

**Information Technology**

**Strategic Plan Update**

**University of Nevada, Reno**

**Reno, NV**

**January 2004**

# Information Technology Division Strategic Plan 2002-2007 Revised January 2004

## Executive Summary

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The information Technology Division is committed to delivering secure, responsive, high-quality, customer-services and support that foster a productive academic and research environment for students, faculty, and staff at the University of Nevada, Reno. This commitment requires the development of customer-focused support systems to meet the needs of today and tomorrow. Our focus is not on technology, itself; the focus is on what technology can deliver through its effective use.

Given that the Information Technology Division is working with an extraordinary number of information technology applications, the Division's over-riding principle is to assure that its programs, services, activities, and implementations are aligned with the strategic directions of the University. This necessarily entails a high level of network performance and computing security.

This plan does not stand alone; it is but one component in a continuum of strategic planning documents that outlines clearly the activities, emphases, and intentions of the Division. This report differs from earlier documents in that this iteration reflects a fundamental change in the University's approach to funding information technology. At the time of the writing of this report, the Information Technology Division is completing its first six months of operation in an atmosphere where there is, for the first time, a sufficiently robust funding base on which to make a notable difference in the IT infrastructure of the campus. By making this adjustment in 2003, the University has moved beyond "random acts of funding." While additional funding will be required for the Division to cover basic services at a high level, let alone cover rising information technology demands and opportunities, the funding IT received this past year is an excellent start to recover from years of sparse funding and neglect.

This document outlines initiatives planned as well as undertaken on the campus, but makes an emphatic point that the University of Nevada, Reno is fundamentally limited in its progress to achieve parity with its peers in the area of basic business operations and services until the University and Community College System confronts problems inherent in its statewide legacy administrative systems.

Some of the areas that will receive specific attention during the next year will be:

- Improving all facets of customer service to campus IT users;
- Increasing meaningful communications to users relating to the range of available IT services;
- Upgrading of major portions of the campus' network infrastructure, including extending wireless network connectivity to at least 20 campus buildings;
- Addressing the growing use and expanded support for information technology-assisted learning environments for faculty and students;
- Expanding the University's current document imaging program in a move towards a less paper intensive environment;
- Increasing support for departmental Web pages;

- Initiating a plan on how to implement a modern integrated campus wide telephone service; and
- Making significant progress to comply with a growing number of largely unfunded federal legal regulatory measures related to information technology and digital recordkeeping.

To make progress in the many areas of IT responsibility requires additional staffing. This is nowhere more evident than in an area of intense University emphasis and activity—the University’s School of Medicine in Reno and Las Vegas. The gap between available support and need is huge. Likewise, the University is in dire need of an electronic records manager as the institution moves to a less-paper environment that requires careful planning and management to meet the requirements of federally mandated regulations related to digital records. Specific IT requests are outlined at the end of this report. Progress on specific projects is noted in a related document, “Status of 2003 Goals and Strategic Initiatives.”

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## **Information Technology Mission and Vision**

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The Information Technology division serves as the principal resource for leadership, advocacy, planning, innovation, day-to-day practical guidance, and support in information and instructional technologies.

Vision for information technology:

*In teaching* -- Information technology will be used to enhance the way education is delivered. Support for the use of technology in the learning process will take two primary directions:

- support for the campus infrastructure that includes essential network resources, equipment, software, and training and technical personnel; and
- encouragement of experimentation with emerging media and modes of learning using information technologies.

*In research* -- Information technology is a critical component in maintaining an environment that enables leading-edge research. The division will provide support for information technology resources as both tools and products in research, within both existing and new disciplines of campus concentration and expertise.

*In service* -- Support for evolving information technologies that assist in carrying out the institution's service mission and to facilitate lifelong learning.

*As an institutional resource* -- Support for institution-wide IT resources to meet the needs for standardized, broad-based access to information as well as for innovative, research-oriented experimentation with leading-edge technologies.

## **IT Division Status – December 2003**

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In 1997, the Northwest Association accrediting report expressed “general and serious concern over computer technology” at the University of Nevada, noting that, “faculty and staff in most parts of the University were largely left on their own for years to acquire needed hardware and software and that instruction, research, and other efforts have suffered.” A parallel concern was “the lack of technical support for computer technology.”

We believe that 2003 will mark a turning point in the history of the University. For the first time since that 1997 report, and, indeed, in the history of the University, information technology, has a budget that begins to address the needs of a growing university with lofty ambitions. As a result of the University Planning Council’s priority setting and the President’s acceptance of those recommendations, IT is no longer dependent almost entirely on random acts of funding. Planning has meaning beyond merely requests for funds.

The University administration fundamentally changed the prevailing institutional philosophy regarding information technology. In funding IT in a meaningful way, a conscious decision was made to treat IT as a strategic asset rather than simply a cost to be avoided or controlled. Fundamental to this change in philosophy was the provision of IT with a budget that could be used to engage in realistic planning to be more efficient by taking advantage of working towards being a true network-centric operation through a common software architecture. Such an approach promises more effective planning, performance, and operations. Spanning applications, operations, and information infrastructures is also the key to reducing IT complexity.

Even though this funding base only emerged in August 2003, detailed planning allowed IT to put the new funding to work. Much of this early work involved upgrading the campus network backbone; more conspicuous progress will be seen as the requisite new staff positions can be filled.

While the IT funding and institutional direction in IT can only be deemed dramatic, it is important to keep in mind that IT is digging out of a very large hole that has permitted long-standing wasteful and overly decentralized IT coordination. We also know, as the President pointed out in his annual address to the University, that additional IT funding will be needed simply to support current operations, let alone, rising information technology demands and opportunities.

The Division’s highest priorities are pointed out elsewhere, but it is important to note that inadequate levels of IT support will continue to exist at spots throughout the campus due to the lack of systems support personnel. While we are hoping to mitigate some of these shortfalls through technology solutions described elsewhere, additional personnel will be needed and will continue to be the highest priority. This priority will be a challenge due to the increasing adoption of IT in almost every facet of the University’s enterprise and the necessity of hiring individuals with specific critical skill sets. Both of these shortfalls are nowhere more evident than in support of the rapidly growing instructional and IT support needs of the University’s School of Medicine in Reno and in Las Vegas.

## **ENVIRONMENTAL CONTEXT for IT**

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The environmental context for IT in higher education is framed in this section along three major themes: aging legacy systems that lack interoperability at a time when modern, mature integrated systems are available, a national IT concern over the challenges posed by securing information systems and networks and demands to comply with numerous laws, regulations, and directives to ensure appropriate levels of security; and the opportunities available through embracing instructional technology across the curriculum.

### **Legacy Administrative Systems**

The one area where the University of Nevada, Reno differs dramatically from its peers in a broad environmental context of institutions of higher education is in the area of enterprise administrative systems. Administrative computing systems on which the University of Nevada, Reno relies presents numerous points of failure, ineffectiveness, as well as missed opportunities. Modern higher education administrative systems were developed to perform much more than transaction-based operations. Their various applications are tightly integrated to provide insight into the operations across the enterprise and to be critical tools to assist in the planning efforts of the institution. Typically, primary components of such systems consist of modules covering human resources, financial, and student information. This integrated approach to administrative functions is essential in an age in which strategic planning has placed demands on a solid, usable source of data. These data are required to be used in institutional assessment not only by the institution itself, but also by a variety of entities ranging from accrediting bodies to state government.

Modern administrative systems also provide the capability to deal with electronic commerce and to offer business transactions and processes in a network-centric environment. This includes a centrally coordinated uniform interface that provides a wide variety of integrated online Web services for such functions as admissions and payment of application fees; payment of tuition and student bills; purchase of books, computers, software, etc., online; business-to-business electronic procurement; hazardous materials tracking; electronic processing of accounts payable invoices; EFT; direct deposit of payroll and travel reimbursement; multifaceted one-card systems; electronic reporting of grades and ordering of transcripts; and records management and imaging to move to a less paper-intensive campus environment.

As important as these functions are to a modern campus, perhaps the most dynamic advances are occurring in the area of student services. Mature, integrated higher education administrative systems tightly link student information with the institution's strategic academic and economic objectives in areas such as student retention, recruitment, and graduation rates; enrollment management; resource management; revenue generation; academic planning; marketing; as well as performance assessment at the student and institutional level.

Student oriented Web services also are readily available and provide numerous opportunities for self-help interactions and communications in newer, integrated systems.

Routine services are easier and made available electronically at any time and at any place without intermediation of student services staff.

Due to the centralization of core administrative software at System Computing Services (SCS) of the University and Community College System of Nevada, the University of Nevada, Reno is in a peculiar position regarding administrative computing. The University may be the only land grant institution that does not have its own campus administrative systems or have access to a modern integrated, centralized system based on relational database technology. This lack of capability is a major impediment to creating a responsive administrative IT service environment on campus.

Numerous efforts have been made to change the status quo. Consultants have come and gone and their recommendations have been dismissed due to resistance to change as well as the initial cost of replacement of increasingly fragile systems. SCS's existing systems, operated and maintained for system-wide use, are rigid, have a steep learning curve, lack essential functions, are stand alone and defy critical integration. Clearly, these systems put the University at an increasingly competitive disadvantage.

Through the building of campus data warehouses for each of these functional areas, the University of Nevada, Reno has blunted the green screen plague of these aging, inflexible systems. However, there is a limit to what the University can do within a data warehouse environment to overcome administrative systems that lack the basic, let alone advanced, capabilities of modern enterprise systems installed at peer institutions. Moreover, the present funding of administrative systems at System Computing Services also means that funds that might come to the campus will always be hard to obtain for local administrative systems initiatives due to the belief that funding the System's needs for administrative computing are satisfied via the mainframe operations at SCS. At present, the University is working through and around SCS for administrative computing; finesse is the main tactic, but the age and inflexibility of the legacy systems are making this more difficult with each passing year.

#### Shortfall of SCS Administrative Systems

The organizational issue is in many respects secondary to the patchwork of SCS-operated systems, purchased on the cheap without a clearly defined strategic vision. The cost to rectify this situation on a statewide basis has traditionally been considered prohibitive. As a result, incremental efforts at upgrading existing systems have been undertaken and the commitment to existing vendors with a decreasing user base is almost unshakeable. Moreover, internal, exhaustive efforts to write code to make these systems functional is extraordinarily expensive and can, in no way, compensate for the dramatic advantages offered by modern integrated administrative systems.

The legacy nature of the administrative systems requires massive mainframe architecture and there is no opportunity to scale down the architecture to reduce costs. The current SCS administrative systems and vendors are: Student Information System (SIS) [Informs], Financial (Advantage) [American Management Systems], and Human Resources (HR) [Integral]. These are *old* systems, from the age of green screens and before. These three vendors are in various stages of moving to new versions that are "Web-enabled." Regardless, this is too little too late in

light of the mature integrated applications that now dominate the higher education administrative software market and does not solve the basic functionality shortfalls of such disparate and aging systems.

### Today's Higher Education Administrative Software Marketplace

Modern higher education administrative software reached relative maturity by the end of the century. Leading systems today incorporate “best-practice” solutions in the major business modules (personnel, financial reporting, and student administration). The earlier tendency to purchase best-of-breed functional units from different vendors has given way to the purchase of highly integrated systems from such firms as Oracle, PeopleSoft, or SCT (Banner). These systems are several generations ahead of what SCS is currently using in that the modern systems embed a solid enterprise-wide strategy through a robust database that supports open standards and a plethora of development tools. Modern higher education administrative software systems have fleshed out their fundamental modules and are actively partnering with other established vendors to provide integrated solutions to enhance Web services such as electronic purchasing, portals, and course management software such as those represented by Web-CT.

In short, advances in administrative computing support and Web services will continue to be difficult to accomplish at the University. We will trail peer institutions as long as the UCCSN maintains its present course. Individual components added by the campuses to administrative systems will require additional and expensive efforts to integrate into SCS systems or even to campus data warehouses.

### **Security and Compliance**

Increasingly, the environmental context for IT on campus grows closer to the broader international context of IT, regardless of sector. Beyond basic funding, the overriding national concern across all manner of IT operations is the present and emerging directives, regulations, and statutory compliance issues. Ten years ago, when IT was not recognized as being so pervasive in everyday life, these issues were all but non-existent in national political discourse and were of far less concern to IT operations. Prior to the turn of the century, however, the seeds of discord were planted in such areas as fundamental economic/property rights in a digital era and individual privacy concerns. These initial concerns grew rapidly in the post-9/11 era when matters of national security kindled latent concerns about privacy, and corporate misdeeds brought increased national attention to digital recordkeeping.

Consequently, the environmental context in which University IT functions must now deal relates directly to the regulation of unwanted commercial email, elimination of any extraneous uses of Social Security Numbers (SSNs) as primary identifiers, illegitimate uses of peer-to-peer file sharing technologies, intellectual property rights, privacy, and an assortment of federal legislation and regulatory matters that are only partially encompassed in the U.S.A. PATRIOT Act, the Gramm-Leach-Bliley Act of 1999 (GLB), the Health Insurance Portability and Accountability Act of 1996 (HIPAA), the Student and Exchange Visitors Information System (SEVIS), and the Digital Millennium Copyright Act. These and additional directives, combined with growing U.S. government sentiment that higher education computer activities are inherently insecure, all need to be evaluated in light of the principles of academic freedom fundamental to the University environment. Ultimately, these issues, in tandem with persistent and increasingly

virulent outside attacks on University networks and systems require that the University have its IT infrastructure as secure as possible.

### **Instructional Technology Adoption**

Another area of national concern and one that we, in IT, recognize as being of increasing importance to the University of Nevada, Reno is the growth of information technology to enhance the instructional experience. Nationally, and even locally, integration of IT into classroom and extra-classroom activities has reached critical mass. This environment is undergoing constant change that is supporting new pedagogical approaches and creating new forms of learning communities. Moreover, student enthusiasm to access educational opportunities at a place and time of their choosing is unmistakable.

For faculty, this means retooling, but it also means that faculty can be more effective through a customized and flexible learning environment to meet the needs of increasingly diverse student groups. These changes all demand critical evaluation from academic affairs on the campus. To succeed, such changes require ongoing investment in enabling services that include tools and support staff capable of facilitating the development of courses as well as numerous and well-maintained “smart classrooms.”

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## **Fundamental Assumptions and Directions**

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- Customer needs and the institution's mission and goals will be the central drivers of all organizational improvement efforts.
- All IT decisions will take fully into account the impact on clientele. All IT services must be as easy as practically possible to understand and use.
- The University views information and technology as strategic resources, supporting and safeguarding them as critical assets.
- All University personnel must understand their roles and responsibilities with regard to data, including the access, use, acquisition, and validation of data. Users are responsible for ensuring the appropriate use of data. Data custodians are responsible for ensuring appropriate access to data.
- Policies and procedures will be established with an understanding that the institution's basic values must be respected (e.g., academic freedom, presumption of privacy). Policies will be developed with an awareness of an evolving framework of state and federal law and regulations (e.g., FERPA, HIPAA, USA PATRIOT Act, rapidly changing intellectual property laws). The University will comply with federal mandates that call for ensuring reasonable accommodation for disabled students.
- The University must establish a centrally managed funding mechanism for life-cycle replacement of each category of computing equipment, either building technology replacement and maintenance costs into the base budget or finding alternative methods of funding (e.g., overhead from grants and contracts, student fees). Replacement cycles for standard desktop computers, computers in labs, instructional equipment (e.g., projection units, computers in classrooms), centrally managed servers, and other categories of IT equipment have been recommended and are reflected in IT budget projections.
- Basic and widely used IT core services can most effectively be provided centrally (e.g., email, Web services, institutional information systems), with specialized academic and research computing supported at the unit level by department personnel and IT division systems administrators. In addition to reducing costs, centralizing IT services under the management of professional systems administrators improves overall network and computing security.
- All core IT servers must be fully redundant for maximum availability and reliability.
- Centralized management and support of desktop computing, particularly for administrative units, will provide better service, efficiency, and economy of scale.
- Establishing purchasing standards for computing equipment and software is essential. Increased standardization will improve functionality and reduce costs.
- IT services will be as transparent as possible to users, so that users will not be required to understand the IT organization in order to gain access to services. Points of access for Information Technology assistance will be kept to a minimum.
- Business and administrative processes must be migrated to integrated systems that enable users to conduct transactions easily. Goals include eliminating duplicate data entry and moving towards a less paper-intensive environment for standard University processes.
- Staff and budget resources available to IT will be reallocated on an ongoing basis to meet the highest priority needs.
- The demands for information technology funding and services will exceed the institution's ability to respond.

- Planning for IT is ongoing, as befits a dynamic organization striving to respond appropriately to changing institutional needs, priorities, and processes an ever-changing environment.

## Strategic Initiatives 2002-2007

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Target dates (calendar year) and responsible IT units are noted for each initiative. Budget and staffing requirements are noted if not covered by current funding. These initiatives drive role statements and corresponding performance expectations of staff members throughout the IT organization.

Abbreviations for IT units:

CC	Campus Computing
CIS	Campus Information Systems
NetCom	Network Communications
PPP	Process & Performance Planning
TLT	Teaching & Learning Technologies
VPIT	Vice President for Information Technology
Webmaster	Campus Webmaster

Each IT manager will develop detailed implementation plans and timelines for each of the initiatives for which they are responsible. Implementation plans will be incorporated into IT unit and individual staff work plans. Performance expectations of individual staff members throughout the IT organization will be measured against progress made toward reaching or exceeding the initiatives.

### Improve IT Customer Service

*The Information Technology Division is in a position to offer improved services to our primary clientele. Our number one goal is to provide outstanding customer service. IT staff possess a wide variety of skills and expertise to assist the campus community's need to utilize current and future technologies. Our challenge is to ensure that faculty, staff, and students understand the full range of services that are offered, and understand how to gain access to those services. Now that basic services have been established, it is imperative that the quality of services be enhanced to meet and exceed the expectations of our clientele. We must instill in all IT staff the attitude that customer service is our number one priority. Customer service is not a strategy; it is a way of doing business.*

- ***Improve communication with faculty, staff, and students about IT services and about IT-related topics.***
  - Hire a Technical Communication Specialist (search underway). Responsibilities of the position are (1) managing and disseminating training materials and reference documentation for support personnel and for end-users and (2) creating Web-based documentation for operating system platforms and for topics such as virus protection, troubleshooting, desktop applications, mail clients, web development, and administrative computer applications. This new IT staff member will also create and present workshops for computer-related technical information for technical and non-technical faculty, staff, and students. [2004; VPIT]
  - Redesign the IT Web site(s). Hire a professional information architect to evaluate the current mix of IT Web sites and design a structure that will consolidate the present sites into one cohesive, well organized, and usable site. [2004; VPIT; \$25,000 est.]

- Actively promote IT services through effective communication with all campus constituents. Utilize a variety of approaches, including updated Web pages, presentations to new faculty and teaching assistants, and updated printed literature. [Ongoing; all IT units]
- **Consolidate the primary points of contact for accessing IT services.** Users should not be required to understand the IT organization in order to gain access to services. At present, users must call the Computing Help Desk, the main service desk in Teaching & Learning Technologies, the Webmaster, the Campus Information Systems department, Process & Performance Planning, or Telecom Services, depending on their perceived need as to the area in which they need assistance. Given the increasingly integrated nature of the various IT services, it is increasingly difficult for the end user to discern the nature of the assistance they may need. Many users call specific IT personnel who have given them good service in the past.
  - Examine the feasibility of centralizing the support desk functions for some or all IT units into the Campus Computing support center(s). All points of contact will be evaluated with the goal of simplifying access to IT services for users. [2004; all IT directors]
  - Create an IT culture where staff accept ownership of problems and service requests and are personally accountable for following through with each problem until a resolution is reached. [Ongoing; all IT managers]
  - Create a strategy for moving the Help Desk and the library Information Desk closer together, both physically and functionally. Achieve this consolidation in the next few years, before the move into the new Knowledge Center. [2004-2006; CC, Library]
- **Create focused support services for faculty/staff and students.** Examine the role of the current Help Desk and develop a strategy to provide focused support services for faculty and staff, distinct from the services provided for students. [2004; CC]
  - Escalate support calls based on Service Level Agreements that are established with colleges and departments. [2004-2005; CC]
  - Integrate network service requests (upgrades, repairs, and network troubleshooting) into the faculty/staff support center. [2004; CC, NetCom]
  - Evaluate the incident tracking system(s) that are currently in place. Select a single system to unify tracking for all IT service requests and work orders. Tracking will be implemented on each piece of equipment installed or repaired, including inventory and software tracking, virus and operating system/software level, and automatic update implementation. [2004; CC, NetCom, TLT, CIS]
  - Develop a system for clients to place service requests via a secure Web form. Integrate these service requests into the call tracking/work order system. [2004; CIS]
- **Centralize support of faculty/staff desktop computing.** In 2003, progress has been made in shifting responsibility for routine desktop support from systems administrators to Desktop Services. Desktop Services has hired 2.5 FTE classified positions for the technician pool, and an additional 3.0 professional positions are expected to be hired by early 2004. These positions will be the core of ongoing administrative desktop support, and are also expected to play an increasing role in desktop support for faculty. Policies are now in place that enable desktop computer support for non-hardware and on-warranty issues at no charge to the user, removing the financial burden from departments and encouraging the use of centralized desktop support. [2004-2006; CC]

- **Improve support for college and departmental computing.**
  - As Desktop Services expands the scope of centralized desktop support, and as service levels are consistently met, the roles of the Systems Administrators will shift towards dedicated server management and more involvement in strategic project management in departments and colleges. Colleges and departments are seeking to develop a wide variety of computer systems and applications. Often these locally developed applications can present an unacceptable network security risk; database applications may contain personal student data and other sensitive information that are not properly secured. Systems administrators will provide direction on solutions for departmental needs, working with programmer analyst staff in Campus Information Systems who will develop custom solutions, as needed. [2004-2006; CC, CIS]
  - Develop and implement a master Service Level Agreement that will serve most departments. Make exceptions, when necessary, to accommodate special service requirements. [2004-2005; CC]
- **Evaluate and improve support provided to underserved areas on and off campus.**
  - Identify and prioritize the IT support needs for under-served areas. Examples of these are evening/weekend classes and special events (on-campus) and Nelson building and Valley Road occupants (off-campus). [2004-2005; CC, NetCom, TLT]
  - Develop strategies to provide improved technology support for special segments of the University, including the Medical School (north and south), Cooperative Extension (statewide), and Extended Studies. It is estimated that to deal with the high growth area of the Medical School and its highly IT-intensive instruction as well as its basic research would require four additional positions, including one position to serve as a coordinator of the Medical School. [2004-2005; VPIT, CC, NetCom, TLT]
  - Develop a support plan for the Redfield campus. The first Redfield building is scheduled to open next year. Formulate a plan for support of the network, telephones, desktop computers, classroom technology, and computer labs. [2004; CC, NetCom, TLT; requires additional funding and positions]

**Implement strategies to ensure a high level of network and computing security.**

*It is imperative that Information Technology develop and enforce a broad spectrum of security measures to protect data integrity and proprietary resources and to prevent abuse of University computing resources.*

- **Ensure that critical operating system and application updates are regularly installed on all desktop computers.**
  - IT is purchasing a remote desktop management application (LanDeskPro) that will be installed on all administrative faculty/staff PCs and on new PCs purchased beginning January 2004. LanDeskPro will enable centralized management of all included workstations, allowing IT staff to install remotely updates of virus applications as well as operating system and application updates. [2004; CC]
  - Beginning in 2004, IT is funding a Microsoft Campus Agreement for all PCs on campus, so lack of departmental operating funds for upgrading basic software will no longer be an issue. The MS Campus Agreement covers Windows Operating Systems and Microsoft Office. Whenever possible, workstations will be upgraded to Windows 2000 or Windows XP Professional. Supporting only two major variants of the

Windows Operating System will simplify management and maintenance and improve security. [Ongoing; CC]

- ***Establish secure authentication for all computing and network services.*** The foundation of basic security is a fully functioning authentication system (Microsoft Active Directory).
  - Continue to deploy Microsoft Active Directory to provide secure authentication for all IT services. [Ongoing; NetCom, CIS]
  - Ensure that authentication is adequate on all computing services on all platforms (e.g., UNIX, Windows, Netware, Macintosh), including desktop PCs. Establish policies and guidelines for secure authentication on all devices attached to the campus network. [Ongoing; NetCom, CC; requires portion of one additional NetCom position].
- ***Register all network-based services.*** A process has begun to register all network-based services on campus (e.g., Web servers, email servers, FTP servers). The goal is to register all services by the end of 2004. [2004; NetCom]
- ***Adopt effective practices for secure server management.*** The NIST (National Institute of Standards and Technology) has issued Special Publication 800-37, *Guidelines for the Security Certification and Accreditation of Federal Information Technology Systems*. Guideline 800-37 establishes standard processes (depending on the sensitivity and exposure of the system) to verify the correctness and effectiveness of security controls to ensure adequate security. The University will adopt similar guidelines and will conduct security evaluations as are determined to be appropriate for an academic institution. [2004-2007; NetCom; requires portion of one additional NetCom position]
- ***Begin regular auditing of vulnerable systems, patch levels, and anti-virus compliance*** across campus. NetCom will work with regional systems administrators to develop plans to address existing problems and prevent future issues. [2004; NetCom]
- ***Develop a training/certification program to ensure a minimal level of competence for all server administrators,*** including faculty, staff, and students outside of IT who administer servers.
  - A one-time plan for Microsoft training for IT systems administrators has been approved. This training covers the Windows XP and Server 2003 coursework as approved by Microsoft. It includes eight courses to be delivered on-campus by a certified Microsoft Training Professional. The core plan provides funding for the academic Systems Administrators and there are provisions for making the plan available to IT and non-IT Administrators. [2003-2004; CC]
  - Explore strategies for offering training to systems administrators in other divisions. [2004-2005; CC]
- ***Develop additional strategies for virus threat management.***
  - Purchase a campus-wide license for a new virus protection software (Norton Antivirus), including licensing for faculty and staff personal use and student use. [2004; CC]
  - Explore the possibility of restricting access to the network for computers that are not running current versions of the campus-provided anti-virus software. [2004; NetCom, CC, CIS]
  - Ensure that all incoming mail on all campus email servers is scanned for viruses. [2004; CC]

- **Support secure network transactions.** Continue to work on better authentication methods such as smart cards and biometric authentication. Enhance the PKI infrastructure to allow for smart cards and digital signatures. Standardize on Kerberos-based authentication for all IT systems. Begin to investigate Kerberos relationships to non-IT supported systems such as those in Computer Science and System Computing Services (SCS). [2004-2006; NetCom]
- **Begin deployment of internal firewalls.** Provide protected zones within the University network that can be used to secure desktops and any resources from both external and internal threats. [2004-2006; NetCom]
- **Develop a written network and computing security plan.** [2004; NetCom, VPIT]
- **Develop a written disaster recovery plan.** [Ongoing; all IT directors]

### **Strengthen and expand IT core services.**

*As robust and effective core services are made available, encourage faculty and staff to utilize these services so that departments are not supporting duplicative services.*

- **Strengthen campus Web services.** The University Web site and college and departmental Web sites are essential as portals to information resources and services that are critical to student success, student recruitment, and faculty and staff productivity. Minimal institutional resources have been made available to support campus Web developers and Web servers. Increasing the support for Web services at every level of the institution is essential.
  - Upgrade the main University Web server and related servers and establish life-cycle funding. The main University Web site and many departmental sites are hosted on a clustered group of servers that are due for replacement (out of warranty) in FY 2004 and FY 2005. Additional servers must be added to provide redundancy. [2004-2005; CIS]
  - Establish a committee representing a cross-section of campus computer users to assess Web service needs. [2004; Webmaster]
  - Develop enhanced Web services for faculty and staff. Based on recommendations of the committee (above), assess the feasibility of implementing services such as PHP, MySQL, MS IIS with ASP, .NET, and Cold Fusion. [2004-2006; Webmaster, CIS; additional funding required]
  - Develop a secure database service. At this time, IT does not have the personnel or servers required to support the storage of sensitive data gathered via the Web. There is a widespread need for this service to support research as well as institutional information. For example, a major project undertaken by the Office of University Assessment requires the ability to conduct surveys and data gathering via the Web with secure data storage. Develop a form generation application that allows users to generate Web forms to collect survey research data. [2004-2006; CIS, Webmaster; additional funding required]
  - Encourage colleges and departments to use centralized Web services rather than managing Web servers at the unit level. This will eliminate unnecessary and costly duplication of services that needlessly complicates the user environment and compromises network security. [Ongoing; Webmaster]
  - Simplify content management by encouraging broader use of Macromedia Contribute. Following a year-long pilot project to evaluate Macromedia Contribute, a methodology has been created to design and deploy template-based Web sites for individual departments. A Web design position has been established to begin

- improving individual Web sites across campus using this methodology. Begin applying this methodology to departmental Web sites and continue researching other tools for maintaining Web content. [Ongoing; Webmaster]
  - Build and maintain Web sites that are accessible to people with disabilities. This is an evolving need dependent on legal and regulatory exigencies. Continue monitoring the applicability of Section 508 and ADA to the University's Web presence. Strengthen accessibility policy and training in this area. [Ongoing; Webmaster]
- ***Improve centralized UNIX-based email services for faculty and staff.***
  - Place two new redundant email servers into production using the new SAN backend. Plan a phased migration of users to the new email system. [2004; CIS]
  - Implement an optional spam filtering service for all incoming campus email. [2004; CC]
  - Upgrade WebMail software. [2004; CC]
  - Provide Web-based management of all email lists. A new server will be provided for all list services formerly housed on Equinox. [2004; CC]
- ***Expand Microsoft Exchange services and retire Lotus Notes.*** MS Exchange is the system that has been selected for users who require shared calendaring, personal productivity tools, and collaboration tools that cannot be supported on UNIX email. The current Exchange server will be retired and replaced with four new servers to provide redundant front-end and back-end services. The SAN will be used for back-end storage. The new servers will provide capacity for additional administrative users, eliminating the need for Lotus Notes. The goal is to expand the availability of centrally provided MS Exchange services to support 750 users, making it unnecessary for departments to run their own mail servers. [2004-2005; CIS]
- ***Make progress towards "single sign-on" using the NetID for all networked services.*** The goal is to develop a "single sign-on" for all computing services on campus, eliminating the need for a user to remember multiple logins and passwords. Active Directory accounts (called NetID accounts) have been created for all students, faculty, and staff. Active Directory is being used for secure authentication of selected Library and IT-provided services. CAIS / SIS currently utilizes the NetID for authentication for Class Rosters, NACElink uses the NetID for students who are looking for outside employment.
  - Work with the E-purchasing vendor to utilize the NetID for authentication. [2004; CIS]
  - Use the NetID for authentication for remote use of the library's licensed information resources. [2004; Library]
  - Make plans to scale the system to meet the needs of all IT services and to provide authentication and authorization services to other campus departments. A special task force will examine the utilization of SIS and HR data to develop a comprehensive information base for authentication and authorization of services. [2004-2006; NetCom, CIS; requires part of an IT Programmer Analyst position]
  - Implement password "self help" so that faculty, staff, and students can change passwords on their own or be provided prompts for forgotten passwords. [2004; CC]
- ***Ensure that faculty and staff can securely access computing and information services from off-campus.*** Access to computing resources from off-campus must be controlled due to security and licensing concerns. Simultaneously improve security and usability of remote access services.

- Test remote access solutions to determine the best solution for various services. VPN (virtual private network) may be the best solution for some users' needs. Evaluate alternatives to traditional VPN such as SSL-VPN. Test a NetScreen secure access solution for accessing licensed library resources. [2004; NetCom, Library]
- Investigate secure file access methods such as WebDAV over SSL, Web-based messaging over SSL connections, or any technology that makes access to resources easier for the user while minimizing internal support requirements. [2004-2005; NetCom, CC]
- ***Increase students' access to computers.***
  - Expand student access to full-productivity computers by converting NEON workstations in the libraries from browser-based to full-function computers. [2004; Libraries]
  - Evaluate the use of the JTSU computer lab. Consider providing laptops with wireless cards for checkout to students as an alternative to the JTSU computer lab. [2004; TLT, CC]
  - Increase the number of laptops with wireless cards available for checkout to students. [2004-2005; TLT]
  - Coordinate activities and directions with departmental lab managers. Work with lab managers to adopt best practices for secure server and workstation management. Encourage departments to use the campus-wide authentication system to control access to lab computers. [2004-2005; CC]
  - Provide support for departmental computer lab equipment through the Technology Fee. Consider providing additional support for departmental labs that are open to all students. [2004-2005; CC]
  - Explore partnerships with Dell that would encourage the purchase of standard configurations of laptops for incoming students. [2004-2005; CC]
- ***Implement Network-based Storage.*** Network-based storage (SAN), to be installed in 2004, will provide significant benefits for users – rapid recovery from failed disks, large amounts of disk space for central file storage, expandable storage space to provide for growth in storage needs, adequate disk space for increasing quotas on email and Web accounts, with resources usable by multiple operating systems. The implementation of a SAN is assumed to be a prerequisite for improving all core IT services. [2003-2004; CIS]
  - Determine who will provide oversight for allocation of SAN resources and who will provide technical support and operational support. [2004; CC, CIS]
- ***Create a backup plan for all core servers.*** Use the SAN for backup. However, the amount of data to be backed up may mean that backups will need to be stored daily on hard disks to meet time and network bandwidth restrictions – storage purchases will need to be sufficient to accommodate this need. Devise a method for storing archived backups off-site – either in other buildings on campus or, preferably, off-campus. [2004; CC, CIS]

**Serve as a partner in creating a technology-assisted learning environment for students and faculty.**

- ***Define online learning in the context of the University's overall instructional programs.*** The TLT Instructional Design group will take the lead in working with instructional faculty and other appropriate groups and individuals to articulate the University's approach to online education. This effort will be coordinated among TLT, the Provost's Office, Extended

Studies, Campus Computing, Admissions & Records, and Planning, Budget and Analysis. Determine how increasing the use of online learning for entire courses, hybrid courses, and blended courses, affects the University's budget, facilities, and human resource allocations. [2004-2006; TLT, CC, CIS, VPIT]

- ***Partner with faculty to integrate technology into the curriculum.*** Encourage and support faculty to further integrate learning technologies into teaching activities. Develop a campus culture that rewards faculty who are willing to learn to do things differently. Work with faculty to understand the faculty's instructional technology support needs. [Ongoing; TLT, PPP]
  - Work cooperatively with the Excellence in Teaching Program, the Libraries, Campus Computing, Process and Performance Planning, and the Assessment Office to develop programs for integrating instructional technology and online learning into classroom instruction. [Ongoing; TLT, PPP, CC, Libraries]
  - Develop a mentoring program for instructional faculty. Recruit a group of faculty with exemplary instructional skills to mentor other faculty, LOAs, and teaching assistants. Coordinate the project with TLT's Instructional Design group, the Excellence in Teaching Program, and the Office of Assessment. [2004-2005; TLT]
- ***Increase support for faculty using WebCT (course management software).*** WebCT is having a significant impact on the way instruction is delivered to students. At present, over 7,000 students have WebCT accounts, representing 250 courses with nearly 450 sections. Many faculty members need support to incorporate course management software into existing courses. Increase the number of full-time TLT faculty and LOA staff members who support faculty in using WebCT. [2004-2006; TLT; additional positions required]
- ***Develop means of assessing the effectiveness of online learning.***
  - Provide support to the Provost's Office in compiling and analyzing information from student evaluations to assess the overall effectiveness of using technology to deliver course content. [Ongoing; TLT]
  - To the extent that outsourcing evaluative or assessment processes can be achieved, explore these alternatives (i.e. the Flashlight program). [2004-2005; TLT]
- ***Implement strategies for helping students to succeed in online learning and research.***
  - Develop tutorials to familiarize students with WebCT protocols and procedures. [2004; TLT, CC]
  - Create online tutorials to assist students in using online information resources made available through the Libraries. Explore other means of assisting students and encouraging them to use these valuable resources. [2004-2005; Libraries]
- ***Expand support for classroom instructional technology.***
  - Assign staff to cover expanded hours during evenings and weekends. Complete the hiring for a new AV Technician II and explore the possibility of utilizing trained students for classroom support. [2004; TLT; funding required for Audiovisual Technician or student assistants]
  - Develop distributed storage locations (closets) for portable audiovisual equipment. The greatest challenge is to identify appropriate space in locations in close proximity to instructional spaces. [2004-2006; TLT]
  - Update and/or replace classroom instructional technology on a 3-to-5-year cycle, depending on type of technology. Funding has been identified for life-cycle replacement of equipment in existing level 4 and level 5 classrooms. Identify a stable

- funding source to support technology replacement in other types of instructional spaces. The issue of funding was addressed in the Space Utilization Technology Subcommittee's report of February 10, 2003 to the Provost. Whether the replacement cycle funding becomes part of the base-budget formula or is accomplished via increased student fees, the cost of maintaining our current levels of instructional technology needs to be resolved. [2004-2006; TLT, VPIT]
- ***Develop strategies for supporting student and faculty use of information in digital formats.***
    - Develop a coordinated program of services to support students and faculty in using digital images and streaming media for instructional purposes. As positions become available through retirement or attrition, consider creating a position either in TLT or the Library that focuses on content delivery of digital resources. [2004-2006; TLT; Libraries]
    - Design, develop, and support facilities where faculty, staff, and students can create digital multimedia projects. A small Dynamic Media Lab is currently being developed on Level 2 of Getchell Library, near the Multimedia Center. Initial staffing will be done by student assistants. Planning is also underway for an expanded facility in the Knowledge Center, estimated to open in 2007. Expanded services will require additional permanent staffing. [2004-2007; TLT]
    - Develop and support multimedia, interactive instructional tools. Provide a central resource for computer-based media, digital photography, and video production. Integrate digital media elements into authored multimedia products for classroom as well as distance education applications. [2004-2006; TLT]

**Serve as a partner in building a University information environment that provides appropriate access to accurate and timely institutional information.**

- ***Continue to develop a University data repository*** that is integrated, accessible (as appropriate) and easy to use for staff, faculty, and administrators.
  - In 2003, CIS provided class rosters via CAIS, using NetID authentication. The student information portion of the data warehouse is now 80% complete. Evaluate the balance of student data to see if there is any functional use for the information. Release CAIS SIS functions into production in the March – June 2004 timeframe. [2004; CIS]
  - Store more information in the data warehouse, provide improved user access to the warehouse for ad-hoc queries, and determine and implement additional functions in CAIS. [Ongoing; CIS]
- ***Work with Purchasing to acquire, implement, and integrate an electronic purchasing system.***
  - Test the interface between the selected E-purchasing system and Advantage. The Purchasing Department has been using the system for credit card purchases for the month of November 2003 and will start testing with outside users in December. [2004; CIS]
  - Prepare for a campus-wide rollout for spring semester 2004. [2004; CIS]
- ***Examine data integrity and information assurance in database records for students, faculty, and staff.*** Find a way to acquire, update, and ensure complete and accurate information for all University affiliates. This data is essential for directory services, for

authentication on the network, and for authorization to use the University's network and computing resources. [2004; NetCom, CIS]

- ***Determine the best strategy for providing access to degree audit data.*** Students need ready access to their records to assess their progress towards graduation; faculty need up-to-date and accurate information to use in advising students. Work with the Student Services division to solve this problem. [2004;VPIT]
- ***Establish a common environment for document imaging projects*** that are housed in various areas of campus. CIS supports the Nolij document imaging system. CIS hosts the database and security for document imaging and assists departments with initial setup. Accounts Payable/Travel was converted to a custom document imaging system on July 1, 2003. All documents utilized in Accounts Payable/Travel are imaged. The images became viewable in CAIS in early November. Purchasing card documents became available in October. Document imaging will spread to other departments and administrative units. Enhancements are needed in the areas of USAC, Graduate School, and the Controller's Office. Human Resources, Police, and the Provost's Office are looking at document imaging applications. Currently, some colleges are using document imaging to process graduate applications. One of the open programmer/analyst positions in CIS will be dedicated to document imaging support. [Ongoing; CIS]
- ***Develop a strategy for implementing online forms, campus wide*** (2004; CIS).
  - Implement an electronic forms trial (2004: CIS)
- ***Participate in developing a strategy for managing digital institutional records.*** The management of digital records on campus is a challenge that will require collaboration among many organizational units. An electronic records specialist position should be developed; the position could be affiliated with University Archives or with an administrative or IT unit. [2004-2006; VPIT]
- ***Improve functionality of the online campus directory to the point that it will be the authoritative source for directory information.*** Add the "general listings" section of the printed directory to the online directory. Permit corrections to the directory to be submitted online. Either eliminate the printed directory or enable production of all sections of the printed directory from the online database with limited editing. [2004; NetCom, CIS]
- ***Participate in evaluation of one-card systems.*** [2004; CIS]

**Implement strategies to maximize faculty and staff use of technology while minimizing the need for user support.**

- ***Establish a mechanism for central coordination of information technology training.*** At present, information technology training is scattered among various units within IT: Process & Performance Planning, Teaching & Learning Technologies, Webmaster, Campus Computing, and Telecom Services. Other units on campus also have a role in information technology training: Excellence in Teaching Program, Human Resources, Controller's Office (administrative systems training), Office of Assessment, Admissions and Records Office, Scheduling Office, Graduate Student Instructional Design (GSID). Collaborate with all stakeholders (including the Provost and the Interim Vice President for Finance and Administration) to define the roles and responsibilities of each of these organizational units and explore synergies with other training topics of interest across division lines [2004; VPIT, PPP, TLT, CC, Webmaster]

- **Create a searchable knowledge base** with a Web interface, enabling customers to find answers for common IT questions and to check on status of service requests. [2004; CC]
- **Explore the feasibility of developing a set of basic technical competencies that are required for various categories of faculty and staff.** Work with Human Resources and with existing faculty and staff organizations to assess the general level of support for this initiative. Determine whether meeting a minimum skill level would be mandatory or optional. [2004-2006; CC, VPIT]
- **Phase out FrontPage training and develop training in support of Macromedia Contribute.** The Campus Webmaster currently teaches regular classes on Microsoft FrontPage. While many campus Web publishers use FrontPage, its sophistication is beyond the level that can be handled by many charged with maintaining university Web sites. [2004-2005; PPP, Webmaster]

### **Support Research and Advanced Computing Applications.**

- **Support the management of large datasets used in research.** The Libraries have formed a new service unit called DataWorks to support the management of large datasets and to provide an advanced academic computing environment for research and instruction. Currently DataWorks provides a four terabyte redundant distributed storage system for large dataset storage.
  - Continue to support and expand storage capacity to accommodate new projects. [2004-2007; Libraries; funded from Technology Fee]
- **Support advanced visualization, modeling, data analysis and computer mathematics applications.** DataWorks provides a sophisticated thin client-server computing environment that allows users to run advanced applications. Users connect to these applications hosted on a cluster of Microsoft Windows 2000 servers using a simple Web browser as an interface. This environment provides a powerful and cost effective platform for providing access to a wide variety of sophisticated and high cost applications that are used by many different disciplines.
  - DataWorks systems are currently supporting the research work of a number of faculty and graduate students. What is currently needed is additional knowledgeable staff to provide consultation to users regarding the use of these advanced applications. At least two graduate assistants are required, one with experience in geographic information systems(probably coming from a geography or geosciences background) and one versed in data analysis and visualization (probably from mathematics, physical sciences or engineering). Adding this additional staff would allow users to derive maximum benefit from advanced, valuable, and unique computing infrastructure. [2004-2007; Libraries; funding for two graduate assistants]
- **Expand and enhance the DataWorks computer lab.** DataWorks maintains a lab of high-end workstations for data analysis and visualization, located in Getchell Library. The lab workstations provide users with a dedicated platform for particularly resource intensive analysis, visualization, and graphics tasks.
  - Expand the size of the DataWorks lab. Planning is underway for remodeling and additional workstations. [2004; Libraries]
- **Support collaboration via the Internet.** Collaboration among researchers and collaboration for instructional purposes is becoming increasingly important in higher education.
  - Improve videoconferencing facilities. Investigate funding alternatives for replacing current technology with H323-based equipment. Priorities for providing facilities

- using the H323 standard are for support of the proposed cooperative Ph.D. program in Nursing and the graduate program in Supply Chain Management. [2004-2006; TLT, NetCom]
- Finish Access Grid Node projects for ACES and BRIN. Identify additional spaces suitable for Access Grid Nodes. To make the Access Grid Nodes fully operational, a portion of at least one systems administrator will be needed to manage the equipment and software, train users of the system, work with NetCom staff to configure the network to support high quality network video, and troubleshoot operational problems between campus Grid Nodes and other Access Grid Nodes. [2004-2005; NetCom, TLT]
  - Purchase and support collaboration software that meets the needs of faculty and administrators. Consider software such as Xythos. [2004; CC]
  - **Evaluate the need for advanced consulting and information services for members of the campus community.** Perform assessment to determine the interest in advanced consulting services. Coordinate with staff in DataWorks (University Libraries), who are already offering advanced consulting in several areas. [2004; CC, Library]
  - **Plan for server space to accommodate research server clusters.** Existing server rooms for research server clusters (e.g., Beowulf cluster, Cortex cluster) have environmental requirements that are not being satisfied. Serious problems with servers have occurred because of insufficient temperature control and lack of controlled access. IT staff will work with departments to determine the scope of need to upgrade server rooms to meet standards. Staff will also explore the possibility of developing a single large shared space with controlled access to each group of server clusters. [Ongoing; CC; requires additional space and funding]

### **Maintain and enhance the campus network infrastructure.**

*The University of Nevada, Reno, is a network-centric campus. A functional network that supports integration of data, voice, and video technologies is the backbone on which all information services are built. Network bandwidth and speed must continually be increased to accommodate increased demand and new initiatives such as Access Grid Nodes, Internet2 advanced research projects, digital video, and IP telephony. By 2005, it is the goal to bring the network to a level that is redundant in the core, redundant to the distribution layer, with gigabit uplinks to all appropriate buildings.*

- **Participate in master planning for the campus utilities infrastructure.** Help to create a plan that requires suitable telecommunications spaces and pathways, including outdoor utility corridors. The physical master planning process should identify utility corridors that will not be disrupted by construction of new buildings so that investments in communications conduits and cables installed within these corridors will have a longer useful life. [2004; NetCom]
- **Upgrade telecommunications rooms.** Telecommunications rooms in all buildings on campus need to be brought to a minimum level of standards to support effective network services. According to the Western Telecommunication Consulting survey in 2001, it will cost approximately \$666,000 to upgrade or replace substandard telecommunications rooms. IT plans to build and upgrade telecommunications rooms over a six-year period (2002-2007). In six years, all telecommunications rooms will be at levels to support IP telephony and other expanded network needs. [2002-2007; NetCom]

- Create a policy that requires that appropriate telecommunications rooms and pathways be constructed whenever building renovations are planned. Telecommunications rooms must be a fundamental priority. Building networks are at risk without a permanent suitable location for supporting the data/voice wiring and equipment. [Ongoing; NetCom]
- ***Replace outdated network wiring and electronics on a regular cycle.***
  - In late 2003, Reynolds School of Journalism network wiring is being completely replaced with CAT6 wiring. A new telecommunications room on the 3<sup>rd</sup> floor is being built. All existing voice and data lines plus additional data lines are being pulled to one of three telecommunications rooms. The network switches will provide one gigabit/second networking to each desktop. [2003; NetCom]
  - Clark Administration and Manville Health Sciences will be upgraded to CAT6 wiring in 2004. This will eliminate wiring on campus incapable of supporting 100/1000 Mbps Ethernet. Several other buildings are also in need of complete wiring replacement but cannot proceed until suitable telecommunications rooms become available. These buildings include Sarah Fleischmann, Fleischmann Agriculture, Mack Social Sciences, and Scrugham Engineering/Mines. [2004-2006; NetCom]
  - Continue three-year cycle of replacing core network electronics. [Ongoing; NetCom]
- ***Accomplish BRIN-Related Network Upgrade.*** As a result of an NIH funding initiative, the Reno-Sacramento Internet link will be upgraded to an OC48 with a pair of 1 Gigabit Ethernet connections on each end. This pipe will be a general upgrade of the University's CENIC/CalRen2/Abiline network connections and not a pipe dedicated to special research associated with BRIN. This project is on a fast track. Testing of the fiber and ordering of the hardware will be underway in early 2004. Border firewall services will be expanded to reflect the increased bandwidth. [2004; NetCom]
- ***Expand the capacity and redundancy of the fiber network.*** NetCom recently purchased the equipment needed to install and terminate all indoor and outdoor fiber plants. This will allow repair or installation of fiber optic cable without long lead times.
  - Upgrade the fiber optic backbone to provide higher-quality single-mode interconnections that can support 10 Gigabit Ethernet links between core devices. [Ongoing; NetCom]
  - Implement a conduit and fiber project to place a new fiber path along Evans Avenue. This will provide fiber path diversity and prepare for the removal of the existing fiber that will be in the construction footprint of the Knowledge Center. [2004-2005; NetCom]
  - Add network redundancy. This includes upgrading the links with SCS to accommodate the new OC48 link to CENIC and SCS's location of a second switch outside of the SCS Computing Center building. IT will activate a second core to provide core routing and link redundancy. [2004; NetCom]
- ***Install wireless network services.*** Implementation of wireless services began in 2003 with test deployment in Getchell Library and contracting for a site survey that covers 20 buildings. Complete the installation of wireless networks in at least 20 buildings in 2004; more buildings will be included if funding permits. Expand wireless services to all appropriate buildings over the next three years. [2004-2006; NetCom]

- **Explore solutions for improving off-site networking.** Examine strategies for extending networking to the Manogue property and providing services to buildings on Evans Avenue. [2004-2005; NetCom]
- **Improve network performance and operational responsiveness.**
  - Improve centralized logging and analysis of network monitoring and auditing data related to network performance. Improving analysis of this data requires robust database services and high-performance storage (SAN). Development of appropriate backup strategies for offline storage and retention of network monitoring data is also essential. [2004-2005; NetCom, CIS]
  - Expand real-time network device monitoring to identify network outages and congestion. This will improve network uptime and will identify any segments that need to be upgraded. [2004; NetCom]
  - Improve bandwidth arbitration. Increase the University's ability to restrict application protocols such as P2P on publicly accessible networks such as the wireless network and the residence hall network. [2004; NetCom]
  - Extend the number of hours that qualified network support staff are available to respond to operational failures. For 2004, NetCom can commit to staffing a 7am-7pm network and security response center. Additional hours will require more staff. [2004; NetCom]
- **Create private VLANs for appropriate network traffic.** Create a VLAN for the Nortel Business Communication Modules (telephone key systems), for the building security systems, and for the heat plant network. [2004-2005; NetCom]
- **Begin to provide DHCP services** to allow for easier desktop management and to more efficiently utilize IP address space. [2004; NetCom]
- **Convert services formerly provided via analog video to digital video.** At the end of 2003, all network switches have been replaced with multicast-capable switches with gigabit Ethernet uplinks and 100 Mbs per computer. The existing coaxial broadband far outlived its originally projected lifespan. It is no longer operational due to disruptions from construction. The next step is to purchase several hardware video-over-IP encoders to allow the transport of broadcast quality video from the existing video head-end servers to any location on the campus network. Any digital projector or monitor connected to a fast computer will be able to decode and display a broadcast quality video signal sent over the data network. Multicast network technology allows many concurrent locations to display a single video stream. [2004; NetCom, TLT; cost per building may exceed current funding]
- **Develop a support structure to support increased use of streaming services.** Instructional uses will come from evolving distance education activities that have previously used compressed video. Research activities such as the BRIN project and the ACES project both lend themselves to streaming activities.
  - Train staff formerly responsible for supporting video over the campus cable system to support IP streaming technologies. [2004; TLT; may require realigning position]
  - Coordinate responsibilities for streaming services among IT support units. Pay particular attention to coordinating support for special events such as the President's State of the University Address. [2004; NetCom, TLT, CC]
- **Negotiate with Charter Communications to provide broadband services to the residence halls on the east side of Virginia St.** [2004; NetCom]

### **Modernize voice (telephone) services on campus.**

- ***Complete the 911 emergency database update project for 4,000 telephone lines.*** [2003-2004; NetCom with Facilities and SBC]
- ***Continue to improve service for people calling the main campus telephone number.*** Test revised auto attendant scripts; consider redirecting a greater number of informational calls to the Library; improve information available to the campus operators. [2004-2005; NetCom]
  - Begin preliminary investigation of voice recognition answering systems. [2004-2005; NetCom]
- ***Implement a new call accounting package for Centrex services.*** Eliminate use of the SBC magnetic tape by 2005. [2004-2005; NetCom]
- ***Develop a method for ensuring audit control for long distance bills.*** [2004; NetCom]
- ***Introduce Nextel cell and radio services to campus users.*** Convert users from AT&T and other cell providers to Nextel. By the end of 2004, convert all cell users to cell plans managed by the University. [2004; NetCom]
- ***Develop a phased plan to replace the current Centrex telephone switch and the diverse and aging telephone equipment on campus with a modern unified telephone/voice mail system.***
  - Work with Western Telecommunication Consultants, Inc. to issue an RFI to major telephone equipment providers. Evaluate the responses to the RFI and develop a strategy for converting to a unified voice services solution over the next five-to-seven years. [2004; NetCom]
  - Create a new position in Telecom Services to oversee the voice services project and manage the new PBX and related services. The position will require campus or corporate PBX experience, with the candidate being well grounded in traditional telephony as well being open to emerging telephony technology. [2004; NetCom, VPIT; funding required for position]
  - Begin experimentation with voice over Internet protocol (VOIP). The University's most recent accreditation report suggests that faculty should be able to place calls from classrooms to request technical assistance. Explore the feasibility of using VOIP telephony for this purpose. [2004-2005; NetCom]
- ***Identify strategies to improve stability and functionality of the 60+ key systems currently in use.***
  - Replace UPS devices on a four-year cycle. [Ongoing; NetCom]
  - Develop a plan to back up the Norstar systems routinely. [2004; NetCom]

### **Establish policies and practices in support of the University's information technology goals and values.**

- ***Establish appropriate vehicles to encourage broad participation in IT planning and policy development from all constituent groups.***
  - Organize focus groups on high-interest topics. [Ongoing; VPIT, IT managers]
  - Work proactively with the Faculty Senate Technology Committee and respond to the Committee's suggestions and initiatives. [Ongoing; VPIT, IT managers]
  - Meet with representatives from student government and from the residence halls. [Ongoing; VPIT, IT managers]
- ***Continue IT staff review of all IT acquisitions.***
  - Ensure compliance with established equipment and software standards. Exceptions to the standards will be made, as appropriate. [Ongoing; CC]

- Prior to acquisition of a server, ensure that a trained systems administrator has been identified to manage the server. Evaluate server room facilities (including HVAC, space, and physical security), requirements for network connectivity, and the adequacy of ongoing funding for maintenance and license renewals. In some cases, it may be determined that core services supported by Information Technology will meet the research or instructional need, so that purchase of an additional server is not recommended. [Ongoing; CC]
- **Monitor, interpret, and implement, as required, state, and federal information policies.**
  - Monitor statutory and regulatory matters as information technology advances in capabilities and becomes an integral aspect of daily life. Current national security concerns have added to this burden with the federal government's increased efforts to thwart threats to the national information infrastructure. [Ongoing; VPIT]
  - Assess a wide variety of policy promulgations to assure appropriate application to and implementation within the university environment. Recent examples of federal legislation and resulting regulatory directives include compliance with the various provisions of the Health Insurance Portability & Accountability Act (HIPAA), implications of IT security related to the USA PATRIOT Act, and the Department of Justice's new and enhanced requirements regarding the tracking of international students. Complex information infrastructure security directives are also anticipated in the weeks, months, and years ahead. [Ongoing; VPIT]
  - Continually review existing policies for acceptable use of campus information systems in light of a growing number of areas impacted by a flurry of federal laws and regulations, i.e. security, privacy, anonymity, intellectual property. Ubiquity of IT is increasing the possibility of institutional liability. [Ongoing; VPIT]
  - Assess, on an ongoing basis, future use of information systems on campus in light of national and state law. Implementations of Web-based services and secure payments require substantial policy development as do a myriad of other activities such as faculty submission of grades online. [Ongoing; VPIT]

**Improve the Information Technology division's ability to serve the University's needs effectively.**

- **Improve internal communication within the IT division.** Find ways to share ideas about new initiatives, policies, and directions more effectively with all IT staff. Develop methods for consulting with affected staff before making changes to operations. [Ongoing; all IT managers]
  - Reorganize the IT intranet and provide relevant, up-to-date content. [2004; VPIT]
  - Conduct periodic "town meetings" to provide an informal forum for all IT staff to discuss topics of current interest. [Ongoing; VPIT]
- **Bring IT salaries into line with current market conditions.** Participate in the current administrative faculty salary study with the expected outcome to be an increase in IT salaries in general. [2004-2005; VPIT]
- **Develop a career path for administrative faculty in IT.** A new hire with minimal experience might start at Administrative Faculty Level 1. As experience and knowledge is gained, and with exemplary performance, qualified staff should be able move through Administrative Faculty Levels 2 and 3. [2004-2007; VPIT; requires additional funding]
- **Evaluate the division's current and future space requirements.**

- Expand the number of available offices to accommodate current needs and anticipated growth of IT staff. Examine possibilities for expanding in Cain Hall as current occupants move to other buildings over the next few years. [2004-2007; all IT managers]
- Evaluate the adequacy of shared computer training facilities. Propose additional facilities as needed. [2004; PP, TLT, CC, Library]
- **Complete the development of well-equipped IT server rooms.** Primary IT server rooms are located in Getchell Library and Cain Hall. The goal is to distribute IT servers among multiple server rooms on campus for convenient access as well as to provide redundancy, minimizing service disruption in the event of a disaster in any one building.
  - Complete upgrades to the Getchell Library and Cain Hall server rooms to meet standards for electrical service, temperature and humidity control, and physical security (locks, alarm). [2003-2004; CC, CIS]
  - Develop a third server room in the new NetCom area at Central Services. [2004; NetCom]
- **Upgrade departmental server rooms.** Over 250 servers are being managed in colleges and departments. These servers are housed in facilities that are generally inadequate. Serious problems with servers have occurred because of insufficient temperature control and lack of controlled access. Rooms for research server clusters (e.g., Beowulf cluster, Cortex cluster), in particular, have environmental requirements that are not being satisfied. In some cases, servers are housed in faculty and staff offices, with no environmental control and little access control. IT staff will work with departments and colleges to determine the scope of need to upgrade server rooms to minimal standards and will contribute funding to do the needed upgrades. [Ongoing; CC; requires additional funding]
- **Finish provisioning a comprehensive test lab for IT.** The present test lab is located in the Central Services building. [2004; NetCom]
- **Develop a method for tracking and maintaining records for all hardware and software purchases and contracts in IT.** [2004; VPIT office]
- **Develop a model for managing IT projects that includes comprehensive planning, testing, and signoff by stakeholders, organized implementation, and follow-up.** [2004; all IT managers]
- **Consider establishing the position of IT Acquisitions Coordinator** to participate in negotiations and auditing of all software and hardware agreements, to assist departments with managing software and computing equipment inventory, to review IT-related purchase requests for compliance with standards, and to assist users with IT-related purchases. Hundreds of thousands of dollars are spent University-wide each year on computing-related purchases. Institution-wide savings can be realized by improving the information available to purchasers of computing equipment and software and/or providing more rigorous oversight of these acquisitions. The savings are not only in purchase dollars, but also in reduced cost of ongoing support. [2004-2005; VPIT]
- **Consider moving responsibility for managing all public computers in the libraries to the Library Systems Office.** Responsibility is currently shared between the library and Campus Computing. [2004; CC, Libraries]
- **Explore strategies for consolidating technicians in Telecom Services and Network Services into one operational group.** [2004-2005; NetCom]

- ***Review and modify the performance indicators for every IT unit.*** Compile and publish all measures that are currently available. Collect additional information. [Ongoing; all IT managers]
- ***Review the role and responsibilities of the Process & Performance Planning unit.*** [2004; VPIT, PPP]

## Process for Planning and Resource Allocation

As a service unit, the primary driver of IT planning is the overall mission and goals of the University and its respective units. Given the rapidly changing nature of information technology and its numerous applications throughout the campus, the Division engages in ongoing planning within the parameters of campus needs as outlined through the strategic planning process. Internally, the Division engages in continuous planning and redefinition through weekly IT director meetings and semi-annual all-staff meetings.

To address broader issues, the Division receives input from individual clientele and through countless meetings of IT staff and administration with University faculty, staff, and students, at all levels. During the past year, the Vice President for Information Technology has encouraged a closer working relationship with the Faculty Senate 111 Committee. Knowing there is a need for broader and more effective communication with all of its constituencies, the Division is in the process of hiring a technical writer to provide documentation for the Division as well as to produce informative bulletins and news releases that outline ongoing activities, new and existing services, and suggested enhancements for which input will be solicited.

The very nature of information technology and the culture of the Information Technology Division make a 1% target of internal reallocation unrealistically low. The Division's reallocation in such a rapidly changing environment far exceeds the 1% reallocation target as is demonstrated above, and in even more detail in the plans of earlier years. Information technology is a moving target and the institution's needs are in almost constant flux. Combined, these forces require vigilant and ongoing reevaluation of strategies and appropriate technologies to best serve the Division's clientele.

### APPENDIX A: Resource Requests for FY 05 Not Previously Submitted

Line No.	Description	Salary	Fringe	Operations	Comment
1	Computer Systems Administrators (Medical)	200,000	50,416		Expansion of IT support for new Medical School plan requires 3 additional technical positions in the North and 1 in the South.
2	Electronic Records Manager	50,000	12,604		To establish guidelines and overall management for electronic records, which are replacing paper archival practices across campus.
3	Network Technician II	40,000	11,473		Technical support for Redfield campus.
4	Network Technician II	40,001	11,474		Technical support for Redfield campus.
5	Graduate Assistant	14,000	1,000		Dataworks... faculty research data.
6	Network Security / Programmer	50,000	12,604		To address increasingly complex network security issues and programming requirements.
7	H323 video conferencing	0	0	48,000	Expand and upgrade 6 video conferencing sites.
TOTALS		404,000	100,701	48,000	Total FY 05 Enhancement Request: \$552,701