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UNIVERSITY
IDAHO
Information Technology

IT Strategic Plan 2008-2011

DRAFT

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1 Introduction

The purpose of the strategic plan is to help IT plan for the future and widely communicate those plans. It is our desire to align IT goals with the University's mission and President Clark's imperatives.

The mission of IT is to be academic focused, customer centric, and proactive in leveraging innovative technology for improved teaching, learning, and productivity.

IT strategies are the foundation we build IT initiatives upon. In a way, strategies are the lens through which we view initiatives. IT initiatives are the steps we take to further the mission of IT and the University mission and imperatives. The IT strategies follow.

1.1 Provide Excellent Customer Service

Students will become our customer more than ever before as more of them have their own laptops that communicate on our wireless network. We are building a Help Desk largely staffed with students to fill this need. Technology Support Specialists are increasingly using student employees to keep up with growing demands. Our intention is to make it so anyone, whether they are students or employees, who is experiencing a problem is just one call away from speedy resolution.

1.2 Focus on Academics for Improved Learning/Teaching

Academic support for learning management services, the BYU-Idaho Learning Model, and online learning will receive renewed focus and emphasis, with intuitive and user-friendly tools and applications. Re-thinking how best to teach and learn, as well as how to reach out to more students through online courses will allow the university to better serve the students' educational needs. Most of the progress in those areas will not being done directly by IT, but will rely on technologies and systems managed and supported by IT. To be successful, IT must actively seek opportunities to enable and support the effort.

1.3 Enable Pervasive and Mobile Computing

Students will greatly benefit by having access anytime, anywhere-on-campus access to the network. They will have access to coursework, tools to complete homework and stay organized, and instant communication. IT creates this environment by establishing baselines and standards for student laptops, building an extensive wireless network, and providing technical assistance. Although students stand the most to gain from this initiative, employees and guests will also experience productivity gains.

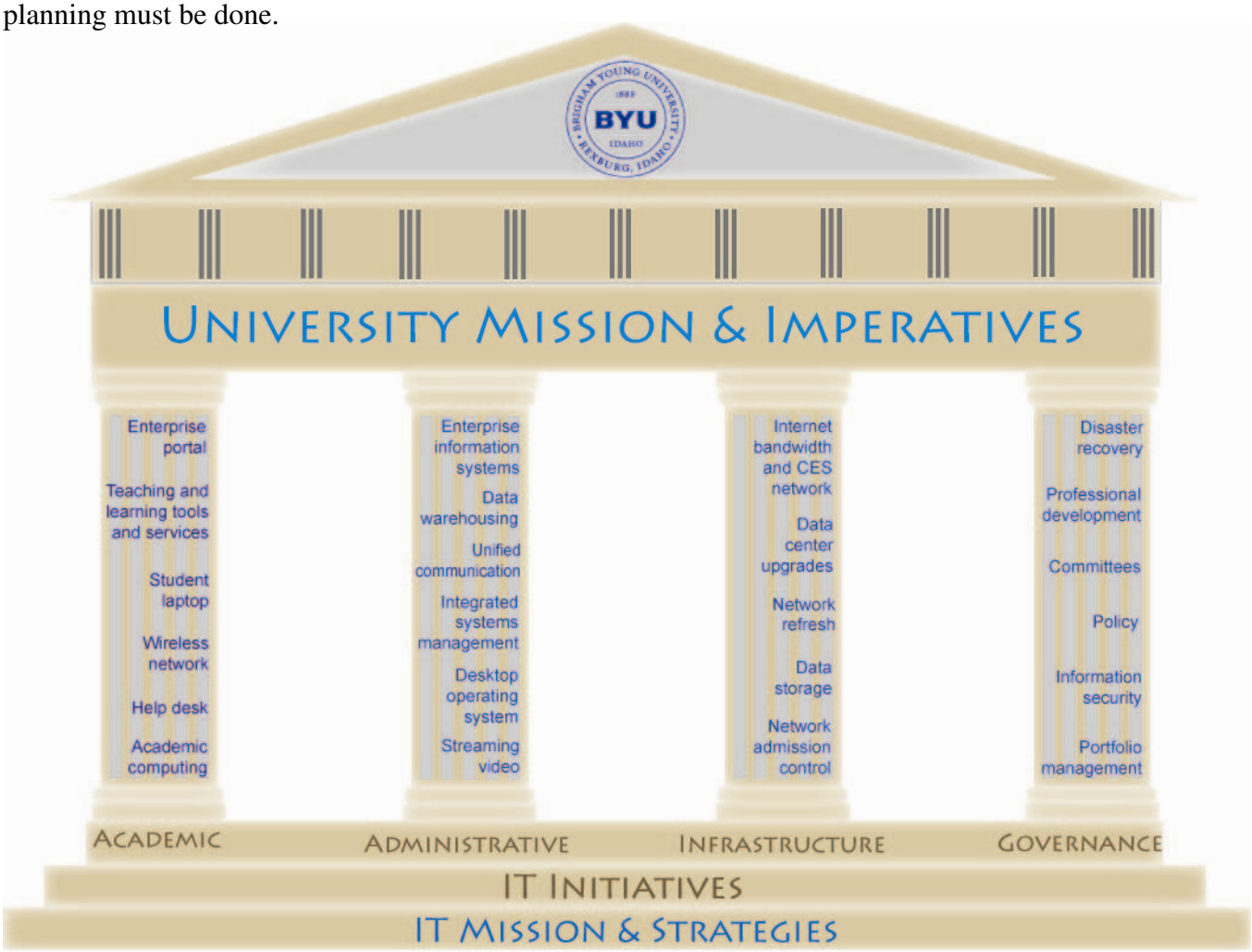
1.4 Build on a Foundation of Service-oriented Architecture

Service-oriented architecture (SOA) is a vision in which resources are cleanly partitioned and consistently represented as modules. This framework is adaptable and flexible, setting a globally accepted standard for representing logic and information. The strategy in targeting this framework is to leverage the expertise of commercial and non-commercial vendors and use modules from these vendors for integrated best-of-breed

solutions. The delivery to the BYU-Idaho community of these solutions will be via an enterprise portal where the presentation is tailored to a user's specific role.

1.5 Extend a Secure, Reliable, Converged, and Highly-available Infrastructure

The services we provide can be no better than the infrastructure upon which they depend. The underlying infrastructure is often behind the scenes, but makes everything else possible. Infrastructure includes servers, network equipment, telephone systems, wireless networks, cabling, telecommunication rooms, data centers, and the software that makes it all work. It is critical to build a system of infrastructure that is secure, resilient, reliable, high-speed, and highly-available. It is necessary to support this system with organization, planning, design, the development of standards and policies. Business continuity and disaster recovery planning must be done.



IT initiatives are built upon the IT mission and strategies and support the University mission and imperatives. IT initiatives are extensive and require much effort and funding. We will continually be faced with the balance of making progress with limited resources. We will continue to make innovative, wise, and cost-conscious decisions. Although this plan outlines a four year timeline for accomplishing these initiatives, it is intended to be updated yearly and to provide the basis for annual stewardship reviews.

2 Academic Technology Initiatives

2.1 Enterprise Portal

A web portal is a starting point from which students and employees can access a multitude of campus services. Tailored specifically to the individual, the web portal gives access to various applications and services. A key web portal feature is single sign-on; the user logs in once then navigates through a variety of services and resources without having to supply login credentials again. Other benefits include a common look and feel, roles, and audience targeting.

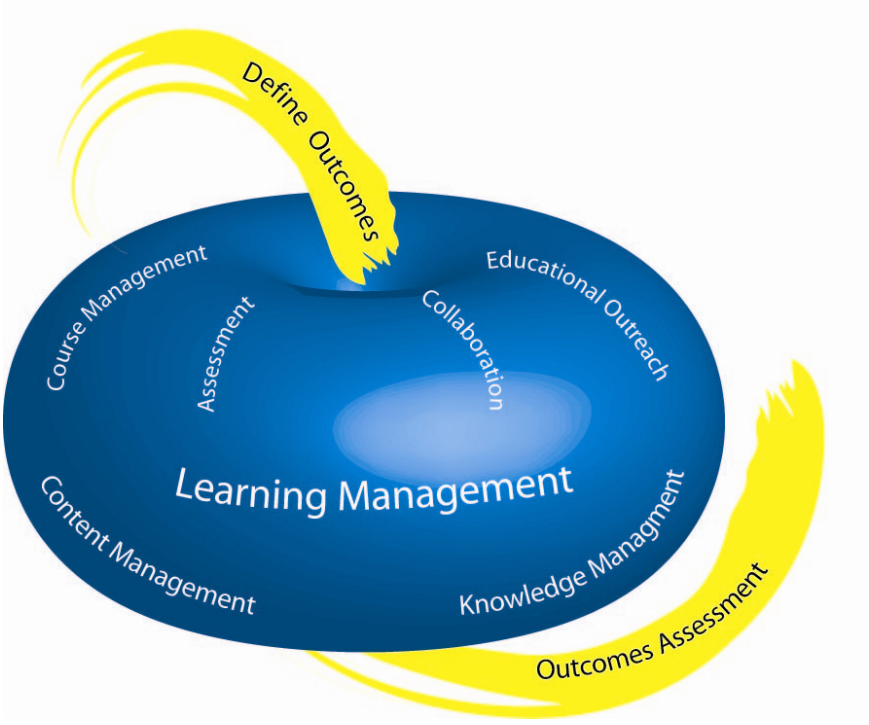
The *my.byui.edu* portal is a first stage web portal that is currently in production. Evaluations and pilots of products like SharePoint and other portals have resulted in choosing Jenzabar's JICS as our enterprise portal. The first phase of this implementation will begin last quarter of 2008 and into 2009. Authentication, authorization, and single sign-on are some of the unsolved issues associated with this initiative. The re-write of *my.byui.edu* features as portlets will follow the implementation of JICS.

2.2 Teaching and Learning Tools and Services

To best support the BYU-Idaho Learning Model and online learning, we need to implement high-quality and reliable tools that complement each other and provide a stable working environment. Outlined in this section are the campus' needs and the types of technology that would meet these needs. The exact tools created or purchased will be decided upon through further research and continuous refinement of this plan.

The initiatives are designed to assist instructors in following a model of defining outcomes, creating a learning experience through guided learning communities, assessing the outcomes, and continuously improving the learning experience. An array of tools and services will available to assist the instructors. The initiatives are organized in the following categories:

- Content Management: the way information is created, stored, and used
- Learning Management: the way learning and teaching is carried out and improved
- Educational Outreach: how the BYU-Idaho educational experience can reach beyond the campus



2.2.1 Content Management

A major responsibility of BYU-Idaho faculty is to innovatively create and present information content. Once created, the content has a life cycle spanning from individual use by the instructor to storage in a library of digital assets. The easier it is for the campus to manage the life cycle of all new and old content the better. Systems must be able to handle continued growth as the University provides more content for more students. These systems must be robust, secure, reliable, and intuitive. We can think of these services in terms of the following broad categories:

- Content Creation. Information has a life-cycle and needs to be created with a plan in mind to use it in a variety of ways. For example, the same content can be used by a professor in different forms: course material available over the Internet; a presentation for classroom instruction; a case study; or a test. We need to adopt tools for creating learning materials in all its forms for on-campus and online teaching. The tools should be able to create text, graphics, audio, video, animation, and simulation, all with various levels of interactivity. They should also be able to store digitized classroom presentations, search existing content, and share their content with the campus community, other instructors, and students. We are after a diversified tool kit for learning object creation that is easy to use, so faculty can concentrate on content rather than technology. This would allow the rapid creation of course content and the ability to create course content that gives the students the best opportunity for meaningful learning.
- Content Management. Very closely related with the creation of content is a place to put it and a plan to manage information content. A content management system provides a secure repository for all business documents, course material, and web page content. The requirements for managing these types of documents are unique, so there may be a need for different types of content management systems that can communicate with each other. The systems need to be able to provide metadata, cataloging, and full text search capabilities. Version control, including the ability to roll back to a prior version, and workflow, such as routing a document for approval is also needed. This system should leverage existing Library systems and the expertise of Library personnel in the area of content management. This will benefit of the whole campus by allowing subject matter experts to concentrate more on the content instead of being impeded by the trivial details of managing content. The first phase of the content management plan was to incorporate the Blackboard Content Management System. This was accomplished in 2007 and provides a starting place for other innovations in this area. This system has provided an environment where content is centralized and instructors are able to reuse and share content among colleagues. An architectural layout of a digital asset management tool is underway that will provide a more robust and long term solution which is described later in this document (see 3.6).
- Knowledge Management: There is a vast array of material available to enhance learning and by combining knowledge management tools with content management tools, the vast amount of available knowledge will be better integrated with learning activities in and out of the classroom. Content created by BYU-Idaho faculty may also be integrated with licensed content, and both types can be searched effectively. Again, we can utilize existing Library resources in integrating information content and its management. Library resources are increasingly becoming digital and knowledge management tools provide effective ways of cataloging, searching, and presenting the digital resources available to students. The expertise of the Library can break down the barriers between administrative, academic, and library content, so all three can be seamlessly tied together.

Achievement of these objectives will require the expertise of instructional designers, multimedia developers, video technicians, technology engineers, database managers, content specialists, librarians, and Helpdesk

employees in Academic Technology, the Library, and IT. Highly skilled technology experts and a solid underlying infrastructure will allow these systems to very reliable.

2.2.2 Learning Management

We need to further explore tools and methods which will enhance and better track the students' learning experience and life-cycle. We organize this subject in the following major categories:

- Learning Management. Learning management systems track the student's learning experience and life-cycle, beginning with their pre-matriculation and orientation experiences until their final graduation, and perhaps beyond. At any point an advisor, teacher, or the students themselves would be able to see the student's progress toward academic goals and graduation. They can see what has already been accomplished, what still needs to be accomplished, and create goal-seeking scenarios to plan future learning activities. This leads to goal-driven learning and not just course completion. There is a direct connection between the learning management system and the enterprise portal described above. The learning management system could be an integrated system that tracks a student's progress and activities in academics, activities, and church which are all aspects of a student's preparation as a disciple, leader, and teacher.
- Course and Organization Management: Course management systems deal with the presentation of learning content to students, and the management of learning activities surrounding that content. This may be for formal classes or for other campus functions such as those in the Activities program. They provide learning tools for instructors and students within the context of an individual course or group. They also provide data for the learning management system, which then provides data to the outcomes assessment system (discussed later) for checking against previously defined outcomes. Our current course management system is Blackboard, which will continue to serve the course management function until we transition to a more modular "learning system" over time. The more modular system will blend various commercial, open source, or custom built tools to increase the quality of the system and increase the rate of innovation. The tools should assist faculty in defining and setting up their course architecture, in syllabus creation and reuse along with calendar creation and reuse. The course management system should be able to effectively integrate content from the following sources: custom-created, library, and publisher-created.
- Collaboration Tools. Collaboration tools are integral to a successful academic experience. They allow students to connect with each other and with faculty in and outside the physical classroom or office. Students are able to learn by doing, critiquing, and sharing as they work together in teams. Some tools serve students whether on or off campus, while others are specifically geared toward one or the other. Such tools allow: shared document creation with editing, journaling, and threaded discussions; sharing of desktops and applications; creation of electronic portfolios; instant live communication via text, audio, video with an intuitive interface showing who is online and available; classroom capture that goes beyond the standard lecture capture.
- Assessment and Testing. Typical methods of academic assessment are in-class pop quizzes and proctored tests in a controlled environment like the Testing Center. Online quizzes and tests are becoming more prevalent in higher education as a part of academic assessment. Modern technology provides an effective way of meeting many assessment needs through online resources, including: adaptive testing and testing that integrates multimedia; authentic testing or assessment with various forms of simulations; hybrid tests somewhere between online and proctored testing; and other non-traditional types of assessment that require a technology infrastructure, such as performance assessment via video. The instructor can spend less classroom time for assessments. Students have

the convenience of taking tests online at anytime (within a controlled period) or any place. Instructors and students benefit from large volumes of peer feedback and peer grading.

- Outcomes Assessment. An outcomes assessment tool improves institutional effectiveness, helps meet accreditation requirements for assessing student learning outcomes, and communicates those outcomes to key stakeholders by providing visibility into the data and information guiding institutional processes. Every member of the institution can quickly see if the institution is actually accomplishing what they say they are trying to accomplish, from the general overview perspective down to the details of an individual stewardship. Outcomes assessment will occur at all levels, from the institution mission statement to the individual objectives of a specific lesson in a specific course, allowing input from college deans, department chairs, and instructors. In order for it to be effective it needs to be readily available at the institution level and viewable by role. For example, students will track how they are progressing through the university outcomes. This requires close connections between the outcomes system, the course management system, and learning management systems. This initiative is also closely related to the data warehouse initiative which is discussed later (3.2).

2.2.3 Educational Outreach Technology

Each semester, there are thousand of students enrolled at BYU-Idaho who rarely, if ever, make it to campus. Many of them are living elsewhere, taking online classes while pursuing internships and other career-building activities. Unfortunately, the format of current online classes doesn't always meet the academic needs of those students. For example, a nursing major working at a distant hospital may need more interaction and live demonstrations to fully understand the classroom topics. This initiative will better serve such students and enable them to receive the best education possible, wherever they are.

One example in the area of outreach is the implementation of a distance learning experience for the Nursing program which will allow students at BYU-Idaho to communicate through live video and audio with students at the Burley IHC hospital. The courses using this technology will provide a method of sharing and collaborating and allow students in Burley the same opportunity to interact and communicate with those in the classroom at BYU-Idaho, which resembles actual physical attendance in those courses. Another example is the use of the other technologies to allow entire classes, groups, and individuals to interact through video, audio, and presentations using readily available web technologies.

Fortunately, technology has evolved to allow online courses to become virtual classrooms where students can participate and feel a part of the class even when they are physically isolated from campus. Embracing this technology will not only improve the experience and success of off-campus students, but allow the University to enroll and serve more students without expanding as many physical facilities. The challenge will be to bridge the gap between on-campus learning efforts and the off-campus experience. For example, as on-campus students are encouraged to become active participants in the classroom learning experience, how can this be achieved with online students? We need to allow on-line students to truly interact, participate, and contribute to the classroom learning experience. These tools will not only benefit students on campus, but will enable high quality learning for students away from campus.

2.3 Student Laptop

The purpose of the student laptop initiative is to increase the quality of the student experience by providing better access to network resources and online learning opportunities. Students will have better tools to learn, communicate, organize, and complete assignments. Expenses will be reduced in the long run as students have more access to less expensive learning material. Students will be better prepared for lifelong learning and employment in the information age.

A pilot program begins this summer. In the fall of 2008, students will be expected to have their own laptop or purchase a campus-recommended laptop. We have leveraged the campus' hardware/software buying power to make laptops available at attractively low prices. The Helpdesk has geared up to provide support, including hardware repairs. Wireless networks have been and will continue to be expanded and enhanced across campus. Some of the issues that require further attention include: software licensing and distribution; furthering the use of electronic text books; and putting in place authentication and anti-virus remediation systems.

2.4 Wireless Network

Wireless networking provides the anytime, anywhere network connectivity essential to the laptop initiative. It provides access to network resources without the need to be physically connected to the network. We are currently deploying the next generation wireless system that will scale to cover the entire campus. The following buildings have secure and pervasive wireless completely deployed:

Perkins Hall
Kerr Hall
Barnes Hall
Ricks Hall
Chapman Hall
Joseph Fielding Smith
Thomas E. Ricks
David O. McKay Library
George S. Romney
Spencer W. Kimball
Philanthropies
Ag Engineering

The remaining buildings (below) will have the old Cisco hot spots replaced with the more robust Xirrus network arrays before May 1, 2008. These buildings will also have pervasive wireless deployed by August 2009:

Ezra Taft Benson
Eliza R. Snow
Jacob Spori
Oscar A. Kirkham
John W. Hart
Hyrum Manwaring Center
John L. Clark
Student Health and Counseling Center
John Taylor
Mark Austin
Gordon B. Hinckley
Livestock Center

The new wireless network will enhance student-teacher communication, provide more efficient use of time, and reduce the overall cost of network cable on campus. These benefits will be magnified if the decision is made to also provide wireless access in outdoor spaces such as quads and play fields. As the campus builds a campus-wide wireless infrastructure, other benefits will certainly be derived and realized as wireless applications mature. For example, more devices will go wireless such as building controls, cameras, sensors, alarms, and door locks. Our ability to provide emergency notification may be enhanced. Convergence of wireless voice over IP, cell phones, and the PDA will open up many new possibilities.

2.5 Help Desk

A Help Desk has been established and is staffed with a full time employee and some great students. They are providing support for wireless connectivity and hardware and software issues. Technical knowledge and resources are centralized in one convenient location. Staffing will increase and support for students and their computers will improve as the laptop initiative takes off and wireless connectivity becomes more widely used across campus. The Help Desk will not only answer questions, but may also distribute software, security patches, operating system updates, and anti-virus tools. This will result in better security and readiness for students. We anticipate software suites and tools will be available at lower costs. Some degree of warranty hardware support will be provided. While the quality of the student experience has been enhanced, the Help Desk can also serve as a backup resource for employee help and support. It is our goal for students or employees to be well on their way to resolution of a problem by one simple call.

In order for the Help Desk to continue to improve, we need to complete the building of the Help Desk area in the McKay basement. Response Center resources and processes need to be improved. The hardware support and repair models, including consideration of spare parts, needs to be more fully developed. Implementing a Help Desk software system will be crucial to our success.

2.6 Academic Computing

As the bar is raised on using technology in education, so also is the need for more support for departments where computing technology is at the center of learning. These departments include Computer Information Technology (CIT) and Computer Science and Engineering (CSE). As these department programs are expanded and enhanced, the need for support from IT also increases. We are gathering requirements to find the best-fit product to provide virtual lab environments for these departments. These new virtual environments will allow the students the ability to access the lab environments on and off campus and at the same time reduce the administrative burden of managing the systems.

We need to take another look at classroom technology. It has been a while since “Tech Room” standards have been reviewed. We need to consider whether we still have the right mix of technology. For example, should digital whiteboards be part of the mix? We also need to consider if there is a need for faculty to have a tablet PCs in the classroom. The underlying goal is to provide tools that improve teaching/learning and productivity.

3 Administrative Technology Initiatives

3.1 Enterprise Information Systems

It is our goal to provide application support that meets the needs of the entire University. In order to provide services that adapt and grow with the University's ever changing needs, we are migrating to a more modular approach commonly referred to as Service Oriented Architecture (SOA). Modularity will allow us to be flexible in selecting solutions and more efficient in the creation of reusable modules. This new paradigm will better enable us to share resources among CES institutions. For reasons outlined below, we are also striving to use commercial software whenever possible, use open source software when possible, and develop in-house software when necessary. This will allow us to provide a more seamless computing environment for our users and be more effective in our efforts to integrate various systems. Following are reasons why the University should seriously adopt commercial software packages whenever possible for administrative and academic systems.

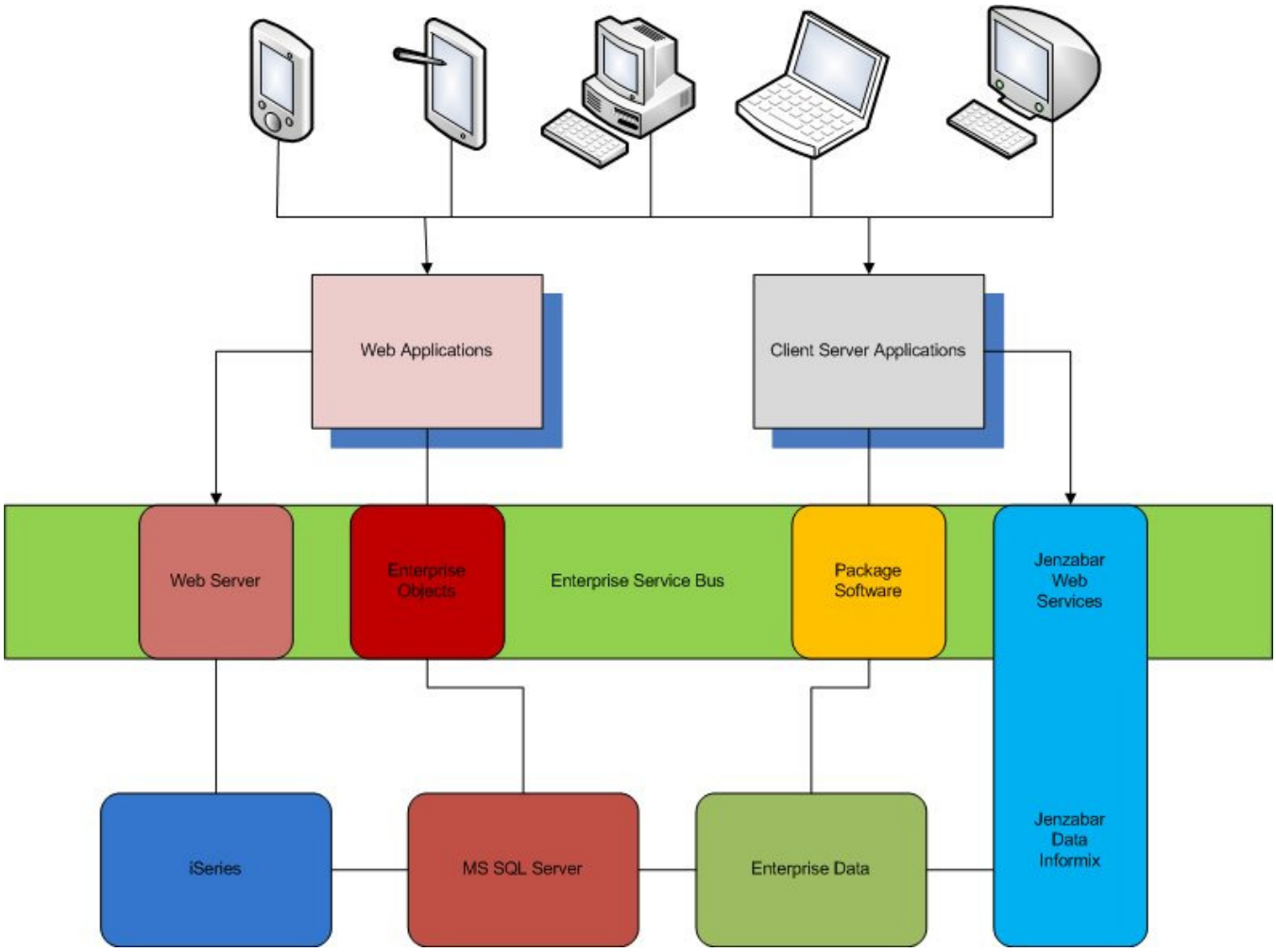
- Better out-of-box functionality, for example, the capability of financial aid auto-packaging, which we do not currently have, is available commercially
- More flexibility because of their modular design and systems
- Enhanced capacity to meet current needs and scale to meet growing University needs
- Reduced maintenance time and cost complying with regulatory changes
- The software vendor assumes more of the associated risk
- Commercial software packages better address unmet needs
- More secure environment with better standards

We will be able to provide better in-house development by:

- Creation of an enterprise architecture and security model for creating custom applications
- Creation of enterprise architecture and development standards.
- Creation of an enterprise application design and development process

As we define our long term Enterprise Information System strategy, we need to consider the following:

- Replacement of current systems, iSeries migration, uncoupling iSeries systems, and data conversion
- Policies, procedures, and standards, such as storage archival and management policies, software engineering standards, backup and disaster recovery standards, and application versioning
- Active monitoring of system utilization and security
- The need to change some current business rules
- Increasing data base management resources
- Impact on current functional FTE levels, professional development, skill upgrades of existing staff
- Extra data storage and backup
- Full time database and software engineering expertise and part time student programming



SOA encourages modularity, flexibility, and efficiencies

3.2 Data Warehouse

A data warehouse is a repository of the organization's electronically stored data. Data warehouses are designed to facilitate reporting and analysis including tools for business intelligence, tools to extract, transform, and load data into the repository, and tools to manage and retrieve metadata. A data warehouse:

- Takes the workload of data analysis requests off the production database
- Gives decision makers self-serve access to data for analysis
- Provides automated drill-down on reports from summary to detail
- Allows scheduled running of reports
- Supports the business intelligence and data analysis systems

Work has been completed on the database cluster and the first stage data warehouse data model. Work is continuing on reporting services. In 2008 more training on the design and best practice of data warehouse data models will be initiated. In conjunction with the implementation in 2008 and 2009 of Jenzabar CX, a data warehouse data model, a design for extract, transform and load of data from CX, and the associated reporting services will be developed.

3.3 Unified Communication

Unified Communications is a term used to describe the integration of disparate communication systems. These systems may include fixed and mobile telephones, voice over IP (VoIP), email, instant messaging, fax, audio-, video-, and web-conferencing, and many more. Unified Communications is sometimes confused with or interchanged with Unified Messaging. However, they are distinct technologies. Unified communications refers to a real-time delivery of communications based on the preferred method and location of the recipient. Unified Messaging simply accumulates messages from various sources (email, voice mail, faxes, etc.), sometimes into a single location like an email in-box, but holds those messages for retrieval at a later time.

Unified Communications might also incorporate a concept called presence – knowing where one's intended recipients are and if they are available, in real time. The caller might not know where the intended recipient is, but the system does. The Help Desk might receive a call that needs to be escalated to higher level of support in IT. The Help Desk staff will call the intended individual. The unified communication system senses that the IT employee is not at his/her desk and routes the call directly to a cell phone. If the cell is not answered, the call can be automatically routed to another phone, a pager, or another IT employee altogether. The system might also be configured to call an office phone, cell phone and a home phone simultaneously. The call is then routed to which ever answers first.

Voice over IP (VoIP) is a significant piece of big picture. IT is currently evaluating VoIP solutions from different vendors. There is a small pilot project in place within IT using Cisco VoIP solutions. Cisco has also donated some VoIP equipment as part of the network equipment that was recently purchased. It is likely that VoIP will be moved into production early in 2009.

IT is also evaluating and implementing other aspects of Unified Communications (UC) such as email, instant messaging, faxing, and presence. Information Technology is currently in the process of evaluating various components of UC from various vendors and solution providers. Cisco has donated some UC equipment as part of the network equipment that was recently purchased. IT will conduct a pilot project to thoroughly evaluation the benefits of UC to the campus. We expect the benefits to the campus community would include enhanced communication between students, students and faculty, and CES institutions as well as productivity improvements. Some of the greatest enhancements should come in the ability of administrative assistants to route calls.

3.4 Integrated Systems Management and Security

The Response Center was created to monitor servers, networks, and other infrastructure equipment, and it is responsible for notifying the appropriate personnel in the event of a failure. In order to provide quality service to the campus community as the demands on the resources increase, the Response Center's ability to perform these functions needs to be strengthened.

We also need to strengthen our ability to detect attacks against the security of our system. With the continual increase in the number of servers, storage, and other managed devices, the volume of information to log, review, monitor, and manage increases significantly. It has never been totally feasible to manually review all system logs for problems, errors, and security events in an effective manner, but now that task is literally impossible. Fortunately the industry has seen the need for systems that automate this process and many vendors now provide solutions for this task. As the university grows and systems increase in complexity and criticality, the need for a logging, monitoring, and alerting solution also increases. Intrusion detection and prevention systems are also needed to further automate monitoring of security.

The Infrastructure Department will complete the following steps to increase Response Center productivity and efficiency:

- Define and implement an on-call policy and procedure
- Define logging, monitoring, and alerting criteria
- Identify possible vendors
- Write and distribute a logging, monitoring, and alerting solution RFP and send to vendors
- Evaluate proposed solutions
- Purchase and implement a solution
- Create a web application to disseminate system status information to the campus community
- Review Response Center staffing needs, decrease or increase coverage as needed, 24x7 if necessary
- Review and improve change management policies and procedures

As the number, variety, and locations of servers, storage, and other equipment increases, so does the need for an integrated management environment. This system is needed in 2008 to assist in migrating servers from one location to another during the data center upgrades, but is also needed as a long-term and permanent system management environment. This solution will also include "high availability" and "disaster recovery" capabilities, needed as the criticality of hosted services increases. Current server environments include VMWare virtual servers, Dell blade chassis and servers, IBM iSeries, HP RX7640, and HP and Dell rack mounted servers. The future could easily include other server environments. Current server operating systems include Microsoft Windows Server 2000 and 2003, Redhat Linux, HP UX, and IBM OS400. We will be implementing Windows 2008 Server in 2008 and 2009 on many servers. Our current philosophy is to use virtual servers wherever possible, blade servers as the next alternative, and other rack mounted and specialized servers and appliances as the situation dictates.

Most servers are located in two data centers in Kimball and Smith buildings, a few servers in buildings across campus, and a few virtual servers in the BYU Data Center. Several academic departments have servers located in other campus buildings. System administration occurs primarily from offices in the IT suite in the Kimball Building, but administration is also performed from other buildings and off-campus locations. Other current related projects include the data center upgrades and a KVM solution. IT intends to incorporate the following list of features into this Integrated System Management (ISM) solution:

- Integrated management of physical and virtual servers
- Functions to help with the transition of servers from one data center to another
- Functions to help provide High Availability (HA)
- Functions to help provide Disaster Recovery (DR)
- Ability to move servers as needed
- Automated monitoring and moving of servers to hardware that is the most capable of handling the current load
- Monitoring software and screens to graphically see all system locations, performance, load, and problems
- Ability to perform conversions to and from images, and physical and virtual servers
- Ability to store continually updated copies of all server images with the capability of quickly and automatically bringing up a replacement server after a failure
- Ability to monitor, convert, and manage servers in different geographic locations.

As the functions of the Response Center are enhanced the university will realize proactive notifications of issues and resolutions, a resource for Help Desk personnel to turn for additional information pertaining to technical issues. The evaluation of log files on a daily basis has become a security requirement.

3.5 Desktop Operating System Migration

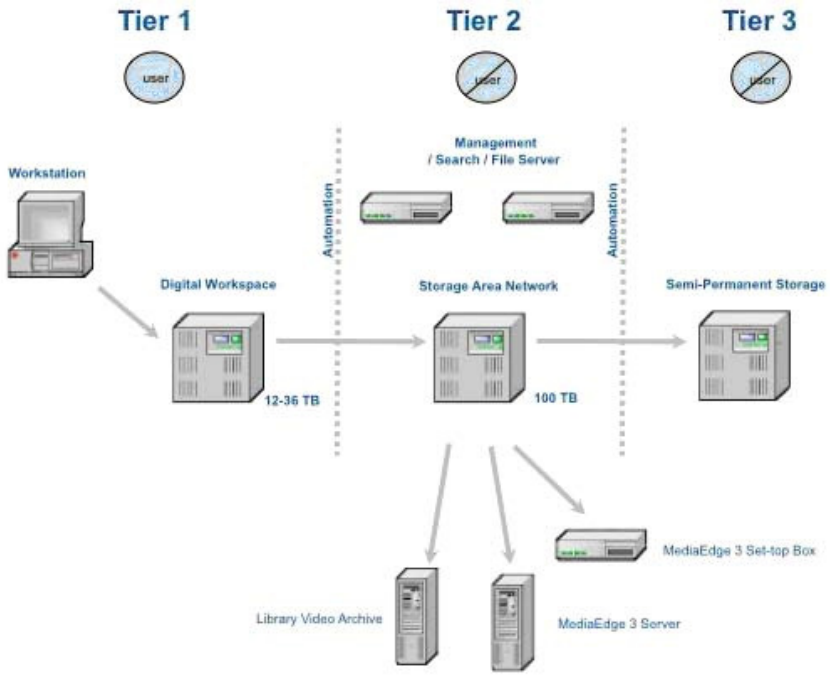
In 2007 we rolled out our first Microsoft Vista computers. The rollout had some bumps due to software incompatibility issues, but overall it well real smooth. The rollout will continue over the next two to three years as old computers are replaced with new ones. Any new computer purchases will accommodate Vista's hardware requirements, but computers purchased before 2006 may lack the hardware requirements for a satisfactory installation. No funding will be required beyond existing hardware replacement, software agreements, and operational budgets. We expect to benefits from improved operating system security and self-healing capability, metadata searching capabilities, and better integrated tools for managing computers. We will continue dealing with training for end users, compatibility issues, updating hardware standards, and deciding whether to install Vista on older machines.

The Microsoft Office 2007 rollout is going quite well. We still have a few pockets of people that are using MS Office 2003, but the migration to Office 2007 has been relative smooth. Our testing procedures were successful. We also pushed out the compatibility patch so all older Office users would be able to read the new Office file formats. MS Office 2007 is part of the base image for computers running the new Vista operating system. We expect to benefit from:

- Improved e-mail security, filtering, encryption, and business continuity
- Added features in Outlook 2007 and tighter integration with Vista
- Improved and integrated features between Exchange 2007 and SharePoint 2007
- Enhanced performance, administration, and deployment

3.6 Streaming Video and Digital Asset Architecture

We refer to streaming video as sending video over the network to locations on campus or throughout the world. A video stream can be live multicast, prerecorded multicast, or a prerecorded on-demand unicast. A live multicast is simultaneously seen by all subscribers at once as it is being recorded. A prerecorded multicast is a video stream sent to and simultaneously seen by all subscribers. An on-demand unicast is a video stream sent to and seen by individual subscribers when they want to see it. Each subscriber has their own dedicated stream, which means more bandwidth is consumed. The management of video files will be part of the digital asset architecture as illustrated below.



We plan to install two Media Edge Servers, one in the Kimball and one in the Smith for redundancy. These servers will allow us to stream video content over the school's network, such as the weekly devotionals to each PC on campus. We will also purchase several (to be determined) Media Edge Set-top boxes, which will allow us to provide digital signage and real-time streaming video to LCD screens at various locations on campus.

The implementation of this technology is dependant on the network refresh. Video traffic is the most significant (bandwidth-intensive) traffic on the network. After the network refresh, we will complete a network utilization study to find out the impact this technology will have on the network. This will allow us to tune the network for this traffic. Upon completion of this study, the full implementation of this technology can commence. The implementation of the Media technology is part of the Digital Assets Management Architecture, which will allow all digital assets created on campus to be stored in one central repository and to be retrieved by a high-speed search engine.

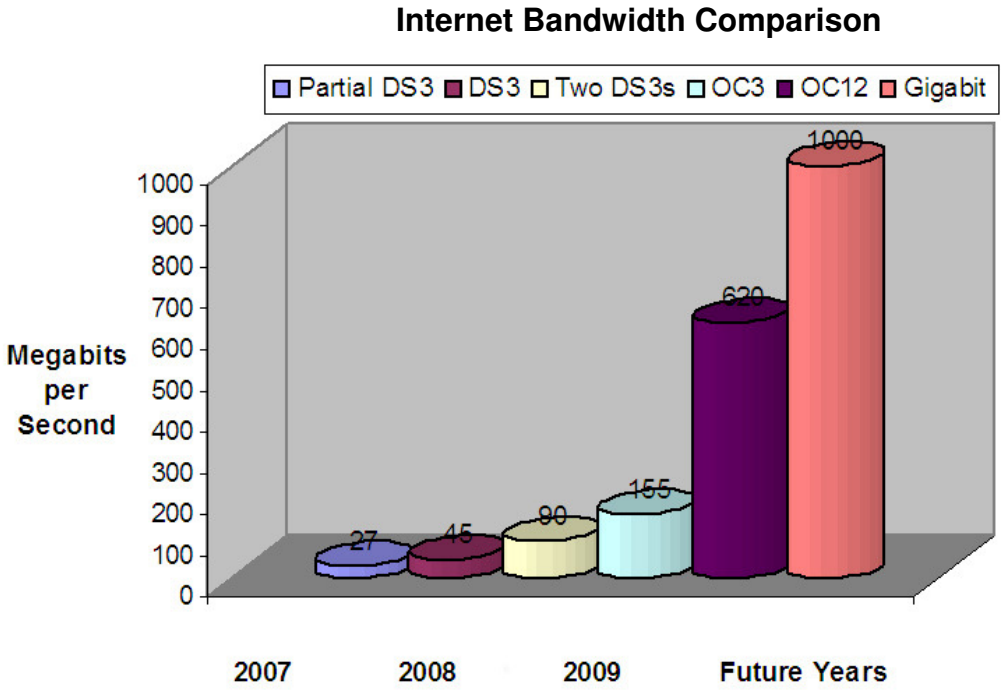
We are looking forward to a more unified approach to distributing digital video across campus. Here are some areas, in addition to those mentioned above, we are currently researching:

- IPTV (Internet Television) is a concept of distributing television channels campus wide over the network. This makes it possible to distribute cable TV over the network to places where there is no coaxial cable. For example, "CNN Headline News" can be sent to any classroom, once licensing arrangements have been made.
- We need to determine how to stream devotionals over the Internet. This would be hosted from off campus, so none of the resulting traffic would affect our campus Internet bandwidth.
- Sonicfoundry's Mediasite is a good candidate for the capture of comprehensive classroom lectures (including slides, questions, and answers), making the lecture available for live and on-demand viewing.
- A campus video distribution facility will be part of the new auditorium and will become a key means to an ever increasingly important campus video capability. Such a facility will provide better, more seamless distribution of video across campus and to other production entities. For example, our devotionals and other audiovisual programs can then be easily transmitted elsewhere, such as BYU Television.
- HDTV (High Definition TV) is a requirement imposed by the FCC (Federal Communications Commission) on much the same time line as the completion of the new auditorium. A large investment in HDTV technology will be made in the new auditorium and the rest of the campus will migrate to HDTV using established equipment replacement cycles.
- Video content management becomes more important as video becomes more ubiquitous and critical to achieving the campus mission. Video content is massive and requires much high-speed storage. We plan to acquire a video content management system that will enable us to: store, manage, and search video content; edit and master videos much more quickly; provide faculty video production and editing.

4 IT Infrastructure Initiatives

4.1 Internet Bandwidth and CES Network

In the past 12 months, the university's Internet bandwidth has been increased from 27 Megabits to 45 Megabits (a DS3) to 90 Megabits (two DS3s) to 155 Megabits (an OC3). The OC3 connection terminates in Salt Lake City in the same Point of Presence (POP) location in which the Internet connection of BYU terminates. This measure will facilitate easy tie-in to the data center in Provo. Users quickly utilized the additional bandwidth available after each increase. The "Field of Dreams" movie line, "If you build it, they will come" is very applicable. We are researching further bandwidth increases such as an OC12 (620 Megabits) and a 1 Gigabit connection. Our research has shown that connectivity into South-east Idaho is extremely limited. Some providers have told us that they cannot provide a 1 Gigabit service at this time.



With the increasing number of students and on-line resources, the availability of server and storage resources in the BYU Data Center, and the need to perform off-site backups to that location, increased bandwidth is needed. As a means to conserve the Internet bandwidth purchased by the University, and also enable other needed management functions across the Internet, IT is researching technologies such as WAN Optimization. The Internet connection has been increased twice in the past year, and more is planned for the future, but the demands continue to out-pace the increases. WAN Optimization allows Internet bandwidth to function as though it is has greater capacity than its size indicates by incorporating technologies that conserve bandwidth. One such technology is caching of routinely visited Internet sites and pages. Another technology is de-duplication, which keeps track of data packets sent and only sends unique packets. Devices at both ends of the transmission manage the packets and deliver appropriate results.

We recently made a strategic move that may be a solution to our future Internet bandwidth needs. We joined the consortium named Idaho Regional Optical Network (IRON). BYU-Idaho is a voting member of the consortium and has taken on the Treasury duties of the organization. The IRON proposal would connect Idaho universities and INL to the National Lambda Rail (NLR) by establishing an NLR on-ramp in Boise

and by building a regional fiber-optic network in Idaho. In addition to providing BYU-Idaho with either a primary or secondary Internet connection, IRON will provide a stable, high-speed connection between BYU-Idaho and Intermountain Healthcare facilities which will provide distance learning for programs such as Nursing.

Though the cost of providing Internet service to the campus community has risen, we will be able to utilize the increased bandwidth to take advantage of distance learning opportunities, off-site data replication, and leverage the virtual data center concept available to us via the Provo data center. Value may also be realized by sharing some bandwidth and services with BYU and other CES institutions. Although there may someday be a 1 Gigabit connection to BYU-Idaho we must keep in mind the sites we connect to will likely not have comparable connections. The speed at which we connect to any remote site will always be limited by the slowest link between here and there.

4.2 Computing and Telecommunication Centers

The Kimball Computing Center (KCC) and the Smith Telecommunication Center (STC) are critical to supplying and maintaining IT services to the campus community, as well as the rapidly growing online community. These facilities host the majority of the servers and data systems necessary for campus operations. The STC is the demarcation point for all communication services entering or exiting the campus, including Internet service and telephony. The STC is also the primary hub of the fiber ring interconnecting all of the campus buildings. Even the telephone and network service that Qwest provides to the Rexburg temple runs through the STC.

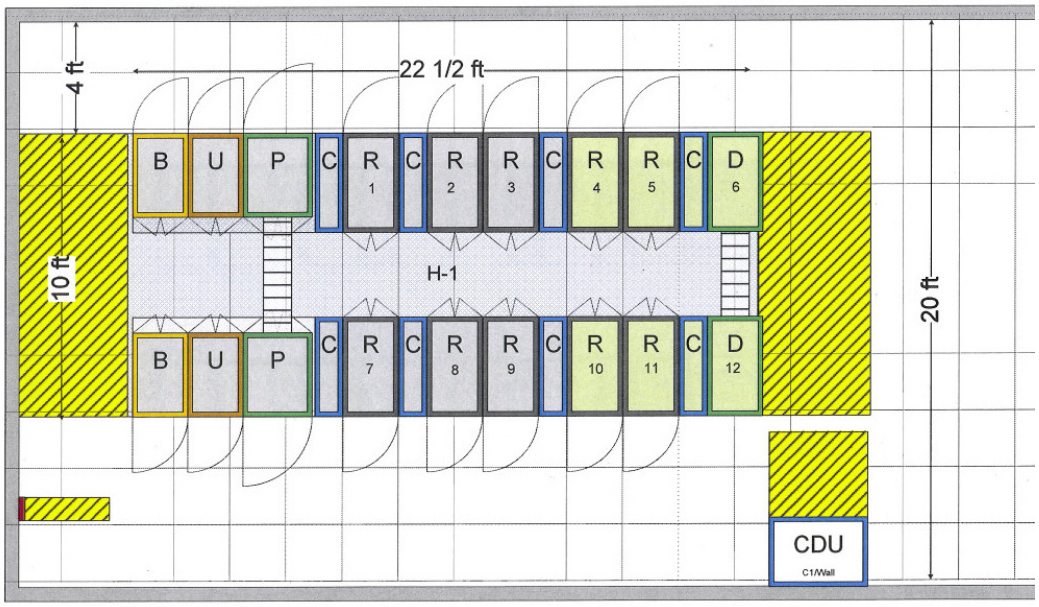
With the growth in the number of servers, mass storage devices, and network infrastructure equipment over the last several years, our existing data and telecommunications centers have become completely overloaded. We are at full capacity in terms of power distribution, cooling capacity and space for current and future deployment of equipment. Resiliency and high availability demands have increased tremendously and we now find ourselves unable to guarantee even existing services at the level that a “world class” IT infrastructure should be capable of providing. We are also unable to provide these resources for any new major data, storage, server or network systems in our data and telecommunications centers.

The designs of the remodeled KCC and STC have been completed and a request for appropriations has been sent to the board. Both facilities will be expanded to provide space for technological growth. A state-of-the-art modular power distribution system, backup power system, and cooling system will be installed in both locations. The STC will be fitted with a new 350KW generator and 1000KVA transformer.

The new design utilizes modular power distribution and backup power systems allowing us to expand services in the data center in a more measured manner. The environment is also better controlled by maintaining a semi-closed system to manage the hot and cold air. The racks are placed back to back, with all of the hot air contained between the rows. This hot-aisle containment system allows us to provide more efficient cooling of equipment, particularly high-density areas like blade servers. We refer to this entire system (power distribution, backup power, cooling, and equipment racks) as a pod.

These modifications are necessary to move forward with the network upgrade, additional storage requirements, additional and resilient Internet bandwidth, voice over IP (VoIP) telephone services, backup and disaster recovery solutions, Exchange 2007 rollout, as well as additional requests for servers and services. We anticipate that at the completion of this project this year, BYU-Idaho will have the facilities capable of moving our IT infrastructure into the future with facilities that are modular and scalable, and be capable of delivering highly available and highly reliable network and data services to the growing number of people and buildings that utilize them. Monitoring and security solutions will also be included allowing

us to proactively monitor growth and environmental conditions to protect systems, infrastructure, and technology assets.



Kimball Pod (B=Batteries, U=UPS, P=Power Distribution, C=Cooling Unit, R=Rack D=Power Distribution)

4.3 Telecommunication Rooms

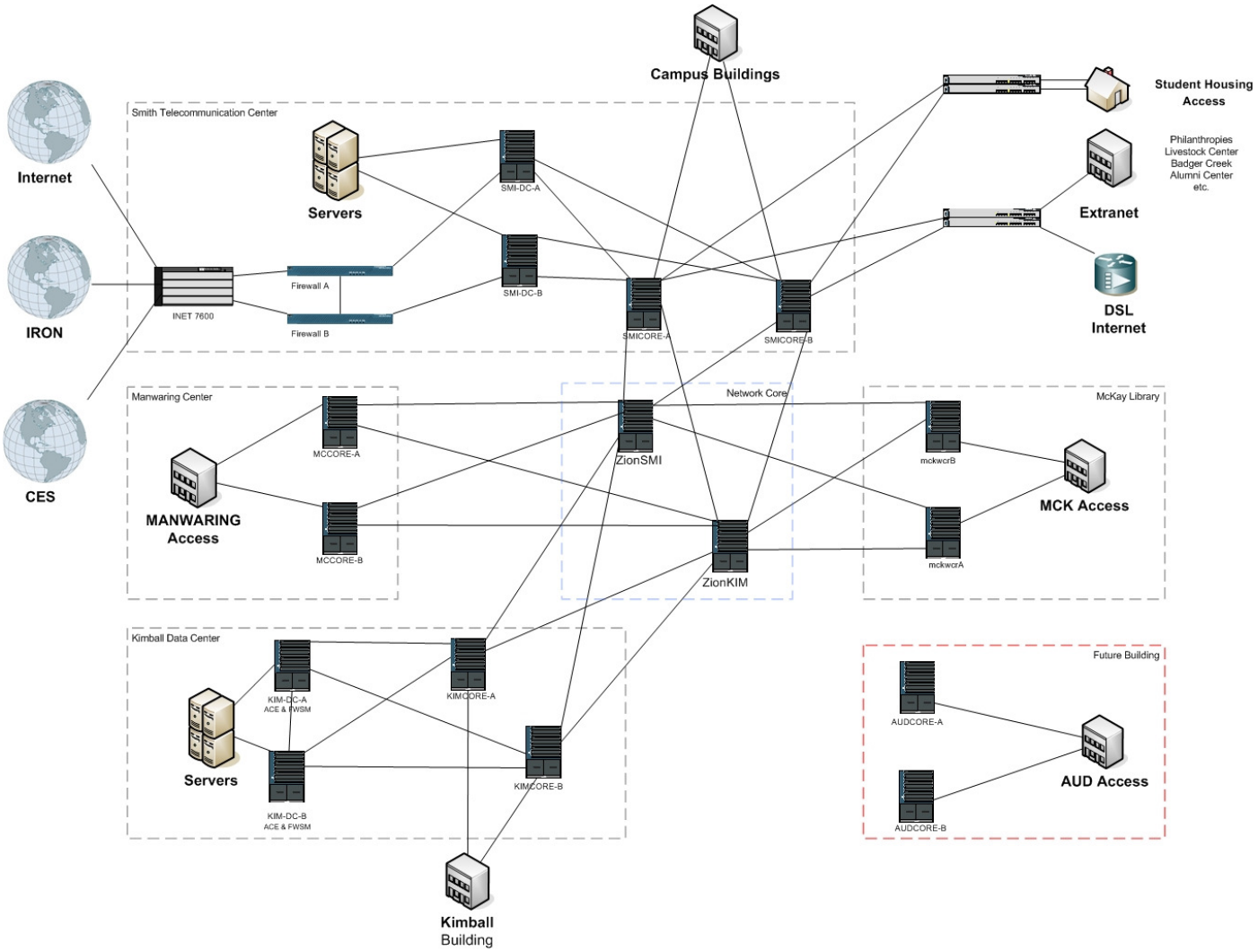
There are over eighty telecommunication rooms on campus, and they are essential to the distribution of cable, network, telephone, wireless, surveillance and video services within each building. Industry shifts in services and convergence of services onto the network are requiring more power distribution capacity and therefore increased air conditioning is required to maintain the proper environmental conditions. For example, wireless access points scattered throughout a building and future voice over IP (VoIP) telephones will be powered over the network from these rooms. Few of the rooms already meet these requirements and are in varying degrees of need. The evaluation and research of these spaces is nearing conclusion. Funds have already been approved for the necessary upgrades. A project will be submitted in the near future seeking appropriations.

4.4 Network Refresh

The campus network is the circulatory system of the campus – it is essential to the transmission of information. As needs of the University have changed and grown, it has become necessary to replace existing network equipment to provide more bandwidth, retire aging equipment, and enhance feature sets and security. Specific infrastructure upgrades are also required to support technological advances like VoIP, wireless networking, video streaming, and IP TV. The upgrades will enhance customer service by providing adequate support for the university network, while also expanding scaling capacity for a growing campus.

A talented team of campus network engineers, network equipment vendors and partners, have completed a detailed redesign of the new network. Aggressive negotiations with the vendor and partner have also been completed. The agreements include consulting services during the deployment of the new equipment, warranty and maintenance for the next five years, training credits, and a savings of over two million dollars from original budget submitted in 2007. The new network will include components that make it resilient

and resistant to down-time and service outages. The result, over the next 12 months, will be a world class network infrastructure, secure and prepared to provide services to individuals and entities both on and off campus.



4.5 Data Storage

Data storage is at the foundation of the BYU-Idaho infrastructure; nearly every piece of data resides on a hard disk somewhere. Critical and enterprise level data is generally stored in a central system in a data center. This storage system requires environmental control, consistent and reliable power, and a resilient architecture. Data storage is a key element to temporary storage, long term storage, and backup. For the sake of resiliency, data storage should be distributed both locally and remotely. Nearly every initiative in this plan requires additional disk space for data storage.

These needs are fulfilled through a growing storage area network. Scaling this data storage is foundational to providing most other services. Tier I storage was purchased in 2006 and tier II storage in 2007. In general, tier I storage is faster, more reliable, and more expensive than tier II storage. No additional storage will need to be purchased in 2008. A combination of tier I and II storage will be purchased in 2009 according to the needs dictated by campus initiatives.

IT Infrastructure has also purchased de-duplication appliances that will greatly enhance and simplify the backup strategy. Traditionally, data backup has always been done to some sort of streaming media such as tape. Backup tapes are bulky, expensive, slow, and susceptible to a myriad of errors and data loss. De-duplication technology utilizes fast, reliable, less-expensive disk to store backed up data. In addition, though the disks look like traditional streaming media to the backup software, these appliances more closely resemble an indexed database. When data is submitted to the appliance for storage, an index is consulted to see if an identical block of data already, exists. If so, an entry is made referencing the already existing data rather than writing another copy of the same data. The result is a huge compression ratio, allowing us to backup terabytes of data in a fraction of the space. Other benefits include faster data restorations, smaller backup windows, and longer retention periods.

Three of these appliances have been purchased. When they have all bee deployed, one will exists in the Kimball Computing Center as the primary backup unit for university data. Another will be deployed in the Smith Telecommunication Center. Data from the primary unit will be replicated to this unit. It will also serve as a secondary backup unit in the case of a failure in the primary unit. The third de-duplication appliance will be mounted in the BYU data center in Provo. Critical data will be replicated across the Internet from the primary unit in the Kimball to this tertiary unit for recovery in a disaster situation.

IT will continue to keep a pulse on the storage needs of the campus and upcoming initiatives. As bandwidth becomes available, research conducted, and evaluations completed, we will also place data storage devices in remote locations, such as the data center in Provo, to provide more reliable services to the world.

4.6 Network Admission Control and Remediation

Network Admission Control (NAC) requires each user to authenticate before being granted access to network resources. This will prevent malicious users from outside the campus community from accessing the network. This will also allow BYU-Idaho to monitor, log, and track other inappropriate network access and activity. NAC has already been implemented on the new wireless network and will be incorporated into the new wired network.

In order to maintain a secure network, we also need to be able to monitor those who are allowed to get on the network. Those who are authorized will be permitted access to the network after their system has been checked for viruses, malicious software, and a properly patched operating system. If their system does not meet the minimum requirements, it will be connected to an isolated network. This dead-end network will contain a server from which they can install patches, updates, and anti-virus software. When the offending system has been properly patched and protected, access will then be granted.

5 IT Governance Initiatives

5.1 Business Continuity and Disaster Recovery

It is vital for the University to have a plan to minimize consequences of and continue daily operations in the event of an emergency or disaster. The plan delineates how we can efficiently recover data and systems crucial to the University. IT will form a team that will classify University data and systems according to importance, as well as attach a monetary value and retrieval time to each, enabling us to determine appropriate methods of retrieval for each category. This will require a high-level review, using the feedback of several departments on campus. The team will then provide the President's Council with a recommendation for the backup and restoration of the University's Business Critical Data (BCD). The recommendation will detail the BCD that the University creates and employs in daily operations and what policies and procedures need to be implemented for the backing up and restoration of data. Having the assurance that critical data is secure and protected is a key part of business continuity and disaster recovery. Backup can range anywhere from a simple backup disk to storing data off-site. We anticipate partnering with other CES institutions to accomplish any off-site needs. This initiative is highly dependent on upgrading our Internet bandwidth, becoming part of the CES network, and implementing a resilient backup system. The network refresh will provide us with fail-over and load balancing capability between the Kimball computing center and the Smith telecommunication center. We will work with BYU in Provo to provide the campus with a third fail-over center in the case of a natural disaster.

5.2 Professional Development

Over the past year IT has lost some key people. We have not been able to replace them with the level of experience they took with them and that we need to have. For the most part we have hired our students with little experience. We need to do a better job of attracting the talents we need and make sure we do everything we can to keep the talents we now have. Following are measure we can take to help with the hiring and retention issues.

- We need to ensure that our salary is comparable to the market. Since we are loosing our best people to private business, it does not help for us to just compare our salaries with higher education. IT is working with HR to review all of IT job descriptions. This will allow HR to better compare IT jobs and salaries within the CES system and with outside entities.
- We need to do more to make sure the IT staff feel a part of everything that is happening at the University and that everyone can contribute to major IT initiatives. The IT portfolio management system should allow us to better balance tasks that we give to our staff. It is desirable that everyone gets involved with the new projects and get exposed to new technologies.
- We need to encourage IT staff to work toward professional development goals and provide training opportunities for them to improve their skills.

5.3 IT Committees

IT has evaluated how various committees and councils interface with IT. Improvements have and can be made in the way IT is governed and how IT aligns with the University's mission through the proper use of advisory bodies. You will see some of these proposed changes in the *IT Portfolio* section below (5.6).

The Computer Technology Council's (CTC) role will be fine tuned. Their primary role will be to prioritize IT projects at the University level. They will advise President's Council on strategic IT matters and will

continue to be a policy making body. Their involvement in day-to-day decisions will be curtailed. Their approval to spend budget for projects that have already been approved will end.

5.4 IT Policy

IT policies, procedures, guidelines, and standards need to be created, updated, and approved by management. They will set the rules and expectations for the use of University information and systems, and should be made readily available. Policies allow users to learn their responsibilities so they can be held accountable for their actions. During the past year policies for web pages and information security have been written and approved. Many more policies and procedures need to be updated. Further work in standards and checklists can improve productivity and security. Making these documents available on the web has been and needs to continue to be done.

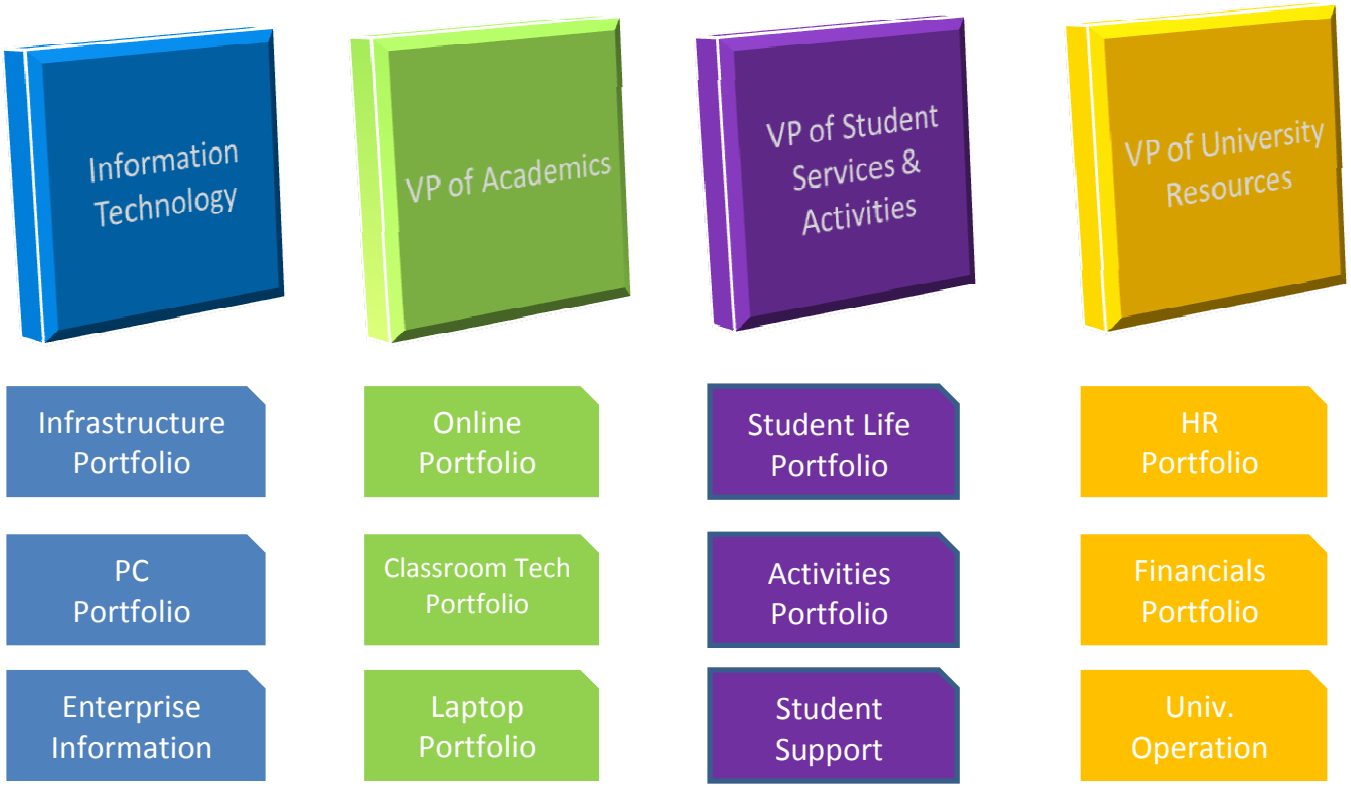
5.5 Information Security

Moving an information security program forward and infusing information security into the culture of BYU-Idaho is important. Issues raised by risk assessment, vulnerability scans, and self-assessments are being tracked for progress. Information security policy for the campus has been developed and approved. An information security plan has been written. Such activities should result in improvements and increased awareness. There are several issues that need to be resolved and are worth noting:

- The campus is not compliant with the PCI DSS (Payment Card Industry Data Security Standard). The steps necessary to become compliant have been identified and are being tracked. These standards have recently been updated, which may create other steps that need to be taken.
- Application developers and programmers need specific training on secure programming practices. This is expensive and time consuming at a time when there is already plenty on the plate.
- The Infrastructure department needs to put in place tools to monitor log files and system events to detect signs of intrusion, loss of data, loss of integrity, etc. More importantly they will need to make it part of their job description to pay attention to security matters. This is expensive and time consuming and at a time when everyone already has plenty to do.
- Recently approved information security policy will be of no value if no one reads them or receives awareness training. All employees should be required to attend awareness training.
- As devices become more mobile, smaller, and easier to loose we need to make sure no confidential information is put on them. When doing so is a requirement, we must have take special precautions and efforts to protect it. Again, awareness training is paramount in this arena.

5.6 IT Portfolio Management

The IT portfolio management system (i-Port) is a collection of processes, governance principles, and tools that will help with the management of IT resources. i-Port will help the University to effectively manage IT resources, and deliver IT solutions in a more timely fashion. It will also improve how IT aligns with the University's strategies. Because of i-Port, President's Council will have more insight and Oversight of IT resources, helping the University prioritize IT projects. This will promote and support a "front door" approach to IT projects. As a result, IT throughput and performance will improve. The i-Port system will be web-based and will provide functionality and web reporting to all interested parties. Each album consists of several portfolios as illustrated below (slightly out-of-date due to the recent reorganization).



A portfolio is organized from a set of IT initiatives, projects, and ongoing services related to one area of the University. A portfolio will spawn projects as the services and initiatives of the portfolio are analyzed. Portfolios are prioritized at several levels. At a high level, the vice presidents prioritize IT requests for their areas. CTC (Computer Technology Council) prioritizes projects at the University level. Executive directors manage their respective portfolios and work closely with IT portfolio managers. IT project managers leverage IT resources to meet each portfolio's needs.

The project workflow is designed to improve documentation, collaboration, and communication. These efforts are expected to result in:

- Better communication of priorities and objectives at all management levels
- IT staff focusing their works efforts more on University mission priorities

- Improved ability to forecast objectives, timelines, cost, and resource requirements
- Improved ability to meet the projected objectives, timelines, and costs
- Better communication to stakeholders concerning project status
- Better accountability of resources

6 Cost Estimates

2008 BYU-Idaho I.T. Initiative Request (summary)
March 31, 2008 Revision
All Funds - I.C.III page 1

One-time Appropriation Requests	**Total Cost**	**Cash Flow 2008**	**2009**	**2010**
New ITI requests:				
Voice over IP(handsets & licensing)				
Servers				
Storage				
Data backup & disaster recovery				
Network equipment				
IT load balancer				
Auto attendant				
Pervasive wireless (appropriated portion)				
Network security				
Network management				
WAN equipment				
Student S.I.S. and portal system - servers				
I.T. Development Projects:				
Student S.I.S and portal system - data conversion				
Student S.I.S. and portal system - implemen./cust.				
Student S.I.S. and portal system - license				
Student S.I.S. and portal system - training and travel				
Capital Projects:				
*Upgrade Kimball computer equipment room				
*Upgrade Smith telecommunication room				
Upgrade other telecommunications rooms				
*AC21 needs to be approved in 07 (October) for design to allow construction to be started and completed in 2008. (cost includes design fees of $164k, use local funds , contr. start date 3/08)				
Total Projects Cost				
Projects Funded Internally:				
I.T. initiative funds applied to ERP project				
I.T. R&R funds applied to Network Equip (above)				
Total projects funds requested				

CENSORED

2008 BYU-Idaho I.T. Initiative Request (summary)
March 31, 2008 Revision
All Funds - I.C.III page 2

	Total	Requested Increases in Operating Budget		
		2008	2009	2010
	Cost	---	-	---

On-going Appropriation Requests:

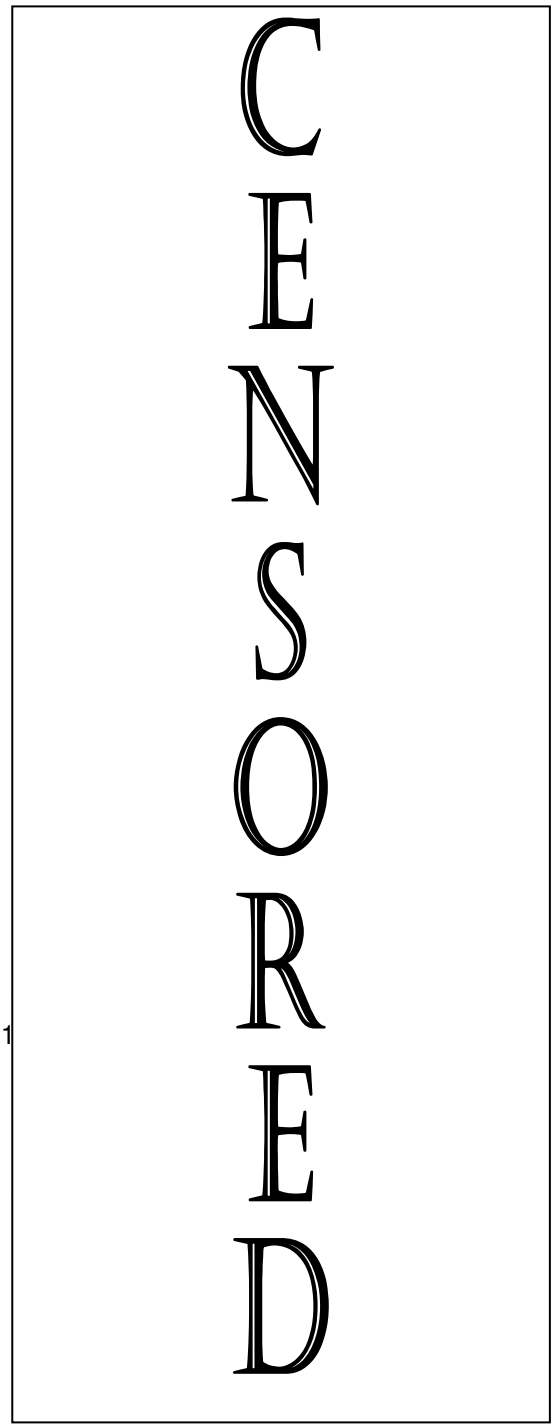
FTE:
FTE salaries($60k) **and benefits**(30%)**:**

Operating Budget::
Student S.I.S. and portal system maintenance fee
Pervasive wireless maintenance
Microsoft Premier support
Internet bandwidth
Student wages technology support
Security - penetration testing
Security - vulnerability scanning
Blackboard-group management tools
Blackboard-turnitin or safe assignment
Blackboard-virtual classroom
Blackboard-class top
Blackboard-Agiliz course creator
Blackboard-content and outcomes systems
Blackboard-advanced assessment tools
Renew wiki, blog, and podcast tools
Video streaming maintenance
Employment application system maintenance fee
Travel & material funds for new I.T. fte($2,500 per fte)

Total operating budget increase

Operating Costs Funded Internally:
(3) contingency fte from previous expanded prog. req.

Total operating funds requested



2008 BYU-Idaho I.T. Initiative Request (summary)
March 31, 2008 Revision
All Funds - I.C.III page 3

ITI Summary:	Total 2008-10 ITI cash flow	Cash Flow 2008	2009	2010
New appropriation requests:				
On-going ITI replacement requests				
On-going ITI addition requests				
ITI initiative requests				
Previously appropriated unspent ITI funds: *				
Total ITI cash flow	2	CENSORED		

* Mostly network core equipment (approx. $1.5 million)

7 Manpower Estimates

As the need for IT support keeps growing, we anticipate the need of these additional positions to meet demand. Requests will be formalized in stewardship review.

- One software engineer for interfaces
- One audio visual technician for additional classroom support
- One data modeler for data warehouse
- One network engineer for wireless
- One application analyst

8 Timeline Estimates

As we consider when these initiatives can be accomplished, we must find the right balance between priorities, resources, and dependencies. We expect these initiatives to follow this general timeline:

IT Initiatives Timeline

Winter 2008	Summer 2008	Fall 2008	Winter 2009	Summer 2009	Fall 2009	Winter 2010	Summer 2010	Fall 2010	Winter 2011	Summer 2011	Fall 2011
Enterprise Portal											
	Content Management			Assessment							
	Knowledge Management				Outcomes Assessment						
	Course Management										
	Learning Management										
	Online Content Creation										
	Online Content Management										
	Online Collaboration Tools										
	Virtual Classroom Technology										
	Student Laptops										
Wireless Network											
Help Desk											
Academic Computing											
Enterprise Information Systems											
	Data Warehousing										
Unified Communication											
Integrated Systems Management and Security											
Desktop Operating System Migration											
		Streaming Video and Digital Asset Architecture									
Internet Bandwidth and CES Network											
Computing and Telecommunication Centers											
	Telecommunication Rooms										
	Network Refresh										
				Data Storage			Data Storage			Data Storage	
Network Admission Control and Remediation											
		Business Continuity and Disaster Recovery									