

Information Technology Services

Operations Plan: 2003–04 to 2006–07

University of Saskatchewan Integrated Planning

... working closely with faculty, students, colleges and departments to provide services and leadership that support and enable teaching, learning, research and administrative service delivery through the effective use of information and communications technology.

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Executive Summary

University Dependence Upon ICT

The University of Saskatchewan is committed to renewal by pursuing the strategic directions outlined by the President in *University of Saskatchewan Strategic Directions 2002 – Renewing the Dream*. The effective application of information and communications technology (ICT) is critical if the University is to attain these strategic goals. “The quality of our ICT environment affects the way we teach and the way we learn, the way we manage our business processes and the way we interact with our customers. This technology impacts everything we do, affecting both how we do it and the quality of the product.”¹

Every year, usage of ICT by faculty, students, researchers and staff continues to increase dramatically. Some examples of the increased usage follow.

- There are now over 8,000 computers on campus. This is an increase of 2,500 in the last two to three years. We expect that 3,000 additional computers will be installed in the next three years.
- The current campus network standard is 100Mbs. This is a tenfold increase over the service provided three years ago. However, another tenfold increase will be needed in the next three years to meet research needs.
- We currently provide e-mail service to 50,000 members of the University community. This number is expected to exceed 70,000 within three years.
- The use of e-mail doubles, almost yearly. At peak times, we deliver more than 400,000 e-mails daily.
- The number of e-mails sent to the University with viruses has increased more than tenfold in the last eight months (to 90,000 per day).
- The number of Internet-based attacks against the University doubles every 4–6 months. We block over 5 million attempts to probe or attack the University from the Internet daily. Less than a year ago, this number was 1 million.
- Almost 12,000 students, instructors, researchers and staff have used the campus portal (PAWS) since its implementation in September 2003 (less than six months ago).
- Usage of the WebCT course management system is increasing 50% yearly. Today, 118 courses and almost 4,000 students are using WebCT.

ICT’s impact on higher education has been significant and includes: e-communications, e-collaboration, e-communities, e-learning, e-libraries, e-journals, e-whiteboards, e-services, e-payments, e-business, e-science, e-research, learning management systems and learning object repositories.

The University will continue to be increasingly dependent upon ICT in the future for teaching, learning, research and service delivery in ways that few can predict. This dependence will be driven by the changing expectations and needs of the incoming students, faculty and researchers, as well as by the new capabilities provided by technological advances.

¹ Advantage U of S, ICT Foundational Document, June 2003

Information technology service organizations are struggling to respond to the needs expressed by students, faculty and researchers.

ITS Services Overview

Information Technology Services' (ITS) mission is "to work closely with faculty, students, colleges and departments to provide services and leadership that support and enable teaching, learning, research and administrative service delivery through the effective use of information and communications technology."

ITS does not provide all ICT services on campus. Under the federated support model adopted by the University, the responsibility for service delivery is shared.

- Colleges and administrative units are responsible for services that address the specific (often discipline-specific or local) needs of their students, faculty and staff.
- The central ICT organization, colleges and administrative units share responsibility for: service planning, standard setting, enterprise (administrative) systems development and ICT security.
- The central ICT organization is responsible for services that are used by faculty, students, researchers and staff in all colleges and administrative units; that are most cost-effectively provided centrally (economies of scale); and that require interoperability among colleges and departments.

The services provided centrally for the campus community are often called "foundational," "baseline" or "core" services. Most of ITS' foundational services support teaching, learning, research and service delivery. These services include:

- Research and Educational Network
- E-Communication and Collaboration
- Identification, Authorization and Authentication
- Desktop Support
- Help
- Training
- ICT Security

ITS also provides some foundational services that are unique or specific to each of the following: teaching, learning and research and administrative service delivery.

- Instructor Support
- Learner Support/Student Computing
- Research Computing
- Administrative Information Systems

Service Maintenance

ITS' services are required and used daily by instructors, students, researchers, staff and other members of the University community. ITS proposes to maintain and enhance these services,

to the degree we have been able to, using current staff, operating budget resources and project resources. Disinvestment will occur as part of ongoing service planning and evolution.

The table below summarizes the budget that will be assigned to maintaining each of the 11 ITS service areas during the current planning cycle. The budget includes staff resources from our operating budget as well as capital funding from the Campus-Wide ICT Infrastructure Services Capital budget.

The maintenance budget assumes that \$900,000 of capital funding will continue to be available to maintain and renew the network equipment and servers used to deliver campus-wide ICT services. We propose that the annual allocation from this fund to specific initiatives be determined in consultation with the Academic Support Committee of Council, the Budget Committee and the Associate Vice-President (ICT). This is similar to the process used in previous years.

Funding received for staffing from the Systems Development Fund (SDF), Student Computing Fund (SCF) and the provincial TEL (Technology Enhanced Learning) initiative is included in the “Project or Fee-for-Service” column. This funding is provided on a project or special initiative basis as is the staff funding provided by the USR-net and the Si! projects. A detailed budget for the SDF and SCF is outlined in section 3.2.4.

Budget Assigned to Delivery of Core ITS Services				
Service Area	FTE 2003–2004		“Steady State” FTE for Planning Cycle	Typical Annual Capital Equipment Allocation
	ITS Operating Budget	Project or Fee- for-service	ITS Operating Budget	
Research and Educational Network	10.60	4.00	10.50	\$400,000
E-Communication and Collaboration	5.20	4.20	5.00	\$150,000
Identification, Authorization and Authentication	1.50	1.40	1.50	Uses existing servers
Desktop Support	3.00	25.30	3.00	\$25,000
Help	8.90	3.70	9.00	
Training	0.90	1.70	1.00	
ICT Security	1.10	2.00	1.00	Included in allocation for other services
Instructor Support	3.00	2.30	3.00	\$75,000
Learner Support/Student Computing	1.40	4.10	1.50	\$75,000
Research Computing	0.70	0.00	1.00	\$50,000
Administrative Information Systems	21.60	15.90	21.50	\$125,000
Subtotal	57.90	64.60	58.00	\$900, 000
College/Unit Specific Staff	5.10	4.00	5.00	
Administrative Support	4.00	1.00	4.00	
Director	1.00		1.00	
Total	68.00	69.60	68.00	

The assigned staffing level, based upon our current operating budget and current University ICT service needs, is adequate to meet the campus needs in only two areas.

- Research and Education Network services. This assumes that the funding, approved in the CFI conditions of award (USR-net project) for the support and operation of the upgraded campus network, is provided.

- Training services. This assumes that funding will continue to be available from the provincial TEL initiative.

The assigned staffing level, from operating budget, is inadequate to meet the needs of instructors, students, researchers and staff in the following eight service areas (see details in section 3).

- E-Communication and Collaboration (to maintain/enhance campus portal)
- Identification, Authorization and Authentication
- Desktop Support
- Help (for extended hours of service)
- IT Security
- Instructor Support
- Learner Support/Student Computing (improve support for mobile student computing)
- Research Computing

The staffing level that is assigned to the support of institutional administrative information systems is adequate to address only some of the University's needs (see section 3.1.11 for details). It is adequate to support the University's current needs with respect to the following systems:

- Student Information System (SIS, Si! project, Banner Student)
- PeopleSoft Human Resources Management System (About-US)
- Finance and Accounting System (FRS, Banner Finance)

The assigned staffing level is inadequate to meet University needs with respect to the following systems.

- Campus Contacts Database (U-Who)
- Systems and associated "data warehouse" enhancements required to support University planning activities and government reporting. (Institutional Analysis/Integrated Planning Office)
- Alumni/Donor System (U-Friend)
- Electronic Payments Infrastructure Support

Faculty, students, researchers and staff depend upon ITS' services daily. We will be unable to meet the University community's core ICT service needs for this planning cycle within our current operating budget. As a result, additional investment is requested to improve the following core services (see section 4 for details).

- E-Communication and Collaboration (to maintain/enhance campus portal)
- Identification, Authorization and Authentication
- Desktop Support
- Help (for extended hours of service)
- IT Security
- Instructor Support

- Learner Support/Student Computing (to support student mobile computing)
- Research Computing
- Administrative Information Systems
 - Campus Contacts Database (U-Who)
 - Systems and associated “data warehouse” enhancements required to support University planning activities and government reporting.
 - Evolution of Alumni/Donor System (U-Friend)
 - Electronic Payments Infrastructure Support

The consequences of an inadequate investment in core ICT services are numerous and include the following.

- Service failures will occur more frequently. The response time to repair failures will be longer. Faculty, students, researchers and staff will spend more time waiting for help, waiting for ICT services to be fixed or doing ICT work rather than teaching, research, learning or delivering services.
- Colleges and administrative units rely upon ITS’ services for their teaching, research and administrative service delivery, and will not be able to curb the demand for those services. If services levels are inadequate, colleges and administrative units will be forced to deliver core ICT services themselves. Multiple (duplicate) implementations of services will occur. Services may not interoperate creating user confusion and increased learning times. The University’s total cost for delivering ICT services will likely increase.
- Requests for service changes or for new services to meet changing University needs will be delayed or may not be implemented. The University loses out on the benefits that would have been provided by the required service changes. Colleges and administrative units will be forced to duplicate existing services so they can control their evolution, and, develop new services on their own.
- A university’s ICT environment is increasingly becoming an important factor in how people choose the university in which they want to work or study. Without adequate core ICT services, colleges will have more difficulty recruiting outstanding faculty, graduate students and academically promising undergraduate students. Again, they will be forced to provide core ICT services on their own.

Investment Initiatives

Four initiatives are proposed.

The first investment initiative will enhance core services, listed below, so they meet the needs of instructors, students, researchers and staff over the planning period. We will be unable to adequately meet those needs within our current budget. This initiative consists of eight sub-initiatives, one for each of the following services.

- E-Communication and Collaboration (to maintain/enhance campus portal)
- Identification, Authorization and Authentication
- Help (for extended hours of service)
- IT Security

- Administrative Information Systems
 - Campus Contacts Database (U-Who)
 - Systems and associated “data warehouse” enhancements required to support University planning activities and government reporting.
 - Evolution of Alumni/Donor System (U-Friend)
 - Electronic Payments Infrastructure Support

The table below outlines the funding requested for this initiative, on a service (sub-initiative) basis. The services, for which investment is requested, are used in teaching, learning, research and administrative service delivery. An investment in this initiative would therefore provide a more productive environment for all those activities.

While the requested investments are presented in priority order, the University will probably have to make additional investment in all of these services during this planning period. For example, investment will be needed to integrate the contacts database (U-Who) with Banner Student and Banner Finance; investment also will be required to address ICT security issues as they arise.

Without additional funding for core services, resources will have to be continually redirected from one project or service to address pressing needs in another project or service. For example, resources from the Si! and Unifi projects may have to be re-directed towards U-Who integration; resources from the USR-net project may have to re-directed to addressing ICT security problems. This is akin to continually using sand from one area in a dike to repair holes in another area just in time before the next wave comes in.

Initiative 1: Enhance Core ICT Services				
	2003–04	2004–05	2005–06	2006–07
Maintain and Enhance the Campus Portal		\$480,000	\$490,000	\$500,000
Enhance the University’s Identification, Authentication and Authorization systems		\$390,000	\$160,000	\$70,000
Enhance “Contacts” Database (U-Who)		\$160,000	\$150,000	\$150,000
ICT Security – Provide a Secure and Productive ICT Environment		\$190,000	\$350,000	\$500,000
Enhance University Systems and Databases Used for Planning and Reporting (Institutional Analysis, Integrated Planning Office)		\$200,000	\$260,000	\$140,000
Enhance Alumni and Donor System (U-Friend)		\$13,000	\$35,000	\$65,000
Maintain and Enhance the Campus Electronic Payment Infrastructure	\$35,000	\$40,000	\$30,000	\$35,000
Extend Hours of Support for Core ICT Services		\$270,000	\$260,000	\$260,000
Total (over 2003–04 budget)	\$35,000	\$1,743,000	\$1,735,000	\$1,720,000

The second investment initiative will (1) increase support for the use of technology in instruction, (2) enhance existing, and develop new, ICT services that support research, scholarly and artistic work, and (3) improve support for student mobile computing. This initiative is presented as three sub-initiatives.

The table below outlines the funding requested for each sub-initiative. While the total funding requested is significant, it is an investment in the support of instruction, research and an

improved student experience. Initial consultation has identified service requirements, related to research computing, alone, that would require an investment of more than \$1 million per year to address. While the three sub-initiatives are presented in priority order, we believe that some investment should be made for each service during the planning cycle.

Initiative 2: Strategic investments to improve ICT support for instruction, research and students.				
	2003–04	2004–05	2005–06	2006–07
Increase support for the use of technology in instruction		\$270,000	\$380,000	\$500,000
Enhance existing, and develop new, ICT services that support research, scholarly and artistic work		\$300,000	\$375,000	\$450,000
Improve support for student mobile computing		\$340,000	\$310,000	\$360,000
Total (over 2003–04 budget)		\$910,000	\$1,065,000,	\$1,310,000

The last two investment initiatives will be implemented through a re-assignment of ITS staff.

- The third investment initiative will develop a campus desktop strategy.

This strategy will be developed in consultation with the University community. It will consider the acquisition, funding and renewal of desktop computers as well as associated peripherals and servers; data backup; desktop security; software updates; end-user support and training. The intent of the strategy is to identify best practises, efficiencies and cost savings, and to reduce the amount of time instructors, researchers and staff spend resolving computing issues rather than teaching, research and delivering other service. The need for a campus desktop strategy has been highlighted in the ICT foundational document.

While the strategy will identify efficiencies and best practices, the University will probably need to invest more in desktop computing to provide the supportive environment required by instructors, researchers and staff.

- The fourth initiative will review and improve, on an ongoing basis, ITS’ service delivery processes and organizational structure so we continue to provide services in an efficient and effective manner.

This will include the simplification and automation of key service delivery processes so that they provide self-service and makes it easier for instructors, students, researchers and staff to use our services.

Lastly, it should be noted that the Library has requested an upgrade of their information systems. They have estimated the cost of those upgrades at \$1 million.

Disinvestment Initiatives

ITS’ disinvestments may include service level reductions and service eliminations. While these disinvestments would save ITS costs, they will not result in institutional cost savings.

Instructors, students, researchers and staff in all colleges and departments rely upon ITS’ services daily. If service levels are reduced significantly or if a service is eliminated, they will either perform the ICT work themselves or seek another service provider. If they do the work themselves, they will have less time to do instruction, research or service delivery. If another service provider is selected, costs are merely off-loaded but not saved.

Some colleges or administrative departments will deliver core ICT services themselves through parallel, or even competing, ICT support organizations. Having separate and disparate services causes interoperability problems and creates confusion and frustration for users. Again, costs are off-loaded and the overall cost to the institution will likely increase.

ITS often has been forced to eliminate services rather than to reduce service levels across the board, in order to address increasing service delivery costs in times of decreasing or flat budget growth. In our experience, each time a service was eliminated (or service levels reduced significantly), one or more colleges and/or administrative units started delivering the service. The cost of delivering ICT services was transferred to others but was not reduced.

Even though service level reductions or the elimination of services does not save the University money, certain disinvestments in ICT services must be undertaken. These disinvestments provide the opportunity to re-direct resources to services that better align with institutional directions and priorities, to replace old services with improved services or to focus on technologies that better support the needs of users.

ITS will undertake the following disinvestments within this planning cycle. ITS' yearly operating plans will identify further disinvestments.

- Support for SIS and FRS will be eliminated when the Si! and Unifi projects are completed. This assumes that the projects convert seven years of historical data into the new systems to meet regulatory requirements.
- The faculty and staff dial-up service will be discontinued as of April 30, 2003.
- The POP e-mail protocol will not be supported after September 1, 2004.
- Support for Word-11 will be eliminated by fall 2005.
- Support for coax network wiring will be phased out by 2005 (replaced by support for Cat-5, Cat-6, and fibre connections).
- Support for the Appletalk network protocol will be phased out by 2005.
- Support for the application development tools that were used to develop our existing legacy administrative information systems will be discontinued when those applications are replaced by new systems. The legacy applications include: SIS, FRS, Course Inventory System, DMT's billing/inventory system, Dental Clinic system, Supplemental Chequing, General Receipting, Student Fees, Emergency Loan and other systems.

Support for the OpenVMS operating system will also be dropped after the administrative systems that run on OpenVMS are converted. Target date: summer 2007.

Coordinating and Rationalizing Service Delivery

The University has adopted a federated support model. A federated support model specifies guidelines for determining the services that should be provided in a distributed manner, the services that should be provided centrally, and the shared responsibilities for ICT. However, our adoption of the federated support model was not based on a formal application of those guidelines.

Like many other higher education institutions, our ICT environment has evolved into a complex, interrelated, and in some cases, duplicated mesh of services that are delivered by ITS, colleges and administrative units. Most colleges and administrative units maintain their

own ICT staff and services. In essence, this results in having 15 or more ICT organizations on campus.

The ICT foundational document recognizes that “the lines of responsibility and authority (within our implementation of the federated model) aren’t as clear as they need to be.” A process for clarifying responsibilities for ICT service delivery is required. Our ICT service delivery matrix needs to be reviewed with the goals of:

- Clarifying responsibilities of colleges, administrative units and ITS for various services.
- Increasing efficiency. In general, the University cannot afford to duplicate competency centres for highly complex skills that are expensive to develop and maintain.
- Removing unnecessary duplication of services. In the case of duplicated services, the review should determine whether the duplication is necessary. The federated model recognizes that some ICT skills (services) should be delivered (duplicated) in colleges and administrative units. These services should focus on addressing the specific (local) needs of a college or administrative unit.
- Removing competition between units. Services that are offered by multiple units (duplicated) to the campus community create internal competition and confusion for users; in general, these duplicated services should be eliminated.
- Clarifying and simplifying the ICT service model for users.
- Permitting each unit to focus on services at which they can succeed and which will be appreciated by the institution.

The University has already clarified the responsibility for some services (e.g. campus-wide printing for students, discipline specific computer facilities) with a resulting improvement in service. Clarification regarding the central and unit responsibilities for other services is still required.

While a clarification of the responsibilities for ICT service delivery under the federated model is recommended, we are not recommending that all ICT services be centralized; some ICT services should be provided locally by colleges and administrative units.

It should also be noted that a re-alignment of responsibilities likely will not result in significant cost savings to the University. The University of Saskatchewan spends less on ICT than other comparable universities; any cost savings will be insignificant. Even if cost savings are identified, they may be impossible to capture.

Nevertheless, the clarification of service delivery responsibilities in the federated model should continue. It would clarify service responsibilities for service providers, make it simpler for users to acquire services, help identify the true cost of computing across campus, and help define the budget required to adequately deliver campus services. In summary, it would “ensure that we have the right allocation of authority, responsibility, and budget.”²

The effective application of ICT is critical to the achievement of the goals outlined in the Strategic Directions and, as a result, the University is becoming increasingly dependent upon ICT. Despite substantial investments over the past year, further investments are still

² ICT Foundational Document, June 2003

necessary. These investments will need to occur in colleges and administrative units as well as centrally. A process is needed to:

- develop a collective understanding of the opportunities presented to us by ICT;
- develop benchmarks to measure contribution of ICT (and other) investments towards our strategic goals;
- determine the priorities for ICT investments and services across the institution.

At this University, these tasks may fall upon the recently established Campus Advisory Board for Information Systems (CABIS). In any case, successful ICT decision-making models are being used at other universities (e.g. University of Alberta, Northeastern³). At these universities, the advisory group establishes the metrics and weightings with which to compare the value to the institution (return on investment) among proposed investments in ICT projects (e.g. network connections in the residences and in a research grant accounting system). It also develops metrics for evaluating risks and costs to the institution. The need for such a process was recently recommended by an external review relating to support of administrative information systems at this University.

Generating Revenue and Reducing Costs

The strategic directions call for a supportive environment that includes enriched resources and enhanced revenue opportunities. We contribute to a supportive environment by providing quality and cost-effective services, by securing external funding, by reducing University costs through partnerships with industry, and by creating a secure and productive work environment.

Competing in the private sector would generate questions and complaints, from both that sector and the campus community, regarding the use of public funds. We rarely provide services outside of the University.

However, we actively look for opportunities to secure outside funding. Some examples of our successes follow.

- **USR-net Project.** This CFI-funded project will bring \$11.5 million of new funding to the University, \$5 million of which counts toward the University's total research income. We identified the opportunity for external funding and participated in the development of the University's grant application. In the late 1990s, we were successful in receiving \$1.5 million from the National Infrastructure Program for network renewal.
- **ITS, together with the University of Regina, developed the first provincial Internet service (SaskNet).** Once commercial alternatives were available for this service, the network was "sold" to SaskTel in exchange for several years of a reduced Internet service costs.

ITS will continue to seek external funding wherever possible, recognizing this funding must align with the strategic directions and priorities of the University.

ITS also seeks and negotiates partnerships with industry in order to reduce the University's

³ *IT Investments Decisions that Defy Arithmetic*, EDUCAUSE Quarterly, 1, 2004

cost of equipment and software. Frequently, we have been able to negotiate access to software, worth millions of dollars, for use in instruction and research at annual usage fees of \$5,000 to \$15,000. Section 7 details some of these partnerships and their benefits. The following table lists just a few examples of the annual savings resulting to the University from industry partnerships.

University Annual Estimated Cost Savings	
Microsoft Campus Agreement	\$200,000
Adobe Software	\$ 60,000
SPSS Software	\$125,000
Oracle (for Si! project)	\$250,000
Estimated Annual Savings	\$635,000

The following table lists a sample of the annual cost savings realized by students, faculty and staff from industry partnerships.

Student, Faculty and Staff Annual Estimated Cost Savings	
Microsoft Software	\$110,000
High Speed Internet	\$ 600,000
Estimated Student, Faculty and Staff Savings	\$710,000

Inherent in our mission is the goal of providing a productive scholarship and work environment for the University community. SPAM e-mail and successful Internet-based attacks can make for a very unproductive environment. Sections 3.1.7, 4.1.4 and 7 outline the actions that ITS has undertaken, or will undertake, to reduce SPAM and Internet-based attacks.

Office Space

To be effective in service delivery and supporting the strategic directions of the University, ITS requires space that is suitable and conducive to providing services in a cost-effective manner.

ITS offers services from nine buildings across the campus; this is in addition to the five locations used to deliver services to specific colleges or administrative units (see section 8 for more information). Having the department split among nine locations presents problems to users of our services as well as to ITS staff and management.

- Users must learn the locations from which various ITS services are delivered. Sometimes, users go to the wrong location, and some have to visit multiple locations to receive what should be a single set of services.
- Some staff are separated from people with whom they must work on a daily basis. Extra time is sometimes required to do work.
- The physical separation also tends to cause people to focus on just “their piece of the puzzle,” as that is all they see. This leads to reduced service levels and a less cohesive unit.
- Managing and directing staff is more difficult if they are located in many locations.

Additionally, the space in some locations is inadequate to meet our needs.

- In the help desk area, full-time staff must share desks and office cubicles.
- Allergens, present in the Help Desk Services space in the Arts Building, cause a high level of sick time and force ITS to reassign and/or relocate staff to other areas resulting in a negative service impact.
- The Campus Computer Store does not have sufficient space for offices as well as to carry the range of products and services needed on campus. There is a safety risk resulting from the piles of boxes in staff work areas.

It can take months to find space for required staff. For example, the USR-net project was underway for 12 months before securing staff space. The lack of adequate office space delays the hiring of staff and thus projects are delayed.

In order to improve our services to instructors, students, researchers and staff, we recommend that:

- Our office space be consolidated from the current nine to two or three locations. This would improve productivity and morale, and bring together staff into a more efficient and cohesive unit.
- A central location (IT Central) be established for providing ITS services. Like Student Central, this will provide a convenient, single location (one stop) for all “front-line” ITS services including help, desktop support, consulting, desktop sales, workstation repair, and, if possible, training.

Conclusion

ICT is strategic to the success of the University. It is an integral part, today, of teaching, learning, research, administrative service delivery and communications. The effective application of ICT is critical to helping the University achieve the goals articulated in the strategic directions.

The demand for existing and new ICT services, or ICT-enabled services, is increasing at a dramatic rate. This demand is being driven by the increasing needs and expectations of our changing student body and incoming faculty as well as by the new capabilities provided by technological advances.

ITS cannot keep up with the demand for new ICT services or even meet all the demands of the University community with respect to the services we currently offer. A review of our service maintenance budgets has shown that the resources allocated to maintain core services are only adequate in two service areas—even then, only if the historical project funding provided to those services continues.

If ITS cannot keep up with demand for core ICT services, if it eliminates core services or if it reduces service levels, the University community will find an alternate service provider or will deliver those services on their own. In either case, costs are off-loaded but not saved. Duplicate or even competing service organizations will form. Total University ICT costs will likely increase.

The University can improve the effectiveness of its ICT service delivery model by clarifying responsibilities for service delivery, by eliminating unnecessary duplicated services, by eliminating internal competition, by developing a collective understanding of the opportunities presented by ICT and by prioritizing ICT investments across the institution.

While improving the ICT environment, these actions likely will not result in enough savings to eliminate our gap in ICT investments. The table below shows the average amount that North American doctoral/research universities invest in ICT (the total invested centrally and in a distributed manner). These almost shocking figures are indicative of the strategic importance that universities place upon ICT.

	Per FTE Student	Per FTE Faculty
Average Annual ICT Expenditures Per FTE at North American Research/Doctoral Universities (total expenditures - central and distributed)	\$2,800	\$30,000

From Educause Core Data Survey, Summary Report, 2002.

By comparison, we estimate that the University of Saskatchewan spends less than half that amount. Without significant increases in ICT investment, the University is at risk: we may not be competitive in recruiting the faculty, graduate students or even undergraduate students that we want; we may not be successful in intensifying our research efforts; and our students will not be as well prepared for success in the knowledge age.

The same survey shows that 70% of the research/doctoral universities' ICT budget is allocated centrally. The table shows below the average amount that North American doctoral/research universities budget centrally for ICT.

	Per FTE Student	Per FTE Faculty
Average Annual ICT Budget Per FTE at North American Research/Doctoral Universities (central ICT budget only)	\$2,000	\$22,000

From Educause Core Data Survey, Summary Report, 2002.

The magnitude of our requested investments does not seem so “out of place” taking into consideration ITS’ budget and the central ICT budgets of other research/doctoral universities. Without a more comparable level of funding, ITS will not be able to provide the supportive ICT environment required by this University. The need for additional budget has been consistently identified by multiple external reviews of ITS (previously called Computing Services)

ITS provides excellent value to the University. We look forward to continuing to work closely with faculty, students, colleges and departments to provide services and leadership that support and enable teaching, learning, research and administrative service delivery through the effective use of information and communications technology.

The University has stated that it is prepared to make the choices that will propel us towards the achievement of our vision. We encourage the University to make the ICT choices and investments necessary to achieve this vision.

1. University Dependence Upon ICT

The University of Saskatchewan is committed to renewal by pursuing the strategic directions outlined by the President in *University of Saskatchewan Strategic Directions 2002 – Renewing the Dream*. Because ICT (Information and Communications Technology) is “tightly woven into the fabric of the contemporary university”⁴ the quality of ICT and the choices the University makes concerning future ICT investment will be integral to the achievement of this renewal.

This section outlines the University’s current dependence upon ICT as well as how we will become even more dependent.

1.1 Current Dependence

The University is highly dependent upon ICT for its teaching, learning, research, service delivery and business processes. The ICT foundational document characterizes our dependence.

“The quality of our ICT environment affects the way we teach and the way we learn, the way we manage our business processes and the way we interact with our customers. This technology affects everything we do, affecting both how we do it and the quality of the product.”

The pervasiveness of information and communications technology at universities is evident by the names of the processes tools that instructors, students, researchers and staff use every day.

- e-communications
- electronic discussion forums
- e-collaboration
- building e-communities
- e-mail
- e-calendaring
- e-learning
- e-libraries
- e-journals and e-books
- e-whiteboards
- e-services
- e-payments
- e-business and e-commerce
- e-science
- e-research
- learning management systems
- course management systems
- learning object repositories
- instant messaging

Many University projects, initiatives and services either depend upon ICT or have significant ICT component.

- In order to improve services for students, the ROSS (Registrar’s Office and Student Services) project recommended the establishment of “one-stop shopping” to handle student queries and transactions. This “shop” (now called Student Central) is relying

⁴ *Advantage U of S - Foundational Document for Information and Communications Technology at the University of Saskatchewan*, June, 2003.

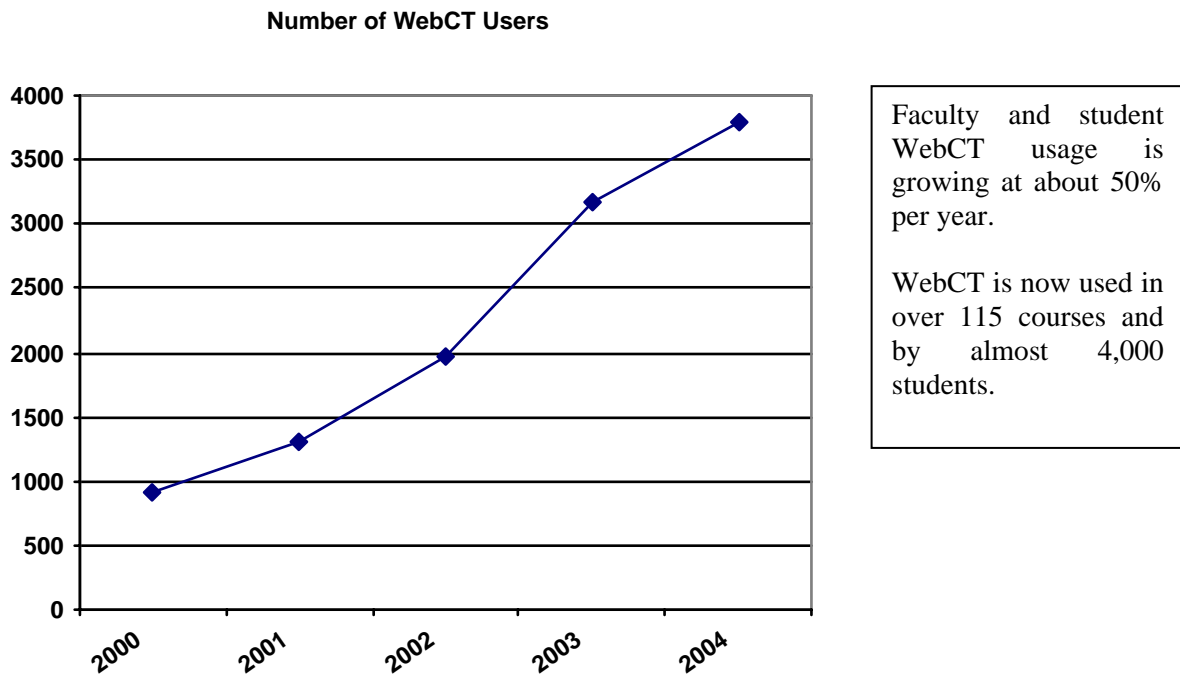
upon the recently implemented campus portal to handle, electronically, 90% of all those queries and business transactions.

- In order to improve the students (as well as faculty and college) experience, the University is implementing a new student information system that will provide self service such as online admissions, online course catalogue, web-based registration, electronic grade and fee lookup, electronic transcript requests, electronic payment of tuition, online grade submission, degree planning, degree audit and other services.
- In order to provide a supportive environment for research, scholarly and artistic work, the University had chosen to upgrade the campus network (USR-net project).
- In order to provide better services and information to the students and other members of the University community, the University implemented a portal (PAWS - Personalized Access to Web Services).
- In order to improve service, the University has implemented an e-payment infrastructure. This infrastructure makes it convenient for prospective students to apply to the University; for students to pay tuition and fees; for the University community and the public to purchase goods and services; for donors to make contributions to the University; for people to register for conferences hosted by the University. This infrastructure can help reduce the cost associated with manual transactions. All transactions will be secure and auditable.
- The University's Systematic Program Review, Integrated Planning Process and Saskatchewan Universities Funding Mechanism rely upon data from administrative information systems. ICT is also used to analyze this data.
- Building and renovation construction projects (e.g. Kinesiology, Spinks Addition) are designed and managed using computer assisted design systems and project management software. The building design must provision for network services and other technologies—such as multimedia classrooms—as appropriate.
- In order to make learning more accessible, the University is developing 20–25 online courses yearly as a partner in the province's Technology Enhanced Learning initiative.
- In order to achieve the service improvements and cost avoidances (related to not maintaining two networks) now possible with integrated voice, data and video technologies, the University has implemented an IP Telephony pilot project to investigate the related opportunities and costs.
- Students are arriving in residences today with their own computer and expect that Internet access will be available (as it was in their homes and as it is at many other universities). The University must provide network access in the residences to help recruit and retain students.
- Instructors rely upon desktop computers, office and classroom network services, Internet access, electronic access to library resources, e-mail, data projection units and other ICT tools to prepare and deliver instructional materials.
- Prospective students rely upon our web site for information about the University on a 24 hours a day, 7 days a week (24x7) basis.
- The Canadian Light Source would not be able to operate without significant investments in networking, high bandwidth access to Canadian and international research networks, workstations, data storage and compute servers, data analysis

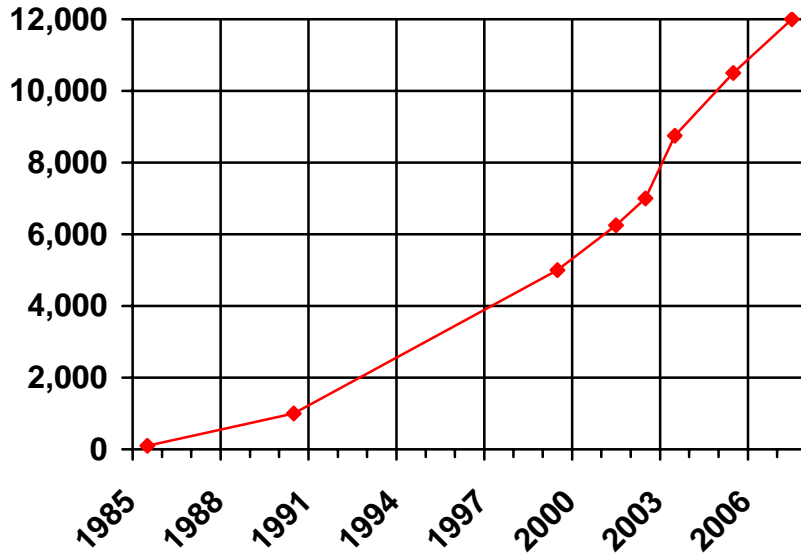
software and ICT support personnel as well as modern administrative systems. Many of these same components apply to other research projects.

- In order to support student needs for computer access, the University has installed about 200 computers in the libraries (Learning Commons) and other spaces. Access to these computers is available to all students. This is in addition to 1,100 or so workstations in college student computing facilities.
- In order to improve the experience of students who bring the laptop computers to campus, 80 wireless network access points have been installed in libraries, classrooms and other areas in which students work.
- In order to provide a more productive work environment, the University has implemented SPAM blocking, virus detection and removal from e-mail, and other ICT security measures.
- Universities are using ICT as a marketing tool to recruit and retain students. For example, Penn State (and other universities) provides free music downloads to all their students as part of tuition. Officials and student leaders hope that this approach will appease student demand for online music while satisfying record companies by using the now-legal Napster service. [New York Times, 7 November 2003]

Usage statistics for existing ICT services demonstrate our increasing dependence upon ICT (see graphs and text, below) and the growth of that dependence over very short time periods.



Number of Computers/Network Connections

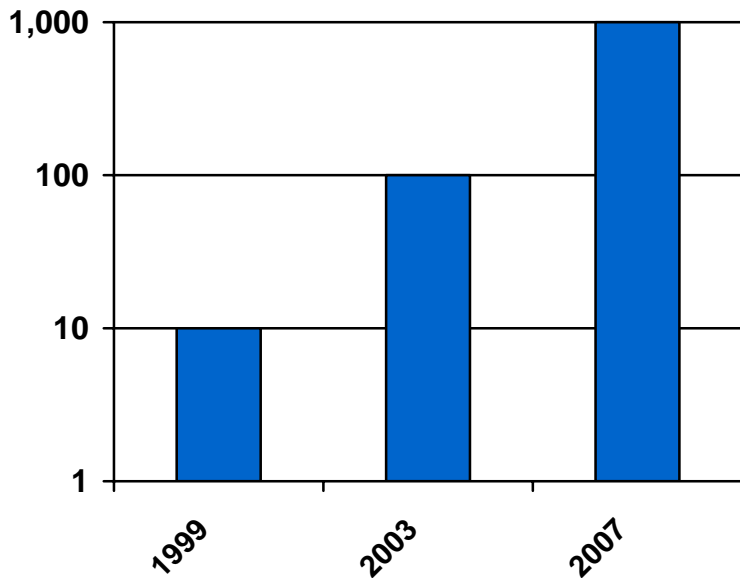


The desktop computer and the Research and Education Network are the “backbone” of the University’s ICT environment. As of fall 2003, there were over 8,000 network connections and computers on campus.

We expect that an additional 3,000 network connections and computers will be installed in the next three to four years.

The primary driver for this is the University’s increased commitment to graduate education and research. The USR-net project alone will add 2,000 more connections in the next two years.

End-User Network Connection Speed (Capacity) in Mbps

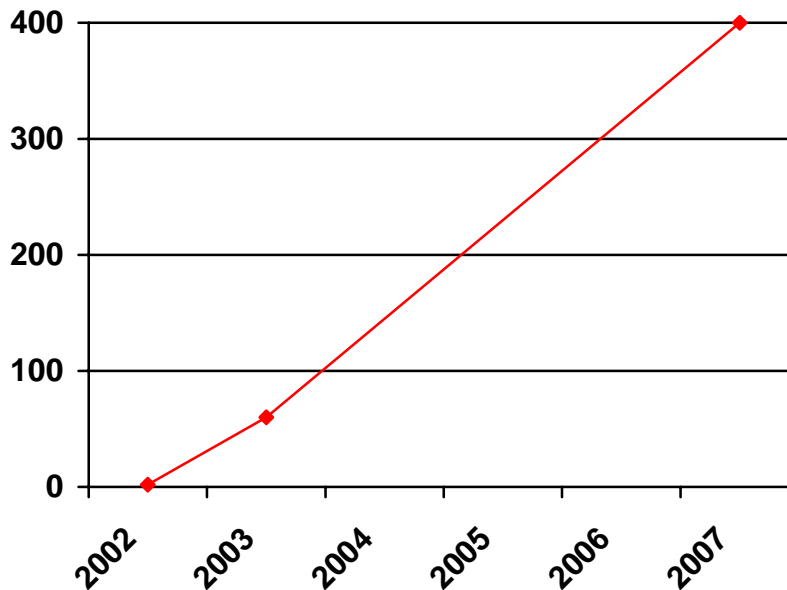


Not only have the number of connections increased but the network connection speed has increased tenfold in the last three years.

The network speed will again increase another tenfold in the next three years to support research and communications.

We estimate that 1,000 of these high speed (1Gb) connections will be needed and must be installed in the next three to four years.

Number of Wireless Network Access Points



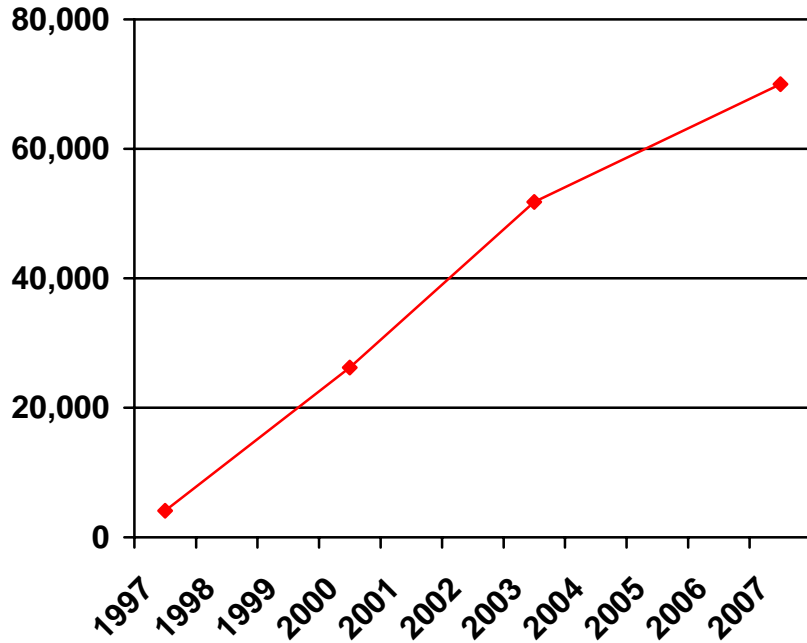
Today's students are demanding "anywhere, anytime" access to ICT resources. There is evidence that the notepad is giving way to the laptop in student backpacks. The University is beginning to address the demand for mobile student computing.

Currently, there are 80 wireless access points in the Libraries, student work areas and classrooms. An additional 200 access points will be required over the next three to four years.

The installation cost for each access point is estimated at \$3,000 (including FMD costs).

The U of S is not alone in this endeavor; UBC and McGill have installed 1,200 and 240 access points respectively.

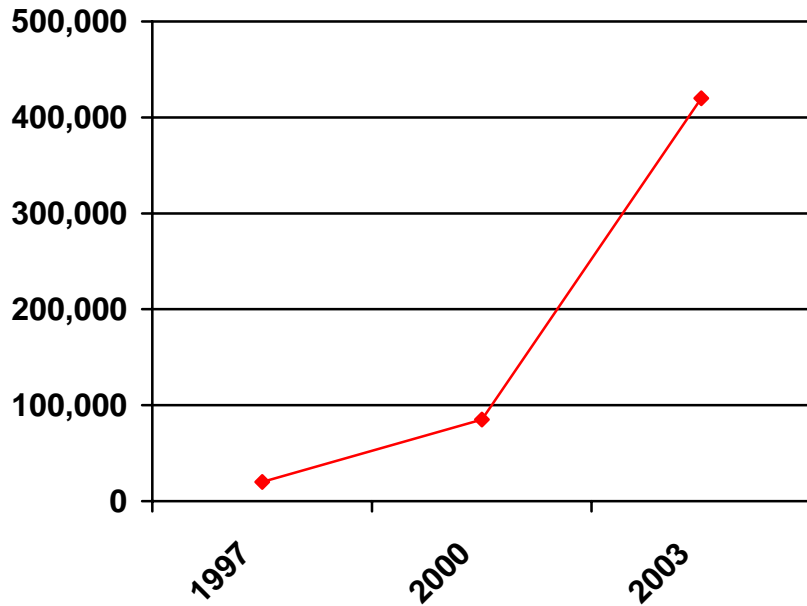
Number of Email Accounts



E-mail is a tool that has been integrated into the daily lives of almost all faculty, staff, researchers and students.

The University provides e-mail services to 50,000 users today. In three to four years this is expected to exceed 70,000 accounts as the University offers more services to its expanding community (prospective students, provincial health care professionals as part of the Academic Health Sciences Network, more alumni, etc.).

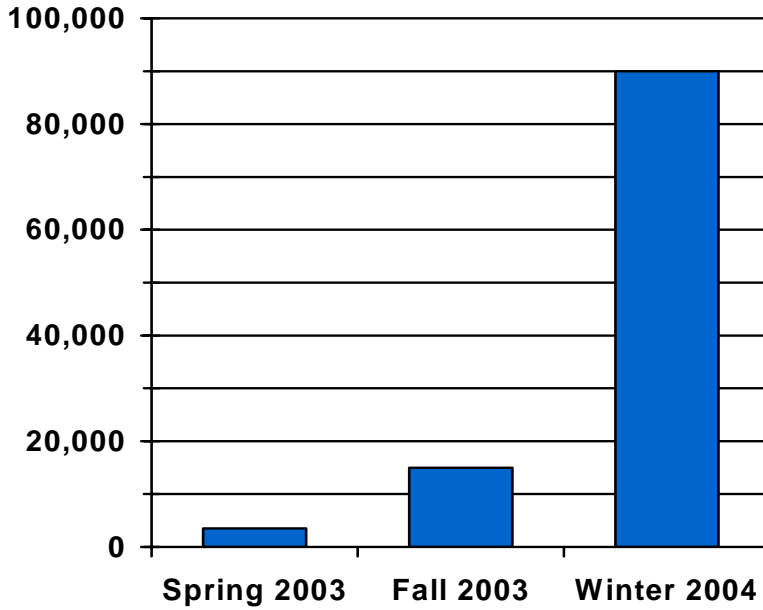
Email Messages Delivered Daily



The number of e-mail messages has grown even more dramatically, doubling almost yearly.

At peak times, we now deliver more than 400,000 e-mail messages per day.

**Email Messages with Viruses
(Peak Daily Rate)**



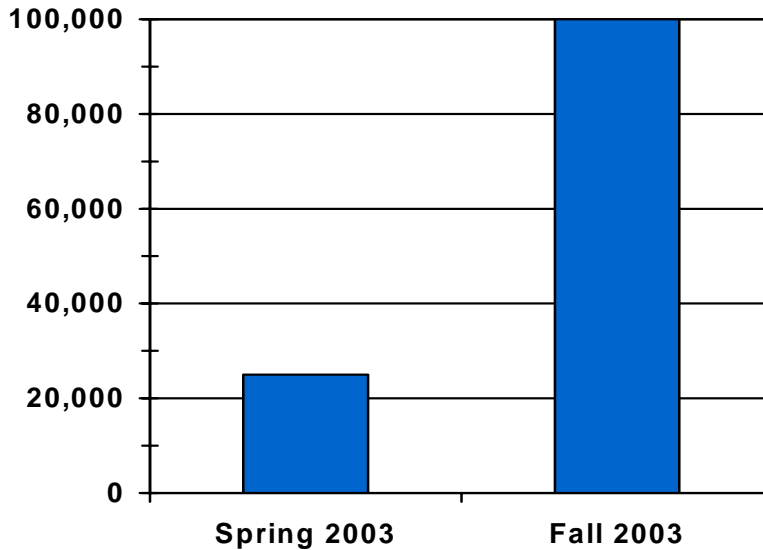
The number of Internet-based attacks on University ICT resources continues to increase dramatically.

Campus e-mail servers remove 90,000+ e-mails that contain viruses daily (peak daily rate).

The number of viruses removed has quadrupled every four months between spring 2003 and winter 2004.

ICT security will continue to be an issue that the University will have no choice but to address.

Blocking Email Connectons From Known SPAM and Open Relay Sites (Peak Daily Rate)

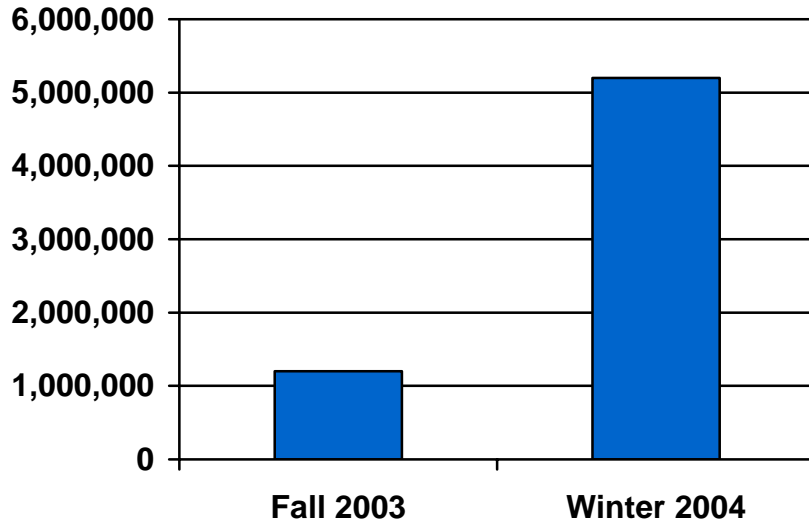


We currently block 100,000+ attempts to send SPAM to campus e-mail servers, daily.

This is a fourfold increase since spring 2003.

Additionally, over 55,000 e-mail messages were “quarantined” daily as suspected being SPAM (as of November 2003).

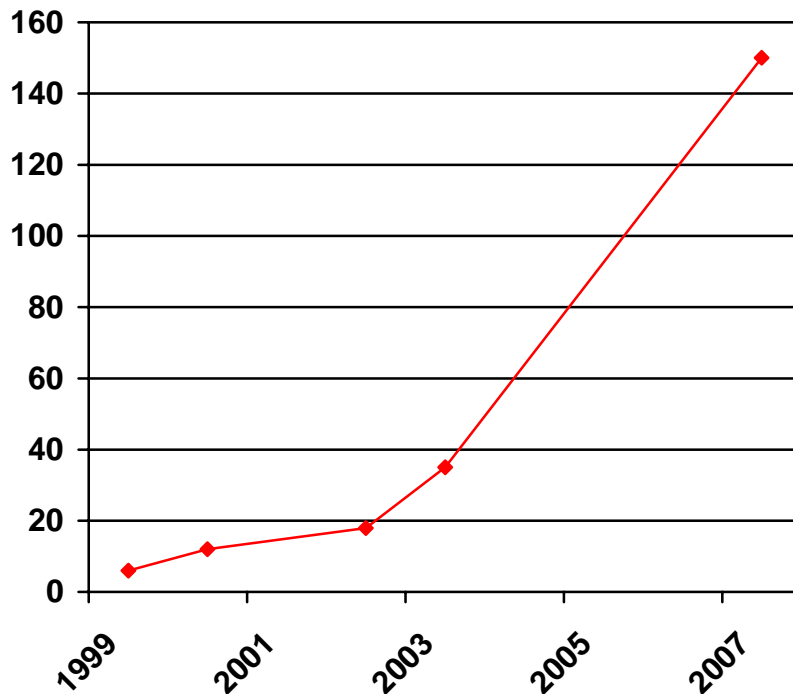
Number of Network Probes



5,200,000 attempts, daily, to probe or attack campus ICT resources are blocked daily (February 2004).

This is a fourfold increase from fall 2003.

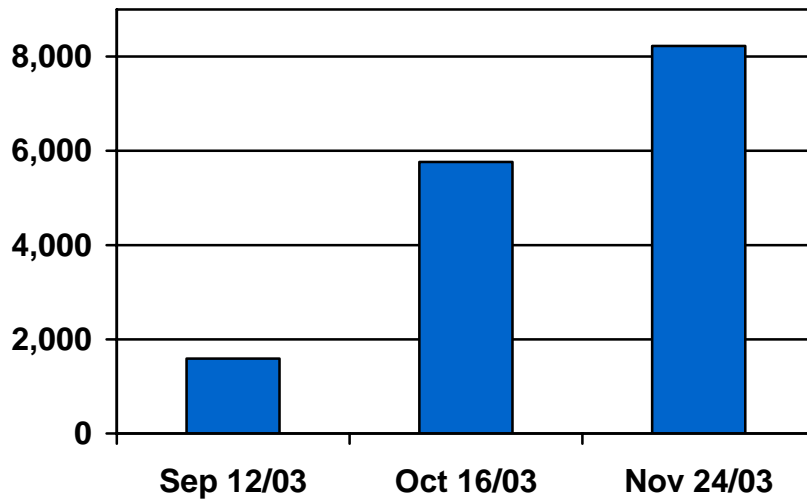
Access to "Commercial" Internet (Mbps)



The demand for Internet access has required an annual doubling of bandwidth (capacity) from the "commercial" provider.

The rate of growth of access to Canadian and International research and education networks is even higher. From 40 Mbps in 2002 to 1,000 Mbps in 2003, this is expected to grow to 10,000 by 2007, a tenfold increase.

Number of People Who Have Used PAWS



Almost 12,000 students, faculty and staff have used the PAWS portal (Personal Access to Web Services) since its implementation in September 2003 (less than six months ago).

As more services (e.g. Banner Student/Si! Banner Finance, Student Central) adopt PAWS as their service delivery method, usage will further increase.

1.2 Increasing ICT Dependence in the Future

The University will continue to be increasingly dependent upon information and communications technology in the future—for teaching, learning, research and service delivery. The ICT foundational document states:

“Investing in ICT is critical if the University is to attain the strategic goals articulated by the President in his Strategic Directions paper.”

Increasingly, each incoming class of students will expect “anywhere, anytime access to everything.” They will expect that all course materials will be available online, wireless connectivity will be available everywhere, ICT services will be available 24x7 and self-service for all administrative functions.

A recent graduate of Queen’s University currently taking further education at U of S recently made the comment: “At Queen’s I had online registration, a high band-width Internet connection in my room, a connection point for my laptop in every library study carrel, all my courses on WebCT and I could pay my tuition easily online or at any Bank of Montreal in Canada. How does the U of S get away with its IT?”

The attached editorial from the January 29, 2004 Sheaf is indicative of the importance that students place upon ICT. It also highlights the value of ITS’ services.

In the long-term, students will expect learning environments that are flexible, support different learning styles, are resource rich, are active and learner centered, support life long learning, are cost-effective and are of high quality. If the University is to meet its goal to “recruit and retain a diverse and academically promising body of students, and prepare them

From the editor's desk

On Sunday night, one of the most catastrophic events of my university career transpired. During a nice, mellow, candlelit moment in my room, my laptop decided to die. A good indication of the imminent death of a computer: when the MP3 it's playing begins to skip like a scratched CD and the screen starts flashing like a \$10 strobe light from San Francisco. Turns out my "main logic board" doesn't like Saskatchewan winters any more than I do.

So where does this leave me? It leaves me without my computer for up to a month, it leaves me getting friendly with the very nice, and obliging staff at the ITS Tech Shop, and it leaves me with three little

insights into life.

Insight #1: I am incredible dependent on my computer, and technology in general. Without a hint of exaggeration, my laptop likely sees an average of at least 6 hours of active use, everyday of the year. That might even be a bit conservative. I use it at both my jobs, and in all my classes. I take all my class notes on it, write all my essays on it, have all my music on it, and edit this illustrious paper on it. Its slender, white form is a constant presence in my life. I never really realized just how much I appreciated it until it was gone.

Insight #2: My dependence on my laptop has made my life better. So much so, in fact, that I now think almost everyone should have one. The wisdom of

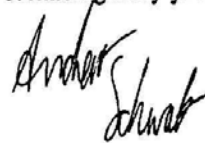
universities in the States that include a laptop lease in your tuition fees is now very apparent to me. Typing my notes improved the quality, legibility, and organization of my notes, and I would say that that had a direct impact on the quality of my essay writing and test studying. I was became more organized, and use far less paper in my day-to-day life. Basically, every student could benefit from having a laptop, if not all computer users. In addition, as ITS expands its wireless network, the use of computers and the Internet in classes could revolutionize the classroom experience.

Insight #3: The extended warranty is always worth it. When I bought my computer, I bought a

combo from the Campus Computer Store that included the 3-year warranty. At the time, I felt kind of suckered into that warranty, as it seemed like a useless add-on. Now being suckered is saving me \$800. So getting the extended warranty is never a scam, even if it feels like it at first.

Well, that's that. I'm a little disoriented and disorganized without my computer, but I have a feeling there's a newspaper something after this little rant, so I hope you enjoy it.

Technologically yours,



Andrew Schwab
Co-Managing Editor

for success in the knowledge age” its ICT will have to compare favourably with other universities.

Increasingly, instructors will expect network connectivity in all classrooms, tools to conduct online quizzes and exams, electronic whiteboard software, desktop videoconferencing software, “smart boards” and data projectors as well as the ability to disseminate all course materials⁵ electronically. At some universities, instructors are using new classroom technology to capture their lectures (audio, video, slides, whiteboard notes, class notes, images) for subsequent review by students. It is estimated that one third of faculty in Canada will retire in the next decade and that one half of University of Saskatchewan faculty will retire in that same period.⁶ Competition for faculty will be intense and access to up to date well-supported technology will be a competitive advantage. Accreditation will depend increasingly on the effective application of ICT in academic programs.

The University has renewed its commitment to research, scholarly and artistic work and acknowledges that “encouraging the fruits of scholarship requires enhanced infrastructure.”⁷ The ICT services researchers are expecting include ultra-high speed networks to move large amounts of data, large secure data storage capacity, high performance computing clusters, grid computers or supercomputers, visualization hardware and software, and desktop based videoconferencing and electronic whiteboard software to communicate with distant collaborators and graduate students. Not only are these technologies increasingly demanded by those undertaking research, scholarly and artistic work, there is also a greater demand for extended hours of service and support. If a researcher is conducting an experiment in collaboration with a colleague ten time zones away, the concept of 8:00 a.m. to 5:00 p.m. service is unacceptable. Recognizing the rapid change in technology and changing requirements, research-based universities are re-examining how ICT can better support research, scholarly and artistic work. “More than ever before, central IT organizations need to rededicate themselves to becoming involved with the research mission and enterprises at their institutions.”⁸

Increasingly, faculty, researchers, students, prospective students, alumni and staff expect that all administrative services will be delivered electronically (self-service), will support e-payments and will provide easy access to the data they require. Service availability must approach 24x7. The availability of effective administrative systems will help attract and retain faculty, students, researchers and staff.

The University’s increased dependence upon ICT is driven by:

- the changing expectations and needs of incoming students, faculty and researchers, as well as
- the new capabilities from ongoing ICT advancements.

ITS and other support organizations are responding to address the needs expressed by students, faculty and researchers.

⁵ Including course notes, images, simulations, video and recorded lectures.

⁶ From “University of Saskatchewan Strategic Directions 2002 – Renewing the Dream”.

⁷ *ibid*

⁸ Bill Decker and Bonnie Neas, “Research Universities and the Central IT Organization: Rebuilding The Partnership”, *EDUCAUSE Review*, May/June 2003.

2. ITS Service Overview

2.1 Mission

The key themes of our mission are collaboration, service, effectiveness and leadership. Our mission is:

“to work closely with faculty, students, colleges and departments to provide services and leadership that support and enable teaching, learning, research and administrative service delivery through the effective use of information and communications technology”

2.2 Federated Model of ICT Service Delivery

The University has adopted a federated model for the provision of ICT services. The federated model typically is used in large universities and businesses as it combines the benefits of both the centralized and decentralized support models.

Under this model, ITS does not provide all ICT services on campus. Rather, the responsibility for service delivery is shared between the central ICT organization, and, colleges and administrative units.

“... individual units (colleges, departments, or administrative units) have both responsibility and budget to address local needs, and central units ... provide institution-wide services where it is appropriate and effective for them to do so. Inherent in this approach is a requirement for cooperation and collaboration, rather than competition ...”

ICT Foundational Document, June 2003

While there are no “black and white” rules to define central vs. unit responsibilities for ICT services under a federated model, there are some guiding principles in general use to help organizations define specific responsibilities.

Colleges and administrative units are responsible for services that address the specific (often discipline-specific or local) needs of their students, faculty and staff. They can provide those services “in-house,” contact an external service provider or purchase them from ITS on a fee-for-service basis.

The central ICT organization (ITS), colleges and administrative units share responsibility for:

- Service planning
- Standard setting
- Enterprise (administrative) systems development
- ICT Security

The central ICT organization (ITS) is responsible for services:

- that are used by faculty, students, researchers and staff in all colleges and administrative units across campus,
- that are most cost-effectively provided centrally (economies of scale),
- that require interoperability among colleges and departments.

2.3 Services

The services that are provided centrally for the campus community are often called “foundational,” “baseline” or “core” services.

Most of ITS’ services support teaching, learning, research and service delivery. These services include:

- Research and Educational Network
- E-Communication and Collaboration
- Identification, Authorization and Authentication
- Desktop Support
- Help
- Training
- ICT Security

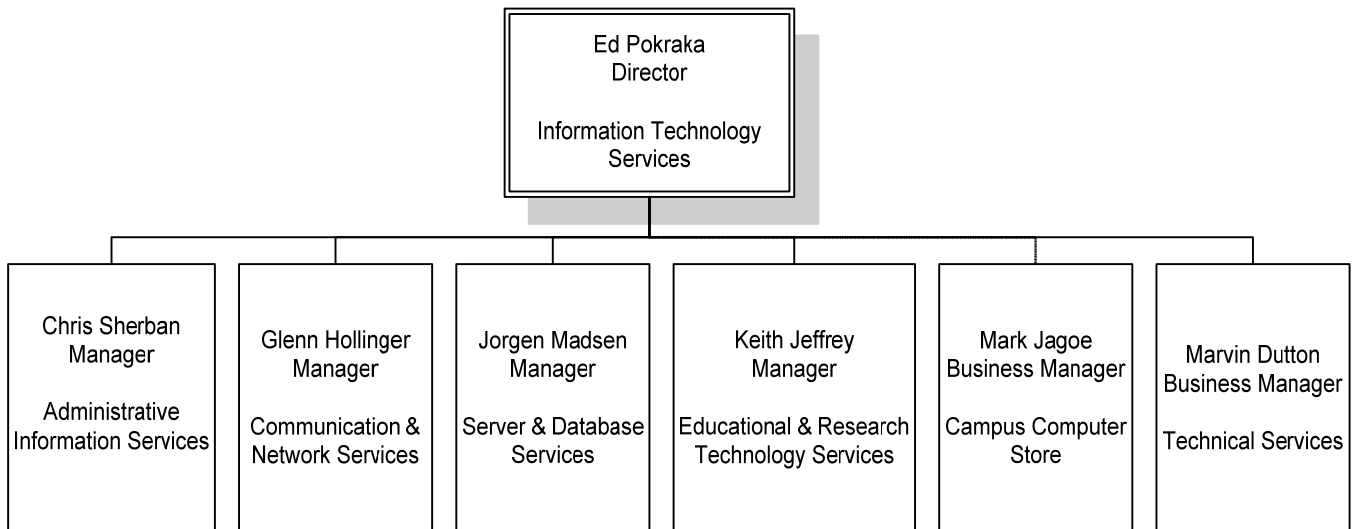
We also provide foundational ICT services that are unique or specific to each of the following: teaching, learning and research and administrative service delivery.

- Instructor Support
- Learner Support/Student Computing
- Research Computing
- Administrative Information Systems

Section 3 outlines the ITS’ maintenance initiatives required to ensure that these core IT services are kept operational, reasonably up to date and secure in order to meet the needs of the entire University. Section 4 outlines investment initiatives to enhance and/or expand these services to meet the changing and increasing needs of the University.

2.4 Organizational Structure

The first two levels of the ITS organizational structure are shown in the chart below:



3. Maintenance Initiatives

ITS' services are required and used daily by instructors, students, researchers, staff and other members of the University community. ITS proposes to maintain and enhance these services, to the degree we have been able, using current staff levels and our existing operating and capital budgets.

The need for these services cannot be curbed by ITS. If ITS does not provide these services (like e-mail or security), colleges and/or administrative units would be forced to do so themselves. Having separate, and disparate, service implementations will create interoperability problems for students, instructors, staff and others. The total institutional ICT cost will increase. These services are provided centrally at most universities.

- Research and Educational Network
- E-Communication and Collaboration
- Identification, Authorization and Authentication
- Desktop Support
- Help
- Training
- IT Security
- Instructor Support
- Learner Support/Student Computing
- Research Computing
- Administrative Information Systems

Section 3.1 describes the maintenance initiatives for each of the eleven service areas. Note: the maintenance initiatives also include disinvestments⁹ that will be undertaken in each service area as part of ongoing service maintenance.

Section 3.2 outlines the budget assigned, for this planning cycle, to the maintenance of each service area. The FTE, assigned from operating budget, is adequate to meet the campus needs for ICT service in only two areas—Research and Education Network services and Training services. This assumes that the funding, approved in the CFI conditions of award (USR-net project) for the support and operations of the new campus network, is provided. This also assumes that the project funding, provided by TEL, will continue to be available for training.

The budget that can be assigned to all other services, based upon our current operating budget and current ICT needs, is inadequate to maintain the ICT services needed by instructors, students, researchers and staff. Additional investment is requested in Section 4 to alleviate the inadequacy of funding to run the current services and to improve the ICT services provided.

⁹ ITS will undertake disinvestments in each service area as part of the ongoing maintenance and evolution of each service area. For example, the faculty/staff low-speed dialup service will be eliminated from the Research and Education Network Services area. In the Electronic Communications and Collaboration Service area, we will drop support for the POP e-mail protocol.

Without additional investment, service failures will occur more frequently and the response time to repair service failures will be longer. Requests for service changes to meet the changing needs of the University will be delayed or may not be implemented. Colleges and/or administrative units will not be able to curb the need for ICT in instruction, learning, research and service delivery. Multiple implementations of a particular service will occur in colleges and/or administrative units. Total institutional ICT cost will increase; services may not interoperate. It is interesting to note that this was once the state for student computing.¹⁰

3.1 Maintenance Initiatives: Descriptions

3.1.1 Research and Education Network

Service Overview

The campus Research and Educational Network is critical to supporting research at the University of Saskatchewan. In its approval of the USR-net grant submission, the Canadian Foundation for Innovation agreed that 80% of the proposed investment to upgrade the campus network was in support of research. The ICT foundational document has also identified the importance of a high-capacity and reliable network to support University research and scholarly work.¹¹

The presence of a quality research and education network can be used to help recruit and retain faculty and researchers. Faculty and researchers depend on a capacious and reliable network to transmit and access data, to access information (e.g. libraries, journals), and for communications and collaboration.

The campus network is the foundation for all ICT-based services regardless of whether these services are delivered by ITS, colleges or administrative units.

The network is used to disseminate and access course materials, for communications (e.g. e-mail), to access library resources, to access Internet resources and to provide software used in student computing facilities. Some courses (e.g. WebCT-based courses) are delivered only via the network. Students also use the network to apply for admission and to register (U-Star and soon Si!) at the University. Increasingly, students will want anywhere access (e.g.

¹⁰ Other than for Computer Science, ITS established the first student computing facilities on campus: Thorvaldson, Arts and Sciences, Health Sciences and Law. The facilities were established using one-time (project) funds. ITS was unable to acquire an operating budget for the support and renewal of these facilities and divested itself from this service. Colleges assumed responsibility for student computing facilities. The support and renewal of the facilities were funded from student computing fees, college operating budgets and capital equipment requests.

In addition to facilities, colleges also provided e-mail, file, web and print services to their students. Students, who took courses from more than one college, could have multiple e-mail, file service and web service accounts—one set of accounts for each college. In many instances, these accounts could only be accessed from the college facility that provided the account. Likewise, students would have pay computing fees and purchase pages for printing at each facility. Unused pages from one facility could not be used in another.

¹¹ “The campus computer network (...) is vitally important to our research activity in supporting access to information resources, collaboration with other researchers, and the movement of data among researchers. Ongoing development of this critical resource is required to meet the new demands of evolving and emerging research programs (...). Increased capacity is essential to enable the exchange of the anticipated volumes of research data, to provide effective remote access to shared research facilities, and to permit researchers to communicate effectively with each other.”

wireless) to all IT-based services from anywhere on campus. Prospective students use the network to view the University's web presence.

In the book, Preparing Your Campus For A Networked Future,¹² Philip Long states:

“The campus network has become a core infrastructure for teaching, learning, and research in higher education. All of the many electronic teaching, library, and administrative services of an institution of higher education are built on top of and assume the existence of a ubiquitous, capacious, reliable campus network.”

The University's Research and Educational Network service includes:

- **The campus network.** This includes 8,600+ end-user connections in offices, classrooms, student computing facilities and research laboratories.
- **USR-net project.** This is a CFI-funded project to upgrade the campus network to support the University's commitment to research.
- **Wireless network access.** This includes the wireless network access points required to support the use of laptops and other portable devices by students and faculty on campus.
- **Network Access for remote University locations.** The University has a number of off campus locations where University departments or parts of departments are located and research (as well as teaching and learning) occurs. Many of these locations require network access to complete this work. Current examples include the Physics RadarSat and the recently announced Primary Health Centre on Fairlight Drive.
- **Access to Canadian and international research networks.** This includes access to the Canadian research network, CA*Net, the Saskatchewan research network, SRnet, and international networks such as Internet2 and Abilene.
- **Access to the “commercial” Internet.** This enables faculty, students and staff to communicate electronically with organizations (industry, government, etc.) other than universities and research organizations.
- **Access to other external networks.** This includes access to the Saskatoon Health Region network and CommunityNet (a provincial network for education, health and government).
- **Remote-access (dial-up) services.** This enables faculty, students and staff to access the campus network and University network services from their homes.
- **Virtual private networks (VPNs).** This enables workstations located on organizationally separate networks to appear as if they were part of one network in terms of security and access. A VPN can be used when additional security is needed, for example when faculty, staff and students use a wireless network or when highly sensitive data and/or applications are accessed from external networks.
- **Virtual local area networks (VLANs).** This allows segregation of traffic while traveling over the same physical network links, such as Vo/IP calls from regular network traffic, for increased security.

¹² Preparing Your Campus For A Networked Future, Educause Leadership Strategies Volume 1, Mark A. Luker, Editor, Jossey-Bass Publishers, 2000.

- **Voice (Phone) and Data (Computer) Network Integration.** By integrating phones as part of the data network, this provides many opportunities for service improvements and cost savings/avoidance, as outlined below.
- **Domain Name Services.** This is the primary directory service for computers on campus, needed by computers when accessing web pages and e-mail addresses. The directory service translates a server name (e.g. www.usask.ca) to the TCP/IP (computer) address of the server (e.g. 133.122.140.58)
- **Domain Controller Services.** Microsoft Windows employs a set of directory services provided by Domain Controllers. These servers provide information about usernames, passwords, and other details for Microsoft computers.
- **Network Security.** With the increase in number and effect of computer viruses and worms, as well as the concern over CyberTerrorism, the University must take action to reduce the threat to users of the network, as well as the threat we might pose to others. This involves denial of some forms of network communications as well as monitoring for intrusion attempts and break-ins.
- **Ultra-high speed network to support research.** This includes both gigabit connections for servers (10 Gbps in future) as well as special-purpose high-speed connections needed for researchers utilizing dedicated CA*net 4 lightpaths.
- **Consulting.** To accomplish the goals of researchers (and other users) ITS often works collaboratively with them to design custom solutions to meet their unique needs. For example, ITS is implementing a wireless point-to-point network link for the Prairie Swine Centre and has done work on videoconference and wireless with Dr. Gary Morris, located in Royal University Hospital.

As in other universities, researchers, students, faculty and staff from all colleges and departments at the University of Saskatchewan rely upon the campus network daily for research, teaching, learning and service delivery. It must be ubiquitous, capacious and reliable (high availability).

Maintenance Initiatives

Four maintenance initiatives, related to the campus Research and Education network, have been identified for this planning cycle.

- Complete the implementation of the USR-net project.
- Continue to renew and expand the network to meet the University's research, teaching and service delivery needs that are not included within the USR-net project.
- Develop, in collaboration with Facilities Management, a plan to take advantage of the opportunities provided by an integrated data and voice (as well as video) network.
- Develop, in collaboration with the Associate Vice-President (Student Services), the Director (Consumer Services) and the Associate Vice-President (ICT), a plan to provide network services to students living in University residences.

USR-net Project

USR-net is a CFI funded project to upgrade the campus network so that it is more capable of supporting the University's research activities. The project focus is to improve network capacity (speed), availability and security. Specific initiatives include:

- All existing network connections in offices, student computing facilities and research facilities will be upgraded to 100Mb¹³.
- 60 1Gb connections will be installed to support researchers who need additional network capacity.
- 2,000 new connections will be installed to support research.
- Access to Canadian and international research networks will be increased (to 1Gb initially (from 0.04 Gb) and eventually to about 10Gb
- Some (not complete) redundancy will be built in to the network to improve network availability.
- Improve network security with firewall and intrusion detection technology to reduce the number of break-ins on campus computers and the effect of network-based attacks.

Total project cost is \$15 million. Of this, \$13 million has been secured from CFI, provincial matching funds, industry and in-kind contributions. The University's investment in this \$15 million network upgrade is \$2 million; the University committed to this funding as part of its acceptance of the CFI award. It should be noted that other universities are also undertaking major network upgrades.¹⁴

Ongoing Network Renewal

The University must continue to renew and expand the network, on an ongoing basis, to meet the research, teaching and service delivery needs that are not covered by the USR-net project. This includes:

- Wireless network access
- Expand network access, including wireless network access, to all classrooms.

Only 120 out of a total of 365 classrooms in the classroom scheduling pool have network access. Instructors (and students) who wish to incorporate online electronic resources into their classroom teaching face are restricted to the rooms they can teach in. In some cases, classroom scheduling is unable to schedule classrooms to meet instructor needs for network access.

In 2003–04, the Academic Services Committee of Council (formerly the Information Technology Committee) has recommended that \$60,000 per year be allocated from the Campus-Wide ICT Infrastructure Services Capital budget to provide network

¹³ The campus network backbone (between building network) will also be upgraded to 10 Gb (10,000Mb).

¹⁴ For example, the University of British Columbia has just completed an upgrade of most of their campus network including the installation of 1,200 wireless access points. Estimated project cost was \$30 million. For more information, see <http://www.unp.ubc.ca/>

connections in all shared classrooms. At this level, it will take about 3–4 years to provide network access to all shared classrooms.¹⁵

- Additional research connections (beyond 2,000).
- 1Gb network services for more researchers (beyond 60).
- Network connections in new buildings (e.g. renovated College building)
- Expansion of network to U of S buildings not already on the campus network (e.g. residences, Crop Science Field lab, Poultry Science, etc.).
- Additional network connections for non-research (instruction and administration) purposes.
- Serial line network connections (terminals and serial printers).
- Some network monitoring tools (the USR-net project assumes a base level of tools).

Integrated Data/Voice Network

In 4–8 years, all telephone services will be provided using standard computer and network technology. Many universities and other organizations are moving to integrated voice and data (Vo/IP) services. Traditional service providers are offering integrated voice, video and Internet services.¹⁶

ITS, in collaboration with the Facilities Management Division (FMD), has successfully implemented a converged network (Vo/IP) in Kinesiology this fall. We are now working together to determine how the University can best take advantage of the opportunities presented by Vo/IP.

The primary benefits of an integrated voice and data network to the University include:

- Service improvements. This can take the form of enhanced technology with more capabilities or something as simple as less calls and coordination for any office relocation.
- Long-term cost avoidance or cost savings. The University will need to invest in only one network to support computer, voice and video communications (as opposed to 2–3 networks). The University should be able to share technical staff to support the computer network and phone service. Common systems will allow for cost savings in billing, inventory, work order, and network management. Common group planning will achieve economies in implementing services in new buildings and renovations.

Most western Canadian universities have combined support for telephone and IT services under the ICT portion of their organizations, including:

- University of British Columbia
- University of Northern British Columbia
- University of Victoria

¹⁵ The time required to provide network access to all shared classrooms will depend upon the type of network access required. The cost to provide wireless network access is up to three times that for wired network connections. If wireless network access is required in all classrooms, additional funding must be provided to complete this initiative in five years.

¹⁶ Shaw has announced that it will offer an integrated voice, video and internet service; SaskTel now offers video, computer and voice services.

- Athabasca University
- University of Alberta
- University of Lethbridge
- Brandon University
- University of Manitoba
- University of Regina

Provide Network Services to Student Residences

Most Canadian universities provide network (Internet) service to students living in campus residences. The estimated construction cost to provide network connections in the on-campus residences alone, is estimated at \$300,000–\$350,000; network equipment and support costs are over and above this figure. The service provided would be 100Mb network access—about 100 times faster than commercial high-speed service. The cost of equipment and annual support costs can be recovered from student “access” fees. We recommend that the cost to provide network access be part of the residence fee and NOT a separate charge to users. Student “access” fees will be inadequate to recover the construction costs. [Note: The availability of network service in the residences will make it easier to convert the rooms to offices (if required in the future). Renovation time and costs should be reduced.]

ITS has investigated alternative methods for providing network services to the residences, including wireless. While the initial cost are lower (depending on the coverage provided), annual equipment renewal and annual support costs are higher.

ITS will develop, in collaboration with the Associate Vice-President (Student Services), the Director (Consumer Services) and the Associate Vice-President (ICT), a plan to provide network services to students living in University residences.

Disinvestments

ITS continually disinvests from older technologies, when appropriate. As an example, all of the 9.6Kbps leased lines (for terminal access) and most of the slower phone-net network wiring (for older Macintosh systems) have been replaced by Ethernet connections over the past three years. This provides faster, more reliable communications for users. Older protocols, such as LAT and DECNET have also been retired in favour of the IP protocol. ITS will support new protocols, such as IPv6, when it is readily available and required on campus.

In the future, ITS plans to retire the Faculty and Staff Dial-up service, as well as drop support for the Appletalk network protocol.¹⁷

This type of disinvestment does not result in significant cash or effort savings. Rather they allow for ITS to focus on more current as well as new technology to meet the needs of users, advancing the network and improving the set of services offered.

¹⁷ This is following Apple’s direction regarding the Appletalk protocol—Apple is recommending the use of TCP/IP protocol instead of Appletalk. Note: Apple Macintosh products will still be supported even though the Appletalk protocol will not be supported.

Budget

The Research and Education Network service will be maintained and enhanced using ITS operating budget (e.g. staff), USR-net project funds and an annual allocation from the Campus-Wide ICT Infrastructure Services Capital budget.

Approximately \$400,000 from the Campus-Wide ICT Infrastructure Services Capital budget has been allocated yearly by the Information Technology (now Academic Support) and Capital Planning Committees of Council towards the renewal of the campus network. Of this figure, \$200,000 has been allocated towards the University's share of the USR-net project. The budget assumes this funding will be available for 2003–04 to 2005–06 to cover some the University's share of USR-net project costs.

After the USR-net project is completed, ITS expects continued growth in user needs, for more and faster network connections, much more wireless service, and for other, currently unknown services. The annual allocation of \$400,000 to the campus network will be needed on an ongoing basis to meet these changing and growing requirements.

As a condition of CFI award, the University also committed to the increased costs for operating the new campus research and education network.

Service Area	FTE 2003–2004		“Steady State” FTE	Typical Annual Capital Equipment Allocation
	ITS Operating Budget	Project or Fee- for-service	ITS Operating Budget	
Research and Educational Network	10.60	4.00	10.50	\$400,000

Partnership

In addition to the almost \$10 million from CFI and the Provincial Government, we has developed a partnership with Cisco Systems and IBM, resulting in additional discounts of approximately \$2 million to further reduce the costs to the University of both USR-net and all other networking activity.

3.1.2 Electronic Communications and Collaboration

Service Overview

Like the Research and Educational Network service, instructors, students, researchers and staff require and expect access to electronic communication and collaboration services for instruction, learning, research and service delivery. Without these services, it would be difficult to recruit and retain faculty and students, to undertake certain research or to prepare our students for the knowledge age. These services support teaching, learning and research by creating a supportive environment for the strategic directions.

The following electronic communications and collaboration services are available to all instructors, students, researchers and staff.

- E-mail (50,000 accounts)
 - Virus scanning/removal
 - SPAM filtering

- Mailing lists (for classes, workgroups, etc.)
 - “automatically” created lists based upon membership in a class, department, college, etc.
 - user maintained lists (e.g. workgroup, committee, interest group, etc.)
- File services (30,000 accounts)
- Web page hosting (30,000 accounts)
 - Student, faculty and researcher “personal” web pages
 - University, college, departmental and workgroup web sites
- E-calendaring
 - Sun One Calendaring (Portal)
 - Microsoft Exchange
- Campus Portal – PAWS (Personalized Access to Web Services)
- E-discussion forums
- E-Whiteboards (available only via WebCT)
- IP-based Video Conferencing
 - two-way interactive video with two or more universities
 - desktop-based video-conferencing (limited support)

Additionally, our students and some staff are requesting an Instant Messaging service. This service is provided at many other universities.

Maintenance Initiatives

ITS will enhance campus-wide electronic communications and collaboration services so they continue to address student, instructor, researcher and staff needs in terms of capacity, functionality, availability (high reliability), security and accessibility (easily accessible from on and off campus). Specific initiatives follow:

E-mail

Usage of the campus e-mail services continues to double, almost yearly. For example, we now provide e-mail services to 50,000 faculty, students, researchers, staff, alumni, adjunct faculty and other members of the University community. In 3–4 years, we will need to provide e-mail services to more than 70,000 people as the University offers services to prospective students, more alumni and other members of the University community (e.g. health care professionals through the Academic Health Sciences Network). The amount of disk space required to store e-mail has increased as users transmit very large data files, graphics, audio, video and html documents as opposed to plain text. Our e-mail servers must be upgraded regularly to handle the increasing workloads.

	Number of E-mail Accounts	Number E-mail Messages/Day
October 1, 1997	4,100	20,000
October 1, 2000	26,200	85,000
October 1, 2003	51,800	420,000
October 1, 2007 (projected)	70,000	

As usage of e-mail services increases, the number of attempts to distribute viruses and SPAM e-mail to faculty, students, researchers and staff more than doubles yearly. Additional server capacity is required to scan incoming e-mail messages for viruses and SPAM. Our virus checking and SPAM blocking software must be upgraded regularly to counter the threat of new viruses and new methods for camouflaging SPAM e-mail.

The student e-mail server will be upgraded in spring 2004 so that it has the capacity to handle the even higher e-mail load expected in the fall. Some disk upgrades will be required in spring 2006.

E-mail services to instructors, researchers and staff are offered on several servers that also provide other services. ITS will attempt to consolidate these services on one server.

Functional improvements to the e-mail service will be undertaken in the areas of mailing list management, account customization, shared mailboxes and a campus-wide directory of e-mail addresses.¹⁸

File Services

Instructors, students and researchers are highly mobile. They require easy access to their “work” files and data from many locations on and off campus. In collaborative projects, they must share files and data among themselves as well as others at other organizations. The interfaces used to define the access rights to files must be easy to use. The files and data must be backed up in case of accidental deletion.

ITS provides file services to all students and many instructors, researchers, workgroups and staff. A central file service enables students to access their work from computing facilities in different colleges, from foundational computing facilities (e.g. Learning Commons), from their laptop computers using wireless network access points on campus and from their home computers. The file service provides faculty access to their work from their office, research lab, home, and other off-campus locations (e.g. another university or research organization). A web interface provides easy access to the central file store from a variety of workstation platforms.

The student file service is heavily used—often, more than 1,000 students use this service at the same time. The existing server is four years old and cannot handle the current workload reliably. It must be replaced in spring 2004 to increase performance, capacity and reliability for fall.

ITS will also improve the file service provided for instructors, researchers and staff. The current file service is provided on several servers and is not promoted. The new file service will be provided on one server (this will simplify work for ITS and for users). The amount of file space that will be provided to any user must be limited according to the availability of

¹⁸ For example, more mailing lists that are defined “automatically” from institutional data will be created (e.g. all faculty, all students in the College of Education); this will help improve communications with specific groups within the University community. Easier to use tools to define and maintain user-managed mailing lists will be implemented. An easy to use (self-service) interface(s) to customize a user’s e-mail account will be implemented—to set e-mail forwarding, to set a vacation/away from the office message, server-side SPAM filtering rules, disk quotas, etc. A mechanism to share mailboxes among several users will be developed.

budget. An investment in ICT support for research is proposed in section 4; this funding can be used to improve the file service (e.g. increase disk space) for researchers. Very large file spaces may have to be provided on a fee-for-service basis.

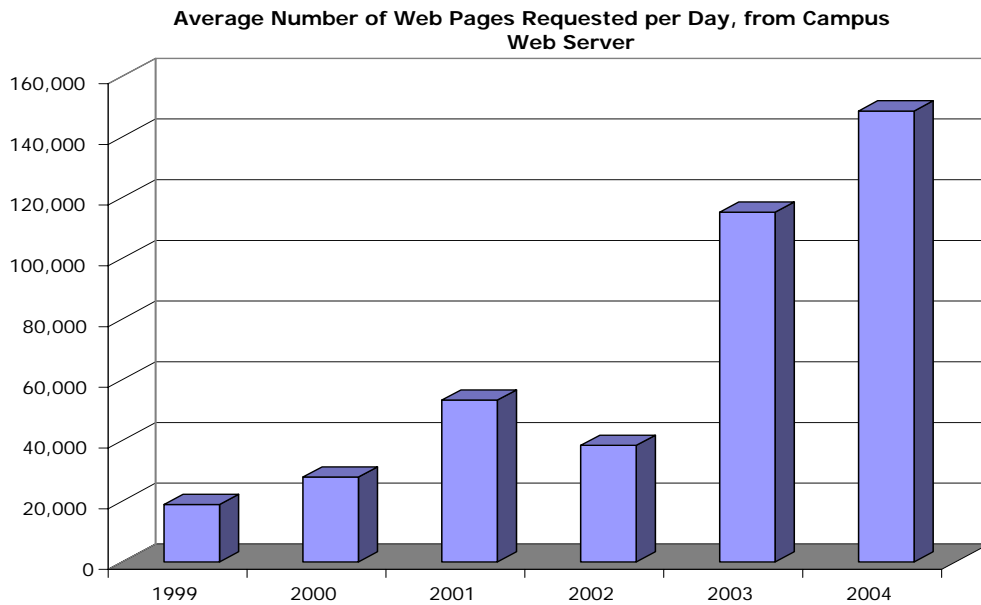
Note: The current file service for students, instructors, researchers and staff currently provides over 1 Terabyte (1,000,000,000 bytes) of disk storage. This number is expected to triple in the next 2–3 years.

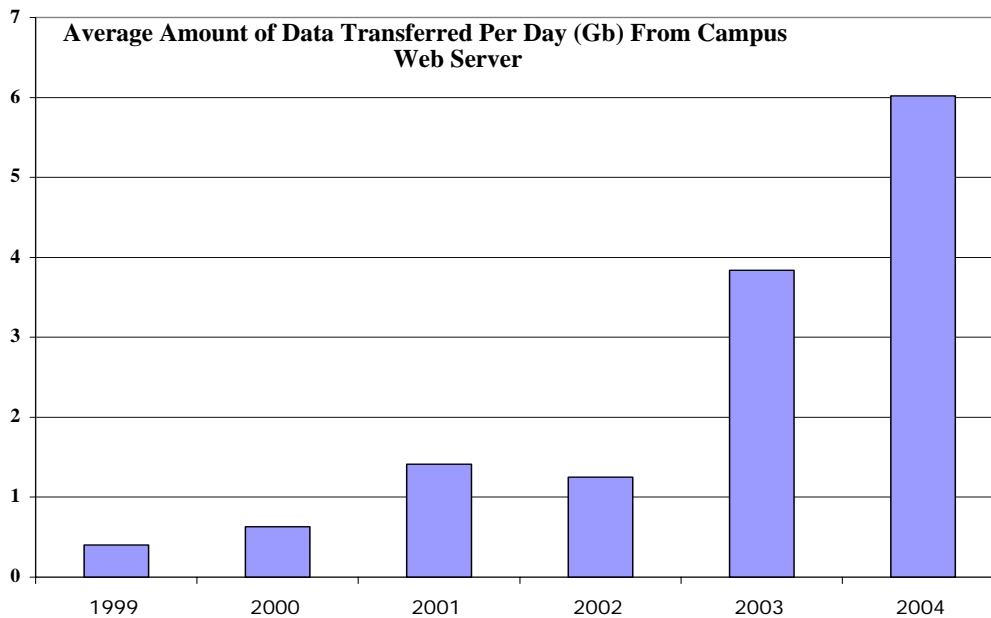
In addition to server and disk space upgrades, ITS will provide easy to use tools to support collaboration. These tools will enable file owners to easily specify who can access their files and the type of access granted (ability to read, copy, modify or delete).

Web (Hosting) Services

ITS provides the campus web service (used by 150 colleges, departments and workgroups) and offers web page hosting for students, instructors, researchers and staff.

The campus web service is the University's presence on the Internet. Usage of the campus web service has increased at a rate of 50% per year, in each of the last four years.





The campus web server will need to be replaced in spring 2005–06 so that it is capable of handling the increased usage.

The web page hosting service for students, instructors and researchers is provided on several servers. This service will be consolidated onto one server in 2005–06. A central server will help develop a directory of personal web sites.

E-calendaring Services

A campus-wide e-calendaring system would reduce both the effort and elapsed time currently required to schedule meeting times. This work is especially difficult for committees or large workgroups.

Many universities also offer e-calendaring services to students. Student calendars are automatically maintained with the student’s class, lab and exam schedule. Students also use the e-calendar to maintain their personal calendars.

ITS currently provides two e-calendaring services.

One e-calendar service is based upon the Sun One calendaring product. ITS will continue to provide this service at no direct cost to all members of the University community via the campus portal (PAWS). This provides the basic calendaring functionality required by most users. All members of the campus community have access to this service.

The other service is based upon Microsoft Exchange. This service is of interest to users who want an integrated Microsoft e-mail, calendar and file service. ITS will continue to offer this service, if required by some colleges,¹⁹ on a fee-for-service basis.

¹⁹ Note: The College of Commerce and Facilities Management Division have implemented their own Exchange service (this was done prior to the availability of ITS’S service). ITS provides some technical assistance for those Exchange Servers. The Library is planning their own Exchange service.

The Library is considering the implementation of an Exchange-based e-calendaring service for their staff.

IP-based Video Conferencing

ITS supports live, two-way, interactive video across the campus, to other universities around the world, and to Health and Education centres across the province. This interactive video is used for delivery of courses with both lecture and electronic materials, training of medical students through rounds, and research collaboration. For example, two-way, interactive video has been used to deliver courses simultaneously to/from the University of Saskatchewan and one or more of the following universities: Manitoba, Calgary and Alberta. This is an effective method for delivering courses collaboratively when subject expertise is only available in one institution. Classroom support is provided through studios and staff in DMT.

While effective for course delivery, live, two-way, interactive video requires specialized facilities and technical support. ITS will enhance service in this area to support desktop-based videoconferencing among three or more users (or small groups of users). This will make the service more accessible and cost-effective. Faculty have been interested in this technology to communicate with undergraduate students, graduate students and research collaborators at a distance.

Other Electronic Communications and Collaboration Services

ITS will enhance other services such as electronic discussion forums and whiteboard services and provide new services (e.g. chat, instant messaging) as required to meet the University's instruction, learning and research needs.

Disinvestments

As part of service evolution, ITS will disinvest from older technologies. For example, the POP e-mail protocol will no longer be supported after September 1, 2004. ITS will also reduce the number of servers that it uses to provide similar services (e.g. e-mail and file services).

Budget

Service Area	FTE 2003–2004		“Steady State” FTE	Typical Annual Capital
	ITS Operating Budget	Project or Fee- for-service	ITS Operating Budget	Equipment Allocation
E-Communication and Collaboration	5.20	4.20	5.00	\$150,000

3.1.3 Identification, Authentication and Authorization

Service Overview

ITS, colleges and departments now offer more than 250 different ICT services to 60,000 or more members of the University community. The provision of each ICT service requires a mechanism (software) for identifying, authenticating and authorizing users. It is cost-effective that campus authentication and authorization services be automated and performed centrally rather than duplicated in every college and administrative unit.

- Identification is needed to assign a unique username to each member of the University community. At the University of Saskatchewan, the NSID (Network Services Identifier) is commonly used to identify members of the community for purpose of providing ICT services. The use of a common identifier, such as the NSID, enables instructors, students, researchers and staff to a single login name and password to access all the ICT services to which they are authorized.
- The authentication system verifies that the person trying to access a particular service is who they claim to be.
- The “authorization” system determines the set of ICT services for which each member of the University community is eligible. Authorization to services is often granted based upon a person’s role: faculty, sessional, instructor, faculty in a particular college, student taking a particular program, etc. The group membership (role) information is obtained from institutional databases (e.g. student database). Authorization can also be based upon membership in an ad hoc group (e.g. a workgroup); someone is responsible for maintaining the list of people (NSIDs) that are members of this group.

The authorization system must ensure that individuals are afforded access only to the services and data to which they are eligible.

ITS has developed a system for managing authorization and authentication at the University; this system is known as the Service and Server Account Management system (SSAM). This system is used by ITS, colleges²⁰ and some academic support units²¹ to manage authorization and authentication for more than 230 services to 60,000 people.

Maintenance Initiative

ITS will maintain the campus identification, authorization and authentication management system for the currently supported services and users.

Budget

Service Area	FTE 2003–2004		“Steady State” FTE	Typical Annual Capital Equipment Allocation
	ITS Operating Budget	Project for Fee-for-service	ITS Operating Budget	
Identification, Authorization and Authentication	1.50	1.40	1.50	Uses existing servers
	Includes the staffing paid from the System Development and Student Computing Funds			

²⁰ Some colleges that use SSAM include Commerce, Medicine, Pharmacy & Nutrition, Nursing, Dentistry, Arts & Science, Computer Science, Education, Kinesiology and Engineering.

²¹ Some academic support units that use SSAM include Libraries, Financial Services, Student and Enrolment Services, Human Resources Division, University Advancement, Facilities Management, Consumer Services, the Learning Commons facilities and Information Technology Services.

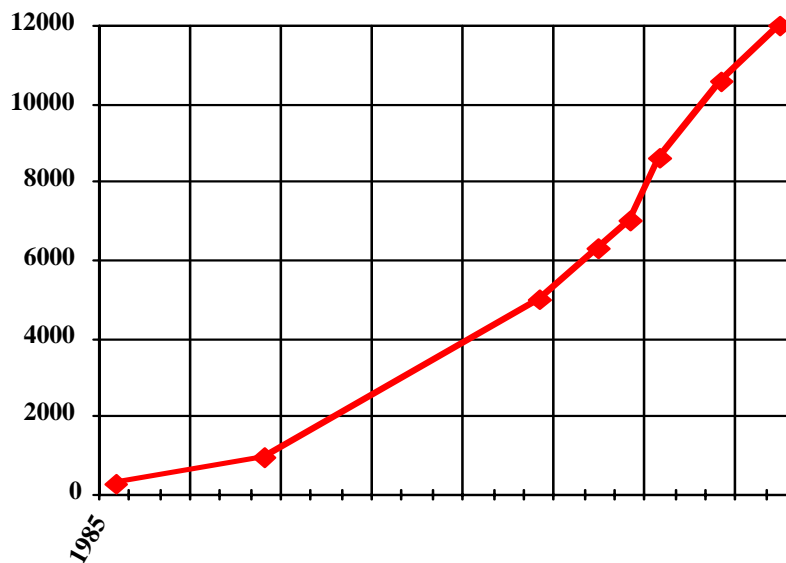
The budget allocated to service maintenance is inadequate to provide functional enhancements,²² to support new services (200 new “services”²³ are expected in the next three years), to expand the service to support the growing University community²⁴ (expected to be 90,000 or more within three years), to improve system security, to integrate with the authorization and authentication mechanisms used in the Banner Student and Finance systems, and to upgrade the technology platform used to develop SSAM.

Additional investment is requested to enhance the University’s authorization and authentication systems so they meet these changing University needs. The investment initiative, along with benefits to the University, is described in section 4.1.

3.1.4 Desktop Support

Service Overview

The University’s use of desktop computers has increased significantly. Today, the University owns more than 8,000 desktop computers (based upon the number of network connections). We expect that 3,000 additional desktop computers will be acquired in the next 3–4 years to support the University’s increased commitment to graduate education and research. [The USR-net project alone will add 2,000 more network connections (and computers) in the next two years in support of research.]



²² For example, automated delivery of usernames (NSIDs) and passwords to new members of the campus community.

²³ A new “service” managed by SSAM may be the provision of set of services to a subset of the campus community (e.g. graduate students in Commerce). A new “service” may also be the provision of one or more ICT services (e.g. access to the Health Sciences Library) to new members of the University community (e.g. provincial nurses as part of the University’s commitment to Saskatchewan Health Sciences network).

²⁴ In the next three years, the University of Saskatchewan will offer ICT services to more people including prospective students, visiting researchers, research collaborators from other universities, guest lecturers, contractors, provincial health care professionals (nurses, pharmacists, doctors, physiotherapists, etc.), non-credit study students, students from the Saskatoon Theological Union, parents of students and others. Other universities have started providing these services.

The increase in the number of desktop computer has increased the University's ICT costs relating to acquisition, end-user support and problem resolution, training, software installation (new versions, bug fixes), security and network connectivity. Despite improvements in operating systems and software usability, support costs account for the lion's share of the total cost of owning a desktop computer; the acquisition cost is the smallest portion of the total cost of ownership.

Desktop support at the University of Saskatchewan is largely a responsibility of the colleges and units and many have hired their own ICT support staff. In some cases, the responsibility for desktop support falls to faculty and staff and this takes time away from their core activities.

However, ITS must continue to provide core services that support the desktop computing environment for the University. Base budget expenditures in this area are small but critical. ITS' desktop services include:

- Consultation, to departments, regarding desktop requirements and planning.
- Microsoft Domain Name Controller.
- Print spooling.
- Anti-virus site license (Sophos) for all University computers and servers, as well as for faculty, student and staff home computers.
- Automated virus distribution and update service for on-campus computers. This will automatically download the latest "updates" to the anti-virus software to your desktop computer. This frees up faculty and other time to update their anti-virus software and protects the computer and campus network from new viruses. For more information, see http://www.usask.ca/its/help_desk/virus_info/sophos/index.
- Disk imaging and automatic software updates services.
- Development of desktop support strategies on behalf of the campus.

ITS also offers desktop support services to units that do not want to hire their own ICT support staff, on a fee basis. Some 34 departments purchase desktop support services from ITS. These services include:

- Operating system, applications and security updates
- On-site help – problem resolution
- Customized training

To further assist the University with desktop computing, ITS operates the Campus Computer Store (CCS). The mandate of the CCS is to improve desktop support for the University community through lower pricing and a higher level of service. The CCS is operated as a cost recovery centre. Rather than operating its own help desk, the CCS contributes some funding for staff at the ITS Help Desk.

The CCS provides excellent services for students and employees, for both on campus and at-home use. The CCS has partnerships with Apple, IBM, Microsoft, Adobe, Shaw and SaskTel and others. The CCS services include:

- Expert advice and help to ensure sound purchases of compatible hardware and software. For on-campus purchases, this means that departments or employees do not have to spend time acting as their own purchasing agents.
- Educational pricing on hardware, software, supplies and services. Individual students, faculty and staff save money on personal purchases; the University saves money on institutional purchases.
 - desktop computers, laptops, tablet computers and personal digital assistants
 - servers including compute/Beowulf clusters
 - printers, copiers, scanners, digital cameras, data projectors and other peripherals
 - computer supplies
 - Administration of Microsoft Campus Agreement licensing
 - SPSS, SAS, Adobe and other software
 - high speed Internet access—special University pricing for Shaw, SaskTel high speed Internet services
- Extended, on-site warranty for desktop computers, servers, and peripherals.
- Installation of desktop computers in on-campus offices, instructional facilities or research labs.
- Employee purchase program through payroll deduction.

In addition, ITS has a Technical Services group. This group works closely with the CCS and is an authorized warranty provider for most major brands of computer and peripherals. It can repair most other brands of computers, printers and other peripherals as well as other electronic office equipment. It has received recognition from IBM and Compaq as one of the top warranty providers in Canada. Work can be done as part of a maintenance contract or on a time and materials basis. On-site and depot service is available.

Maintenance Initiatives

ITS will continue to provide core services that support the desktop computing environment for the University; offer services, on a fee basis, to units that do not have their own ICT support staff and; continue to operate the Campus Computer Store and Technical Services with the mandate of improving desktop support on campus.

Budget

	FTE 2003–2004		“Steady State” FTE	Typical Annual Capital Equipment Allocation
Service Area	ITS Operating Budget	Project or Fee- for-service	ITS Operating Budget	
Desktop Support	3.00	25.30	3.00	\$25,000

Of the 3 FTE from operating budget, about 1.8 FTE are used to provide consultation to departments regarding desktop requirements and planning, to participate in deployment of

anti-virus software and to develop desktop support strategies (e.g. desktop imaging and remote updates). The remaining 1.2 FTE provides support for the servers that perform the Microsoft Domain Name Controller function, print spooling, Sophos anti-virus software distribution, disk imaging, and automatic software updates services that are used by many colleges and units from all over campus.

A new initiative, described in section 4, will develop a campus desktop strategy that would seek to leverage the existing expertise spread across campus and ITS, and reduce the duplication of effort in designing and implementing diverse desktop management implementations.

3.1.5 Help Service

Service Overview

All instructors, students, researchers and staff periodically require assistance in resolving ICT problems. All colleges and departments that provide ICT Services must offer a help service.

ITS must provide a service that members of the University community can contact for remediation related to campus IT services (e.g. network, authentication, e-mail, web, file, portal, accessing services from off-campus, WebCT, etc.) or for ICT information (e.g. available ICT training course, etc.). It is expected that ITS will also provide general ICT help for colleges and departments that do not have local technical staff.

ITS' Help service includes:

- A help desk service. Full help service is only available from 8:00 a.m. to 5:00 p.m., Monday to Friday throughout the year. Problems are resolved directly on contact or are referred to the appropriate person who can resolve it. Faculty, staff, students can contact for information or help:
 - In-person at Arts 70
 - Over the phone
 - Via e-mail

In order to support distance education students, extended help service is available evenings (5:00–9:00 p.m. Monday to Thursday) and weekends (1:00–5:00 p.m.) during the fall and winter academic session. The extended Help service is available at the Learning Commons (Main Library) location. Telephone and e-mail queries are also handled during that same period. These extended hours are supported currently with TEL funding.

- Proactive communication of ICT security information, FAQs, “how to” information, new services, etc.
- Design and testing of user interfaces for new or changed ITS services so they are more intuitive and easier to use, so potential problems can be avoided, and so that the help service knows in advance most of the problems users may experience and how to aid them.
- Additional specialty services such as configuring wireless network cards in user laptops; emergency repair of virus-infected computers that are interfering with the campus network.

While the majority of our help service offerings are provided without charge to the user, users are charged for instances where an on-site visit is necessary to assist a user or configure a user's computer. [Many colleges provide this local desktop support at their own expense.]

Maintenance Budget

Service Area	FTE 2003–2004		“Steady State” FTE	Typical Annual Capital Equipment Allocation
	ITS Operating Budget	Project or Fee- for-service	ITS Operating Budget	
Help	8.90	3.70	9.00	Uses existing servers
	Includes \$40,000 provided by Campus Computer Store for Help desk support in lieu of establishing their own help desk.			

It is becoming increasingly difficult to provide the ICT help service expected by the University community within this budget.

- While certain peaks in demand for help can be predicted, such as beginning of term or a planned change in a service, other peaks in demand can happen at any time without warning, such as new virus attacks or hardware failures. At peak times it is impossible to keep up with all demands—with the result that not all requests for service can be handled promptly.
- The current help service (available from 8:00 a.m. to 5:00 p.m., Monday to Friday) is no longer acceptable for the University. Instructors, students, staff and particularly researchers, use ICT at all days of the week and all hours of the day. Prospective students and faculty expect that our web site, online catalogue and online admissions systems will be operational 24x7.

Currently, an ICT service problem that occurs at 6:00 p.m. on Friday night will often not get resolved until 62 hours later or more (after 8:00 a.m. Monday); this period can be longer when there is a statutory holiday.

One of the investment initiatives outlined in section 4 requests resources to extend the hours of support for key ICT services. Under this initiative, coverage hours will be based on the main library, which is open weekdays 8:00 a.m. to 11:00 p.m. except Friday (closes at 5:00 p.m.), Saturday 10:00 a.m. to 6:00 p.m. and Sunday 11:00 a.m. to 11:00 p.m.

Additionally, ITS will work with the campus community to determine the appropriate set of help services that can be provided in a responsive and timely manner, within the available resources, during core hours.

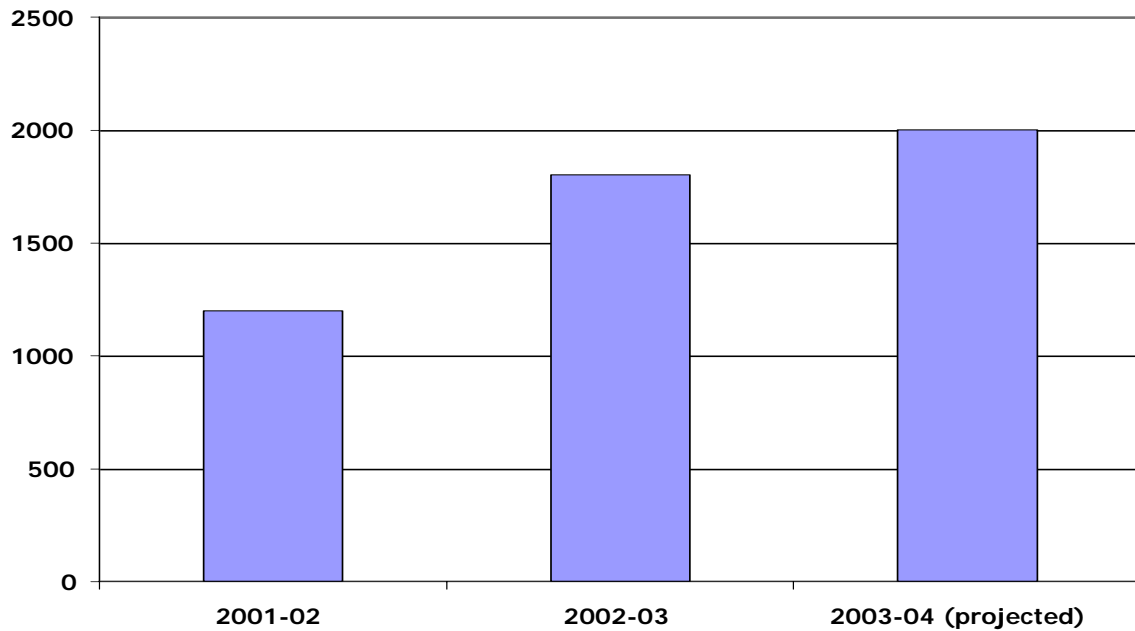
3.1.6 Training

Service Overview

Technological change occurs frequently forcing people to re-learn new versions of software often. Additionally, instructors, researchers, students and staff are continuing to use more software.

There is continual demand for ITS' training courses, reflecting a need identified by the researchers, instructors, students and administrators of the University. Training makes these people more effective at their work. ITS training has also been instrumental in helping to effect change on campus, most recently with the adoption of PAWS and with WebCT for Technology Enhanced Learning (TEL). The Training group has also helped advance the use of a common methodology for managing ICT projects.

Number of Attendees To ITS Training Course



In 2002–03 fiscal year, the Training group offered 205 training sessions in 61 different ICT topics with 1,801 attendees. This figure excludes custom training or usage of online modules. The number of attendees at ITS' training courses almost doubled in the last two years. To address this demand, we have also doubled the number of topics for which training is provided.

The ITS Training unit has an excellent record of collaborating with other campus units such as Teaching and Learning Centre, Extension and the Division of Media and Technology, as well as planning and mounting symposia for the provincial TEL initiative. The Organizational and Employee Development group within the Human Resources Division has contracted the Training group to provide ICT training for CUPE employees to meet the University's contractual obligations.

Since only 1 FTE is assigned to the maintenance of this service, ITS charges a fee for some courses as well as for customized training.

Maintenance Initiatives

ITS will continue to:

- Provide training courses for the software commonly used by instructors, students, researchers and staff (e.g. security, e-mail, WebCT, Dreamweaver, Flash, Photoshop, use of multimedia, PAWS portal, Sun One (PAWS) calendar, Exchange, Word, PowerPoint, Excel, MS Access, etc.). See <http://focus.usask.ca/courses/index> for more information.
- Provide customized training to individuals or units whose needs diverge from the standard course offerings provided.
- Develop online training modules to support self-service and just-in-time training for the University community.
- Broker training offerings. For instance, the Training group has coordinated training sessions for the University in ESRI's GIS (Geographical Information System), Crystal Reports, SAS, SPSS, Project Management and others.

Maintenance Budget

Service Area	FTE 2003–2004		“Steady State” FTE	Typical Annual Capital Equipment Allocation
	ITS Operating Budget	Project or Fee- for-service	ITS Operating Budget	
Training	0.90	1.70	1.00	
	Includes funding provided from TEL			

The ITS Training group has leveraged a single base budget position into three positions by providing new services, and by accessing project funds (e.g. TEL) as well as funds from departments, researchers and even off-campus units.

In the long-term, ITS cannot provide a viable training service for the University with only 1 FTE funded from operating budget. The training group has succeeded only due to consistent project funding, primarily from the provincial TEL initiative. **This operating plan assumes that TEL project funding will continue over this planning cycle. If not, an additional 1 FTE, from the operating budget, will be required.**

3.1.7 ICT Security

Increasingly, the University's ICT resources are under “attack” from the Internet. The number of Internet-based attacks against University ICT resources have increased dramatically in the last year.

For example, the number of viruses sent to the University **daily** has increased thirtyfold in the last nine months (see table below). ITS' e-mail servers detect these viruses and do not deliver them to the intended recipients on campus.

	Viruses Removed Per Day (Peak)
Spring 2003	3,500
Fall 2003	40,000
January 2004	90,000+

Additionally, ITS also blocks over 5.2 million attempts **daily** to probe or attack campus ICT resources from the Internet. This is an increase from the 1.2 million attempts per day experienced in November 2003.

The number of Internet-based attacks against University ICT resources will continue to increase (see inset, below).

Intruders are using new tools that are increasingly sophisticated, easily available to anyone over the Internet, easy to use—especially by novice intruders—and designed to support large-scale attacks. Internet attacks are easy, low risk and hard to trace.

There are many more opportunities today for system intrusion:

- Computer and network technology is continuing to be rapidly adopted in education, research, service delivery, industry and government.
- Operating systems, applications and network protocols that run on desktop computers and servers are more functional and more complex. This makes managing IT security more difficult and time-consuming, and increases the number of opportunities for security flaws in vendor’s software.
- System administrators, faculty and staff are increasingly busy and do not have adequate time to spend on IT security. Professional training in this area is expensive and difficult to obtain.
- The vendor product development and testing cycle is decreasing leading to the production of software with vulnerabilities.
- Internet hackers often target large networked IT environments, such as those at universities.

Service Overview

Successful Internet-based attacks prevent University teaching, learning, research and service delivery. University data may be modified, deleted and/or distributed at random to others on the Internet. University computers are used for illegal purposes. Publicity of successful Internet-based attacks can damage the University’s reputation; recruitment of faculty and students may become more difficult.

The University has had to make significant investments, especially in the last year, to reduce its risks relating to ICT security.

- Software has been installed on campus (ITS-operated) e-mail servers to detect and remove viruses that are transmitted via e-mail.
- Campus e-mail servers have been modified to automatically delete e-mail with a “from:” address that has been forged by a virus. During major virus attacks, this can prevent users from receiving hundreds of forged e-mails.
- The campus network has been reconfigured to “block” (i.e. not transmit) network packets that have forged network (IP) addresses. Some viruses forge the IP address of the infected computer to attack other computers on campus and across the Internet. The blocking of forged IP addresses will reduce the spread of these viruses and their effect on the University community.

- Network scanning software is used to detect campus computers that have a virus. Infected machines are removed from the campus network (to prevent further infections) until they are disinfected. Note: The scanning software can detect machines infected with only certain types of viruses.
- Internet access methods that are commonly used to “attack” campus IT resources have been blocked from the campus.²⁵ About 5.2 million packets (probe attempts) are blocked daily.
- Virtual Private Network (VPN) hardware and software has been implemented to provide secure access to U of S IT resources from the Internet. Initial deployment focused on faculty, researchers, graduate students and staff who might otherwise use the insecure methods now blocked.
- Firewall hardware and software has been purchased for (a) the campus network and (b) for the (60+) campus servers. This will enable the University to block or accept, at a more granular level (compared to port blocking), attempts to access the campus network and institutional servers from the Internet. It will also enable the University to detect a larger number of Internet-based attacks.
- A site license for Sophos anti-virus software has been purchased. The site license covers all campus servers and desktop computers (Windows, Macintosh, Linux) as well as faculty, staff and student home computers. Initial deployment is focused on all on-campus computers (approx. 8,000). Usage of this software has grown so fast that ITS had to purchase a faster Sophos software server to assist with the deployment. The license for MacAfee anti-virus software has been extended for another year (till summer 2004) to give those users time to convert to Sophos.
- Recommendations regarding how to reduce the risks related to Internet-based viruses have been published. The recommendations for on-campus computers are published at http://www.usask.ca/its/help_desk/cpusecurity/oncampus.html (or users can contact their local ICT support staff). The recommendations for on-campus computers are published at http://www.usask.ca/its/help_desk/cpusecurity/index.html.
- New backup hardware and software will be implemented in early 2004 to ensure that backup and restore of data from 100 institutional servers is reliable. The existing backup technology is about eight years old and often prone to problems. Data on campus servers is backed up daily (Monday to Friday).
- A policy regarding data access and use is under development.
- Recent operational decisions relating to IT security (e.g. port blocking, removal of infected computers from the campus network) are forming the basis of a U of S IT security policy. A complete IT security policy is still required.
- A collaborative model for handling IT security incidents as well as for developing strategies to prevent attacks has been developed. This model involves collaboration from ICT support across campus and staff in Security Services. This model has proven to be successful and is unique to our University.

²⁵ The following IP ports are currently blocked: 137, 138, 139, 445, 88, 135, 514, 515, ICMP Echo and Echo-Reply.

Maintenance Budget

Service Area	FTE 2003–2004		“Steady State” FTE	Typical Annual Capital Equipment Allocation
	ITS Operating Budget	Project or Fee-for- service	ITS Operating Budget	
IT Security	1.10	2.00+	1.00	See note below

The maintenance budget for ICT security is insufficient to handle the current reality of Internet-based attacks.

- The Campus-Wide ICT Services Infrastructure Capital Fund is ITS’ primary source for capital funds. ICT security is making unanticipated demands against this fund. ITS did not request capital for security from this fund until 2003–04 when the Academic Support Committee approved \$95,000 for ICT security hardware and software. This reduced the amount that would have traditionally been available for allocation to other ICT services. Even so, this allocation was insufficient to meet campus ICT security needs and additional hardware and software for security was purchased as part of the USR-net project.
- The FTE assigned to ICT security, from operating budget, were insufficient to prevent Internet-based attacks and to handle IT security incidents last year. Additional staff effort was required from USR-net project staff; staff re-assignments within ITS; additional term staffing within ITS; college and administrative unit ICT support staff effort and; Security Services staff effort. Re-allocating staff from a current project or service, to support security initiatives, delays the other projects (e.g. USR-net) and reduces service levels in other areas.

Even with the investments in ICT security undertaken to date, more work must to be done to develop a secure and productive working environment for instructors, students, researchers and support staff. Additional investment is requested in section 4 to prevent Internet-based attacks and to mitigate the effect of successful attacks.

3. 1.8 Instructor Support

Service Overview

ITS provides many services that support instruction, learning and research. These services have been outlined in section 3.1.1 to 3.1.7 above and include: network connections to instructor offices, access to the “commercial” Internet, access to Canadian and international research networks, classroom network access, e-mail, web services, file services, authorization and authentication, security, desktop support, help and training.

In addition to those services, ITS also provides services specific to supporting instruction. These services include:

- Instructional software licensing and hosting.²⁶
 - Online course delivery environments

²⁶ Hosting includes the installation of new software versions, bug fixes and integration with other applications such as campus authorization and authentication systems (e.g. SSAM, the new student information system (Si! Project) and the campus portal (PAWS) as appropriate).

- WebCT
 - MyCourses (PAWS)
 - Exam question database software (LXR)
 - Online quiz tools (part of WebCT)
 - Online survey tools
 - iHelp including Oracle database²⁷
 - Streaming video server
 - GIS (Geographic Information System) software
 - CoursEval [used by Nursing, Dentistry, Pharmacy and Nutrition, Veterinary Medicine and Kinesiology for student evaluation of courses]
 - Others like Art & Art History Database
- Technical assistance, documentation, training and consultation for some of the above instructional tools.
 - Participation in the planning and development of online courses, faculty development initiatives and learner support initiatives in support of the University-Province TEL (Technology Enhanced Learning) initiative.
 - Online course or course module development. The online courses/modules are developed in collaboration with Extension (for instructional design), DMT (for graphics and video) and others as required to meet the pedagogical needs of the course. Project funding is required.
 - Computer marked (optical mark reader) exam scoring, course evaluations and surveys, as well as design of custom survey forms.
 - Research and evaluation of new technologies and new applications that instructors want to investigate. Example areas include: online examination tools, better electronic whiteboard applications, desktop videoconferencing, and WebCT alternatives.
 - Negotiating educational and/or site licenses for new instructional software.
 - Instructional application and database design, development/acquisition, maintenance and support (typically on a fee-for-service basis).

The instructional support services are provided in consultation with user-groups (instructors, Academic Support Committee of Council, WebCT, course instructors/designers, etc.) and in collaboration with Extension, the Gwenna Moss Teaching and Learning Centre, Division of Media and Technology, ICT support staff in colleges and the provincial Technology Enhanced Learning (TEL) working groups.

Maintenance Budget

Service Area	FTE 2003–2004		“Steady State” FTE	Typical Annual Capital Equipment Allocation
	ITS Operating Budget	Project or Fee-for- service	ITS Operating Budget	
Instructor Support	3.00	2.30	3.00	\$75,000

Faculty usage of instructional technology is increasing.

²⁷ Currently used by the Computer Science department in their courses.

- For example, WebCT is currently used in 118 courses and by 3,800+ different students. WebCT usage by faculty and instructors has been increasing 50% yearly. The server must be upgraded regularly so it has the capacity to adequately handle increased usage.

Usage of the “my courses” component of the campus portal (PAWS) is also expected to grow rapidly. The portal servers must be upgraded as usage increases.

We assume that \$75,000 from Campus-Wide ICT Services Infrastructure Capital budget will be available yearly to renew and expand the servers used to provide the instructional technology services outlined in this section.

The capital allocation above does not include the \$60,000 recently allocated from this fund, as part of network renewal, by the Academic Support Committee of Council to provide network access, including wireless network access, to all shared classrooms.

Adequate support for instructors in the use of instructional technology will help attract and retain the outstanding faculty that the University desires and will help provide the educational experience desired by the academically promising body of students we want to attract. Minimizing the effort required by faculty in using this technology will make more time available for teaching or research. Additional investment is required to provide the instructional technology support required by faculty and students today; this investment is outlined in section 4.

3.1.9 Learner Support/Student Computing

Service Overview

In addition to the services ITS provides that support instruction, learning and research,²⁸ ITS also provides services specific to supporting learning (student computing). These services include:

- Foundational Student Computing facilities, operations, and support (approximately 200 workstations)
 - Learning Commons (in collaboration with all Library branches)
 - Browsers
 - Place Riel tunnel
 - Kinesiology public lab
 - Physical Activity Centre (Fitness Centre)
 - Indigenous Student’s Centre
- Wireless network access for student-owned laptops and personal digital assistants (PDAs) (approximately 60 locations, more planned)
 - Educational pricing on wireless network cards
 - See <http://studentcomputing.usask.ca/wireless/> for locations

²⁸ These services include 1,300 network connections to student computing facility workstations, access to the “commercial” Internet, access to Canadian and international research networks, wireless network access, e-mail, web services, file services, authorization and authentication, security, educational software pricing, help and training.

- Campus-wide printing for students
- Campus-wide instructional software license management (proposed)
- Software distribution service for students (proposed)
- Discipline (college-specific) student computing facility operation and support (on a fee-for-service basis)

Maintenance Initiatives

ITS will maintain and enhance the existing foundational facilities and services. Service evolution will be done collaboratively with colleges and other units in order to reduce the risk of duplicated effort, to develop campus-wide standards and practices, and to leverage the collective knowledge and resources. Specific initiatives include:

- Continue to operate and enhance the existing foundational (open-access) student computing facilities.

This includes the provision of technical and end-user (student) support, as well as the regular renewal of workstations, associated servers, peripherals and software. The annual (amortized) cost for workstations, shared servers, peripherals and software is estimated at \$1,000 (in some facilities, annual costs are lower). A three-year renewal cycle is recommended. Based upon the current facilities, up to \$150,000 is budgeted annually (from ITS operating budget and the Campus-Wide ICT Capital Equipment Budget) to renew foundational student computing facilities. Bulk purchases will help reduce the costs. It should be noted that the infrastructure and (best) practices developed to support these facilities can also be used to support office environments as well as discipline specific facilities.

The size (number of workstations) of the foundational facilities is not expected to grow significantly during this planning cycle as we expect to increase services that leverage the use of student-owned computers (see new initiative, Student Mobile Computing, for more information).

- Enhance the campus printing system so it continues to meet the needs of students and other providers of IT services to students.

The current service allows students to print in almost any college or foundational student computing facility from their “student printing account”. Previously students often had to purchase pages (a print account) for each of the facilities in which they wanted to do printing. Purchased, but unused pages in one facility could not be used in another.

Evolution of this service will include the ability of student to purchase pages online using a credit card. The ability for students to charge their printing to their tuition account will also be examined.

- Expand the existing wireless network service.

Ten new wireless access points will be installed yearly in classrooms and other areas where students work. The new wireless access points will support both the existing (predominant) wireless standard (802.11b) as well as new faster standard that is currently available (802.11g).

This maintenance initiative is in addition to the wireless network access points that

may be installed as part of the evolution of the Research and Education Network.

It is expected that the University will need at least 250–300 wireless access points. A larger deployment of wireless network service is proposed as a new initiative, Student Mobile Computing (section 4).

For security reasons, the current network service supports only the LEAP protocol. The wireless cards installed by some manufacturers in their laptop computers do not support this protocol. Students must then purchase a LEAP compatible wireless card. Research will be undertaken to determine if, and how, wireless cards that do not support LEAP can be supported on campus in a secure manner.²⁹

Additionally, the existing 802.11b network access points will need to be upgraded to support the current wireless standard.

- Develop a campus-wide software license management service.

ITS and colleges currently deploy a number of methods for managing software licenses in student computing facilities. In cases where affordable site or facility software licenses are not available, ITS and colleges purchase concurrent user licenses. Concurrent user licenses limit the number of workstations (students) that can run this software at the same time. Failure to limit the use of this software is a violation of copyright, and the license management software would track the usage of software to ensure compliance with copyright regulations. Costs may be reduced by sharing license fees among units.

ITS will also deploy a self-service system to distribute software to student laptop and home computers. This system can be used to distribute “freeware” (e.g. Netscape browser software) as well as software students may purchase. Electronic (online credit card) purchases will be supported. The distribution of some software can be restricted to certain eligible groups (for example, colleges may want to distribute software licenses only to eligible students based upon their college or course enrolment). This service will also be used to distribute software to faculty and staff office or home computers.

- Collaborate with colleges and other units to make a variety of online learning resources readily available for student use.

Resources may include general IT online help and training (akin to the proposed IT Ready program in the College of Arts and Sciences), access to general academic tools (online writing assistance, online math readiness, dictionaries, etc.) and discipline- or course-specific content.

- Continue to support college or discipline-specific student computing facilities on a fee-for-service or contract basis.

ITS staff currently operates facilities in Engineering, Veterinary Medicine, Pharmacy and Nutrition, Kinesiology, Education, Dentistry, Medicine, Nursing, Agricultural Economics and others.

²⁹ The LEAP protocol provides additional security than that provided by the industry-standard WEP protocol. Software is readily available on the internet to enable people to monitor wireless conversations. This monitoring can be used to find out another person’s username and password (this can then be used to impersonate that person) or someone else’s work (assignments, exams, research papers, etc.).

Budget

Service Area	FTE 2003–2004		“Steady State” FTE	Typical Annual Capital Equipment Allocation
	ITS Operating Budget	Project or Fee-for- service	ITS Operating Budget	
Learner Support/Student Computing	1.4	4.1	1.5	\$75,000
	Includes funding from Student Computing Fund			

In addition to ITS operating budget, project funding from TEL and the Student Computing Fund is used to maintain and enhance this service.

Approximately \$75,000 has been allocated yearly by the Information Technology (now Academic Support) and Capital Planning Committees of Council, from the Campus-Wide ICT Services Infrastructure Capital budget, toward the renewal of facilities and servers. This does not include monies that might be allocated towards additional wireless network access points related to the evolution of the Research and Education Network service.

The academically promising (and “IT-savvy”) body of students we want to recruit and retain expect “anywhere, anytime” access to instructional and administrative services. The University must provide these students with “anywhere, anytime” access if we are to successfully recruit and retain students, and prepare them for success in the knowledge age. Additional investment is required to support student mobile computing, including the larger scale deployment of a campus wireless network service; this investment is outlined in section 4.

3.1.10 Research Computing

Service Overview

Research in virtually all disciplines now relies heavily upon information technology. Within some disciplines, research simply cannot occur without IT.

In addition to the services ITS provides in support instruction, learning and research,³⁰ ITS also provides services specific to supporting research. These services include:

- Computational resources
 - VMS and UNIX servers (on campus)
 - C3.ca (off-campus)
- IT consulting for research grant proposals
- Software licensing and hosting
 - ESRI GIS
 - SPSS (VMS), BMDP (VMS), Minitab (VMS), SAS (VMS, Unix), Maple (Unix) and other software

³⁰ These services include network connections to research spaces, access to the “commercial” Internet, access to Canadian and international research networks, support for ultra-high speed network access, e-mail, web services, file services, authorization and authentication, security, educational software pricing (e.g. SPSS, SAS, etc.), help and training (e.g. GIS, SPSS, SAS, etc.).

- Training in the completion of online grant NSERC and SSHRC applications
- Optical Mark Reader (OMR) scanning of survey and other research data
- Online surveys
- Application and database development (fee-for-service)

Budget

Service Area	FTE 2003–2004		“Steady State” FTE	Typical Annual Capital Equipment Allocation
	ITS Operating Budget	Project or Fee-for- service	ITS Operating Budget	
Research Computing	0.70	0.00	1.0	\$50,000

The Information Technology (now Academic Support) and Capital Planning Committees of Council, have recommended an average of about \$50,000 yearly from the Campus-Wide ICT Infrastructure Services Capital budget towards the renewal of servers used to support research. It is assumed that this level of funding will continue to be available.

This maintenance budget (staffing and capital) is inadequate to support the University’s goal to increase research, scholarly and artistic work. The University’s Strategic Directions state that “encouraging the fruits of scholarship requires enhanced infrastructure and an environment in which research and creativity can flourish.”

ICT services are critical part of the enhanced infrastructure required to support research. Enhanced ICT services and support can free researchers from performing ICT operational tasks (e.g. file backups, workstation security management, workstation software updates) and provide them more time for research and creativity. An initiative to improve the IT support for research is proposed in section 4.

3.1.11 Administrative Information Systems

Service Overview

Administrative Information Systems are important to the operations of a modern university. The University is dependent upon administrative information systems for:

- transaction processing (e.g. registering students, recording marks, paying people, tracking expenditures, tracking donations, billing);
- delivering services (e.g. online admissions and registration, grades lookup);
- reporting (e.g. to colleges, administrative units, government, granting agencies, Saskatchewan Universities Funding Mechanism, Statistics Canada, Maclean’s);
- analysis (e.g. enrolment and research funding trends); and
- decision making and planning (e.g. budgeting, program planning integrated planning, Systematic Programme Review).

The ICT foundational document states “the University cannot meet its business (and service delivery) requirements without effective contemporary administrative support systems.” Effective administrative systems should:

- simplify business processes;
- improve access to institutional data;
- improve the quality of institutional data; and/or
- provide self-service to students, faculty, researchers and staff.

ITS is responsible for the ICT components relating to the operation and evolution of the institutional administrative systems. ITS:

- Provides technical support for the application software, databases, development tools,³¹ integration tools, reporting tools and operating systems (upgrades, bug fixes, troubleshooting, customization, consultation, etc.).
- Designs, develops and maintains applications to meet critical University needs not addressed by commercial software.
- Hosts the application software, databases, development tools, reporting tools and integration tools.
- Manages software licenses (applications, databases, development tools, reporting tools, integration tools, and operating systems).
- Develops and supports campus application and database integration strategies.
- Assists colleges and administrative units to identify business requirements, perform business process analysis and redesign, develop and evaluate RFPs, negotiate contracts and licenses, develop change management processes and manage ICT projects.

In consultation with the user community, the administrative business units and ITS are jointly responsible for planning the evolution of University administrative systems.

Maintenance Initiatives

Five maintenance initiatives have been identified for this planning cycle.

- Continue participation on the Si! and Unifi projects.
These projects will implement a new student information system (Banner Student) and a new finance/accounting system (Banner Finance) for the University. Upon implementation, ITS will maintain and enhance those systems so they remain current (are supported by the vendor) and meet the changing needs of the University.
- Maintain and enhance existing administrative systems so they remain current (are supported by the vendor) and meet the changing needs of the University. Current maintenance funding is insufficient to implement significant changes or modifications to these systems. Additional investment is requested in section 4 for four of the following five areas.

³¹ Development tools include: Oracle Forms, ColdFusion, Witango, Cobol, PeopleSoft Tools, etc.

- Systems and associated “data warehouses” required to support the University’s integrated planning processes, institutional analysis and the growing need for government and public reporting
 - Alumni and Donor system (U-Friend)
 - PeopleSoft Human Resources Management System³² (About-US)
 - Electronic payments infrastructure³³
 - Contacts (name and address) database (U-Who)
- Maintain, with minimal or no changes, the following legacy administrative systems until their replacement systems are fully operational. Some of these systems will need to be maintained for as long as seven years to meet regulatory requirements relating to data retention (if seven years of legacy data is not converted to the replacement systems):
 - Student Information System (SIS v1)
 - Financial Records System (FRS)
 - Human Resources System (HRS)
 - Enhance other enterprise systems, acquire and/or develop new systems as prioritized by the University. For example:
 - The Library has proposed replacement of their system (proposed cost: \$1 million).
 - System(s) for accepting payments online (credit card, debit card) for tuition fees, computer printing, etc.
 - Some have suggested that a campus CV database along with ability to automatically produce “reports” in the formats required by various granting agencies would help researchers prepare grant submissions.
 - Self-service applications, within ITS and other units.
 - Assist colleges and support units to develop and/or acquire systems that address their specific needs (that are not addressed by enterprise systems).³⁴ For example, a student information system for non-credit courses to be used by Extension; a dental clinic system for the College of Dentistry (patient records, billing, student grading, research).

Disinvestments

As legacy administrative systems are retired (replaced by new systems), ITS will disinvest from the support of those systems. When the new student information and finance/accounting systems are implemented (Si! and Unifi projects are completed), ITS will no longer support SIS and FRS assuming that seven years of data is converted as part of project implementation to meet regulatory requirements. In the case of the PeopleSoft HR/Payroll system, the implementation project did not convert seven years of data; ITS must support the legacy system (HRS) until the seven year window expires.

³² Evolution will include self-service, and if prioritized and funded by the University, a module to support recruitment.

³³ This infrastructure was implemented this year. Support will be required to integrate applications that want to provide electronic payment (e.g. Bookstore sales, conference registration, tuition payments).

³⁴ Note: Facilities Management is implementing a system for telephone management and billing. Support for this is no longer provided by SaskTel.

ITS may also be able to drop support for the legacy tools that were used to develop the legacy systems, assuming that those tools are not used for any other system. For example, the Course Inventory System and the Dental Clinic system were developed using some of the same tools that were used to develop SIS. ITS will not be able to drop support for all those tools (RDB, Rally, Datatrieve, CDD/Repository and SAS on the OpenVMS operating system) when the Si! project is completed until the Course Inventory System, the Dental Clinic system and other systems that use these tools are upgraded. ITS will be able to drop support for RDO, Periphonics, TDMS and CMS once the Si! and Unifi! projects are fully completed and all systems that use these tools are replaced.

If support for SIS and the associated legacy tools can be discontinued, ITS will reassign 2.5 FTE (current SIS support level) towards the support of the Banner Student system. Likewise, if support for FRS and the associated legacy tools can be discontinued, ITS will reassign 0.5 FTE (current FRS support level) towards the support of the Banner Finance system.

Budget

Service Area	FTE 2003–2004		“Steady State” FTE	Typical Annual Capital
	ITS Operating Budget	Project or Fee-for- service	ITS Operating Budget	Equipment Allocation
Administrative Information Systems	21.60	15.90	21.50	\$125,000
	Includes funding from the System Development Fund, Si! and Unifi projects.			

In addition to the above, some funding is provided yearly for new initiatives from the Systems Development Fund. This funding is reflected in the “project and fee-for-service” FTE allocation. The planned use of this fund for the planning cycle is outlined in section 3.2.4.

A total of 21.6 FTE are assigned (from operating budget) towards the maintenance of the University’s student, finance and accounting, alumni and donor, contacts database, institutional analysis and reporting, human resources and payroll, electronic payments and other systems. This includes 12.5 FTE for applications support, 8.1 FTE for server and database support and one manager (total 21.6 FTE). The following table shows the FTE assigned the various administrative systems³⁵ in 2003–04 as well as in 2005–07 (“steady state”).

³⁵ Note: The table above does not include the FTE assigned to support Library administrative systems. Support for these systems is provided by ITS staff (on a fee-for-service basis) and by Library ICT staff.

	2003-04		2004-05	2005-06, 2006-07
	ITS Operating Budget	Project or Fee-for-service	ITS Operating Budget	ITS Operating Budget
Administrative System:	FTE	FTE	FTE	FTE
Student Information (SIS and Banner Student)	2.60	5.00	2.50	Per Si! Operations Plan
Alumni & Donor (U-Friend)	0.55	0.50	0.50	0.50
Institutional “Data warehouse” and Reporting (Institutional Analysis/Integrated Planning Office)	0.60	1.50	0.50	0.50
Contacts Database (U-Who)	1.35	1.00	0.50	0.50
PeopleSoft Human Resources Management System (About-US)	4.10	-	4.00	4.00
E-Payments Infrastructure	0.50	1.00	-	-
Finance and Accounting (FRS and Banner Finance)	0.60	-	0.50	Per UniFi Operations Plan
ITS Internal Systems	0.80	2.10	2.00	2.00
Project Management/Analysis for software tools upgrades	1.00	-	1.00	1.00
Support for College and Departmental Administrative System Projects	0.40	2.80	1.00	1.00
Sub-Total	12.50	13.90	12.50	9.50
Server Support for Above Systems	4.75	-	4.75	4.75
Database Support for Above System	3.34	2.00	3.34	3.34
Manager	1.00		1.00	1.00
Total	21.60	15.90	21.60	18.60

Figure 3.1 FTE Assigned to Support Administrative Systems

At first glance, this staffing level may seem excessive to some. However, the assigned staffing level is adequate only to meet the University’s current needs with respect to three systems, listed below. The maintenance budget for these systems was planned and approved as part of the new system implementation and based upon vendor recommendations and experiences at other universities. The maintenance budget for Banner Student, Banner Finance and PeopleSoft HRMS systems are significantly higher than for the systems they replaced.

- Student Information System (Si! project, Banner Student)
- PeopleSoft Human Resources Management System (About-US)
- Finance and Accounting System (Banner Finance³⁶)

The maintenance budget provides a modest 1FTE to assist colleges and departments to initiate projects to acquire or develop administrative systems that address business needs that are not met by the enterprise administrative systems. For example, ITS is working with Dentistry to assist them in the implementation and integration of a new administrative system to support the Dental Clinic. Recently, ITS has worked with extension regarding the implementation of a

³⁶ Technical support staff within the Financial Services Division will support the Banner Finance application. ITS will provide application and database hosting.

student information system to support non-credit studies. There is an increasing demand for this service. This staffing level will not meet all the demand, at all times.

This budget also provides 2 FTE to maintain and develop systems that support the delivery of ITS’ services. Without these systems, users will have to rely upon paper-based and manual processes (e.g. for authorizing computers on the campus network, placing trouble calls, placing requests for network connections, registration for ITS courses, etc.); this reduces ITS service quality and effectiveness. ITS’ billing system will have to be modified to work with the new chart of accounts that will be developed by the Unifi project.

The assigned staffing level (“Steady State” from ITS Operating Budget) is insufficient to support the administrative systems (areas) listed below. Additional investment is needed to maintain and enhance these systems; this investment is outlined in section 4.

FTE Assigned For Applications Support (ITS Operating Budget)	
	“Steady State” (2004–2007)
Alumni & Donor (U-Friend)	0.50
Institutional “Data warehouse” and Reporting (Institutional Analysis/Integrated Planning Office)	0.50
Contacts Database (U-Who)	0.50
E-Payments Infrastructure	-

The University’s existing administrative systems have been developed over the last 20 years using more than 15 different software development environments (tools). Vendors typically upgrade their products yearly. Our maintenance budget allows for 1 FTE to manage the projects for these software tool upgrades. This effort is inadequate to perform the updates on a timely basis. The University is at risk that its administrative systems may fail and vendor support will be unavailable. To mitigate this risk, staff from applications support will need to be assigned to software tool upgrade projects; this may lead to application software failures (due to inadequate support staff to maintain the systems) or to delays in functional enhancements required by the University.

3.2 Maintenance Initiatives: Budget Summary

3.2.1 Operating Budget (Staffing)

About 85% of ITS’ operating budget is allocated to staff salaries and benefits. The following table shows the FTE staffing assigned, from operating budget, to each service area for 2003–04 (December 2003) and for the remainder of the planning cycle. While it is difficult to predict, we expect that project and fee-for-service work will remain the same or will be slightly lower during the remainder of the planning cycle.

Service Area	FTE 2003–2004		“Steady State” FTE for Planning Cycle
	ITS Operating Budget	Project or Fee-for- service	ITS Operating Budget
Research and Educational Network	10.60	4.00	10.50
E-Communication and Collaboration	5.20	4.20	5.00
Identification, Authorization and Authentication	1.50	1.40	1.50
Desktop Support	3.00	25.30	3.00
Help	8.90	3.70	9.00
Training	0.90	1.70	1.00
ICT Security	1.10	2.00	1.00
Instructional Technology	3.00	2.30	3.00
Learner Support/Student Computing	1.40	4.10	1.50
Research Computing	0.70	0.00	1.00
Administrative Information Systems	21.60	15.90	21.50
Subtotal	57.90	64.60	58.00
College/Unit Specific Staff	5.10	4.00	5.00
Administrative Support	4.00	1.00	4.00
Director	1.00		1.00
Total	68.00	69.60	68.00

Figure 3.2 FTE Assigned to ICT Service Areas

The assigned staffing level from ITS’ operating budget, based upon our current operating budget and current University ICT service needs, is adequate to meet campus needs in only two service areas.

- Research and Education Network services. This assumes that the funding, approved in the CFI conditions of award (USR-net project) for the support and operation of the new campus network, is provided.
- Training services. This assumes that funding will continue to be available from the provincial TEL initiative.

The assigned staffing levels, from ITS’ operating budget, are inadequate to meet the needs of instructors, students, researchers and staff in the other nine service areas. For example:

- The University has developed a campus portal, using funds from a variety of sources. Stable funding is required for the maintenance and evolution of the portal.
- Nine (9) FTE are currently assigned to provide help and information to 20,000 instructors, students, researchers and staff. Even with the existence of local college ICT support staff, these people are the first line of help for many and answer more than 20,000 questions yearly at three in-person locations, a phone centre and through e-mail. They also proactively assess and mitigate the effect on the University community of service changes and new service deployments.

This staffing level is inadequate to provide responsive and timely assistance for the entire University community during core hours, let alone the extended hours of support that instructors, researchers, students and staff now need.

ITS will work with the campus community to determine the appropriate set of help

services that can be provided in a responsive and timely manner, within the available resources, during core hours.

- Three (3) FTE are assigned from operating budget to instructional technology support. The staff effort is split primarily between (1) providing “operations support”³⁷ for WebCT, CourseEval, Video Streaming and other instructional applications and (2) supporting the servers and databases that are needed for these applications. Little time is available to provide direct support to instructors wishing to use instructional software, let alone evaluate, provide and support additional software for use in instruction.
- While many of ITS’ services support research (e.g. research and education network, electronic communications), ITS is able to assign only 0.75 FTE to provide services that support research specifically. This effort is required to support and operate the servers used by researchers; no time is available to help researchers with their specific ICT needs.
- As described in section 3.1.11, the staffing assigned to support the following administrative information systems is insufficient to meet campus needs.
 - Campus Contacts Database (U-Who)
 - Systems and associated “data warehouse” enhancements required to support University planning activities and government reporting.
 - Evolution of Alumni/Donor System (U-Friend)
 - Electronic Payments Infrastructure Support

Additional investment is required to maintain and enhance these nine service areas to meet campus needs. The specific investments required for these service areas are detailed in section 4.

- E-Communication and Collaboration (to maintain/enhance campus portal)
- Identification, Authorization and Authentication
- Desktop Support
- Help (for extended hours of service)
- IT Security
- Instructor Support
- Learner Support/Student Computing (support for mobile student computing)
- Research Computing
- Administrative Information Systems
 - Campus Contacts Database (U-Who)
 - Systems and associated “data warehouse” enhancements required to support University planning activities and government reporting. (Institutional Analysis/Integrated Planning Office)
 - Evolution of Alumni/Donor System (U-Friend)
 - Electronic Payments Infrastructure Support

³⁷ Operations support includes the installation of new versions, installation of bug fixes, problem resolution and integration (as appropriate) with other campus systems (e.g. SIS, SSAM).

Without additional investment, service failures will occur more frequently and the response time to repair service failures will be longer. Requests for service changes to meet the changing needs of the University will be delayed or may even not be implemented. Colleges and/or administrative units will develop multiple implementations of a particular service. Total institutional ICT cost will increase; services may not interoperate.

The following figure shows the FTE assigned to each service area, in a graph (rather than the table in figure 3.1).

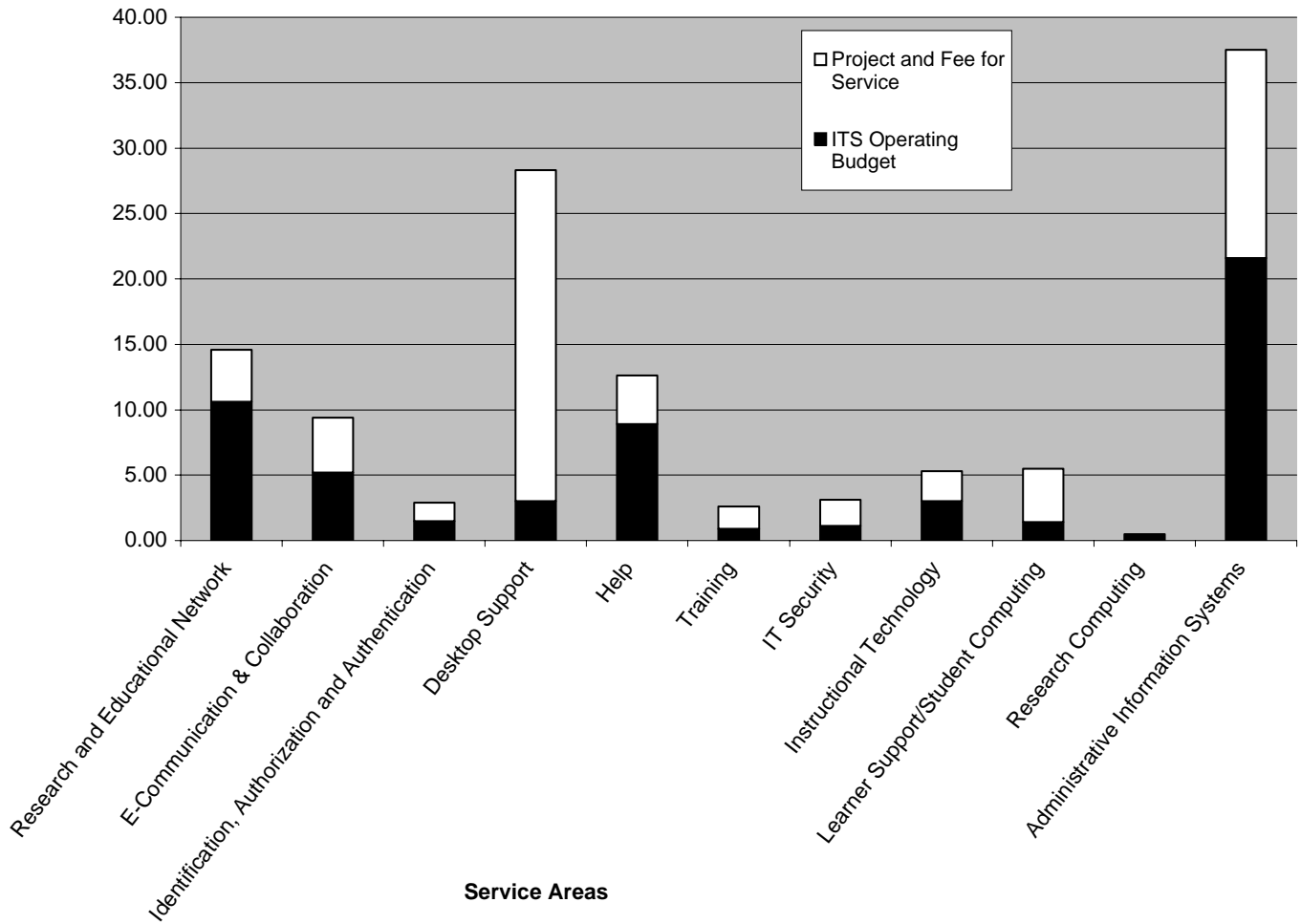


Figure 3.3 FTE Assigned to Service Areas (Graph)

The graph above (and table below) shows that ITS relies heavily upon project funding or fee-for-service in each service area (except research computing support). While it varies among service areas, overall, 50% of our staff are paid from project funds or fee-for-service.

Service Area	Percent FTE Funded from Projects or Fee-for-service
Research and Educational Network	27%
E-Communication and Collaboration	45%
Authorization and Authentication	48%
Desktop Support	89%
Help	29%
Training	65%
IT Security	58%
Instructional Technology	43%
Learner Support/Student Computing	75%
Research Computing	0%
Administrative Information Systems	42%

Project funds are usually targeted toward the development of a new service rather than to support, operate and enhance a core service that is under-funded. The quality of core services languish until project funding is received to renew or replace the service, or until it is replaced by a college or another support unit (or even several colleges or support units).

Even when project funding is available to deploy new services, little or no money is provided to support, operate and enhance the new service (for example, the recent portal development). The cycle continues. Without adequate operating funds, service levels decrease. Project funds are then required to renew or replace the service when service levels have decreased significantly. During this time, the University does not receive the most value from the service.

Furthermore, since half of our staff are project funded, ITS may not have the capacity (number of people, appropriate skill sets) to quickly undertake approved projects.

3.2.2 Operating Budget (Non Salary)

Approximately 15% of ITS’ operating budget (approximately \$760,000) is non-salary. This budget used for:

- Materials and supplies for staff use
- Materials and supplies for campus services (paper, printer ribbon/ink cartridges, backup tape media, etc.)
- Staff desktop hardware and software
- Shared equipment such as printers, fax machines, servers
- Staff professional development
- Purchased services such as leased lines and consulting, etc.
- Some term staffing and contracted services (e.g. SPSS, GIS and SAS training and support)

- Telephone rental (special phone services), long distance, voicemail, pagers and cell phones
- Vehicle rental for technicians to respond to network trouble calls, network installations, other services
- Advertising (recruitment)
- Other items such as courier, mailing, renovations, furniture, network installations for staff offices and printing

For general planning purposes, the non-salary operating budget is allocated to various services in roughly the proportions as it is in the staff budget (section 3.2.1).

3.2.3 Capital Equipment

The Campus-Wide ICT Infrastructure Services Capital budget is used to maintain and renew network equipment and servers used to deliver campus-wide ICT services. **Our service maintenance plan assumes that this level of capital funding will be available during this planning cycle.** We propose that the annual allocations, from this fund to specific services, will be determined in consultation with the Academic Support Committee of Council, the Budget Committee and the Associate Vice-President (ICT). This is similar to the process used in previous years. The following table outlines the typical annual allocations to various services.

Service	Typical Annual Capital Allocation
Research and Educational Network	\$400,000
Electronic Communication and Collaboration	\$150,000
Desktop Support (campus-wide infrastructure)	\$25,000
Instructional Technology	\$75,000
Research Computing	\$50,000
Learner Support/Student Computing	\$75,000
Administrative Information Systems	\$125,000
ICT Security	See note, below.
Total	\$900,000

Figure 3.4 Typical Annual Allocations from the Campus-Wide ICT Services Infrastructure Capital Budget

Note: ITS did not request capital funding for ICT security hardware and software until 2003–04 (other service improvements were prioritized over ICT security risk mitigation). In 2003–04, the Academic Support Committee approved \$95,000 for ICT security hardware and software from the Campus-Wide ICT Services Infrastructure Capital Fund. This allocation reduced the amount that was available for allocation to other campus-wide ICT services. Additional ICT security hardware and software was purchased as part of the USR-net project. The current capital budget for campus-wide services infrastructure is inadequate to meet today’s ICT service needs. Some of the investment initiatives (section 4) include additional capital equipment investment (e.g. wireless network access equipment, security).

3.2.4 Other Funding Sources

Software maintenance costs (e.g. PeopleSoft, Oracle, FRS, WebCT, Banner Student, Banner Finance) and other outsourced services (e.g. Internet access costs) are funded as utilities. For example, the ongoing support budget for the new student system will increase as SCT software maintenance fees increase.

The Systems Development Fund (SDF) and the Student Computing Fund (SCF) are used to develop new campus-wide services. Since additional funding is not available to support, operate and enhance these services, these funds are being “eroded” for service maintenance and evolution. The capacity to develop new services using these funds is continually diminished.

	Systems Development Fund Budget			
	2003-04	2004-05	2005-06	2006-07
Payroll/HR System (About-US) Support & Evolution	\$315,000	\$315,000	\$315,000	\$315,000
Payroll/HR System (About-US) Development Cost Repayment	\$300,000	\$300,000	\$100,000	
Student Information System (Si!)			\$200,000	\$300,000
Portal Maintenance and Evolution	\$70,000	\$70,000	\$70,000	\$70,000
Authentication and Authorization System Evolution	\$130,000	\$50,000	\$50,000	\$50,000
Authentication and Authorization System Evolution [carry forwards between 03-04 and 04-05]	(\$40,000)	\$40,000		
Contacts Database (U-Who) Evolution	\$54,250	\$60,000	\$58,000	\$58,000
System and associated “data warehouse” enhancements (Institutional Analysis/Integrated Planning Office)	\$82,100	\$60,000	\$60,000	\$60,000
E-Payments Project, Maintenance and Evolution	\$60,000			
Unallocated for New Initiatives	\$28,650	\$105,000	\$147,000	\$147,000
Total Budget Allocations	\$1,000,000	\$1,000,000	\$1,000,000	#####
SDF Budget Available	\$1,000,000	\$1,000,000	\$1,000,000	#####

Figure 3.5 System Development Fund Budget Allocation

	2003-04	2004-05	2005-06	2006-07
Costs				
Salary and Benefits	\$232,000	\$286,190	\$270,190	\$270,190
Staff training and equipment	\$15,000	\$12,500	\$12,500	\$12,500
Communications	\$5,000	\$5,000	\$5,000	\$5,000
Student Computing Facilities				
Renewal	\$127,609	\$0	\$180,900	\$216,000
Expansion	\$46,000	\$54,000	\$0	\$0
Software License Management	\$61,000	\$5,000	\$5,000	\$5,000
User support tools	\$0	\$25,000	\$25,000	\$25,000
Services				
Campus Wide Printing System	\$135,000	\$0	\$10,000	\$0
Software Distribution	\$0	\$15,000	\$15,000	\$15,000
Wireless Network Evolution	\$80,000	\$30,000	\$30,000	\$30,000
Survey Software (in PAWS)	\$25,000	\$0	\$0	\$0
Special Initiatives				
PAWS portal	\$60,000	\$60,000		
NSID distribution	\$0	\$50,000		
Unallocated			\$90,000	\$90,000
Total Costs	\$786,609	\$542,690	\$643,590	\$668,690
Available Funds				
Student Computing Fund	\$545,000	\$545,000	\$545,000	\$545,000
Student Computing Fund (carry forward)	\$160,934			
Allocation from Campus-Wide ICT Services Capital Equipment	\$93,000	\$75,000	\$75,000	\$75,000
Total Available Funding	\$798,934	\$620,000	\$620,000	\$620,000
Surplus / (Gap)	\$12,325	\$77,310	(\$23,590)	(\$48,690)

Figure 3.6 Student Computing Fund Budget Allocations

4. Investment Initiatives

Four investment initiatives are proposed.

- The first investment initiative will enhance core services, listed below, so they meet the needs of instructors, students, researchers and staff over the planning period. We will be unable to adequately meet those needs within our current budget. The need for investment in these services was identified in section 3. This initiative consists of eight sub-initiatives, one for each of the following services (see section 4.1).
 - E-Communication and Collaboration (to maintain/enhance campus portal)
 - Identification, Authorization and Authentication
 - Help (for extended hours of service)
 - IT Security
 - Administrative Information Systems
 - Campus Contacts Database (U-Who)
 - Systems and associated “data warehouse” enhancements required to support University planning activities and government reporting.
 - Evolution of Alumni/Donor System (U-Friend)
 - Electronic Payments Infrastructure Support
- The second investment initiative will (1) increase support for the use of technology in instruction, (2) enhance existing, and develop new, ICT services that support research, scholarly and artistic work, and (3) improve support for student mobile computing. This initiative is presented as three sub-initiatives (see section 4.2).
- The third investment initiative will develop a campus desktop strategy (see section 4.3).

This strategy will be developed in consultation with the University community. It will consider the acquisition, funding and renewal of desktop computers as well as associated peripherals and servers; data backup; desktop security; software updates; end-user support and training. The intent of the strategy is to identify best practises, efficiencies and cost savings, and to reduce the amount of time instructors, researchers and staff spend resolving computing issues rather than teaching, research and doing service. The need for a campus desktop strategy has been highlighted in the ICT foundational document.

While the strategy will identify best practices, the University may need to invest more in desktop computing to provide the supportive environment required by instructors, researchers and staff.

- The fourth initiative will review and improve, on an ongoing basis, ITS’ service delivery processes and organizational structure so we continue to provide services in an efficient and effective manner (see section 4.4).

This will include the simplification and automation of key service delivery processes so that they provide self-service and makes it easier for instructors, students, researchers and staff to use our services.

4.1 Improve Core ICT Services in Support of Instruction, Learning, Research and Administrative Service Delivery

As outlined in section 3, the resources that ITS can assign, from the operating budget, are inadequate to meet the student, instructor, researcher and staff needs for core (foundational) ICT services. This initiative will prevent the equivalent of crumbling foundations and, in cases where preventive maintenance could not be funded in earlier years, will “repair” critical systems upon which the entire University depends. Some of the newer services were developed in response to critical campus needs using one-time funding. The older services have reached a stage where the threat of technical and functional obsolescence is very real.

While the eight sub-initiatives are outlined below, in priority order, investment will be required in all of the sub-initiatives during the planning cycle. For example, if the University sustains another severe Internet-based attack, resources will need to be reassigned from other services to address the problem; this will delay other projects and may increase project costs (e.g. the USR-net, Si! or Unifi projects, if ITS resources are reassigned to addressing security problems and are not available for project work).

Note: The budget figures, in the table below, are incremental to 2003–04 operating budget.

	2003–04	2004–05	2005–06	2006–07
Maintain and Enhance the Campus Portal		\$480,000	\$490,000	\$500,000
Enhance Identification, Authentication and Authorization Systems		\$390,000	\$160,000	\$70,000
Enhance “Contacts” Database (U-Who)		\$160,000	\$150,000	\$150,000
ICT Security – Provide a Secure and Productive ICT Environment		\$190,000	\$350,000	\$500,000
Enhance University System and Databases Used to for Planning and Reporting (Institutional Analysis, Integrated Planning Office)		\$200,000	\$260,000	\$140,000
Enhance Alumni and Donor System (U-Friend)		\$13,000	\$35,000	\$65,000
Maintain and Enhance the Campus Electronic Payment Infrastructure	\$35,000	\$40,000	\$30,000	\$35,000
Extend Hours of Support for Core ICT Services		\$270,000	\$260,000	\$260,000
Total (over 2003–04)	\$35,000	\$1,743,000	\$1,735,000	\$1,720,000

4.1.1 Enhance and Maintain the Campus Portal

Initiative

Enhance and maintain the campus portal³⁸ (PAWS) so that it:

- enables members of the University community (prospective students, students, instructors, researchers, staff, alumni, and “electronic” visitors, etc.) easy access to the information and services they require;
- enables colleges and administrative departments to easily provide electronic information and services to the University community.

Rationale/Need

Prospective students, current students, faculty, staff, alumni and “electronic” visitors to the University have often expressed difficulty finding the information and interactive (electronic) services that they need. Most students, faculty and staff expect that this information and services will be provided via a portal.

Many campus information and services providers (colleges, SESD, Library, University Advancement and others) have asked for a standard, relatively easy-to-use method (portal) to deliver content and services electronically to specific members (groups) within the University community.

In response to those needs, a campus portal (PAWS) was deployed in fall 2003. The portal was implemented using funds from a variety of sources³⁹ (see attached budget for details). However, funding for the long-term maintenance and evolution of the portal has not been secured.

In just the first two months of operations, over 8,000 different students, faculty and staff have used the portal. Usage of the portal will continue to increase rapidly over the next two years. In addition to the current information and service providers, Student Central will use the portal to provide services and information to students. Access to the new student and finance/accounting systems will primarily be available through PAWS. The Library is

³⁸ A portal is an extension of the University’s web site presence. Rather than providing links to generic information that may be of interest to specific groups within the University community, the portal is an integrated, customized and personalized source for the electronic information and services that prospective students, current students, faculty, staff, alumni and “electronic” visitors need. The information and services provided on the portal are customized based on the “role” of the user. Users of the portal can also personalize “their portal” to subscribe or unsubscribe at any time to their choice of the information that is available to them (users are authorized to subscribe to different information based on their role). The portal remembers personal preferences upon subsequent visits to the portal site. As such, the portal always presents the information and services determined to be relevant by each member of the University community thereby removing the overwhelming task of navigating through vast quantities of content and web pages.

In addition to providing tools for end-users, the portal will also provide a rich array of tools and templates that the University’s information and service providers can utilize to deliver their content and services to their target audiences.

³⁹ Funding for implementation of PAWS was obtained from the Si! project, ITS, student computing, the Campus-Wide ICT Capital Equipment budget and the ICT Systems Development budget (see “Budget” section, below, for details). SESD also contributed 0.5 FTE to the project for approximately six months.

planning to use the portal to deliver information to students about the reserved reading lists for courses.

This initiative requests long-term funding to maintain and enhance PAWS so it meets the needs of students, instructors, researchers, staff and other members of the University community.

Budget

While developed using a variety of funding sources, stable, ongoing funding (not unlike that required for new buildings) is required to maintain and enhance the campus portal so it meets the needs of students, instructors, researchers, staff, alumni and other members of the campus community.

If the needs of the campus community are not met, some colleges and administrative departments will develop their own portals. It is not clear that any college will have funds sufficient to make the product universally available, nor to continue its ongoing operation adequately.

	2003-04	2004-05	2005-06	2006-07
Costs				
Salary and Benefits (Portal Operations, 4.25 FTE)		\$265,499	\$265,499	\$265,499
Salary and Benefits (Portal Evolution, 3.75 FTE)		\$246,064	\$246,064	\$246,064
<i>Subtotal (Salary & Benefits)</i>	\$338,644	\$511,562	\$511,562	\$511,562
Staff training	\$18,882	\$20,000	\$20,000	\$20,000
Staff desktop hardware and software		\$8,000	\$8,000	\$8,000
Staff furniture		\$20,000	\$0	\$0
Network Connection(s) for Staff Offices		\$8,000	\$0	\$0
<i>Subtotal (staff related costs)</i>	\$18,882	\$56,000	\$28,000	\$28,000
External Services/Consulting	\$97,526	\$60,000		
Luminis Software	\$431,667			
Luminis Software Maintenance	\$79,023	\$82,183	\$85,471	\$88,890
Server Purchase/Upgrades	\$100,000		\$10,000	\$15,000
Server Maintenance				\$10,000
	\$4,547	\$10,000	\$20,000	\$20,000
Other Software - Purchase and Maintenance				
Project Deficit Carry Forward		\$34,759		
<i>Total Costs</i>	\$1,070,288	\$754,505	\$655,033	\$673,452
Funding				
ITS/Project Manager	\$49,055	\$36,375		
ITS/(Student Computing	\$120,000	\$60,000		
ITS (Contingency)	\$60,000			
ITS (Server maintenance & upgrades)		\$6,400	\$6,400	\$16,400
SESD/Content Lead	\$40,026			
Systems Development Fund	\$70,000	\$70,000	\$70,000	\$70,000
Campus-Wide IT Services Infrastructure	\$100,000			
Capital Equipment				
Si! Project/Si! Operations	\$596,448	\$142,183	\$85,471	\$88,890
<i>Total Available Funding</i>	\$1,035,529	\$278,583	\$161,871	\$175,290
Surplus / (Gap)	(\$34,759)	(\$475,922)	(\$493,162)	(\$498,162)
Requested Funding (over 2003-04)		\$480,000	\$490,000	\$500,000

Benefits

A University of Saskatchewan portal would benefit all members of our community.

- Prospective students, current students, faculty, staff, alumni and “electronic” visitors to the University will have a consistent, easy to use, integrated interface to our services and information.
- Information and service providers will have a standard and rich array of tools and templates for delivering their information and services to target audiences within the University community.
- The University’s cost for providing information and services is reduced through the use of standard tools and by avoiding the duplicated effort of units developing and supporting their own portals.

- The learning time for users is reduced through the use of common web-based tools and interfaces. The productivity and the quality of their experience with the University of Saskatchewan is enhanced.

In summary, PAWS provides an effective mechanism for the University and its departments to provide compelling, web-based information and services to its community. Costs are minimized through the use of standard tools and by avoiding the counter-effectiveness of multiple campus portals. A portal, rich with information and services that meets the expectations of members of the University community, will strengthen and enhance the image of the University and put us on a level playing field with competing institutions.⁴⁰ The University of Saskatchewan must effectively use new technologies to provide the electronic services that are expected from us if we are to successfully compete for the quality faculty, staff and students we hope to attract and retain.

Partnerships

The PAWS portal team is working with the College of Arts and Science to incorporate the functionality of my.usask⁴¹ into PAWS. This will improve the value of the campus portal and reduce College costs. Rather than duplicating the effort (cost) to develop a parallel portal, the College (like other information and service providers) can focus their resources on developing ICT services specific to the needs of their students and faculty.

4.1.2 Identification, Authentication and Authorization

Initiative

Enhance the University's authentication and authorization systems so they continue to allow Colleges, ITS and other units to deploy new online services quickly, securely and cost-effectively to the growing (extended) University community.

Rationale/Need

ITS, colleges and departments now offer hundreds of different ICT services to 60,000 members of the University community. The provision of each ICT service requires a mechanism (software) for identifying, authenticating and authorizing users' access to ICT resources. It is cost-effective that campus authentication and authorization services be automated and performed centrally rather than duplicated in every college and administrative unit.

- Identification is needed to assign a unique username to each member of the University community. At the University of Saskatchewan, the NSID (Network Services Identifier) is commonly used to identify members of the community for purpose of providing ICT services. The use of a single unique identifier, such as the NSID, along with a password, provides instructors, students, researchers and staff a single login name to access all the ICT services for which they are authorized. Note: In order to

⁴⁰ Most universities in Canada and the United States have either implemented a web portal (e.g Simon Fraser, University of British Columbia, University of Manitoba, Memorial, and others) or are planning to implement a portal in the near future.

⁴¹ My.Usask is a portal developed by the College of Arts and Sciences to begin addressing the needs of their students and faculty in the absence of a campus portal.

mitigate the security risks associated with malicious⁴² access to certain services, the University may choose to implement “fewer sign-ons” rather than a single sign-on for all services.

- The authentication system verifies that the person trying to access a particular service is who she or he claims to be.
- The “authorization” system determines the set of ICT services for which each member of the University community is eligible. Authorization to services is often granted based upon a person’s role or affiliation with the University: faculty, sessional, instructor, faculty in a particular college, student taking a particular program, visiting researcher etc.; the group membership (role) information is obtained from institutional databases (e.g. student database). Authorization can also be based upon membership in an *ad hoc* group (e.g. a workgroup); someone is responsible for maintaining the list of people (NSIDs) that are members of this group.

The authorization system must ensure that individuals are only afforded access to the services and data for which they are eligible.

Description

About three years ago, ITS developed a system for identifying a person’s affiliation with the University (using source HR, student or alumni data) and managing authentication and authorization; this system is known as the Service and Server Account Management system (SSAM) and relies on the Contacts Database (see 4.1.3). This system is used by ITS, colleges⁴³ and academic support units⁴⁴ to manage authentication and authorization for more than 230 services to 60,000 members of the University community. That volume could not be accomplished manually without increasing administrative staff.

This system must be enhanced to meet the changing needs of the University.

- Within this planning cycle, the authentication and authorization system must be expanded to support 500 different services (from current 230) for the expanded University community (expected to grow to 90,000 in the next three years).

The University community is growing. The University must offer some ICT services to prospective students, visiting researchers, research collaborators from other universities, guest lecturers, contractors, provincial health care professionals (nurses, pharmacists, doctors, physiotherapists, etc.), non credit study students, students from the Saskatoon Theological Union, parents of students and others. Other universities have started to provide these services.

New ICT services will need to be defined and managed for the expanded community. Additionally, colleges want to offer ICT services in a more granular level, for example to “Commerce undergraduate students in the accounting program.” This increases the number of services to manage.

⁴² For example, malicious access to services can occur when one person tries to access a service impersonating another person (via their NSID).

⁴³ College users include Commerce, Medicine, Pharmacy & Nutrition, Nursing, Dentistry, Arts & Science, Computer Science, Education, Kinesiology and Engineering.

⁴⁴ Academic support units include Libraries, Financial Services, Student and Enrolment Services, Human Resources Division, University Advancement, Facilities Management, Consumer Services, the Learning Commons facilities and Information Technology Services.

- The authentication and authorization system must be enhanced so it supports automated delivery of usernames (NSIDs) and passwords to new members of the campus community.

The current process requires new members of the University community to go to the ITS help desk (or some college help desks) to obtain their NSID (to ensure the person is who s/he says s/he is). ITS sets up extra help desks across campus prior to, and during, the first week of classes. NSIDs must be delivered to about 4,000 new students annually.

The University has implemented some systems to automate the delivery of usernames. However, these systems do not work for prospective students, distant education students and others. The system must be modified to support a “self-discovery” procedure for username and password distribution. This process will let users “discover” their NSID and set their corresponding password, electronically.

- Improve security. While the authentication and authorization system is operated centrally, support staff across campus are authorized to manage their services (define the community eligible for that service) as well as to set/change their user passwords. The system security model must be improved to ensure that support staff are limited to only managing their services (as opposed to all campus ICT services).⁴⁵

Students sometimes wish to allow their parents or guardians access to some of their information; for example, T2202A forms are often used by parents rather than by the student. As well parents or agencies may be granted access to fee payment information by the student if she or he wishes. To provide this service, the security model must be improved.

- Develop integration plan for Banner Student, Finance and portal. ITS and the Banner ERP projects must decide if, and how, they will implement and integrate authentication and authorization for Banner Student, Banner Finance, Luminis portal and WebCT. The source of student information (for SSAM) must also be changed from SIS to the new Banner Student system (Si! project).
- Technology changes require that portions of the SSAM system must be upgraded.

⁴⁵ Without security improvement, support staff from one department may inadvertently or purposefully grant someone access to services managed by another department. For example, ITS staff should not be able to grant access to services managed by another department such as the payroll system, the student system or research system.

Budget

	2003-04	2004-05	2005-06	2006-07
Costs				
Staff (FTE)		7	3	2
Staff Salary & Benefits	\$0	\$453,291	\$198,761	\$115,742
Staff training, desktop equipment, network connection	\$0	\$28,000	\$9,000	\$5,250
Server Purchases		covered by existing ITS budget.		
Server Maintenance		covered by existing ITS budget.		
Total Costs	\$0	\$481,291	\$207,761	\$120,992
Available Funds				
SDF, 2003-04 Carry Forward		\$40,000		
SDF		\$50,000	\$50,000	\$50,000
Total Available Funding	\$0	\$90,000	\$50,000	\$50,000
Surplus (Gap)	\$0	(\$391,291)	(\$157,761)	(\$70,992)
Requested Funding (from 2003-04)	\$0	\$390,000	\$160,000	\$70,000

Benefits

- Reduces the number of usernames and passwords that faculty, students, researchers, staff and other members of the University community must know to access services and/or data for which they are authorized. Otherwise, each time a person is granted access to a new online service like e-mail, library information, etc., that person would also receive a new username and password.
- Reduces the implicit “denial of service” experienced by new members of the University. Without a campus-wide authentication and authorization system, new students, faculty and staff must give information to multiple people before they can use the online resources to which they should have access. Before and during this process, the person cannot perform their course work or the functions for which they were hired.
- Institutional cost avoidance (savings). A campus-wide authentication and authorization system provides a unified means of enabling and disabling access to a wide range of online services. The alternative is to manage access to each service separately, requiring more staff for each service and increased costs for colleges and other service providers. The incremental cost to provide a new service is reduced.
- Quicker deployment of new services. Colleges, ITS and other online service providers can create new services quickly and easily using the consolidated systems and processes for authorization, account management and authentication. Since these processes and systems do not need to be created for each new service, the time (and cost) of doing so (as well as the recurring cost of maintaining these systems) is avoided.

- Student, faculty, researcher and staff accounts can be quickly and easily created, activated. Account problems can be more quickly resolved.
- Data is interpreted consistently and updated almost “live” across all services that are managed by the authentication and authorization system.

The operational and management overhead of enabling and disabling access to services is reduced. When a new service is introduced, a service account is automatically created for all people authorized to use that service. When a person is no longer eligible for a service (leaves the University, changes departments), the account(s) to which that person is no longer eligible for, are closed.

- Improved security. The proposed security enhancements will ensure that services are provided only to members of the University community who are eligible for that service.
- Distributed management of services. While the authentication and authorization management system is operated centrally, the responsibility for managing services is distributed to service providers (colleges, ITS and administrative units). Service owners can implement changes quickly regarding eligibility to their services.
- Faculty, students, researchers and staff can use self-service to manage or change some aspects of the services for which they are eligible, for example, their passwords
- Increased accountability. Changes to an individual’s service eligibilities and passwords are logged⁴⁶ for audit purposes. Password information is stored in an encrypted form.

4.1.3 Enhance the University’s “Contacts” Database (U-Who)

Initiative

Enhance (upgrade) campus “contacts” database so that it meets the functional needs outlined by colleges and administrative units and so that it is implemented on a supported technology.

Rationale/Need

Colleges and administrative units need up-to-date contact information for students, instructors, researchers, staff, and alumni.

U-Who is the campus-wide “contacts” database that provides name, address, electronic identification and other contact information about the people that are members of, and organizations that do business with, the University of Saskatchewan. It is used daily by various colleges⁴⁷ administrative units⁴⁸ and systems⁴⁹ as well as the Library. Other units

⁴⁶ Note: While the system logs that a user’s password has been changed (including the NSID of the person who changed the password), all passwords are stored in an encrypted format and cannot be read by ICT support staff

⁴⁷ Including Arts and Science, Graduate Studies and Research

⁴⁸ Including Institutional Analysis, Student and Enrolment Services, University Advancement, Financial Services, Human Resources, Information Technology Services and Facilities Management,

⁴⁹ Including the Campus Print System (CPAS) and the Campus Authentication and Authorization Management System (SSAM).

such as Extension, Residences and Consumer Services have requested access to this data.

The contacts database was developed about six years ago. Funding (resources have) has not been available to enhance the database to meet the changing needs of the University or the changing technologies.

Description

This initiative will:

- Work with the Banner Student and Finance to integrate their systems with U-Who.
- Extend the functionality of U-Who so it meets the new needs of colleges and administrative units. Specific address collection issues, including improving e-mail address collection will be addressed. This will position colleges and departments to use e-mail as a reliable address, thereby reducing costs of surface mailings. In response to fund-raising needs, the organization model will be improved. A self-serve address change module will be implemented to provide an electronic single point of address change for our community of instructors, students, researchers and staff.
- Upgrade the technology used in U-Who. The contacts database is critical to the operation of many systems. In order to ensure high availability, U-Who must be “upgraded” to the current, vendor supported versions of the database (Oracle 9i) and applications development platform.

Budget

	2003-04	2004-05	2005-06	2006-07
Costs				
Staff (FTE))	3	4	4	4
Staff Salary and Benefits	\$121,677	\$196,342	\$196,342	\$196,342
Staff training, desktop hardware and software, furniture and network connections		\$19,500	\$9,000	\$9,000
External Services/Consulting				
Software Purchase		See budget assumptions in text below.		
Software Maintenance				
Server Purchases				
Server Maintenance				
Total Costs	\$121,677	\$215,842	\$205,342	\$205,342
Available Funds				
ITS	\$67,250			
System Development Fund (SDF)	\$54,250	\$60,000	\$58,000	\$58,000
Total Available Funding	\$121,500	\$60,000	\$58,000	\$58,000
Surplus / (Gap)	(\$176)	(\$155,842)	(\$147,342)	(\$147,342)

This initiative is supported by the heads of Financial Services, Human Resources, the Libraries, University Advancement, Student and Enrolment Services and Institutional Analysis.

The budget assumes:

- No software purchases are required. The proposed work will be done using existing tools and Oracle database licenses.
- The software maintenance costs for Oracle and other tools used for campus application development will be covered by ITS.
- There is capacity on ITS servers for the databases and applications.
- Since institutional servers are used, there is no incremental hardware maintenance costs associated with this initiative.

Benefits

- Better service to students and others.
Students and other members of the University community need only to enter or update their contact information in one place (the Library, Student Central, HRD, ITS, etc.); their current address information is then available to other units, with whom they interact. Students, faculty, staff, alumni and others assume that they will have to provide their contact information (or changes to that information) once to the University rather than to each of the campus units with which they have a relationship.
- Reduced operating costs for colleges and administrative units.
Colleges and administrative units do not have duplicate the staff effort required to enter and maintain up-to-date contact information for students, faculty, staff, alumni and others. U-Who allows the data entry effort to be shared among several units; therefore, unit staff do not have to duplicate data entry and have more time to work on other things. New self-service initiatives will allow students, faculty, staff and alumni to update their contact information.
In addition to staff savings resulting from not having to enter duplicate contact information, colleges and administrative units do not have to develop and maintain their own systems that store contact information.
- Higher quality (more accurate) contact information.
Colleges and units have access to the most current contact information as soon as it is entered. Without U-Who, people (e.g. students) would communicate their contact information to one unit (e.g. Library) but this information would not be available to others (e.g. SESD, colleges).
Because contact information (or changes to the contact information) is entered once, potential data entry errors are reduced.

Additionally, the central contacts database allows for a single implementation of a utility that verifies correct postal codes and addresses. Colleges and administrative unit costs are reduced. One copy of this software is licensed for the campus (rather than once for every system). Similarly, technical staffing costs to support this system do not have to be

duplicated. Bulk surface mailing costs are reduced because we can guarantee that the postal codes are correct.

In summary, U-Who provides a supportive environment for students (students change their address one for all communications with the campus) and creates campus efficiencies (cost avoidances). Before U-Who, students had to visit each of the Library, Student and Enrolment Services, their college computing facility, the ITS Help Desk and, if they were also employed at the University, the Human Resources Division or Payroll Services to change an address! Without a fully supported central contacts database, the name and address information would be maintained in multiple systems and will often be out-of-date or incorrect. Colleges and administrative units would have to duplicate the staff effort to maintain correct contact information (as well as duplicate the staff effort to maintain multiple systems that store contact information).

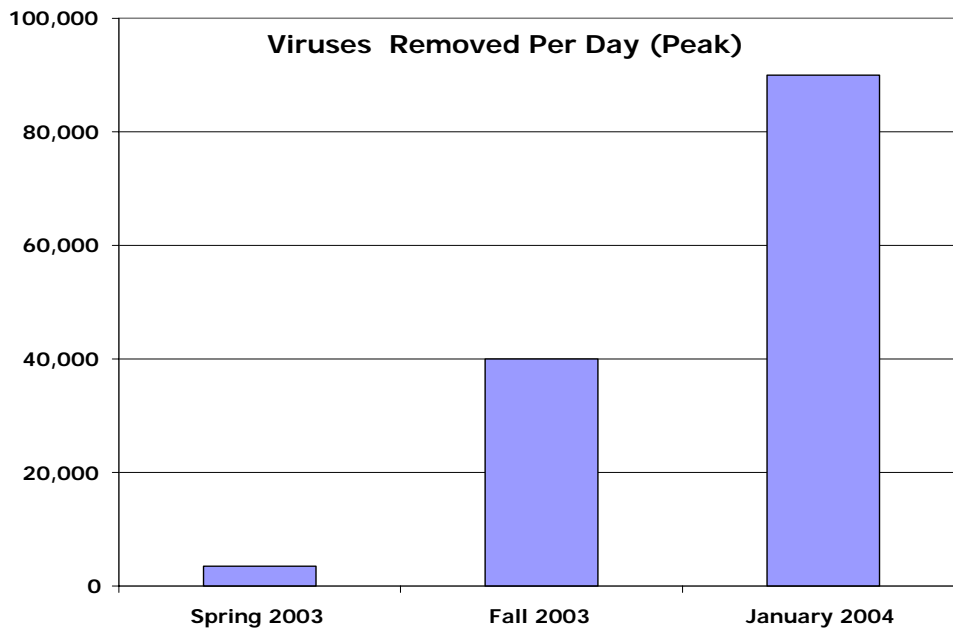
4.1.4 Secure and Productive ICT Environment

Initiative

Provide a secure and productive ICT environment for instructors, students, researchers and staff.

Institutional Need

The University's ICT resources are constantly assaulted from the Internet at an ever-increasing rate. The number of viruses sent to the University has increased 30 times over the last nine months. The graph below shows the number of e-mail messages, which contain viruses, that are detected and removed by ITS' e-mail servers daily.



We also block over 5.2 million attempts daily from the internet, to probe or attack campus ICT resources. This is a fivefold increase from November 2003.

The number of internet-based attacks against University ICT resources will continue to increase.

The effect of successful Internet-based attacks is significant and includes the following.

- **Disruption of University services and prevention of University activities.**

Increasingly, successful Internet-based attacks are preventing faculty, students and staff from teaching, learning, performing research and delivering services. Successful Internet-based attacks have disrupted college, departmental and campus ICT services for periods lasting from one hour to a week. In fall 2002, about 10,000 students were without ICT services for about two days.

Recently, a virus attack affected about 60 computers and 200 staff in one department. The department estimated that the virus attack cost them \$60,000 in time to rebuild the computer systems and in lost staff productivity. Operations were affected for almost a month.

SPAM, once a minor issue and inconvenience, now threatens to swamp the e-mail communications systems critical to the research and learning of the University. Without SPAM blocking, successful SPAM attacks result in all e-mail users being forced to sort through the often hundreds of SPAM messages daily to find the important messages for their work. This wastes significant amounts of user time, server resources to store and present these messages, and presents an opportunity for important mail to be lost, delayed, or forgotten in the flood of SPAM.

- **Modification, deletion and/or distribution of confidential University data.**

Some viruses delete (or modify) the data residing on the servers and desktop computers they infect. This data may be administrative (registration, grades, budget, etc.) or research (proposals, data and articles, etc.). The loss of this data, if not appropriately backed up, can hurt service delivery and research programs.

Other viruses e-mail the contents of an infected computer to others on and off campus. The data distributed “randomly” may include budget information, student marks, exams, draft research papers, etc.

- **Use of University computers for illegal purposes.**

Some viruses use infected University computers for illegal purposes: to distribute child pornography and copyright materials such as music, videos and software; to “attack” other computers on and off campus; and to harass and threaten others.

These activities are carried on under the “electronic letterhead” of the University. External investigating authorities routinely (at least twice a week in 2002) contact the University to complain about the systemic abuse originating from University-owned computers. Security Services and ITS investigate over 100 incidents yearly relating to harassing or threatening e-mail.

- **Increased financial liability for the University.**

Students may sue the University if the service disruptions (resulting from the attacks) are significant and prevent them from obtaining the quality of education they were expecting.

Some viruses e-mail the contents of an infected computer to others on and off campus.

The distribution of confidential information (for example, employee performance information) may be the cause for lawsuits against the University.

- **A reduction in the level of public confidence towards the University.**

Initiative Description

The University has had to make significant investments in ICT security in the last year (see section 3 for details). Even with these investments, more work must to be done to develop a secure and productive working environment for instructors, students, researchers and support staff. In this initiative, ITS will:

- Extend deployment of the existing methods for preventing Internet attacks (e.g. use of anti-virus and VPN software) to the University community (20,000+ computers).
- Implement, maintain and enhance a network firewall.
- Implement, maintain and enhance a firewall for 60+ institutional servers.
- Monitor network and servers for signs of attack and intrusion, and respond to this activity.
- Develop, implement and support methods for “automatically” providing operating system and application software security patches to Windows, Macintosh and Linux-based workstations.
- Monitor the evolution of new Internet-based attacks, develop new approaches to prevent those attacks and mitigate the effect of successful incursions.
- Provide ongoing information and training to faculty, students, researchers and staff regarding the new methods of preventing Internet-based attacks, and help them (a community of 20,000+) deploy those methods.
- Continue to enhance the University’s SPAM blocking system.
- Continue to enhance the University’s virus detection and removal system.
- Assist in the development of a campus ICT risk-management/security policy.
- Enhance and improve the security architecture and policies for the campus network.
- Assist in performing a security assessment of some campus ICT services.

This activity will reduce both the frequency and total effect of Internet-based attacks on University ICT resources, as well as provide resources to more quickly resolve the problems caused by successful attacks.

Budget

The enterprise-wide risk management survey, recently completed by PriceWaterhouseCoopers, recommends the University hire an additional 6 FTE to prevent Internet-based attacks and to mitigate the effect of successful attacks. Based upon initial planning, ITS would assign the 6 FTE as outlined below.

- Network security: 1 FTE (for network monitoring, analysis and implementation of new network security mechanisms)
- Server security: 2 FTE (for server monitoring, analysis and implementation of new server security mechanisms). Note: ITS operates over 100 servers. The additional 2

FTE would provide less than one hour of additional time, per day, to be spent on ICT security for each server.

- Faculty, student and staff desktop computer security: 3 FTE (develop new methods for preventing new Internet-based attacks, provide ongoing information and training to faculty, students, researchers and staff regarding those methods, and help them (a community of 20,000+) deploy those methods).

It is unlikely that the University will be able to implement the risk management recommendations immediately. The budget proposed for this initiative “ramps up” to the recommendations over a three-year period (starting with 2 FTE in 2004–05).

In addition to staff, hardware and software is also required to monitor and prevent Internet-based attacks.

	2003–04	2004–05	2005–06	2006–07
Staffing (FTE)		2	4	6
Staff salary and Benefits		\$121,215	\$247,270	\$373,325
Staff training, desktop, hardware and software, network connections and furniture for new staff		\$12,000	\$18,000	\$24,000
External Services/Consulting				
Hardware and Software purchase		\$50,000	\$75,000	\$90,000
Hardware and Software maintenance		\$5,000	\$7,500	\$9,000
Total Cost		\$188,215	\$347,770	\$496,325
Requested Funding (from 2003–04)		\$190,000	\$350,000	\$500,000

Benefits

Instructors, students, researchers and staff depend upon ICT services for their teaching, learning, research and administrative service delivery.

The proposed initiative would provide a more secure and productive ICT (work) environment for instructors, students, researchers and staff. It provides a supportive environment for all of the University’s strategic directions.

Not proceeding with this initiative will result in a continued increase in the number of successful Internet-based attacks upon University ICT resources. Successful attacks can disrupt network, Internet, web and e-mail services; impede the operation of desktop computers in offices, classrooms, student computing facilities and research labs; halt the delivery of online courses; shut down administrative systems such as student registration, library, payroll and fund-raising; and jeopardize CLS operations.

In summary, successful Internet-based attacks will prevent University teaching, learning, research and service delivery. University data will be modified, deleted and/or distributed at random to others on the Internet. University computers will be used for illegal purposes. Publicity of successful Internet-based attacks will damage the University’s reputation; recruitment of faculty and students will become more difficult.

Today, almost all universities and other organizations are increasing their investment in ICT security. However, no organization can remove all (100%) of its risk relating to Internet-based

attacks. Even with larger investments in ICT security, organizations such as banks, as well as the huge online presences of Microsoft and Amazon are still susceptible to Internet-based attacks. However, the 80-20 rule applies; significant benefit can be achieved for reasonable investments in ICT security.

4.1.5 Enhance University Systems and Databases Used for Planning and Reporting

Initiative

Enhance the systems and associated “data warehouses” required to support University planning activities and government reporting.

This initiative was developed in collaboration with, and with the support of, Institutional Analysis (Rob Schultz, Director) and the Integrated Planning Office (Barrie Dubray, Assistant Provost).

Rationale/Need

The Institutional Analysis office (IA) relies upon a number of systems and databases, internal and external to their office, to provide information for University planning, decision-making, funding allocation as well as government reporting (which in turn may sometimes affect funding allocations).

The current systems and databases internal to IA are inadequate to meet current needs. Providing the information required by the University is often a “manual” process. Frequently, information and reports are not delivered on time or require multiple iterations to produce correctly.

Two of the primary external sources of information used by IA—student and financial data—will change over the next two years as the University implements the new Banner Student and Finance systems.

Description

This initiative will:

- Consolidate some of the multiple processes and applications used to provide information required for Systematic Program Review, Saskatchewan Universities Funding Mechanism support, Maclean’s survey and integrated planning as well as to meet various University (e.g. the University Statistics Book) and government reporting requirements.

This will reduce the effort required to provide the required information and deliver more timely service.

- Integrate the IA’s systems and databases with the Banner Student and Finance databases as they are implemented.
- Replace the Course Inventory System that, like the current SIS v1.0, is an obsolete technology no longer supported by the vendor.
- Plan and implement ESIS reporting, as part of the University’s federal government reporting obligations. IA is responsible for this reporting.

- Enhance the capabilities of the existing systems and databases (e.g. iDat).
The first phase of iDat will go into production at the end of this fiscal year. It will bring the University closer to developing an online ten-year history of student, financial and faculty data. The information will be used for mandated University and government reporting including the University Statistics Book, integrated planning reports, and the Systematic Programme Review.
- Improve reporting by implementing a self-service capability for administrators (college and other) and researchers to access aggregated University data as well as a query tool to access University data for analysis. Access to data must be provided only to those who are authorized to use this data in their work.

Budget

	2003-04	2004-05	2005-06	2006-07
Costs				
Salary (FTE)		5	6	4
Staff Salary & Benefits		\$309,664	\$375,112	\$226,645
Staff training, desktop equipment, furniture and network connections		\$30,875	\$17,250	\$10,500
Software Purchase		See assumptions, in text below, regarding these costs.		
Software Maintenance				
Server Purchases				
Server Maintenance				
Total Costs		\$340,539	\$392,362	\$237,145
Funding				
Institutional Analysis		\$70,287	\$42,172	\$35,143
Si Project has some funds for CIS implementation (falls into data mart/ad hoc reporting category of project)		\$15,152	\$30,304	
UniFi Project re: CIS implementation - no funds set aside during project budget stage		\$0	\$0	\$0
System Development Fund		\$60,000	\$60,000	\$60,000
Available Funding		\$145,439	\$132,476	\$95,143
Surplus / (Gap)		(\$195,101)	(\$259,886)	(\$142,002)
Requested Funding (over 2003-04)		\$200,000	\$260,000	\$140,000

The budget assumes:

- No software purchases are required. The proposed work will be done using existing tools and Oracle database.
- Oracle, SAS and software tool maintenance costs will be covered by ITS for campus-wide use.
- There is capacity on ITS servers for the databases and applications.

- Since institutional servers are used, there will not be incremental hardware maintenance costs associated with this initiative.

Benefits

- Reduced effort to provide the information required for University planning and reporting.
- More timely delivery of information.
- Compliance with government reporting requirements (e.g. ESIS).
- Systems and databases that use vendor-supported technologies.

4.1.6 Enhance Alumni and Donor System (U-Friend)

Initiative

Enhance the University's Alumni and Donor system in order to provide reliable support for the University's fund-raising activities, to integrate this system with Banner Student and Finance, and to allow electronic donations.

Rationale/Need

University Advancement's (UA) mandate is to build life-long relationships with prospective students, current students, alumni and donors. UA depends upon the Alumni and Donor System (U-Friend) to track these relationships and to raise money for the University.

Some enhancements to U-Friend system and infrastructure are needed to provide reliable support for the University's fund-raising. Integration is also needed with the soon-to-be-implemented Banner Student and Finance systems (the need for integration was not anticipated until recently).

Description

This initiative will:

- Implement system enhancements, as required, to support the fund-raising campaign as described in University Advancement's four-year plan.
- Modify U-Friend so that it integrates with Banner Finance. This will require extensive modifications to the financial portions of U-Friend, including the recording and reporting of monies gathered during fund-raising campaigns.
- Modify U-Friend so that it integrates with Banner Student. U-Friend uses data from the student information system to populate its alumni database.
- Implement an interface to the University's electronic payment infrastructure.
- Upgrade the Campus Call system to support University fund-raising. This system is used for telephone solicitation, pledge reminder calling and student orientation; it can potentially also be used for student recruitment. Additional software licenses are required (US\$5,000/user).
- Develop separate development and testing environments for U-Friend and U-Who.

- Implement potential separations of U-Who and U-Friend based upon recommendations of U-Who Evolution Project.
- Review institutional needs to determine if the current system should be replaced or enhanced (scheduled for 2006–07).

Budget

	2003–04	2004–05	2005–06	2006–07
Costs				
Staff (FTE)		2	3	4
Staff Salary and Benefits	\$60,608	\$126,055	\$143,627	\$196,342
Staff desktop hardware and software, training, network connection and furniture		\$13,000	\$9,750	\$12,000
External Services/Consulting				
¹ Software Purchase			\$25,000	
¹ Software Maintenance		covered by existing ITS budget.		
Server Purchases		covered by existing ITS budget.		
Server Maintenance		covered by existing ITS budget.		
Total Costs	\$60,608	\$139,055	\$178,377	\$208,342
Available Funds				
University Advancement	\$60,608	\$126,055	\$143,627	\$143,627
Surplus / (Gap)	\$0	(\$13,000)	(\$34,750)	(\$64,715)
Requested Funding (above 2003–04)		\$13,000	\$35,000	\$65,000

Benefits

This initiative enhances a system that supports revenue generation for the University. It improves self-service capability for alumni, donors and friends. It ensures data quality by integration with Banner Student and Banner Finance. A plan for the long-term replacement or upgrade of U-Friend will be developed.

4.1.7 Maintain and Enhance Electronic Payments Infrastructure

Initiative

Ensure that a secure electronic payment and refund infrastructure is available to all University units in order to provide desired customer service.

Rationale/Need

Students consistently ask for the ability to pay fees for services and goods electronically. Colleges and departments on campus want to respond to this request. A central e-payment service allows for secure, audited ongoing operations in accepting personal information such as credit card numbers.

Some of the reasons the University's administrative units⁵⁰ expressed for developing an institutional system included:

- Better student and outside community service by creating a central University of Saskatchewan pay page that maintains contact with the credit card processor on contract.
- Less duplication of programming effort, thereby improving efficiency, reducing the potential of errors and avoiding costs.
- Sensitive credit card data is not stored on campus.
- Central logging of electronic payment and refund transactions in support of privacy legislation and audit needs.
- Centralized servers have a high level of security suitable for the needs of this type of application (e.g. units may have their servers in an office).

Description

Technical consultation will be provided to applications developers who wish use e-payments. This could include:

- Banner Student and Banner Finance.
- Alumni and Donor System (U-Friend)
- Colleges for conference registration and booking
- Bookstore
- Extension Division for attendance at non-credit courses

New security measures will be implemented as required by University business practices, the Provincial Auditor or legislation.

⁵⁰ Financial Services, University Advancement, the Extension Division, Student and Enrolment Services, the College of Kinesiology, Consumer Services, Audit Services and Information Services are involved in the development of the electronic payment infrastructure.

Budget

	2003-04	2004-05	2005-06	2006-07
Costs				
Staff (FTE)		1	1	1
Staff Salary and Benefits	\$108,587	\$39,752	\$39,752	\$39,752
Staff training, desktop hardware and software, furniture and network connection		\$3,900	\$1,800	\$1,800
Software Purchase	\$67,116			
Software Maintenance	\$9,669	\$10,636	\$11,699	\$12,869
Server Purchases	\$8,275			
Server Maintenance		\$850	\$900	\$1,100
Total Costs	\$193,647	\$55,138	\$54,152	\$55,522
Available Funds				
ITS staffing paid from contingency; staff training	\$49,201			
Implementation Fees per application; one of \$200, \$500 or \$1,000 depending on volume of transactions	\$4,700	\$4,300	\$6,300	\$2,500
Annual operating fees	\$4,050	\$2,160	\$3,240	\$3,240
Transactions fees	1000	\$1,500	\$2,100	\$2,290
System Development Fund (SDF)	\$60,000			
Si! Project Contribution	\$30,000			
ITS/Software maintenance	\$9,669	\$10,636	\$11,699	\$12,869
Total Available Funding	\$158,620	\$18,596	\$23,339	\$20,899
Surplus / (Gap)	(\$35,027)	(\$36,542)	(\$30,812)	(\$34,622)
Requested Funding (over 2003-04)	\$35,000	\$40,000	\$30,000	\$35,000

Benefits

This initiative will provide supportive and cost-effective e-payment environment that will aid in recruiting and retaining our student body. The University of Calgary was considering the elimination of fee payment by credit card to avoid the fees paid to credit card companies for this service; the student body strongly disapproved of this initiative noting that being able to pay fees via credit card and online was a benefit to students.⁵¹

Without a fully supported central electronic payment and refund system, the information would be maintained in multiple systems increasing our exposure to errors, including breaches of security or privacy.

The central electronic payment and refund system allows for a single implementation of a utility that verifies correct postal codes and addresses. This reduces software licensing costs, implementation costs (once rather than for every application wanting to accept credit cards online) and audit costs associated with ensuring correct implementation of financial applications.

⁵¹ Calgary Herald, February 2, 2004

4.1.8 Extend Hours of Support For Core ICT Services

Initiative

Extend the hours of support for key (core) ICT services to evenings and weekends, in order to meet the needs of faculty, students, researchers and prospective students.

Rationale/Need

Every hour of every day, there are instructors, students, researchers and staff who are working. Much of their work depends on core ICT services such as the campus network, Internet access, e-mail, web services, WebCT, portal, help desk, About-US (HR and payroll system⁵²), e-payment system and the student registration/information system. Prospective students from all around the world access the University's web site; they expect that our web site and online admissions system will be available 24x7. Instructors, students, researchers and staff expect that most ICT services be operational during the hours that they work (evenings and weekends).

While efforts are taken to build highly reliable services, some service outages are inevitable. Since ITS cannot provide extended hours of support with the current staffing level, service outages may last overnight or over a weekend. The effect of these outages can be extremely disruptive. Some possible outcomes could be:

- Students are unable to complete their coursework because of an ICT service failure the day prior to the due date (e.g. a network outage affects a college student computing facility or WebCT is inoperable).
- Students are unable to register for courses or make course changes prior to the deadline because the server that runs the student information system fails.
- Instructors do not complete their course preparation because they cannot log into their desktop computer or access network resources (e.g. file servers, library).
- A researcher's grant application or publication is not considered because the submission deadline was missed (because the campus access to the CA*net was down or because the file service was inoperable and the application form was unavailable for electronic submission).

The Research, Scholarly and Artistic Works Committee of Council has identified extended hours as an important service improvement in support of research. The lack of off-hours support is the most common complaint about ITS' services.

- A researcher writes (May 2003). *"This is the second weekend in a row when all e-mail through Duke has ground to a halt. As one who relies on e-mail for time-sensitive professional communication, over weekends and early AM during the week, these outages put a serious crimp in my activities. I do not expect "five nines" reliability, but I do expect that when things break, they will be fixed before Monday morning."*
- The same researcher writes (July 2003, during a severe virus attack): *"The mail server seems choked again (see previous e-mail, below). I don't want to hector, but please let me explain why this is an issue for me today. I have two students working today and tomorrow (Sat. and Sun), in a set of experiments at a laboratory in Berkeley, CA. I am*

⁵² HRD staff regularly work evenings and weekends in order to ensure that payroll schedules are met.

trying to supervise them remotely. One step in this supervision is examining data, and then discussing the next set of experiments. The method for sharing data is e-mail. They often alert me to problems by e-mail, as this is usually the best way to get a hold of me.”

- On August 2003: *“...the duke e-mail program is stalled. On the bright side, at least I'm not getting the sobig virus ;-). I just spent 50 minutes on the phone with a colleague from McMaster, in which he read out the e-mail that he sent me this morning. He was a bit shocked that my e-mail was down, and I was a bit embarrassed. However, we had a schedule, and this exchange couldn't wait until Monday. I'm also trying to have a dialog with one of my students, and set up travel plans with a colleague in Wisconsin. He probably thinks I'm ignoring his rather urgent e-mails. I will reiterate my previous point -- we really need a way to get the e-mail running when it goes down in the "off hours".”*
- An instructor writes (December 2004): *“We are planning to use WebCT for (our) courses and I understand that ITS supports WebCT with a 24/7 commitment. I was asked by our development team to contact you to confirm that we could count on this level of support in the event that we convert (our) program to Web CT. Can you advise me on this please.”*
- An Associate Vice-President left voice mail for the ITS Director, Sunday afternoon, February 8, 2004: *“I am having trouble with my password. I phoned the help desk but there was no answer. I was wondering if you could help.”*
- A department head left voice-mail on February 9, 2004. *“... our network in part of the Health Sciences building has been down all weekend. Even today, some people who had to register with the federal government can't yet make the contact. I can't reach the help desk. Can you please look into this? We can't even print.”*

Description

This initiative will extend ITS hours of operation so that core ICT services are available evenings and weekends.

- Both in-person and on-call staff⁵³ will be available to extend support for core ICT services to evenings and weekends.

The core ICT services will include the campus network, Internet access, e-mail, web services, WebCT, portal (PAWS) and the help desk as well as the servers that run the student registration/information, About-US and e-payment systems. Note: Extended hours of support for the About-US and Si system (application) is not included in the initiative.⁵⁴

Coverage hours will be based on the main library, which is open weekdays 8:00 a.m. to 11:00 p.m. except Friday (closes at 5:00 p.m.), Saturday 10:00 a.m. to 6:00 p.m. and Sunday 11:00 a.m. to 11:00 p.m.

Coverage will be adjusted based on both need and budget. In the long term, the University may require 24x7 support for core ICT services. The increased cost for this

⁵³ This will include help desk (2 FTE), server support (1 FTE) and network staff (0.5 FTE).

⁵⁴ Extended hours of support for About-US or Si! systems will be budgeted within the support plan for that system.

coverage is high and not included in this initiative.

A system will be implemented to track trouble calls. This will provide the required coordination of support efforts among staff on varying shifts, as well as online information on current support issues and problem resolutions.

Budget

The following table outlines the funding requested so that core ICT services are available evenings and weekends, as outlined above.

	2003-04	2004 - 05	2005 - 06	2006 - 07
Costs				
Number of Staff		3.50	3.50	3.50
Staff salary and Benefits		\$224,692	\$224,692	\$224,692
Staff training, desktop hardware and software, network connection and furniture for new staff		\$22,750	\$10,500	\$10,500
External Services/Consulting				
Call tracking software implementation & support (amortized over 3 years)		\$50,000	\$50,000	\$50,000
Software Maintenance		\$5,000	\$5,000	\$5,000
Server Purchase/Upgrades		will be covered by existing ITS budget, as required.		
Server Maintenance				
Total Costs		\$302,442	\$290,192	\$290,192
Less available funding				
USR-net Operations		\$34,840	\$34,840	\$34,840
Surplus / (Gap)		(\$267,601)	(\$255,351)	(\$255,351)
Requested Funding		\$270,000	\$260,000	\$260,000

The average hours of operation for a help desk at North American doctoral/research universities is 82.5 hours per week. Thirteen per cent (13%) of these universities operate a 24x7 help desk. [Source: Educause Core Data Survey, 2002]

ITS' "main" help desk is operational 45 hours per week.⁵⁵ In the future, the University will need to extend its hours of support for core ICT services to 24x7.⁵⁶ This will increase University costs significantly.

⁵⁵ A "satellite" help desk is operational, 5:00–9:00 p.m. (Monday to Thursday) and for four hours/day on weekends. The help desk focuses on supporting distant education students and students using the Learning Commons.

⁵⁶ For example, 24x7 support for the campus network and associated services will be required when CLS operations become 24x7.

Benefits

ICT services, critical to teaching, learning, research and service delivery will be available evenings and weekends. The duration (and effect) of service outages will be reduced as staff will be available, evenings and weekends, to resolve major problems.

This will help the University to recruit and retain faculty and researchers, as well as undergraduate and graduate students. Faculty, prospective students, students and researchers expect the availability of these core services over extended hours as matter of course.

This initiative will help the University's internationalization efforts. Our web site (and portal, in the future) is usually their first contact with the University. The web server, campus network and our access to the "commercial" Internet must be available 24x7 to support access from all time zones. The student admissions, registration and e-payment systems must also be available 24x7.

We live in a world where University work (preparation for teaching, learning, research and electronic service delivery) is done every hour of every day of every week. We have users accessing our services from other time zones on a regular basis. For the University to be competitive and achieve the excellence it aims for in the quality of its education, service and research, its ICT services must eventually be available 24x7. Extended hours of ICT support provides a more supportive environment for all the University's strategic directions.

4.2 Improve Foundational ICT Services Specific to Each of Instruction, Learning and Research

ITS provides many services that support instruction, learning and research. Three sub-initiatives are proposed in this section to improve services specific to teaching, learning (student computing) and research.

The initiatives are outlined, in priority order, below. The following budgets are proposed for this planning cycle. Note: The budget figures are incremental to the 2003–04 operating budget.

	2003–04	2004–05	2005–06	2006–07
Increase Instruction Support		\$270,000	\$380,000	\$500,000
Increase ICT Services in Support of Research, Scholarly and Artistic Work		\$300,000	\$375,000	\$450,000
Support Student Mobile Computing		\$340,000	\$310,000	\$360,000
Total		\$910,000	\$1065,000,	\$1,310,000

4.2.1 Increase ICT Support for Instruction

Initiative

Improve the teaching and learning processes of the University by providing appropriate tools and support to instructors as they incorporate technology into their teaching. This will improve the quality of education, aid in attracting and retaining superior students and faculty, and minimize the effort spent by faculty in the logistics of teaching.

Rationale/Need

The Strategic Directions document outlines some of the challenges facing the University as we enter the twenty-first century. These challenges include: rapid change and the need for the University to be responsive and flexible; increased competition for faculty, students and resources; and the need to prepare our students for a global, knowledge-based economy.

Within this environment,

- Faculty want access to modern, easy-to-use technologies that support rather than hinder their goals and allow them to focus on teaching and research. They want assistance in the use of these tools and in the development of electronic resources to support their teaching strategies, as required. Finally, faculty want to retain control of how or if technology is applied in the delivery of their courses.
- For students, the learning environment must include access to all course materials⁵⁷ electronically, a rich set of communication and collaboration tools, and access to discipline-specific software, training and assistance. Online resources must be accessible from any classroom or study space on campus and from their homes. They want ICT services levels to approach 24 hours a day, 7 days a week. They would like the information presented to them to be tailored to their needs. The effective incorporation of technology in instruction is a factor in student recruitment and retention.
- The University seeks to improve the quality of education and the educational experience, to reduce student failure/drop-out rates, increase revenue and/or reduce costs. Technology investments should support one or more of these goals.

The University has made progress in incorporating technology into instructional processes. However, demand for additional services and support is increasing:

- Usage of WebCT is increasing at 50% per year. There are now 118 courses and 3,800 students (almost 25% of all students) using WebCT.
- The Province and the University are engaged in a multi-year multi-million dollar Technology Enhanced Learning initiative. The University is developing 20–25 new online courses per year.
- There is increasing demand for seats in ITS training courses regarding WebCT, Web page editing, digital imaging, PowerPoint, etc.
- The new PAWS portal provides faculty and students with another means to “deliver” course content online and provides new tools for class-related electronic interaction.
- Faculty members expect to teach in classrooms using computers, computer network, and data projectors. The institution’s capability to facilitate an instructor’s use of technology is a factor in recruitment of dynamic faculty members.

The University expects ITS to provide leadership in evaluating, providing and supporting current tools such as WebCT and its integration with student registration, electronic conferencing, whiteboard software, and video streaming services. There is increasing pressure from faculty and students for ITS to provide and support other technologies to aid in teaching and learning.

⁵⁷ Including class handouts, notes, assignments, lectures and library resources.

Description

This initiative consists of three parts:

- Help improve teaching and learning by providing instructors with additional ICT tools and the associated technical support they require to incorporate technology into their teaching processes.
- Develop, evaluate and recommend, in consultation with instructors and other units, a standard set of tools for use in teaching and learning.
- Assist the University to develop a plan stating how it will use information and communications technology to deliver courses, or portions of courses, electronically.

A. Help improve teaching and learning by helping instructors incorporate ICT into teaching.

This initiative will provide instructors with (1) additional ICT tools and (2) technical support to help them incorporate these tools into their teaching processes. It will also, in consultation with instructors and colleges, (3) evaluate and recommend ICT tools for use in teaching and learning.⁵⁸

ICT Tools

Many instructors already use a variety of ICT software tools in their teaching. These tools include e-mail, discussion forums, computer (optical mark recognition) marked exams and course web sites. This initiative will provide new software tools (including replacement for some existing tools) for faculty to use in instruction. The software tools could include:

- e-collaboration software such as videoconferencing and electronic whiteboards
- tools for developing online learning/course content
- online student feedback survey and polling software
- online quizzing software
- software to generate exams from question databanks
- software to help student (and faculty) maintain e-portfolios (electronic portfolios of their educational experience or teaching experience)
- improved integration of these tools with student enrolment, class lists, grades handling, etc.

The outcome will be a rich, evolving set of standard software available for instructors (faculty, graduate students, etc.) to use in their teaching. This software will be hosted on robust and secure servers with appropriate technical support to ensure a very high degree of performance and availability.

Technical Support

Additional technical support (online documentation, in-person help and training) will be provided to help instructors incorporate and use instructional technology in their teaching. Some examples of instructional tools, for which support will be provided, include:

- course management systems and learning management systems (e.g. WebCT)

⁵⁸ For face-to-face, mixed-mode and distributed teaching and learning.

- software tools for developing electronic learning/course content
- e-collaboration software such as videoconferencing, e-whiteboards, and application sharing
- online student feedback survey and polling software
- online quizzing software
- software to generate exams from question databanks
- tools to help instructors “capture” their lectures electronically so students can (re)view them “anytime, anywhere”⁵⁹
- software to help students (and faculty) maintain e-portfolios

Technical assistance will also be provided to help instructors incorporate online resources provided by textbook publishers into their courses

Additional technical support is required in order to reduce the time faculty will spend learning how to teach with instructional technology. College and department staff will become conversant with these tools (through training) and will be able to provide local support. Instructors will be informed about the availability of various tools and have adequate access to consultants and assistance using those tools.

The technical support will be provided through a combination of a small number of full-time staff and many students. Many universities have used students to provide technical support to faculty in the use of instructional technologies; this approach is often called the Student Technology Assistant program. We propose that graduate students be used as technology assistants. Using graduate students would have the additional benefits of giving them some exposure to teaching and experience with teaching technologies.

B. Evaluate and Recommend ICT Tools for Use in Instruction

Through this initiative, ITS will provide consultative leadership for the institution in evaluating and recommending ICT tools for teaching and learning. The outcome will be a collaborative effort to evaluate and select appropriate tools and to prioritize the effort and expenditures required to deploy those tools.

The use of a “standard” set of tools mitigates the training effect on students and faculty that might occur if they were required to use multiple tools to perform the same function. Standardization of tools could also reduce total institutional software licensing and support staff costs. It is anticipated that through this process, campus-wide “standards” would be developed in the following areas:

- Learning object repositories
- Help desk services and call tracking systems
- Course management systems
- Online quiz and exam tools
- Electronic whiteboard tools
- Desktop videoconferencing tools

⁵⁹ This includes webcasting live events and streaming archived events.

C. Assist the University develop a plan for electronic course delivery.

Governments and universities are investing more in technology to support instruction. Some of the reasons for these investments follow.

- Changing demographics and expectations of faculty and students
- To provide flexible learning opportunities
- To support different learning styles
- To increase accessibility
- To meet market demand
- To enhance student and faculty communication and discussion
- Potential cost savings
- Potential revenue generation

For example, one university determined that the student retention rate for many of its courses was 65%. It estimated that about \$14 million of instructor salaries was spent teaching the 35% of students who did not return. It is now investigating what investments, including investments in instructional technology, would increase retention rates (and reduce the amount of “wasted” teaching time).

PEW Charitable Trusts has funded a project to determine how universities can improve the quality of student learning and reduce instruction costs through the use of technology. Thirty institutions were given a grant of \$200,000 per course to redesign 30 large-enrollment courses using technology. Five different course redesign models were used. Each model varied by the amount of technology used (e.g. from where technology was supplemental to a traditional course to where the entire course was delivered using technology). Results show that:⁶⁰

- student learning improved in 20 of the 30 courses with no significant difference in the other 10;
- course delivery costs were reduced an average of 40% reduction (with a range of 7% to 77%). This amounted to \$3.6 million per year for the 30 courses;
- student completion rates were higher than for the same course prior to redesign (lower drop-failure-withdrawal rates); and
- students were more satisfied with the mode of instruction offered by the redesigned courses.

Many universities now depend heavily, or solely, upon information and communications technology to deliver courses. Some of these universities include the University of Central Florida, UMassOnline,⁶¹ the University of Phoenix⁶² as well as some Canadian universities.

⁶⁰ For more information the redesign process, see Center for Academic Transformation www.center.rpi.edu. For more information about the results, see “Improving Learning and Reducing Costs: New Models for Online Learning”, Educause Review, September - October 2003 <http://www.educause.edu/pub/er/erm03/erm035.asp>

⁶¹ UMassOnline, the University of Massachusetts's Web-based learning division, announced that online education program revenues and enrollments grew 40% and 33%, respectively, in 2003. Revenues from the combined online programs at the university exceeded \$11 million, up from \$7.8 million in 2002, while enrollments reached 13,375, up from 10,039 in 2002. More than 90% of the revenues are retained by the UMass campuses to support education and research programs.

The University of Saskatchewan must determine how it will use technology for course delivery. There are number of questions that should be asked regarding how we will use technology to best support the strategic directions and enrolment plan. Should we use technology to increase accessibility, to deliver niche programs in which we excel, for large courses, for undergraduate courses, for graduate courses, to reduce instruction costs, to increase revenue, to provide students experience with online learning and/or to improve retention rates?

This is an important strategic choice that will help shape our future. Without a plan, the University may not be taking advantage of the opportunities presented by ICT. ITS will assist in the development of this plan in collaboration with colleges and other service providers (e.g. Library, Extension, Teaching and Learning Centre, Media and Technology, Extension). The current planning done around the University's participation in the provincial TEL (technology enhanced learning) program can provide a starting point for the development of a campus plan.

Budget

The following table outlines the incremental funding proposed to improve the availability of instructional technology software tools and technical assistance to instructors in the use of this technology.

The school attributes its rapid growth to the continued addition of new online programs that serve community needs, high levels of online student satisfaction, and its recognition in the national distance learning market due to factors such as winning several national distance learning awards.

"Distance learning is critical to the future of UMass and all of higher education," UMass interim President Jack M. Wilson said. "Without it, we cannot adequately serve students who live far from our campuses or whose work and family lives make traditional higher education an unattainable goal. Also, at a time when we are expected to do more with less state funding, UMassOnline is mobilizing our five campuses to create entrepreneurial revenue-generating online programs, multi-campus collaborations, innovative faculty training, increased national visibility and significant cost savings for the university."

Source: UMassOnline press release, November 6, 2004.

http://www.umassonline.net/news/shownews.cfm?news_ID=47

⁶² The University of Phoenix is probably the best known North American "online" university. The University was founded in 1976 and states that it has granted more than 171,000 degrees. It offers both online and face-to-face instruction. It has 128 campuses (including at least one Canadian location) and offers courses worldwide via the Internet. In late December, their ads were being run on a local radio station. For more information, see [www. http://onl.uophx.edu/](http://onl.uophx.edu/)

	2003-04	2004-05	2005-06	2006-07
Costs				
Number of staff (FTE)		2.25	2.75	3.25
Staff salary and benefits		\$140,000	\$170,000	\$200,000
Number of students		10	16	25
Student salary and benefits		\$70,000	\$120,000	\$180,000
Student desktop hardware and software		\$3,000	\$5,000	\$8,000
<i>Subtotal student related costs)</i>		<i>\$73,000</i>	<i>\$125,000</i>	<i>\$188,000</i>
Software Purchases		\$50,000	\$75,000	\$100,000
Software Maintenance		\$5,000	\$7,500	\$10,000
Server Purchases		covered by existing servers or ITS existing budget		
Server Maintenance				
Total Costs		\$268,000	\$377,500	\$498,000
Requested Funding (from 2003-04)		\$270,000	\$380,000	\$500,000

Benefits

The appropriate use of electronic teaching tools can increase the effectiveness and efficiency of the teaching process and enhance the educational experience for students, thereby supporting the Strategic Directions. Specific benefits include:

- Usage of technology in instruction is a powerful factor for students in selecting an institution. Effective incorporation of technology in instruction is a factor in student retention. Students expect course materials to be available on the Web, and expect to be able to communicate with instructors via e-mail.
- Students with varying learning style preferences will benefit from alternative forms of instruction, such as can be supported using technology. This should help improve student success and satisfaction and should result in increased student retention.
- Faculty members expect to teach in classrooms using computers, computer network, and data projectors. The institution's capability to facilitate an instructor's use of technology is a factor in recruitment of dynamic faculty members
- Enrichment of content using technology and media, as well as effective use of new interactivity facilitated electronically, can improve the learning and satisfaction of students.
- Enabling undergraduate and graduate students around the world to enrol in University distributed education courses also contributes to recruitment and retention.
- The use of technology in blended learning (part face-to-face and part online) is expected to increase efficiency in teaching of large enrolment courses.
- Instructors would spend less time struggling with ICT and would have more time to spend on their teaching and research.

A collaborative approach to evaluating and selecting appropriate tools should minimize the number of similar tools that are in use and must be supported on campus. Collaboration on the tools might extend to other institutions (in the province or in consortia like COHERE). Using graduate students as student technology assistants will involve them in the teaching process and get them familiar with the tools themselves. This will be a step towards making

them better instructors, and gives them some additional experience for their e-portfolio. It has the added benefit of applying additional funds to financial support for graduate students.

Finally, a coordinated approach for the use of information and communication technology for course delivery should result in economies of scale, efficiencies in the number of software and hardware licenses required and a more effective training and support program. A coordinated plan has the added benefit of allowing the University to present a united front to outside agencies with respect to distributed learning.

Partnership

This initiative will be undertaken in collaboration with the Teaching and Learning Centre, colleges, Library, Extension and the Division of Media and Technology.

4.2.2 Increase ICT Services in Support of Research, Scholarly and Artistic Work

Initiative

Enhance existing, and develop new, ICT services and facilities that support research, scholarly and artistic work.

Rationale/Need

One of the stated strategic directions for the University is to increase campus-wide commitment to research, scholarly and artistic work. Information and communications technology is an enabler of research in virtually all disciplines. Most of ITS' services are available to all campus users—instructors, students, staff and researchers (e.g. the campus network, Internet access, access to research networks, e-mail, web services, file services, site licenses and/or educational software licenses pricing, statistical software support, desktop anti-virus software, training, etc.).

However, ITS provides very few services that are directed only towards the support of research (e.g. access to compute resources, training on the use of SSHRC and NSERC online grant application forms). Colleges provide few ICT services directly in support of research. As a result researchers are mostly on their own with respect to ICT support, hardware and software. In addition to applying the ICT technology in their discipline, many researchers struggle to find the time to keep the technology operational and secure.

A strategic and significant campus investment in ICT support and facilities for research will help build and share technical expertise, will provide resources not readily available to some researchers, and will free up faculty time to focus on, and become more successful in, their research, scholarly and artistic work. In other words, **the increased commitment to research, scholarly and artistic work (RSA) called for in the strategic directions can be supported with more ICT support for researchers.**

Description

ITS has consulted with the Research, Scholarly and Artistic Work Committee of Council, the Office of the Vice-President (Research), and the Dean (Graduate Studies and Research) regarding specific ICT services that would help improve University productivity and success

in research, scholarly and artistic work. This consultation identified three groups of services as follows:

- services that would benefit the broadest number of researchers;
- services that would benefit the research efforts in a variety of disciplines; and
- services that would support specialized, high-priority research areas.

ICT services benefiting the broadest number of researchers:

- Provide consulting regarding the ICT components of research grant proposals.
- Develop a database that would help faculty store and maintain their curriculum vitae (CV). This CV database would have the ability to convert CV information from the database to the formats required for research grant applications, web pages, and text versions for papers.
- Provide an electronic file storage, backup, retrieval and archive service for researchers with very large data needs. The current backup processes are often inadequate. A central service would offload the operational responsibility from researchers.
- Improve on-campus access to ICT for graduate students, especially graduate students outside of the sciences. It has been suggested that the University develop a computing facility that contains the hardware and software these students require.
- Provide ICT mentoring to graduate student assistants or research assistants who do not have an background in ICT, to help ensure they are following good programming or web site practices—version control, documentation, off-site backups, testing plans, etc.
- Provide systems administration and security management services for Windows and Linux-based workstations and servers. Most researchers and small research groups do not have dedicated ICT staff; this service would offload researchers from having to become ICT experts and from performing regular operational ICT activities. As an alternative, assistance in the form of training, mentoring, consulting and security monitoring can be provided to researchers and their research staff (often graduate students) in performing those duties.
- Provide a “desktop utility” for researchers including additional ICT support to unburden the researcher from chores related to selecting, installing, administering, securing and patching desktop computers. Note: this is presented as a separate initiative (see section 4.3)
- Develop a central listing (web page) of campus software licenses—including site licenses, open-source licenses, volume or educational pricing arrangements. A similar web page for vendor hardware agreements would also be created.
- Extend the hours of operations for key foundational services (network, Internet access, e-mail, web services, portal, help desk, etc.) to evenings and weekends. Faculty and researchers (as well as students and staff) expect that critical ICT services be operational during the hours that they work. Note: this is presented as a separate initiative (see section 4.1.8)

The benefits, resulting from the above services, include:

- Applies resources to deal with the technology (operation, licensing, updates) so the researchers in can focus more on the research. Helps avoid duplicating that effort across several research teams
- Prevent losses of data by ensuring proper file storage, backups, and workstation security
- Better training for graduate students in good practices related to developing and testing programs
- Incremental time savings for researchers across the campus and throughout the year.

ICT services benefiting the research efforts in a variety of disciplines:

- Establish a research data centre. The centre would contain public research data (e.g. Statistics Canada) that would be of interest to several disciplines as well as tools and technical support to help user access the data.
- Additional consulting, help and training in commonly used software for research including statistical and mathematical software, GIS (Geographic Information Systems) image and research databases.
- Desktop videoconferencing hardware, software and support to facilitate meetings among geographically separated collaborators, faculty and graduate students. Videoconferencing can facilitate virtual attendance by external thesis examiners.
- Provide a campus visualization centre (large screen, 3D, high resolution 2D, or immersive) for more effective display, presentation, and interaction with research data. Technical visualization experts would help researchers from various disciplines to use the campus facility, or would assist them to establish their own visualization centres.
- Improve network connectivity between the campus and the Saskatoon Health Region (primarily Royal University Hospital and Cancer Centre), and CommunityNet.

The benefits, resulting from the above services, include:

- Helps establish a critical mass of expertise in a technology or application, so that enough technical staff and researchers are available to assist new researchers. The dissemination of expertise, by researchers, in the technology or application would not directly detract from research in progress.
- Encourages collaboration and shared facilities.

ICT services to support specialized, high-priority research areas:

- Provide ICT support, beyond that which will be provided by the CLS, to help University of Saskatchewan researchers use the CLS.
- Provide technical ICT support to researchers for the setup of specialized equipment.
- Provide support to researchers who require high performance computing resources. Support can include:
 - provision of shared, local cluster-based high performance computing facilities and the associated support (as is available in many universities);
 - assistance and consulting regarding use of national high performance computing facilities available through the C3.ca consortium (e.g. WestGrid);
 - technical and operational support for cluster-based computing facilities established by individual research groups.

The benefits, resulting from the above services, include:

- Assists directly with establishing academic preeminence in some areas
- Assists with attracting star faculty
- Demonstrates institutional support of particular research areas or facilities and assists in winning grant competitions

Budget

The list of services identified during consultations is extensive. The cost to provide all of these services would easily exceed \$1 million annually. At best, the University has capacity to undertake only a small number of these services during the planning cycle. The following budget is proposed for this planning cycle.

	2003-04	2004-05	2005-06	2006-07
Staff salary and benefits	\$0	\$250,000	\$300,000	\$375,000
Hardware and software		\$50,000	\$75,000	\$75,000
Total Costs	\$0	\$300,000	\$375,000	\$450,000

The proposed budget will enable the provision of some services that will have an effect on research, scholarly and artistic work. The services to be provided will be approved, yearly, by the VP (Research) and AVP (ICT), in consultation with the RSA Committee, the Academic Support Committee, and researchers.

Benefits

This initiative will facilitate the development of ICT facilities and expertise that span multiple research groups and outlast any particular research project. Researchers (and their research staff, often graduate students) will be able to spend more time on their research instead of dealing with operational ICT issues. This should help improve the University's success and productivity in research, scholarly and artistic work. An improved level of ICT service can also help attract and retain faculty and graduate students. Research success may lead to increased revenue to the University through commercialization and spin-off economic benefits to the province. ICT professionals involved in these activities would participate on the national and international scale to raise the profile of the University.

An example of how investment in ICT can further RSA is the development of GIS (Geographical Information Systems) on campus. ITS was a contributing partner along with several departments in selecting and acquiring facilities and a campus-wide license for ESRI GIS software. Brian Reilkoff, an ITS employee, coordinated the effort and manages the licenses and servers involved. Brian handles the liaison with ESRI for other post-secondary institutions in the province as well as for the University. Brian has been instrumental in promoting and demonstrating GIS to other units on campus and in incorporating them into the critical mass of users.

4.2.3 Student Mobile Computing

Initiative

Leverage the student ownership of laptop and desktop computers to meet the expectations of an academically promising (and "ICT-savvy") body of students for "anywhere, anytime" access to instructional and administrative services, to assist in the recruitment of those students and to reduce the need for additional space for campus student computing facilities.

Description

The majority of students who come to the University of Saskatchewan either own their own computer or have access to one at their home. Increasingly, students are purchasing laptop computers (about 50% of student purchases at the Campus Computer Store are laptops). Students expect access to all the instructional and administrative services, currently provided by on-campus computing facilities, from laptops while they are on campus and from their home computers.

This initiative will:

- Provide 150 additional wireless network access points in classrooms, libraries and other student workspaces to facilitate student use of their laptop computers on campus.⁶³ Forty of the existing 802.11a access points will also be upgraded to support the faster wireless standard (802.11g) supported in new laptops. In addition to those provided by this initiative, we expect that colleges and departments will fund additional wireless network access points.

McGill University has installed about 240 wireless network access points for their students. UBC has recently installed about 1,200 wireless network access points in 150 buildings.

- Provide students access to the general purpose and discipline specific software and instructional resources that are currently available at campus computing facilities to students from their home computers and laptop computers while on campus.

This will require collaboration with colleges regarding software licensing and student support. An application server will probably be required to deliver software applications to student machines.

- Provide additional technical support to students. This support will include the development of automated methods to install commonly used software, operating system security upgrades and application software security upgrades on student computers. Additional training (in-person and/or online) and technical assistance will be available to they run into problems. The additional support is necessary to ensure that student workstations do not inadvertently create ICT security problems for campus computers.
- Continue to develop vendor alliances and programs to provide special hardware and software pricing for students. This activity would be provided primarily through the Campus Computer Store. Additionally, financing opportunities, such as leasing, will be explored.
- Research and evaluate new mobile technologies that support the educational process.

⁶³ There are currently about 60 wireless network access points on campus; another 20 will be installed within the next month. It is expected that about 10 wireless access points can be installed yearly from the student computing maintenance initiative. With the 150 access points proposed in this initiative, there will about 260 wireless access points on campus at the end of this planning cycle.

Budget

The following table outlines the incremental funding requested to improve the provision of “anywhere, anytime” instructional and administrative services to student home computers and laptop computers while they are on campus.

The main components of the requested funding is staffing plus the cost to install 150 additional wireless network access points⁶⁴ and the cost to upgrade the existing access points.

	2003-04	2004 - 05	2005 - 06	2006 - 07
Costs				
Staff salary and Benefits		\$154,005	\$179,298	\$229,886
<i>Subtotal (Salary & Benefits)</i>	\$0	\$154,005	\$179,298	\$229,886
Staff training	\$0	\$3,825	\$4,575	\$6,075
Staff desktop hardware and software	\$0	\$2,550	\$3,050	\$4,050
Staff furniture		\$10,125		
Staff network connection		\$4,050		
<i>Subtotal (staff related costs)</i>	\$0	\$20,550	\$7,625	\$10,125
Wireless Access Points (150 access points over 3 years)	\$0	\$150,000	\$150,000	\$150,000
Upgrade of existing wireless network access points		\$50,000		
Wireless network access cards	\$30,000			
Application Server, licenses	\$60,000		\$10,000	\$10,000
Server hw/sw maintenance	\$0	\$6,000	\$6,000	\$6,000
Application software	\$0	\$20,000	\$25,000	\$25,000
Total Costs	\$90,000	\$400,555	\$377,923	\$431,011
Available Funds				
ITS/Staff assignment	\$30,000	\$53,233	\$53,233	\$53,233
Capital Equipment Allocation for Campus Wide ICT Services	\$60,000	\$0	\$10,000	\$10,000
ITS/Hardware Maintenance		\$6,000	\$6,000	\$6,000
Total Available Funding	\$90,000	\$59,233	\$69,233	\$69,233
Surplus / (Gap)	\$0	(\$341,322)	(\$308,691)	(\$361,778)
Requested Funding		\$340,000	\$310,000	\$360,000

Benefits

Given the current, heavy demand for space on campus in general, it will be increasingly difficult to find space to expand traditional “computer laboratories” to meet the increasing student usage of computing resources.

This initiative supports student mobile computing. Wireless network access allows other existing campus spaces (for example, libraries, student study spaces, student “lounge” areas, Marquis Hall, classrooms) to be used for student computing, without repurposing those

⁶⁴ The cost to install a wireless network access point is estimated at \$3,000 per access point (including FMD work to install conduit, power, network cable and the access point, as well as the cost of the access point).

spaces. This initiative also improves access to University ICT resources from student home computers. In the short term, it should reduce the need for additional space for campus student computing facilities. In the longer term, this may result in a decrease of the amount of space required for dedicated student computing facilities. The funding needed to expand campus computing facilities can be directed to supporting mobile computing and to leverage student ownership of computers.

This initiative can also help the University attract an academically promising body of students. These students expect “anywhere, anytime access to anything” service.

Related Initiatives

The campus portal (initiative described in section 4.1.1) will help deliver online access to ICT services and applications for students, instructors, researchers and staff.

Partnership

Under the federated model, student computing services are delivered by ITS and colleges. This initiative will be implemented in collaboration with colleges.

This initiative provides an alternative to student computing model at some other universities. At those universities, the university leases computers to students and provides support. This initiative leverages the student ownership of computers. Several vendors will be interested in partnering with the University to support this model. Discussions are currently underway with one potential vendor, IBM.

4.3 Develop Campus Desktop Support Strategy

Initiative

Develop, in consultation with the University community, a strategy for acquiring, funding, deploying, supporting, maintaining and renewing desktop computers and their associated peripherals. The intent of such a strategy is to identify efficiencies, cost savings and to reduce the amount of time that instructors, researchers and staff spend on resolving computing issues rather than teaching and research.

Rationale/Needs

The document *Advantage U of S – Foundational Document for Information and Communications Technology at the University of Saskatchewan* outlined some of the background to the current way the University manages desktop devices. The federated model for ICT management has resulted in an *ad hoc* approach to the acquisition and management of these valuable assets. There are pockets on campus already following best practices for desktop computer management. While the University remains committed to the principle of “shared responsibility” for technology, the foundational document urges us to explore the potential for efficiencies of a more coordinated approach to desktop management and support.

The Gartner Group, a technology research organization, has developed a model for calculating the total cost of ownership of a desktop asset over its life cycle. This model has been used widely to help organizations understand these costs, many of them hidden or not well understood. Many organizations have made the effort to calculate these costs with

surprising results; costs were as high as \$5,000 per computer per year, with significant costs being attributed to troubleshooting problems, inadequate training for users, peer consulting time, and lost productivity.

Description

This initiative will develop a strategy for managing desktop computers and their associated peripherals. This strategy will consider:

- Funding models for acquisition and renewal (for example, purchase, lease, or budgeted utility funding models similar to telephone service).
- User help and training support models and costs (including the cost of the informal support provided by non-ICT support staff).
- The use of tools to automatically distribute, over the network, bug fixes to operating systems and applications software, security “patches,” and new versions of applications software.
- Software licensing models (site licenses, educational pricing, shared licenses among units).
- Clarification of the central, college, department and even individual responsibility for desktop support.
- Emerging desktop technologies such as tablet computers, personal digital assistants, and thin-client workstations.
- Best practices in industry and among comparable universities in Canada that can be used to achieve cost savings and efficiencies
- An assessment of the changes required to achieve these savings including the effect on the organization and the University’s preparedness for this kind of change.

Budget

	2003–04	2004–05	2005–06	2006– 07
Staff salary and benefits	ITS, college and administrative unit staff assignments		Required funding will be dependent upon the strategy chosen by the University in 2004–05	
Hardware				
Software				

ITS will reassign staff to this planning initiative from its existing budget (no incremental funding is requested). Contributed participation from other colleges and units will be required in the development of a campus strategy. The University can capitalize on the recently signed alliance with IBM to access additional expertise and experience in desktop management in large corporate and higher education environments.

Following development of the desktop strategy, the funding required to implement any strategy would be dependent upon the strategy chosen by the University.

Benefits

The development of the desktop strategy will take an overall look at the pictures of acquisition and support across campus. It will identify the key problems and issues for

students, faculty and staff. It will identify the costs of owning and using desktop computers now (whether explicit or hidden) and under a managed environment. It will engage many colleges and units in determining the best options for this University.

The subsequent wide-scale adoption of an adequately planned and funded desktop strategy will allow the University to:

- “Unburden” all faculty/ staff of desktop management responsibilities that they do not want by:
 - Reducing effort spent by faculty and staff on selection, acquisition, installation, patching, etc.; and
 - Limiting and maximize the effort spent by ICT professionals in staying current with the latest update issues and making informed decisions.
- Improve faculty/staff productivity in using ICT for research and teaching, by providing:
 - Timely support;
 - Adequate user training;
 - Compatibility and interoperability; and
 - Adequate desktop performance.
- Potentially cut costs through a variety of changes:
 - Standardized specifications and larger volumes, which can increase the leverage in the procurement process;
 - More standardized software to reduce the amount of time needed by help desk personnel to solve problems;
 - Standardized device specifications to reduce the amount of time needed to install “patches” to software (a fairly common occurrence), a service that can be done over the network as opposed to sending a technician to the device; and
 - If devices are more standard the time for repairs is reduced along with the associated inventory of parts.
- Improve ICT Security in order to:
 - Prevent losses such as loss of research data or loss of productivity resulting from a security breach or crash; and
 - Improve overall desktop security, a feature that is also an element of a security initiative outlined in section 4.1.
- Reduce ICT risks such as:
 - Data privacy lapses; and
 - Tarnished reputation of the University when University machines get infected.
- Improve utilization of ICT staff, which will:
 - Avoid duplication of efforts by ICT staff (such as in developing disparate disk imaging strategies and individually studying virus and vulnerabilities) and permit current ICT staff to be assigned to more discipline-specific support of faculty and staff or of improved local support service.

Partnerships

There would need to be careful consultation with all stakeholders. In addition, there are many outside organizations that desire partnerships/contract to assist with desktop management.

4.4 Continuous Improvement of ITS' Service Delivery Processes

ITS will review and improve, on an ongoing basis, its service delivery processes and organizational structure so we continue to provide services in an efficient and effective manner. Specific initiatives include:

- Review service offerings and rationalize which services are provided on base-budget and which are provided on a fee-for-service basis along with the rates for those services.
- Simplify and automate key business processes so that they provide self-service and makes it easier to for the University community to access our services.
- Change organizational structure, as required, to more effectively deliver service.
- Develop and implement a communications plan.

5. Disinvestments

ITS disinvestments⁶⁵ may include:

- service level reductions and
- service elimination.

While these disinvestments will save ITS cost, they will not result in institutional cost savings. Nevertheless, certain disinvestments in ICT services must be undertaken to re-direct resources to services that better align with institutional directions and priorities.

ITS offers core services that are used by instructors, students, researchers and staff in all colleges and departments daily. While a reduction in service level may save ITS costs, it does not result in reduced institutional costs. Faculty, researchers and staff will “waste” time waiting for service or spend time performing ICT work rather than their own work. In response to reduced ITS service levels, some colleges or administrative departments will be forced to offer ICT services on their own (in duplication to ITS’ services) in order to meet the required service levels of their faculty, researchers and staff.

- For example, in the case of inadequate desktop support, a percentage of faculty, researcher and other staff time is lost to workstation setup, troubleshooting hardware and software problems, installing software and security patches, developing a data backup strategy and backing up data. The lost opportunity becomes one of the hidden costs of computing; as a result, no one at the University knows the *true cost* of computing.
- In the case of inadequate support levels for network services, faculty, researchers and staff must wait a longer time before problems are resolved. The wait time is often unproductive and is another hidden cost of computing. More importantly, instructional, research and service delivery activities are delayed.
- Inadequate support levels for other services such as e-mail will force some colleges and departments to provide those services on their own rather than endure the reduced support levels. Providing duplicated services will cost the University more than the cost to provide one service.

As with service level reductions, service eliminations will save ITS costs but will not result in savings to the institution. Faculty, researchers, students and staff who depend upon the eliminated service will be forced to find another service provider; this results in an off-loading of ICT costs. In some cases, colleges and/or departments will deliver the service themselves through parallel, or even competing, ICT support organizations. Having separate and disparate services causes interoperability problems, creates confusion and frustration for users, and likely increases overall cost to the institution.

⁶⁵ ITS’ service planning process considers instructor, student, researcher and staff requirements within the context of institutional directions and priorities; service usage trends; changes in technologies; vendor support (or lack of support) for hardware, operating systems and software applications; existing service levels; service delivery costs; opportunity costs; ITS budget constraints. The resulting service plan specifies the technologies that will be used, service changes or enhancements that will be undertaken, service support levels and budget. Inevitably, the service plans identify areas of maintenance, investment and disinvestment.

ITS often has been forced to eliminate services, rather than to reduce service levels across the board, in order to address increasing service delivery costs in times of decreasing or flat budgets. The elimination of services did not lead to lower institutional costs. Colleges and/or departments began offering the discontinued services. The cost of delivering ICT services was transferred to others but was not reduced.

- Other than Computer Science, ITS established the first student computing facilities on campus in Thorvaldson, Arts 144, Health Sciences and Law. The facilities were established using one-time (project) funds. ITS was unable to acquire an operating budget for the support and renewal of these facilities and divested this service.

Colleges assumed responsibility for student computing facilities. In order to obtain adequate funds to support and renew these facilities, many colleges implemented student computing fees.

In addition to facilities, colleges also provided e-mail, file, web and print services to their students. Students, who took courses from more than one college, could have multiple e-mail, file service and web service accounts—one set of accounts for each college. Likewise, students had to pay computing fees and purchase pages for printing at each facility. Unused pages from one facility could not be used in another. ITS and the College of Arts and Science began offering services, often on a fee-for-service basis, to the colleges who choose not provide student computing facilities on their own.

Student complaints led to the development of campus-wide services. ITS provides e-mail, file and web services for all students; these services can be accessed at all college student computing facilities. A campus printing solution was implemented in fall 2003; students who purchase printing can now print in all college student computing facilities, the Learning Commons and other campus locations. Foundational student computing facilities were developed; these facilities are open to students in all colleges. College student computing fees were eliminated.

- ITS (and others) identified the need for a campus portal about four years ago but did not have the resources to begin implementation. Because it was a priority, the College of Arts and Science developed a college portal (my.usask.ca). The University is now operating two portals, my.usask.ca and PAWS.

As part of this planning process, ITS has considered divesting other services. We have not identified any service, which when eliminated, would save the University money. For example, we have considered eliminating support for institutional administrative information systems. “Business units” would be then become responsible for the technical support of those systems. However, the transfer of responsibility will not reduce institutional costs—“business units” will have to pick up the cost for supporting the administrative systems (an off-loading) or ITS would probably have to transfer the resources currently assigned to supporting those systems to the business units. Each business unit would form their own ICT department. Each business unit would need their own systems, database and applications support staff; total institutional costs would likely rise. If license management is not coordinated centrally (to take advantage of volume or site license pricing), institutional costs will also increase. In order to take advantage of economies of scale, the University would eventually combine the various business unit ICT groups into one unit.

Even though service level reductions or the elimination of services does not save the University money, certain disinvestments in ICT services must be undertaken. These disinvestments provide the opportunity to re-direct resources to services that better align with institutional directions and priorities,⁶⁶ to replace old services with improved services or to focus on technologies that better support the needs of users. For example:

- ITS will eliminate support for SIS and FRS when the Si! and Unifi projects are completed. This assumes that the projects convert seven years of historical data into the new systems to meet regulatory requirements.

This disinvestment will not result in lower costs for the University. The annual software and database license cost for the new student information system will be several times higher than that for the current system. The amortized yearly server cost for the new system will be higher than those for the current system. The technical support (staffing) costs will also be higher. Likewise, the functional (non-technical) staffing required to operate the new student system will be higher than the staffing currently deployed.

Even though this disinvestment will not result in lower costs, the University has decided to implement the new systems to improve services for students and faculty.

- ITS has announced the discontinuation of the faculty and staff dial-up service (scheduled for April 30, 2003).

The service provides low speed (28 Kb per second) access to the Internet. A vendor no longer supports the hardware and software used to provide this service. The equipment is seven years old and replacement parts are not available. The cost to provide this service is increasing.

Nevertheless, this service is used by 500 faculty, sessionals and staff on a regular basis. With the elimination of this service, the affected people will need to purchase Internet access service (e.g. from Shaw, SaskTel, or U-Connect), or come onto campus to do the work now done off-site. Some sessionals have indicated that they don't have offices on campus and therefore are forced to incur additional costs to do their University work.

This service is also used by staff in University offices or research labs that do not yet have network access (e.g. Poultry Centre, Crop Sciences Research Lab, Kernan Farm, University Feed Mill, Physics RadarSat station and some offices in Royal University Hospital). ITS is working with the staff and departments affected to provide alternate network access; the cost to provide this access is sometimes high (for example, when long-distance wireless internet access equipment must be used). Alternatively, University staff or their departments must buy commercial Internet service (if it is available at that location).

The elimination of this service will likely increase institutional costs (including the costs for the affected users to purchase commercial Internet service and ITS' cost to provide network service to the areas affected). Even though institutional costs may increase, elimination of this service is the best course of action. The provision of Internet access to homes should not be a core competency of the University. The

⁶⁶ In business terms, this may be stated as the ability to re-direct resources to services that provide a better return on investment.

commercial service delivered to faculty and staff homes will provide a higher quality of service. Likewise, the provision of ITS network service to affected campus areas (or even commercial Internet access services in areas where the cost of campus network service is prohibitive) will also provide a higher quality of service to faculty, researchers and staff.

- The POP e-mail protocol will no longer be supported after September 1, 2004.

The POP protocol downloads users' e-mail from the e-mail server onto user desktop computers and deletes the e-mail from the server. Incorrect e-mail configurations on desktop computers, desktop hard drive failures and user error can also cause the e-mail to be deleted from the desktop computer. ITS spends about 20 days per year trying to recover lost e-mail (sometimes the e-mail cannot be recovered).

The IMAP protocol only stores e-mail on a server. This saves both users and ITS the time it now takes to recover e-mail that is accidentally deleted. Additionally, e-mail can be accessed from any computer that the user chooses.

The change in e-mail protocol will affect 1,700 users. Those users must reconfigure their desktop computers to use IMAP.

While the cumulative user and ITS cost to reconfigure these workstations will likely require more than 20 days of effort, it is still the best course of action.

In addition to the above, ITS will undertake the following disinvestments within this planning cycle. ITS yearly operating plans will identify further disinvestments.

- Support for Word-11 will be eliminated by fall 2005.
- Support for coax network wiring will be phased out by 2005 (replaced by support for Cat-5, Cat-6, and fibre connections).
- Support for the Appletalk network protocol⁶⁷ will be phased out by 2005.
- Support for the application development tools⁶⁸ that were used to develop our existing legacy administrative information systems will be discontinued when those applications are replaced by new systems. The legacy applications include: SIS, FRS, Course Inventory System, DMT's billing/inventory system, Dental Clinic system, Supplemental Chequing, General Receipting, Student Fees, Emergency Loan and other systems.

⁶⁷ This is following Apple's direction regarding the Appletalk protocol—Apple is recommending the use of TCP/IP protocol instead of Appletalk. Note: Apple Macintosh products will still be supported even though the Appletalk protocol will not be supported.

⁶⁸ These tools include RDB, Rally, Datatrieve, CDD/Repository, SAS on the OpenVMS operating system, RDO, Periphonics, TDMS and CMS.

6. Coordinating and Rationalizing Service Delivery

The coordination and rationalization of ICT services across the University requires

- clarification of the responsibilities between ICT service providers within the University's federated model, and
- articulation of the institutional priorities for ICT investments and services.

This will require the participation and active engagement of senior administration and the leadership of a wide spectrum of academic and administrative units. Both of these tasks can be managed by the same assembly of leaders of academic and administrative units.

Clarification of Responsibilities between ICT Service Providers

The effective application of ICT is critical to achievement of the goals outlined in the Strategic Directions and as a result the University is becoming increasingly dependent upon ICT. Despite substantial investments over the past year,⁶⁹ further investments are still necessary. These investments will need to occur in colleges and administrative units as well as centrally.

The University has adopted a federated support model. Under a federated support model, the responsibilities for ICT are shared between colleges and administrative units, and the central ICT organization. A federated support model specifies guidelines for determining the services that should be provided in a distributed manner, the services that should be provided centrally, and the shared responsibilities for ICT (see section 2.2).

However, our adoption of the federated support model was not based on the formal application of these principles. Like many other higher education institutions, the University's ICT environment has evolved into a complex, interrelated, and in some cases, duplicated mesh of services that are delivered by ITS, colleges and administrative units.⁷⁰ Most colleges and administrative units maintain their own ICT staff and services. In essence, this results in having 15 or more ICT organizations on campus. The degree to which colleges' and administrative units' ICT services are coordinated with ITS' services or among each other varies, but often is generally low.

The ICT foundational document recognizes that "the lines of responsibility and authority (within our implementation of the federated model) aren't as clear as they need to be." The integrated planning process further challenges us to review how ICT services are delivered.

The ICT service delivery matrix needs to be examined with the goals of

- Increasing efficiency
- Clarifying things for users
- Removing competition between units

⁶⁹ Some of these investments are outlined on page 25 of the ICT foundational document.

⁷⁰ Including the Library, Division of Media and Technology, Facilities Management Division, Financial Services Division, Consumer Services, Extension, Teaching and Learning Centre, Student Enrolment and Services Division, University Advancement, Institutional Analysis

- Removing unnecessary duplication of services
- Permitting each unit to focus on services at which they can succeed and which will be appreciated by the institution

This will require a review of ICT services on campus by a broadly based group with a mandate to recommend change where it may be needed.

The review would determine the responsibilities of colleges administrative units and ITS for various services. In the case of duplicated services, the review should determine whether the duplication is necessary. The federated model recognizes that some ICT skills (services) should be delivered (duplicated) in colleges and administrative units. The focus of those services should be to address the specific (local) needs of a college or administrative unit. However, services that are offered by multiple units (duplicated) to the campus community create internal competition and confusion for users; in general, these duplicated services should be eliminated.

The review should also consider cost-effectiveness of service delivery. In general, the University cannot afford to duplicate competency centres for highly complex skills that are expensive to develop and maintain.

While further clarification of specific responsibilities for ICT services is required, the responsibilities for some services, including the ones below, have been clarified, with a resulting improvement in service.

- Campus-wide printing (for students)
- E-payments infrastructure
- E-mail, file services and web services for students
- E-mail services for alumni
- Discipline specific computer facilities and support

The following services are provided by several organizations on campus. Clarification regarding the central and unit responsibilities for these services is still required.

- E-mail for instructors, researchers and staff
- Instructional technology and course management systems
- Help desk services
- ICT training
- File services for instructors, researchers and staff
- Web page hosting for instructors, researchers and staff
- Desktop support services
- Software license management
- Application and database design and development
- E-calendaring services

While more clarification of the responsibilities for ICT service delivery under the federated model is recommended, we are not recommending that all ICT services should be centralized. **Some ICT services should be provided locally by in colleges and administrative units.**

It should also be noted that a **re-alignment of responsibilities likely will not result in significant cost savings to the University**. The University of Saskatchewan spends less on ICT than other comparable universities; any cost savings will be insignificant. Even if cost savings are identified, they may be impossible to capture.

Nevertheless, the clarification of service delivery responsibilities in the federated model should continue. It would clarify service responsibilities for service providers, make it simpler for users to acquire services, help identify the true cost of computing across campus, and help define the budget required to adequately deliver campus services. In summary, it would “ensure that we have the right allocation of authority, responsibility and budget.”⁷¹

A formalized federated support model will require a culture that supports effective, broad cooperation and collaboration. This collaboration would have to include setting ICT priorities with the ultimate goal of developing an integrated ICT plan.

Setting Institutional Priorities for ICT Investments and Services

ICT expenditures will increase because colleges and administrative units want and need ICT to deliver more functionality and more service (including for recruitment, retention, increased research, scholarly and artistic work, or whatever). Recent examples include the Si!, UniFi and portal projects.

Given this increasing demand and limited funding, the choices for investment (and disinvestment) in ICT need to be made collectively by the leaders of the academic and business units in order to maximize the benefits of those investments for our institution. ICT investment decisions are business (academic and administrative) decisions; they are not ICT decisions. Of course, ICT has a role to play in providing investment advice regarding costs, interoperability, technology directions, etc.

At this University, the task of setting ICT priorities may fall upon the Campus Advisory Board for Information Systems (perhaps with the addition of some members). Successful ICT decision-making models are being used at other universities (e.g. University of Alberta, Northeastern⁷²). At those universities, the advisory group establishes the metrics and weightings with which to compare the value to the institution (return on investment) among proposed investments in ICT projects (e.g. network connections in the residences and in a research grant accounting system). It also develops metrics for evaluating risks and costs to the institution.

The discussion of ICT investments in such a forum has additional benefits of the following.

- A better partnership relationship between the business units and the ICT units based on a common view of the projects and full collaboration during the formative stages of the project definition and plan
- Creation of a common IT lexicon for everyone involved
- Increased understanding of the problems and imperatives in other academic and administrative units

⁷¹ ICT Foundational Document, June 2003

⁷² *IT Investments Decisions that Defy Arithmetic*, EDUCAUSE Quarterly, 1, 2004

- Alerts to units regarding planned changes that could affect their own processes
- The costs of process change and cultural change
- Completely costed proposals to enable informed decision making

The University has an opportunity to use ICT to help it progress towards the goals stated in the Strategic Directions and the foundational documents.

- We must make investments in ICT that contribute the “most” towards the goals stated in the Strategic Directions and foundational documents.
- We must collectively develop a better understanding of the opportunities presented to us by ICT.

We must develop better benchmarks to measure contribution of ICT (and other) investments towards our strategic goals.

7. Generating Revenue and Reducing Costs

The strategic directions call for a supportive environment that includes enriched resources and enhanced revenue opportunities.

In addition to providing quality and cost-effective services, ITS contributes to a supportive environment by securing external funding, by reducing University costs through partnerships with industry and by creating a secure and productive work environment.

7.1 Generating Revenue

ITS' mandate is to provide quality and effective services for the University. Competing in the private sector would generate questions and complaints, from both that sector and the campus community, regarding the use of public funds. We rarely provide services outside of the University.

However, ITS actively looks for opportunities to secure outside funding. Some examples of our successes follow.

- **USR-net Project.** This CFI-funded project will bring \$11.5 million of new funding to the University, \$5 million of which counts toward the University's total research income.
- **National Infrastructure Program.** In the late 1990s, we were successful in receiving \$1.5 million for network renewal.
- **ITS, together with the University of Regina, developed the first provincial Internet service (SaskNet).** Once commercial alternatives were available for this services, the network was "sold" to SaskTel in exchange for several years of a reduced Internet service costs.

ITS will continue to seek external funding wherever possible, recognizing this funding must align with the strategic directions and priorities of the University.

7.2 Reducing Costs

ITS seeks and negotiates partnerships with the industry in order to reduce the University's cost of equipment and software. The benefits, to the University, of some of these partnerships are outlined below.

- **Our partnership with Cisco and IBM has resulted in \$2 million of industry contributions toward the USR-net project.**
- **Additionally, Cisco has provided approximately \$200,000 worth of equipment for an IP-based telephony project in Kinesiology.**
- **Special pricing agreements have been negotiated with Apple, HP, IBM, Sun Microsystems and others. These agreements benefit colleges, departments, researchers, students, faculty and staff.**
- **ITS, together with SIAST, negotiated a site license for geographical information system (GIS) software with ESRI Canada. The commercial cost of this software is valued at \$7 million whereas the site license costs the University \$15,000 yearly.**

- Partnerships have been established with two suppliers of geological and seismic processing software. This software is used for instruction and research. The cost of this software is estimated at US\$3 million. The University cost is \$5,000 per year.
- A recently negotiated contract with Oracle will save the University \$250,000 per year for the new student information system; assuming a fifteen-year life for this system, these savings will total almost \$4 million. [Note: These discounts were negotiated prior to the selection of the Si! system and were included in the budget to the Board.] These discounts also reduce the University's database license costs related to Banner Finance, About-US, iHelp and other systems.
- A site license for Sophos anti-virus software has been acquired. This license covers all desktop computers and servers on campus as well as all faculty, student and staff workstations at home. This license costs the University \$12,000 per year (less than a \$1.00 per machine per year). This is a significant reduction even from normal educational prices.
- University (low cost) pricing for students, faculty and staff have been negotiated for SaskTel and Shaw high-speed Internet services. Individual savings can be as much as \$240.00 per year.
- The Campus Computer Store negotiates and manages the Campus Microsoft Agreement. Savings to the University are estimated at \$200,000 per year.

The following table summarizes some of the annual cost savings resulting to the University from our industry partnerships.

University Annual Estimated Cost Savings	
Microsoft Campus Agreement	\$200,000
Adobe Software	\$ 60,000
SPSS Software	\$125,000
Oracle (for Si! project)	\$250,000
Estimated Annual Savings	\$635,000

The following table provides a sample of annual cost savings realized by students, faculty and staff from our industry partnerships.

Student, Faculty and Staff Annual Estimated Cost Savings	
Microsoft Software	\$110,000
High Speed Internet	\$ 600,000
Estimated Student, Faculty and Staff Savings	\$710,000

The Campus Computer Store (CCS) is a vital part of ITS' service delivery. They help us administer software and hardware agreements negotiated by the University. Through their membership in Campus Retail Canada and Canadian Consortium of Campus Computer Stores, the store works directly with industry to advocate for special pricing for higher education. Additionally, the CCS offers a free setup service for all computers installed on campus; this support is valued at \$70,000 (based upon the staff effort spent to provide the support).

7.3 Providing a More Productive Environment

Inherent in our mission is the goal of providing a productive work and scholarship environment for the University community. SPAM e-mail and successful Internet-based attacks can make for a very unproductive environment. The following outlines some of the actions that ITS has undertaken with respect to SPAM and Internet security to provide a more productive ICT environment.

- 90,000 virus infected e-mail messages are detected and removed daily at peak times.
- 100,000 SPAM attempts are blocked daily from known SPAM and open relay sites.
- 55,000 e-mail messages are quarantined daily through global SPAM blocking.
- 5.2 million probes of the campus network (attempts to attack campus ICT resources) are blocked daily.

ITS will continue to seek ways to enable instructors, students researchers and staff to be more productive.

8. Office Space

To be effective in service delivery and supporting the strategic directions of the University, ITS requires space that is suitable and conducive to providing services in a cost-effective manner.

ITS offers two types of services. Direct or Dedicated services are provided to individual colleges and administrative units. General services are provided to the campus community. Each of these services has different space requirements.

8.1 Direct/Dedicated Services to Colleges and Administrative Units

Direct or Dedicated services are provided to colleges and departments to address their specific needs. These services may take a number of forms, ranging from an academic focus such as in Engineering and Geological Sciences, to instructional support (desktop and college IT support for Kinesiology).

Direct services are best delivered where the support staff are “at the elbow.” This proximity allows for prompt response, a better rapport and, over time, a better understanding of the client’s needs.

Space for this staff is provided by the colleges and administrative units, and is usually suitable to needs of the service being delivered. For some staff this is a permanent office while for others it is a shared workspace.

Currently Direct Services staff have office in the following buildings:

Building	Staff
Library	3
Geology	1
Engineering	2
WCVM	3
Security Services	1

In addition to these locations, some ITS staff provide Direct services to colleges and administrative units on a part-time or rotational basis (for example, for the College of Kinesiology). This staff has offices in either the Physics or Arts buildings.

8.2 General Campus Services

General campus services are those provided to all users, or all colleges. These services are utilized by faculty and students across the entire campus and in some cases by everyone on campus.

Because of their wide use, these services need to be delivered in a way that is readily accessible to the entire University community. Users want access to ITS’ services without traveling a long distance.

Currently, ITS General services staff are located in nine separate buildings on campus ranging from the RDJ Williams building to the Peterson building, and from the Education building to

the Administration building. The following table shows the buildings in which this staff have offices.

Building	Staff
Physics	33
Arts	27
Peterson	26
Education	12
Place Riel	7
Administration	5
J. Mitchell	5
RJD Williams	4
Research Annex	2

The large number of office locations creates significant negative impact on service delivery.

- Users must learn the locations from which various ITS services are delivered. Sometimes, users will go to the wrong location, and some will have to visit multiple locations to receive what should be a single set of services. As an example, computers are purchased in Place Riel, setup in Arts and repaired in Education. It is extremely difficult to build a single service delivery when our offices are spread over so many locations.
- Some staff are separated from the people with whom they must work. As examples,
 - The About-US support team, located in RJD Williams are separated from their clients in the Administration building. This adds delay to service response and reduces the perceived level of support delivered.
 - Database experts (located in Peterson) are separated from software developers (located in the Mitchell, Physics, RJD Williams, etc.) with whom they must work on a daily basis.
- The physical separation also tends to cause people to focus on just “their piece of the puzzle,” as that is all they see. This leads to reduced service levels and a less cohesive unit. It is also more difficult to manage staff located in many locations.

In many areas, the office space is inadequate to meet our needs. For example:

- In the help desk area, four full-time staff share works desks.
- The Campus Computer Store does not have sufficient space for offices or to carry the range of products and services needed on campus. There is a safety risk resulting from the piles of boxes in staff work areas.
- Allergens, present in the Help Desk Services space in the Arts Building, cause a high level of sick time and forces ITS to reassign and/or relocate staff to other areas resulting in a negative service impact.

It can take many months to find space for required staff. For example, the USR-net project was underway for 12 months before securing staff space. The lack of adequate office space has delayed the hiring of the people needed to complete the project and therefore delays project completion. Significant effort is spent trying to find space for staff.

8.3 Recommendations

In order to improve our services to instructors, students, researchers and staff, ITS recommends:

- A consolidation of our office space to two or three locations. This would improve productivity and bring together staff into a more efficient and cohesive unit.
- The establishment of “IT Central.” Like Student Central, this will provide a single location (one stop) for all “front-line” ITS services including help, desktop support, consulting, desktop sales, workstation repair, and, if possible, training. IT Central must be located in a location that is convenient to instructors, students, staff and researchers.