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 disinvestments[9] 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 100Mb[13].
- 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 (to1Gb 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 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 provided 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.

	FTE 2003–2004		**"Steady State" FTE**	**Typical Annual Capital Equipment Allocation**
Service Area	**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:

<u>E-mail</u>

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.

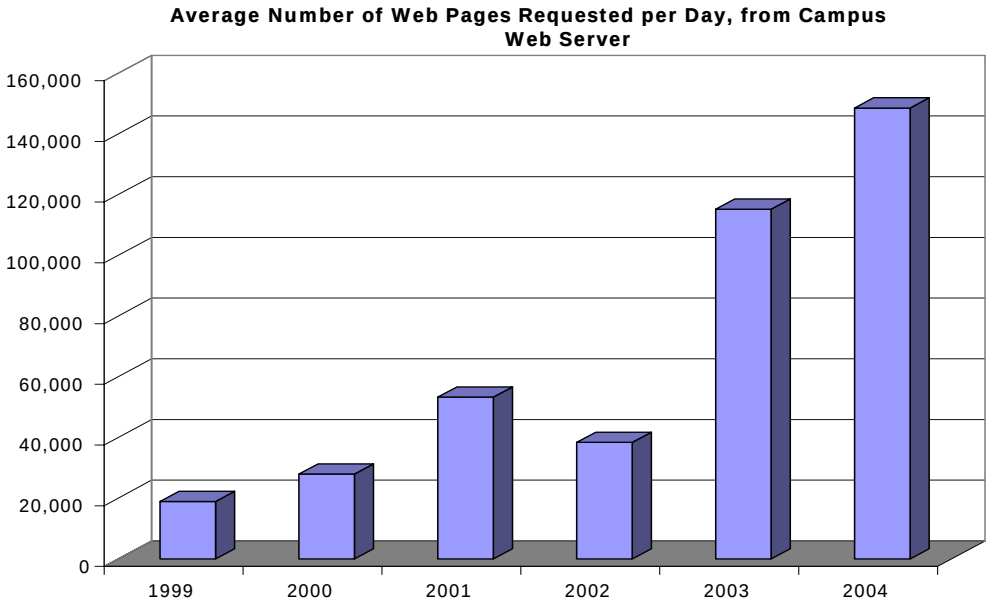
Note: The current file service for students, instructors, researchers and staff currently provides over 1 Terabyte (1,000,000,000 bytes) of disk storage. This number is expected to triple in the next 2–3 years.

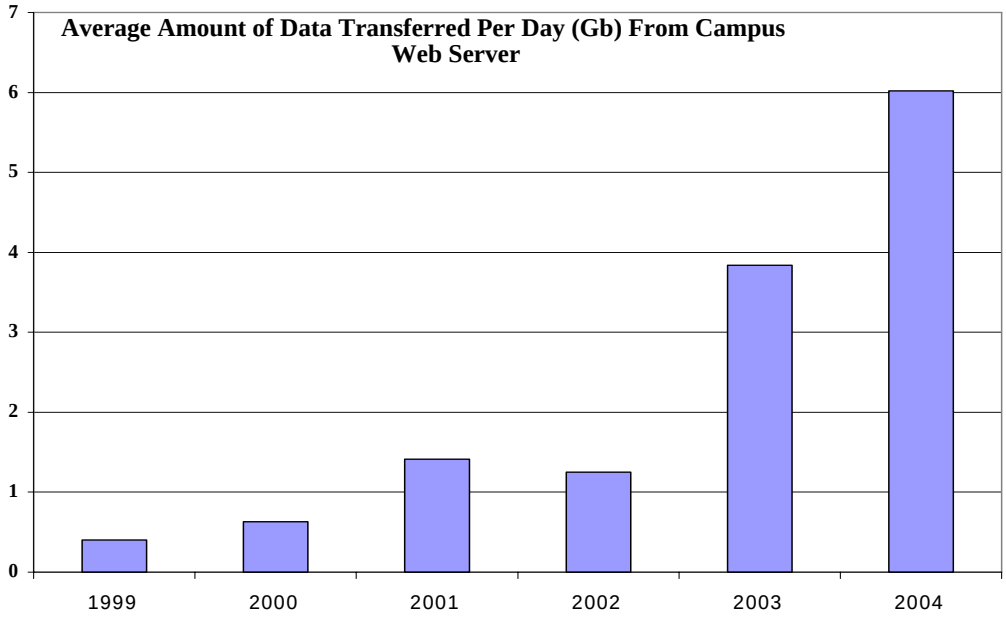
In addition to server and disk space upgrades, ITS will provide easy to use tools to support collaboration. These tools will enable file owners to easily specify who can access their files and the type of access granted (ability to read, copy, modify or delete).

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

	FTE 2003–2004		"Steady State" FTE	Typical Annual Capital Equipment Allocation
Service Area	**ITS Operating Budget**	**Project or Fee-for-service**	**ITS Operating Budget**	
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, colleges[20] and some academic support units[21] 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

	FTE 2003–2004		"Steady State" FTE	Typical Annual Capital Equipment Allocation
Service Area	**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.

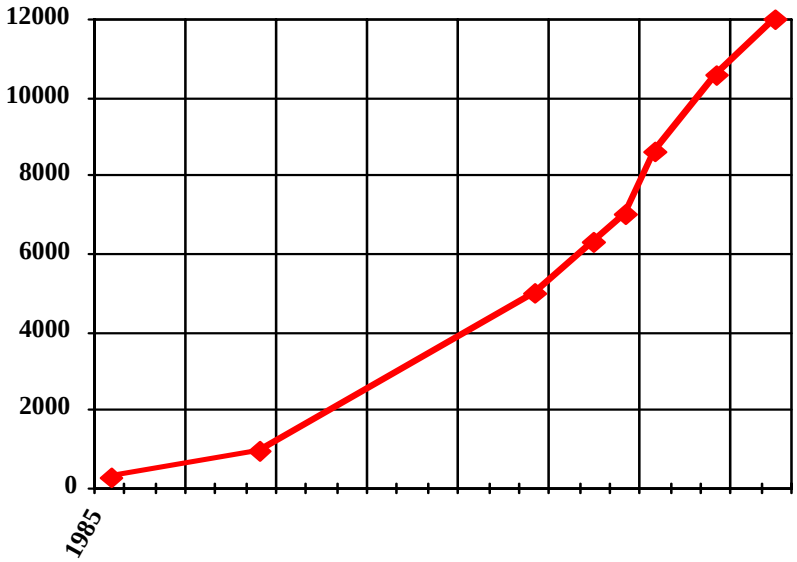
The budget allocated to service maintenance is inadequate to provide functional enhancements,[22] to support new services (200 new "services"[23] are expected in the next three years), to expand the service to support the growing University community[24] (expected to be 90,000 or more within three years), 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

	FTE 2003–2004		"Steady State" FTE	Typical Annual Capital Equipment Allocation
Service Area	**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.

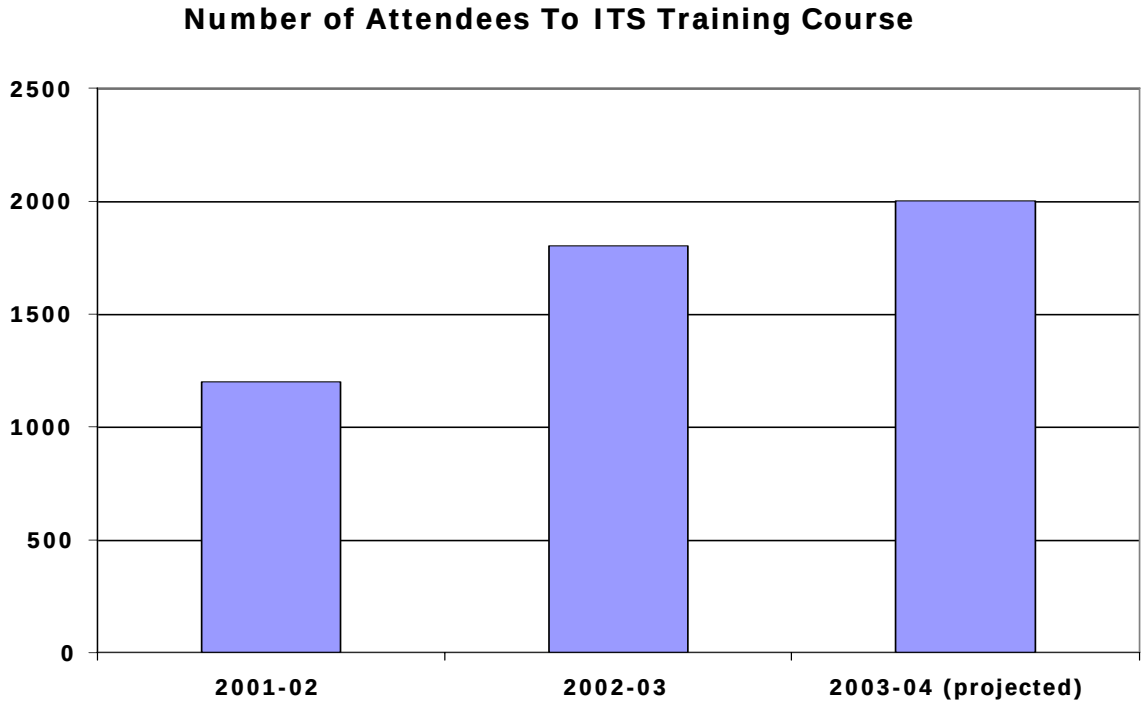
Additionally, ITS will work with the campus community to determine the appropriate set of help services that can be provided in a responsive and timely manner, within the available resources, during core hours.

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.



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

	FTE 2003–2004		**"Steady State" FTE**	**Typical Annual Capital Equipment Allocation**
Service Area	**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 database[27]
  - 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

	FTE 2003–2004		"Steady State" FTE	Typical Annual Capital Equipment Allocation
Service Area	**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

	FTE 2003–2004		"Steady State" FTE	Typical Annual Capital Equipment Allocation
Service Area	**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

	FTE 2003–2004		"Steady State" FTE	Typical Annual Capital Equipment Allocation
Service Area	**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 System[32] (About-US)
    - Electronic payments infrastructure[33]
    - 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

	FTE 2003–2004		**"Steady State" FTE**	**Typical Annual Capital Equipment Allocation**
Service Area	**ITS Operating Budget**	**Project or Fee-for-service**	**ITS Operating Budget**	
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 systems[35] 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 Finance[36])

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.

	FTE 2003–2004		"Steady State" FTE for Planning Cycle
Service Area	**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).

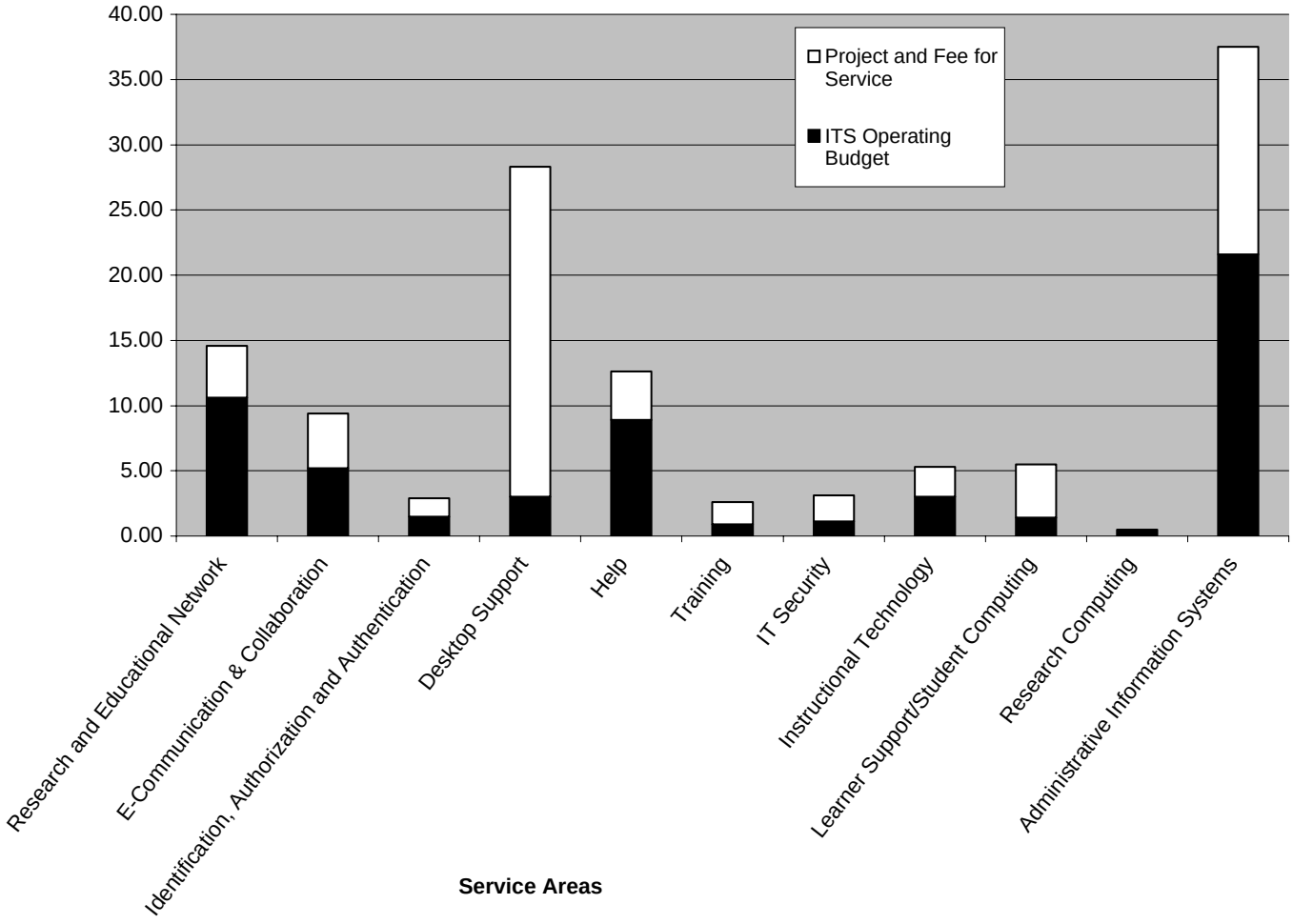


Figure 3.3 FTE Assigned to Service Areas (Graph)

The graph above (and table below) shows that ITS relies heavily upon project funding or fee-for-service in <u>each</u> 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 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