

Appendix

Major ICT Projects Inventory

Introductory Notes:

- The set of tables in this Appendix represents an inventory of potential projects related to campus-wide ICT services over the next five years—2007-2008 followed by the four years of the next planning cycle. The projects listed reflect the expressed needs of instructors, students, researchers, colleges and administrative units. Some also reflect ICT services provided/planned at other Universities.
- The list of projects is not given in priority order. Priorities will be set after further consultation with the campus community. This consultation may also change the scope of some projects and will undoubtedly result in additions to the list. Some early examples of additional projects are given in later tables.
- Even if no new funding is allocated for these projects, the University will need to address the pressing needs within many of the projects proposed over the next five years. This will require re-allocation of central ICT resources and/or re-allocation of college, department or administrative unit resources. Central planning and coordination can contribute to a collaborative, integrated approach rather than the piecemeal, *ad hoc* development that might happen otherwise.

Summary of Consultation with Council Committees:

- The list of projects has been discussed with the Academic Support, Budget and Planning Committees of Council, with CABIS and the Enterprise Systems Planning Committee, and with ACIP and PCIP.
- There was general agreement in the committees that essentially all of the proposed projects will be required over the next five years.
- Some additional projects for inclusion on the list were identified; one of those is the provision of a backup service for research data stored on researcher workstations and servers. Also, the proposed list does not include any projects required to support campus-wide student computing facilities and services.
- Some committee members questioned whether the cost estimates of some projects were too low to adequately meet campus needs.
- The Chairs of the respective Council committees expressed concern about how the University would fund the proposed projects given that the identified gap is close to \$20 million over the next five years.
- Committee members wanted to know the priority order of the proposed projects. A number stated that the University will need to make progress on all of them over the next five years. Some suggested that instead of setting priorities for the entire list of projects, initiatives should be identified that will be undertaken (outcomes that will be realized) at various funding levels; this would help the University determine an appropriate commitment.
- Committee members also identified various potential funding sources:
 - a special capital request to the province for ICT;

- including ICT generally and/or specific ICT projects in the “Thinking the World of our Future“ fundraising campaign;
- indirect costs of research; and
- increasing the level of University capital funding allocated towards campus-wide ICT services.

Major Projects Related to Campus-Wide ICT Services (Over Next Five Years)

Projects to Improve Campus-Wide ICT Services. These Services Support Teaching, Learning, Research and Administrative Service Delivery.	1. Upgrade existing computer room space and develop new space to meet campus needs.
	2. Introduce cyclical (3 year) renewal of servers (including disk and tape backup devices) so that they continue to have the functionality, capacity and availability required by the University community.
	3. Introduce provision and cyclical renewal of desktop/laptop computers for faculty members.
	4. Enhance campus identity management/authorization/authentication system.
	5. Enhance ICT security on campus to protect University business and research data, and to provide a safe and productive ICT working environment for instructors, students, researchers and staff.
	6. Deploy additional servers and software to meet the University's Business Continuity and Resiliency Plans for selected campus-wide ICT Services.
Projects to Improve Support for Teaching and Learning	7. Expand campus-wide wireless network services.
	8. Install/upgrade classroom technology along with classroom renovations to meet changing needs of instructors and students.
	9. Implement new technologies to support new teaching and learning methods.
	10. Develop a media lab to support the development of a media/ICT-literate community.
Projects to Improve Support for Research	11. Digital resources repository for teaching and learning
	12. Complete the work for the WestGrid CFI project (part of the pan-Canadian high performance computing initiative).
	Upgrade existing computer room space or develop new space to meet needs of researchers (included in initiative # 1 above).
Projects to Streamline Administrative Processes and Improve Services	13. Provide additional ICT infrastructure to support research.
	14. Purchase and install campus document management/workflow software along with required hardware, and implement several campus processes.
Projects to Support University Planning	15. Implement a web page content management system for campus-wide use.
	16. Implement an enterprise data warehouse to improve our institutional analytics/reporting capability.
Projects to Support Business Processes	17. Enhance the alumni and fund-raising system (U-Friend).
	18. Modify institutional systems to be in compliance with Bill 180.
	19. Continue with enhancements to major institutional systems (About-US, SiRIUS, UniFi, Library, ...).

Brief Project Descriptions and Cost Estimates

	Initiative	Est. 5 Year Capital Cost
<p>Projects to Improve Campus-Wide ICT Services. These Services Support Teaching, Learning, Research and Administrative Service Delivery.</p>	<p>1. Upgrade existing computer room space and develop new space to meet campus needs.</p> <p>Additional space, emergency power and air conditioning is required to house the network and computer equipment required to provide campus-wide ICT services and to support research that increasingly requires the use of large computers.</p> <p>In the last year, the University has constructed additional computer rooms at the USB and Spinks. A large portion of the USB space will be used for the WestGrid disk storage facility.</p> <p>Additional emergency power (and/or long-run uninterruptible power supplies) and air-conditioning will be required in both rooms as more servers are deployed in those spaces. Furthermore, additional computer room space may be needed in the Health Sciences complex and/or Engineering.</p> <p>Based on previous computer room construction, a conservative estimate of the cost to add even a small amount of emergency power and air conditioning and to develop computer room space in the Health Sciences complex is estimated at \$2 million. Extra funding would be required to develop computer room space in Engineering, should such space be required.</p>	\$2,000,000
	<p>2. Introduce cyclical (three year) renewal of servers (including disk and tape backup devices) so that they continue to have the functionality, capacity and availability required by the University community.</p> <p>150 (physical) servers are used to provide e-mail, virus detection, spam filtering, network domain name services, web page hosting, file services, library system hosting, PAWS, administrative database hosting, instructional and research application hosting, software distribution, ICT security, etc. Required funding is \$400,000 per year. Due to pressing needs in other areas, the capital allocation to server renewal last year was only \$200,000 (compared to about \$400,000 in other years), putting services at greater risk.</p>	\$2,000,000

	<p>3. Introduce provision and cyclical renewal of desktop/laptop computers for faculty members.</p> <p>Includes hardware, software and improved security (e.g. firewalls, automated updates). Recent desktop/laptop purchases range from about \$1,200 to \$3,000. Tablet computers will be at the high end of this range. Additional cost will be incurred for some software and peripherals (e.g. printer, backup devices). The proposed budget assumes a three-year renewal cycle with a cost of about \$1,000 per year (figure includes a small amount of support) and 1,000 computers. This amounts to \$1 million per year (a total of \$5 million over five years). A modest pilot program was launched in the fall of 2007 and was well-received.</p>	\$5,000,000
	<p>4. Enhance campus identity management/authorization/authentication system.</p> <p>Our current system manages authorizations for 67,000 users and 870 services. It synchronizes passwords for many services and support for CAS single sign-on is in progress.</p> <p>Finer grained authorization, Shibboleth support and federated (inter-university) user identity management/authorization is required.</p>	\$750,000

	<p>5. Enhance ICT security on campus to protect University business and research data, and to provide a safe and productive ICT working environment for instructors, students, researchers and staff.</p> <p>The number of Internet-based “attacks” continues to increase. For example, we block some six million attempts <u>daily</u> to probe the campus network and the computers attached to it. During peak attack periods, we have blocked as many as 350,000 e-mail messages that contain a computer virus per day. Similarly, at peak periods we have blocked the delivery of some 450,000 e-mail messages per day from known spam sites (this does not include the e-mail messages quarantined as suspected to be spam).</p> <p>The impact of a successful Internet-based attack is significant and can include the following:</p> <ul style="list-style-type: none"> • disruption of University services (those services could include student registration, payment of tuition online using credit cards, use of student computing facilities, online course delivery, e-mail, etc.); • use of University computers for illegal purposes; • modification, deletion and/or distribution of confidential University data; • identity theft; • loss of trust in the University computer/network system; and • loss of public confidence in the University of Saskatchewan. <p>The University must ensure that its business and research data is secure and that instructors, students, researchers and staff have a safe and productive ICT environment in which to work. While progress has been made in this area, it is still insufficient. For example, Moneris would not allow the University to extend the use of online credit card payments on campus until aspects of our campus ICT infrastructure were made more secure and we provided 24x7 monitoring of that infrastructure. The increasing trend of students and visiting scholars to bring and connect their computers to the campus network increases our security risk that campus computers can become compromised.</p>	<p>\$1,000,000</p>
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	<p>6. Deploy additional servers and software to meet the University’s Business Continuity and Resiliency Plans for selected campus-wide ICT services.</p> <p>The University relies upon ICT for its teaching, learning, research and business activities. It is hard to find an activity at the University today that does not depend upon ICT.</p> <p>As doing academic or administrative work becomes synonymous with using ICT, students, instructors, researchers and staff expect a ICT service availability that approaches 24 x 7. In reality, certain system failures may cause ICT services to be unavailable for days, weeks or even several months. These services include student registration, grade entry, payroll, UniFi, e-mail, Blackboard (formerly WebCT), PAWS and many others.</p> <p>ITS has been asked to work with the University community to develop a Business Continuity Plan for these services. While the plan is not yet developed, we expect that additional investments in servers and software will be required to meet the University service needs. Additional staffing will also be required.</p>	<p>\$2,000,000</p>
<p>Projects to Improve Support for Teaching and Learning</p>	<p>7. Expand campus-wide wireless network service.</p> <p>We presently offer wireless network access from about 250 places on campus, including some public spaces, some meeting rooms, some research spaces and some classrooms. This number will expand this year to approach 400. It is our intention to provide wireless network access to all formal (e.g. classrooms, libraries) and informal learning spaces as well as to offices.</p> <p>It is estimated that another 600 locations are required to provide campus-wide coverage. This would include coverage in just over 350 classrooms in the shared classroom pool. The installation cost is estimated at \$1.2 million. The annual cost of cyclical renewal of 1000 access points (currently planned to be replaced every three years) would be about \$250,000.</p> <p>It is interesting to note that under the Academic Health Sciences project, ITS and the College of Medicine are investigating the provision of a complete in-building wireless system that will support computers, pagers, cell phones, equipment location tags, and PDAs. This system would interoperate with one planned for Royal University Hospital. ITS is also evaluating this system for use in other campus locations if it proves to be cost-effective.</p>	<p>\$1,450,000</p>

	<p>8. Install/upgrade classroom technology along with necessary renovations to meet changing needs of instructors and students.</p> <p>Health Sciences B450 has been referred to as a model teaching space. While there will be some "technology" cost to upgrade the University's teaching/learning spaces, the majority of the cost is construction related. Assuming an average cost of \$35,000 per classroom, the requested funding would enable the renovation of about 100 classrooms over the next five years.</p> <p>We have 350+ teaching spaces in the shared classroom pool and we have equipped 152 of them. At this pace, it will take more than 15 years (and cost \$12 million) to renew all 350 classrooms in the shared classroom pool. Actual costs per classroom will depend on teaching and learning requirements.</p>	\$3,500,000
	<p>9. Implement new technologies to support new teaching and learning methods.</p> <p>Faculty and students expect to use cutting edge ICT in teaching and learning. Technologies requested include course management systems, lecture recording and streaming video playback systems, web conferencing, online exams, podcasting, blogs, wikis, PDAs, e-portfolios, etc. Network connectivity to experiential learning sites will often also be required. The cost to provide this technology will depend upon the pace of University adoption.</p> <p>A campus-wide implementation of some technologies can cost \$200,000–\$500,000, or more. This estimate represents an investment of \$400,000 annually for five years.</p> <p>The specific service improvements that will be undertaken yearly will be determined in consultation with the E-learning Priorities Committee, the Academic Support Committee and others.</p>	\$2,000,000
	<p>10. Develop a media lab to support the development of a media/ICT-literate community.</p> <p>To best capitalize on new technologies for teaching, learning and research both faculty and students need a "hands on" opportunity to create media in support of their activities. A well-equipped centrally located media lab developed in collaboration with the ULC will provide the opportunity to acquire this knowledge through creating a wide range of teaching materials, and class presentations as well as familiarizing themselves with new technologies.</p>	\$200,000
	<p>11. Digital resources repository for teaching and learning.</p> <p>The University produces excellent digital teaching and learning resources from single images through to sophisticated tutorials. A learning object repository will enable sharing and repurposing of these assets across campus.</p>	\$100,000

	An open-source product is being evaluated for this purpose. If the evaluation is positive, funding for a commercial product will not be required.	
Projects to Improve Support for Research	12. Complete the work for the WestGrid CFI project (part of the pan-Canadian high performance computing initiative). This assumes that the requested provincial contribution of \$1.6 million will be secured ⁸ .	\$75,000
	Upgrade existing computer room space and develop new space to meet needs of researchers.	Included in Project #1
	13. Provide additional ICT infrastructure to support research . Infrastructure may include the ICT required to establish a Statistics Canada Research Data Centre, high performance servers, visualization facilities, software licenses, and/or enhancements to the Digital Media Research Centre. The level of investment (project scope) will depend upon the infrastructure that the University wishes to provide to support researchers (as opposed to the facilities that researchers must acquire to perform their specific research). With few details at this time an annual investment of \$200,000 is requested ⁹ . The specific service improvements that will be undertaken yearly will be determined in consultation with the Academic Support Committee, the Research, Scholarly and Artistic Work Committee and others.	\$1,000,000
Projects to Streamline Administrative Processes and Improve Services	14. Purchase and install campus document management/workflow software along with required hardware, and implement several campus processes. Cost will depend upon scale of implementation.	\$500,000
	15. Implement a web page content management system for campus-wide use. Cost will depend on scale of implementation.	\$250,000
Projects to Support University	16. Implement an enterprise data warehouse to improve our institutional analytics/reporting capability. Includes software licenses, hardware, design and implementation.	\$3,000,000

⁸ In addition to provincial funding, the project budget includes industry and University in-kind contribution of over \$1 million.

⁹ As a reference point, the province of Alberta has committed to investing \$15 million per year over the next five years to improve the province's cyberinfrastructure in support of research and innovation.

Planning	Actual cost will depend upon the final project scope. Does not include the cost to address system-specific (About-US, UniFi, SiRIUS, etc.) operational reporting needs.	
Projects to Support Business Processes	<p>17. Enhance the alumni and fund-raising system (U-Friend). University Advancement, in consultation with ITS, has decided not to replace their alumni tracking and fund-raising system during this planning cycle. Funds that might have been allocated for a system replacement will instead be directed towards in-house developed enhancements and to support University fund-raising activities.</p> <p>Based on the implementation costs of other systems, the implementation cost for this system is estimated at \$4-5 million (including operational reporting capability). This may be required during the next four year planning cycle.</p>	Not Required Within this Planning Cycle
	<p>18. Modify institutional systems to be in compliance with Bill 180. Bill 180 may become the Canadian equivalent of the Sarbanes-Oxley Act, an act to improve organizational accountability. The full business impact of this bill cannot be properly assessed until the bill is finalized, and so the cost to modify our institutional systems to be compliant with the bill cannot be estimated at this time. The actual cost could turn out to be small or it could run into the millions of dollars.</p>	\$500,000
	<p>19. Continue with enhancements to major institutional systems (About-US, Library, SiRIUS, UniFi, ...). The operating budgets for those systems were designed to be sufficient to handle major system upgrades as well as the development of some new functionality. Experience has shown that these operating budgets may not be sufficient to purchase and implement new modules that are required to meet changing University needs. While there have been isolated discussions about software that could be helpful¹⁰, the specific modules that may be required over the next five years are not known at this time. Therefore, an accurate cost estimate is not available at this time.</p>	\$ TBD
Cost Summary	Total project funding required over next five years (Estimated)	\$25,325,000
	Less capital funding available (presently \$1.15 million/year)	\$5,750,000

¹⁰ Both SiRIUS and UniFi have presented PCIP with requests for increases to ongoing operating budgets, the Library is undertaking a major upgrade to its system and conversations continue with other groups. The About-US group in HRD, for example, feels that a faculty/staff recruitment management module would be beneficial to the University.

Incremental funding required over next five years	\$19,575,000
Incremental funding required annually	\$3,915,000

Unit-Specific Projects

<p>Acquire and implement a system to support instructional and administrative needs in the College of Dentistry's Dental Clinic.</p> <p>The College feels that their current system no longer meets its teaching and administrative needs. It also uses technology that is no longer supported by the manufacturer. Based on a needs assessment and product evaluation done almost three years ago, a replacement cost of \$700,000 is estimated.</p>	\$700,000
<p>Select and implement an electronic medical records (EMR) system for the WestWinds Primary Health Clinic.</p> <p>The College of Medicine's Department of Family Medicine is the largest beneficiary of this system. An EMR system is a tool used in recruiting medical residents. Student Health Services will use it too. Total project cost is estimated at \$500,000 but some funding is expected from the Province and the Saskatoon Health District. The College of Medicine and the Department of Family Medicine have allocated \$280,000 towards this project. A needs analysis and product survey is required to determine the project cost more accurately.</p>	\$500,000
<p>Implement business support system(s) for ITS.</p> <p>ITS requires systems to help manage the delivery of their services. Required functions include scheduling, inventory, work order, billing, problem tracking and project portfolio management. Other ICT support units on campus (such as EMAP, FMD, FSD, Consumer Services and Colleges) could also make use of some of this functionality, providing an important level of standardization. Estimated cost over the next five years is \$500,000.</p>	\$500,000

Other Potential Projects (In The Very Early Planning Stages)

Development of a backup service for research data located on researcher workstations and servers.	\$ TBD
Provision and cyclical renewal of desktop/laptop computers (hardware, software, servers) used in campus-wide student computing facilities.	\$ TBD
<p>Provision and cyclical renewal of desktop/laptop computers for staff (other than faculty, which is covered under project #3 above).</p> <p>It's reasonable to assume a cost of about \$800 per computer per year for hardware, software and peripherals for these machines. The overall funding requirement can be reduced if colleges and departments provide support from their operating budgets.</p>	\$ TBD
<p>Provision of adequate office space and other work space for ITS.</p> <p>ITS requires space that is suitable and conducive to providing services to the campus community in a cost-effective manner. ITS' offices are now located in many buildings across campus. This is appropriate for services that are delivered to a specific group of people (e.g. end-user support) located in a specific building.</p> <p>For other services, however, a consolidation of ITS office space in one, two or three locations will improve productivity and bring staff together into a more efficient and cohesive unit.</p> <p>Additionally, the establishment of "ITS Central" would provide a single location (one stop) for all "front-line" services including help, desktop support, consulting, desktop sales, workstation repair, and, if possible, training. ITS Central must be located in a location that is convenient to instructors, students, staff and researchers. The University Learning Centre or space close to the ULC (for example, near "Student Central) would be ideal.</p> <p>Costs are unknown but are expected to be high given current construction prices.</p>	\$ TBD