



Information Technology Services Operational Plan Update

As of December 3rd, 2008
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1 Operational Plan Summary

Current Year's Activities

This has been another very busy and successful year for ITS. Beyond the need to maintain the hundreds of servers and services and provide support for the campus on a day-to-day basis, the following list highlights some of the accomplishments this year.

- Successfully replaced the Voicemail system on campus while making it accessible to both the old and new phone systems.
- Implemented the CISCO Voice Over IP telephony solution, linking it with the old system. Deployed the new VoIP phones to all occupants in Support Services Building.
- Moved ITS staff to the new Support Services Building. During this time, ITS was also responsible for all IT and phone infrastructure in this building and helping all other departments move in and get on-line quickly.
- Moved a Machine Room! Well over 300 servers were moved from the Natural Science Machine Room to the new Support Services Building during the months of September and October without disrupting services to campus! Many months of hard work preceded the move including server upgrades for data and service redundancy, testing, documenting and planning. The hard work and preparation paid off!
- Made significant progress on the ITS portion of the Western ID project, converting many applications and processes to be ready to handle a single ID with multiple roles. The SUN Identity Manager was implemented and work is underway to improve account maintenance processes including provisioning and password management.
- Every four years the computers in the General Use student labs need upgrading and this summer ITS replaced over 350 workstations. This also required the testing and development of a new installation of secure software for the desktops (operating system, applications and management tools).
- Managed the security of the Western IT environment including a dramatic increase in the number of security incidents such as the new threat of Spear Phishing, which was targeted at University members worldwide. New processes were put in place to manage these types of incident and reduce the exposure and an awareness campaign helped inform campus members.
- Managed a large number of server upgrades in support of the Machine Room Move and Disaster Recovery Plan and upgraded WebCT, Email, CE, Calendar and LDAP to manage increased load and/or vendor requirements. New environments were also implemented in support of the ITS Virtual Server Service and the SQL Database service.
- Given the significant growth in the amount of data ITS is managing, ITS investigated and implemented new technologies for both “data management” and “backup and recovery”, improving security, manageability and compression rate.
- Investigated and implemented a Wiki solution for campus. Wikis are now available as a service within every WebCT course and also as a chargeable service for campus members to use as a collaboration tool. The new service has been well received.
- ITS implemented Eduroam, as part of the national Access Management project.

Major Initiatives On-going and Planned

- A high priority will be the continued investigation and development of improved Security for the campus infrastructure, services and data. Registered Services, Encryption, a PCI Audit and process improvements will all require dedicated effort and resources.
- Further roll-out of the VoIP project across campus including implementing new modules to help automate processes and possibly enhance the Emergency Communications capabilities at Western.
- Further work with the Western Identity project, assisting WISG, HR, and Registrar's in this important initiative.
- ITS will take advantage of the Sun Identity Manager that was implemented as part of the Western Identity infrastructure to help streamline support issues around account management and password management. ITS will also be investigating National Access Management in cooperation with the CUCCIO group to enable authentication and authorization between Canadian Universities. This enabling technology allows for sharing of services such as access to Library resources or specialized Research applications on a national level.
- The demand on Email resources continues to grow. The pressure from increased SPAM requires constant vigilance to adjust our strategies and tools for dealing with this. ITS implemented a new service called SPAM TRAP this year giving users more control over the SPAM they receive and this will require further promotion and support this year. Other email related issues that also require time and attention are Spear Phishing and a growing variety of devices and applications that must integrate with email and calendar.
- Implement a content management system that will become the foundation for all web development across campus providing a more efficient way of managing the creation and maintenance of web content. Substantial work will be required to implement, maintain and support a CMS this year. The initial drive for this project is the needs of Communications and Public Affairs, both for their 'Western News' and main home page and their support of Western web pages, in particular the Graduate Studies effort.
- Investigate new options for data management and disk management, allowing for possible cost savings. There is potential to use less expensive disk and backup infrastructure for non-critical or static data while maintaining the traditional high levels of protection and redundancy around our more critical data.
- Develop the Disaster Recovery features of the new Virtual Server Environment and implement more of the available features to manage the environment more effectively.
- Upgrade the ITS Windows server infrastructure to Windows 2008 and take advantage of some of the new tools for managing Windows workstations.
- Manage the growing support issues around the huge influx of new Operating Systems, devices and applications on campus.
- Along with all of these new and important initiatives of course is the understanding that ITS must continue to 'keep everything running smoothly', and as the infrastructure continues to grow and become more complex, and the customers rely on these services to get their own jobs done, this is not an insignificant task.

2 Indicators and Benchmarks

Many of the following indicators are the year over year comparisons of critical core services that ITS provides to campus. These statistics offer strong evidence of the growing use of centrally provided technology at Western.

2.1 Increasing demand on some core ITS services

<i>Comparison Element</i>	<i>2000</i>	<i>...</i>	<i>2005</i>	<i>2006</i>	<i>2007</i>	<i>2008</i>
Internet Bandwidth-UWO (megs/sec)	11		45	90	100	110
Internet Bandwidth – Residence (megs/sec)	10		35	52	85	100
# of WebCT courses	229		1,289	1,643	2,082	2,992
# of Concurrent WebCT sessions (Oct)			1,187	1,863	3,211	2,351 ¹
# of Instructors enrolled in WebCT			881	959	1,409	1,915
# of Student enrollments in WebCT			80,090	107,768	150,330	206,572
# of Unique Students enrolled in WebCT sections				33,509	38,357	39,320
# of G.U. lab workstations	204		343	343	343	343
E-mail messages per day	130,000		300,000	371,000	396,000	550,355 ²
Disk space managed (in terabytes)	2.7		64	93	158	336 ³
Disk Space backed up Monthly (in terabytes)	4		25	27	33	43 ⁴
ITS managed servers	97		235	319	395	497 ⁵
Hours of dedicated support (as Sept)	10,207		14,014	14,742	16,198	17,108
Wireless:						
- # of access points	n/a		381	520	649	744
- avg # logins weekly	n/a		25,500	43,500	63,848	100,243
- total # of unique logins since Sept 1	n/a		10,760	12,816	16,255	26,538

Notes:

1. Concurrent use seems down, but is a result of shortening the automatic timeout from 3 hours to 1 hour.
2. One of the things that is not evident from the current E-mail statistics is the amount of SPAM email that is being prevented from getting this far and showing up as delivered E-mail. The figure does include emails sent by Western to the world however, which may have been skewed by the affects of Phishing attacks on UWO accounts.
3. Approximately 100TB of this increase from 2008 is attributed to X4500 (Tier 2/Biotron) and Data De-duplication storage additions.
4. This figure represents compressed data. Due to technology changes in the backup infrastructure environment (Data De-duplication), statistics going forward will be reported on an uncompressed basis. Ie. In next year's submission, the 43 Tb will be replaced with 85 Tb for the fall 2008 data.
5. Includes both physical servers (77%) and virtual servers (23%). 320 (64%) are ITS owned.

Email Statistics

The growing statistics in this table only represents a small portion of the real growth in email that ITS is managing. SPAM, which is not included in this number but dropped at the gateway, continues to consume both staff time and real resources. The table primarily shows growth in 'non-SPAM' email of 37% and is evidence of the growing reliance of Western on email.

Applications Infrastructure (Servers and Disk Space)

The number of servers, services and amount of disk that ITS manages remains one of the most impressive indicators of the growth to the 'central core services' that ITS is supporting. The number of servers being supported increased by another 25% this year up to 497. Environments like WebCT and Email are designed in such a way that as use increases, a new server may be added to the cluster to share the load. Both services showed significant increased usage this past year requiring the addition of resources. Another growth was in the number of servers and virtual servers ITS is now supporting for other units on campus (32 new servers).

The amount of disk that ITS is managing grew by 112% this year alone. There are many components to this. In all areas of campus the work that is being done is relying more and more on electronic records. Not only is the use of email growing, but units are using more file server space, and web space. The advantages of keeping data on line and accessible to all of the right people has driven this growth. As areas look for more efficiencies using IT this trend will continue. The increased use of WebCT and email also required additional disk space to support this on-line resource. So there is a natural growth to the amount of disk used at Western. (This is NOT unique to Western, it is estimated the internet data grew by 30% last year!) Two more reasons for the large increase in ITS managed disk are the addition of support for the Biotron and the implementation of a new Backup and Restore strategy.

This infrastructure growth in size and complexity is a telling measure of the increasing demand on highly skilled staff. There are more servers, applications and disk per staff member again this year. ITS staff must manage this continual growth in the current infrastructure, maintaining a high quality production environment for campus, while at the same time researching, testing and implementing the next evolution of the systems. It is a very challenging role.

Wireless Network Statistics

As indicated, wireless usage took an amazing leap, showing a 62% increase in the number of unique users over this time last year. Concurrent users hit an all time high of 4,810 on Nov 11th. A map of wireless coverage on campus can be found at <http://wireless.uwo.ca>.

WebCT and Instructional Support Statistics

All measures show continued growth in the usage of WebCT and discussions with Deans indicates this will increase again next year.

The next two tables are an indication of the use of both WebCT OWL and the Instructional Technology Resource Center.

2.2 Per Faculty use of Course Management Software (WebCT-OWL)

<i>Faculty</i>	<i>2002 Coures</i>	<i>...</i>	<i>2007 OWL Courses</i>	<i>2008 OWL Courses *</i>	<i>All possible courses</i>	<i>% of courses in OWL **</i>
Arts	201		396	445	1388	32%
Education	6		11	16	1257	1%
Engineering	31		107	151	524	29%
Health Sciences	66		258	338	941	36%
Information & Media Studies	25		48	67	369	18%
Law	37		89	59	258	23%
Medicine & Dentistry	46		132	158	507	31%
Music	9		28	58	512	11%
Richard Ivey School of Business	2		22	16	509	3%
Science	74		187	335	1203	28%
Social Science	212		502	536	1606	33%
Library	28		6	3	n/a	n/a
WCCS			68	83	n/a	n/a
Brescia				135	287	47%
Huron				179	456	39%
Kings				258	852	30%
Other	96		228	55	n/a	n/a
Total	833		2,082	2,992	10,669	28%

*more accurate counts are now available than in the older version

**percentage of all lecture courses (labs excluded for a more accurate reflection of possible on-line courses)

2.3 Per Faculty distribution of ITRC Projects completed

<i>Faculty</i>	<i>1999</i>	<i>...</i>	<i>2006</i>	<i>2007</i>	<i>→ Sept 2008</i>	<i>Total</i>	<i>On-going</i>
Arts	4		2	1	1	16	
Education						3	
Engineering	1					7	
Health Sciences	1		2	2	7	35	
FIMS	1					5	
Law	1			2		8	
Med & Dent	3		3	5	10	45	1
Music	1				1	5	
Ivey			2		1	4	
Science			3	3	3	24	
Social Science	2		3	2	3	22	
TSC			3	3	3	9	
WCCS			2	1	1	4	
Library	1		1	4		9	
Other *			1	2	2	10	1
Total	15		22	25	32	206	

* examples are “Safe Campus” project, and staff training projects

3 Operational Plan Details

3.1 Campus Backbone / Network Access and Security

One of the primary responsibilities of ITS is to provide a robust and secure infrastructure for computing and telecommunications on campus. The campus backbone network is key to this service and is constantly being upgraded and renewed to improve service as well as add the security features needed to protect productivity and the critical data that Western generates and uses.

3.1.1.1 The Campus Backbone

Each year portions of the backbone are upgraded so that the whole remains current and able to provide the up-to-date, reliable and secure infrastructure needed for the many services it supports. The most recent upgrades included fibre builds and equipment to complete 10gig services on the main backbone and additional ports on the main Catalyst switches.

3.1.1.2 Wireless Access

As indicated in the statistics, wireless usage on campus took an amazing leap this year. The number of access points on campus grew to 744, which was a 14% increase, however the use of the wireless network grew an astonishing 62%! There are now over 26,500 unique users of our wireless network. This service is obviously a key element of our student's computing environment and one that contributes to the "Best Student Experience".

Next year will focus on maintaining the stability and usability of this very heavily used network. For an up to date map of wireless coverage on campus, please see <http://wireless.uwo.ca>.

3.1.1.3 Security

There was a marked increase in the number of security incidents ITS was managing this past year and a high priority for ITS will be the continued investigation and development of improved Security for the campus infrastructure, services and data.

- A new version of RAMP has been developed that supports 'registered services' and this will be rolled out across campus this year. This will provide increased security for the individual networks and computers around campus against some of the more common Internet based attacks.
- Investigation and piloting of a desktop firewall product to further protect the computers from hacking, both from network sources and even from sources that are not network based such as inserting USB keys or DVD's with malicious code.
- Investigation and piloting of encryption technologies that help protect data on desktops, laptops and mobile media if it was to fall into the wrong hands. This same investigation may provide new methods of protecting email from being viewed if it were to get to the wrong person either accidentally or through intentional interception of the email (such as capturing wirelessly transmitted data).

- Significant programming and infrastructure improvements will be made around the E-Commerce services on campus to align with PCI (Payment Card Industry) standards. Once ready, an external auditor will be contracted to test the infrastructure and report on any areas that may need improvements or that do not meet the PCI standard.
- ITS will be replacing the current security scanning software with a new product. Once implemented some of the new features will be explored for improved detection and reporting of security issues on the campus network.
- Review and improve incident management. When an incident happens in the current complex environment it takes many different skills and people to get engaged to track and resolve the issue. The processes and data stores that are required to do the initial investigation will be analyzed and wherever possible new tools and scripts will be put in place to streamline and/or automate portions of this investigative work.
- After a security investigation has identified the particular threat or compromise there are very few resources to manage the technical details to eliminate the threat and bring the service/system back on line in a clean and hopefully strengthened position. More resources will need to be directed to this aspect of security.
- Continued involvement in a Canadian wide Security Special Interest Group. This group is sponsored by CUCCIO, the Canadian University Council of CIOs, and allows for peer discussions and learning as well as dealing with security issues faced by all Canadian Universities.
- ITS will continue to provide central servers and security related services for the benefit of the campus. ITS provides servers with both Trend Anti-virus and Microsoft security patches that push updates to campus servers and workstations daily to keep their security software up to date. There is also continual upgrading to the security scanning software and the ability to monitor security issues on the network.

3.2 Core Servers and Services

ITS provides and supports hundreds of servers and software that the campus relies on. Many are invisible to the end user and others, like email, are noticed if they are gone for more than a few minutes.

Most of the core services provided by ITS require constant upgrading and resizing and replacing as the community grows or the service demand increases and as new hardware and software become available. ITS must constantly be evaluating new technology and changing our infrastructure to accommodate growth and react to changes such as new security threats, more effective or useful services, or changing problems like spyware or escalating SPAM.

3.2.1.1 Email

As a measure of the complexity of this service, what the end user sees as 'Email' is currently being supported on 25 ITS servers (up from 22 last year) which provide the virus scanning, SPAM control, web access, message delivery and storage of the growing number of emails Western receives and sends daily.

Each of these servers requires ITS Staff and a wide variety of skills just to maintain the current infrastructure without any improvements. Each server has an operating system that requires regular security patches and upgrades as well as various applications that require the similar patching and upgrading just to remain current.

The latest threat to the email system (and other systems on campus) was the Spear Phishing that started in May and dramatically increased by August, which managed to trick many Western members into giving away their passwords. Outbound email from Western suddenly jumped from a daily average of 150,000 messages to 2.5 million in one day. Not only did this overload the Western infrastructure, but resulted in Western being blacklisted as a SPAMMER. Email being such a common and heavily used application results in it also being a prime target for hackers and spammers.

Although faculty, staff and grad students saw an increase in disk space for email last year from 55megs to 250megs and undergraduate students increased from 25megs to 50megs, there is still a perception by many that this is not enough. A new SPAM control service that ITS has implemented called SPAM TRAP may help as it is adopted more broadly around campus. This software not only provides better control of SPAM, but quarantines SPAM 'before' it gets to the inbox and helps manage disk quota, especially when a member is away from campus for a period of time. ITS has 'encouraged' the use of SPAM TRAP, and received positive feedback from new users, but is wondering if it is appropriate to 'insist' that accounts be converted.

3.2.1.2 Redundancy, Backup, Disaster Recovery

There has been a significant amount of change in both managed disk space and in the backup infrastructure this year.

There was a 112% growth in the amount of disk that ITS is managing. As explained earlier, a portion of this mirrors the growth as being seen world-wide as more and more data is being maintained on-line and this is a trend that is likely to continue.

A large portion of this year's increase in ITS managed disk however can be attributed to two unique changes. The first is that ITS took on the management of a very large disk array being used by the BioTron. The second was the deployment of a new backup and restore technology that ITS implemented called Data De-duplication.

With the growing amount of disk ITS was managing, the old method of backing up data was not able to keep up. It was getting slow, inefficient and costing more money to grow and maintain. A new solution was needed. This solution, which requires its own disk has several advantages. First, it reduces the number of tapes and tape drives that ITS relies on for backup and it also makes restoring of data far more efficient. The other advantage is that not only can this new service keep up to the growth, but it is far more efficient at storing the archived data. The old method provided 2 to 1 compression of archived data. The new service provides 7 to 1 compression, taking up far less media (whether that is disk or tape) for every megabyte of data stored.

This significantly more efficient storage and the fact that the new disk cost less per meg this year than previous years has also created a far more cost effective backup solution. Besides backing

up WebCT OWL, Email, Peoplesoft and many other ITS servers, ITS also offers this backup solution to campus and is currently backing up 145 customer servers. ITS shared the cost savings with our customers by reducing the cost per meg of this service to reflect the new actual cost. In this time of fiscal constraint it is important that campus finds cost effective means of continuing to protect their data and the old price was becoming prohibitive. ITS is committed to providing cost effective strategic services and applications.

ITS will continue to be involved in a Canadian wide DRP Special Interest Group. This group is also sponsored by CUCCIO, the Canadian University Council of CIOs, and allows for peer discussions and learning and sharing of best practices by all Canadian Universities.

An important component of Disaster Recovery Planning is the creation of an 'off-site' storage of critical data. This has also been recommended by our auditors. The University of Windsor and Western have agreed to offer space in each other's machine room to accommodate this need. I believe this is a wonderful, cost effective solution to this issue. Please refer to last year's budget plan and the request for approximately \$300K

3.3 Support for Technology in Instruction

As Technology has gained a place in Instruction, ITS has provided both services and support.

3.3.1.1 General Student Computing Labs

ITS upgraded all of the Student Labs this past summer with new hardware and software. Arts and Humanities, FIMS, Health Science and Science are the primary users of 'teaching time' in the labs with Science being the largest user. The labs are heavily used by all students on a drop in basis between the scheduled teaching slots. A selection of the unique software for instruction that is available on the lab computers is also being offered to the students in residence through the 'virtual lab' service and statistics for use have grown significantly this year.

3.3.1.2 Instructional Technology Resource Center

The Instructional Technology Resource Centre (ITRC) assists faculty members learn about and introduce technology into their teaching. The ITRC offers access to unique and sophisticated equipment, software and hardware together with the technical support needed to take advantage of the technology. It also provides training in WebCT OWL throughout the year to faculty and teaching assistants. In early September 2008, the ITRC relocated to the new Support Services Building, room 4320.

Manualettes, created by the ITRC student consultants, document all the tools in WebCT OWL and supplement training. This year, video versions of most manualettes were created. The pdf and video files can be viewed online at <http://www.uwo.ca/its/itrc/resources/manualettes/>.

During the summer of 2008, a new series of training videos were created by the ITRC student consultants and staff. The whole series covers "Building a course in WebCT OWL" and together the ten videos cover most of the tools and run for approximately one hour. ITS has received

many positive comments and thanks for these new training tools. The link to the videos is <http://webct.uwo.ca/videos/instructionalVideos.html>

Apart from the creation of the training videos, many of the projects this past year have been video projects. There seems to be a trend here. A major project was filming and creating videos of the scenes, performed by actors, for the "Safe Campus Community" project.

The Instructional Support team works closely with the ITRC. The Instructional Support team are technical staff from the ITS Web and Instructional team who assist faculty in the use of WebCT OWL and also provide leadership and support to the ITRC students with assigned projects. Project proposals are accepted from Faculty and must identify a particular need within a course that technology can assist with. One of the newest requests includes the goal: "Create a brief video/animation, to enable the students to observe schooling behavior in different fish species. This is of utmost importance since we need to reduce/replace the use of live organisms for teaching purposes as directed by the Animal Use Subcommittee on campus". The ITRC can help.

The ITRC continues to work with and provide instructional technology leadership to the Teaching Support Centre in the Weldon Library. The ITRC has collaborated again this year with the TSC on a number of activities. These include filming Fall Perspectives 2007 and Spring Perspectives 2008 and making the presentations available online at <http://tsc.blogs.uwo.ca/>, the Summer Institute in May for faculty preparing a course in WebCT, and assisting with WebCT training offered by the TSC to graduate students.

3.3.1.3 WebCT OWL

This year Western experienced one of the smoothest September start-ups for WebCT ever! Part of this is thanks to the IPB project "Who Teaches What" that managed to get the majority of instructor data into Peoplesoft before the start of classes. The other significant improvement was from taking advantage of features in the new version of WebCT that ITS implemented last year. The instructors each had access to very simple to use tools that allowed them to migrate last year's course to use again this year. The tool removes all old student data (marks, chat, discussions, assignments) and also replaces old dates with new dates and filters other useful content as it creates the new course. This was well received by instructors and helped save time for ITS staff.

As indicated in the ITRC update, many new training materials have been created which are specific to the needs and environment here at Western.

ITS has also incorporated new tools within the WebCT environment again this year. Wimba Live Classroom is again available, and a new service, which provides individual class wikis was also implemented. These new tools are available within each course area and the instructor simply needs to click to turn them on and all of their students will automatically have access.

ITS is working closely with Registrars on providing further automations and links between Peoplesoft and WebCT. Currently work is underway to more closely link the marks/grades information. This will allow WebCT to be used to gather and securely display student marks and then present an option to submit the end results to Peoplesoft, helping streamline this process.

3.4 Technical Expertise and Support for campus

ITS has very technical and customer service oriented staff that support the many core services ITS provides as well as offering our expertise and assistance to campus and providing leadership in the investigation and selection of new technology. In these days when technology is changing so quickly, this leadership role is an extremely challenging one.

One metric that ITS has in regards to helping campus members is the direct support received through the ITS Help Desk. The 'Points of Interaction' for the help desk include Phone, Web-Form, Ask-ITS Escalations, Drop-In and Chat. These numbers need to be interpreted however, as there were more phone calls for support last September than this September. This is as a direct result and having fewer challenges with the September startup of WebCT! Still, the Help Desk responded to 3,378 requests for help this September.

Another interesting statistic is the use of the "Ask-ITS" application. Along with the ITS web site, this is providing assistance that does not require ITS staff time. Last year "Ask-ITS" was asked 63,551 questions. Of these, only 2,548 were escalated to the Help Desk staff for further follow-up. This is an amazing 96% success rate for this self-service application leaving the Help Desk staff to deal with the more unusual problems. This September alone has an impressive 9,770 questions answered with only 416 being escalated.

ITS also offers the assistance of technical staff at a nominal fee to help departments with their many unique computing needs from consulting and training to desktop support or server installation and maintenance or developing interactive web/database and ecommerce applications. As seen in the statistics for Dedicated Support, this is a popular service. For more information about all of the services ITS can provide, please see <http://www.uwo.ca/its/services.pdf>

3.5 Newer Initiatives and Investigations

By the very nature of IT, there is always something new that will replace what is currently being used and supported and it is up to ITS to stay abreast of these developments and make strategic decisions about which technologies to invest time and energy in. Several investigations this year revolve around new security initiatives including encryption, personal firewalls, two-part authentication and access management. ITS is also investigating new tools for the management of Virtual Servers and Disaster Recovery.

Many other new initiatives may arise during the year, driven by the needs as expressed around campus or pressures of change in the IT environment as a whole.