

Botany IT Report

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1. Overview

This report explains what we have done to improve IT support in the Department of Botany since July 2011. The previous status of Botany IT is described in the "Background" section. The "Actions" section includes details in eight areas: define the mission, organizational restructure, set up IT service management system, setup project management system, improve public education and communication, create IT budget, encourage staff professional development, cooperate with external partners. A brief outlook of future Botany IT is summarized in the "Future" section.

2. Background

UBC IT sent the Infrastructure Special Projects Team to the Department of Botany for a comprehensive IT review in March 2011. The team spent three months looking into every aspect of IT support in Botany. The final outcome of this review is the Service Delivery Proposal for Department of Botany that was delivered on June 13th, 2011. In this proposal, UBC IT clearly stated the problems that Botany IT was facing: "Based on the scale of services and expected service levels, UBC IT determined that current resourcing is insufficient. The existing situation exposes the department to risk and is not scalable or sustainable over the long term. Botany has a number of options available to them - continue with the current situation, reduce scope of services, or consider revising the IT service delivery model to provide a more sustainable solution for the future." Due to cost constraints, Botany only partially adopted the suggestions listed in the proposal and revised the IT service delivery model in this department.

3. Actions

3.1 Define the Mission

The expectation from the Head of Botany is: "IT should be invisible in this department", i.e. we define the mission of Botany IT as providing high quality IT services to the department, minimizing the impact of any IT related incidents and transitions so that Botany members can focus on their core mission, which is excellence in teaching and research.

The mission defines the fundamental purpose of Botany IT and serves as the ultimate guideline to lead us through all challenges.

3.2 Revise the Organizational Structure

3.2.1 Report Line

Under the new structure, the IT manager reports directly to the Head of Botany for operational and strategic planning and to the Botany Administrative Director for HR and financial issues. The IT manager is responsible for providing accurate information, expertise, and professional IT perspective to the Head, as well as for leading the Botany IT Unit.

3.2.2 Staffing

Botany added a full time Support Analyst in April, 2012 to focus on end user support while covering service request, website management, and procurement. The IT manager focuses on running projects to improve the overall IT environment. This change helps accommodate the department's existing IT support requirements on an ongoing basis.

3.2.3 Advisory Committee

Selected Botany faculty members, with Alistair Blanchford from the Zoology computing unit, form the Botany IT advisory committee to provide comprehensive advice and feedback regarding important IT issues. Tom Yerex was a member of this committee and we would welcome representation from an IT professional in the Dean's office again.

3.2.4 Change Advisory Board

The Head, Administrative Director and IT manager form the Botany IT Change Advisory Board (CAB) which helps ensure that changes to IT systems are managed in a rational and predictable manner. CAB is responsible for enforcing change management policies within IT and for overseeing and approving request for changes (RFCs).

3.2.5 Meetings

Monthly meetings between the Botany Head, Administrative Director and IT manager have been scheduled for efficient communication on IT issues.

3.2.6 IT Policy

The IT manager proposes IT policies in specific areas such as network security and web content management. Once approved by the Head, these policies provide guidelines to all Botany members at the operational level.

3.3 Set up IT Service Management System

Botany IT has adopted the Information Technology Infrastructure Library (ITIL) as the framework for IT operational management. The ITIL is a set of practices for IT service management (ITSM) that focuses on aligning IT services with the needs of the organization. While ITIL is a complex and comprehensive body of knowledge, Botany IT has selectively implemented practices listed below to accommodate our limited resources and capability.

3.3.1 IT Services Portfolio

The Botany IT Manager is the service owner for all services provided by Botany IT. Our current service portfolio includes Botany Active Directory, backup service, print service, web hosting service, and FileMaker Database Hosting service.

3.3.2 Service Level Agreement

By creating service level agreements, Botany members and Botany IT will have a clear baseline for expectations and responsibilities. The agreement also functions as metrics for assessing our performance, and helps us to prioritize tasks and improve service quality.

3.3.3 Operational Level Agreement

An Operating Level Agreement (OLA) is an agreement between an IT Service Provider (Botany IT) and another part of the organization. Some services, such as the print service, rely on support from Botany administrative staff. OLAs define supporting services to be provided from the other part of the organization to Botany IT, as well as the responsibilities of both parties.

3.3.4 Service Desk

We set up the Service Desk as the single point of contact for all of our customers. We use an open source ticketing system, OTRS, to track every incident, service request, change request and event/Alert. We have defined ticket escalation procedures and training plan for work-study students that we hire as IT support analysts sitting at the service desk.

3.3.5 Service Strategy

Botany IT has shifted its focus from providing IT support to delivering IT services. We package our current tasks into services by attaching warranty aspects to their functionalities. Within our limitations, we will actively seeking opportunities to roll out new services while continuously improving our current ones. Also, we closely monitor and communicate with other IT service providers to avoid duplication of effort.

3.4 Set up Project Management System

Botany IT runs projects according to the general guidelines and standards in the Project Management Body of Knowledge (PMBOK) Guide published by the Project Management Institute (PMI).

The Botany Head decides on the priority of projects. The IT manager proposes the project details using the Project Charter then starts the project after the project sponsor has signed the project charter. The project sponsor needs to sign off once the project is complete.

Major Projects that we are working on or have completed since September 2011 are as follows:

3.4.1 Botany Virtual Firewall (Sept 1st, 2011 to Nov 30th, 2011)

Botany only had a SonicWall firewall box protecting its servers, so all other computers were exposed to the whole wide world. There were several cases in which Botany Computers were captured by hackers. There was low awareness of the risk, and there was no efficient tool to protect most computers in the department. After consulting with multiple IT professionals and UBC IT, we decided to implement the virtual firewall system provide by UBC IT. In addition to implementing the firewall features, we also redesigned the overall network topology for Botany. It provides a secure and solid foundation to build up Botany IT infrastructure.

3.4.2 HPC and Genome-sequencing (phase 1: April 29th, 2012 to May 31st, 2012; phase 2: Sept 1st 2012 to Oct 10th, 2012)

Genome-sequencing support is the most mentioned requirement from our research faculty members.

Phase 1 of this project focused on High Performance Computing (HPC) and large data processing & storage. We interviewed specialists in various areas such as researchers, HPC System Administrators,

Bioinformaticians, programmers, Large Data management experts, and HPC and Storage solution suppliers. We are able to understand the requirements of our research faculty members, the available resources in UBC, and the cost of providing this support.

Phase 2 of this project focused on hands on experience with processing large Illumina sequencing data sets with several software and Perl scripts.

3.4.3 Botany Drupal Website (June 1st, 2012 to August 31st, 2012)

The old Botany website was outdated and its capabilities would not meet future needs. Botany identified the need to redevelop its site in order to take advantage of the functionality of a Content Management System, as well as to update its look and feel to match the new UBC Common Look and Feel. This project was to design, build, and implement a user-friendly, educational, and interactive website that allows site visitors to easily navigate pages and access site content. This website also has built-in functionality that allows for maintenance by general content editors and associated contributors, not just IT professionals.

3.4.4 Botany Web Hosting Service (Oct 25th, 2012 to Nov 23rd, 2012)

The old Botany web server was built in 2004 and became problematic in 2012. This project was to build a new web server as a replacement, while implementing enhanced security settings. In addition to this functionality, we enhanced the availability, security, continuity, and capacity aspects, and have packed it as a service. The service level agreement (SLA) for this service was the first SLA created by Botany IT and has provided a robust model for other services.

3.4.5 FileMaker Database Hosting Service (Dec 1st, 2012 to Feb 15th, 2013)

In the absence of IT support from the Beaty Museum, the UBC Herbarium had an outdated database system for digitizing and archiving the hundreds of thousands of plant samples in the collections. The FileMaker Database Server ran on a Mac Mini computer. There was no firewall system to protect this server leaving it vulnerable to external attacks. This database system had become very unreliable recently, especially with regard to the web interfaces for online databases. Because this database system is an essential system for the UBC Herbarium, it was necessary to immediately upgrade the current system to increase reliability while adding some long overdue security approaches. The focus of this project was the reliability and security aspects while maintaining all other functionalities. We have also accounted for and incorporated the potential for future capacity and functionality expansions.

3.4.6 Botany AD Upgrade (Mar 1st 2013 to Apr 30th, 2013)

Botany has a small Active Directory (AD) built in 2007, covering computers in the Botany main office. This directory service was built on Windows Server 2003. There is only one server functioning as domain controller, file and print server. There are multiple group policies covering file system settings, user access control, and security. Each user has exclusive access to their home drive, and all office staff has access to several shared network drives for their day to day jobs. All files in a user's home drive and "P" drive have at least one year of backup. Users can move to any computer in the Botany main offices while automatically retaining access to their profiles, home drive, and other shared network drives. According to feedback from users, the Active Directory build on the Windows Server platform has satisfied their requirements, but there are still areas for improvements. This project focuses on upgrading availability, continuity, capacity, and security, while maintaining current functionality.

3.5 Improve Public Education and Communication

Botany IT provides IT related education such as our Lunch & Learn series to increase awareness of effective IT practices. It is a proactive way to mitigate the impact of IT incidents without department members having to take too much time away from their core tasks. We have brought in leading companies such as Dell and Apple to our Lunch and Learn series. The most successful session was WestGrid's discussion on High Performance Computing resources in UBC. We had 19 department members attend this session.

3.6 Create IT Budget

Financial resources are required for Botany IT to fulfill its missions. For the first time, and with approval from the Botany Head, Botany IT rationalized its proposed budget for the 2013 fiscal year. Excluding staff salary, the total estimated budget was \$36000. Of this amount, \$16000 was budgeted for operational costs, including hardware and software purchases, stationary/shop supplies, Botany Lunch & Learn fund, Botany IT staff Professional Development fund, communication, and salary for hiring work-study students. \$7000 was allocated for infrastructure maintenance, including virtual servers and storage costs, server software purchases and licensing, hardware/parts, and web hosting cost for the Botany Website. \$13000 was proposed for Projects funding including consulting fee, labour, equipment, storage device, physical servers, virtual servers, software, and licensing. This budget proposal was accepted by the Botany Head and Administrative Director, who work directly with the IT manager to implement the budget over the fiscal year.

3.7 Encourage Staff Professional Development

We realize that we have to constantly upgrade ourselves to keep up with the growing needs of the Botany department faculty, graduate students and staffs. After a discussion with the Botany Head, we were able to identify some urgent capability gaps and put together a plan to prioritize our efforts. As a result, I obtained the Certificate for ITIL Foundation and the UBC Certificate in Project Management. I will keep working on my Project Management Professional (PMP) designation and will renew some of the credentials that I obtained a long time ago. Our new IT staff member, John Ng, is working on his Network+ certificate and will focus on the Microsoft Certified Solution Associate (MCSA) certificate later this year.

3.8 Cooperate with External Partners

We welcome any opportunity to cooperate or coordinate our efforts with other IT units if this will benefit the Botany department.

We rely on UBC IT to provide us with such essential services as network connectivity, Virtual Server Service and FASmail, and we have had good experiences with many professional staff within UBC IT. In 2010, I worked as a volunteer for UBC IT in the Virtual Desktop Interface (VDI) project so that I could learn this new technology. I have also been sitting in several focus groups organized by UBC IT to provide feedback for future projects such as Pay4Print solution, SharePoint, Enterprise DropBox, etc.

We are using the WordPress platform provided by the UBC Centre for Teaching and Learning Technology (CTLT) for our Botany IT website.

Previously, we had close partnership with the Faculty of Science (FoS) Dean's office when Tom Yerex was the IT Coordinator. We were able to create a joint service desk, plus share the backup service along with other resources including tools, equipment and staff.

4. Future

In summary, we now have a firewall system that can protect the entire department. We have one additional IT staff member who has proven very capable of providing professional end user support, and our response time has been reduced from days or even weeks to within a few hours. Botany faculty and staff report high levels of satisfaction with the routine IT support as well as the IT unit's ability to undertake larger projects such as the FileMaker database hosting service and Botany department website. By July 2013, we will have 12 servers in production mode, 9 of them are built with virtual servers provided by UBC IT, compared to 3 servers in 2011. By implementing the best practices through the whole service life cycle, our IT services have become more secure and reliable, and have the capacity to support the growing needs of this department. The high performance computing needs of researchers using next-generation sequencing technology will continue to expand and we have identified this as a future challenge. Although there will be other challenges ahead, I believe that we have turned the boat around and are sailing toward a better future.