

Service Level Agreement

Botany Storage Cluster

1. Overview

a) Definitions

Term	Description
SLA	Service Level Agreement
UBC	University of British Columbia
UBC IT	UBC Information Technology Services
Botany	Department of Botany, UBC
Botany IT	Botany Information Technology Unit
Customer	Person who has invested for and own storage space on this system
JBOD	Just Bunch Of Disks
TB	Terabyte
SAS	Serial Attached SCSI
SCSI	Small Computer System Interface
ReFS	Resilient File System

b) Parties

The purpose of this SLA between Botany IT and the customer is to establish a statement of targets and protocols for using the Botany Backup Service as detailed below.

c) Terms

This agreement is valid from the date the customer starts connecting to the Botany Storage Cluster (directly or through another service), and is automatically renewed each year, for the term of one year, unless otherwise negotiated or terminated.

d) Intent

As both parties are fellow members of UBC, the intention of this SLA is, first and foremost, to foster the customer's satisfaction and quality of service, through clarification of both parties' expectations, needs and responsibilities. The policies and procedures outlined in this SLA are intended to ensure that each party is able to meet the other party's needs, in good faith and to the best of their abilities.

2. Brief Description of Botany Storage Cluster

- a) The Botany Storage Cluster is a jointly funded storage solution not only to accommodate our current needs, but also to provide a reliable and scalable foundation for our growing storage requirements in the future.
- b) This service is built with Microsoft Storage Spaces Technology as the software solution, along with commodity hardware for best value.
- c) As the minimum system to start, there are two Dell servers (loaded with Windows Server 2012 R2; they function as fail-over controller nodes), both of which are connected to one SuperMicro JBOD chassis (with 45 SAS hard drive slots). When fully populated with 4TB SAS hard drives, the minimum system can provide 180TB of raw storage space. In the future, it

will be possible to scale the system out to 4 JBOD chassis and provide up to 720TB of raw storage space (or more when using larger hard drives).

- d) For better redundancy and data integrity, this service has several built-in features at different levels:
 - a. There are two controller nodes that are configured as a failover cluster. When one node fails, the other node will take over all functionality within seconds.
 - b. Each hard drive is connected to both controller nodes through dual channels on each SAS expander card, to avoid a single point of failure.
 - c. In each disk pool, multiple hard drives are configured with parity settings (similar to RAID5) to avoid data loss under a single hard drive failure situation.
 - d. When formatted using the ReFS file system, the system can monitor the data integrity in a particular partition to guard against data degradation in the storage media, and to automatically recover the original data if decay is detected.
- e) To use this service, the customer will need to purchase one or more SAS hard drives through Botany IT according for their storage space. Botany IT will recommend the best hard drive model at the time of procurement. The total usable space for a customer will be the sum of the capacities of all SAS hard drives purchased by the customer. Botany IT staff will help the customer to create a space allocation plan according to his or her specific needs.
- f) We **CANNOT** use SATA hard drives for this system. We may accept used SAS hard drives provided by the customer, if:
 - a. The SAS hard drive is 1TB or bigger;
 - b. The SAS hard drive is an Enterprise class product by one of the major hard drive manufacturers, such as Seagate and Western Digital.
 - c. The SAS hard drive is a Near Line SAS hard drive or faster.
 - d. The SAS hard drive passes the hardware test by Botany IT.
- g) The system supports multiple protocols to mount the storage space on the client systems:
 - a. SMB shared folder. This is the recommended method for most users. During testing, we successfully mounted shared folders to Windows, Mac and Linux computers. Although the newest SMB3 protocol is more reliable and delivers much better performance, we still support SMB2 and SMB1 to accommodate older client systems.
 - b. iSCSI target. It is possible to mount a virtual disk on the client system through the iSCSI protocol. This method actually delivers best performance in both sequencing and random Input/Output tests. However there is a 64TB space limit for each mountable virtual disk, and the iSCSI target cannot be mounted to more than one client system at a time.
 - c. NFS shared folder. Although it is possible to provide NFS shared folders to our customers, we highly recommend our customers to use SMB instead since it will work with most systems and has delivered better performance during our tests. We will only provide NFS shared folders if you cannot use the other two methods.
- h) The customer can also choose to mount A partial AMOUNT or all of the purchased storage space to Botany backup server and use it for backup purposes. The customer will get one

- free backup license (can be used to back up a maximum of 4 computers) if he or she chooses to do so.
- i) Please note that the design goals of this storage cluster are to provide reliable, scalable, high capacity near line storage. The performance of this cluster won't be good enough to function as online storage space for a High Performance Computing cluster.
 - j) Please note that all parts of this storage cluster is in one server rack, connecting to two UPS units and two breakers in the same emergency power panel back by the building emergency generator. However, there is no geographic redundancy for this system. Please talk with Botany IT staff if you require greater availability.

3. Policies and Procedures

- a) For the purpose of this SLA: "normal office hours" are defined as 9:30 am to 5:00pm on week days.
- b) Potential customers can send in a service request to join this cluster, or report any related issues to Botany IT helpdesk by email at helpdesk@botany.ubc.ca. If the applicant of the service request falls under the eligible list defined in **8. Eligibility and Cost**, Botany IT staff will respond within 1 business day to set up an introduction meeting with the applicant; otherwise, the service request will be escalated to Botany IT Change Advisory Board for approval. For a related incident, Botany IT helpdesk staff will either resolve customer issues, or escalate critical issues to the appropriate Botany IT staff within 1 business day.
- c) Botany IT will work on any issues with Botany Storage Cluster during normal office hours, until the issue is resolved. Any reported issues or requests will be considered "normal" priority and will be addressed within one business day, unless specified as critical or emergency by the customer.
- d) Work requests outside of "normal office hours" will normally be performed on a best effort basis.
- e) Botany IT procedures require that Botany IT Advisory Board approval is obtained for any changes to production systems. An affected customer will be notified a minimum of 72 hours in advance of any such scheduled impacts to the system(s). In most instances, provisioning or changes to the configuration of a user account and/or recovery of user data will not require Botany IT Advisory Board approval.
- f) The Customer agrees to notify Botany IT of any changes to the ownership and purpose of an existing storage space.

4. Availability and Continuity

- a) Botany IT's objective is to provide access to the Botany Storage Cluster 24 hours per day, every day of the year, except during necessary planned interruptions of service, upgrades, reconfiguration or unplanned interruptions. Botany IT will minimize the number and duration of these interruptions. Botany IT will attempt to coordinate with all affected customers to schedule planned interruptions during times that are least disruptive to the customers.

- b) For standard support issues, Botany IT commits to a normal first response time of 1 business day during normal office hours. For support issues deemed critical by Botany IT and the customer, Botany IT commits to a maximum first response time of 2 hours; all other issues will be handled during the next business day.
- c) Both Botany IT and the customer agree to a planned regular maintenance window every first Sunday of each month from 7:00 pm to 11:00 pm as needed to allow scheduling of regular maintenance changes, patches, upgrades, etc. Both parties must be notified of any such maintenance changes and their planned change schedule.
- d) This SLA applies primarily to the specific system described; in the event of service interruption due to other causes, Botany IT commits to realizing the resumption of the customer's service and support as soon as is reasonably possible.

5. Security and Privacy

- a) The Servers used by this service are to be configured behind a firewall, restricting access to/from ports, protocols and client IP addresses as appropriate.
- b) Application and content level security of the client side devices is the responsibility of customers, unless there is another agreement between the customer and Botany IT.
- c) The customer is responsible for understanding and respecting relevant Federal and Provincial laws, UBC's Policy #104, Acceptable Use and Security of UBC Electronic Information and System, and Information Security Standards published by the Information Security Governance Committee (UBC).
- d) While effort is made to secure the system and provide a secure environment, the customers should not assume that their data is in a secure environment or will meet federal, provincial or commercial standards for data protection. Customers are responsible for employing available security mechanisms for protecting the confidentiality and integrity of their own information, where required.
- e) Users must report immediately to Botany IT if they suspect their data or device has been compromised.
- f) If Botany IT suspects that the data or/and device has been compromised, the customer will give Botany IT the authority to freeze and isolate the data and/or device from the network due to a security risk. An attempt to notify the account owner will be made while doing this.
- g) All user data in the (SMB or NFS) shared folders **WILL NOT** be stored in an encrypted format. Botany IT staff will not look into the customer's data under any circumstances.
- h) If the customer shares his/her access account with a third party, it is the customer's responsibility to ensure that all federal, provincial laws and UBC policies are followed by the third party. The customer must also make sure that the third party understands the security and privacy risk of sharing the account.
- i) Please note that Botany IT may be forced to hand over account access and records to a third party with approval from the head of unit and the Office of the University Counsel, as defined in the UBC Information Security Standard: Accessing Electronic Accounts and Records. More details about UBC Information Security Standards can be found at <http://cio.ubc.ca/securitystandards> .

6. Performance

Performance of this service heavily relies on the access protocol, File system, and network speed between the client device and our control nodes, and the performance of the client device.

Some of these factors are beyond the control of Botany IT. Botany IT shall assist the customer and UBC IT in identifying any bottlenecks.

7. Disaster Recovery

- a) If the complete loss of the service is due to environmental factors such as power outage, network outage, etc., Botany IT will recover the service within one business day after the environmental factor is removed.
- b) If the complete loss of the service is due to software issues, or to a hardware failure which costs less than \$200 to replace, Botany IT will start the recovery process within one business day after identifying the cause of the failure.
- c) If the complete loss of the service is due to hardware failure which costs more than \$200 to replace, Botany IT will submit an application for funding to Botany IT Advisory Board within one business day.
- d) In the event that two hard drive units in the same disk pool fail at the same time, lost user data may not be recovered. By default, Botany IT will not back up any data on this service unless it is otherwise arranged.

8. Eligibility and Cost

- a) Since this is a jointly funded system, all Botany professors, associates and/or adjunction professors, teaching faculty members, and Botany sub-unit directors/managers can purchase their share of storage space through Botany IT with the accounts that they have signing authority to use.
- b) Some use cases may be paid with the Botany General Purpose Operation fund, if approved by Botany IT Advisory Board.
- c) The total usable space for a customer is roughly the sum of all disk space the customer will purchase, but may vary due to parity setting. The cost of the SAS near line disk will vary due to capacity and market change. In June 2014, a 4TB enterprise class near line SAS hard drive cost around \$400 before tax. Botany IT will provide a suggestion for best value at the time of procurement.

9. Cancellation, Termination, and Suspension of Service

- a) Botany IT may terminate, restrict or suspend use of Botany Storage Cluster if the customer's use violates UBC's Policy #104, Acceptable Use and Security of UBC Electronic Information and System, federal, provincial laws, or if the customer is in violation of any of the terms and conditions within this Agreement.
- b) Botany IT reserves the right to refuse or terminate service to the customer with 90 days written notice, if the customer is deemed, at the sole discretion of Botany IT, to have a negative impact on the operation of the Service.

- c) Botany IT reserves the right to freeze and isolate the access account or data of customers without prior notice if customers' accounts or data cause problems on the network or to the system.
- d) The parties may, at any time, in mutual consultation and agreement, terminate this agreement. A written notice needs to be issued to the other party, one month prior to the termination.
- e) After termination, Botany IT will return hard drives to the customer within 30 days. Those hard drives will add up to the same space capacity as what the customer has invested, but they may not be the exact same disks. After termination, the customer will be given a 30 day grace period to transfer data off this cluster to another location.

10. Force Majeure

Neither Botany IT nor the customer shall be liable for any delay, interruption or failure in the performance of our obligations if caused by acts of God, declared or undeclared war, fire, flood, storm, slide, earthquake, power failure, the inability to obtain equipment, supplies or other facilities that are not caused by failure to pay, labour disputes, or other similar events beyond the control of the parties affected that may prevent or delay such performance. If any such act or event occurs or is likely to occur, the party affected shall promptly notify the other, giving the particulars of the event. The party so affected shall use reasonable efforts to eliminate or remedy the event.

11. Unenforceable Provisions

If any part of these Terms and Conditions is found to be invalid or unenforceable under applicable law, such part shall be ineffective to the extent of such invalid or unenforceable part only, without in any way affecting the remaining parts of these Terms and Conditions.