

## CASE STUDY: MCGILL UNIVERSITY

### TRUENAS® PROVIDES PETABYTE CAPACITY STORAGE WITH REPLICATION



# McGill

*“We liked the built-in snapshots and data integrity features that ZFS had to offer. We are very familiar with FreeBSD, which we used as a diskless platform for all of our teaching workstations. The fact that TrueNAS is rooted in those technologies was a very big selling point for us in regard to administration and stability.”*

**- Ron Simpson,**  
*Operations Supervisor at McGill University School of Computer Science*

### THE STORAGE CHALLENGE

McGill University's School of Computer Science runs almost exclusively on Open Source software. Their systems team manages very specialized computing environments across the campus that central IT doesn't serve. McGill stores petabytes of data for the various research projects that take place on campus and the Goodman Cancer Research Centre. They needed a solution that can keep pace with their data growth while keeping it simple to manage and within an ever-shrinking budget. McGill had run Linux and BSD file servers to meet their School of Computer Science's storage needs previously, but they needed a more centralized solution. An in-house solution at that scale was simply too much of a risk to implement, so they began researching vendors such as Dell, DDN Storage, Oracle and NexSAN as well as iXsystems.

iXsystems is the corporate sponsor of FreeNAS®, a popular Open Source storage operating system that leverages FreeBSD and the Zettabyte File System (ZFS). McGill's commitment to Open Source and prior use of FreeBSD for back-end storage made iXsystems, and its enterprise-grade storage array, TrueNAS, an appealing option. In addition, they were familiar with ZFS and its built-in self-healing file system as well as its instant snapshot and replication capabilities, which TrueNAS also leverages and improves.

McGill asked iXsystems to propose a TrueNAS solution that met their current storage needs and was scalable, allowing them to meet continually growing storage requirements. The sales staff at iXsystems worked closely with McGill to understand its specific use case requirements and proposed a solution to meet those requirements. iXsystems' TrueNAS storage array nearly halved the cost per gigabyte

*“The Sales Team at iXsystems were more hands-on than any of the vendors we looked into. We had many questions and the sales team walked us through everything we needed to know. The system they designed for us gave us a lot more bang-for-the-buck than the competitors.”*

**- Ron Simpson,**  
*Operations Supervisor*

over the other vendors’ storage arrays they had researched. With TrueNAS, they also got an enterprise-grade storage array that combined the benefits of ZFS with an Open Source development model. For those reasons, McGill chose the TrueNAS storage array for their use case.

## **HIGH CAPACITY BACKEND STORAGE WITH REPLICATION AND HIGH AVAILABILITY**

McGill purchased its first TrueNAS array in early 2012 with 300TB of raw storage capacity for multiple research groups in the Goodman Cancer Research Centre. Over time, they have scaled their environment with TrueNAS expansion shelves to 1 petabyte of usable storage with plans for future capacity increases. They subsequently purchased additional TrueNAS units that McGill uses as backend storage for Linux servers, virtual machines and databases. McGill utilizes TrueNAS’ snapshot and replication capabilities to synchronize a petabyte of data with an additional TrueNAS for disaster recovery purposes. The initial TrueNAS array replicated over 250 home directories for their Linux-based servers as well as 200+ terabytes of research data. McGill subsequently purchased an additional TrueNAS storage array, a High Availability model, that provides nearly half a petabyte of storage and supports 2500+ home directories for various research teams in the School of Computer Science. They plan on deploying two of iXsystems’ award-winning TrueNAS Z35 storage arrays in the near future.

The TrueNAS storage arrays utilize aggregated quad port network interfaces to maximize throughput over McGill’s 1GbE network infrastructure. McGill shares datasets using various file protocols, like NFS, SMB (Windows), and AFP. They also share data using the iSCSI block protocol. They plan on deploying two of iXsystems’ award-winning TrueNAS storage arrays in the near future.

*“Throughout multiple storage expansions and Operating System updates, and generally putting TrueNAS through the wringer, we have never lost any data. That demonstrates how stable and reliable ZFS is as a file system and logical volume manager.”*

**- Ron Simpson,**  
*Operations Supervisor*

## IMPROVED STORAGE ADMINISTRATION AND STABILITY

Previously, McGill stored all of its data using direct access storage (DAS) on multiple servers using various operating systems. By consolidating storage onto their TrueNAS systems, they've cut down on administration overhead by drastically reducing the potential points of failure for their data storage. This makes troubleshooting any issues that might arise substantially less work. Having a centralized user interface to manage their storage also reduces administrative overhead and, consequently, operational expenses.

Data integrity is paramount to supporting McGill's many research projects. TrueNAS performs file system integrity checks that occur continually on all data, so McGill can rest assured their research data is not being corrupted during transfer or at rest. In addition, McGill runs daily snapshot and replication tasks to duplicate stored data and create system images that can be restored at any time, giving their critical research data an additional level of protection.



*“iXsystems’ support has been incredible. And given our commitment and in the context of how important the data is to our researchers, it has to be.”*

**- Ron Simpson,**  
*Operations Supervisor*

## TRUENAS PROVIDES A SUPERIOR SUPPORT EXPERIENCE

In 2011, McGill University was an early adopter of TrueNAS with unique requirements and a sizable deployment. iXsystems worked side by side as a surrogate extension of McGill’s IT team to support their many storage deployments and expansions. iXsystems takes a “white-glove” approach to support that does not employ the call center model used by many competing storage providers. Instead, iXsystems makes sure that any support ticket submitted by McGill is assigned to a technician who is well-versed in the specific issue being dealt with.

iXsystems also strives to be responsive to customer needs by actively seeking feedback and facilitating communication between its TrueNAS support and engineering teams. The TrueNAS engineering team also works closely with McGill to determine ways to improve their ease of administration and performance, adding features and capabilities to the TrueNAS platform along the way.



## CONCLUSION

From its Open Source-friendly School of Computer Science to the Goodman Cancer Research Centre, McGill University found iXsystems' award-winning TrueNAS enterprise storage to be the ideal match for the school's ever-growing storage needs. As one of Canada's oldest and most prominent universities, McGill University has maintained its status through forward-thinking and innovative problem solving. As an early-adopter of TrueNAS and an iXsystems customer since 2011, McGill University is also one of TrueNAS' longest-running deployments. This special relationship has allowed iXsystems to work closely with McGill's IT teams to understand and refine TrueNAS to meet their demanding data growth challenges, passing that experience on to other TrueNAS users of every size.

With multiple petabytes of research and user data entrusted to TrueNAS, McGill University makes extensive use of TrueNAS' enterprise features, including OpenZFS data protection and TrueSync replication. Together, these guarantee that the school's data is not only free of data loss or corruption, but also ensure that McGill has the ability to restore data from regularly scheduled snapshots. iXsystems gives McGill University peace of mind by providing the storage products and expertise it needs to support its ever-growing storage deployment.

## ABOUT MCGILL UNIVERSITY

McGill University is among Canada's best-known institutions of higher learning and one of the leading universities in the world (Ranked 30th in the world in QS World University Rankings 2016-17). With students coming to McGill from some 150 countries, their student body is the most internationally diverse of any research-intensive university in the country. McGill University was founded in 1821 thanks to a generous bequest by James McGill, and since then, it has grown from a small college to a bustling university with two campuses, 11 faculties, some 300 programs of study, and 40,000 students.

McGill is recognized around the world for the excellence of its teaching and research programs. Today their professors are building the new

field of epigenetics, developing alternative energy sources from crop plants and driving human achievement in every field imaginable. Their 250,000+ graduates form a vast global network, with many alumni reaching the top of their professions as Supreme Court Justices, award-winning authors and musicians, astronauts and more.

## ABOUT IXSYSTEMS

By leveraging decades of expertise in hardware design, its contributions to many Open Source software communities, and corporate stewardship of leading Open Source projects (FreeNAS and TrueOS), iXsystems has become an industry leader in building innovative storage solutions and superior enterprise servers for a global marketplace that relies on open technology.

Thousands of companies, universities, and government organizations have come to rely on iXsystems' storage, servers, and consultative approach to doing business. Headquartered in the heart of Silicon Valley since its founding in 1996, the dedication to white-glove customer service, industry-leading support, and transparent technological contributions has never wavered and continues to help lay the foundation for a new era powered by open technology.

FreeNAS and TrueNAS are registered trademarks of iXsystems, Inc. All rights reserved.