Success Story

Unlocking Innovation for Canadian Research



The Shared Hierarchical Academic Research Computing Network, SHARCNET, is a consortium of Canadian academic institutions providing Advanced Research Computing (ARC) resources, including compute and storage, to academic researchers across Canada. As one of the country's national high-performance computing (HPC) sites, SHARCNET supports the diverse long tail of the ARC community, from bioinformatics and astrophysics to humanities and social sciences.

Reliability Over Raw Speed

For 25 years, SHARCNET had relied on a Lustre-based file system, a solution John Morton, Director of Technology, SHARCNET describes as "the race car that is very fast but requires constant attention to keep running." While performing well at its peak, the system's lack of stability and reliability created persistent issues that could take down the entire compute cluster, frustrating both the administration team and the thousands of researchers who depend on the resource.

"One of the critical things was an easy to manage and more stable file system," Morton stated when discussing the organization's $45 million system refresh. SHARCNET needed a modern, resilient data platform that could handle a highly varied and often novice user base whose demanding workloads, including crazy high IOPS and massive file counts, historically destabilized the older system. The decision-making criteria were clear: reliability, availability, performance, and manageability were paramount.

The VAST AI Operating System

After a rigorous review of the market, including proof-of-concepts with several companies, the VAST AI Operating System (VAST AI OS) was selected as the foundational data platform. The VAST AI OS unified architecture, features, and stability were the decisive factors.

> *VAST was successful based on the reliability, stability and feature set that it comes with.*
>
> **John Morton,** Director of Technology, SHARCNET.

The VAST installation supports SHARCNET's new, state-of-the-art Nibi cluster, ranked #173 on the TOP500 list, featuring 288 NVIDIA H100 GPUs and 700 immersion-cooled Intel Granite Rapids CPU nodes, totaling over 135,000 cores.

The transition from the legacy Lustre system was surprisingly straightforward. Despite having to migrate billions of files, Morton highlighted the simplicity of VAST: "As soon as the data transfer was complete, we flipped the switch and just started using VAST. We made configuration settings in the dashboard, wrote our scripts and that was all very smooth and straightforward."

Minimal Administration

Since deployment, VAST has delivered on its promise of stability, allowing the SHARCNET team to focus on innovation rather than fire-fighting. The shift to VAST has been transformational for the technical team. The solution is so reliable it's become nearly invisible to the administrative team. Morton relayed a telling anecdote from a recent system administrator meeting:

> *Has anyone looked at VAST because I haven't. Everyone in the meeting was just shaking their head going 'nope, haven't looked at it, haven't seen any tickets.' There's no reason to even log into the system because it's just taking care of things.*
>
> **John Morton,** Director of Technology, SHARCNET.

Optimized AI Workflows

VAST directly benefits AI researchers ensuring stability with high-IOPS and high-file-count workloads. While the performance of VAST meets their needs, the key benefit for these users—who generate large numbers of small files and high IOPS—is the platform's resilience. VAST is designed to keep running reliably without being destabilized by the intensive I/O patterns typical of large AI research.

For the bioinformatics research community, a group previously restricted by metadata constraints on the old system, the VAST architecture immediately simplified their work. Morton explained the reaction to the new capabilities:

> *The bioinformatics researchers said, 'My dataset has millions or even billions of files, and I don't have to tar it up anymore, then untar it just to start using it? I can just leave the data as-is?' They were very pleased that their workflows were simplified, as they no longer need to manage data and can rely on extremely reliable infrastructure for their research.*
>
> **John Morton,** Director of Technology, SHARCNET.

New Capabilities for Future Growth

With VAST, SHARCNET is exploring advanced features to further enhance user experience and operational efficiency, including:

- **Accelerated Data Queries:** Leveraging the VAST Catalog for rapid metadata operations, which replaces the slow process of "walking the file system" or querying the old Robin Hood database.
- **Enhanced Data Protection:** Implementing VAST's native snapshots allowing users to easily recover short-term deletions and protect from ransomware.
- **Multi-Site Data Replication:** Investigating data replication with other VAST installations in Canada to offer users a common home directory regardless of which national system they log into, creating a seamless user experience.

A Platform for Canadian Innovation

The partnership with VAST Data enables SHARCNET to provide a robust, resilient, and manageable ARC platform to Canadian academic researchers. By solving fundamental challenges around data management, SHARCNET can focus on its primary goal: continuing its vital work supporting the next wave of Canadian innovation across all fields of research.

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