

High Performance Computing Helps Researchers at Canada's St. Francis Xavier University



Organization

- St. Francis Xavier University

Vertical Market

- Education

Key Challenges

- Deliver a powerful high performance computing system within a limited budget
- Meet the specific needs of researchers; develop a system for an academic environment

Solution

- A grid-based server, leveraging Sun Fire servers, Sun Grid Engine software, and Linux, to deliver stability for the experimental environment sought by StFX.

Why Sun

- Sun met or surpassed all benchmarks and other testing criteria set by StFX
- Superior price:performance ratio
- Sun was actively involved in the planning phase

With the completion of its new, Sun-powered high-performance computing laboratory, academics at Nova Scotia's St. Francis Xavier University have access to much more powerful tools for their research into fields like materials science.

Nova Scotia's St. Francis Xavier University (StFX) was established in 1853, and has evolved into one of Canada's leading educational institutions, and a key centre of learning on the Country's east coast. With a strong focus on research, the University has continually enhanced the tools it provides to academics. Research is done in a wide range of fields, including physics and materials science, which require powerful computers to conduct modeling experiments.

Researchers at StFX had previously used a number of outside resources to accommodate their high performance computing needs. Since these resources were offsite, the researchers had to compete for their use and didn't have control over how the systems were managed. The researchers and the University made the decision to acquire funds and bring the research resources in-house.

StFX made a successful case for funding to the Atlantic Innovation Fund and the Canada Foundation for Innovation, to invest in an on-campus computing facility. When funds were secured, it tendered an RFP to the leading high-performance computing vendors. Thorough research revealed the majority of the offerings were of comparable technical merit. The final decision came down to price and to the relationship the vendor was capable of building with the University.

"Once we had established a benchmark for performance, the single most important components were price and relationship," noted Peter Poole,

StFX's High Performance Computing system has given researchers a ten-fold increase in computational capabilities.

"I have worked with a number of major vendors and in my experience, Sun delivered at or beyond expectation" –Peter Poole

Associate Professor, Canada Research & Chair in Modeling and Computer Simulation at StFX. "Sun won hands-down."

The StFX High Performance System

StFX chose a system built with three Sun Fire V65X rack servers and a 50-node Sun Compute Grid, running Red Hat Enterprise Linux ES Edition, Sun Grid Engine Enterprise Edition, and Sun Control Station software.

"It was important that Sun servers work well with Linux," continued Poole. "Running Linux gives students the latitude to experiment with our research system."

Poole also noted that, while the University didn't engage in a formal service relationship, Sun engineers were on site to help at the beginning of the implementation phase. "Sun also provides preventative maintenance by making us aware of new updates and innovations. These informal relationships are important: we can access the expertise of Sun's technical people, who are quick to

respond and come up with creative ideas."

Putting the System to Work

StFX's High Performance Computing system has given researchers a ten-fold increase in computational capabilities, and demand for the facility has been very strong: the HPC system has been running at full capacity since it opened in January 2004. There are already plans to expand the "starter facility" to two- or three-times its current size.

The Physics department is actively using high performance computing to run simulations of how liquids solidify at a molecular level. This type of research can be applied in a wide range of areas. For instance, by studying the way molecules of metal solidify, researchers can grow crystals into very strong materials. This is useful to the aircraft industry, where designers want to develop the lightest, strongest materials for items like turbine blades.

Another member of the Physics Department is using the Sun system to study biofilms. Biofilms are bacterial colonies, which attach to surfaces, and are present in many uses, including oil and gas pipelines. Simulations allow researchers at StFX to understand the structure of these biofilms, and how to manipulate, control and suppress their formation.

**High Performance Computing:
Building Academic Hubs, Opening
Doors To The Private Sector**

StFX's expanded research capabilities deliver benefits beyond the walls of the University. As the academic cluster in Eastern Canada grows, more regional commercial enterprises can benefit.

StFX is one of six regional post-secondary schools to partner in ACENet, the Atlantic Computational Excellence Network, a geographically diverse regional research community whose members are linked electronically. Working with groups like StFX's Centre for Applied Petroleum Sciences, ACENet can increase academic interaction with commercial interests, such as Atlantic Canada's large Oil & gas industry.

The energy industry relies heavily on modeling, and if successful, Atlantic Canada will be able to participate in work that has traditionally gone to businesses in Houston and Calgary.

StFX's new high performance computing systems delivers the key to a groundswell of academic activity, and the catalyst to new business ventures.

Sun Technology:

Hardware:

- Sun Fire™ V65X Servers
- Sun Compute Grid (50 nodes)

Software:

- Sun Grid Engine Enterprise Edition
- Sun Control Station

Get the details.

For more information on St. Francis Xavier University, visit www.stfx.ca. For more information on Sun products, please visit sun.ca

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