



SOLARIS 10

ST. FRANCIS XAVIER UNIVERSITY

Organization

- St. Francis Xavier University

Vertical Market

- Education

Key Challenges

- Deliver a high power and scalable physics research hub
- Meet the needs for complex yet easy to manage algorithmic computations

Solution

- Cluster of Opteron-based Sun Fire V20z servers running on Solaris 10 and connected via Myrinet network

Why Sun?

- Sun technology was able to meet the high level of research needs
- Sun was able to implement the system in a short period
- Sun offers optimal price performance

When Nova Scotia's St. Francis Xavier University set out to reinforce the university's role as a regional hub for academic research and enhance partnership opportunities with private industry, such as oil and gas companies, they turned to Sun.

Much of the research performed at Nova Scotia's St. Francis Xavier University involves the modelling of various algorithms to prove or disprove a given thesis in the Physics Department. That level of research requires high performance computing (HPC), which necessitated enhancing the University's computing environment. Before upgrading its environment, several factors had to be considered, including speed, ease of systems management and price performance. At one time, St. Francis Xavier was running its systems on Red Hat's Linux operating system. After evaluating both Red Hat Linux and the Solaris 10 operating system for this environment, the University turned to Sun, which proposed a Sun Fire V20z Opteron-based system, running Solaris 10. Sun's Customer Ready Systems program configured and assembled a 238 CPU cluster and Sun Java W2100z Workstation.

The main challenges faced by St. Francis Xavier were to develop a system that could do the following:

- Perform research using non-commercial software written by the researchers involved
- Run very complex software designed to run on clusters
- Have a very efficient relationship between the processors and the memory, with CPU and memory speeds playing an important role in software performance
- Scale so that the software will output data faster as more CPUs are being used simultaneously



Performance with Sun Fire v20z and Solaris 10

Sun's solution was a cluster of Sun Fire V20z servers that use the Opteron processor, with many of the servers utilizing Myricom's Myrinet technology. This provided a low latency, high bandwidth interconnect network between a portion of the servers to facilitate the passing of large data sets between processors residing in separate systems.

Additionally, Sun's HPC team also provided a custom-built message passing interface (MPI) framework for the environment and configured the entire system to run the Solaris 10 operating system.

High technology that is easy to manage

The Sun solution combined a compelling operating system and system architecture strategy. Components included Sun's resource management solution (N1 Grid Engine), systems management solution (Control Station), software compiler suite (Studio 10) and operating system (Solaris 10). The built-in integration of these important solution components provided an ease of management and level of utility not found in commonly-used open-source offerings.

Systems built on Sun's Opteron-based servers are currently leading in price performance in all benchmark results relevant to the work being done

by St. Francis Xavier University's Physics Department.

Moreover, the combination of Solaris 10 with Studio 10 yields a high performance value, as Sun's benchmark team proved on very short notice.

Benchmark results of the Solaris 10 operating system were also very favorable compared to Red Hat Linux and the future builds promised even better performance. ISV support for Solaris 10 is an important element of Sun's value proposition, as well.

A world first for Solaris 10

Construction of the system occurred with minimal disruption. Myricom was very helpful in working with Sun and St. Francis Xavier to ensure support of their networking technology with Solaris 10, which was in pre-release state at the time of installation. In fact, St. Francis Xavier was the world's first production server deployment of Solaris 10 on the Opteron processor.

At St. Francis Xavier, research is at its height during the summer months because undergraduate students are on vacation and most classes are not in session. The new system will reach maximum use in summer 2005 and Sun and St. Francis Xavier are very confident in its ability to support the high level of research that is expected at that time.

Learn More

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

The new system is expected to allow for advanced computational physics research in:

- Modeling of crystal formations in liquids
- Modeling of biological membranes and the molecules that interact with them
- Studying phase transitions in ferromagnets and polymers
- Modelling of non-equilibrium physics of block copolymers, liquid crystals and colloids

Sun Products

- Solaris 10
- Studio 10
- 118 - Sun Fire V20z servers, each with two AMD Opteron processors; 56 utilizing the Myrinet network and interconnected via Gigabit Ethernet
- 4 - Sun Rack 1000 cabinets
- 3511 storage arrays providing 6 TB of SATA storage
- W2100z workstation