



ENERGY

HYDRO-QUEBEC

TRACKING PROJECTS ON TIME

Highlights

Company

Hydro-Quebec

Industry

Utility

Applications/Solutions

- Oracle-based project management, project reporting, and work scheduling systems
- Oracle 7.3.4 and 8.0.5 databases

Products/Services

- Sun Enterprise™ 4000 server (databases and application server)
- Two Sun Enterprise™ 3000 and 3500 servers (databases and application servers)
- Sun Enterprise™ 250 (development system)
- Sun UltraSPARC™ 2 (backup system)
- Four Sun™ D1000, 108-GB storage arrays

Key Business Challenge

Migrate mission-critical applications serving 300 users to high-performance, open architecture platforms

Key Business Results

- Dramatic 90%+ performance improvements, with processing time for complex jobs being reduced from 12 hours to 30 - 60 minutes
- Excellent system availability, with unplanned outages virtually eliminated.

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*Claude Germain, Database Administrator
Hydro-Quebec*

Hydro-Quebec, one of eastern Canada’s largest enterprises, is best known for generating and distributing power to over 3.5 million customers across the province of Quebec.

With abundant reserves of hydropower, the company also supplies power to nine municipal systems, one regional cooperative and 15 electric utilities in the Northeastern United States and surrounding Canadian provinces. In recent years, the company has become a global provider of services and venture capital for energy projects worldwide.

Managing such a huge transmission and distribution system requires stringent project management. Hydro-Quebec’s construction and maintenance projects can range from hundreds of thousands to billions of dollars in cost, and in many cases stretch out over several years. “We manage many projects that cost billions of dollars,” noted Claude Germain, database administrator for Hydro-Quebec. Because of the size, complexity, and volume of projects, in 1991 the company developed its own project management and work scheduling systems, initially using Oracle Forms.

Because computing project requirements and work schedules involves large volumes of data, Hydro-Quebec required an efficient, robust, high-performance platform. It recently migrated from legacy Digital VAX platforms to Sun Enterprise™ servers. The results,

according to Germain, have been startling. Jobs that formerly required up to 12 hours of processing could now be turned around within 30 minutes to an hour.

Powering Up

Power generation and transmission projects can get highly detailed. For example, imagine the amount of data and detailed work plans necessary to build a 7-kilometer water tunnel in pure rock for a hydroelectric complex. Numerous contractors and hundreds of people, often scattered across multiple sites, must have their activities coordinated to keep the projects moving on schedule and on budget. Not surprisingly, developing a project plan can involve enormous amounts of data.

Keeping projects on track is a critical component of delivering the service that Hydro-Quebec’s customers expect. For instance, after the massive ice storms of 1998, there were over 200 projects involved with rebuilding fallen power lines alone. Having a robust project management system has become critical to keeping the lights on.

When Hydro-Quebec developed the first version of its project management system in 1991, processing times for complex jobs could extend far beyond the workday. “In the past, many people wouldn’t use the system because it was so slow,” said Germain. He added that, although the system was developed around an

open Oracle database, the closed nature of the original VAX platform made it difficult to use the information with other third-party applications.

Over the years, Hydro-Quebec had excellent experience using Sun workstations as its standard for research and technical computing, and when Sun's enterprise server product line became available, the company began phasing it in for numerous applications. "If it comes down to NT vs. Sun, we'll always pick Sun because it's a far more stable server," said Germain.

Not surprisingly, when it came time to improve the performance and accessibility of the Oracle-based project management system, Sun was the obvious choice. "It was a natural choice for us," said Germain, adding, "Hydro-Quebec has used Sun platforms for so many years that we've gotten to know them very well. We've found that Sun platforms work especially well with Oracle."

In January 1999, Hydro-Quebec installed several Sun enterprise servers to base the project management system and several related applications. They began with a four-way Sun Enterprise 4000, with two gigabytes of RAM and (216) gigabytes of storage, as the database and application server for the project system. Significantly, both the server and client portions of the application were based on this system to allow Hydro-Quebec to eventually migrate to a web-based architecture. Additionally, the system hosts the database used with a subset of the project

system, which is used for initial planning of projects before they are uploaded to the main project system.

A 4-way Sun Enterprise 3500 server is used to base a project reporting system, which includes a replicated database from the main project system. Additionally, a Sun Enterprise 3000 server is used for running several applications, an engineering catalog system and a system to manage water levels at hydropower facilities. Rounding out the system is a Sun UltraSPARC 2 server, which is used for backup, and a Sun Enterprise 250 server, which is reserved for the development environment.

The system is backed with dual, mirrored Sun D1000 storage arrays, which contain 108 gigabytes of data apiece. Reflecting the critical nature of the data, the data is stripped for performance and mirrored for fault tolerance, using RAID levels 0 and 1.

Generating Results

The project management system currently serves over 300 users, with typical concurrent usage loads averaging about 40-50 users. Usage involves a mixed pattern of routine transaction processing and the complex computations to generate project plans. Performance improvements on the new system have been dramatic. For instance, generating complex plans used to take up to 12 hours to process on the old system. With the Sun Enterprise servers, processing of the worst problems is completed in less than an hour, and often within 30 minutes.

Since the system was installed in January, availability has been excellent. The only unplanned outage occurred when a larger server had to be installed to handle the load resulting from the system's newfound popularity. "We are making sure that utilization rates on our servers never exceeds 70%, to maintain performance," said Germain. Keeping service levels high has been a big priority of Hydro-Quebec and Sun. "When we have a problem, we've always gotten the answers from Sun very quickly."

According to Germain, performance is a powerful selling point for getting better use of the system. Reflecting problems with the earlier system, only 20% of all projects were tracked on the system. Today, with the high-performance Sun Enterprise systems, 100% of all new projects are being entered. Based on the high acceptance of the system, Hydro-Quebec plans to put the project management system on the web to ease access from outside the main offices. Having the combination of high-performance and ready access has become an unbeatable equation, according to Germain. "The performance is so fast that our people think it's too good to be true."

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