

SDSC, McGill University Win Awards to Design Ultra-Efficient 'Green' Data Center

Canada's Advanced Research Network, CANARIE, and the Canada-California Strategic Innovation Partnership (CCSIP) to Provide Funding

June 8, 2010

Jan Zverina

The San Diego Supercomputer Center (SDSC) at UC San Diego and CLUMEQ, a Canadian High Performance Computing consortium led by McGill University in Montreal, Quebec, have been awarded grants from Canada's Advanced Research and Innovation Network (CANARIE) and the Canada-California Strategic Innovation Partnership (CCSIP) to design an ultra-efficient data center as part of a program to promote 'green' IT initiatives.

Under the partnership, SDSC and CLUMEQ/McGill University researchers will design and build a business case and a conceptual design for a jointly-managed, ultra-efficient data center to be built in Quebec, which has an abundance of green hydroelectric power and an ideally suited cool climate that can provide 'free cooling' to the data center's high-performance computer systems for much of the year. Hydro Quebec, Quebec's state-owned utility, Rumsey Engineering of Oakland, California, and ClimateCHECK, an Ottawa-based firm specializing in green house gas (GHG) emission standards and measurement, are collaborating on the project.

Researchers from SDSC and CLUMEQ will be presenting the preliminary conceptual design at the upcoming GSMI Green Data Center Conference June 15-17 at SDSC.

Such a data center would offer energy-efficient co-location and managed hosting services to the high-performance computing (HPC) and research communities served by the University of California and through CLUMEQ to Canadian researchers. The current scalable data center design would achieve a "power usage effectiveness" ratio, or PUE, of 1.1 or lower by leveraging cutting-edge technologies such as natural thermal storage through a man-made ice pond.

"At SDSC we operate one of the most efficient facilities in the region and, through various efficiency projects, have achieved a PUE of 1.35," said Dallas Thornton, SDSC's Division Director of Cyberinfrastructure Services. "This project focuses on designing an even more efficient facility that capitalizes on unique site capabilities available in Quebec, while developing a business model for the bilateral effort's success. This is an exciting project that will benefit both Canadians and Californians."

A PUE ratio is a commonly used metric calculated as the ratio between a data center's total power consumption and power used by the IT equipment within the center. Typical data centers have PUEs of 1.7 to 2.0, well-managed data centers typically have PUEs of 1.4 to 1.6, and aggressively managed operations strive to achieve lower ratios, with the ultimate goal of reaching 1.0, a completely lossless and energy-efficient data center.

The joint design study comes as power consumption due to IT equipment and data centers continues to grow at a rapid pace. In a 2007 report by the U.S. Environmental Protection Agency to Congress on data center efficiency, it was estimated that power consumption was about 61 billion kilowatt hours (kW-h) in 2006, or 1.5

percent of total U.S. electricity consumption. This consumption is expected to double by 2011. Power and cooling costs continue to be a growing percentage of the overall costs of IT for all organizations, including academic institutions.

SDSC and UC San Diego have been leaders in promoting energy-efficient and sustainability practices throughout the campus, from building design and transportation alternatives to conservation and recycling. UC San Diego is one of the leading universities investigating energy efficiency in information technology and data centers, and is the only university member of Green Grid, an international consortium dedicated to reducing energy usage at data centers.

The CCSIP is a catalyst for collaborative Research, Development, and Delivery (RD&D) between California and Canada, stimulating the development of new models of collaboration that leverage key research capabilities, address common priorities, accelerate the delivery of research results, launch revolutionary RD&D projects that aim to bring new products and services to market, and deliver economic and social benefits to citizens in both jurisdictions. CCSIP funding for the project was awarded as one of 15 bilateral projects selected in the CCSIP's first Call for Proposals (CFP) in January 2010.

Additional support for the project was received from CANARIE, Canada's Advanced Research and Innovation Network. The SDSC/McGill University grant is part of CANARIE's C\$2.4 million funding plan for four ground-breaking IT projects aimed at reducing the carbon footprint of the information and communications technologies (ICT) sector, and measuring the impact of ICT and cyberinfrastructure on university electric consumption. "Canada is being very aggressive in developing new green IT strategies for computing and communications that mesh well with long standing traditions of environmental responsibility and technological development," said Jorge Vinals, director of CLUMEQ.

About SDSC As an Organized Research Unit of UC San Diego, SDSC is a national leader in creating and providing cyberinfrastructure for data-intensive research. Cyberinfrastructure refers to an accessible and integrated network of computer-based resources and expertise, focused on accelerating scientific inquiry and discovery. SDSC is a founding member of TeraGrid, the nation's largest open-access scientific discovery infrastructure.

About CLUMEQ CLUMEQ (Consortium Laval, Université du Québec, McGill and Eastern Quebec) is a research consortium for high performance computing (HPC) composed of McGill University, Université Laval, and the Université du Québec. CLUMEQ's mission is to provide world class HPC infrastructures to its member institutions, for the advancement of knowledge in all areas of research, and to provide support and training to researchers in order to help them exploit these infrastructures efficiently. CLUMEQ is part of the Compute Canada national HPC platform that coordinates the seven regional consortia across Canada. Through Compute Canada, all Canadian researchers can obtain access to CLUMEQ infrastructures.

Media Contact:

Jan Zverina, SDSC Communications, 858 534-5111 or jzverina@sdsc.edu Warren R. Froelich, SDSC Communications, 858 822-3622 or froelich@sdsc.edu Kathryn Anthonisen, CANARIE Communications, 613 943-5374 or kathryn.anthonisen@canarie.ca