

Umeå University launches green Windows-based supercomputing on an IBM BladeCenter cluster



Bo Kågström, professor at Umeå University and director of HPC2N

Overview

■ Challenge

To enable new research opportunities at Umeå University's High-Performance Computing Center North

■ Solution

Installing a high-performance IBM BladeCenter® cluster with a powerful mix of Intel® Xeon®, IBM POWER6™ and Cell processors

■ Key Benefits

Achieves 46 teraflops and an efficiency rating of 85 percent, while using less energy than other supercomputers of its size

Collaboration is a hallmark of research and education, especially at Umeå University, where a unique collaborative effort has led to the development and implementation of Akka, the fastest Windows®-based system in Europe.

Built by IBM, Akka belongs to the High-Performance Computing Center North, or HPC2N, a national center for scientific and parallel computing located at the university. Partners of HPC2N include several universities and research institutes in northern Sweden who have joined forces to promote the use of high-performance computing (HPC) in industry and academia.

Reaching new scientists

Akka is a high-performance IBM BladeCenter cluster that runs both Microsoft® Windows HPC Server 2008 and Linux® operating systems. The system is made up of 672 IBM BladeCenter HS21 XM blades running two Xeon processors each. Efficiently organized in 48 chassis across 12 racks, these blades take up

a small footprint in the HPC2N data center. Making up a smaller part of the system are four IBM BladeCenter JS22 blades running POWER6 processors, and six IBM BladeCenter QS21 and QS22 blades running Cell Broadband Engine™ processors. Cisco Infiniband switches provide high-speed interconnects.

What inspired the university to design and install a system like Akka, when Linux-based applications continue to dominate the supercomputing field? "The humanities and social sciences traditionally use Windows as their operating environment," explains Bo Kågström, a professor at Umeå University and the director of HPC2N. "Offering a Windows environment enables us to reach new scientists and new application areas."

Record-setting performance

Not only does Akka enable Windows-based research for users at HPC2N, it does so at record-setting speeds. LINPACK Benchmarks measured Akka at 46 teraflops of sustained performance, with bursts to 54 teraflops, putting Akka at #39 in the June 2008 TOP500 list of the world's fastest supercomputers. This ranking has brought HPC2N and Umeå University a new level of visibility in the academic HPC community, making the center even more attractive to researchers across Europe.





In addition to remarkable processing power, Akka also provides ample memory to accommodate the data requirements of HPC2N's researchers, with 10 terabytes of RAM and over 110 terabytes of storage provided by an IBM System Storage™ DS4800 disk storage system.

Another significant benefit of the cluster is that it provides HPC2N with a level of energy efficiency that far surpasses that of comparable supercomputers, in part because each Xeon processor draws only 50 watts of power. Akka is ranked #16 in the June 2008 Green500 list, making it the most power-efficient of all the HPC clusters in the TOP500.

A strong collaboration

Throughout the implementation process, HPC2N worked very closely with IBM, Microsoft, Intel, and IBM Business Partner Gridcore to discuss options, gather requirements, and design the system. Gridcore also provided installation services.

"When we started the process, we had a blank slate," explains Dr. Mats Nylén, a lecturer at Umeå University and a senior consultant at HPC2N. "But we've always had a very strong collaboration with IBM, and when IBM was able to put together an offer with Microsoft, Intel, and Gridcore, we thought this was a really good option for us."



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"We've always had a very strong collaboration with IBM."

– *Dr. Mats Nylén, lecturer at Umeå University and senior consultant at HPC2N*

Future plans for the system include the use of the POWER6 blades in a cloud computing project for the EU's RESERVOIR project, which IBM Haifa Labs is coordinating.

For more information

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