University Benefits from Incredibly Fast Database Access and Built-In Redundancy

Multiple Generations of SGI Hardware Installed

Key Facts

Organization:
Masaryk University

Primary Location:
Brno, Czech Republic

Industry:
Database/Business Intelligence

Masaryk University, located in Brno, Czech Republic, is one central Europe's leading teaching and research institutions. With more than 50,000 students, faculty and staff, Masaryk University is firmly committed to a high level of educational quality, and part of that is improving access to information.

To that end, Masaryk University has developed its own intranet system, featuring a number of tools for use across the institution. In fact, in 2005 the university received the prestigious EUNIS Elite Award in recognition of its leading position in the use of information technology within the university community. It was the first university in the Czech Republic and among the new European Union member countries to win the award.

Many Applications Across the University

An SGI® customer since 2004, Masaryk University utilizes a number of generations of SGI hardware, including an SGI Altix® XE, Altix 350, Altix 450, several SGI InfiniteStorage arrays, and an SGI UV 100, its latest acquisition in August, 2011.

The university operates its SGI UV 100 server as its main single shared memory system, running an Oracle® database. The Intel® Xeon® processor X7560-based SGI UV 100 is the new heart of a complex system, where it is the workhorse for the Oracle database back-end. Before purchasing the UV system, Masaryk had been using their Altix 450 for this function. As a database server, the UV is standalone, but from a functional perspective it is part of a much bigger infrastructure including surrounding PC servers for applications and a PC farm for web access. Today, the Altix 450 is used for other work, and also serves as the disaster recovery machine for the UV, as it can take the entire database load in the event that the UV becomes totally inaccessible.

Masaryk's purely web-based platform serves both the educational and administrative needs of the university, for applications including e-learning, finance support (online payments), document management and award-winning plagiarism detection software, as well as thousands of other applications.

According to Michal Brandejs, Director of the Computer Systems Unit in the University's Faculty of Informatics, "Our primary need was to improve overall database performance. We have designed the system to manage the assessment of tens of thousands of application forms for studies, the implementation of e-learning, registering students for examinations, helping staff to work more efficiently and supporting rapid communication between offices and departments."

Masaryk University considered IBM servers with similar capabilities. However, states Brandejs, "The SGI UV platform is able to provide higher throughput and overall performance. No other vendor was able to provide such a high performance on an X86-64 platform with the high availability hardware features we need."

Brandejs reports that the performance of their applications has more than doubled. In addition, the system remains stable and does not get overloaded, even during the highest periods of end-user peak loads upon the system. "We have been able to reach the highest enterprise technology performance level at less than US$1 per active user per year!" he exclaims.

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Three Primary Performance Benchmarks for the School

The university looks at three factors the when proclaiming the virtues of its recent investment in SGI hardware:

• Highest single-core performance

• Simple system architecture

• Hardware availability features

Highest single-core performance

"Unlike our older RISC or IA64 systems, SGI UV provides very impressive single-core performance which leads to outstanding response time that's really notable to common users," Brandejs says. "We never thought that increasing single-core performance would lead to such a big advantage, even compared to the very high throughput of our older system."

In fact, because of the high single core performance, combined with the very high throughput capability of the SGI UV platform, Masaryk needs far fewer Oracle licenses to get to the performance they need, as compared to any other technical solution. For example, if the school were to build Oracle RAC from PC servers, they might save money on their hardware investment, but their electricity bill would be higher from using PC servers and their Oracle licenses would be several times more expensive. As an Oracle license is far more costly than a hardware core, this would result in much higher total cost of ownership (TCO) compared with UV. According to Masaryk officials, there is no other low TCO solution comparable to UV available on the market.

Simple system architecture

The school's system administrators benefit greatly from the fact that the single system image, even in such a large form factor, makes the UV look like one PC. Brandejs reports, "Unlike older high-end servers running proprietary UNIX operating systems or special Intel® Itanium®-based applications, we can now install, configure and run any Linux® application like we are used to doing on our small, single-socket or four-way X86-64 Linux systems. However, unlike smaller PC or Mac-based servers, SGI UV 100 provides even higher performance because it's not limited to only 8 sockets. Our UV – without any special optimization – even leads the popular PC- and Mac-based benchmark Geekbench [see browse.geekbench.ca/geekbench2/top]."

Hardware availability features

The SGI UV platform, with its unique, high speed, SGI-developed NUMAlink® architecture, offers varying shared memory configurations. Masaryk University has structured the UV as a single system image solution, but partitioned as two "independent" servers. Each server can operate completely separately, even with the smaller number of CPUs and memory this configuration provides, but system administrators can virtually rearrange the components without powering down the system in case of failure of any system component or application need. This means that two independent computers do not have to be operated in order to establish redundancy in case of system failure, and both servers can work together to reach even higher capacity and performance.
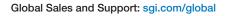
States Brandejs, "Many comparable X86-64 systems with similar performance lack this feature because of a single point of failure component inside and no ability to connect two servers into one single operating system. In addition, clusters or distributed computing environments are not able to provide the high level of performance of a single in-memory database instance we use."

About Masaryk University

Masaryk University is the second largest public university in the Czech Republic and the leading higher education institution in Moravia. At present it comprises nine faculties with more than 200 departments, institutes and clinics. Recognized as one of the most important teaching and research institutions in the Czech Republic and a highly-regarded Central European university, it has been marked by a strong democratic spirit ever since its establishment in 1919. The university also plays a major role in the social and cultural life of the South Moravia Region.

Please visit www.muni.cz for more information.

Photo Credit

Left: Courtesy Zdenek Náplava
Right: Masaryk University Archive