SUCCESS STORY

MASARYK UNIVERSITY

SGI® Altix® and Oracle® Database 10*g* Real Application Clusters Earn High Marks at Masaryk University

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– Michal Brandejs, Director of the Computer Systems Unit at University's Faculty of Informatics

Tasked with meeting the academic and operational needs of more than 45,000 students and faculty members, Masaryk University's information system (IS MU) is the lifeblood of the premier Eastern European university. The Web-based information system processes over 2 million highly complex transactions per day and provides critical services to every member of the University, including support of University administration, e-learning, study material dissemination, research, student personal data and communications.

Three years ago, Masaryk University's IT professionals turned to SGI® and Oracle® to meet the school's technology needs. Today, with higher enrollment and greater access demands than ever, officials have selected SGI once again. This time, supplementing its SGI® Altix® 350 high performance computing system with a SGI® Altix® 450 server.

Innovation in Information Services

IS MU development began in 1998. Within a short time, it acquired a reputation for being the most complex information system of its kind in Europe and proving itself a key asset for the school. For the University, IS MU represented a move to a student-driven education paradigm and a bridge to the European Credit Transfer System (ECTS). Now, with approximately 1,000 Perl-based applications implemented, the system enjoys truly massive usage, supporting up to twenty five thousand users daily.

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IS MU has made it possible for Masaryk University to introduce paperless processes to replace what were formerly manual activities. It has also significantly increased student and faculty productivity by offering a complete online forum for study departments, bulletin boards, teachers, class materials, grading and other critical functions. IS MU supports real-time processes and acts as the hub for most activities linked to academic life.

As the volume of transactions handled by the outdated infrastructure increased, the University quickly realized the system as it was originally designed could not keep up.

The IT development team began the program to upgrade its infrastructure in 2004. As long time Oracle users, the team was determined to choose the system that could best run the latest version of the Oracle database, Oracle Database 10*g*. A number of industry options were under consideration, including Sun® systems running Solaris™ on SPARC™ and IBM® systems running AIX® on POWER™. In conducting its research, the group looked at several key criteria: total performance for handling a high volume of Web requests in real-time, performance per processor, reliability, acquisition cost, total cost of ownership and the ability to expand the system as the mission grew. Additionally, the system had to guarantee 24x7 availability. To test these criteria, the developers created a sophisticated benchmark suite to predict the performance of each hardware platform. Following this detailed research and testing, Masaryk chose SGI.

Performance, Efficiency and Flexibility

"SGI Altix was definitely faster than any other system running Oracle," said Michal Brandejs, Director of the Compute Systems Unit at the University's Faculty of Informatics. "This is because of the Altix system's unique architecture. Our OLTP application generates extremely high concurrent data access which can be handled only by a large shared-memory system. With the NUMAflex® architecture, we're able to get to disk and memory very quickly. The CPUs are never starved and the jobs go much faster. We saw linear vertical scalability of the performance on Altix. That is, when we doubled the number of processors in the system, we doubled the performance of Oracle. I don't think any other system in the world, including commodity clusters, can do that."

Mr. Brandejs also found that Altix had the lowest total cost of ownership of all the systems on the market for their type of applications. "While Opteron and Xeon systems had lower acquisition costs for the same number of processors and memory, we would have needed a lot more of those resources in these other systems to make them competitive with Altix. And Altix was simply cheaper than the proprietary systems such as Sun's SunFire."

Leveraging Storage

Because of its high bandwidth, Altix places extremely heavy demand on the storage subsystem. After investigating all of the options on the market, Mr. Brandejs and his team chose SGI® InfiniteStorage as the solution. "SGI Storage is outstanding," said Mr. Brandejs. "Just as a system architecture can starve processors, so too can the disk subsystem. SGI InfiniteStorage addresses the problem of storage overload."

Masaryk University

Masaryk University IT added to its data center two SGI Altix 350 servers with a total of 16 Intel® Itanium® 2 processors, 32GB of memory, Novell® SUSE™ Linux Enterprise Server 9 operating system and 2 terabytes of SGI® InfiniteStorage TP9300 fibre channel RAID as its solution.

Then came the task of loading Oracle for the production system. “The system is as stable as any other enterprise platform while the total system throughput and performance are amazing,” said Mr. Brandejs. “It validated all of the research we’d done beforehand.”

In fact, independent tests have shown SGI Altix to be the industry’s fastest, most scalable Linux® system for real-world, multi-tier applications running Oracle Database 10*g*. SGI delivered the best benchmark result with a medium-sized Oracle Database10*g*. Running the Oracle E-Business Suite 11*i* (11.5.10) Benchmark, also known as the Oracle Applications Standard Benchmark (OASB), the SGI Altix 450 system delivered 70 percent faster performance than the previous record holder in tests that measure average response times for 3,000 online users. The SGI system also delivered record hourly throughput in Oracle’s measurement of order management and payroll batch business processes

Masaryk University chose Oracle® Database10*g* and Real Application Cluster technology for its high availability. “We

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can't afford to have the system offline, and Altix with Oracle 10*g* RAC guarantees availability," commented Mr. Brandejs. "The Oracle application is optimized running on the Altix system."

Performance, however, is only a means to an end. The bottom line, according to Mr. Brandejs, isn't the speed or unique features of the system, but what it means for his users.

"With SGI and Oracle, we have fast access to critical data, and we can grow our system as our computing needs expand. SGI was an obvious choice for us."

An Award Winning Solution

In 2005, Masaryk University's Information System won the EUNIS Elite Award for excellence in implementing administrative information systems for higher education. This prestigious European prize recognizes the academic institution with the best IT system of the year.

"Masaryk University Information System was awarded the EUNIS prize because of the stability, reliability and performance of IS MU," said Professor Jiri Zlatuska, Professor of Informatics, previous Rector of Masaryk University and a key member of the team that developed the system and oversaw the recent upgrade. "We won because we chose the best technology. Because of this system, Masaryk University provides its students, teachers and researchers with the world-class solution they deserve."

Building on Success

With the continued growth of the university, Masaryk's IT team found itself facing unprecedented demand on its IS MU system. To handle that demand, the group once again turned to SGI.

"We selected the Altix 450 to handle the massive computational throughput requirements generated by the ever increasing number of applications and requests," said Mr. Brandejs. "Not only did the Altix 450 provide the highest performance for our limited budget, we were impressed by the global professional support and fast problem resolution offered by SGI."

Running the new Altix 450 with its faster CPU core and expanded memory has dramatically lowered response time in handling requests. "The Altix 450 has delivered great performance without any overloading," said Mr. Brandejs. "We never get user complaints about performance or stability."

The system's modular blade design is intended to provide a combination of high performance, density and flexibility. Additionally, the university is leveraging the shared memory NUMAflex technology, which streamlines installation, software development, workload management and system administration.

The new solution is not just about the Altix 450. The Altix 350 continues to play a major role in the IS MU infrastructure, providing offsite backup and acting as a platform for other applications. "In case of a disaster, we will be able not only to restore data, but we'll have access to significant capacity to rapidly start up the system again," said Mr. Brandejs.

Using the two systems in different roles has proven to be an optimal solution for Masaryk University. "We have achieved really high performance thanks to the huge and fully shared m memory and large number of CPU cores," said Mr. Brandejs. "The deployment of the Altix 450 with the Altix 350 acting as backup has offered the results we had hoped for. We believe we have enough capacity for additional users, new applications and rapid system development for years to come. In addition, we are confident that we can handle emergency incidents. The new, combined solution enables us to offer a high level of service to our academic community."

[1] Oracle® E-Business Suite Benchmark "http://www.oracle.com/apps_benchmark/html/results.html#medium
Oracle E-Business Applications 11i (11.5.10) B Benchmark Using Oracle 10g on SGI Altix 450 (16-way Itanium 2 9000) and Altix XE240 (2-way Xeon) Servers

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