

Success Story

Masaryk University IT Department



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SGI® Altix® and Oracle® Database 10g Real Application Clusters Provide Real-time Access to a World of Information

Masaryk University is the premier university in Eastern Europe. To support its population of thirty seven thousand students and faculty members, Masaryk University’s academic information system must manage terabytes of information and make all of it available at the click of a mouse to anyone who needs it, whenever they need it. The system they use to do this is called the “Masaryk University Information System” (IS MU). It is a web-based information system that must process about a million highly complex transactions per day. IS MU provides critical services to every member of the University in support of university administration, e-learning, study material dissemination, research, student personal data, and communication. The system represents the lifeblood of the University.

Its real time operations present an extremely demanding task. To accomplish it, Masaryk University’s IT professionals turned to SGI and Oracle.

History

IS MU development began in 1998. Within a short time, it acquired a reputation for being the most complex system of its kind in Europe and a key asset of the school. For the University, it represents a move to a student-driven education paradigm and a bridge to the new The European Credit Transfer System (ECTS). Approximately 1,000 Perl-based web applications have already been implemented, and the system enjoys truly massive usage: up to twenty thousand users and more than a million operations daily.



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Thanks to this system, Masaryk University was able to introduce paperless processes to replace what were formerly manual activities. The system significantly increases student and faculty productivity by offering a complete online forum for study departments, bulletin boards, teachers, class materials, grading, and other crucial functions. ISMU supports real time processes and acts as the hub for most activities linked to academic life.

As the volume of transactions handled by the system increased, the IT team quickly realized the existing infrastructure could not keep up. So the team decided to upgrade the infrastructure to ensure it could keep pace with the current workload and scale as the transaction and data volumes grew.

IT development team began the program to upgrade its IT infrastructure in 2004. Masaryk University had been using Oracle for many years, so the only question was which hardware platform they would choose to run the latest version of Oracle Database, Oracle Database 10g. The technology specialists investigated all of the available choices, including Sun® systems running Solaris® on SPARC®, and IBM® systems running AIX® on POWER®. The most important criteria in their decision were total performance (handling all of those 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 (from one million transactions today to tens of millions in the near future). Additionally, the system had to guarantee 24x7 system availability.





The developers created a sophisticated benchmark suite to predict the performance of each hardware platform under consideration, and the results were definitive. “SGI Altix was definitely faster than any other system for running Oracle,” says Michal Brandejs, Director of the Computer Systems Unit at 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 Altix NUMAflex™ architecture, we’re able to get to disk and memory instantly. The CPUs are never starved, and the jobs go much faster. We saw linear vertical scalability of performance on Altix. That is, if when we doubled the number of processors in the system, we doubled the performance of Oracle. No 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 of the systems on the market for their type of application. “While Opteron® and Xeon® systems had lower acquisition cost 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®.”

Mr. Brandejs had to take into account future needs as well. “We will have to grow our system every year or two, basically forever, so we wanted a system that could expand on demand.” The answer, again, was the unique Altix NUMAflex

architecture. “With Altix, you can scale each system resource as you need, and do so independently of all other resources. Altix is entirely modular. For example, if we need more memory but not more processors, we can do it. If we need more I/O bandwidth, we can just add it. Everything plugs into the ultra-fast NUMAflex fabric. No other system on the market today has anything like NUMAflex. And best of all, we get this unique, ultra high bandwidth system with Intel® processors and standard, off the shelf Linux.”

Because it is so high bandwidth, Altix places extremely heavy demand on the Storage subsystem. After investigating all of the options in the market, Mr. Brandejs with his team chose SGI InfiniateStorage as the solution. “SGI Storage is outstanding,” he said. “Just as a system architect-

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previous Rector of Masaryk University



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In the end, Masaryk University IT chose 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 fiber 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.”

Oracle Database 10g and Real Application Cluster technology were chosen for high availability. “We can't afford to have the system offline, and Altix with Oracle 10g RAC guarantees availability.”

The IT experts noted during their tests that “sharing memory via SGI NUMAflex is much faster than with Oracle Cache Fusion®, because NUMAflex is so incredibly high bandwidth and low latency. That is, it is more efficient to connect another CPU and memory module to your current NUMAflex system than to add another separate server connected via Ethernet network. But,” Mr. Brandejs quickly adds, “the performance of Oracle 10g RAC on Altix is still so high that we chose to run RAC for the high availability feature. The performance is still extraordinary.”

But performance 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, everyone at Masaryk University has instant access to every critical piece of data, and we can grow our system on demand to meet the challenges of tomorrow. SGI was our only real choice.”

Earlier this year, Masaryk University's Information System won the 2005 EUNIS Elite Award for excellence in implementing Administrative Information Systems for Higher Education. This is a prestigious European prize that recognizes the academic institution with the best IT system of the year.

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



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