

ANSWERING THE 64-BIT QUESTION

CHALLENGE

Drive increased performance and scalability to handle peak workloads on company's retail website, keeping response times in line with customer expectations and staying ahead of growing customer demand.

SOLUTION

Move from a 32-bit environment to a 64-bit environment with Dell PowerEdge™ 2950 servers and Microsoft SQL Server 2005.

BENEFITS

The IT group is seeing a 41% improvement in response time, a 33% increase in transactions processed per second, and a 57% decrease in CPU usage—and it now has an infrastructure that can keep pace with business growth.

In business, there are some challenges that are actually good to have—and chief among those are healthy sales and sustained growth. Those may contribute to a healthy bottom line, but they can put demands on the behind-the-scenes people and systems that support them, says Jairo Avritchir, Global Database Management Director, Dell IT. “In our case, with Dell.com, we’re in a good situation in that we keep growing all the time. But we know that also means that we have to always keep finding ways to build more scalability into our infrastructure.”



Dell.com, the company's retail website, is a central component of Dell's business model—and one of the world's premier e-commerce sites, with tens of millions of visitors a month. Many of the vital customer-facing applications on Dell.com are based on servers using Microsoft® SQL Server™ databases, these include the site's shopping-cart application, which tracks to-be-purchased items throughout the sales process, and the My Account service, which manages credit card information, order history, coupons and other customer data. SQL Server databases also support the company's dynamic product catalog and the ability to let users configure systems with different parts and peripherals during the purchasing process.

To keep up with the growing business on Dell.com, the Dell IT group had upgraded its database from SQL Server 2000 to SQL Server 2005. That upgrade brought improvements in terms of greater availability, simpler management and increased scalability, with application performance increasing up to 1.4 times. Those improvements were a big help, says Avritchir. But with the ongoing success of Dell.com, the IT group continued to keep an eye on growing workloads. "Most of the time, there was no problem. But during big promotions, or around the holidays, the volumes increased significantly—they would often double," he says. "And at those times, we

consistently saw performance issues. Having 1,000 users online might quickly turn into having 2,000 users. So instead of being under three seconds, response time might then be six or eight seconds."

With rising customer expectations for fast response times, even those small delays could impair customer satisfaction. At the same time, the company was looking ahead to continued business growth that would only increase workloads further. As a result, the Dell IT group wanted to take its next step toward increased scalability, so that it could stay ahead of increasing customer demand.

MOVING FAST—AND CAREFULLY

Dell's IT Group decided to build on the improvements it had already seen in the SQL Server arena, and move its SQL servers to a 64-bit environment. As part of that effort, the group chose to run the 64-bit version of its SQL Server software on Dell PowerEdge™ 2950 servers. These servers were selected because they provided the cost-effective performance needed for the new approach, with the latest dual-core and quad-core Intel® Xeon® processors and the Intel 5000X chipset, and as much as 32GB of fully-buffered DIMM memory, which drives increased throughput and capacity.

These Dell servers and Microsoft SQL databases are critical to the operation of Dell.com. With that in mind, the IT team created a thorough



DELL POWEREDGE 2950

The two-socket PowerEdge 2950 delivers a balance of internal expandability and rack density. Perfect for network infrastructure applications such as web, messaging, database, and file/print consolidation.

“THE 64-BIT ENVIRONMENT GIVES US A LOT OF SCALABILITY”

Thomas Barta, Senior Database Analyst, Dell IT

testing plan that could be completed quickly. The group used this testing plan to certify that all its existing activities and functions—such as database maintenance, monitoring, automatic installation, and backups—would work well in the 64-bit environment. Meanwhile, to assess scalability and performance, the team conducted benchmark testing at the Microsoft Test Center in Austin, Texas, a facility that gives companies an opportunity to test their Microsoft and Dell solutions. “We worked closely with our Microsoft partners at the center, using the Dell servers that they made available to us there,” says Ravi Gurram, Senior Database Analyst, Dell IT.

“In the benchmark tests, we compared the 32-bit versus 64-bit operating systems, says Gurram. “We kept everything else constant, using the same servers and storage. And we automated most of that process using the DVD Store application.” Developed by Dell engineers, DVD Store is an open-source e-commerce test application designed to help companies evaluate performance and scalability of database servers. Based on parameters set up by administrators to represent various load patterns, it simulates OLTP workloads

on servers, and summarizes the application load in terms of response time. To augment the DVD store application, the team also created innovative automated tools that quickly combine data about server and database performance into a database, and produce the results in graphic form within minutes.

With these various tools, the IT group was able to streamline the testing process significantly. “Typically, what you see in the industry is a company coming over to the Microsoft center for three weeks of testing,” says Gurram. “Then, they gather the results, go home and analyze the data for another two or three weeks. So it’s usually a five or six week process.” The Dell team, on the other hand, was able to work with near real-time feedback to move forward quickly. “We could do the reconciliation on every iteration, as the load increased,” Gurram says. “That way, we could immediately see if we had to fix or change something, and do it right on the spot.” With that kind of accelerated approach, the entire testing process was completed in just one week.

THE PAYOFF OF MAKING THE TRANSITION

The results of all that testing were impressive, to say the least. Response time improved by 41%, and the number of transactions processed per second increased 33%. At the same time, CPU usage decreased 57%, freeing up computing power to higher volumes during peak sales periods.

“Overall, we are able to handle 1.5 times the workload, just by upgrading from 32 to 64—taking the existing functionality and putting it on the 64-bit machine. Even with increased loads, the server still performs with a much better response time,” says Thomas Barta, Senior Database Analyst, Dell IT.

That translates into a better experience for online customers, especially during promotions and peak sales periods. For example, in the 32-bit environment, the shopping cart application could support 1,000 simultaneous users with response times under 3 seconds. With the 64-bit environment, the system can handle well over 2,000 users, while keeping response times under one second.

“THE FUTURE FOR US IS CLEARLY THE 64-BIT ENVIRONMENT”

Thomas Barta, Senior Database Analyst, Dell IT

“The 64-bit environment gives us a lot of scalability,” adds Barta. “We can take our existing hardware running the 32-bit operating system, switch it to 64-bit, and get a lot more out of it. So there’s cost benefit because you don’t have to migrate to a new machine to get those kinds of performance increases.” The cost picture is also enhanced by the fact that the PowerEdge™ 2950 servers—which are relatively low-cost themselves—run on standard 110 volt power and require a minimal amount of space, which is typically at a premium in any data center.

The IT group has been putting the 64-bit systems into production on a phased basis, starting with Dell’s manufacturing area and following up with the sales and marketing functions. In time, says Jairo Avritchir, the group will migrate all its SQL servers to the 64-bit operating system—a transformation that could eventually affect some 500 servers at the company. “We’ve laid a solid foundation with what we’ve done,” he adds. “The future for us is clearly the 64-bit environment.”

As the shift to the 64-bit world is completed, it will give the IT group one consistent platform to support, helping to reduce complexity and control

maintenance costs. The shift is also opening the door to more aggressive consolidation efforts, due to the increased capacity and performance delivered by the new system. “We’re now able to bring many databases onto one server,” says Avritchir. “Instead of putting just two or three SQL databases on a server, we can put up to 20 or 30. That will give us additional power and space savings, better visibility into database and server operations, and generally make the infrastructure easier to manage.”

Finally, the Dell IT group’s efforts have helped chart a path forward for other companies considering a similar transition. “With these efforts, we have come up with clear, measurable metrics that can help companies understand just what kind of improvements they can expect from moving to a 64-bit Dell and SQL Server world,” says Avritchir. “I think our tests and experience show that there is nothing stopping companies from going forward with the 64-bit environment to take advantage of their hardware. It’s a way to really unlock the tremendous potential that is waiting there in your Dell servers.”

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