How Dell
Does IT

When the computer company moved one of its critical supply chains from a legacy UNIX system to industry-standard technology and Oracle Database 10*g,* it boosted performance and cut $5 million out of IT costs.

The right IT platform helps Dell manufacturing facilities like the one above stay up and running and turning out some 100,000 systems a day.

At Dell, fast, flexible, and lean supply chains lie at the heart of the business. Indeed, Dell's supply chain capabilities are a key competitive differentiator for the company—one that enables Dell to deliver built-to-order computers to customers quickly and cost-effectively. And that means that when it comes to the information systems that support that supply chain, there is little room for error. "If these systems are not operational, we don't build and ship products. If we don't do that, we don't book revenue—which makes these systems mission-critical," says Duane Miller, senior manager of Worldwide Procurement IT at Dell.

Not long ago, however, Dell's IT professionals saw potential problems looming on the horizon. The database that was the foundation of its supply chain applications was running on a legacy UNIX

system—and with the ongoing success of Dell products and the resulting IT workloads, that system was reaching the limits of its capacity.

"We were starting to get 'Sev 1' calls regularly," says Miller. Such calls, he explains, occur when an outage in the supply chain management system interrupts production. "They are the highest level of severity in terms of problem calls, based on the degree of impact to the business. With those calls, it's all hands on deck, and we drop everything and get them back up and operational, because the problem is stopping manufacturing at one of our domestic or international facilities."

What's more, the IT group could see that things weren't going to be getting any easier. The demand for Dell's products was increasing, and forecasts called for higher production volumes in the near future. In addition, the company was bringing on new factories the system had to support. To handle these growing workloads, the IT department clearly needed to increase the capacity of its supply chain database platform—and managers wanted to do so quickly, before the coming holiday season, when the company's sales tend to spike.

Saying good-bye to UNIX

Dell's challenge was hardly unique: Running out of headroom on a large legacy server is a familiar problem for IT professionals in many organizations. Traditionally, the solution has been to add another legacy server, in essence implementing a relatively large amount of capacity in one pass—and then hope the new server will meet the company's needs for several more years. But Dell IT leadership took a look at advancing technology and decided there was a better way.

"We saw that there was an opportunity to move the database from the expensive UNIX environment to a more cost-effective standards-based environment that could provide the high levels of performance we needed," says Miller. The platform Dell selected: groups of Dell™ PowerEdge™ servers running Oracle® Database 10g with Oracle Real Application Clusters, and drawing on Dell/EMC storage devices. The platform uses the Linux® operating system, reflecting a growing trend in the Oracle community: According to an Independent Oracle Users Group member survey in early 2006, Linux will overtake Sun's UNIX-based Solaris as the top operating system for Oracle database deployments in 2007.

The demands on the Dell and Oracle platform were clearly going to be significant. The database has to support a range of vital supply chain processes, including configuration management, procurement, material-cost management, inventory, and accounts payable. In terms of workloads, that means handling the volumes of information needed to manage 1 million Dell part numbers across nearly 200 product families. It also means tracking nearly 3 million inventory movements a day, more than
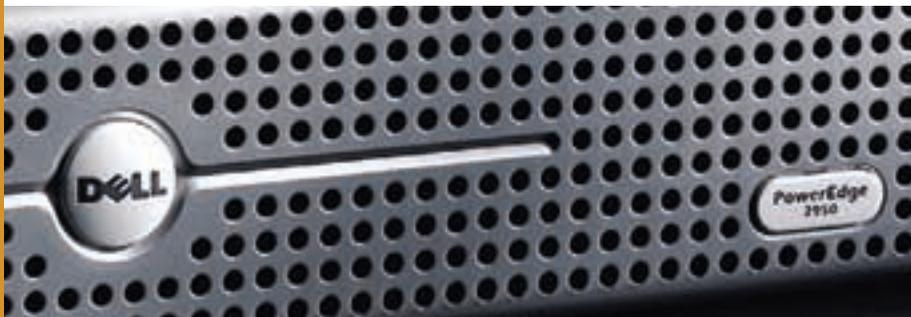
Dell on Dell at a Glance

Business system
Database supporting a supply chain involving:
- More than 10 manufacturing plants worldwide
- 1 million part numbers
- 3 million inventory movements per day
- More than 2 million bills of materials per year
- 1.8 million purchase order lines per year

Old environment
Sun® UNIX server

New environment
- Dell PowerEdge servers
- Oracle Database 10g with Oracle Real Application Clusters
- Dell/EMC storage devices

Benefits
- More than $5 million in IT savings
- 90 percent reduction in the number of product units not manufactured due to system outages
- 40 to 50 percent shorter financial closings
- Increased IT flexibility and scalability
- Reliable, cost-effective support for critical supply chain

"The availability of our supply chain systems is paramount to keeping our factories running. . . . any downtime costs us thousands of dollars per minute."

—Curt Johnson, director of Worldwide Procurement IT, Dell

2 million bills of materials a year, and nearly 1.8 million purchase order lines per year—and doing so with high levels of reliability and speed. "The availability of our supply chain systems is paramount to keeping our factories running," says Curt Johnson, director of Worldwide Procurement IT at Dell. "And because we're building more than 100,000 systems each day, any downtime costs us thousands of dollars per minute."

Not surprisingly, Dell's IT group put the platform through an extensive and rigorous evaluation. "Given the high stakes involved, the choice was certainly not a matter of simply choosing the company's own servers," says Miller. "We built an environment where we could simulate a full online set of users, as well as the batch processing we use to interface this data with numerous other applications." The group also put the system to the test in the real world, implementing and evaluating it in its Malaysian operations before rolling it out globally.

The system passed these various tests, and today Dell's supply chain database is run on clusters of up to six Dell PowerEdge servers, depending on the region being supported, with mirrored disaster recovery systems at remote sites. That means that Dell has redundancy at both the backup and cluster levels. If a server node goes down, its workload can be picked up instantly by another node in the cluster. Additionally, individual nodes can be brought down one at a time for maintenance without affecting the operation of the overall system—as opposed to having to take the entire UNIX server down when maintenance was required.

And new nodes can be easily added to the cluster to increase capacity.

In recent years, Dell and Oracle have tested and validated a variety of configurations using Dell PowerEdge servers and Oracle software, including such clustered systems. As a result, Dell's IT group has been able to take advantage of the strengths of both companies' technologies. In terms of performance, for example, using Oracle Database 10*g,* Dell servers lead other vendors' servers in the 300GB clustered TPC-H price/performance results. The PowerEdge servers also include Dell OpenManage™ tools, which offer integrated deployment, monitoring, and change-management capabilities for updating server software, operating systems, databases, and applications, all from a single console.

Dell's IT group has also drawn on Oracle Enterprise Manager 10*g* Grid Control tools to streamline the monitoring and management of its databases. "Grid Control lets us manage the clustered database on multiple servers through one central location," says Ravee Avutu, senior manager of Database Management Services at Dell. "This has helped us improve reliability and reduce management costs."

With the new system, Dell IT is now supporting supply chain operations at more than 10 plants around the world, as well as several merging centers in the U.S., where products such as computers, printers, and flat panels are consolidated into orders for more efficient shipping. Within months, Dell plans to have all of its regions using Dell and Oracle Database 10*g,* giving the company a powerful, consistent platform worldwide.

Better performance, lower cost

In operation, the Dell and Oracle platform has proven to be highly effective. "The reliability and stability has just been phenomenal," says Miller. For example, Dell tracks the number of product units that are not manufactured due to system outages—and that figure has been reduced by more than 90 percent. At the same time, he adds, "we've seen tremendous performance improvements. The new environment can process significantly more data than before."

That improvement is especially evident during weekly, end-of-quarter, and end-of-month financial processing times, which have been cut by an estimated 40 to 50 percent—or more. Basic month-end batch jobs that used to take eight hours now take two to three hours. In more complex cases, there can be some 40 steps involved in closing the books and calculating cost, a process that used to take 13 hours or more to complete. Those closings are now completed in six hours or less. Such reductions have been key, because during these closing processes, the supply chain system is shut down—and so is

manufacturing. Looking ahead, Dell plans to use the Dell and Oracle platform to separate the closing process from production, so that manufacturing will not be interrupted at all.

Among other things, the system's performance helps Dell do more with the same manufacturing capacity. "With fewer disruptions, we are basically creating more capacity for those facilities, which they can use to build more product," says Miller.

The new platform has also brought significant benefits to Dell's IT group itself. With the switch to more cost-effective technology and sophisticated management tools, Dell has seen more than $5 million in IT savings, as well as process improvements across its IT production, disaster recovery, and development activities. In addition, says Miller, "this greater reliability has kept us from having to spend a lot of time troubleshooting issues, and let us keep focused on what we need to be focused on— delivering new functionality to our business users."

That ability to provide enhanced support to the business is being strengthened by the high level of flexibility that is inherent in the new system. "It's very easy for us to move services from one node to another to adjust to changing workloads," says John Harvill, development lead for Worldwide Procurement at Dell. "For example, if a batch or online processing server is down, we can move the work from one node to another, without interruption. Or, if the company needs to add another factory, we can easily scale out to support it. In the past, that would have involved the fairly painful process of adding a whole new large UNIX server. Now we can add a separate node and a little storage, and we're good to go."

Looking back at the decision to move

to the Dell and Oracle platform, Miller says the experience holds lessons for IT departments everywhere. "We ran into a problem with the old UNIX system that a lot of companies run into—and we found a solution that gives us the performance, flexibility, and scalability we need for Dell's business. We've been able to significantly lower our IT costs at the same time. And most of all, we've been able to reliably support the Dell supply chain, and play a vital role in helping Dell continue to meet the needs of our end customers."

Combined Expertise, Complete Solutions

Dell and Oracle work together on a number of fronts to help companies take advantage of cost-effective, powerful alternatives to legacy systems.

"Experts from both companies collaborate to develop complete solutions," says Reza Rooholamini, director of Software Development at Dell. Through these efforts, Dell is able to provide pre-engineered, tested, and validated Intel-based Oracle database solutions on Red Hat Linux and Microsoft® Windows Server® 2003. "We test and support the entire solution stack—servers, storage, switches, operating systems, and Oracle Database software," says Rooholamini. In addition, Dell Services and Oracle Consulting Services work together to provide fixed-fee and custom services designed to accelerate implementation and help organizations make the best use of the technology.

These collaborative efforts are in keeping with the long-term visions of both companies. Oracle's Grid Computing strategy focuses on delivering flexible, reliable database throughput; the dynamic provisioning of database workloads on grids of industry-standard servers; and the ability to easily add more capacity to grids. Dell's Scalable Enterprise vision complements that strategy with its focus on standardizing the core elements of IT infrastructure to deliver superior value, and ultimately enabling customers to simplify operations, improve utilization, and scale effectively.

The effectiveness of the Dell and Oracle partnership is perhaps best illustrated by the fact that both companies use Dell and Oracle platforms in their own operations. Oracle develops and tests much of its software on Dell PowerEdge servers and relies on more than 20,000 Dell Linux servers to power key elements of its Global IT operations. Similarly, Dell entrusts several mission-critical business systems to PowerEdge servers running Oracle Database 10*g*—including not only the company's supply chain, but also its European order management system.

Resources

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