Lithonia Lighting Case Study: Red Hat, Oracle, Dell Solution Halves Batch Processing for ERP Applications

When Lithonia Lighting's fast-growing product databases and user activity tested the limits of the company's existing environment, they migrated to clustered Dell servers powered by Intel® Xeon™ processors running Oracle9*i*™ RAC on Red Hat Linux® Advanced Server. The solution significantly cut batch processing jobs and provided performance headroom to meet future demand.

Solution Summary

Challenge

Lithonia Lighting, an Acuity Brands Company, is one of the largest industrial and commercial lighting manufacturers in the world, relying heavily on technology to provide a competitive edge. But when fast-growing product databases and user activity tested the limits of the company's existing environment, Lithonia needed a change.

Solution

To handle the rapidly increasing loads, Lithonia migrated from a single, Intel processor-based database server to clustered Dell servers powered by Intel Xeon processor family technology and running Oracle9*i* Real Application Clusters (RAC) and Red Hat Linux Advanced Server 2.1. Most importantly, this solution delivers performance headroom to meet future demand.

Business Value

Clustering multiple Intel processor-based Dell servers by running Oracle9*i* RAC helped Lithonia reduce the costs likely to result from a migration to a proprietary RISC platform. The solution also minimized business disruption, while allowing Lithonia to take full advantage of the expertise and efficiencies it had developed in-house over the years. The result: Low costs, improved productivity.

Database servers	Four Dell PowerEdge™ 6450 servers based on quad Intel Pentium III Xeon Processors
Application servers	Six Dell PowerEdge 2650 servers based on dual Intel Pentium® 4 processors
Concurrent managers	One 8-way Dell PowerEdge™ 8450 server and one 4-way Dell PowerEdge 6450 server, both with Intel Pentium III Xeon processors
Client PCs	More than 5,000 Dell Optiplex™ PCs deployed internally, another 2,000 Dell Optiplex PCs deployed to third-party reps
Database software	Oracle9*i* RAC
Enterprise applications	Oracle® E-Business Suite, release 11*i,* including Oracle Financials® and Oracle® HR
Operating system	Red Hat Linux Advanced Server 2.1
Load balancing	Cisco IP Load Balancer

Business Challenge

Turning on the Lights

From humble beginnings in a Georgia garage in 1946, Lithonia Lighting has become one of the largest manufacturers and assemblers of lighting equipment for commercial, industrial, outdoor and residential applications. With more than 8,700 employees and a vast network of independent sales agents, Lithonia operates 22 manufacturing plants and five major distribution centers in North America and Mexico. Lithonia recorded gross revenues of $1.5 billion in 2002. Lithonia Lighting is the largest business unit within the lighting group of Acuity Brands, Inc.

Behind these numbers is a highly competitive business that operates on slender margins, tight turnarounds and complex product configurations. As an assembler, Lithonia Lighting fulfills the needs of thousands of electrical distributors and wholesalers worldwide, providing custom products for a broad array of applications, industries, and environments. It's a daunting challenge, says Jeff Kernan, Executive Vice President and Chief Supply Chain Officer of Acuity Lighting Group, Lithonia's parent.

"We are as complicated a thing to configure as there is. If an automobile is a three, we're a ten," Kernan explains. "We have 400,000 manufacturing bill of materials, for instance, in our core facilities, and we add about 1,000 bills of materials a week. So our manufacturing environment is very dynamic. It's an interesting challenge with a high degree of complexity, yet a need for a relatively low unit cost and high velocity."

One thing is certain: Large companies like Lithonia can't succeed by shipping finished products from distant locations. Short turnarounds and high shipping costs make a centralized operation untenable. In fact, until the 1970s there were no national players in the lighting sector at all. Lithonia changed all that, pioneering a regional distribution model that put warehousing and assembly operations in regional centers across the United States. That national-yet-local approach helped Lithonia compete with thousands of small, local distributors, and eventually transformed the lighting sector.

Getting finished product to the customer build site was only half the battle. "It was determined that the way for us to grow was to put strong agents and inventory in the territory and create an IT infrastructure that gave our sales agents the same power the local manufacturer had," Kernan recalls. Tapping into more than 2,000 representatives across the country enabled Lithonia to wrest control of product packaging and configuration from local electrical distributors. The local reps allowed Lithonia to deliver economies of scale right where time-starved contractors and builders needed it—at their doorsteps.

Technology Solutions

Hiring independent representatives to move products is nothing new. But Lithonia's aggressive use of technology certainly was. According to Kernan, the company's early adoption of PC technology helped drive its commanding lead. "We connected our sales agents to us very early—actually in the late 1970s we were starting to connect sales agents to us electronically," he says. "With the advent of the PC in 1983, we almost immediately put local area networks in our sales agencies that were connected to our office computers. As the world has gone on, those client server systems have gradually migrated over to being directly connected in real time through IP-based technology."

Behind this aggressive adoption is a back-end infrastructure that has continually pushed the leading edge. The company was among the first to move Intel architecture-based servers into mission critical roles.

"We were early Intel and Dell customers, and contrary to some people's advice, we proved what could be done on these servers," says Phil Kilgore, Lithonia Lighting's director of information technology. "We've had our order processing system for seven years now running off Intel-based servers from Dell. We can deliver a lot of horsepower for the money."

Until last year, Lithonia had run its Oracle enterprise database and Oracle E-business Suite on a Dell PowerEdge 8450 server. The build-out provided outstanding cost-performance compared to proprietary, RISC solutions, but the growing number of users and transactions forced a scaling decision.

Business Solution

Cluster Karma

Lithonia considered migrating to a Unix® environment based on servers from a proprietary vendor. Such a move would have required an enormous investment in both infrastructure and staff, but the company's options seem limited — until a timely meeting with Dell product managers introduced Kernan and Kilgore to the idea of running Oracle9*i* Real Application Clusters (RAC) on Intel-based servers and Red Hat Linux.

Oracle9*i* RAC is tailored specifically for clustered server environments. By taking advantage of the aggregate processing power of economical, Intel-based servers arrayed in a network, Oracle9*i* RAC enables companies like Lithonia to scale to unprecedented heights. Oracle9*i* RAC's innovative Cache Fusion architecture eliminates stubborn I/O bottlenecks, enabling multiple servers to access data directly from local cache, rather than making slower reads and writes to and from system memory. The result is a clustered database environment that provides near-linear scaling as new servers are added.

Today, Lithonia Lighting runs a four server cluster dedicated to the company's enterprise Oracle9*i* RAC database, and Lithonia's Oracle E-Business Suite 11*i* applications. The cluster consists of Dell PowerEdge 6450 servers—each outfitted with four Intel Pentium III Xeon processors. The servers each incorporate 8GB of system RAM to ensure maximum responsiveness under heavy transaction loads.

On the front end, six Dell PowerEdge 2650 dual-processor servers power the Oracle E-Business Suite 11*i* application set, including Oracle Financials, Oracle HR, Oracle Manufacturing and other components. Based on fast Intel Pentium 4 processors running at 2GHz, these servers sit behind a Cisco IP load balancer to ensure equal loading at all times.

A pair of servers are deployed as concurrent managers to balance loads and schedule the processes that move through the Oracle E-Business Suite 11*i* environment. The pair consists of an 8-way Dell PowerEdge 8450 server with eight Intel Pentium III Xeon processors and a 4-way Dell PowerEdge 6450 server that is configured identically to the database servers.

Scale Away

Red Hat Linux has played an integral role in the solution, allowing Lithonia to stay with familiar Intel-based solutions from Dell. After initial deployment on Red Hat Linux 7.1, early tests revealed memory constraints. Lithonia inked a service contract with Red Hat to bring deeper Linux expertise on board. Red Hat consultants facilitated the move to Red Hat Linux Advanced Server 2.1, which provides superior scalability.

"We signed a support contract with Red Hat, and practically the same day they were here working with us and with the Oracle and Dell people to get the right drivers, the right patch levels and the right kernel to address performance and memory model issues," Kernan says. "They brought a level of confidence and capability to support the operating system side of the equation. And it wasn't that anybody else was naive about it. It was just that Red Hat had the expertise to move things forward." For Lithonia, the clustered Oracle infrastructure provides a remarkably robust and economical foundation for the growing business. By deploying Red Hat Linux Advanced Server on Intel architecture-based Dell PowerEdge servers, Lithonia did more than remove a memory bottleneck—It multiplied the power available to its applications. Kilgore says batch job times have been cut significantly, meaning that intensive operations like payroll—which have unforgiving deadlines—are being completed much faster than before. The improvements haven't gone unnoticed.

"It's been a real positive thing," Kernan says. "The users like it because it works faster. We meet all the payrolls and they run awfully fast—especially on Oracle9*i* RAC. They run lickety-split."

That solution has raised the ceiling on Lithonia's infrastructure. Kernan says Lithonia will eventually scale up to the Dell PowerEdge 6650 line of rack-mounted servers, tapping into the significant performance increase provided by the quad Intel Xeon processor MP with its advanced three-stage cache subsystem. From there, Oracle9*i* RAC makes it easy to scale out performance by dropping in additional servers.

"One of the advantages of our Intel environments — and one of the things we have always done — is to scale horizontally," Kernan says. "One of the attractions is the potential of doing that."

Dollars and Sense

Lithonia could not have afforded to scale performance this effectively on a proprietary platform. When Kernan and his team compared a Sun deployment against one based on clustered Intel-based servers from Dell, the numbers weren't even close.

"It was considerably more expensive just for the hardware," Kernan says. "And given that we had no Unix expertise in-house, we would have had to hire a number of Unix experts, which we believe would have been extremely expensive."

By staying with Intel architecture and deploying Red Hat Linux Advanced Server on proven Dell PowerEdge servers, Lithonia was able to sidestep additional staffing costs. Kilgore says the in-house IT staff has adapted well to the demands of the Linux environment. In just six months, the organization is 95% self-sufficient in the environment.

Kernan also credits a rock-solid relationship with Dell for the program's success. "Dell has always backed up their machines. They've done whatever it took to make it right," says Kernan. "That's my definition of a strategic supplier — quick delivery, customizable configurations, and they firmly stand behind their systems with great expertise. It's been a very winning kind of relationship."

In fact, Lithonia today is talking about migrating other portions of its infrastructure to Linux. "We never do anything halfway. We are now a Linux site," Kernan says. "With our Oracle database cluster successfully running on Linux we're talking now about how and when to move the middleware to Red Hat Linux Advanced Server, on Oracle9*i*AS."

Lithonia may have big plans for the future, but Kernan makes it clear none of this would have gotten off the ground without the active participation of all parties. The strong alliance of Oracle, Dell and Red Hat, working on the Intel platform, enabled Lithonia to realize significant value from the migration.

"I think we got great support from everybody. We got great support from Oracle, we got great support from Dell, we got great support from Red Hat, all of which contributed to our success in the 90 days we took to get the initial Linux RAC up and running," Kernan says. "It happened fast, and it happened because we all worked together as a team."

Lessons Learned

Commit to the platform.

Lithonia has relied on the Intel platform since 1983, so when fast-growing system loads forced a scaling decision, the company wasn't eager to scrap its deep expertise in the platform for a RISC solution. By deploying an Intel architecture-based clustered environment on Red Hat Linux Advanced Server 2.1, Lithonia achieved its scaling objectives while retaining its platform expertise.

Safety in numbers.

Optimized for clustered environments, Oracle9*i* RAC delivers outstanding performance to Lithonia when deployed over 10 multiprocessing Dell PowerEdge servers based on Intel Pentium III Xeon processors. Intelligent load balancing and active failover capability also helps deliver greater availability, further enhancing value.

Forge Relationships.

Close and effective ties with Dell, Red Hat and Oracle enabled the company to tap expert resources on short notice and achieve an unprecedented 90-day turnaround on a major migration project.

Embrace innovation.

Lithonia is among the first companies to deploy the Oracle E-Business Suite version 11*i* suite on top of a clustered Oracle9*i* RAC environment on Linux. That pioneering effort has paid off handsomely in the form of faster batch job times, improved productivity and reduced operating costs.

Look forward.

Lithonia plans to migrate to more powerful Dell PowerEdge 6650 servers based on Intel Xeon processors and Red Hat Linux Advanced Server in the near future. From that base, the company will be able to scale out performance to match demand for the foreseeable future.