



Marty Edelman,
director, Advanced Technologies,
The Home Depot



Assembling the right tools

The Home Depot builds the superlative customer experience using HP NonStop servers and SOA

P EOPLE LOSE RECEIPTS. RECEIPTS GET CRUMPLED UP AND thrown away, turned into shopping lists, washed with the work clothes, and filed away in that mysterious “safe place” that’s impossible to find when you need it.

Normally this fundamental truth about receipts causes nothing more than minor annoyance. But for construction professionals and weekend “do-it-yourself” warriors—those people who finish a job only to find a sizable inventory of unused lumber, paint, duct tape, hinges, fasteners, sheetrock, spackle, lighting fixtures, countertops, fittings, faucets, pipes, appliances, cabinet doors, and conduit on their hands—the pain can be greatly magnified. Of course they’d like to return these items for a refund. But in the unlikely event that the receipts can be located, which ones contain which items? When were the various purchases made? Did the tenders take the form of cash, check, or credit card? What if different credit cards were used for multiple purchases?

If the items were purchased at the Home Depot, these questions cease to matter. Why? Because the Home Depot is smart: The company knows its customers. It knows that people often need to return goods. And it has Marty Edelman and his team making sure that the refund process is quick, accurate, and painless.

Edelman is director of Advanced Technologies at the Home Depot, with responsibility for application development in the company’s HP NonStop system environment. Along with John Rohland, another senior manager, Edelman oversees all point-of-sale solutions for the company. And on the side, he manages “small” projects like replacing the entire IT infrastructure in the 2,100 Home Depot stores that blanket Canada and the United States.

EXCITING STORY

But the NonStop system is really where the story gets exciting for customers who want to return items for a refund. Thanks to an innovative “receipt lookup” application, any associate of the Home Depot can access complete sales data on any credit, debit, or check transaction via a browser-based terminal or POS device, and take the appropriate action immediately while the customer is still there.

“The Home Depot’s guiding principle is ensuring a superlative experience for our customers, and the receipt lookup system is a great example of how HP’s NonStop platform helps us do this,” said Edelman. “People who start projects—like working on weekends to renovate a bathroom—often come to our store on a weekly basis to buy materials. By the end of the project, they usually have a lot of things they need to return.

“Before we implemented the receipt lookup system, customers had to keep track of all their receipts and bring them to the store to get refunds. This was a time-consuming and frustrating experience. Now they can come in with all their materials and no receipts. We can look up how and when they paid for everything, even if they used 10 different credit cards. Customers don’t have to worry about whether they’ll be able to do the returns. We’ve made it very simple.”

Data capture and receipt lookup were the first applications that the Home Depot developed in-house for deployment on the NonStop server. (Previously, the company ran a third-party, NonStop system-based application that provided limited refund and gift card capabilities.) The data capture component takes sales data in real time from every store and writes it into a NonStop SQL database. The receipt lookup system retrieves that information for refund purposes.

THE SOA EDGE

All of the Home Depot’s NonStop system-based applications, including data capture and receipt lookup, have service-oriented architecture (SOA) interfaces. This design approach makes it possible for IT to react quickly to new payments-related business requirements by assembling the necessary application components, or “services.”

“We are constantly coming up with innovations in response to a steady stream of new things that the business wants to do,” said Edelman. “You’ve got to be very nimble in retailing. Projects can’t take five years; they have to be up and running in a matter of months. Agility is a key requirement for us—we have to meet the needs of the business in a timely fashion, providing exactly what the business needs, when it needs it. SOA in the NonStop system environment has made this possible for us.”

The ability to build reusable components is key to this dramatic productivity increase. “When people want information about receipts, they simply go to a well-known interface and access the data directly,” said Edelman.

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“We’re not writing new code to enable this function—we’re just work-flowing multiple services together to build new applications. The SOA approach gives us extreme speed in getting new solutions up and running, and here’s the proof: We did about one software release per year before we moved to SOA. By contrast, we did five software releases last year, with no increase in our NonStop system development and support staff.”

One particularly interesting application presents a visual “genealogy,” derived by mining gift card data for patterns that might indicate fraudulent activity. If the company uncovers a fraud ring, it can show every transaction, from first to last. “It looks just like a family tree,” said Edelman. “You can walk into a court of law and, with a single picture, clearly demonstrate the extent of the fraud. There is really no limit to the innovative solutions we can create today to run on our NonStop system.”

In addition to enhancing productivity and responsiveness, SOA helps the Home Depot reduce IT costs. “If I don’t have to write new code, I just saved money on a developer,” said Edelman. “What’s more, I no longer need to hire developers with specific NonStop system skills; people who understand SOA principles can become productive very quickly in the NonStop system environment using normal XML, HTTP, and SOAP interfaces. And the system is so easy to use, we no longer need to have a trained analyst sitting with business users to help them find the desired information.”

From the NonStop system point of view, the Home Depot is blazing the SOA trail in retail. “SOA has been around for a few years now, and everybody is moving toward it,” said Edelman. “But NonStop system users have been kind of slow in getting there. People didn’t



Escort SQL bridges the gap

The Home Depot’s original NonStop system ran a third-party refund and gift card package using Enscribe database software. Over the last four years, however, the company has brought these applications and more in-house, rewriting them from the ground up in accordance with the latest SOA design principles. The improvement in responsiveness and productivity has been striking. Carr Scott Software Incorporated—a longtime NonStop system partner, whose Escort SQL database middleware helped the Home Depot move into the modern SQL relational database world—deserves some of the credit.

“Our third-party application package allowed us to use only Enscribe flat files, which have very limited capacity by today’s standards,” said Marty Edelman, director, Advanced Technologies, at the Home Depot. “When we installed that initial system, the Home Depot had only 200 or 300 stores—but we grew rapidly, and our Enscribe data files could no longer hold all our data. We used Carr Scott’s Escort SQL product to convert these files into NonStop SQL tables, eliminating those size limitations very cost-effectively.”

Escort SQL, NonStop SQL database middleware for Enscribe applications, makes it possible to quickly and easily replace Enscribe files with redesigned NonStop SQL tables. No source code changes or recompiles are necessary, and the conversion can be handled through small, manageable increments. The high-speed parallel database loader of Escort SQL moves the existing Enscribe data into the new NonStop SQL tables efficiently, using user-supplied rules to govern data transformation. Once production data is loaded into the tables, these same transformation routines are used by the database middleware to successfully read and write the data. And because Escort SQL provides a database middleware layer, Enscribe programs can execute unchanged against either Enscribe files or SQL tables.

“Escort SQL also allowed us to revise the internal structure of the tables to improve performance,” said Edelman. “Our move to NonStop SQL using Escort SQL provided the all-important bridge between the old and new systems, positioning us to move into the SOA world. We saved a significant amount of money, time, and risk by using Carr Scott Escort SQL database middleware.”



Mapping the hurricane

In addition to its primary function as the Home Depot's payment hub, the NonStop system also plays a pivotal role in disaster support work at the company. "We



monitor all of our stores in real time, and we can see how many transactions are taking place at each of our 50,000 cash registers," said the Home Depot's Marty Edelman, "If there's a

problem at any given store, the related icon will turn red on the map and we can respond quickly."

The team's agility was put to the test when Hurricane Dennis battered the Florida coastline in July 2005. "Our operations folks came to us on a Friday, asking if there was any way we could help monitor stores that lay in the path of the hurricane—without having to call each store on the telephone to see if it had been affected," said Edelman. "Using the externalized interfaces of our SOA-based environment, we were able to build a map to provide this real-time monitoring capability. If we'd had to write special code to submit and process database queries, it would have taken us weeks to implement the solution. But with SOA on the NonStop system, we pulled it all together over a three-day weekend."

understand that, with the software tools HP has been releasing over the last few years, the NonStop server supports SOA just as well as a UNIX® or Microsoft Windows® box does. The Home Depot was the first retail enterprise to leverage this approach on a NonStop system. In fact, we are aggressively moving toward SOA across all of our platforms, because it will make us much more agile."

FUNDAMENTALS AT WORK

The great thing about putting SOA applications on the NonStop server is that they automatically inherit the hallmark "fundamentals" of the platform. Continuous availability, for example, is essential for the Home Depot's payment-related applications. "We process approximately 1.5 billion customer transactions a year," said Edelman. "On a nice weekend in spring, it's not unusual for 4 or 5 million transactions a day to hit the NonStop server. Our first priority is keeping the system up and running, without any hiccups. The NonStop system ensures that we're always available to serve the customer."

The Home Depot also must have a highly scalable and parallel system. "When we implemented the new receipt lookup system, we were probably at 1,700 stores," recalled Edelman. "Now we're at 2,100 stores, and we're still growing very rapidly—opening more stores and also increasing our sales volume. We need a system that scales predictably and with linear performance, which essentially defines the NonStop server.

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along with more than 130 data disks. When a transaction comes in, we break it into a lot of small pieces and process them all independently, using NonStop TMF to guarantee that all transactions are fully committed to the database before we respond to the store.”

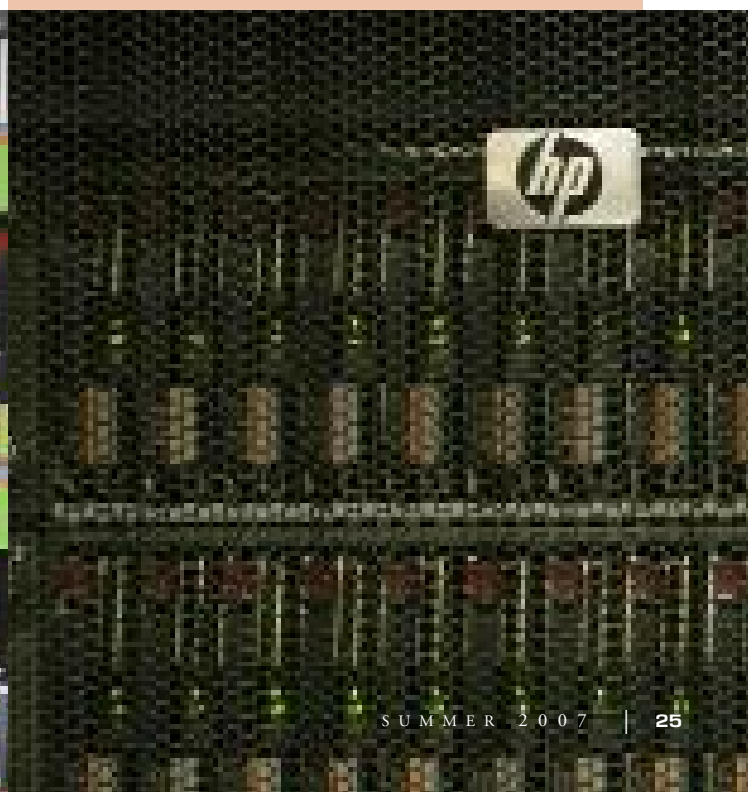
Mixed workload capabilities are critical in the Home Depot’s dynamic retail environment. “The reporting infrastructure and the disaster support applications are totally unrelated to our online transaction processing environment,” said Edelman. “We absolutely need the ability to adjust processing priorities in order to ensure fast response time in the stores. Customers don’t want to spend their time paying for things. They want to walk in, find the products they came for, and then get out of the store and back to their projects and job sites. The mixed workload capabilities of the NonStop system ensure fast response time, so we can meet the service-level agreements we’ve set for our customers.”



Growing respect

Before it started bringing payment-related applications in-house, the Home Depot considered the NonStop server as “that black box” that sat in the corner running a third-party application. “The platform was not well understood, and people didn’t appreciate its capabilities,” said the Home Depot’s Marty Edelman.

“When we started building the new set of applications, the potential of the system quickly became apparent,” he continued. “More and more applications were put on it, and today the platform has earned the respect of users and upper management alike. When you’re the size of the Home Depot, hiccups are magnified—imagine 1,000 stores not being able to take customer payments. The NonStop system makes it possible for all of us to sleep at night.”





Thick reports are history

In the days before the Home Depot brought its NonStop system application development work in-house and started following SOA design guidelines, business users regularly received stacks of thick, static reports from the IT group. "Somebody went in, wrote a bunch of code, and produced a report, and we would send these reports to every store every night," recalled Marty Edelman, director, Advanced Technologies. "Every transaction was a separate line and people had to figure out how the data points correlated with one another."

As the Home Depot adopted the SOA approach, it created a Web-based application to satisfy business users' need for information. "Now, instead of having to go through static reports, users can pull out the exact data they need without going through 1,000 pages of paper," said Edelman. "We have saved a fortune in printing, because everything is now on the screen. Users print only the three or four things they really care about, rather than printing all the transactions that took place the day before."

Today, people work on the screen. They submit a query, get the information they need, and cut and paste it into Excel, Word, PowerPoint, or some other application. "What we're really looking for is knowledge—taking that data and turning it into something that can be used to make decisions," said Edelman. "With SOA in the NonStop system environment, our business users can exploit the data in a much more robust and flexible manner."

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Not surprisingly, real-time computing capabilities are also high on Edelman's list of critical attributes. "During our busy season, we can process between 1,500 and 2,000 transactions per second and sustain that rate for hours on end," he said. "We can't continue on to the next transaction until the previous one has been completed. So the real-time processing capabilities of the NonStop system are quite important to us."

Partners also play an important role in the Home Depot's NonStop platform environment. ESQ's Automated Operator (AO) and Vision products provide real-time system monitoring with extensive reporting, problem escalation, automated recovery actions, performance analysis, and capacity planning. NSK-NTP software from Bowden Systems, running on production and disaster recovery systems, provides continuous time synchronization within .01 seconds to ensure operational compatibility. And Escort SQL database middleware from Carr Scott Software was instrumental in helping the Home Depot move into the SOA world (see "Escort SQL Bridges the Gap").

"OPEN" LOWERS COSTS

Support for open standards is a fundamental requirement in the SOA world, and this is another area in which the NonStop system excels. "The reason I say we're probably the only retailer on the planet using SOA on a NonStop server is directly linked to open standards," said Edelman. "People do not understand that this platform has all of those capabilities, including the OSS personality, iTP WebServer, and XML parsers. I can hire kids out of college who have been trained on these open software platforms, so my training time is reduced. And our UNIX and PC developers can navigate the system to take advantage of our SOA data, without the help of a trained NonStop system developer."

Another important benefit of the NonStop system is its support for Web-based features. In particular, this capability has enabled the Home Depot to move from “green screens” to browser-based terminals in the stores. “These days, pretty much everybody on the planet knows how to use the Web,” said Edelman. “All our screens are now Web-based, so we don’t have to worry about training—and with 350,000 employees, high turnover, and seasonal part-timers, training can be a very big expense. This approach has saved the company millions of dollars in training costs.”

The system, comprising two NonStop S86016 servers and running many applications in active-active mode, supports all of the Home Depot stores across North America. Every sale goes through the system, so an associate can pull up the original sales receipt when customers request a refund. The NonStop server is also the database of record for gift cards, electronic deposits, and tax-exempt status, and it plays a critical role in disaster support (see “Mapping the Hurricane”). “With the NonStop system as the payment hub of the Home Depot, we now have a complete view of our world,” said Edelman.

Plans to move to the Intel® Itanium® 2 processor-based HP Integrity NonStop platform—using the Triple Modular Redundancy (TMR) configuration—are already in place, and Edelman has high expectations. “We expect to see the cost per transaction drop significantly, because it’s a much less expensive machine in terms of CPU,” he said. “We also know that going from five to seven 9s will give the business that much more reliability and safety. Finally, we expect to see a significant increase in price/performance as we move into the Integrity NonStop server line, because it uses much more openly available hardware. It promises to deliver the same volume economics that HP enjoys. We continue evolving as the NonStop server evolves, following the direction set by HP, which is the right direction for us.”

For the Home Depot, the world revolves around the customer. “Everything my team and I do is about trying to enhance the experience of our customers when they walk into the store,” said Edelman. “The NonStop system and its SOA-based applications help us ensure that this experience is delightful.” ♦

MARTY EDELMAN has held a variety of positions since joining the Home Depot in 2003. Currently he serves as director, Advanced Technologies. His team is responsible for in-store and customer-facing systems, including the Showroom Point-of-Sale, Strategic Store Infrastructure, Coupon Management, Gift Cards, Check Authorization, Electronic Deposits, and Tax Automation systems, as well as the Hurricane and other disaster support systems.



Edelman has been involved in the IT field for more than 25 years. As an independent consultant, he founded a small consultancy firm that specialized in developing high-volume mission-critical solutions for Fortune 500 companies. He and his team helped to build the UPS Tracking System, the NYSE Consolidated Trade and Quote systems, and the SWIFT next-generation computing platform.

A frequent speaker at such industry events as the Standish Group’s Chaos University, the ITUG Summit for NonStop system users, and the HP Executive Council, Edelman has also been interviewed for numerous industry publications.

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Edelman dons his Home Depot apron. All employees—even the company’s CEO—have their own apron.

PHOTOGRAPH BY ERIK BUTLER