



RED HAT SOLUTIONS ENABLE CME GROUP TO PROCESS MILLIONS OF CRITICAL FINANCIAL TRANSACTIONS PER DAY

FAST FACTS

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| Company | CME Group |  <small>A CME/Chicago Board of Trade/NYMEX Company</small> |
| Industry | Financial Exchange | |
| Geography | Global | |
| Business challenge | To migrate from a cost-inhibitive proprietary UNIX platform to a Linux alternative in order to reduce costs and increase performance, reliability, scalability, and agility of the systems on which its critical trading platforms handle billions of derivatives trades per year, worth more than a quadrillion in notional value | |
| Software | Red Hat Enterprise Linux, JBoss Enterprise Application Platform, Red Hat Technical Account Manager (TAM), Red Hat Training | |
| Hardware | 4,000 x86 quad-core servers | |
| Migration path | Sun Solaris on SPARC servers to Red Hat Enterprise Linux on x86-based servers | |
| Benefits | Achieved reduced latency, expanded flexibility, heightened performance, ease of migration and management, and increased scalability while providing cost savings for the systems responsible for processing CME Group's millions of daily transactions | |

BACKGROUND

CME Group is the world's largest and most diverse derivatives exchange. Building on the heritage of the Chicago Mercantile Exchange, Chicago Board of Trade, and New York Mercantile Exchange, CME Group serves the risk management needs of customers around the globe. As an international marketplace, CME Group brings buyers and sellers together on the CME Globex electronic trading platform and on trading floors in Chicago and New York.

CME Group provides the widest range of benchmark futures and options products available on any exchange, covering all major asset classes, including interest rates, equities, FX, commodities, and alternative investments such as weather and real estate. CME Group's vision is one of ongoing global growth, innovative product development, continually enhanced technology, and the highest level of service available on any exchange.

“Our technology partnership with Red Hat is key to us staying competitive in the market. We look to Red Hat for technology leadership through updates and support that help us to improve our tuning so that we can give our customers the best possible experience.”

--Joe Panfil, managing director of Enterprise Technology Services at CME Group

BUSINESS CHALLENGE

CME Group processes millions of transactions per day. In 2008, CME Group's volume totaled 3.3 billion contracts, worth \$1.2 quadrillion in notional value. In order to meet the heavy demands placed on its IT systems, CME Group has rigorous requirements that must be met across the performance, scalability, reliability, ease of use, and costs of its IT infrastructure.

CME Group's IT architecture must also be agile to scale with rapid system changes in demand and volume. It must reduce latency wherever possible to ensure millisecond response times for its customers and needs the reliability, scalability, and performance of a mission-critical infrastructure.

Since 1997, CME Group has witnessed a migration of trading volume from the trading floors to its Globex electronic trading platform. Today, 80% of CME Group's volume is handled by its electronic trading platform, with 20% of volume still handled on the trading floor.

CME Group previously relied on a proprietary UNIX operating platform, but began looking for affordable, high-performance alternatives in 2002.

"Our systems were relying on a proprietary UNIX platform," said Joe Panfil, managing director of Enterprise Technology Services at CME Group. "As the responsibilities of the UNIX servers grew and the number of applications they ran continued to expand, the cost of running those applications grew too."

CME Group began investigating alternative platforms and placed an emphasis on examining open source Linux options. After rigorous internal testing, CME Group's IT team decided that a move to Linux would provide cost, performance, and reliability benefits over its previous Solaris platform. To prepare for the migration, the team created an eight-step plan for moving to Linux.

SOLUTION

A key factor in CME Group's plan to move to Linux was to identify a technology vendor that could provide optimized support for its Linux operating systems.

"Our systems are too critical to not have someone to turn to in the event that an issue arises," said Panfil. "We looked at the players, and Red Hat had the best support infrastructure and the most solid product."

"We saw the performance advantages of Linux and were looking for ways to reduce costs and increase performance for our customers," said Vinod Kutty, associate director, Distributed Computing at CME Group. "Red Hat Enterprise Linux fit the bill, and we started to gradually test and deploy it internally. Our organization was an early adopter of open source technologies, and we first deployed Linux in 2003."

Red Hat Enterprise Linux became the primary operating platform for CME Group's Globex electronic trading platform in 2004. The exchange began by deploying Red Hat Enterprise Linux 2.1, and has migrated to all of the latest versions of the leading operating platform through today's Red Hat Enterprise Linux 5. During the first year in production in 2004, Red Hat Enterprise Linux delivered a twofold increase in performance and reduced costs for CME Group by 50%. Today, 99% of its distributed platform runs on Red Hat Enterprise Linux.

Red Hat Enterprise Linux-based servers support both CME Group's Globex electronic trading platform as well as devices on its trading floors.

"We still have a huge interest in the trading floor, but the electronic trading platform is very attractive to those who desire the speed it delivers," said Panfil. "Red Hat Enterprise Linux supports both the electronic trading platform and the floor through the server floor displays and hand-held trading devices."

CME Group's IT architecture is designed so that every application runs on a minimum of two servers and a disaster-recovery server. "We try to design applications so that failover is seamless and customers don't see interruptions," said Panfil.

The move to Red Hat Enterprise Linux on commodity x86 hardware goes hand-in-hand with CME Group's horizontal scalability model.

"Red Hat helped us achieve the level of horizontal scalability that we needed," said Kutty. "Our ability to add incremental capacity to the thousands of servers we maintain daily with the reliability to deal with the great demands of day-to-day trading is only possible because of Linux and our work with Red Hat."



Given the history and partnering with Red Hat, CME is considering extending that partnership to JBoss Enterprise Middleware technology.

"We've worked with JBoss architects on solutions in the past and are now determining if JBoss can help us drive the open source software community in the same manner Red Hat has driven the operating system," said Joel Tosi, lead applications architect for Front-End Systems at CME Group.

Relying on one vendor for support for both its operating system and middleware layers has proved valuable to CME Group. "The coordination between Red Hat and CME Group has been great," said Tosi. "We knew we wanted to grow the partnership with Red Hat that we had already established and grown for more than six years. With Red Hat, we also knew we'd get the high visibility we wanted for both our operating system and middleware projects."

BENEFITS

Performance is a key metric on which CME Group is judged by its customers. Many of CME Group's customers' highest priorities are reduced latency and speed. "We need a good balance of performance and reliability," said Kutty. "We need to be able to react very quickly to changes in business. We don't want fluctuations in performance and cannot have any downtime."

"One thing we found was that Linux was faster, and speed in this industry is really important," said Panfil. "We want customers to get as fast a response time as possible, and with Red Hat Enterprise Linux we gained speed and reduced costs."

The reduced costs associated with Linux were an attractive factor to CME Group's selection of Red Hat Enterprise Linux. "Cost savings was something we were targeting, but we didn't know how dramatic the cost savings would be," said Kutty. "We saved during the initial switch from the support perspective, but over time, a combination of Linux and commodity hardware has continued to deliver reduced costs."

The IT team expects to gain continued cost savings from elimination of licensing with both its Red Hat Enterprise Linux and JBoss Enterprise Application Platform solutions and through resource reallocation.

"We see cost savings not only from both the operating system and middleware infrastructures, but from the productivity of staff too," said Tosi. "We see productivity gains when our staff has the ability to see into the code and also through the ease of management of the systems."

CME Group also reduced costs by gaining flexibility with its systems. CME Group strategically executes a multi-vendor strategy in order to avoid vendor lock-in. With Red Hat, it achieved a platform with great flexibility through a broad ecosystem of certified hardware and software vendors.

CME Group was quickly able to transition its administrators' UNIX expertise to its new systems. The team leveraged hands-on Red Hat Training courses to ease the shift of both skills and systems, which resulted in a seamless migration. CME Group also benefited from the skills of its dedicated Red Hat Technical Account Manager (TAM), who offers additional, ongoing Red Hat expertise to the exchange's IT team. Its TAM is the first line of support and provides one point of contact through which CME Group can collaborate with Red Hat on new technologies and support needs.

"The practical, hands-on nature of Red Hat Training courses provided real value to the transition of our team's skills to Linux," said Kutty. "All of our system administrators are Red Hat Certified Engineers (RHCE)."

CME Group today works closely with Red Hat's performance teams to demonstrate workloads and tune systems for the great performance and reliability demands it mandates for its mission-critical systems. It builds synthetic workloads that replicate the demands of its systems in order to collaborate with Red Hat for future developments for Red Hat Enterprise Linux and other products. Together, Red Hat and CME Group form a technology partnership that benefits the entire open source community as well as the vast community of Red Hat customers.

"Our technology partnership with Red Hat is key to us staying competitive in the market," said Panfil. "We look to Red Hat for technology leadership through updates and support that help us to improve our tuning so that we can give our customers the best possible experience. To be competitive in this industry, we have to use the best possible applications, operating systems, and servers. For our mission-critical systems, we leverage Red Hat Enterprise Linux."



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