

THE COMPUTERWORLD HONORS PROGRAM

CASE STUDY



LOCATION:
*Chicago, Illinois,
United States*

YEAR:
2006

STATUS:
Laureate

CATEGORY:
*Finance, Insurance
and Real Estate*

NOMINATING COMPANY:
Oracle

ORGANIZATION:

Chicago Stock Exchange

PROJECT NAME:

Grid Project

Summary

The Chicago Stock Exchange (CHX) is an active competitor of the NYSE, Amex, NASDAQ and regional stock exchanges. Always seeking to better business, CHX has deployed state-of-the-art technology over the years that has enhanced its systems reliability and capacity, as well as member productivity.

In its ongoing effort to use technology as a competitive advantage, CHX chose to replace its legacy database systems and overhaul its entire IT infrastructure. In 2002, the stock exchange moved forward with plans to implement a grid computing environment that would provide continuous uptime, scalability and rock-solid performance at lower costs. Prior to the migration, CHX experienced a back office hardware failure that lasted three hours, but outages, though rare, ranged from 15 to 20 minutes which impacted back office processing.

The exchange looked to grid computing, little more than a visionary concept at the time, as the answer.

Introductory Overview

The planning phase of the project began in 2002 when CHX elected to upgrade its legacy systems and roll out an enterprise grid to increase database capacity, simplify systems management and decrease downtime. Recovery from hardware failures could take up to three hours, but outages ranging from 15 to 20 minutes were more common, and impacted back office processing.

As CHX embarked on the deployment, the IT group struggled to estimate the capacity needed for the new system. To complicate matters, the stock market was entering a downturn, making it particularly difficult to “guesstimate” capacity – buying too little or too much could prove to be equally problematic. If CHX bought more servers than needed, it would pay for idle capacity, but if it under-bought, it risked throwing away the hardware investment when market activity increased and required additional computing power.

CHX realized that its high-availability, low-cost requirements could be met by implementing an enterprise grid architecture using Oracle software and HP hardware. CHX initially deployed Oracle Database 9i and Oracle Real Application Clusters. Recently, the stock exchange rolled



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out 10g versions of the infrastructure software, as well as added Oracle Application Server 10g to the mix. In the near future, the exchange will deploy Oracle Enterprise Manager 10g Grid Control. The grid environment enabled CHX to buy what it needed while providing the flexibility to incrementally scale-out, as business needs changed.

CHX deployed the entire 9i system, including creating a new data model, new hardware, operating system and Oracle Real Application Clusters all within six months. The system underwent significant testing and went live without any hiccups on the target date.

CHX launched the system with two servers, but during testing realized it would need an additional two. The grid infrastructure enabled CHX to very quickly add two servers without changing system configurations. The exchange continues to rely on Oracle software and HP hardware to run its business. In doing so, CHX has upgraded its software and hardware accordingly.

The project has delivered above and beyond CHX's expectations. Not only did the new IT architecture deliver a 171 percent return on investment over a five year period and gains of \$2.3 million in total benefits, but it also delivers increased customer satisfaction through higher service levels.

Benefits

With advanced automation and self-tuning capabilities, Oracle Database 10g and Oracle Real Application Clusters 10g will provide greater flexibility in allocating workloads and better transparency in diagnosing system trouble spots.

Cost Benefits:

Prior to deploying Oracle software, the exchange ran on two HP AlphaServer GS60 servers in a loosely coupled cluster that recorded trading information during the day and then processed transactions at night. It meant that capacity was severely underused with one big machine virtually idle while the other was very busy. With Oracle's grid infrastructure, the exchange was able to move to low-cost commodity hardware that provides fault-tolerant functionality and enables the exchange to allocate resources, on the fly.

DBA / System Administrator Benefits:

Additionally, the built-in automation and self-diagnostic capabilities will enable DBAs and systems administrators to focus less on routine administrative tasks and more on strategic projects. Greater visibility through centralized system management will ease the challenge of managing mixed workloads in an enterprise grid by dynamically monitoring and shifting resources, as predetermined by CHX's business rules.

Customer Benefits:

CHX runs its online customer service, batch reporting and data mining systems along with a near-real-time decision support system on Oracle.

One of the main goals of David Milne, director of database technologies for the CHX, was to "continuously improve our computing environment, making it seamless and transparent, so the customer never knows that there's a database serving them. Oracle Real Application Clusters on HP keeps our database up and running, allowing our customers to conduct business on their



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schedule. Oracle helps us ensure maximum uptime so we're here whenever our customers need us."

The Importance of Technology

By implementing advanced IT solutions, CHX has been able to keep pace with its larger stock exchange counterparts and provide an alternative to the NYSE, Amex and NASDAQ. Additionally, it has been able to deliver higher quality of service for its customers.

Originality

The collaborative efforts of the hardware and software development teams at HP and Oracle created the appropriate configuration to provide CHX with reliability, flexibility, and the ability to modify computing resources without disrupting service or isolating applications.

One of the greater challenges of devising a new IT infrastructure was the ability to estimate capacity. Deploying an enterprise grid circumvented the guesswork and enabled CHX to construct a system within its tight budget to achieve its goals.

Success

CHX expects a 171 percent return on investment over a five year period and looks to gain \$2.3 million in total benefits. Beyond pure monetary benefits, the best measure of success is satisfaction. CHX has achieved significant productivity increases and improved customer satisfaction levels with its grid roll out.

David Milne, director of database technologies for the exchange, can't help but laud the implementation saying, "I give a lot of credit to Oracle and a lot of credit to the HP environment. In fact, the deployment went so well that the migration was transparent to both internal and external customers."

Difficulty

Facing shrinking revenues in the early 2000s, CHX's IT department needed to devise a plan to upgrade systems within a tight budget. At the same time, it needed to eliminate bottlenecks created by massive data loads on heavy trading days. Seeking peak reliability and performance, CHX chose to deploy a grid architecture, including Oracle Database on HP hardware. Implementing state-of-the-art technology was nothing new for the exchange.

The CHX's grid implementation followed a long history of using innovations in technology to maintain a competitive edge. For example, during record-breaking trading days of 2000, CHX handled three times its normal trading volume without event.

The 1990s

In 1999, CHX participated in the Security Industry Association (SIA) Y2K industry-wide tests and launched the Internet auto-entry system. 1998, new trading floor systems were implemented based on a stock exchange first - the distributed object model, which significantly enhanced system flexibility and reliability.



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The 1980s

In the early 1980s, CHX was the first floor-based stock exchange to implement state-of-the-art trading technology that significantly expedited and fully automated order execution so orders sent to the trading floor could be routed, executed and confirmed in less than one second – making it easier for investors to buy and sell when they wish.

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