CommSec

Investment in 64-bit Intel® Itanium 2 servers pays returns for CommSec

Solution Overview

Intel® and Microsoft® Customer Reference Case Study

Customer Profile

Founded in 1995 as a telephone-based investment service, Commonwealth Securities Limited (CommSec) is a subsidiary of the Commonwealth Bank of Australia (CBA). Since launching its share trading Web site in 1997, CommSec has expanded rapidly to offer a full range of managed investments become Australia's busiest financial services Web site, with more than 500 million hits per month from more than 537,000 clients.

Challenge

As Australia's largest online financial services provider, CommSec needs to ensure that the internal and external Web sites it maintains, which receive more than 27 million hits a day, are providing the fastest and most effective user experience possible. This requires regular analysis of server performance logs, but a log analysis system proved unable to provide results quickly enough to support business decisions.

Solution

A 4-way Intel® Architecture server running 1.5GHz Intel® Itanium 2 processors and Microsoft® SQL Server 2005 manages the logging, processing, storage and analysis of Web user logs relating to 40 million weekly hits served up by dozens of Web servers running CommSec's many internal and external transactional sites.

Business value

- Log analysis time has shrunk from more than 10 hours to 1.5 hours.
- Availability of reports first thing in the morning facilitates rapid response.
- Managers and technical administrators better understand customer activities and responsiveness issues, to keep long-term planning ahead of demand.

Business Challenge

The investment services arm of the Commonwealth Bank of Australia (CBA) Limited, Commonwealth Securities Ltd (CommSec) maintains numerous internal and external transactional sites including Australia's busiest financial services Web site, www.commsec.com.au. All told, CommSec-managed Web servers handle over 620 million hits and 300,000 investment transactions monthly.

Because the company's business depends so heavily on online services, it is essential for the business to monitor the performance of those services from the end-user's perspective. Chronic slow or unreliable performance can create major problems for the business if customers are unable to trade, for example, or find that anomalies in the site's construction are making navigation difficult.

Keeping quality of service high, and therefore ensuring that customers get consistent and speedy response from the company's online services, was therefore a business priority. This was particularly the case as a period of significant expansion in online services had rapidly increased usage by bank staff and CBA customers.

"The user's perception will ultimately drive the technological strategy we use, so we want to understand what the user experience is," said Michael Blomfield, head of CommSec. "In the past, however, reporting was ad hoc; we were mainly hearing about issues later, through the user help desk. It's an exceptionally large Web site, and we want information on its performance in real time. Knowing how users are using the sites will allow us to be more proactive rather than reactive."

Although usage of its online services was growing steadily, CommSec had no way of monitoring the performance of its applications. In the event of a service interruption, business managers had to work with technical staff to pore through Web server logs and try to figure out the reason for the problem. It was easy to find out basic statistics like how many visitors had come to the site every day, but more complicated analysis – for example, figuring out which Web pages might be slowing down users because of misplaced buttons – was virtually impossible.

Early in 2005, CommSec implemented a new Web server logging system designed to improve the company's ability to collate and analyse activity logs. That system was built on 32-bit Intel® Architecture servers and a Microsoft® SQL Server 2000 database, and went through Web server logs every night to extract, dimensionalise and load data into an OLAP cube for easy analysis.

This approach worked, but the sheer volume of data being processed – more than 40 million rows per week – meant that it was taking more than 10 hours for the information to be available to managers. Data processing runs begun at 2:00 am would finish after lunchtime, meaning that it was often the end of the day before technical staff could revise application code or take other necessary remedial actions.

Latency between the data's creation and its availability was hindering CommSec's goal of providing responsive and proactive management of its growing online environment. After analysis by consultancy EasternMining.com.au, it was suggested that the system's 32-bit architecture was creating a bottleneck. The Web log reporting system was moved to a completely new environment built on servers running 64-bit Intel® Itanium 2 processors and the Microsoft® SQL Server 2005 database platform.

The improvement in processing speed was dramatic: daily Web log analysis, which previously took more than 10 hours, now completes in around an hour and a half. This meant that the

> *Intel® Itanium 2 servers and Microsoft® SQL Server 2005 have given us an unprecedented view into the performance of our online services so we can focus on delivering the services customers want – with the performance they expect.*

Michael Blomfield
Head, Commonwealth Securities Limited

> *The previous database was just screaming out for more memory. Now, with the power and memory of the 64-bit Intel® Itanium 2 processors, and the capabilities of Microsoft® SQL Server 2005, the whole data transformation and dimensionalisation process goes much faster.*

Richard Lees
Principal, EasternMining.com.au

monitoring database, which had more than 820 million rows after six months' usage and was continuing to grow at breakneck pace, could be processed, analysed and reported upon well before managers arrived at work in the morning.

This capability, in turn, has allowed CommSec to both better understand Web and intranet usage patterns, and to more readily identify and remediate any potential performance issues. For example, after a recent analysis showed a slight slowdown in response time due to increasing numbers of users, the technical managers were able to present concrete performance information to business managers and an additional eight Web servers were quickly purchased to keep critical systems running within acceptable service parameters.

Over time, increasingly sophisticated analysis will give CommSec managers even more visibility into user trends, allowing them to better classify users based on their usage patterns. In turn, this capability will help ensure that development testing best reflects real-world performance.

"Deploying Intel® Itanium 2 servers and Microsoft® SQL Server 2005 to monitor our servers has given us an unprecedented view into the real-world performance of our critical online services," said Blomfield.

"As we continue to add functionality to our core Web sites, we can structure our business with the confidence that we can meet optimal service levels no matter how far our user based expands. This way, we can continue to focus on delivering the services customers want – and the performance they expect."

Technology Case

Performance monitoring is essential to ensure the ongoing value of any high-volume Web environment, and the CommSec's online environment is no exception. With millions of customers relying on its systems to complete essential transactions, it was imperative that CommSec's systems be both responsive and effective in delivering the information those users required.

CommSec's Web environment is built on a Web services environment that is supported by dozens of servers dishing up millions of hits per week. Each time any of those systems are accessed, details are recorded within the Web server logs.

Those logs contain invaluable information about user session length, time to load particular pages, time spent on particular pages, the navigation path users take through the site, and other details that are essential to ensuring that the design of such a high-volume Web site is best suiting its user's needs. However, this information was previously inaccessible to managers, who were at best able to use third-party analysis tools to get only basic usage statistics for the day before.

In the hopes of extracting meaningful information from the logs, EasternMining.com.au consultant Richard Lees was engaged to design a business Intel® ligence system that would let CommSec get more meaningful information from its Web server logs. After spending time manually importing and exporting the log information into OLAP data cubes for analysis, Lees and CommSec staff realised that an automated solution was going to be necessary to keep up with steadily growing usage volumes.

"It's critical to be able to perform fast ad hoc analysis of the logs to ensure service level agreements are met," said Lees. "This application allows the bank to monitor the performance of the Web servers to analyse the actual experience of the end user."

In early 2005, CommSec took its first step towards more effective log analysis

by introducing a two-way 32-bit Intel® Architecture server running the Microsoft® Windows Server™ 2003 operating system and Microsoft® SQL Server 2000 database. This system dimensionalised Web server log information – compressing and organising it by assigning codes to frequently-used values, such as '23' to represent a particular Web resource – and then fed it into a massive 22-dimension OLAP data cube that is available to users for rapid data analysis.

Even when data was only being taken from nine Web servers, this immense and data-intensive process took more than 10 hours to complete on the 32-bit system, due largely to bottlenecks from 32-bit servers' limit of 4GB RAM.

Such a long processing run was limiting the effectiveness of the log analysis, since runs that started during the night would typically stretch into the afternoon. This limited managers' ability to respond to technical issues as they arose.

Recognising that the greater RAM capacity and processing capabilities of 64-bit Intel® Itanium 2 processors could relieve the bottleneck of the 32-bit systems, Lees and CommSec designed an alternative. Four-way servers, based on 1.5GHz Intel® Itanium 2 processors and featuring 14GB of RAM, were loaded with Microsoft® Server 2003™ Enterprise x64 Edition and Microsoft® SQL Server 2005.

The new system's benefits were obvious. A complete analysis of over 300GB of legacy Web log information, ported from the Microsoft® SQL Server 2000 database, previously took several weeks, but completed in just four hours on the new system.

Daily log updates were also significantly faster. Receiving, dimensionalising, and processing over 40 million new records recorded every week took just 1.5 hours – around one-tenth the time of the old system. Furthermore, the new system is processing logs from 20 servers compared with just nine on the old system. This means that data analysis can conclude, and reports can be generated, before managers arrive for work in the morning. Most queries on the OLAP cube, which now contains nearly 1 billion rows, are answered within one to five seconds.

"Managers have always found the analysis really useful, yet although we could provide analysis on the old system it took a very long time to import and process new data," said Lees. "The database was just screaming out for more memory. Now, with the power and memory of the 64-bit Intel® Itanium 2 processors and the capabilities of Microsoft® SQL Server 2005, the whole data transformation and dimensionalisation process goes much faster."

After six months online, the Microsoft® SQL Server 2005 database includes more than 825 million rows, with 20 million or so still added every day. As new systems and functionality continue to be added to the mission-critical systems, CommSec's analysis environment will help architects ensure that the systems they are managing continue to meet user requirements.

"With the analysis capabilities online, managers can slice and dice any aspect of performance and server activity," said Lees. "They can see why the system is having problems and whether it's a one-off issue, or a trend that's going to give more problems over time."

"For example, by knowing that we're near capacity, we can tell the business where we need more servers, and back it up with clear performance information. The old system's main problem was RAM, and 64-bit computing was the solution."

Lessons Learned

- **It's all about the user experience.**

  It doesn't matter how effective your new system is; if it's not responsive and well-designed for user needs, they won't make the most of it. With any core online system, make sure you have a way of not only monitoring server performance directly, but also of measuring the speed of the user interface from their perspective.

- **Databases need memory. Lots of memory.**

  The 4GB physical RAM limit of 32-bit computing means extensive use of disk-based virtual memory in high-volume data environments can bring performance to a crawl. However, 64-bit systems support up to 1TB of memory, improving database performance and freeing up stubborn data processing bottlenecks.

- **Infrastructure evolves**

  You can't build systems, deploy and then forget them. As user demands change, extra functions are added to core systems or new sites are brought online, transaction volumes are sure to increase – and the burden on your servers with them.

  Ensure business leaders understand the business impact of the technical infrastructure, and support that infrastructure with the means to keep it growing along with demand.

More information

www.Intel.com/Business
www.Microsoft.com
www.commsec.com.au

306561-001

About Microsoft®

Founded in 1975, Microsoft® (Nasdaq "MSFT") is the worldwide leader in software, services and solutions that help people and businesses realize their full potential.

For more information

For more information about Microsoft® products or services, visit: http://www.microsoft.com

About Intel® Corporation

For more than three decades, Intel® Corporation has developed technology enabling the computer and Internet revolution that has changed the world. Founded in 1968 to build semiconductor memory products, Intel® introduced the world's first microprocessor in 1971. Today, Intel® supplies chips, boards, systems, software, networking and communications equipment, and services that comprise 'ingredients' of computer architecture and the Internet. Intel®'s mission is to be the preeminent building block supplier to the worldwide digital economy.

For more information about this innovative solution: www.Intel.com