



Success Brief

Quad-Core Intel® Xeon®
processor 7300 series
Online Gaming



“The new Quad-Core Intel® Xeon® processor 7300 series performed flawlessly. Its superior quality was highlighted immediately during our tests.”

Ralf Reichert,
Managing Director,
Turtle Entertainment

New Heights in Gaming Performance

Turtle Entertainment turns to Quad-Core Intel® Xeon® processor 7300 series to improve performance and efficiency and enable business growth

Company:	Turtle Entertainment specialises in e-sports (electronic sports) in which multiple players compete against each other in computerised games. Its Electronic Sports League (ESL) is the largest online gaming community in Europe.
Product evaluated:	Quad-Core Intel® Xeon® processor 7300 series
Challenge:	Since its launch in 2000, ESL has witnessed exponential growth in web traffic with page impression doubling on average every 12 months – from 4.5 million in early 2002 to 162 million in late 2007. CPU power and memory bottlenecks were experienced frequently. Vertical server scaling did not result in noticeable speed increases.
Results:	By testing a new database system powered by the Quad-Core Intel Xeon processor 7300 series, a significant decrease in database and web server render times was gained. Average CPU usage dropped to half compared to the old system, providing a very large buffer for future increases in user numbers and page impressions.
Impact:	With the Quad-Core Intel Xeon processor 7300 series, Turtle Entertainment has been able to embrace the Predictive Enterprise computing vision. The Quad-Core Intel Xeon processor 7300 series has increased performance and efficiency, paving the way for future business growth.
Next steps:	Migration from ESL Server infrastructure to the Quad-Core Intel Xeon processor 7300 series has been completed.

Challenge

Founded in 2000, Turtle Entertainment is the company behind the Electronic Sports League (ESL), the largest online gaming community in Europe. ESL provides league organisation and tournaments with high prize monies.

The national football premier league of the ESL is the Pro Series where the best players can compete for the German championship. Its concept is similar to the German soccer league system – the Bundesliga – with a number of different divisions and players ranked according to games won and lost. Players battle it out for prestige and prize money. The overall prize money since ESL began is EUR 1.5 million (USD 2.2 million).

Growth in electronic sports has spiraled upwards in recent years and today ESL has over 750,000 members. This is also reflected in the number of page-impressions for ESL web site traffic. In the early months of 2002, 4.5 million impressions were registered. By the third quarter in 2007 this had soared to 162 million, representing a doubling of impressions approximately every 12 months.

Deployment

Turtle Entertainment's ESL server infrastructure is based on a LAPP* system (Linux, Apache, PostgreSQL, PHP), running on approximately 50 servers. At the backend there are four major SQL database servers. More than 30 diskless web servers request content from the SQL database servers, delivering it to the clients.

Critically, the most crucial element in this architecture is the time it takes to generate a web page following the end-user's request. Technically, this is known as the render time, which comprises the database processing time and the web server processing time.

As the ESL league increased in popularity, naturally the number of page impressions grew. However, due to bottlenecks in processing power and memory, content serving became slower and render time increased, potentially threatening the success of the business.

In order to optimise data flow, all parts of the business need to be highly tuned. To address bottleneck problems, vertical scaling of servers is a typical industry-wide solution. However, given the exponential growth that ESL was experiencing, adding new servers did not generate any noticeable increase in speed.

To address this issue, ESL simply replaced the old system with a new one that had more processor cores and memory. This normally happened after 12 months of service. But as 2007 drew to a close, page impressions rocketed skywards; with an all-time high of 162 million registered in the third quarter.

This time Turtle Entertainment decided to measure its main database system against one powered by the Quad-Core Intel® Xeon® processor 7300 series with a total of 16 cores. A series of key evaluation tests were carried out comparing the performance of the average render time and average CPU usage of the existing ESL server infrastructure against the new one.

The old database system was measured at the beginning of December 2007 and the new system powered by the Quad-Core Intel Xeon processor 7300 series was measured at the end of the same month. The days were carefully chosen to create comparable situations in terms of page impressions and database queries per second.

Results

The evaluation showed that the new database system powered by the Quad-Core Intel Xeon processor 7300 series decreased the web server render time by 29.6% – from 354 milliseconds to 249 milliseconds. The database-related part of the render time was improved by nearly 60% – from 177 milliseconds to 72 milliseconds.

Impact

Importantly for ESL, CPU usage should never exceed more than 50%. This is to ensure quick response times and system stability even at busy times with peak usage. While the old system would have exceeded its CPU usage limit within a year, the system powered by the Quad-Core Intel® Xeon® processor 7300 series expands this by more than 14 months.

In effect, this reduced CPU usage over a greater length of time, which in turn increased the lifecycle of the system from 12 months to approximately 26 months.

The significant decrease in render time has also resulted in a web site that responds better for customers. To achieve the same level of performance Turtle Entertainment would have to add further web servers at an estimated cost of EUR 5,000 (USD 7,400). In financial terms, this means the Quad-Core Intel Xeon processor 7300 series will amortise after only nine months.

Overall, the Quad-Core Intel Xeon processor 7300 series has provided Turtle Entertainment with compelling value. The database lifecycle has been more than doubled and the decrease in render time ensures greater efficiency and system stability; all whilst ESL game players experience greater responsiveness.

The same performance boost could have been achieved by optimising the web server part of the render time. However this would have required more than 12 additional web servers.

Importantly, average CPU usage time dropped to half compared to the old database system, which provides a very large buffer for future increases in user numbers and page impressions.

For example, CPU usage in the old system was 25.4% and for the Quad-Core Intel Xeon processor 7300 series only 11.8%.

When Turtle Entertainment projected ESL CPU usage forward over two years based on current rates of growth, the Quad-Core Intel Xeon processor 7300 series maintained superior performance. For example, estimated CPU usage of the old system in December 2008 was anticipated to be 48.8% and in December 2009, 93.5%.

In sharp contrast, the system powered by the Quad-Core Intel Xeon processor 7300 series showed an estimated CPU usage of 22.6% in December 2008 and 43.4% in December 2009.

Future

In view of the considerable advantages, Turtle Entertainment wasted no time in migrating its database system to the Quad-Core Intel Xeon processor 7300 series and considers the project a flawless success.

The move towards the Quad-Core Intel Xeon processor 7300 series adoption has also enabled Turtle Entertainment to embrace the Predictive Enterprise computing vision.

Improved performance and efficiency, underpins the company's operations with systems that are fully capable of handling exponential increases in user demands. In turn, this ensures Turtle Entertainment can continue to maintain and grow its leading market position in the European online interactive games market.

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