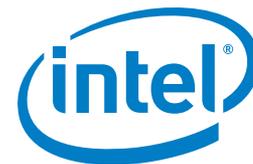


CASE STUDY

Intel® Xeon® processor 5600 series

Financial Services

Performance for Data-Intensive Computing



Thesys Technologies Turns Intel's Platform Advances into Business Growth

Delivering a 50 percent performance increase, the Intel® Xeon® processor X5690 helps Thesys handle more than 100 percent annual growth in share volumes



Thesys Technologies delivers a customizable, end-to-end trading solution that helps banks, brokerage houses, and other investment groups turn trading strategies into profits. Thesys runs its high-frequency trading (HFT) platform exclusively on Intel® Xeon® processors and says each round of advances from Intel helps Thesys enable its customers to make more money with less cost. Upgrading to the six-core Intel Xeon processor X5690 gave the Thesys HFT platform a 50 percent performance increase over its Intel Xeon processor 5500 series predecessors, and the company is looking to the Intel Xeon processor E5 family for its next performance leap.

CHALLENGES

- **High data volumes, high-speed responses.** The Thesys Technologies platform must analyze millions of messages of market data per second and consistently respond within microseconds, even on the busiest trading days.
- **Failure is not an option.** With millions of dollars riding on a few seconds' activity, Thesys and its customers demand rock-solid reliability.

SOLUTIONS

- **Supermicro® servers with the Intel® Xeon® processor 5600 series.** Thesys runs its custom solutions on Supermicro 1U servers powered by dual six-core Intel Xeon processors X5690 and running Ubuntu Linux® 10.04 LTS.
- **Intel® Solid-State Drives (Intel® SSDs).** Thesys increases disk reliability and performance with the Intel SSD 320 Series.

IMPACT

- **50 percent faster throughput.** Moving to the Intel Xeon processor X5690 provided a dramatic increase in overall throughput, enabling customers to keep up with greater volumes of market data. The platform routinely processes 200 million shares daily, and has handled peaks of more than 500 million daily shares without blinking. Typical through-system latencies are well below 30 microseconds from tick to order.
- **Business growth.** Thesys more than doubled the volume of trades it processed in 2011, with peak days processing USD 20 billion worth of equity shares in a single day. The company is expanding into the even larger U.S. futures trading segment and looking toward other markets and geographies.

Data-Intensive Computing for High-Frequency Trading

From small-scale firms to the largest investment banks, organizations that want to move into the elite world of high-frequency equities trading are finding their way to Thesys Technologies. Thesys is a company of interdisciplinary innovators who say they're offering the world's fastest commercially available

trading platform. "We believe—and our largest institutional clients, who have carefully researched this space, tell us—that we have the fastest commercially available equities trading platform in the world," says Arzhang Kamarei, a managing partner at Thesys.

By working with Thesys, customers avoid the high costs of developing their own HFT platform. Customers also benefit from

"We push our infrastructure very hard. When we survey the market, we see Intel out in front of what's available and providing a processor that can support what we're doing. We see their continual advancements keeping them on the leading edge and thereby helping keep us on the leading edge."

— Michael Beller,
Managing Partner,
Thesys Technologies





Even on a slow day, the system handles USD 4 billion in trades

the expertise of the Thesys team, which creates and refines individualized trading solutions using each generation of Intel Xeon processor-based servers.

The demands on the infrastructure are extreme. "To be successful, we need to achieve extremely low latencies in our response to the market, and we need to provide those latencies while processing all the data coming in from all the exchanges, which easily reach millions of messages per second," Kamarei says. "The combination of extremely low latency and extreme throughput is a tremendous challenge."

Pushing the Limits

Thesys is on its third generation of Intel server technologies and is looking forward to the Intel Xeon processor E5 family. "The Intel Xeon processor 5500 series provided significant advances in memory bandwidth, I/O bandwidth, and inter-core and inter-package communication," explains Michael Beller, a managing partner at Thesys. "The Intel Xeon processor 5600 series gave us 50 percent more cores and allowed us some super-linear scalability. The Intel Xeon processor E5 family will provide higher memory capacity and bandwidth as well as integrated I/O, and we are excited to start testing it."

Thesys pushes the limits of today's commodity servers, and its IT leaders select vendors that can collaborate deeply to help them achieve their goals. Supermicro configured servers that provided the capabilities Thesys and its customers need. Intel and Thesys have done engineer-to-engineer collaborations to maximize the Thesys platform's performance and gain input for Intel's next-generation architectures.

Thesys says its use of Intel technologies and expertise delivers bottom-line benefits to the company's trading clients. "When markets move suddenly, you need to keep up with the messaging volumes," says Kamarei. "If you don't, your orders get in late and you miss opportunities. Being able to process more messages per second means there's that much more time in the day that you're trading at profitable levels. That's how our clients keep score, and that's how they evaluate us."

"With each new processor from Intel, we can run more strategies and handle more exchanges without adding power dissipation," Beller adds. "That's money saved and it's money made. Customers can look for more opportunities and be faster in responding to changes in the market—and the faster the response, the more money they stand to make."

SPOTLIGHT ON THESYS TECHNOLOGIES, LLC

Launched in early 2009, Thesys Technologies is the infrastructure affiliate of Tradeworx. Thesys offers a comprehensive, front-to-back trading solution that serves the high-performance technology needs of market participants including institutional investors, professional traders, brokerage firms, exchanges, and regulatory agencies. Thesys Technologies offers access to all major U.S. equities markets and has expanded into U.S. futures trading.

Kamarei and Beller say the affordability of Intel processor-based servers is helping Thesys democratize trading by extending sophisticated HFT techniques to additional segments of the financial markets. "The speed and capabilities that are necessary today for a high-frequency trader will become essential for all types of traders in the future if they want to keep their trading performance competitive," says Kamarei. "Eventually, everyone will need this kind of speed."

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