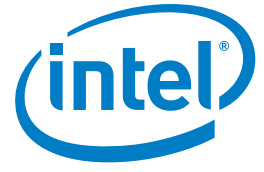


CASE STUDY

Intel® Xeon® Processor 5500 Series
Enterprise Server
Performance: Data-Intensive Computing



Extreme Speed, Extreme Throughput

Thesys Technologies delivers both with leading-edge trading platform and Intel® Xeon® processors

Speed and throughput are vital in most trading environments, but nowhere are the demands fiercer than in high-frequency trading of U.S. equities. Those twin requirements explain why many organizations that want to move into this dynamic arena are turning to Thesys Technologies. Thesys has gained a reputation for having an ultra-fast trading platform, and it runs its state-of-the-art platform exclusively on the Intel® Xeon® processor.



"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."

— Arzhang Kamarei
Managing Partner
Thesys Technologies

CHALLENGES

- **Low-latency infrastructure for high-frequency trading.** Thesys Technologies delivers a highly optimized, end-to-end trading solution that helps its clients turn their trading ideas and strategies into profits.
- **Millions of messages, microseconds of performance.** The technology infrastructure must analyze market data that floods in at peak rates of millions of messages per second, and respond to market changes within microseconds.
- **Failure is not an option.** With millions of dollars riding on a few seconds' activity, Thesys and its customers demand rock-solid reliability.

SOLUTIONS

- **Intel® Xeon® processor 5500 series.** Thesys Technologies chose the Intel® Xeon® processor 5560 for its balanced combination of processor performance, I/O throughput, and memory bandwidth, as well as a track record of outstanding reliability.

IMPACT

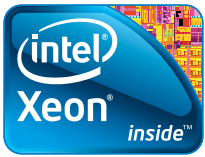
- **15 to 20 percent speedup in application throughput.** Thesys achieved a dramatic increase in overall application throughput, driving business growth by enabling customers to keep up with ever-rising volumes of market data.
- **End-to-end median latency under 30 microseconds.** The Thesys trading platform achieves typical through-system latencies of less than 30 microseconds and sits atop a low-latency mesh network that interconnects all the major stock exchanges.

Speeding Up Time-To-Market for New Trading Firms

From one-person shops to global hedge funds and multi-national banks, many organizations are eager to move into the elite world of high-frequency equities trading. But to enter the playing field, they need some of the world's most performance-sensitive software and infrastructure. Most don't have the time or expertise to develop it in-house, and going the build-it-yourself route could incur millions of dollars in opportunity costs.

Instead, many come to Thesys Technologies, a company of interdisciplinary innovators who have spent over two years refining and optimizing what they believe is now the world's fastest commercially available trading platform.

"We enable our clients to reduce the cost of starting a high-tech trading business by millions of dollars, and reduce time-to-market by a year or more," says Managing Partner Arzhang Kamarei.



Speeding up application throughput by 15 to 20 percent was “a big deal,” says Managing Partner Michael Beller.

“To be successful, we need to achieve extremely low latencies in our response to the market, and we need to do that while processing all the data coming in from all of the equities exchanges and other exchanges, which can easily reach peaks of a couple of million messages per second. The combination of extremely low latency and extreme throughput is a tremendous challenge.”

Processor, Memory, I/O

Thesys achieves exceptional results by balancing its custom-developed software with robust server hardware and networking. It began using Intel® server technologies with Intel’s first dual-core processors. It was quick to adopt the Intel Xeon processor 5500 series when it became available, choosing the dual-socket, quad-core Intel Xeon processor 5560.

“A big success factor in handling huge volumes of market data is the ability to move data rapidly between the network, main memory, and processor caches,” explains Managing Partner Michael Beller. “And a big factor in providing very quick response times to the market is the ability to communicate quickly and effectively between cores in a single processor package, and between CPU packages on a single server.”

The Intel Xeon processor 5500 series delivered on all fronts, according to Beller. “On memory bandwidth, I/O bandwidth, and inter-core and inter-package communication, the Intel Xeon

processor 5500 series provides significant advances,” he says. “It improved both our throughput and latency by 15 to 20 percent over our previous-generation systems. That’s a big deal.”

Kamarei adds that the “big deal” can translate into bottom-line benefits for Thesys Technologies’ trading clients.

“The challenge in high-frequency trading is always to keep up with the increasing volume of market data without increasing your latency,” Kamarei comments. “When markets move suddenly, you need to keep up with the messaging volume; otherwise, 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.”

Ready to Grow

Always looking for the next performance advantage, Thesys has brought the Intel Xeon processor 5660 into its labs. Because of the way Thesys software distributes general-purpose tasks across cores, the company expects the higher core counts of the dual-socket six-core processor to enable super-linear scalability. Thesys is also testing Intel® Solid State Drives. “Our initial impression from basic tests compiling the Linux* kernel is that the drives are blazing fast,” notes Beller. “We also like the reliability data we are seeing on them. We don’t do a lot of disk work, but for what we do, we need performance and reliability.”

SPOTLIGHT ON THESYS TECHNOLOGIES, LLC

Launched in early 2009, Thesys Technologies meets the financial community’s rising need for high-performance, ultra-low latency trading technology. Thesys Technologies offers access to all major U.S. equities markets and trades peak volumes of over 100 million shares per day. Its infrastructure is co-located at the major U.S. equities trading facilities, including the New York Stock Exchange, NASDAQ, and others.

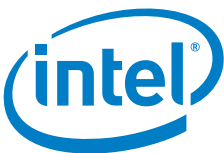
Thesys is eyeing a variety of growth strategies and expects to benefit as high-performance trading techniques are adopted across broader segments of the financial markets.

“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.”

With a foundation of Intel® technologies, Thesys Technologies is ready.

Performance. Data-intensive computing. Support the most demanding business data processing.

Find a solution that is right for your organization. Contact your Intel representative or visit the Reference Room at www.intel.com/references.



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