Case Study
Intel® Xeon® Processor E5 Family
High-Performance Computing
Big Data Analytics
Financial Services

Enabling Ultra-Low-Latency Trading with Intel® Xeon® Processors

Fluent Trade Technologies reduces parsing latency to 2 microseconds, a 90 percent improvement, by upgrading to the Intel® Xeon® processor E5 family

FLUENT
TRADE TECHNOLOGIES

"The Intel® Xeon® processors are the perfect fit for this highly demanding process environment. We have tested other processing architectures, but none of them even came close to the low latency that we were able to achieve on the Intel Xeon processor E5 family."

– Moshe Roffie, CTO and Head of Information Technology and Connectivity, Fluent Trade Technologies

Each day, the Fluent Trade Technologies ultra-low-latency platform handles billions of dollars of trades for brokers and automated trading systems. Fluent offers its ecosystem of feed handlers, risk management solutions, big data analytics environments, and other solutions as fully managed, turnkey hosted services and solutions that can be deployed in client data centers. To meet the high-speed data transfer rates its clients require, Fluent recently upgraded its in-house servers to the Intel® Xeon® processor E5 family. The upgrade is helping Fluent retain its competitive edge by reducing latency by more than 90 percent while controlling operating costs.

Challenges

- **Upgrade performance.** Accelerate feed handling and big data analytics while reducing latencies to help clients make fast, informed decisions.
- **Optimize efficiency.** Maximize infrastructure density and energy efficiency to reduce in-house and client operating expenses.
- **Quick response.** Rapidly update the system in response to changing market conditions and emerging technologies.

Solution

- **Dell servers with Intel® Xeon® processors.** Fluent upgraded its trading platform using Dell PowerEdge* R720 servers equipped with the Intel Xeon processor E5 family. The infrastructure runs Fluent's proprietary software on a Centos* Linux* operating system. Fluent plans to incorporate Intel® Xeon Phi™ coprocessors to further accelerate performance for highly parallel applications and mathematical computing.

Technology Result

- **Ultra-low latency.** Fluent has experienced dramatic performance improvements by upgrading to the Intel Xeon processor E5 family, reducing latency from 20 microseconds with previous-generation processors to just 2 microseconds.

Business Value

- **Lower costs.** Intel Xeon processors help create a dense, energy-efficient environment that reduces power, cooling, and real estate costs, all of which enhance Fluent's overall profitability.
- **Software based.** Fluent achieves low latency not with specialized hardware, but with extremely optimized software. As a result, the Fluent solution is highly responsive to changes in requirements, allowing introduction of adaptations in weeks, even days.
- **Competitive advantage.** Single-digit-microsecond latency helps Fluent attract and retain clients by providing them with an edge in the high-speed electronic trading market.

With millions of dollars riding on the speed of each transaction, improving the processing performance and reducing the latency of IT systems is paramount for financial services firms. "Even the smallest improvements in processing speed and latency can deliver tremendous competitive advantages," says Moshe Roffie, CTO and head of information technology and connectivity at Fluent. "We are constantly evaluating technologies that might help our clients gain that critical edge."

Using a high-performance processing architecture is essential for the company's feed handler, which integrates data from multiple sources, and its big data solution, which facilitates analysis of tremendous data volumes. "For our feed handler, we need to gather, parse, and deliver data from and to dozens of sources with single-digit microsecond latency," says Matan Kollnecher, fixation product team leader at Fluent. "To support our big data offering, we need the processing performance for running complex queries on large data volumes and providing real-time results."

At the same time, Fluent needs technology that can help control costs. "As data center expenses continue to rise, it's crucial that our solutions

Intel Xeon processors deliver performance for high-speed trades and big data analytics

deliver maximum infrastructure density and energy efficiency," says Roffie. "Using a dense infrastructure for our infrastructure can help us keep our operating expenses in check. Similarly, creating dense, energy-efficient solutions should help attract clients looking to reduce power, cooling, and real estate costs in their own data centers."

Taking Performance to a New Level with the Intel Xeon Processor E5 Family

After careful evaluation and testing, Fluent upgraded its trading platform using Dell PowerEdge R720 servers equipped with the Intel Xeon processor E5 family. The servers run Fluent's proprietary software on the Centos Linux operating system. "The Intel Xeon processors are the perfect fit for this highly demanding process environment," says Roffie. "We have tested other processing architectures, but none of them even came close to the low latency that we were able to achieve on the Intel Xeon processor E5 family."

Several technologies built into the Intel® architecture are particularly useful for the workloads run by Fluent's clients. For example, Intel® Advanced Vector Extensions (Intel® AVX) deliver the floating-point performance needed to improve performance for clients' custom algorithms. Intel AVX augments Intel® Streaming SIMD Extensions (Intel® SSE), which help improve manipulation of the string data presented by liquidity providers by executing several steps with a single instruction. "These Intel technologies help us rapidly integrate data from multiple liquidity providers so our clients can streamline decision making," says Roffie.

Reducing Latency by 90 Percent

Low-latency processing is a requisite for making rapid and accurate decisions based on the most up-to-date financial data. Using Intel Xeon processors for its feed handler, Fluent has significantly reduced the latency between the time that data is collected from multiple sources to the instant a unified feed is presented to clients. "By moving to the Intel Xeon processor E5 family, we have reduced latency from 20 microseconds with previous-generation Intel processors to just 2 microseconds," says Kollnecher. "In an environment where the speed of trading is measured in microseconds, upgrading to the Intel Xeon processor E5 family has allowed us to build an ultra-low-latency platform that gives our customers the ability to execute a half a million more messages per CPU core—a significant advantage in their ability to execute trades quickly and reliably."

Meeting Big Data Workload Demands

The Intel Xeon processors are also helping improve the speed of big data analytics. The Fluent big data environment uses an Apache Cassandra* database and a Hive* data warehouse for querying and analyzing large data sets stored in a Hadoop Distributed File System* (HDFS*). Clients use the Fluent solution to generate new insights by running customized algorithms on real-time data. "With the ability to process complex calculations and huge workloads with extremely low latencies, the Intel Xeon processor E5 family provides our big data solution with a significant performance advantage," says Roffie. "For our clients, that means faster trading, reliable execution, and better decision making."

Reducing Operating Costs by Increasing Infrastructure Density

In addition to performance improvements, the new Intel Xeon processors also help Fluent and its clients reduce infrastructure costs. "The Intel Xeon processor E5 family enables us to capitalize on greater core counts and memory capacity per server," says Roffie. "As a result, we and our customers can accommodate more and larger workloads without significantly increasing the infrastructure footprint. We can keep our own costs down and also gain a competitive edge by offering greener, more energy-efficient solutions to clients."

Achieving Breakthrough Performance with Intel® Xeon Phi™ Coprocessors

Fluent is working closely with Intel to uncover additional ways to enhance the performance and efficiency of its trading platform. The company is considering incorporating Intel Xeon Phi coprocessors with the Intel Xeon processor E5 family as a way to enhance real-time big data analytics and accelerate performance in highly parallel applications while still using cost-effective, industry-standard systems.

"Using Intel Xeon Phi coprocessors along with the Intel Xeon processor E5 family can provide a real advantage in conducting very complex calculations, like massive financial algorithms, while maintaining very low latency. The Intel Xeon Phi coprocessors enable us to offload heavy mathematical calculations from the low-latency path and then reintegrate data—doing so avoids adding latency," explains Roffie. "As a result, our clients can analyze financial information on the fly to improve decision speed and accuracy."

Spotlight on Fluent Trade Technologies

Established in 2009, Fluent Trade Technologies strives to provide the premier global, multi-asset class, ultra-low-latency, transparent ecosystem for automated trading systems and brokers. The company's clients transact billions of dollars daily through the company's high-performance ecosystem, taking advantage of Fluent's experience and expertise in data processing, trading, large database warehousing, data distribution, monitoring, and risk management.

Getting to Microsecond Latency Without Losing Software Flexibility

"In an ever-changing financial environment where fast response to new threats and opportunities is crucial, the rigidity of specialized hardware-based solutions is a serious deterrent," says Udi Ariav, R&D manager at Fluent. "Fluent's software-based solutions enable rapid adaptations to technology and market changes, allowing customers to stay on top of the competition. Whether you need to add a liquidity provider, update trading algorithms, upload new risk rules or connect a new client application, being able to just install a software version, or even just change configuration, is a major advantage."

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