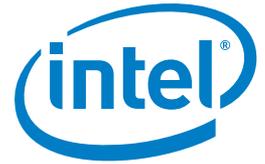


## CASE STUDY

### Intel® Xeon® Processor E5 Family

Financial Services

Energy, Environment, and Performance



# Direct Edge Banks Its Stock Exchange on the Intel® Xeon® Processor E5-2690

Processor's memory and I/O enhancements help shrink Direct Edge's data center footprint and reduce latency to handle peaks smoothly



On a typical trading day these days, fewer shares change hands compared to the pre-2009 stock market heyday. But the peaks of activity are as intense as ever, and are sometimes even more concentrated. The combination of lower volumes and concentrated volatility makes the demands on a stock exchange's technology infrastructure far more challenging, according to Saro Jahani, CIO of New Jersey-based Direct Edge. Jahani is upgrading critical components of his platform to the Intel® Xeon® processor E5-2690 and says the move will help Direct Edge handle the bursts of market activity both smoothly and affordably.

## CHALLENGES

- **Peak performance.** Direct Edge needs balanced high performance and exceptional I/O throughput.
- **Scale.** Direct Edge prizes scalable infrastructure that can grow quickly and affordably as markets rebound.
- **Stability.** System failures can affect market behavior, so solid reliability is essential.

## SOLUTION

- **Peak processing.** Direct Edge is moving compute-intensive workloads to clusters of HP ProLiant\* DL360 Gen8 servers powered by the Intel® Xeon® processor E5-2690 running Microsoft Windows\* Server 2008 R2.

## TECHNOLOGY RESULTS

- **Five percent reduction in latency.** Jahani says the new platforms are improving one of his critical concerns—latency—by 5 percent.
- **More efficient, cost-effective data center.** Direct Edge is reducing floor space for specific classes of servers by half.
- **Affordable stability and scalability.** With powerful, modular 1U servers and multiple levels of redundancy, Jahani provides stable performance and ready scalability.

## BUSINESS VALUE

- **Fulfilling the brand promise.** The solution's high performance and throughput help Direct Edge execute trades smoothly even during peak trading periods, and fulfill its brand promise of innovation, flexible choices, affordable trading prices, and consistent trading performance.

## Servers for a Volatile Environment

Established in 2005, Direct Edge is an electronic stock exchange and market innovator that offers affordable trading prices and flexible choices through its EDGA\* and EDGX\* trading platforms. The company handles approximately 10 percent of U.S. equity trading volume daily<sup>1</sup> and provides a growing portfolio of market data services. It was named the top financial services company at the 2012 American Business Awards,<sup>2</sup> and the best overall exchange operator in the Wall Street Letter's 2012 Institutional Trading Awards.<sup>3</sup>



"Our infrastructure has to perform faster and be more resilient and stable and give us all the scalability we need, but at the same cost or lower cost....

The Intel® Xeon® processor E5-2690 and HP ProLiant\* DL360 Gen8 1U servers give us superior performance and help us save in our data centers.... They're a great Christmas gift."

– Saro Jahani,  
CIO,  
Direct Edge



## Intel innovation helps Direct Edge handle volatile trading conditions

Direct Edge has maintained its position throughout the market's ups and downs, according to Jahani, but today's volatile environment increases the demands on his technology infrastructure. "The requirements have gotten tougher and harder to predict," he says. "We see the same volatility today that we saw in 2009, but now it's concentrated on just a few minutes at the beginning and end of the day. Our processing requirements for those peaks are growing, and when the market spikes back to historical levels, we have to have enough capacity to handle that."

Jahani is looking for the sweet spot that balances scale, throughput, and latency with cost-effectiveness. "Scalability is the name of the game for us, but because the daily volume is not as high as it used to be, our infrastructure has to perform faster and be more resilient and stable and give us all the scalability we need, but at the same cost or lower cost," he says.

### Shrinking Footprint, Reducing Latency

Moving his performance-sensitive trading infrastructure to HP ProLiant DL360 Gen8 servers based on the Intel Xeon processor E5-2690 helps Jahani meet these demands. The Intel Xeon processor E5-2690 is the most powerful member of the Intel Xeon processor E5-2600 product family. Running at 2.90 GHz, the processor provides eight cores, 20 MB of high-speed cache, and Intel® QuickPath Interconnect (Intel® QPI) bandwidth of 8 gigatransfers (GT) per second.

"The Intel Xeon processor E5-2690 and HP ProLiant 1U servers give us superior performance *and* help us save in our data centers on footprint," says Jahani. "They're a great Christmas gift that Intel and HP have given us, and we're capitalizing on them. Our entire production environment will run on Intel® architecture."

The Intel Xeon processor E5-2600 product line offers expanded memory capacity, I/O enhancements, and other capabilities that align with Jahani's demanding environment. His software must not only execute trades at high speeds but also write them to disk so they can be stored and audited. Although Direct Edge architects its software to minimize any slowdowns, even miniscule delays can drag down trading latency.

"Throughput and latency are of extreme importance to an exchange," Jahani explains. "My order-execution latency is typically on the order of 200 microseconds, but if I have jitter, it creates tails of latency, and the average latency can spike to 1 millisecond or even higher, so throughput is very important to us. The advances Intel has made in the new processors mean we are able to achieve more consistent performance."

Jahani's team is seeing a 5 percent improvement in latency compared to their previous HP ProLiant G7 servers based on the Intel Xeon processor 5680. He says the new servers also take half the data center space.

### LESSONS LEARNED

- **Use scale-out models for affordable, scalable performance.** Jahani's team looked at 6U scale-up servers but chose 1U models so they can add smaller amounts of incremental capacity.
- **Work closely with key vendors.** Jahani's extended architectural committee, chaired by the company's chief architect, includes Intel technical experts.

### Architectural Collaboration

Jahani and his team work closely with Intel to make the most of their infrastructure, and Jahani includes an Intel technologist on his extended architectural committee. "Intel has advised us on how we can right-size our performance, improve our applications, and more," Jahani says. "The collaboration has been extremely fruitful and has helped us develop software faster, better, and more on demand."

Nor is the information exchange one-sided. Direct Edge provides real-world insights that help Intel improve its next-generation hardware designs—and keep customers like Direct Edge on the leading edge.

Find a solution that is right for your organization. Contact your Intel representative, visit [Business Success Stories for IT Managers](#), or explore the [Intel IT Center](#).



<sup>1</sup> www.directedge.com

<sup>2</sup> www.stevieawards.com/pubs/awards/403\_2654\_21616.cfm

<sup>3</sup> www.wallstreetletter.com/wsl\_institutional\_trading\_awards\_2012

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