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

Maximum performance for faster risk computations

India's National Stock Exchange tests its PRISM* inline trade risk management system on an open platform based on Intel® Xeon® processor E5-2600 v2 product family, delivering 1.55 times higher throughput performance than the previous Intel Xeon processor generation

NSE

Located in Mumbai, India, the National Stock Exchange (NSE) was established in the mid-1990s as a demutualized electronic exchange. Now the eleventh largest stock exchange in the world by market capitalization, and the largest in India by daily turnover and number of trades, both for equities and derivative trading, NSE provides a modern, fully automated, screen-based trading system with over 200,000 dealer terminals through which investors in every corner of India can trade. It has a market capitalization of more than USD 1 trillion (₹ 67,637.81 billion) and 1,665 companies listed as of December 2012. Though India has a number of other exchanges, NSE is one of the most significant, responsible for the vast majority of share transactions. Its key index is the CNX Nifty, now known as the NSE NIFTY (National Stock Exchange Fifty), an index of 50 major stocks weighted by market capitalization. Through the years, NSE has played a critical role in reforming the Indian securities market and in bringing unparalleled transparency, efficiency and market integrity. It continues to update its trading system to ensure reliability in all its transactions and provide better services for its members.

Challenges

- **Improve trading ecosystem.** Enhance the PRISM* Inline Trade Risk Management System's speed, reliability and throughput by adding more cores to support all applications.
- **Test on an open platform.** Achieve and maintain necessary levels of reliability and fault tolerance.
- **Maintain technology spending.** Improve the trading ecosystem's performance without increasing the budget for system operation and maintenance.

Solutions

- **Utilize Intel® Xeon® processor E5-2600 v2 product family.** Adopt commodity hardware with Intel Xeon processor E5-2600 v2 product family to improve the PRISM Inline Trade Risk Management System's efficiency and boost high-performance datacenter infrastructure.
- **Continue on open platform.** Scale the platform based on business need, and achieve desired throughput and reduced latency.

Technology Result

- **Increased throughput.** Using the Intel Xeon processor E5-2600 v2 product family-based open platform provided 1.55 times higher throughput with 50 percent more cores, giving nearly linear application scaling efficiency for concurrent portfolio processing[1].

Business Value

- **Modernize the trading system data center.** Using the Intel Xeon processor E5-2600 v2 product family enables NSE to achieve greater efficiency and flexibility, since the processor enables rapid delivery of services for high-performance computing.
- **Improve risk computation processing.** The new platform delivers excellent scaling and maximum performance for faster risk computations, enabling processing of more risk computations in the same time.
- **Boost business growth.** The new-generation, fault-tolerant servers based on Intel Xeon processor E5-2600 v2 product family enable new services to be delivered and expanded into new businesses for the same budget or less, while providing a better level of reliability, latency and performance to customers.

"We address our technology needs with Intel's new processors to meet our increasing compute needs and reinforce our leadership position in the equity market."

– N Muralidaran
Chief – Special Projects, NSE, and Director, NSETECH

PRISM based on the Intel® Xeon® processor E5-2600 v2 product family, delivers excellent scaling and maximum performance for faster risk computations, enabling processing of many more portfolios at the same time

Since its inception, NSE has considered efficient usage of technology its hallmark. Over the years, the need and use of technology has grown exponentially. NSE continues to innovate and use technology to provide a state-of-the-art trading infrastructure to its members.

Today NSE's technology compares with the top exchanges in the world. In fact, NSE sees the largest number of transactions in the world being processed in its futures segment. It is second in the world in terms of the number of transaction processes being processed in the equities segment. On any given day, about half a billion transaction processes are processed in a six-and-a-half-hour trading window across various segments.

"Technology has changed the way equity markets work in India," says N Muralidaran, chief of special projects and director of NSETECH at NSE. "The markets have matured a lot over the last eight years and brokers have adopted new technologies. NSE was one of the first to create an electronic market in India. As technology advances, the speed of processing transactions also improves. Earlier, what used to happen in seconds, now happens in milliseconds and microseconds.

"IT architectures continue to get more and more connected and today, we have more than 200,000 dealer terminals connecting every day into NSE's trading system through various means like leased lines, VSAT, Internet, mobile, Financial Information Exchange (FIX), among others," Muralidaran continued. "Towns with a population over 10,000 today have at least one NSE terminal – something which was unthinkable a few years back. Currently, more than 3,000 towns are seamlessly connected."

In keeping with its commitment to innovating technology and making it work more effectively to boost its trading system, NSE tested a new platform that will run PRISM, its inline trade risk management system. With a huge computing requirement, PRISM currently needs more cores and faster computing capability.

Improving trading ecosystem performance on open platform

NSE's PRISM previously ran on older generations of Intel Xeon processors. Since applications and workloads running on the system have become more intensive, NSE continuously strives to boost the throughput capacity of the system to support these applications and workloads. It tested the risk infrastructure on an open platform to allow scaling of the platform based on business need.

The open platform, based on the Intel Xeon processor E5-2600 v2 product family, has delivered 1.55 times higher throughput compared to the previous generation of Intel Xeon processors without compromising on latency[1].

Since the Intel Xeon processor E5-2600 v2 product family provides 50 percent extra cores, this gives the new system nearly linear application scaling efficiency for concurrent portfolio processing. It also provides faster memory to accelerate in-memory operations.

Delivering enhanced trading system for improved business

With the Intel Xeon processor E5-2600 v2 product family powering its PRISM application, NSE has modernized its risk application architecture, achieving greater efficiency and flexibility since the processor enables rapid delivery of services for high-performance computing. This means improving risk computation processing, since the new platform delivers excellent scaling and maximum performance for faster risk computations, enabling the processing of many more portfolios in the same time. More importantly, the new-generation, fault-tolerant servers based on the Intel Xeon processor E5-2600 v2 product family enable new services to be delivered and expanded into new businesses for the same budget or less, while providing the same level of reliability, latency and performance to customers.

Lessons Learned

- NSE's PRISM Inline Trade Risk Management System, tested on an open platform based on Intel Xeon processor E5-2600 v2 product family, achieved 55 percent throughput gain with only 50 percent extra cores and without compromising on latency.
- This scaling, coupled with cache and memory access enhancements, impressed users the most about the new platform.
- The Intel Xeon processor E5-2600 v2 product family enables faster memory to accelerate in-memory operations.

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