



Cisco High Performance Trading Solutions

Monitor – identify latency bottlenecks in trade and market data

In today's dynamic trading environment latency visibility is more important than ever. At very high data rates, customers need more granular tools. The ability to identify the exact location of delays – whether in the customer's edge network, the central processing hub, or the transaction application level – significantly determines the ability of firms to achieve consistent handling of market data feeds and FIX order flow. For buy-side and sell-side firms as well as for market syndicators, the quick identification and removal of bottlenecks translates directly into enhanced trading opportunities and revenue.

Part of the difficulty in measuring latency is ensuring that the monitoring function itself does not introduce any extra effects on throughput and performance, while still providing actionable information about what is going on. The solution is to operate "out of band", that is, using a separate path away from the main data stream, similar to the way in which telephone control signals do not interfere with voice traffic.

Through its unique approach of incorporating FIX monitoring infrastructure directly into the network, the Cisco AON for FIX Order-flow Latency solution provides powerful business benefits.

Cisco Financial Services Monitoring Solution for FIX Order-Flow Latency

Cisco Application Oriented Networking (AON) technology is the foundation for a new class of network-embedded solutions that unite intelligent networks with application infrastructure based on either service-oriented or traditional architectures. Through a partnership with Trading Metrics, Cisco AON for FIX Latency monitoring Solution can perform a rich set of analyses to track the performance of TCP connections, FIX connections and FIX transactions. Dashboard presentation capabilities display KPIs related to the FIX traffic flow.

Reduces the cost of order flow latency monitoring and its complexity

Rather than having to set up, configure and manage multiple point components and servers throughout the enterprise, possibly performing proprietary coding and integration, firms can simply embed the required functions within the existing infrastructure. Both the capture and the packaging of FIX traffic for consumption by the analytical applications are controlled through simple configuration and centrally managed policies. These policies can be propagated automatically to the appropriate Cisco AON observer as needed. The automatic propagation helps ensure consistent monitoring and it also virtually eliminates the need to send out expensive IT personnel to manually update and synchronise policy at multiple individual servers and points of interception.

Increased business agility

Cisco AON not only captures a wide variety of order flow messages (trade orders, confirmations, notification of execution), but it can also act upon these captured messages to extract important information from them and compare it with market data or calculate summary statistics. The Cisco AON solution also provides an API that can link it to trading applications. By monitoring and measuring latency early in the cycle, firms can make better decisions about which network service and which market, intermediate or counterpart to select for routing trade orders.

Bridges the network/application gap

The Cisco solution correlates two kinds of events at the point of observation: network events correlated directly with coincident trade order-flow and market update events. Using timestamps asserted at the point of capture in the network, real-time analysis of these correlated data streams permits precise identification of bottlenecks across the infrastructure while a trade is being executed. This tight correlation allows levels of real-time insight and control previously unobtainable.

Accelerate – order flow and computational analysis

Identifying latency bottlenecks in the trading cycle is only one part of the solution. The explosion of electronic trading has created the need for high-performance computing (HPC) environments. To gain a competitive edge in the marketplace, portfolio and risk managers must be able to access real-time financial information and utilise technical indicators to buy and sell equities and exotic investments. As new investment products are introduced, the need to obtain an accurate view of a fund's value and its related risk is significantly increased. These growing business necessities are creating enormous stress on the current compute infrastructures, where highly computational algorithms in mission-critical applications are unable to scale effectively.

Automated trading makes reducing latency and increasing performance essential in a market data environment. Feed handlers receiving real-time market data feeds from stock exchanges, market data feed providers and ECNs require these feeds to be "normalised" before being distributed to black boxes and traders alike. Data normalisation allows feeds to be standardised through dedicated feed processors and entered into a uniform database model. The uniform access to multiple normalised market data feeds facilitates data distribution to end-users and ensures data consistency throughout the organisation. The high server-to-server traffic that occurs as these computations are performed means that a cluster of servers with the lowest possible latency interconnect is needed to reduce delay in delivering the market data.

Cisco's innovative HPC solution creates a high-performance server I/O fabric, achieving ultra-low-latency performance to support the growing computing needs of market data feed handlers and other trading floor applications. Through the use of RDMA technology, an application can offload all communications management to the InfiniBand host channel adapter, which allows more CPU cycles to be spent on processing, rather than communications.

**Minimises latency in each component of delivery platform**

It is imperative that latency be minimised when delivering time-sensitive data. As the data traverses the different components of a trading platform – including market data delivery, order routing, and execution, an HPC environment addresses the speed-sensitivity requirements by providing a lowest-latency interconnect, so that raw computational power can be utilised in clusters to deliver the fastest response possible.

Helps prepare for new regulations that will drive high market-data volumes

Regulatory changes such as Reg NMS and MiFID will generate more quote, order, and cancel/replace messages as equity firms adapt to more – electronic business processes. In the US, the sub-penny pricing rule will also increase demands on the supporting infrastructure. MiFID, is also expected to lead to higher data volume, since investment banks that internalise trades will be required to publish their pre-trade quotes electronically. An InfiniBand HPC environment provides a secure, scalable solution to meet the growing needs of the financial services industry.

Increases competitive edge by incorporating FAST protocol for lowest-latency connections

As financial industry experts predict relentless growth in market-data volumes, organisations are preparing for implementation of the FAST Protocol. FAST offers a lower-latency feed that uses a data – compression technology. Exchanges are planning to use FAST to deliver new products in areas such as derivatives and equities. However, to support the new rapid market data message rates and deliver the quickest-possible trade execution, a grid computing model is needed to parse the data from the feeds and then deliver it to consumers. The InfiniBand HPC solution can provide the lowest latency transport while providing the bandwidth to sustain increased market volumes.

Provides flexibility to support a service-oriented architecture based on industry-standard protocols

The Cisco HPC solution adheres to industry standard protocols such as Open MPI and Open Fabrics. This allows customers to leverage the true high-performance, ultralow-latency characteristics of the InfiniBand fabric. An application environment that supports these industry protocols will truly benefit from the open architecture, as it becomes part of a service-oriented architecture strategy for the adaptive enterprise. This shortens the time to market for new financial products, providing a competitive edge.

Allows the use of common tools to manage Ethernet and InfiniBand networks

The VFrame management platform enables the delivery of utility computing into the data centre environment. This increases the ability to rapidly provision shared-server and I/O resources on demand. By managing and orchestrating diverse Ethernet and InfiniBand resources, a financial organisation can become more agile, adapting easily to rapidly changing market conditions. In addition, just-in-time provisioning reduces operational costs by automating regular tasks. Since InfiniBand creates a high-speed fabric that is shared by all the nodes participating in it, downtime can be quickly averted by reallocating resources to different resource pools.



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Supports the increasing trend toward a utility computing model to support heavy computations

As market-data levels continue to rise and financial organisations look to expand their product portfolios, increasing raw computational power is required to support the algorithms needed for portfolio performance analytics, Monte Carlo simulations, value calculations, and risk profiling of trades. Grid services virtualise computing silos that underperform, or are underutilised and makes them well-balanced, fully optimised enterprise backbones. The Server Fabric HPC infrastructure can be scaled quickly, because additional computing power can be added to the grid dynamically to support business processes with increasing demands. The combination of Server Fabric Switching and VFrame allows for effective consolidation, virtualisation, and automation of resources that deliver instantaneous return on investment.

Cisco Systems® is uniquely positioned to address this problem with its high-performance computing solutions, which include both Ethernet and InfiniBand technologies. Cisco's broad solution portfolio delivers high speeds, low latencies, open standards, and high system availability and allows financial firms to deploy the right infrastructure for their application.

For more information on Cisco's solutions for financial markets please visit www.cisco.com/go/financialmarkets



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