



## NetScout Provides Visibility into Financial Trading Applications

Financial Trade and Market Data Feed applications are among the most time sensitive applications in the world. Of the thousands of applications crossing networks every hour, very few depend on micro-second latencies to determine the difference between soaring profits and abject loss.

### The Changing Financial Industry

A whole industry has sprung up to meet the needs of growing market data volumes and the ever-increasing speeds required for algorithmic trading and critical market feeds. New messaging protocols increase messaging throughput rates while reducing overall latency. Some, like Financial Information eXchange (FIX), have become broadly accepted trade standards; while others, like TradElect, continue to be developed for specific markets. Recently, IBM has entered the mix by introducing Low Latency Messaging (LLM). All these technology-leading methodologies drive productivity and are exclusively designed for financial electronic communications.

Financial feeds are also embracing newer, faster technology. The market feeds are typically based on "one to many" (or "Server to Groups" (S,G)). Since these messages are typically one-way communications, it is critical that the information be properly delivered. If market data is dropped, trades may be based on erroneous information.

### Visibility is Key

The inherent problem with all this new technology is it is difficult to track and monitor. Many traditional monitoring tools simply don't have visibility into many financial applications.

With the nGenius and Sniffer brands, NetScout has led the industry for almost a quarter century in intelligent protocol analysis. With close ties to major exchanges and primary financial players, NetScout bridges the gap between the business of trading and the underlying technology of packets analysis. So it comes as little surprise NetScout is the first and only company to provide comprehensive visibility into Financial Trading Applications.

Comprehensive visibility requires broad awareness of the hundreds of protocols used. It also must present the information in both monitoring and problem resolution formats. NetScout does all of this and more. The following sections break comprehensive visibility into three critical elements:

- Financial-Aware Data Source
- Sophisticated Monitoring
- Problem Resolution and Analysis

NetScout automatically recognizes more than 600 Financial Market and Data Feed applications including:

- Archipelago Arcabook Equities and bonds protocol (ArcaBook Equity)
- Chicago Mercantile Exchange-Multicast Dissemination Protocol CME-MDP
- CQS Consolidated Quote System
- CTS Consolidated Tape System
- FAST Archabook Options for ARCA-FAST
- FIX - Financial Information Exchange (4.4, 5.0, Fast 1.1)
- Financial Multicast MCA
- IBM LLM (Low Latency Messaging)
- LBM Protocol
- London Stock Exchg Infolect and TradeElect LSE
- MDP FAST
- Multicast TIBCO Financial Feeds
- NASDAQ UQDF, UTDF, and OMDf
- NASDAQ Mold UDP based feeds
- NSX Depth OF Book
- NYSE Alerts, LRP, UltraBook, and Trades
- OPRA FAST
- Options Price Reporting Authority (OPRA ASCII)
- Russell Index 1000

## Financial-Aware Data Source – nGenius InfiniStream

With industry-leading intelligent Deep Packet Capture (iDPC) technologies, NetScout provides purpose-built appliances to discretely capture packets off the wire without any affect on the actual transactions. These nGenius InfiniStream appliances quickly and efficiently gather statistical performance information prior to writing and indexing the packets to storage. This provides both real-time and post capture analysis.

“Out-of-the-box”, nGenius InfiniStream appliances recognize more than 600 financial Market Data Feeds built on top of the protocols by the various exchanges, including the new addition of IBM’s LLM. Message loss per feed is detected in real-time. For trade order applications, FIX protocol and TradELECT are supported for order acknowledgment in real-time. Customization is provided to recognize feeds altered for in-house use. Data is then sent to the nGenius Performance Manager console to monitor the performance of these critical applications.

Since timing is so critical to financial applications, NetScout provides optional time synchronization adaptors to correct for  $\mu$ sec drift across devices. Satellite triangulation (via GPS or CDMA) is used to create a more precise timing method than that normally provided by older technologies such as Network Performance Time Protocol (NTP). This timing can be critical when determining why a transaction did or did not close properly or where along the line market feed information was discarded.

## Sophisticated Monitoring – nGenius Performance Manager

Multi-point monitoring is accomplished using a centralized nGenius Performance Manager console. With this, customers can alert on gaps, out of sequence packets, retransmissions, and microburst activities that can all impact financial trades and feeds. Quick drill-down is available to efficiently monitor these critical applications and to answer questions about how the application is performing. It is even possible to alert on trading anomalies due to rising or falling activities.

## Problem Resolution and Analysis – Sniffer Financial Intelligence

For the ultimate in network forensics, the saved packets provide critical back-in-time analysis. This can be used to prove what really happened, or to just better understand how the applications (and the associated messages) work together. The Sniffer Financial Intelligence module visualizes financial trades and market feeds in an easy-to-use format. It provides insight into how the FIX and TradELECT transactions are working without the need for a networking background. Users can see how the trades progressed, and where issues arise. Latencies are broken down by transport as well as the time taken for a transaction to be turned by the server. Latency figures include carrier latency, intermediary network latency, and transaction / response latency. Because nGenius InfiniStream appliances keep track of all packets traversing the network, Sniffer Financial Intelligence is commonly used to:

- Proactively alarm and drill-down to specific packets detecting message loss on Market Data Feeds
- Resolve problems within FIX networks
- Report on client latency / delivery, and compliance
- Track which Orders closed properly
- Determine if certain transaction types run faster than others

With the packet, timestamp, and the interface on which it was seen, the transaction is reassembled on demand. Forensic examination of an institutions packet-flow provides a map of how the packets traverse the network. Users see the financial details of each transaction (transaction type, Order ID, Client etc) as well as the delivery delay at each point in a bounce chart diagram. With visibility into the entire order flow, both Order and Execution times are depicted. Information such as active sessions, transaction type (Order, Fill, etc) are presented to the user in an easy to understand interface.

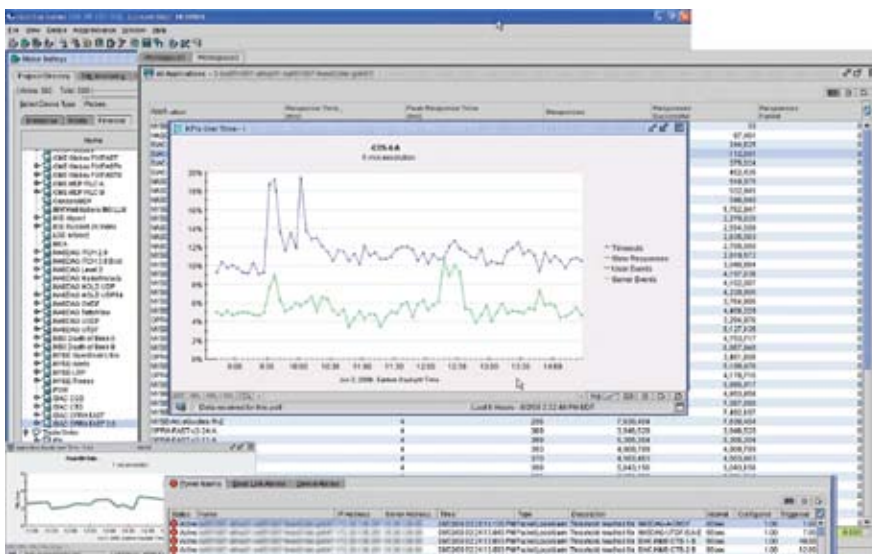
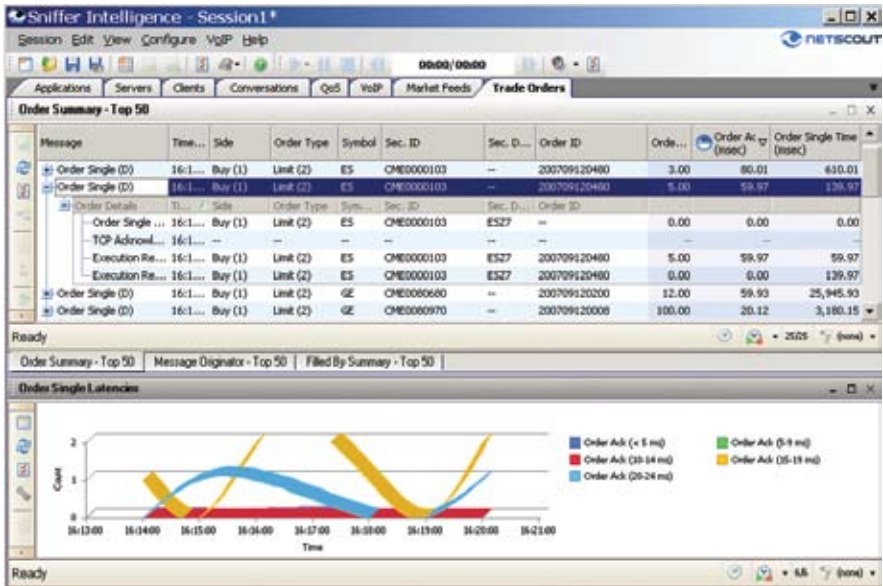


Figure 1. Alarms, Packet Burst, Financial Protocol directory, and KPIs Over Time views of real-time market data feeds.



### Summary

For truly comprehensive visibility into Financial applications, choose NetScout. Nothing else provides the ability to see both high-level monitoring combined with active drill-down into the depths of the financial transactions. NetScout provides detailed insight into the real performance of your financial applications.

Figure 2. Trade information is compiled for every Order Single transaction.

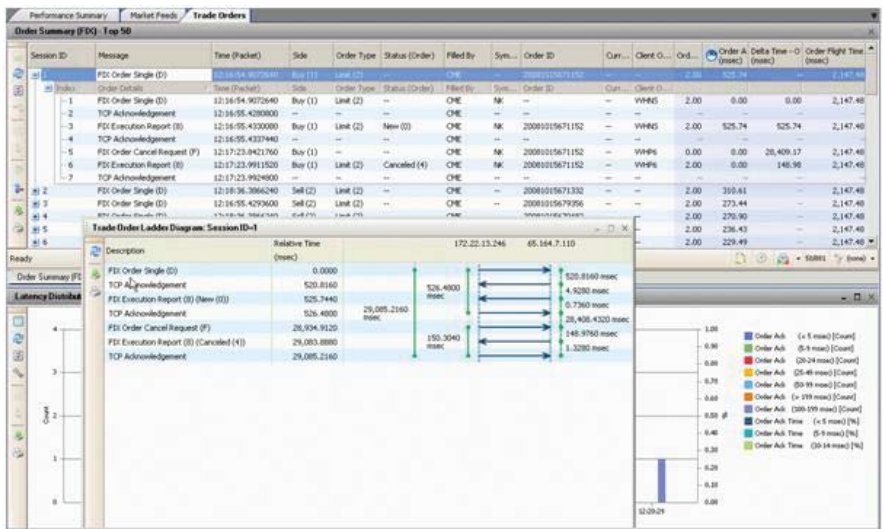


Figure 3. Trade Order Ladder Diagram showing latency within a FIX transaction.



***Corporate Headquarters***

310 Littleton Road  
Westford, MA 01886-4105  
Phone: 978-614-4000  
Toll Free: 888-999-5946  
[www.netscout.com](http://www.netscout.com)

***European Headquarters***

NetScout Systems (UK) Ltd.  
100 Pall Mall  
London SW1Y 5HP  
United Kingdom  
Phone: +44 (0)20 7321 5660

***Asia/Pacific Headquarters***

Room 105, 17F/B, No. 167  
TunHwa N. Road  
Taipei, Taiwan  
Phone: +886 2 2717 1999  
[www.netscout.cn](http://www.netscout.cn)

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