VISUALIZE TRADING LATENCY IN REAL TIME

The ability to monitor, investigate, and act on time-sensitive data is critical to the success and profitability of electronic trading operations. With Altair® Panopticon™, traders can visualize latency metrics while slicing the data by symbol, order router, decision strategy, time in force, and any other FIX message field in real-time.

Microseconds Matter

Trading firms know that despite the fact that latency is typically quantified in microseconds, its impact on profitability is immediate and substantial. As such, measurement tools must support sub-microsecond precision.

Absolute and comparative measurements of latency are critical factors that determine how well algorithms perform in high frequency trading environments. Similarly, profitable arbitrage trading depends on identifying profitable trading opportunities that exist for mere milliseconds. Therefore, knowing exactly how much latency exists in the entire system is vital, but not as important as rapidly identifying latency's source.

However, latency measurements are insufficient on their own. The measurement process itself can't contribute latency to the flow of trading data, and traders must be able to understand latency issues quickly so they can take immediate action when necessary.

Use Panopticon to Optimize Your Corvil Investment

Many buy-side and sell-side firms use Corvil, a product of Pico Quantitative Trading LLC, to capture and monitor trade performance, infrastructure performance, and latency from the edge all the way through their infrastructure.

The Altair Panopticon real-time streaming analytics platform lets traders and managers design visual user interfaces that provide valuable data insight. It can access streaming data from all popular message queues and complex event processing (CEP) engines as well as all commonly used time series and relational databases. The trading industry has used Panopticon widely for more than 20 years because of its ability to resolve, process, and visualize time series data down to the microsecond.

Typical Implementation Scenario

The current solution analyzes a smart order router that performs real-time execution of incoming client orders on dedicated FIX channels by:
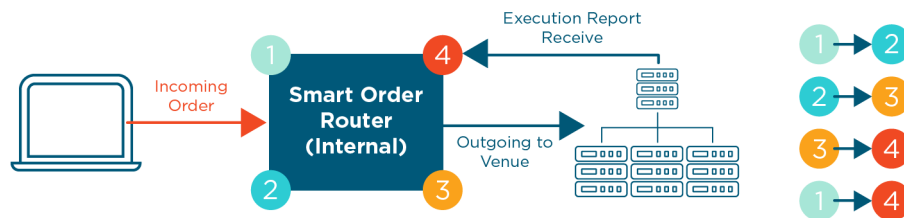
- Breaking up parent client orders into multiple child orders;
- Sending individual child orders to exchanges based on proprietary algorithms;
- And acknowledging, tracking, and generating execution reports.

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> The ability to process and visualize streaming data with microsecond-level precision is essential in the electronic trading business, and there are many emerging applications for the same capabilities in industrial settings. The ability to precisely monitor latency – down to the nanosecond if necessary – is therefore vital to the overall functioning of real-time systems.
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> Sam Mahalingam, CTO, Altair

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The Corvil Network Engine handles packet capture and latency calculations, and the Corvil Analytics Stream takes care of PNQM hop-to-hop latency calculations. A high-performance time series database stores the data and creates the FIX schema.

Ensure Maintenance of SLAs and Flag Potential Breaches

Panopticon's streaming analytics capabilities let traders configure proactive alerts that notify them about potential and/or actual latency SLA breaches. For example, a firm may offer an SLA that requires every parent order to be broken up into child orders in less than a millisecond. This lets firms be more aggressive in their SLA offers and makes them more competitive.

Microsecond-Scale Stream Processing and Data Visualization

Panopticon advanced data visualization software supports fast, efficient visual analysis of real-time streaming and historical time series data from a huge variety of sources, including:

- Apache Kafka Distributed Streaming Platform
- Message buses: Solace, JMS, AMQP, RabbitMQ, AMPS
- CEP engines: TIBCO StreamBase, SAP ESP, Kx kdb+tick, OneTick CEP
- Time series databases: Kx kdb+, OneTick, InfluxDB, Vertica, TimescaleDB
- NoSQL: Cassandra, MongoDB, Elastic, Spark, SAP HANA,
- Relational databases: Any SQL database

With Panopticon, traders get an intuitive dashboard where they can see router performance statistics for a single order in real time as it's being executed. Users can select different types of events to be brought on screen as needed, and the system color-codes numbers to highlight event names and the relative number of fills, cancellations, and requests.
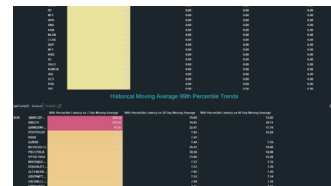
Altair: A Comprehensive Range of Data Analytics Tools

Altair gives teams the power to use data analytics and AI to gain competitive advantages and drive next-level business results:

Stream Processing and Data Visualization: Connect directly to streamed sensor data from MQTT, Kafka, Solace, and other message queues and build complex stream processing applications with a simple drag-and-drop interface. Build and publish sophisticated real-time dashboards without writing any code. Solve difficult problems quickly, understand complex relationships in seconds, and identify issues that require further investigation with just a few clicks.

Artificial Intelligence and Machine Learning: Our industry-leading visual approach to analytic modeling minimizes repetitive tasks, shares knowledge across enterprises, and reuses steps within connected model workflows for faster analysis and shared insight.

Data Preparation: Access, cleanse, and format data from a wide variety of sources (including Excel, CSV, PDF, TXT, JSON, XML, HTML, SQL databases, Big Data like Hadoop, and more) without any manual data entry or coding.

TOP: Account-level execution overview a combination of treemaps, bar charts, and pie charts to visualize latency for all orders and all clients. **MIDDLE:** Business execution performance dashboard displays a weighted distribution of all orders in the system and allows traders to select and deselect points in the trading infrastructure as needed. **BOTTOM:** This screen provides a real-time view into latency percentile trends for a single order router.

TRADING FIRMS MONITOR LATENCY WITH PANOPTICON TO BOLSTER THEIR COMPETITIVENESS BOTTLENECKS.