Market trading networks are some of the most demanding environments in the IT world. The real-time nature of trading means that any problem will likely impact customer transactions, which directly impacts revenue. While network operators in these environments face many of the same challenges as other organizations, the criticality of these networks amplifies them, making proactive solutions that much more crucial.

Some of the biggest challenges facing market trading organizations include monitoring the increasing volume and velocity of data in the market feeds, identifying problems in real-time, achieving broad visibility over all critical links, and analyzing traffic at a resolution where predictive indicators can be identified.

THE NEED

**Challenges Facing Market Trading Organizations**

**Increasing Volume and Velocity of Data**
Trading volumes handled by worldwide exchanges has continued to grow, forcing exchanges to continually expand their capacity. Additionally, the velocity of this data is increasing, as this traffic has migrated from 1G to 10G, and now to 40G and 100G.

**Real-Time Monitoring**
Most market data feeds operate under strict performance service level agreements, so ensuring the quality of those feeds must happen in real-time. Anything less can result in loss of revenue.

**Achieving Broad Visibility**
As the network has expanded to handle trading growth, visibility can suffer. Often, budget will dictate how much of the network is actively monitored, leaving operators only able to monitor a limited scope.

**Unable to See Predictive Indicators**
Since network problems directly impact revenue, it’s important to be able to identify predictive behaviors of these problems before end-customers are impacted. However, it can be difficult monitor traffic at a fine enough resolution that these indicators become available.
The Advantage: Advantages of an Intelligent Monitoring Fabric

cPacket Networks provides customers with a next-generation, high performance network monitoring solution called an Intelligent Monitoring Fabric (IMF). This integrated solution delivers better performance, deeper levels of insight, broader visibility, and increased operational efficiency, as compared to traditional monitoring solutions. cPacket’s distributed intelligence provides a more accurate view of network events by reducing false positives caused by faults within the monitoring infrastructure itself. Because analysis happens in hardware and directly at the wire, you eliminate bottlenecks caused by processing delays common to software-based monitoring solutions, and spikes or bursts that happen within the tap and aggregation layer. With robust hardware-based performance, cPacket enables proactive detection of imminent issues before they negatively impact end-users. This combination reduces both CAPEX and OPEX costs, for a lower overall monitoring total cost of ownership.

cPacket offers solutions that address the specific challenges faced by Market Trading organizations, including high-resolution stream analysis, real-time market feed gap detection, high-resolution analytics, and nanosecond time stamping.

The Means: cBurst - High-Resolution Stream Analysis

Since market behavior is event-driven, market data feeds can experience extreme fluctuations in traffic levels. This sets up the potential for spikes and bursts that exceed network capacity, causing critical trading data to be dropped. When traffic in a UDP stream is dropped, that data is permanently lost, directly impacting customer trading activity. Additionally, these spikes can occur across very short spans, resulting in microbursts that can be difficult to detect.

cBurst solves this problem by allowing real-time, monitoring of up to one thousand data streams per port, and with up to 1ms resolution, providing the customer with both high-density and high resolution monitoring, and at line rate speeds of up to 40Gbps.

With cBurst, faults are proactively monitored, providing predictive indicators of problems before end user trading is impacted.

When a fault is identified by cBurst, an alert is visualized on our dashboard layer in real-time, identifying the specific IP address and network the fault came from, greatly reducing troubleshooting time.
Real-Time Market Feed Gap Detection

Market feeds are made up of UDP multi-cast streams that deliver real-time market data from the exchanges to brokerage houses, in-between exchanges, and to large algorithmic traders. Each level of customer relies on service level agreements (SLAs) to ensure their data feed is correct and complete. This multi-tiered SLA structure causes any network fault to become a game of finger-pointing to determine the source of the problem. While a gap or out-of-sequence error in the feed could come from the data seller, it could also come from the operator’s own production network infrastructure, or could be a false-positive that comes from within their monitoring network. Because of the potential negative impact on the trading operations, organizations need broad coverage across all key junctures in the network, but are often unable to with the high-cost of these solutions.

cPacket provides a robust solution powered by our Distributed Monitoring Architecture to detect packet gaps and sequence errors in real-time. With link speeds of up to *40Gbps line rate, and per-appliance throughput density of between 160Gbps and 1280Gbps, cPacket delivers unmatched ability to provide broad coverage at the same time as handling the velocity, volume and precision needed in today’s market trading networks.

Millisecond Resolution Analytics

Critical feeds, such as market trading data, require accurate analysis to correctly and proactively monitor for network problems, packet bursts and other abnormalities. When robust solutions are deployed, they can not only actively identify problems, but also identify network behavior that is predictive of future problems. Unfortunately, many solutions rely on sampled flow-based, or low-resolution packet-based analysis, which can hide these critical predictive indicators. Also, systems that perform software-based analysis are prone to their own spikes and bursts, which can cause false-positives within the monitoring infrastructure that aren’t in the production network.

To avoid these problems and deliver the most accurate analysis possible, cPacket provides performance metrics with single-millisecond accuracy. This 10X increase in resolution over standard one-second traffic resolution allows you to correlate performance analytics more accurately across the entire network.
Nanosecond Time Stamping

Latency in the network can impact the timing of trading activity. Because of this, network operators work to reduce any potential delays in network traffic. To help this, precision timestamps are used at the wire to precisely sync activity across the network.

cPacket offers nanosecond accuracy timestamping, based on PTP/NTP or PPS time-sources, our IMF helps avoid the stochastic contamination that can occur in queuing and traffic buffering. By using Digital Phase Locked Loops (PLL), and built-in diagnostics to monitor for oscillator issues due to vibration or heat, we can offer the most accurate time-stamping in the industry.

Visualization Layer

The increasingly large amounts of data running across your network can make it difficult to understand what, where, and when problems are happening. SPIFEE maps and visualization tools allow you to proactively monitor and better understand network behavior, while providing immediate access to the packet view, on-demand as needed.

Performance Analytics and Forensic Layers

cVu Monitoring Appliances are distributed across your network to provide broad coverage of the entire environment by inspecting packet traffic in real time, bringing Operational Intelligence directly to wire, and eliminating the risk of bottlenecks and data loss.

cSTOR Forensic Storage Arrays capture and archive packet traffic, allowing you to retrieve specific incidents while troubleshooting, making intermittent problems easier to understand and solve.

Production Layer

This is the lifeblood of your organization. Your productivity depends on it. Your revenue depends on it. Your compliance depends on it. If it goes down or isn’t performing properly, you have a problem.