Low-Latency, High-Performance Optical Networking Solutions

Financial Services Gain Competitive Edge with CN 4200

Executive Summary

Financial services firms specializing in high frequency trading are looking to reduce network latency anywhere within the algorithmic-based trading work flow. In the past, efforts to reduce latency have been implemented with superfast computers, faster software and faster storage connections. Today saving fractions of seconds by reducing data transport latency in network systems and fiber-based transport networks is receiving more attention. In addition, since low-latency market data is uncompressed and trading volumes are increasing so rapidly, much more bandwidth capacity is required.

Ciena's new low-latency, high-capacity fiber optic networking solutions address these demanding requirements for high frequency trading driven by advanced algorithms.

Background

Financial services firms rely on securities trading for a large portion of their revenue and have developed algorithmic trading systems that have greatly changed how investment products are priced and sold. These high frequency trading systems are designed to execute trades and market orders automatically based on hundreds of different data points provided by third parties such as Reuters and Bloomberg.

This data is sent to the trading desks and aggregated into an automated trading system. The hedge fund's or trader's computer algorithms dissect the data and compare it to predetermined trade triggers. If the data matches the trading triggers, the automated systems immediately execute the buy or sell command.

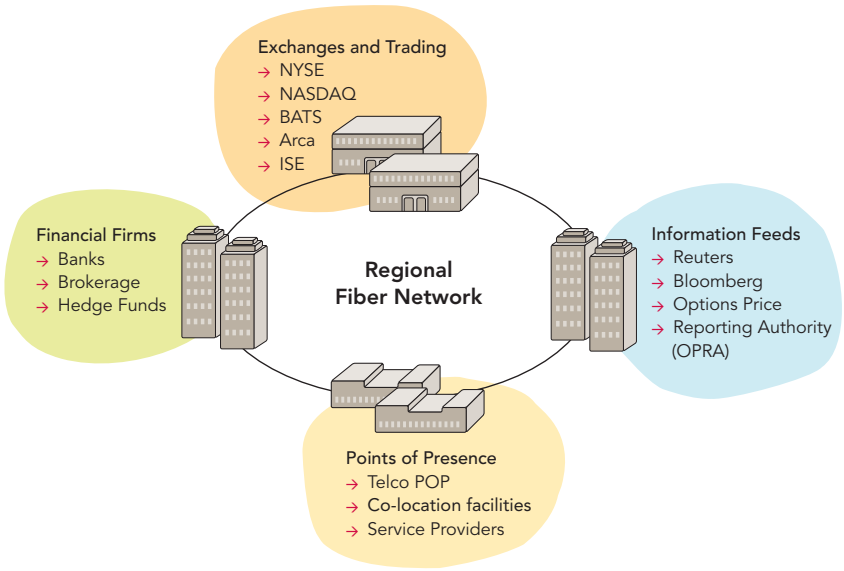

Figure 1. Fiber-connected trading network

"Powering our new data centers and network with Ciena technology will help produce a clear competitive advantage for NYSE Euronext and our customers in terms of executing trades and delivering mission critical information as well as advancing leading edge applications such as state-of-the-art co-location facilities."

Stanley Young

CEO of NYSE Technologies and Co-Global CIO of NYSE Euronext[1]

Benefits

- Enables lower-latency server connectivity between algorithmic computation and processing operations with the lowest-latency GbE connections over fiber
- Lowers transport latency through the reduction of fiber dispersion compensation delay through the fiber
- Offers high-capacity, future-proof network platforms for 10G, 40G and 100G solutions

Hedge funds and brokerage firms can buy and sell the same stock automatically, several times in just a few hours—moving millions of shares for a gain or loss of a fraction of a penny—using these algorithmic trading platforms. For example, NYSE Euronext has over 4100 listed companies, and their equity exchanges transact an average daily trading value of $141 B[2] with algorithmic trading accounting for over 25% of their trades.

Fractions of milliseconds impact revenue—it is estimated a one millisecond advantage can equate to over $100 M per year. Lowering network latency can result in a competitive advantage if a financial firm is able to trigger its algorithmic trading and deliver the trade to the market faster than the competition. With long-distance Wide Area Network (WAN) connectivity often in the tens or hundreds of milliseconds, many firms are using proximity-based hosting solutions in regional points of presence locations using fiber-based connectivity between the market's servers and the trader's servers to further lower latency due to distance.

New Ciena Solutions for Low-Latency, High-Capacity Networks

Ciena has developed new networking capabilities to address emerging low-latency, high-capacity networking requirements over fiber.

CN 4200® 2RS Module

Ciena's 2RS module for the CN 4200 FlexSelect® Advanced Services Platform offers the fastest, lowest-latency server GbE interconnection. The 2RS module simply reshapes and retransmits the data signal, adding virtually no latency. The latency tested for the 2RS module was 0.2 microseconds (µs) (200 nanoseconds[3]) round trip, or 0.050 µs (50 nanoseconds) through each card. The 2RS supports Small Form-factor Pluggable (SFP) transceivers for easy plug-and-play interfaces to optical fiber over a variety of distances.

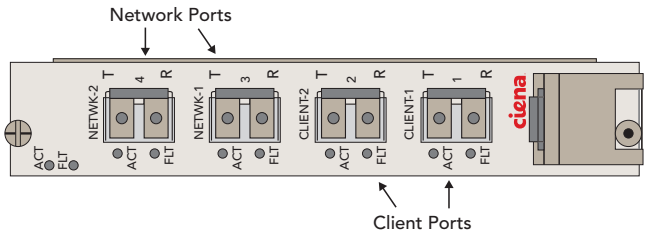

Figure 2. Ciena's 2RS Module

CN 4200 Dispersion Compensation Modules

Dispersion compensation modules are used to reduce the signal distortion caused by chromatic dispersion as light travels down the fiber. However, some modules, like Dispersion Compensating Fiber (DCF) modules, can add up to 70 µs of latency for 100 km fiber transmission. Ciena is offering new ways to reduce the time it takes for light to travel through the fiber. Ciena's new FBG Dispersion Compensation Modules reduce latency to less than 0.15 µs (150 nanoseconds).

CN 4200 100G

NYSE Euronext and Ciena recently announced plans to implement the first 100G network that will enable NYSE Euronext to provide both the speed and the ultra-low latency to facilitate financial transactions globally. Moving to 100G accommodates expanding bandwidth requirements and eliminates any congestion-related latency in the exchange.

The CN 4200 platform allows network operators to adopt a phased approach by implementing 10G and 40G networks, and adding 100G without re-engineering the network. By focusing on inventive solutions built for long-term value, Ciena provides investment protection, flexibility, and cost savings to solidify lasting business relationships and allow customer networks to adapt readily to new requirements.

[1] NYSE Press Release 5/5/09
[2] Source: Andrew Bach 8/27/08 "Network and Interconnect Requirements for Global Equities Trading," average trading value on 12/31/07
[3] A nanosecond, one billionth of a second, is approximately equal to the time taken for light to travel one foot.

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