

Low-Latency, High-Performance Optical Networking Solutions

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.

Allied Fiber's new Chicago to New York dark fiber route and 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.

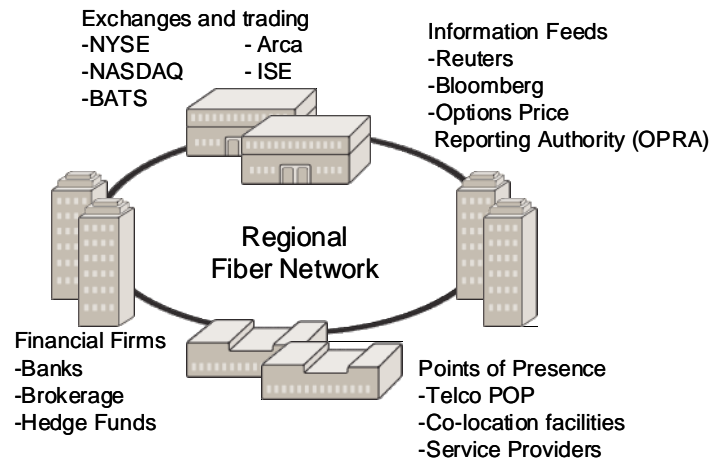


Figure 1 Fiber Connected Trading Network and

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 B¹ 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.

¹ Source: Andrew Bock 8/27/08 “Network and Interconnect Requirements for Global Equities Trading”, average trading value on 12/31/07

New Allied Fiber Fiber Route: Chicago to New York (998 miles)

Allied Fiber was created to address America's need to eliminate obstacles for broadband access, wireless backhaul and lower latency through new, next generation long haul dark fiber construction with sound principles and an open access philosophy. The Allied Fiber team is a dedicated to building and providing access to an abundant supply of dark fiber in areas where it is most needed. The first phase of new duct and fiber construction will be between New York, NY, Ashburn, VA and Chicago, IL. For more information, please visit www.alliedfiber.com or email info@alliedfiber.com.



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. These solutions offer:

- Lower-latency server connectivity with the lowest-latency GbE connections over fiber
- Lower transport latency through the reduction of fiber dispersion compensation delay
- High-capacity, future-proof network platforms for 10G, 40G and 100G solutions

CN 4200® 2RS Module & Dispersion Compensation Modules

Ciena's 2RS module for the CN 4200 FlexSelect® Advanced Services Platform offers the fastest, lowest-latency server GbE interconnection. The latency tested for the 2RS module was less than 0.050 μ s (50 nanoseconds) through each card.

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 μ s 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 Dispersion Compensation Modules reduce latency to less than 0.15 μ s (150 nanoseconds²).

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 globally³. Moving to 100G on the CN 4200 accommodates expanding bandwidth requirements and eliminates any congestion-related latency in the exchange.



"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 Euronext³

² A nanosecond, one billionth of a second, is approximately equal to the time taken for light to travel one foot.

³ NYSE Press Release 5/5/09