

CONNECTING THE DOTS:

**Better Collaboration
Among Industry
Players will Address
Customer Needs**

Bloomberg



Better Collaboration Among Industry Players Will Address Customer Needs

EXECUTIVE SUMMARY

Continuing technology and connectivity investments in capital market infrastructure have set off a chain of events that will significantly alter the global trading landscape. Capital market exchanges are expanding beyond traditional country borders, while industry service and technology providers are aligning in new ways. The broad adoption of industry standards and protocols is reducing trade friction while generating new levels of trade activity and information. Today's firms face the challenge of adapting to this new climate while answering continuing calls for optimization and cost reduction.

Studies conducted by the TABB Group reveal that exchange mergers over the next two to five years will be driven by a desire for global reach and shared infrastructure. The scope of the expansion and consolidation is truly global, with Asian markets spending on trade infrastructure at a pace nearly equal to their U.S. and European counterparts. These investments are being made as exchanges seek new sources of liquidity. As electronic trading spreads to all asset classes, liquidity will be found not on the trading floor but in electronic data centers where buyers and sellers co-locate trading infrastructure.

As exchanges broaden their horizons, so, too, do market participants. In the early days of automated trading, companies focused almost exclusively on finding an edge through speed. Receiving market-moving data a few milliseconds earlier than competitors generated millions in value. Today, that edge is achieved in nanoseconds. As speed moves toward commoditization, firms that can digest a wider array of market data will benefit the most. Algorithms that offer the ability to read markets broadly will create new levels of alpha that rely more on smarts and less on speed.

To meet the demand for such applications, firms are developing trading infrastructures that are tuned to an extraordinary degree for complex global trading and arbitrage. Vendors are collaborating and developing coalitions to meet the complex challenges that no single vendor can satisfy. Bloomberg has expanded beyond its focus on the desktop to develop solutions that address businesses' needs at the enterprise level.

Changes in the industry will continue to force companies to adapt. Firms that have spent years developing proprietary systems are discovering the true cost of these decisions as they attempt to unspool complex components. Embracing open standards and technologies promises to reduce system complexity and lifetime maintenance costs while allowing firms to build componentized systems that can be updated more quickly and effectively.

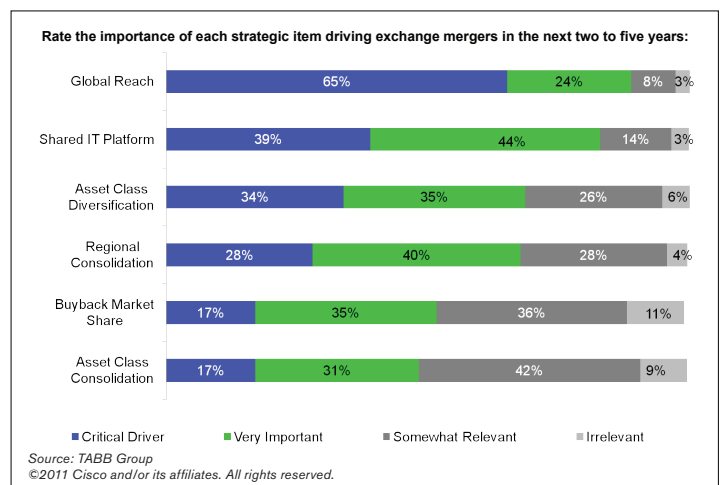
Adopting organizational changes will benefit businesses. Financial services firms that realign personnel in multidisciplinary teams will prove more effective than those that maintain skill-specific departments. Testing methods that include the use of live data will be critical to creating systems that yield promised results when they are first deployed.

This paper explores these issues and more, offering insights to CIOs that will help them prepare for changes over the next two to five years.

EXCHANGES EMBRACE GLOBALIZATION AND STANDARDIZATION

For decades, market exchanges have invested heavily in technology. Now, the drive to develop globalized markets and reduce trading friction through standards is not just streamlining exchanges, it is redefining them.

A recent study by the TABB Group reveals the continuing influence that technology and globalization will have on exchange mergers over the next two to five years. Senior analyst Kevin McPartland explains that while traditional economic and strategic factors, such as the desire to dominate a particular market, continue to play a role, the expected wave of mergers among exchanges will drive the need to achieve technology efficiencies. The exchange business has become a technology business.



Industry observers believe that a desire for global reach and the economic benefits of shared IT platforms will be the dominant factors driving exchange mergers during the next few years.

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“The interconnected nature of financial markets means it’s uncommon for firms to look at a single exchange or region. Going along with this is the desire to achieve efficiencies through shared IT platforms and infrastructure. The more inter-connected the markets are, the bigger the benefit to the trading community and, as the theory goes, the exchanges will see much more liquidity,” observes McPartland. “We’re seeing that happen, not just in the U.S. and Europe, but also in Southeast Asia, where small exchanges are looking to create a network to bring that liquidity onto their platforms.”

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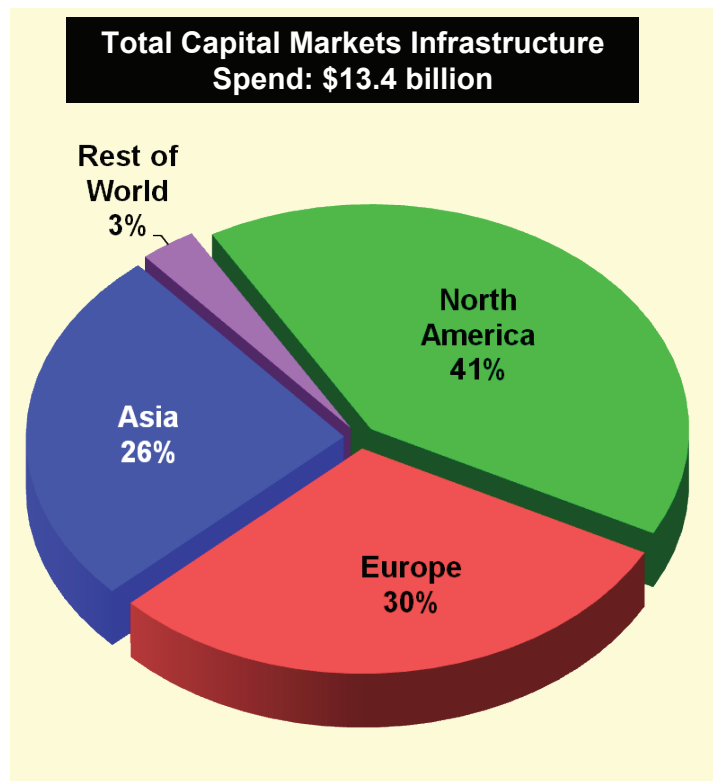
Globalization allows exchanges to look beyond traditional boundaries, seeking liquidity wherever it may be. As borders disappear, the notion of “foreign exchange” will fade—as institutions will be able to trade on any exchange from local markets. These developments are driving business at infrastructure firms such as Equinix, a prominent co-location provider in financial services. John Knuff, general manager of Global Financial Services at Equinix, says that the interest from exchanges in other parts of the world underscores the interest they have in seeking out liquidity.

“We had an announcement from the Australian Securities Exchange, which partnered with us in Chicago, so now if you want to trade on the Sydney Futures Exchange and you are in the Chicago Equinix facility, they are 100 feet away from you,” says Knuff. “This drive toward borderless trading will promote exchange mergers and consolidation. As exchanges merge, we expect more standardization of trading infrastructure, which will reduce trading friction further.”

Knuff believes that a deliberate creation of dense interconnection points at co-location facilities will become the areas that attract exchanges because they will become sites of liquidity. “You won’t necessarily view the exchange matching engine as the liquidity source,” he explains. “These dense hubs of buy sides and sell sides, regardless of asset classes, where a lot of trading is taking place—these are tomorrow’s trading floors.”

INFRASTRUCTURE INVESTMENTS REQUIRED TO ATTAIN WIDER MARKET AWARENESS

A number of trends portend continued heavy spending on infrastructure to facilitate global, automated trading across exchanges and asset classes.



Infrastructure spending in Asia is nearing parity with US and European markets. E-trading will continue to drive massive increases in computing power and bandwidth, thus expanding demand for infrastructure.

Automated trading in foreign currency exchange, Treasury bonds and other traditional high-touch businesses continues to rely on more automation and bigger infrastructure. In addition, investments that bring firms closer to the exchange-matching engines continue to drive growth.

Meanwhile, exchanges have begun to seek more opportunities to standardize on platforms and common APIs and thus remove friction from markets. The fewer “languages” spoken among firms trading on the exchanges, the lesser the complexity. And, as exchange consolidation continues, the number of “languages” and APIs will decrease while message peaks will continue to rise.

In the run-up to 2008, infrastructure investment was made chiefly to accommodate growth in trade volume driven by the advent of automated trading. Volatility and trade volume have dropped from market peaks in 2008, while trade-related messaging has skyrocketed—regularly reaching hundreds of thousands of messages per second. During the so-called flash crash on May 6, 2010, Knuff notes that message rates surged to 2.8 million mps, a new high.

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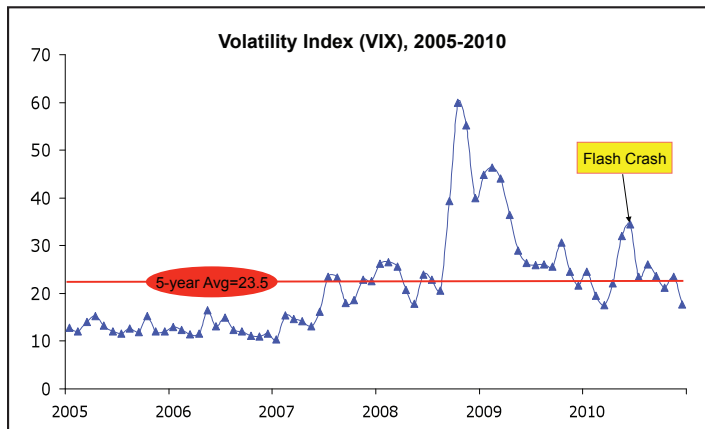
That spike in message traffic revealed new weaknesses in electronic trading systems that compromised the ability of broker-dealers and other institutions to function. "A number of market data systems weren't reporting indices information. They couldn't update their pricing. So, many broker-dealers went offline or pulled out of the market because their system was redlined," observes Knuff.

Volume and volatility have declined since 2008, but messaging volume has exploded.

It soon became obvious that traffic spikes, once characterized as a once in 10- or 20-year event, were to become more common. Just a few months later, on Aug. 31, 2010, positive economic data and an in-play company took peak message rates up to 3.7 million. All firms involved in markets had to process these data.

"It's a struggle for companies to stay ahead of this. Typically, you don't want your network or storage or systems to run at a pace higher than 40 to 50 percent of peak times. This is driving consistent and constant acquisition of new assets," says Knuff.

Knuff also sees a shift in strategy. Although firms continue to chase faster speeds and lower latency, he believes greater value is being placed on the ability to receive data from more sources and to develop a wider view of the market.



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"Much of the business we're taking on now isn't about being close to a matching engine and just trading a microsecond faster. A lot of the increase in business we've seen [consists of] people needing to access data for trade input. It's economic data from Bank of England, the Department of Labor in Washington, machine-readable news feeds. These feeds have been the primary driver in the last year or two. Companies try to manage risk by increasing their span of awareness of what's happening in global markets," Knuff notes.

THE EVOLUTION OF TRADING ECOSYSTEMS

Pervasive change, globalization and standardization are rewriting the rulebook for all companies that participate in financial services, especially vendors. Companies that offer technology solutions such as co-location and network providers and established financial services companies such as Bloomberg have discovered the necessity of working together in an era of rising complexity.

Bloomberg's Kevin McGilloway, head of Business Development for EPS, says the trends have been apparent for more than a decade. At one time, firms benefited by creating proprietary islands of services or data, but McGilloway contends that those structures no longer make sense in today's open environment. And, firms such as Bloomberg can no longer pretend they can serve every need of financial services firms.

For example, when approached by a customer to find more timely access to data, Bloomberg now collaborates with firms like Equinix to help meet customer needs. "We have developed a mini-ecosystem so we can leverage the strengths of our partners," explains McGilloway. "We no longer see the benefit of trying to be all things to all people."

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McGilloway believes developments like these are the expected result of growth through globalization, but they are also necessitated by demands from customers for greater standardization and less complexity. Firms want ecosystems that work together seamlessly— systems that do not require many translations between each hop. The adoption of FIX protocols, the use of shared infrastructure and the availability of open symbology from Bloomberg are driving this demand.

Bloomberg's commitment to openness is coupled with the broader perspective the firm now has for the industry. "We used to focus on the desktop, on the individual, at 'eyeball speed,'" says McGilloway. "We now have to focus on the enterprise. It's not just the desktop. It's algorithm boxes, it's golden copies, it's middle and back office, it's handling regulatory needs. We have recognized this need to be open and to think at the enterprise level."

As a firm, McGilloway admits that Bloomberg once held a proprietary view of the market and its role. Events and trends over the past decade have made an inevitable and permanent

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change. “We all have to open our minds and our infrastructures to make these approaches work. We understand the natural resistance to openness in a market that has been closed for so long, but anyone who stands in the way of these trends will be steamrolled.”

RECOGNIZING OPPORTUNITIES

As financial services firms watch these trends unfold, experts believe that they can take several steps to anticipate the impact and restructure their organizations to maximize the opportunities that change presents.

RECOGNIZE THE SCOPE AND INEVITABILITY OF CHANGE

Bloomberg’s McGilloway counsels firms to adopt an assertive stance, tempered with patience. He believes it is important for company leaders to acknowledge the breadth and depth of change that is sweeping the industry. However, decades of investment in tools and technologies have been made using old models, leading to complex systems he believes will take years to unwind.

“A migration to new technologies, open architectures, services that rewrite fundamental rules of trading, all must be considered,” notes McGilloway. But don’t expect results overnight. “A seamless integration of services takes time to mature,” he says. “We’ve been working with Equinix and other technology partners for two years, and we’re still learning what service level agreements and other structures need to be put in place as markets are changing under us. Everyone—the markets, the vendors, the customers—we’re learning as we go.”

UNDERSTAND THE IMPACT ON THE ENTERPRISE

Such fundamental industry realignment affects the way companies staff projects. Cross-functional teams are becoming the norm within the enterprise, observes Aron Dutta, senior director of Global Financial Markets Strategy at Cisco Systems. Once organized by function, such as infrastructure, systems administration, and application development, teams are being re-formed, Dutta adds.

“When I look at successful trading operations, they are small three- to five-people teams who are innovating around their cross-functional expertise,” observes Dutta.

Knuff, meanwhile, says the drive to create automated systems with broader market awareness and intelligence will continue to drive demand for high-quality software developers. Understanding the logic and translating the intuition of an experienced trader into algorithms is a sophisticated task. And mistakes are costly. “If you don’t have the right business logic living on an algo box [when you’re] making decisions to trade in milliseconds or nanoseconds, that is a big problem.”



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DEVELOP A TRADING FABRIC

Companies increasingly want to trade in multiple asset classes and across markets at any time.

Accommodating this need requires building and connecting systems across multiple co-location facilities. No small feat, even under ordinary circumstances, according to David Malik, director of Solution Architecture for Cisco Systems. Adding the need for ultra-high availability and ultra-low latency turns the construction of such a system into an outsized challenge. Malik recommends that firms look at a few key aspects of their infrastructure to develop an effective, scalable architecture.

Malik points out that the speed and performance properties of a rack of equipment may change as a firm begins scaling or when shifting the system from prototype or test bed into production. Firms can anticipate issues such as impedance mismatches and other test-site problems by building prototypes and test systems near production environments and using live data to test applications.

“We all know that synthetic data are helpful, but you have to test with live data coming into a plant to get a system that performs as you would expect in real market conditions because it has been exposed to real market conditions,” explains Malik. “You can determine ‘Are live strategies responding as expected? Is the timing firing those strategies at the precise time? Are the orders being placed at the right time? Are you getting an order confirmation or a fail?’”

Another key element of the fabric is that it must be highly tuned. Using the precision time protocol IEEE1588 standard is critical to systems that must time-stamp with nanosecond precision on the host and other network elements. This helps ensure that strategies are firing off at the right time—a vital consideration when a firm performs latency arbitrage between multiple venues.

Malik points out that although many firms focus on network latency, delays can be found in many layers of the infrastructure above the transport level. “There’s a significant amount of latency inside the host, in the operating system, the adaptor, the kernel and obviously in the strategies themselves in the application,” says Malik. “We’re working with clients to help them tune these stacks from end to end, Layer 1 all the way up to Layer 7, and to be able to test it at a systemwide level.”

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CONCLUSION

Connecting the data points and emerging patterns in financial services clearly shows that game-changing shifts are occurring to foundational elements of the trading industry and causing a significant realignment of industry peers and players.

Nowhere is this more evident than in the development of new industry initiatives such as open protocols and symbologies, matched by new coalitions. As Bloomberg's McGilloway notes, "A few years ago, Bloomberg probably would not have been at the table, but we do believe, as a community, as these things happen, we all have to work together to make sure that they are in the general best interest of free information flow and higher efficiency."

Infrastructure investments that focus on reducing latency will continue, but industry observers see a move away from

proprietary systems and an exclusive focus on speed. Many believe that the new focus is on creating awareness in the trading fabric. Intelligence, awareness and correlation are the areas in which algorithms will add the most value in the coming years.

The relentless drive to enable global trading is being met by an increasing interest among exchanges, which are making plans to expand beyond traditional boundaries—settling at co-location facilities where large concentrations of buyers and sellers are meeting. And, while the implications of this shift are not yet fully known, one thing is clear to McPartland of the TABB Group: "If you're looking for liquidity, it's no longer on Broad Street," he says. "It's somewhere in New Jersey."

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