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A-TEAMGROUP

PERFORMANCE AND EFFICIENCY:

How a Managed Services Approach
Can Ease Your Market Data Headache

October 2009

An industry briefing prepared
by **A-Team Group** for



NYSE TechnologiesSM

Introduction

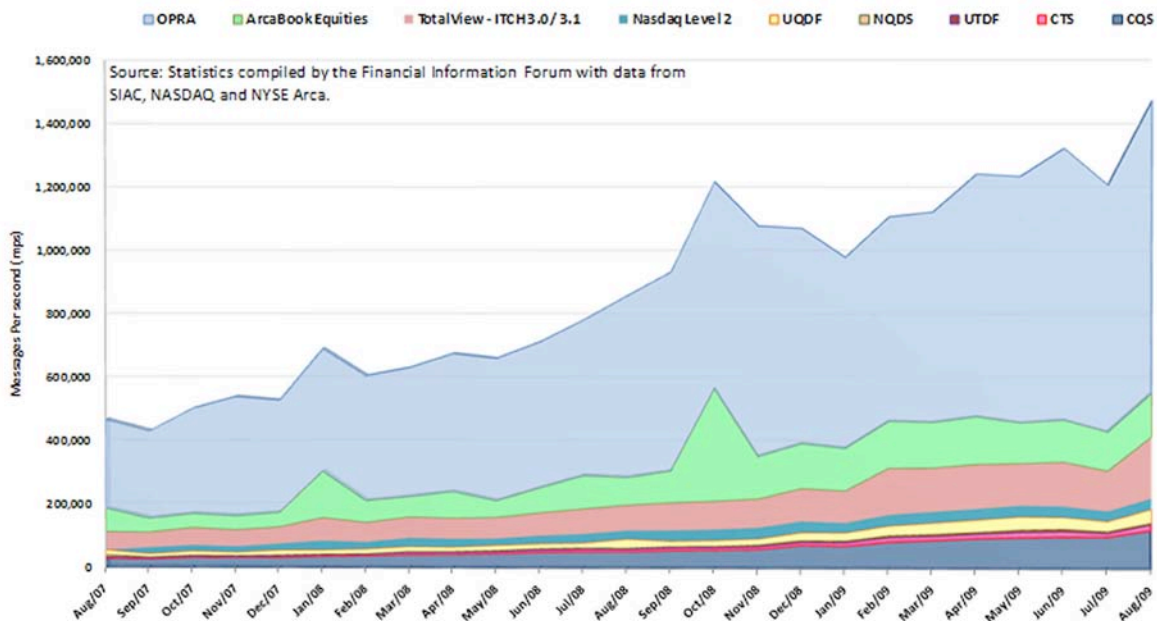
Market infrastructure is evolving at a pace that even the most technology-savvy financial institutions find challenging. New execution venues are popping up everywhere fragmenting liquidity and creating cross-dependencies between primary and derivative marketplaces. The move to fast markets and trading automation is cutting response times and increasing data volumes. Markets have shown a 70% increase in volume over the last year alone (see chart below).

Update latencies of less than 10 microseconds are now possible – even commonplace. Market data rates in excess of 20 billion update messages per day are on the near horizon. With a universe of more than 250 real-time markets trading in excess of 40 million instruments and derivatives, developing and delivering a market data system for today’s markets is, at best, problematic.

With mounting business-side expectations of super-fast access to more and more markets, management of market data and system infrastructure has become a major headache for everyone.

Never before have financial institutions faced a more pressing need for flexible data acquisition solutions. And the requirement applies across the board: From the largest tier 1, bulge bracket firms, to the pluckiest speciality execution firm, firms of all shapes and sizes are seeing the market data management requirement leap to the top of their priority lists.

And the timing couldn’t be worse.

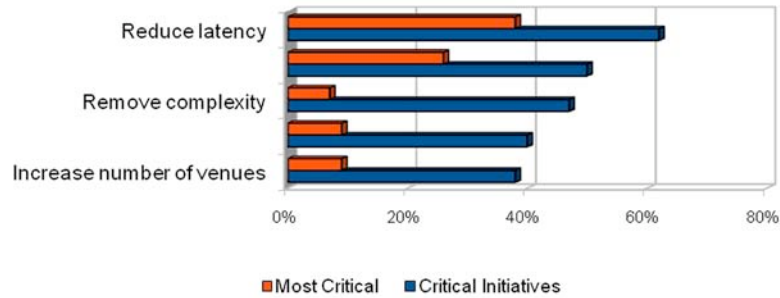


Note: TotalViewITCH 3.0 Shown from Aug 2007 to March 2009. TotalView ITCH 3.1 shown from April 2009 onwards. TotalView ITCH 2.0 has been discontinued in 2009. TotalView Legacy has been discontinued since June 2007.

OPRA & Consolidated Equities 5 Second Peak Rates showing three-fold increase over past two years and 70% over the last year.

The need to lower latency is at an all-time high. More than three-quarters of organizations concerned with market connectivity are driven to remove undue latency while lowering total cost of ownership (TCO) and removing complexity from their market data infrastructure (see bar graph).

Current market conditions mean fewer staff are available for deploying crucial systems. Market data acquisition has always involved an arduous orchestration of people, technology, legal, administration and timing. The changing demands of internal clients and ongoing regulatory change are making matters more urgent.



Graph showing overall initiatives and individual priority. E.g. 62% indicated reducing latency is critical while 38% selected it as their most critical (source: NYSE Technologies).

The breadth of market coverage necessary, meanwhile, is adding to the overall complexity while the business demands more information in a timely fashion, and the data is being put to more uses. Nearly every trading house is contending with complex requirements for algorithmic trading and market data redistribution, as well as statistical arbitrage, portfolio evaluation, risk avoidance, or data collection for compliance and verification.

Many firms are finding their existing solutions are not up to the challenge and cannot be modified cost effectively or within a reasonable timeframe. Most have observed that within a five year window they will need to re-architect their data centres. More and more are finding that a fresh solution is the only way to meet latency objectives efficiently.

Microseconds of delay can adversely affect trading decisions, and the latency requirement from the business side places huge pressures on system performance. But establishing and maintaining network connections to multiple markets alone can rack up significant costs. Bandwidth requirements reach into the multiple hundred megabit range for major markets. Update rates are approaching two million messages per second. All of which costs in terms of direct network infrastructure, computing power, and the human resource required to support it.

The total cost of ownership (TCO) of a locally deployed ticker plant, and the market data infrastructure to which it delivers data, is a complicated calculation. It depends heavily on an organization's size and existing infrastructure, data and performance requirements, and physical location. TCO also includes lost opportunity through lengthy time-to-market, the fully burdened cost of staff necessary to develop, integrate, test, and deploy new solutions and enhancements to the ticker plant, in addition to hardware maintenance and replacement strategies.

A growing firm, where time to market is critical, will want to invest in infrastructure that can easily expand and adapt to fluid conditions. Larger organizations, with market data infrastructure already in place, are scrutinizing the rising costs for development and maintenance of existing systems. Many find themselves with higher-than-optimal latency with no ability to improve the performance of internal systems; in-house solutions that have grown with the company haphazardly are often overly complex and exhibit reliability issues.

For organizations large or small, conservative or aggressive, traditional or agile, an outsourced, managed or hosted solution may be worth considering – for reasons of performance, cost control and operational efficiency. A hosted third-party ticker plant, with interfaces to all major venues, can offer similar levels of performance to an in-house platform at a compelling price point.

This white paper provides an analysis of the challenges facing market data technologists everywhere. It looks at the platform requirement, outlines total cost of ownership considerations, and discusses the relative merits of a managed or hosted service approach like NYSE Technologies' SuperFeed™.

Evaluating the Situation

Many considerations factor into the choice of market data infrastructure, and how to choose the mix of outsourced solution, in-house development, proximity hosting and direct market access. Over time, industry preferences have swung from one extreme to another, based on technology limitations, economic conditions, and the capabilities and attitudes of staff and management.

In today's economic environment, many market participants are frantically trying to identify their strengths and capitalize on them. Improvements in technology are removing capacity limitations, making the optimum solution a function of an organization's commitment and appetite for tackling new challenges.

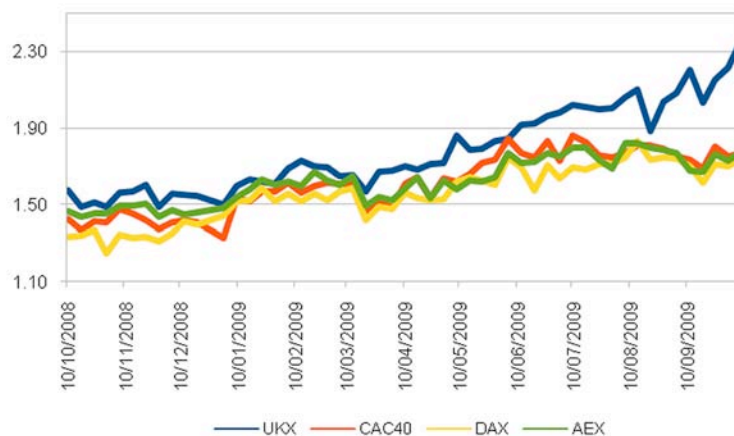
More than ever before, market data technologists face real infrastructure choices permitting more sophisticated collection, processing, and distribution of their data. But that doesn't necessarily make their task any easier.

Large firms engaging in a broad range of activities may find they have a wide variety of needs for the same core data. Some require high throughput of data from primary markets perhaps for statistical analyses, real-time risk calculation or algorithmic trading. Other departments may need a different cross-section of information with a more relaxed latency requirement.

Traditionally, high-performance solutions for market data have often entailed costly custom-built data acquisition software to satisfy throughput and latency profiles. This approach typically involves significant investment that only the largest firms can bear. But, the vast majority of firms are seeking to minimize the hassle and burden on accountable resources an in-house solution can entail. The commitment in capital costs, staff and other resources to own and manage a low-latency, high performance collection and processing system is non-trivial.

Direct market access (DMA) involves streaming data with a 'minimal touch' philosophy that ensures time-sensitive delivery to a firm's trading engines. Larger firms consider this an axiom of competitiveness and utilize DMA in operations centres located physically near their primary markets. Smaller firms, hoping to remain nimble but competitive, may be less willing or able, however, to invest the time and infrastructure to take full advantage of DMA on their own.

With market data quote volumes on the rise, tackling DMA for all relevant sources is a challenge most are not ready to address.



Shows Fidessa Fragmentation Index (FFI) average for major indices. An index over 2 indicates a stock no longer has a "primary" venue. (Source: Fidessa Fragmentation Index (<http://fragmentation.fidessa.com>)). Note: Figures are compiled from order book trades only. Totals only include stocks contained within the major indices.

Primary				Alternative Venues			
Index	Venue	Share	Chi-X	Turquoise	NASDAQ OMX	BATS	Others
AEX	Amsterdam	69.94%	15.78%	4.64%	0.70%	4.46%	4.33%
BEL 20	Brussels	60.79%	14.04%	3.10%	0.51%	3.33%	17.98%
CAC 40	Paris	67.21%	15.31%	5.25%	1.05%	4.20%	6.34%
DAX	Xetra	74.68%	17.00%	3.72%	0.49%	3.12%	0.03%
FTSE 100	London	62.74%	21.84%	6.37%	1.21%	7.82%	
FTSE 250	London	71.39%	18.13%	5.71%	0.35%	4.41%	
IBEX 35	Madrid	99.36%	0.50%	0.05%			0.04%
FTSE MIB	Milan	88.84%	6.80%	1.01%	0.08%	3.18%	0.04%
PSI 20	Lisbon	97.74%	0.72%	1.43%	0.04%	0.05%	
SMI	SWX	79.96%	11.83%	5.58%	0.75%	1.87%	
OMX C20	Copenhagen	87.31%	10.78%	1.32%	0.24%	0.32%	0.01%
OMX H25	Helsinki	79.02%	12.34%	5.31%	0.74%	0.85%	1.55%
OMX S30	Stockholm	78.60%	13.68%	3.83%	0.43%	1.14%	2.23%
OSLO OBX	Oslo	93.42%	3.33%	0.61%	0.04%	0.19%	2.41%

Liquidity fragmentation for major indices in Europe showing that 6 or more venues should be hit to fill orders. (source: Fidessa).

Recent statistics show, especially within Europe, that fragmentation has led to the necessity to connect to four or more markets for each major group of instruments (see table and graph).

In-house DMA systems require allocated space and budget for data centres in multiple locations. With this come power and capacity considerations, with tick boxes for future growth, network and physical security, and connectivity to markets of interest.

Research estimates the total lifetime cost of rack equipment at about \$150,000 per unit, or about \$4,000 a month in a data centre. With firms looking to cut costs wherever they can, data centre space must be utilised effectively. Firms must consistently “right-size” their data centres – an ongoing expensive and frustrating experience best left to specialists.

Notwithstanding whether a truly ultra-low-latency requirement exists, any consumer of market data faces a significant contract administration task. Direct and consolidated data feeds require contracts with source market venues, as well as any redistributors. Consumers need to satisfy usage tracking, entitlements and reporting clauses used by suppliers for pricing. For firms where a significant number of market feeds are brought in-house, this can be a time-consuming, resource-intensive burden.

More broadly, business continuity planning is a critical consideration of any operationally healthy organization and fault tolerance is a mainstay element of any modern market data operation. Data systems with flexible architectures can provide local redundancy or geographically diverse ‘hot backup’ scenarios. But all is for naught if secondary systems are not compatible with primary systems on which the organization bases its operations.

Overall, a daunting array of variables factor into a forthright comparison of an organization’s current capabilities against its needs. For this reason, some firms opt to seek out a hybrid, or even fully external, solution that gives them the performance profile they need at a capital expenditure and maintenance burden they can afford (see Demonstrable Benefits of Hosted Solutions sidebar overleaf).

Although responsiveness to market conditions is often the overriding constraint, in-house development is no longer a foregone conclusion especially with current focus on spend for anything that doesn’t turn a direct profit. Adding performance profiles and increased demand on datasets only complicates the analysis.

Establishing a Reference for Comparison

So how does a market data operations professional make the right decision about meeting this considerable and complex set of current and future requirements?

It's important to consider the starting point before making decisions about what direction to take. It's highly likely that anyone currently examining how to optimize their firm's market data infrastructure isn't considering a green-field development: every firm today has some form of market data infrastructure in place.

That points to two choices of project imperative: either you are replacing an existing platform that's costly or cumbersome to maintain; or you are seeking to upgrade to something faster and more efficient. In either case, a clean break is probably a more direct way to achieve project goals.

Entrenched infrastructure may define an organization's current capabilities but it doesn't necessarily satisfy the wants and needs of the entire enterprise. What's required is an approach that encompasses the firm's requirements in a timely and affordable manner while remaining agile for future demands.

Total cost of ownership (TCO) for internal platforms is difficult to calculate within an organization due to overlapping responsibilities and confusing priorities. True allocation of costs is necessary to perform a fair comparison – a near impossibility for any organization that has its own development and operations staff because many real costs are hidden in shared resources or covered by corporate overhead.

But how does TCO factor into the decision? And what are the best practices for future-proofing an organization?

An internally constructed and managed market data platform can yield explicit benefits in terms of flexibility and time to market for new financial instruments, markets and data sets. But internal efforts may be hampered by any number of uncontrollable factors: contravening development team priorities, resource allocation delays and questions about the suitability for purpose of the end-result, to mention just a few.

As such, for some market players, there are compelling arguments for outsourcing the entire data acquisition suite and backbone platform to a capable third party, even before the potential performance benefits and management streamlining.

Latency and control are the two most frequently voiced objections to farming out market data acquisition and processing, even if the function is not a core capability of most market data consumers.

But those objections can be short-circuited by a third-party,

Demonstrable Benefits of Hosted Solutions

A mid-sized, New York based buy side firm had a very common problem – a legacy infrastructure built over time that required excessive resources to manage, maintain, and expand. The goal: reduce costs and simplify the acquisition of market data.

Total expense, for direct costs that could be identified, was over \$2 million annually to acquire basic market data relating to equities, futures, and options. Custom applications were interfaced to vendor supplied software for consolidated and direct feeds using ticker plants on two sites.

And this cost doesn't include the staff involved in keeping the department running – a market data architect and manager, two application engineers, two level one support staff, an application developer, a systems administrator, and a network engineer.

By implementing SuperFeed™, a hosted, managed service from NYSE Technologies, the firm was able to realize a 40% savings and still meet the basic requirements:

- Over \$800,000 of direct cost savings
- Direct feeds for minimum latency on required venues
- Consolidated feed for other sources
- Connection to primary hosted and disaster recovery sites

SuperFeed™ integration afforded additional tangible benefits that could not be assigned a cost value:

- Performance upgrade from legacy middleware to latest technology
- Repurposing of eight staff to core business functions
- Complementary reduction in data centre capacity requirements

managed system that satisfies immediate requirements while providing a solid base system from which to expand.

The arguments for such a hybrid solution are compelling.

Today, an outsourced solution can offer similar performance levels to – and often better than – an in-house ticker plant. When co-located with a firm’s primary trading and investment applications latency concerns are alleviated. And it can be interfaced to a proven market data platform within the firm’s data centres, raising the possibility of use in concert with other locally sourced data.

Although TCO is a function of a specific firm, an outsourced ticker plant from a single provider virtually removes many hassles, leaving them instead to the supplier. These include data centre capacity planning, data acquisition and normalization, venue connectivity and contract administration, physical and network security exposure to multiple connection points, and capital expenditures for hardware.

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By purchasing a complete solution, a firm adds a full suite of capabilities over a single, commodity network interface with little operational burden. Gone are the frustrations with

power upgrades at data centres, the intricacies of space allocation in a large organization, or the need to deal with the trade-off of replacing hardware with newer, faster units versus adding facility space.

No longer does exposure to multiple, unfamiliar and remote network interfaces cause concern. No longer must development and operations staff deal with updates and compatibility with all of the venues and data sources critical to the enterprise (see map below).

What’s left is a compelling reduction in resource commitment for any organization: A single, low-latency, high-throughput pipe for all required markets that can be provisioned and used selectively which simplifies so many aspects of market data acquisition and management.

With an outsourced solution, the business has a consistent and accurate view of its costs for data acquisition and systems, while providing normalized data the entire organization can use.

An outsourced ticker plant can be used to consolidate high-speed data feeds, while retaining compatibility with the existing enterprise market data platform. This can help reduce time to market for mission critical applications by allowing development staff to focus on value-added functionality. Market data acquisition is not – and should not be – a core strength of any

Where do you locate and how do you keep up?



Outside primary exchanges there are up to 120 MTFs (69 in London alone), 90 regulated markets, and 60 dark pools | (source: NYSE Technologies).

financial institution. Such data is a core requirement to be sure, but buy- and sell- side firms alike make money on understanding the data and using it to their advantage – not on collecting it.

Deployed in an optimal way, and combined thoughtfully with internal mission-critical systems, an outsourced, managed market data environment can begin to

deliver on the promises of high-speed delivery and comprehensive coverage, while diminishing the overhead, in terms of both direct and indirect costs. (See A Case in Point box below).

Market data acquisition is not – and should not be – a core strength of any financial institution.

A Case in Point: Considering Total Cost of Ownership

Have you reviewed the full scope of the cost of your ticker plant? Use this check list to identify if you have reviewed common, often overlooked, expenses within your market data acquisition system:

Yes No

Latency and Access:

- Latency, across all sources
- Latency from primary markets
- Direct market access – software and provisioning
- Co-location and proximity hosting costs

Lost Opportunity and Product Availability:

- Time to market for new or modified features
- Control over software development resources
- Development, integration, test, deployment resources

Hardware and Maintenance:

- Capital outlay for computers, O/S, racks
- Disposal costs for old equipment
- Administration and maintenance costs for equipment
- Connectivity costs and lead-time

Complexity and Security:

- Number of “final mile” communications circuits
- Network security, operations, and maintenance costs

Facilities Management:

- Wasted money on oversized data centres
- Cubic footage within your data centre(s) for expansion
- Electricity and cooling costs
- Facility continuity during power/hardware upgrades
- Capacity planning – physical, electricity, computers
- Business continuity and disaster recovery planning

Administration and Auditing:

- Reporting requirements for each source
- Contract fulfilment for each source
- Multiple use costs for each source
- Auditing and accounting resources

If you ticked ‘Yes’ for most of the points then you are considering the range of commercial and strategic issues necessary to ensure you have a well structured solution which meets your needs. But that’s only the ‘what’. It’s then onto the ‘how’. Your consideration is then between in-house or outsource, and if you outsource do you buy a solution to run in-house or lease a solution from a full service provider. An outsourced solution bundles the costs for most expenses in an easily managed, single line item.

SuperFeed™ from NYSE Technologies

From favourable TCO to high data availability, from outsourced operational resources to system redundancy, a hosted, managed service – ready to deploy when you are – built by a trusted, experienced partner could be how your organization can streamline its market data management processes while optimizing performance.

SuperFeed™ provides latency profiles consistent with DMA requirements while delivering the breadth of data previously only seen in slower, consolidated feeds.

Flexible deployment strategies and manageable solutions are the foundations on which NYSE Technologies has built its Market Data Platform V5 and the SuperFeed™ fully managed, hosted ticker plant. SuperFeed™ provides latency profiles

consistent with the most demanding performance requirements, while delivering the breadth of data previously only seen in slower consolidated feeds. Installed in hosting facilities with excellent access to major markets, SuperFeed™ is packaged ready for mainstream applications.

Top-of-book data is delivered with sub-100 microsecond latency through the SuperFeed™ plant, and even faster performance as Market Data Platform V5 feed handlers are deployed. High throughput is assured with the Secure Financial Transaction Infrastructure (SFTI) network which is architected to provide the fastest point to point connections. Coupled with NYSE Technologies' global leading data centre and co-location strategy, a range of high performance solutions are available to meet all needs. Data is acquired for all major in region venues with sub-millisecond timing and delivered to co-located clients in less than 100 microseconds. This timing is obviously extended for continental European venues and out of region exchanges but NYSE Technologies continually assesses the most efficient and lowest latency network routes for acquiring and delivering exchange data.

SuperFeed™ delivers all of the NYSE Euronext markets, as well as other major venues in the US and Europe through a single SFTI network connection. NYSE Technologies' also provides its SuperBook virtual order book aggregation via SuperFeed™. The simplified interface, accessed through the mature MAMA application programming interface (API), provides streamlined procurement and acquisition of market data and related services to your downstream products.

SuperFeed™, powered by NYSE Technologies' ultra-low-latency Data Fabric middleware, is a consolidated feed delivering realtime market data content within a

co-location facility for ultimate connectivity to global markets. The individual feed handlers used within SuperFeed™ are also available within Market Data Platform V5, permitting a variety of configurations from fully outsourced to hybrid scenarios integrated with your internal market data infrastructure.

Total Cost of Ownership is brought into focus with SuperFeed™ because market data interfaces and management costs are brought together.

For example, SuperFeed™ may be used initially to provide needed sources quickly or as a redundant feed, and then expanded as necessary utilizing the same network pipe.

Likewise, as new markets are added to the hosted SuperFeed™, they can be migrated to a firm's internal platform when needed for increased data utilization.

Total cost of ownership (TCO) is brought into focus with SuperFeed™ because market data interfaces and management costs are brought together. By comparing the features of SuperFeed™ against legacy in-house installations, SuperFeed™ can show tremendous cost-benefits in just the first year while enjoying a lightweight management burden in ongoing years.

NYSE Technologies can handle the upstream administration for all data delivered via SuperFeed™ making it the single management interface to administer market data access throughout your organization. Whether to a single co-location facility or multiple data centres for high-performance computing, the SuperFeed™ consolidated feed is easy to manage and easy to integrate.

Rapid solutions deployment and agile data acquisition systems underscore the simplicity gained by relying on a proven partner to handle the complex tasks of updating market data feeds, handling data centre resources, and conducting ongoing business continuity planning. High-performance and low-latency are key drivers in finding the best solutions for an organization committed to success in today's markets. NYSE Technologies' SuperFeed™ addresses these requirements with a cost-effective and direct solution.

SuperFeed™ provides a high-performance, consolidated ticker plant service with high data availability and redundant operations to ease your market data headache.

For more information, visit www.nyxdata.com/superfeed



www.nyse.com/technologies

A business division of NYSE Euronext (NYSE), NYSE Technologies is a leader in providing innovative software, market data products and data management applications, connectivity solutions, exchange technology, and transaction solutions for trading firms, vendors and financial markets around the world. Offering the most comprehensive suite of best-of-breed commercial technology solutions that also include advanced messaging platforms, co-location systems, ultra low-latency order routing capabilities and a one-of-a-kind hosted networked community, NYSE Technologies' products attract and enable the free flow of liquidity for the global marketplace. With offices across the U.S., Europe and Asia, NYSE Technologies' advanced integrated solutions for fully-deployed, hosted, managed or on-demand services has earned the trust to power the trading operations of hundreds of global financial institutions and exchanges.

For additional information visit:
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www.a-teamgroup.com

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We're widely known for our focused series of publications, research and events across mission-critical functions including high-performance trading infrastructure, low-latency market data and connectivity, enterprise data management, reference data, market structure, risk and regulation and more.

A-Team Group's publishing division publishes a range of online and in print news services including Risk & Regulation IT, Reference Data Review, Market Data Insight, Electronic Trading and Low-Latency.com and A-Team IQ magazine. Find out more at www.a-teamgroup.com/publishing.

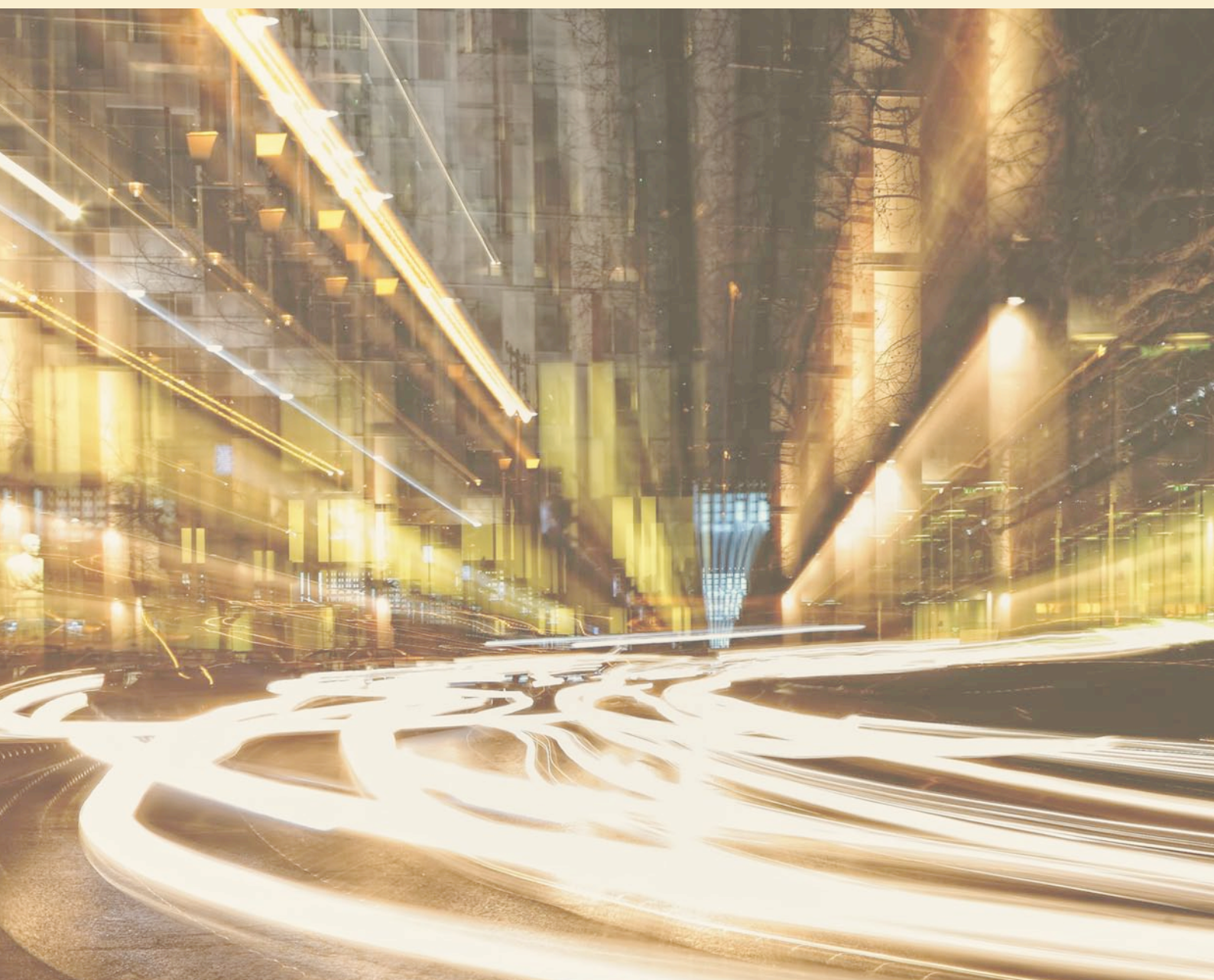
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- Faster Than a Speeding Bullet... Low-Latency Architectures and Building Blocks for Tomorrow's Trading Applications
- Buyer Persona - The Influence Behind Data Management Decisions, and more...

Find out more at www.a-teamgroup.com/research

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