

Market Data Management: In-house vs. Outsourced Solutions



Tom Price

Securities & Investments
February 2009

Executive Summary

This report presents analysis of market data management strategies based on past TowerGroup research and on interviews recently conducted with broker-dealers concerning the merits of in-house versus outsourced solutions.

The environment and requirements for market data feeds are continuously changing for broker-dealer firms, driving them to seek ways to leverage their existing systems to meet current and future trading demands. Volumes of market data, both trades and quote traffic, are skyrocketing. TowerGroup estimates these volumes will continue growing at 100% per year for the foreseeable future. At submillisecond speeds, algorithmic and other automated trading strategies have reached, or are about to reach, the efficient frontier despite the need perceived by many market participants for ever-lower latency.

Building and maintaining the infrastructure necessary to keep up with high volumes of trades and quotes, and processing these at speed reliably and without degradation of quality or throughput, have become challenging for even the largest sell-side firms. Although the largest firms historically built their own in-house solutions, seeing this as the best way to meet latency and international and asset-class coverage requirements, even they are now determining which participants in the value chain of market data management might be able to share the burden of this investment.

Previously, the returns provided by low latency, quality, and security outweighed the cost to build a market data solution. Today, however, firms are being forced by economic circumstances to evaluate even the most mission-critical applications very rigorously with respect to return on investment. With in-house start-up costs running \$200,000 to \$300,000 higher for a single market center and monthly operations consuming four times the cost of an outsourced solution, the economic case for outsourcing has become highly compelling.

In addition, vendors have so improved their product offerings that they can now compete toe-to-toe with in-house market data solutions and meet the bulk of the requirements of even the largest brokerage institutions. Since the gap has narrowed between outsourcers' solutions and the in-house management, which was previously perceived to be technologically superior, firms have begun taking a much harder look at how outside market data solutions could replace, or at least complement, their own. Indeed, outsourced solutions have reached a point at which as each firm, in the context of its own unique business and infrastructure needs, weighs the costs and rewards of owning versus renting, it has become essential that the latter option be given careful consideration.

TowerGroup Research is available on the Internet at www.towergroup.com

© 2009 The Tower Group, Inc.

May not be reproduced by any means without express permission. All rights reserved.

TowerGroup is a wholly owned subsidiary of MasterCard Worldwide and operates as a separate business entity with complete editorial independence. MasterCard Worldwide is not responsible for and does not necessarily endorse any opinions, statements, or other content presented by TowerGroup.

Introduction

Large broker-dealer institutions have historically built their own market data feed solutions to gain a competitive advantage. Today, however, they increasingly see low-latency solutions as a requirement rather than a differentiator. Smaller brokers traditionally couldn't afford to build their own solutions and so relied on vendors to meet their needs, as they continue to do.

For large sell-side shops, in-house solutions were historically the only means to achieve the low latency, control and security, and high quality of data called for by advanced algorithmic trading strategies. In-house data infrastructure was also the only way that firms trading high volumes could handle the explosive growth in market data associated with those trades. Smaller sell-side institutions, accustomed to outsourcing because of cost and resource constraints, are unearthing new opportunities to compete on latency, volume, and security. As outsourced solutions have become more flexible and all encompassing (e.g., covering trading in multiple asset classes or in international markets), these firms are finding that they can compete for business in arenas that used to be accessible only by their bulge-bracket brethren.

Through continued product development, many of today's market data feed vendors now provide solutions with latency and security comparable to or better than those of many in-house solutions and offer feed capabilities from an increasing number of exchanges internationally. The purpose of this report is to help large and midsized broker-dealers understand the value they receive from an in-house market data system and whether it makes sense for them to outsource all or a portion of that function. To compare the business cases of the in-house solution and outsourcing, TowerGroup contrasted the total cost of ownership associated with market data feeds with a firm's need for strategic control of the associated infrastructure.

With internationalization of trading and demand for multiple-asset-class trading strategies, the rising maintenance costs for supporting in-house solutions have led several firms to consider outsourcing all or a portion of their market data infrastructure. The outsourcing options vary in depth and breadth of the product offerings, and vendors range from those with fully integrated approaches to pure content providers to open-architecture integrators.

Market data management is a multidisciplinary function encompassing a complex array of processes and solutions that need to be skillfully managed individually and in tandem:

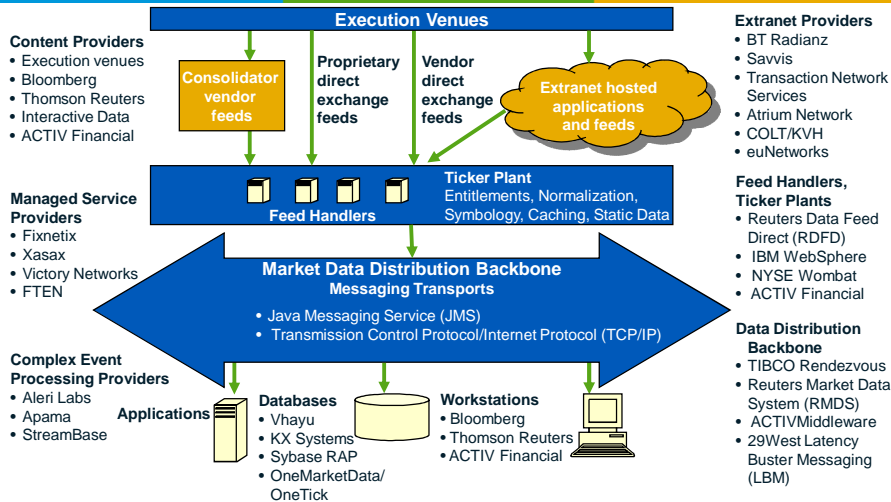
- Telecommunications and network management
- Hosting and facilities management
- Exchange/venue connectivity
- Database management
- Operations and data support
- Front-end application development and maintenance
- Ongoing systems research and development

Exhibit 1 illustrates market data infrastructure and its elements, and lists leading providers of each element. Exhibit 2 presents TowerGroup's analysis of each category of infrastructure and content vendors. Given today's difficult economic environment, any vendor of a market data solution will need to clearly demonstrate measurable economic value or will find that the solution has little chance of success, regardless of its speed, service, or other capabilities.

Exhibit 1



Market Data Infrastructure with Providers (2009)



© 2009 The Tower Group, Inc.

Exhibit 2



Market Data Vendors by Category (2009)

Vendor Category	Vendors	What's New	TowerGroup View
Content providers	<ul style="list-style-type: none"> Execution venues Bloomberg Thomson Reuters Interactive Data ACTIV Financial 	<ul style="list-style-type: none"> Consolidated feeds are undifferentiated; providers need to offer more choices, e.g., direct feeds, hosted low-latency solutions, outsourcing. Content and infrastructure can be provided by a single provider other than Reuters. 	<ul style="list-style-type: none"> Low latency is a requirement not a differentiator. Content data quality is paramount for electronic trading. Budget restrictions will contract the number of content vendors utilized.
Feed handlers, ticker plants, and distribution platforms	<ul style="list-style-type: none"> Reuters (RMDS and RFD) IBM WebSphere NYSE Wombat ACTIV Financial 	<ul style="list-style-type: none"> The field of major players has seen significant takeover resulting in some consolidation. Thomson bought Reuters, IBM bought InfoDyne, and NYSE bought Wombat. Hardware acceleration is aiding latency race. 	<ul style="list-style-type: none"> Data speed is still the benchmark, and all providers will have to prove lowest possible latency. Latecomers to the end-to-end low latency market data arena will have to integrate bought and built components.
Complex event processors	<ul style="list-style-type: none"> Aleri Labs Progress Software (Apama) StreamBase 	<ul style="list-style-type: none"> Real-time data requires low-latency detection and response to events as they happen. Electronic trading tools have become primary data consumers requiring event direction. 	<ul style="list-style-type: none"> This category of vendors has shown value and will be an integral part of the low-latency arsenal. TowerGroup expects that these tools will ultimately be embedded in applications and solutions.
Databases	<ul style="list-style-type: none"> Kx Systems Vhayu Technologies Sybase RAP OneMarketData 	<ul style="list-style-type: none"> Traditional databases cannot handle both fast inserts and queries in real time. These databases provide low-latency access to massive amounts of historical, proprietary, and real-time data for back testing. 	<ul style="list-style-type: none"> The need for low-latency analysis of massive amounts of tick data has led firms to adopt parallel database solutions. Firms will run parallel structures until the enterprise model can deliver the same functionality.
Extranet providers	<ul style="list-style-type: none"> BT Radianz SAVVIS, Inc. TNS 	<ul style="list-style-type: none"> Latency and the cost of real estate continue to drive demand for extranets and hosted solutions. 	<ul style="list-style-type: none"> Proximity solves some latency, but application latency remains a challenge.
Managed service providers	<ul style="list-style-type: none"> Fixnetix Xasax Victory Networks FTEN 	<ul style="list-style-type: none"> Nuts and bolts oversight: coordinated management and maintenance of network, hosting, connectivity, proximity, VOR provisioning. 	<ul style="list-style-type: none"> Fills a useful niche between fully integrated MDM solutions and simple space/power/bandwidth outsourcing. Enables laying off some utility-like functions, but short of data management, software development, end-user application value-add, etc.

© 2009 The Tower Group, Inc.

Industry Issues Driving Market Data Infrastructure Decisions

The need to reduce market data latency has been the key factor driving broker institutions' decisions on market data infrastructure. Latency reduction has been a crucial differentiator among firms, allowing some broker-dealers to execute trades faster and thereby claim greater success than the competition in carrying out high-velocity trading strategies. In today's trading world, however, speed has become table stakes for large broker institutions rather than a differentiator.

To the latency issue have also been added other drivers such as coverage of a growing list of different asset classes, access to newer international exchanges, and the need for greater transparency with respect to reporting internalized order flow (in the wake of the European Union's Markets in Financial Instruments Directive (MiFID), the US Securities and Exchange Commission's Regulation National Market System (Reg NMS), broker best execution obligations, and other regulatory requirements). In order to strike the right balance among the competing needs of cost, speed, new products and regions, and evolving trading requirements, firms have two basic options for managing market data infrastructure: build their own solutions or outsource.

Criteria for Choosing Whether to Build or Buy

The choice of whether to build or outsource depends on several factors.

- *Anticipated trading volumes:* Can the system handle volumes at the speed and throughput levels that the firm anticipates over the next several years? Will capacity remain manageable — and economically justified — if growth scenarios err on either the high or the low side?
- *Asset type:* How well does the system address not just equities but also fixed income, foreign exchange, and derivatives to the extent these asset classes are critical to the firm's business?
- *International Coverage:* How readily can the system extend from national or regional venues to global or emerging ones?
- *Integration:* How easily does the system integrate with legacy infrastructure?
- *Latency requirements:* Can the system perform well under both peak and off-peak volume conditions?
- *Data quality and security:* Is the data accurate within tolerances that are acceptable for various user demands such as high-velocity trading, model-driven strategies, benchmarked execution performance?
- *Front-end requirements:* How well does the system integrate with or adapt to increasingly demanding end-user applications?
- *"Staying power" of a potential vendor:* How reliable are the vendor's service levels, and will longevity be a problem?
- *Total cost:* Start-up and ongoing, including those related time-to-market losses, management focus. Are investments in ongoing research and development, in the face of a complex and rapidly evolving market data landscape, more effectively borne in-house or by a vendor?

Evaluating Total Cost of Ownership of Market Data Infrastructure

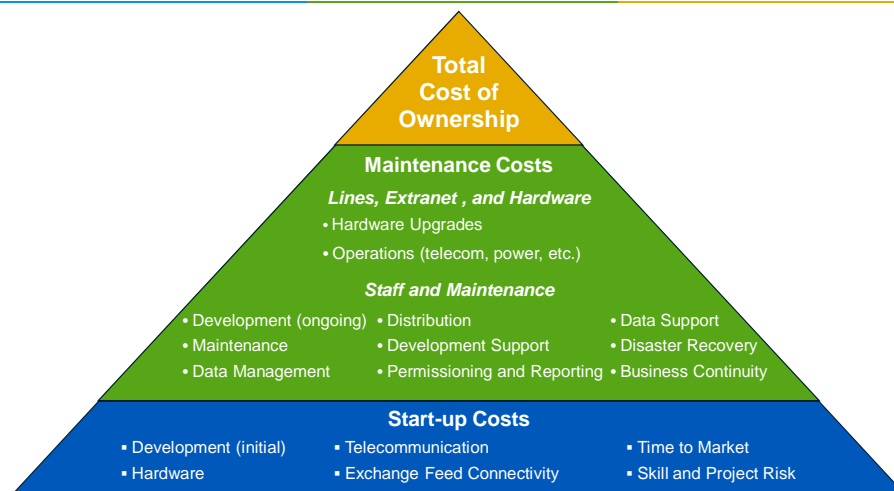
In today's constrained economic environment, total cost of ownership is a primary factor in the evaluation of any solution. TowerGroup's analysis of the cost of ownership of a market data management solution focused on two main aspects: the cost to develop a solution (start-up cost, in this case for a typical high-volume market center) and the cost to maintain it.

Exhibit 3 outlines the elements of these two costs of ownership, which are estimated in Exhibits 4 and 5. An additional scenario is possible for institutions unable or unwilling at present to hand over the entire market data operation to an outsider: serviced infrastructure by an outsourcing firm of an on-site ticker plant. This option has begun to attract some interest as a means of offloading management of the complexity of the overall function while not requiring change of all existing systems or embarking on full-blown outsourcing.

Exhibit 3



Elements of Total Cost of Ownership of a Market Data Management Solution



© 2009 The Tower Group, Inc.

Start-up Costs

Start-up costs are composed of costs of the following elements (as categorized in Exhibit 4):

Development

- Time to design and build the infrastructure

Hardware and Exchange Feed Connectivity

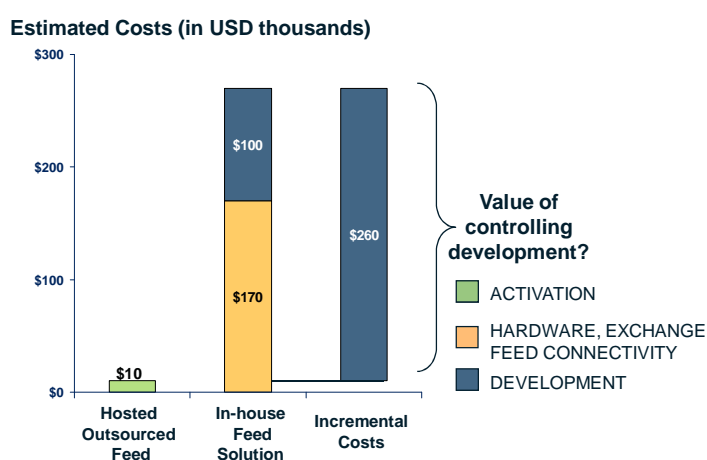
- Ticker plant hardware and software: servers, software, etc. for the receipt, storage, and internal distribution of market data — including redundancy (typically 2X)

- Telecommunications lines or extranet costs for the connections from market data sources and for data transport from remote sites (if applicable) to internal distribution points or consuming applications — also including redundancy
- Establishing connectivity to direct exchange or other feeds

Exhibit 4



**Start-up Costs of Market Data Management:
Hosted Outsourced vs. In-house (2009E)**



Source: TowerGroup estimates.
Note: Start-up costs based on representative high-volume market center (e.g., NYSE, LIFFE).

© 2009 The Tower Group, Inc.

Clearly, the most important consideration when contemplating an in-house or outsourced solution is project cost. TowerGroup analysis, shown in Exhibits 4 and 5, finds that an in-house solution is significantly more expensive than a hosted service. The largest cost associated with an in-house solution is hardware upgrades (including servers and extranet). With extraordinary growth in data volumes, providing sufficient bandwidth and processing capacity has become the single most important ongoing expense of a broker-dealer running its own ticker plant.

Significant additional costs are incurred, however, in the remaining costs of managing and running a far-reaching and complex data delivery service. Because these "hidden costs" are often spread over a number of different functions, geographies, and organizations, they often remain opaque to decision makers. They are nonetheless large enough, when brought together under the microscope of a detailed total cost analysis, that they must be incorporated into any choice whether to build or buy.

Exhibit 4 does not reflect certain additional costs associated with start-up that TowerGroup nonetheless believes to be significant (estimating costs running into multiple six-figures for a large broker-dealer). They include the following:

- Costs resulting from delays in bringing a solution to market (as opposed to plugging into a vendor's existing infrastructure and starting trading in near-real time)

- Costs to acquire and retain skilled resources who can remain current in the latest technologies for low latency, high-volume throughput, quality optimization, etc., including increasingly highly complex issues around hardware acceleration
- “Soft” costs due to the reputational and business risk that the development project will be delayed or exceed the budget (while more skillful competitors move ahead)

Maintenance Costs

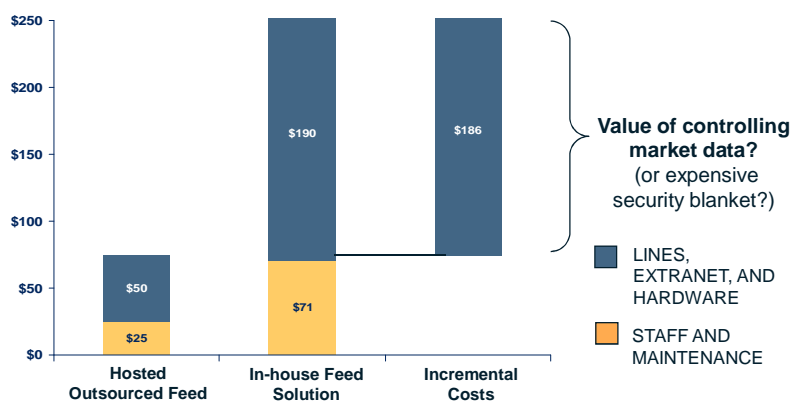
Maintenance costs are made up of the items categorized in Exhibit 5 and listed in more detail below the exhibit.

Exhibit 5



Monthly Maintenance Costs of Market Data Management: Hosted Outsourced vs. In-House (2009E)

Estimated Costs (in USD Thousands)



Source: TowerGroup estimates.

Note: Maintenance costs based on representative high-volume market center (e.g., NYSE, LIFFE).

© 2009 The Tower Group, Inc.

Lines, Extranet, and Hardware

- Ongoing market data distribution costs (principally telecommunications and extranet fees)
- Ongoing hardware upgrades
- Expenses for operations, colocation, and back-up (e.g., power, cooling, space fees, administration)

Staff and Maintenance

- Data management (e.g., for normalization management, symbology maintenance, caching processes)
- Entitlements/permissions and reporting management

- Ongoing development costs for maintaining and upgrading servers, integrating with legacy systems, maintaining software, etc.
- Management overhead, and project and program management related to development and data support and business continuity/disaster recovery
- Operational management of corporate actions and related administrative issues in support of maintaining high-quality data
- Data content licensing, distribution, and other data support issues (e.g., optimization of Reuters Identification Code (RIC) lists, OTC data sourcing, data organization/structuring/gaps, legacy systems integration, proprietary display requirements).

For example, a leading broker-dealer presiding over 50 high-capacity market data servers is replacing five servers every month, the monthly expense amounting to approximately \$100,000. The same firm is spending \$90,000/month on lines and extranet infrastructure. Combined, these charges amount to a nearly fourfold premium over the cost of an all-in hosted solution in the \$50,000/month range.

The hosted services model divides the cost of its pipes and servers among the host vendor's total client base, which enables the vendor to pass on to its clients the savings and efficiency advantages of capacity load-leveling.

An additional cost of maintaining a market center is the overhead for management and operations. A conservative estimate of the management and operational/maintenance overhead associated with keeping this representative market center functioning is nearly three times that of an outsourced solution: \$71,050/month vs. \$24,500/month. Clearly, the cost in time and management focus is a critical, if often overlooked, element of the build vs. buy equation.

Benefits and Risks: In-House vs. Outsourced Market Data Management

Benefits of an In-House Solution

Given the significant price differential between a hosted and in-house feed solution, what are the reasons for using an in-house solution? The primary reasons are:

- Perceived control given mission-critical status
- Perceived differentiation
- Higher speed, throughput, and scalability (than a traditional consolidated feed)
- Understanding of technology infrastructure
- Responsiveness to business unit needs

Of utmost importance with any solution is overall data quality and security. Any solution must be able to reliably deliver a high level of speed and throughput, on both an average and a peak basis, and do so within acceptable data quality standards (for example, avoiding dropped prints, out-of-order messages). Although most outsourced solutions claim outstanding quality and security, scrapping a tried-and-true market data feed requires a leap of faith. Because of this,

large broker institutions are comfortable using an in-house solution for large-volume exchange data (coming from, for example, the Chicago Mercantile Exchange, NYSE, or Liffe).

Among bulge-bracket firms' biggest concerns has always been keeping up with each other in the ability to handle ever-larger volumes of data in service of advanced trading approaches. In the past, the solution to that arms race was simply to own and operate the entire infrastructure. In that world, lower latency and better reliability than the competition was a differentiator worth investing in — no matter the cost — so a firm could control the outcome from start to finish.

With regard to infrastructure and responsiveness, a brokerage firm knows its systems' capabilities and the service provided by its in-house IT team. Typically, this team knows the intricate workings of the data management system and can address issues relatively swiftly and reliably. Expectations of turnaround time and ability have been demonstrated and a relationship exists that has been forged over time. The ability to control your own team and solution provides comfort and security.

Risks of an In-House Solution

The components of an in-house data management solution contain multiple data sources and vendors that require additional management. It is conceivable to have a different vendor for every aspect of your market data infrastructure from content and extranet providers to feed handlers and complex event processing solutions. Maintaining multiple relationships and coordinating activities for such a mission critical aspect of a brokerage institution adds another layer of complexity to managing market data infrastructure.

One industry participant TowerGroup interviewed pointed out: "If you go down the path of thinking you can 'plug and play' one component and not feel any pain in the end from integration or data standards issues or even asset class coverage, you are going to be severely disappointed. The costs of managing — and the costs of mistakes — have become just too high to take it all on without comprehensive guidance, whether from inside or outside."

In addition, because of the growth of additional asset classes and internationalization, buy-side clients are demanding feeds from an increasing number of exchanges and brokerage institutions are consequently adding these feeds. As the combined costs to add more exchanges have grown, so has the expertise required to manage different markets and instruments.

In addition, the ongoing research and development "arms race" that has ensued as solutions become more complex and demanding has become an expensive proposition for many firms. As a result of the recent industry downturn and massive layoffs, many broker institutions have lost a significant amount of expertise, a loss that threatens their overall ability to maintain the skills needed to manage such a diverse and difficult portfolio.

Benefits of an Outsourced Solution

A number of factors make the case for outsourcing market data management:

- All-in costs — not only explicit start-up and maintenance costs, but also invisible costs related to time-to-market, R&D investments, and management attention
- The ability to outsource a portion, or portions, in solutions that are tailored to the infrastructure constraints of each firm; outsourcing need not be a high-risk, all-or-nothing decision

- Access to multiple exchanges, asset classes, and technologies — without having to invest in the intricate expertise and infrastructure to cover all the bases
- The ability to “outsource” the learning and scaling needed to stay current and high functioning across a large portfolio of instruments, regions, etc.

The most visible benefit for outsourced solutions is clearly cost. Given the economics of today’s brokerage environment, firms must evaluate even the most mission-critical applications with respect to return on investment. As shown previously in this discussion, outsourced solutions present a compelling argument when comparing both start-up costs and maintenance costs. In the words of one decision maker at a large player who was interviewed by TowerGroup: “I don’t need to own a utility company to make sure my lights stay on. As critical as the lights are to my business, I’m not willing to build a power plant just to have them — not when there are perfectly good outsiders who can do it for a fraction of what it would cost me.”

Not factored into this analysis are the time-to-market costs associated with building a firm’s own solution. Even a moderately sized product generating \$20,000/day in gross margin constitutes a significant missed opportunity if implementation is delayed more than a month or two. Given the complex nature and uniqueness of each institution — and therefore its ability to introduce products quickly — this may represent an enormous hidden cost to the firm, and one that must be considered when evaluating its options.

Trading volumes tend to be significantly lower on secondary exchanges than on the large venues like the New York Stock Exchange or CME and typically do not require as low latency. Thus, for broker institutions that want to be in every market, a cost-effective outsourced solution, especially for data from exchanges or on products with low trading volumes, can be beneficial. Rather than writing code and connecting to every minor exchange — and incurring the associated monitoring and maintenance costs — an institution can “flip the switch” with a vendor and gain access to the data.

As hardware-accelerated market data systems mature, it may eventually make sense for firms to consider outsourcing even their highest-volume and lowest-latency feeds. Development in hardware languages is difficult and time consuming, so it is best left up to vendors who can leverage the development effort across many firms. Hardware acceleration is clearly a technology to watch as the performance benefits and reduction in hardware footprint can be quite significant.

Another benefit to outsourcing is that a firm does not need to make a wholesale change to its market data infrastructure. Outsourcing a portion of its market data feed solution gives an institution the opportunity to build a relationship with a vendor while verifying the cost, effectiveness, and quality of the outsourced solution. In this way, a firm can “test the waters” first with a more modest, lower-risk part of its data infrastructure before potentially moving into a more mission-critical trading area.

The outsourced providers have varying degrees of “open architecture” in terms of their ability to integrate with other elements of the market data value chain. The component approach to an outsourced solution is thus also a means of vendor testing in the context of a firm’s existing infrastructure, in effect seeing how the vendor performs before throwing the whole system over to an outsider.

In addition, market data solution providers address companies’ concerns over access and expertise to different markets, instruments, and technology. A solution that has access to

multiple exchanges globally can automatically solve a problem both for firms looking to optimize their international trading and those looking to enter far-flung trading centers. Outsourced providers with a large number of exchange connections and strategically placed colocation facilities are especially attractive because they allow institutions to plug directly into the ticker plant. Because outsourced firms are providing market data infrastructure for multiple broker institutions, they can justify developing and maintaining this access and expertise by spreading expenses over multiple clients, making it cost-effective.

Finally, brokerage institutions will have less need to develop and maintain internal expertise and continuity for these new products because these matters become the outsourcing company's responsibility. And it is the vendor's responsibility — not the broker-dealer's — to maintain the technical capabilities to keep up with growth of volumes in different markets or instruments.

Risks of an Outsourced Solution

Based on TowerGroup analysts' research and prior experience in the industry, and experience of the firms we surveyed in the course of this study, it is clear three key dimensions determine how likely brokers are to relinquish control of market data infrastructure to an outsider:

- The volume of securities they trade in a given asset class
- The complexity of the instruments they trade, such as large-cap equities versus off-the-run corporate bonds or second-tier foreign exchange
- The "maturity" of the market in terms of both volumes and speed requirements of the trading strategies, for example, typical of a Korea or India versus a London or Tokyo

With regard to volume, firms are most concerned that there not be *any* hiccups in the reliable flow of trading and therefore of market data where their clients' high-volume trading needs are concerned. High-volume trades constitute the most "mission-critical" situations for brokers and the ones in which they are least likely to give up control of market data.

With respect to multiple asset classes, the larger firms have often already built the infrastructure necessary to handle even the more arcane instruments and are likely to continue to maintain it for reasons similar to the ones that apply to the high-volume situations. If, on the one hand, a large proportion of a firm's clients trade in multiple asset classes, the broker is not likely to be willing to relinquish control of the market data. If, on the other hand, the instrument is new to the firm, or somewhat exotic — say, a forward contract on Thai baht — but constitutes a sufficiently large opportunity going forward, then brokers large and small are fairly likely to let an outsider handle the infrastructure.

Nonetheless, firms are still concerned with the trade-off they would be making between control and cost by outsourcing, despite the dramatic difference in total cost this study ascertained. Clearly, even the most compelling business case needs to be made explicit in this regard to reassure clients that, indeed, what they are giving up in terms of control will be more than compensated for in reduced cost and redundancy.

A secondary but still notable point is that an outside solution provider will be able to differentiate itself if it can clearly demonstrate its willingness and ability to customize its offering to the needs of the institution. By presenting a thoughtful and relevant value proposition and business case, vendors can help institutions address their very real concerns regarding security risks, switching cost/benefits questions, and more.

Finally, the long-term quality and viability of the vendor needs to be beyond reproach before any institution is willing to move forward. As fraught with uncertainty as the decision to outsource is what happens if a vendor cannot perform or is not around to honor its commitments. In these uncertain economic times, the potential for that outcome unquestionably needs to be weighed.

Conclusion

Transition periods provide great opportunities to evaluate and compare in-house legacy systems against outsourced service providers. When it comes to market data infrastructure, institutions are looking to handle demand for more asset class coverage, the need to access regional exchanges, and increased internalization of trading. The decision to outsource or continue with in-house market data technology turns on scalability, ability to expand asset types and regions, low-latency throughput, data quality and security and, clearly, cost. There are many components of cost, including the start-up expenses of development itself, and the ongoing expenses associated with hardware and software maintenance, data management, distribution, etc. — coupled with less visible costs in terms of missed opportunities from slow time to market and the cost of managing complex infrastructure and multiple vendors.

TowerGroup evaluated the benefits and risks of proprietary versus third-party market data management infrastructure solutions. Proprietary systems offer perceived differentiation, control, and throughput but carry significant risks in terms of cost, expertise, and the need for complex vendor management. In comparison, vendor offerings have the potential to save a firm a substantial amount of money over proprietary builds and carry the added benefits of access to and expertise in different markets, instruments, and technologies. With an outsourcer, responsibility for continuity and volume management is also transferred from the broker-dealer to the provider. At the same time, certain risks associated with an outsourced market data solution must be evaluated carefully: the perceived loss of control, differentiation, and latency in addition to the long-term risk of vendor service levels and viability. Each firm may weigh the risks and rewards differently, but the benefits of outsourcing have reached a point where brokerage institutions must give third-party technology thorough consideration.

ACTIV Financial commissioned TowerGroup to conduct independent research and analysis of market data management practices and trends by brokerage institutions in the securities industry. The content of this report is the product of TowerGroup and is based on independent, unbiased research not tied to any vendor product or solution. Although every effort has been taken to verify the accuracy of this information, neither TowerGroup nor the sponsor of this report can accept any responsibility or liability for reliance by any person on this research or any of the information, opinions, or conclusions set out in the report.