



Stairway to the Market Data Cloud

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Introduction

The financial services industry led the digital revolution. That digital revolution, largely created by the formation of the market data industry, first collected and disseminated price quotes onto stand-alone terminal screens for humans to view – and then those terminals were replaced by data feeds and on-premises infrastructure to allow the data to be transformed and integrated into applications for viewing by humans or use in computer models. This was a generation ago. While there have been some significant technology advancements around compute processing and speed, this model for market data delivery remains largely the same, and while other industries have been entirely disrupted or created through the efficiencies and flexibility offered by cloud services, wholesale financial services is just recently embracing public cloud. At the same time, the data used by financial markets is expanding to include new sources and types of data delivered via the cloud.

The time is now for the market data delivery paradigm to be changed via a next-generation cloud distribution model.

We interviewed a select group of senior executives (CTOs, CIOs, Heads of Market Data, & Heads of Infrastructure) at both buy- and sell-side firms. We found that the industry is ready for a disruption in the aggregation and delivery of market data. Both buy- and sell-side agree that the industry could be – and should be – on the cusp of a new digital revolution for market data delivery that leverages the public cloud.

The macro market drivers are requiring this change. The cost model of the capital markets was put under tremendous pressure post-financial crash. An avalanche of new regulations since then has increased compliance costs and taken away the ability of much of the sell-side to proprietary trade their own balance sheet. Post-crash, the large sell-side banks almost all saw their return on equity (ROE) fall below their cost of capital. Struggling to grow their way back to double-digit ROE, they sought efficiencies by exiting certain business lines and leveraging technology. A recent tempering of financial regulation, at least in the US, plus a potential for rising interest rates, mean a rosier ROE outlook. However, our opinion is that banks are not interested in returning to their old ways. In fact, rapidly advancing technologies and competition from outside traditional financial services are forcing banks to adopt more open and agile practices.

A perfect storm of challenges is creating the need for a new model: Market and technology drivers both are prompting a review of the market data delivery paradigm.

Exhibit 1
Return on Average Equity for all US Banks



Note: shaded area indicate U.S. recession

Source: Federal Financial Institutions Examination Council (US), Federal Reserve Bank of St. Louis

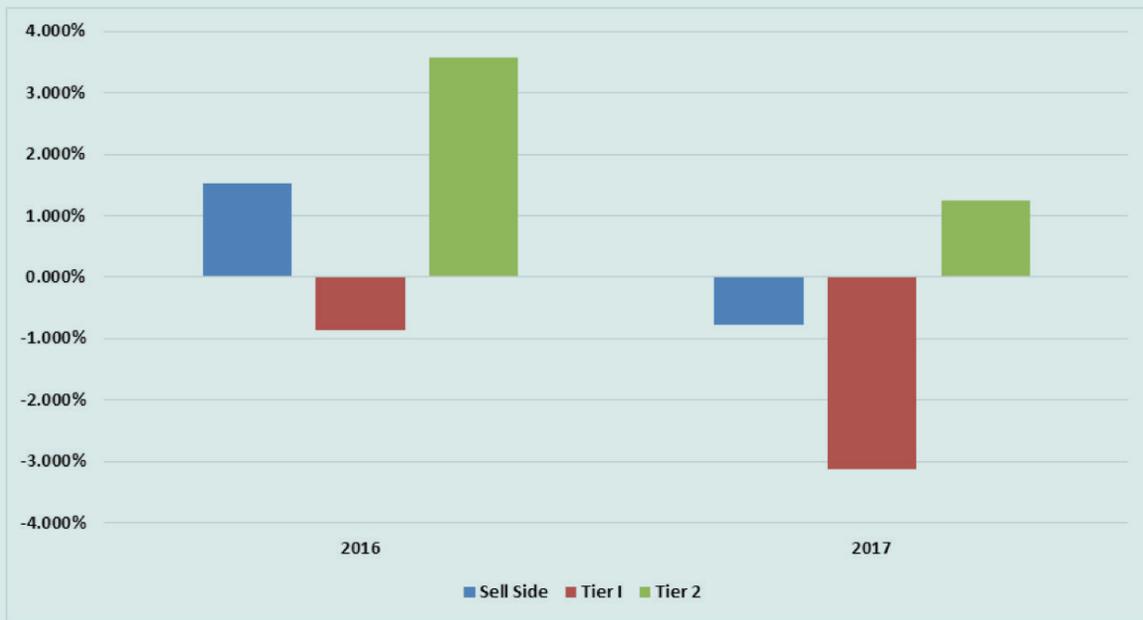
Controlling technology costs while operating on the cutting-edge of innovation is one of the challenges the industry faces. One of the allures of cloud services is that it provides a way to reduce costs but also supports moving to be part of the latest technical advances, supporting flexible and agile business models. This creates an environment that is more nimble and will allow financial services firms to focus more resources on innovation.

Cloud services have been adopted by financial services firms on both the buy- and sell-side in many of its verticals — Sales, Finance, Marketing, Human Resources departments are comfortable leveraging the public cloud. Cost savings have been a direct result of these moves.

Leveraging public cloud for market data delivery is not a question of if but when.

One buy-side executive considering reducing its internal data infrastructure footprint in favor of the public cloud noted that his firm is projecting costs to come down at least 75% over the next two years. This would be a direct result of reducing big-data platforms and moving to a stateless environment. In addition, the expectation is that costs will come down even further as more core trading and market data infrastructure migrate to an off-premises, cloud environment.

There is a huge opportunity to drive down costs with an ability to reduce not just the technical but also the operational overhead. Partnering more with data providers will enable many firms to reduce costs and headcount.

Exhibit 2
Sell-Side Budget Trends

Source: TABB Group

In 2016 TABB Group's extensive industry outreach has identified that there will be a significant budget decline for sell side institutions. This expected budget decline is a further indication that the industry must embrace new models of operation wherever those models provide the opportunity to simultaneously reduce cost and embrace innovation.

Stages of Market Data Delivery

It all began in the 1980s with a few big transformations that brought the industry to where it is today.

Phase I

In the 1980s, there were three primary market data providers – Quotron, Reuters, and Telerate – with many others vying for market share along with Innovative Markets Systems, later to be renamed Bloomberg. The market data industry started before the Internet, before PCs, before messaging protocols, etc. Financial institutions contributed information to Reuters and/or Telerate solely to advertise that they were making a market.

Brokers delivered individual screen-based services to the dealers, known as “green screens” as many displayed green characters on block text, a far cry from today’s multimedia, assisted reality (AR) displays. Trading floors had walls of video screens, as many as 12 for a single trading position, that delivered data for traders to see. Video switches then came onto the scene but only reduced the screen desktop footprint slightly; there was still miles of cable under the trading floors.

Phase II

Then in the 1990s a digital revolution came to financial services. This was of course before the consumer digital revolution of the 2000’s involving the world wide web and mobile phones. In the financial markets’ data digital revolution, the data went from analog to digital form. Data feeds were invented and were delivered from the vendor’s aggregation hub (ticker plants) via dedicated telecommunications lines and distributed throughout the financial institution via Unix platforms, local area networks (LANs) and proprietary middleware software. Digital data could be displayed on screens or fed into software applications where it could then be aggregated, manipulated and re-published. Eventually, the Unix desktop delivery yielded to PCs but the model remained the same. This model largely remains in place today.

Moving Forward

Some question whether or not the existing market data incumbents need to change. A managing director and global head of market data at a Tier 1 Sell-Side firm stated, “When you really think about it adoption of cloud-delivered market data services should not be seen as controversial. It can be said that Bloomberg and Thomson Reuters deliver cloud-based market data.” This is an interesting perspective. Yes, both Bloomberg and Thomson Reuters, the dominant market data service providers, aggregate data, normalize that data, package the data for delivery into feeds, desktops, analytics products and more...all from their data centers around the world, and they do a tremendous job at doing so. They both leverage large-scale computer infrastructure for the creation and delivery of their services and then their clients accept a network into their premises to consume the services. On-premises digital platforms typically provided by a third-party vendor with proprietary code and application programmer interfaces (APIs) then distribute the data to consuming applications and desktops. This is a private cloud services delivery model for both the services provider and the client.

So, is a pure cloud-based market data provision very different? Well yes. Although these vendors centralize some functions – e.g., aggregation, normalization – the customer is still responsible for vast infrastructure and headcount costs. Incumbent market data distribution approaches require firms to purchase and manage significant on-premises compute, database and network infrastructures; data is often replicated inside the customers' own data centers. Scaling services can be costly for the firm, while the vendors' proprietary delivery methods and APIs make aggregating or substituting data between vendor sources technically challenging. Cloud-based approaches, meanwhile, start with virtualized infrastructure that offers elastic, on-demand access to servers, databases and network resources often based on more open standards. The firm's technical resources are freed up to focus on leveraging this technology to meet business needs, in an environment that is flexible and agile. This means less time to market and lower costs for testing new business models.

The point, however is valid: It is not necessarily legacy technology holding back a progression to cloud, but legacy thinking.

Time for Transition

Capital markets have long operated infrastructure, applications and services on-premises, with much of the technology being proprietary, either developed in-house or purchased as an off-the-shelf solution. Whether the firm has a build or buy strategy, it largely maintains responsibility for the capital costs of purchasing and upgrading the necessary servers, databases, software and network equipment, as well as the ongoing costs such as headcount, real estate and other data center costs. In the early days of the digital revolution firms found competitive advantage in utilizing customized, cutting-edge infrastructure, software and network approaches.

As servers, software and network solutions become more commoditized, the potential for a client to differentiation via infrastructure has been significantly reduced. Faster telecommunications options for delivery, including fiber networks, have come down in cost, meaning data can be located further from consumers than before. Yet the expensive on-premise overhead remains. Many consolidated data vendors have introduced managed or “hosted” versions of their services as to offer an operational expense (opex) model for some of the required infrastructure as opposed to a capital expenditure (capex) model. However, as noted earlier, customers still need to maintain significant infrastructure and corresponding IT headcount on-premises to support local compute, storage and redistribution of data.

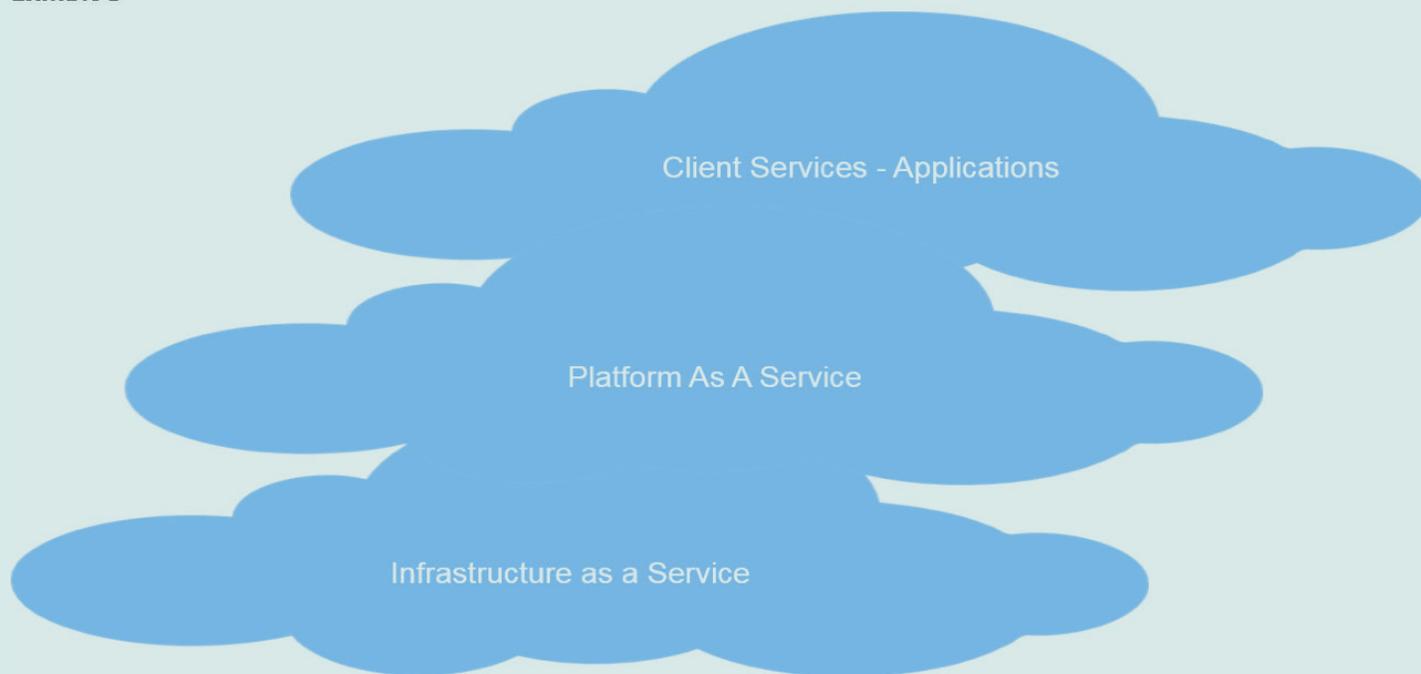
Financial services firms are increasingly looking at the options to shed their proprietary infrastructure to become more nimble, innovative and cost efficient. They understand that it is no longer necessary to house their data centers on site and manage the aggregation and distribution of data, but also know it is not an easy road to transition to a cloud-services environment. There are both technical and compliance challenges. For example, most real-time data sources, such as exchange or vendor feeds, charge for data on a granular, per-service, per-consumer (person or application) basis. These costs are high, so data access is restricted through the use of permissions or entitlements. Entitlement systems offer the ability to track, report and periodically audit these permissions. Of course on-premises entitlement systems and functions create additional overhead in both infrastructure and headcount.

The legacy infrastructure, supporting legacy applications at firms, particularly the larger sell-side firms, is still substantial and tremendously complicated to unwind. However, the old model is now unsustainable as the cost model of financial services is evolving. This transformation will require a stepchange in thinking and an openness to innovation in both their technology departments and processes. Privacy and control over data are key issues for banks; after all, data has always been one of the most valuable assets in financial services. Trusting the cloud with this data can be an initially daunting thought. However, not all data has the same privacy issues. Most financial markets data that is purchased is used to support pre-trade decision-making and pricing – largely commodity data such as exchange prices. This data has not yet been enriched with sensitive client data or other proprietary information. So storing and receiving this data via the public cloud does not pose privacy issues.

Similarly, security issues are a massive and growing concern for any institution. In this case public cloud can be seen as having an advantage over private corporations, as the public cloud providers have the necessary scale and business model to invest in state-of-the-art cybersecurity solutions.

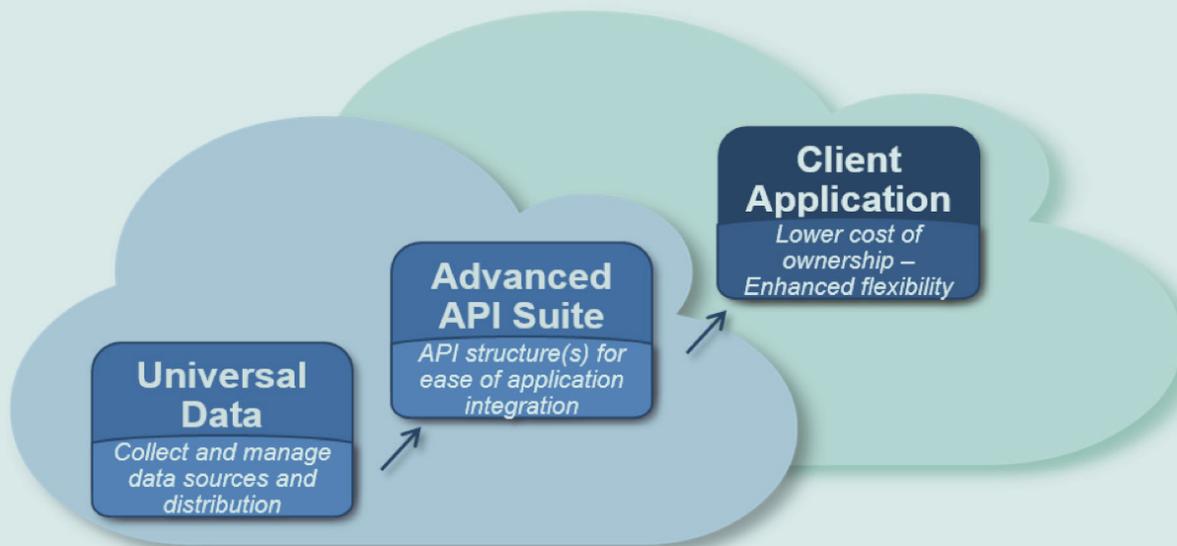
Next Generation

Exhibit 3



Source: TABB Group

Cloud services today provide the foundation for a multi-tiered model of delivery. The cloud service provider provides Infrastructure as a Service (IaaS); the service provider provides Platform as a Service (PaaS); and third-party value-add service providers can provide Software as a Service (SaaS). Clients also have the opportunity to migrate applications into the cloud to be co-located, if you will, to the cloud services those applications are consuming. The architecture represented above is fundamentally similar to what clients run today in their private clouds or hosting environments. The difference, of course, is that in this model one outsources the IaaS and PaaS to the market data cloud-service provider instead of running it in-house.

Exhibit 4

Source: TABB Group

Another way to view the building blocks, more specifically for market data delivery, encompasses two primary components. Data aggregation is the first step. Aggregating data from sources around the world to create a pool of services that provides sufficient markets coverage is made possible via existing telecommunications networks that carry raw exchange data feeds and through collaboration with over-the-counter market providers to access their price feeds. This data is deliverable in its native form or preferably normalized to a common data format.

The next step is distribution of the data, with the key component being an application programmer interface (API) suite. The API suite provides the interface for clients to integrate the data into their own or third-party applications, desktop and mobile platforms to deliver services to the consumers of the data.

This model eliminates the need to maintain the overhead associated with the aggregation and distribution of data.

Know Your Could

TABB Group's recently published [The Future of Grid Computing in a Cloud-Enabled World](#) reported that the migration to the cloud does come with potential speed bumps.



Cloud Service Partner
must have clear and
complete understanding
of your business and
technology needs

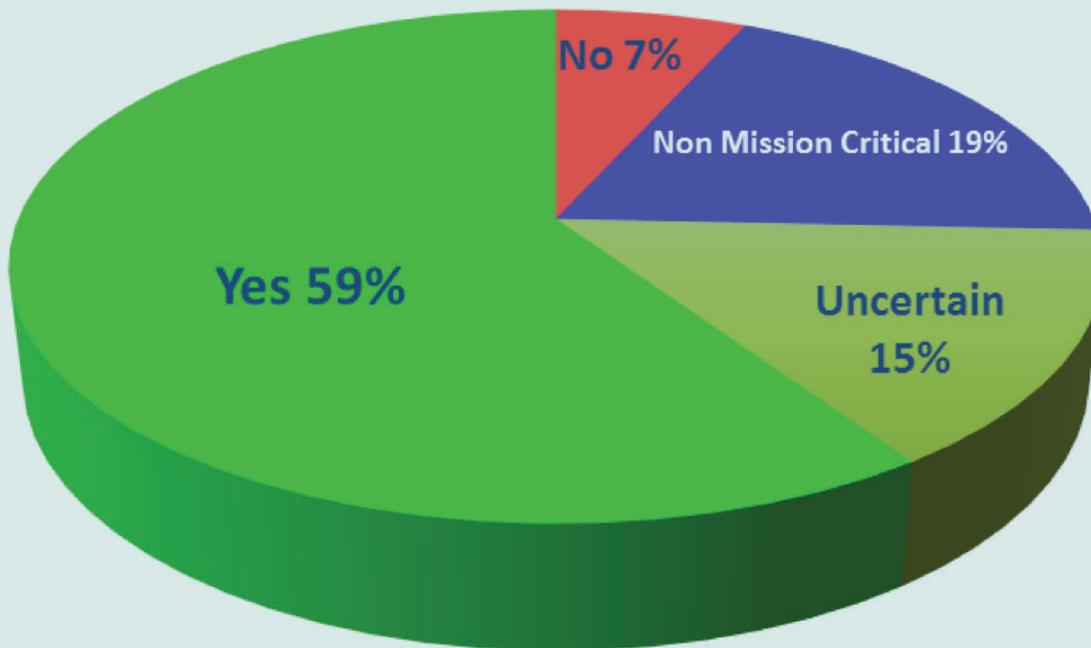


Interestingly, a majority of firms found that managing services in the cloud was more expensive than they had predicted and a majority moved at least part of their infrastructure back to on-premises. We should keep in mind that these are efforts to migrate client-owned services to the cloud. Partnership with a cloud-based service provider could ameliorate these challenges if that cloud-based service provider has a complete understanding of the client's business needs and has a firm grasp on the moving parts of cloud IaaS.

Pushing on an Open Door

Our market outreach has found that a solid majority of firms across the spectrum of large and small banks, brokers, asset managers, hedge funds, and service providers are open to considering acquiring a cloud-based market data service to run their businesses. We see 78% of respondents positive about the prospects of cloud-delivered market data as either a straight yes or a qualified yes for services that are deemed non mission critical.

Exhibit 5
Would you or your firm ever consider using cloud-based market data delivery?



Source: TABB Group

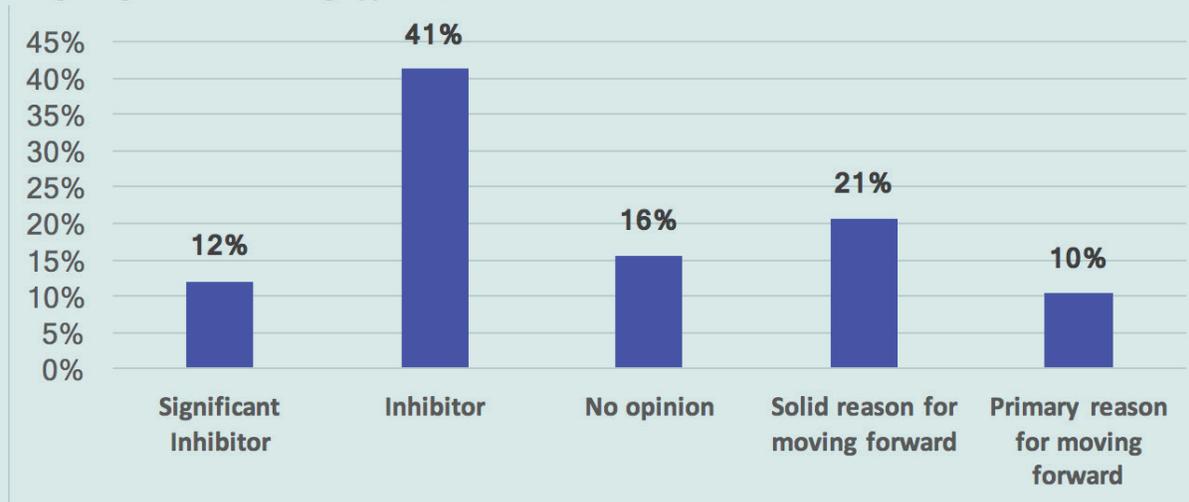
Inhibitors

While there are some inhibitors to adoption of cloud-based services for capital markets, the core concerns about cloud security and operations have largely been addressed by cloud providers. TABB Group's paper *A Look Through the Keyhole of Cloud Adoption in Capital Markets* detailed the evolution in cloud-delivered services and details the significant advancements in terms of operations and security within the cloud.

One market data executive from a Tier 1 sell-side firm said that the only inhibitor is perception. He says that fear is what has kept the industry from leveraging cloud for their market data aggregation and delivery. The same executive notes that firms are fine using vendors who leverage cloud services for market data, but are still afraid to adopt fully public cloud for their infrastructure. This particular market data executive felt that it is critical for the industry to move to the public cloud and has been pushing for it so that the industry may realize cost and operational efficiencies.

Indeed, a comment all industry participants made was that if they were starting a new firm, they would absolutely be a public cloud shop, and they understand that this is where the industry is heading.

Exhibit 6
Integrating Data with Existing Applications



Source: TABB Group

Of course, financial services firms are all about the applications that drive the business and almost all of those applications use some form of data. Therefore, integration of market data is a key topic of consideration in moving toward a cloud-based model.

Our outreach identified that 53% of those surveyed see this space as an inhibitor or significant inhibitor.

“Everyone acts like it’s a scary thing.

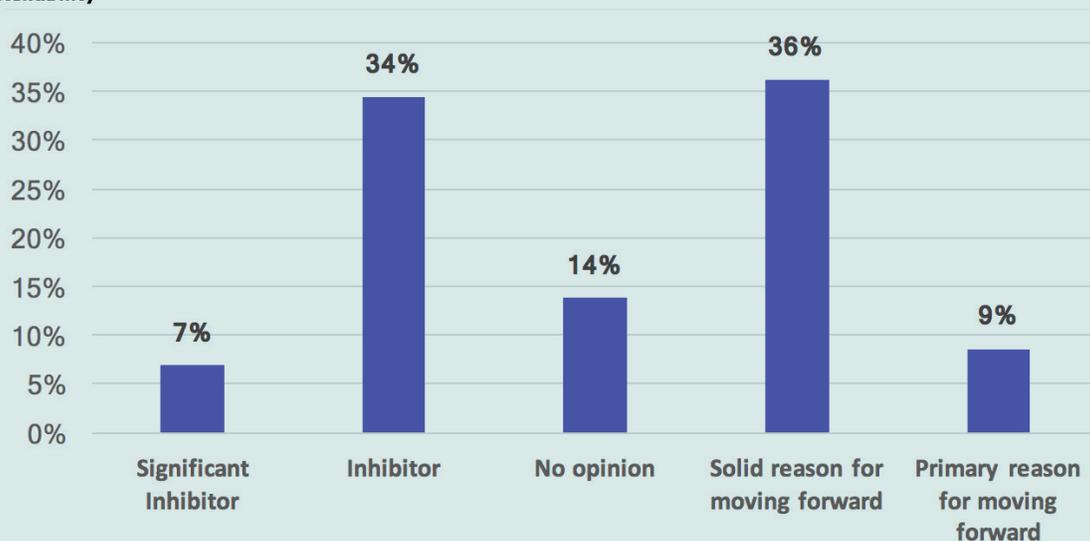
There is no reason. They’re just afraid,”

– Global Director of Market Data,

Tier 1 Sell-side Firm

However, 31% believe that they will see efficiencies and an easing of their application integration challenges. This 31% believe that the opportunity to move to a more open API structure is a benefit to their operation and, further to their point, believe that as they migrate their services into the cloud a flexible cloud-based model for market data delivery would ease that transition and ongoing servicing. Particularly as a cloud-based market data service would have similar elastic characteristics in terms of provisioning on the fly for more data or more infrastructure.

Exhibit 7
Reliability



Source: TABB Group

Once again, we see very interesting responses from the market place. For example, more respondents see reliability of services delivered via cloud as positive than negative. While 41% believe that the reliability of services delivered from the cloud would be an inhibitor or significant inhibitor, 45% believe that reliability is a core reason to migrate to a cloud-based market data service. Perhaps with enough budget one is able to construct a failsafe market data environment with sufficient redundancy in terms of feed, platform and hosting location and harness that platform with a highly tuned failover regime so that no application or end user ever sees a service interruption. However, even so, change in those environments can be costly and time consuming and, realistically, this proposition is not within the reach of the entire market. Those who do not have the wallet or in-house expertise to construct a high-end market data delivery regime can achieve significant improvements to reliability through cloud-based market data delivery.

"I don't see it as a job eliminator, more of an opportunity for you to learn new technology on a new platform. Either get on board or it's going to run over you."
— An Infrastructure Executive at Large Buy Side Firm.

Management teams need to ascertain that the cloud model does not bring additional risks and those teams need to satisfy the legitimate concerns of their Risk and Compliance teams. Early engagement with Risk and Compliance will help to outline the road map required to a future in the cloud and will help to educate those teams on the advancements and benefits of cloud-based service delivery and address the operations requirements that must be maintained. To start, compliance firms need to be brought up to speed on current industry acceptance and understand that not all data, especially data purchased from outside vendors, has privacy risk exposure..

“We moved our most mission-critical, data-intensive services [to public cloud] ... FINRA’s “crown jewels”.

– Steve Randich, EVP and CIO, FINRA

During TABB Group’s most recent MarketTech conference, Sean Roche, Assistant Deputy Director of the Central Intelligence Agency (CIA) discussed the agency’s use of public cloud services. One expects that the CIA have a rigorous set of criteria that must be satisfied for the use of such a service. Financial markets regulators are also increasingly comfortable with public cloud. The US Financial Industry Regulatory Authority (FINRA) uses public cloud services from Amazon Cloud Services including its infrastructure, data services, and security tools for some of their most mission-critical, data-intensive services.

There is a means to move forward to meet performance obligations and to satisfy the legitimate concerns of risk and compliance, but it requires an engagement.

Retraining - Refocusing

Equally important is investing in retraining technology teams to develop applications for the cloud and then set up their applications to point to the cloud and rather than to their own proprietary data centers. However, most executives said, the beauty of leveraging the cloud is turning it on. It is a simple process.

Most financial services technology executives we spoke with say they are very comfortable embracing the cloud services for their data organization but acknowledge it will take some time to transition. There will be staff training needs for the new era. This will be a challenge that some will embrace, allowing them to refocus themselves for the future.

Cloud Competitive Advantages

In a TABB Group’s recently published Focus Note, Introduction to the [Third Generation Platform for Financial Markets](#), we explained how third-generation platform services based on cloud that bring together mobile technology, social platforms and big data will eventually affect all financial workflows. Executives who participated agreed that adopting a third-generation platform brings benefits including competitive advantage and the ability to innovate going forward.

Public cloud enables firms to take advantage of “pay as you go” or “on-demand” type models. Sometimes this is called “bursting into the cloud”.

Examples of how this is currently being leveraged by the markets is computing Monte Carlo simulations, strategy development, reporting and much more. In addition, capital markets organizations are already adopting cloud services for many other verticals such as sales, marketing, and human resources; moving to the cloud for critical functions such as market data and trading thus requires a bigger organizational leap. Nevertheless, things are changing.

The capital markets were leaders in the digital revolution and the first online community. The capital markets industry is now leveraging that community by embracing disruptors through innovation labs and accelerators, as well as through direct investment or collaboration in utility services to save money and solve business problems.

Those who have embraced utility services and participants adopting a cloud approach will be well positioned to achieve the biggest benefits. The utilities will be developed in a way where data can be accessed more quickly and efficiently with an open standards environment. This is a huge shift in culture. Cloud-native capital markets firms can further benefit by allowing front-office users to analyze data or create predictive models without the need to provision servers, configure databases or even write code in some cases.

Increase Efficiency, then Innovate _____

Much of the focus on moving to cloud-delivered services is rooted in increasing efficiency. Taking the opportunity to outsource your infrastructure data operations and in this case obtaining a service delivered from the cloud will indeed provide the ability to reduce costs. That cost reduction may offer increased investment in innovation. Instead of spending on running infrastructure, spend to serve your clients in a better manner to maximize your return.

The model of services delivery has changed not only for banks and brokers consuming services but also for the services that those institutions provide to their clients. The consumer world has already largely migrated to a model that is cloud based and that integrates mobile, social, big data and big data analytics along with offering micro services. That very same model, applied to financial services, will broaden reach, create innovation and most importantly fit in with the way the balance of society now operates.

Now we are seeing a model where there's hosted or cloud-based delivery of services, infrastructure as a service, data feeds as a service. The question is: What is differentiating about aggregating data feeds and distributing data to your applications? At this point of technology maturity, the answer is nothing, because for other than low-latency applications, does it really matter where your infrastructure sits as long as it is reliable and can easily integrate to your environment? Once again the answer from the street is no. At times, it is a reluctant no, but it's a no nonetheless.

Conclusions

Like all things technological, the pace of change is relentless and change itself never ending. This applies to market data services as it does all other things technological. Jack Welch once said, “Change before you have to.” It seems that we are nearing the “have to” stage. The challenges of moving toward cloud-based models are manageable and the benefits exponential. Arthur C. Clarke once observed that new ideas pass through three periods: 1) It cannot be done. 2) It probably can be done, but it is not worth doing. 3) I knew it was a good idea all along. As it pertains to cloud-sourced market data services we are probably somewhere between numbers two and three. Those in the “1” camp, take note.

The primary challenge is to embrace the future. Find use cases that are safe and can be learned from and move forward, extracting the maximum benefits in the most nimble manner. As we embark on the third phase of market data services delivery, that phase is in the cloud.

About

TABB Group

TABB Group is the international research and consulting firm focused exclusively on capital markets, founded on the interview-based research methodology developed by Larry Tabb. Since 2003, TABB Group has been helping business leaders gain a truer understanding of financial markets issues to develop actionable roadmaps and approaches to future growth. By accurately assessing clients' customer bases, competition, and key market opportunities, TABB Group works with senior industry leaders to make critical decisions about their business. For more information, visit www.tabbgroup.com.

TABB Group's FinTech Research Practice

TABB Group's FinTech research practice is specifically designed to help financial institutions understand the latest spending trends, strategies and solutions that are critical to achieving best practices in financial services technology, data, analytics and technical infrastructure. The practice also helps technology and data solution sales and marketing organizations understand specific requirements and use cases within financial services and capital markets firms.

FinTech Team

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