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Connecting the **Capital Markets** in the SDN era: **a new approach**

Virtual markets: connecting to the cloud
MiFID II: the role of a cloud-enabled extranet

Introduction

Connectivity has always been at the heart of the capital markets. Without the global web of interconnections between trading venues, participants, clearing houses and regulators, the financial markets simply wouldn't be what they are today.

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The capital markets landscape is undergoing considerable change. The emergence in recent years of new technologies like cloud hosting and Software Defined Networking (SDN), plus the introduction of MiFID II, are causing participants to rethink how they operate and reassess what they need from their connectivity strategy.

Next generation networks are coming online that are more agile and responsive, allowing market players to customise capabilities according to their specific trading requirements. These networks also offer access to a fast-growing, interconnected global ecosystem made up of exchanges, trading venues and third parties offering everything from clearing house services to compliance testing, market data and cybersecurity solutions.

In this brave new world of heightened regulation, complex interconnectivity and technological change, trading firms face crucial decisions.

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The pre-MiFID monopoly

In order to better understand where the industry is headed, it helps to see where we've come from. Arguably, MiFID I was the catalyst for the revolution in global trading that continues to unfold today.

Pre-MiFID I, trading was a monopoly. Central exchanges were the only venues where organised trading occurred; they set the prices, the commission levels and even stipulated how you connected to them. Everyone was forced to use the same connectivity provider and so speed was a fixed parameter, influenced only by distance from the venue.

MiFID I's introduction released the stranglehold that established exchanges had on equity trading. But by allowing for the creation of alternative trading venues, MiFID I inadvertently created the conditions necessary for the latency race and thus the globalisation of trading.

MTFs sprang up across Europe, offering lower transaction costs, often better liquidity and the ability to connect to them with any provider. Connecting with any provider often meant that participants got to choose the fastest one. Best execution rules meant that any latency in trading systems needed to be minimised so that speed wasn't compromised by the extra step of routing orders, and this extended to the physical connection to exchanges.

The growth in number of MTFs led to an exponential increase in the demand for connectivity in order to connect to this more complex and crowded market. This in turn led to providers boosting

connection speeds through higher capacity fibre and data centres co-located at venues.

Making new connections, reaching new markets

Connectivity providers have subsequently developed financial extranet services that enable participants to connect to trading venues and market data feeds worldwide more quickly, more easily and more cost-effectively than was possible with point-to-point connections. Extranets have reduced the time and cost for trading firms to connect to and trade in new markets.

The "one-to-many" approach of extranets has made them the mainstay of connectivity strategies, and as they develop they are moving beyond providing pure connectivity. Increasing numbers of venues and third party suppliers are joining extranets in order to connect to an extended community of trading firms, brokerages, and other prospective customers. These suppliers range from algorithm testing and transaction reporting that helps firms meet their regulatory responsibilities to aggregated market data and content for making better, more informed trading decisions.

The effect of regulation: reporting and algo testing

The forthcoming MiFID II directive expands the capital markets ecosystem – and by extension the value of a financial extranet service to market participants. Trading firms, exchanges, and service providers must learn how to meet a range of regulatory requirements for all types of assets trading over the next 12 months. MiFID II's focus on stringent reporting and testing policies means firms must now connect to both exchanges and venues to execute trades, and also to specialist providers (ARMs and APAs), whose services and solutions enable them to meet their regulatory responsibilities.

An example of this is MiFID II's mandate for regular testing of trading algorithms. According to MiFID II, any firm that uses algorithms must carry out its own regular testing to prove to the regulator that its algorithms won't disrupt a market, or malfunction under stress conditions.

The practical solution for algorithm traders is to test and monitor their algorithms in independent lab environments provided by specialist consultancies that simulate live market conditions. In this way, they can demonstrate independence and auditability to the regulators. They can also adjust and make necessary changes to their algorithms at very short notice, before they go live into the markets.

Algorithm traders will need to undergo this testing on an annual basis, and also whenever they make significant changes to an algorithm. An extranet can provide the fast and convenient access to secure third-party lab facilities so that regular testing can become routine.

The effect of regulation: best execution

Best execution is another important aspect of MiFID II that an extranet service can help with. MiFID II makes best execution compulsory and extends it to all asset classes, not only equities. It will be one of the more complicated aspects of MiFID II for market participants to implement: the task of connecting to multiple venues, comparing prices, ensuring quality of execution and then proving that quality, is a considerable challenge.

That said, an extranet service already possesses many of the fundamental properties needed to help firms with best execution compliance. They have the connections to a range of liquidity venues, plus access to market data and the catalogue of analytics and algorithms needed to trade. The global reach of an extranet means an accurate and complete market view is relatively straightforward

to obtain. It also has the potential to act as a pseudo-consolidated tape that serves as a benchmark for measurement of best execution.

It's not just new regulation that's reshaping and redefining connectivity in capital markets. The adoption of new technologies by capital markets firms such as Software Defined Networking (SDN) and cloud computing can offer improved agility, flexibility and scalability - all at a lower cost.

The future is the cloud

The capital markets sector has traditionally been slow to adopt new technologies. However, more and more venues and trading firms are adopting secure private cloud-based hosting to take advantage of its greater flexibility, with the opportunity to scale up storage and IT resources (including complex computing capability) as and when required.

However, concerns around data security and the potential loss of access to critical apps and systems is an ongoing issue that affects firms' uptake of public cloud services from third-party providers. As an alternative, some participants adopt a hybrid approach by moving less critical functions to the lower-cost public cloud, while retaining sensitive and business-critical systems in their own private proprietary clouds.

Use of the cloud to host key functions and features, such as a bank's front office trading environment, is not yet widespread. But cost pressures and CAPEX savings will drive uptake in the longer term. With the FCA releasing guidance for firms outsourcing functions to the cloud or to third parties, it seems that even capital markets firms cannot resist the force of change forever.

The tipping point will come when we see whole venues moving to the cloud. When – rather than if - this migration takes hold, the issue of how to connect to these remotely hosted venues, platforms and services will take on added significance.

Lead and they will follow

What's even more interesting, and potentially game-changing, is the idea of the capital markets as a whole moving into the cloud, but how might this happen?

The answer, in part, lies with the exchanges and how they are accessed. Exchanges have always been physical places, from the earliest forms in coffee shops and under a buttonwood tree to the modern monoliths suffused by the quiet hum of microprocessors. Increasingly, however, the physical location is becoming less important. In the drive to reduce latency, trading firms co-locate with exchanges at out of town centres or in locations close to them, and have been doing so for a long time. The actual location of a single exchange is becoming less relevant with liquidity sources being fragmented across venues.

In addition, "access" technology can make physically separate liquidity pools look like a single logical location. Indeed, as trading activity grows and the number of trades executed in each second increases at an exponential rate, ever more space will be needed.

A move to a secure cloud infrastructure is expected to be the next step. Clearly it's not going to happen overnight but there's no real reason why – if security and regulatory concerns were met – such a move couldn't work. The technology is in place for it to work and the desire from capital markets firms, although nascent, is increasing.

Once exchanges move to a cloud environment, market participants and trading activity will follow. Advantages gained from being in the best rack of a data centre will be less attractive. Participants will start looking for better experience all around, an experience that reflects the flexibility they get in a cloud environment for their compute and storage needs. Such flexibility, or elasticity, will be expected from the way they reach the cloud as well. As such users will expect an elastic bandwidth, topology, and commercial model.

Software Defined Networking – bringing flexibility to the network

Accompanying the trend towards private cloud-hosted trading platforms and services is the emergence of SDN over the last five years or so. SDN is a move away from the "static" architecture of traditional networks in favour of a virtualised approach that is more dynamic, flexible and scalable, but which importantly still delivers a reliable, resilient, low-latency connection to key cloud-hosted venues and exchanges.

The combination of the trend towards cloud and the emergence of SDN has the potential to trigger a new connectivity arms race in the capital markets. Fast, stable and secure connectivity to the cloud will become all-important.

But so too will agility. Organisations want to manage and customise the connectivity, functions and services they use via their networks. They want to adjust the bandwidth available to them, or introduce ("switch on") new functions into the network like extra cybersecurity or a firewall, from a single dashboard.

A more agile, software-based network gives capital markets participants more control. They can dial up extra bandwidth and capacity to their network as and when they need it – for example, during peak trading time or when a major market-moving announcement is due, such as the latest US labour market data.

Conversely, they can reduce the bandwidth, at night for example, and use the network for order clearing: they could even turn it off entirely. All without delay and without having to renegotiate their SLA with their service provider. Rather than purchase a fixed amount of capacity to a particular location or venue for 12 months, trading firms will move connectivity between different participants and providers according to their specific needs.

Connectivity is king – again

SDN's model of agile, customisable connectivity is the direction that capital markets will follow. Both SDN and the cloud offer participants greater flexibility, more connectivity and improved ROI. Participants will have a wider range of differently-priced tiered services from their provider to choose from. They will be able to select their preferred service and its level of guaranteed latency, reliability and redundancy based on their trading objectives, or their budget.

But technology advancements mean that today's networks have reached their limit in latency vs cost terms. Alternative wireless technologies like microwave and millimetre wave offer ultra-low latency. However, their capacity and bandwidth is very limited at this stage. Research and investment continues into other early-stage connective technologies such as hollow fibre, which offers the ultra-low latency of wireless but the capacity of fibre.

Extranets – from one-to-one, to one-to-many

The increasingly international diversity of the capital markets marketplace, together with factors like the incoming MiFID II regulatory framework, has widened firms' connectivity needs beyond low-latency connectivity. As well as having a global connective reach, an extranet service can provide participants with a broad range of value-added features and services. These include the ability to more quickly and easily connect to new markets and clients worldwide than was previously possible, in order for firms to take advantage of new and emerging trading opportunities as they occur.

An effective extranet also offers participants immediate access to a broad ecosystem of third party suppliers. In addition, its guaranteed deterministic latency enables the near real-time delivery of market-moving content and data, as and when it's needed. Built-in real-time performance monitoring makes sure participants receive the requisite level of service and speed of connection that their provider promises in its Service Level Agreement.

Such a wide and varied range of advanced features and services can potentially be confusing and difficult for the client to manage and monitor. That's why an extranet's user interface should incorporate every feature and function, but in a way that's accessible and user-friendly. A self-service portal fronted with an easy-to-use dashboard lets the participant conveniently pick and choose which features, services and providers they want to access and use, while also allowing them to continually check the quality of their connection.

Reaching the inflection point

The capital markets industry is today at an inflection point. The international expansion of capital markets and the growing global interconnectivity between exchanges, venues, suppliers and trading firms creates new and complex challenges, as well as new opportunities for growth. Cloud and SDN are also set to disrupt existing network and connectivity strategies.

Participants already face ongoing pressure to cut costs and stay ahead of the competition. But now they must also factor in new regulations like MiFID II that require them to be more transparent in their trading practices and reporting.

Just as MiFID I helped define capital markets as we know it today, these factors are defining the markets of today and tomorrow. As such, participants must rethink their connectivity strategy, for now and into the future.

In today's increasingly complex capital markets sector, connectivity will more than ever be the vital difference between success and failure for trading firms. They should therefore look for solutions that can meet and manage their current data, service and connectivity needs: and which also have the scalability, flexibility and foresight to adapt, evolve and expand their functions and services, according to the changing conditions and demands of the market.

About Colt Capital Markets

Colt delivers highly secure, on-demand services that are designed to meet the stringent requirements and speed of the financial markets on a global scale. Its team of Capital Markets experts works closely with firms to understand their challenges and regulatory requirements, delivering a solution that meets their specific needs. Colt's Capital Markets portfolio include dedicated access propositions, the Colt PrizmNet financial extranet, market data as well as hosting and managed communications services.

Colt serves over 400 Capital Markets firms worldwide. Customers include 18 of the top 25 bank and diversified financial groups and 13 European central banks. Colt's history in serving the needs of Capital Markets firms started in the City of London over 20 years ago and the company has since expanded into the key financial hubs in Europe, Asia and North America. Following the acquisition and integration of MarketPrizm in 2011 and KVH in 2014, Colt has the service portfolio and reach to support Capital Markets firms on a global scale.

For more information, please visit

colt.net/capitalmarkets | @colt_technology | capitalmarkets@colt.net