EXCHANGES SPLITTING INTERFACES **COPING WITH DATA MASSES: THE EXCHANGES' SIDE**

With the exponential rise of electronic and automated trading around the world over the past thirty or so years, accurately predicting what the future holds might be akin to a futile exercise. But one thing is clear: the global trend towards machine-based trading is forcing many exchanges to upgrade their IT infrastructures and gateways, to handle booming trade and market data with increasingly lower latency. This article looks at the challenges the exchanges are facing with insight provided by Martin Zwick, Managing Director at Orc Software GmbH in Frankfurt.

The race is on for exchanges to enhance system performance and reduce millisecond latencies. Yet it's not the only race taking place. Traders too face big challenges just remaining in the game and surviving.

"More or less it's winner takes all out there," says Martin Zwick, Managing Director, Orc Software GmbH in Frankfurt.

"Everybody is racing. Market participants are racing for that last millisecond and microsecond just to catch that trading opportunity before their rivals do. Now it's the turn of the exchanges to react, upgrade and provide additional capacity," he adds.

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Zwick argues that while the fastest [traders] to react usually bag those opportunities and make money, "second will lose and being third probably isn't worth being in the business". Although trying to be the fastest might be "nothing really new", what is relates to the ferocity of competition.

"Competition a decade or so back was equally fierce, but on a different level of sophistication," notes Zwick. "That's all changed. Take the things that we sell in Orc. Not only our standard front end, which has a lot of automation already built in, but also with Orc Liquidator, which pushes automation even further. It's now about surviving the whole race."

The global trend towards machine-based or automated trading - where the intention among market making and prop trading firms is to react to each market tick - generates increased market data and worsens the problem. Into the breach come the Independent Software Vendors (ISV's) like Orc, who act as bridges or facilitators in connecting trading participants with more than 100 exchanges globally.

Developments in the electronic trading space have progressed at a frenetic pace since the Toronto Stock Exchange became the first to introduce electronic trading back in 1977. Subsequently, virtually all European and Asian exchanges went electronic during the in the 1990s, with U.S. exchanges being the last to give up their trading floors and go electronic.

It was the Deutsche Termin Boerse, founded in 1989 and the forerunner of Eurex (part of Deutsche Boerse), that became the first electronic exchange in Europe to trade options and futures. Today, their Members are linked to the Eurex system through a dedicated wide-area commu-

nications network (WAN), with access points dotted across the globe - including in Amsterdam, Chicago, New York, London, Paris, Hong Kong, Tokyo and Sydney.

The primary trading technologies used by most exchanges is either order driven with continuous order processing ('continuous matching or auctioneering') or quote driven with continuous liquidity providing ('market making').

Historically, US and UK exchanges have shown a preference for quote driven trading, while continental Europe bourses have preferred order driven. Recently, however, European exchanges have been implementing more elements of a market maker system and even going as far as creating new 'hybrid' trading systems catering to both.

Now with heightened competition between the traditional exchanges and Multi-lateral Trading Facilities (MTFs) like Instinet Chi-X, Turquoise and BATS Europe, the incumbents are deploying trading technologies to provide the optimal system for the type of trading activity performed. At the heart of the battle amid rising levels of automated trading, technology is being deployed to attract and retain the most liquidity.

In this battle for market share, operators like Chi-X have made serious inroads into the market share of blue-chip equity trading right across Europe - from Austria to the UK. In addition to low cost trading tariffs, this operator touts co-location roundtrip latency of just 400 microseconds and internal matching latency of 250 microseconds.

Providing a flavour of Turquoise access and splitting order entry interfaces, CTO Yann L'Huillier reveals: "Turquoise believes in fair access for all members and currently offers a native interface as well as FIX connectivity to our platform. Our new FIX gateway is a rules-based engine that allows us to connect any flavour of FIX 4.4 and 4.2 for customers that are less latency sensitive - adding 100 microseconds to the low latency API."

Orc's Zwick reflects, saying: "Clearly, if your technology is up to speed you will be attractive to market participants. However, technology is not only about bandwidth for the lines that market participants can use in order to connect to a particular exchange, but also about the roundtrip execution times to process orders."

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Against this backdrop, European and North American exchanges have been beset in recent years by surging trading volumes and a ballooning of market data - virtually across all asset classes and products. Illustrating the point, Order-Trade Ratios (OTRs) on many of the leading equity and derivatives exchanges have mushroomed, seemingly out of control.

If recent trends are anything to go by, data management issues have become increasingly critical for exchanges and explain the motivation among European bourses to split pipes for execution from pipes for market data, as well as establishing new interfaces or market access points.

Using OTR growth on the London Stock Exchange (LSE) as proxy for the major European equity markets, JWG-IT, a think tank for EU-driven IT change in financial services, predic¬ts that an average of 25 orders will be needed to process a single trade (25:1) by the end of 2009. This would lead to in¬creased message rates (generated by order and trading volumes) and significantly impact leading European exchanges' IT sys¬tems.

At Euronext.LIFFE, part NYSE Euronext, the ratio of quotes to trades in 2004 was just 2.16, but by 2005 it was almost at 8 and had shot up to over 17 by 2006. Figures from Eurex, typical throughout the derivatives market, showed quotes per day had increased from c.10m daily in January 2005 to 145m a day by May 2006, with the maximum load having been 3,600 quotes per second on DAX options.

The trends are unlikely to have altered much in the intervening years with the slicing and dicing of orders on exchanges. Indeed, a Detica white paper described this data explosion recently as: "Not merely up...but frankly just about as close to vertical as possible, no matter what the scaling on the chart."

And, while different exchanges can adopt different approaches to making such changes, in essence it involves having a separate interface/gateway for market data, from

another for trading, and still another for providing quoting. There are a range of options and measures on the block. Euronext, for instance, has technical limits that only permit a set number of messages per second - currently around four (4) - to and from the exchange. Others like Eurex impose some financial sanctions or penalties through excessive usage fees.

Deutsche Boerse's Xetra ATM Programme is an example of a measure designed to ramp up the performance for sophisticated traders. Specifically, ATM brings new and separate access options specifically for automated trading.

In terms of current exchange developments, Deutsche Boerse have halved the round trip times with their new 'asynchronous' message-based interface on Eurex. And, they intend to implement the same technology for Xetra later this year.

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For Xetra too there is Enhanced Transaction Service (ETS), which relates to order matching, and, Enhanced Broadcasting Service (EBS) where users can access market data a separate thread.

Zwick says that the trading interface here is not the only upgrade. New trading strategies and new products have led to a considerable increase in daily transaction volumes on Eurex/Xetra, resulting in a greater demand for more order book depth and additional market information.

In addition to the regular service or so-called 'VALUES Architecture', market users can obtain some privileged access of Eurex's market for a premium. The normal route into Eurex will not provide users with each print that has taken place, but a net feed of market data with time slices at around 250 milliseconds.

Zwick explains; "With a different approach through ETS participants are to obtain each tick and see each print that has taken place at the exchange." This means users will get a more granular view and be able to understand the market far better than via the standard architecture.

SIX Swiss Exchange, which announced this February that it had gone live with its SWXess modular trading platform, has started a migration period that gives member banks until 9 April 2009 to move off SWX's old platform.

"SWX have essentially undertaken to split things up just to take load off each pipe," Zwick says. "They are replacing everything that they had and implementing a completely new system. Eurex had done this previously as separate streams, whereby the normal system was still running and then additional or optional ways were provided to access the market."

SWXess is modular, consisting of four basic business service components, each with a separate interface. Market participants subscribe to the business services they need for their activities. For example, high volume users will connect to the capacity trading interface for quoting on book and executing high-speed algorithmic trades.

With the business service components being the same for three markets - SIX Swiss Exchange, SWX Europe and Scoach - separate component interfaces handle reference data and market data distribution. (The latter makes use of FIX 5.0 encoded with the FAST).

Borsa Italiana will introduce a separate market data feed, Enhanced Infolect based on LSE technology towards the end of 2009. The LSE had already introduced separate market data feeds long ago; first with its London Market Information Link (LMIL), then Infolect.

Elsewhere, NYSE Euronext has two alternatives for their trading access. One is FIX-based and the other a proprietary facility for ultra-low latency called UTP Direct. And, in an effort to leapfrog acquisitions and keep up with the pace of change, NYSE Euronext's new Universal Trading Platform (UTP) has a Common Customer Gateway (CCG).

Already rolled out in the US in 2008 and poised to go live in Europe this May, UTP will give access to any product in any geography through its Secure Financial Transaction Infrastructure (SFTI) network. It is all designed to make liquidity more accessible across all the exchanges markets.

With many of these IT initiatives either well underway or complete, there is no doubt that the global race for microseconds and milliseconds will continue in some shape or form.

The race is manifesting itself today with developments in areas such as multiple core CPUs, where processing throughput can be increased and flexibility can be given to IT developers at exchanges. Orc, for instance, continues to play a vital role by providing market links to exchange gateways and liaising closely with bourses over any significant changes likely to impact market participants.

As Zwick puts it: "In the global race for microseconds, where processing hardware, network technology, software components and trading logic are the parameters, optimizing one part of these components will result in pressure on the others. Hence a constant effort on all sides will be required. But you are only as good as your weakest link."

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