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DEALING WITH TECHNOLOGY

Smart Order Routing
Special Report

Improving Smart Order Routing

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In this report

A Rich
Man's Game?

When it comes to smart order routing (SOR) there are really only two choices for most firms: Either roll your own platform or rely on your neighbor's engine to route your orders to market. The former involves a significant investment in time and resources while the latter, though cheaper, always leaves the lingering doubt of whether you are truly getting best execution.

Over the years as the market has become more fragmented and the clients' demands have become more complex, smart order routers have been forced to keep pace. In this report, we speak with Jamil Nazarali, managing director and global head of the electronic trading group at Knight Capital Group, to discuss the environment in which the next generation of smart order routers will need to operate and some of his comments may surprise you. Not only should firms prepare to scale their systems out to other asset classes and geographies, but they also should be prepared to have the regulators completely change the rules of the game.

We also sit down with Margaret Bailey, vice president, business development at smartTrade Technologies, and Charles-Henry Choël, director of trading and client connectivity with SunGard Global Trading, to discuss the future of smart order routing and how firms can optimize and scale their router's performance.

Setting up your smart order routing with the proper architecture and trading venue connectivity is sure to help future-proof it against any major changes coming down the pike. Is yours ready?

Rob Daly
Editor

SOR Heads in New Direction

As liquidity continues to fragment and buy-side firms seek easier execution of their complex trading strategies, the sell-side firms must leverage their technology investment better to assure that they achieve best execution for their clients' orders. For Knight Capital Group, developing and maintaining its smart order router was a multi-year process that cost and tens of millions of dollars, according to firm officials.

Looking to the future of smart order routing (SOR), Knight sees three major characteristics that all smart order routers must have. Chief among them is the ability to interact with dark liquidity, says Jamil Nazarali, managing director and global head of the electronic trading group at Knight Capital. "Two or three years ago, if you only interacted with displayed liquidity you would have been fine. If you're not routing to undisplayed liquidity today, you are giving clients inferior executions."

The U.S. Securities and Exchange Commission (SEC) estimates that 15 percent of trading volume in the U.S. cash equities markets occurs in dark liquidity pools and another 10 percent is generated from market-makers and internalizers, according to Knight officials.

Secondly, smart order routers will need to incorporate support for multi-asset trading in order to automate trades like simple and complex arbitrage strategies. An example would be a convertible arbitrage transaction where a firm would trade all three legs of the strategy—the fixed income security, equities security and option—in a coordinated fashion, explains Nazarali.

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Jamil Nazarali, managing director and global head of the electronic trading group, Knight Capital Group

Finally, smart order routers will have to support cross-border trading capabilities. "Right now, routers—even that those handle multiple asset classes—tend to be domestically oriented and being able to cross borders will be the next major step," he estimates.

However, one characteristic that will be a ways off for smart order routers is predictive routing, or routing orders to where the best price will be by the time the order gets to the market, rather than routing orders to the current National Best Bid and Offer (NBBO).

Nazarali attributes this to the SEC's Regulation National Market Structure (Reg NMS), which prohibits firms from trading through a displayed quote in the market.

"Under Reg NMS, we have to route to the best price and not take anything else into consideration," says Nazarali. "This means that if a regional market that is slow at updating its quotes is alone at the inside, we have to route there, even if we think that the quote is stale. By the time we route there and get a cancel back, other liquidity we would have wanted is gone. Our client would have been better off ignoring the quote, but we can't do that under Reg NMS."

Yet, when multiple markets are tied to the NBBO, traders can consider other metrics for their routing decisions, such as latency, the chance of available reserve orders and the possibility of filling the order.

Nazarali says that of the 2 million orders the brokerage trades per day, the regional exchanges will have the NBBO only several hundred times per day.

New Game

The next greatest change in smart order routing isn't going to be from technological advances from development labs, but from the conference and committee rooms in Washington, D.C., says Nazarali. "There are a number of components within the SEC's market structure concept release that will affect smart-order routing," he says.

Trade-at may mean that traders have to exhaust all displayed liquidity before trading at the same price, according to Nazarali. Internalizers and dark liquidity pools would have to price-improve at least one penny if they didn't want to route to the displayed market, he adds. "The exchanges love this because they get that previously dark volume onto the exchange and the high-frequency traders also like it because they could interact with it. What's worse is that the proposed rules force people to pay access fees."

In the meantime, Nazarali sees smart order routing being a capability for the largest firms that have the resources and internal talent to develop, support and grow the technology. "You have to be a very large organization and do a lot of trading to justify an investment in a smart order router with sophisticated quantitative intelligence and connected to all of the dark liquidity pools, alternative trading systems (ATSes), exchanges and brokers," he says. "There are a handful of buy-side firms—fewer than 10—where that is effective." Nazarali says there are a few off-the-shelf smart order routers that smaller firms can deploy, but the choice is limited.

The most cost-effective way for smaller firms to exploit SOR is by "renting" a smart order router, according to Nazarali. Firms like Knight invest tens of millions of dollars updating capabilities and they will charge clients a sub-penny per share executed, he says. "The cost to a client could be several thousands of dollars to use a router that requires millions of dollars of investment," he adds.

Mapping Out the Future of SORs

The concept of smart order routing (SOR) has proven itself over the past several year and has lead the industry to push the technology into new and wider implementations throughout their organizations. *DWT* discusses with Margaret Bailey, vice president Business Development at smartTrade Technologies, and Charles-Henry Choël, director of trading & client connectivity with SunGard's global trading business, the future of SOR and what firms can expect to see.

DWT: How would you describe the current generation of smart order routing (SOR)?

Choël, SunGard: In Europe, the current generation of smart order routers mainly deals with displayed liquidity and these have not yet completely integrated with other algorithms that are driving trading. We think this will change dramatically in the near future given the developments in the U.S. and the progress of the underlying technology. As firms develop multi-listed trading algorithms and integrate dark liquidity pools into their smart-routing strategies while seeking the lowest latency, these issues will contribute to the birth of a new breed of smart order routers.

Bailey, smartTrade Technologies: Smart order routing is firmly entrenched in the market today. Current discussions within financial institutions focus on how to make these routers handle more complex transactions, including multi-product routing that can perform sophisticated arbitrage between products as well as provide a deeper level of customization where the router can manage the parent and child orders. The routers also should address advanced connectiv-

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ity issues, such capturing/measuring market data throttles and managing venue disruptions. They need to be designed to support cross-asset trading and integrated into the organization's trading backbone.

Multi-product routing is being driven from both a geographical and trading perspective. Inter-listed securities that can trade on multiple exchanges located in different countries have a foreign-exchange (FX) component to them; smart order routers need to be able to analyze and provide best execution not only on

the security, but on the FX trade as well. Add to this scenario that the ability to leave the security on multiple exchanges at the same time—i.e. queue jumping—will require a smart order router that is "state-aware." Arbitrage opportunities can arise in all the product groups. For example, in the auto-hedging of cash versus futures in fixed income, the router should be able to execute the cash, futures and spread legs based on the criteria of the user. In the case of trading exchange-traded funds (ETFs), the router needs to price each under-

lying security to make the proper routing decision.

DWT: How can firms leverage their smart order routing technology into other functions, such as trade reporting or clearing?

Bailey: In order to provide for proper trade reporting and clearing information, the smart order router should be "ground zero" for all details relating to the transaction. If the router has been designed properly, it has all the granular information that is required for the reporting and can relay that information real-time. If we extend the possibilities of a well-designed router, it is possible to automate the control of the post-trade features with regards to how this can affect the trading. For example, it is possible to limit the access in trading a certain security if the clearing has failed, or if there is a mismatch signal that has been sent from the post-trade layer.

DWT: How should smart order routers be designed to scale to meet market fragmentation?

Bailey: Each new venue has its own microstructure that consists of fees, rebates, execution conditions, order types, trading protocols,

latencies, and refresh rates, among other nuances specific to the individual venue. For smartTrade, we have cleanly isolated those pieces of information that are redundant among the venues so that the connection is not burdened with undue weight. For example, there are a range of accepted order types in the market; smartTrade can process these order types directly on the level of the router or emulate them as well, which is important. We have given our customers the flexibility to define their own additional order types. Even more important to our connections is the fact that we are a state-aware system, which means that we know at all times where an order is, what state it is in, if a connection is up, or if data is being throttled or refreshed. In being state-aware, our smart order router can make decisions in real time like redirecting flow when a venue goes down, reacting to throttled data immediately, and calculating the fees/rebates before executing even across multiple venues at the same time, and of course, managing passive orders dynamically.

We have found through our experience that our clients prefer that we do the development and maintenance of the connectors and give them high flexibility in defining and customizing their smart order routing rules and order types. This is where smart order routing's real value lies for them.

Choël: Further market fragmentation and the continual rise of high-frequency trading will increase pressure on

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Market fragmentation and the rise of high-frequency trading will increase pressure on smart routing technologies to be faster and more adaptable. We expect smart routers and algorithms to benefit from the latest progress in low-latency direct market access infrastructure. CEP will help the next generation of routers become more efficient and quicker at adapting algos to changing liquidity dynamics and more fragmentation.

smart routing technologies to be faster and more adaptable. We expect that smart routers and algorithms will benefit from the latest progress in low-latency direct market access (DMA) infrastructure. Complex event processing (CEP) technology will help the next generation of routers become more efficient and quicker at adapting algorithms to changing liquidity dynamics, and handling higher degrees of fragmentation.

We also see much closer integration being achieved between "how" and "when" trading algorithms, which will help considerably in reducing inter-process latency.

DWT: Which new metrics are we seeing introduced into the smart order router calculations?
Choël: One current area of emphasis for many firms is integrating market data his-

tories and adopting dynamic intraday routing logic, so one key objective for metrics is to assess the resulting gained execution improvements. This is classical transaction cost analysis (TCA), which has always been the key metric for smart routers, but the range of possibilities and the finesse of the techniques involved are increasing steadily.

The use of a smart order router means that broker-dealers have to manage a constant conflict of interests: How can they improve their clients' execution prices without increasing their cost of trading excessively?

It is very difficult to optimize overall trading costs and still achieve the best price for the client due to all the venues' business models—central counterparties (CCPs) and clearers—which you have to take into account in Europe. Tracking the relationship between execution quality

and trading costs is clearly a necessary guide to striking the right balance.

A full analysis of trading costs requires front-to-back measurements, including the use of dark liquidity pools and in-house liquidity. Those brokers who are able to optimize their flow management and trading costs front-to-back will be best able to deliver best execution and make it cost-effective for the investor.

Bailey: We see the addition of more sophisticated venue monitoring to smart order routers that will also need to become much more analytical in order to support multi-product trading.

DWT: What is the best way for smart routers to deal with dark and "gray" markets?
Bailey: It is always by respecting the rules of the market. An institution may have had its own unique experience with each venue and this information can be used in the smart order router as part of its decision-making process. Heat maps are key to finding liquidity in dark or gray pools. Producing the appropriate heat map depends on the trader's strategy, but in my eyes, cannot be an off-the-shelf package. At smartTrade, we focus on our LiquidityOrchestrator smart order router to make these decisions based on multiple factors or monitored data, including complex heat maps if needed.

Choël: The optimal type and degree of use of dark liquidity is very dependent on the type

Mapping Out the Future of SORs

of order flow involved. When executing in large scale, exploitation of dark and grey liquidity can give the advantage of limiting, or even removing, market impact. But the cost of trading on these platforms is usually considerably higher than the equivalent activity on the displayed markets. The first key issue for a smart order router is to balance these factors and then strike the right

balance between what is available and known and what is potential and unknown—this is the larger challenge. The search for dark liquidity should not compromise the use of the available lit books.

DWT: How do smart order routers meet the demands for low-latency execution?
Choël: It is similar to the way that they will address

market fragmentation, which I mentioned earlier.

Bailey: My sense is that if a smart order router adds less than 1 millisecond of latency, it is perfectly acceptable in most of the market cases, whatever the asset class.

However, the real trap is in the coding of the rule or execution strategy. Since complex strategies may add

some additional loops of code in their execution, this could lead to additional latency because of the additional required CPU cycles needed to accomplish the strategy, especially when reproduced through the entire trading workflow. To obtain ultra-low latency, firms have to take into account collocation, transport, network and so forth.

Smart Order Routing in the News

SUNGARD DEBUTS VALDI TRADING SYSTEM

Financial technology giant SunGard recently launched the first phase of Valdi, its trading systems suite that includes integrated transaction processing and compliance services for broker-dealers, according to vendor officials. In the Americas, SunGard launched the Valdi order management system (OMS) and in Europe, SunGard launched Valdi-hosted smart order routing and liquidity services. Valdi allows firms to trade multiple asset classes, find new sources of liquidity for growth and manage costs. The suite also provides global trade order management, integrated direct market access (DMA), compliance, liquidity solutions and hosted services.

UNX ADDS KNIGHT ALGOS

Trading platform and connectivity provider UNX has added the electronic trading services and equity trading algorithms from Knight Capital's Knight Direct trading system to its UNX Catalyst execution management system (EMS)

and trading portal. The Knight tools UNX added include its suite of algorithmic trading and smart-order routing strategies, including volume-weighted average pricing (VWAP), participation algorithms and liquidity-seeking algorithms such as FAN, Oasis, Covert and Sumo. UNX has had a long relationship with Knight Capital, previously offering access to the Knight Link and Knight Match systems.

FIDESSA POWERS DAIWA TRADING

Daiwa Capital Markets America has gone live with a U.S. hosted trading platform from market connectivity and trading platform provider Fidessa, according to vendor officials. Daiwa Capital Markets

America is using Fidessa's order management function and will also be using benchmark and execution algorithms built into BlueBox, Fidessa's algorithmic trading engine. Fidessa's trading platform is comprised of specialist trading platforms that include electronic order management, smart order routing, real-time market data, middle-office capabilities, position keeping, risk management and compliance.

REALTICK GAINS JEFFERIES ALGOS

Townsend Analytics has expanded its RealTick trading front end with new algorithms from institutional brokerage firm Jefferies & Co., according to vendor and firm officials. Jefferies' new algorithms, MultiScale, Trader and Panel, give traders more control over executions, and better ability to respond to changing market dynamics. Jefferies also has improved its pairs trading algorithms to provide simultaneous execution of two stocks under pre-defined conditions of spreads, price ratios and performance compared to a benchmark.

How strong is your backbone?

Executing complex strategies across all asset classes requires a strong trading backbone.

The smartTrade Liquidity Management System (LMS) is the market's proven software solution to create deep execution patterns and matrices to face fragmentation head-on. The smartTrade LMS is the market's only 'state-aware' software, giving organizations real-time order state information, trading instructions (RFQs, RFS, etc), venue status, and complete systems-state information for all smartTrade integrated systems.

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Cross-Asset, Modular and Componentized, LMS is comprised of five essential pillars:
LiquidityAggregator — Aggregation Engine
LiquidityDistributor — Customized Distribution Strategies
LiquidityCrosser — Matching Engine
LiquidityOrchestrator — Smart Order Routing
LiquidityConnect — Gateways to Liquidity Providers

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