



Rule-based trading and intelligent order routing

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As technology and market structure continue to evolve, the concepts of rule-based trading and intelligent order routing are changing as well.

What is rule-based trading? Rule-based trading is basically trading or more specifically, order routing, based on a set of rules that have been established either by a firm or by an execution venue. One use for rule-based trading is for sell-side firms to send orders under a certain size threshold directly to an electronic exchange system, such as DOT. This type of rule enables traders to focus on the more sizable orders where their expertise in 'working the order' is desired. Rule-based trading can also be used to route certain symbols to certain traders who cover a particular sector or group of symbols. This helps to streamline the order-routing process, so that certain rules or preferences are automated within a system and not dealt with manually. In essence, it is about bringing orders to market faster and more effectively.

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Rule-based trading is often, but not always, routed using the FIX Protocol. The evolution of FIX has enabled financial firms to implement increasingly complex formulas for rule-based trading and intelligent order routing. In its debut and simplest form, the FIX-explicit routing header tags (sender and target) were used to route orders. Other instructions, including specific routing information, were contained in additional and non-standard tags. With the addition of more advanced FIX tag fields, such as the 'on behalf of' tags, users could utilise message-based routing to include information on additional variables such as sector, size, symbol and quantity in order to route to destinations that have adopted these more refined execution parameters. As FIX became even more developed, users could use the proactive mode to program additional rules into the protocol, such as delivering orders to a specific destination based on certain proprietary algorithms. The last and most advanced protocol usage for the more in-depth rule-based trading includes utilising the Time In Force field and generating Immediate or Cancel (IOC) orders among

different execution destinations, in a search of the 'best' execution. Systems that manage orders on behalf of traders, using their pre-configured order types, order instructions and/or routing rules have the advantage of allowing rapid and automated probing of the market without creating busy work for the trader. For example, s/he can enter a large day order with certain parameters, and then rely on the intelligent router to create sub-orders (often IOC) over the course of the day that will try to grab hidden reserve quantities at the inside price without affecting the market price. If execution speed is valued over price, then a simple configuration change would give the intelligent router more price discretion in an effort to get faster fills.

The quest for Best Execution is the primary force behind the industry's use of rule-based trading and intelligent order routing. Often Best Execution is considered purely a question of price, but it is ultimately a balance of price and execution time. For some, price may be the most significant factor in determining the quality of a trade, while for others, the timeliness may be the most important determinant of execution quality. In all cases, it is some combination of the two.

Achieving Best Execution has spurred numerous firms, vendors and even execution venues to offer smart order routing products and services. The most common definition of smart order routing involves some sort of scanning of the market for the best-displayed price and then routing orders to that market centre for execution. This can potentially help traders achieve better-priced executions, as well as saving time and effort with traders trying to manually locate the most appropriate execution point. The effectiveness of such routing paradigms is such that if traders can achieve superior prices on their orders, that the overall cost of their transactions is lowered, leading to an increased bottom line. This is especially relevant to firms with large trading volumes where a penny here or there can add up to thousands or even millions of dollars. The improved price benefits only the investor directly; the broker will only get the 'recognition' for a job well done and his commission.

The more fragmented the market, the greater need for smart order routing technologies

The trader's good performance can often lead to repeat business for the trader motivating him/her to seek out the Best Execution for his/her clients.

The more fragmented the market, the greater need for smart order routing technologies. It stands to reason that smart order routing functionality is used most in the over the counter marketplace where ECNs and ATs have captured a larger market share than in other areas, such as listed trading or even derivatives. The industry's consolidation among various execution destinations, as well as the growth of new venues and systems, has increased the urgency of the need for such services. Increasingly, firms are utilising advanced algorithms to determine where to best route their orders. Ultimately, the value of smart order routing is determined by the quality of its underlying algorithm and how well matched that algorithm is to meeting the traders' objective. Indeed, the smart order routing functionality adds a completely intellectual component into the order routing process.

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In the listed markets, the SEC's likely repeal of the trade-through rule will instantly increase electronic trading in listed names. Currently, the delay-prone nature of the ITS to meet the trade-through rule has meant that traders rarely factored speed of fill and fill rates into their electronic order routing rules. They simply routed smaller orders to DOT and worked the larger ones over the day. Moreover, if the SEC approves NASDAQ's use of SuperMontage for Intermarket trading of listed names, they will have added yet another electronic liquidity pool to the already fragmented marketplace. Each time a venue is added, rule-based trading and intelligent order routing become more relevant.

As a result of the fragmentation of the equities marketplace, market makers, buy-side trading desks, order entry firms and professional day traders all seek systems that will allow them to access all liquidity venues with equal

ease and above all, speed. Moreover, decimalisation, tighter spreads, fee-based trading, ECN access fees and a sluggish economy have all added to the urgency of controlling costs and trading 'smarter'. Technology companies and internal development teams have responded by building a bundle of functionality, commonly referred to as 'smart order routing.' This functionality allows traders to access liquidity quickly, no matter where it lies, with an emphasis on balancing Best Execution and controlling trading costs.

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What makes the topic so fascinating is that the rapidly changing market structure in which the trader currently operates, and the possible directions market participants and regulators may take going forward, mean that vendors need to adapt and innovate continually in order to stay ahead of the potential changes. In order for solutions to be lasting ones in this environment, vendors must provide a flexible and configurable toolbox that will allow traders to operate most efficiently in a rapidly evolving and fragmented marketplace. Any engine for smart order routing should provide strong performance, scalability and reliability. The FIX Protocol allows solution providers to create lasting solutions – it is the only known variable in the uncertain formula that is the current equities marketplace.

There is often an element of fear when talking to traders about smart order routing. Traders think that they could eventually be replaced. This is not true. The objective is not to replace the trader, but to provide him/her with the tools to trade better. This objective can be met by either giving the trader orders types and rule configurations that s/he can control, or by allowing a truly 'smart' engine to control the placement of orders. This second aspect requires the collection, analysis and the real-time application of raw statistics for each liquidity venue as input variables for the smart order routing business logic. These heuristics include

execution speed, price improvement, fill rate and the impact of access fees on the overall cost of the transaction, to name but a few. Once this historical data is available, it can be used to make the decision of where the order(s) should be placed. Typically, most firms stick to the first solution, wishing to control the order placement decision to a larger extent. However, in the interest of allowing more automated order placement, traders increasingly use other bits of data as inputs. For example, they may want to create sell orders to the following X venues when the price of a certain stock drops over Y% in a single day. More and more traders are asking for more fundamental and technical data to be used in real-time decision-making. It should be noted that such automated mechanisms must be simple to use in order to make them practical in the market. They will also become more valuable as more and more data becomes available in an electronically digested format as a lot of information is still not available, for example, general market news and floor indications.

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Smart trading applications must be equally able to provide liquidity access, as well as interest management. This means that they must equally be able to send out marketable orders to access liquidity and post bids or offers that others will access. This is increasingly true for both sell-side and buy-side firms. The FIX Protocol, now fully established and trusted as the standard trade communication protocol, has finally been adopted by NASDAQ's SuperMontage platform as an alternative way to send orders to the system. A firm can now use the well-defined and accurate FIX Protocol to represent one- or two-sided quotes. This is a milestone on the way to retiring the outdated and error-prone API legacy quote for NASDAQ market makers. FIX orders are faster and have a much better audit trail than the legacy quote.

Rule-based trading applications need to be able to automatically work larger orders in response to quote,

trade, position and order events, just like a trader normally would. These reactions, in turn, must be guided by traders' pre-configurations and special order types. The idea is not to replace the trader, but to give him/her more tools to trade in a fragmented marketplace. This allows traders to make markets in more stocks, as well as spend more time working complicated orders that won't meet the criteria of rule-based trading. For instance, orders in illiquid names as well as certain instructions are outside the scope of what is automated today. The automation currently in place reduces costs for trading desks, while also helping to improve execution quality. This, in turn, helps attract more customer order flow, creating a very positive cycle.

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The FIX Protocol allows users to easily create multiple orders stemming from a single ticket that can be sent to different destinations, carry different order instructions and have individual states separate from the parent or other child orders. Rest assured that no matter how simple or elaborate a smart trading application is purported to be, this is the basic design and protocol upon which it rests. As the market structure and regulatory changes continue to shape the financial industry, rule-based trading and smart order routing will undoubtedly serve as useful tools for traders navigating a constantly evolving marketplace. **FIX**