# Execution overview – The micro level

It all starts with a **decision** to buy or sell. Depending of the size of the investment and the available liquidity – the execution objectives have to be selected. These objectives serve as inputs into the *macro level* of execution and typically involve dividing a big investment decision into smaller, more manageable parts. Each smaller part is then transmitted to an execution venue and will fight with all the other market orders in the order book. This is what we refer to as the *micro level* of execution and is the focus of this document.

We will look at how the Smart Order Router (SOR) and the Market Access layer work together to process these orders and how we can benchmark the micro structure of the market in regards to both quality and cost. We will also quantify the value of this process and will show that its value can be 5 -10 bps (basis points) and at time, even greater.
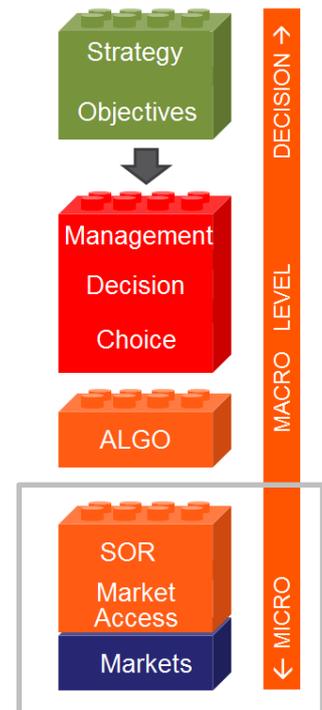
The micro level of execution

The Smart Order Router and the Market Access layer works as a finely tuned mechanism that handles trading in the micro structure of the market. The SOR and the consolidated (aggregated) market data price quotes hide the complexity of fragmentation (many markets trading same paper/instrument) so that all markets are presented in a single view for all levels higher up in the execution chain. It handles the immediate and short term execution of small slices of the algorithmic orders, as well as click and trade order submissions.

Benchmarking the micro level – the quality aspect

On the primary market, there is only one best bid and one best offer–"the best bid and offer". The difference between best bid and offer is called the spread. When multiple venues trade the same instruments, the bids and offers for those instruments can be better or worse than those on the primary market. The best bid and the best offer across all European venues is called the EBBO (European Best Bid and Offer). This means that the EBBO will always be equal or better than the best bid and offer on a primary market (better if any of the alternative venues have a better price at any time). To have access to - and execute within the EBBO - is the first benchmark of micro execution.

Neonet uses a third party vendor to benchmark execution – LiquidMetrix (LM). Below is a LM-report with description and comments. The sample report refers to a smart order routed flow from one of Neonet's customers during a short time period.

Trading Summary

In this example of traded instruments, the Average On-book Spread (EBBO spread) was 17.13 bps (1 bps/basis point = 0.01%). Other fact such as average trade size and value traded is also available.
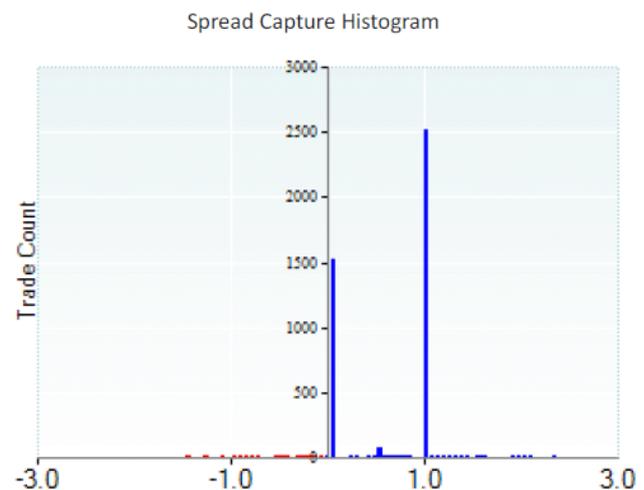
Trading Summary

Value Traded:	€ 23,611,592
NumberOfTrades:	4,803
Average Trade Size:	€ 4,916
Average On-book Spread:	17.13 BPS
Distinct Instruments Traded:	64

Spread Capture Histogram

To trade passively means that you are not crossing the spread (not accepting the offer). Someone else has crossed the spread to hit your order. You capture one spread (in this case 17.13 bps). This will be plotted as 1.0 in the graph to the right.

To lift the offer and take no risk over time will not allow for the capture of any spread and is plotted as 0.0 in the graph.

Before lifting the offer, Neonet's SOR will try to save half of the spread in a mid-point dark pool (8.6 bps in this case). This is plotted as 0.5 in the graph. Trading within EBBO is plotted as 0 to 1.

Spread Capture Histogram

Performance summary

Successful trading within the EBBO is measured in percentage terms and in this case is 98.16%, as seen in the summary to the right.

By capturing 43.7% of the spread on average, the client received a 7.48 bps improvement compared to just hitting the best bid or lifting the offer (43.7% of 17.13).

Taking into account the distance between markets and the resulting millisecond/s delays, there is no such thing as getting a perfect EBBO execution. The SOR Improvement Potential will therefore almost never be zero. On the other hand, a high number will indicate a missing venue with

Performance Summary

	% By # of Trades	% By Value Traded
Percentage Success	97.61%	98.16%
Percentage Better	56.88%	60.88%
Percentage Equal	39.89%	36.53%
Percentage Worse	2.39%	1.84%
Not Benchmarked (N/B)	0.83%	0.75%

Average Improvement/Shortfall Value	**7.48 BPS** (€17,536)
Spread Capture	**43.70%**
SOR Improvement Potential Value	**0.08 BPS** (€178)

Execution overview – The micro level
All screenshots courtesy of LiquidMetrix
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relevant volumes or a miss-tuning of the SOR. We believe that 0.08 bps is a great result. Without access to all venues the value would most likely be in the range of 1 to 3 bps.

Quantifying the value of having full EBBO access
If the best offer is 17.04 on the primary and 17.03 at another venue, this 1 cent price difference translates to a difference of 5.9 bps. If you have access to dark pools, you have the potential ability to trade at the mid-price. If the best bid is 17.01, the mid will be 17.025 - a potential 8.8 bps in better execution quality. For illiquid small cap instruments, we have seen that the impact of missing one single offer on one market can be up to 1000 basis points.

Conclusion
There are important lessons to learn from benchmarking the quality of the micro level. Dark pools can help attain as high as 50% saving in spread when executing aggressively. Having access to alternative venues, such as Multilateral Trading Facilities (MTF's), can provide clients with access to better bids and offers than having access to only the primary exchange. Therefore, being aware of the EBBO is very important for clients.

Benchmarking the micro level – the cost aspect

Alternative venues, such as MTF's compete with primary exchanges by offering a simpler, more transparent and cheaper cost structure of trading. The primary exchanges often have complicated pricing structures that make comparisons difficult. Some MTFs pay for passive flow. Cost varying with traded amount, adding to the non-transparent pricing structure. Still, there are ways to compare costs. Below is an example of a price comparison between Nasdaq OMX Sweden tariff 1 and CHI-X:

Amount traded in SEK	OMX Agg (bps)	Pas (bps)	CHI-X Agg (bps)	Pas (bps)	Clearing cost 1tr (bps)	Clearing cost 5tr (bps)
1000	75.75	49.93	0.3	-0.2	8	40
5000	15.23	10.17	0.3	-0.2	1.6	8
10000	7.79	5.2	0.3	-0.2	0.8	4
30000	2.83	1.89	0.3	-0.2	0.267	1.33
60000	1.59	1.06	0.3	-0.2	0.1333	0.65
100000	1.1	0.73	0.3	-0.2	0.08	0.4
1000000	0.43	0.28	0.3	-0.2	0.008	0.04

Comments: Executing one order of 30k SEK aggressively in five trades on the primary, resulted in a cost of 2.83 + 1.33 = 4.16 bps. Executing the same trade on an MTF resulted in a cost of 0.3 + 1.33 = 1.63 bps - a difference of 2.53 bps. The difference will depend on the chosen venues.

Conclusion

Your Smart Order Router and how it deals with passive and aggressive volume and the priority of execution venues can dramatically affect not only the quality of execution, but also the cost. Where the order in the working example is executed, is reported as below. 53.51% of the orders were reported on the primary and 46.49% on MTF's.

Performance Breakdown by Execution Venue

Venue	# Trades	Value(€)	Val(%)	% Better	% Equal	% Success	% N/B	SOR (EUR)	SOR (BPS)	Imp(EUR)	Imp (BPS)	SC (%)	Spread (BPS)
OMX Helsinki	2,345	12,635,311	53.51%	57.43%	39.55%	98.39%	1.41%	70	0.06	12,144	9.61	41.35%	23.24
Chi-X Europe	2,033	9,060,096	38.37%	67.72%	30.64%	98.37%	0.00%	69	0.08	4,849	5.35	61.76%	8.67
BATS Europe	131	387,108	1.64%	2.67%	90.23%	92.89%	0.00%	13	0.33	-1	-0.03	-0.22%	12.25
Turquoise	107	267,589	1.13%	6.34%	83.26%	89.60%	0.00%	13	0.50	-6	-0.22	-1.15%	19.13
Chi-Delta	68	620,987	2.63%	95.66%	4.34%	100.00%	0.00%	0	0.00	446	7.19	52.18%	13.78
Burgundy	59	277,647	1.18%	0.00%	90.27%	90.27%	0.00%	14	0.52	-14	-0.52	-5.38%	9.63
Turquoise Dark	27	159,518	0.68%	100.00%	0.00%	100.00%	0.00%	0	0.00	122	7.66	50.90%	15.04
BATS Dark	18	118,356	0.50%	100.00%	0.00%	100.00%	0.00%	0	0.00	90	7.64	51.43%	14.85
NYSE Arca Eur.	8	19,161	0.08%	91.58%	8.42%	100.00%	0.00%	0	0.00	29	15.06	104.39%	14.42
XUBS	7	65,818	0.28%	100.00%	0.00%	100.00%	0.00%	0	0.00	48	7.24	59.52%	12.17

Summary

Benchmarking the micro level of the execution chain is crucial and can significantly lower costs while at the same time increase the overall quality of execution. When benchmarking against EBBO the typical net effect are price improvements ranging between one and ten basis points but in instances and certain order types even in the thousands of basis points. When looking at costs and specifically for smaller orders it is also not unusual to see improvements in the tens of basis points, again highlighting its' importance in comparison with the price a counterparty is charging.

At Neonet, we strive to deliver a truly transparent and independent execution service with an optimized balance of quality and cost. Transparent reports like the one illustrated in this document give our clients full control and insight as to how we perform.

For more information, visit www.neonet.com.