



TRADING INSIGHTS- MISSED OPPORTUNITIES LATENCY GATEWAY

Product Specification Document

Last Update: 7/12/2017

1 Product Description:

- Missed Opportunity Latency Gateway allows customers to understand the latency profile of the orders they have submitted to Nasdaq. The report provides visibility into trading patterns for model optimization to yield better returns.
- Looking at partially filled or cancelled IOCs submitted via OUCH, the Missed Opportunity Latency Gateway report provides details on orders that missed an execution due to another firm getting to the liquidity faster.
- This will help customers understand by how much they missed a specific order, thus determining whether they need to invest further in their infrastructure to mitigate these missed opportunities.
- Through this component you may be able to garner higher returns by having better fill rates or potentially limiting cost exposure in the market.

2 Product Details

- Missed Opportunity Latency Gateway detects cases in which a firm's order is not executed, even though they submitted a marketable order. It enumerates the total number of qualifying IOC orders missed by execution and the total number of orders missed by cancellation and the details of the time missed through the sessions.
- The report starts with a partially filled or cancelled IOCs submitted via OUCH and then looks up to 1 millisecond back to see when that order would have executed, either partially or fully.
- For each missed opportunity, the report provides best effort measurements into how much earlier the firm's initial IoC order would have had to arrive at the gateway, in 25 microsecond buckets. We use a high precision latency capture device to collect this data out of band of the transactions. This has its own separate level of fidelity and latency associated with it.
- Reports
 - Daily Security File- T+1 report available by 6:30am the next business day
 - Daily Summary File- T+1 report available by 6:30am the next business day

3 Data Delivery Options

- SFTP
- Entitlements
 - Only the firm responsible for the trading is allowed to access the information.

File Delivery

- External customers download the daily files via the current data SFTP.
- Follow the current SFTP historical data file directory structure as follows:

Directory structure: /TradingInsights/MPID/Port/YYYY/MM/DD/mola

File Name structure:

- mmddyymm_MPID_Port_Daily_Security_MissedOp-Gateway_25us-#####.csv
 - mmddyymm_MPID_Port_Daily_Summary_MissedOp- Latency-#####.csv
 - mmddyymm_MPID_Port_Monthly_Summary_MissedOp- Gateway_25us-#####.csv
- If there are no files for a given time period, path to mola directory will not be present

- All Orders that come into the system from MPID via protocols other than OUCH will be grouped as RASH
- All RASH ports missed opportunities are consolidated and in RASH folder:
/TradingInsights/MPID/RASH/YYYY/MM/DD/mola

4 Data Fields and Types

- Data files will be provided in a comma-delimited, ASCII-text file (csv). For convenience, NASDAQ will include a header row within each file.
- All timestamps are in nanoseconds since midnight ET and applied by the matching engine at time of order processing.
- Every row will have either a partial fill, full fill or both. Zero indicates no matching event was found in the 1 millisecond look-back window.
 - Because the report calculates Partial Missed Opportunities and Full Missed Opportunities independently, it is possible for the partial fill event to precede the full fill event, although it is not exceedingly common
- Orders canceled due to NMS price protections may result in a “Missed Time” of 0 nanoseconds and an order timestamp that is equal to either of the missed timestamps.
 - This can be seen when the PartialFillMissedBy = FullFillMissedBy = 0

Field Name	Field Name Detail	Description						
Date	Date	Date of report						
MPID	MPID	MPID of the firm						
Port	Port	Port assigned to firm						
Symbol	Symbol	NASDAQ assigned issue symbol for the security on the day of trade.						
BuySell	Buy/Sell Indicator	Side of the market at which the market participants are quoting. Allowable values are: <table border="1" data-bbox="786 1381 1308 1493"> <thead> <tr> <th>Code</th> <th>Value</th> </tr> </thead> <tbody> <tr> <td>B</td> <td>Buy (Bid)</td> </tr> <tr> <td>S</td> <td>Sell (Ask)</td> </tr> </tbody> </table>	Code	Value	B	Buy (Bid)	S	Sell (Ask)
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B	Buy (Bid)							
S	Sell (Ask)							
Price	Price	Price (inclusive of decimal point) at which NMC market participants had order interest for the given security at the given time.						
OrderReferenceNumber	Order Reference Number	The unique reference number assigned to the qualifying order at the time of receipt. Applied by matching engine						
OrderSize	Order Size	Size of the order, in number of shares						
ExecutedQuantity	Executed Quantity	The amount of the original order that executed. Result will be zero if none executed.						

Field Name	Field Name Detail	Description								
TimeOfMissedloc	Time of Missed IOC	The matching engine time of an incoming aggressive IOC order that is not fully executed Aggressive orders are those where the buy is higher than the prevailing BB or the sell is lower than the prevailing BO. IOC : Immediate or cancel orders								
TimeOfMissedPartialFill	Time of Missed Partial Fill	The most recent matching engine time that the incoming order would have gotten its first partial fill (up to 1 millisecond back from matching engine time of original missed order).								
TimeOfMissedFullFill	Time of Missed Full Fill	The most recent matching engine time that the incoming order would have gotten a full fill (up to 1 millisecond back from matching engine time of original missed order).								
PartialFillMissedBy	Partial Fill Missed By	Missed opportunity time (in nanoseconds) to first partial fill above quantity originally executed (as calculated by TimeOfMissedloc- TimeOfMissedPartialFill)								
FullFillMissedBy	Full Fill Missed By	Missed opportunity time (in nanoseconds) to first full fill of original quantity (as calculated by TimeOfMissedloc- TimeOfMissedFullFill)								
OrdersAheadOfPartialFill	Orders Ahead of Partial Fill	Number of order book updates from the time of the original order to the time of the first partial fill								
MissedPartialQuantity	Missed Partial Quantity	Quantity of shares that would have been filled at the first partial fill.								
OrdersAheadOfFullFill	Orders Ahead of Full Fill	Number of order book updates from time of the original order to the time to first full fill								
ReasonPartialFillMissed	Reason Partial Fill Missed	Type of first order book update immediately following the time of the first partial fill (ie, the reason for not getting that first partial fill). Blank indicates there was no partial fill found. <table border="1" data-bbox="784 1524 1294 1776"> <thead> <tr> <th>Code</th> <th>Value</th> </tr> </thead> <tbody> <tr> <td>E</td> <td>There was an Execution ahead of your fill</td> </tr> <tr> <td>C</td> <td>There was a cancellation ahead of your fill</td> </tr> <tr> <td>Q</td> <td>Order Cancelled because of self-match prevention</td> </tr> </tbody> </table>	Code	Value	E	There was an Execution ahead of your fill	C	There was a cancellation ahead of your fill	Q	Order Cancelled because of self-match prevention
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E	There was an Execution ahead of your fill									
C	There was a cancellation ahead of your fill									
Q	Order Cancelled because of self-match prevention									

Field Name	Field Name Detail	Description								
ReasonFullFillMissed	Reason Full Fill Missed	Type of first order book update immediately following the time of the first full fill (ie, the reason for not getting that full fill). Blank indicates there was no full fill found. <table border="1"> <thead> <tr> <th>Code</th> <th>Value</th> </tr> </thead> <tbody> <tr> <td>E</td> <td>There was an Execution ahead of your fill</td> </tr> <tr> <td>C</td> <td>There was a cancellation ahead of your fill</td> </tr> <tr> <td>Q</td> <td>Order Cancelled because of self-match prevention</td> </tr> </tbody> </table>	Code	Value	E	There was an Execution ahead of your fill	C	There was a cancellation ahead of your fill	Q	Order Cancelled because of self-match prevention
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C	There was a cancellation ahead of your fill									
Q	Order Cancelled because of self-match prevention									
Partial_GatewayCategory	Gateway Latency Category for Partial Fill	Best effort measurement of the difference between the gateway timestamp of the initial IoC order and the first partial fill, bucketed into 25us buckets								
Full_GatewayCategory	Gateway Latency Category for Full Fill	Best effort measurement of the difference between the gateway timestamp of the initial IoC order and the first full fill, bucketed into 25us buckets								
MinimumQueueDepth	Minimum Queue Depth	Minimum number of order messages waiting to be processed at the gateway at the time that the missed order was received. Count only includes order messages (i.e. Cancel or Modify messages are not included) and is a best-effort estimate.								

Summary File (Daily)

Field Name	Field Name Detail	Description
Date	Date	Date of report
MPID	MPID	Firm MPID Name
Port	Port	Port Assigned to the customer
Total_PartialFillMissedReason_Execution	Total Partial Fill Missed Reason Execution	Total count of missed opportunities for partial fill due to execution
Total_FullFillMissedReason_Execution	Total Full Fill Missed Reason Execution	Total count of missed opportunities for full fill due to execution
Total_PartialFillMissedReason_Cancel	Total Partial Fill Missed Reason Cancel	Total count of missed opportunities for partial fill due to cancelation
Total_FullFillMissedReason_Cancel	Total Full Fill Missed Reason Cancel	Total count of missed opportunities for full fill due to cancelation

Field Name	Field Name Detail	Description
MeanTime_PartialFillMissedBy	Mean Time Partial Fill Missed By	Mean time (in nanoseconds) by which the orders missed their first partial fill
MeanTime_FullFillMissedBy	Mean Time Missed Full Fill Missed By	Mean time (in nanoseconds) by which the orders missed their first full fill
MinTime_PartialFillMissedBy	Minimum Time Partial Fill Missed By	Minimum time (in nanoseconds) by which the orders missed their first partial fill
MinTime_FullFillMissedBy	Minimum Time Full Fill Missed By	Minimum time (in nanoseconds) by which the orders missed their first full fill
MaxTime_PartialFillMissedBy	Maximum Time Partial Fill Missed By	Maximum time (in nanoseconds) by which the orders missed their first partial fill
MaxTime_FullFillMissedBy	Maximum Time Full Fill Missed By	Maximum time (in nanoseconds) by which the orders missed their first full fill
MedianTime_PartialFillMissedBy	Median Time Partial Fill Missed By	Median time (in nanoseconds) by which the orders missed their first partial fill
MedianTime_FullFillMissedBy	Median Time Full Fill Missed By	Median time (in nanoseconds) by which the orders missed their first full fill
00: <25us_full_count	Bucket 00: <25us for full fill orders	Count of full fill orders that fell into this gateway timestamp bucket over the day
01: 25us - 50us_full_count	Bucket 01: 25us - 50us for full fill orders	Count of full fill orders that fell into this gateway timestamp bucket over the day
02: 50us - 75us_full_count	Bucket 02: 50us - 75us for full fill orders	Count of full fill orders that fell into this gateway timestamp bucket over the day
03: 75us - 100us_full_count	Bucket 03: 75us - 100us for full fill orders	Count of full fill orders that fell into this gateway timestamp bucket over the day
04: 100us - 125us_full_count	Bucket 04: 100us - 125us for full fill orders	Count of full fill orders that fell into this gateway timestamp bucket over the day
05: 125us - 150us_full_count	Bucket 05: 125us - 150us for full fill orders	Count of full fill orders that fell into this gateway timestamp bucket over the day
06: 150us - 175us_full_count	Bucket 06: 150us - 175us for full fill orders	Count of full fill orders that fell into this gateway timestamp bucket over the day
07: 175us - 200us_full_count	Bucket 07: 175us - 200us for full fill orders	Count of full fill orders that fell into this gateway timestamp bucket over the day

Field Name	Field Name Detail	Description
08: 200us - 225us_full_count	Bucket 08: 200us - 225us for full fill orders	Count of full fill orders that fell into this gateway timestamp bucket over the day
09: 225us - 250us_full_count	Bucket 09: 225us - 250us for full fill orders	Count of full fill orders that fell into this gateway timestamp bucket over the day
10: 250us - 275us_full_count	Bucket 10: 250us - 275us for full fill orders	Count of full fill orders that fell into this gateway timestamp bucket over the day
11: 275us - 300us_full_count	Bucket 11: 275us - 300us for full fill orders	Count of full fill orders that fell into this gateway timestamp bucket over the day
12: 300us - 325us_full_count	Bucket 12: 300us - 325us for full fill orders	Count of full fill orders that fell into this gateway timestamp bucket over the day
13: 325us - 350us_full_count	Bucket 13: 325us - 350us for full fill orders	Count of full fill orders that fell into this gateway timestamp bucket over the day
14: 350us - 375us_full_count	Bucket 14: 350us - 375us for full fill orders	Count of full fill orders that fell into this gateway timestamp bucket over the day
15: 375us - 400us_full_count	Bucket 15: 375us - 400us for full fill orders	Count of full fill orders that fell into this gateway timestamp bucket over the day
16: 400us - 425us_full_count	Bucket 16: 400us - 425us for full fill orders	Count of full fill orders that fell into this gateway timestamp bucket over the day
17: 425us - 450us_full_count	Bucket 17: 425us - 450us for full fill orders	Count of full fill orders that fell into this gateway timestamp bucket over the day
18: 450us - 475us_full_count	Bucket 18: 450us - 475us for full fill orders	Count of full fill orders that fell into this gateway timestamp bucket over the day
19: 475us - 500us_full_count	Bucket 19: 475us - 500us for full fill orders	Count of full fill orders that fell into this gateway timestamp bucket over the day
20: 500us - 525us_full_count	Bucket 20: 500us - 525us for full fill orders	Count of full fill orders that fell into this gateway timestamp bucket over the day
21: 525us - 550us_full_count	Bucket 21: 525us - 550us for full fill orders	Count of full fill orders that fell into this gateway timestamp bucket over the day
22: 550us - 575us_full_count	Bucket 22: 550us - 575us for full fill orders	Count of full fill orders that fell into this gateway timestamp bucket over the day
23: 575us - 600us_full_count	Bucket 23: 575us - 600us for full fill orders	Count of full fill orders that fell into this gateway timestamp bucket over the day
24: 600us - 625us_full_count	Bucket 24: 600us - 625us for full fill orders	Count of full fill orders that fell into this gateway timestamp bucket over the day

Field Name	Field Name Detail	Description
25: 625us - 650us_full_count	Bucket 25: 625us - 650us for full fill orders	Count of full fill orders that fell into this gateway timestamp bucket over the day
26: 650us - 675us_full_count	Bucket 26: 650us - 675us for full fill orders	Count of full fill orders that fell into this gateway timestamp bucket over the day
27: 675us - 700us_full_count	Bucket 27: 675us - 700us for full fill orders	Count of full fill orders that fell into this gateway timestamp bucket over the day
28: 700us - 725us_full_count	Bucket 28: 700us - 725us for full fill orders	Count of full fill orders that fell into this gateway timestamp bucket over the day
29: 725us - 750us_full_count	Bucket 29: 725us - 750us for full fill orders	Count of full fill orders that fell into this gateway timestamp bucket over the day
30: 750us - 775us_full_count	Bucket 30: 750us - 775us for full fill orders	Count of full fill orders that fell into this gateway timestamp bucket over the day
31: 775us - 800us_full_count	Bucket 31: 775us - 800us for full fill orders	Count of full fill orders that fell into this gateway timestamp bucket over the day
32: 800us - 825us_full_count	Bucket 32: 800us - 825us for full fill orders	Count of full fill orders that fell into this gateway timestamp bucket over the day
33: 825us - 850us_full_count	Bucket 33: 825us - 850us for full fill orders	Count of full fill orders that fell into this gateway timestamp bucket over the day
34: 850us - 875us_full_count	Bucket 34: 850us - 875us for full fill orders	Count of full fill orders that fell into this gateway timestamp bucket over the day
35: 875us - 900us_full_count	Bucket 35: 875us - 900us for full fill orders	Count of full fill orders that fell into this gateway timestamp bucket over the day
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39: 975us - 1ms_full_count	Bucket 39: 975us - 1ms for full fill orders	Count of full fill orders that fell into this gateway timestamp bucket over the day
40: >1ms_full_count	Bucket 40: >1ms for full fill orders	Count of full fill orders that fell into this gateway timestamp bucket over the day
00: <25us_partial_count	Bucket 00: <25us for partial fill orders	Count of missed opportunity partial fill orders that fell into this gateway timestamp bucket over the day

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