

iLink Execution Report - Fill Messaging Behavior

This topic describes iLink Execution Report - Fill messaging behavior for aggressing and resting orders in FIFO and Non-FIFO markets and also describes additional Execution Report - Fill considerations.

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Summary of iLink Execution Report - Fill Messaging Behavior

Scenario	Behavior
Aggressing Order	One fill sent per trade price and per liquidity source regardless of how many counter-parties traded with
Resting Order (FIFO Market)	For all order types other than Display Quantity, no change from today.
Resting Order (Non-FIFO Market)	One fill sent with trade quantity aggregated from all match algorithm steps
Display Quantity (DQ) Order	One fill sent with trade quantity aggregated from all refreshes
Opening Trade	All bids and asks receive one fill for each order in alternating sequence (i.e., BUY/SELL, BUY/SELL, etc.)

Video overview of iLink Execution Report - Fill Messaging Behavior



Fills for Aggressing Orders

When an aggressing order matches with multiple resting orders at the same price level, Execution Report - Fill messages are sent to the aggressor:

- per aggressor order
- per trade price
- per *liquidity source*

Execution Report - Fill messages are sent to resting order clients per trade per price level with the exceptions noted below in [non-FIFO](#) markets and for [Display Quantity](#) orders.

Liquidity Source

A liquidity source is the order or orders that provide the matching quantity to the aggressing order.

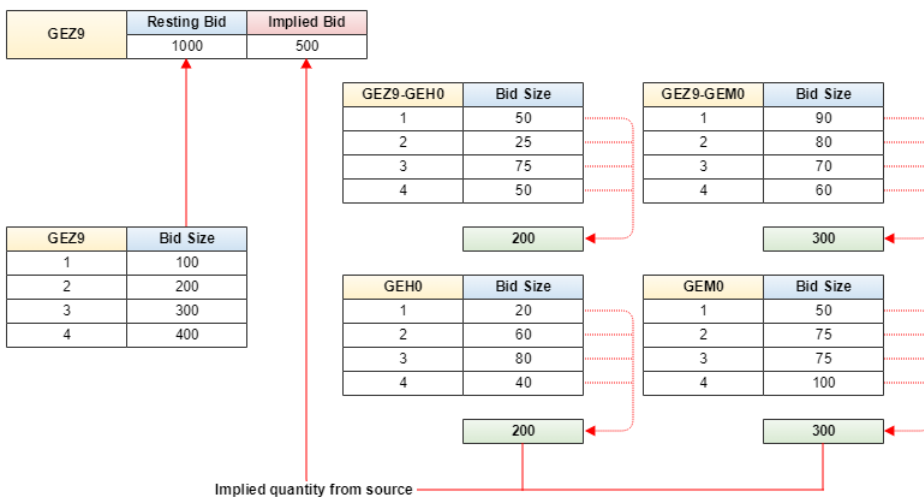
- Multiple customer orders at the same price level are considered a single liquidity source.
- An implied order may have multiple liquidity sources.

Example - Multiple Liquidity Sources

In this example, the total **GEZ9** bid size is 1500, 1000 of which is customer order resting quantity. The other 500 lots are implied from two other liquidity sources.

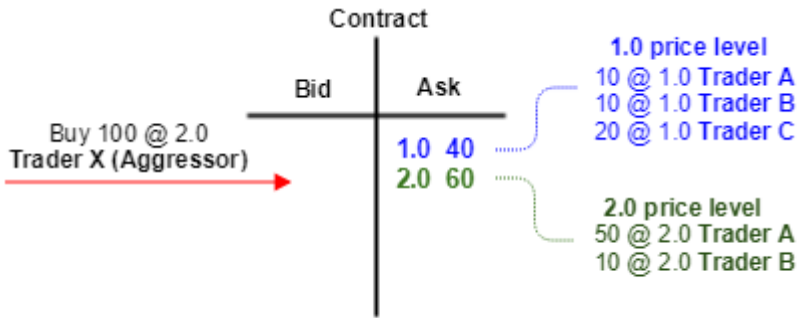
The liquidity sources are:

1. GEZ9 resting, 1000 lots
2. GEZ9-GEH0 and GEH0, 200 lots
3. GEZ9-GEM0 and GEM0, 300 lots



Example - Aggressor Matches at Two Price Levels

This examples depicts a basic matching scenario showing Execution Report - Fill messages sent for aggressing and resting orders.



When the aggressor order matches with the resting orders in the order book, each counterparty receives Execution Report - Fill messages as follows:

Trader X

- Fill Report 40 @ 1.0
- Fill Report 60 @ 2.0

Trader A

- Fill Report 10 @ 1.0
- Fill Report 50 @ 2.0

Trader B

- Fill Report 10 @ 1.0
- Fill Report 10 @ 2.0

Trader C

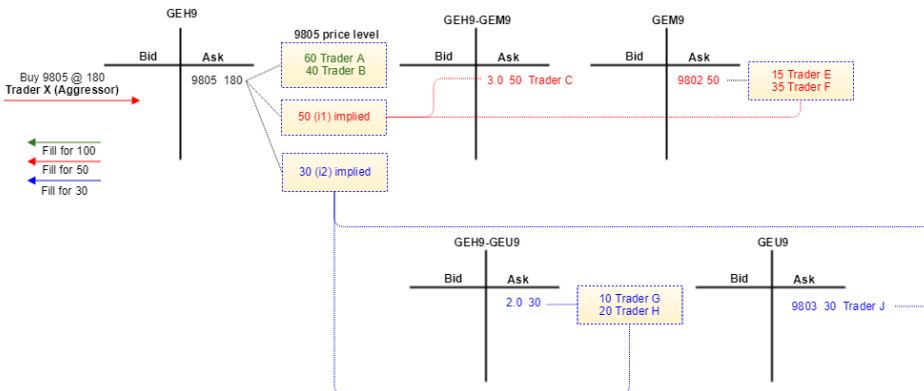
- Fill Report 20 @ 1.0

i For stop orders, each triggered stop order is treated as a new aggressor, and the order fills will be sent based on trade price and liquidity source.

Example: Aggressor Matches with Implied Orders

Given the markets below, with an aggressing Bid for 180 @9805 in GEH9:

- The aggressing order matches with multiple orders at price level 9805.
- The liquidity sources are:
 - customer orders A and B
 - implied order i1
 - implied order i2



When the aggressor order matches with the resting orders in the order book, each counterparty receives Execution Report - Fill messages as follows:

Liquidity Source 1 (customer orders A and B):

- **Trader X** - GEH9 Fill Report 100 @ 9805
- **Trader A** - GEH9 Fill Report 60 @ 9805
- **Trader B** -GEH9 Fill Report 40 @ 9805

Liquidity Source 2 (implied order i1):

Trader X

- GEH9 Fill Report 50 @ 9805

Trader E

- GEM9 Fill Report 15 @ 9802

Trader F

- GEM9 Fill Report 35 @ 9802

Trader C

- GEH9-GEM9 Fill Report 50 @ 3.0
- GEH9 Fill Report 50 @ 9805
- GEM9 Fill Report 50 @ 9802

Liquidity Source 3 (implied order i2):

Trader X

- GEH9 Fill Report 30 @ 9805

Trader J

- GEU9 Fill Report 30 @ 9803

Trader G

- GEH9-GEU9 Fill Report 10 @ 2.0
- GEH9 Fill Report 10 @ 9805
- GEU9 Fill Report 10 @ 9803

Trader H

- GEH9-GEU9 Fill Report 20 @ 2.0
- GEH9 Fill Report 20 @ 9805
- GEU9 Fill Report 20 @ 9803



An off-tick implied is considered a different liquidity source from an on-tick implied order that is from the same spread + outright combination. For example:

SIH9 and SIM9 with a tick of 5 and SIH9-SIM9 spread with a tick of 1

Buy SIM9@10 + Buy spread@2 generate an implied bid in SIH9@12 which is rounded down to 10

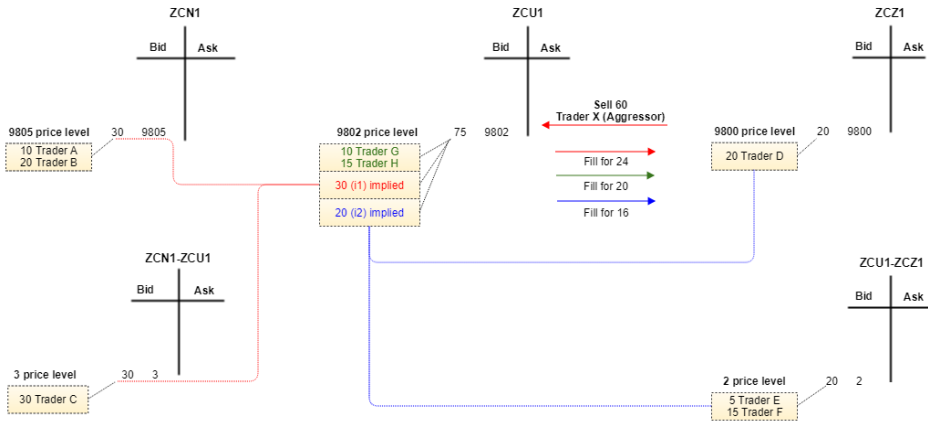
Buy SIM9@10 + Buy spread@3 generate an implied bid in SIH9@13 which is rounded down to 10

Although the same spread and leg combination is used to generate multiple implieds at the same price, these are not consolidated and considered as a different liquidity source.

Example: Aggressor Matches with Implied Orders in Pro Rata Market

Given the markets below, with an aggressing Ask for 60 @ 9802 in ZCU1:

- The aggressing order matches with multiple orders at price level 9802.
- The liquidity sources are:
 - customer orders G and H (20)
 - implied order i1 (24)
 - implied order i2 (16)



Trader	Trade qty & price	Description	Liquidity Source
Trader X	24@9802 (ZCU1)	Aggressor	Implied1 Source
Trader B	16@9805 (ZCN1)	Within leg1 orders, 24 is allocated on a pro rata basis and the sequence is based on higher pro rata qty	
Trader A	8@9805 (ZCN1)		
Trader C	24@3 (ZCN1-ZCU1)	Spread	
	24@9805 (ZCN1)	Leg1 of spread	
	24@9802 (ZCU1)	Leg2 of spread	
Trader X	20@9802 (ZCU1)	Aggressor	Customer Source
Trader H	12@9802 (ZCU1)	Within leg2 Customer orders, 20 is allocated on a pro rata basis and the sequence is based on higher pro rata qty	
Trader G	8@9802 (ZCU1)		
Trader X	16@9802 (ZCU1)	Aggressor	Implied2 Source
Trader D	16@9800 (ZCZ1)	Leg3	
Trader F	12@2 (ZCU1-ZCZ1)	Spread	
	12@9802 (ZCU1)	Leg of the spread	
	12@9800 (ZCZ1)	Leg of the spread	
Trader E	4@2 (ZCU1-ZCZ1)	Spread	
	4@9802 (ZCU1)	Leg of the spread	
	4@9800 (ZCZ1)	Leg of the spread	

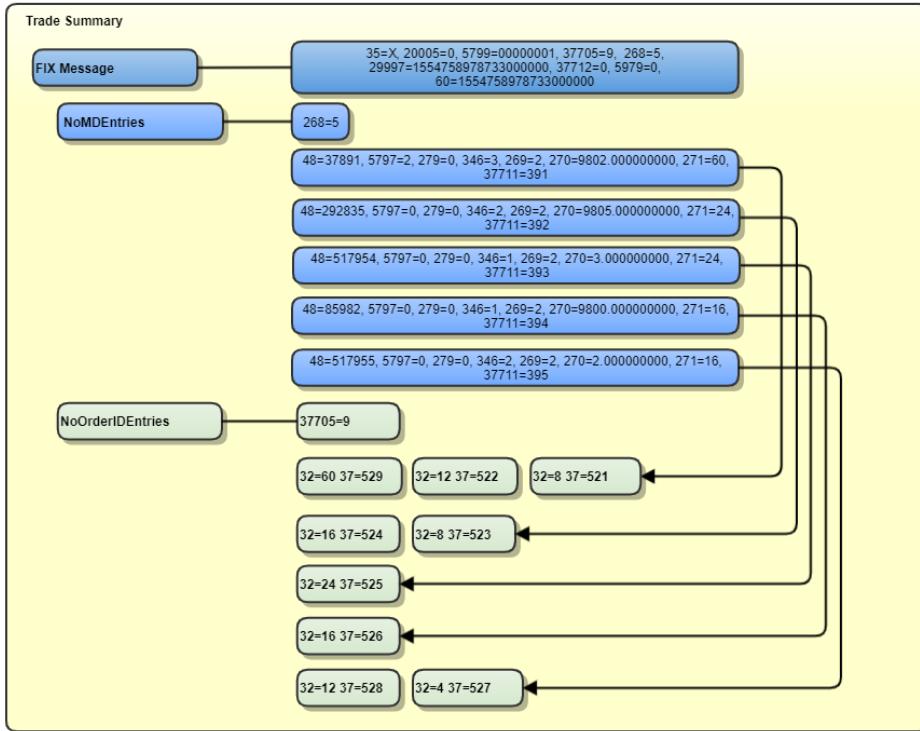
Aggressor Matches with Implied Orders in Pro Rata Market - Market Data Trade Summary Message

This diagram illustrates the market data Trade Summary generated from the match shown in the example above.



Tag 48-SecurityID for the corresponding instruments:

- 37891=ZCU1
- 292835=ZCN1
- 517954=ZCN1-ZCU1
- 85982=ZCZ1
- 517955=ZCU1-ZCZ1



i The [MDP 3.0 - Trade Summary](#) message will always report trade information from an aggressor order first. See [Aggressor Matches with Implied Orders in Pro Rata Market - Trade Summary Message](#) for an example.

Fills for Resting Orders

This section describes the behavior of Execution Report - Fill messaging for resting orders.

FIFO vs Non-FIFO

Execution Report - Fill messages behave as follows for FIFO vs. Non-FIFO markets.

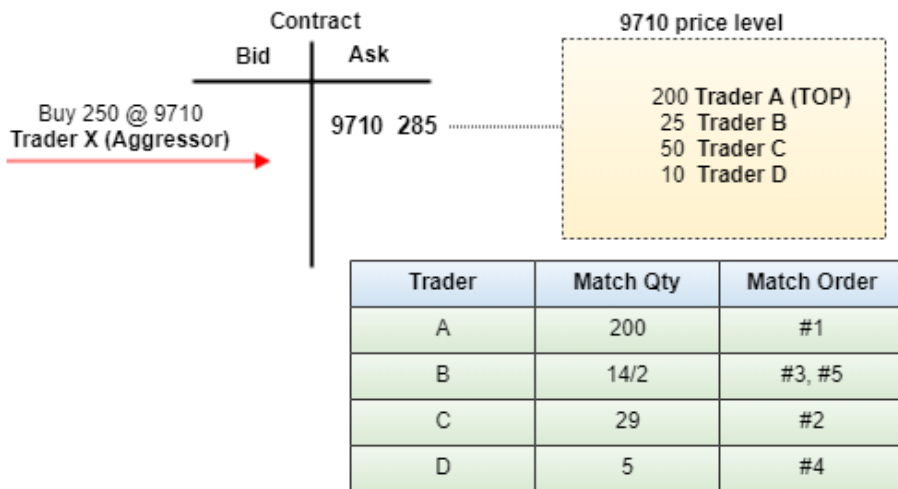
- For all order types other than Display Quantity in First-In First-Out (**FIFO**) markets, Execution Report - Fill messages are sent per client per transaction per price level.
- For resting orders filled in **non-FIFO** markets, for all order types, a single Execution Report - Fill will be sent with the trade quantity aggregated from all [match algorithm steps](#).

i Resting order fills in **non-FIFO** markets are aggregated per aggressor order, trade price, and liquidity source.

Example - TOP/Pro Rata/FIFO

In the following example, these steps are used to match trades:

- TOP - 100%
- Pro-Rata with a minimum allocation
- FIFO for any residual quantity



When the Trader X aggressor order to Buy 250 @ 9710 arrives at the order book:

1st Step - TOP

- Trader A (TOP Order) = 200

2nd Step - Pro rata

- Trader C ($50/85 \times 50$) = 29
- Trader B ($25/85 \times 50$) = 14
- Trader D ($10/85 \times 50$) = 5

3rd Step - FIFO

The 2-lot is assigned to the order with the highest priority, which is Trader B.

- Trader B = 2

When the aggressor order matches with the resting orders in the order book, each counterparty receives Execution Report - Fill messages as follows:

Trader X

- Fill Report 250 @ 9710 (Aggressor)

Trader A

- Fill Report 200 @ 9710 (TOP)

Trader B

- Fill Report 16 @ 9710 (Pro-rata + FIFO)

Trader C


- Fill Report 29 @ 9710 (Pro-rata)

Trader D

- Fill Report 5 @ 9710 (Pro-rata)

Display Quantity Orders

With this release, in any matching scenario involving Display Quantity orders, the Execution Report - Fill messages for the Display Quantity order will be aggregated and sent *after* the non-display quantity order fills resulting from the match.

 Display Quantity resting order fills are sent per aggressor order, trade price and liquidity source.

Example: Hidden Quantity Filled

In this example an incoming aggressor order matches with 2 resting orders, including a Display Quantity order and a regular order.



When the aggressor order matches with the resting orders in the order book, each counterparty receives Execution Report - Fill messages as follows:

Trader X

- 1 Fill Report 100 @ 1.0 (Instead of 10 Fill Reports 10 @ 1.0)

Trader B

- 1 Fill Report 10 @ 1.0

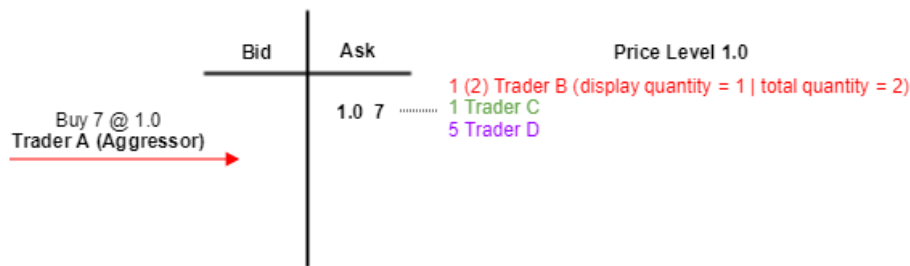
Trader A (Display Quantity Order)

- 1 Fill Report 90 @ 1.0 (Instead of 9 Fill Reports 10 @ 1.0)
 - Display Quantity Order gets the fill report after regular order fills regardless of their display quantity refresh status

Example: Aggressor Quantity Equals Price Level Displayed Quantity

In this example an incoming aggressor order matches with multiple resting orders and the aggressor quantity equals the total displayed quantity.

Given the following order book:



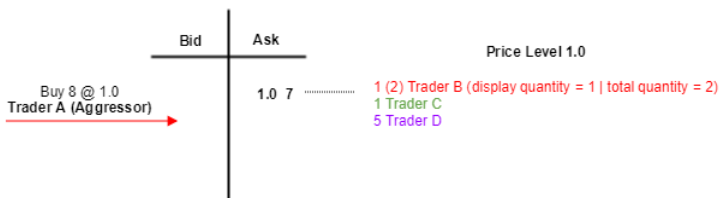
iLink fills will be sent in the following order:

- Trader A - 7 @ 1.0 (Aggressor)
- Trader C - 1 @ 1.0
- Trader D - 5 @ 1.0
- Trader B - 1 @ 1.0

Example: Aggressor Total Quantity Equals Price Level Total Quantity

In this example an incoming aggressor order matches with multiple resting orders and the aggressor quantity equals the price level total book quantity, including hidden quantity.

Given the following order book:



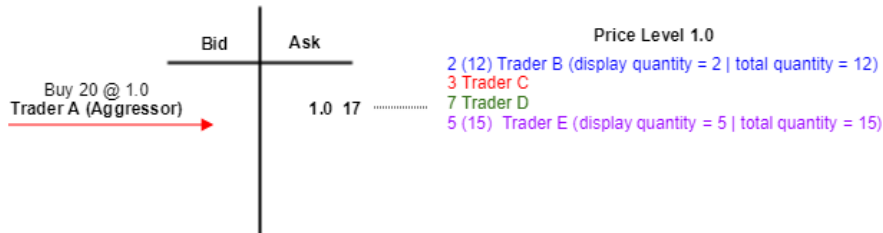
iLink fills will be sent in the following order:

Trader A - 8 @ 1.0 (Aggressor)
 Trader C - 1 @ 1.0
 Trader D - 5 @ 1.0
 Trader B - 2 @ 1.0

Example: Display Quantity Refresh

In this example an incoming aggressor order matches with 2 Display Quantity resting orders.

Given the following order book:



iLink fills will be sent in the following order:

Trader A - 20 @ 1.0
 Trader C - 3 @ 1.0
 Trader D - 7 @ 1.0
 Trader B - 4 @ 1.0
 Trader E - 6 @ 1.0

Opening Trade

For the opening trade, **BUY** and **SELL** Execution Report - Fill messages are sent for each order in alternating sequence (i.e., BUY/SELL, BUY/SELL, etc.).

Example

Beginning with the following order book:

Contract			
	Bid	Ask	
Bid 1	8@100	5@100	Ask 1
Bid 2	15@100	6@100	Ask 2
		19@100	Ask 3

With an Indicative Opening Price (IOP) of 100, Bid 1, Bid 2, Ask 1 and Ask 2 are completely filled, Ask 3 is partially filled for qty 12.

- Bid1 Fill 8@100
- Ask1 Fill 5@100
- Bid2 Fill 15@100
- Ask2 Fill 6@100
- Ask3 Fill 12@100

RFC Order

For an aggressor matching with an RFC order, aggressor fills are not sent per trade price per liquidity source, but per discrete order quantity filled.

iLink Execution Report - Fill Message Publishing Sequence

This table gives the iLink Execution Report - Fill message publishing sequence for the matching scenarios that may occur on CME Globex.

Outright Trades	Spread Outright Trades	Implied Trades (Aggressor Outright Contract)	Implied Trades (Aggressor Spread Contract)	Resting Orders
<ul style="list-style-type: none"> • AGGRESSOR order fills always published first • RESTING order fills published based on match algorithm allocation steps 	<ul style="list-style-type: none"> • AGGRESSOR spread order fills and their legs always published first • RESTING spread order fills and their legs published based on match algorithm allocation steps 	<ul style="list-style-type: none"> • AGGRESSOR order fills always published first per liquidity source • RESTING order fills on other outright contracts published next • RESTING spread order fills and their leg fills published last 	<ul style="list-style-type: none"> • AGGRESSOR spread order fills and their legs always published first per liquidity source • RESTING order fills on other outright contracts published next • RESTING order fills on other spread contracts and their leg fills published last 	<ul style="list-style-type: none"> • For Non-Display Quantity order fills, <ul style="list-style-type: none"> • FIFO Sequenced by time priority • TOP TOP order always published first • LMM Sequenced by time priority • Pro-Rata Sequenced by size • Display Quantity order fills always published last after the non-display quantity order fills