

A guide for executing Orders and Algos via 360T



THE NWM ALGO SUITE



NWM CLIENT ORDER
MATCHING SYSTEM (COMS)



PEG CLIPPER



PEG TWAP



TWAP



LIMIT PRO



NatWest
Markets

Public



The NWM Algo Suite

Leveraging NWM client liquidity - a clear technology differentiator

- FX liquidity has significantly deteriorated over the last few years meaning that small tickets can have material market impact if not appropriately executed.
- Client focus has therefore shifted towards a desire to be transparent and reduce market impact and NWM have developed an algo suite to satisfy this need.
- NWM FX execution algos are built around an alternative technology solution which is a differentiator in comparison to the majority of bank algo providers.
- Rather than seeking to take liquidity from, or place orders into external 'ECN' venues (Reuters, EBS, Currenex, etc.), our algos leverage the NWM client franchise using a proprietary liquidity pool (COMS) comprising of internal trading desks and, more importantly, NWM client flow.
- The 'matching engine' lets a child order from an algo become part of our market making price which is then shown to our large client franchise. If any client crosses the spread the algo order takes precedence and is filled first. In many cases up to 100% of the flow is matched off when the algo is run in passive mode.

NWM Client Order Matching System (COMS)

Many of the NatWest Markets algos focus on passive execution and utilise the Client Order Matching System (COMS).

Offers the ability to submit bids / offers within the spread

- Clients' bids and offers are incorporated into the NatWest Markets eCOM price.



Provides low cost passive algo execution

- Increasingly, clients are looking for algorithms that do not cross the spread, without the brokerage cost of ECNs.

Delivers tighter spreads and less information slippage

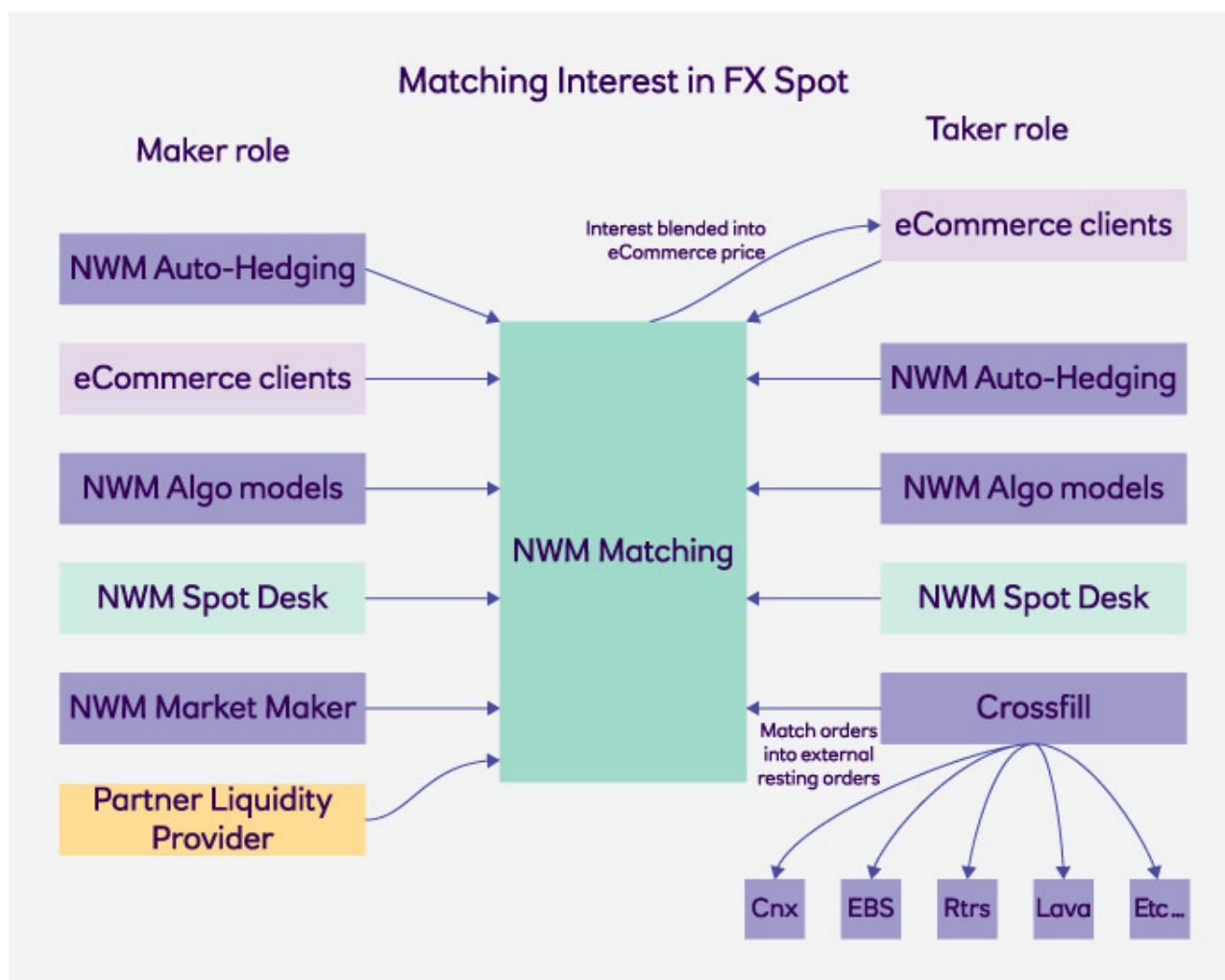
- Blends algo interest into NatWest Markets prices to tighten spreads which are then shown out to a large, diverse set of clients.

Client Order Matching System - Supported Pairs

AUD/JPY	AUD/NZD	AUD/USD	EUR/AUD	EUR/CAD	EUR/CHF
EUR/GBP	EUR/JPY	EUR/NOK	EUR/PLN	EUR/SEK	EUR/TRY
EUR/USD	GBP/AUD	GBP/JPY	GBP/USD	NOK/SEK	NZD/USD
USD/CAD	USD/CHF	USD/CNH	USD/HKD	USD/JPY	USD/MXN
USD/NOK	USD/PLN	USD/SEK	USD/SGD	USD/TRY	USD/ZAR

NWM Client Order Matching System (COMS)

NWM Client Order Matching System (COMS), a client liquidity pool - our solution to minimising market impact and maximising spread capture.



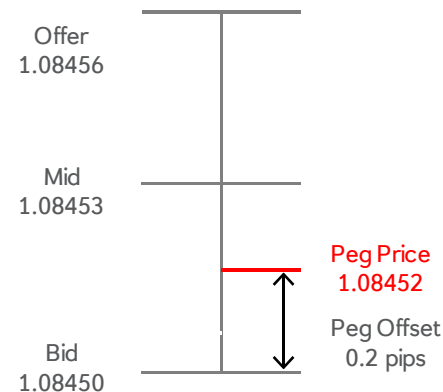
Peg Clipper

- The Peg Clipper allows the user to execute an order by passively placing successive smaller clips into the Client Order Matching System (COMS) to capture spread, minimise market impact and reduce signalling risk.
- Users can peg to the reference bid/ mid/ offer and the order level will be updated as the market moves up or down.
- An optional offset can be used to fine tune the order level. The offset can be a positive or negative value, and simply raises or lowers the peg prices irrespective of whether you are buying or selling.

Peg Type Characteristics

- **Passive:** Bid price if buying / Offer Price if selling +/- offset. Captures the maximum amount of spread, minimising market impact and matching against other client flow.
- **Mid:** $(\text{Offer} + \text{Bid}) / 2$ +/- offset Captures spread whilst increasing the fill probability and speed of execution.
- **Aggressive:** Offer price if buying / Bid Price if selling +/- offset Orders that need to be completed quickly with available liquidity.
- **Adaptive:** Intended to reduce the probability of adverse selection when the market is moving in the order's favour and increase the probability of exercise when the market is moving away from the order.

Peg Diagram



An example of the Peg Price calculation when following Bid (Passive buying / Aggressive selling) with 0.2 pips offset

IMPORTANT: There may be periods when the COMS matching engine sees liquidity on external venues (including ECNs) at or better than the order price level, and liquidity may be taken from those venues. Orders are filled at the price level entered in COMS.

Peg Clipper

User Specified Parameters

- **Buy/Sell:** Direction to trade.
- **Amount Requested:** Total quantity to trade - 500mio USD max.
- **Peg Type:** Can be 'Passive', 'Mid', 'Aggressive' or 'Adaptive' and indicates which side of the order book to use as a reference price for the peg.
- **Peg Offset Value:** Used to offset the peg order from the level given by the 'Peg Type' This is expressed as an absolute price.
- **Peg Clip Size:** An optional parameter which when left blank is set to 5% of the order notional.
- **No Worse Than Price:** An optional parameter where the model will not buy or sell past a specified rate.

EURUSD Peg Clipper

The screenshot shows the 'Algo Order' window for a 'Peg Clipper' strategy. The 'Order Details' tab is active. The order is set to 'Buy' for 'EUR' with a quantity of '10,000,000'. The 'Market Rate' is displayed as '1.23720'. The strategy is identified as 'RBS.TEST' and 'Peg Clipper'. The 'Peg Type' is set to 'Passive', 'Peg Offset Value' is '0', 'Peg clip size' is '1,000,000', and 'No Worse Than' is '1.2400'. A 'Strategy Description' box states: 'Execute an order by splitting it up into smaller clips, placing each in the client matching engine'. The 'Counterparts' tab shows the 'Provider' as 'RBS.TEST' and 'Trade As' as 'RBSCOMP.TEST.FOND.A1'. At the bottom, there are 'Extended actions...', 'Cancel', and 'Place' buttons.

IMPORTANT: Note that use of the 'No Worse Than' price may affect the probability of fills and may result in partial order execution.

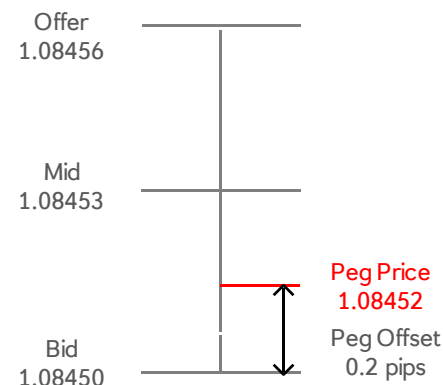
Pegged TWAP

- The aim of the 'Pegged TWAP' is to execute a large order in smaller slices over a fixed time frame, working orders iteratively in COMS.
- Market impact is minimized by breaking the parent order into smaller slices and working each slice as an order in COMS Parent order sizes up to 500mio USD are supported.
- There are 3 ways to define the characteristics of a slice as shown here The users can choose between the number of slices ('Slices'), the length of the slice ('Time Interval') or the size of the slice ('Notional').
- Each slice is placed as a limit order, with the limit price being continually adjusted to a chosen benchmark (the peg type) and a user defined offset (optional parameter). This ensures that the order level is maintained at the desired position relative to the market bid or offer as the market moves.
- At the end of each time step the passive peg order may be partially filled. The remaining part of the slice will then be executed by taking liquidity on FX Stream, the prevailing NatWest Markets streaming price.

Peg Type Characteristics

- **Passive:** Bid price if buying / Offer Price if selling +/- offset. Captures the maximum amount of spread, minimising market impact and matching against other client flow.
- **Mid:** $(\text{Offer} + \text{Bid}) / 2$ +/- offset Captures spread whilst increasing the fill probability and speed of execution.
- **Aggressive:** Offer price if buying / Bid Price if selling +/- offset Orders that need to be completed quickly with available liquidity.
- **Adaptive:** Intended to reduce the probability of adverse selection when the market is moving in the order's favour and increase the probability of execution when the market is moving away from the order.

Peg Diagram



An example of the Peg Price calculation when following Bid (Passive buying / Aggressive selling) with 0.2 pips offset

Pegged TWAP

Example Order

User Specified Parameters

- **Buy/Sell:** Direction to trade.
- **Amount Requested:** Total quantity to trade - 500mio USD max.
- **Effective Time:** Time that the execution starts.
- **Duration:** The length of the execution in HH:MM:SS form.
- **Expire Time:** Time that the execution finishes.
- **Slice Mode:** Choose between the number of slices ('Slice Count'), the length of the slice ('Time Step') or the size of the slice ('Amount per Slice').
- **Peg Type:** Can be 'Passive', 'Mid', 'Aggressive' or 'Adaptive' and indicates which side of the order book to use as a reference price for the peg.
- **Peg Offset Value:** Used to offset the peg order from the level given by the 'Pegging type' This is expressed in absolute price units e.g. 0.0001 for 1 pip in EURUSD.
- **No Worse Than Price:** An optional parameter where the model will not buy or sell past a specified rate.

EURUSD Pegged TWAP

The screenshot shows the 'Algo Order' window with the following details:

- Order Details:** Buy/Sell: Buy, Currency: EUR, Amount: 60,000,000. Market Rate: 1.23683.
- Order Type:** Pegged TWAP.
- Start Time:** Now (selected) or Other (16:30:00).
- End Time:** 17:00:00.
- Peg Type:** Passive.
- Peg Offset Value:** (empty field).
- Slice Mode:** Amount Per Slice (2,000,000), Slice Count (100), Time Step (HH:MM:SS) (0:0:0).
- Max Spread:** (empty field).
- No Worse than:** (empty field).
- Strategy Description:** Execute an order over a defined time range splitting flow into small clips, working each clip first in the client matching engine before aggressing on the NWM eFX price.
- Counterparts:** Provider: RBS.TEST, Trade As: RBSCOMP.TEST.FOND.A1.
- Buttons:** Cancel, Place.
- User:** RBS.Treasurer1, Company: RBSCOMP.TEST.

IMPORTANT: Note that use of the 'No Worse Than' price may affect the probability of fills and may result in partial order execution.

TWAP

- The 'TWAP' is similar to the 'Pegged TWAP'; but only executes in a price-taking capacity on FX Stream over a defined time period rather than working orders in the Client Order Matching System (COMS).
- Market impact is reduced by breaking orders into smaller slices to be executed on the NatWest Markets streaming reference price according to a predetermined schedule.
- All currency pairs available on FX Stream are supported up to order sizes of 500mio USD.
- Time slice orders can be run in any combination of the following currencies: AUD, CAD, CHF, CNH, EUR, GBP, ILS, JPY, MXN, NOK, NZD, PLN, SEK, SGD, TRY, USD, ZAR.



TWAP

Example Order

User Specified Parameters

- **Buy/Sell:** Direction to trade.
- **Notional:** Total quantity to trade - 500mio USD max.
- **Start time:** Date and time that execution starts.
- **Duration:** How long the execution will run for.
- **Slice mode:** Choose between the number of slices ('Slices'), the length of the slice ('Time Interval') or the size of the slice ('Notional').
- **No Worse Than:** An optional parameter where the model will not buy or sell past a specified rate.

EURUSD TWAP

The screenshot shows the 'Algo Order' window with the following details:

- Order Details:**
 - Sell: EUR, 60,000,000
 - Buy: USD
 - Market Rate: 1.23680
- Order Type:** TWAP
- Start Time:**
 - Now
 - Other: 16:30:00
- End Time:** 17:00:00
- Slice Mode:**
 - Amount Per Slice: 2,000,000
 - Slice Count: 100
 - Time Step (HH:MM:SS): 0:00:00
- Max Spread:**
- No Worse than:**
- Strategy Description:** Execute an order over a defined time range by splitting flow into small clips and executing against the NWM eFX Price
- Counterparts:**
 - Provider: RBS.TEST
 - Trade As: RBSCOMP.TEST.FOND.A1
- Buttons:** Cancel, Place
- User:** RBS.Treasurer1, Company: RBSCOMP.TEST

IMPORTANT: Note that use of the 'No Worse Than' price may affect the probability of fills and may result in partial order execution.

Limit Pro

- The Limit Pro takes liquidity from external venues up to a user-specified 'Liquidation Price' ('No Worse Than') without leaving passive bids or offers on those venues.
- If there is no available liquidity within the liquidation price, the Limit Pro will place passive interest into the NatWest Markets Client Order Matching System (COMS), automatically varying the order level using a short term momentum signal to optimise the overall fill rate.
- The maximum order size is dependent on currency pair, ranging from 100mio EUR in EURUSD to smaller sizes in less liquid pairs. The speed of fill is dependent on liquidity conditions and the parameters set by the user.
- If the algo is being used in a sweeping capacity, by specifying a liquidation price more than 2 bps from mid through the market, the maximum volume limits in black are enforced. If the algo is not being used in a sweeping capacity (the liquidation price specified is no more than 2 bps from mid through the top of book), the maximum volume that can be executed is 300m USD.

Max Limit Pro Order Sizes by Currency Pair (in base millions) - Sweeping

Currency Pair	Max Order Size (m)	Currency Pair	Max Order Size (m)	Currency Pair	Max Order Size (m)
AUDJPY	30	EURSEK	30	USDCNH	30
AUDNZD	30	EURTRY	30	USDJPY	100
AUDUSD	75	EURUSD	100	USDMXN	75
EURAUD	30	GBPAUD	30	USDNOK	30
EURCAD	30	GBPJPY	30	USDPLN	30
EURCHF	50	GBPUSD	75	USDSEK	30
EURGBP	75	NOKSEK	250	USDSGD	50
EURJPY	50	NZDUSD	50	USDTRY	30
EURNOK	30	USDCAD	75	USDZAR	30

Limit Pro

Example Order

User Specified Parameters

- **Buy/Sell:** Direction to trade.
- **Notional:** Total quantity to trade, the maximum order size is dependent on currency pair, ranging from 100mio EUR in EURUSD to smaller sizes in less liquid pairs.
- **Liquidation Price:** Required parameter which defines the cut-off point between passive liquidity provision and aggressive liquidity taking. The shortcuts B, M or O (referring to Bid, Mid or Offer) can be used to populate the liquidation price field with the current market bid, mid or offer.

GBPUSD Limit Pro

The screenshot shows the 'Limit Pro' order entry window. At the top, there's a tabbed interface with 'Order Details' and 'Order Changes'. Under 'Order Details', there are dropdowns for 'Sell' and 'Buy' (both set to 'Buy'), and currency pairs 'GBP' and 'USD'. A 'Market Rate' of 1.33185 is displayed. Below this, there's a dropdown for 'RBS.TEST' and a dropdown for 'LimitPro'. The 'Liquidation Price' field is empty, and the 'Expiry' is set to '21:00:00'. A 'Strategy Description' box contains the text: 'Aggressive strategy, sweeping external liquidity and using COMS (Client Order Matching System). Execute against external liquidity at or better than the liquidation price. If no liquidity is available at the level, the limit pro will work the order in our COMS liquidity pool.' At the bottom, there's a 'Counterparts' section with 'Provider' set to 'RBS.TEST' and 'Trade As' set to 'RBSCOMP.TEST.FOND.A3'. There are 'Cancel' and 'Place' buttons at the bottom right, and a status bar at the very bottom showing 'User: RBS.Treasurer2, Company: RBSCOMP.TEST' and the 'SECT' logo.

IMPORTANT: Note that use of the 'Liquidation Price' may affect the probability of fills and may result in partial order execution.

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