

# Arrival Price

Arrival Price (AP) is a dynamic liquidity-seeking algorithm that aims to minimize implementation shortfall by completing an order close to its arrival price. It is designed to manage the trade-off between market impact and price risk. It will build an optimal trading schedule based on order size, expected participation rate, desired start and end times, and stock-specific characteristics including historical volume, volatility and spread. The trading schedule will dynamically adapt to real-time market conditions throughout the order's lifecycle.

## FEATURES AT A GLANCE

- EXPECTED PARTICIPATION %
- URGENCY
- PRICE ADAPTATION
- I WOULD
- I WOULD DARK
- OPEN AUCTION
- CLOSE AUCTION
- CLOSE AUCTION USING NYSE FLOOR BROKER
- COST OPTIMIZATION
- ENTERPRISE CROSS
- MIN/MAX VOLUME %
- NO NEW HIGH/LOW PRICE

### EXPECTED PARTICIPATION % DRIVES THE TARGET TRADING SCHEDULE

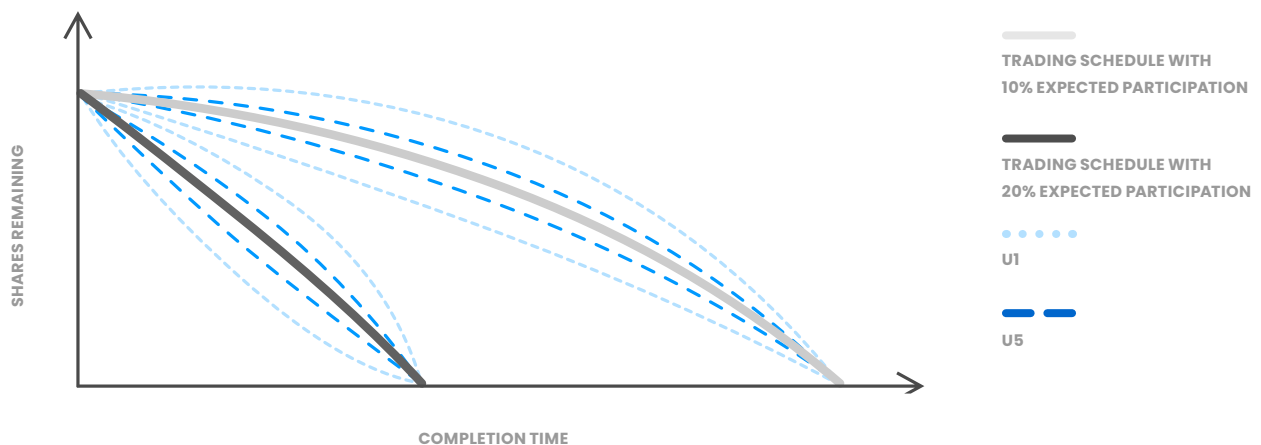
Set your expected participation rate, which targets an expected rate of trading using historical and real-time signals. The strategy will dynamically adapt its trading schedule based on current market conditions and attempt to find an optimal balance of passive and aggressive executions. Expected participation defaults to 12% if nothing is set.

### URGENCY CONTROLS DISCRETION AROUND THE TRADING SCHEDULE

Urgency controls the discretion the algorithm has to work around the target schedule and determines the size and frequency of the slice intervals. An urgency setting of 1 (lowest) has the most amount of discretion to deviate from the target schedule, while 5 (highest) has the least discretion. A higher urgency will deviate from the schedule less but may result in greater impact and less opportunistic trading, while a lower urgency gives the algorithm more discretion over order placements but may result in less predictability around participation level. The amount of deviation from the target schedule allowed by each urgency level is:

- Urgency 1: 40%
- Urgency 2: 32%
- Urgency 3: 24%
- Urgency 4: 16%
- Urgency 5: 10%

EFFECT OF EXPECTED PARTICIPATION AND URGENCY ON TRADING SCHEDULE



## ADVANCED ORDER AGGREGATION AND QUEUE PRIORITY TECHNIQUES SEEK OUT MORE FILLS

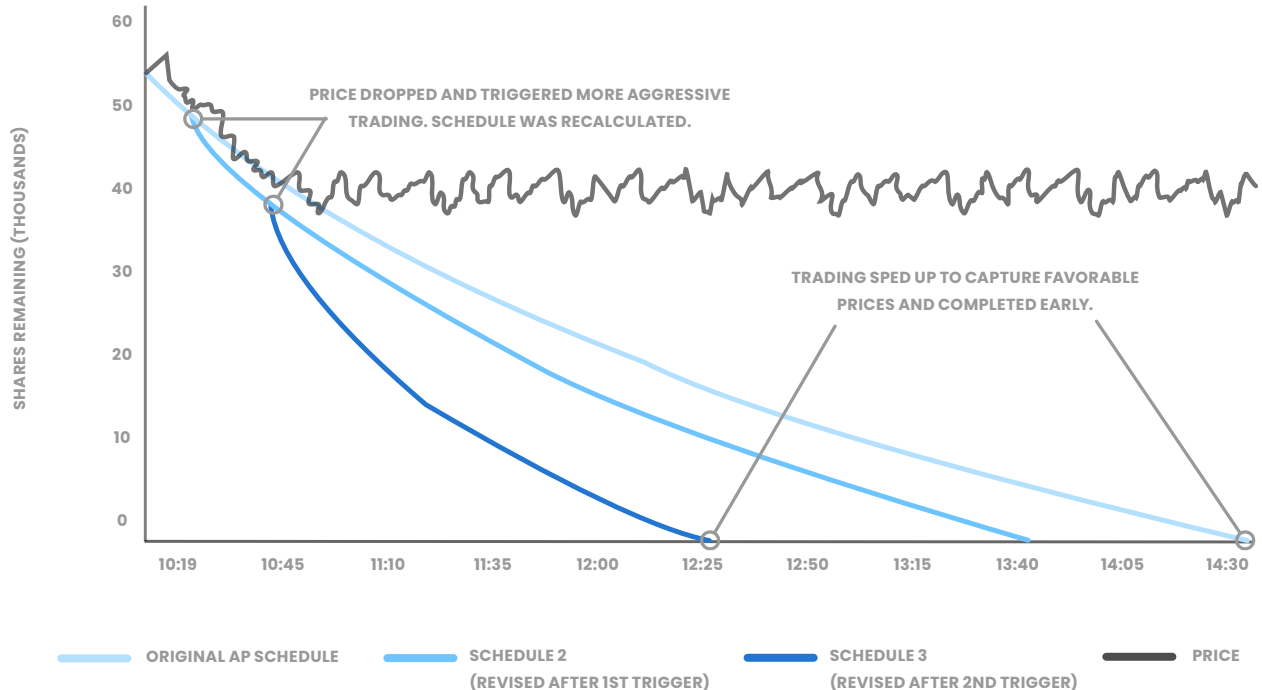
Clearpool's proprietary order placement technology judiciously aggregates child orders across the Clearpool universe to optimize queue placement. It operates with a deep understanding of the multitude of complex order types and execution handling protocols. Optimal queue placement is sustained regardless of modifications made to orders, improving your fills and interactions in exchange and off-exchange venues.

## PRICE ADAPTATION ALLOWS THE STRATEGY TO ADJUST BASED ON STOCK PRICE MOVEMENT

Enable price adaptation in the AMS to inform the strategy to speed up or slow down based on stock price movement vs. the reference arrival price. Set a reference price and sensitivity level and choose to be either passive or aggressive in the money.

- **Passive in the money** (aggressive out of the money) takes a 'momentum' view of the market, in which the direction of price movements is likely to persist. Use it to slow down when prices are in your favor because you think prices will move even more in your favor (and speed up when prices are not in your favor because you think they will move against you even more).
- **Aggressive in the money** (passive out of the money) takes a 'contrarian' view of the market, in which the direction of price movements is likely to reverse. Use it to speed up when prices are in your favor because you think the price movement is short-term and will revert soon (and slow down when prices are not in your favor because you think they will move back in your favor soon).

### PRICE ADAPTATION EXAMPLE: AGGRESSIVE IN THE MONEY BUY ORDER



**TRADING STYLE DICTATES PHASES AVAILABLE IN AN ORDER'S LIFECYCLE & DETERMINES HOW THE STRATEGY ATTEMPTS TO**

**SOURCE LIQUIDITY**

Phases are simply combinations of venue and order types. Passive (rest) phases utilize day orders while aggressive (ping) phases utilize IOC orders. For each trading style available in schedule-driven algorithms, passive phases are prioritized to maximize price improvement while trading according to the schedule. It will move to aggressive phases and cross the spread when falling behind schedule. The Opportunistic phase also runs in parallel with passive and aggressive phases and will cross the spread when our proprietary models detect opportunities for good-quality liquidity.

Trading Styles	Passive Phases				Opportunistic	Aggressive Phases		
	Rest Dark Optimal/ Conditional	Rest Maker/ Taker	Rest Dark Mid	Rest Inverted		Ping Dark PX Imp	Ping Dark Touch	Ping Lit
<b>All</b> Passive in dark venues before moving to lit. Use it to source liquidity across all market centers.	✓	✓	✓	✓	✓	✓	✓	✓
<b>Dark Optimal</b> Only rests in select dark/conditional venues to seek high-quality liquidity. Use it to passively source high-quality dark liquidity and never display.	✓				✓	✓	✓	✓
<b>Limited Dark</b> Skips the Rest Dark Optimal phase to limit dark exposure to less expensive venues/order types. Use it to reduce fees by skipping select dark venues and use of order types that are typically more expensive.		✓	✓	✓	✓	✓	✓	✓
<b>Inverted</b> Rests only in inverted venues. Use it to source passively from inverted venues and skip resting with dark venues and maker/takers.				✓	✓	✓	✓	✓
<b>Rebate</b> Rests in rebate venues. Use it to maximize rebates.		✓	✓		✓	✓	✓	✓
<b>Passive Only</b> Will never cross the spread, even opportunistically. Will not move into aggressive phases, even when falling behind schedule, therefore not forcing completion. Use it to provide liquidity following the schedule and never cross the spread.	✓	✓	✓	✓				
<b>Passive Opportunistic</b> Will only cross the spread opportunistically. Will not move into aggressive phases, even when falling behind schedule, therefore not forcing completion. Use it to provide liquidity following the schedule and only cross the spread for opportunistic liquidity.	✓	✓	✓	✓	✓			

Dark phases include gray venues (hidden exchange orders).

## ELECT TO PARTICIPATE IN AUCTIONS

- Orders entered before 9:30 a.m. are eligible for participation in the **open auction** using our dynamic Auction algorithm. The Auction algorithm uses historical auction ADV to determine the optimal slice size to submit to the auction then monitors real-time imbalance feeds and sends imbalance-only orders to attempt to get more shares done (which may override the specified Max Volume %). Participating in the open can help to reduce impact because the opening price on shares filled in the auction equals the arrival price benchmark. Any shares remaining after the open (note that orders may potentially be fully filled in the open auction) will be carried over to trade in the continuous market.
- If an order's size is larger than the target schedule derived from expected participation %, then participating in the **close auction** can get more of the order completed with minimal market impact. If the algorithm can complete the order in the core session according to its schedule, then it will not participate in the close auction, even if close auction is enabled. The algorithm will also not participate in the close auction if the 'I Would' or 'Max % of Volume' parameters are enabled.

## SET AN 'I WOULD' PRICE THAT TRIGGERS AP TO GET THE ORDER DONE

Specify an 'I would' price to trigger AP to deviate from its schedule and attempt to complete the order. The trigger price (typically a dollar amount but may also be % of reference price) can be passive (favorable) to attempt completion when price moves in favor or aggressive (unfavorable) to attempt to stop losses when the market price is moving away.

## 'I WOULD DARK' ALLOWS YOU TO OVERLAY DARK AGG

'I would dark' allows a Dark Agg algorithm to capture additional opportunistic non-displayed liquidity while AP continues to work the order. 'I would dark' can be enabled in the AMS and parameters for the dark leg of the order can be set to control urgency, specify maximum size thresholds and set minimum execution quantity.

**TIP:** Enable 'I would dark' and set a high minimum execution quantity to allow Dark Agg to seek out block liquidity while AP also continues to work the order, which may reduce impact and complete the order sooner.

## CONFIGURE CROSSING PROTOCOLS

Enterprise Cross\* provides opportunities to match orders within your own firm or within Clearpool's universe, minimizing market impact without any missed opportunity costs. In the routing tab of the AMS, you can set up multiple crossing protocols and prioritize them in your routing table.



### USE IT WHEN YOU WISH TO:

- Minimize slippage versus arrival price (implementation shortfall)
- Balance market impact and price risk
- Capture liquidity in the open auction & trade the balance in the core session
- Overlay Dark Agg to capture additional opportunistic dark liquidity



### THINGS TO NOTE:

- May not complete in Passive Only and Passive Opportunistic trading styles
- May not complete if no new high/low price is enabled
- Using min/max % of volume may constrain strategy's dynamic behavior. Try changing expected participation rate & urgency instead.

\*All Cross orders are routed to a third party's market place or facility for execution and subject to that venue's order matching and execution systems controls. Consequently, there is no guarantee that Cross orders will execute at the third-party venue.



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