

# Guide to Cash Equities Electronic Trading Services for US Markets



## Safeguarding of Client Information

- BofA Securities, Inc. (“BofAS” or the “Firm”) maintains policies and procedures designed to safeguard the confidential information of clients, including information relating to orders and trading activities. We appreciate the sensitivities around client trading strategies, and we exercise care in our dealings and communications to preserve client anonymity and avoid adverse dissemination. In addition, we have information barriers in place to prevent improper sharing or disclosure of confidential information among trading desks. These information barriers consist of physical separation, policies and procedures, and system access controls.

## Execution Quality

- BofAS maintains an Execution Quality Working Group (“EQWG”), whose mandate is to regularly and rigorously review not held institutional order flow. The EQWG meets regularly to review algo performance and evaluate execution venues, including currently active destinations, new destinations, and changes in flow sent to destinations.
- Generally, material changes to the handling of clients’ order flow will be communicated to our clients in a timely manner.

## ATS Working Group

- The ATS Working Group meets monthly and, as necessary, on an ad hoc basis. Its mandate includes, but is not limited to, reviews of the activities and behavior of the participants and subscribers within the Firm’s Alternative Trading System (“ATS”), Instinct X®, new client marketing material, other general issues and concerns within the ATS (e.g., connectivity, system outages, connection issues), and any regulatory changes or news items that could impact the ATS or its participants.

## Trade Advertisement Policy

- BofAS advertises client electronic trading executed volume in 15-minute intervals on a T+0 basis; clients may opt out of advertisements upon request.

## Order Routing Disclosure

- Rule 606 of Securities and Exchange Commission (“SEC”) Regulation NMS requires broker-dealers to make publicly available quarterly reports that identify the primary market centers to which they route non-directed customer orders in exchange-listed stocks and equity options. BofAS’s Rule 606 reports also disclose the material aspects of our relationships with the market centers to which we direct orders. Rule 606 reports for BofAS are available via the public website ([https://business.bofa.com/en-us/content/best\\_execution.html](https://business.bofa.com/en-us/content/best_execution.html)), and upon client request we will provide additional details concerning the routing and execution of a client’s own orders, including the market center(s) that executed such orders.
- BofAS may, at its discretion, form partnerships with third parties for evaluation, and/or use of routing, and/or algorithmic strategies.

## Ownership of Execution Venues

- BofAS or an affiliate currently owns a minority equity investment stake in the following market centers and therefore stands to participate as a shareholder/investor in the profits that each market center realizes in part from the execution of securities transactions, including transactions that may involve orders for the accounts of BofAS customers: (i) eBX/Level ATS; (ii) Luminex ATS; (iii) PureStream ATS; and (iv) Members Exchange (“MEMX”).

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## Infrastructure and Data Centers

- BofAS has electronic trading infrastructure in Equinix NY4 Data Center in Secaucus, New Jersey, as well as in Savvis NJ2X Data Center in Weehawken, New Jersey, and in CenturyLink NJ3 Data Center in Piscataway, New Jersey.
- BofAS uses a combination of dark fiber, millimeter wave and free space optics technologies for order routing. At times when millimeter wave and free space optics technologies are not available due to inclement weather or otherwise, components that utilize these may automatically switch to dark fiber technology.

## Market Data

- BofAS utilizes direct market data feeds for all major exchanges. These data feeds are transmitted over BofAS's proprietary network and combined to create a consolidated order book by the BofAS's market data handlers. The SIP may be used should there be an issue identified with any proprietary feed or to interpret any condition disseminated by the marketplace (e.g. Limit Up-Limit Down bands).

## Algorithms

### Pre-Trade and Intra-Order Checks

- Orders received by BofAS's algorithmic engines are assessed for a number of factors to determine specific settings that will be enforced on orders as they work in the market. Parameters assessed include, but are not limited to, the order quantity, strategy selected, order type, target and maximum participation percentage.
- Based on this assessment, price and participation thresholds are placed on qualifying orders. Evaluations are performed on an order's participation in the market and take into account adverse price moves across various time frames. If order participation and adverse price move thresholds are breached, then the order may be cancelled back to the upstream order management system with an alert generated indicating that the order is no longer active in the market.

### Order types

- BofAS currently accepts limit, market, pegged, Market-on-Open ("MOO"), Market-on-Close ("MOC"), Limit-on-Open ("LOO"), Limit-on-Close ("LOC"), D-Quote order types, and Imbalance Only order types.

### Change Control & Monitoring

- Algorithmic performance is typically monitored on a daily, intraday basis by the BofAS electronic trading desk. Additional performance monitoring, by BofAS's product and execution consulting teams, focuses on changes in performance trends to assess benefits/success of product enhancements.
- The release of new algorithms or algorithm enhancements follows a controlled process subject to the Firm's policies and procedures including the Algorithm Governance Policy and Algorithm Controls Standard, which requires, but is not limited to, establishing and maintaining standardized approval process, control parameters, required evidence and ongoing periodic testing.

## Instinct X® ATS Overview

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- Operated as an SEC-registered NMS Stock Alternative Trading System (NMS Stock ATS)
- Non-displayed venue that allows subscribers to anonymously source liquidity
- Accepts orders in NMS stocks (i.e., U.S. exchange-listed equity securities)
- Instinct X® is available to receive orders starting at 9:00 a.m. ET, and will execute orders between 9:30 a.m. (after the opening print on the Primary Exchange) and 4:00 p.m.
- Accepts orders for odd-lot, mixed-lot and round lot quantities
- MinQty will only be satisfied by a single counterparty: No Aggregation
- Prevents the subscriber from crossing against the same account by default
- Executes orders at or within the National Best Bid or Offer ("NBBO") (except for Trajectory and IXCC matches), and utilizes direct market data feeds, if available, for NBBO calculation
- Prevents executions when the NBBO is locked or crossed (not applicable for Trajectory and IXCC Orders)

Please see the link to our Form ATS-N filing on the SEC website for detailed information regarding the operation of Instinct X®. <https://business.bofa.com/en-us/content/high-touch-electronic-trading.html>

## Order Attributes

- Instinct X® accepts the following order instructions:
  - Time in Force ("TIF"): Day, Immediate or Cancel ("IOC") and At The Close
  - Order Types: Market, Limit and Pegged
  - MinQty: Minimum quantity of an order than can be executed versus one counterparty only.
  - Selective MinQty: Subscribers can select contra client segments that they will allow executions below the MinQty.
  - Execution Instructions: Mid, Market and Primary
  - Post Only orders are supported.
  - IXCC (Instinct X® Closing Cross) orders are supported. (Order Type = Market and TIF = At the Close)
  - Discretionary Order Types are supported: DPO (Discretionary Passive Order), DMO (Discretionary Mid-point Order), and DFO (Discretionary Far-Touch Order)
  - Trajectory Order Types are supported

## Client Segmentation

- Instinct X® clients are divided into segments based on various criteria.
- Instinct X® has six subscriber segments: 1 (BofAS Retail); 2 (Institutional); 3 (Low); 4 (Medium); 5 (High); and 6 (BD Retail). Segments 3, 4, and 5 are based on analysis of the subscribers' flow by the ATS Working Group. Segment 3 consists of subscribers that have the most favorable execution quality, segment 5 has the least favorable execution quality, and segment 4 includes the remaining subscribers.
- Instinct X® clients may exclude client segments with which they do not wish to trade.
- Instinct X® subscribers may exclude trading against BofAS principal orders.

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- Clients may request an execution analysis on their order flow.

## Conditional Placements

- Conditional placements: Uncommitted trading interest that receives a cross invitation when matched with an eligible conditional placement or firm order. Requires a following Firm-Up interaction for execution.
- Firm orders and conditional placements have three options for interaction: (1) interact with both firm orders and conditional placements; (2) interact with only firm orders; and (3) interact with only conditional placements.
- By default, all firm orders and conditional placements will be able to interact with all eligible contra firm orders and conditional placements, except for firm IOC orders which default to interact with firm orders.
- Firm-Up Invites need to satisfy the MinQty and limit price of the original conditional placement.

## Trajectory Orders

- Trajectory Order crossing is intended to cross eligible orders at the VWAP price over a specific duration. Trajectory Orders can only execute against other Trajectory Orders.
- Trajectory Orders can specify a duration over which the order is eligible for trading. The duration can be separated into two types: Short Duration with order duration  $\leq 5$  minutes, and Long Duration with order duration  $> 5$  minutes.
- Short Duration orders will only receive a single execution at the end of the Trajectory Match. Long Duration orders may receive multiple executions at intervals throughout the duration of the order.
- Firm Orders are limited to a maximum of 5-minute duration and therefore designated as Short Duration orders. Conditional Orders may be Short or Long Duration.
- Trajectory Orders can include an optional instruction to allow an unmatched Trajectory Order to decay, meaning that the time elapsed before pairing will count toward the duration of the order.
- For Trajectory Cross Orders, Instinct X calculates the VWAP using executions reported on the SIPs during the eligible duration period.

## Discretionary Order Types (Firm Orders Only)

- A Discretionary Order must be a firm order and cannot be a conditional order.
- DPO (Discretionary Passive Order) executes at a quantity below the specified MinQty if the order can be executed at the near touch price. MinQty is required for DPO orders.
- DMO (Discretionary Mid-point Order) posts on the book at near touch, with discretion for the order to execute at prices more aggressive, up to the mid-point price if the execution size satisfies the specified Discretionary Qty.
- DFO (Discretionary Far-Touch Order) posts on the book at mid-point, with discretion for the order to execute at prices more aggressive, up to the far touch price if the execution size satisfies the Discretionary Qty.

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## Matching Priority

- Instinct X<sup>®</sup> prioritizes firm orders based on Price/Client Segment/Time. Within the Client Segment, priority is determined in the following segment order: BofAS Retail/Institutional/3/4/5/BD Retail.
- Instinct X<sup>®</sup> prioritizes conditional placements based on Price/Quantity/Time.
- Instinct X<sup>®</sup> Closing Cross (IXCC) prioritizes orders based on Quantity/Time.
- Instinct X<sup>®</sup> Trajectory Cross prioritizes orders based on Client Segment/Ratio of Order Size to Duration/Time.

## BofAS Smart Order Router (“SOR”)

### Venue Access

- BofAS has in place connectivity to the Regulation NMS market centers with protected quotes. The Firm is also connected to a select group of ATS and Single Dealer Platforms (“SDPs”), which we evaluate continuously to seek the best performance for our clients. Please see the Execution Quality section for further information.
- BofAS publishes a US Equities Market Execution Venues list of all accessible trading destinations on its public website. How each market is accessed varies based on the strategy or client instruction.
- To the extent BofAS routes client orders to a registered national securities exchange, BofAS pays fees or receives credits in accordance with such exchange’s SEC-approved fee schedules. In some cases, the credits offered by a market center to BofAS over a period of time may exceed the charges assessed. However, the Firm does not route client orders based on such fees, unless requested to do so by a client.
- Clients may opt out of trading with any venue except when legal, regulatory, or policy requirements prevent such action, and BofAS is equipped to stop routing orders to any venue upon a client’s request. In addition, clients may customize certain features of venue interaction (e.g., Minimum Execution Quantity (“MEQ”)).
- In certain situations (e.g., system or market data outage) BofAS may use a third-party router, which may result in accessing venues not currently on the US Equities Market Execution Venues list, or not being able to access venues that are on the list. In addition, as we seek to provide best execution to our clients, we may form partnerships with third parties for evaluation, and/or use of routing, and/or algorithmic strategies.

### Venue Monitoring & Analysis

- Non-displayed trading venues and hidden order type usage are reviewed via the EQWG, which may exercise its discretion in revising interaction settings at each destination.
- All clients remain anonymous to external execution venues.
- Clients may request a venue analysis of their own order flow.

## Overview of the Firm’s Smart Order Router Functionality

The BofAS SOR is highly customizable. Below is a general description of the default order routing functionality, describing order interaction with exchange and off-exchange liquidity. A client may customize certain features of its order execution upon discussion with a BofAS sales representative.

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- BofAS SOR is available between the hours of 7:00am – 8:00pm ET, handling orders for pre/post and core trading sessions in US exchange-listed equities.
- BofAS SOR is utilized by BofAS algorithms and clients who directly access SOR routing strategies.
- BofAS SOR offers strategies that are designed to handle market, marketable limit, and non-marketable limit orders. Routing strategies use a combination of tactics for adding or removing liquidity at either non-displayed venues or at national exchanges, depending on strategy settings and market conditions.
- Our default routing strategy is generally cost agnostic and does not post/take liquidity based on economics. Upon client request, however, solutions can be offered which incorporate economics into the routing strategy.
- BofAS SOR may attempt to find liquidity internally (via Instinct X® only) prior to accessing other trading venues, including other non-displayed liquidity sources. Clients may, however, choose different options for accessing liquidity.
- BofAS SOR does not transmit any indications of interest (“IOIs”) for any client orders, which includes, but is not limited to, internal desks or external venues.
- BofAS receives IOIs from SDPs, which may be used to send orders to those venues. SDP venues may include registered broker-dealers as well as their unregistered affiliates.

BofAS SOR has four high-level default routing tactics that are combined to form a specific routing strategy. These liquidity sourcing tactics are briefly outlined below. For more detailed information, please contact a BofAS sales representative.

## **Sweep – seek displayed liquidity**

- This functionality utilizes IOC orders or IOC Intermarket Sweep Orders (“IOC ISOs”) to remove available displayed liquidity at national exchanges.
- To minimize the potential for liquidity fade due to latency differences across venues, the SOR will access protected venues in parallel, attempting to synchronize venue arrival times.
- Depending upon the urgency of execution and on the client or algorithm instruction, the SOR may attempt to take out multiple price levels across multiple venues simultaneously using IOC ISOs. In addition, oversizing logic can be applied when order quantity exceeds displayed quantity, in an attempt to capture reserve liquidity.
- To minimize the potential of market impact and information leakage, the SOR may preference exchanges with an inverted model when removing displayed quotes on exchanges.

## **Scan – seek non-displayed liquidity**

- BofAS SOR may attempt to access non-displayed liquidity prior to sweeping lit quotes on exchanges with protected quotes. Non-displayed liquidity may be sourced from ATSS, SDPs, or by utilizing hidden order types at exchanges. Venues may be accessed either in parallel or sequentially.

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- Unless explicitly specified by client or algorithm, the SOR will make a dynamic decision to access various venues based on its view of the order urgency. Order urgency is driven, among other factors, by the liquidity demand for the order. In an effort to maximize fill rates and seek price improvement, the SOR may determine which venues to access and price points within the spread. In addition, the SOR may set specific MEQs in an attempt to reduce information leakage caused by executing against smaller contraparty orders.
- Clients may opt out of this feature and instead specify an agreed-upon list of venues that may be accessed prior to public markets.
- To increase access to non-displayed liquidity, the SOR may leverage both firm and conditional orders across venues.

## **Lit Post - post non-marketable orders on public markets**

- BofAS SOR primarily takes into account queue dynamics, stock and venue-specific trading patterns to allocate non-marketable orders, with a general objective of minimizing fill time. Posting logic may change based on regular reviews (e.g., EQWG).
- Unless explicitly specified by client or algorithm, the SOR dynamically determines optimal “show size” based on a number of factors. Show size represents an aggregate display quantity distributed among multiple venues, with balance being posted in reserve.
- Order rebalancing of posted orders may occur in a variety of circumstances until the order is filled or cancelled. In addition, in certain situations the SOR may attempt to remove liquidity during locked or crossed markets, but this behavior may be disabled.

## **Dark Post - post non-marketable orders at non-displayed venues**

- To maximize non-displayed liquidity capture, the SOR leverages firm and conditional order types across various ATSS. In addition, hidden order types may also be used across a number of national exchanges (grey venues).

### **Firm Order Allocation**

- Orders are dynamically allocated by reacting to real-time information from BofAS executions at non-displayed venues. The optimal distribution is determined by measuring size and frequency of executions, prioritizing venues based on the likelihood of execution, and combining real-time liquidity signal with historical observations.
- The SOR dynamically adjusts venue allocations throughout the order lifetime, re-optimizing as liquidity patterns change. In addition, BofAS will opportunistically search for liquidity in venues where no order is resting from prior allocations.
- Allocation is subject to available order quantity and meeting the default MEQ. Clients may customize the SOR’s default MEQ preferences on a venue-specific basis.

### **Conditional Order Allocation**

- The SOR aims to optimally route conditional orders to all eligible venues by using proprietary allocation logic.



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- Conditional orders are generally allocated to venues via a staggering sequence to improve the success rates for Firm-Up orders.
- BofAS SOR may attempt to send conditional orders to Instinct X® prior to accessing other trading venues.

## Overview of the Algo Strategy Functionality

The BofAS algo strategy offering includes a set of default strategies designed to meet a variety of trading objectives. All strategies utilize the BofA SOR to access exchange and off-exchange liquidity. A client may customize certain features of its order execution upon discussion with a BofAS sales representative. Below is a general description of the algo strategy functionality.

- BofAS strategies are generally available between the hours of 7:30 am – 4:00pm ET, handling orders for the open and close auction as well as the core trading sessions in US exchange-listed equities.
- BofAS strategies work orders independently of all other orders in the BofAS trading system, treating each order equally and uniquely.
- Strategy operation is guided by a combination of historical statistics, trading signals, and real-time market data.
- BofAS strategies may use a combination of marketable and non-marketable orders at displayed and non-displayed venues.
- BofAS strategies may also utilize and manage conditional orders as part of their order placement operation.
- BofAS strategies leverage conditional and firm order placements to trade on a trajectory basis. Strategies may trade on time-based and/or POV-based trajectories on supported venues.



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## Disclaimer

BofA Securities Instinct X®  
BofA Securities, Inc. ("BofA Securities") operates Instinct X®, an NMS Stock Alternative Trading System ("NMS Stock ATS") in the US, and in other geographies. BofA Securities seeks to operate Instinct X in accordance with applicable regulations, and in accordance with reasonable expectations of fairness. However, potential execution counterparties in Instinct X may have trading objectives and/or expectations that may be adverse to your own, and so execution outcomes may vary. BofA Securities makes no guarantee as to the performance that can be achieved through the use of Instinct X.

Within Instinct X, BofA Securities may offer a variety of crossing services that support various order types/attributes and counterparty selection criteria to enhance Client choice regarding the nature of potential counterparties with whom they may execute. Where it does so, BofA Securities will use reasonable efforts to adhere to your expressed preferences regarding the use of different crossing services, to assign Clients to the appropriate segment and to maintain those assignments, and to adhere to your expressed preferences regarding interaction with participants in such segments. While BofA Securities will use reasonable efforts in this context, it makes no guarantee as to accuracy or consistency of the composition of any segmentation assignment, which may be based in part on BofA Securities' understanding of information supplied by others.

### BofA Securities Routing and Order Handling

In the absence of instructions to the contrary, or depending upon your expressed preferences, the particular BofA Securities routing strategy or algorithm that you may elect to employ, or that is employed on your behalf, and as part of BofA Securities' services seeking the most efficient and effective experience for Client orders, your orders may be given an opportunity to interact with any non-displayed orders and conditional placements in BofA Securities' own NMS Stock ATS, which may include BofA Securities principal trading interest, prior to being exposed to external venues. External venues may include but not be limited to public exchange markets, multi-lateral trading facilities, other ATSs, or broker dealers, (such routing appropriate to each BofA Securities region) consistent with your instructions or BofA Securities' routing logic as applicable. While BofA Securities maintains relationships and connectivity to a variety of such venues as part of its routing processes, BofA Securities does not represent that it has access to all such venues that potentially may be available at any given point in time. To the extent that this document references performance times, such information is indicative and attempts to illustrate the performance speed and latency generally associated with certain systems, order/message paths, and linkages. Actual performance may be different and, in some cases, materially slower than indicated.

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