

Guide to Cash Equities Electronic Trading Services for US Markets



Safeguarding of Client Information

- BofA Securities, Inc. (“BofAS”) 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 on an ad hoc basis as necessary. Its mandate includes but is not limited to reviews of the activities and behavior of the participants and subscribers within the Firm’s ATSs Instinct X® and Global Conditional Cross or GCX, hereinafter referred to as “MLCX”, new client marketing material, other general issues and concerns within the ATSs (e.g., connectivity, system outages, connection issues), and any regulatory changes or news items that could impact the ATSs or their participants.

Trade Advertisement Policy

- BofAS advertises client electronic trading executed volume in 15 minute intervals on a T+0 basis, subject to certain exclusions; clients may opt out of advertisements upon their 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 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://www.bofaml.com/en-us/content/best_execution.html), and upon client request we will provide additional details concerning the routing and execution of client 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) Block Interest Discovery Services LP (BIDS ATS) and (ii) EBX LCC (“eBX/Level ATS”).

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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 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 combined to create a consolidated order book. 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).
- BofAS's market data handlers are co-located at major data centers where the information is transmitted over BofAS's proprietary network.

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.

Anti-Gaming

- Anti-gaming methods utilized within algorithms when using a non-displayed liquidity-seeking overlay include the following:
 - **Adverse Price Response:** The working quantity resting at non-displayed venues will be modified as the price moves away from the arrival price. Configurable parameter settings control the nature of the response. There are currently two response approaches: a linear price response and an optimized price response. The linear price response is designed to decrement or increment the working quantity in accordance with pre-configured price offsets. For example, a 10 bps move away would reduce the open quantity by 20% with a 20 bps move reducing the quantity by 40%. The optimized price response seeks to reduce working quantity in response to an adverse price move but will utilize additional factors such as expected duration and stock volatility. As an order progresses towards completion, the optimized response will tend to become more muted.
 - **Minimum Execution Quantity ("MEQ"):** The minimum execution size is an order parameter utilized by the non-liquidity-seeking overlay and the algo strategies that leverage such overlay. The MEQ is

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set as a function of incoming parameters such as the urgency or mode selected by the client. The MEQ may also be set by a strategy based on stock specific statistics such as average trade size.

Order types

- BofAS currently accepts limit, market, pegged, Market on Open (“MOO”), Market on Close (“MOC”), Limit on Open (“LOO”), Limit on Close (“LOC”) and D-Quote 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 in order 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 the following, but is not limited to, establishing and maintaining standardized approval process, control parameters, required evidence and ongoing periodic testing.

Instinct X[®] ATS Overview

- Operated as an SEC-registered Alternative Trading System (ATS)
- Non-displayed venue that allows subscribers to anonymously source liquidity
- Accepts orders in U.S exchange listed equity securities
- Does not support orders for odd-lot quantities, but allows execution of mixed-lot orders
- MEQ will only be satisfied by a single counterparty: No Aggregation
- Prevents the subscriber from crossing against the same account
- Executes orders at or within the Best Bid or Offer (“BBO”), and utilizes direct market data feeds, if available, for BBO calculation
- Please see the ATS Working Group section for further information
- For a detailed description of the operation of the Instinct X[®] ATS, please refer to the Firm’s Form ATS-N filing on the U.S. Securities and Exchange Commission Form ATS-N Filings and Information site at www.sec.gov/divisions/marketreg/form-ats-n-filings.htm

Hours of Operation

- Instinct X[®] is available for connectivity between 7:00 a.m. - 6:00 p.m. Eastern Time
- Instinct X[®] trading begins after the opening print on the Primary Exchange (9:30 a.m. Eastern Time or later)
- Instinct X[®] will accept orders effective at 9:30 a.m., however, no orders will execute until the Primary Exchange opens

Order Attributes

- Instinct X[®] ATS only accepts the following order instructions:
 - Time in Force (TIF): Day and Immediate or Cancel (“IOC”)

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- Order Types: Market, Limit and Pegged
- MEQ: Minimum quantity of an order than can be executed versus one counterparty only
- Execution Instructions: Mid, Market and Primary

Client Segmentation

- Instinct X[®] clients are divided into segments based on various criteria
- Instinct X[®] has the following client segments: Institution, private client¹, broker-dealer and market maker. Broker-dealer and market maker segments are broken down further based on various characteristics
- Instinct X[®] clients may exclude client segments that they do not wish to trade with
- Clients may request an execution analysis by segment specific to their order flow

Conditional Placements

- Conditional Placements: Uncommitted interest that receives a cross invitation when matched with another Conditional Placement
- Conditional Placements can only interact with other Conditional Placements
- Responses to Firm Up Invites need to satisfy the MEQ and limit price of the original Conditional Placement, except for Conditional Placements matched in MLCX as detailed further below

Important Features

- Instinct X[®] prioritizes client orders over principal orders. Among agency client orders, first priority is given to private client, institutional, and broker/dealer agency orders. These agency client orders have highest queue position at an equal price
- Instinct X[®] ATS does NOT accept Intermarket Sweep Orders (“ISOs”), Post Only, or Percentage of Spread Orders

MLCX ATS Overview

- MLCX is operated as an SEC-registered Alternative Trading System (ATS)
- MLCX is a conditional matching engine. All executions will occur at the official closing price published by the primary listing exchange, following the primary listing exchange’s closing print.
- Access to MLCX will be based on a client’s strategy settings, market conditions, and client preferences.
- MLCX will accept eligible Conditional Placements up to the MLCX cutoff time, a pre-determined configurable time prior to each primary listing exchange’s closing cutoff time.
- For Conditional Placements that are matched, MLCX will generate a Firm-Up Invite with the matched full or partial order quantity. Matched shares will be executed following the primary listing exchange’s closing print.
- For unmatched Conditional Placements, MLCX will cancel back the unmatched quantity to the BofAS Smart Order Router (“SOR”) for execution at the primary listing exchange.
- MLCX only accepts market Conditional Placements and Responses to Firm Up Invites from the BofAS SOR.

¹ Private Client (Retail)-- This segment consists only of Merrill Lynch, Pierce, Fenner & Smith Incorporated Wealth Management order flow from retail Customers

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- Matching priority for Conditional Placements is based on capacity and time.
- Only trading in NMS stocks will be supported.
- Client segmentation and MEQ will not be supported.
- MLCX will support restricting interaction against BofAS principal capacity Conditional Placements.
- For a detailed description of the operation of the MLCX ATS, please refer to the Firm's Form ATS-N filing on the U.S. Securities and Exchange Commission Form ATS-N Filings and Information site at www.sec.gov/divisions/marketreg/form-ats-n-filings

BofAS Smart Order Router ("SOR")

Venue Access

- BofAS has in place connectivity to the Regulation NMS market centers with protected quotes. We are connected to a select group of Alternative Trading Systems ("ATs") and Single Dealer Platforms ("SDPs"), which we evaluate on a continuous basis 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).
- 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 Execution Quality Working Group, 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 for their order flow

Overview of the 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 Eastern Time, handling orders for pre/post and core trading sessions in U.S. 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, we offer an option that incorporates economics
- BofAS SOR may attempt to find liquidity internally (Instinct X[®] only) prior to accessing other trading venues, including other non-displayed liquidity sources, however clients may choose different options for accessing liquidity
- BofAS SOR may attempt to find liquidity internally (MLCX only) in combination with routing MOC orders to the primary listing exchange. Default behavior is dependent on the strategy settings, market conditions and client preferences.
- 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 indications of interest (IOI) 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 routing tactics that are combined to form a specific routing strategy. These liquidity sourcing tactics are briefly outlined below. For more information, please contact a BofAS sales representative.

Sweep – seek displayed liquidity

- 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 geographical fragmentation, 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, an oversizing logic is applied when order quantity exceeds displayed quantity, in an attempt to capture reserve liquidity

Scan – seek non-displayed liquidity

- BofAS SOR may attempt to access non-displayed liquidity prior to sweeping public markets. Non-displayed liquidity may be sourced from ATs, SDPs or by utilizing hidden order types at exchanges. Venues may be accessed either in parallel or sequentially
- Unless explicitly specified by client or algorithm, the router 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 router will

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determine which venues to access and price point within the spread. In addition, the SOR may set a specific MEQ to reduce the potential for quote fade

- Clients may opt out of this feature and specify a pre-agreed list of venues that may be accessed prior to public markets

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 an overall time to fill. Posting to a particular destination may change based on regular reviews
- 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, under certain situations 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, 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 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
- Full order size is allocated on a staggered basis to venues based on statistical ranking, respecting pegging instructions. Venue rankings may change based on regular reviews
- Default MEQ is set to approximate the typical block size in the market, but can be customized on a per-venue basis. Note, certain venues require a minimum block size

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Disclaimer

BofA Securities Instinct X®

BofA Securities ("BofA Securities") operates Instinct X®, an Alternative Trading System ("ATS") in the US and in other geographies. BofA Securities seeks to operate its ATSs in accordance with applicable regulations, and in accordance with reasonable expectations of fairness. However, potential execution counterparties in BofA Securities' ATSs and in external venues 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 its ATSs. BofA Securities' ATSs operate on a Price/Capacity/Time priority, with any BofA Securities principal capacity orders yielding to client orders at an equal price.

Within its own ATSs, BofA Securities may offer a variety of crossing services that support a segmentation and/or tiering model 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 resident non-displayed orders in one of BofA Securities' own ATSs, 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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