The Nasdaq Opening and Closing Crosses

Frequently Asked Questions

1. What are the Nasdaq Opening and Closing Crosses?

The Nasdaq Opening and Closing Crosses are price discovery facilities that cross orders at a single price. The Crosses enable market participants to execute on-open and on-close interest and provide unparalleled transparency into the market open and market close. All nationally-listed securities are eligible for the Crosses.

2. How do the Crosses work?

Nasdaq accepts on-open and on-close order types that are executable only during the Opening or Closing Cross, respectively.

- Leading up to an open or close, Nasdaq disseminates information about any order imbalance that exists among orders on the opening or closing book, along with an indicative opening or closing price.
- In the Cross process, the opening or closing book and the Nasdaq continuous book are brought together to create a single Nasdaq opening or closing price.
- Nasdaq opening and closing prices are distributed to the consolidated tape immediately after the Cross occurs.

3. What are the current thresholds for establishing the Nasdaq Opening and Closing Cross prices?

Today the Opening and Closing Cross threshold is the greater of $0.50 or 10%.

4. How do the thresholds work?

The threshold of 10% is utilized to calculate a price range for the Cross. 10% of the Nasdaq Best Bid and Offer (QBBO) Midpoint (with a minimum of $0.50) is added to the Nasdaq Offer and subtracted from the Nasdaq Bid to establish the threshold price range.

For example, if the bid/offer is $10.00 x $11.00, then the midpoint equals 10.50 and the threshold value is 10%: 10% x 10.50 =1.05. This value is then added to the offer and subtracted from the bid to obtain the Cross's threshold range: Bid: $10.00 - $1.05 = $8.95 Offer: $11.00 + $1.05 = $12.05 Therefore in this example, the Cross can occur within the prices of $8.95 and $12.05. This means $8.95 is the lowest price at which the Cross can occur and $12.05 is the highest price at which it can occur. The threshold range is dynamic; as the Nasdaq Best Bid and Offer (QBBO) changes, the threshold price range changes.

For Exchange Traded Products (ETPs) only, the methodology is the same as above, however, the threshold percentages used to calculate the threshold price range are as follows:

	Percentage/Thresholds
Opening Cross including Opening Price Validation Parameters Checks A, B, and C	Greater of 5% or $0.50
Closing Cross	3% for ETPs >$50.01
	Greater of 5% or $0.50 for ETPs <= $50.00

5. What time do the Crosses execute?

At 9:30 a.m. ET, the Opening Cross is initiated and the opening book and the Nasdaq continuous book are brought together to create a single Nasdaq Opening Cross. Nasdaq opening prices are distributed to the consolidated tape immediately after the Opening Cross.

At 4:00 p.m., the Closing Cross is initiated and the on-close book and the continuous book are brought together to create a single Nasdaq Closing Cross. Nasdaq closing prices are distributed to the consolidated tape immediately after the Closing Cross.

6. How does the Opening (Closing) Cross affect the Nasdaq Official Opening (Closing) Price?

The Opening Cross sets the Nasdaq Official Opening Price (NOOP). If an issue does not have an Opening Cross, the Nasdaq Official Opening Price is determined by the first last-sale eligible trade reported at or after 9:30 a.m., when regular trading hours begin.

The Closing Cross sets the Nasdaq Official Closing Price (NOCP). If a stock does not have a closing cross, the last regular way last-sale eligible trade reported prior to 4:00 p.m. is used as the NOCP.

7. What information about Opening and Closing Cross is disseminated leading up to the open and close?

Between 9:25 and 9:28 a.m. and 3:50 and 3:55 p.m., Nasdaq disseminates the following information every 10 seconds via Nasdaq TotalView® ITCH, and the Nasdaq Workstation®.

- **Current Reference Price:** A price within the Nasdaq Inside at which paired shares are maximized, the imbalance is minimized and the distance from the bid-ask midpoint is minimized, in that order.
- **Number of Paired Shares:** The number of on-open or on-close shares that Nasdaq is able to pair off at the current reference price.
- **Imbalance Shares:** The number of opening or closing shares that would remain unexecuted at the current reference price.
- **Imbalance Side:** The side of the imbalance: B = buy-side imbalance; S = sell-side imbalance; N = no imbalance; O = no marketable on-open or on- close orders.

8. Between 9:28 and 9:30 a.m. and 3:55 and 4:00 p.m., Nasdaq disseminates the above and the following information every second via Nasdaq TotalView® ITCH, and the Nasdaq Workstation®.

- **Near Indicative Clearing Price:** The crossing price at which orders in the Nasdaq opening / closing book and continuous book would clear against each other.
- **Far Indicative Clearing Price:** The crossing price at which orders in the Nasdaq opening / closing book would clear against each other.

The NOII is available via Nasdaq TotalView ITCH. TotalView ITCH is available via a wide array of market data vendors and service bureaus, and also directly from Nasdaq. Additionally, the NOII is available on the Nasdaq Workstation. To learn more, please visit Nasdaq Trader.

9. What is the Closing Price for a Nasdaq-listed ETP that does not have a closing cross?

When a Nasdaq-listed ETP does not have a closing cross, its Closing Price methodology will utilize a time-weighted average of the midpoint of the NBBO during the time frame 15:58:00-15:59:55. In order to account for situations where an ETP may have a BBO quotation that is excessively wide, Nasdaq will define a maximum spread width for purposes of defining an eligible quote. An eligible quote is defined as a quote whose spread width is no greater than a value of 10% of the midpoint price. For more information refer here

Order Types

10. Which order types are eligible for the Crosses?

Regular Hours Orders: Regular Hours orders are executable from 9:30 a.m. to 4:00 p.m.

- Executed from 9:30 a.m. to 4:00 p.m., including during the Cross.
- Includes Good-for-the-Day (DAY), Good-til- Canceled (GTC), Immediate-or-Cancel (IOC) and market orders.
- Market Orders placed after 9:28 a.m. will be held until the market opens and will not participate in the Opening Cross.

Quotes & Extended Hours Orders: Extended Hours orders are executable from 4:00 a.m. to 8:00 p.m.

- Eligible for the Cross, except for extended Immediate-or-Cancel orders.
- Extended day, Extended GTC, and Extended IOC orders can be executed during normal and extended hours.

On-Open (OO) Orders (Opening Cross)

- Executed only during the Opening Cross.
- Market-on-open (MOO) orders must be received prior to 9:28 a.m.
- Limit-on-open (LOO) orders may be entered until 9:29:30 a.m.ET. However, LOO orders entered after 9:28 a.m. ET will be accepted at their limit price, unless its limit price is more aggressive than the 9:28 a.m. ET price or the security's previous day's official Closing Price, in which case the Late LOO order will re-price to the more aggressive of the two Prices and DAY orders will be converted to IOC.**
- LOO orders with a TIF other than IOC received after 9:29:30 a.m. are treated as Imbalance-Only orders.

Imbalance-Only (IOs) Orders (Opening Cross)

- Executed only during the Opening Cross.
- Liquidity-providing orders that stabilize the crossing price.
- IO orders may be submitted but not updated or canceled.
- IO orders to buy (or sell) priced more aggressively than the 9:30 a.m. Nasdaq bid (or ask) are adjusted to the Nasdaq bid (or ask) prior to the execution of the Cross.

On-Close Orders (Closing Cross)

- Allow investors to specifically request an execution at the closing price.
- Accepted beginning at 4:00 a.m.
- Market-on-close (MOC) orders must be received prior to 3:55 p.m.
- Limit-on-close (LOC) received after 3:55 p.m. will be accepted at its limit price, unless its limit price is more aggressive than the 3:50 p.m. or the 3:55 p.m. Reference Prices in which case the Late LOC order will re-price to the more aggressive of the two Prices. LOC orders must be received prior to 3:58 p.m. Note: If there is no crossing interest eligible for the Closing Cross and thus no 3:55 p.m. Reference Price, LOC orders received after 3:55 p.m. will not be accepted.

Imbalance-Only Orders (IO) (Closing Cross)

- Provide liquidity to offset on-close order imbalances during the Closing Cross.
- Must be priced (limit); no market IO orders.
- Re-priced to the best bid/ask (displayed or non-displayed) on the Nasdaq book prior to the execution of the Closing Cross.

11. What are IO orders in the Crosses? Why use an IO order when the continuous market is also being used for the Crosses?

    IO orders provide liquidity and are intended to offset a buy/sell imbalance during the Closing Cross. IO orders do not add to an imbalance. They are executable only during the Opening and Closing Crosses. Prior to the Crosses, buy/sell IO orders are re-priced to the best bid and offer, respectively.

    Unlike continuous market orders, IO orders are not at risk for execution prior to market open/close.

12. Do paired shares include IO orders?

    Yes. IO orders are included in the number of paired shares.

13. How is the execution priority of IO orders determined after the re-pricing process of these orders is complete?

    After they are re-priced, IO orders are treated the same as limit orders at the price to which they have been re-priced and are timestamped at the original time of entry for time priority.

14. Is short selling permissible at the Crosses?

    Yes, subject to applicable short sale rules.

15. Is the Manning Rule applicable to the Opening and Closing Crosses?

    Yes. The Manning Rule and all other market rules that pertain to the regular trading day apply to the Nasdaq Opening and Closing Crosses. In particular, when determining its Manning Rule obligations, a market participant must consider executions that result from the Opening and Closing Crosses since those executions occur during normal trading hours.

16. Does Nasdaq guarantee market-on-close (MOC) orders in the Closing Cross?

    No, the Opening and Closing Crosses provide unparalleled transparency which encourages market participants to provide necessary liquidity to offset any MOC imbalance.

17. If a firm sends in a MOO/MOC or LOO/LOC order after the cut-off, is it rejected?

    a. MOOs (MOCs) entered after the cut-off at 9:28 a.m. (3:55 p.m.), are not accepted.

    b. LOOs entered after the cut-off at 9:29:30 a.m., with a time-in-force of IOC, are not accepted.

    c. LOCs entered after the cut-off at 3:58 p.m., regardless of TIF, are not accepted.

18. If a firm sends in a MOO/MOC or LOO/LOC or IO orders that do not get executed, will they receive a cancellation message?

    Yes. A cancellation message will be returned to the firm after the cross occurs.

19. Which price is used to execute on-open (OO) / on- close (OC) orders? What happens for market and limit orders?

    The Cross process considers all orders on Nasdaq book and the inside prices at the time of the cross. Imbalance-Only (IO) orders are re-priced to the Nasdaq inside price- sell IOs are repriced to the best continuous book offer and buy IOs are repriced to the best continuous book bid. The

Cross price is based on the following steps:

1. Maximize the number of shares executed.
2. Minimize the imbalance of Cross orders.
3. Minimize the distance from the Nasdaq inside bid- ask midpoint.

The Opening Cross price determines the NOOP for each stock that has a Cross. If a stock does not have an Opening Cross, the Nasdaq Official Opening Price is determined by the first last-sale eligible trade reported at or after 9:30 a.m., when regular trading hours begin.

The Closing Cross price determines the NOCP for each stock included in the Closing Cross. If a stock does not have a Closing Cross, the last regular was last-sale eligible trade reported prior to 4:00 p.m. is used as the NOCP.

Imbalance Information Dissemination

20. When does Nasdaq begin its dissemination of the Net Order Imbalance information?

Nasdaq begins disseminating Net Order Imbalance information at 9:25 a.m. for the Opening Cross and 3:50 p.m. for the Closing Cross.

21. Where can I access the Net Order Imbalance information for the open?

The Net Order Imbalance Indicator (NOII) information is available via the Nasdaq TotalView® data feed, the Nasdaq DataStore at data.Nasdaq.com, the Nasdaq Workstation® and select market data distributors and service bureaus.

To view a guide on how to access Nasdaq Order Imbalance Indicator data through market data vendors and service bureaus and for more information on the Crosses, visit www.NasdaqTrader.com/Cross Firms should check with their vendors and service bureaus for more information on how they can access the imbalance data.

Other

22. Do the Crosses access liquidity from other venues?

No. Only interest on the Nasdaq book is eligible to participate in the Crosses.

23. Is there special processing for odd lot orders?

Odd lots follow regular Nasdaq processing.

24. Can pegged and discretionary orders participate in the Closing Cross?

Yes, if they reside on the Nasdaq continuous book. On-close (OC) and Imbalance-Only (IO) orders cannot be pegged or discretionary.

25. What are the cutoff times for modifying or cancelling orders in the Opening and Closing Crosses?

Orders can be modified or cancelled for the opening cross prior to 9:25 a.m. and for the closing cross prior to 3:50 p.m.

More Information

For more information about the Nasdaq Crosses:

- Contact Nasdaq Market Sales at +1 800 846 0477 or sales@Nasdaq.com.
- Visit www.NasdaqTrader.com/Cross

To subscribe to the Nasdaq Net Order Imbalance Indicator, visit the Nasdaq DataStore or call your Market Data Representative.

To view a guide on how to access Nasdaq Net Order Imbalance data through market data vendors and service bureaus and how to enter closing orders, visit NasdaqTrader.com/Cross.

*Pending SEC approval. Currently, full NOII dissemination leading up to the Opening Cross begins at 9:28 a.m.

All Times Eastern

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