Nasdaq TotalView-Aggregated 2.0

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Nasdaq

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1 Overview

Nasdaq TotalView-•·Aggregated[SM] is a direct data feed product offered by The Nasdaq Stock Market, LLC.

Nasdaq TotalView-•·Aggregated features the following data elements (in binary number format) for all exchange-•-listed equities securities traded via the Nasdaq execution system:

- **Nasdaq Price Level Data:** For Nasdaq execution system, Nasdaq aggregates the order and quotation depth at each price point. For each price point, Nasdaq shows the aggregated number of shares available for each market participant ID as well as the total amount for Nasdaq execution system. TotalView-Aggregated carries price level data for NYSE-, NYSE American-, NYSE Arca- and BATS-listed securities as well as for Nasdaq-listed securities.
- **Net Order Imbalance Data:** In the minutes leading up to the Nasdaq Crosses, Nasdaq disseminates the indicative clearing price and net order imbalance in the Nasdaq market system. Because the calculation includes non-displayable as well as displayable order types, the net order imbalance indicator (NOII) is the best predictor of the Nasdaq opening and closing prices available to the public.
- **Administrativemessages**, suchtradingactionsandsymboldirectorymessages:
  - Trading action messages are used to inform market participants when a security is halted/paused or released for trading.
  - Symbol Directory messages provide basicsecurity data such as the market tier and Financial Status Indicator.
  - Market participant position message carries the Primary Market Maker status, Market Participant status and Market Maker mode fields used by some firms to comply with market regulations.
- **Eventcontrols,** such as startof day, end of day and emergencymarkethalt/resume.

2 Architecture

The TotalView-•·Aggregated feed is made up of a series of sequenced messages. Each message is variable in length based on the message type. The messages that make up the TotalView–Aggregated protocol are typically delivered using a higher level protocol that takes care of sequencing and delivery guarantees.

Nasdaq offers the TotalView–Aggregated data feed in three protocol options:.

- SoupBinTCP
- Compressed via SoupBinTCP
- MoldUDP6

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3 Data Types

All integer fields are big-•-endian (network byte order) binary encoded numbers. Unless otherwise noted, they are unsigned.

All alpha fields are ASCII fields which are left justified and padded on the right with spaces.

Prices are integerfields, supplied with an associated precision. When converted to a decimal format, prices are in fixed point format, where the precision defines the numberof decimal places. For example, a field flagged as Price (4) has an implied 4 decimal places. The maximum value of price (4) in TotalView--Aggregated is 200,000.0000 (decimal, 77359400 hex).

Timestamps are represented as nanoseconds since midnight

4 Message Formats

The TotalView–Aggregated supports four basic types of messages:

- System Events
- Nasdaq Single Book Price Levels
- Nasdaq Net Order Imbalance Indicators
- Administrative Data

Within the system event and administrative types, Nasdaq may support multiple message formats as outlined below.

4.1 System Event Message

The system event message type is used to signal a market or data feed handler event. The format is as follows:

System Event Message				
Name	**Offset**	**Length**	**Value**	**Notes**
Message Type	0	1	"S"	System Event Message
Tracking Number	3	2	Integer	Nasdaq internal tracking number
Timestamp	3	6	Integer	Nanoseconds since midnight
Event Code	9	1	Alpha	See System Event Codes below

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Nasdaq supports the following event codes on a daily basis on the TotalView-Aggregated data feed.

System Event Codes – Daily	
Code	**Explanation**
"O"	Start of Messages. Outside of time stamp messages, the start of day message is the first message sent in any trading day
"S"	Start of System hours. This message indicates that Nasdaq is open and ready to start accepting orders
"Q"	Start of Market hours. This message is intended to indicate that Market Hours orders are available for execution
"X"	Clear NOII - Opening Cross Data. This message signals that firms may clear NOII cache for the regular Opening Cross.
"M"	End of Market Hours. This message is intended to indicate that Market Hours orders are no longer available for execution.
"E"	End of System Hours. It indicates that Nasdaq is now closed and will not accept any new orders.
"C"	End of Messages. This is always the last message sent in any trading day.

4.2 Stock Related Messages

4.2.1 Stock Directory

At the start of each trading day, Nasdaq disseminates stock directory messages for all active symbols in the Nasdaq execution system.

Market data redistributors should process this message to populate the Financial Status Indicator (required display field) and the Market Category (recommended display field) for Nasdaq-listed issues.

Stock Directory				
Name	**Offset**	**Length**	**Type**	**Value/Description**
Message Type	0	1	"R"	Stock Directory Message
Tracking Number	1	2	Integer	Nasdaq internal tracking number
Timestamp	3	6	Integer	Time at which the directory message was generated. Refer to Data Types for field processing notes.
Stock	9	8	Alpha	Denotes the security symbol for the issue in the Nasdaq execution system.
Market Category	17	1	Alpha	Indicates Listing market or listing market tier for the issue

Code	Definition
Nasdaq---Listed Instruments	
Q	Nasdaq Global Select Market℠
G	Nasdaq Global Market℠
S	Nasdaq CapitalMarket®
Non---Nasdaq---Listed Instruments	
N	New York Stock Exchange (NYSE)
A	NYSE American
P	NYSE Arca
M	NYSE Texas
Z	BATS Z Exchange
V	Investors' Exchange, LLC

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F	Texas Exchange
<space>	Not available

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FinancialStatus Indicator	18	1	Alpha	For Nasdaq-listed issues, this field indicates when a firm is not in compliance with Nasdaq continued listing requirements

Code	Definition
Nasdaq---Listed Instruments	
D	Deficient
E	Delinquent
Q	Bankrupt
S	Suspended
G	DeficientandBankrupt
H	DeficientandDelinquent
J	Delinquent and Bankrupt
K	Deficient, Delinquent and Bankrupt
C	Creations and/or Redemptions Suspendedfor ExchangeTradedProduct
N	Normal(Default): Issuer Is NOTDeficient, Delinquent, orBankrupt
Non---Nasdaq---Listed Instruments	
<space>	Not available. Firms should refer to SIAC feeds for code if needed.

Round Lot Size	19	4	Integer	Denotes the number of shares that represent a round lot for the issue
Round Lots Only	23	1	Alpha	Indicates if Nasdaq system limitsorder entry for issue

Code	Definition
Y	Nasdaq system only accepts round lots
N	Nasdaq system does not have any order size restrictions for this security. Odd and mixed lot ordersare allowed.

Issue Classification	24	1	Alpha	Identifies the security class for the issue as assigned by Nasdaq. See Appendix for allowable values.
Issue Sub-•-Type	25	2	Alpha	Identifies the security sub-•-type for the issue as assigned by Nasdaq. See Appendix for allowable values.
Authenticity	27	1	Alpha	Denotes if an issue or quoting participant record is set-•-up in Nasdaq systems in a live/production, test, or demo state. Please note that firms should only show live issues and quoting participants on public quotation displays.

Code	Definition
P	Live/Production
T	Test

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Short Sale Threshold Indicator	28	1	Alpha	Indicates if a security is subject to mandatory close-•-out of short sales under SEC Rule 203(b)(3). **Code** — **Definition** Y — Issue is restricted under SEC Rule 203(b)(3) N — Issue is not restricted <space> — Threshold Indicatornotavailable
IPO Flag	29	1	Alpha	Indicates if the Nasdaq security is set up for IPO release. This field is intended to help Nasdaq market participant firms comply with FINRA Rule 5131(b). **Code** — **Definition** Nasdaq---Listed Instruments Y — Nasdaq system only accepts round lots orders for this security. N — Nasdaq system does not have any order size restrictions for this security. Odd and mixed lot orders are allowed. Z — Nasdaq-listed instrument is a non-IPO new listed security Non---Nasdaq---Listed Instruments <space> — Not available
LULD Reference Price Tier	30	1	Alpha	Indicates which Limit Up / Limit Down price bandcalculation parameter is to be used for the instrument. Refer to LULD Rule for details. **Code** — **DefInItIon** 1 — Tier 1 NMS Stocks and select ETPs 2 — Tier 2 NMS Stocks <space> — Not available
ETP Flag	31	1	Alpha	Indicates whether the security is anexchange traded product (ETP): **Code** — **Definition** Y — Instrument is an ETP N — Instrument is not an ETP <space> — Not available
ETPLeverage Factor	32	4	Integer	Tracks the integral relationship of the ETP to the underlying index. Example: If the underlying Index increases by a value of 1 and the ETP's Leverage factor is 3, indicates the ETF will increase/decrease (see Inverse) by 3. Leverage Factor is rounded to the nearest integer below, e.g.

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level_agg_factor_1	of 1 to 1.99. This field is used for LULD Tier I price band calculation purposes.
would_represent_level_agg_factors	

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Inverse Indicator	36	1	Alpha	Indicates the directional relationship between the ETP and Underlying index. Code — Definition Y — ETP is an Inverse ETP N — ETP is not an Inverse ETP Example: An ETP Leverage Factor of 3 and an Inverse value of 'Y' indicates the ETP will decrease by a value of 3.

4.2.2 Stock Trading Action

Nasdaq uses this administrativemessage to indicate the current tradingstatus of a security to the trading community.

Prior to the start of system hours, Nasdaq will send out a Trading Action spin. In the spin, Nasdaq will send out a Stock Trading Action message with the "T" (Trading Resumption) for all Nasdaq--- and other exchange-•-listed securities that are eligible for trading at the start of the system hours. If a security is absent from the pre-•-opening Trading Action spin, firms should assume that the security is being treated as halted in the Nasdaq platform at the start of the system hours. Please note that securities may be halted in the Nasdaq system for regulatory or operational reasons.

After the startofsystemhours, Nasdaq willuse the Trading Actionmessage to relay changes in tradingstatus for an individualsecurity. Messageswill besent when a stock is:

- Halted
- Paused*
- Released for quotation
- Releasedfor trading

* The paused status will be disseminated for Nasdaq---listed securities only. Trading pauses on non---Nasdaq listed securities will be treated simply as a halt.

Stock Trading Action

Name	Offset	Length	Value	Notes
Message Type	0	1	"H"	Stock Trading Action Message.
Tracking Number	1	2	Integer	Nasdaq internal tracking number
Timestamp	3	6	Integer	Nanoseconds since midnight
Stock	9	8	Alpha	Stock symbol, right padded with spaces
Trading State	17	1	Alpha	Indicates the current trading state for the stock. Allowable values: "H" = Halted across all U.S. equity markets / SROs "P" = Paused across all U.S. equity markets / SROs (Nasdaq---listed securities only)

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				"Q" = Quotation only period for cross-•-SRO halt or pause "T" = Trading on Nasdaq
Reason	18	4	Alpha	Trading Action reason.

4.2.3 Reg SHO Short Sale Price Test Restricted Indicator

In February 2011, the Securities and Exchange Commission (SEC) implemented changes to Rule 201 of the Regulation SHO (Reg SHO). For details, please refer to **SEC Release Number 34-61595**. In association with the Reg SHO rule change, Nasdaq will introduce the following Reg SHO Short Sale Price Test Restricted Indicator message format.

For Nasdaq-•-listed issues, Nasdaq supports a full pre-•-opening spin of Reg SHO Short Sale Price Test Restricted Indicator messages indicating the Rule 201 status for all active issues. Nasdaq also sends the Reg SHO Short Sale Price Test Restricted Indicator message in the event of an intraday status change.

For other exchange-•-listed issues, Nasdaq relays the Reg SHO Short Sale Price Test Restricted Indicator message when it receives an update from the primary listing exchange.

Nasdaq processes orders based on the most Reg SHO Restriction status value.

Reg SHO Restriction

Name	Offset	Length	Value	Notes
Message Type	0	1	"Y"	Reg SHO Short Sale Price Test Restricted Indicator
Tracking Number	1	2	Integer	Nasdaq internal tracking number
Timestamp	3	6	Integer	Nanoseconds since midnight
Stock	9	8	Alpha	Stock symbol, right padded with spaces
Reg SHO Action	17	1	Alpha	Denotes the Reg SHO Short Sale Price Test Restriction status for the issue at the time of the message dissemination. Allowable values are: "0" = No price test in place "1" = Reg SHO Short Sale Price Test Restriction in effect due to an intra-•-day price drop in security "2" = Reg SHO Short Sale Price Test Restriction remains ineffect

4.2.4. Market Participant Position

At the start of each trading day, Nasdaq disseminates a spin of market participant position messages. The message provides the Primary Market Maker status, Market Maker mode and Market Participantstatefor each Nasdaq market participant firm registered in an issue. Market participantfirms may use thesefields to comply withcertainmarketplacerules.

Throughout the day, Nasdaq willsend out this message only if Nasdaq Operations changes the status of a marketparticipantfirm in an issue.

Market Participant Position

Name	Offset	Length	Value	Notes
Message Type	0	1	"P"	Market Participant Position message
Tracking Number	1	2	Integer	Nasdaq internal tracking number

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Timestamp	3	6	Integer	Nanoseconds since midnight
MPID	9	4	Alpha	Denotes the marketparticipant identifier for which the position message is being generated
Stock	13	8	Alpha	Stock symbol, right padded with spaces
Primary Market Maker	21	1	Alpha	Indicates if the market participant firm qualifies as a Primary Market Maker in accordance with Nasdaq marketplace rules "Y" = primary market maker "N" = non-•-primary market maker
Market Maker Mode	22	1	Alpha	Indicates the quoting participant's registration status in relation to SEC Rules 101 and 104 of Regulation M "N" = normal "P" = passive "S" = syndicate "R" = pre-•-syndicate "L" = penalty
Market Participant State	23	1	Alpha	Indicatesthe marketparticipant'scurrent registration status in the issue "A" = Active "E" = Excused/Withdrawn "W" = Withdrawn "S" = Suspended "D" = Deleted

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4.2.5. Market---Wide Circuit Breaker (MWCB) Messaging

4.2.5.1 MWCB Decline Level Message

Informs data recipients what the daily MWCB breach points are set to for the current trading day.

MWCB Decline Level Message				
Name	**Offset**	**Length**	**Value**	**Notes**
Message Type	0	1	"V"	Market wide circuit breaker Decline Level Message.
Tracking Number	1	2	Integer	Nasdaq internal tracking number
Timestamp	3	6	Integer	Time at which the MWCB Decline Level message was generated
Level 1	8	8	Price (8)	Denotes the MWCB Level 1 Value.
Level 2	17	8	Price (8)	Denotes the MWCB Level 2 Value.
Level 3	25	8	Price (8)	Denotes the MWCB Level 3 Value.

4.2.5.2 MWCB Status Message

Informs data recipients when a MWCB has breached one of the established levels

MWCB Decline Level Message				
Name	**Offset**	**Length**	**Value**	**Notes**
Message Type	0	1	"W"	Market-wide Circuit Breaker Status message
Tracking Number	1	2	Integer	Nasdaq internal tracking number
Timestamp	3	6	Integer	Time at which the MWCB Breaker Statusmessage was generated
Breached Level	9	1	Alpha	Denotes the MWCB Level that was breached. "1" = Level 1 "2" = Level 2 "3" = Level3

4.2.6 IPO Quoting Period Update

Indicates the anticipated IPO quotation release time of a security.

IPO Quoting Period Update				
Name	**Offset**	**Length**	**Value**	**Notes**
Message Type	0	1	"K"	IPO Quoting Period Update Message
Tracking Number	1	2	Integer	Nasdaq internal tracking number
Timestamp	3	6	Integer	Time at which the IPO message was generated
Stock	9	8	Alpha	Stock symbol, right padded with spaces
IPO Quotation Release Time	17	4	Integer	Denotes the IPO release time, in seconds since midnight, for quotation to thenearest second. NOTE: If the quotation period is being canceled/postponed, we should state that: 1. IPO Quotation Time will be set to 0 2. 2. IPO Price will be set to 0

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IPO Quotation Release Qualifier	21	1	Alpha	"A" = Anticipated Quotation Release Time: This value would be used when Nasdaq Market Operations initially enters the IPO instrument for release "C" = IPO Release Canceled/Postponed: This value would be sued when Nasdaq Market Operations cancels or postpones the release of the new IPO instrument
IPO Price	22	4	Price (4)	Denotes the IPO Price to be used for intraday net change calculations Prices are given in decimal format with 6 whole number places followed by 4 decimal digits. The whole number portion is padded on the left with spaces; the decimal portion is padded on the right with zeroes. The decimal point is implied by position, it does not appear inside the price field

4.2.7 Limit Up – Limit Down (LULD) Auction Collar

Indicates the auction collar thresholds within which a paused security can reopen following a LULD Trading Pause

LULD Auction Collar				
Name	**Offset**	**Length**	**Value**	**Notes**
Message Type	0	1	"J"	LULD Auction Collar
Tracking Number	1	2	Integer	Nasdaq internal tracking number
Timestamp	3	6	Integer	Nanoseconds past midnight
Stock	9	8	Alpha	Stock symbol, right padded with spaces
Auction Collar Reference Price	17	4	Price (4)	Reference price used to set the Auction Collars
Upper Auction Collar Price	21	4	Price (4)	Indicates the price of the Upper Auction Collar Threshold
Lower Auction Collar Price	25	4	Price (4)	Indicates the price of the Lower Auction Collar Threshold
Auction Collar Extension	29	4	Integer	Indicates the number of the extensions to the Reopening Auction

4.2.8 Operational Halt

The Exchange uses this message to indicate the current Operational Status of a security to the trading community. An Operational Halt means that there has been an interruption of service on the identified security impacting only the designated Market Center. These Halts differ from the "Stock Trading Action" message types since an Operational Halt is specific to the exchange for which it is declared, and does not interrupt the ability of the trading community to trade the identified instrument on any other market place.

Nasdaq uses this administrative message to indicate the current trading status of the three market centers operated by Nasdaq.

Operational Halt				
Name	**Offset**	**Length**	**Type**	**Value/Description**
Message Type	0	1	"h"	Operational Halt

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Tracking Number	1	2	Integer	Nasdaq internal tracking number
Timestamp	3	6	Integer	Time at which Operational Halt message was generated. Refer to Data Types for field processing notes
Stock	9	8	Alpha	Denotes the security symbol for the issue in Nasdaq execution system.
Market Code	17	1	Alpha	"Q": Nasdaq "B": Nasdaq Texas "X": PSX
Operational Halt Action	18	1	Alpha	"H": Operationally Halted on the identified Market "T": Operational Halt has been lifted and Trading resumed

4.3 TotalView Price Update

Nasdaq disseminates a price level message whenever the aggregated position at a price level changes. Price levels will be generated whenever an order is entered, canceled or executed or when a quote is updated for a certain price point.

When a firm receives the initial message for a given price point, it should add the price level to its display.

When a firm receives subsequent messages for a given price point, it should update the display to reflect the update.

When a firm sees the number of shares fall to zero, it should remove the price level from display.

Price Level Update				
Name	**Offset**	**Length**	**Value**	**Notes**
Message Type	0	1	"U"	Participant Price Level Update
Tracking Number	1	2	Integer	Nasdaq internal tracking number
Timestamp	3	6	Integer	Time at which the price level update was generated
Market Side	9	1	Alpha	Denotes the side of the market associated with the price level update "B" = Buy Order. "S" = Sell Order.
Participant Shares	10	4	Integer	Reflects the current number of shares displayed by this participant at this price level
Aggregate Shares	14	4	Integer	Reflects the total number of shares displayed in the Nasdaq execution system for ALL participants at this price level
Stock	18	8	Alpha	Denotes the security symbol for which the price level is being generated
Price	26	4	Price (4)	Reflects the price associated with the update. Refer to Data Types for field processing notes.
MPID	30	4	Alpha	Denotes the market participant identifier associated with the price level update

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4.5 Net Order Imbalance Indicator (NOII) Message

- Nasdaq begins disseminating Net Order Imbalance Indicators (NOII) at 9:25 a.m. for the Opening Cross and 3:50 p.m. for the Closing Cross.
- Between 9:25 and 9:28 a.m. and 3:50 and 3:55 p.m., Nasdaq disseminates the NOII information every 10 seconds.
- Between 9:28 and 9:30 a.m. and 3:55 and 4:00 p.m., Nasdaq disseminates the NOII information every second.
- For Nasdaq Halt, IPO and Pauses, NOII messages will be disseminated at 1 second intervals starting 1 second after quoting period starts/trading action is released.
- For more information, please see the FAQ on Opening and Closing Crosses.
- Nasdaq will also disseminate an Extended Trading Close (ETC) message from 4:00 p.m. to 4:05 p.m. at five second intervals.
- For more information, please see the FAQ on Extended Trading Close.

NOII Message

Name	Offset	Length	Value	Notes
Message Type	0	1	"I"	NOII Message
Tracking Number	1	2	Integer	Nasdaq internal tracking number
Timestamp	3	6	Integer	Nanoseconds since midnight.
Paired Shares	9	8	Integer	The total number of shares that are eligible to be matched at the Current Reference Price.
Imbalance Shares	17	8	Integer	The number of shares not paired at the Current Reference Price.
Imbalance Direction	25	1	Alpha	The market side of the order imbalance. "B" = buy imbalance "S" = sell imbalance "N" = no imbalance "O" = Insufficient orders to calculate "P" = Paused
Stock	26	8	Alpha	Stock symbol, right padded with spaces
Far Price	34	4	Price (4)	A hypothetical auction-clearing price for cross orders only. Refer to Data Types for field processing notes.
Near Price	38	4	Price (4)	A hypothetical auction-clearing price for cross orders as well as continuous orders. Refer to Data Types for field
Current Reference Price	42	4	Price (4)	The price at which the NOII shares are being calculated. Refer to Data Types for field processing notes.
Cross Type	46	1	Alpha	The type of Nasdaq cross for which the NOII message is being generated "O" = Nasdaq Opening Cross "C" = Nasdaq Closing Cross "H" = Cross for IPO and halted / paused securities "A" = Extended Trading Close
Price Variation Indicator	47	1	Alpha	This field indicates the absolute value of the percentage of deviation of the Near Indicative Clearing Price to the nearest Current Reference Price. "L" = Less than 1%

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	"1" = 1 to 1.99% "2" = 2 to 2.99% "3" = 3 to 3.99% "4" = 4 to 4.99% "5" = 5 to 5.99% "6" = 6 to 6.99% "7" = 7 to 7.99% "8" = 8 to 8.99% "9" = 9 to 9.99% "A" = 10 to 19.99% "B" = 20 to 29.99% "C" = 30% or greater <Space> = Cannot be calculated

4.6 Retail Price Improvement Indicator(RPII)

Identifies a retail interest indication of the Bid, Ask or both the Bid and Ask for Nasdaq-•-listed securities.

Retail Interest Message				
Name	Offset	Length	Value	Notes
Message Type	0	1	"N"	Retail Interest message
Tracking Number	1	2	Integer	Nasdaq internal tracking number
Timestamp	3	6	Integer	Nanoseconds since midnight.
Stock	9	8	Alpha	Stock symbol, right padded with spaces
Interest Flag	17	1	Alpha	"B" = RPI orders available on the buy side "S" = RPI orders available on the sell side "A" = RPI orders available on both sides (buy and sell) "N" = No RPI orders available

4.7 Direct Listing with Capital Raise Price Discovery Message

The following message is disseminated only for Direct Listing with Capital Raise (DLCR) securities. Nasdaq begins disseminating messages once per second as soon as the DLCR volatility test has successfully passed.

Direct Listing with Capital Raise Price Discovery Message				
Name	Offset	Length	Value	Notes
Message Type	0	1	"O"	Direct Listing with Capital Raise Message
Tracking Number	1	2	Integer	Nasdaq internal tracking number
Timestamp	3	6	Integer	Nanoseconds since midnight
Stock	9	8	Alpha	Stock symbol, right padded with spaces
Open Eligibility Status	17	1	Alpha	Indicates if the security is eligible to be released for trading "N": Not Eligible "Y": Eligible

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Minimum Allowable Price	18	4	Price (4)	20% below Registration Statement Lower Price
Maximum Allowable Price	22	4	Price (4)	80% above Registration Statement Highest Price
Near Execution Price	26	4	Price (4)	The current reference price when the DLCR volatility test has successfully passed
Near Execution Time	30	8	Integer	The time at which the near execution price was set
Lower Price Range Collar	38	4	Price (4)	Indicates the price of the Lower Auction Collar Threshold (10% below the Near Execution Price)
Upper Price Range Collar	42	4	Price (4)	Indicates the price of the Upper Auction Collar Threshold (10% above the Near Execution Price)

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5 Support

- For generalproduct support for Nasdaq data feeds, pleasecontact clientsuccess@nasdaq.com.

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Appendix A – Data Channel Assignment – MoldUDP Option Only

For initial implementation of the TotalView–Aggregated data feed, Nasdaq will disseminate the outbound messages via eight logical channels.

Price level, NOII and administrative messages will be split based on the initial letter of the stock symbol within the message. Each data channel will contain the full range of exchange-listed (Nasdaq-, NYSE-, NYSE American-, NYSE Arca- and BATS-listed) security data. The symbol assignment will be:

Data Feed Channel	Symbol Alphabetic Range
TotalView–Aggregated #1	A
TotalView–Aggregated #2	B-C
TotalView–Aggregated #3	D-F
TotalView–Aggregated #4	G-K
TotalView–Aggregated #5	L-N
TotalView–Aggregated #6	O-Q
TotalView–Aggregated #7	R-S
TotalView–Aggregated #8	T-Z

System event messages, however, will be disseminated across all data channels.

For the MoldUDP protocol, the packet sequencing schema will be unique to each data channel.

For the addressing information, please refer to the MoldUDP Data Feed IP Addresses page of the Nasdaq Trader website.

Appendix B – Stock Symbol Convention

For Nasdaq-listed issues, Nasdaq currently restricts its symbol length to a maximum of 8 characters. For common stock issuances, Nasdaq, PSX and Nasdaq Texas will only assign root symbols of 1 to 4 characters in length with possible fifth and or sixth character denoting a suffix. In certain instances, a dot "." delimiter may be applied to symbols after the root and between the suffix eg., XXXX.A. For subordinate securities, Nasdaq and Nasdaq Texas will assign a 5 character symbol for which the last character relays information about the issue class or issue type. For the current list of fifth and or six character symbol suffixes, please refer to Ticker Symbol Convention page on the Nasdaq Trader website.

For NYSE-, NYSE American- and NYSE Arca-listed securities with subordinate issue types, please refer to Ticker Symbol Convention page on the Nasdaq Trader website.

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Appendix C- Trading Action Reason Codes

For Nasdaq-listed issues, Nasdaq acts as the primary market and has the authority to institute a trading halt or trading pause in an issue due to news dissemination or regulatory reasons.

For CQS issues, Nasdaq abides by any regulatory trading halts and trading pauses instituted by the primary or listing market as appropriate.

For both issue types, Nasdaq may also halt trading for operational reasons.

Nasdaq will send out a trading action message to inform its market participants when the trading status of an issue changes. For informational purposes, Nasdaq also attempts to provide the reason for each trading action update. For bandwidth efficiency reasons, Nasdaq uses a 4-byte code for the reason on its outbound data feeds.

REASON CODES FOR TRADING HALT ACTIONS	
Code	**Value**
T1	Halt News Pending
T2	Halt News Disseminated
T5	Single Security Trading Pause In Effect
T6	Regulatory Halt — Extraordinary Market Activity
T8	Halt ETF
T12	Trading Halted; For Information Requested by Listing Market
H4	Halt Non-Compliance
H9	Halt Filings Not Current
H10	Halt SEC Trading Suspension
H11	Halt Regulatory Concern
O1	Operations Halt; Contact Market Operations
LUDP	Volatility Trading Pause
LUDS	Volatility Trading Pause – Straddle Condition
MWC1	Market Wide Circuit Breaker Halt – Level 1
MWC2	Market Wide Circuit Breaker Halt – Level 2
MWC3	Market Wide Circuit Breaker Halt – Level 3
MWC0	Market Wide Circuit Breaker Halt – Carry over from previous day
IPO1	IPO Issue Not Yet Trading
M1	Corporate Action
M2	Quotation Not Available
Space	Reason Not Available

REASON CODES FOR QUOTATION/TRADING RESUMPTION ACTIONS	
Code	**Value**
T3	News and Resumption Times
T7	Single Security Trading Pause / Quotation Only Period
R4	Qualifications Issues Reviewed/Resolved; Quotations/Trading to Resume
R9	Filing Requirements Satisfied/Resolved; Quotations/Trading To Resume
C3	Issuer News Not Forthcoming; Quotations/Trading To Resume
C4	Qualifications Halt ended; Maintenance Requirements Met; Resume
C9	Qualifications Halt Concluded; Filings Met; Quotes/Trades To Resume
C11	Trade Halt Concluded By Other Regulatory Auth.; Quotes/Trades Resume
MWCQ	Market Wide Circuit Breaker Resumption
R1	New Issue Available
R2	Issue Available
IPOQ	IPO Security Released for Quotation (Nasdaq Securities Only)

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IPOE	IPO Security — Positioning Window Extension (Nasdaq Securities Only)
Space	Reason Not Available

Appendix D - Issue Classification Values

Identifies the security class for the issue as assigned by Nasdaq

CODES FOR ISSUE CLASSIFICATION VALUES	
Code	**Value**
A	American Depositary Share
B	Bond
C	Common Stock
F	Depository Receipt
I	144A
L	Limited Partnership
N	Notes
O	Ordinary Share
P	Preferred Stock
Q	Other Securities
R	Right
S	Shares of Beneficial Interest
T	Convertible Debenture
U	Unit
V	Units/Benif Int
W	Warrant

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Appendix E – Issue Sub Type Values

CODES FOR ISSUE CLASSIFICATION VALUES	
Code	**Value**
A	Preferred Trust Securities
AI	Alpha Index ETNs
B	Index Based Derivative
C	Common Shares
CB	Commodity Based Trust Shares
CF	Commodity Futures Trust Shares
CL	Commodity-Linked Securities
CM	Commodity Index Trust Shares
CO	Collateralized Mortgage Obligation
CT	Currency Trust Shares
CU	Commodity-Currency-Linked Securities
CW	Currency Warrants
D	Global Depositary Shares
E	ETF-Portfolio Depositary Receipt
EG	Equity Gold Shares
EI	ETN-Equity Index-Linked Securities
EN	Exchange Traded Notes
EM	Exchange Traded Managed Funds*
EU	Equity Units
F	HOLDRS
FI	ETN-Fixed Income-Linked Securities
FL	ETN-Futures-Linked Securities
G	Global Shares
I	ETF-Index Fund Shares
IR	Interest Rate
IW	Index Warrant
IX	Index-Linked Exchangeable Notes
J	Corporate Backed Trust Security
L	Contingent Litigation Right
LL	Identifies securities of companies that are set up as a Limited Liability Company (LLC)
M	Equity-Based Derivative
MF	Managed Fund Shares
ML	ETN-Multi-Factor Index-Linked Securities
MT	Managed Trust Securities
N	NY Registry Shares
O	Open Ended Mutual Fund
P	Privately Held Security
PP	Poison Pill
PU	Partnership Units
Q	Closed-End Funds

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R	Reg-S
RC	Commodity-Redeemable Commodity-Linked Securities
RF	ETN-Redeemable Futures-Linked Securities
RT	REIT
RU	Commodity-Redeemable Currency-Linked Securities
S	SEED
SC	Spot Rate Closing
SI	Spot Rate Intraday
T	Tracking Stock
TC	Trust Certificates
TU	Trust Units
U	Portal
V	Contingent Value Right
W	Trust Issued Receipts
WC	World Currency Option
X	Trust
Y	Other
Z	Not Applicable

*NextShares Exchange Traded Managed Funds (ETMFs) launched in February 2016. NextShares prices are stated in proxy price on this feed. For more information, please refer to the NextShares Homepage.

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Appendix F – Documentation Revision Control Log

June 11, 2026: TotalView-Aggregated Version 2.00
Included additional listing market value "F" (Texas Exchange).

February 19, 2025: TotalView-Aggregated Version 2.00
Added value "Z" for Nasdaq-listed Non-IPO New Issues
in the IPO Flag field of the Stock Directory Message

February 13, 2026: TotalView-Aggregated Version 2.00
Nasdaq BX name change to Nasdaq Texas.

June 23, 2025: TotalView-Aggregated Version 2.00
Included additional listing market value "M".

April 28, 2023: TotalView-Aggregated Version 2.00
Introduction of Direct Listing with Capital Raise Message and new Imbalance Direction of Paused to NOII Message

May 3, 2018: TotalView-Aggregated Version 2.00
Nasdaq made the decision to fall back to the previous version number to avoid customer confusion related to different sequencing between the version number of the product specifications and the version number of the actual product code.

March 3, 2018: TotalView-Aggregated Version 2.1
Released a new version of Nasdaq TotalView-Aggregated documentation to add a new Operational Halt message (Section 4.2.8) to indicate the current Operational Status of a security to the trading community.

September 12, 2017: TotalView-Aggregated Version 2.00
Nasdaq added a new Market Category code in the Symbol Directory messages for the Investors' Exchange, LLC to distinguish IEX-listed issues. New market category code is "V".

September 6, 2017: TotalView-Aggregated Version 2.00
Nasdaq updated the specification to include a new LULD Auction collars message, number 4.2.7, to support the release of LULD enhancements.

Other revisions to spelling and format were made.

March 6, 2015: TotalView-Aggregated Version 2.00
Released a new version of the TotalView- Aggregated documentation to include the new
Issue Sub-Type "EM" for Exchange Traded Managed Funds.

January 2, 2015: TotalView-Aggregated Version 2.00
Nasdaq RPI program ceased on 12/31/14. Please refer to Equity Trader Alert #2014-94.

December 5, 2014: TotalView-Aggregated Version 2.00
Released a new version of Nasdaq Texas TotalView-ITCH documentation to include missing Issue Sub- Type Codes (Appendix E):

- AI – Alpha Indexes ETNs
- CO – Collateralized Mortgage Obligation
- EU – Equity Units
- F – HOLDRS
- IR – Interest Rate
- IW – Index Warrant
- J – Corporate Backed Trust Security
- PP – Poison Pill
- Q – Closed -End Funds
- RT – REIT
- SC – Spot Rate Closing
- SI – Spot Rate Intraday
- WC – World Currency Option

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- X – Trust
- Y – Other
- Z – NA

October 1, 2013: TotalView-Aggregated Version 2.00
Released a new version of the TotalView- Aggregated documentation to support the following changes:

- Conversion to binary

August 2, 2013: TotalView-Aggregated Version 2.00
Released a new version of the TotalView- Aggregated documentation to support the following changes to take effect October 2013:

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- Updated field offsets in the Symbol Directory Message
- Changed the IPO Quotation Release Message Type to "K"
- Updated length of the IPO Quotation Release Time in the IPO Quotation Release Message. Also, included format of the field.
- Inclusion of the Appendices for Issue Classification and Issue Sub-Type
- Renamed the Compliance ID field to TrackingID
- Added the TrackingID to the TotalView Price Level Update Message
- Updated offsets and lengths in the MWCB Decline Level Message

July 10, 2013: TotalView-Aggregated Version 2.00
Released a new version of the TotalView- Aggregated documentation to support the following changes to take effect October 2013:

- Added Enhanced Symbol Directory
- Added IPO Quotation Release Message
- Added Market-Wide Circuit Breaker (MWCB) Messaging
  - MWCB Decline Level Message
  - MWCB Status Message
- Addition of an internal tracking number to the Stock Trading Action Message
- Addition of 'C' to the Financial Status Indicator field in the Symbol Directory Message

March 9, 2013: TotalView-Aggregated Version 1.10
Released a new version of the TotalView- Aggregated documentation to support the following change:

- Added the following Trading Action Reason Code for LULD to reflect when the National Best Bid is below the lower price band and/or the National Best Offer is above than the upper price band and the NMS Stock is not in a Limit State.
  - LUDS - Volatility Trading Pause – Straddle Condition

January 9, 2013: TotalView-Aggregated Version 1.10
Released a new version of the TotalView- Aggregated documentation to support the following changes:

- Added the following Trading Action Reason Code:
  - MWC0 - Market Wide Circuit Breaker Halt – Carry over from previous day
- Removed the Trading State, "R", from the Stock Trading Action message.

January 8, 2013: TotalView-Aggregated Version 1.10
Released a new version of the TotalView-Aggregated documentation to support the following changes:

- Modified the Retail Price Interest Indicator Message. Changed the message type from "G" to "N".

November 2, 2012: TotalView-Aggregated Version 1.10
Nasdaq released a new version of the TotalView-Aggregated documentation to support the following changes:

- Added the "P" value to the Trading State in the Stock Trading Message.
- Modified the values for the Trading Action Reason Codes. Added the following codes:
  - LUDP - Volatility Trading Pause
  - MWC1 - Market Wide Circuit Breaker Halt – Level 1
  - MWC2 - Market Wide Circuit Breaker Halt – Level 2
  - MWC3 - Market Wide Circuit Breaker Halt – Level 3
  - MWCQ - Market Wide Circuit Breaker Resumption
- Removed the Trading Action values related to the Volatility Guard Program. Removed Trading State, "V". Eliminated Trading Action Reason Codes, V1 and V2.
- Added Retail Price Interest Indicator Message

November 1, 2011: TotalView-Aggregated Version 1.10
Nasdaq updated the Market Category message to include the code "Z" for BATS- listed securities.

April 6, 2011: TotalView-Aggregated Version 1.10

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Nasdaq added two new Trading Action – Reason codes to Appendix C for the Nasdaq Volatility Guard pilot program. New Reason codes were V1 and V2.

November 11, 2010: TotalView-Aggregated Version 1.10

Nasdaq corrected a time stamp error in the Stock Trading Action message format.

November 4, 2010: TotalView-Aggregated Version 1.10

Nasdaq updated the Regulation SHO message definition to reflect the new SEC implementation date. Nasdaq also corrected a time stamp error in the Stock Trading Action message format.

July 14, 2010: TotalView-Aggregated Version 1.10

Nasdaq added a new Regulation SHO Short Sale Price Test Restricted Indicator message format to be introduced in the fourth quarter of 2010.

July 2, 2010: TotalView-Aggregated Version 1.10

Nasdaq added new Action Trading code(s) to the Stock Trading Action message for the Nasdaq Volatility Guard trading pause.

May 25, 2010: TotalView-Aggregated Version 1.10

Nasdaq added two new Trading Action Reason code values (T5 and T7) for single security trading pause situations to Appendix C.

January 26, 2010: TotalView Aggregated Version 1.10

Released a new version of the TotalView-Aggregated documentation to support the following changes:

- Increased length of the symbol field from 6 characters to 8 characters in multiple message formats in support of the equity symbology initiative.
- Modified the values for the Market Category field in Symbol Directory messages to delineate among NYSE-, NYSE Amex- and NYSE Arca-listed issues.
- Added note to Appendix B to reflect that Nasdaq is reviewing its stock symbol conventions to determine if changes are needed

June 10, 2008: TotalView Aggregated Version 1.00

Nasdaq modified the TotalView-Aggregated specifications document to add new codes for emergency market condition (EMC) situations:

- Section 4.2 – System Event Message. Added the following three codes for EMC situations.

  A = Emergency market condition – halt
  R = Emergency market condition – quote only period
  B = Emergency market condition – resumption

April 30, 2007: TotalView Aggregated Version 1.00

Nasdaq modified the TotalView-Aggregated specifications document to reflect the following changes:

- Section 4 – For clarity reasons, the Data Type field was updated for all formats to delineate between alphabetic and alphanumeric fields.
- Section 4.2.1 – Within the Issue Directory message format, Nasdaq updated the code list for the Market Category field to denote that space is an allowable value. The Market Category field may be space filled if the security symbol is associated with a test issue OR if Nasdaq Operations adds a production issue to its online systems intra-day.

April 3, 2007: TotalView-Aggregated Version 1.00

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Nasdaq modified the TotalView-Aggregated specifications document to reflect the following changes:

- 2.0 – Architecture and Appendix A - Data Channel Assignment. Updated document to clarify that only the MoldUDP data feed option is available in a split alphabet format.

February 15, 2007: TotalView-Aggregated Version 1.00

Nasdaq modified the TotalView-Aggregated specifications document to reflect the following changes:

- 4.2.2 – Stock Trading Action. Updated document to reflect actual system processing rules for pre-opening trading action spin.
- Appendix B – Stock Symbol Convention. Updated document to reflect the most current URL links to Nasdaq symbology matrices.

October 16, 2006: TotalView-Aggregated Version 1.00

Nasdaq modified the TotalView-Aggregated specification document to reflect the following change:

- 4.2.3 Market Participant Position message. Corrected MPID field size to 4 bytes.

October 2, 2006: TotalView-Aggregated Version 1.00

Nasdaq modified the TotalView-Aggregated specification document to reflect the following change:

- Section 4.5 – Net Order Imbalance Indicator (NOII) message: Nasdaq corrected message offset error in the original documentation.

August 22, 2006: TotalView-Aggregated Version 1.00

Nasdaq modified the TotalView-Aggregated specification document to reflect the following changes:

- Section 4.1 – System Events: Updated the explanations for the "O", "Q", "M" and "M" events to more accurately reflect the feed processing.
- Appendix B – Stock Symbol Convention: Please contact Nasdaq Systems Engineering via e-mail for conversion matrix.

July 11, 2006: TotalView-Aggregated Version 1.00

Nasdaq released the initial TotalView-Aggregated specification document to the public

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