NASDAQ TotalView–Aggregated
Version 1.00

Note: This version of the NASDAQ TotalView-Aggregated service is designed to support symbols up to six characters only.

*As noted in [Data Technical News #2010-31](#), NASDAQ OMX released new versions of the NASDAQ TotalView-Aggregated to support expanded symbol fields in April 2010. When the feed was released, NASDAQ OMX notified direct data feed subscribers that they needed to migrate to the new NASDAQ TotalView-Aggregated (Version 1.1) data formats before year end. This version of the NASDAQ TotalView-Aggregated feed (Version 1.0) will be discontinued at the close of business on **December 31, 2010**.*

1. Overview

NASDAQ TotalView-Aggregated^{SM} is a direct data feed product offered by The NASDAQ Stock Market®, which features the following data elements:

- **NASDAQ Price Level Data:** For NASDAQ Single Book, 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 Single Book. TotalView-Aggregated carries price level data for NYSE- and Amex-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 Single Book. 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.

- **Administrative messages**, such trading actions, symbol directory and market participant position messages:

  - Trading action messages are used to inform market participants when a security is halted / paused or released for trading.

  - Symbol Directory messages provide basic security 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.

- **Event controls**, such as start of day, end of day and emergency market halt/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 and is composed of non-

control ASCII bytes. 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:

Protocol Option	Number of Outbound Channels
SoupTCP	Single outbound channel for all securities
Compressed via SoupTCP	Single outbound channel for all securities
MoldUDP	Eight outbound data channels using alphabetic split (See Appendix A)

3. Data Types

All numeric fields are represented in ASCII digits and are right-justified. Padding spaces appear on the left as necessary.

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 zeros. The decimal point is implied by position; it does not appear inside the price field.

Timestamp reflects the NASDAQ system time at which the outbound message was generated. NASDAQ states time as the number of milliseconds past midnight. The time zone is U.S. Eastern Time.

All alpha fields are left-justified.   Padding spaces appear on the right as necessary.

4. Message Formats

NASDAQ TotalView–Aggregated supports four basic types of messages:

- o   System Events

- o   NASDAQ Single Book Price Levels

- o   NASDAQ Net Order Imbalance Indicators

- o   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**
Timestamp	0	8	Numeric	Time at which the system event was generated. Time is represented as number of seconds and milliseconds past midnight, Eastern Time (ET).
Message Type	8	1	"S"	System Event Message
Event Code	9	1	Alpha	Refer to System Event Codes below

NASDAQ supports the following event codes on a daily basis.

SYSTEM EVENT CODES - DAILY	
Code	**Explanation**
"O"	*Start of Messages.* This is always 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. For initial implementation of Single Book, this message will be disseminated between 8:00 and 9:00 p.m., ET.

Beginning the third quarter of 2008, NASDAQ will be capable of supporting the following event codes for an emergency market situation on TotalView-Aggregated.   These messages will be disseminated if NASDAQ needs to evoke an emergency market condition (EMC) as the result of circuit breaker rules or other major market emergency.

SYSTEM EVENT CODES – AS NEEDED	
Code	**Explanation**
"A"	*Emergency Market Condition – Halt:* This message is sent to inform NASDAQ market participants that the EMC is in effect. No trading is allowed during the EMC.
"R"	*Emergency Market Condition – Quote Only Period:* This message is sent to inform NASDAQ market participants that the EMC quotation only period is in effect.
"B"	*Emergency Market Condition – Resumption:* This message is sent to inform NASDAQ market participants that EMC is no longer in effect.

4.2 Administrative Messages

4.2.1 Stock Directory

At the start of each trading day, NASDAQ disseminates stock directory messages for all active symbols in Single Book.

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**	**Value**	**Notes**
Timestamp	0	8	Numeric	Time at which the directory message was generated. Refer to Data Types for field processing notes.
Message Type	8	1	"R"	Stock Directory Message
Stock	9	6	Alphanumeric	Denotes the security symbol for the issue in the NASDAQ Single Book.
Market Category	15	1	Alphanumeric	Indicates Listing market or listing market tier for the issue "T" = CQS (NYSE, Amex or regional exchange) "Q" = NASDAQ Global Select Market^{SM} "G" = NASDAQ Global Market^{SM} "S" = NASDAQ Capital Market® *Space* = Not available
Financial Status Indicator	16	1	Alphanumeric	For NASDAQ-listed issues, this field indicates when a firm is not in compliance with NASDAQ continued listing requirements. "D" = Deficient "E" = Delinquent "Q" = Bankrupt "S" = Suspended "G" = Deficient and Bankrupt "H" = Deficient and Delinquent "J" = Delinquent and Bankrupt "K" = Deficient, Delinquent and Bankrupt Space = Company is in compliance, if NASDAQ-listed issue For CQS issues, this field will be space-filled. Redistributors should refer to SIAC feeds for code if needed.
Round Lot Size	17	6	Numeric	Indicates the number of shares that represent a round lot for the issue
Round Lots Only	23	1	Alphanumeric	Indicates if NASDAQ system limits order entry for issue "Y" = only round lots are accepted in this stock "N" = odd/mixed lots are allowed

4.2.2 Stock Trading Action

NASDAQ uses this administrative message to indicate the current trading status 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 start of system hours, NASDAQ will use the Trading Action message to relay changes in trading status for an individual security. Messages will be sent when a stock is:
- Halted / paused
- Released for quotation
- Released for trading.

STOCK TRADING ACTION				
Name	Offset	Length	Value	Notes
Timestamp	0	8	Numeric	Time at which the stock trading action message was generated
Message Type	8	1	"H"	Stock Trading Action Message
Stock	9	6	Alpha	Denotes the security symbol for the issue in the NASDAQ Single Book.
Current Trading State	15	1	Alpha	Reflects the current trading state for the issue "H" = Halted or paused across all U.S. equity markets / SROs "V" = Halted or paused on NASDAQ only "Q" = Quotation only period for cross-SRO halt or pause "R" = Quotation only period for NASDAQ only halt or pause "T" = Trading on NASDAQ
Reason	16	4	Alpha	Reflects the Market Ops or MarketWatch code for the trading state change. Refer to Appendix C for values.

4.2.3 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 Participant state for each NASDAQ market participant firm registered in an issue. Market participant firms may use these fields to comply with certain marketplace rules.

Throughout the day, NASDAQ will send out this message only if NASDAQ Operations changes the status of a market participant firm in an issue.

PARTICIPANT POSITION SUMMARY				
Name	Offset	Length	Value	Notes

Timestamp	0	8	Numeric	Time at which the market participant position message was generated
Message Type	8	1	"P"	Stock Directory Message
MPID	9	4	Alphabetic	Denotes the market participant identifier for which the position message is being generated
Stock	13	6	Alphanumeric	Denotes the security symbol for which the position is being generated
Primary Market Maker	19	1	Alphanumeric	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	20	1	Alphanumeric	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	21	1	Alphanumeric	Indicates the market participant's current registration status in the issue "A" = Active "E" = Excused/Withdrawn "W" = Withdrawn "S" = Suspended "D" = Deleted

4.3 TotalView Price Level 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*
Timestamp	0	8	Numeric	Time at which the price level update was generated
Message Type	8	1	"U"	Participant Price Level Update Message
Market Side	9	1	Alphabetic	Denotes the side of the market associated with the price level update "B" = bid update "S" = offer/ask update
Participant Shares	10	9	Numeric	Reflects the current number of shares displayed by this participant at this price level
Aggregate Shares	19	9	Numeric	Reflects the total number of shares displayed in the NASDAQ Single Book for ALL participants at this price level
Stock	28	6	Alphanumeric	Denotes the security symbol for which the price level is being generated
Price	34	10	Numeric/ Price	Reflects the price associated with the update. Refer to Data Types for field processing notes.
MPID	44	4	Alphabetic	Denotes the market participant identifier associated with the price level update

4.5 Net Order Imbalance Indicator (NOII)

NASDAQ disseminates NOII data at 5-second intervals in the minutes leading up to the NASDAQ Opening Cross, NASDAQ Closing Cross, and NASDAQ IPO/Halt/Imbalance Cross.

- o For the standard NASDAQ Opening Cross, NOII messages will be disseminated during the two minutes leading up to the start of market hours.
- o For the NASDAQ Opening Cross for IPO and halted / paused securities, NOII messages will be disseminated during the quote only period. The first NOII message will be disseminated approximately five seconds after the Stock Trading Action message with the "Q" or "R" action value is disseminated.
- o For the NASDAQ Closing Cross, NOII messages will be disseminated during the ten minutes leading up to the end of market hours.

NOII MESSAGE				
Name	*Offset*	*Length*	*Value*	*Notes*
Timestamp	0	8	Numeric	Time at which the NOII message was generated
Message Type	8	1	"I"	NOII Message
Paired Shares	9	9	Numeric	Indicates the total number of shares that are eligible to be matched at the Current Reference Price.
Imbalance Shares	18	9	Numeric	Number of shares not paired at the Current Reference Price.
Imbalance Direction	27	1	Alphabetic	Indicates the market side of the imbalance "B" = buy imbalance "S" = sell imbalance "N" = no imbalance "O" = insufficient orders to calculate
Stock	28	6	Alphanumeric	Denotes the security symbol for which the NOII message is being generated
Far Price	34	10	Numeric/ Price	A hypothetical auction-clearing price for cross orders only. Refer to Appendix D for processing notes.
Near Price	44	10	Numeric/ Price	A hypothetical auction-clearing price for cross orders as well as continuous orders.
Current Reference Price	54	10	Numeric/ Price	Indicates price at which the NOII shares are being calculated.
Cross Type	64	1	Alphabetic	Denotes the type of NASDAQ cross for which the NOII message is being generated "O" = Open Cross "C" = Close Cross "H" = Intra-day Opening Cross for IPO and halted / paused securities

Price Variation Indicator	65	1	Alphanumeric	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% "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

5. Support

- o For general product support for NASDAQ OMX data feeds, please contact NASDAQ OMX Global Data Products at +1 301 978 5307 or dataproducts@nasdaqomx.com.

- o For technical support for NASDAQ OMX data feeds, please contact NASDAQ Systems Engineering at devsupport@nasdaqomx.com.

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 both CQS- and NASDAQ-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 NASDAQ Market Data Multicast Addresses page of the NASDAQ Trader website.

Appendix B

Stock Symbol Convention

For bandwidth efficiency reasons, NASDAQ supports a 6-byte symbol field on its TotalView-ITCH data feed products.

For most classes of securities, this field length is sufficient to support the exchange-assigned symbol. For select NYSE- and Amex-listed securities with subordinate issue types, however, NASDAQ must modify the trading symbol to fit the allotted field size on the data feeds.   For the current symbol convention matrix, please refer to the Ticker Symbol Conversion for CQS Securities page on the NASDAQ Trader® website.

For NASDAQ-listed issues, NASDAQ currently restricts its symbol length to a maximum of 5 characters.   For common stock issuances, NASDAQ will assign a symbol of 1 to 4 characters in length. For subordinate securities, NASDAQ 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 character symbol suffixes, please refer to Current List of Fifth Character Symbol Suffixes for NASDAQ-listed Issues.

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
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
R1	New Issue Available
R2	Issue Available
IPOQ	IPO Security Released for Quotation (NASDAQ Securities Only)
IPOE	IPO Security — Positioning Window Extension (NASDAQ Securities Only)
Space	Reason Not Available

Appendix D

Documentation Revision Control Log

November 11, 2010: TotalView-Aggregated Version 1.00
NASDAQ OMX fixed a documentation error with the Stock Trading Action message introduced in July 2, 2010.

July 2, 2010: TotalView-Aggegated Version 1.00
NASDAQ OMX added new Action Trading code(s) to the Stock Trading Action message for the NASDAQ Volatility Guard trading pause.

May 25, 2010: TotalView-Aggegated Version 1.00

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

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.:

- o 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:

- o Section 4 – For clarity reasons, the Data Type field was updated for all formats to delineate between alphabetic and alphanumeric fields.
- o 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

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

- o 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:

- o 4.2.2 – Stock Trading Action. Updated document to reflect actual system processing rules for pre-opening trading action spin.
- o 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:

- o 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:

- o 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:

- o Section 4.1 – System Events: Updated the explanations for the "O", "Q", "M" and "M" events to more accurately reflect the feed processing.
- o 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.