Market Data Feed – Version 3.3

Best of Nasdaq Options

1. Overview

BONO^{SM} is a direct data feed product in the NOM2 system offered by Nasdaq® that features the following data elements:

- o Best Bid and Offer Quotations: The options system will calculate and disseminate its best bid and offer position, with aggregated size, based on displayable order and quote interest in the options market system. For bandwidth efficiency reasons, the feed will display Quotes as two sided if the bid and ask sides change, one sided if only one side changes.

- o Last Sale Data: The options system will also disseminate trade messages for executions that occur within the options market via this feed. Broken Trades are reported in the event that an options trade transaction is broken on the same business day that it is reported.

- o Administrative and market event messages including:

  - Timestamp messages to indicate the time of following messages on the stream.

  - Options Directory messages to be disseminated to relay basic option symbol and contract information for those securities traded on the options market.

  - Security Open Message to be disseminated for each security as soon as the opening auction process is completed to inform recipients that the option symbol denoted in the message is available for auto execution within the options market system.

  - Trading action messages to inform market participants when a specific security is halted or released for trading on the options market.

* Please note that the Nasdaq Options Market BONO specification matches the Nasdaq Texas Options Top of Market and Nasdaq PHLX TOPO specifications.

2. Architecture

The feed will be made up of a series of sequenced messages. Each message is variable in length based on the message type and is composed of binary and alphanumeric data. The messages that make up this protocol are typically delivered using a higher level protocol that takes care of sequencing and delivery guarantees.

The options system offers the data feed in two protocol options:

Protocol Option	Number of Outbound Channels
SoupBinTCPv3.00	Multiple output channels, each channel supporting a subset of securities, the range defined by first letter of underlying
MoldUDP64v1.00	Multiple output channels, each channel supporting a subset of securities, the range defined by first letter of underlying

The feed is composed of 2 groups of Multicast or Soup channels: the "Q" Group, for Quote related information; and the "T" Group, for Trade related information.

Both the primary ("A feed") and secondary ("B feed") will be hosted by servers co-located with the trading system and will have identical performance characteristics. In fact the "A" and "B" feeds are logically identical: Mold or Soup messages will have the same Mold or Soup sequence numbers across all the streams.

Please note that Nasdaq has determined to provide local redundancy in the NY Metro Area ("A" and "B" feeds), while using the Mid-Atlantic Region ("C" feed) for disaster recovery in the event order entry is switched from the NY Metro Area.

A complete set of alternate connection parameters are available for each Multicast Channel and TCP Connection in the event of a failure in any of the primary connections.

3. Data Types

All Alpha or Alphanumeric fields are left justified and padded on the right with spaces.

All Integer fields are unsigned big-endian (network byte order) binary encoded numbers unless otherwise specified. Integers may be 1, 2 or 4 bytes long.

Prices are 2 byte or 4 byte Integer fields. 2 byte Price fields are unsigned positive numbers. 4 byte Price fields are signed positive numbers. When a 4 byte price is converted to a decimal format, prices are in fixed point format with 6 whole number places followed by 4 decimal digits. When a 2 byte price is converted to a decimal format, prices are in fixed point format with 3 whole number places followed by 2 decimal digits.

Time is expressed as two Integers, the number of seconds past midnight and a fractional (nanoseconds) portion.

4. Message Formats

This feed supports five basic types of messages:

- o Time Events

- o System Events

- o Administrative Data and Market Events

- o Best bid and offer updates

- o Trade reports

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

4.1. Timestamp Message

For bandwidth efficiency reasons, the timestamp for a message is divided into two pieces: the seconds portion and sub-seconds portion. The seconds portion of the timestamp appears in the Timestamp Message, any message on the stream following this message has this seconds portion of time until the next timestamp message. The format is as follows:

TIMESTAMP MESSAGE				
Name	*Offset*	*Length*	*Value*	*Notes*
Message Type	0	1	Alpha	"T" = Timestamp Message
Seconds	1	4	Integer	Number of seconds since midnight. All messages between this Timestamp Message and the next Timestamp Message will have this value of seconds in their timestamp.

This message is transmitted in both the "Q" and "T" groups.

4.2. **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	Alpha	"S" = System Event Message
Nanoseconds	1	4	Integer	The sub-second portion of the time, in nanoseconds (0-999999999). The second portion of the time is obtained from the most recent timestamp message.
Event Code	5	1	Alpha	Refer to System Event Codes below
Version	6	1	Integer	Version of this interface. Currently set to 3.
Sub-version	7	1	Integer	Sub-version of this interface. Currently set to 0.

SYSTEM EVENT CODES		
Code	*Explanation*	*When (typically)*
"O"	*Start of Messages.* This is always the first message sent in any trading day.	After ~2:00am
"S"	*Start of System Hours.* This message indicates that the options system is open and ready to start accepting orders.	7:00am
"Q"	*Start of Opening Process.* This message is intended to indicate that the options system has started its opening auction process.	9:30:00am
"N"	*Start of Normal Hours Closing Process.* This message is intended to indicate that the options system will no longer generate new executions for options that trade during normal hours.	4:00:00pm
"L"	*Start of Late Hours Closing Process.* This message is intended to indicate that the options system will no longer generate new executions for options that trade during extended hours.	4:15:00pm
"E"	*End of System Hours.* This message indicates that the options system is now closed.	~5:15pm
"C"	*End of Messages*. This is always the last message sent in any trading day.	~5:20pm

This message is transmitted in both the "Q" and "T" groups.

4.3. **Options Directory Message**

At the start of each trading day, the options system disseminates directory messages for all symbols eligible for the auction process in the options system.

The options directory messages are sent once per symbol, typically before the "Start of System Hours" System Event. Should it be necessary, intra-day updates to this message will be sent as they occur. In the case of an intra-day update, for a given Option Id, the canonical information for the option is invariant (will not change). The canonical information consists of Security Symbol, Expiration Year Month and Day, Strike Price and Option Type. Other attributes for the Option may change.

If an option is removed intra-day, a new options directory message will be sent with "Tradable" field set to "N".

OPTIONS DIRECTORY				
Name	*Offset*	*Length*	*Value*	*Notes*
Message Type	0	1	Alpha	"D" = Directory Message
Nanoseconds	1	4	Integer	The sub-second portion of the time, in nanoseconds (0-999999999). The second portion is obtained from the most recent timestamp message.
Option ID	5	4	Integer	Option ID for this option, assigned daily, valid for trading day.
Security Symbol	9	6	Alphanumeric	Denotes the option root symbol (security symbol)
Expiration Year	15	1	Integer	Last two digits of the year of the option expiration
Expiration Month	16	1	Integer	Expiration Month of the option (1-12)
Expiration Day	17	1	Integer	Day of the Month of expiration (1-31)
Strike Price	18	4	Integer	Explicit strike price. Refer to Data Types for field processing notes.
Option Type	22	1	Alpha	"C" = Call option "P" = Put option
Source	23	1	Integer	Identifies the source of the option, valid for the trading day.
Underlying Symbol	24	13	Alpha	Denotes the unique symbol assigned to the underlying security within the Exchange System.
Option Closing Type	37	1	Alpha	Denotes which System Event is used to determine when trading ceases in this symbol. "N" = Normal Hours "L" = Late Hours
Tradable	38	1	Alpha	Denotes whether or not this option is tradable at the exchange: "Y" = Option is tradable "N" = Option is not tradable
MPV	39	1	Alpha	Minimum Price Variation for this option: "E" = penny Everywhere "S" = Scaled "P" = penny Pilot

Symbol Directory Notes:

1) The options directory messages are sent once per symbol, typically before the "Start of System Hours" System Event. Should it be necessary, intra-day updates to this message will be sent as they occur. In the case of an intra-day update, for a given Option Id, the canonical information for the option is invariant (will not change). The canonical information consists of Security Symbol, Expiration Year Month and Day, Strike Price and Option Type. Other attributes for the Option may change.

2) Firm should note that they will only receive Option Directory messages for the symbol range associated with the matching engine serving that connection.

3) The Underlying Symbol is in most cases the same as the industry standard ticker underlying. In rare cases, such as a special settlement symbol, the exchange assigns unique underlying symbols.

4) This is a sequenced message and therefore can be replayed upon re-connection.

5) If an Option is removed from the system intra-day, a new options directory message will be sent with "Tradable" field set to "N". Any Quotes sent for this removed Option will be rejected. All existing quotes for this option will be purged.

6) The Minimum Price Variation (MPV) has the following values:
   a. "E" – All prices are in penny increments
   b. "S" – Prices below $3.00 are in increments of $0.05, prices above $3.00 are in increments of $0.10
   c. "P" – Prices below $3.00 are in increments of $0.01, prices above $3.00 are in increments of $0.05

7) The symbol directory message is transmitted in both the "Q" and "T" groups.

4.4. **Trading Action Message**

The options system uses this administrative message to indicate the current trading status of an index or equity option within the options market.

Prior to the start of system hours, the options system will send out a Trading Action message. The options system will send out a Trading Action message with the "T" (Trading Resumption) for all options contracts that are eligible for trading at the start of the options market 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 options platform at the start of the system hours. Securities may be halted in the options system for regulatory or operational reasons.

After the start of system hours, the options system will use the Trading Action message to relay changes in trading status for an individual security. Messages will be sent when an option is halted or is released for trading

Trading Action Message				
Name	*Offset*	*Length*	*Value*	*Notes*
Message Type	0	1	Alpha	"H" = Trading Action
Nanoseconds	1	4	Integer	The sub-second portion of the time, in nanoseconds (0-999999999). The second portion of the time is obtained from the most recent timestamp message.
Option ID	5	4	Integer	Integer ID of the option, as defined in the Options Directory Message.
Current Trading State	9	1	Alpha	Reflects the current trading state for the options security in the options market. The allowable values are: "H" = Halt in effect "T" = Trading on the options system

This message is transmitted in both the "Q" and "T" groups.

4.5. **Security Open/Closed Message**

The options system uses this administrative message to indicate when an option has completed the opening process and is now available for auto execution or when the option has closed and is no longer available for auto execution.

Security Open Message				
Name	*Offset*	*Length*	*Value*	*Notes*
Message Type	0	1	Alpha	"O" = Security Open
Nanoseconds	1	4	Integer	The sub-second portion of the time, in nanoseconds (0-999999999). The second portion of the time is obtained from the most recent timestamp message.
Option ID	5	4	Integer	Integer ID of the option, as defined in the Options Directory Message.
Open State	9	1	Alpha	Reflects the current eligibility for auto execution of the options security in the options market. The allowable values are: Y = Open for auto execution N = Closed for auto execution

This message is transmitted in both the "Q" and "T" groups.

Note: Recipients should continue to process the Trading Action message in order to determine if a contract is in a Halt state for the day. A security open message should **_NOT_** override the Trading action message indicating if an index or equity option is halted. Recipients should use both messages in tandem to indicate if the issue is halted and/or or open for auto execution.

4.6. *Best Bid AND Ask Update – Short Form*

The options system will continuously calculate its best bid and offer position for active options contracts on the options market during the trading day. Whenever the best bid and ask position changes on both sides, the options system will send its best bid and ask update via the data feed for the affected security. A change in bid or ask implies a change in price and/or size. The quote will reflect the highest price displayable in the options system for buy orders/quotes and the lowest price displayable in the options system for sell orders/quotes.

If only one side of the quote changes, Best Bid OR Ask Update message will be sent for bandwidth efficiency reasons.

The Quote Condition applies to both the bid and ask sides.

There are two forms of the Best Bid AND Ask Update, the Short Form has Prices and Sizes in 2 byte Integer fields. Note that 2 byte Prices are in pennies and does not imply a loss of precision in the price.

BEST BID AND ASK UPDATE – SHORT FORM				
Name	*Offset*	*Length*	*Value*	*Notes*
Message Type	0	1	Alpha	"q" = Best bid AND ask update
Nanoseconds	1	4	Integer	The sub-second portion of the time, in nanoseconds (0-999999999). The second portion of the time is obtained from the most recent timestamp message.
Option ID	5	4	Integer	Integer ID of the option, as defined in the Options Directory Message.
Quote Condition	9	1	Alpha	<space> = regular quote/autox eligible "F" = Non-firm quote on both bid/ask sides "R" = Rotational quote "X" = Ask side not firm, bid side firm "Y" = Bid side not firm, ask side firm
Bid Price	10	2	Integer	Best bid price. **NOTE:** When converted to a decimal format, this price is in fixed point format with 3 whole number places followed by 2 decimal digits.
Bid Size	12	2	Integer	Aggregated number of contracts on the bid side being displayed in the options market at the current time.
Ask Price	14	2	Integer	Best ask price. **NOTE:** When converted to a decimal format, this price is in fixed point format with 3 whole number places followed by 2 decimal digits.
Ask Size	16	2	Integer	Aggregated number of contracts on the ask side being displayed in the options market at the current time.

This message is transmitted in the "Q" group only.

4.7. Best Bid AND Ask Update – Long Form

This message is the same as the Best Bid AND Ask Update Message – Short Form described above except that Prices and Sizes are 4 byte Integers, the price having 4 implied decimal places.

Name	Offset	Length	Value	Notes
BEST BID AND ASK UPDATE – LONG FORM				
Message Type	0	1	Alpha	"Q" = Best bid AND ask update
Nanoseconds	1	4	Integer	The sub-second portion of the time, in nanoseconds (0-999999999). The second portion of the time is obtained from the most recent timestamp message.
Option ID	5	4	Integer	Integer ID of the option, as defined in the Options Directory Message.
Quote Condition	9	1	Alpha	<space> = regular quote/autox eligible "F" = Non-firm quote on both bid/ask sides "R" = Rotational quote "X" = Ask side not firm, bid side firm "Y" = Bid side not firm, ask side firm
Bid Price	10	4	Integer	Best bid price.
Bid Size	14	4	Integer	Aggregated number of contracts on the bid side being displayed in the options market at the current time.
Ask Price	18	4	Integer	Best ask price.
Ask Size	22	4	Integer	Aggregated number of contracts on the ask side being displayed in the options market at the current time.

This message is transmitted in the "Q" group only.

4.8. *Best Bid OR Ask Update – Short Form*

The options system will continuously calculate its best bid and offer position for active options contracts on the options market during the trading day. Whenever the best bid or ask position changes on one side but not the other side, the options system will send its best bid or ask update via this feed for the affected security. A change in bid or ask implies a change in price and/or size. The quote will reflect the highest price displayable in the options system for buy orders/quotes and the lowest price displayable in the options system for sell orders/quotes.

For the bid or ask update received, the data feed recipient firm should adjust the quotation bid or ask side *only* for the market side indicated in the message. Implicitly the opposite side has the same price and size as previously displayed.

If *both* bid and ask change as *one update*, the Best Bid AND Ask Update message will be sent, displaying both sides of the quote simultaneously.

The Quote Condition applies to both the bid and ask sides.

There are two forms of the Best Bid OR Ask Update, the Short Form has Price and Size in 2 byte Integer fields. Note that 2 byte Price is in pennies and does not imply a loss of precision in the price.

BEST BID OR ASK UPDATE – SHORT FORM				
Name	*Offset*	*Length*	*Value*	*Notes*
Message Type	0	1	Alpha	Best bid OR ask update: "b" = Quote update bid side "a" = Quote update ask side
Nanoseconds	1	4	Integer	The sub-second portion of the time, in nanoseconds (0-999999999). The second portion of the time is obtained from the most recent timestamp message.
Option ID	5	4	Integer	Integer ID of the option, as defined in the Options Directory Message.
Quote Condition	9	1	Alpha	<space> = regular quote/autox eligible "F" = Non-firm quote on both bid/ask sides "R" = Rotational quote "X" = Ask side not firm, bid side firm "Y" = Bid side not firm, ask side firm
Price	10	2	Integer	Best bid or ask price, the side determined by Message Type. **NOTE:** When converted to a decimal format, this price is in fixed point format with 3 whole number places followed by 2 decimal digits.
Size	12	2	Integer	Aggregated number of contracts on the bid or ask side being displayed in the options market at the current time.

This message is transmitted in the "Q" group only.

4.9. *Best Bid OR Ask Update – Long Form*

This message is the same as the Best Bid OR Ask Update Message – Short Form described above except that Prices and Sizes are 4 byte Integers, the price having 4 implied decimal places.

Name	Offset	Length	Value	Notes
BEST BID OR ASK UPDATE – LONG FORM				
Message Type	0	1	Alpha	Best bid OR ask update: "B" = Quote update bid side "A" = Quote update ask side
Nanoseconds	1	4	Integer	The sub-second portion of the time, in nanoseconds (0-999999999). The second portion of the time is obtained from the most recent timestamp message.
Option ID	5	4	Integer	Integer ID of the option, as defined in the Options Directory Message.
Quote Condition	9	1	Alpha	<space> = regular quote/autox eligible "F" = Non-firm quote on both bid/ask sides "R" = Rotational quote "X" = Ask side not firm, bid side firm "Y" = Bid side not firm, ask side firm
Price	10	4	Integer	Best bid or ask price, the side determined by Message Type.
Size	14	4	Integer	Aggregated number of contracts on the bid or ask side being displayed in the options market at the current time.

This message is transmitted in the "Q" group only.

4.10. Trade Report

The Trade Report message will be used to relay execution system transactions that are reported during the current business day. The options system only reports one-side of a trade execution on the feed and other data feed products.

Trade Report messages should be included in time-and-sales displays as well as volume and other market statistics.

Trade Report				
Name	*Offset*	*Length*	*Value*	*Notes*
Message Type	0	1	Alpha	"R" = Trade Report
Nanoseconds	1	4	Integer	The sub-second portion of the time, in nanoseconds (0-999999999). The second portion of the time is obtained from the most recent timestamp message.
Option ID	5	4	Integer	Integer ID of the option, as defined in the Options Directory Message.
Cross ID	9	4	Integer	Indicates the internal control number (cross id) associated with the given options trade transaction.
Trade Condition	13	1	Alpha	The Trade Condition is the same as defined in the OPRA specification (OPRA terminology is either "Last Sale" or "Transaction"): http://www.opradata.com/specs/data_recipient_interface.pdf. Always refer to the www.opradata.com website to ensure the possible Trade Conditions sent out by this feed, which are consistent with the Trade Conditions defined by OPRA.
Price	14	4	Integer	Reflects the transaction (premium) price on the execution.
Volume	18	4	Integer	Current number of contracts traded for an option in one trade.

This message is transmitted in the "T" group only.

4.11. Broken Trade Report

The following message is used in the event that an options trade transaction is broken on the same business day that it is reported.

Broken Trade Report				
Name	*Offset*	*Length*	*Value*	*Notes*
Message Type	0	1	Alpha	"X" = Broken Trade Report
Nanoseconds	1	4	Integer	The sub-second portion of the time, in nanoseconds (0-999999999). The second portion of the time is obtained from the most recent timestamp message.
Option ID	5	4	Integer	Integer ID of the option, as defined in the Options Directory Message.
Original Cross ID	9	4	Integer	Indicates the original internal control number (cross id) associated with the given trade transaction in the options market system.
Original Price	13	4	Integer	Reported Premium Price of an option contract in the original trade report message on this feed.
Original Volume	17	4	Integer	Reported number of contracts in the original trade report message on this feed.

This message is transmitted in the "T" group only.

4.12. End of Replay Sequence Message (Only for SoupBINTCP)

The End of replay Sequence message reflects the sequence number at the time replay of existing messages is complete. The firms can then use this sequence number to resume on the real time Mold channel.

End of Replay Sequence Message				
Name	*Offset*	*Length*	*Value*	*Notes*
Message Type	0	1	Alpha	"M" = End of Replay Sequence Message
Sequence Number	1	20	Alpha Numeric	Use this sequence number to resume on the real time Mold channel.

Note: This field is ASCll representation of the sequence number.

General Communication: This content contains non-sensitive information

5. Support

- For general product support and technical support for data feeds, please contact Clientsuccess@nasdaq.com.

General Communication: This content contains non-sensitive information

Appendix A – Sample messages

Each message defined in this protocol has an example to clarify how the message is parsed. Some points to consider:

- The encapsulating protocol defines the message length, in bytes. This can be used as an aid to parsing the messages, since many of the messages are not fixed length by message type. For example, the best bid or ask update message varies in length from 9 to 15 bytes depending on the encoding of the PriceSize data type;
- The first byte of the message is always message type. Once the type of the message is known, the rest of the message can be parsed from the definitions of the messages.

Example 1 – Timestamp Message
Network byte stream (in hex):

- 54 00 00 85 98

Message fields:

- Byte 0: Message type = (54)(hex) = "T". This is a timestamp message. See timestamp message definition for more information.
- Bytes 1-4: Seconds = (00 00 85 98)(hex) = 34200 (decimal). Expressed in seconds past midnight, this time represents 9:30:00am (or 34200 seconds past midnight)

This byte stream is a *timestamp message* with a time value of 9:30:00 am. All messages received between this message and the next timestamp message will have this time value in seconds associated with the message.

Example 2 – System Event Message
Network byte stream (in hex):

- 53 07 5B CD 15 51 03 00

Message fields:

- Byte 0: Message type = (53)(hex) = "S". This is a system event message. See system event message definition for more information.
- Bytes 1-4: Nanoseconds = (07 5B CD 15)(hex) = 123456789 (decimal). This time represents 9:30:00.123456789am, assuming the last received Timestamp Message had a value of 9:30:00am.
- Byte 5: Event Code = (51)(hex) = "Q". Event code for Start of Opening Process.
- Byte 6: Version = (03)(hex) = 3 (decimal). Current version of the interface.
- Byte 7: Sub-Version = (00)(hex) = 0 (decimal). Current sub-version of the interface.

This byte stream a *System Event* message which announces a Start of Opening Process event. The version of this interface is 3.0. If the last received timestamp message was the message in Example 1, the event occurred at 9:30:00.123456789 am.

General Communication: This content contains non-sensitive information

Example 3 – Options Directory Message
Network byte stream (in hex):

- 44 0D FB 38 D3 00 01 4D 91 4F 49 48 31 20 20 0B 01 16 00 04 70 B8 43 02 4F 49 48 20 20 20 20 20 20 20 20 20 20 4E 59

Message fields:

- Byte 0: Message type = (44)(hex) = "D". This is an options directory message, representing a definition of an option in the system. See options directory message definition for more information.
- Bytes 1-4: Nanoseconds = (0D FB 38 D3)(hex) = 234567891 (decimal). This time represents 9:30:00.234567891am, assuming the last received Timestamp Message had a value of 9:30:00am.
- Bytes 5-8: Option ID = (00 01 4D 91)(hex) = 85393 (decimal). An Integer identifying this option. All option specific messages will use this integer to identify the option
- Bytes 9-14: Security Symbol = (4F 49 48 31 20 20)(hex) = "OIH1" (alpha, blank padded).
- Byte 15: Expiration Year = (0B)(hex) = 11 (decimal). Expiration year is 2011.
- Byte 16: Expiration Month = (01)(hex) = 1 (decimal). Expiration month is January.
- Byte 17: Expiration Day = (16)(hex) = 22 (decimal). Expiration day is the 22nd day of the month.
- Bytes 18-21: Strike Price = (00 04 70 B8)(hex) = 291000 (decimal). Strike price is $29.1000
- Byte 22: Option Type = (43)(hex) = "C" (alpha). Option is a call option
- Byte 23: Source = (02)(hex) = 2 (decimal). Source is 2
- Bytes 24-36: Underlying Symbol = (4F 49 48 20 20 20 20 20 20 20 20 20 20)(hex) = "OIH" (alpha, blank padded).
- Byte 37: Option Closing Type = (4E)(hex) = "N" (alpha). Option closes at normal hours
- Byte 38: Tradable = (59)(hex) = "Y" (alpha). Option is tradable in the system

This byte stream is an *options directory* message describing an option having ID 85393 with the following properties: security symbol "OIH1", expiration date 2011/1/21, strike price $29.1000, type call option, underlying symbol "OIH", with normal closing hours trading on the exchange on source 2. If the last received timestamp message was the message in Example 1, the event occurred at 9:30:00.234567891 am.

General Communication: This content contains non-sensitive information

Example 4 – Security Open/Closed Message

Network byte stream (in hex):

- 4F 14 9A A4 40 00 01 4D 91 59

Message fields:

- Byte 0: Message type, 4F = "O". This is a security open/closed message, representing an option that has open or closed for auto execution. See security open/closed message definition for more information.
- Bytes 1-4: Nanoseconds = (14 9A A4 40)(hex) = 345678912 (decimal). This time represents 9:30:00.345678912am, assuming the last received Timestamp Message had a value of 9:30:00am.
- Bytes 5-8: Option ID = (00 01 4D 91)(hex) = 85393 (decimal). An Integer identifying this option which previously has been described with an options directory message.
- Byte 9: Open State = (59)(hex) = "Y" (alpha). Option is open for auto execution

This byte stream is a *security open/closed* message indicating that option with id 85393 is open for auto execution. If the last received timestamp message was the message in Example 1, the event occurred at 9:30:00.345678912 am.

Example 5 – Best Bid AND Ask Update – Short Form

Network byte stream (in hex):

- 71 1B 3A 0C 83 00 01 4D 91 20 00 FA 00 C8 01 04 01 2C

Message fields:

- Byte 0: Message type (71)(hex) = "q". This is a Best Bid AND Ask Update message, representing a Quote that has changed on both bid and ask sides. See Best Bid AND Ask Update message definition for more information.
- Bytes 1-4: Nanoseconds = (1B 3A 0C 83)(hex) = 456789123 (decimal). This time represents 9:30:00.456789123am, assuming the last received Timestamp Message had a value of 9:30:00am.
- Bytes 5-8: Option ID = (00 01 4D 91)(hex) = 85393 (decimal). An Integer identifying this option which previously has been described with an options directory message.
- Byte 9: Quote Condition = (20)(hex) = "<space>" (alpha). Quote is a regular quote
- Byte 10-11: Bid Price = (00 FA)(hex) = 250 (decimal). Price is $2.5000 (2 byte price has 2 decimal digits with 4 digit accuracy)
- Byte 12-13: Bid Size = (00 C8)(hex) = 200 (decimal). 200 contracts
- Bytes 14-15: Bid Price = (01 04)(hex) = 260 (decimal). Price is $2.6000 (2 byte price has 2 decimal digits with 4 digit accuracy)
- Bytes 16-17: Bid Size = (01 2C)(hex) = 300 (decimal). 300 contracts

This byte stream is a *best bid and ask update - short form* message representing a $2.5000(200) x $2.6000(300) quote with regular condition for option with id 85393. If the last received timestamp message was the message in Example 1, the event occurred at 9:30:00.456789123 am.

Example 6 – Best Bid AND Ask Update – Long Form

Network byte stream (in hex):

- 51 1B 3A 0C 84 00 01 4D 91 20 00 00 61 A8 00 00 00 C8 00 00 65 90 00 01 11 70

Message fields:

- Byte 0: Message type (51)(hex) = "Q". This is a Best Bid AND Ask Update message, representing a Quote that has changed on both bid and ask sides. See Best Bid AND Ask Update message definition for more information.
- Bytes 1-4: Nanoseconds = (1B 3A 0C 84)(hex) = 456789123 (decimal). This time represents 9:30:00.456789124am, assuming the last received Timestamp Message had a value of 9:30:00am.
- Bytes 5-8: Option ID = (00 01 4D 91)(hex) = 85393 (decimal). An Integer identifying this option which previously has been described with an options directory message.
- Byte 9: Quote Condition = (20)(hex) = "<space>" (alpha). Quote is a regular quote
- Byte 10-13: Bid Price = (00 00 61 A8)(hex) = 25000 (decimal). Price is $2.5000
- Byte 14-17: Bid Size = (00 00 00 C8)(hex) = 200 (decimal). 200 contracts
- Bytes 18-21: Bid Price = (00 00 65 90)(hex) = 26000 (decimal). Price is $2.6000
- Bytes 22-25: Bid Size = (00 01 11 70)(hex) = 70000 (decimal). 70000 contracts

This byte stream is a *best bid and ask update – long form* message representing a $2.5000(200) x $2.6000(70000) quote with regular condition for option with id 85393. If the last received timestamp message was the message in Example 1, the event occurred at 9:30:00.456789124 am.

Example 7 – Best Bid OR Ask Update – Short Form

Network byte stream (in hex):

- 62 21 D9 55 22 00 01 4D 91 20 00 FF 01 2C

Message fields:

- Byte 0: Message type = (62)(hex) = "b". This is a Best Bid OR Ask Update message, representing a Quote that has changed on the bid side only. See Best Bid OR Ask Update message definition for more information.
- Bytes 1-4: Nanoseconds = (21 D9 55 22)(hex) = 567891234 (decimal). This time represents 9:30:00.567891234am, assuming the last received Timestamp Message had a value of 9:30:00am.
- Bytes 5-8: Option ID = (00 01 4D 91)(hex) = 85393 (decimal). An Integer identifying this option which previously has been described with an options directory message.
- Byte 9: Quote Condition = (20)(hex) = "<space>" (alpha). Quote is a regular quote
- Bytes 10-11: Price = (00 FF)(hex) = 255 (decimal). Price is $2.5500 (2 byte price has 2 decimal digits with 4 digit accuracy)
- Bytes 12-13: Size = (01 2C)(hex) = 300 (decimal). 300 contracts

This byte stream is a *best bid or ask update – short form* message representing a $2.5500(300) bid side quote with regular condition for option with id 85393 and the ask side the same as the last ask side received. If the previous received quote for this option was in Example 6, the current two sided quote would be $2.5500(300) x $2.6000(70000), reflecting the last seen ask side for this quote. If the last received timestamp message was the message in Example 1, the event occurred at 9:30:00.567891234am.

Example 8 – Best Bid OR Ask Update – Long Form

Network byte stream (in hex):
- 41 21 D9 55 23 00 01 4D 91 20 00 00 65 90 00 01 0D 88

Message fields:
- Byte 0: Message type = (41)(hex) = "A". This is a Best Bid OR Ask Update message, representing a Quote that has changed on the bid side only. See Best Bid OR Ask Update message definition for more information.
- Bytes 1-4: Nanoseconds = (21 D9 55 23)(hex) = 567891235 (decimal). This time represents 9:30:00.567891235am, assuming the last received Timestamp Message had a value of 9:30:00am.
- Bytes 5-8: Option ID = (00 01 4D 91)(hex) = 85393 (decimal). An Integer identifying this option which previously has been described with an options directory message.
- Byte 9: Quote Condition = (20)(hex) = "<space>" (alpha). Quote is a regular quote
- Bytes 10-11: Price = (00 00 65 90)(hex) = 26000 (decimal). Price is $2.6000
- Bytes 12-13: Size = (00 01 0D 88)(hex) = 69000 (decimal). 69000 contracts

This byte stream is a *best bid or ask update – long form* message representing a $2.5500(300) bid side quote with regular condition for option with id 85393 and the ask side the same as the last ask side received. If the previous received quote for this option was in Example 7, the current two sided quote would be $2.5500(300) x $2.6000(69000), reflecting the last seen ask side for this quote. If the last received timestamp message was the message in Example 1, the event occurred at 9:30:00.567891235am.

Example 9 – Trade Report Message

Network byte stream (in hex):
- 52 28 77 61 59 00 01 4D 91 00 BC 61 4E 49 00 00 63 9C 00 00 00 0A

Message fields:
- Byte 0: Message type= (52)(hex) = "R". This is a trade report message, representing a trade that has occurred on an option. See trade report message definition for more information.
- Bytes 1-4: Nanoseconds = (28 77 61 59)(hex) = 678912345 (decimal). This time represents 9:30:00.678912345am, assuming the last received Timestamp Message had a value of 9:30:00am.
- Bytes 5-8: Option ID = (00 01 4D 91)(hex) = 85393 (decimal). An Integer identifying this option which previously has been described with an options directory message.
- Bytes 9-12: Match ID = (00 BC 61 4E)(hex) = 12345678 (decimal). Match ID of the trade.
- Byte 13: Trade Condition = (49)(hex) = "I" (alpha). Trade condition indication auto executed trade
- Bytes 14-17: Price = (00 00 63 9C)(hex) = 25500 (decimal). Premium price is $2.5500
- Bytes 18-21: Size = (00 00 00 0A)(hex) = 10 (decimal). Volume is 10 contracts

This byte stream is a *trade report* message for option id 85393, auto executed condition, premium price $2.5500, volume of 10 contracts, match id 12345678. The timestamp of this trade is at 9:30:00.678912345am.

General Communication: This content contains non-sensitive information

Example 10 – Broken Trade Report Message

Network byte stream (in hex):

- 58 2F 09 11 80 00 01 4D 91 00 BC 61 4E 00 00 63 9C 00 00 00 0A

Message fields:

- Byte 0: Message type= (58)(hex) = "X". This is a broken trade report message, representing a broken trade that has occurred on an option. See broken trade report message definition for more information.
- Bytes 1-4: Nanoseconds = (2F 09 11 80)(hex) = 789123456 (decimal). This time represents 9:30:00.789123456am, assuming the last received Timestamp Message had a value of 9:30:00am.
- Bytes 5-8: Option ID = (00 01 4D 91)(hex) = 85393 (decimal). An Integer identifying this option which previously has been described with an options directory message.
- Bytes 9-13: Original Match ID = (00 BC 61 4E)(hex) = 12345678 (decimal). Match ID of the original trade.
- Bytes 14-17: Price = (00 00 63 9C)(hex) = 25500 (decimal). Original premium price is $2.5500
- Bytes 15-18: Size = (00 00 00 0A)(hex) = 10 (decimal). Original volume is 10 contracts

This byte stream is a *broken trade report* message for option id 85393, original premium price $2.5500, original volume of 10 contracts, original match id 12345678. The timestamp of this broken trade is at 9:30:00.789123456am.

Example 11 – Trading Action Message

Network byte stream (in hex):

- 48 35 1F 29 07 00 01 4D 91 48

Message fields:

- Byte 0: Message type, 48 = "H". This is a trading action message, representing an option that has halted or resumed trading in the system. See trading action message definition for more information.
- Bytes 1-4: Nanoseconds = (35 1F 29 07)(hex) = 891234567 (decimal). This time represents 9:30:00.891234567am, assuming the last received Timestamp Message had a value of 9:30:00am.
- Bytes 5-8: Option ID = (00 01 4D 91)(hex) = 85393 (decimal). An Integer identifying this option which previously has been described with an options directory message.
- Byte 9: Current Trading State = (48)(hex) = "H" (alpha). Option has been halted

This byte stream is a *trading action* message indicating that option with id 85393 has been halted. The timestamp of this trading action is at 9:30:00.891234567am.

General Communication: This content contains non-sensitive information

Appendix B – Document Revision Control Log

April 22, 2025: Best of Nasdaq Options - Version 3.3
- Adding End of Replay Sequence Message only for SoupBINTCP
- Converting the SoupBINTCP Protocol option to a replay without support for Live Market Data

January 9, 2023: Best of Nasdaq Options - Version 3.3
- Version updated to 3.3
- Clarifying the Data Types: Added "2 byte Price fields are unsigned positive numbers. 4 byte Price fields are signed positive numbers."

November 2, 2017: Best of Nasdaq Options - Version 3.2
- Updated the Start of Messages (System Event Code "O") time to ~2:00 am.

November 30, 2015: Best of Nasdaq Options - Version 3.1
- Updated the Start of Messages (System Event Code "O") time to ~4:00 am.
- Updated the End of System Hours (System Event Code "E") time to ~5:15 pm to more accurately reflect current practice.
- Updated the End of Messages (System Event Code "C") time to ~5:20 pm to more accurately reflect current practice.

January 18, 2011: Best of Nasdaq Options - Version 3.0
Major Update:
- Timestamp messages introduced
- Options identified by Option ID
- Two forms of one-sided Quotes introduced
- Two forms of two-sided Quotes introduced
- All numeric data is binary

March 31, 2009: Best of Nasdaq Options - Version 2.01-OSI
Update to reflect format changes for Options Symbology Initiative Compliance

November 7, 2007: Best of Nasdaq Options - Version 2.00
Nasdaq added the Security Open Message (Section 4.4) to the document and renumbered the document to reflect this included message.

September 18, 2007: Best of Nasdaq Options - Version 1.00
Nasdaq released the initial BONO data feed specification document to the public.

General Communication: This content contains non-sensitive information