



U.S. Options Auction Feed Specification

Version 1.1.2

March 7, 2019

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1 Introduction

The Cboe U.S. Options Auction Feed specification may be used to deliver Auction message information for the Cboe Options (“C1”) and EDGX Options Exchanges.

Multicast Options Auction Feed Descriptions

Exchange	Shaping	Served From Data Center (Primary/Secondary)	Multicast Feed ID
C1 Options	Gig	Primary	CAA
C1 Options	Gig	Primary	CBA
C1 Options	Gig	Secondary	CEA
EDGX Options	Gig	Primary	EAA
EDGX Options	Gig	Primary	EBA
EDGX Options	Gig	Secondary	EEA

Cboe Members may also use Cboe Multicast PITCH to receive auction messages as well as real-time depth of book quotations and execution information. Refer to the [US Equities/Options Multicast Depth of Book \(PITCH\) Specification](#) for more information.

1.1 Feed Connectivity Requirements

Gig Shaped feeds are available to members with a minimum of 1 GB/s of connectivity to Cboe via cross connect or dedicated circuit.

Members with sufficient connectivity may choose to take both the Gig-Shaped feeds from one of Cboe datacenters and arbitrate the feeds to recover lost data. Alternatively, members may choose to arbitrate feeds from both datacenters. It should be noted that feeds from the secondary datacenter will have additional latency for those connected with Cboe in the primary data center due to proximity and business continuity processing.

Cboe Options Auction Feed real-time events are delivered using a published range of multicast addresses divided by symbol range units.

2 Protocol

C1 and EDGX Options users may receive the Cboe Options Auction Feed protocol over multicast only.

The Cboe Options Auction Feed cannot be used to enter orders. For Cboe Options Auction order entry, refer to the Cboe US Options [FIX](#) or [BOE](#) specifications.

2.1 Message Format

Cboe Options Auction Feed protocol messages are delivered un-sequenced and may not be retrieved if missed.

Cboe Members familiar with the Multicast Depth of Book protocol should find it very easy to reuse that code to process the Cboe Options Auction Feed. All multicast delivered events will be self-contained. Developers can assume that delivered data will not cross frame boundaries and a single Ethernet frame will contain only one Unit Header with associated data.

The Cboe Options Auction Feed is comprised of a series of dynamic length un-sequenced messages. Each message begins with *Length* and *Message Type* fields. **Cboe reserves the right to add message types and grow the length** of any message without notice. Members should develop their decoders to handle unknown message types and messages beyond the expected length. Messages will only be grown to add additional data to the end of a message.

2.2 Data Types

The following field types are used within the `Sequenced Unit Header` and `PITCH 2.X`.

- **Alphanumeric** fields are left justified ASCII fields and space padded on the right.
- **Binary** fields are unsigned and sized to “Length” bytes and ordered using Little Endian convention (least significant byte first).
- **Binary Long Price** fields are unsigned Little Endian encoded 8 byte binary fields with 4 implied decimal places (denominator = 10,000).
- **Multiplier** fields are unsigned Little Endian encoded 4 byte binary fields with 1 implied decimal place (denominator = 10).
- **Bit Field** fields are fixed width fields with each bit representing a Boolean flag (the 0 bit is the lowest significant bit; the 7 bit is the highest significant bit).
- **Printable ASCII** fields are left justified ASCII fields that are space padded on the right that may include ASCII values in the range of 0x20 – 0x7e.

2.3 Sequenced Unit Header

The `Sequenced Unit Header` is used for all Cboe Options Auction Feed messages.

Unsequenced data may be delivered using the `Sequenced Unit Header`. Sequenced headers will have a 0 value for the sequence field and potentially for the unit field.

Sequenced Unit Header				
Field	Offset	Length	Value/Type	Description
<i>Hdr Length</i>	0	2	Binary	Length of entire block of messages. Includes this header and <i>Hdr Count</i> messages to follow.
<i>Hdr Count</i>	2	1	Binary	Number of messages to follow this header.
<i>Hdr Unit</i>	3	1	Binary	Unit that applies to messages included in this header.
<i>Hdr Sequence</i>	4	4	Binary	Will be zero.
Total Length = 8 bytes				

2.4 Heartbeat Messages

The `Sequenced Unit Header` with a count field set to “0” will be used for heartbeat messages. During trading hours heartbeat messages will be sent if no data has been delivered within 1 second.

Outside of trading hours Cboe sends heartbeat messages on all real-time channels to help users validate multicast connectivity. Heartbeat messages may not be sent from 12:00 am – 1:00 am ET or during maintenance windows.

3 Cboe Options Auction Feed Messages

3.1 Time

A `Time` message is sent whenever the source time for a unit passes over a second boundary. All subsequent time offset fields for the same unit will use the new `Time` value as the base until another `Time` message is received for the same unit.

Time				
Field Name	Offset	Length	Type/(Value)	Description
<code>Length</code>	0	1	Binary	<code>Length</code> of this message including this field
<code>Message Type</code>	1	1	0x20	<code>Time</code> Message
<code>Time</code>	2	4	Binary	Number of whole seconds from midnight Eastern Time
Total Length = 6 bytes				

3.2 Unit Clear

The `Unit Clear` message instructs feed recipients to clear all orders for the Cboe book in the unit specified in the `Sequenced Unit Header`. This message will be sent at startup each day. It would also be distributed in certain recovery events such as a data center fail-over.

Unit Clear				
Field Name	Offset	Length	Type/(Value)	Description
<code>Length</code>	0	1	Binary	<code>Length</code> of this message including this field
<code>Message Type</code>	1	1	0x97	<code>Unit Clear</code> Message
<code>Time offset</code>	2	4	Binary	Nanosecond offset from last unit timestamp
Total Length = 6 bytes				

3.3 Auction Notification

`Auction Notification` messages are used to disseminate order details of an auction. Auctions will be available for a defined period of time known as the exposure period.

Auction Notification				
Field Name	Offset	Length	Type/(Value)	Description
<code>Length</code>	0	1	Binary	<code>Length</code> of this message including this field
<code>Message Type</code>	1	1	0xAD	<code>Auction Notification</code> Message
<code>Time offset</code>	2	4	Binary	Nanosecond offset from last unit timestamp
<code>Symbol</code>	6	6	Printable ASCII	<code>Symbol</code> right padded with spaces.
<code>Auction ID</code>	12	8	Binary	Day specific identifier assigned to this auction.
<code>Auction Type</code>	20	1	Alphanumeric	B = Bats Auction Mechanism (BAM) (EDGX Only) or AIM (C1 Only)

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				S = Solicitation Auction Mechanism (C1 Only) T = Step Up Mechanism (SUM) A = SUM All or None (C1 Only)
<i>Side</i>	21	1	Alphanumeric	“B” or “S”
<i>Price</i>	22	8	Binary Long Price	For SUM this will reflect the NBBO price of the opposite side of the auction at the time of entry. For BAM and SAM this will reflect the limit price specified on the order. For AIM this will be set to zero.
<i>Contracts</i>	30	4	Binary	Number of contracts available in the auction.
<i>Customer Indicator</i>	34	1	Alphanumeric	N = Non-Customer C = Customer
<i>ParticipantID</i>	35	4	Alphanumeric	Executing Broker (optional) of firm attributed to this quote
<i>Auction End Offset</i>	39	4	Binary	Nanosecond offset from last timestamp
<i>Client ID</i>	43	4	Alphanumeric	Optional user specified value attributed to this quote.
Total Length = 47 bytes				

3.4 Auction Cancel

Auction Cancel messages are used to disseminate the cancellation of an earlier Auction Notification message as a result of a user cancellation of the original order, a user modification request to change the price or increase the original order quantity, or a fading of the NBBO.

A user request to modify the order price or to increase the original order quantity will result in a cancellation of the auction followed by a new Auction Notification message. Auction Cancel messages will not be issued for order quantity decrements.

Auction Cancel				
Field Name	Offset	Length	Type/(Value)	Description
<i>Length</i>	0	1	Binary	Length of this message including this field
<i>Message Type</i>	1	1	0xAE	Auction Cancel Message
<i>Time offset</i>	2	4	Binary	Nanosecond offset from last unit timestamp
<i>Auction ID</i>	6	8	Binary	Day specific identifier assigned to this auction
Total Length = 14 bytes				

3.5 Auction Trade

Auction Trade messages are used to disseminate executions resulting from an options auction.

Auction Trade				
Field Name	Offset	Length	Type/(Value)	Description
<i>Length</i>	0	1	Binary	Length of this message including this field
<i>Message Type</i>	1	1	0xAF	Auction Trade Message
<i>Time offset</i>	2	4	Binary	Nanosecond offset from last unit timestamp
<i>Auction ID</i>	6	8	Binary	Day specific identifier assigned to this auction
<i>Execution ID</i>	14	8	Binary	Day specific identifier assigned to this execution
<i>Price</i>	22	8	Binary Long Price	Trade price
<i>Contracts</i>	30	4	Binary	Number of contracts traded
Total Length = 34 bytes				

3.6 Options Auction Update (C1 Only)

Options Auction Update messages are used to disseminate price and size information during Opening and Re-Opening (halt) auctions on the Cboe Options Exchange. Options Auction Update messages are sent every five seconds during an opening period provided that one of the field values has changed. When no values have changed, a message is sent once every 60 seconds. Refer to the [Cboe Options Opening Process](#) specification for more information.

The Options Auction Update message has the following format:

Options Auction Update				
Field Name	Offset	Length	Type/(Value)	Description
<i>Length</i>	0	1	Binary	<i>Length</i> of this message including this field.
<i>Message Type</i>	1	1	0xD1	Options Auction Update Message
<i>Time offset</i>	2	4	Binary	Nanosecond offset from last unit timestamp.
<i>Symbol</i>	6	8	Printable ASCII	<i>Symbol</i> right padded with spaces.
<i>Auction Type</i>	14	1	Alphanumeric	G = GTH Opening O = RTH Opening H = Halt Re-Opening V = Volatility Opening
<i>Reference Price</i>	15	8	Binary Long Price	Collared VMIM price computed on the queuing book only.
<i>Buy Contracts</i>	23	4	Binary	Cumulative Buy contracts at the <i>Reference Price</i> and above.
<i>Sell Contracts</i>	27	4	Binary	Cumulative Sell contracts at the <i>Reference Price</i> and below.

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<i>Indicative Price</i>	31	8	Binary Long Price	Collared VMIM price computed on the combined queueing book and the continuous book. Equal to <i>Reference Price</i> for options that do not have a GTH trading session.
<i>Auction Only Price</i>	39	8	Binary Long Price	Uncollared VMIM price computed on the queueing book only.
<i>Opening Condition</i>	47	1	Alphanumeric	O = Would open Q = Need quote to open B = Need more buyers S = Need more sellers
Total Length = 48 bytes				

3.7 Auction Summary (C1 Only)

Auction Summary messages are used to disseminate the results of the Opening and Re-Opening process. An Opening or Re-Opening *Auction Summary* message for each symbol is sent at the conclusion of the Opening or Re-Opening process and represents the Cboe opening price.

The *Auction Summary* message has the following format:

Auction Summary				
Field Name	Offset	Length	Type/(Value)	Description
<i>Length</i>	0	1	Binary	Length of this message including this field.
<i>Message Type</i>	1	1	0x96	<i>Auction Summary</i> Message
<i>Time offset</i>	2	4	Binary	Nanosecond offset from last unit timestamp.
<i>Symbol</i>	6	8	Printable ASCII	<i>Symbol</i> right padded with spaces.
<i>Auction Type</i>	14	1	Alphanumeric	G = GTH Opening O = RTH Opening H = Halt Re-Opening V = Volatility Opening
<i>Price</i>	15	8	Binary Long Price	Auction price.
<i>Quantity</i>	23	4	Binary	Cumulative number of contracts executed during the auction.
Total Length = 27 bytes				

3.8 Width Update (C1 Only)

The *Width Update* message is used to communicate opening quote width multiplier. This message will be sent at the beginning of the day for all underlyings and in the event that the exchange decides to change the quote width multiplier on a per underlying basis. For complete details on the opening collars see the [Cboe Opening Process Specification](#).

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Width Update				
Field Name	Offset	Length	Type/(Value)	Description
<i>Length</i>	0	1	Binary	<i>Length</i> of this message including this field.
<i>Message Type</i>	1	1	0xD2	Width Update Message
<i>Time Offset</i>	2	4	Binary	Nanosecond offset from last unit timestamp.
<i>Underlying</i>	6	8	Printable ASCII	Underlying right padded with spaces.
<i>Width Type</i>	14	1	Alphanumeric	R = Regular V = Volatility
<i>Multiplier</i>	15	4	Multiplier	Width multiplier.
Total Length = 19 bytes				

3.9 Symbol Mapping

A *Symbol Mapping* message is used to map the 6 character multicast feed symbol field to an OSI symbol. These messages are sent continuously through the day at variable rates as bandwidth allows.

Symbol Mapping				
Field Name	Offset	Length	Type/(Value)	Description
<i>Length</i>	0	1	Binary	<i>Length</i> of this message including this field
<i>Message Type</i>	1	1	0x2E	<i>Symbol Mapping</i> Message
<i>Feed Symbol</i>	2	6	Printable ASCII	Symbol right padded with spaces
<i>OSI Symbol</i>	8	21	Printable ASCII	OSI Symbol
<i>Symbol Condition</i>	29	1	Alphanumeric	N = Normal C = Closing Only
<i>Underlying</i>	30	8	Alphanumeric	Symbol of underlying instrument right padded with spaces.
Total Length = 38 bytes				

3.10 End of Session

The *End of Session* message is sent for each unit when the unit shuts down. No more auction messages will be delivered for this unit, but heartbeats from the unit may be received.

End of Session				
Field Name	Offset	Length	Type/(Value)	Description
<i>Length</i>	0	1	Binary	<i>Length</i> of this message including this field
<i>Message Type</i>	1	1	0x2D	<i>End of Session</i> Message
<i>Timestamp</i>	2	4	Binary	Nanosecond offset from last unit timestamp
Total Length = 6 bytes				

4 Message Types

0x20	Time
0x97	Unit Clear
0xAD	Auction Notification
0xAE	Auction Cancel
0xAF	Auction Trade
0xD1	Options Auction Update
0x96	Auction Summary
0xD2	Width Update
0x2E	Symbol Mapping
0x2D	End of Session

5 Example Messages

Each of the following message types must be wrapped by a sequenced unit header as described in Section 2.24. Note that in the following examples, each byte is represented by two hexadecimal digits.

5.1 Sequenced Unit Header

Hdr Length	31 00	49 bytes, including header
Hdr Count	02	2 messages to follow
Hdr Unit	01	Unit 1
Hdr Sequence	00 00 00 00	Always set to zero

5.2 Time Message

Length	06	6 bytes
Type	20	Time
Time	98 85 00 00	34,200 seconds = 09:30 AM Eastern

5.3 Unit Clear

Length	06	6 bytes
Type	97	Unit Clear
Time offset	18 D2 06 00	447,000 ns since last Time Message

5.4 Auction Notification Message

Length	2F	47 bytes
Type	AD	Auction Notification
Time offset	18 D2 06 00	447,000 ns since last Time Message
Symbol	30 30 6D 45 56 4F	00mEVO
Auction ID	05 40 5B 77 8F 56 1D 0B	631WC4000005
Auction Type	54	T = SUM
Side	42	B = Buy Side
Prc	E8 A3 0F 00 00 00 00 00	\$102.50
Contracts	64 00 00 00	100 contracts
Customer Indicator	43	C = Customer
ParticipantID	45 46 49 44	EFID
Auct. End Offset	38 73 0E 00	947,000 ns since last Time Message
Client ID	43 4C 49 44	CLID

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5.5 Auction Cancel Message

Length	E	14 bytes
Type	AE	Auction Cancel
Time offset	18 D2 06 00	447,000 ns since last Time Message
Auction ID	05 40 5B 77 8F 56 1D 0B	631WC4000005

5.6 Auction Trade Message

Length	22	34 bytes
Type	AF	Auction Trade
Time offset	18 D2 06 00	447,000 ns since last Time Message
Auction ID	05 40 5B 77 8F 56 1D 0B	631WC4000005
Execution Id	34 2B 46 E0 BB 00 00 00	0AAP09VEC
Prc	E8 A3 0F 00 00 00 00 00	\$102.50
Contracts	64 00 00 00	100 contracts

5.7 Options Auction Update (C1 Only)

Length	30	48 bytes
Type	D1	Options Auction Update
Time offset	18 D2 06 00	447,000 ns since last Time Message
Symbol	30 30 6D 45 56 4F	00mEVO
Auction Type	56	Volatility Opening
Reference Price	E8 A3 0F 00 00 00 00 00	\$102.50
Buy Contracts	64 00 00 00	100 Contracts
Sell Contracts	C8 00 00 00	200 Contracts
Indicative Price	E8 A3 0F 00 00 00 00 00	\$102.50
Auction Only Price	E8 A3 0F 00 00 00 00 00	\$102.50
Opening Condition	4F	O = Would Open

5.8 Auction Summary (C1 Only)

Length	1B	27 bytes
Type	96	Auction Summary
Time offset	18 D2 06 00	447,000 ns since last Time Message
Symbol	30 30 6D 45 56 5F 20 20	00mEVO
Auction Type	4F	O = Opening
Price	E8 A3 0F 00 00 00 00 00	\$102.50
Quantity	4B 00 00 00	75

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5.9 Width Update (C1 Only)

Length	13	19 bytes
Type	D2	Width Update
Time Offset	18 D2 06 00	447,000 ns since last Time Message
Underlying	5A 56 5A 5A 54 20 20 20	ZVZZT
Width Type	52	R = Regular
Multiplier	0F 00 00 00	Multiplier of 1.5

5.10 Symbol Mapping Message

Length	26	38 bytes
Type	2E	Symbol Mapping Message
Feed Symbol	30 30 6D 45 56 4F	00mEVO
OSI Symbol	4D 53 46 54 20 20 31 30 30 31 31 36 43 30 30 30 34 37 35 30 30	MSFT 100116C00047500
Symbol	4E	'N' - Closing Only
Condition		
Underlying	4D 53 46 54 20 20 20 20	MSFT

5.11 End of Session

Length	06	6 bytes
Type	2D	End of Session
Time offset	18 D2 06 00	447,000 ns since last Time Message

6 Multicast Configuration

6.1 US Options Production Environment Configuration

6.1.1 Limitations/Configurations

The following table defines Cboe current configuration for network and gap request limitations. These limitations are session based. Cboe reserves the right to adjust the gap request limitations to improve the effectiveness of the gap request infrastructure.

Period/Type	Limit/Setting	Notes
MTU	1500	Cboe will send UDP messages up to 1500 bytes. Members should ensure that their infrastructure is configured accordingly.
Gig-Shaped Throttle	1 Gb/s	The real-time and gap multicast head ends are configured to shape their output to this level to minimize packet loss.

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6.1.2 Production Unit Distribution

The following table describes an updated Cboe symbol distribution across units.

Unit	EDGX Symbol Range	EDGX Exceptions	C1 Symbol Range	C1 Exceptions
1	A – ADOZZ		A – ACNAZ	
2	ADP – ANETZ	Excludes AMZN	ACNB – AMGNZ	
3	ANEU – BAAAZ		AMGO – BAAZ	Excludes AMZN
4	BAAB – BKNFZ		BAB – BKNFZ	
5	BKNG – BZZZZ		BKNG – CASZZ	
6	C – CLGXZ		CAT – COOZZ	
7	CLGY – CSXAZ		COP – DEAAZ	
8	CSXB – DISAZ		DEAB – EEMAZ	Excludes DJX
9	DISB – ETFBZ		DJXA – FBAAZ	
10	ETFC – FIVDZ		FBAB – GOOFZ	
11	FIVE – GLDAZ		GOOG – GOOGZ	
12	GLDB – GOOGZ		GOOH – IFFAZ	
13	GOOH – HSXZZ		IFFB – IWLZZ	
14	HSY – IWLZZ		IWM – IWMAZ	
15	IWM – JNJAZ		IWMB – LOVZZ	
16	JNJB – LMTAZ		LOW – MPCAZ	
17	LMTB – MLNXZ		MPCB – NFLWZ	
18	MLNY – MUAAZ		NFLX – NUEAZ	
19	MUAB – NTESZ		NUEB – PEPAZ	Excludes OEX
20	NTET – OXYAZ		PEPB – QQPZZ	
21	OXYB – QGENZ		ROKV – SPZZZ	Excludes RUT, RUTW, SIXB, SIXC, SIXE, SIXI, SIXR, SIXRE, SIXT, SIXU, SIXV, SIXY, SPX, SPXW, SPY
22	QGEO – RHAAZ		SQ – TLRZY	
23	RHAB – SMGZZ	Excludes RUT, RUTW	TLRZ – TSLAZ	
24	SMH – SYEZZ	Excludes SPY	TSLB – UVXXZ	
25	SYF – TSKZZ		UVXY – VZZZZ	Excludes VIX, VIXW
26	TSL – UALAZ		W – XLEAZ	Excludes XEO
27	UALB – VLOAZ		XLEB – ZZZZZ	Excludes XSP
28	VLOB – WDCAZ		QQQ	
29	WDCB – XLDZZ		AMZN	
30	XLE – ZZZZZ	Excludes XSP	SPY	
31	AMZN		DJX, OEX, RUT, RUTW, XEO, XSP, SIXB, SIXC, SIXE, SIXI, SIXR, SIXRE, SIXT, SIXU, SIXV, SIXY	
32	SPY		VIX, VIXW	
33	XSP		SPX	
34	N/A		SPXW	
35	N/A		SPX/SPXW Cross Product Spreads	

Note – Cboe reserves the right to add units and/or change symbol distribution with 48 hours of notice and no migration period. Notice will be given that the distribution will change on a certain date. Care should be taken to support mappings in these tables via software configuration.

6.1.3 C1 Options Production Multicast Routing Parameters

Data Center	Rendezvous Point
Primary Data Center A feed	TBD
Primary Data Center B feed	TBD
Secondary Data Center E feed	TBD

6.1.4 EDGX Options Production Multicast Routing Parameters

Data Center	Rendezvous Point
Primary Data Center A feed	74.115.128.160
Primary Data Center B feed	74.115.128.161
Secondary Data Center E feed	174.136.181.250

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6.1.5 C1 Options Production Address/Unit Distribution

The following tables describe the unit distribution across the C1 Options Auction Feed.

Primary Datacenter		Gig Shaped [CAA] TBD	Gig Shaped [CBA] TBD
Unit	IP Port	Real-time MC	Real-time MC
1	TBD	TBD	TBD
2	TBD		
3	TBD		
4	TBD		
5	TBD	TBD	TBD
6	TBD		
7	TBD		
8	TBD		
9	TBD	TBD	TBD
10	TBD		
11	TBD		
12	TBD		
13	TBD	TBD	TBD
14	TBD		
15	TBD		
16	TBD		
17	TBD	TBD	TBD
18	TBD		
19	TBD		
20	TBD		
21	TBD	TBD	TBD
22	TBD		
23	TBD		
24	TBD		
25	TBD	TBD	TBD
26	TBD		
27	TBD		
28	TBD		
29	TBD	TBD	TBD
30	TBD		
31	TBD		
32	TBD		
33	TBD	TBD	TBD
34	TBD		
35	TBD		

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Secondary Datacenter		Gig Shaped [CEA] TBD
Unit	IP Port	Real-time MC
1	TBD	TBD
2	TBD	
3	TBD	
4	TBD	
5	TBD	TBD
6	TBD	
7	TBD	
8	TBD	
9	TBD	TBD
10	TBD	
11	TBD	
12	TBD	
13	TBD	TBD
14	TBD	
15	TBD	
16	TBD	
17	TBD	TBD
18	TBD	
19	TBD	
20	TBD	
21	TBD	TBD
22	TBD	
23	TBD	
24	TBD	
25	TBD	TBD
26	TBD	
27	TBD	
28	TBD	
29	TBD	TBD
30	TBD	
31	TBD	
32	TBD	
33	TBD	TBD
34	TBD	
35	TBD	

Note – Cboe reserves the right to add multicast addresses with prior notice, but no migration period. Notice will be given that the distribution will change on a certain date. Care should be taken to support mappings in these tables via software configuration. Addresses in the gray area are pre-assigned but not available. Members should not configure their networks or systems for these addresses.

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6.1.6 EDGX Options Production Address/Unit Distribution

The following tables describe the unit distribution across the EDGX Options Auction Feed.

Primary Datacenter		Gig Shaped [EAA] 174.136.164.0/28	Gig Shaped [EBA] 174.136.164.16/28
Unit	IP Port	Real-time MC	Real-time MC
1	30601	224.0.131.144	233.130.124.144
2	30602		
3	30603		
4	30604		
5	30605	224.0.131.145	233.130.124.145
6	30606		
7	30607		
8	30608		
9	30609	224.0.131.146	223.130.124.146
10	30610		
11	30611		
12	30612		
13	30613	224.0.131.147	233.130.124.147
14	30614		
15	30615		
16	30616		
17	30617	224.0.131.148	233.130.124.148
18	30618		
19	30619		
20	30620		
21	30621	224.0.131.149	233.130.124.149
22	30622		
23	30623		
24	30624		
25	30625	224.0.131.150	233.130.124.150
26	30626		
27	30627		
28	30628		
29	30629	224.0.131.151	233.130.124.151
30	30630		
31	30631		
32	30632		
33	30633	224.0.131.152	233.130.124.152

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Secondary Datacenter		Gig Shaped [EEA] 174.136.176.128/28
Unit	IP Port	Real-time MC
1	31601	233.19.3.128
2	31602	
3	31603	
4	31604	
5	31605	233.19.3.129
6	31606	
7	31607	
8	31608	
9	31609	233.19.3.130
10	31610	
11	31611	
12	31612	
13	31613	233.19.3.131
14	31614	
15	31615	
16	31616	
17	31617	233.19.3.132
18	31618	
19	31619	
20	31620	
21	31621	233.19.3.133
22	31622	
23	31623	
24	31624	
25	31625	233.19.3.134
26	31626	
27	31627	
28	31628	
29	31629	233.19.3.135
30	31630	
31	31631	
32	31632	
33	31633	233.19.3.136

Note - Cboe reserves the right to add multicast addresses with prior notice, but no migration period. Notice will be given that the distribution will change on a certain date. Care should be taken to support mappings in these tables via software configuration. Addresses in the gray area are pre-assigned but not available. Members should not configure their networks or systems for these addresses.

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6.2 US Options Certification Environment Configuration

6.2.1 Certification Unit Distribution

The following table describes the Cboe Options symbol distribution across units.

Unit	EDGX Symbol Range	EDGX Exceptions	C1 Symbol Range	C1 Exceptions
1	A – ADOZZ		A – ACNAZ	
2	ADP – ANETZ	Excludes AMZN	ACNB – AMGNZ	
3	ANEU – BAAAZ		AMGO – BAAZ	Excludes AMZN
4	BAAB – BKNFZ		BAB – BKNFZ	
5	BKNG – BZZZZ		BKNG – CASZZ	
6	C – CLGXZ		CAT – COOZZ	
7	CLGY – CSXAZ		COP – DEAAZ	
8	CSXB – DISAZ		DEAB – EEMAZ	Excludes DJX
9	DISB – ETFBZ		DJXA – FBAAZ	
10	ETFC – FIVDZ		FBAB – GOOFZ	
11	FIVE – GLDAZ		GOOG – GOOGZ	
12	GLDB – GOOGZ		GOOH – IFFAZ	
13	GOOH – HSXZZ		IFFB – IWLZZ	
14	HSY – IWLZZ		IWM – IWMAZ	
15	IWM – JNJAZ		IWMB – LOVZZ	
16	JNJB – LMTAZ		LOW – MPCAZ	
17	LMTB – MLNXZ		MPCB – NFLWZ	
18	MLNY – MUAZ		NFLX – NUEAZ	
19	MUAB – NTEZ		NUEB – PEPAZ	Excludes OEX
20	NTET – OXYAZ		PEPB – QQPZZ	
21	OXYB – QGENZ		ROKV – SPZZZ	Excludes RUT, RUTW, SIXB, SIXC, SIXE, SIXI, SIXR, SIXRE, SIXT, SIXU, SIXV, SIXY, SPX, SPXW, SPY
22	QGEO – RHAZ		SQ – TLRZ	
23	RHAB – SMGZZ	Excludes RUT, RUTW	TLRZ – TSLAZ	
24	SMH – SYEZZ	Excludes SPY	TSLB – UVXXZ	
25	SYF – TSKZZ		UVXY – VZZZZ	Excludes VIX, VIXW
26	TSL – UALAZ		W – XLEAZ	Excludes XEO
27	UALB – VLOAZ		XLEB – ZZZZZ	Excludes XSP
28	VLOB – WDCAZ		QQQ	
29	WDCB – XLDZZ		AMZN	
30	XLE – ZZZZZ	Excludes XSP	SPY	
31	AMZN		DJX, OEX, RUT, RUTW, XEO, XSP, SIXB, SIXC, SIXE, SIXI, SIXR, SIXRE, SIXT, SIXU, SIXV, SIXY	
32	SPY		VIX, VIXW	
33	XSP		SPX	
34	N/A		SPXW	
35	N/A		SPX/SPXW Cross Product Spreads	

Note - Cboe reserves the right to add units and/or change symbol distribution with 48 hours of notice and no migration period. Notice will be given that the distribution will change on a certain date. Care should be taken to support mappings in these tables via software configuration.

6.2.2 Options Certification Multicast Routing Parameters

Primary Certification Data Center	Rendezvous Point
C1	74.115.128.131
EDGX	74.115.128.129

6.2.3 C1 Options Certification Address/Unit Distribution

The following tables describe the unit distribution across certification C1 Options Multicast Auction Feed out of the Primary datacenter.

Primary Datacenter		WAN-Shaped 170.137.126.16/28
Unit	IP Port	Real-time MC
1	32401	233.103.126.22
2	32402	
3	32403	
4	32404	
5	32405	
6	32406	
7	32407	
8	32408	
9	32409	
10	32410	
11	32411	
12	32412	
13	32413	
14	32414	
15	32415	
16	32416	
17	32417	233.103.126.23
18	32418	
19	32419	
20	32420	
21	32421	
22	32422	
23	32423	
24	32424	
25	32425	
26	32426	
27	32427	
28	32428	
29	32429	
30	32430	
31	32431	
32	32432	
33	32433	
34	32434	
35	32435	

Note - Cboe reserves the right to add multicast addresses with prior notice, but no migration period. Notice will be given that the distribution will change on a certain date. Care should be taken to support mappings in these tables via software configuration.

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6.2.4 EDGX Options Certification Address/Unit Distribution

The following tables describe the unit distribution across certification EDGX Options Multicast Auction Feed out of the Primary datacenter.

Primary Datacenter		WAN-Shaped 174.136.174.176/28
Unit	IP Port	Real-time MC
1	32601	224.0.74.208
2	32602	
3	32603	
4	32604	
5	32605	
6	32606	
7	32607	
8	32608	
9	32609	
10	32610	
11	32611	
12	32612	
13	32613	
14	32614	
15	32615	
16	32616	
17	32617	224.0.74.210
18	32618	
19	32619	
20	32620	
21	32621	
22	32622	
23	32623	
24	32624	
25	32625	
26	32626	
27	32627	
28	32628	
29	32629	
30	32630	
31	32631	
32	32632	
33	32633	

Note - Cboe reserves the right to add multicast addresses with prior notice, but no migration period. Notice will be given that the distribution will change on a certain date. Care should be taken to support mappings in these tables via software configuration.

7 Connectivity

7.1 Supported Extranet Carriers

The Cboe Options Auction Feed will be made available to Members through extranet carriers that have completed their multicast implementation and certified with Cboe on a per-market basis. Cboe has certified a number of carriers for redistribution of Cboe Multicast data feeds as outlined in the [Cboe US Equity/Options Connectivity Manual](#). For more information on receiving the Cboe Options Auction Feed through any of these providers, please refer to the vendor contact information noted in the Extranet Providers section of the Connectivity Manual.

8 References

For more information on Cboe Symbology, please refer to the [Cboe Symbology Reference](#) document.

9 Support

Please e-mail questions or comments regarding this specification to tradedesk@cboe.com.

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Revision History

Document Version	Date	Description
1.0.0	05/17/16	Initial version 1.0.0.
1.0.1	05/31/16	Added IPs and Port Numbers to the EDGX Options Certification Address/Unit Distribution table.
1.0.2	06/28/16	Added IPs and Port Numbers to the EDGX Options Production Address/Unit Distribution table. Updated the Sequenced Unit Header to 8 bytes. Removal of NBBO Price from Auction Notification message.
1.0.3	08/01/16	Added support for BAM Auctions.
1.0.4	01/06/17	Updated description of Auction Trade message.
1.0.5	10/17/17	Cboe branding/logo changes.
1.0.6	03/08/18	Updated Unit Distribution ranges.
1.0.7	03/23/18	Updated Unit Distribution ranges effective date updated to 4/14/18.
1.0.8	6/28/2018	Added Multicast Options Auction Feed Descriptions table. Added Feed Connectivity Requirements section. Added feed shaping information to source network headers.
1.1.0	11/16/18	Added support for C1 Options Feed.
1.1.1	12/06/18	Added notes indicating Feature Pack 4 updates.
1.1.2	03/07/19	Added matching engine unit 33 information in support of XSP trading on EDGX Options effective 04/08/19 . Added C1 certification primary data center rendezvous point IP address, unit distribution, and C1 Certification symbol ranges.