U.S. Options

Opening Process Feed

Specification

Version 1.0.20

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Contents

1   Introduction

1.1   Overview

This specification will be the standard specification used for the Cboe U.S. Options Opening Process Feed on the Cboe Options ("C1") Exchange platform.

Cboe customers may use the Cboe U.S. Options Opening Process Feed specification to receive real-time Opening Auction message information including auction updates and execution information.

The Cboe U.S. Options Opening Process Feed cannot be used to enter orders. For Cboe U.S. Options order entry, refer to the Cboe U.S. Options FIX or BOE specifications.

A WAN-Shaped version of the Cboe U.S. Options Opening Process Feed is available from both of Cboe's datacenters. Customers may choose to take one or more of the following feed options depending on their location and connectivity to Cboe.

Exchange	Shaping	Served From Data Center (Primary/Secondary)	Multicast Feed ID
C1 Options	WAN	Primary	CCO
C1 Options	WAN	Primary	CDO
C1 Options	WAN	Secondary	CEO

Cboe customers may also use Cboe U.S. Options Multicast PITCH, Cboe U.S. Options Multicast TOP, and Cboe U.S. Options Auction data feeds to receive opening process messages. Refer to the specifications for the respective feeds for more information.

1.2   24x5 Feed Hours and System Restart

For C1 Options operating in 24x5 mode, the Opening Process feed starts on Sunday at approximately 1:00 p.m. ET and shuts down on Friday at approximately 5:30 p.m. ET. A daily restart occurs between 5:30 and 7:00 p.m. ET each day at which time sequences will be reset. The daily restart is typically observed between 5:30 p.m. and 6:00 p.m. ET, but could occur later (between 6:00 p.m. and 7:00 p.m. ET) if needed for operational reasons. Feed startup and shutdown times may be adjusted without notice.

Under normal operations, it is expected that the order books are cleared (Delete Order messages sent for any open orders, including GTC and GTD orders), prior to the daily restart and reset of sequences. Persisted GTC and GTD orders will be added back onto the order books immediately after restart.

1.3 Feed Connectivity Requirements

WAN Shaped feeds are available to customers with a minimum of 100 Mbs/s of connectivity to Cboe via cross connect or dedicated circuit.

Customers with sufficient connectivity may choose the WAN-Shaped feeds from any of the Cboe 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 U.S. Options Opening Process Feed real-time events are delivered using a single published multicast address for all symbol ranges.

1.4 Gap Request Proxy and Message Retransmission

Recovery of missed data is not available on the Cboe U.S. Options Opening Process Feed as this feed contains only unsequenced messages.

1.5 Spin Servers

A spin is not available on the Cboe U.S. Options Opening Process Feed as this feed contains only unsequenced messages.

2   Protocol

C1 Options customers may receive the Cboe U.S. Options Opening Process Feed protocol over multicast to receive auction update and summary execution information.

2.1   Message Format

Cboe U.S. Options Opening Process Feed protocol messages are delivered unsequenced and may not be retrieved if missed.

All UDP delivered events will be self-contained. Developers can assume that UDP delivered data will not cross frame boundaries and a single Ethernet frame will contain only one Sequenced Unit Header with associated data.

The Cboe U.S. Options Opening Process 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. Customers 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).

➢ **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.

➢ **Binary Date** fields are 4 byte unsigned Little Endian values where the base-10 representation is the YYYYMMDD representation of that date. For example, October 30, 2023 would be represented as 20,231,030 (20231030).

2.3   Message Framing

Messages will be combined into single UDP frame where possible to decrease message overhead and total bandwidth. The count of messages in a UDP frame will be communicated using the `Sequenced Unit Header`. Framing will be determined by the server for each site. The content of the multicast across feeds (e.g. C/D WAN-Shaped) will be identical, but framing will not be consistent across feeds.

2.4   Sequenced Unit Header

The `Sequenced Unit Header` is used for all Cboe U.S. Options Opening Process Feed messages.

This feed will deliver only unsequenced data using the `Sequenced Unit Header`. Unsequenced headers will have a 0 value for the sequence field and unit field.

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

2.5   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. Heartbeat messages never increment the sequence number.

Outside of trading hours Cboe sends heartbeat messages are sent 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 U.S. Options Opening Process Feed Messages

3.1 Time Reference

The `Time Reference` message is used to provide a midnight reference point for recipients of the feed. It is sent whenever the system starts up and when the system crosses a midnight boundary. All subsequent `Time` messages for the same unit will the use the last *Midnight Reference* until another `Time Reference` message is received for that unit. The `Time Reference` message includes the *Trade Date*, so most other sequenced messages will not include that information.

`Time Reference` messages will be included in a spin response.

Time Reference				
Field Name	**Offset**	**Length**	**Type/(Value)**	**Description**
Length	0	1	Binary	*Length* of this message including this field.
Message Type	1	1	0xB1	`Time Reference` Message
Midnight Reference	2	4	Binary	Midnight Eastern Time reference time for subsequent `Time` messages, expressed as number of whole seconds since the Epoch (Midnight January 1, 1970 UTC).
Time	6	4	Binary	Number of whole seconds from midnight Eastern time.
Time Offset	10	4	Binary	Nanosecond offset from last unit timestamp.
Trade Date	14	4	Binary Date	Current Trade Date
Total Length = 18 bytes				

3.2 Time

A `Time` message is sent whenever the source time for a unit passes over a second boundary. The *Time* field is the number of seconds relative to midnight Eastern Time. 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. The `Time` message will also include the *Epoch Time* field, which is the current time represented as the number of whole seconds since the Epoch (midnight January 1, 1970).

A trading day may span multiple calendar days. Therefore, C1 options market data recipients must prepare for a crossing of the midnight ET boundary. At such time, a new `Time Reference` message will be sent and the *Time* field in subsequent `Time` messages will reset to reflect the number of seconds from the most recent midnight ET time.

Time				
Field Name	**Offset**	**Length**	**Type/(Value)**	**Description**
Length	0	1	Binary	*Length* of this message including this field
Message Type	1	1	0x20	`Time` Message
Time	2	4	Binary	Number of whole seconds from midnight Eastern Time
Epoch Time	6	4	Binary	Number of whole seconds since the Epoch (midnight January 1, 1970 UTC).
Total Length = 10 bytes				

3.3 Options Auction Update

`Options Auction Update` messages are used to disseminate price and size information and Composite Market bid and offer prices 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**
Length	0	1	Binary	*Length* of this message including this field.
Message Type	1	1	0xD1	`Options Auction Update` Message
Time offset	2	4	Binary	Nanosecond offset from last unit timestamp.
Symbol	6	8	Printable ASCII	*Symbol* right padded with spaces.
Auction Type	14	1	Alphanumeric	G = GTH Opening O = RTH Opening H = Halt Re-Opening V = Volatility Opening
Reference Price	15	8	Binary Long Price	Collared VMIM price computed on the queuing book only.
Buy Contracts	23	4	Binary	Cumulative Buy contracts at the *Reference Price* and above.
Sell Contracts	27	4	Binary	Cumulative Sell contracts at the *Reference Price* and below.
Indicative Price	31	8	Binary Long Price	Collared VMIM price computed on the combined queueing book and the continuous book. Equal to *Reference Price* for options that do not have a GTH trading session.
Auction Only Price	39	8	Binary Long Price	Uncollared VMIM price computed on the queuing book only.
Opening Condition	47	1	Alphanumeric	O = Would open

				Q = Need quote to open B = Need more buyers S = Need more sellers C = Crossed Composite Market
Composite Market Bid Price	48	8	Binary Long Price	Bid Price of the prevailing Composite Market
Composite Market Offer Price	56	8	Binary Long Price	Offer Price of the prevailing Composite Market.
Total Length = 64 bytes				

3.4 Auction Summary

`Auction Summary` messages are used to disseminate the results of an auction. An Opening or Re-Opening `Auction Summary` message for each symbol is sent at the conclusion of its Opening or Re-Opening auction and represents the Cboe Opening Price.

The `Auction Summary` message has the following format:

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

3.5 Width Update

The `Width Update` message is used to communicate the 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](#).

Width Update				
Field Name	**Offset**	**Length**	**Type/(Value)**	**Description**
Length	0	1	Binary	*Length* of this message including this field.

Message Type	1	1	0xD2	`Width Update` Message
Time Offset	2	4	Binary	Nanosecond offset from last unit timestamp.
Underlying	6	8	Printable ASCII	Underlying right padded with spaces.
Width Type	14	1	Alphanumeric	`R = Regular` `V = Volatility`
Multiplier	15	4	Multiplier	Width multiplier.
Total Length = 19 bytes				

3.6 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**
Length	0	1	Binary	*Length* of this message including this field
Message Type	1	1	0x2E	`Symbol Mapping` Message
Feed Symbol	2	6	Printable ASCII	Symbol right padded with spaces
OSI Symbol	8	21	Printable ASCII	OSI Symbol
Symbol Condition	29	1	Alphanumeric	`N = Normal` `C = Closing Only`
Underlying	30	8	Alphanumeric	Underlying right padded with spaces.
Total Length = 38 bytes				

3.7 End of Session

The `End of Session` message is sent for the feed when all the units have shut down. No more auction messages will be delivered for this feed.

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

3.8 SOQ Strike Range Update

The `SOQ Strike Range Update` message is only available on the C1 Exchange. This message disseminates the minimum and maximum strike prices in the strike price range used to calculate the Special Opening Quote ("SOQ") on a Volatility Settlement date. In the event that multiple distinct SOQ calculations occur on the same day, the applicable SOQ is differentiated by the *SOQ Identifier* field, which is set to the CSMi symbol on which the final settlement SOQ value is disseminated

The `SOQ Strike Range Update` message has the following format:

SOQ Strike Range Update				
Field Name	**Offset**	**Length**	**Type/(Value)**	**Description**
Length	0	1	Binary	Length of this message including this field
Message Type	1	1	0x9D	`SOQ Strike Range Update` Message
Time offset	2	4	Binary	Nanosecond offset from last unit timestamp
SOQ Identifier	6	20	Printable ASCII	Dissemination symbol of the final SOQ right padded with spaces.
Lower Strike Price	26	8	Binary Long Price	SOQ lower strike price
Upper Strike Price	34	8	Binary Long Price	SOQ upper strike price
Total Length = 42 bytes				

3.9 Constituent Symbol Mapping

The `Constituent Symbol Mapping` message is only available on the C1 Exchange. This message is used to communicate which options series (if any) are Constituent Series in a Volatility Settlement Special Opening Quote ("SOQ"). The message is identical to the `Symbol Mapping` message with the addition of the *SOQ Identifier* field, which is set to the CSMi symbol on which the final settlement SOQ value is disseminated. The `Constituent Symbol Mapping` message is sent as an unsequenced message with one message sent for each Constituent Series in a continuous loop as bandwidth allows.

The `Constituent Symbol Mapping` message has the following format:

Constituent Symbol Mapping				
Field Name	**Offset**	**Length**	**Type/(Value)**	**Description**
Length	0	1	Binary	Length of this message including this field.
Message Type	1	1	0x9E	`Constituent Symbol Mapping` Message
Feed Symbol	2	6	Printable ASCII	*Symbol* right padded with spaces
OSI Symbol	8	21	Printable ASCII	OSI Symbol
Symbol Condition	29	1	Alphanumeric	N = Normal C = Closing Only
Underlying	30	8	Alphanumeric	Symbol of underlying equity right padded with spaces.
SOQ Identifier	38	20	Printable ASCII	Dissemination symbol of the final SOQ right padded with spaces.
Total Length = 58 bytes				

4 Message Types

0xB1	Time Reference
0x20	Time
0xD1	Options Auction Update
0x96	Auction Summary
0xD2	Width Update
0x2E	Symbol Mapping
0x2D	End of Session
0x9D	SOQ Strike Range Update
0x9E	Constituent Symbol Mapping

5 Example Messages

Each of the following message types must be wrapped by a sequenced unit header as described in Section 2.4. 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 Reference

```
Length          12                 18 bytes
Type            B1                 Time Reference
Midnight        D0 8B 34 60        2021-02-23 00:00:00
Reference                          Eastern    (1614056400
                                   seconds since the Epoch)
Time            00 E1 00 00        16:00:00
Time Offset     00 00 00 00        Exactly 16:00:00
Trade Date      2F 62 34 01        2021-02-23
                                   February 23, 2021
```

5.3 Time Message

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

5.4 Time Message

```
Length          10                 10 bytes
Type            20                 Time
Time            98 85 00 00        34,200 seconds =
                                   09:30 AM Eastern
Epoch Time      68 11 35 60        1,614,090,600 seconds
                                   since the Epoch
```

5.5 Options Auction Update

```
Length          40                 64 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                 Volatilty Auction
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       E8 A3 0F 00 00 00 00 00         $102.50
Price
Opening Condition  4F                              O = Would Open
Composite Market   50 69 0F 00 00 00 00 00         $101.00
Bid Price
Composite Market   70 B7 0F 00 00 00 00 00         $103.00
Offer Price
```

5.6   Auction Summary

```
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
```

5.7   Width Update

```
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
```

5.8   Symbol Mapping

```
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 39         MSFT  190920C00150000
                   30 39 32 30 43 30 30 31
                   35 30 30 30 30
Symbol             4E                              'N' – Closing Only
Condition
Underlying         4D 53 46 54 20 20 20 20         MSFT
```

5.9 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
```

5.10 SOQ Strike Range Update

```
Length              2A                              42 bytes
Type                9D                              SOQ Strike Range Update
Time offset         18 D2 06 00                     447,000 ns since last
                                                    Time Message
SOQ Identifier      56 58 53 20 20 20 20 20         VXS
                    20 20 20 20 20 20 20 20
                    20 20 20 20
Lower Strike        40 66 03 01 00 00 00 00         $1,700
Price
Upper Strike        00 48 E8 01 00 00 00 00         $3,200
Price
```

5.11 Constituent Symbol Mapping

```
Length              3A                              58 bytes
Type                9E                              Constituent Symbol
                                                    Mapping Message
Feed Symbol         30 30 6D 45 56 4F               00mEVO
OSI Symbol          53 50 58 57 20 20 31 39         SPXW  190927C02390000
                    30 39 32 37 43 30 32 33
                    39 30 30 30 30
Symbol              4E                              'N' – Normal
Condition
Underlying          53 50 58 20 20 20 20 20         SPX
SOQ Identifier      56 58 53 20 20 20 20 20         VXS
                    20 20 20 20 20 20 20 20
                    20 20 20 20
```

6 Multicast Configuration

6.1 US Options Production Environment Configuration

6.1.1 C1 Options Unit Distribution

The following table describes an updated C1 symbol distribution across units.

Unit	C1 Symbol Range	C1 Exceptions
1	A – ADBD~	
2	ADBE – ASMK~	Excludes AMZN
3	ASML – BBX~~	
4	BBY – BYND~	
5	BYNE – COUO~	
6	COUP – DH~~~	
7	DI – ENPG~	Excludes DJX
8	ENPH – FCXA~	
9	FCXB – GLDA~	
10	GLDB –INCX~	Excludes GOOG, GOOGL
11	INCY – IWMA~	
12	IWMB – LMS~~	
13	LMT – MELI~	
14	MELJ – NED~~	Excludes MRUT, MXEA, MXEF, NANOS
15	NEE – NSCA~	
16	NSCB – OKS~~	Excludes OEX
17	OKT – PTOM~	
18	PTON –ROKU~	Excludes QQQ, RLG, RLV
19	ROKV – SHOP~	Excludes RUI, RUT, RUTW
20	SHOQ – SQAA~	Excludes SIXB, SIXC, SIXE, SIXI, SIXR, SIXRE, SIXT, SIXU, SIXV, SIXY, SPESG, SPX/SPXW, SPY
21	SQAB – TQQP~	
22	TQQQ – ULTA~	Excludes TSLA, UKXM
23	ULTB – WAAA~	Excludes VIX, VIXW
24	WAAB – XLT~~	Excludes XEO
25	XLU – Z~~~~	Excludes XSP
26	GOOG, GOOGL	
27	TSLA	
28	QQQ	
29	AMZN	
30	SPY	
31	DJX, MRUT, MXACW*, MXEA, MXEF, MXUSA*, MXWLD*, OEX, RLG, RLV, RUI, RUT, RUTW, SIXB, SIXC, SIXE, SIXI, SIXR, SIXRE, SIXT, SIXU, SIXV, SIXY, SPESG, XEO, UKXM, XSP	
32	NANOS, VIX, VIXW, XSP	
33	SPX	
34	SPXW	
35	SPX/SPXW, Cross Product Spreads	

*Effective 03/18/24

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.

6.1.2   C1 Options Production Multicast Routing Parameters

Data Center	Rendezvous Point
NY5 Primary Data Center A feed	74.115.128.183
NY5 Primary Data Center B feed	74.115.128.184
CH4 Secondary Data Center E feed	174.136.181.249

6.1.3   C1 Options Production Address/Unit Distribution

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

NY5 Primary Datacenter		WAN Shaped [CCO] 170.137.114.80 /28	WAN Shaped [CDO] 170.137.115.80 /28
Unit	IP Port	Real-time MC	Real-time MC
1	30551		
2	30552		
3	30553		
4	30554		
5	30555		
6	30556		
7	30557		
8	30558		
9	30559		
10	30560		
11	30561		
12	30562		
13	30563		
14	30564		
15	30565		
16	30566		
17	30567		
18	30568	224.0.74.94	233.182.199.222
19	30569		
20	30570		
21	30571		
22	30572		
23	30573		
24	30574		
25	30575		
26	30576		
27	30577		
28	30578		
29	30579		
30	30580		
31	30581		
32	30582		
33	30583		
34	30584		
35	30585		

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.

CH4 Secondary Datacenter		WAN Shaped [CEO] 170.137.124.224/28
Unit	IP Port	Real-time MC
1	31551	
2	31552	
3	31553	
4	31554	
5	31555	
6	31556	
7	31557	
8	31558	
9	31559	
10	31560	
11	31561	
12	31562	
13	31563	
14	31564	
15	31565	
16	31566	
17	31567	
18	31568	233.19.3.254
19	31569	
20	31570	
21	31571	
22	31572	
23	31573	
24	31574	
25	31575	
26	31576	
27	31577	
28	31578	
29	31579	
30	31580	
31	31581	
32	31582	
33	31583	
34	31584	
35	31585	

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.

6.2 US Options Certification Environment Configuration

6.2.1 C1 Options Certification Unit Distribution

The following table describes an updated C1 symbol distribution across units.

Unit	C1 Symbol Range	C1 Exceptions
1	A – ADBD~	
2	ADBE – ASMK~	Excludes AMZN
3	ASML – BBX~~	
4	BBY – BYND~	
5	BYNE – COUO~	
6	COUP – DH~~~	
7	DI – ENPG~	Excludes DJX
8	ENPH – FCXA~	
9	FCXB – GLDA~	
10	GLDB –INCX~	Excludes GOOG, GOOGL
11	INCY – IWMA~	
12	IWMB – LMS~~	
13	LMT – MELI~	
14	MELJ – NED~~	Excludes MRUT, MXEA, MXEF, NANOS
15	NEE – NSCA~	
16	NSCB – OKS~~	Excludes OEX
17	OKT – PTOM~	
18	PTON –ROKU~	Excludes QQQ, RLG, RLV
19	ROKV – SHOP~	Excludes RUI, RUT, RUTW
20	SHOQ – SQAA~	Excludes SIXB, SIXC, SIXE, SIXI, SIXR, SIXRE, SIXT, SIXU, SIXV, SIXY, SPESG, SPX/SPXW, SPY
21	SQAB – TQQP~	
22	TQQQ – ULTA~	Excludes TSLA, UKXM
23	ULTB – WAAA~	Excludes VIX, VIXW
24	WAAB – XLT~~	Excludes XEO
25	XLU – Z~~~~	Excludes XSP
26	GOOG, GOOGL	
27	TSLA	
28	QQQ	
29	AMZN	
30	SPY	
31	DJX, MRUT, MXACW*, MXEA, MXEF, MXUSA*, MXWLD*, OEX, RLG, RLV, RUI, RUT, RUTW, SIXB, SIXC, SIXE, SIXI, SIXR, SIXRE, SIXT, SIXU, SIXV, SIXY, SPESG, XEO, UKXM	
32	NANOS, VIX, VIXW, XSP	
33	SPX	
34	SPXW	
35	SPX/SPXW, Cross Product Spreads	

*Effective 03/18/24

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   C1 Options Certification Multicast Routing Parameters

Data Center	Rendezvous Point
NY5 Certification Data Center	74.115.128.131

6.2.3   C1 Options Certification Address/Unit Distribution

The following tables describe the unit distribution across the C1 Options Certification Opening Process Feed.

NY5 Primary Datacenter		Certification 170.137.126.16/28
Unit	IP Port	Real-time MC
1	32551	
2	32552	
3	32553	
4	32554	
5	32555	
6	32556	
7	32557	
8	32558	
9	32559	
10	32560	
11	32561	
12	32562	
13	32563	
14	32564	
15	32565	
16	32566	
17	32567	
18	32568	233.103.126.20
19	32569	
20	32570	
21	32571	
22	32572	
23	32573	
24	32574	
25	32575	
26	32576	
27	32577	
28	32578	
29	32579	
30	32580	
31	32581	
32	32582	
33	32583	
34	32584	
35	32585	

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 U.S. Options Opening Process Feed will be made available to customers 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 Connectivity Manual. For more information on receiving the Cboe U.S. Options Opening Process Feed through any of these providers, please refer to the vendor contact information noted in the Extranet Providers section of the Connectivity Manual.

7.2 Bandwidth Recommendation

The WAN-shaped feeds require 1Gbps of bandwidth. Cboe will use 90% of these respective bandwidths for Multicast to allow customers to use the same physical connection for FIX order entry if desired.

8   References

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

9   Support

Please direct questions or comments regarding this specification to tradedesk@cboe.com.

Revision History

Document Version	Date	Description
1.0.0	11/16/18	Initial version 1.0.0.
1.0.1	02/14/19	Removed `Trading Status` from Message Types as it was included in error. Added certification IP addresses and unit distribution information.
1.0.2	03/05/19	Updated narrative description and field descriptions for `Options Auction Update` message.
1.0.3	04/15/19	Added Production IP addresses for C1 Options.
1.0.4	05/08/19	Corrected C1 Production IP addresses for Primary WAN Shaped [CCO] and [CDO] source network IP addresses.
1.0.5	05/14/19	Updated `Options Auction Update` message with *Opening Condition* = C (Crossed Composite Market), and added *Composite Market Bid Price* and *Composite Market Offer Price* fields. Added new `SOQ Strike Range Update` message. Updated example for `Options Auction Update` and added example for `SOQ Strike Range` messages. Added additional proprietary products to matching unit 31 in C1.
1.0.6	05/20/19	Added `Constituent Symbol Mapping` message with example.
1.0.7	09/25/19	Updated OSI Symbol example values in `Symbol Mapping` and `Constituent Symbol Mapping` message type examples.
1.0.8	02/01/21	Corrected QQQ, UKXM, and SPESG symbol exclusion entries in Unit Distribution table. Added SPESG to the symbol range entries in Unit Distribution table. Added MRUT to Unit/Symbol Distribution table (effective 03/01/21). Added new updated Unit/Symbol Distribution tables with harmonized symbol ranges (effective 03/22/21).
1.0.9	03/25/21	Added Binary Date field type to Section 2.2 - Data Types (effective 10/10/21 ~~TBD 09/27/21 Q3 2021~~). Added new `Time Reference` message (effective 10/10/21 ~~TBD 09/27/21 Q3 2021~~). Added *EpochTime* field to `Time` message (effective 10/10/21 ~~TBD 09/27/21 Q3 2021~~). Updated description of *Auction Type* field on `Options Auction Update` and `Auction Summary` messages (~~effective TBD 09/27/21 Q3 2021~~).
1.0.10	05/13/21	Updated Curb session related effective date to ~~TBD 09/27/21~~.

1.0.11	06/15/21	Updated extended GTH session effective date to 11/21/21.
1.0.12	08/25/21	Updated Curb session effective date to ~~TBD~~.
1.0.13	09/09/21	Updated description of *Auction Type* field on `Options Auction Update` and `Auction Summary` messages (~~effective TBD~~).
1.0.14	09/30/21	Updated effective date for new `Time Reference` message, *EpochTime* field on `Time` message, and Binary Date field type to Section 2.2 - Data Types to 10/10/21. Added new section 1.2 - '24x5 Feed Hours and System Restart ' (effective 10/10/21).
1.0.15	11/4/21	Removed note indicating AuctionType value O will be sent prior to Curb session. This value will only be sent for the RTH Opening.
1.0.16	12/9/21	Updated hyperlinks to technical specifications.
1.0.17	02/02/22	Added NANOS to the C1 unit 32 Unit/Product Distribution tables (effective 03/14/22).
1.0.18	11/07/22	Moved XSP to the C1 unit 32 Unit/Production Distribution tables (effective 12/04/22).
1.0.19	03/30/23	Removed past effective dates.
1.0.20	01/29/24	Added MXACW, MXUSA, and MXWLD to the C1 unit 31 Unit/Product Distribution tables (**effective 03/18/24**).