Cboe Futures Exchange Binary Order Entry Protocol Specification (Version 3)

Version 1.0.6

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Contents

1 Introduction

1.1 Overview

This document describes Binary Order Entry, version 3 (BOEv3), the CBOE proprietary order entry protocol used by a Trading Privilege Holder ("TPH") to send orders and quotes to the Cboe Futures Exchange ("CFE").

Where applicable, the terminology (e.g., time in force) used in this document is similar to that used by the FIX protocol to allow those familiar with FIX to more easily understand BOEv3. This document assumes the reader has basic knowledge of the FIX protocol.

BOEv3 fulfills the following requirements:

- *CPU and memory efficiency.* Message encoding, decoding, and parsing are simpler to code and can be optimized to use less CPU and memory at runtime.
- *Application level simplicity.* State transitions are simple and unambiguous. They are easy to apply to a TPH's representation of an order.
- *Session level simplicity.* The session level protocol (login, sequencing, replay of missed messages, logout) is simple to understand.

While CFE has strived to preserve feature parity between FIX and BOEv3 where possible, some features may only be available in one protocol or the other.

Note that while FIX is an ASCII based protocol, BOE is binary based, providing for efficiencies that can allow for reduced latency. Additionally, FIX and BOEv2 messages pass through an additional process not applicable to BOEv3 messages before being ordered for processing by receipt time at the BOEv3 order handler, which can allow for reduced latency for BOEv3 messages relative to FIX/BOEv2 messages.

All binary values are in little-endian (as used by Intel x86 processors), and not network byte order.

Each message is identified by a unique message type. A listing of the supported message types is provided in Table 1 - Session Message Types and Table 2 - Application Message Types.

All communication is via standard TCP/IP.

1.1.1 Differences with prior versions of BOE

Notable differences between BOEv3 and the prior major version of BOE (BOEv2) include:

1. BOEv3 has statically sized messages except when sizing variability is required due to (statically sized) repeating groups of fields. Consequently, BOEv3 does not support optional fields on input nor bitfield-specified optional return fields. This provides a more consistent and predictable experience for all users.

2. Connectivity is now managed as a port specific to a matching unit. Consequently, separate ports will be required for access to each matching unit.
3. The `Logout Response` message no longer returns the *LastReceivedSequenceNumber*, nor the highest available sequence numbers of the matching unit(s).
4. There is no longer a systematically enforced limit on the number of open orders or quotes a firm may have entered on the exchange.
5. BOEv3 requires that the EFID (*ClearingFirm*) be specified on all `Cancel Order` and `Modify Order` messages (either via Port default or by specifying in the message). This differs from prior versions of BOE where this was only required of service bureau TPHs.
6. If *CustOrderHandingInst* is not specified on a `Modify Order` message the port default will be applied. In prior versions of BOE, the *CustOrderHandingInst* would have been carried forward from the current version of the order.
7. When logging in, TPHs may specify a behavior of "Fail" for unspecified matching units (fail the login if a matching unit was not specified). This in addition to the "Skip" and "Replay" behaviors, as detailed in 'Section 2.2 – Login, Replay, and Sequencing'.
8. The `Cancel Order` message type now cancels a single order. A new message type `Mass Cancel Order` provides all multi-order cancellation requests.
9. There no longer exists a condition where a TPH would send a `Modify Order` followed immediately by a `Cancel Order` message and it was not deterministic as to which *OrigClOrdId* value was correct on the `Cancel Order` message. In BOEv3, the *OrigClOrdId* on a cancel should be the *ClOrdId* sent on the most recent `Modify Order` (or `New Order` if no modifies have been sent), even if the corresponding response has not yet been seen. *CancelOrigOnReject* should be set to 'Y' to ensure that a rejected `Modify Order` does not leave behind a live order.
10. TPH risk trips and self-imposed lockouts are now required to be reset using the `Reset Risk` message. They can no longer be reset via the `New Order` message.
11. BOEv3 `Trade Cancel or Correct` messages are not suppressible by port parameter.
12. Added requirement for TPHs to record and connect to secondary IP in event of failover to secondary port in the primary, Secaucus Datacenter as detailed in 'Section 1.1.4 – Failover and Disaster Recovery (DR)'
13. Risk resets on a BOEv3 port only apply for the unit associated with that port. In BOEv2 and FIX, risk resets apply to all units.
14. Unlike BOEv2, BOEv3 does not support sequenced messages from TPH to CFE with a sequence number of zero. A sequenced BOEv3 message sent from TPH to CFE having a sequence number of zero will disconnect the port.
15. BOEv3 introduces a number of changes to the information returned to the member in the Application Messages:
    a. *MaturityDate* will return with all zeros (i.e. blank) if it is all zeros on input.
    b. *TimeInForce* will no longer be included on `Order Modified`, as this field is unmodifiable.

c. `Order Acknowledgment` will no longer include the fields *DayOrderQty*, *DayCumQty*, *AvgPx*, and *DayAvgPx* as they have limited use in an order ack.
d. *QuoteRejectReason* will no longer be included on the `Quote Update Acknowledgment` message since all rejects of an entire message block are reported via the `Quote Update Rejected` message.
e. In the `Order Rejected` message, the optional fields from BOEv2 which echoed back fields of the rejected order are no longer supported; only *ClOrdId* and *ClearingFirm* are included on the rejection message.
f. In the `Order Modified` message, several optional fields supported under BOEv2 are not included in BOEv3 in the interest of message brevity: *Side, OrdType, TimeInForce, MinQty, Symbol, Capacity, Account, ClearingAccount, PreventMatch, MaturityDate, OpenClose, ExpireTime, CmtaNumber, CtiCode, OEOID*.
g. In the `Order Cancelled` and `Cancel Rejected` messages, none of BOEv2 the optional fields are included.
h. In the `Order Executed` message, the BOEv2 field *ContraBroker* has been removed (it was always 'CFE').
i. In the `Order Executed` message, several BOEv2 optional fields are no longer included in this message in the interest of message brevity: *Price, PrdType, TimeInForce, MinQty, Capacity, Account, ClearingAccount, OrderQty, PreventMatch, OpenClose, ExpireTime, StopPx, CmtaNumber, CtiCode, ManualOrderIndicator, OEOID, TradeDate, CumQty, DayOrderQty, DayCumQty, AvgPx, DayAvgPx*.
j. In the `TAS Restatement` message, several BOEv2 optional fields are no longer included in the BOEv3 message in the interest of message brevity: *OrdType, TimeInForce, MinQty, Capacity, Account, ClearingFirm, ClearingAccount, PreventMatch, MaturityDate, OpenClose, OrigClOrdId, StopPx,CmtaNumber, CritCode, ManualOrderIndicator, OEOID, FrequentTraderId, CustOrderHandlingType*.
k. In the `Variance Restatement` message, several optional fields in the BOEv2 message are no longer included in BOEv3 in the interest of message brevity. The only BOEv2 optional fields included in the BOEv3 message are *ClearingPrice, ClearingSize,* and *ClearingSymbol*.
l. In the `Order Cancelled` message, none of the optional BOEv2 fields are present in the BOEv3 version of the message.
m. A new field, *RequestReceivedTime,* has been added to the `Order Acknowledgement`, `Quote Update Acknowledgement`, `Order Modified`, `Order Cancelled`, and `Mass Cancel Acknowledgment` messages. This will inform the TPH of the earliest timestamp, with nanosecond precision, recorded by CFE of the corresponding inbound message being acknowledged. This will be the timestamp as received in turn by the process providing all Unit Ports for the matching unit (BOEv3 ports are provided per matching unit).

1.1.2 BOEv3 Message Format Versioning and Nomenclature

Since BOEv3 uses a more rigidly structured message format than prior versions of BOE, message types may be introduced when new fields cannot be accommodated by utilizing reserve bytes in the existing message specification. In such cases, when a new message type is introduced, it will be documented as a distinct message type in this document. Application layer message types are named using the following pattern:

Application Layer Message Type	General Type	Market	Version
NewOrderUSFuturesV1	New Order	USFutures	V1

This allows for ease of distinction between similar message types between markets (for example, US Futures compared to US Options), and the handling of new versions of the message (V1, V2, *et cetera*).

When application layer message types are discussed in this document, they are being referred to using their general type name unless their specific version is relevant to the documentation.

During any time when multiple versions of messages from CFE to TPH are supported concurrently, the configuration of the port determines which message version may be sent by CFE.

1.1.3 Introduction of New Fields in Existing BOEv3 Messages

Existing message fields will not change in length. Fields currently identified as "Reserved" may be redefined, in part or in whole, as new specified fields. New fields may be introduced at the end of any message that does not have a repeating group of fields; consequently, TPHs must check the length of messages received from CFE and treat any additional bytes present as undefined values.

1.1.4 Failover and Disaster Recovery (DR)

Each BOEv3 session assigned to a TPH will have three total ports available for the TPH's use:

- Secaucus Primary port (A)
- Secaucus Secondary port (B)
- Chicago DR port (C)

All three ports will have distinct IP addresses assigned. During normal operation, only the primary port in Secaucus (port A) will accept a login request and order/quote traffic. Port B will not accept any login attempts until it is promoted to a primary state due to the failure of Port A. As a result of this design, TPHs **may** design their system to try to connect to either Port A or Port B and can be confident that the port that accepts their connection is the current primary. Port A and Port B will share common sequences, and in the event of a failover to Port B a TPH should expect sequencing to continue from where it left off on Port A.

The DR port (Port C) will accept login attempts during normal trading operations but will reject all orders and quotes. This means that this port **should not** be included in a list that the TPH uses for round-robin login attempts on a normal trading day. Port C will reject all orders and quotes until CFE promotes its disaster recovery site to be the primary site. While this may occur intraday, it will only occur only after CFE has provided notification to TPHs. Port C will not share common sequences with Ports A and B. As a result, in the event that a DR failover to the secondary site is performed TPHs should expect all unit sequences to be zero.

To reduce possibility of a single NIC software issue impacting both primary and secondary BOE3 processes Cboe will, by default, configure Port B and C with some features disabled so that a zero value is returned for *RequestReceivedTime* when Port B or C is promoted to primary state due to the failure of Port A.

1.2 Hours of Operation

Trading hours on CFE vary by product and for expiring and non-expiring contracts. See the product contract specifications for details on trading hours for each product. The test product "ZVXT" will enter a queuing period five minutes ahead of other CFE products. TPHs are encouraged to utilize ZVXT for the purpose of confirming connectivity during the five minutes prior to the start of the Pre-Open queuing period for other CFE products. See the Cboe Futures Exchange holiday calendar for trading hour adjustments corresponding to holidays.

BOEv3 sessions are available for connection on Sunday starting by 10:30 a.m. CT. BOE sessions will disconnect each day between 4:05 and 4:45 p.m. CT for the daily restart. This will reset all sequences to zero in preparation for the next trading segment. BOE sessions will disconnect on Friday at around 4:05 p.m. CT but will remain available for connectivity testing (telnet testing) until startup on the following Sunday.

1.3 Data Types

The following data types are used by BOEv3. The size of some data types varies by message. All data types have default values of binary zero, in both TPH to CFE and CFE to TPH contexts.

- *Binary:* Little Endian byte order, unsigned binary value. The number of bytes used depends on the context.
  - One byte: `FE = 254`
  - Four bytes: `64 00 00 00 = 100`
- *Signed Binary:* Little Endian byte order, signed two's complement, binary value. The number of bytes used depends on the context.
  - One byte: `DF = -33`
  - Four bytes: `64 00 00 00 = +100`

- *Binary Price:* Little Endian byte order value, signed two's complement, eight bytes in size, with four implied decimal places. So, if the value is −123,400, the actual value taking into account implied decimal places is −12.34.
  - `08 E2 01 00 00 00 00 00` = 123,400/10,000 = 12.34
  - `F8 1D FE FF FF FF FF FF` = −123,400/10,000 = −12.34
- *Alpha:* ASCII uppercase letters (A-Z) and lowercase letters (a-z) only. ASCII NUL (0x00) filled on the right, if necessary. The number of bytes used depends on the context.
- *Alphanumeric:* ASCII uppercase letters (A-Z), lowercase letters (a-z) and numbers (0-9) only. ASCII NUL (0x00) filled on the right, if necessary.
- *Text:* Printable ASCII characters only (binary values in the inclusive range 0x20 through 0x7E). ASCII NUL (0x00) filled on the right, if necessary.
- *DateTime:* 8 bytes. The date and time, in UTC, represented as nanoseconds past the UNIX epoch (00:00:00 UTC on 1 January 1970). The nanoseconds portion is used on the *RequestReceivedTime* field only and set to 0 by the exchange in all other fields.
  - E0 FE 20 F7 36 71 F8 11F = 1,294,909,373,757,324,000 = 2011-01-13 09:02:53.757324 UTC
- *Date:* Little Endian byte order, unsigned binary value, 4 bytes in size. The YYYYMMDD expressed as an integer.
  - `A7 3C 34 01` = `20200615` = "June 15, 2020"
- *Reserved*: sequence of ASCII NUL (0x00) values when sent by the TPH. May contain any values when sent by the exchange, and should be ignored by the TPH.

1.4 Protocol Features

1.4.1 Carried Order and Quote Restatements

Good 'till Cancel ("GTC") orders, Good 'till Date-Time ("GTD") orders, and Day orders or quotes entered during partial holiday sessions can result in orders persisting between sessions. The CFE BOEv3 protocol provides a mechanism for clients to request restatement of orders that have been carried forward from the previous business day trading session. See 'Section 6 - Port Attributes' for information on available port attributes, including 'Carried Order Restatements'.

When enabled, Carried Order Restatements are sent to connected clients for each product on the CFE for which orders or quotes have been carried forward from the previous business day trading session. Carried Order Restatements are sent after connection establishment and before regular trading activity messages on a per-product basis.

Carried Order Restatements are represented using `Order Acknowledgement` messages with the following attributes:

- *BaseLiquidityIndicator* = A (Added Liquidity)
- *SubLiquidityIndicator* = C (Carried)

To receive Carried Order Restatements, the 'Carried Order Restatement' port attribute must be enabled (contact CFE Trade Desk). In addition, since the Carried Order Restatement messages are delivered to the session handler before the TPH connects, replay must be requested by setting the *ReplayUnspecifiedUnit* parameter of the `Login Request` message Unit Sequence Parameter Group to R (Replay) or specifically set the UnitSequence to zero in the associated unit param group to ensure replay is not suppressed.

Note that no notification is provided at the end of a trading session to indicate when GTC, GTD, or Day orders/quotes on partial holiday sessions are persisted to carry over to the next trading session. Instead, TPHs can use Carried Order Restatements to be notified of orders/quotes that have persisted from the previous session.

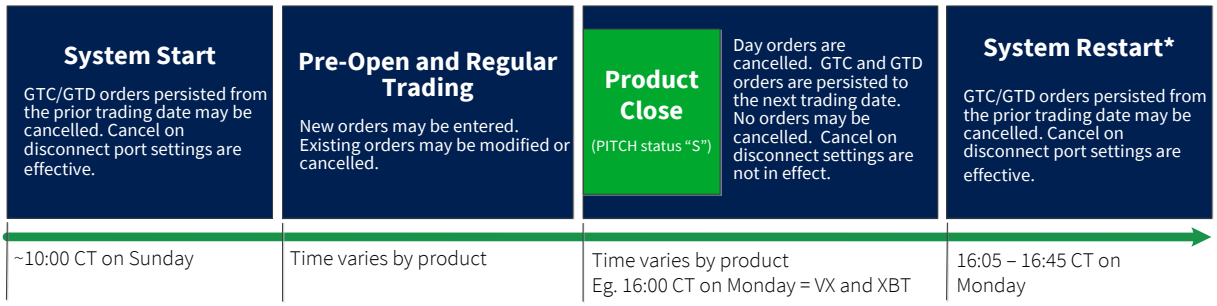
1.4.1.1 *Quotes Carried Across Multiple Sessions*

Quotes cannot be marked as GTC or GTD, but Day quotes can persist across multiple sessions in the case of a holiday. The same Carried Order Restatement logic applies to quotes, which means that quotes will be restated with `Order Acknowledged` messages containing the *OrderId* from the original `Quote Update Acknowledgement`. Quotes that are carried across multiple sessions may only be modified or cancelled by using a `Quote Update` message on the quote port where the quote originated. **TPHs may determine which restatements are quotes by matching the *OrderId* received on a carried order restatement (`Order Acknowledgement`) to the *OrderId* received in the original `Quote Update Acknowledgement`.**

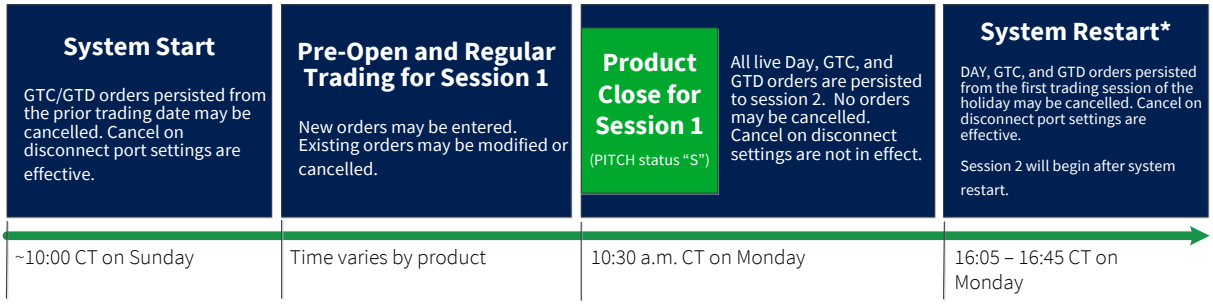
1.4.2 Cancellation of Carried Orders or Quotes Between Sessions

GTC and GTD orders persist within CFE's trading system between CFE business days. GTC, GTD, and Day orders/quotes also persist between multiple trading sessions on the same business day in connection with a holiday. Persisted orders/quotes can be cancelled while the associated product is in a suspended state and during other trading states as described above. At the scheduled end of trading for a product, cancellation requests for persisted orders or quotes in that product will be rejected with reason "O: Unknown Order" until after the system restart completes. After the system restart, persisted orders/quotes can be cancelled from that time until the scheduled end of trading. In other words, the period of time in which persisted orders or quotes cannot be canceled starts at the scheduled end of trading for the associated product and ends after the system restarts. System restarts occur during a suspended state prior to the start of a queuing period and there may be minimal variation in the system restart time.

Regular Trading Example

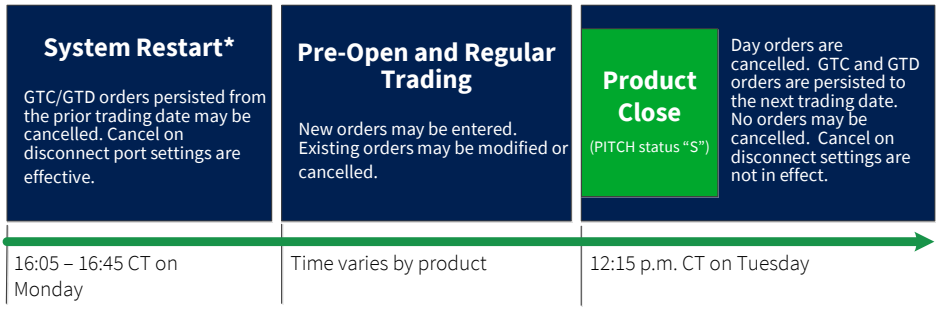


Monday Holiday Example

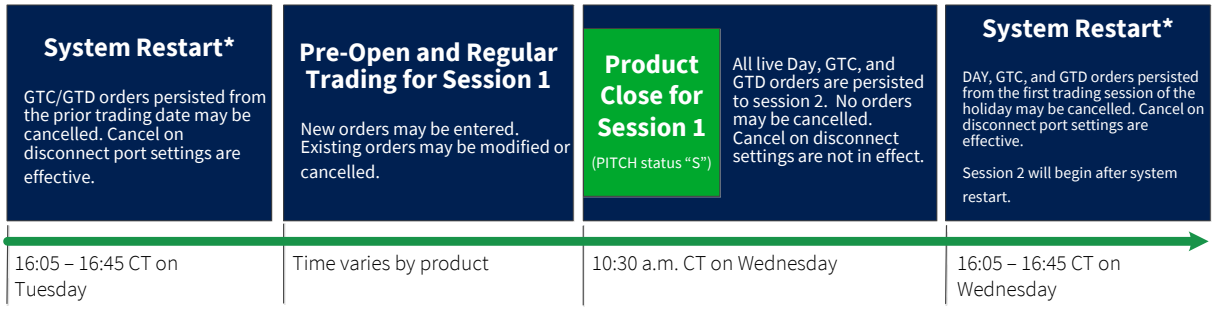


Tuesday Half-Day followed by Wednesday Holiday Example

Tuesday Half-Day



Wednesday Holiday



*The disconnect/reconnect sequence of a system restart generally takes about two minutes and could occur anytime between 16:05 and 16:45 CT.

1.4.3 **Post-Settlement Execution Restatements**

`Order Execution` messages received at the time of the trade in products VXT (Trade-At-Settlement ("TAS") for VX), VXMT (TAS for VXM), IBHYT (TAS for IBHY), IBIGT (TAS for IBIG), VA (Variance Futures), and VAO (Variance Stub Futures) should be considered initial notification of trade. In all three of these products, information available only after the settlement time of the associated contract is required before the trade can be cleared. The following describes the post-settlement processing required for each applicable product:

VXT, VXMT, IBHYT, IBIGT Execution prices of VXT, VXMT, IBHYT, and IBIGT (TAS) trades represent an offset to the end-of-day settlement price of the associated VX, VXM, IBHY, and IBIGT contracts, respectively. For example, a trade executed at 0.02 is an agreement to buy and sell VX contracts at a price 2-cents above the end-of-day settlement price, which is available after 3:00 p.m. CT. When VX end-of-day settlements are available, TAS trades executed during the business date are 'resolved' by updating the execution price and changing the symbol to the associated contract (VXT, VXMT, IBHYT, and IBIGT trades are cleared as VX, VXM, IBHY, IBIG trades, respectively).

VA Variance Futures are traded at prices in Volatility points (e.g., 15.5% volatility equals a price of 15.5) and quantity expressed in units of Vega (e.g., 100 equals 100 * 1,000 = 100,000 Vega, which is an exposure such that the value change of the position corresponding to a 1% change in Volatility change is $100,000). While VA trades are executed in Volatility and Vega terms, they are cleared in Variance price and size units. At the time of a trade, required information is available to compute the trade size in Variance units (i.e., traded size in Vega units, traded price in Volatility units, and expected and elapsed trading days). As a result, the pending `Order Execution` message at the time of execution, as well as the end-of- day `Variance Restatement` and `Variance Quote Restatement` messages will contain the traded size in Variance units in the *ClearingSize* field. At approximately 4:00 p.m. CT, the closing price of the S&P 500 index is obtained and used to translate trade price and size to Variance units, after which trades can be cleared and restated.

VAO Variance Stub futures are used to trade small size Variance Futures as required to exactly exit a previously entered Variance Futures position (see the Variance Futures Contract Specification). Exiting a VA position requires determining the number of Vega units to be transacted in order to offset a previously executed trade (note the Vega associated with a specified number of Variance Units changes daily). Inevitably, the associated Vega is not an even multiple of 1,000 (minimum VA contract size). To exit a VA position, the round lots of Vega are executed directly in VA. VAO trades are used to execute residual 'odd lots' of VA directly in Variance Units to completely exit a position. The 'odd lots' of Variance Units is computed by subtracting the Variance Units associated with the just executed offsetting VA trade (in Vega units) from the original size in Variance Units. Like VA futures, VAO trades in price units of Volatility. Unlike VA futures, VAO futures trade directly in Variance units for size.

As a result, both the pending `Order Execution` and the end-of-day `Variance Restatement` and `Variance Quote Restatement` messages contain the *ClearingSize* populated with Variance units size, which is simply a copy of the *LastShares* field. At approximately 4:00 p.m. CT, the closing price of the S&P 500 index is obtained and used to translate trade price to Variance units, after which trades can be cleared and restated as VA trades in the associated VA contract.

In all three of the above products, trades executed intraday are acknowledged back to participants using `Order Execution` messages. The `Order Execution` message received in these products is considered a 'Pending' trade. As a convenience to customers, an optional value *PendingStatus* is provided on the `Order Execution` message (see Section '4.2.5 - Order Execution'). CFE follows up each initial (i.e., pending) TAS and Variance future execution with post-settlement `TAS Restatement` and `Variance Restatement` messages, respectively. The following summarizes the restatement details for each product:

VXT, VXMT, IBIGT, IBHYT Trades in these symbols are restated with the same *ExecId* and *ClOrdId* as the original trade. The as-executed symbol, price and size are maintained in the *Symbol*, *LastPx* and *LastShares* fields of the `TAS Restatement` message, respectively. The symbol into which the TAS execution will clear (for example, the VX or VXM symbol with the same expiration as the as-executed VXT or VXMT symbol, respectively) is contained in the *ClearingSymbol* field. The price with which the TAS execution will clear (i.e., the execution price offset with the contract settlement price) is contained in the *ClearingPrice* field.

VA VA trades are restated with the same *ExecId* and *ClOrdId* as the original trade. The as-executed symbol, price (in Volatility units) and size (in Vega units) are maintained in the *Symbol*, *LastPx* and *LastShares* fields of the `Variance Restatement` message, respectively. The *ClearingSymbol* field will contain a copy of the as-executed Symbol since there is no symbol change for VA executions. The prices with which the VA execution will clear (i.e., the as-executed Volatility unit price in the *LastPx* field transformed to Variance units) is contained in the *ClearingPrice* field. Lastly, the size with which the VA execution will clear (i.e., the as-executed Vega unit price in the *LastShares* field transformed to Variance units) is contained in the *ClearingSize* field.

VAO VAO trades are restated with the same *ExecId* and *ClOrdId* as the original trade. The as-executed symbol, price (in Volatility units) and size (in Variance units directly) are maintained in the *Symbol*, *LastPx* and *LastShares* fields of the `Variance Restatement` message, respectively. The symbol into which the VAO execution will clear (i.e., the VA symbol with the same expiration as the as-executed VAO symbol) is contained in the *ClearingSymbol* field. The price with which the VAO execution will clear (i.e., the as-executed Volatility unit price transformed into Variance units) is contained in the *ClearingPrice* field. Lastly, the size with

which the VAO execution will clear, which is the same as the *LastShares* field as the VAO instrument trades directly in Variance units, is contained in the *ClearingSize* field.

See sections '4.2.13 - TAS Restatement' and '4.2.1.14 - Variance Restatement' for details on the `TAS Restatement` and `Variance Restatement` messages used to restate TAS and Variance trades, respectively.

1.4.4 Spread Instruments and Signed Prices

All price fields in the CFE BOE protocol are signed values to accommodate spread instruments and TAS prices that can be negative (See section '1.3 - Data Types' for a description and an example of using the *Binary Price* type, which is little-endian byte order value, signed two's complement, eight bytes in size, with four implied decimal places). This section presents negative price scenarios introduced by Spread instruments.

Spreads instruments trade on CFE in a well-defined universe of two, three and four legged spreads with a restricted set of ratios and buy/sell conventions as shown in the table below. The notation S(1):B(1) means sell the first (earliest) expiration and buy the second (latest) expiration. The parenthesized numbers are the leg ratios. For S(1):B(1) the ratios of each leg are 1, which means one unit of the spread contract is equivalent to selling 1 unit of the first expiration and buying 1 unit of the second expiration.

Legs	Spreads (B=Buy, S=Sell, ()=Ratio)
2	**S(1):B(1),** B(1):B(1), S(1):B(2), S(2):B(1)
3	B(1):B(1):B(1), B(1):S(2):B(1)
4	B(1):B(1):B(1):B(1), B(1):S(1):B(1):S(1), B(1):S(1):S(1):B(1)

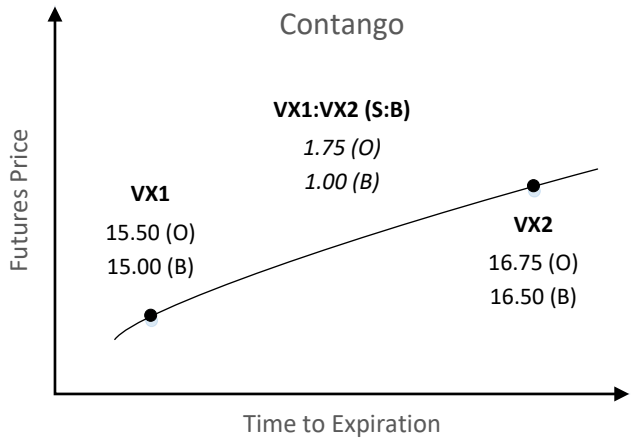
The bold 2-leg spread in the above table – S(1):B(1) – is a special spread that always exists in the CFE system. As new contracts are listed, the S(1):B(1) two leg spread instruments are automatically created between the new contract and all existing active contracts.

Spread instruments can result in executions where the buyer gets paid and the seller pays. This can be non-intuitive in all but the simplest spreads. Consider the two leg S(1):B(1) spread VX1:VX2 comprising selling 1 unit of the VX1 contract and buying 1 unit of the VX2 contract. To illustrate how buyers can get paid and sellers can pay, we examine spread pricing in Contango and Backwardation price environments.

Figure 1 below illustrates spread pricing in a 'Contango' price environment in which the price of the early expiration contract is lower than the later expiration contract. In this example the Bid/Offer of the VX1 simple contract is 15.00 x 15.50 and the Bid/Offer for the VX2 contract is 16.50 x 16.75. The synthetic market for the VX1:VX2 spread (i.e., the Bid/Offer implied by the leg markets) is 1.00 x 1.75. The bid of 1.00 derives from the fact that the offer on the VX1 leg is 15.50 and the bid on the VX2 leg is 16.50 and

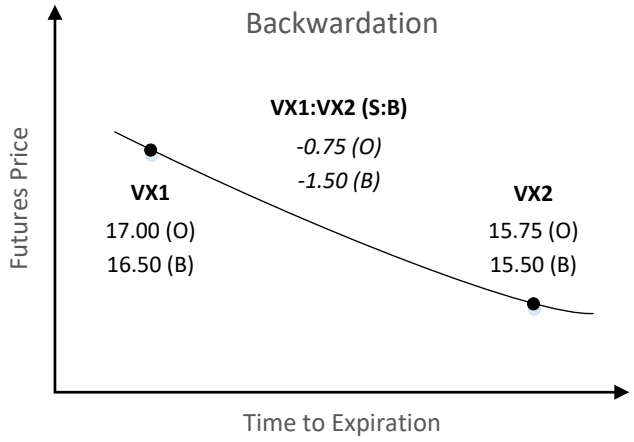
the net of the two is 1.00 net debit (i.e., buyer pays). Figure 1 shows the implied spread market in italics. This is the normal intuitive situation where the spread buyer pays and seller gets paid.

Figure 1 - *Contango S(1):B(1) spread price example*



Next, consider the same example in the context of a Backward, or Inverted, market in which the price of the early expiration is higher than the price of the later expiration. Figure 2 below illustrates spread pricing in a Backward price environment. The Bid/Offer of the VX1 simple contract Is 16.50 x 17.00 and the Bid/Offer for the VX2 contract is 15.50 x 15.75. The synthetic market for the VX1:VX2 spread is -1.50 x -0.75. The bid of -1.50 derives from the fact that the offer on the VX1 leg is 17.00 and the bid on the VX2 leg is 15.50 and the net of the two is 1.50 net credit (i.e., buyer gets paid).

Figure 2 - *Backwardation (Inverted) S(1):B(1) spread price example*



Spread pricing requires thinking of instrument prices on the entire real number line and not just positive numbers. In the example above the bid is *less* than the offer as its left of the offer on the real number line. One can buy at the offer (paying -0.75 = receiving 0.75) and subsequently sell back at the bid

(receiving -1.50 = paying 1.50), giving up the bid/offer spread (0.75) in the process; the same as positive prices. This concept generalizes to two and three leg spreads and unequal ratios; prices can just as easily be negative as positive as a result of the pricing environment (i.e., shape of the price curve vs. expiration date) and the spread definition (which legs bought/sold and ratios).

1.4.5 OCC Clearing Reference

The following table can be used to assist firms in mapping values sent in BOE to their associated field names at the OCC. Note that *ClearingAccount* is not sent to the OCC.

BOE Field Name	FIX Tag	OCC Mapping
ClearingFirm	115	Exec Broker
Account	1	The first ten characters will appear in the Account # field. The entire 16 character string will appear in the optional CM Data field.
ExecId	17	Trade Id
OrderId	37	Exchange Data
ClOrdId	11	Order Id
CMTANumber	439	CMTA CM#
ClearingAccount	440	Not sent to the OCC.

1.4.6 Port Types

All BOE port types may be ordered through the Customer Web Portal using the Logical Port Request tool. Changes to port attributes may be requested through the same tool by submitting a 'Modify' request for one or more existing BOE ports.

> **BOEv2 → BOEv3 Migration Note**
> BOEv3 ports for CFE are per matching unit: access to symbols on a particular unit via BOEv3 requires a port for that matching unit. FIX ports will continue to service all symbols, but messages will consequently have to pass through an additional process before being ordered for processing by receipt time of the unit.

1.4.6.1 *BOE Unit Order Ports*

BOE Unit Order Ports (also referred to as order unit match capacity allocations) support simple and complex/spread order entry as well as resetting TPH risk trips but do not support the usage of the following message types: `Quote Update, Purge Orders`. The attempted usage of any of these message types on standard BOE order ports will result in a rejection of the disallowed message type.

BOE Unit Order Ports are specific to a particular matching unit. Only messages having symbols mapped to the matching unit will be accepted.

BOE Unit Order Ports are limited to 3,000 inbound messages per second. Once the inbound limit is reached new orders are rejected, modifies are handled as cancels, and cancels are processed normally. BOE Unit Order Ports are limited to 10 inbound messages per second on CFE Test Products.

`Mass Cancel Order` messages received on a BOE Unit Order Port will only cancel orders or quotes for symbols which are mapped to the matching unit associated with this port.

`Risk Reset` messages received on a BOE Unit Order Port will only reset risk for symbols which are mapped to the matching unit associated with this port.

1.4.6.2 *BOE Unit Quoting Ports*

BOE Unit Quoting Ports (also referred to as quoting unit match capacity allocations) are intended for use by firms quoting large numbers of simple futures contracts. BOE Unit Quoting Ports do not support the `Purge Orders` message type. This requires a separate BOE Unit Purge Port (described below).

BOE Unit Quoting Ports are specific to a particular matching unit. Only messages having symbols mapped to the matching unit will be accepted.

Match Trade Prevention is only available if defaulted at the port level. For BOE Unit Quoting Ports, only Cancel Newest, Cancel Oldest, or Cancel Both are permitted. If a BOE Unit Quoting port is not configured with both a default MTP Modifier and Unique Id Level, Match Trade Prevention will be disabled.

Quoting Port Order Acceptance Table

Message	Simple/Complex	Accepted over Unit Quoting Port?	Other Conditions
`Quote Update`	Simple	Yes	
`Quote Update`	Complex	No	
`New Order`	Simple/Complex	Yes	Must have a *TimeInForce* value of Day, GTD, GTC, IOC, or FOK.
`Purge Orders`	Simple/Complex	No	
`Reset Risk`		Yes	

1.4.6.3 *BOE Unit Purge Ports*

BOE Unit Purge Ports support two message types: `Purge Orders` and `Risk Reset`. Members may use this port type to request a cancellation of groups of orders, including orders across multiple BOE/FIX Order or BOE Quoting ports.

BOE Unit Purge Ports are specific to a particular matching unit. Only messages having symbols mapped to the matching unit will be accepted. Only orders and quotes for symbols mapped to the matching unit may be purged.

1.4.7 **Matching Unit Reference**

The following table describes each matching unit and the associated symbols that are supported on each unit.

Symbol Range Start	Unit
VX,VXT,VXM,VXMT	1
All Other Products	2

2 Session

2.1 Message Headers

Each message has a twelve byte header. The two initial *StartOfMessage* bytes are present to aid in message reassembly for network capture purposes. The *MatchingUnit* field is only populated on sequenced, non-session level messages sent from CFE to the TPH. Messages from TPH to CFE and all session level messages must always set this value to 0.

Field Name	Offset	Length	Data Type	Description
StartOfMessage	0	2	Binary	`BA CE` (47822)
MessageLength	2	2	Binary	Number of bytes for the message, including this field but not including the two bytes of the *StartOfMessage* field.
MessageType	4	2	Binary	Message type
MatchingUnit	6	1	Binary	The matching unit which created this message. Matching units in BOE correspond to matching units on Multicast PITCH. **For session level traffic and unsequenced messages, the unit is set to 0.** **For messages from TPH to CFE, the unit must be 0.**
Reserved	7	1	Binary	Must be zero from member. Value unspecified from CFE.
SequenceNumber	8	4	Binary	The sequence number for this message. Messages from CFE to TPH are sequenced distinctly per matching unit. Zero for session level traffic and for unsequenced application layer messages.

2.1.1 Handling of Invalid Message Headers

If an invalid message header is encountered, the exchange will disconnect the port. A message header is considered invalid if any of:

- *StartOfMessage* is not `BACE`.
- *MessageLength* is not appropriate for the given message type.
- *MessageType* is not a documented message type for CFE. Note that the types of application messages accepted may vary between CFE and other BOEv3 exchanges.

2.2 Login, Replay, and Sequencing

Session level messages, both inbound (TPH to CFE) and outbound (CFE to TPH) are unsequenced.

Inbound (TPH to CFE) application messages are sequenced. Upon reconnection, CFE informs the TPH of the last processed sequence number; the TPH may choose to resend any messages with sequence numbers greater than this value. A gap forward in the TPH's incoming sequence number is permitted at any time and is ignored by CFE. Gaps backward in sequence number (including the same sequence number used twice) are never permitted and will always result in a `Logout Response` message being sent and the connection being dropped.

Most (but not all) outbound (CFE to TPH) application messages are monotonically sequenced per matching unit. Each message's documentation will indicate whether it is sequenced or unsequenced. While matching units on BOE correspond directly to matching units on Multicast PITCH, sequence numbers do not.

Upon reconnection, a TPH sends the last received sequence number per matching unit in a `Login Request` message. CFE will then respond with any missed messages.

BOEv2 → BOEv3 Migration Note
BOEv3 introduces a new replay mode, "Fail", which TPHs can use to fail a login if there are any unspecified units.

The *ReplayUnspecifiedUnit* value can be used to control the replay behavior for unknown units. If the flag is set to F (Fail), CFE will send a `Login Response` and close the connection if there are any messages to replay from any unspecified unit. If the flag is set to S (Skip), CFE will exclude messages from unspecified matching units during replay. If the flag is set to R (Replay), CFE will send messages from unspecified units during replay. CFE will send a `Replay Complete` message when replay is finished. If there are no messages to replay, a `Replay Complete` message will be sent immediately after a `Login Response` message. CFE will reject all orders and all quote updates during replay.

When connecting to unit ports (Unit Order Ports, Unit Quoting Ports, or Unit Purge Ports), *ReplayUnspecifiedUnits* will be processed per the above description if the local unit number is not present in any instance of the *UnitSequence* field.

Assuming a TPH has requested replay messages using a properly formatted `Login Request` after a disconnect, any unacknowledged orders remaining with the TPH after the `Replay Complete` message is received should be assumed to be unknown to CFE.

Unsequenced messages will not be included during replay.

A session is identified by the *SessionId* and *SessionSubId* (both supplied by CFE). Only one concurrent connection per username and session sub-identifier is permitted per matching unit.

If a login is rejected, an appropriate `Login Response` message will be sent and the connection will be terminated.

2.3 Sequence Reset

A reset sequence operation is not available for Binary Order Entry. However, a TPH can send a `Login Request` message with *ReplayUnspecifiedUnit* field set to S (Skip), and *NumberOfUnits* field set to zero. Then, upon receiving a `Login Response` message from CFE, the TPH can use the field *ClientSequence* as the sequence starting point for sending future messages.

2.4 Heartbeats

`Client Heartbeat` messages are sent from TPH to CFE and `Server Heartbeat` messages are sent from CFE to TPH if no other data has been sent in that direction for one second. Like other session level messages, heartbeats from CFE to the TPH do not increment the sequence number. If CFE receives no inbound data or heartbeats for five seconds, a `Logout Response` message will be sent and the connection will be terminated. **TPHs are encouraged to have a one second heartbeat interval and to perform similar connection staleness logic.**

2.5 Logging Out

To gracefully log out of a session, a `Logout Request` message should be sent by the TPH. CFE will finish sending any queued data for that port and will then respond with a `Logout Response` message and close the connection. After receipt of a `Logout Request` message, CFE will ignore all other inbound (TPH to CFE) messages except for `Client Heartbeat`.

3 Session Messages

Table 1 - Session Message Types

Direction	Message Name	Type	Sequenced
TPH to CFE	Login Request	`01 00` (1)	No
TPH to CFE	Logout Request	`02 00` (2)	No
TPH to CFE	Client Heartbeat	`03 00` (3)	No
CFE to TPH	Login Response	`F5 01` (501)	No
CFE to TPH	Replay Complete	`F6 01` (502)	No
CFE to TPH	Logout Response	`F7 01` (503)	No
CFE to TPH	Server Heartbeat	`F8 01` (504)	No

3.1 TPH to CFE

3.1.1 Login Request

A `Login Request` message must be sent as the first message upon connection.

The message includes a repeating group starting with field *UnitNumber* which repeats *NumberOfUnits* times. This can be used to specify the last consumed sequence numbers per matching unit received by the TPH. CFE uses these sequence numbers to determine what outbound (CFE to TPH) traffic, if any, was missed by the TPH. If *NumberOfUnits* is 0, it is assumed the TPH has not received any messages (e.g., start of day).

The TPH does not need to include a sequence number for a unit if they never received messages from it. If the TPH wishes to send a value for the unit anyway, 0 is the only allowed value.

If the TPH is sending a `Login Request` to a Unit Order Port, Unit Quoting Port, or Unit Purge Port, the only *UnitNumber* accepted is the number of the port's unit.

Field Name	Offset	Length	Data Type	Description
StartOfMessage	0	2	Binary	`B0 E3` (58288)
MessageLength	2	2	Binary	(30 + 5*NumberOfUnits)
MessageType	4	2	Binary	`01 00` (1)
MatchingUnit	6	1	Binary	Must be zero
Reserved	7	1	Binary	Must be zero
SequenceNumber	8	4	Binary	Must be zero
SessionId	12	4	AlphaNumeric	Session Id as supplied by CFE
SessionSubId	16	4	AlphaNumeric	Session Sub Id as supplied by CFE
Password	20	10	AlphaNumeric	The password associated with the *SessionId* and *SessionSubId*.

ReplayUnspecifiedUnit	30	1	Text	Controls replay behavior for unknown units. Must be one of: F = fail if unit not specified R = replay any unspecified unit from zero S = skip replay of unspecified units
NumberOfUnits	31	1	Binary	The number (possibly 0) of unit/sequence pairs to follow, one per unit from which the TPH has received messages over this port. The value must be 0 or 1 since all BOEv3 ports are associated to a single unit.
→*UnitNumber*	32	1	Binary	A unit number. This must be the unit number of the port.
→*UnitSequence*	33	4	Binary	Last received sequence number for the unit.

3.1.1.1 ***Example Login Request Message***

Field Name	**Hexadecimal**	**Description**
StartOfMessage	B0 E3	Start of message bytes
MessageLength	22 00	34 bytes
MessageType	01 00	Login Request
MatchingUnit	00	Must be zero
Reserved	00	Must be zero
SequenceNumber	00 00 00 00	Must be zero
SessionId	54 45 53 54	"TEST"
SessionSubId	30 30 30 31	"0001"
Password	54 45 53 54 49 4E 47 00 00 00	"TESTING"
ReplayUnspecifiedUnit	46	"F" (Fail)
NumberOfUnits	01	1 unit
→*UnitNumber*	02	Unit 2
→*UnitSequence*	3F 15 00 00	5,439

3.1.2 **Logout Request**

To end the session, the TPH should send a `Logout Request` message. CFE will finish sending any queued data and finally respond with a `Logout Response` message and close the connection.

A TPH may simply close the connection without logging out, but may lose any queued messages by doing so.

Field Name	Offset	Length	Data Type	Description
StartOfMessage	0	2	Binary	`B0 E3` (58288)
MessageLength	2	2	Binary	`0A 00` (10)
MessageType	4	2	Binary	`02 00` (2)
MatchingUnit	6	1	Binary	Must be zero
Reserved	7	1	Binary	Must be zero
SequenceNumber	8	4	Binary	Must be zero

3.1.2.1 *Example Logout Request Message*

Field Name	Hexadecimal	Description
StartOfMessage	`B0 E3`	Start of message bytes
MessageLength	`0A 00`	10 bytes
MessageType	`02 00`	`Logout Request`
MatchingUnit	`00`	Must be zero
Reserved	`00`	Must be zero
SequenceNumber	`00 00 00 00`	Must be zero

3.1.3 Client Heartbeat

See 'Section 2.4 - Heartbeats' for more information about heartbeat and the session level protocol.

Field Name	Offset	Length	Data Type	Description
StartOfMessage	0	2	Binary	`B0 E3` (58288)
MessageLength	2	2	Binary	`0A 00` (10)
MessageType	4	2	Binary	`03 00` (3)
MatchingUnit	6	1	Binary	Must be zero
Reserved	7	1	Binary	Must be zero
SequenceNumber	8	4	Binary	Must be zero

3.1.3.1 *Example Client Heartbeat Message*

Field Name	Hexadecimal	Description
StartOfMessage	`B0 E3`	Start of message bytes
MessageLength	`0A 00`	10 bytes
MessageType	`03 00`	`Client Heartbeat`

MatchingUnit	00	Must be zero
Reserved	00	Must be zero
SequenceNumber	00 00 00 00	Must be zero

3.2 CFE to TPH

3.2.1 Login Response

A Login Response message is sent in response to a Login Request message. On a successful login, the *LoginResponseStatus* will be set to 'A'. On a failed login, *LoginResponseStatus* will be set to a value other than 'A', and *LoginResponseText* will be set to an appropriate failure description.

Note that the repeating group starting with field *UnitNumber* provides the highest available CFE to TPH sequence number for the specified unit. Only the unit of the port will populate this group (i.e. *NumberOfUnits* will be 1).

Field Name	Offset	Length	Data Type	Description
StartOfMessage	0	2	Binary	B0 E3 (58288)
MessageLength	2	2	Binary	(76 + *NumberOfUnits**5)
MessageType	4	2	Binary	F5 01 (501)
MatchingUnit	6	1	Binary	Will be zero
Reserved	7	1	Binary	Unspecified
SequenceNumber	8	4	Binary	Will be zero
LoginResponseStatus	12	1	Text	Accepted, or the reason for the rejection. A = Accepted B = Session In Use D = Disabled I = Invalid Unit M = Invalid Message N = Not Authorized Q = Sequence Ahead S = Invalid Session
LoginResponseText	13	60	Text	Human-readable text with additional information about the reason for rejection. ASCII NUL (0x00) filled on the right, if necessary.
ClientSequence	73	4	Binary	Last inbound (TPH to CFE) message sequence number processed by CFE on this port.
NumberOfUnits	77	1	Binary	A number, n, of unit/sequence pairs to follow, one per unit. A pair for every unit will be sent, even if no messages have been sent to this port today. For unsuccessful logins, this will be 0.

				This value will be 1 since all BOEv3 ports are associated with a single unit.
→*UnitNumber*	78	1	Binary	A unit number
→*UnitSequence*	79	4	Binary	Highest available CFE to TPH sequence number for the unit.

3.2.1.1 *Example Login Response Message*

Field Name	Hexadecimal	Description
StartOfMessage	`B0 E3`	Start of message bytes
MessageLength	`51 00`	81 bytes
MessageType	`F5 01`	`Login Response`
MatchingUnit	`00`	Always zero
Reserved	`00`	
SequenceNumber	`00 00 00 00`	Always zero
LoginResponseStatus	`41`	"`A`" (Accepted)
LoginResponseText	`54 45 53 54 49 4E 47 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00`	"`TESTING`"
ClientSequence	`01 00 00 00`	1
NumberOfUnits	01	1 unit
→*UnitNumber*	02	Unit 2
→*UnitSequence*	3F 15 00 00	5,439

3.2.2 Replay Complete

See 'Section 2.2 - Login, Replay, and Sequencing' for more information about heartbeats and the session level protocol.

Field Name	Offset	Length	Data Type	Description
StartOfMessage	0	2	Binary	`B0 E3` (58288)
MessageLength	2	2	Binary	`0A` (10)
MessageType	4	2	Binary	`F6 01` (502)
MatchingUnit	6	1	Binary	Will be zero
Reserved	7	1	Binary	Unspecified
SequenceNumber	8	4	Binary	Will be zero

3.2.2.1 *Example Replay Complete Message*

Field Name	Hexadecimal	Description
StartOfMessage	B0 E3	Start of message bytes
MessageLength	0A 00	10 bytes
MessageType	F6 01	Replay Complete
MatchingUnit	00	Always zero
Reserved	00	
SequenceNumber	00 00 00 00	Always zero

3.2.3 Logout Response

A Logout Reponse is usually sent in response to a Logout Request. Any queued data is transmitted, a Logout Reponse is sent, and CFE will close the connection. However, a Logout Reponse may also be sent if the TPH violates the protocol specification (e.g., by moving backwards in sequence number).

Field Name	Offset	Length	Data Type	Description
StartOfMessage	0	2	Binary	B0 E3 (58288)
MessageLength	2	2	Binary	47 00 (71)
MessageType	4	2	Binary	F7 01 (503)
MatchingUnit	6	1	Binary	Will be zero
Reserved	7	1	Binary	Unspecified
SequenceNumber	8	4	Binary	Will be zero
LogoutReason	12	1	Text	Reason for the logout. U = User Requested A = Administrative ! = Protocol Violation
LogoutReasonText	13	60	Text	Human-readable text with additional information about the reason for logout.

3.2.3.1 *Example Logout Response Message*

Field Name	Hexadecimal	Description
StartOfMessage	B0 E3	Start of message bytesd
MessageLength	47 00	71 bytes
MessageType	F7 01	Logout Response
MatchingUnit	00	Always zero
Reserved	00	
SequenceNumber	00 00 00 00	Always zero
LogoutReason	55	"U" (User Requested)

LogoutReasonText	54 45 53 54 49 4E 47 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	"TESTING"

3.2.4 **Server Heartbeat**

See 'Section 2.4 - Heartbeats' for more information about heartbeats and the session level protocol.

Field Name	Offset	Length	Data Type	Description
StartOfMessage	0	2	Binary	B0 E3 (58288)
MessageLength	2	2	Binary	0A (10)
MessageType	4	2	Binary	F8 01 (504)
MatchingUnit	6	1	Binary	Will be zero
Reserved	7	1	Binary	Unspecified
SequenceNumber	8	4	Binary	Will be zero

3.2.4.1 ***Example Server Heartbeat Message***

Field Name	Hexadecimal	Description
StartOfMessage	B0 E3	Start of message bytes
MessageLength	0A 00	10 bytes
MessageType	F8 01	Server Heartbeat
MatchingUnit	00	Always zero
Reserved	00	
SequenceNumber	00 00 00 00	Always zero

4 Application Messages

Note that if CFE receives a message type not listed in this specification, the connection will be closed. See section “2.1.1 - Handling of Invalid Message Headers” for details.

Table 2 - Application Message Types

Direction	Message Name	Version	Type	Sequenced
TPH to CFE	New Order	V1	E9 03 (1001)	Yes
TPH to CFE	Modify Order	V1	EA 03 (1002)	Yes
TPH to CFE	Cancel Order	V1	EB 03 (1003)	Yes
TPH to CFE	Mass Cancel Order	V1	EC 03 (1004)	Yes
TPH to CFE	Purge Orders	V1	ED 03 (1005)	Yes
TPH to CFE	Quote Update	V1	EE 03 (1006)	Yes
TPH to CFE	Reset Risk	V1	EF 03 (1007)	Yes
CFE to TPH	Order Acknowledgement	V1	DD 05 (1501)	Yes
CFE to TPH	Order Rejected	V1	DE 05 (1502)	No
CFE to TPH	Order Modified	V1	DF 05 (1503)	Yes
CFE to TPH	Modify Rejected	V1	E0 05 (1504)	No
CFE to TPH	Order Execution	V1	E1 05 (1505)	Yes
CFE to TPH	Order Cancelled	V1	E2 05 (1506)	Yes
CFE to TPH	Cancel Rejected	V1	E3 05 (1507)	No
CFE to TPH	Mass Cancel Acknowledgement	V1	E4 05 (1508)	No
CFE to TPH	Mass Cancel Rejected	V1	E5 05 (1509)	No
CFE to TPH	Purge Acknowledgement	V1	E6 05 (1510)	No
CFE to TPH	Purge Rejected	V1	E7 05 (1511)	No
CFE to TPH	Trade Cancel or Correct	V1	E8 05 (1512)	Yes
CFE to TPH	TAS Restatement	V1	E9 05 (1513)	Yes
CFE to TPH	Variance Restatement	V1	EA 05 (1514)	Yes
CFE to TPH	Quote Update Acknowledgement	V1	EB 05 (1515)	No
CFE to TPH	Quote Update Rejected	V1	EC 05 (1516)	No
CFE to TPH	Quote Restated	V1	ED 05 (1517)	Yes
CFE to TPH	Quote Execution	V1	EE 05 (1518)	Yes
CFE to TPH	Quote Cancelled	V1	EF 05 (1519)	No
CFE to TPH	TAS Quote Restatement	V1	F0 05 (1520)	Yes
CFE to TPH	Variance Quote Restatement	V1	F1 05 (1521)	Yes

CFE to TPH	Reset Risk Acknowledgement	V1	F2 05 (1522)	No

4.1 TPH to CFE

4.1.1 New Order

BOEv2 → BOEv3 Migration Note
The BOEv2 *RiskReset* field is no longer supported on the New Order message: the Reset Risk message must be used instead.

4.1.1.1 *NewOrderUSFuturesV1*

Field Name	Offset	Length	Data Type	Description
StartOfMessage	0	2	Binary	B0 E3 (58288)
MessageLength	2	2	Binary	8B 00 (139)
MessageType	4	2	Binary	E9 03 (1001)
MatchingUnit	6	1	Binary	Must be zero
Reserved	7	1	Binary	Must be zero
SequenceNumber	8	4	Binary	The sequence number for this message
ClOrdId	12	20	Text	Unique Id chosen by the client. Characters in the ASCII range 33-126 are allowed, except for **comma, semicolon,** and **pipe**. If the ClOrdId matches a live order, the order will be rejected as duplicate. A leading **tilde** (~) cannot be sent on any *ClOrdId* and will result in a reject. These are reserved for internal use by CFE and could be received as a result of a CFE-generated *ClordId*. Sent to the OCC in the OrderId field. **Note: CFE only enforces uniqueness of *ClOrdId* values among currently live orders, which includes long-lived GTC and GTD orders. However, using unique *ClOrdId* values is strongly recommend.**
Side	32	1	Text	1 = Buy 2 = Sell
OrderQty	33	4	Binary	Order quantity. System limit is 999,999 contracts.
ClearingFirm	37	4	Alpha	EFID that will clear the trade. **Port attribute value of 'Default EFID' is used if not provided.** Sent to OCC in Exec Broker field.

ClearingAccount	41	4	Alpha	Supplemental identifier. Recorded and made available in execution reports. Available via Drop feeds. This field can be blank or populated with an optional four character string. This field is not sent to the OCC.
Price	45	8	BinaryPrice	Limit price. Four implied decimal places. Required for limit orders (*OrdType* = 2). If specified on market order (*OrdType* = 1), the order will be rejected. Orders will be rejected if *Price* does not fall on the applicable minimum trading increment. For all contracts other than Trade at Settlement contracts, simple orders will be rejected if *Price* is less than or equal to zero, or greater than or equal to 100,000. For Trade at Settlement (TAS) contracts, simple orders will be rejected if *Price* is outside the price limits presented in the contract specification. Spread orders will be rejected if *Price* is outside the price limits implied by the spread instrument definition and constituent instrument min and max prices..
OrdType	53	1	Text	1 = Market 2 = Limit (default) 4 = Stop Limit Market implies *TimeInForce* of IOC (3). Stop Limit orders must have a *TimeInForce* of DAY (0), GTC (1), or GTD (6).
TimeInForce	54	1	Text	0 = Day (Expires at the end of the business day). 1 = GTC (Good 'till Cancel. Order remains until cancelled or contract expires). 3 = IOC (Portion not filled immediately is cancelled. Market orders are implicitly IOC). 4 = FOK (An IOC where the entire size must be filled, else the order will be cancelled back).

				6 = GTD (Good 'till Date-Time Expires at the date-time specified in the *ExpireTime* field).
MinQty	55	4	Binary	Minimum fill quantity for IOC orders. Ignored for other Simple instrument orders. Not supported for Spread instruments. Spread instrument orders with specified *MinQty* will be rejected.
Symbol	59	8	Alphanumeric	Simple Instruments can be specified by providing the mapped symbol format in the *Symbol* field or by providing the product name (e.g., "VX") in the *Symbol* field and maturity date in the *MaturityDate* field. Responses to the TPH will contain the instrument specification in the manner that was provided on the associated new order specification (e.g., either Symbol Id or Product and MaturityDate). The *Symbol* field for Spread instrument related messages will always contain mapped symbol Id as product and maturity date does not completely specify the Spread instrument.
Capacity	67	1	Text	C = Customer F = Firm The Capacity refers to the OCC account type. A value of "C" denotes an account that clears in the Customer range at OCC. A value of "F" denotes an account that clears in the Clearing Firm range at OCC.
Account	68	16	Text	Unique account identifier associated with an order. This field will be reflected back on execution reports associated with this order. The first 10 characters are sent to the OCC in the Account # field. The entire 16 character string will appear in the optional CM Data field. Valid characters include ASCII 32-126.
PreventMatch	84	3	Text	Three characters: ***1st character – MTP Modifier:*** N = Cancel Newest O = Cancel Oldest

				B = Cancel Both ***2nd character – Unique Id Level:*** F = Prevent Match at Firm(TPH) Level M = Prevent Match at EFID Level ***3rd character – Trading Group Id (optional):*** TPH specified alphanumeric value 0-9, A-Z, or a-z. The unique Id level (character 2) of both orders must match to prevent a trade. If specified on both orders, Trading Group Id (character 3) must match to prevent a trade. Note that in the event of a Spread order match with a Simple order, the Spread order will always be cancelled irrespective of the 1st character value.
ExpireTime	87	8	DateTime	Required for *TimeInForce* = 6 orders, specifies the date-time (in UTC) that the order expires.
MaturityDate	95	4	Date	When specifying the *Symbol* for a `New Order` message the user can specify the mapped symbol identifier in the *Symbol* field. Alternatively, the product class (e.g., "VX", "VXT", etc.) can be supplied for the *Symbol* field and the *MaturityDate* field is used to specify the expiration date of the symbol within the specified product class. If a value is provided for *MaturityDate*, the *Symbol* field must correspond to a valid product or the order will be rejected with reason code C (Unknown Product Name). If an invalid *MaturityDate* is provided, the order will be rejected with reason code B (Unknown Maturity Date).
OpenClose	99	1	Text	Indicates status of client position in a trade resulting from the order. O = Open C = Close N = None NUL (0x00) = None
CMTANumber	100	4	Binary	CMTA Number of the firm that will clear the trade. Must be specified for CMTA orders and left unspecified for non-CMTA orders.

				Sent to the OCC in the CMTA CM# field.
StopPx	104	8	BinaryPrice	Stop price. Required if *OrdType* = 4 (Stop Limit). Stop Limit orders will only be triggered off Last Sale Eligible trades.
CustomGroupId	112	2	Binary	Used to group orders for use in mass cancels where multiple orders can be cancelled by specifying a list of *CustomGroupId*s. A zero value is treated as "no CustomGroupIds".
CtiCode	114	1	Text	Valid values: 1, 2, 3, 4 1 = CTI 1: Transactions initiated and executed by an individual TPH for the TPH's own account, for an account the TPH controls, or for the account in which the TPH has an ownership or financial interest. 2 = CTI 2: Transactions executed for the proprietary account of a clearing TPH or non-clearing TPH. 3 = CTI 3: Transactions where an individual TPH or authorized trader executes for the personal account of another individual TPH, for an account the other individual TPH controls or for an account in which the other individual TPH has an ownership or financial interest. 4 = CTI 4: Any transaction not meeting the definition of CTI 1, 2 or 3. (These should be non-TPH customer transactions).
ManualOrderIndicator	115	1	Text	Y = Manual order entry N = Automated order entry
OEOID	116	18	Text	Identifies the Order Entry Operator responsible for this message. Min length 3, max length 18. Values in ASCII range 33-126 except comma, semicolon, and pipe are permissible.
FrequentTraderId	134	6	Alphanumeric	Supplemental customer identifier used for billing related programs.
CustOrderHandlingInst	140	1	Text	Execution source code provided during order entry to describe broker service. A default value can be set using the 'Default Customer Order Handling Instruction' port attribute.

				W = Desk (high touch) Y = Electronic C = Vendor-provided platform, billed by Executing Broker G = Sponsored Access via Exchange API or FIX, provided by executing broker H = Premium algorithmic trading provider, billed by executing broker D = Other, including other-provided screen NUL (0x00) = Apply port default (initially 'Y')

4.1.2 **Modify Order**

Request to modify an order. The order attributes which may be adjusted are *Price*, *OrderQty*, *OrdType*, *StopPx*, *ManualOrderIndicator*, *CustOrderHandlingInst*, and *OEOID*. Modifies will result in a loss of time priority unless (1) they have no change in *Price* and also reduce *OrderQty* or (2) they change the *StopPx* for a stop order that has not been elected. *OrdType* may be adjusted from Limit to Market.

Changes in *OrderQty* result in an adjustment of the current order's *OrderQty*. The new *OrderQty* does not directly replace the current order's *LeavesQty*. Rather, a delta is computed from the current *OrderQty* and the replacement *OrderQty*. This delta is then applied to the current *LeavesQty*. If the resulting *LeavesQty* is less than or equal to zero, the order is cancelled. This results in safer behavior when the modification request overlaps partial fills for the current order, leaving the TPH in total control of the share exposure of the order.

A `Modify Order` may be issued before the acknowledgement for the previous `New Order` or `Modify Order` message is received. The *OrigClOrdId* on the overlapping modify should reference the *ClOrdId* of the last message that was sent and not the last acknowledged message. `Modify Order` requests that merely reduce *OrderQty* may be overlapped and the existing *ClOrdId* may be reused. This is the only case where reuse of the *ClOrdId* is allowed.

> **BOEv2 → BOEv3 Migration Note**
> The BOEv3 `Modify Order` message must specify all values to apply to the update. This is unlike BOEv2, wherein the absence of optional fields implied that the values would be carried forward from the version of the order being modified. (Blank fields in BOEv3 will have port defaults applied when available.)

A maximum of 1,679,615 `Modify Order` requests may be made to a single order each trading day. Once the 1,679,615th modification is made, then the next user-generated message on the order should be a `Cancel Order` request.

4.1.2.1 ***ModifyOrderUSFuturesV1***

Field Name	Offset	Length	Data Type	Description
StartOfMessage	0	2	Binary	`B0 E3`

MessageLength	2	2	Binary	`66 00` (102)
MessageType	4	2	Binary	`EA 03` (1002)
MatchingUnit	6	1	Binary	Must be zero
Reserved	7	1	Binary	Must be zero
SequenceNumber	8	4	Binary	The sequence number for this message
ClOrdId	12	20	Text	Unique Id chosen by the client. Characters in the ASCII range 33-126 are allowed, except for **comma, semicolon,** and **pipe**. If the ClOrdId matches a live order, the order will be rejected as duplicate. A leading **tilde** (~) cannot be sent on any *ClOrdId* and will result in a reject. These are reserved for internal use by CFE and could be received as a result of a CFE-generated *ClordId*. Sent to the OCC in the OrderId field. **Note: CFE only enforces uniqueness of *ClOrdId* values among currently live orders, which includes long-lived GTC and GTD orders. However, using unique *ClOrdId* values is strongly recommend.**
OrigClOrdId	32	20	Text	The *ClOrdId* of the original order.
ClearingFirm	52	4	Alpha	EFID that will clear the trade. **Port attribute value of 'Default EFID' is used if not provided.** Sent to OCC in Exec Broker field.
OrderQty	56	4	Binary	Order quantity. System limit is 999,999 contracts.
Price	60	8	BinaryPrice	Limit price. Four implied decimal places. Required for limit orders (*OrdType* = 2). If specified on market order (*OrdType* = 1), the order will be rejected. Orders will be rejected if *Price* does not fall on the applicable minimum trading increment. For all contracts other than Trade at Settlement contracts, simple orders will be rejected if *Price* is less than or equal to zero, or greater than or equal to 100,000. For Trade at Settlement (TAS) contracts, simple orders will be rejected if *Price* is

				outside the price limits presented in the contract specification. Spread orders will be rejected if *Price* is outside the price limits implied by the spread instrument definition and constituent instrument min and max prices.
OrdType	68	1	Text	1 = Market 2 = Limit (default) 4 = Stop Limit Market implies *TimeInForce* of IOC (3). Stop Limit orders must have a *TimeInForce* of DAY (0), GTC (1), or GTD (6).
CancelOrigOnReject	69	1	Text	N = Leave original order alone. Y = Cancel original order if modification fails.
StopPx	70	8	BinaryPrice	Stop price. Required if *OrdType* = 4 (Stop Limit). Stop Limit orders will only be triggered off Last Sale Eligible trades.
ManualOrderIndicator	78	1	Text	Y = Manual order entry N = Automated order entry
OEOID	79	18	Text	Identifies the Order Entry Operator responsible for this message. Min length 3, max length 18. Values in ASCII range 33-126 except comma, semicolon, and pipe are permissible.
FrequentTraderId	97	6	Alphanumeric	Supplemental customer identifier used for billing related programs.
CustOrderHandlingInst	103	1	Text	Execution source code provided during order entry to describe broker service. A default value can be set using the 'Default Customer Order Handling Instruction' port attribute. W = Desk (high touch) Y = Electronic C = Vendor-provided platform, billed by Executing Broker G = Sponsored Access via Exchange API or FIX, provided by executing broker H = Premium algorithmic trading provider, billed by executing broker D = Other, including other-provided screen

				NUL (0x00) = Apply port default (initially 'Y')

4.1.3 Cancel Order

Request to cancel a single order or quote. (See section '4.1.4 - Mass Cancel Order' for the cancellation of multiple orders and/or quotes.)

BOEv2 → BOEv3 Migration Note
The BOEv3 `Cancel Order` message is used to cancel a specific order. Mass order cancellation requests are now requested via the `Mass Cancel Order` message.

4.1.3.1 *CancelOrderUSFuturesV1*

Field Name	Offset	Length	Data Type	Description
StartOfMessage	0	2	Binary	B0 E3 (58288)
MessageLength	2	2	Binary	35 00 (53)
MessageType	4	2	Binary	EB 03 (1003)
MatchingUnit	6	1	Binary	Must be zero
Reserved	7	1	Binary	Must be zero
SequenceNumber	8	4	Binary	The sequence number for this message
OrigClOrdId	12	20	Text	The *OrigClOrdId* on a cancel should be the *ClOrdId* sent on the most recent modify (or new order if no modifies have been sent), even if the corresponding response has not yet been seen.
ClearingFirm	32	4	Alpha	EFID that will clear the trade. **Port attribute value of 'Default EFID' is used if not provided.** Sent to OCC in Exec Broker field.
ManualOrderIndicator	36	1	Text	Y = Manual order entry N = Automated order entry
OEOID	37	18	Text	Identifies the Order Entry Operator responsible for this message. Min length 3, max length 18. Values in ASCII range 33-126 except comma, semicolon, and pipe are permissible.

4.1.4 Mass Cancel Order

A `Mass Cancel Order` message is a request to cancel a group of orders or quotes. A `Mass Cancel Order` message sent to a Unit port will only cancel orders on that port's unit.

Mass cancellation of a group of orders or quotes requires sending *MassCancelInst* which comprises filters used to specify the set of orders to cancel.

- If the Clearing Firm Filter is set to "F", the *ClearingFirm* optional field must not be blank or the Cancel Order request will be rejected.
- If the Acknowledgement Style is set to "S" or "B", or in combination with "M", the *MassCancelId* must not be blank or the `Mass Cancel Order` request will be rejected.
- If the *ProductName* field is not blank then only orders for instruments associated with the product (e.g., "VX") are cancelled.
- If Lockout Instruction is set to "L" and the *ProductName* optional field is not specified, a *Firm-level* Risk Reset is required to clear the Lockout condition. If Lockout Instruction is set to "L" and the *ProductName* optional field is specified, a Product level reset is required.
- Lockout will apply to all `New Order` and `Modify Order` messages for the *ClearingFirm* (and *ProductName* if specified), regardless of other filtering in the cancel order request message.

Any self-imposed lockout at the Firm/EFID or CustomGroupId level sent on a BOEv3 `Mass Cancel Order` message will only apply to the port's matching unit and will not apply across all units.

The system limits the rate at which identical `Mass Cancel Order` and `Purge Orders` requests can be submitted to the system. Requests are restricted to twenty (20) messages per second per port.

An identical mass cancel message is defined as a message having all of the same *CustomGroupId*, *Symbol*, *Clearing Firm*, *Lockout Instruction*, *Instrument Type Filter* and *GTC Order Filter* field values, as a previously received message.

4.1.4.1 ***MassCancelOrderUSFuturesV1***

Field Name	Offset	Length	Data Type	Description
StartOfMessage	0	2	Binary	`B0 E3` (58288)
MessageLength	2	2	Binary	`4B 00` (75)
MessageType	4	2	Binary	`EC 03` (1004)
MatchingUnit	6	1	Binary	Must be zero
Reserved	7	1	Binary	Must be zero
SequenceNumber	8	4	Binary	The sequence number for this message
MassCancelId	12	20	Text	User-defined identifier of the mass cancel or purge request.
ClearingFirm	32	4	Alpha	EFID that will clear the trade. **Port attribute value of 'Default EFID' is used if not provided.** Sent to OCC in Exec Broker field.
ProductName	36	6	Text	Used to specify product class (e.g., "VX", "VA", etc.) for `Purge Orders` and `Cancel Order` message cancel by product functionality.

				If an unrecognized *ProductName* is provided, the associated request will be rejected with reason code C (Unknown Product Name).
MassCancelInst	42	16	Text	Corresponds to *MassCancelInst* (7700) in CFE FIX. Used for specification of `Purge Orders` functionality and optionally used for specification of Mass Cancel functionality associated with the `Cancel Order` message. At least one character must be provided (Clearing Firm Filter). Contiguous characters must be specified up to total length. Truncated/unspecified characters will default to values indicated (D) below. ***1st Character : Clearing Firm Filter*** A = No filtering by clearing firm relationship is performed. F = All orders that were sent under the clearing relationship specified in *ClearingFirm* optional field. If "F" specified and ClearingFirm not provided, the Mass Cancel or Purge request will be rejected. ***2nd Character : Acknowledgement Style*** M = (D) `Order Cancelled` messages are sent for each cancelled order. If "M" is set, any *MassCancelId* value is ignored. S = A single `Mass Cancel Acknowledgement` message is sent once all cancels have been processed. The *MassCancelId* optional field must be specified or the Mass Cancel or Purge Request will be rejected. B = Both individual `Order Cancelled` and `Mass Cancel Acknowledgement` messages will be sent. Also requires *MassCancelId* optional field to be specified or the Mass Cancel or Purge request will be rejected. ***3rd Character : Lockout Instruction*** N = (D) No lockout L = Lockout until corresponding Reset Risk received. Lockout can be used

				only with Clearing Firm Filter set to "F", otherwise the Mass Cancel or Purge request will be rejected. Lockout will apply to all `New Order`, `Quote Update`, and `Modify Order` messages for the *ClearingFirm* (and *ProductName* or *CustomGroupIds*, if specified), regardless of other filtering in the `Purge Orders` or `Cancel Order` message. ***4th Character : Instrument Type Filter*** B = (D) Cancel both Simple and Complex orders S = Cancel Simple orders only C = Cancel Spread orders only ***5th Character : GTC Order Filter*** C = (D) Cancel GTC and GTD orders P = Don't cancel (preserve) GTC and GTD orders If *ProductName* optional field is specified, it must contain a valid futures root symbol (e.g., "VX"), in which case only orders/quotes associated with the specified product will be cancelled. A self-imposed lockout can be released using the *Reset* Risk message. An `appropriate` reset is required to `be` sent for each lockout type in order to resume trading. For example, a product-level lockout requires a product-level reset. For more information, refer to the CFE Risk Management Specification.
ManualOrderIndicator	58	1	Text	Y = Manual order entry N = Automated order entry
OEOID	59	18	Text	Identifies the Order Entry Operator responsible for this message. Min length 3, max length 18. Values in ASCII range 33-126 except comma, semicolon, and pipe are permissible.

4.1.5 Purge Orders

Request to cancel a group of orders or quotes across all the TPH's sessions **for that port's matching unit**. This differs from a mass cancel request sent via a `Cancel Order` message as the purge request is applied across all of the TPH's sessions, not just the session on which the `Cancel Order` was received. In addition, the `Purge Orders` message accepts a list of *CustomGroupIds* as part of the order matching filter.

Any self-imposed lockout at the Firm/EFID or CustomGroupId level sent on a BOEv3 `Purge Orders` message will only apply to the port's matching unit and will not apply across all units.

- `Purge Orders` requires sending *MassCancelInst* bitfield.
- Optionally *ProductName, ClearingFirm, MassCancelId* and list of *CustomGroupId* may also be sent (if non-blank).
- *ProductName* and *CustomGroupId* are mutually exclusive. Messages containing both will be rejected.
- A maximum of 10 *CustomGroupId* may be sent in one message.
- A `Purge Acknowledgment` message may be requested by setting the Acknowledgement Style value in the required 'optional' field *MassCancelInst* to "S" or "B"or in combination with "M". In these cases, the Purge Orders request will be rejected if the *MassCancelId* optional field is not provided.
- Individual `Order Cancelled` or `Quote Cancelled` messages are requested by setting the Acknowledgement Style value of the required 'optional' field *MassCancelInst* to "M" or "B".

The system limits the rate at which identical `Mass Cancel` and `Purge Orders` requests can be submitted to the system. Requests are restricted to twenty (20) messages per second per port.

An identical `Purge Orders` message is defined as a message having all of the same *CustomGroupId*, *Symbol*, *Clearing Firm*, *Lockout Instruction*, *Instrument Type Filter* and *GTC Order Filter* field values, as a previously received message.

4.1.5.1 *PurgeOrdersUSFuturesV1*

Field Name	Offset	Length	Data Type	Description
StartOfMessage	0	2	Binary	`B0 E3` (58288)
MessageLength	2	2	Binary	(76 + *CustomGroupIdCnt**2)
MessageType	4	2	Binary	`ED 03` (1005)
MatchingUnit	6	1	Binary	Must be zero
Reserved	7	1	Binary	Must be zero
SequenceNumber	8	4	Binary	The sequence number for this message
MassCancelId	12	20	Text	User-defined identifier of the mass cancel or purge request.

ClearingFirm	32	4	Alpha	EFID that will clear the trade. **Port attribute value of 'Default EFID' is used if not provided.** Sent to OCC in Exec Broker field.
ProductName	36	6	Text	Used to specify product class (e.g., "VX", "VA", etc.) for `Purge Orders` and `Cancel Order` message cancel by product functionality. If an unrecognized *ProductName* is provided, the associated request will be rejected with reason code C (Unknown Product Name).
MassCancelInst	42	16	Text	Corresponds to *MassCancelInst* (7700) in CFE FIX. Used for specification of `Purge Orders` functionality and optionally used for specification of Mass Cancel functionality associated with the `Cancel Order` message. At least one character must be provided (Clearing Firm Filter). Contiguous characters must be specified up to total length. Truncated/unspecified characters will default to values indicated (D) below. ***1st Character : Clearing Firm Filter*** A = No filtering by clearing firm relationship is performed. F = All orders that were sent under the clearing relationship specified in *ClearingFirm* optional field. If "F" specified and ClearingFirm not provided, the Mass Cancel or Purge request will be rejected. ***2nd Character : Acknowledgement Style*** M = (D) `Order Cancelled` messages are sent for each cancelled order. If "M" is set, any *MassCancelId* value is ignored. S = A single `Mass Cancel Acknowledgement` message is sent once all cancels have been processed. The *MassCancelId* optional field must be specified or the Mass Cancel or Purge Request will be rejected.

				B = Both individual `Order Cancelled` and `Mass Cancel Acknowledgement` messages will be sent. Also requires *MassCancelId* optional field to be specified or the Mass Cancel or Purge request will be rejected. ***3rd Character : Lockout Instruction*** N = (D) No lockout L = Lockout until corresponding Reset Risk received. Lockout can be used only with Clearing Firm Filter set to "F", otherwise the Mass Cancel or Purge request will be rejected. Lockout will apply to all `New Order`, `Quote Update`, and `Modify Order` messages for the *ClearingFirm* (and *ProductName* or *CustomGroupIds*, if specified), regardless of other filtering in the `Purge Orders` or `Cancel Order` message. ***4th Character : Instrument Type Filter*** B = (D) Cancel both Simple and Complex orders S = Cancel Simple orders only C = Cancel Spread orders only ***5th Character : GTC Order Filter*** C = (D) Cancel GTC and GTD orders P = Don't cancel (preserve) GTC and GTD orders If *ProductName* optional field is specified, it must contain a valid futures root symbol (e.g., "VX"), in which case only orders/quotes associated with the specified product will be cancelled. A self-imposed lockout can be released using the `Reset Risk` message. An appropriate reset is required to be sent for each lockout type in order to resume trading. For example, a product-level lockout requires a product-level reset. For more information, refer to the CFE Risk Management Specification.
ManualOrderIndicator	58	1	Text	Y = Manual order entry N = Automated order entry

OEOID	59	18	Text	Identifies the Order Entry Operator responsible for this message. Min length 3, max length 18. Values in ASCII range 33-126 except comma, semicolon, and pipe are permissible.
CustomGroupIdCnt	77	1	Binary	Number of repeating *CustomGroupId*'s included in this message.
→*CustomGroupId*	78	2	Binary	Used to group orders for use in mass cancels where multiple orders can be cancelled by specifying a list of *CustomGroupId*s. A zero value is treated as "no CustomGroupIds".

4.1.6 **Quote Update**

Request to enter or update one or more quotes. `Quote Update` requests will be forwarded in their entirety to the matching engine instance as a single message and will be applied in a single transaction.

All contracts in a single `Quote Update` must trade under a single futures root. Requests which include contracts trading under multiple futures roots will be rejected in their entirety.

A quote is unique per port, EFID, and side. You may quote multiple price levels of depth using either multiple EFIDs on a single port or with the same EFID on multiple ports.

Quote requests are one-sided. The cancellation of quotes can be done by sending a `Quote Update` with a zero size and a *SizeModifier* of NULL (0x00). The table below describes the possible combinations of zero/non-zero sizes and prices and the resulting behavior. The behavior differs depending on the product type (TAS vs non-TAS) and the value of the *SizeModifier* field.

Product Type	Zero Size	Zero Price	*SizeModifier*	Result
Trade At Settlement ("TAS")	Y	Y	0	Quote is cancelled
	Y	N	0	Quote is cancelled
	N	Y	0	Quote price updated
	Y	Y	R	Quote price updated
	Y	N	R	Quote price updated
	N	Y	R	Quote size and price updated
Standard (non-TAS)	Y	Y	0	Quote is cancelled
	Y	N	0	Quote is cancelled
	N	Y	0	Quote is cancelled
	Y	Y	R	Quote is cancelled
	Y	N	R	Quote price updated

	N	Y	R	Quote is cancelled

Quotes may be for simple instruments only; complex/spread quotes may not be submitted.

All quotes will be automatically cancelled at the end of the trading day.

If a quote modification is rejected, the resting quote being modified is also cancelled.

Executions, unsolicited cancels, and unsolicited modification response messages from the exchange are different from those for orders. They are optimized for efficiency and contain some different data elements (e.g., *QuoteUpdateId*) than the respective messages for orders.

Match Trade Prevention is only available if defaulted at the port level. For BOE Unit Quoting ports, only Cancel Newest, Cancel Oldest, or Cancel Both are permitted. If a BOE Quoting port is not configured with both a default MTP Modifier and Unique Id Level, Match Trade Prevention will be disabled.

To maintain time priority, all attributes of an existing quote *must* be unchanged except for a reduction in size. Changing any other attribute or increasing size will result in a loss of time priority.

Capacity may not be changed when modifying a quote. To change *Capacity* of a resting quote, you must first send a quote with zero price and size and then re-enter the quote with the desired *Capacity*.

`Quote Update` and `New Order` messages submitted through BOE Unit Quoting ports will be available over ODROP.

During the queuing period, a `Quote Update` may only contain a bid and/or offer for a single TAS expiration.

4.1.6.1 ***QuoteUpdateUSFuturesV1***

Field Name	Offset	Length	Data Type	Description
StartOfMessage	0	2	Binary	`B0 E3` (58288)
MessageLength	2	2	Binary	(79 + QuoteCnt*20)
MessageType	4	2	Binary	`EE 03` (1006)
MatchingUnit	6	1	Binary	Must be zero
Reserved	7	1	Binary	Must be zero
SequenceNumber	8	4	Binary	The sequence number for this message
QuoteUpdateId	12	16	Text	Id chosen by the client. Characters in the ASCII range 33-126 are allowed, except for comma, semicolon, and pipe. All quote response messages will include this identifier.

				Note: CFE only enforces uniqueness of *QuoteUpdateId* values among those not yet acknowledged by the ME. However, we strongly recommend that you keep your *QuoteUpdateId* values unique for a trading day.
ClearingFirm	28	4	Alpha	EFID that will clear the trade. **Port attribute value of 'Default EFID' is used if not provided.** Sent to OCC in Exec Broker field.
ClearingAccount	32	4	Alpha	Supplemental identifier. Recorded and made available in execution reports. Available via Drop feeds. This field can be blank or populated with an optional four character string. This field is not sent to the OCC.
CMTANumber	36	4	Binary	CMTA Number of the firm that will clear the trade. Must be specified for CMTA orders and left unspecified for non-CMTA orders. Sent to the OCC in the CMTA CM# field.
Account	40	16	Text	Unique account identifier associated with an order. This field will be reflected back on execution reports associated with this order. The first 10 characters are sent to the OCC in the Account # field. The entire 16 character string will appear in the optional CM Data field. Valid characters include ASCII 32-126.
CustomGroupId	56	2	Binary	Used to group orders for use in mass cancels where multiple orders can be cancelled by specifying a list of *CustomGroupId*s. A zero value is treated as "no CustomGroupIds".
Capacity	58	1	Text	C = Customer F = Firm The Capacity refers to the OCC account type. A value of "C" denotes an account that clears in the Customer range at OCC. A value of "F" denotes an account that clears in the Clearing Firm range at OCC.
CtiCode	59	1	Text	Valid values: 1, 2, 3, 4 1 = CTI 1: Transactions initiated and executed by an individual TPH for the

				TPH's own account, for an account the TPH controls, or for the account in which the TPH has an ownership or financial interest. 2 = CTI 2: Transactions executed for the proprietary account of a clearing TPH or non-clearing TPH. 3 = CTI 3: Transactions where an individual TPH or authorized trader executes for the personal account of another individual TPH, for an account the other individual TPH controls or for an account in which the other individual TPH has an ownership or financial interest. 4 = CTI 4: Any transaction not meeting the definition of CTI 1, 2 or 3. (These should be non-TPH customer transactions).
ManualOrderIndicator	60	1	Text	Y = Manual order entry N = Automated order entry
OEOID	61	18	Text	Identifies the Order Entry Operator responsible for this message. Min length 3, max length 18. Values in ASCII range 33-126 except comma, semicolon, and pipe are permissible.
SizeModifier	79	1	Text	Controls the behavior of the quote *OrderQty* field. Using "R" allows for a TPH to ensure that in-flight fills or cancels do not result in unwanted additional size exposure. NULL (0x00) = New quote size will be set to value of *OrderQty*. R = Reduce outstanding size of quote by the *OrderQty* provided. When using "R", if the resulting size is zero or negative, then the quote is cancelled. TPHs are expected to track the remaining quantity of each quote as resulting size is not included on the `Quote Update Acknowledgement` message.
QuoteCnt	80	1	Binary	Number of repeating groups included in this message. Allowed values are 1-20.
→ *QuoteSymbol*	81	6	Alphanumeric	CFE native identifier of the instrument being quoted.

→ *Side*	87	1	Text	1 = Buy 2 = Sell
→ *OpenClose*	88	1	Text	Indicates status of client position in a trade resulting from the order. O = Open C = Close N = None NUL (0x00) = None
→ *Price*	89	8	BinaryPrice	Limit price. Four implied decimal places. Required for limit orders (*OrdType* = 2). If specified on market order (*OrdType* = 1), the order will be rejected. Orders will be rejected if *Price* does not fall on the applicable minimum trading increment. For all contracts other than Trade at Settlement contracts, simple orders will be rejected if *Price* is less than or equal to zero, or greater than or equal to 100,000. For Trade at Settlement (TAS) contracts, simple orders will be rejected if *Price* is outside the price limits presented in the contract specification. Spread orders will be rejected if *Price* is outside the price limits implied by the spread instrument definition and constituent instrument min and max prices.
→ *OrderQty*	97	4	Binary	Order quantity. System limit is 999,999 contracts.

4.1.7 **Reset Risk**

Reset or release Firm/EFID, Product, or Custom Group Id level lockout conditions resulting from risk profile trips or self-imposed lockouts issued via `Mass Cancel Order` or `Purge Orders` messages. Risk resets can be performed using this message. **New in BOEv3** – risk resets at the Firm/EFID and CustomGroupId levels will only apply to the unit associated with the BOEv3 port that is used.

Only one unique risk reset of a given type (Firm/EFID, Product, CustomGroupId) is allowed per second. Additional resets will be ignored (*RiskResetResult* = <space>). For example, a customer may reset risk for *CustomGroupId* = 1 and may not reset risk again for *CustomGroupId* = 1 until one second has elapsed. This restriction is designed to safeguard the trading platform from excessive risk messaging.

BOEv2 → BOEv3 Migration Note
As noted in the `New Order` message, be aware that the `New Order` message can no longer be used to reset risk.

4.1.7.1 *ResetRiskUSFuturesV1*

Field Name	Offset	Length	Data Type	Description
StartOfMessage	0	2	Binary	`B0 E3` (58288)
MessageLength	2	2	Binary	`2E 00` (46)
MessageType	4	2	Binary	`EF 03` (1007)
MatchingUnit	6	1	Binary	Must be zero
Reserved	7	1	Binary	Must be zero
SequenceNumber	8	4	Binary	The sequence number for this message
RiskStatusId	12	16	Text	Unique identifier for this Reset Risk request. Response message will have this corresponding identifier. **Note: CFE only enforces uniqueness of *RiskStatusId* values among currently unacknowledged requests. However, we strongly recommend that you keep your *RiskStatusId* values day-unique.**
RiskReset	28	8	Text	Single Character Values (Values may be combined) S = Product-level risk/lockout reset F = Firm-level lockout reset C = CustomGroupId lockout reset Values may be combined together to allow for resets of multiple risk trips or self-imposed lockouts in a single message. For example, “FS”, “SC”, “FC”, and “SFC” are all acceptable values. The characters may be combined in any order. For example, to “reset all” set this field to “SFC”, which is the equivalent to “CFS”. For more information, refer to the CFE US Futures Risk Management Specification.
ClearingFirm	36	4	Alpha	Risk will be reset for this EFID. Resets a self-imposed EFID-level lockout initiated using a mass cancel or purge request. Required on all resets.

ProductName	40	6	Text	Used to specify product class (e.g., "VX", "VA", etc.) for `Purge Orders` and `Cancel Order` message cancel by product functionality. If an unrecognized *ProductName* is provided, the associated request will be rejected with reason code C (Unknown Product Name).
CustomGroupId	46	2	Binary	Used to group orders for use in mass cancels where multiple orders can be cancelled by specifying a list of *CustomGroupId*s. A zero value is treated as "no CustomGroupIds".

4.2 CFE to TPH

4.2.1 Order Acknowledgement

`Order Acknowledgement` messages are sent in response to a `New Order` message. The message corresponds to a FIX Execution Report with *ExecType* (150) = 0 (New).

> **BOEv2 → BOEv3 Migration Note**
> Note that several fields which could be requested in BOEv2 will no longer be available under BOEv3, such as the *DayOrderQty, DayCumQty, AvgPx,* and *DayAvgPx* fields.

4.2.1.1 *OrderAcknowledgementUSFuturesV1*

Field Name	Offset	Length	Data Type	Description
StartOfMessage	0	2	Binary	`BA E3` (58288)
MessageLength	2	2	Binary	`AB 00` (171)
MessageType	4	2	Binary	`DD 05` (1501)
MatchingUnit	6	1	Binary	The Matching Unit which created this message.
Reserved	7	1	Binary	Unspecified
SequenceNumber	8	4	Binary	The sequence number for this message. Distinct per Matching Unit
TransactionTime	12	8	DateTime	The time the event occurred in the CFE Matching Engine (not the time the message was sent).
ClOrdId	20	20	Text	Echoed back from the TPH message
OrderId	40	8	Binary	Order identifier supplied by CFE. This identifier corresponds to the identifiers used in CFE market data products. Sent to the OCC in the Exchange Data field.

Side	48	1	Text	Echoed back from the TPH message
Price	49	8	BinaryPrice	Echoed back from the TPH message
OrdType	57	1	Text	Echoed back from the TPH message
TimeInForce	58	1	Text	Echoed back from the TPH message
MinQty	59	4	Binary	Echoed back from the TPH message
Symbol	63	8	Alphanumeric	Echoed back from the TPH message
Capacity	71	1	Text	Echoed back from the TPH message
Account	72	16	Text	Echoed back from the TPH message
ClearingFirm	88	4	Alpha	Echoed back from the TPH message
ClearingAccount	92	4	Alpha	Echoed back from the TPH message
OrderQty	96	4	Binary	Echoed back from the TPH message
PreventMatch	100	3	Alpha	Echoed back from the TPH message
MaturityDate	103	4	Date	Echoed back from the TPH message
OpenClose	107	1	Text	Echoed back from the TPH message
LeavesQty	108	4	Binary	Quantity still open for further execution. If zero, the order is complete.
BaseLiquidityIndicator	112	1	Text	Indicates whether the trade added or removed liquidity. A = Added Liquidity R = Removed Liquidity C = Market opening / re-opening trade
ExpireTime	113	8	DateTime	Echoed back from the TPH message
SubLiquidityIndicator	121	1	Text	Additional information about the liquidity of an order. CFE may add additional values without notice. TPHs must gracefully ignore unknown values. NULL (0x00) = No Additional Information C = Carried Order Indicator U = Qualifying Market Turner order
StopPx	122	8	BinaryPrice	Echoed back from the TPH message
CMTANumber	130	4	Binary	Echoed back from the TPH message
CtiCode	134	1	Text	Echoed back from the TPH message
ManualOrderIndicator	135	1	Text	Echoed back from the TPH message
OEOID	136	18	Text	Echoed back from the TPH message
CumQty	154	4	Binary	Echoed back from the TPH message
FrequentTraderId	158	6	Alphanumeric	Echoed back from the TPH message

CustOrderHandlingInst	164	1	Text	Echoed back from the TPH message
RequestReceivedTime	165	8	DateTime	The earliest timestamp, populated with nanosecond precision, recorded by CFE of the corresponding inbound message being acknowledged. Populated with zero in event of failover to Port B or Port C.

(New fields may be introduced at the end of this message. Consequently, TPHs must treat any additional bytes present as undefined values.)

4.2.2 **Order Rejected**

`Order Rejected` messages are sent in response to a `New Order` which must be rejected. This message corresponds to a FIX Execution Report with *ExecType* (150) = 8 (Rejected). `Order Rejected` messages are unsequenced.

> **BOEv2 → BOEv3 Migration Note**
> Many optional fields supported in BOEv2 for this message type are not included in the BOEv3 message; only the information needed to identify the order and the reason for rejection are provided.

4.2.2.1 ***OrderRejectedUSFuturesV1***

Field Name	Offset	Length	Data Type	Description
StartOfMessage	0	2	Binary	`BA E3` (58288)
MessageLength	2	2	Binary	`67 00` (103)
MessageType	4	2	Binary	`DE 05` (1502)
MatchingUnit	6	1	Binary	Always zero (since it is unsequenced)
Reserved	7	1	Binary	Unspecified
SequenceNumber	8	4	Binary	Always zero (unsequenced)
TransactionTime	12	8	DateTime	The time the event occurred in the CFE Matching Engine (not the time the message was sent).
ClOrdId	20	20	Text	Echoed back from the TPH message
ClearingFirm	40	4	Alphanumeric	Echoed back from the TPH message
OrderRejectReason	44	1	Text	See Section '5.1 - Order Reason Codes'
Text	45	60	Text	Human readable text with more information.

(New fields may be introduced at the end of this message. Consequently, TPHs must treat any additional bytes present as undefined values.)

4.2.3 **Order Modified**

`Order Modified` messages are sent in response to a `Modify Order` to indicate that the order has been successfully modified.

In some cases, the last message to be received on an order's lifecycle will be an `Order Modified` message. The way to know the order is no longer live is to inspect *LeavesQty*. An example of this would be modification of an order whilst an execution is being generated, resulting in the order being reduced to zero outstanding quantity.

4.2.3.1 ***OrderModifiedUSFuturesV1***

Field Name	Offset	Length	Data Type	Description
StartOfMessage	0	2	Binary	`BA E3` (58288)
MessageLength	2	2	Binary	`6F 00` (111)
MessageType	4	2	Binary	`DF 05` (1503)
MatchingUnit	6	1	Binary	The Matching Unit which created this message.
Reserved	7	1	Binary	Unspecified
SequenceNumber	8	4	Binary	The sequence number for this message. Distinct per Matching Unit
TransactionTime	12	8	DateTime	The time the event occurred in the CFE Matching Engine (not the time the message was sent).
ClOrdId	20	20	Text	Echoed back from the TPH message
OrigClOrdId	40	20	Text	The *ClOrdId* of the original order.
OrderId	60	8	Binary	Order identifier supplied by CFE. This identifier corresponds to the identifiers used in CFE market data products. Sent to the OCC in the Exchange Data field.
ClearingFirm	68	4	Alpha	Echoed back from the TPH message
Price	72	8	BinaryPrice	Echoed back from the TPH message
OrdType	80	1	Text	Echoed back from the TPH message
OrderQty	81	4	Binary	Echoed back from the TPH message
LeavesQty	85	4	Binary	Quantity still open for further execution. If zero, the order is complete.
BaseLiquidityIndicator	89	1	Text	Indicates whether the trade added or removed liquidity. A = Added Liquidity R = Removed Liquidity C = Market opening / re-opening trade
StopPx	90	8	BinaryPrice	Echoed back from the TPH message

FrequentTraderId	98	6	Alphanumeric	Echoed back from the TPH message
CustOrderHandlingInst	104	1	Text	Echoed back from the TPH message
RequestReceivedTime	105	8	DateTime	The earliest timestamp, populated with nanosecond precision, recorded by CFE of the corresponding inbound message being acknowledged. Populated with zero in event of failover to Port B or Port C.

(New fields may be introduced at the end of this message. Consequently, TPHs must treat any additional bytes present as undefined values.)

4.2.4 **Modify Rejected**

`Modify Rejected` messages are sent in response to a `Modify Order` for an order which cannot be modified. `Modify Rejected` messages are unsequenced.

This message corresponds to a FIX Execution Report with *MsgType* (35) = 9 (Order Cancel Reject) and *CxlRejResponseTo* (434) = 2 (Order Cancel/Replace Request).

4.2.4.1 ***ModifyRejectedUSFuturesV1***

Field Name	Offset	Length	Data Type	Description
StartOfMessage	0	2	Binary	`B0 E3` (58288)
MessageLength	2	2	Binary	`7B 00` (123)
MessageType	4	2	Binary	`E0 05` (1504)
MatchingUnit	6	1	Binary	Always zero (since it is unsequenced)
Reserved	7	1	Binary	Unspecified
SequenceNumber	8	4	Binary	Always zero (unsequenced)
TransactionTime	12	8	DateTime	The time the event occurred in the CFE Matching Engine (not the time the message was sent).
ClOrdId	20	20	Text	Echoed back from the TPH message
OrigClOrdId	40	20	Text	The *ClOrdId* of the original order.
ClearingFirm	60	4	Alpha	Echoed back from the TPH message
ModifyRejectReason	64	1	Text	See Section '5.1 - Order Reason Codes'
Text	65	60	Text	Human readable text with more information.

(New fields may be introduced at the end of this message. Consequently, TPHs must treat any additional bytes present as undefined values.)

4.2.5 **Order Execution**

An `Order Execution` is sent for each fill on an order.

Rather than returning a monetary value indicating the rebate or charge for an execution, the *FeeCode* is an indication of a fee classification corresponding to an item on the venue's fee schedule.

> **BOEv2 → BOEv3 Migration Note**
> The BOEv2 *ContraBroker* field has been removed (as it was always 'CFE'). Additionally, many optional fields supported in BOEv2 for this message type are not included in the BOEv3 message. Fields no longer included on the `Order Execution` message are: *Price, PrdType, TimeInForce, MinQty, Capacity, Account, ClearingAccount, OrderQty, PreventMatch, OpenClose, ExpireTime, StopPx, CmtaNumber, CtiCode, ManualOrderIndicator, OEOID, TradeDate, CumQty, DayOrderQty, DayCumQty, AvgPx, DayAvgPx*

4.2.5.1 ***OrderExecutionUSFuturesV1***

Field Name	Offset	Length	Data Type	Description
StartOfMessage	0	2	Binary	`B0 E3` (58288)
MessageLength	2	2	Binary	`65 00` (101)
MessageType	4	2	Binary	`E1 05` (1505)
MatchingUnit	6	1	Binary	The Matching Unit which created this message.
Reserved	7	1	Binary	Unspecified
SequenceNumber	8	4	Binary	The sequence number for this message. Distinct per Matching Unit
TransactionTime	12	8	DateTime	The time the event occurred in the CFE Matching Engine (not the time the message was sent).
ClOrdId	20	20	Text	The order which was executed
ExecId	40	8	Binary	Sent to the OCC in the Trade Id field. Execution Id. Unique across all matching units on a given day. Note: ExecIds will be represented on ODROP and FIXDROP ports as base 36 ASCII.
LastShares	48	4	Binary	Executed contracts quantity.
LastPx	52	8	BinaryPrice	Price of this fill. Note the use *of Price* type to represent positive and negative prices, which can occur with spread instruments.
LeavesQty	60	4	Binary	Quantity still open for further execution. If zero, the order is complete.
BaseLiquidityIndicator	64	1	Text	Indicates whether the trade added or removed liquidity. A = Added Liquidity R = Removed Liquidity C = Market opening / re-opening trade

SubLiquidityIndicator	65	1	Text	Additional information about the liquidity of an order. CFE may add additional values without notice. TPHs must gracefully ignore unknown values. `NULL (0x00)` = No Additional Information `C` = Carried Order Indicator `U` = Qualifying Market Turner order
Side	66	1	Text	Echoed back from the TPH message
Symbol	67	8	Alphanumeric	Echoed back from the TPH message
ClearingFirm	75	4	Alpha	Echoed back from the TPH message
MaturityDate	79	4	Date	Maturity date of the instrument
FeeCode	83	2	Alphanumeric	Indicates fee associated with an execution. Fee codes are published in the pricing schedule. New fee codes may be sent with little or no notice. TPHs are encouraged to code their systems to accept unknown fee codes.
TradeDate	85	4	Date	Business date of the execution. Note that on CFE, business date is not always the same as the calendar date. For example, the VX/VT products open for trading on the calendar day prior to the associated business date. Executions that occur after the open and before midnight will have a *TradeDate* value that is not the same as the calendar date of the execution.
ClearingSize	89	4	Binary	Size to clear with OCC. Same value as *LastShares*, except in VA and VAO where *ClearingSize* is 0 on execution, and the converted clearing size on restatement.
PendingStatus	93	1	Text	Field is provided as a convenience to determine whether an `Order Execution` message is a preliminary notification representing a pending trade. The value 'P' indicates that the execution is associated with a product for which the `Order Execution` message is a preliminary notification of an execution and for which a post-settlement restatement will be sent. `N` = Not applicable `P` = Pending

MultilegReportingType	94	1	Text	Present on `Order Execution`, `TAS Restatement` and `Variance Restatement` messages representing either Spread orders or Simple orders that are part Spread execution. 1 = Simple instrument execution 2 = Simple instrument execution that is part of a Spread execution 3 = Spread instrument execution
SecondaryExecId	95	8	Binary	Field indicates whether an execution is a spread or a simple instrument execution that is part of a spread trade. • If *SecondaryExecId* field is not present, the execution is a simple instrument execution only. • If *SecondaryExecId* is present and is the same as the *ExecId* required field, the execution represents a spread execution for which associated simple instrument executions will follow. Simple instrument executions associated with a spread execution will contain a *SecondaryExecId* value that matches the *ExecId* of the associated spread execution.

(New fields may be introduced at the end of this message. Consequently, TPHs must treat any additional bytes present as undefined values.)

4.2.6 Order Cancelled

BOEv2 → BOEv3 Migration Note
Many optional fields supported in BOEv2 for this message type are not included in the BOEv3 message; only the information needed to identify the order and the reason for cancellation are provided.

4.2.6.1 *OrderCancelledUSFuturesV1*

Field Name	Offset	Length	Data Type	Description
StartOfMessage	0	2	Binary	`B0 E3` (58288)
MessageLength	2	2	Binary	`33 00` (51)
MessageType	4	2	Binary	`E2 05` (1506)
MatchingUnit	6	1	Binary	The Matching Unit which created this message.
Reserved	7	1	Binary	Unspecified
SequenceNumber	8	4	Binary	The sequence number for this message. Distinct per Matching Unit

TransactionTime	12	8	DateTime	The time the event occurred in the CFE Matching Engine (not the time the message was sent).
ClOrdId	20	20	Text	The order which was cancelled.
ClearingFirm	40	4	Alpha	EFID that would clear the trade.
CancelReason	44	1	Text	See Section '5 - Reason Codes' (pg.92)
RequestReceivedTime	45	8	DateTime	The earliest timestamp, populated with nanosecond precision, recorded by CFE of the corresponding inbound message being acknowledged. Populated with zero in event of failover to Port B or Port C. Note: Value will be 0 if this is not a response to a `Cancel Order` message.

(New fields may be introduced at the end of this message. Consequently, TPHs must treat any additional bytes present as undefined values.)

4.2.7 **Cancel Rejected**

A `Cancel Rejected` message is sent in response to a `Cancel Order` message to indicate that the cancellation cannot occur. `Cancel Rejected` messages are unsequenced.

4.2.7.1 ***CancelRejectedUSFuturesV1***

Field Name	Offset	Length	Data Type	Description
StartOfMessage	0	2	Binary	`B0 E3` (58288)
MessageLength	2	2	Binary	`67 00` (103)
MessageType	4	2	Binary	`E3 05` (1507)
MatchingUnit	6	1	Binary	Always zero (since it is unsequenced)
Reserved	7	1	Binary	Unspecified
SequenceNumber	8	4	Binary	The sequence number for this message. Distinct per Matching Unit
TransactionTime	12	8	DateTime	The time the event occurred in the CFE Matching Engine (not the time the message was sent).
ClOrdId	20	20	Text	Echoed back from the TPH message
ClearingFirm	40	4	Alpha	Echoed back from the TPH message
CancelRejectReason	44	1	Text	See Section '5 - Reason Codes' (pg.92)
Text	45	60	Text	Human readable text with more information.

(New fields may be introduced at the end of this message. Consequently, TPHs must treat any additional bytes present as undefined values.)

4.2.8 Mass Cancel Acknowledgement

A `Mass Cancel Acknowledgment` is an unsequenced message sent when a `Cancel Order` or `Purge Orders` message requesting a mass cancellation has completed cancelling all individual orders.

4.2.8.1 *MassCancelAcknowledgementUSFuturesV1*

Field Name	Offset	Length	Data Type	Description
StartOfMessage	0	2	Binary	`BA E3` (58288)
MessageLength	2	2	Binary	`32 00` (50)
MessageType	4	2	Binary	`E4 05` (1508)
MatchingUnit	6	1	Binary	Always zero (since it is unsequenced)
Reserved	7	1	Binary	Unspecified
SequenceNumber	8	4	Binary	Always zero (unsequenced)
TransactionTime	12	8	DateTime	The time the event occurred in the CFE Matching Engine (not the time the message was sent).
MassCancelId	20	20	Text	Echoed back from the TPH message
CancelledOrderCount	40	4	Binary	Number of orders cancelled.
RequestReceivedTime	44	8	DateTime	The earliest timestamp, populated with nanosecond precision, recorded by CFE of the corresponding inbound message being acknowledged. Populated with zero in event of failover to Port B or Port C.

(New fields may be introduced at the end of this message. Consequently, TPHs must treat any additional bytes present as undefined values.)

4.2.9 Mass Cancel Rejected

A `Mass Cancel Rejected` message is sent in response to a `Mass Cancel Order` message to indicate that the mass cancellation cannot occur. `Mass Cancel Rejected` messages are unsequenced.

4.2.9.1 *MassCancelRejectedUSFuturesV1*

Field Name	Offset	Length	Data Type	Description
StartOfMessage	0	2	Binary	`BA E3` (58288)
MessageLength	2	2	Binary	`63 00` (99)
MessageType	4	2	Binary	`E5 05` (1509)
MatchingUnit	6	1	Binary	Always zero (since it is unsequenced)
Reserved	7	1	Binary	Unspecified

SequenceNumber	8	4	Binary	Always zero (unsequenced)
TransactionTime	12	8	DateTime	The time the event occurred in the CFE Matching Engine (not the time the message was sent).
MassCancelId	20	20	Text	Echoed back from the TPH message
MassCancelRejectReason	40	1	Text	Reason for the mass cancel rejection. See Section '5 - Reason Codes' (pg.92).
Text	41	60	Text	Human readable text with more information.

(New fields may be introduced at the end of this message. Consequently, TPHs must treat any additional bytes present as undefined values.)

4.2.10 **Purge Acknowledgement**

A `Purge Acknowledgment` is an unsequenced message sent when a `Purge Orders` message requesting an order purge has completed cancelling all individual orders.

> **BOEv2 → BOEv3 Migration Note**
> The `Purge Acknowledgement` message has been introduced to explicitly acknowledge the `Purge Orders` message.

4.2.10.1 ***PurgeAcknowledgementUSFuturesV1***

Field Name	Offset	Length	Data Type	Description
StartOfMessage	0	2	Binary	`B0 E3` (58288)
MessageLength	2	2	Binary	`32 00` (50)
MessageType	4	2	Binary	`E6 05` (1510)
MatchingUnit	6	1	Binary	Always zero (since it is unsequenced)
Reserved	7	1	Binary	Unspecified
SequenceNumber	8	4	Binary	Always zero (unsequenced)
TransactionTime	12	8	DateTime	The time the event occurred in the CFE Matching Engine (not the time the message was sent).
MassCancelId	20	20	Text	Echoed back from the TPH message
CancelledOrderCount	40	4	Binary	Number of orders cancelled.
RequestReceivedTime	44	8	DateTime	The earliest timestamp, populated with nanosecond precision, recorded by CFE of the corresponding inbound message being acknowledged. Populated with zero in event of failover to Port B or Port C.

(New fields may be introduced at the end of this message. Consequently, TPHs must treat any additional bytes present as undefined values.)

4.2.11 Purge Rejected

A `Purge Rejected` message is sent in response to a `Purge Orders` message to indicate that the mass cancellation cannot occur. `Purge Rejected` messages are unsequenced.

4.2.11.1 *PurgeRejectedUSFuturesV1*

Field Name	Offset	Length	Data Type	Description
StartOfMessage	0	2	Binary	`B0 E3` (58288)
MessageLength	2	2	Binary	`63 00` (99)
MessageType	4	2	Binary	`E7 05` (1511)
MatchingUnit	6	1	Binary	Always zero (since it is unsequenced)
Reserved	7	1	Binary	Unspecified
SequenceNumber	8	4	Binary	Always zero (unsequenced)
TransactionTime	12	8	DateTime	The time the event occurred in the CFE Matching Engine (not the time the message was sent).
MassCancelId	20	20	Text	Echoed back from the TPH message
PurgeRejectReason	40	1	Text	Reason for the purge rejection. See Section '5 - Reason Codes'
Text	41	60	Text	Human readable text with more information.

(New fields may be introduced at the end of this message. Consequently, TPHs must treat any additional bytes present as undefined values.)

4.2.12 Trade Cancel or Correct

Used to provide notification that a trade has been cancelled (busted) or corrected (price change only). The *CorrectedPrice* field will be set to 0 for cancelled trades and to the new trade price for corrected trades. `Trade Cancel or Correct` can be sent for same day as well as previous day trades.

> **BOEv2 → BOEv3 Migration Note**
> The BOEv2 *CorrectedSize* field has been removed (as it is not modifiable by CFE).

4.2.12.1 *TradeCancelCorrectUSFuturesV1*

Field Name	Offset	Length	Data Type	Description
StartOfMessage	0	2	Binary	`B0 E3` (58288)
MessageLength	2	2	Binary	`66 00` (102)
MessageType	4	2	Binary	`E8 05` (1512)
MatchingUnit	6	1	Binary	The Matching Unit which created this message.
Reserved	7	1	Binary	Unspecified

SequenceNumber	8	4	Binary	The sequence number for this message. Distinct per Matching Unit
TransactionTime	12	8	DateTime	The time the event occurred in the CFE Matching Engine (not the time the message was sent).
ClOrdId	20	20	Text	The order which was executed.
ExecRefId	40	8	Binary	Refers to the *ExecId* of the fill being cancelled or corrected.
Side	48	1	Text	1 = Buy 2 = Sell
BaseLiquidityIndicator	49	1	Text	Indicates whether the trade added or removed liquidity. A = Added Liquidity R = Removed Liquidity C = Market opening / re-opening trade
ClearingFirm	50	4	Alpha	EFID that will clear the trade. **Port attribute value of 'Default EFID' is used if not provided.** Sent to OCC in Exec Broker field.
ClearingAccount	54	4	Alpha	Supplemental identifier. Recorded and made available in execution reports. Available via Drop feeds. This field can be blank or populated with an optional four character string. This field is not sent to the OCC.
LastShares	58	4	Binary	Executed contracts quantity.
LastPx	62	8	BinaryPrice	Price of this fill. Note the use *of Price* type to represent positive and negative prices, which can occur with spread instruments.
CorrectedPrice	70	8	BinaryPrice	For trade corrections, this is the new trade price. For trade breaks, this is set to 0.
OrigTime	78	8	DateTime	The date and time of the original trade, in GMT.
Symbol	86	8	Alphanumeric	CFE native identifier of the instrument
Capacity	94	1	Text	C = Customer F = Firm The Capacity refers to the OCC account type. A value of "C" denotes an account that clears in the Customer range at OCC. A value of "F" denotes an account that clears in the Clearing Firm range at OCC.

MaturityDate	95	4	Date	Maturity date of the instrument
OpenClose	99	1	Text	Indicates status of client position in a trade resulting from the order. `O` = Open `C` = Close `N` = None `NUL (0x00)` = None
CMTANumber	100	4	Binary	CMTA Number of the firm that will clear the trade. Must be specified for CMTA orders and left unspecified for non-CMTA orders. Sent to the OCC in the CMTA CM# field.

(New fields may be introduced at the end of this message. Consequently, TPHs must treat any additional bytes present as undefined values.)

4.2.13 **TAS Restatement**

A `TAS Restatement` is sent post-settlement time for each TAS (*e.g.*, VXT, VXMT, IBHYT, IBIGT) execution during the associated business day to communicate the updated Price and Symbol associated with the cleared execution. `TAS Restatement` messages are sent shortly after the VX and VXM contract settlement prices are disseminated.

> **BOEv2 → BOEv3 Migration Note**
> Many optional fields supported in BOEv2 for this message type are not included in the BOEv3 message. Fields no longer included on the `TAS Restatement` message are: *OrdType, TimeInForce, MinQty, Capacity, Account, ClearingFirm, ClearingAccount, PreventMatch, MaturityDate, OpenClose, OrigClOrdId, StopPx,CmtaNumber, CritCode, ManualOrderIndicator, OEOID, FrequentTraderId, CustOrderHandlingType.*

4.2.13.1 ***TASRestatementUSFuturesV1***

Field Name	Offset	Length	Data Type	Description
StartOfMessage	0	2	Binary	`B0 E3` (58288)
MessageLength	2	2	Binary	`72 00` (114)
MessageType	4	2	Binary	`E9 05` (1513)
MatchingUnit	6	1	Binary	The Matching Unit which created this message.
Reserved	7	1	Binary	Unspecified
SequenceNumber	8	4	Binary	The sequence number for this message. Distinct per Matching Unit
TransactionTime	12	8	DateTime	The time the event occurred in the CFE Matching Engine (not the time the message was sent).
ClOrdId	20	20	Text	The order being restated

ClearingFirm	40	4	Alpha	EFID that will clear the trade. **Port attribute value of 'Default EFID' is used if not provided.** Sent to OCC in Exec Broker field.
ExecId	44	8	Binary	Sent to the OCC in the Trade Id field. Execution Id. Unique across all matching units on a given day. Note: ExecIds will be represented on ODROP and FIXDROP ports as base 36 ASCII.
Side	52	1	Text	1 = Buy 2 = Sell
Price	53	8	BinaryPrice	Limit price of the order.
Symbol	61	8	Alphanumeric	CFE native identifier of the instrument
MaturityDate	69	4	Date	Maturity date of the instrument
LastShares	73	4	Binary	Executed contracts quantity.
LastPx	77	8	BinaryPrice	Price of this fill. Note the use *of Price* type to represent positive and negative prices, which can occur with spread instruments.
FeeCode	85	2	Alphanumeric	Indicates fee associated with an execution. Fee codes are published in the pricing schedule. New fee codes may be sent with little or no notice. TPHs are encouraged to code their systems to accept unknown fee codes.
TradeDate	87	4	Date	Business date of the execution. Note that on CFE, business date is not always the same as the calendar date. For example, the VX/VT products open for trading on the calendar day prior to the associated business date. Executions that occur after the open and before midnight will have a *TradeDate* value that is not the same as the calendar date of the execution.
ClearingPrice	91	8	BinaryPrice	Price as sent to clearing after applying post-close conversions to the original *LastPx* value.
ClearingSymbol	99	8	Alphanumeric	Symbol as sent to clearing; after applying post-close conversions to the original *Symbol*.
MultilegReportingType	107	1	Text	Present on `Order Execution`, `TAS Restatement` and `Variance Restatement` messages representing

				either Spread orders or Simple orders that are part Spread execution. 1 = Simple instrument execution 2 = Simple instrument execution that is part of a Spread execution 3 = Spread instrument execution
SecondaryExecId	108	8	Binary	Field indicates whether an execution is a spread or a simple instrument execution that is part of a spread trade. • If *SecondaryExecId* field is not present, the execution is a simple instrument execution only. • If *SecondaryExecId* is present and is the same as the *ExecId* required field, the execution represents a spread execution for which associated simple instrument executions will follow. Simple instrument executions associated with a spread execution will contain a *SecondaryExecId* value that matches the *ExecId* of the associated spread execution.

(New fields may be introduced at the end of this message. Consequently, TPHs must treat any additional bytes present as undefined values.)

4.2.14 **Variance Restatement**

A `Variance Restatement` is sent post-settlement time for each VA and VAO execution during the associated business day to communicate updated Price, Size and Symbol associated with the cleared execution. `Variance Restatement` messages are sent shortly after the S&P 500 index settlement price is received (around 4:00 p.m. CT).

4.2.14.1 ***VarianceRestatementUSFuturesV1***

Field Name	Offset	Length	Data Type	Description
StartOfMessage	0	2	Binary	`B0 E3` (58288)
MessageLength	2	2	Binary	`76 00` (118)
MessageType	4	2	Binary	`EA 05` (1514)
MatchingUnit	6	1	Binary	The Matching Unit which created this message.
Reserved	7	1	Binary	Unspecified
SequenceNumber	8	4	Binary	The sequence number for this message. Distinct per Matching Unit
TransactionTime	12	8	DateTime	The time the event occurred in the CFE Matching Engine (not the time the message was sent).

ClOrdId	20	20	Text	The order being restated
ClearingFirm	40	4	Alpha	EFID that will clear the trade. **Port attribute value of 'Default EFID' is used if not provided.** Sent to OCC in Exec Broker field.
ExecId	44	8	Binary	Sent to the OCC in the Trade Id field. Execution Id. Unique across all matching units on a given day. Note: ExecIds will be represented on ODROP and FIXDROP ports as base 36 ASCII.
Side	52	1	Text	1 = Buy 2 = Sell
Price	53	8	BinaryPrice	Limit price of the order.
Symbol	61	8	Alphanumeric	CFE native identifier of the instrument
MaturityDate	69	4	Date	Maturity date of the instrument
LastShares	73	4	Binary	Executed contracts quantity.
LastPx	77	8	BinaryPrice	Price of this fill. Note the use *of Price* type to represent positive and negative prices, which can occur with spread instruments.
FeeCode	85	2	Alphanumeric	Indicates fee associated with an execution. Fee codes are published in the pricing schedule. New fee codes may be sent with little or no notice. TPHs are encouraged to code their systems to accept unknown fee codes.
TradeDate	87	4	Date	Business date of the execution. Note that on CFE, business date is not always the same as the calendar date. For example, the VX/VT products open for trading on the calendar day prior to the associated business date. Executions that occur after the open and before midnight will have a *TradeDate* value that is not the same as the calendar date of the execution.
ClearingPrice	91	8	BinaryPrice	Price as sent to clearing after applying post-close conversions to the original *LastPx* value.
ClearingSize	99	4	Binary	Size to clear with OCC. Same value as *LastShares*, except in VA and VAO where *ClearingSize* is 0 on execution, and the converted clearing size on restatement.

ClearingSymbol	103	8	Alphanumeric	Symbol as sent to clearing; after applying post-close conversions to the original *Symbol*.
MultilegReportingType	111	1	Text	Present on `Order Execution`, `TAS Restatement` and `Variance Restatement` messages representing either Spread orders or Simple orders that are part Spread execution. 1 = Simple instrument execution 2 = Simple instrument execution that is part of a Spread execution 3 = Spread instrument execution
SecondaryExecId	112	8	Binary	Field indicates whether an execution is a spread or a simple instrument execution that is part of a spread trade. • If *SecondaryExecId* field is not present, the execution is a simple instrument execution only. • If *SecondaryExecId* is present and is the same as the *ExecId* required field, the execution represents a spread execution for which associated simple instrument executions will follow. Simple instrument executions associated with a spread execution will contain a *SecondaryExecId* value that matches the *ExecId* of the associated spread execution.

(New fields may be introduced at the end of this message. Consequently, TPHs must treat any additional bytes present as undefined values.)

4.2.15 **Quote Update Acknowledgement**

`Quote Update Acknowledgment` messages are sent in response to a `Quote Update` message. The effect of each requested update will be found in this response. The ordering between request and response is preserved.

For quotes which are priced at an executable price and which may remove liquidity, a *QuoteResult* reason of “D” or “d” will be provided. In these cases, executions or cancellations (as needed) will immediately follow as additional messages. In some cases, an execution may not be permitted (e.g., risk management causes cancellation of the targeted order before execution), no additional messages will follow and the quote will post.

In some cases, a new *OrderId* will be assigned for an existing quote. There are currently two situations where this occurs, but others may be added in the future:

1. A quote which has received a large number of quote updates over its life will be assigned a new *OrderId* if receiving an update which would cause a loss in priority.
2. A quote update which has had an update to an attribute other than price or size.

If using the *OrderId* in your system or to correlate with an *OrderId* on PITCH, always be prepared to receive an update on a `Quote Update Acknowledgment`.

BOEv2 → BOEv3 Migration Note
The BOEv2 *QuoteRejectReason* field is no longer present under BOEv3 since all rejects of entire quote blocks are reported via the `Quote Update Rejected` message.

4.2.15.1 ***QuoteUpdateAcknowledgementUSFuturesV1***

Field Name	Offset	Length	Data Type	Description
StartOfMessage	0	2	Binary	`B0 E3` (58288)
MessageLength	2	2	Binary	(43 + QuoteCnt*10)
MessageType	4	2	Binary	`EB 05` (1515)
MatchingUnit	6	1	Binary	Always zero (since it is unsequenced)
Reserved	7	1	Binary	Unspecified
SequenceNumber	8	4	Binary	Always zero (unsequenced)
TransactionTime	12	8	DateTime	The time the event occurred in the CFE Matching Engine (not the time the message was sent).
QuoteUpdateId	20	16	Text	Echoed back from the TPH message
RequestReceivedTime	36	8	DateTime	The earliest timestamp, populated with nanosecond precision, recorded by CFE of the corresponding inbound message being acknowledged. Populated with zero in event of failover to Port B or Port C.
QuoteCnt	44	1	Binary	Number of repeating groups included in this message. Allowed values are 1-20.
→ *OrderId*	45	8	Binary	Order identifier supplied by CFE. This identifier corresponds to the identifiers used in CFE market data products. Sent to the OCC in the Exchange Data field.
→ *QuoteResult*	53	1	Text	Result of the quote request. *Acceptance:* A = New Quote L = Modified; loss of priority R = Modified; retains priority (size reduction) N = No change, matches existing quote

				D = New Quote, but may remove liquidity d = Modified, but may remove liquidity *Cancellation:* U = User cancelled (zero size/price requested) *Rejection:* a = Admin P = Rejected, can't post f = Risk management EFID or Custom Group Id level S = Rejected, symbol not found p = Rejected, invalid price s = Risk management product root level n = Risk management configuration is insuffcient u = Rejected, other reason
→ *SubLiquidityIndicator*	54	1	Text	Additional information about the liquidity of an order. CFE may add additional values without notice. TPHs must gracefully ignore unknown values. `NULL (0x00)` = No Additional Information C = Carried Order Indicator U = Qualifying Market Turner order

4.2.16 **Quote Update Rejected**

`Quote Update Rejected` messages are sent in response to a `Quote Update` message when the entire quote block is rejected by the order handler. No existing quotes are updated or cancelled as a result.

4.2.16.1 ***QuoteUpdateRejectedUSFuturesV1***

Field Name	Offset	Length	Data Type	Description
StartOfMessage	0	2	Binary	`B0 E3` (58288)
MessageLength	2	2	Binary	`23 00` (35)
MessageType	4	2	Binary	`EC 05` (1516)
MatchingUnit	6	1	Binary	Always zero (since it is unsequenced)
Reserved	7	1	Binary	Unspecified
SequenceNumber	8	4	Binary	Always zero (unsequenced)
TransactionTime	12	8	DateTime	The time the event occurred in the CFE Matching Engine (not the time the message was sent).

QuoteUpdateId	20	16	Text	Echoed back from the TPH message
QuoteRejectReason	36	1	Text	See Section '5.2 - Quote Reason Codes'

(New fields may be introduced at the end of this message. Consequently, TPHs must treat any additional bytes present as undefined values.)

4.2.17 **Quote Restated**

`Quote Restated` messages are sent to inform the TPH that an order has been asynchronously modified for some reason by CFE. Additional reasons may be added in the future.

In the case where an inbound quote will execute against a resting order or quote, then a `Quote Restated` message will be sent after the `Quote Update Acknowledgement` as a function of normal system behavior. These restatements will contain the *RestatementReason* of "Q = Liquidity".

4.2.17.1 ***QuoteRestatedUSFuturesV1***

Field Name	Offset	Length	Data Type	Description
StartOfMessage	0	2	Binary	`B0 E3` (58288)
MessageLength	2	2	Binary	`3E 00` (62)
MessageType	4	2	Binary	`ED 05` (1517)
MatchingUnit	6	1	Binary	The Matching Unit which created this message.
Reserved	7	1	Binary	Unspecified
SequenceNumber	8	4	Binary	The sequence number for this message. Distinct per Matching Unit
TransactionTime	12	8	DateTime	The time the event occurred in the CFE Matching Engine (not the time the message was sent).
QuoteUpdateId	20	16	Text	Id chosen by the client. Characters in the ASCII range 33-126 are allowed, except for comma, semicolon, and pipe. All quote response messages will include this identifier. Note: CFE only enforces uniqueness of *QuoteUpdateId* values among those not yet acknowledged by the ME. However, we strongly recommend that you keep your *QuoteUpdateId* values unique for a trading day.
OrderId	36	8	Binary	Order identifier supplied by CFE. This identifier corresponds to the identifiers used in CFE market data products. Sent to the OCC in the Exchange Data field.

LeavesQty	44	4	Binary	Quantity still open for further execution. If zero, the order is complete.
WorkingPrice	48	8	BinaryPrice	The price at which the quote is working on the order book.
QuoteSymbol	56	6	Alphanumeric	CFE native identifier of the instrument being quoted.
Side	62	1	Text	`1` = Buy `2` = Sell
RestatementReason	63	1	Text	The reason for this Quote Restated message. `Q` = Liquidity `W` = Wash CFE reserves the right to add new values as necessary without prior notice.

(New fields may be introduced at the end of this message. Consequently, TPHs must treat any additional bytes present as undefined values.)

4.2.18 **Quote Execution**

A `Quote Execution` message is used to indicate an execution has occurred on a resting quote.

4.2.18.1 ***QuoteExecutionUSFuturesV1***

Field Name	Offset	Length	Data Type	Description
StartOfMessage	0	2	Binary	`B0 E3` (58288)
MessageLength	2	2	Binary	`51 00` (81)
MessageType	4	2	Binary	`EE 05` (1518)
MatchingUnit	6	1	Binary	The Matching Unit which created this message.
Reserved	7	1	Binary	Unspecified
SequenceNumber	8	4	Binary	The sequence number for this message. Distinct per Matching Unit
TransactionTime	12	8	DateTime	The time the event occurred in the CFE Matching Engine (not the time the message was sent).
QuoteUpdateId	20	16	Text	Echoed back from the most recent Quote Update request for this quote.
OrderId	36	8	Binary	Order identifier supplied by CFE. This identifier corresponds to the identifiers used in CFE market data products. Sent to the OCC in the Exchange Data field.
ExecId	44	8	Binary	Sent to the OCC in the Trade Id field.

				Execution Id. Unique across all matching units on a given day. Note: ExecIds will be represented on ODROP and FIXDROP ports as base 36 ASCII.
QuoteSymbol	52	6	Alphanumeric	Echoed back from the TPH message
ClearingFirm	58	4	Alpha	EFID that will clear the trade. **Port attribute value of 'Default EFID' is used if not provided.** Sent to OCC in Exec Broker field.
LastShares	62	4	Binary	Executed contracts quantity.
LastPx	66	8	BinaryPrice	Price of this fill. Note the use *of Price* type to represent positive and negative prices, which can occur with spread instruments.
LeavesQty	74	4	Binary	Quantity still open for further execution. If zero, the order is complete.
Side	78	1	Text	Echoed back from the TPH message
BaseLiquidityIndicator	79	1	Text	Indicates whether the trade added or removed liquidity. A = Added Liquidity R = Removed Liquidity C = Market opening / re-opening trade
SubLiquidityIndicator	80	1	Text	Additional information about the liquidity of an order. CFE may add additional values without notice. TPHs must gracefully ignore unknown values. NULL (0x00) = No Additional Information C = Carried Order Indicator U = Qualifying Market Turner order
FeeCode	81	2	Alphanumeric	Indicates fee associated with an execution. Fee codes are published in the pricing schedule. New fee codes may be sent with little or no notice. TPHs are encouraged to code their systems to accept unknown fee codes.

(New fields may be introduced at the end of this message. Consequently, TPHs must treat any additional bytes present as undefined values.)

4.2.19 **Quote Cancelled**

A `Quote Cancelled` message will be sent to indicate an unsolicited cancellation of a quote entered with a `Quote Update` message. An unsolicited cancellation is used, for example, when a resting quote is cancelled due to MTP with an inbound order or quotes are being cancelled due to a risk trip.

4.2.19.1 *QuoteCancelledUSFuturesV1*

Field Name	Offset	Length	Data Type	Description
StartOfMessage	0	2	Binary	`B0 E3` (58288)
MessageLength	2	2	Binary	`32 00` (50)
MessageType	4	2	Binary	`EF 05` (1519)
MatchingUnit	6	1	Binary	Always zero (since it is unsequenced)
Reserved	7	1	Binary	Unspecified
SequenceNumber	8	4	Binary	The sequence number for this message. Distinct per Matching Unit
TransactionTime	12	8	DateTime	The time the event occurred in the CFE Matching Engine (not the time the message was sent).
QuoteUpdateId	20	16	Text	Echoed back from the most recent `Quote Update` request for this quote.
OrderId	36	8	Binary	Order identifier supplied by CFE. This identifier corresponds to the identifiers used in CFE market data products. Sent to the OCC in the Exchange Data field.
QuoteSymbol	44	6	Alphanumeric	CFE native identifier of the instrument being quoted.
Side	50	1	Text	1 = Buy 2 = Sell
CancelReason	51	1	Text	See Section '5 - Reason Codes' (pg.92)

(New fields may be introduced at the end of this message. Consequently, TPHs must treat any additional bytes present as undefined values.)

4.2.20 TAS Quote Restatement

A `TAS Quote Restatement` is sent post-settlement time for each TAS (VXT, VXMT) quote execution during the associated business day to communicate the updated Price and Symbol associated with the cleared execution. `TAS Quote Restatement` messages are sent shortly after the VX, VXMT contract settlement prices are disseminated (shortly after 3:15 p.m. CT).

4.2.20.1 *TASQuoteRestatementUSFuturesV1*

Field Name	Offset	Length	Dta Type	Description
StartOfMessage	0	2	Binary	`B0 E3` (58288)
MessageLength	2	2	Binary	`40 00` (64)
MessageType	4	2	Binary	`F0 05` (1520)
MatchingUnit	6	1	Binary	The Matching Unit which created this message.
Reserved	7	1	Binary	Unspecified

SequenceNumber	8	4	Binary	The sequence number for this message. Distinct per Matching Unit
TransactionTime	12	8	DateTime	The time the event occurred in the CFE Matching Engine (not the time the message was sent).
QuoteUpdateId	20	16	Text	The quote being restated
ExecId	36	8	Binary	Sent to the OCC in the Trade Id field. Execution Id. Unique across all matching units on a given day. Note: ExecIds will be represented on ODROP and FIXDROP ports as base 36 ASCII.
QuoteSymbol	44	6	Alphanumeric	CFE native identifier of the instrument being quoted.
ClearingSymbol	50	8	Alphanumeric	Symbol as sent to clearing; after applying post-close conversions to the original *Symbol*.
ClearingPrice	58	8	BinaryPrice	Price as sent to clearing after applying post-close conversions to the original *LastPx* value.

(New fields may be introduced at the end of this message. Consequently, TPHs must treat any additional bytes present as undefined values.)

4.2.21 **Variance Quote Restatement**

A `Variance Quote Restatement` is sent post-settlement time for each VA and VAO execution during the associated business day to communicate updated *Price*, *Size*, and *Symbol* values associated with the cleared execution. `Variance Restatement` messages are sent shortly after the S&P 500 index settlement price is received (4:00 p.m. CT).

> **BOEv2 → BOEv3 Migration Note**
> Many optional fields supported in BOEv2 for this message type are not included in the BOEv3 message. The only fields optionally present under BOEv2 which are included in the BOEv3 message are *ClearingPrice*, *ClearingSize*, and *ClearingSymbol*..

4.2.21.1 ***VarianceQuoteRestatementUSFuturesV1***

Field Name	Offset	Length	Data Type	Description
StartOfMessage	0	2	Binary	`B0 E3` (58288)
MessageLength	2	2	Binary	`44 00` (68)
MessageType	4	2	Binary	`F1 05` (1521)
MatchingUnit	6	1	Binary	Must be zero
Reserved	7	1	Binary	Unspecified
SequenceNumber	8	4	Binary	The sequence number for this message

TransactionTime	12	8	DateTime	The time the event occurred in the CFE Matching Engine (not the time the message was sent).
QuoteUpdateId	20	16	Text	The quote being restated
ExecId	36	8	Binary	Sent to the OCC in the Trade Id field. Execution Id. Unique across all matching units on a given day. Note: ExecIds will be represented on ODROP and FIXDROP ports as base 36 ASCII.
QuoteSymbol	44	6	Alphanumeric	CFE native identifier of the instrument being quoted.
ClearingSymbol	50	8	Alphanumeric	Symbol as sent to clearing; after applying post-close conversions to the original *Symbol*.
ClearingPrice	58	8	BinaryPrice	Price as sent to clearing after applying post-close conversions to the original *LastPx* value.
ClearingSize	66	4	Binary	Size to clear with OCC. Same value as *LastShares*, except in VA and VAO where *ClearingSize* is 0 on execution, and the converted clearing size on restatement.

(New fields may be introduced at the end of this message. Consequently, TPHs must treat any additional bytes present as undefined values.)

4.2.22 **Reset Risk Acknowledgement**

Response to a `Reset Risk` request.

4.2.22.1 ***ResetRiskAcknowledgementUSFuturesV1***

Field Name	Offset	Length	Data Type	Description
StartOfMessage	0	2	Binary	`B0 E3` (58288)
MessageLength	2	2	Binary	`23 00` (35)
MessageType	4	2	Binary	`F2 05` (1522)
MatchingUnit	6	1	Binary	Always zero (since it is unsequenced)
Reserved	7	1	Binary	Unspecified
SequenceNumber	8	4	Binary	Always zero (unsequenced)
RiskStatusId	12	16	Text	Unique identifier for this Reset Risk request. Response message will have this corresponding identifier. **Note: CFE only enforces uniqueness of *RiskStatusId* values among currently unacknowledged requests. However,**

				we strongly recommend that you keep your *RiskStatusId* values day-unique.
RiskResetResult	28	1	Text	<space> = Ignored; exceeds 1 reset per second Y = Success F = Rejected; exceeds firm reset limit C = Rejected; exceeds Custom Group Id limit E = Rejected; empty *ResetRisk* field I = Rejected; Incorrect data center S = Rejected; exceeds product level reset limit U = Rejected; invalid *RiskRoot* c = Rejected; invalid EFID/ClearingFirm y = Rejected; in replay Additional reject values may be added in the future without notice.
RequestReceivedTime	29	8	DateTime	The earliest timestamp, populated with nanosecond precision, recorded by CFE of the corresponding inbound message being acknowledged. Populated with zero in event of failover to Port B or Port C.

(New fields may be introduced at the end of this message. Consequently, TPHs must treat any additional bytes present as undefined values.)

4.3 Application Message Fields

TagField Name	FIX Field Name	Length	Type	Description
Account	1	16	Alphanumeric	Unique account identifier associated with an order. This field will be reflected back on execution reports associated with this order. The first 10 characters are sent to the OCC in the Account # field. The entire 16 character string will appear in the optional CM Data field. Valid characters include ASCII 32-126.

BaseLiquidityIndicator	9730	1	Alphanumeric	Indicates whether the trade added or removed liquidity. A = Added Liquidity R = Removed Liquidity C = Market opening / re-opening trade
CancelledOrderCount	7696	4	Binary	Number of orders cancelled.
CancelOrigOnReject	9619	1	Alpha	N = Leave original order alone. Y = Cancel original order if modification fails.
CancelReason	58*	1	Text	See Section '5 - Reason Codes' (pg.93)
CancelRejectReason	58*	1	Text	See Section '5 - Reason Codes' (pg.93)
Capacity	47	1	Alphanumeric	C = Customer F = Firm The Capacity refers to the OCC account type. A value of "C" denotes an account that clears in the Customer range at OCC. A value of "F" denotes an account that clears in the Clearing Firm range at OCC.
ClearingAccount	440	4	Alphanumeric	Supplemental identifier. Recorded and made available in execution reports. Available via Drop feeds. This field can be blank or populated with an optional four character string. This field is not sent to the OCC.
ClearingFirm	115	4	Alpha	EFID that will clear the trade. **Port attribute value of 'Default EFID' is used if not provided.** Sent to OCC in Exec Broker field.
ClearingPrice	21050	8	BinaryPrice	Price as sent to clearing after applying post-close conversions to the original *LastPx* value.
ClearingSize	21051	4	Binary	Size to clear with OCC. Same value as *LastShares*, except in VA and VAO where *ClearingSize* is 0 on

				execution, and the converted clearing size on restatement.
ClearingSymbol	21053	8	Alphanumeric	Symbol as sent to clearing; after applying post-close conversions to the original *Symbol*.
ClOrdId	11	20	Text	Unique Id chosen by the client. Characters in the ASCII range 33-126 are allowed, except for **comma, semicolon,** and **pipe**. If the ClOrdId matches a live order, the order will be rejected as duplicate. A leading **tilde** (~) cannot be sent on any *ClOrdId* and will result in a reject. These are reserved for internal use by CFE and could be received as a result of a CFE-generated *ClordId*. Sent to the OCC in the OrderId field. **Note: CFE only enforces uniqueness of *ClOrdId* values among currently live orders, which includes long-lived GTC and GTD orders. However, using unique *ClOrdId* values is strongly recommend.**
CMTANumber	439	4	Binary	CMTA Number of the firm that will clear the trade. Must be specified for CMTA orders and left unspecified for non-CMTA orders. Sent to the OCC in the CMTA CM# field.
CorrectedPrice	9620	8	BinaryPrice	For trade corrections, this is the new trade price. For trade breaks, this is set to 0.
CustomGroupID	7699	2	Binary	Used to group orders for use in mass cancels where multiple orders can be cancelled by specifying a list of *CustomGroupId*s. A zero value is treated as “no CustomGroupIds”.
CtiCode	9702	1	Alphanumeric	Valid values: 1, 2, 3, 4 1 = CTI 1: Transactions initiated and executed by an individual TPH for the TPH’s own

				account, for an account the TPH controls, or for the account in which the TPH has an ownership or financial interest. 2 = CTI 2: Transactions executed for the proprietary account of a clearing TPH or non-clearing TPH. 3 = CTI 3: Transactions where an individual TPH or authorized trader executes for the personal account of another individual TPH, for an account the other individual TPH controls or for an account in which the other individual TPH has an ownership or financial interest. 4 = CTI 4: Any transaction not meeting the definition of CTI 1, 2 or 3. (These should be non-TPH customer transactions).
CustomGroupIdCnt	7698	1	Binary	Number of repeating *CustomGroupId*'s included in this message.
CustOrderHandlingInst	1031	1	Alphanumeric	Execution source code provided during order entry to describe broker service. A default value can be set using the 'Default Customer Order Handling Instruction' port attribute. W = Desk (high touch) Y = Electronic C = Vendor-provided platform, billed by Executing Broker G = Sponsored Access via Exchange API or FIX, provided by executing broker H = Premium algorithmic trading provider, billed by executing broker D = Other, including other-provided screen

				NUL (0x00) = Apply port default (initially 'Y')
ExecId	17	8	Binary	Sent to the OCC in the Trade Id field. Execution Id. Unique across all matching units on a given day. Note: ExecIds will be represented on ODROP and FIXDROP ports as base 36 ASCII.*
ExecRefId	19	8	Binary	Refers to the *ExecId* of the fill being cancelled or corrected.
ExpireTime	424	8	DateTime	Required for *TimeInForce* = 6 orders, specifies the date-time (in UTC) that the order expires.
FeeCode	9882	2	Alphanumeric	Indicates fee associated with an execution. Fee codes are published in the pricing schedule. New fee codes may be sent with little or no notice. TPHs are encouraged to code their systems to accept unknown fee codes.
FrequentTraderId	21097	6	Alphanumeric	Supplemental customer identifier used for billing related programs.
LastPx	31	8	BinaryPrice	Price of this fill. Note the use *of Price* type to represent positive and negative prices, which can occur with spread instruments.
LastShares	32	4	Binary	Executed contracts quantity.
LeavesQty	151	4	Binary	Quantity still open for further execution. If zero, the order is complete.
ManualOrderIndicator	1028	1	Alpha	Y = Manual order entry N = Automated order entry
MassCancelId	7695	20	Text	User-defined identifier of the mass cancel or purge request.

* Example conversion:

Decimal	Base 36
28294005440239	A1234B567
76335905726621	R248BC23H
728557228187	09AP05V2Z

MassCancelInst	7700	16	Text	Corresponds to *MassCancelInst* (7700) in CFE FIX. Used for specification of `Purge Orders` functionality and optionally used for specification of Mass Cancel functionality associated with the `Cancel Order` message. At least one character must be provided (Clearing Firm Filter). Contiguous characters must be specified up to total length. Truncated/unspecified characters will default to values indicated (D) below. ***1st Character : Clearing Firm Filter*** A = No filtering by clearing firm relationship is performed. F = All orders that were sent under the clearing relationship specified in *ClearingFirm* optional field. If "F" specified and ClearingFirm not provided, the Mass Cancel or Purge request will be rejected. ***2nd Character : Acknowledgement Style*** M = (D) `Order Cancelled` messages are sent for each cancelled order. If "M" is set, any *MassCancelId* value is ignored. S = A single `Mass Cancel Acknowledgement` message is sent once all cancels have been processed. The *MassCancelId* optional field must be specified or the Mass Cancel or Purge Request will be rejected. B = Both individual `Order Cancelled` and `Mass Cancel Acknowledgement` messages will be sent. Also requires *MassCancelId* optional field to be specified or the Mass

				Cancel or Purge request will be rejected. ***3rd Character : Lockout Instruction*** N = (D) No lockout L = Lockout until corresponding Reset Risk received. Lockout can be used only with Clearing Firm Filter set to "F", otherwise the Mass Cancel or Purge request will be rejected. Lockout will apply to all `New Order`, `Quote Update`, and `Modify Order` messages for the *ClearingFirm* (and *ProductName* or *CustomGroupIds*, if specified), regardless of other filtering in the `Purge Orders` or `Cancel Order` message. ***4th Character : Instrument Type Filter*** B = (D) Cancel both Simple and Complex orders S = Cancel Simple orders only C = Cancel Spread orders only ***5th Character : GTC Order Filter*** C = (D) Cancel GTC and GTD orders P = Don't cancel (preserve) GTC and GTD orders If *ProductName* optional field is specified, it must contain a valid futures root symbol (e.g., "VX"), in which case only orders/quotes associated with the specified product will be cancelled. A self-imposed lockout can be released using the `Reset Risk` message. An appropriate reset is required to be sent for each lockout type in order to resume trading. For example, a product-level lockout requires a product-level reset. For more information, refer to the CFE Risk Management Specification.

MassCancelRejectReason	58*	1	Text	Reason for the mass cancel rejection. See Section '5 - Reason Codes' (pg.93).
MaturityDate	200, 205	4	Date	When specifying the *Symbol* for a `New Order` message the user can specify the mapped symbol identifier in the *Symbol* field. Alternatively, the product class (e.g., "VX", "VXT", etc.) can be supplied for the *Symbol* field and the *MaturityDate* field is used to specify the expiration date of the symbol within the specified product class. If a value is provided for *MaturityDate*, the *Symbol* field must correspond to a valid product or the order will be rejected with reason code C (Unknown Product Name). If an invalid *MaturityDate* is provided, the order will be rejected with reason code B (Unknown Maturity Date).
MinQty	110	4	Binary	Minimum fill quantity for IOC orders. Ignored for other Simple instrument orders. Not supported for Spread instruments. Spread instrument orders with specified *MinQty* will be rejected.
ModifyRejectReason	103	1	Text	See Section '5.1 - Order Reason Codes'
MultilegReportingType	442	1	Text	Present on `Order Execution`, `TAS Restatement` and `Variance Restatement` messages representing either Spread orders or Simple orders that are part Spread execution. 1 = Simple instrument execution 2 = Simple instrument execution that is part of a Spread execution 3 = Spread instrument execution

OEOID	25004	1	Alphanumeric	Identifies the Order Entry Operator responsible for this message. Min length 3, max length 18. Values in ASCII range 33-126 except comma, semicolon, and pipe are permissible.
OpenClose	77	1	Alphanumeric	Indicates status of client position in a trade resulting from the order. `O` = Open `C` = Close `N` = None `NUL (0x00)` = None
OrderId	37	8	Binary	Order identifier supplied by CFE. This identifier corresponds to the identifiers used in CFE market data products. Sent to the OCC in the Exchange Data field.
OrderQty	31		Binary	Order quantity. System limit is 999,999 contracts.
OrderRejectReason	103	1	Text	See Section '5.1 - Order Reason Codes'
OrdType	40	1	Alphanumeric	`1` = Market `2` = Limit (default) `4` = Stop Limit Market implies *TimeInForce* of IOC (3). Stop Limit orders must have a *TimeInForce* of DAY (0), GTC (1), or GTD (6).
OrigClOrdId	41	20	Text	The *ClOrdId* of the original order.
OrigTime	42	8	DateTime	The date and time of the original trade, in GMT.
PendingStatus		1	Text	Field is provided as a convenience to determine whether an `Order Execution` message is a preliminary notification representing a pending trade. The value 'P' indicates that the execution is associated with a product for which the `Order Execution` message is a

				preliminary notification of an execution and for which a post-settlement restatement will be sent. N = Not applicable P = Pending
PreventMatch	7928	3	Alpha	Three characters: ***1st character – MTP Modifier:*** N = Cancel Newest O = Cancel Oldest B = Cancel Both ***2nd character – Unique Id Level:*** F = Prevent Match at Firm(TPH) Level M = Prevent Match at EFID Level ***3rd character – Trading Group Id (optional):*** TPH specified alphanumeric value 0-9, A-Z, or a-z. The unique Id level (character 2) of both orders must match to prevent a trade. If specified on both orders, Trading Group Id (character 3) must match to prevent a trade. Note that in the event of a Spread order match with a Simple order, the Spread order will always be cancelled irrespective of the 1st character value.
Price	44	8	BinaryPrice	Limit price. Four implied decimal places. Required for limit orders (*OrdType* = 2). If specified on market order (*OrdType* = 1), the order will be rejected. Orders will be rejected if *Price* does not fall on the applicable minimum trading increment. For all contracts other than Trade at Settlement contracts, simple orders will be rejected if *Price* is less than or equal to zero, or greater than or equal to 100,000. For Trade

				at Settlement (TAS) contracts, simple orders will be rejected if *Price* is outside the price limits presented in the contract specification. Spread orders will be rejected if *Price* is outside the price limits implied by the spread instrument definition and constituent instrument min and max prices.
ProductName	55	6	Text	Used to specify product class (e.g., "VX", "VA", etc.) for `Purge Orders` and `Cancel Order` message cancel by product functionality. If an unrecognized *ProductName* is provided, the associated request will be rejected with reason code C (Unknown Product Name).
PurgeRejectReason	58*	1	Text	Reason for the purge rejection. See Section '5 - Reason Codes'
QuoteCnt	*n/a*	1	Binary	Number of repeating groups included in this message. Allowed values are 1-20.
QuoteRejectReason	*n/a*	1	Text	See Section '5.2 - Quote Reason Codes'
QuoteResult	*n/a*	1	Text	Result of the quote request. *Acceptance:* A = New Quote L = Modified; loss of priority R = Modified; retains priority (size reduction) N = No change, matches existing quote D = New Quote, but may remove liquidity d = Modified, but may remove liquidity *Cancellation:* U = User cancelled (zero size/price requested) *Rejection:* a = Admin

				P = Rejected, can't post f = Risk management EFID or Custom Group Id level S = Rejected, symbol not found p = Rejected, invalid price s = Risk management product root level n = Risk management configuration is insuffcient u = Rejected, other reason
QuoteSymbol	*55*	6	Alphanumeric	CFE native identifier of the instrument being quoted.
QuoteUpdateId	*n/a*	1	Text	Id chosen by the client. Characters in the ASCII range 33-126 are allowed, except for comma, semicolon, and pipe. All quote response messages will include this identifier. Note: CFE only enforces uniqueness of *QuoteUpdateId* values among those not yet acknowledged by the ME. However, we strongly recommend that you keep your *QuoteUpdateId* values unique for a trading day.
RequestReceivedTime	n/a	8	DateTime	The earliest timestamp, populated with nanosecond precision, recorded by CFE of the corresponding inbound message being acknowledged. Populated with zero in event of failover to Port B or Port C.
RestatementReason	n/a	1	Text	The reason for this Quote Restated message. Q = Liquidity W = Wash CFE reserves the right to add new values as necessary without prior notice.
RiskStatusId		16	Text	Unique identifier for this Reset Risk request. Response message will have this corresponding identifier.

				Note: CFE only enforces uniqueness of *RiskStatusId* values among currently unacknowledged requests. However, we strongly recommend that you keep your *RiskStatusId* values day-unique.
RiskReset	7692	8	Text	Single Character Values (Values may be combined) S = Product-level risk/lockout reset F = Firm-level lockout reset C = CustomGroupId lockout reset Values may be combined together to allow for resets of multiple risk trips or self-imposed lockouts in a single message. For example, “FS”, “SC”, “FC”, and “SFC” are all acceptable values. The characters may be combined in any order. For example, to “reset all” set this field to “SFC”, which is the equivalent to “CFS”. For more information, refer to the CFE US Futures Risk Management Specification.
RiskResetResult	n/a	1	Text	<space> = Ignored; exceeds 1 reset per second Y = Success F = Rejected; exceeds firm reset limit C = Rejected; exceeds Custom Group Id limit E = Rejected; empty *ResetRisk* field I = Rejected; Incorrect data center S = Rejected; exceeds product level reset limit U = Rejected; invalid *RiskRoot* c = Rejected; invalid EFID/ClearingFirm y = Rejected; in replay

				Additional reject values may be added in the future without notice.
SecondaryExecId	527	8	Binary	Field indicates whether an execution is a spread or a simple instrument execution that is part of a spread trade. • If *SecondaryExecId* field is not present, the execution is a simple instrument execution only. • If *SecondaryExecId* is present and is the same as the *ExecId* required field, the execution represents a spread execution for which associated simple instrument executions will follow. • Simple instrument executions associated with a spread execution will contain a *SecondaryExecId* value that matches the *ExecId* of the associated spread execution.
Side	54	1	Text	`1` = Buy `2` = Sell
SizeModifier		1	Text	Controls the behavior of the quote *OrderQty* field. Using "R" allows for a TPH to ensure that in-flight fills or cancels do not result in unwanted additional size exposure. `NULL (0x00)` = New quote size will be set to value of *OrderQty*. `R` = Reduce outstanding size of quote by the *OrderQty* provided. When using "R", if the resulting size is zero or negative, then the quote is cancelled. TPHs are expected to track the remaining quantity of each quote as resulting size is not included on the `Quote Update Acknowledgement` message.
StopPx	8	99	BinaryPrice	Stop price. Required if *OrdType* = 4 (Stop Limit). Stop Limit orders will

				only be triggered off Last Sale Eligible trades.
SubLiquidityIndicator	9730*	1	Text	Additional information about the liquidity of an order. CFE may add additional values without notice. TPHs must gracefully ignore unknown values. `NULL (0x00)` = No Additional Information `C` = Carried Order Indicator `U` = Qualifying Market Turner order
Symbol	55	8	Alphanumeric	Simple Instruments can be specified by providing the mapped symbol format in the *Symbol* field or by providing the product name (e.g., "VX") in the *Symbol* field and maturity date in the *MaturityDate* field. Responses to the TPH will contain the instrument specification in the manner that was provided on the associated new order specification (e.g., either Symbol Id or Product and MaturityDate). The *Symbol* field for Spread instrument related messages will always contain mapped symbol Id as product and maturity date does not completely specify the Spread instrument.
Text	58	60	Text	Human readable text with more information.
TimeInForce	59	1	Text	`0` = Day (Expires at the end of the business day). `1` = GTC (Good 'till Cancel. Order remains until cancelled or contract expires). `3` = IOC (Portion not filled immediately is cancelled. Market orders are implicitly IOC). `4` = FOK (An IOC where the entire size must be filled, else the order will be cancelled back).

				6 = GTD (Good 'till Date-Time Expires at the date-time specified in the *ExpireTime* field).
TradeDate	75	4	Date	Business date of the execution. Note that on CFE, business date is not always the same as the calendar date. For example, the VX/VT products open for trading on the calendar day prior to the associated business date. Executions that occur after the open and before midnight will have a *TradeDate* value that is not the same as the calendar date of the execution.
TransactionTime	60	8	DateTime	The time the event occurred in the CFE Matching Engine (not the time the message was sent).
WorkingPrice	*n/a*	8	BinaryPrice	The price at which the quote is working on the order book.

5 Reason Codes

5.1 Order Reason Codes

The following is a list of all reason codes used by CFE. These reason codes are used in a variety of contexts (order cancellations and order rejections). All reasons are not valid in all contexts. The reason code will be followed by free-form text. The specific text the system delivers may vary from the text listed below to provide clarification of the reject reason. CFE may add additional reason codes without notice. Members must gracefully ignore unknown values.

- `A` = Admin
- `B` = Unknown maturity date
- `C` = Unknown product name
- `D` = Duplicate identifier (e.g., ClOrdId)
- `H` = Halted
- `I` = Incorrect data center
- `K` = Order rate threshold exceeded
- `M` = Liquidity available exceeds order size
- `N` = Ran out of liquidity to execute against
- `O` = *ClOrdId* doesn't match a known order
- `P` = Can't modify an order that is pending
- `U` = User requested
- `V` = Would wash
- `X` = Order expired
- `Y` = Symbol not supported
- `Z` = Unforeseen reason
- `h` = Order persisted
- `f` = Risk management EFID level or custom group Id level
- `m` = Market access risk limit exceeded
- `n` = Risk management configuration is insufficient
- `o` = Max open orders count exceeded
- `s` = Risk management product level
- `y` = Order received by CFE during replay
- `z` = Session end

5.2 **Quote Reason Codes**

The following is a list of all quote reason codes used by CFE. All reasons are not valid in all contexts. The reason code will be followed by free-form text. The specific text the system delivers may vary from the text listed below to provide clarification of the reject reason. CFE may add additional reason codes without notice. Members must gracefully ignore unknown values.

- `C` = Invalid EFID (*ClearingFirm*)
- `D` = Invalid *WashId*
- `F` = Not enabled for quotes
- `I` = Incorrect data center
- `K` = Message rate threshold
- `L` = Invalid *QuoteCnt*
- `M` = Symbols not on same matching engine
- `O` = Invalid ManualOrderIndicator
- `Q` = Invalid *QuoteUpdateId*
- `R` = Futures root does not match across quotes
- `S` = Symbol not found
- `W` = Invalid *WashPreventType*
- `a` = Admin
- `c` = Invalid *Capacity*
- `e` = Invalid OEOID (Order Entry Operator ID)
- `f` = Risk management EFID or Custom Group Id level
- `i` = Invalid CtiCode
- `m` = Invalid *WashMethod*
- `n` = Exceedes max notional value per order
- `o` = Invalid Open/Close
- `p` = Risk management product level
- `r` = Invalid Remove
- `s` = Invalid *Side*
- `u` = Symbol range unreachable
- `x` = Exceedes max size per order
- `y` = Quote received by CFE during replay
- `z` = Invalid *SizeModifier*

6 Port Attributes

Attribute	Default	Description
Allowed Executing Firm Id(s)	All EFIDs	Executing Firm Id(s) allowed for trading on the port.
Default Executing Firm Id	None	Default Executing Firm Id to use if none is sent on a `New Order` or `Quote Update`.
Cancel on Disconnect	All	Cancels open orders upon order handler disconnect; both graceful and ungraceful. If Cancel On Disconnect is set, open orders in products that are not in Closed state at the time of the disconnect are cancelled. `All` = Cancel Day, GTC, and GTD orders `Day` = Cancel only Day orders `None` = Disabled BOE Unit Quoting ports require Cancel on Disconnect set to All or Day. Default will be used if not specified.
Cancel on Reject[1, 3]	No	Cancels an order upon a modify reject for that order.
Cancel on ME Disconnect	All	Controls whether orders are cancelled or preserved on a Matching Unit failover and provides for the ability to preserve GTC orders (Day). In any event, if a failover takes longer than 5 minutes, all orders are cancelled (including GTCs). `All` = Cancel Day, GTC, and GTD orders `Day` = Cancel only Day orders `None` = Disabled BOE Unit Quoting ports require Cancel on Disconnect set to All or Day. Default will be used if not specified.
Cancel Open Orders on DROP Port Disconnect	No	Only applicable if “Reject Orders on DROP Port Disconnect” has been enabled. When the last Standard FIX DROP port associated with an order handler session has disconnected, open orders, associated with the session are cancelled. `All` = Cancel Day, GTC, and GTD orders `Day` = Cancel only Day orders `None` = Disabled Note this parameter applies to Standard FIX DROP ports and not Order-By-Order DROP ports (ODROP).

Carried Order Restatements	Yes	If the Carried Order Restatements port attribute is set, `Order Acknowledgement` messages representing orders carried forward from the previous business date will be sent after the `Login Response` message and before regular session messages for each product. See 'Section 1.4.1 - Carried Order and Quote Restatements for a detailed description of Carried Order Restatements. Note that any changes made to any port attribute will not be enforced on carried GTC orders. Members who wish to apply updated port attributes to resting GTC orders must cancel those orders, and then resubmit them following the effective time of the port attribute change.
Default MTP Value†	None	Specifies default value for *PreventMatch*.
Default Customer Order Handling Instruction	Y = Electronic	Sets a default *CustOrderHandlingInst* (1031) that will be used unless overridden at the individual order level. `W` = Desk (high touch) `Y` = Electronic (default) `C` = Vendor-provided platform, billed by Executing Broker `G` = Sponsored Access via Exchange API or FIX, provided by executing broker `H` = Premium algorithmic trading provider, billed by executing broker `D` = Other, including other-provided screen
Maximum Order Size	25,000 contracts	A system-wide maximum order size limit that is set by the CFE. TPHs may not request a change to this port attribute.
Reject Orders on DROP Port Disconnect	No	Allows TPH/Sponsoring Firms to associate DROP port(s) to order entry port(s). If all associated DROP ports experience disconnection, new orders will be rejected until at least one DROP port session has been reestablished.
Reject Orders on DROP Port Timeout(s)	30 seconds	Only applicable if "Reject Orders on DROP Port Disconnect" has been enabled. When the last associated DROP port has disconnected, begin rejecting orders on the associated order entry

† Port attributes can be overridden on an order-by-order basis
[2] Requires certification
[3] Not applicable for quotes

		port(s) if a DROP session has not been reestablished within this timeout. Minimum value allowed is 0 seconds.
Port Message Rate Threshold	Default and Max allowed = 3,000 msgs/sec for order ports, 10,000 for quote ports. 10 msg/sec for CFE test products.	The maximum allowed message rate on the session. When the first non-administrative message is received, a one second window begins. For example, on an order port during a second no more than 2,999 additional non-administrative messages will be allowed within that window. If the rate is exceeded all new orders in the time window are rejected, modifies are treated as cancels, and cancels are processed. Unit Quote ports will have a default limit of 10,000 messages per second. A message is defined as any individual quote or any order-related message (new, modify, or cancel). If the limit is exceeded on a quote port the behavior for orders described above applies, and all `Quote Update` messages will be rejected unless the `Quote Update` message contains only cancels.

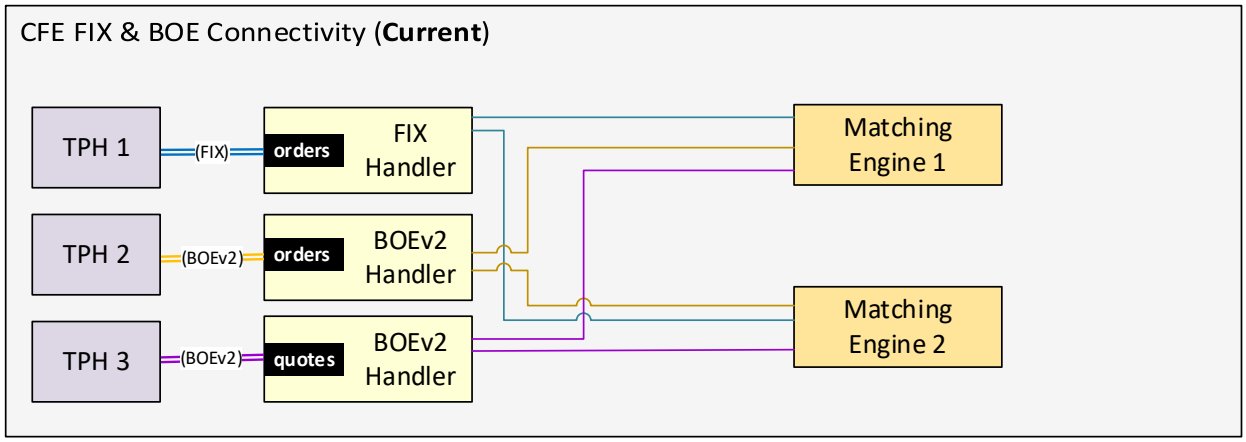
7 Support

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

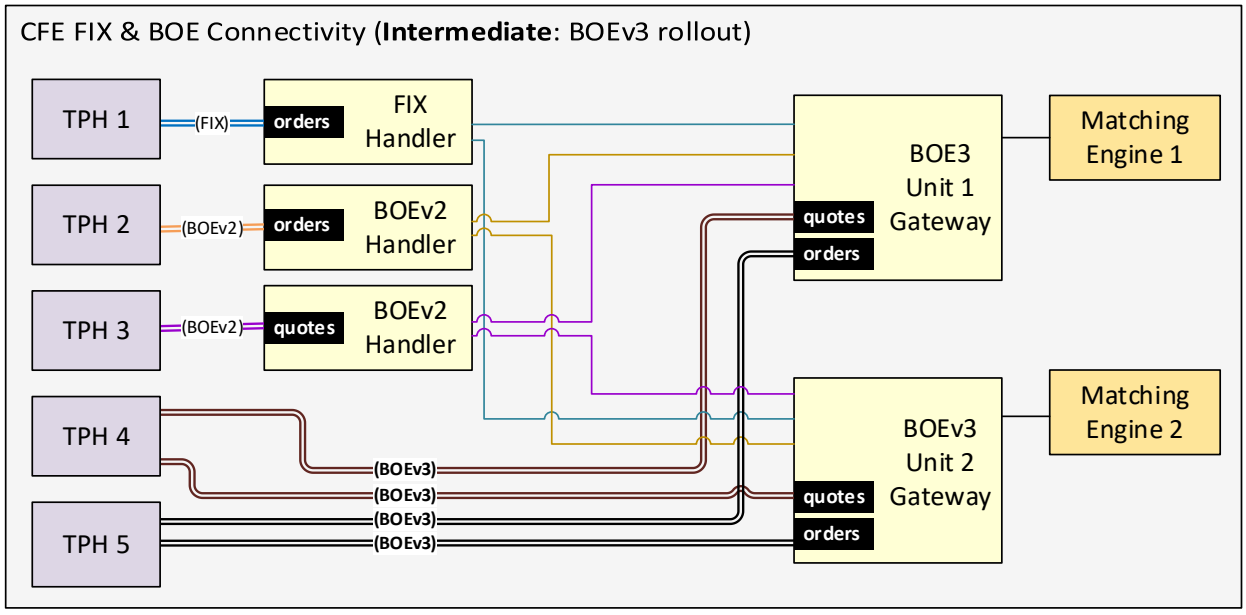
Appendix A: Architectural Diagrams

Cboe is providing the following architectural diagrams to assist TPHs in better understanding how messages will flow through the CFE system at the various stages of BOEv3 rollout. The lines in the diagrams indicate message flow only and are not intended to accurately depict physical cabling distances. All physical customer connections are latency equalized and internal physical connections use equidistant cable lengths.

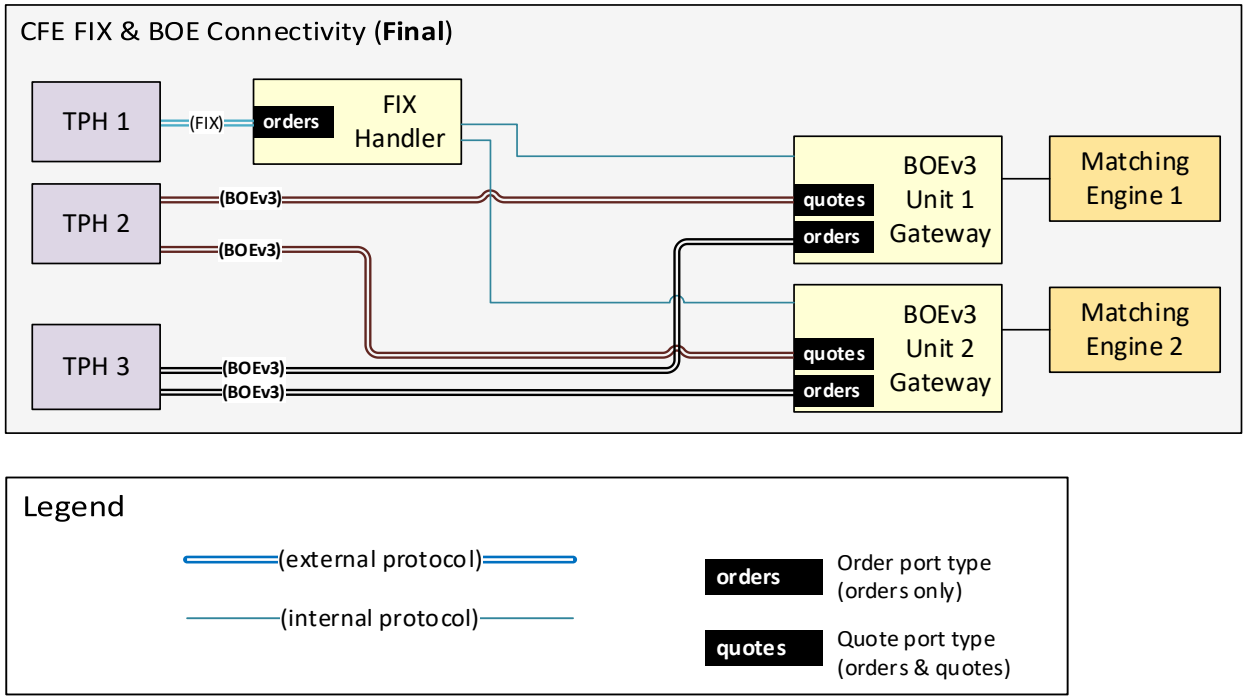
A.1 Current Architecture



A.2 Intermediate Architecture (after BOEv3 initial production release)



A.3 Final State (after BOEv2 decommissioned)



Revision History

Document Version	Date	Description
0.1.0	09/28/2020	First draft for general circulation
0.1.1	10/07/2020	Minor changes from internal review
1.0.0	02/04/2021	Initial version for publication.
1.0.1	02/22/2021	Corrected section 1.4.6.3 to indicate that BOE Unit Purge Ports support both `Purge Orders` and `Risk Reset` message types.
1.0.2	03/03/21	Corrected description for *MessageLength* on `Login Request` message. Corrected offsets on `Quote Update` message. Added *ClearingFirm* field to `TAS Restatement` message. Populated *Side* field offset value on `Variance Restatement` message.
1.0.3	03/11/21	Added 'n' rejection in *QuoteResult* field.
1.0.4	04/22/21	Updated section 1.1.1 with item 14 which identifies BOEv3 requirement for non-zero sequence numbers for sequenced messages sent from TPH to CFE. Corrected section 5.1 by removing 'J' from Order Reason Code list as this value was included in error. Corrected section 5.2 to indicate value for Invalid CtiCode is 'i'.
1.0.5	05/10/21	Clarified language around overlapping modifies in the Modify Order section. Additional language added to describe that *RequestReceivedTime* will be zero in failover scenarios. Fixed numbering of Appendix sections.
1.0.6	05/21/21	Updated *OpenClose* and *CustOrderHandlingInst* field descriptions to address treatment of NUL value.