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CHICAGO BOARD OPTIONS EXCHANGE

CBOE Application Programming Interface

CBOE FIX 4.2 Version 2.5 Release Notes

Provides an overview to the major changes to the FIX 4.2 Service in the next release of the CMi

CBOE PROPRIETARY INFORMATION

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Document #[FIX-00]

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Overview

This document highlights changes to the CBOEdirect FIX 4.2 service to provide you with information needed to scope updates to your applications and infrastructure in order to use this latest version.

The upcoming release will support the CBOE Hybrid trading environment as well as the existing OneChicago™ Futures market. The material is presented to highlight the upcoming changes and place emphasis on important design decisions. Your feedback and questions regarding this document and these changes are encouraged. Please direct your feedback and questions to API@cboe.com

Major changes with the FIX 4.2 Service:

1. Market data will only be available via a separate FIX connection to a CBOE FIX 4.2 market data server located on CBOE premises.

2. Request for Quotes (RFQ's) will not be available via the CBOE FIX 4.2 market data server. RFQ's will only be available via connections used for quoting / order flow.

3. Individual quote status messages for Mass Quotes have been eliminated to reduce bandwidth requirements.

4. An application level queue depth is being provided on reports sent from CBOE. This application level queue depth will report to you the number of application messages that are being queued.

5. QuoteRejectReason [tag 300] with a value 98 will be sent for rate monitor rejections.

6. In the Mass Quote Message the number of blocks will be restricted to a value N, which is currently set to 10 in the W_MAIN session, and 200 in the ONE_MAIN and W_AM1 sessions.

7. On a Quote Cancel by class request there will be only one Quote Status response for all the cancelled quotes in that class. The individual cancel quote responses have been eliminated.

8. A new Quote Locked Notification will be sent via a Quote Status message for indicating locked quotes with quote status tag (9312) set to "Locked". The QuoteText user defined field (tag 9008) will contain a string of the buySide acronyms and sell side acronyms. Example: CBOE:BUYER1,CBOE:BUYER2;CBOE:SELLER1,CBOE:SELLER2

9. Under exceptional circumstances (a firm queuing heavily on order and quote statuses or an internal system problem) the CBOEdirect system will take the following actions

   For backlogs in receiving Order and Quote status and execution reports the user will be unsubscribed by the CBOEdirect system. The user will be notified via a Business Reject message that the unsubscription has occurred.

   For backlogs in receipt of market data messages, the firm will be unsubscribed by the CBOEdirect system. The user will be notified via a Market Data Reject message that the unsubscription has occurred.

For other subscriptions to security status (product state), trading session status, etc., the user will be unsubscribed from that service and a business message reject reason will be sent with a reason text.

Market Data via Separate FIX Connection only

CBOE has optimized their market data delivery mechanism to improve bandwidth and CPU performance. You will no longer receive market data from the FIX connection that you use to submit orders and quotes.

A separate document describing the CBOE FIX Market Data Service will be provided that addresses network and server configuration.

Request for Quotes will not be provided via the FIX Market Data Service.

RFQ data can only be requested via the FIX Order and Quote Service. RFQ data will not be made available via the FIX Market Data Service connection.

Individual Quote Status messages have been eliminated

Transmission of individual quote status messages has been eliminated to reduce bandwidth and client processing requirements. The Quote Acknowledgement message returned after you submit a Mass Quote message will contain the status on entry of your quotes. Fill reports will still be sent.

Application Queue Depth reporting

The following custom fields have been added to outbound messages from CBOE where application level queues can occur. The information is provided to assist both CBOE and the firm in identifying performance issues. Most often backlogs occur because the remote firm FIX engine is unable to read off the messages in a timely manner due to contention or bandwidth issues.

For messages reporting on orders and quotes, no action will be taken.

For Market Data Messages, the latest information will be provided.

From Firm To CBOE:

Tag#	User Defined Fieldname	Description
6700	ApplicationQueueActionRequest	Optional user defined field that indicates the action that should be taken to resolve the Application queue depth (backlog). 0- No action taken 1- Queue flushed 2- Overlay last 3- End subscription This tag will be ONLY applicable on Market Data subscription request messages. It will be rejected on all the other messages.

From CBOE To Firm:

Tag#	User Defined Fieldname	Description
6699	ApplicationQueueDepth	A User defined field that provides the number of application level events that are queued for processing behind this current message. For instance, when ApplicationQueueDepth > 0 on a corresponding application response message sent from CBOE to the firm, this indicates that there are still ApplicationQueueDepth # of reports that have yet to be generated and transmitted to the user. This information is provided to help counter parties manage throughput and backlog issues. This tag is available for Order Status, Quote Status, Order Execution Reports, Quote Execution Reports, and all related Market Data messages.
6701	ApplicationQueueActionTaken	Optional application message field that indicates the action taken to resolve the Application queue depth (backlog). 0- No action taken 1- Queue flushed 2- Overlaid last 3- Subscription Ended This tag will be applicable ONLY on Market Data response messages.

Market Data Service Design Model:

In order to support higher-throughput Market Data CBOE proposes the following change for market data made to the trading FIX engines to the Market Data FIX Engines responsible for processing them, as well as to force a midday reroute to support internal load-balancing or error recovery.
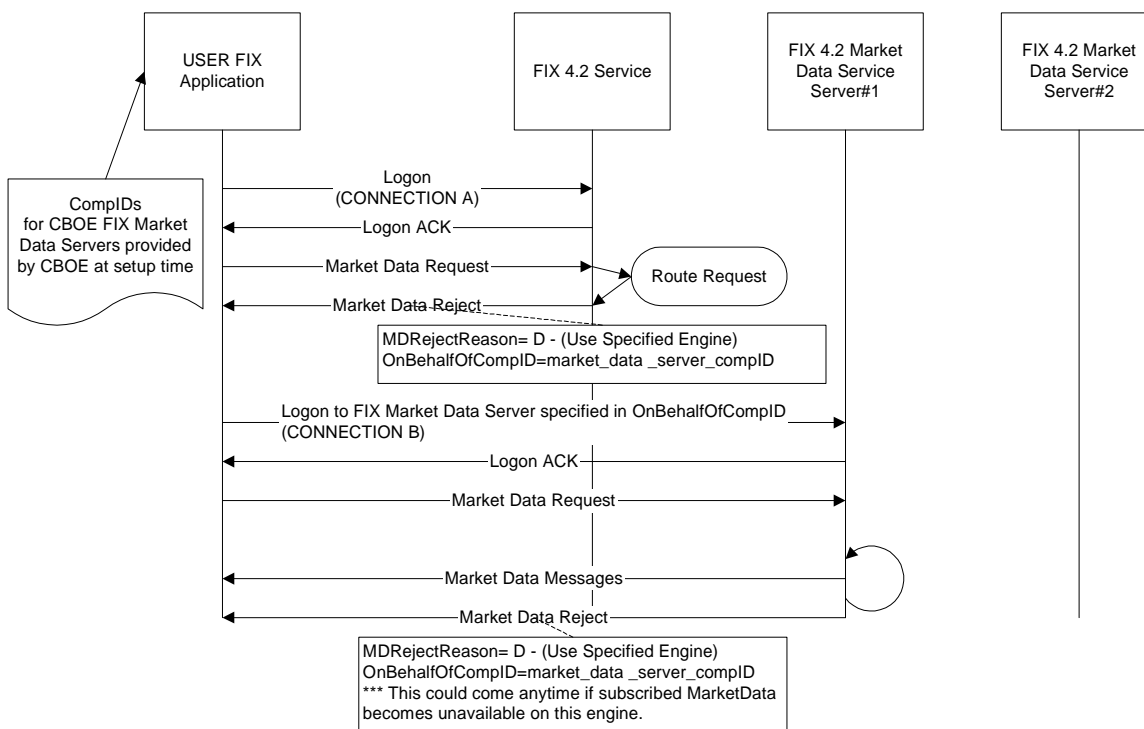
In this model, the initial MarketDataRequest on Connection A is potentially rejected, specifying an alternative "TargetCompID" in the MarketDataRequestReject's OnBehalfOfCompID field.

The firm's engine then has to establish Connection B (unless already established) to the specified Target, and resubmit the Market Data Request.

All the Market Data Incremental responses to that request are sent back on Connection B.

The initial connection can be on the same connection as Orders and Quotes, and every Market Data Request will be rejected with MDReqRejReason equal to 'D' and OnBehalfOfCompID equal to "TargetCompID". The returned ID can be looked up in a specified table of TargetCompIDs to find the connection address information.

Upon the receipt of an unrequested Market Data Reject with MDReqRejReason='D', client engines should follow procedures established above, and establish a new Connection C (unless already connected) to the looked-up "TargetCompID". The Market Data Reject message will contain the list of automatically unsubscribed MDReqIDs – the firm should resubscribe them on the new connection C.

New Market Data Reject Reason Codes

CBOE is adding four new enumerations to the MDReqRejReason (Tag 281) field this is provided in the **Market Data Request Reject** message

D	**Use Specified Engine**
E	**Already Subscribed**
F	**Subscription Replaced**
G	**Forced Unsubscribe**

D) Use Specified Engine

Used to "reroute" a specific MarketData request to another engine that can handle it.

- It can be in direct response to a MarketDataRequest -- no subscription takes place
- Can be sent in a subsequent "loss-of-data-feed" scenario -- with the engine automatically unsubscribing the affected MDRefReqIDs.

In lieu of a new tag for the field containing the new "rerouted" connection information, the routing information will be in OnBehalfOfCompID. Upon receipt, firms should look up this routing information in the provided table, and establish a connection to the

E) Already Subscribed

- Prevents duplicate subscriptions for the same product
- Prevents duplicate subscriptions for a product already subscribed for as a part of a larger subscription (option class, etc) containing that product.

F) Subscription Replaced

- Removes duplicate subscriptions for a product upon a larger subscription (option class, etc) containing that product

G) Forced Unsubscribe

- Allows the engine to remove subscriptions, for throughput, bandwidth, or other reasons, but not for "Use Specified Engine" reasons.

Document Changes

FIX-01

- Added Hybrid RTH market-making information

- Added User Role descriptions

- Added information about support for the Firm and Firm Display roles for CBOE Clearing Firms to obtain duplicate copies of fill reports (for Clearing Firm use only).

FIX-03a

- No changes

FIX-03b (Including Tag Dictionary)

- Open Interest and Settlement Price are not supported by CBOEdirect or OneChicago and can be obtained from the Options Clearing Corporation (OCC) or CBOE Financial Network (CFN).

- Important information added about application queues.

- If backlogs in receiving security status (product state), trading session status, etc. occur, the CBOE will automatically unsubscribe the user from that service with a business message reject reason will be sent with a reason text.

FIX-03c

- Clarified that ClearingAccount[440] is required for all futures orders and market-maker options orders

- For order routing to the CBOE Trading Floor Regular Trading Hours (RTH) session, if the firm wishes to route an order to a specific BART terminal in the firm's booth, the firm can specify the TargetLocationID[143] in the *header* of the order message as described in document FIX-03a.

- Enhancements made to ClearingOptionalData[9324] to support RTH order routing for Market-Maker orders.

- If backlogs in receiving Order Status and / or Execution Reports occur, the CBOE will remove the user's subscription to Order Status and notify the user by sending a Business Reject Message with reason text. The user would have to re-register for Order Status.

- Added ApplicationQueueDepth[6699] to all Execution Report fields.

FIX-03d

- OpenInterest tag is not supported by CBOEdirect or OneChicago and can be obtained from the Options Clearing Corporation (OCC) or CBOE Financial Network (CFN).

- Miscellaneous changes made to the "Types of Market Data provided" table to add support for Hybrid trading

- For Options Market Data Requests, symbol[55] should be set to the underlying stock symbol (IBM, AOL, MSFT, DELL, OEX, DJX, etc.)

- In the Quote Acknowledgement message, QuoteRejectReason [tag 300] with a value 98 will be sent for rate monitor rejections in cases of too many quotes being sent in one mass quote message and also too many quotes being sent to CBOE within (n) seconds.

- New Hybrid quote rate limits are explained.

- Individual Quote Status messages (fill, bust, cancel, etc.) for Mass Quotes have been eliminated to reduce bandwidth requirements. Firms will now only receive one Quote Status message per Mass Quote message.

- When Quote Bid of one market-maker = Quote Ask of another market-maker in W_MAIN, a Quote Locked Notification status message will be sent by CBOE to the firm. This message will contain a string of buy side acronyms and sell side acronyms in tag QuoteText[9008]. This message will contain a QuoteStatus[9312] value of "Locked".

- Extensive changes made to the Market Data Service Design Model including the sequence diagram and four new Market Data Reject Reason Codes (MDReqRejReason[281]).

- If backlogs in receiving Quote Status and / or Execution Reports occur, the CBOE will remove the user's subscription to Quote Status and notify the user by sending a Business Reject Message with reason text. The user would have to re-register for Quote Status.

- For backlogs in receipt of market data messages, the firm will be unsubscribed by the CBOEdirect system. The user will be notified via a Market Data Reject message that the unsubscription has occurred.

- Added information regarding new tags ApplicationQueueActionRequest[6700], ApplicationQueueDepth[6699], and ApplicationQueueActionTaken[6701] to Quote Status, Execution Reports, etc.

- Added QuoteCondition[276] to Current Market response message.

FIX-06

- Added Phase 3j, Quote Hybrid Testing (contained within 3c Quote Test Plan)