



# **CME Globex Platform**

## **iLink 2.x Core Functionality**

Version 2.6

8/4/11

Futures trading is not suitable for all investors, and involves the risk of loss. Futures are a leveraged investment, and because only a percentage of a contract's value is required to trade, it is possible to lose more than the amount of money deposited for a futures position. Therefore, traders should only use funds that they can afford to lose without affecting their lifestyles. And only a portion of those funds should be devoted to any one trade because they cannot expect to profit on every trade.

All references to options refer to options on futures.

CME Group is a trademark of CME Group Inc. The Globe Logo, CME, Chicago Mercantile Exchange, Globex, iLink, E-mini, CME EOS Trader, Galax-C, FirmSoft, CME DataSuite, and CME DataMine are trademarks of Chicago Mercantile Exchange Inc. New York Mercantile Exchange, NYMEX, miNY, and ClearPort are registered trademarks of the New York Mercantile Exchange, Inc. COMEX is a trademark of Commodity Exchange, Inc.

FIX™ and FAST™ are trademarks of FIX Protocol Limited. FIX/FAST<sup>sm</sup> is a service mark of FIX Protocol Limited.

Dow Jones<sup>sm</sup>, Dow Jones AIG Commodity Index<sup>sm</sup>, The Dow<sup>sm</sup>, Dow Jones Industrial Average<sup>sm</sup>, and DJIA<sup>sm</sup> are service marks of Dow Jones & Company, Inc. and American International Group, Inc. (AIG) and have been licensed for use for certain purposes by the Board of Trade of the City of Chicago, Inc (CBOT®). CBOT futures and options on futures contracts based on the Dow Jones Industrial Average<sup>sm</sup> are not sponsored, endorsed, sold or promoted by Dow Jones<sup>sm</sup>, and Dow Jones<sup>sm</sup> makes no representation regarding the advisability of trading such product(s).

BM&FBOVESPA™ is a trademark of BM&FBOVESPA, KRX™ is a trademark of Korea Exchange, DME™ is a trademark of Dubai Mercantile Exchange, BMD™ is a trademark of Bursa Malaysia, BMV™ is a trademark of Bolsa Mexicana De Valores.

All other trademarks are the property of their respective owners.

The information within this document has been compiled by CME Group for general purposes only. CME Group assumes no responsibility for any errors or omissions. Additionally, all examples in this brochure are hypothetical situations, used for explanation purposes only, and should not be considered investment advice or the results of actual market experience.

All matters pertaining to rules and specifications herein are made subject to and are superseded by official CME, CBOT, and NYMEX rules. Current rules should be consulted in all cases concerning contract specifications.

Copyright © 2011 CME Group Inc. All rights reserved.

---

|  |               |
|--|---------------|
| <b>Introduction .....</b>                                      | <b>5</b>      |
| Certification .....  | 5             |
| Additional Information .....                                   | 5             |
| <br><b>Session Management Overview .....</b>                   | <br><b>6</b>  |
| Weekly Reset.....  | 6             |
| Time Synchronization .....                                     | 6             |
| Session Security .....   | 6             |
| <br><b>Sequence Numbers .....</b>                              | <br><b>7</b>  |
| <br><b>Logon .....</b>   | <br><b>8</b>  |
| Beginning of Week Logon .....                                  | 8             |
| Mid-Week Logon .....   | 10            |
| Mid-Week Logon and Undelivered Messages .....                  | 11            |
| In-Session Logon .....   | 13            |
| In-Session Logon Used to Reset Sequence Number .....           | 14            |
| <br><b>Heartbeat .....</b>                                     | <br><b>15</b> |
| <br><b>Test Request .....</b>                                  | <br><b>17</b> |
| <br><b>Session Level Reject .....</b>                          | <br><b>18</b> |
| <br><b>Resend Request.....</b>                                 | <br><b>20</b> |
| Basic Versus Enhanced Resend Logic.....                        | 20            |
| Client System Maximum Resend Request Limit.....                | 21            |
| Resend Request from Client System to CME Globex .....          | 21            |
| Basic Resend Logic from Client System to CME Globex .....      | 21            |
| Enhanced Resend Request from Client System to CME Globex ..... | 22            |
| Enhanced Resend Request + Gap Fill Example .....               | 24            |
| Sequence Reset - Dual Reset Message .....                      | 25            |
| <br><b>Logout.....</b>   | <br><b>26</b> |
| Logout Where Sequence Number Is Lower Than Expected.....       | 27            |
| Logout Where Sequence Number Is Higher Than Expected.....      | 28            |
| <br><b>Fault Tolerance .....</b>                               | <br><b>29</b> |
| Client Logon Procedure with Fault Tolerance.....               | 29            |
| <br><b>Order Management .....</b>                              | <br><b>31</b> |
| Limit Order Example .....                                      | 31            |
| Market-Limit Order (Bid) - Market Example .....                | 32            |
| Market-Limit Order (Bid) - No Market Example.....              | 33            |
| Market Orders (with Protection) Example .....                  | 33            |
| Stop Orders.....   | 35            |
| Stop Order (with Protection) Bid Example .....                 | 35            |
| Stop-Limit Order.....  | 37            |
| Order Qualifiers.....  | 39            |
| Fill and Kill (FAK) .....                                      | 40            |

---

|  |           |
|--|-----------|
| Complete Fill, Match with Single Order Example .....                   | 41        |
| Complete Fill, Match with Multiple Orders Example .....                | 42        |
| Complete Kill Example.....   | 43        |
| Partial Fill then Kill Example .....                                   | 44        |
| Fill or Kill (FOK) Order Example .....                                 | 45        |
| Client Order Identifier.....   | 45        |
| CME Globex Identifiers .....   | 46        |
| In-Flight Mitigation (IFM).....  | 46        |
| Disabled IFM Cancel/Replace Functionality .....                        | 47        |
| Disabled IFM Cancel/Replace Functionality Example .....                | 47        |
| IFM Cancel/Replace Functionality Enabled .....                         | 48        |
| Positive IFM Scenario - IFM CXR Order Quantity > Filled Quantity ..... | 48        |
| Negative IFM Scenario - IFM CXR Order Quantity < Filled Quantity.....  | 49        |
| Trade Cancellation.....  | 51        |
| GCC Trade Cancellation.....  | 51        |
| Trade Cancellation Example.....  | 51        |
| Additional Business Order Management Topics.....                       | 52        |
| Supported Contracts .....  | 52        |
| Trading on Behalf of a Client .....                                    | 52        |
| Average Pricing System (APS).....                                      | 53        |
| <b>Point of Order Origination.....</b>                                 | <b>54</b> |
| Order Origination Identifier.....                                      | 54        |
| ATS Indicator .....  | 54        |
| Trading System and Version.....  | 54        |
| Complete List of Point of Order Origination Tags .....                 | 55        |
| <b>Revision History.....</b>   | <b>57</b> |

# 1. Introduction

This document describes how to develop the basic functionality required for a client system to submit orders on CME Globex and receive order entry responses.

Basic functionality entails establishing and maintaining a FIX session over iLink 2.X on a TCP/IP connection and the ability to send and receive business messages over that session throughout the course of a trading day.

First, this document describes Session Management which includes Logon, Heartbeat, Test Request, Resend Request and Logout messages. The Order Management section provides descriptions of the various order messaging scenarios and order type behavior.

## 1.1 Certification

CME Group requires that all client systems are certified by Autocert+. Certification ensures messaging and processing reliability and the capability to gracefully recover during abnormal message processing events.

---

**Note:** For additional information, please contact the CME Global Account Management (GAM) at 312.634.8700 in North America.

---

## 1.2 Additional Information

The CME Global Control Center provides phone customer support 24 hours a day for the production environment, from 2:00 p.m. Sunday through 4:45 p.m. Friday, Central time. Please contact the GCC in the U.S. at 312-456-2391 or in Europe at 44-20-7623-4708.

The GCC only accepts calls from registered contacts. If you are not registered, have your firm administrator call the GCC on your behalf.

## 2. Session Management Overview

iLink 2.X is based on the FIX 4 protocol to establish and manage bi-directional sessions. A successful client logon establishes a FIX connection and terminates it with the corresponding logout. Clients can establish and terminate FIX connections multiple times throughout the week within a single FIX session.

The FIX protocol defines a FIX session as a bi-directional stream of ordered messages between two parties within a continuous sequence number series. CME Globex is responsible for maintaining FIX sessions on a weekly basis.

### 2.1 Weekly Reset

CME Group internally resets its inbound and outbound sequence numbers to '1' at the start of each week. Clients are required to reset their sequence numbers prior to the Beginning of Week Logon.



#### WARNING

**If you do not reset the outbound sequence number to '1' at the start of each week, you will receive a Logout (tag 35-MsgType=5) message when attempting to logon.**

---

### 2.2 Time Synchronization

**All clients are required to synchronize the time of their application to the CME Group servers.** The client system time does not necessarily need to be synchronized, but the application time must be equal to the CME Group server for log comparison reasons. Although there are a number of ways to synchronize time with CME Group servers, CME Group recommends synchronizing with a standard time source (such as an atomic clock) using standard time-synchronizing software (for example, NetTime). **In addition, CME Group recommends using an hourly synchronization interval between NetTime and the client application.** See [Appendix C in Production Network Connection Guide](#) for additional information.



#### WARNING

**Time synchronization is mandatory. If you do not synchronize your time, your orders may not execute.**

---

### 2.3 Session Security

iLink 2.X has a logon process for authenticating the client application based on the user name and password. iLink 2.X does not allow dual primary logons. Only one primary session per logon is recognized at a time. The combination of tag 49-SenderCompID as the user name and tag 96-RawData as the password identifies a session.

The session does not support encryption; however, transactions are secured by a high level of physical network security.

### 3. Sequence Numbers

FIX protocol requires separate sequence numbers for incoming and outgoing messages between the client system and CME Globex. This ensures that all messages to and from CME Globex are in the correct order and recoverable.

To guarantee message delivery, both the client and CME Globex must maintain the inbound and outbound sequence numbers. The client's responsibility for maintaining the inbound and outbound sequence numbers includes:

- Resetting the inbound and outbound sequence numbers to '1' prior to the Beginning of the Week Logon.
- Incrementing the inbound sequence number by one for each incoming message.
- Incrementing the outbound sequence number by one for each outgoing message.
- Issuing a Resend Request when the client detects a sequence gap.
- Resending any missed or malformed messages when CME Globex detects a sequence gap and issues a Resend Request.
- Maintaining sequence numbers between multiple FIX connections (a FIX connection occurs each time a client logs in).
- If the client uses fault tolerance, the client must maintain sequence numbers among the primary and backup processes during a failover scenario.

CME Globex preserves all inbound and outbound sequence numbers for recovering missed messages during a logon or failover scenario.

If the client's local architecture uses a single-server process that maintains multiple FIX sessions with the CME Globex platform and supports multiple applications, the client software should allow a session to reset and/or recover sequence numbers. This should not affect other actively trading connections on the server or the server process itself.

## 4. Logon

Client systems use the Logon (tag 35-MsgType=A) message for authentication with CME Globex. There are three types of Logon messages:

1. **Beginning of Week Logon** – the very first logon message the client system sends for the week. Client systems **must set** their inbound and outbound sequence numbers to '1' prior to the Beginning of Week Logon for a successful logon.

---

**Note:** If there is a logon failure, CME Globex expects that the client system will reset the inbound and outbound sequence number to '1', until the client system establishes a successful Beginning of Week Logon.

---

2. **Mid-Week Logon** – used for any subsequent logons, after the beginning of the week. Following mid-week log off, the client system logs in mid-week with the next sequential outbound message sequence number.
3. **In-Session Logon** – used to reset sequence numbers while the client system is already logged on.

### 4.1 Beginning of Week Logon

The Beginning of Week Logon message must be populated with:

- Tag 95-RawDataLength
- Tag 96-RawData with the session password
- Tag 49-SenderCompID with the Fault Tolerance Indicator set to 'U' for customers using Fault Tolerance or 'N' for customers opting not to use Fault Tolerance. This tag is 7 characters long and consists of 3 sub-fields:
  - Session ID (left-most 3 characters),
  - Firm ID (next 3 characters) and
  - Fault Tolerance Indicator (last trailing character).
- Tag 141-ResetSeqNumFlag = 'N'
- Tag 34-MsgSeqNum = '1'

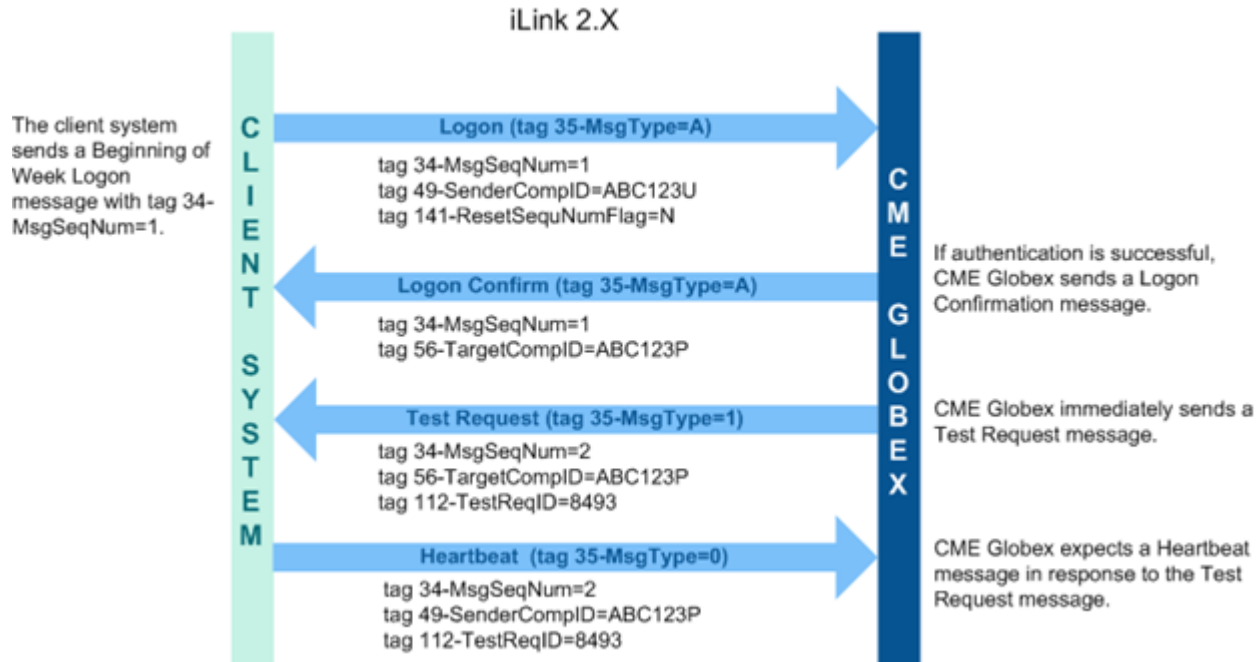
---

**Note:** The Session ID, Firm ID and Password are assigned and can be obtained by contacting your Global Account Manager.

---



The following diagram illustrates the message flow for a successful Beginning of Week logon scenario initiated by the client system.



The password submitted by the client system in tag 96-Raw Data is verified against the password associated with the Session ID. CME Globex also verifies that the Firm ID is included in the list of firms that are allowed to trade under that Session ID.

If any of the requirements are not met or if CME Globex is unable to authenticate the client system, the client system receives a Logout (tag 35-MsgType=5) message and the connection is dropped. In addition, CME Globex does not increment its inbound sequence number.

If authentication is successful, a Logon Confirmation (tag 35-MsgType=A) message is sent with a Fault Tolerance Indicator of either 'P' or 'B' for customers using Fault Tolerance, or 'N' for customers opting not to use Fault Tolerance. The Fault Tolerance Indicator dictates whether the client application must behave as Primary (P) or Backup (B).

After sending the Logon Confirmation (tag 35-MsgType=A) message, CME Globex issues a Test Request (tag 35-MsgType=1) message and expects a Heartbeat (tag 35-MsgType=0) in response. The client application must receive the Logon Confirmation (tag 35-MsgType=A) message prior to sending the Heartbeat (tag 35-MsgType=0) message and any other subsequent messages.

---

**Note:** Tag 141-ResetSeqNumFlag must be 'N' for Beginning of Week Logon message.

---



---

**Note:** **Sequence Numbers** – If the client system **outbound** sequence number is not reset to '1' prior to the Beginning of Week Logon, and the client system sends a Logon (tag 35-MsgType=A) message, the client system is logged out.

**The logout message will have the following text in tag 58-Failed to reset sequence numbers at the beginning of the week. Logout forced. The client system must then reset sequence numbers and reattempt the logon.**

---

## 4.2 Mid-Week Logon

Mid-Week Logon is used for any subsequent logon after a successful Beginning of Week Logon. The Mid-Week Logon uses a sequence number series that continues from the next sequence number where the client logged off or was disconnected.

As a result, the Mid-Week Logon cannot have a sequence number set to '1'. The requirements of Mid-Week Logon are similar to the Beginning of Week Logon except for the sequence number requirement.

The requirements on the Mid-Week Logon message are:

- Tag 95-RawDataLength
- Tag 96-RawData with the password
- Tag 49-SenderCompID with the Fault Tolerance Indicator set to 'U' or 'N' for customers opting not to use Fault Tolerance.
- Tag 34-MsgSeqNo set to continue where the sequence left off at logout
- Tag 141-ResetSeqNumFlag set to 'N'

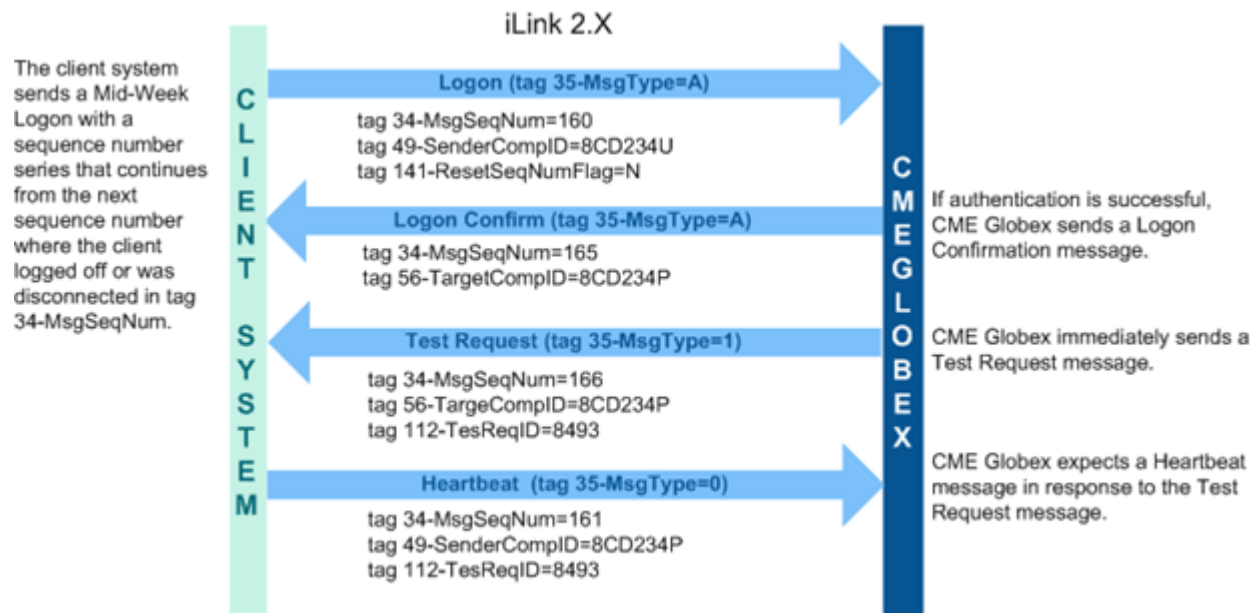
If any of the above requirements are not met, the client system receives a Logout (tag 35-MsgType=5) message in response. In addition, CME Globex does not increment its inbound sequence number.

---

**Note:** ResetSeqNumFlag – tag 141-ResetSeqNumFlag must be 'N' for Mid-Week Logon message. If the client system does not follow this requirement, the client system is logged out.

---

The following diagram illustrates the message flow for a successful Mid-Week Logon scenario initiated by the client system.



## 4.2.1 Mid-Week Logon and Undelivered Messages

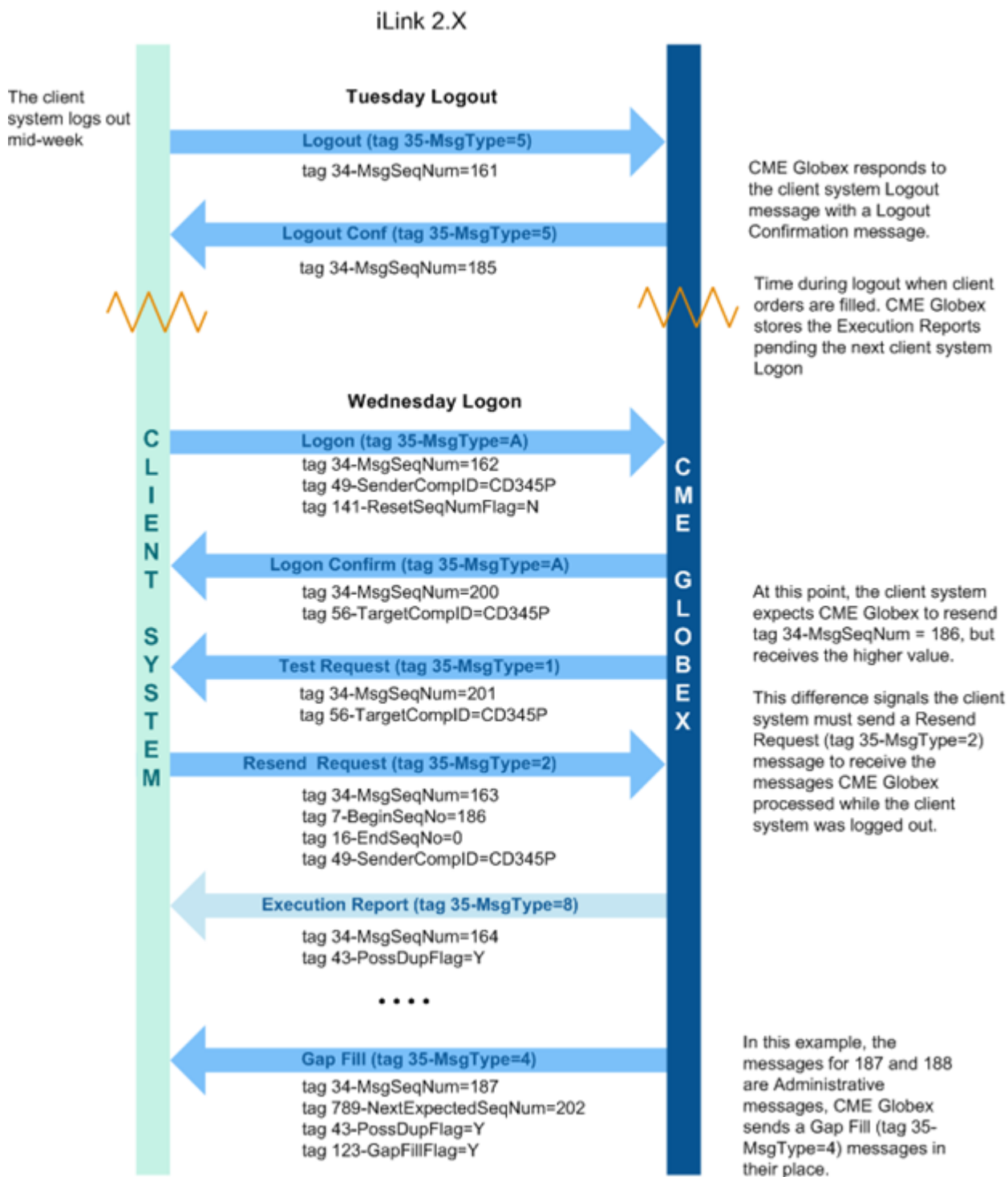
Mid-Week Logon provides handling for undelivered messages which were sent while the client system was logged out:

1. While the client system is logged out, CME Globex stores any messages to be sent to the client system.
2. As a result, the client system may receive a Logon Confirmation (tag 35-MessageType=A) message with a sequence number higher than expected due to the fact that CME Globex processed those stored messages prior to the Mid-Week Logon message and incremented its outbound sequence number accordingly.
3. The client system submits a Resend Request (tag 35-MessageType=2) message for messages stored while the client system was logged out.

The following diagram illustrates the message flow for a Mid-Week Logon scenario where undelivered Execution Reports messages were generated by the CME Globex platform while the client system was logged out.

1. The client system successfully logged on Tuesday morning and submitted New Order Request (tag 35-MessageType=D) messages.
2. The client system logged out. While the client system is logged out, the orders remain active and any corresponding Execution Reports are generated. CME Globex processes these Execution Reports and increments its outbound sequence number while the client system is logged out.
3. The client system logs in on Wednesday morning. When the client system receives the Logon Confirmation (tag 35-MessageType=A) message, the client system detects that the sequence number of the Logon Confirmation (tag 35-MessageType=A) message is higher than expected. The client application follows up with a Resend Request (tag 35-MessageType=2) message and retrieves unsent messages that were generated while the client system was logged out.

The following diagram illustrates the message sequence for a Mid-Week Logon with unsent messages where the client system logs off and logs back on during mid-week.



## 4.3 In-Session Logon



### WARNING

**In-Session Logon should only be used to recover from catastrophic failure.**

In-Session Logon is used to reset sequence numbers after the client system has logged on. During In-Session Logon, tag 141-ResetSeqNumFlag is set to 'Y' to reset sequence numbers and tag 34-MsgSeqNum of that Logon must be set to '1'. If the client would like to reset sequence numbers in the middle of a session, the client should follow these steps:

1. Send a Test Request (tag 35-MsgType=1) message and wait for a Heartbeat (tag 35-MsgType=0) message to ensure that there are no sequence number gaps.

---

**Note:** The client system must send a Test Request (tag 35-MsgType=1) message before sending an In-Session Logon (tag 35-MsgType=A) message. If not sent in that order, the client system might lose messages that cannot be requested again as the sequence number may be reset to '1' for both parties (client and CME Globex).

---

2. Send a Logon message (tag 35-MsgType=A) with tag 141-ResetSeqNumFlag set to "Y" and a sequence number of '1' in tag 34-MsgSeqNum.
  - If the client system sends an In-Session Logon (tag 35-MsgType=A) with tag 141-ResetSeqNumFlag set to 'N' or if the tag is missing, then the client system is logged out.
  - In addition, if the client sends a sequence number other than '1' in tag 34-MsgSeqNum during In-Session Logon, the client system is logged out.
3. CME Globex responds with a Logon Confirmation (tag 35-MsgType=A) message with tag 141-ResetSeqNumFlag set to 'Y' and a sequence number of '1' in tag 34-MsgSeqNum.
4. CME Globex resets its inbound and outbound sequence numbers and expects the client's subsequent message to have a sequence number of '2'.

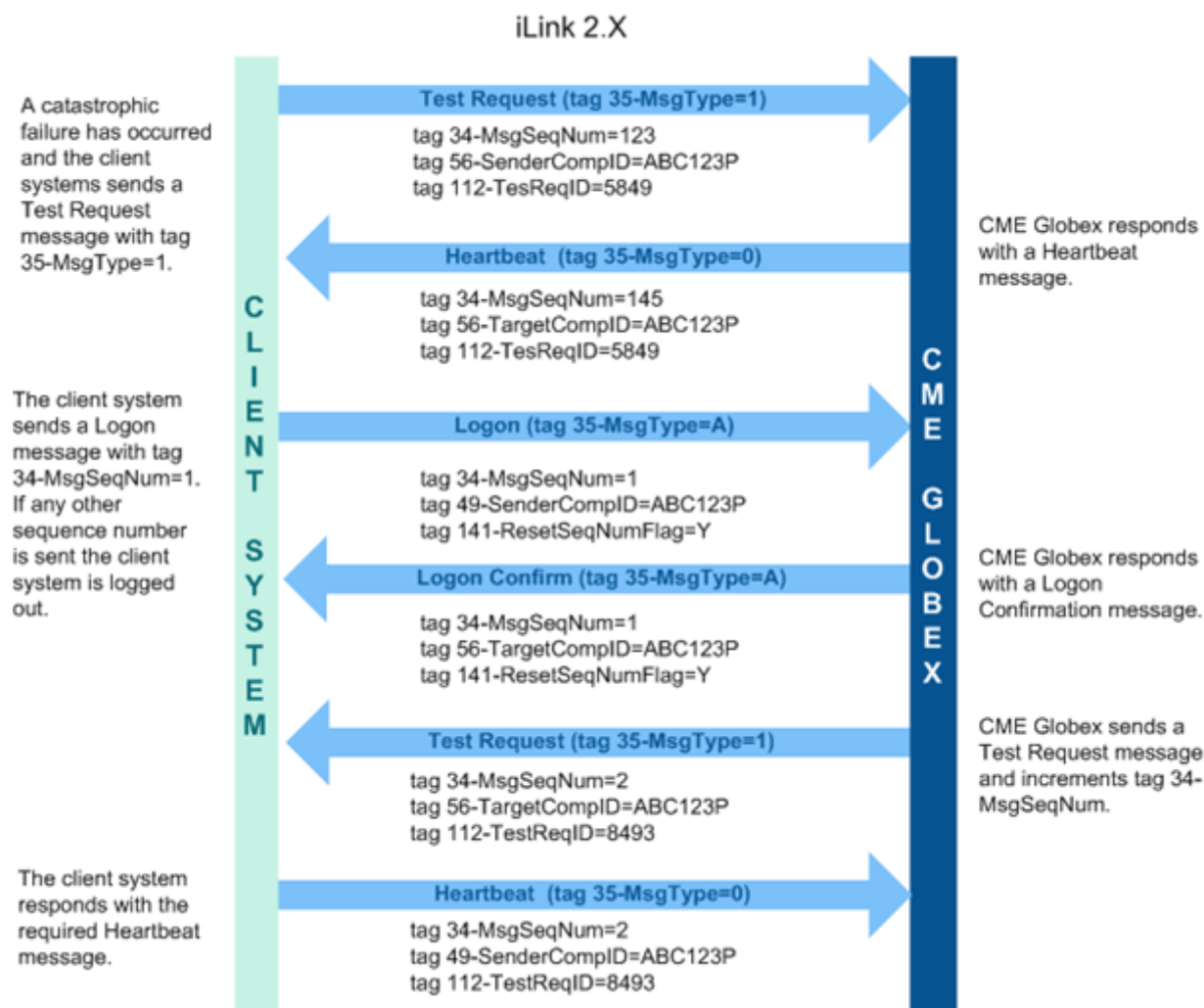
---

**Note:** Do not use tag 141-ResetSeqNumFlag to recover from network disconnects during the week.

---

### 4.3.1 In-Session Logon Used to Reset Sequence Number

The following diagram illustrates a successful In-Session Logon scenario where the client system resets sequence numbers to '1' due to a catastrophic failure.



For additional information on the Logon (tag 35-MsgType=A) message, see the [iLink 2.X Message Specification](#).

## 5. Heartbeat

The Heartbeat (tag 35-MsgType=0) message is sent at regular intervals to ensure that the connection between the client and CME Globex is in a normal state. The heartbeat interval is specified during logon in tag 108-HeartBtInt of the Logon (tag 35-MsgType=A) message. If either the client system or CME Group does not send messages within the time defined in tag 108-HeartBtInt, then a Heartbeat message is transmitted. A Heartbeat message is also sent in response to a Test Request (tag 35-MsgType=1) message.

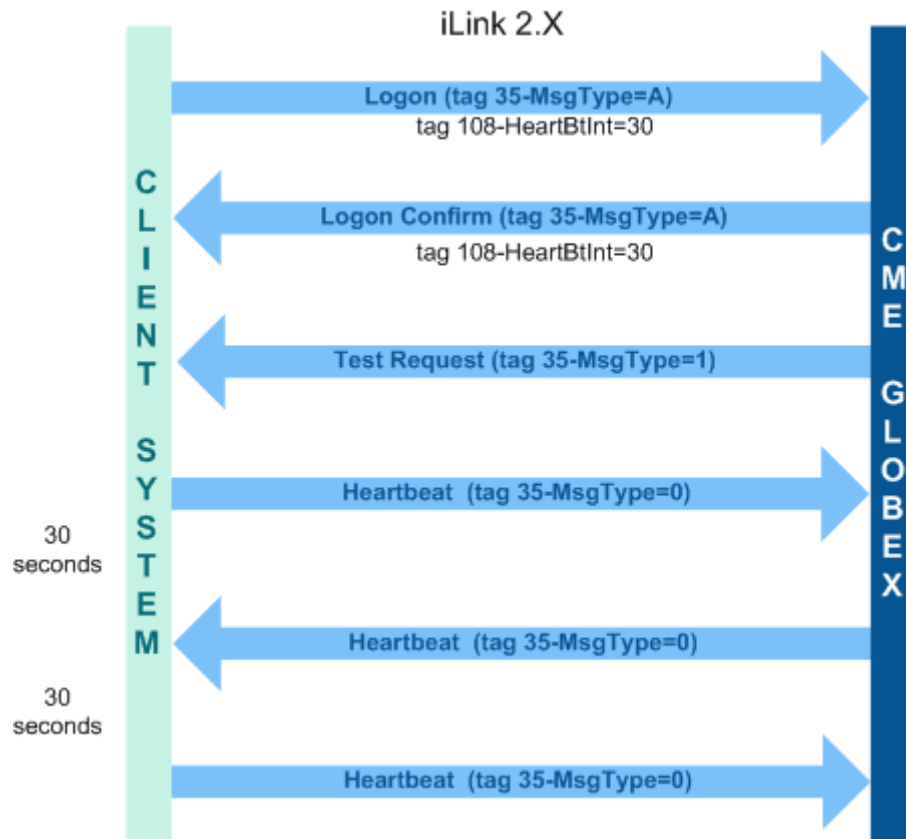


### WARNING

**CME Group requires the client system set the heartbeat interval to 30 seconds.**

- Set the heartbeat interval at less than or equal to 30 seconds. If the client system sets the heartbeat interval to greater than 60 seconds, the client system will not be able to logon.
- CME Globex does not generate Heartbeat messages when responding to a Resend Request. Heartbeats are not sent even in highly unusual cases when the Resend Request takes longer to process than a heartbeat interval. See “Resend Request” on Page 20.

The following diagram illustrates the sequence of Logon (tag 35-MsgType=A), Logon Confirm (tag 35-MsgType=A) and Test Request (tag 35-MsgType=1) messages. In addition the diagram illustrates the recommended Heartbeat (tag 35-MsgType=0) interval and assumes no other messaging activity for 60 seconds following Logon.



Heartbeat (tag 35-MsgType=0) messages can be sent at regularly defined intervals by either side in the absence of any other messaging and keeps the session alive. These Heartbeats also prevents the other side from sending Test Request (tag 35-MsgType=1) messages.

The practice of preventing the other side from sending Test Request (tag 35-MsgType=1) messages mitigates the possibility of the other side timing out and disconnecting from the uncommunicative side.

For additional information on the Heartbeat (tag 35-MsgType=0) message, see the [iLink 2.X Message Specification](#).



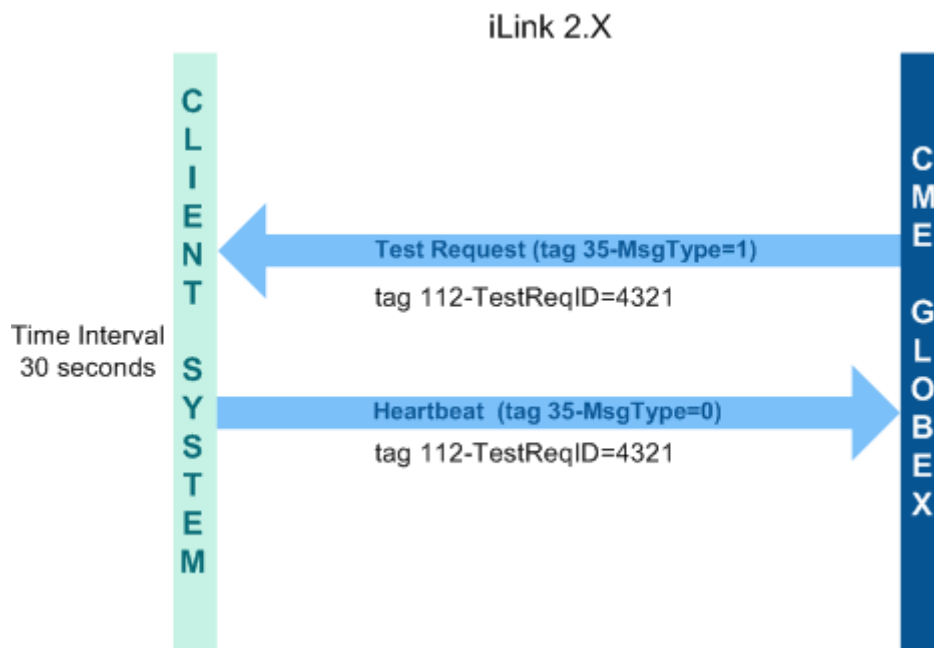
## 6. Test Request

A Test Request (tag 35-MsgType=1) message is sent to ensure connectivity. This message can be sent by both the client system and CME Globex.

If connectivity is in question, for example, a Heartbeat (tag 35-MsgType=0) message has not been received at the defined interval, the following should occur:

1. A Test Request (tag 35-MsgType=1) message is sent.
2. A Heartbeat (tag 35-MsgType=0) message is sent in response with tag 112-TestReqID from the original Test Request message.
3. If no Heartbeat (tag 35-MsgType=0) message is received in response to the Test Request (tag 35-MsgType=1) message within the defined heartbeat interval, the connection is assumed to be stale and the socket is closed.
4. If the connection being closed is the primary connection and the client employs fault tolerance, iLink 2.X initiates a failover process to make one of the backup connections, if existent, the new primary.
5. If the client does not employ fault tolerance, CME Globex updates the status of that client to 'logged out'.
6. A Test Request (tag 35-MsgType=1) message is also used as a handshake at Logon (tag 35-MsgType=A).

The following diagram illustrates the successful Test Request (tag 35-MsgType=1) message flow.



For additional information on the Test Request (tag 35-MsgType=1) message, see the [iLink Message Specification](#).

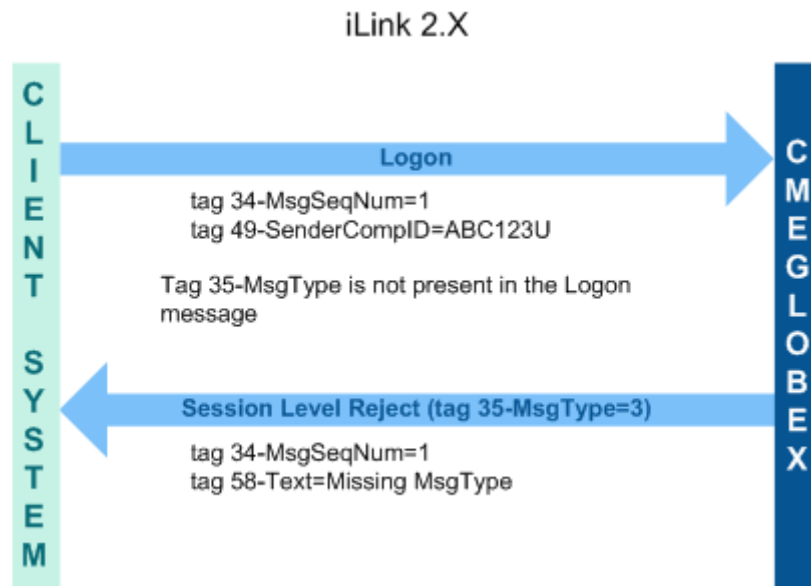
## 7. Session Level Reject

CME Globex issues the Session Level Reject (tag 35-MessageType=3) message when the inbound (client system to CME) message fails to pass a CME session-level validation check. These messages have invalid basic data but successfully passed de-encryption validations, for example, CheckSum and BodyLength. The reason a message is rejected is described in tag 58-Text field.

Reasons that a Session Level Reject (tag 35-MessageType=3) message is sent include:

- Required tag missing
- Undefined tag included
- Tag specified without a value
- Value is incorrect (out of range or invalid) for this tag
- Incorrect data format for value
- ComplID problem
- SendingTime accuracy problem

The following diagram illustrates an unsuccessful message transmission and Session Level Reject (tag 35-MessageType=3) scenario.



In this diagram the client system sent a Logon message where tag 35-MessageType is not present. CME Globex issues a Session Level Reject (tag 35-MessageType=3) with a descriptive reason in tag 58-Text.

iLink 2.X disregards any message that cannot be parsed or fails a data integrity check. Processing the next valid message will cause detection of a sequence gap and a Resend Request (tag 35-MsgType=2) message is generated. If the previously disregarded message is valid on resend, normal processing will continue.

If the previously rejected message remains in error and the client system continues to send the message without making the required corrections, the **Resend Request (tag 35-MsgType=2) message process will loop indefinitely**. Clients must detect this condition and perform the corrective processing to avoid it.

For additional information on the Session Level Reject (tag 35-MsgType=3) message, see the [iLink Message Specification](#).

---

**Note:** For a complete list of Session Level Reject codes, see the iLink Error Codes.

---

## 8. Resend Request

Resend Request logic is the FIX session mechanism by which a given system, upon detecting a higher than expected message sequence number from its counterparty, requests a range of ordered messages resent from the counterparty. The counterparty resends the requested message range sequentially until both systems are back in sequence.

---

**Note:** For all resend requests, it is highly recommended the client system request the maximum limit of 2500 messages.

---

### 8.1 Basic Versus Enhanced Resend Logic

For resend requests on CME Globex, two types of resend logic are currently supported:

- **Basic FIX Resend Logic** - standard FIX protocol resend request logic, which is NOT RECOMMENDED.
- **Enhanced CME Globex Resend Logic** - additional resend logic beyond that defined in the FIX protocol to facilitate rapid recovery in high transaction-per-second (TPS) scenarios which is HIGHLY RECOMMENDED.

Basic resend logic as defined by the FIX protocol will fail in the scenario in which, once a gap is detected and a resend request initiated, the counterparty continues to send incrementally out-of-sequence messages (known in FIX protocol as 'gap continuation'), each of which triggers another resend request. In high TPS situations, this will create a loop or hard disconnect.

Enhanced resend logic solves this problem by identifying any resend request sent in a 'gap continuation' scenario as a duplicate Resend Request which the counterparty can discard. Therefore a system implementing enhanced resend logic must observe the following rules:

- A newly detected message sequence gap must be distinguished from a continuation of a gap and a new gap versus a duplicate Resend Request must be issued accordingly.
- When a message sequence number gap is newly detected (the sequence number received is greater than expected), issue a new Resend Request on its own sequence number. The requested sequence number range must be the next expected sequence number to infinity.
- For each subsequent message that constitutes a continuation of the gap, issue a duplicate Resend Request. This message must be sent on the same message sequence number of the original Resend Request, tag 43-PossDupFlag must be set to 'Y' and tag 122-OrigSendingTime must not be sent.
- The FIX Engine should detect receipt of the first message sent in response to a previous Resend Request and discontinue issuing the Resend Requests marked PossDup.
- The FIX Engine should issue a new Resend Request, if needed, only after the receipt of the counterparty's response has been completed.
- For resend requests from the client system to CME Globex, both basic and enhanced resend logic are supported.



## WARNING

**Basic FIX resend logic, while currently supported, will be phased out. ALL CLIENT SYSTEMS WILL BE REQUIRED TO MIGRATE TO ENHANCED CME GLOBEX RESEND LOGIC. For new system development, it is imperative that enhanced CME Globex resend logic be implemented.**

---

### 8.1.1 Client System Maximum Resend Request Limit

For all resend requests, it is highly recommended the client system request the maximum limit of 2500 messages. CME Group recommends that client systems request all missing messages. In response to the Resend Request from the client system, CME Globex will send all non-administrative messages for the requested range.

If the client system exceeds this value, CME Globex sends a Session Level Reject (tag 35-MessageType=3) message. Tag 58-Text in this message will contain the following: "Range of messages to resend is greater than maximum allowed 2500." If the client system transmits subsequent Resend Request messages with greater than 2500 requested messages, CME Globex ignores the requests.

## 8.2 Resend Request from Client System to CME Globex

The following sections describe the two types of Resend Requests, Basic or Enhanced.

### 8.2.1 Basic Resend Logic from Client System to CME Globex

A description of basic FIX resend request logic is available at <http://www.fixprotocol.org/specifications/>.

In addition to the above, client applications implementing basic resend logic must adhere to the following:

- Tag 122-OrigSendingTime, is required.
- Tag 369-LastMsgSeqProcessed, is not allowed.

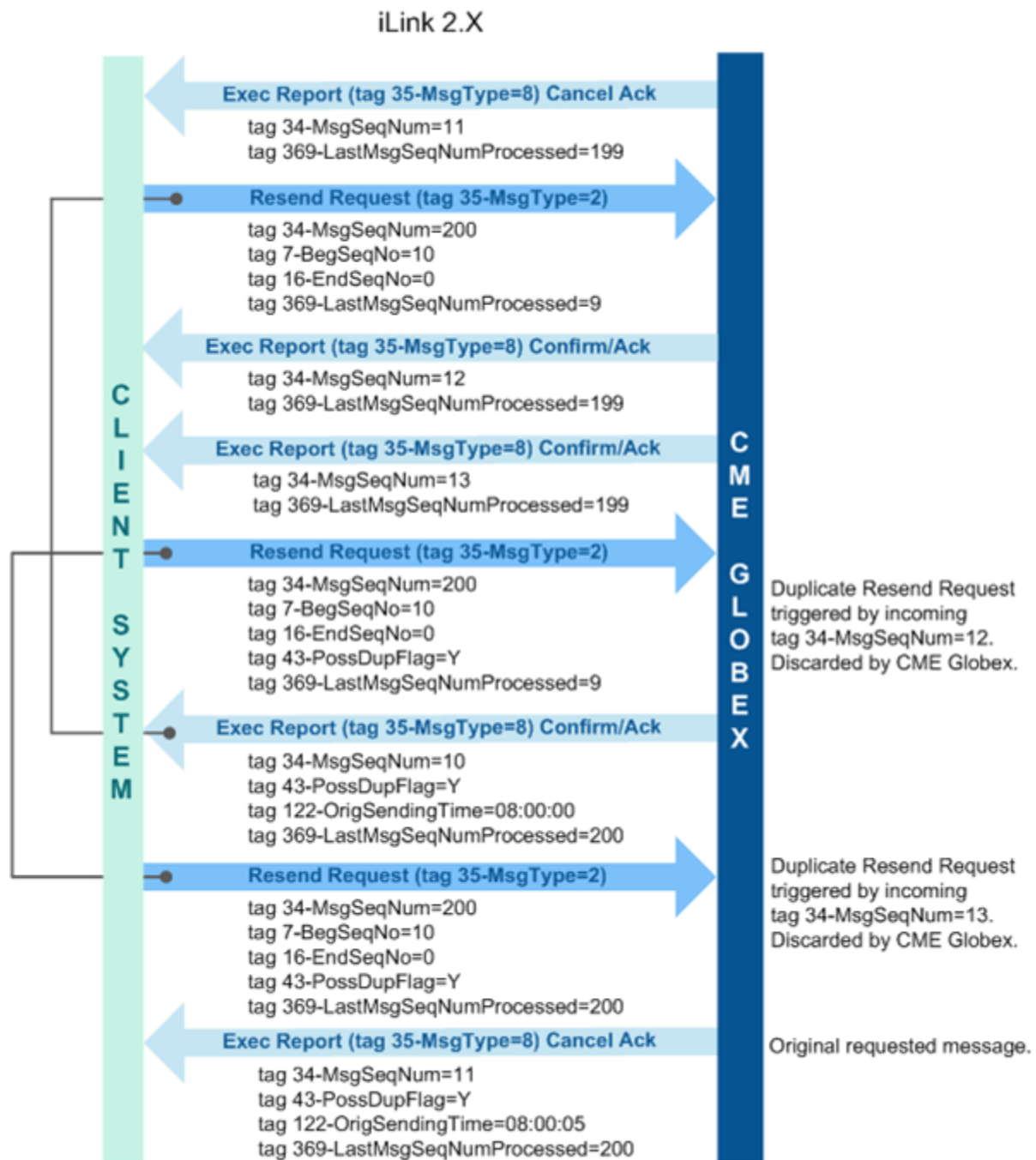
---

**Note:** Enhanced resend logic is identical from client system to CME Globex and vice versa. The following examples depict the client system initiating the resend request.

---

## 8.2.2 Enhanced Resend Request from Client System to CME Globex

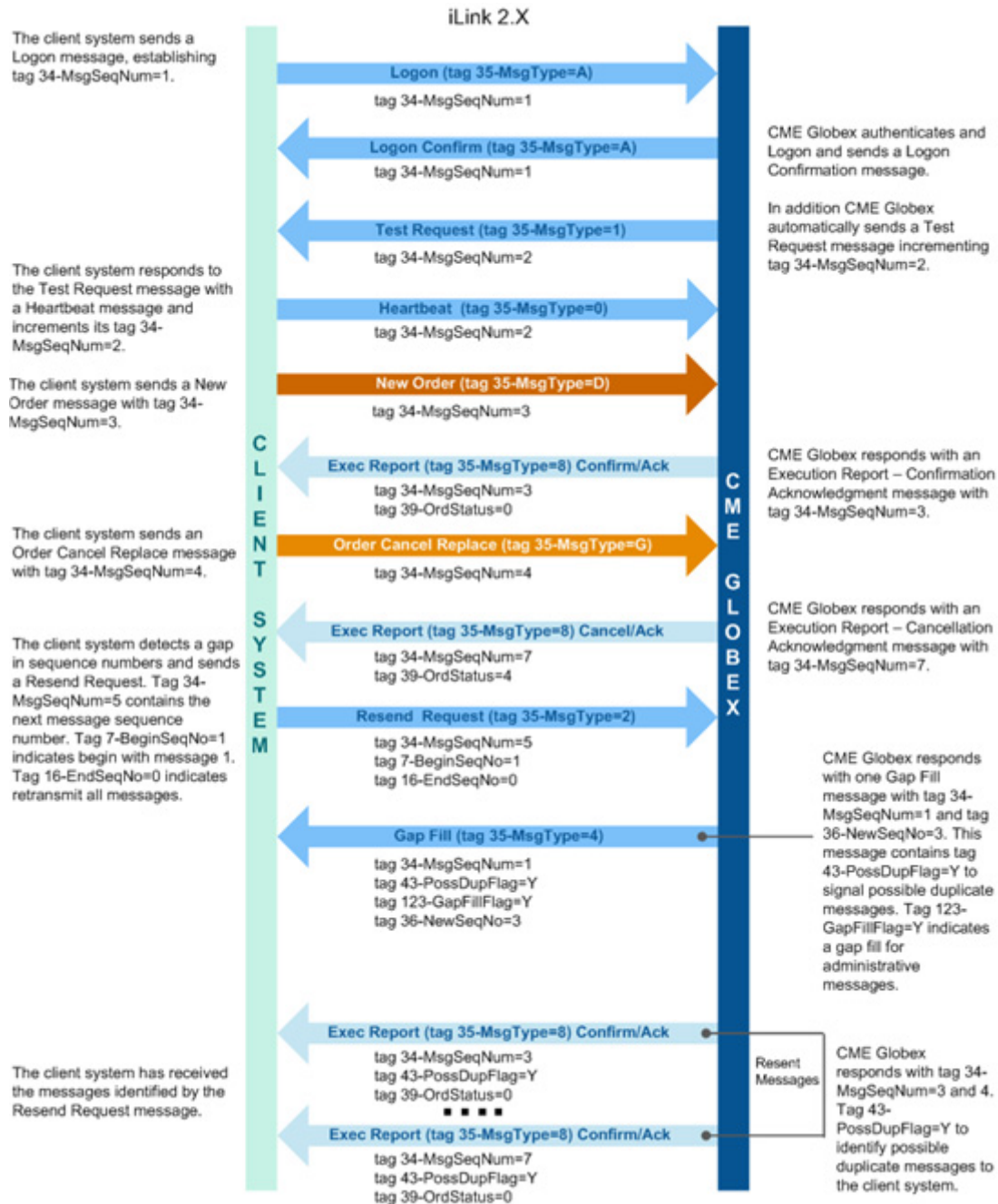
The following example illustrates the message flow for an enhanced logic resend request. All messages that do not explicitly define the message type are assumed to be business messages.



1. The message sent by CME Globex has tag 43-MsgSeqNum=11 and is higher than the client system is expecting.
2. The client system responds with a Resend Request with tag 7-BeginSeqNo=10 and tag 16-EndSeqNo=0 indicating infinity.
3. Before CME Globex receives the Resend Request, it has already sent messages 12 and 13.
4. When the client system receives messages 12 and 13, the absence of the tag 122-OrigSendingTime and tag 369-LastMsgSeqNumProcessed = 199 tells it that messages 12 and 13 are not the resend responses it is expecting.
5. The client system, therefore, issues duplicate Resend Requests with tag 43-PossDupFlag=Y.
6. When CME Globex receives the original Resend Request, it processes it by re-sending messages 10 - 13 with tag 43-PossDupFlag =Y and tag 122-OrigSendingTime tag populated.
7. Since the subsequent Resend Requests were sent as duplicates with tag 43-PossDupFlag=Y and CME Globex has already processed the original message, per the FIX Protocol, CME Globex ignores the duplicate Resend Requests.

### 8.2.3 Enhanced Resend Request + Gap Fill Example

The following example illustrates the use of the Gap Fill message during resend processing. The Sequence Reset (tag 35-MsgType=4) message is identified as a Gap Fill by tag 123-GapFillFlag equal to 'Y'.



During normal resend processing, the Sequence Reset - Gap Fill message is used when the sending application chooses not to resend specific messages, for example stale orders or administrative messages.



### 8.3 Sequence Reset - Dual Reset Message

In the event of an application failure, it may be necessary to use Sequence Reset - Dual Reset (tag 35-MsgType=4) message to force synchronization of sequence numbers on the sending and receiving sides. Keep these important points in mind:

- Do not use Sequence Reset - Dual Reset (tag 35-MsgType=4) as a normal response to a Resend Request (tag 35-MsgType=2) message.
- Use Sequence Reset - Dual Reset (tag 35-MsgType=4) message ONLY to recover from a disaster situation that cannot be recovered via the use of Sequence Reset - Gap Fill.
- Using the Sequence Reset - Dual Reset (tag 35-MsgType=4) message may result in losing messages sent prior to the reset. The Sequence Reset - Dual Reset (tag 35-MsgType=4) message is identified as a Reset by setting tag 123-GapFillFlag to 'N' or leaving the tag out of the message.
- If the Sequence Reset - Dual Reset (tag 35-MsgType=4) message is sent and is not in response to a Resend Request, tag 43-PossDupFlag should be set to 'N'.
- The Sequence Reset - Dual Reset (tag 35-MsgType=4) message must increment the sequence number. A Sequence Reset - Dual Reset (tag 35-MsgType=4) with a lower than expected sequence number logs the client out.
- Tag 36-NewSeqNo of the Sequence Reset - Dual Reset (tag 35-MsgType=4) message contains the sequence number of the next message to be transmitted by the receiving system. If the message is a Sequence Reset - Dual Reset (tag 35-MsgType=4) message and the value in tag 36-NewSeqNo is equal to or higher than the expected sequence number, tag 36-NewSeqNo is adopted as the new expected sequence number of the party that just processed the Sequence Reset - Dual Reset (tag 35-MsgType=4) message.
- Lower than the expected sequence number, a Logout (tag 35-MsgType=5) message is sent.
- No acknowledgment is sent in response to the Sequence Reset - Dual Reset (tag 35-MsgType=4) message; successful reset will be observed in the next value received in tag 34-MsgSeqNum.

For additional information on the Resend Request (tag 35-MsgType=2) message, see the [iLink Message Specification](#).

## 9. Logout

The Logout (tag 35-MsgType=5) message both initiates and confirms the termination of a CME Globex session. When the client system sends a Logout (tag 35-MsgType=5) message, CME Globex sends a Logout Confirmation (tag 35-MsgType=5) message and terminates the session.

After sending a Logout (tag 35-MsgType=5) message, the client system should wait for a Logout Confirmation (tag 35-MsgType=5) message before closing the socket connection. Working orders are not affected by a client logout and will continue to be eligible for trades. Any message activity on working orders sent while the client is logged out will be stored and may be retrieved by the client upon their next login, as described in Section 3.2.1.

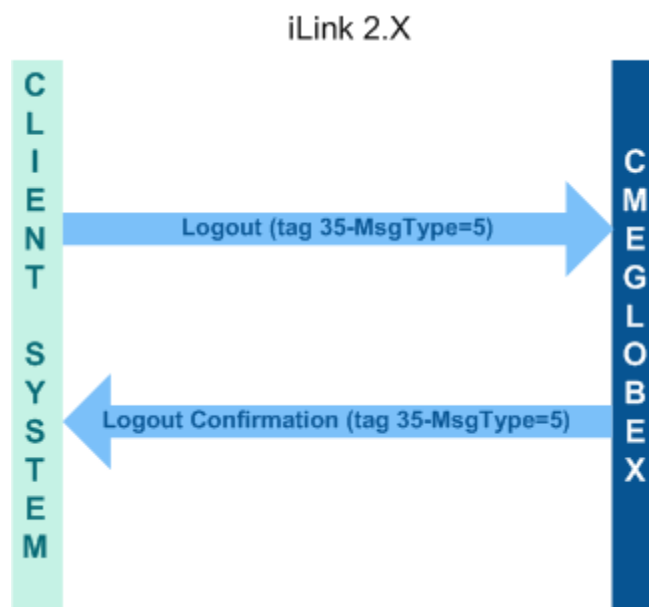
---

**Note:** For clients who use fault tolerance, logging out of the primary system also logs out the backup.

---

CME Globex also sends a Logout (tag 35-MsgType=5) message when it detects an error contained in the message sent by a client system. For example, if the client system submits an invalid password, it is logged out.

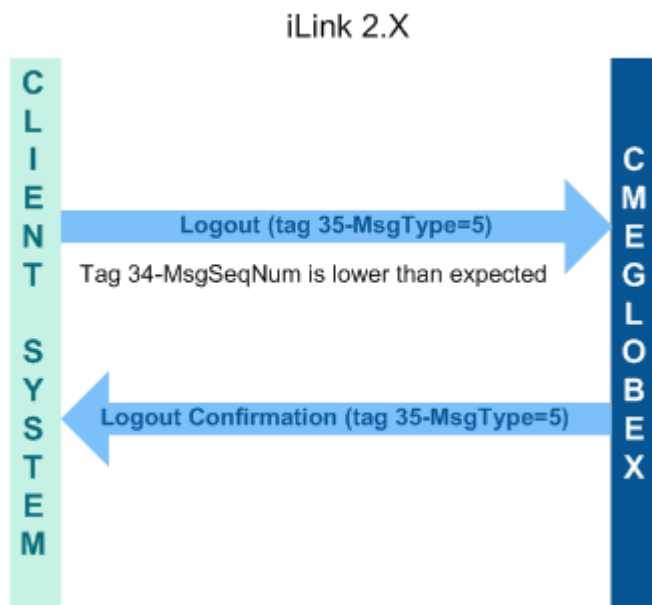
The following figure illustrates a successful Logout scenario where the client system sends a logout message and CME Globex responds with a Logout Confirmation message.



## 9.1 Logout Where Sequence Number Is Lower Than Expected

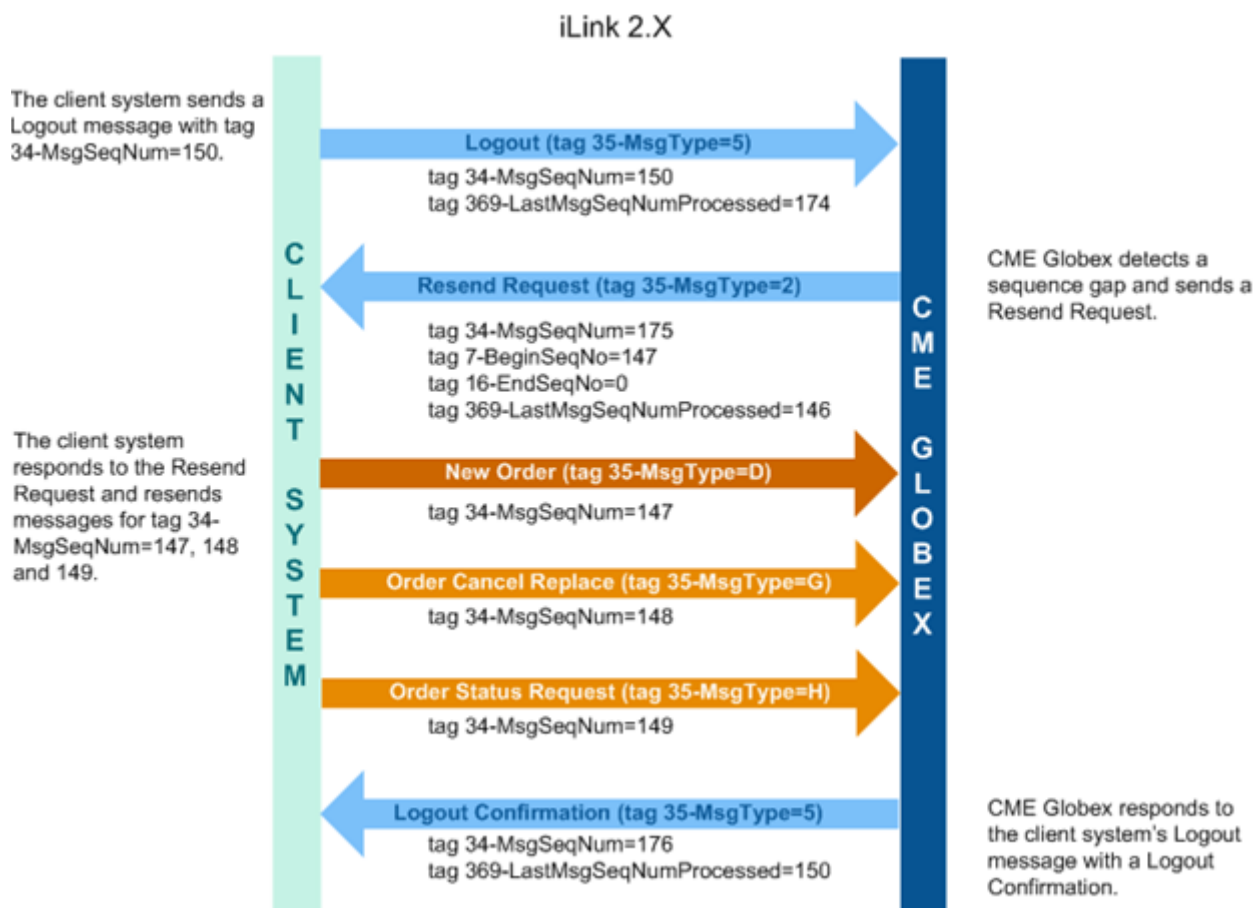
If the client system sends a Logout (tag 35-msgType=5) message with tag 34-MsgSeqNum containing a lower sequence number than CME Globex is expecting, CME Globex automatically logs out the client system.

The following diagram illustrates this message flow.



## 9.2 Logout Where Sequence Number Is Higher Than Expected

The following diagram illustrates the message flow for a Logout scenario where the client's outbound sequence number is higher than what CME Globex is expecting.



In the diagram, the client system sends a Logout (tag 35-MsgType=5) message which contains tag 34-MsgSeqNum=150. CME Globex detects a sequence gap.

CME Globex sends a Resend Request (tag 35-MsgType=2) message with tag 369-LastMsgSeqNumProcessed=146 contain the value of the last message received.

The client system then must resend the messages for tag 34-MsgSeqNum=147, 148 and 149. CME Globex processes those messages.

Now the messages are in sequence, CME Gobex sends a Logout Confirmation (tag 35-MsgType=5) with tag 369-LastMsgSeqNumProcessed=150 which matches the client system Logout (tag 35-MsgType=5) message.

For additional information on the Logout (tag 35-MsgType=5) message, see the [iLink Message Specification](#).

## 10. Fault Tolerance

Clients who choose to use fault tolerance must coordinate their application processes for establishing separate and independent content streams on iLink via TCP/IP socket connections. In a typical deployment scenario, multiple redundant processes are spawned from the same executable file and each of those processes runs on a separate machine.

---

**Note:** CME Group does not recommend running redundant processes on the same machine because if a machine fails, all the processes running on it fail simultaneously.

---

Each client application goes through a separate logon process and receives instructions from iLink 2.X regarding which process should assume the role of primary or backup. Only one process is elected as the primary and the remaining processes in the fault tolerant group become backup members. A backup member must be ready to activate in the same data state as the former primary member being replaced. For example, FIX inbound and outbound sequence numbers must be maintained in a consistent state during failover between all processes.

### 10.1 Client Logon Procedure with Fault Tolerance

In iLink 2.X, when a client application sends a Beginning of Week or Mid-Week Logon (tag 35-MessageType=A) message the primary and backup status for the application has not been yet determined.

When the client sends a Logon (tag 35-MessageType=A) message, the Fault Tolerance Indicator (FTI) in tag 49-SenderCompID must be set to 'U' for undefined. Tag 49-SenderCompID and tag 56-TargetCompID are 7 characters long and are composed of 3 sub-fields:

- **Session ID** (left-most 3 characters)
- **Firm ID** (next 3 characters)
- **Fault Tolerance Indicator** (right-most character).

Beginning of Week Logon and Mid-Week Logon (tag 35-MessageType=A) messages must be sent with the FTI in tag 49-SenderCompID set to 'U'. If the client application submits a Logon (tag 35-MessageType=A) message and the FTI is not set to 'U', a Logout (tag 35-MessageType=5) message is issued and the connection is dropped. Because In-Session Logon messages may be sent only on the primary channel, the FTI must be set to 'P'.

iLink 2.X assigns the primary and backup status of client applications by setting the FTI in tag 56-TargetCompID of the Logon Confirmation (tag 35-MessageType=A) message.

**All client applications, both primary and backup members, must examine the FTI in tag 56-TargetCompID for each incoming message.** Based on the value of the FTI contained in tag 56-TargetCompID, the client application must populate the FTI in tag 49-SenderCompID with the same value for all outgoing messages.

1. If the FTI is set to 'P', then the application must behave as the active member representing the fault tolerant group.
2. If the client application submits a message on the primary connection with an FTI value of 'B' in tag 49-SenderCompID, the message is ignored. In this case, the inbound sequence number of iLink 2.X is not incremented.
3. If the FTI is set to 'B', then the application must behave as a backup member.

4. If the client application submits a message on the backup connection with an FTI value of 'P' in tag 49-SenderCompID, iLink 2.X sends a Reject – Session Level (tag 35-MessageType=3) message on the backup channel.
5. If a client application submits a message **without** either a 'P' or 'B', it receives a Logout (tag 35-MessageType=5) message.

The client application must acknowledge that it has successfully received and processed the FTI instruction from iLink 2.X by sending the FTI in tag 49-SenderCompID for each message to CME Globex.

Application messages (e.g., New Order - Single, Order Cancel/Replace Request) must be sent only through the primary content stream where sequencing is enforced per FIX 4.2 protocol.

Communication over the backup is solely for link maintenance. Only administrative messages (Logon, Logout, Heartbeat and Test Request) are sent through the backup. Sequencing on the backup is not enforced; message sequence numbers in the administrative messages are zero.

## 11. Order Management

When an order is accepted by CME Globex, that order will execute according to the parameters defined in the original New Order (tag 35-MsgType=D) message. Specifically, the order type defined in tag 40-Ord-Type and the order qualifier (behavior) defined in tag 59-TimeInForce.

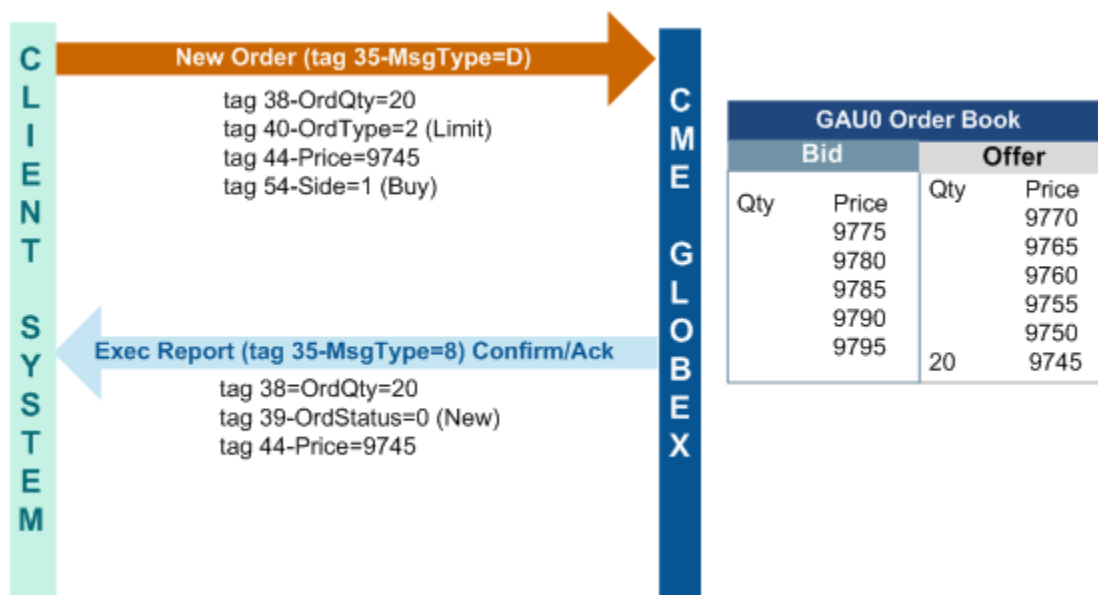
Detailed information on supported order types and qualifiers is available in [Electronic Trading Concepts](#).

The following sections provide examples of various order messaging scenarios and how each order type behaves differently:

- Limit Order
- Market-Limit Order (Bid) with Market and No Market.
- Market Order with Protection
- Stop Order with Protection
- Stop-Limit Order.

### 11.1 Limit Order Example

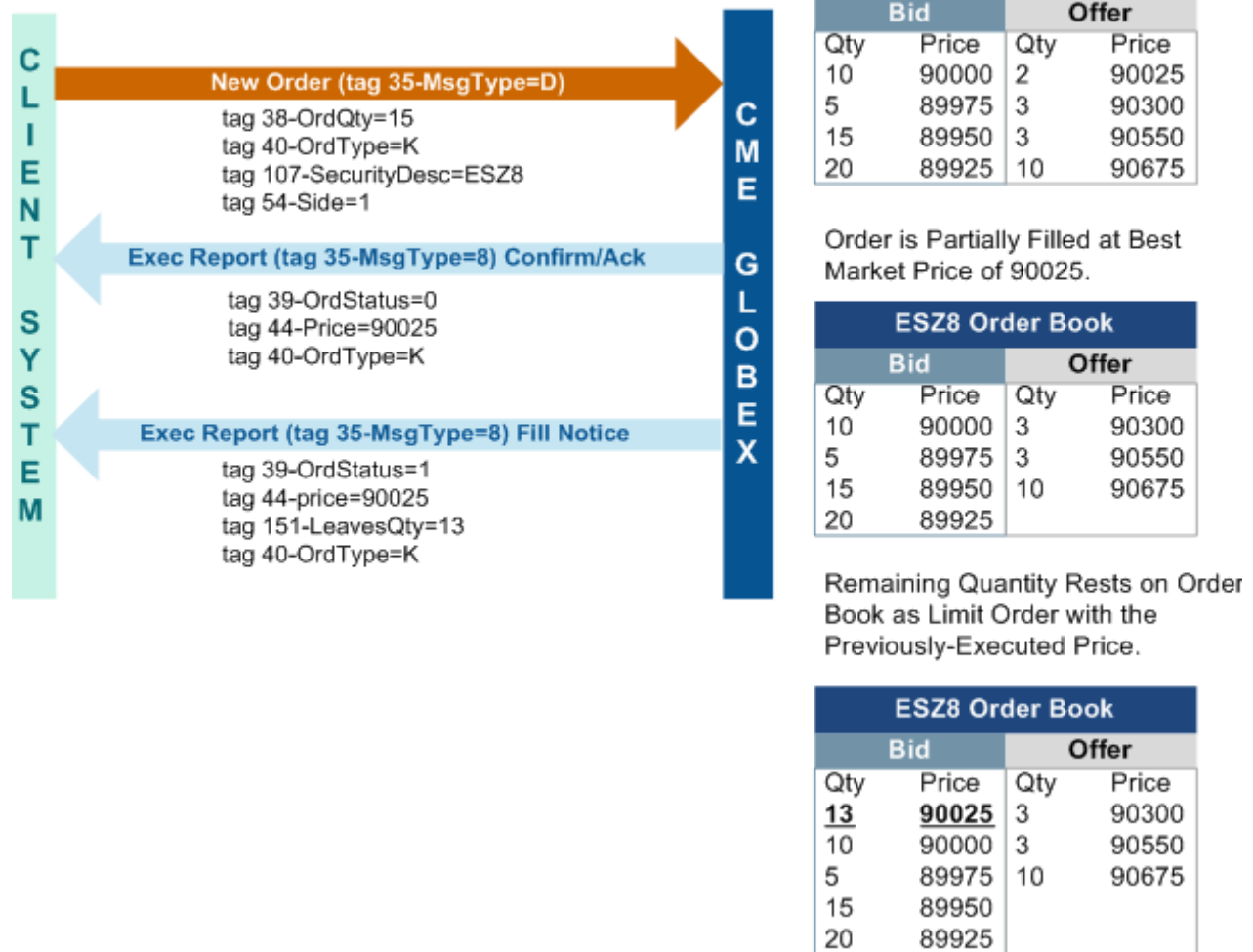
A Limit order, tag 40-OrdType=2, defines the upper price limit at which to buy an instrument and lower price limit at which to sell an instrument. The price limit is defined in tag 44-Price. If the price is not immediately available, the Limit order will rest until filled or cancelled. The following diagram illustrates a Limit order that will rest on the book.



## 11.2 Market-Limit Order (Bid) - Market Example

1. The client sends a New Order to the CME Group, Bid, ESZ8, Market-Limit, quantity of 15.
2. CME Globex responds with an Execution Report - Confirmation/Acknowledgment.
3. The Market-Limit order becomes a Limit order at the best available market price (90025).
4. CME Globex sends an Execution Report – Fill Notice for a partial fill 2-Lot @ 90025.
5. The remaining quantity rests on the book at 90025.

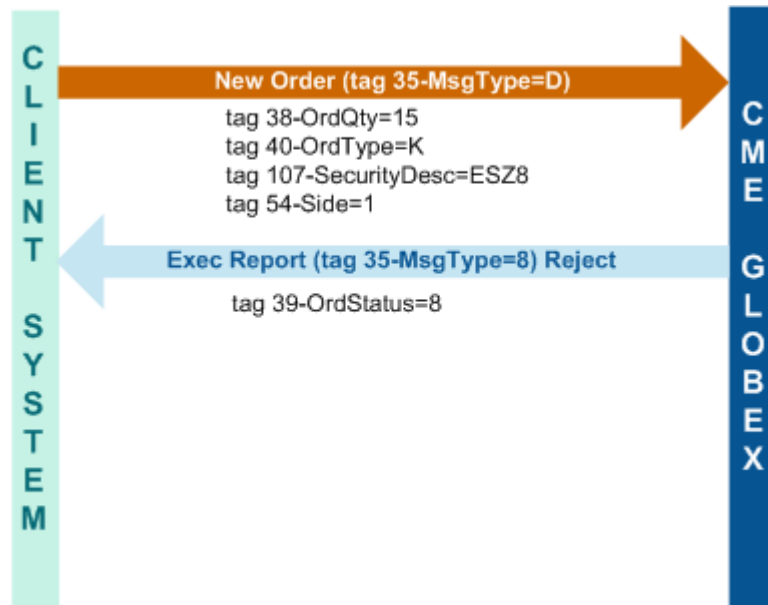
The following diagram illustrates this example.





### 11.3 Market-Limit Order (Bid) - No Market Example

The following diagram displays CME Globex actions when a market-limit order (bid) is placed with no market.



CME Globex returns a Execution Report (tag 35-MsgType=8) Reject message.

### 11.4 Market Orders (with Protection) Example

The following example illustrates Market order (with protection) interaction with the CME Globex platform and the responses that customers see. This example assumes the Protection Points are 600.

1. The client sends a New Order Bid, ESZ8, Market order (with protection), quantity 15.
2. CME Globex responds with an Execution Report – Confirmation/Acknowledgment.
3. At this point, Best Offer = 90025 and Protection Points = 600.

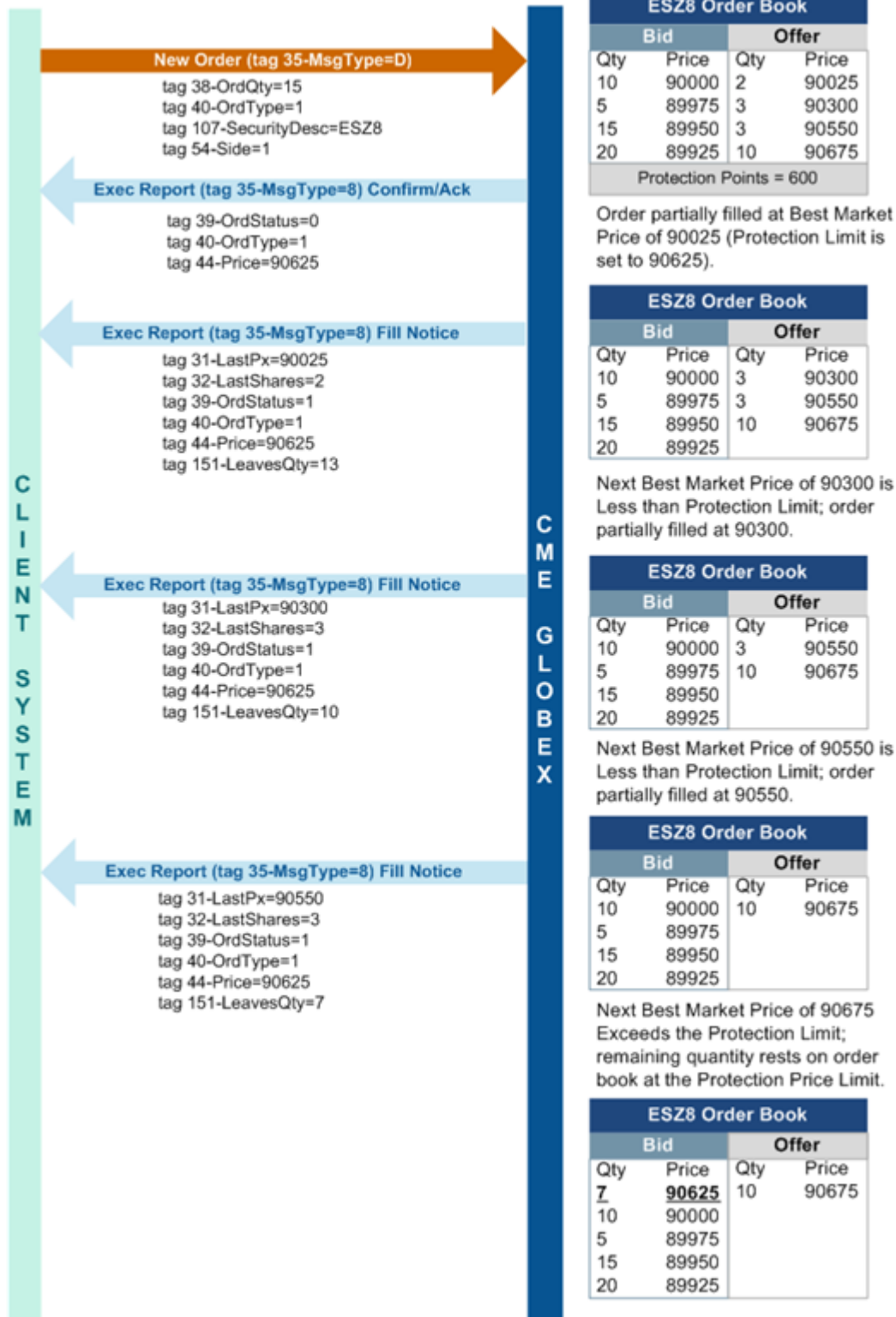
---

**Note:** Refer to [Electronic Trading Concepts](#) for more information on protection points.

---

4. Protection Price Limit = 90025 + 600 = 90625.
5. CME Globex sends an Execution Report – Fill Notice for a partial fill for 2-Lot @ 90025.
6. CME Globex sends an Execution Report – Fill Notice for a partial fill for 3-Lot @ 90300.
7. CME Globex sends an Execution Report – Fill Notice for a partial fill for 3-Lot @ 90550.
8. Next Best Offer = 90675. This value exceeds the Protection Price Limit. CME Group places the remaining quantity on the order book at a Protection Price Limit of 90625.

The following diagram illustrates this example.



## 11.5 Stop Orders

When Stop orders (with protection) are sent, customers should be aware of the response:

- Customer submits a New Order (tag 35-MsgType=D) message with tag 40-OrdType=3 (stop order with protection) with a trigger price in tag 99-StopPx.

---

**Note:** Stop orders may not be submitted with tag 44-Price. CME Globex will reject a New Order message for a Stop Order submitted with tag 44-Price.

---

- When a Stop order (with protection) order is **accepted**, an Execution Report – Confirmation/Acknowledgment (tag 35-MsgType=8) message is returned with tag 40-OrdType=4.
- When the Stop order (with protection) is **triggered**, an Execution Report – Confirmation/Acknowledgment message is returned with tag 40-OrdType=2.
- All subsequent Execution Report messages contain tag 40-OrdType=2.

All Execution Report messages, including order elimination messages, sent in response to Stop orders (with protection) include tag 44-Price populated with the Protection Price Limit (best available price +/- the protection points). If the order is not completely filled, the Protection Price Limit is the price that the remaining Open Quantity rests on the order book.

### Example of Protection Price Limits Calculations for Stop Orders (with protection)

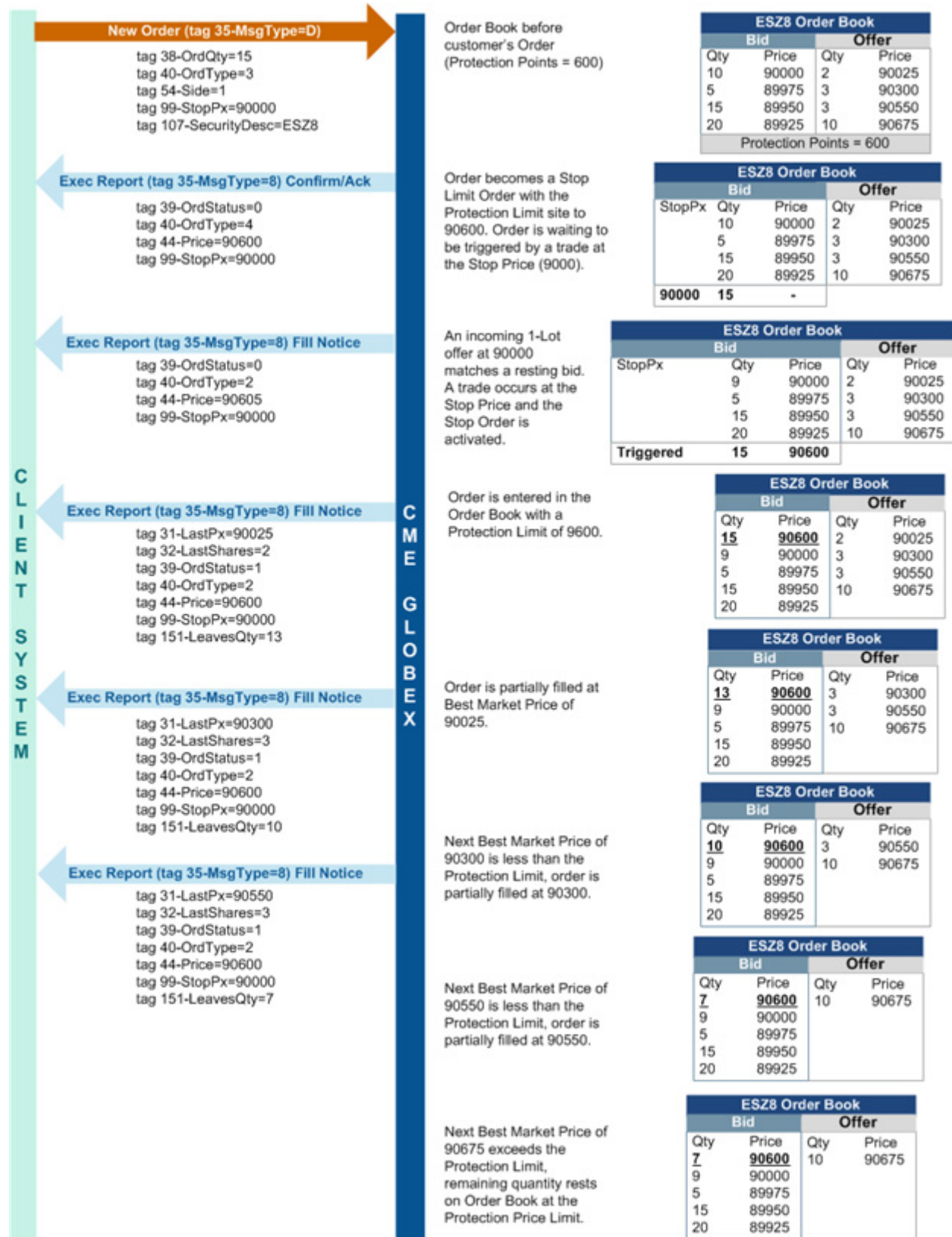
| Stop Orders (with protection) Bid |         | Stop Orders (with protection) Offer |         |
|-----------------------------------|---------|-------------------------------------|---------|
| Trigger Price                     | 90000   | Trigger Price                       | 90000   |
| Protection Points                 | + 600   | Protection Points                   | – 600   |
| Protection Price Limits           | = 90600 | Protection Price Limits             | = 89400 |

### 11.5.1 Stop Order (with Protection) Bid Example

The following example illustrates Stop order (with protection) interaction with the CME Globex platform. This example assumes the Protection Points are 600.

- The client sends a New Order, Bid, ESZ8, Stop order (with protection), 90000 Trigger Price.
- CME Globex responds with an Execution Report – Confirmation/Acknowledgment message.
- A trade occurs at the trigger price of 90000. The client's order is activated as a Limit order and CME Globex responds with an Execution Report – Confirmation/Acknowledgment (notification of the triggering of the order) Trigger Price = 90000, Protection Points = 600.
- Protection Price Limit = 90000 + 600 = 90600.
- CME Globex sends an Execution Report – Fill Notice for a partial fill for 2-Lot @ 90025.
- CME Globex sends an Execution Report – Fill Notice for a partial fill for 3-Lot @ 90300.
- CME Globex sends an Execution Report – Fill Notice for a partial fill for 3-Lot @ 90550.
- Next Best Offer = 90675. This value exceeds the Protection Price Limit. CME Globex places remaining quantity on the order book at a Protection Price Limit 90600.

The following diagram illustrates this example.



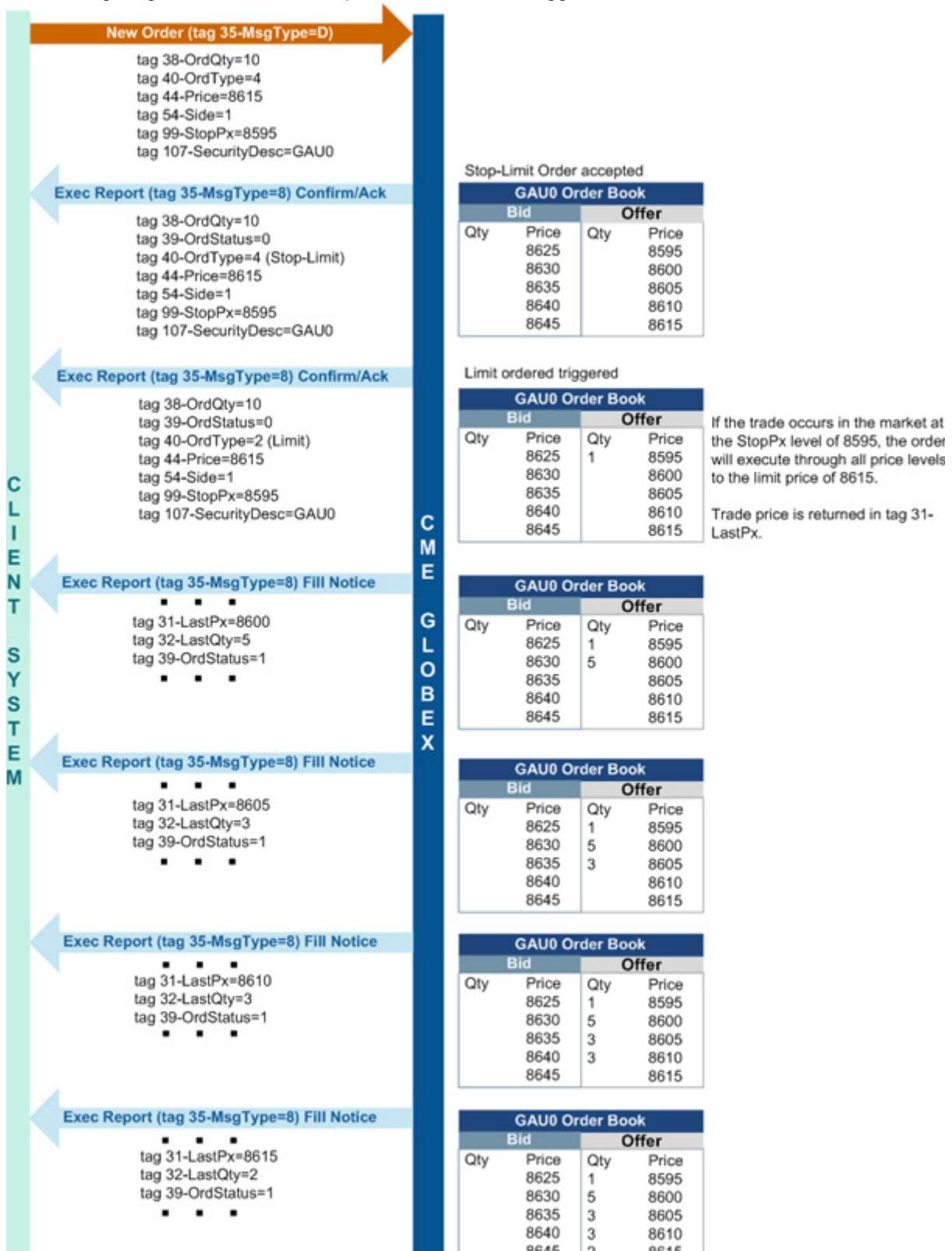
## 11.6 Stop-Limit Order

A Stop-Limit order is activated when the trigger price of the order is traded in the market. The Stop-Limit order then executed at all price levels between the trigger price and the limit price.

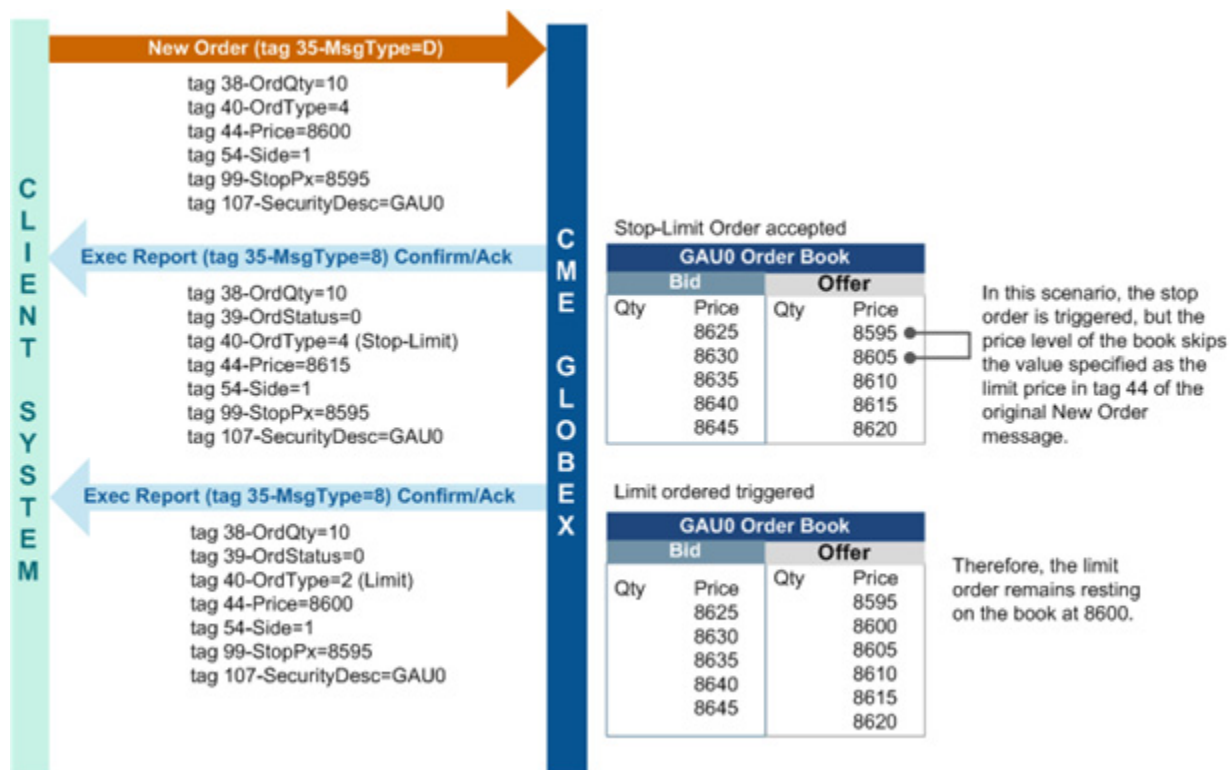
For buy orders, the trigger price is lower than the limit price. For sell orders, the trigger price is higher than the limit price.

- The trigger price is submitted in tag 99-StopPx.
- The limit price is submitted in tag 44-Price.

The following diagram illustrates a Stop-Limit order that is triggered and filled.



The following figure illustrates a Stop-Limit order triggered but not filled.



## 11.7 Order Qualifiers

An order qualifier defines additional characteristics for the order type defined in tag 40-OrdType of the New Order or Cancel/Replace message. Order qualifiers include:

- **Tag 59-TimeInForce**

- 0=Day - order expires at the end of the trading day. This is the default order qualifier; a New Order or Cancel/Replace message sent without tag 59-TimeInForce is by default a Day order.
- 1=Good 'till Cancelled (GTC) - order remains working until cancelled.
- 3=Fill and Kill (FAK) - order is immediately executed against any available quantity and any remaining quantity is cancelled.





## WARNING

### CME GROUP STRONGLY RECOMMENDS THE FOLLOWING FOR FAK AND FOK ORDER TYPES:

An FAK order **must** always contain tag 59-TimeInForce=**3** and tag 110-MinQty. Any order submitted with tag 110-MinQty will behave as an FAK or FOK order

An FOK order **must** always contain tag 59-TimeInForce=**3**, tag 110-MinQty and tag 38-OrdQty; and the values in tag 110 and 38 must be identical.

**When tag 110-MinQty is sent, tag 59-TimeInForce must always = '3'.**

- 6=Good 'till Date (GTD) - order remains working until the end of the trading session of the local market date specified in tag 432-ExpireDate (expire time is not supported).
- **Tag 110-MinQty** - used in combination with tag 59-TimeInForce=3 (FAK) as the minimum quantity for immediate execution.
- **Tag 210-MaxShow** - maximum quantity for the order to show on the order book at any given time. When the quantity of the order shown on the book reaches zero, the quantity will be reinstated as this value until the entire quantity is filled. Orders with this qualifier are known as 'iceberg' orders.

Detailed information on supported order qualifiers is available in [Electronic Trading Concepts](#).

## 11.8 Fill and Kill (FAK)

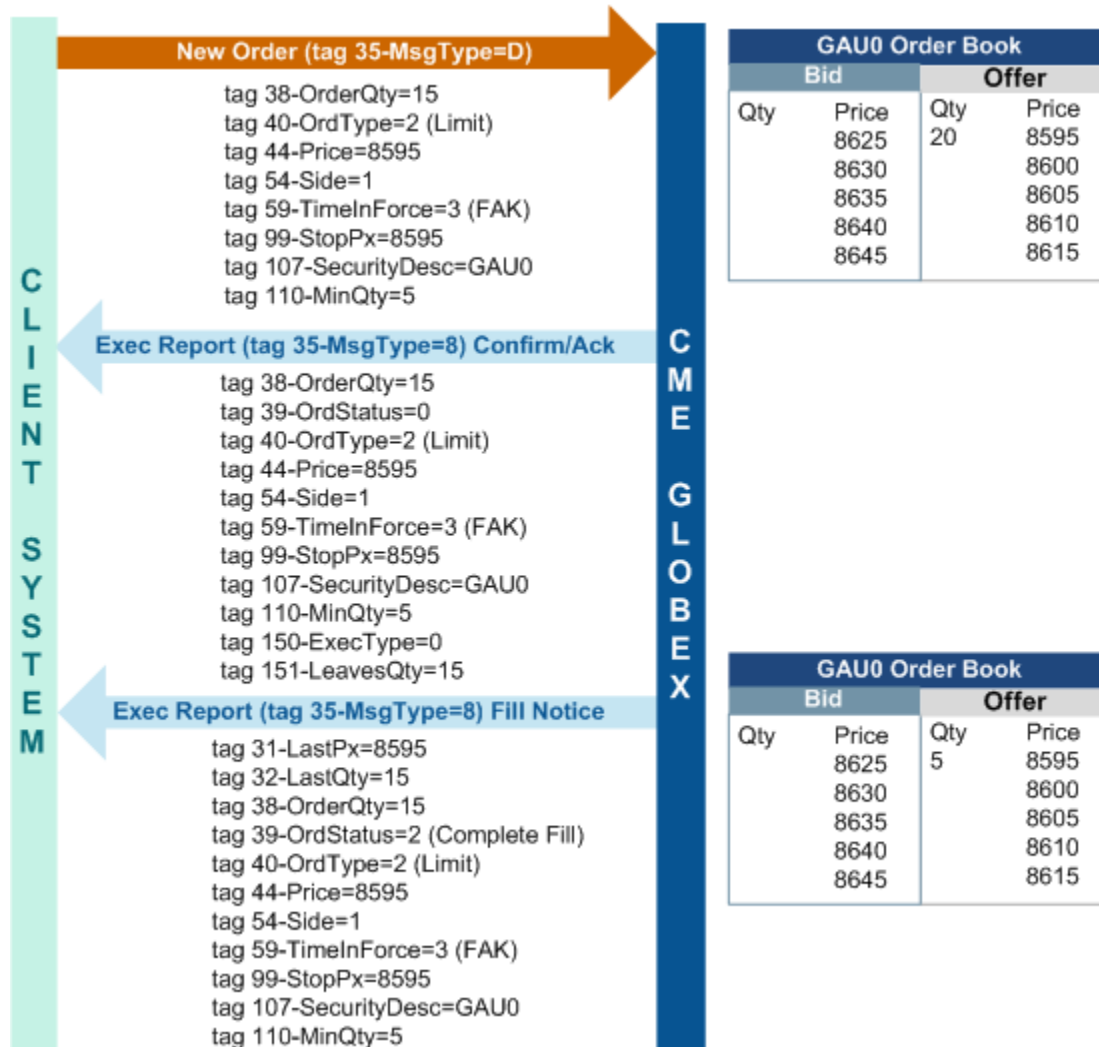
The following section provides examples for each type of scenario that can occur when submitting an FAK order. These scenarios include:

1. Complete Fill, Match with Single Order
2. Complete Fill, Match with Multiple Orders
3. Complete Kill
4. Partial Fill, then Kill
5. Fill or Kill (FOK).



### 11.8.1 Complete Fill, Match with Single Order Example

In this example, the FAK order matches completely with a single sell order at the 8595 price level.



1. The client receives an Execution Report – Confirmation/Acknowledgment (tag 35-MsgType = 8) where tag 39-OrdStatus and tag 150-ExecType=0, 'New', and tag 151-LeavesQty is set to the original order quantity.
2. The client then receives an Execution Report - Fill for a complete fill.

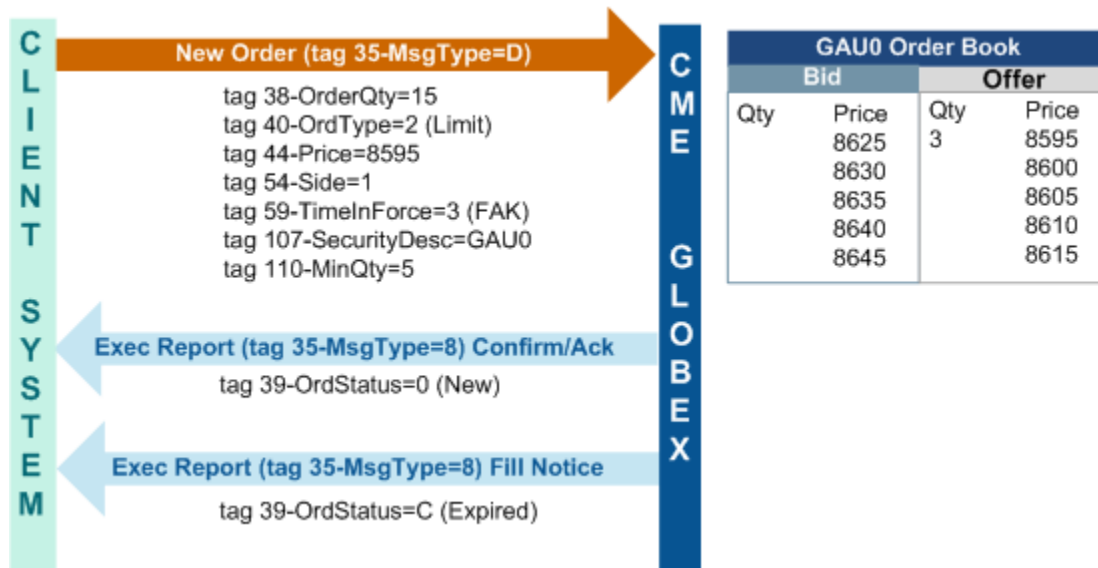
## 11.8.2 Complete Fill, Match with Multiple Orders Example

In this example, the FAK buy order matches completely with multiple sell orders at the 8595 price level.



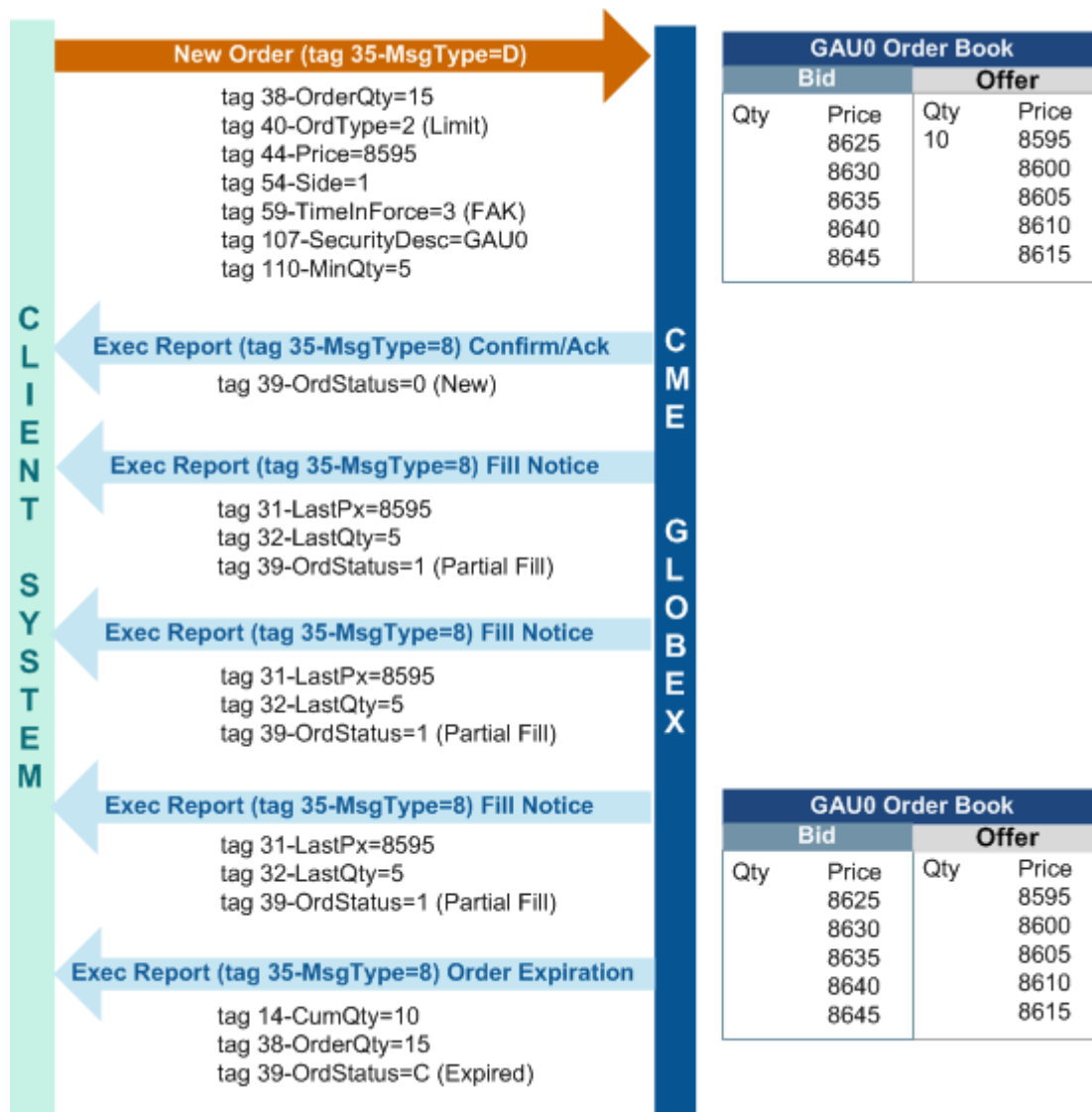
### 11.8.3 Complete Kill Example

In this example, there is insufficient quantity at the price level of the FAK buy order, so the order is cancelled.



### 11.8.4 Partial Fill then Kill Example

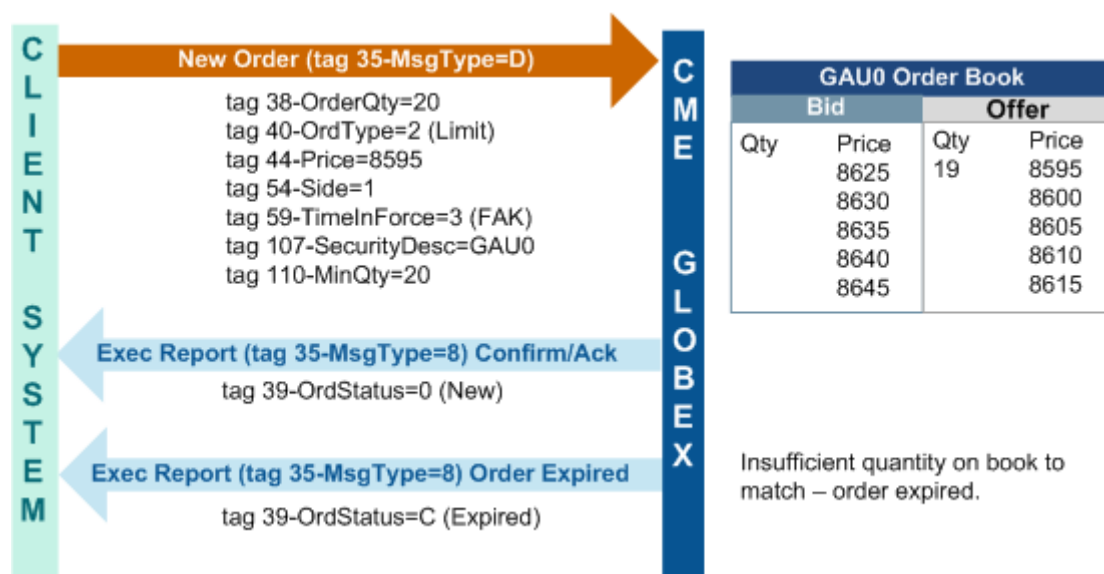
In this example, the FAK buy order matches partially with all available quantity on the book and the remainder is killed.



### 11.8.5 Fill or Kill (FOK) Order Example

An FOK order is either immediately and completely filled against resting orders or cancelled. An FOK order is submitted on iLink by setting the tag 110-MinQty value equal to the tag 38-OrderQty value. This example shows how an FOK order behaves when there is insufficient quantity available to completely fill the order.

**Note:** When an FOK order is unfilled and the order is eliminated, the Execution Report sent to the client system is for an Expired order..



### 11.9 Client Order Identifier

Tag 11-CIOrdID is a unique identifier, assigned by the client on each order submitted to CME Globex. The value submitted in tag 11-CIOrdID for the CME Globex platform must conform to the following rules:

1. All open orders must have a unique value in tag 11-CIOrdID, regardless of the trading session in which the orders are placed.
2. Tag 11-CIOrdID must remain unique until the order is completely filled, cancelled, or expired.
3. Tag 11-CIOrdID is maintained for the lifetime of the order thru all Cancel/Replace messages. After the order is closed, the CIOrdID value can be reused in the next trading day.
4. Tag 11-CIOrdID can only contain numbers and upper case letters. Spaces, tabs, control characters, lower code letters and special characters may NOT be used.
5. Tag 11-CIOrdID may include up to twenty characters.

It is imperative that the client system ensure the uniqueness of tag 11-CIOrdID value. CME Globex does not validate this tag for uniqueness; however, a non-unique value can create downstream impacts on regulatory, support and order status tools.

For example, when an Order Status Request (tag 35-MsgType=H) message is sent with previously used value in tag 11-CIOrdID, the status for the most recent order is retrieved. There is no way to determine the status of a previous order with the same value in tag 11-CIOrdID.

## 11.10 CME Globex Identifiers

CME Globex provides three identifiers that allow the client system to track order activity.

### 1. Order Identifier - Tag 37-OrderID

This value is assigned by CME Globex and is unique per instrument per trading session. This value remains constant through the life of the order and allows customers to track all activity related to the order.

### 2. Message Identifier - Tag 17-ExecID

This value is assigned by CME Globex and is unique per instrument per trading session. This value allows customers to uniquely identify each Execution Report (tag 35-msgType=8) message from CME Globex. The Exec ID contains three pieces of data:

- Unique random identifier
- 'TN' delimiter
- Trade number.

### 3. Trade Bust Identifier - Tag 19-ExecRefID

This value is assigned by CME Globex in the trade bust Execution Report only. Customers can use this value when contacting the GCC to identify the trade bust.

Tag 19-ExecRefID works in combination with tag 17-ExecID as follows.

For the original trade, tag 17-ExecID will contain the identify value following the 'TN' delimiter for the Buy and Sell side.

Example: Buy: 17=53000120100729125303TN0050391

Example: Sell: 17=6800034100006679123TN0050391

On the trade bust message, tag 19-ExecRefID will contain the delimited portion of the value from tag 17-ExecID of the original trade Execution Report message.

Example: Bust: 19=0050391

## 11.11 In-Flight Mitigation (IFM)

In-flight mitigation is an optional feature on CME Globex that allows client systems submitting cancel/replace messages to prevent overfilling in the event that the original order is filled while the cancel/replace message is "in-flight" during processing.

For example, with IFM enabled, if an order for 10 is filled for 2 prior to being replaced with an order for 5, the new order on the book will only be for 3. With IFM disabled, the new order will go on the book as 5.

CME Globex customers who want to use the IFM Cancel/Replace functionality must explicitly indicate their choice in the first Cancel/Replace messages by including tag 9768-OFMOverride=Y.

---

**Note:** Customers must be consistent with the Cancel/Replace functionality they choose. The behavior used in the initial Cancel/Replace message for a given order must be used in all Cancel/Replace messages within the same order chain.

---

### 11.11.1 Disabled IFM Cancel/Replace Functionality

Disabled IFM Cancel/Replace functionality is the default behavior for orders on the CME Globex platform. Customers must also ensure that tag 9768-OFMOverride is not present or equals 'N', which indicates that the IFM functionality is disabled.

### 11.11.2 Disabled IFM Cancel/Replace Functionality Example

The following example illustrates the message flow through iLink 2.X for a client using the disabled IFM Cancel/Replace functionality. When customers send the Order Cancel/Replace Request message, they must populate it with the quantity that they want to be open in the market, irrespective of the amount that has been previously filled.

1. The client sends a New Order (tag 35-MsgType=D) message to CME Globex.  
(tag 38-OrderQty = 15)
2. CME Globex responds with an Execution Report – Order Confirmation (tag 35-MsgType=8) message.  
(tag 38-OrderQty = 15, tag 151-LeavesQty = 15)
3. CME Globex sends an Execution Report – Partial Fill (tag 35-MsgType=8) message.  
(tag 38-OrderQty = 15, tag 32-LastShares = 2, tag 151-LeavesQty = 13)
4. The client sends a Cancel/Replace (tag 35-MsgType=G) message to change the quantity.  
(tag 38-OrderQty = 10)
5. CME Globex responds with an Execution Report – Cancel/Replace Confirmation (tag 35-MsgType=8).  
(tag 38-OrderQty = 10, tag 32-LastShares = 10)
6. CME Globex sends an Execution Report – Fill (tag 35-MsgType=8) message.  
(tag 38-OrderQty = 10, tag 151-LeavesQty = 10, tag 32-LastShares = 0)

The following table provides a summary of the quantities associated with the previous example.

**Data Associated with the Disabled IFM Cancel/Replace Functionality Example**

| Action                           | Tag 38-OrderQty | Tag 32-Last Shares | Tag 151-LeavesQty | Total Filled Qty |
|----------------------------------|-----------------|--------------------|-------------------|------------------|
| New Order for quantity of 15     | 15              | -                  | -                 | 0                |
| Confirmation                     | 15              | -                  | 15                | 0                |
| Partial Fill for 2               | 15              | 2                  | 13                | 2                |
| Cancel/Replace to quantity of 10 | 10              | -                  | 10                | 2                |
| Confirmation                     | 10              | -                  | 10                | 2                |

**Data Associated with the Disabled IFM Cancel/Replace Functionality Example**

| Action      | Tag 38-OrderQty | Tag 32-Last Shares | Tag 151-LeavesQty | Total Filled Qty |
|-------------|-----------------|--------------------|-------------------|------------------|
| Fill for 10 | 10              | 10                 | 0                 | 12               |

The following example shows how the client system with IFM disable, can be filled for more than the desired order quantity in the Cancel/Replace scenario.

**11.11.3 IFM Cancel/Replace Functionality Enabled**

In Flight Mitigation (IFM) allows CME Globex customers to manage working quantity to prevent overfilling of orders in the specific scenario where an order is filled before its Cancel/Replace message is processed. IFM functionality is enabled by submitting the initial Cancel/Replace Request (tag 35-MessageType=G) message for a given order chain with tag 9768-OFMOverride=Y.

**WARNING**

**IFM behavior is indicated in the original Cancel/Replace (tag 35-MessageType=G) message throughout the duration of a given order. CME Globex will not process any change to the original submitted tag 9768-OFMOverride value.**

**11.11.3.1 Positive IFM Scenario - IFM CXR Order Quantity > Filled Quantity**

In the positive IFM scenario, the Cancel/Replace quantity is greater than that of the quantity filled against the resting order while the Cancel/Replace message is 'in flight'. With IFM enabled, the following example shows how CME Globex updates the working quantity.

1. Original Order - Buy quantity 5 @ 885.

Example: Message

```
8=FIX.4.2^9=217^35=D^34=1993^49=qa5649P^50=dummy^52=20091216-
19:21:41.109^56=CME^142=Brio^1=Brio-7101025^11=qa51993^21=1^38=5^
40=2^44=885.0000000^54=1^55=LO^57=G^59=0^60=20091216-19:21:41.109^107=LOU2
C7750^204=1^9702=1^9717=qa51993^10=049^
```

Assume one order at given price level 885.

**IFM Order Quantity > Filled Quantity Example**

| LOU2 C7750 |       |       |          |
|------------|-------|-------|----------|
| Bid        |       | Ask   |          |
| Quantity   | Price | Price | Quantity |
| 5          | 885   | 889   | 12       |
| 7          | 887   | 891   | 8        |
| 15         | 888   | 893   | 15       |



2. Incoming sell order matches for 4 @ 885 - Buy quantity 1 remains working.

**Order Matches 4 @ 885**

| LOU2 C7750 |       |       |          |
|------------|-------|-------|----------|
| Bid        |       | Ask   |          |
| Quantity   | Price | Price | Quantity |
| 1          | 885   | 889   | 12       |
| 7          | 887   | 891   | 8        |
| 15         | 888   | 893   | 15       |

3. Cancel/Replace the original order with an order to buy 10 @ 885 - CME Globex keeps 6 on the book (new quantity 10 - filled quantity 4).

Example: Message

8=FIX.4.2^9=248^35=G^34=1994^49=qa5649P^50=dummy^52=20091216-19:22:14.338^56=CME^142=Brio^1=Brio7101025^11=qa51994^21=1^37=565870255^38=10^40=2^41=q a51993^44=885.0000000^54=1^55=LO^57=G^59=0^60=20091216-19:22:14.338^107=LOU2 C7750^204=1^9702=1^9717=qa51993^9768=Y^10=190^

**Keeps 6 on the Book**

| LOU2 C7750 |       |       |          |
|------------|-------|-------|----------|
| Bid        |       | Ask   |          |
| Quantity   | Price | Price | Quantity |
| 6          | 885   | 889   | 12       |
| 7          | 887   | 891   | 8        |
| 15         | 888   | 893   | 15       |

### 11.11.3.2 Negative IFM Scenario - IFM CXR Order Quantity < Filled Quantity

In the negative IFM scenario, the Cancel/Replace quantity is less than that of the quantity filled against the resting order while the Cancel/Replace message is 'in flight'. With IFM enabled, the following example shows how CME Globex updates the working quantity.

1. Original Order Buy Quantity 10 @ 885.

Example: Message

8=FIX.4.2^9=217^35=D^34=1993^49=qa5649P^50=dummy^52=20091216-19:21:41.109^56=CME^142=Brio^1=Brio-7101025^11=qa51993^21=1^38=10^40=2^44=885.0000000^54=1^55=LO^57=G^59=0^60=20091216-19:21:41.109^107=LOU2 C7750^204=1^9702=1^9717=qa51993^10=049^

Assume one order at given price level 885.

**Buy 10 @ 885**

| LOU2 C7750 |       |       |          |
|------------|-------|-------|----------|
| Bid        |       | Ask   |          |
| Quantity   | Price | Price | Quantity |
| 10         | 885   | 889   | 12       |
| 7          | 887   | 891   | 8        |
| 15         | 888   | 893   | 15       |

2. Incoming Sell order matches for 1 @ 885, Buy quantity 9 remains working.

**Buy 1 @ 885**

| LOU2 C7750 |       |       |          |
|------------|-------|-------|----------|
| Bid        |       | Ask   |          |
| Quantity   | Price | Price | Quantity |
| 9          | 885   | 889   | 12       |
| 7          | 887   | 891   | 8        |
| 15         | 888   | 893   | 15       |

3. Cancel/Replace the original order with an order to buy 5 @ 885 - CME Globex keeps 4 on the book (remaining quantity 9 - new quantity 5).

Example: Message

8=FIX.4.2^9=248^35=G^34=1994^49=qa5649P^50=dummy^52=20091216-  
 19:22:14.338^56=CME^142=Brio^1=Brio-7101025^11=qa51994^21=1^37=565870255^  
 38=4^40=2^41=qa51993^44=885.0000000^54=1^55=LO^57=G^59=0^60=20091216-  
 19:22:14.338^107=LOU2 C7750^204=1^9702=1^9717=qa51993^9768=Y^10=190

**Buy 4 @ 885**

| LOU2 C7750 |       |       |          |
|------------|-------|-------|----------|
| Bid        |       | Ask   |          |
| Quantity   | Price | Price | Quantity |
| 4          | 885   | 889   | 12       |
| 7          | 887   | 891   | 8        |
| 15         | 888   | 893   | 15       |

## 11.12 Trade Cancellation

If CME Group determines that an executed trade on CME Globex has taken place outside the defined price band for that product or for any other reason deems a trade is in violation of the CME Group Rulebook, CME Globex sends an Execution Report - Trade Cancellation (tag 35-MessageType=8).

Prior to a trade cancellation, each client involved in the trade has already received an Execution Report – Fill containing the following tags:

- **Tag 37-OrderID** — Assigned when the order is accepted.
- **Tag 17-ExecID** — An identifier for the Execution Report.

The characters following 'TN' in the ExecID are called the *Trade Number*. This number is used to identify the trade. When the Trade Number is returned by CME Globex, the 'TN' is not sent.

### 11.12.1 GCC Trade Cancellation

If CME Globex Control Center (GCC) cancels a trade, the client application receives an Execution Report – Trade Cancellation (MessageType = 8) containing the following tags:

- **Tag 39-OrdStatus** set to 'H' for trade cancelled.
- **Tag 150-ExecType** set to 'H' for trade cancelled.
- **Tag 19-ExecRefID** containing the Trade Number for the trade being cancelled; the Trade Number as originally contained in the ExecID of the trade being cancelled. Tag 19-ExecRefID in the trade cancellation notice identifies the specific cancelled trade.
- **Tag 32-LastShares** set to the quantity of the trade that is being cancelled.

### 11.12.2 Trade Cancellation Example

The following diagram illustrates the message flow for a trade cancellation scenario on the CME Globex platform.

- The client sends a New Order (tag 35-MessageType=D) message.
- CME Globex platform sends an Execution Report – Order Confirmation (tag 35-MessageType=8) followed by an Execution Report – Fill Notice.
- GCC cancels the trade and an Execution Report – Trade Cancellation Notice (tag 35-MessageType=8) message is sent.

Tag 19-ExecRefID in the trade cancellation message contains the Trade Number of the ExecID from the previously-received message.

Tag 151-LeavesQty is not returned in the Execution Report - Trade Cancellation Notice.

The following diagram illustrates a Trade Cancellation by the GCC.



## 11.13 Additional Business Order Management Topics

### 11.13.1 Supported Contracts

CME Globex platform users are able to access all electronically traded CME contracts. [CME Group's web-site](#) has a listing of the electronically traded contracts available.

### 11.13.2 Trading on Behalf of a Client

CME Globex allows firms to submit orders for clients, as well as other clearing members for whom the firm is authorized to do business:

- A firm trading for itself should populate tag 49-SenderCompID with the value assigned by CME Group to the firm for its own business.
- If the firm is authorized to submit orders for another clearing member (Affiliate, Sub-Accounting or Cross-Margin firm number), the firm should use the SenderCompID value assigned by CME Group to the clearing member for whom the business is being done.

- If the firm wants to submit orders for its own client firms who are not clearing members, the firm can populate tag 109-ClientID with any value the firm designates.

The following examples demonstrate how firm 999 can submit orders for itself (example A), another clearing member firm, 998, (example B) or for a client (example C):

**Example A – Firm Submitting Order of Self**

Tag 49-SenderCompID = ABC999P

**Example B – Firm Submitting Order for Another Clearing Firm**

Tag 49-SenderCompID = ABC998P

**Example C – Firm Submitting Order for Client**

Tag 49-SenderCompID = ABC999P

Tag 109-ClientID = unique identifier firm assigns to client

### 11.13.3 Average Pricing System (APS)

The Average Price System (APS) lets you group multiple orders together and assign them a single average price across the group. All orders designated for averaging in a group must be for the same contract.

There are two ways to designate CME Globex platform trades for the Average Price System:

1. **Group and average multiple orders together.** Enter a "\$" in the first position of the Account number field (tag 1) of each order, the customer account number, followed by a space, followed by an APS Group ID selected by the user. The Group ID enables APS to identify the multiple orders that are to be grouped and averaged together.
2. **Assign an average price to all partial fills associated with a single order.** Enter a "#" in the first position of the Account number field (tag 1), followed by any ad-hoc number that you select.

Fills for orders that are designated using "\$" or "#" as described above are sent to APS. In order for the average price to be calculated and assigned to the fills, the clearing firm must use APS to "complete the group."

## 12. Point of Order Origination

The mandatory tags described below support the following business services:

- **Order origination identifier** - identifies geographical origin of an order.
- **Automated Trading System (ATS) indicator** - identifies an order as submitted manually or by an ATS.
- **Trading system and version identifier** - identifies name and software version of the front-end trading system.

---

*Important:* CME Group audits the values provided in these tags to ensure accuracy and compliance.

---

### 12.1 Order Origination Identifier

CME Group requires each order be tagged with the originating location of 1) the individual submitting the order, or 2) the automated trading system generating the order. The location must be identified in tag 142-SenderLocationID, as follows:

- For a manually submitted order, the location must be the location of the individual submitting the order.
- For an order generated from an ATS, the location must be the location of the person primarily controlling the ATS. For example, if a London based trader controls an ATS that is housed at the CMEG LNET facility, the location should be the ISO code for the United Kingdom.

ISO codes are located at <ftp.cmegroup.com/fix/coo>.

---

**Note:** U.S. and Canadian ISO codes include country and state or province. All other codes identify the country code.

---

### 12.2 ATS Indicator

CME Group considers any order generated without direct human interaction automated. Whether the order is submitted by manual or automated means is indicated by the value in tag 1028-ManualOrderIndicator (Y=manual, N=automated).

### 12.3 Trading System and Version

At client system logon, CME Globex requires proprietary systems and ISVs to identify their front-end system name and current production version of that system. A system provider should contact GAM to generate the unique, static value to identify the system logging into CME Globex. For each new gateway application that utilizes an iLink ID, GAM will generate a new value.

**The following tags are required on the Logon (tag 35-MsgType=A) message only and should not be sent for any other message type.**

- tag 1603-ApplicationSystemName - the system logging into CME Globex via the iLink ID. This tag is required on the Logon (tag 35-MsgType=A) message only.

---

**Note:** The client system may support multiple downstream trading applications. For example, a gateway may log in and then expose an API that many other systems use to route trades to CME Globex. If there are different gateway applications, each should have a unique value for tag 1603 as assigned by GAM.

---

- tag 1604-ApplicationSystemVersion -- client system internal version number.
- tag 1605-ApplicationSystemVendor - the vendor, or proprietary system owner, who supplies the connection to CME Globex as provided by GAM.

## 12.4 Complete List of Point of Order Origination Tags

The following table provides a complete list of tags for all inbound and outbound messages relating to Point of Order Origination.

**Table12. 1. Complete List of Point of Order Origination Tags**

| Tag  | FIX Name                 | Req | Valid Values                   | Format     | Description   |
|------|--------------------------|-----|--------------------------------|------------|---|
| 1603 | ApplicationSystemName    | C   | Obtain from GAM or from Vendor | String(30) | Provides the name of the application system being used to generate FIX application messages. This will normally be a trading system, OMS, or EMS. |
| 1604 | ApplicationSystemVersion | C   | Obtain from GAM or from Vendor | String(10) | Provides the version of the application system being used to initiate FIX application messages.   |
| 1605 | ApplicationSystemVendor  | C   | Obtain from GAM or from Vendor | String(10) | Provides the vendor of the application system.  |

**Table12. 1. Complete List of Point of Order Origination Tags**

| Tag  | FIX Name             | Req | Valid Values | Format     | Description   |
|------|----------------------|-----|--------------|------------|---|
| 142  | SenderLocationID     | Y*  |              | String(32) | <p>Assigned value used to identify specific message originator's location (i.e. geographic location and/or desk).</p> <p>The first two bytes will be used for non-US and non-Canada locations as per ISO 3166-1, identifying only the country (for example, JP for Japan or CN for China).</p> <p>The first five bytes will be used for US and Canada locations, which will include the state or province (for example: US,IL) For valid values, refer to <a href="http://ftp.cme-group.com/fix/coo">ftp.cme-group.com/fix/coo</a>.</p> |
| 1028 | ManualOrderIndicator | Y*  | Y<br>N       | Boolean(1) | Indicates if the order was sent manually (as opposed to being generated by automated trading logic).  |
| 143  | TargetLocationID     | Y*  |              | String(32) | Echoes back Tag 142-SenderLocationID.   |
| 323  | SecurityResponseType | Y   |              | Int(1)     | <p>Type of response:<br/>2 = Accept security proposal with revisions as indicated in the message.<br/>5 = Reject security proposal.</p> <p><b>Note:</b> If tag 142 is missing from a Security Definition Request message (tag 35=c), the UDS request will be rejected with tag 323=5. Tag 1028 is required and will be validated via audit.</p>   |

Y: Required by FIX protocol, Y\*: Required by CME Globex (not by FIX protocol), N: Not Required, C: Conditionally Required (see description).

Refer to the [iLink Message Specification](#) for complete message details.



## 13. Revision History

| Initial Release | Version | Author | Description   |
|-----------------|---------|--------|---|
| 7/15/2010       | 2.0     | CR     | Incorporated Client Impact document functionality that is launched to-date. Modified or corrected tags, values, descriptions, and message flows throughout. |
| 9/10/2010       | 2.1     | CR     | Modifications and corrections to the Order Management chapter. Added Appendix A: Two Types of Resend Logic.   |
| 10/28/2010      | 2.2     | CR     | Correct Section 11.11.3.2 Negative IFM Scenario - IFM CXR Order Quantity < Filled Quantity.   |
| 1/4/2011        | 2.3     | CR     | Modified text on "Client System Maximum Resend Request Limit" on Page 21.   |
| 1/20/2011       | 2.4     | CR/DT  | Modified text on "Client System Maximum Resend Request Limit" on Page 21.   |
| 7/7/2011        | 2.5     | DT     | Added new chapter: "Point of Order Origination" on Page 54.   |
| 8/4/2011        | 2.6     | DT     | Added warning to "Order Qualifiers" on Page 39.   |