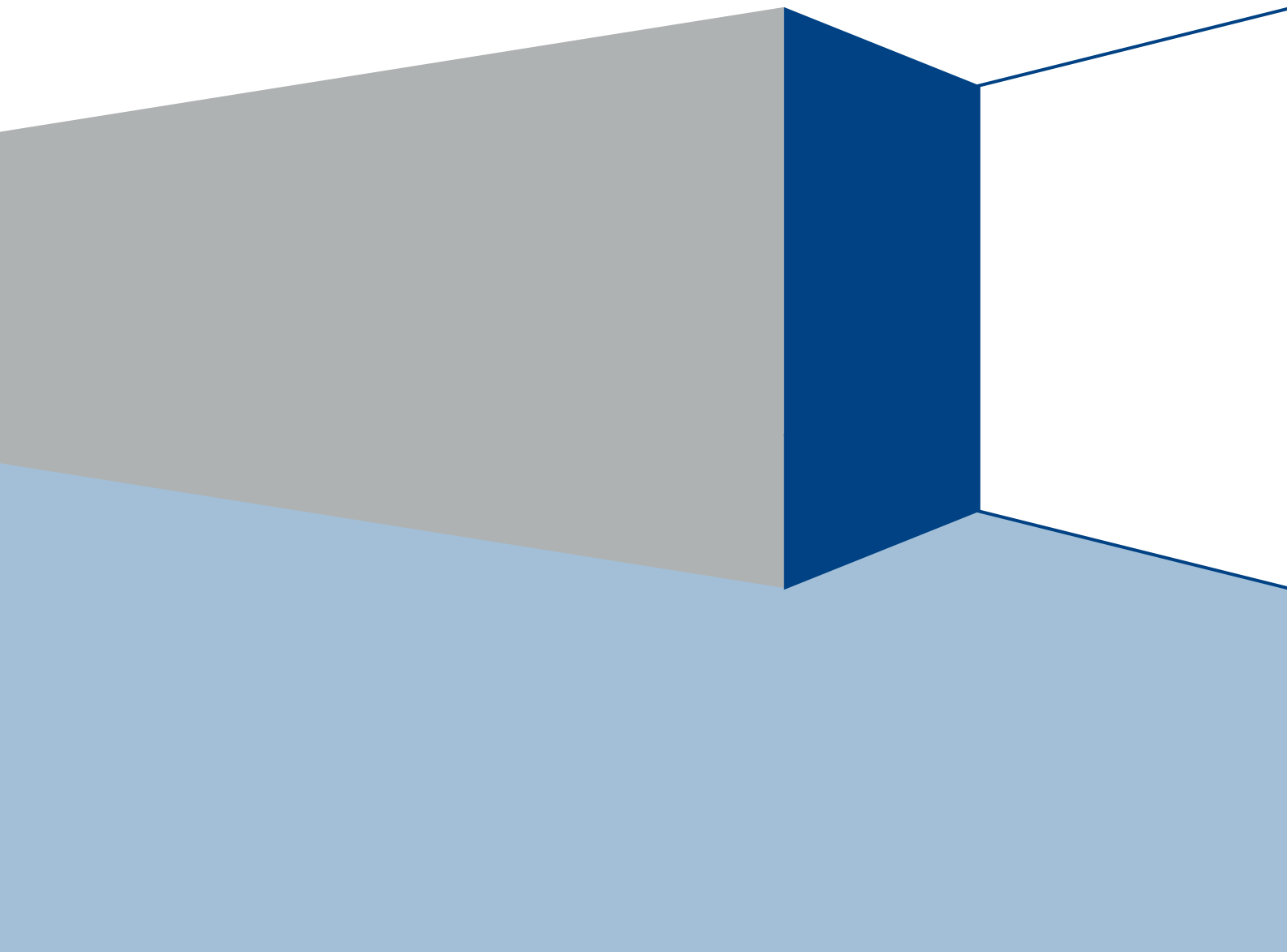




London
Stock Exchange Group

SERVICE AND TECHNICAL DESCRIPTION

Guide to the FIX 5.0 Interface to TradElect™



Important note

This document describes the provision of a FIX 5.0 interface by the London Stock Exchange Group ("the Group") and, as a development project, is subject to change. It has been produced by the Group in order to assist customers in assessing and implementing this interface. While it has been prepared on the basis of the best information available, the Exchange accepts no liability for decisions taken, or systems work carried out by any party, based on this document.

This document does not form part of the contractual documentation between the Exchange and its respective customers.

If you have any general queries relating to this document, please email:

ctgroup@londonstockexchange.com

Further copies of this document can also be downloaded from our website at

www.londonstockexchange.com

Preface

The purpose of this publication is to provide customers with the details necessary for accessing and using the Group's TradElect™ and Infolect™ systems via the FIX 5.0 interface. It should be noted that the term "FIX 5.0 Interface" should be understood to mean the London Stock Exchange Group's implementation of FIX 5.0 for its interface to TradElect and Infolect.

- TradElect is the Group's trading system. It has delivered unprecedented levels of performance, enhanced functionality and new services to our markets and allows customers to trade on one of the fastest, most reliable and technologically advanced equity markets in the world.
- Infolect is the Group's high performance market data system. It broadcasts several levels of data which is generated by the trading activity on our markets including trade prices and sizes as well as a complete tick-by-tick order book.

The document is divided into the following sections:

- Connectivity and session layer summary
- Description of the FIX 5.0 interface, including the message flows between participants and the Exchange for order, quote and trade report entry, Own Trades Book Download (OTBD) and Own Order Book Download (OOBD)
- Exceptions, business and application level rejects

Throughout this document, any reference to a specific message or FIX tag will be marked by highlighting the reference, with the message type or tag value given in brackets:

MsgType (n=x) e.g. ExecutionReport (35=8)
Field name or Tag (n) e.g. OrderType (40)

Associated Technical Specification Publications

This document should be used in conjunction with the London Stock Exchange Group's FIX 5.0 Data Formats repository which is available at

<http://www.londonstockexchange.com/en-gb/products/membershiptrading/techlib/techguidenotes/>

Readers should also refer to the fixed width ("native") interface technical specification documents that support the Group's TradElect and Infolect systems. These documents are:

- TradElect and Infolect Service Description (Ref: TIS101)
- Interface Specification (Ref: TIS102)
- Network Specification (Ref: TIS103)
- Data Formats (Ref: TIS104)

The following documents are also available in electronic form only:

- TradElect and Infolect Service Overview (Ref: TIS100)
- Market Configuration Matrix (Ref: TIS105)
- XML Message Specifications (Ref: TIS106)
- XML Field Specifications (Ref: TIS107)
- Glossary (Ref: TIS108)

Copies of these documents and further information can be obtained from the Technical Library on the London Stock Exchange ("the Exchange") web site at:

<http://www.londonstockexchange.com/en-gb/products/membershiptrading/techlib/>

The following reference material can be obtained from the FIX Protocol Limited (FPL) website:

- FIXT1.1 Transport layer Specification
- FIX 5.0 Service Pack 2 Specification
- FIX Protocol Schema for Version 5 Service Pack 2

<http://www.fixprotocol.org/specifications/>

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- TradElect™
- Extranex™
- Infolect™

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1. Introduction

As part of a wider programme of initiatives designed to facilitate wider access to our markets, we are introducing a Financial Information eXchange (FIX) 5.0 compliant interface to our TradElect trading system. The FIX 5.0 interface will operate alongside the existing fixed width ("native") interface which uses standard data formats and is accessed via the Group's network - Extranex and BitNET.

The following diagram shows how the two interfaces will co-exist:

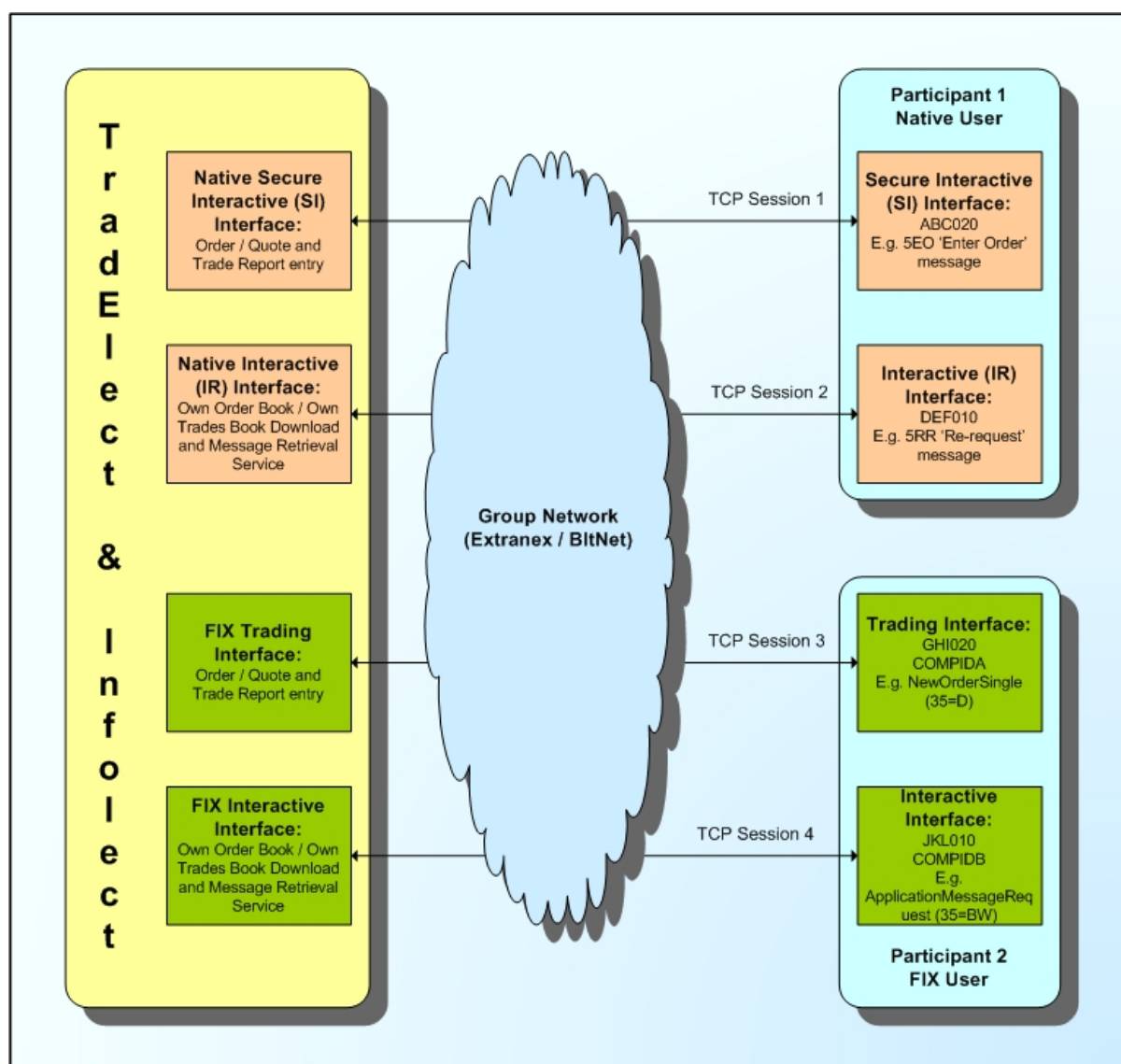


Diagram 1: FIX 5.0 interface for TradElect / Infolect

FIX is an industry-driven messaging standard that is used globally by the sell side, buy side, exchanges, and information technology providers for the electronic trading of financial instruments. By providing customers with an open standard protocol we aim to make it quicker, easier and more

cost efficient for customers to access and maintain connection to our orders books. It may even provide latency advantages to those who use FIX within their own organisation.

1.1. Readership

This document is intended for use by business analysts and software developers building a FIX 5.0 interface to the TradElect and Infolect systems and anyone else who has an interest in understanding the FIX 5.0 Interface.

1.2. Version History

This document, "Guide to the FIX 5.0 Interface for TradElect", has been through the following iterations:

Version	Date	Description
1.0	January 2009	Initial document release
2.0	October 2009	Updated release
3.0	15 February 2010	Updated version, see below schedule of changes
3.1	21 December 2010	Minor update, added to schedule of changes

Amendments made to the original content, will be identified using a series of side bars as illustrated opposite.

The following schedule of changes also provides further details of amendments to the original document.

FIX 5.0 Guide Update			FIX Message Catalogue Update	Description of document change
#	Section	Page #		
1	2.2	12		Additional information provided on the OrdStatus (39) that is returned post the modification of a Parked order: <i>"Please note that when a customer successfully enters a Parked order (e.g. TimeInForce (59) = "7" (At the Close), an ExecutionReport (35=8) message will be returned to the customer with an OrdStatus (39) = "9" (Suspended). If that Parked order is then successfully modified and the orders Price Time Priority changes as a result, the acknowledgment of that modification (ExecutionReport (35=8) message) will return an OrdStatus (39) = "0" (New)."</i>
2	6.2	35		OrderCapacity (528) Riskless Principle tag value changed from "S" to "R". The correct value is "R". FIX Message Catalogue detailed the correct value.

3	6.2	34	Yes	<p>Correction of TimeInForce (59) values for Good For Intra-Day Auction (GFX) and Good For Auction (GFA). The correct values are:</p> <p>8 = Good For Auction (GFA) 9 = Good For Intra-Day Auction (GFX)</p>
4	4.7	19		<p>Section updated to state the allowable range that we will accept from a customer for MaxMessageSize (383) and that if the 383 value stated by a customer is lower than the minimum allowed, we will reject the Logon (35=A) message: <i>"The maximum message size is bilaterally agreed between the client and the Exchange during the logon process using MaxMessageSize (383). This can be modified intraday by performing a logoff and logon with the new MaxMessageSize (383). The allowable range for MaxMessageSize (383) is: 3999 to 6656.</i></p> <p><i>The minimum represents the largest possible ExecutionReport (35=8) with no fragmented sections; the maximum represents largest possible ExecutionReport (35=8) with 99 executions. If the participant does not specify a MaxMessageSize (383) value on logon then no fragmentation of Execution Reports (35=8) will occur.</i></p> <p><i>The MaxMessageSize (383) on outbound messages is 6656. If the MaxMessageSize (383) value stated by a customer is lower than the minimum allowed, we will reject the Logon (35=A) message."</i></p>
5	9.2	57	Yes	<p>Section updated with TrdType (828) values used for the Own Trades Book Download (OTBD) Service: <i>"Optional, the request may specify to include automatic trades (828=0), manual trades (828=54) or both (tag not included). Default value is all."</i></p>

6	6.5	41		<p>Section updated to provide detail on the acknowledgment details returned if multiple (same) Order Mass Cancel Requests (35=q) are sent in by the customer for the same (already cancelled orders):</p> <p><i>"Please note that should a customer send in a subsequent OrderMassCancelRequest (35=q) for messages that have already been cancelled, a valid OrderMassCancelResponse (35=r) message will be returned with a MassCancelResponse = Cancel order for Market Segment (531=9), rather than Cancel Request Rejected (531=0) and appropriate error text."</i></p>
7	7.2	46	Yes	<p>Detail provided on the different order of tags in the repeating group <QuotEntryGrp>: <i>"Please note the different order of tags in the repeating group <QuotEntryGrp> compared to the standard FIX:</i></p> <p><i>Common FIX (please see: www.fixprotocol.org):</i></p> <p><i>295 NoQuoteEntries</i> <i>299 QuoteEntryID</i> <i>132 BidPx</i> <i>133 OfferPx</i> <i>134 BidSize</i> <i>135 OfferSize</i> <i>15 Currency</i> <i>775 BookingType</i> <i>528 OrderCapacity</i> <i>529 OrderRestrictions</i></p> <p><i>LSEG FIX5.0 Interface:</i></p> <p><i>295 NoQuoteEntries</i> <i>299 QuoteEntryID</i> <i>775 BookingType</i> <i>528 OrderCapacity</i> <i>529 OrderRestrictions</i> <i>132 BidPx</i> <i>133 OfferPx</i> <i>134 BidSize</i> <i>135 OfferSize</i> <i>15 Currency"</i></p>
8	6.4	40	Yes	<p>Additional bullet added to say: <i>"Include tags: TimeInForce (59) and OrderCapacity (528)"</i></p>
9	N/A	N/A	Yes	<p><FillsGrp> component block for the NewOrderSingle (35=D) updated. Absence of TimeInForce (59) tag indicates Day order statement removed as this is</p>

				incorrect. This tag is mandatory for this message.
10	Appendix C	122		Description of Q228I expanded to read: " <i>No Matching Has Occurred (FOK order unfilled)</i> "
11	8.2.13	52	Yes	Reworded to say: " <i>OrderType (581) shows whether the trade was carried out against a House or Client account. If this tag is not present, then the default "Standing" value will be used.</i> "
12	4.8	22	Yes	Updated to include change to Maximum Message Size which now reads: <i>The minimum will represent the largest possible ExecutionReport (35=8) with no fragmentable sections; the maximum will represent largest possible ExecutionReport (35=8) with 35 executions.</i>

1.3. Service Updates

This technical guide has been written to cover the introduction of the FIX 5.0 interface to TradElect. The publication of further updates will be communicated via Service Announcement and will be available at:

<http://www.londonstockexchange.com/en-gb/products/membershiptrading/techlib/servannounce/serviceannouncements.htm>

1.4. Useful Reference Material

The following section lists some useful reference material that is mentioned within the main body of this guide. It is recommended this material be read in conjunction with this document:

- Other documents in the Group's TradElect and Infolect technical specifications series (TIS100 to TIS108), which are available on the Exchange's website.

<http://www.londonstockexchange.com/en-gb/products/membershiptrading/techlib/techspecs.htm>

- The 'Guide to TradElect' and 'Trading Parameters' document available via the Exchange's website.

<http://www.londonstockexchange.com/en-gb/products/membershiptrading/tradingservices/>

- Customer testing documentation available via the Exchange's website

<http://www.londonstockexchange.com/en-gb/products/membershiptrading/techlib/cust+test/>

1.5. Enquires

Please contact the Client Technology Group if you have functional questions about this document or the TradElect and Infolect services in general. All enquiries should be addressed to:

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2. FIX 5.0 Interface Overview

The fully integrated FIX 5.0 interface to TradElect offers customers the full range of trading functionality and at least the same high level of performance as the native interface but using industry standard FIX messages.

The key features are as follows:

- Standard FIX version 5.0 Service Pack 2 will be used for functional messages as this is best placed to support both existing and new trading functionality and multi-asset class access. No custom tags or values are used however the LSE has had tags and values added to an official FPL Extension pack to support functionality (see the LSE FIX repository).
- A FIX engine will be incorporated within the existing TradElect architecture in order to manage participant logon and session handling. The existing TradElect USAP model of user identification will continue to be supported.
- The integrated FIX 5.0 interface will support order, quote and trade reporting functionality. Additionally, as part of this release, new order functionality such as Minimum Execution Size and Best Bid/Offer Pegged orders will be introduced and will only be available on the FIX 5.0 Interface. For more details on this functionality, please refer to the Hidden Pegged orders and Minimum Execution Size Service and Technical Description available on the Exchange's website:

<http://www.londonstockexchange.com/en-gb/products/membershiptrading/techlib/techguidenotes/>

- All current trade reporting functionality will continue to be supported.
- The ability to re-request broadcast messages via the FIX 5.0 interface will be supported.
- The Own Order Book Download (OOBD) and Own Trades Book Download (OTBD) services will be supported in a similar fashion to the existing model, however a stream of ExecutionReport (35=8) or TradeCaptureReport (35=AE) messages (depending on the nature of the book download) will be sent in response to a request, instead of the native approach which uses message blocks in response messages.
- Following a phased implementation, participants will be able to access all markets operating on TradElect via the FIX 5.0 interface. Timescales for the adoption of the FIX 5.0 interface for the JSE and Borsa Italiana markets are to be confirmed.
- Market data will initially be only available via the Native protocol; however the Exchange intends to provide Market Data via the FAST protocol across all markets in the future.

2.1. *Benefits Of Using The FIX 5.0 Interface*

- The FIX messaging protocol has been adopted globally and is being used by an increasingly high proportion of the financial community.
- Its standardised nature will make it quicker, easier and more cost efficient for new customers to develop to in order to trade on our orders books. Existing customers who are moving to the FIX 5.0 interface will also have the same benefits.

- Our implementation is in line with the FIX 5.0 SP2 protocol standard and includes amendments to the FIX specification that have been approved by the FIX Protocol Limited Global Technical Committee. These changes are included in the FIX version 5.0 SP2 protocol.
- FIX 5.0 offers a number of features specifically designed for participant/exchange communication and enables us to accommodate the standard business practices and functionality used today.
- FIX 5.0 separates the transport layer from the application layer making it possible to use alternative transport mechanisms such as MQ series. The initial Exchange implementation of the protocol will use TCP/IP only and there are no plans to use any alternatives at this time.

2.2. High Level Comparison With The Native Interface

The FIX 5.0 interface has been designed to be as backward compatible as possible with the native interface to ensure a level of familiarity for customers.

In summary, the changes that are introduced with the FIX 5.0 interface are as follows:

Message security	The private network used to connect clients to TradElect is deemed to be sufficiently secure so as to make the practice of MAC keys and encryption obsolete. As such MAC keys will not be present on any FIX message.
Instrument identification	In order to conform to the existing TradElect identification methodology many inbound FIX messages require the 4 - Way Key of Tradable Instrument Code, Currency Code, Country of Register and Segment Code which will map to the FIX SecurityID (48) field as a concatenation of the four constituents.
Iceberg orders	When the peak of a passive iceberg is refreshed or if a modification is performed that causes the iceberg to lose price/time priority, the owner will receive both new and old Public Order Code fields if he uses the native protocol, returned in the 5TS 'Trade Execution Information' message. For FIX; the OrderID (37) field is returned containing the new Public Order Code in the ExecutionReport (35=8) message if it has changed or the existing one if it has not. The message will also contain the current ClOrdID (11) and the previous OrigClOrdID (41) if the response is as a result of a modification.
Interactive Re-request Response	The current Re-request First Response (5FR) message contains the Re-Request High Sequence Number field, but this is not included in the FIX equivalent: ApplicationMessageRequestAck (35=BX). Also, unlike the native protocol, there is no message contained in the first response, this will be in the subsequent response.

FIX order chaining functionality will be supported	<p>TradElect currently uses the Private Order Code as the unique Order ID for the lifetime of the order. ClOrdID (11) is the unique Order ID designated by the participant upon order entry when using FIX. Its uniqueness must be guaranteed across a CompID and across TraderGroup and Security combinations. The ClOrdID (11) will be the order reference for a future modification, deletion, or status request submitted by the participant.</p> <p>Upon submission of an order modification or delete, the participant will provide a new ClOrdID (11) for the order modification and reference the original order by populating the OrigClOrdID (41) field with the original ClOrdID (11) of the order. ClOrdID (11) is validated for uniqueness across the lifetime of the order that carries the ClOrdID (11), so for a multi day order that ClOrdID (11) will be validated against for ClOrdID (11) uniqueness. The rules regarding ClOrdID (11) apply to QuoteEntryID (299).</p>
In flight modification	<p>FIX provides the ability for customers to modify orders 'in flight' since no acknowledgement is required from TradElect before sending subsequent messages chained to the original order entry message (ClOrderID (11) is used as the unique order code). This results in customer benefits from more flexible risk management.</p>
Parking of orders	<p>In the event that an order is required to be parked a FIX ExecutionReport (35=8) message will be sent with the OrdStatus (39) = "Suspended". An ExecutionReport (35=8) message will also be sent when an order is successfully injected onto the order book. This message will contain an updated order status.</p> <p>Parking/injection will also apply to pegged orders (i.e. when there is an incomplete BBO to peg to) and ExecutionReport (35=8) messages will be sent in the same circumstances.</p> <p>Please note that when a customer successfully enters a Parked order (e.g. TimelnForce (59) = "7" (At the Close), an ExecutionReport (35=8) message will be returned to the customer with an OrdStatus (39) = "9" (Suspended). If that Parked order is then successfully modified and the orders Price Time Priority changes as a result, the acknowledgment of that modification (ExecutionReport (35=8) message) will return an OrdStatus (39) = "0" (New).</p>
Basket functionality	<p>Not supported via the FIX 5.0 interface.</p>
Time standards	<p>Coordinated Universal Time (UTC) is used in all inbound and outbound FIX messages to and from the Exchange. Customer systems will need to be adjusted to correctly identify the local time. This includes SendingTime (52), OrigSendingTime (112) and TransactTime (60).</p>

Own Order Book Download / Own Trades Book Download	<p>Own Order Book Download (OOBD) and Own Trades Book Download (OTBD) will be supported in a similar fashion to the existing model, however in place of the embedded message approach currently used a stream of ExecutionReport (35=8) messages or TradeCaptureReport (35=AE) messages (depending on the nature of the book download) will be sent.</p> <p>OTBD may be filtered by either Segment or 4 Way Key. If Segment is used the SecurityID (48) field must be padded with spaces before the segment code and be 21 chars long.</p> <p>An existing restriction on Own Trades download is lifted. Today, OTBD specifies the private order code which is never returned to a customer using EQ's e.g. any automatic trade in the OTBD cannot be linked to the original EQ. In R5 the OTBD will return the CIOOrderID (11) that was originally specified by the customer in the MassQuoteEntry (35=i) message (EQ equivalent).</p>
Order modification	<p>On the current native interface, participants can modify their order size by specifying a relative size change. When using the FIX 5.0 interface, participants will modify their orders by using a cancel replace method, based on absolute rather than relative size changes. The FIX message OrderCancelReplaceRequest (35=G) should be used.</p> <p>Please note that the current executed volume at the time of the order modification will still be taken into account for the sizing of the modified order.</p>
Message Reference Number	<p>On the current native interface, this field, set by the subscriber, must be unique over three working days for a specific USAP and Interchange Type. The same value is formatted within the response, allowing the subscriber system to match the reply with the original message. In FIX each session will establish an independent incoming and outgoing sequence number series; participants will maintain a sequence series to assign to outgoing messages and a separate series to monitor for sequence gaps on incoming messages.</p>
Relationship Model	<p>Participant hierarchy remains the same however a Trader Group cannot be shared across the native and FIX 5.0 interface. A USAP assigned to the FIX 5.0 interface can have many associated ComplIDs (assigned to each session). A FIX assigned USAP cannot then be used with the native interface.</p>
Connections per USAP	<p>ComplIDs are associated with USAP. There is no restriction in the number of ComplIDs that can be associated with a single USAP. This effectively lifts the existing restriction of 4 sessions per USAP via the native interface, which means that participants that require multiple TCP connections can do so.</p>
Customer disconnection before close of service	<p>Please note that all users of the FIX 5.0 interface must remain <u>connected to the service until the scheduled close time (see 4.3.2 Session Times)</u>. Any unsolicited messages sent after a participant logs off at the end of the day will be lost (this differs from the native interface where by participants would receive these messages when they logon the next day).</p>

Reference data	Any reference data that contains order type information such as the 5PM 'Period Rules for Market Mechanism and Validity Type' message will not be available for the new Hidden and Pegged order types introduced as part of this TradElect release. This is as a result of these new order types not being available via the native interface and therefore not using the concept of Market Mechanism Type.
Order routing	TradElect will now hold third party ComplIDs against orders which are returned in all associated messages. This gives increased flexibility for those customers providing DMA services.

2.3. Validation of FIX 5.0 Interface Messages

Users of the FIX 5.0 interface should consider the following points in relation to the extent of message validation applied to FIX messages by the FIX 5.0 interface. It should be noted that the term "FIX 5.0 Interface" should be understood to mean the London Stock Exchange Group's implementation of FIX 5.0 for its interface to TradElect and Infolect. Specifically:

- Validation will take place against the LSE FIX repository (as published by the LSE)
- Validation will take place with respect order of repeating group fields, as per the FIX spec
- Tags that are not supported by the FIX 5.0 interface will not be validated regardless of their being set (so will result in neither acceptance nor rejection)
- Not all tags in a FIX message will be validated, even if the FIX 5.0 interface supports them for that message type. Different validation on different fields will be performed on the same message type depending on its purpose. For example, although TradeCaptureReport (35=AE) message is used for both enter trade and cancel trade, different fields are validated depending on its intent
- The FIX 5.0 interface may require some fields to be mandatory that are not mandatory in the FIX protocol in order to support Trading System requirements
- The 4 way key must be padded with spaces as appropriate in SecurityID (48) to make the length 21 chars, see section 5.1 Symbology.
- FIX messages must be encoded in ASCII (not extended ASCII)
- PossDup (43) and OrigSendingTime (122) fields are not validated
- If an inbound message fails 'session' level validation at the FIX gateway a reject Message (35=3) is sent. If the message contains an 'E720I' advisory code the Text (58) field will contain some details of fields failed gateway conversion.

For information on which subset of fields are validated for a given message type for a given message function, please refer to the London Stock Exchange Group's FIX 5.0 Data Formats repository which is available at:

<http://www.londonstockexchange.com/en-gb/products/membershiptrading/techlib/techguidenotes/>

Message and field catalogue definitions are provided, detailing mandatory and conditional mandatory rules for inbound messages in to the FIX 5.0 interface.

3. Network Connectivity

The Group currently allows multiple methods of connectivity to its markets, ranging from a full Host to Host solution through to a Vendor Access Network connection where all connectivity is provided by a third party. Note: one method is for Customer Testing Services (CTS) access only:

- London Stock Exchange (Extranet) Host to Host
- Borsa Italiana (BitNET) Host to Host
- Network Service Provider (NSP)
- Vendor Access Network (VAN)
- VPN Developer (test connectivity only)
- Exchange Hosting
- Accredited Data Centre Provider
- Member Authorised Connection (MAC)

The presentation of these services on a client site is referred to as a Service Access Point (SAP). Full and up to date details on connectivity options and pricing are contained in the "Access and Network Services" area on the Exchange's website:

<http://www.londonstockexchange.com/en-gb/products/membershiptrading/accessnetworkservices/>

3.1. Network Security

All customers are responsible for ensuring that the necessary security controls are in place between the Group's network and the customer's own network.

The Exchange has also implemented a number of security controls to minimise the risk of unauthorised access to its network.

A full description of network security is provided in the Network Specification (Ref: TIS102), available on the Exchange's website at:

<http://www.londonstockexchange.com/en-gb/products/membershiptrading/techlib/techspecs.htm>

4. Session Management

With the release of FIX version 5.0, a new Transport Independence (TI) framework was introduced which separates the FIX Session Protocol from the FIX Application Protocol. Under this framework, the application protocol messages can be sent over any suitable transport technology (e.g. MQ, WS-RX, message bus), where the FIX Session Protocol is one of the available transport options for FIX application messages.

The FIX 5.0 interface to TradElect employs a fully compliant FIXT1.1 session protocol as the transport layer over a TCP/IP network connection and it is expected that participant implementations will comply with all aspects of the FIXT1.1 session layer protocol.

Please refer to the FIX Session Protocol Specification for detailed information about the Transport Independence (TI) Framework:

<http://www.fixprotocol.org/fixt1.1spec>

4.1. Summary Of Session Messages In Use

FIX Message	FIX Message Type	Direction
35=A	Logon	Bi-directional
35=0	Heartbeat	Bi-directional
35=1	Test Request	Bi-directional
35=2	Resend request	Bi-directional
35=3	Reject*	Bi-directional
35=4	Sequence Reset/Gapfill	Bi-directional
35=5	Logout	Bi-directional

* Note: The MessageReject (35=3) message is used to return session level advisory codes and unsupported field failure advisory codes.

Other advisory codes are returned in the relevant response message for a given FIX message type.

4.2. Logon Procedures

Clients are required to initiate a connection to TradElect / Infolect at the start of the session by sending a Logon (35=A) message. The identity of the client will be authenticated and if successful TradElect / Infolect will respond with a Logon (35=A) message. Clients must wait for the confirming Logon (35=A) message before declaring the session fully established.

A logon request that fails authentication will be responded to with a Logout (35=5) message and result in the TCP connection being dropped and the FIX session not being created. The reason for the rejection will be provided in the Text (58) tag in the Logout (35=5) message.

Any further logon requests that are sent to the FIX 5.0 interface before the initial logon request has successfully been processed will be discarded.

This logon initialisation process is expected to take 2 Heartbeat intervals + some reasonable transmission time or the connection will be dropped. Customers are advised to configure their TCP connections to stay alive for a period of time equal to this.

Logons to the Trading Gateway will use sessions that span a trading day. Logons to the Interactive Gateway will use sessions that span the life of the connection therefore each connection requires sequence numbers to set to 1.

A CompID may logon once; any attempts at duplicate concurrent logons will result in rejections with advisory code E720E.

4.3. Counterparty Identification

The Exchange will identify counterparties during Logon negotiation using:

- CompIDs
- IP addresses

Clients should identify themselves in the SenderCompID (49) and should insert the Exchange identifier in the TargetCompID (56). Note that the use of SenderCompID (49) and TargetCompID (56) will be different when OnBehalfOf functionality is used.

The Exchange will populate the SenderCompID (49) with its own identifier and insert the Client identifier in the TargetCompID (56) on all outbound messages.

Client CompIDs will be defined by the Exchange (in the same manner as USAPs) and are an alphanumeric value up to 6 characters in length and are not case sensitive.

The Exchange supports one Exchange CompID for the Trading Gateway (used for order, quote and trade report entry) and one Exchange CompID for the Interactive Gateway (used for the retransmission services of Own Order Book Download (OOBD), Own Trades Book Download (OTBD) and Market Data re-request).

CompIDs will be bound to an IP address. The Exchange will not accept any CompIDs originating from any IP address other than ones that have been pre-enabled for use.

Details of the new destination CompID, IP address and port number details for the production and test environments will be provided to customers at a later date.

4.4. CompID and USAP Relationships

Each client CompID will be associated with a User Service Access Point (USAP). A USAP is the Exchange's basic unit of service provision and is used by TradElect to identify one or more client applications.

Customers access to the Group's network is made via a Service Access Point (SAP) installed at a customer site. A SAP consists of one or more edge routers and the termination equipment for the primary and secondary network circuits. The SAP provides both the physical and logical interface to the IP Network.

As with the native interface, USAPs can be shared across SAPs. So, for example, a client application which is shared across a Primary and Backup site can use a single USAP if required, as is the case with the native interface. However as CompIDs can be allocated across USAPs and message recovery is done at the CompID level it is not necessary for USAPs to be shared across SAPs for message recovery.

There is no limit to the number of CompIDs that can be associated with a USAP. Customers will require at least one CompID / USAP to access the Message Retrieval, OOBD and OTBD services

(Interactive) and at least one CompID / USAP combination to access the order/quote/trade report entry services (Secure interactive). The USAP used to access the Interactive services is always different to the USAP required to access the Secure Interactive Services.

Clients will be able to logon with a CompID from any SAP provided that the associated USAP has been configured for use with that SAP. Clients are free to configure their CompID usage according to line bandwidths and locations.

USAPS will not be sent in any FIX 5.0 messages. They will be preconfigured as part of the enablement process and will appear on the client enablement forms as today.

For the FIX 5.0 interface, there is a one to one correspondence between FIX sessions and TCP/IP sessions and each session will be assigned a unique CompID. Many CompIDs can be associated with a FIX enabled USAP, so clients requiring multiple TCP sessions per USAP must request additional CompIDs.

A FIX enabled USAP operates independently of a native interface enabled USAP; it cannot be shared across both interfaces.

There must be one default FIX CompID per Trader Group to allow exchange generated messages to be routed i.e. unsolicited dual sided trade reporting messages.

4.5. Participant Hierarchy, CompIDs and USAPS

The Exchange uses a 3-tier participant structure to identify Trading participants at an application level as shown in the following table.

Member ID	The highest level for depicting a participant - this usually corresponds to a firm's legal entity. Member IDs are public and are used to identify counterparties in trade reports and, indirectly, to advertise a client's name against a named order or quote.
Trader Group	The level at which authorisations and enablement for trading activity are performed by the Exchange. Trader Groups provide a greater level of flexibility during configuration than a single identifier would do, for example they could be used to segment trading activities between individual desks within the client firm. Trader Groups are always private data between the Client and the Exchange.
Trader ID	This is an optional identifier to represent the individual trader. Each Trader ID must be unique within a given Trader Group if used. They are also private.

The relationship model between these entities and the USAP and CompID is given in the following diagram:

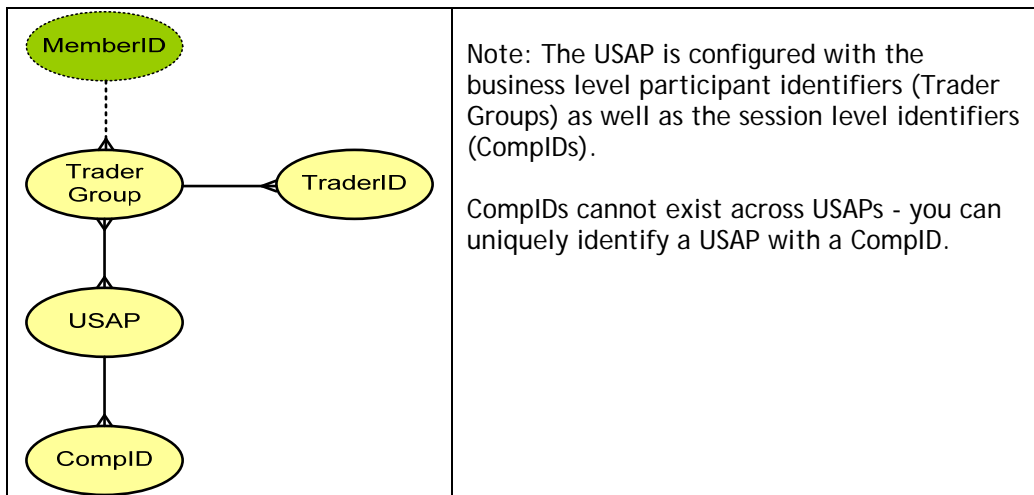


Diagram 2: Relationship Model

Trader Groups and USAPs cannot be shared across the native and the FIX 5.0 interface. For more information on the participant hierarchy please refer to the Guide to TradElect available at:

<http://www.londonstockexchange.com/en-gb/products/membershiptrading/tradingservices/>

4.6. *FIX Version Identification*

The FIX 5.0 protocol separates the session layer from the application layer and each has its own version identifier. The identifier that should be inserted into the BeginString (8) field in the standard header of all messages is the transport version. This should contain the string "FIXT1.1"

In addition to this, the Logon (35=A) message must contain an application identifier to identify the default application version in use. This is a 'one-time' communication of version data at logon. The application identifier should be inserted into the DefaultAppVerID (1137) field and its value should be set to = "9" (TBC).

Use of incorrect version data will result in the logon attempt failing.

4.7. *Heartbeat Intervals*

Heartbeats are negotiated during the logon process and specified in the HearBtInt(108) field. Allowable heart beat periods will be communicated to the market at a later date upon completion of the Exchange's internal technical testing of the FIX 5.0 interface service.

4.8. *Maximum Message Size and Message Fragmentation*

FIX message fragmentation is supported by the Exchange for the ExecutionReport (35=8) message. This is the only message that may be fragmented. An ExecutionReport (35=8) message will be fragmented if the maximum message size has been exceeded for that message.

The maximum message size is bilaterally agreed between the client and the Exchange during the logon process using MaxMessageSize (383). This can be modified intraday by performing a logoff and logon with the new MaxMessageSize (383). The allowable range for MaxMessageSize (383) is: 3999 to 6656.

The minimum represents the largest possible ExecutionReport (35=8) with no fragmented sections; the maximum represents largest possible ExecutionReport (35=8) with 35 executions.

If the participant does not specify a MaxMessageSize (383) value on logon then no fragmentation of Execution Reports (35=8) will occur.

The MaxMessageSize (383) on outbound messages is 6656. If the MaxMessageSize (383) value stated by a customer is lower than the minimum allowed, we will reject the Logon (35=A) message.

4.9. Session Life

A FIX session is valid for one trading day and will begin with sequence number one (1). At the end of each trading day the FIX session should be closed (logged off) and sequence numbers will be reset by the Exchange for the beginning of new session the next trading day.

Please note that all users of the FIX 5.0 interface must remain connected to the service until the scheduled close time (see 4.9 Session Times below). Any unsolicited messages sent after a participant logs off at the end of the day will be lost (this differs from the native interface where by participants would receive these messages when they logon the next day). In this scenario participants would need to perform an OOB/OTBD in the morning to identify any trades or order state changes that have occurred since logoff. Participants can assume that there will be no outstanding messages if they have disconnected after the closing time.

Logons to the Trading Gateway will use sessions that span a trading day. Logons to the Interactive Gateway will use sessions that span the life of the connection therefore each connection requires sequence numbers to set to 1.

Sequence numbers are allocated by the trading system, not the FIX engine

4.10. Session Times

The service hours for when the FIX 5.0 interface will be available to accept connections will mirror TradElect and Infolect service operation hours as follows (times specified in local UK time):

Service	Start	Close
Infolect	05:00	20:30
TradElect	05:00	20:30

4.11. Time Standards

The FIX 5.0 interface uses the Coordinated Universal Time (UTC) standard in all time related tags. Clients can synchronise their systems with the Exchange by using the UTC value in the SendingTime(52) tag in the Logon (35=A) acknowledgement message (i.e. the outbound Logon (35=A) message sent by the Exchange during the logon process). Clients should adjust their systems to correctly identify the local time, if required.

All messages will include the SendingTime (52) field. Resent messages re-requested using the FIX ResendRequest (35=2) session message will additionally include the OrigSendingTime (112) field. Both of these fields are included in the standard header and are always in UTC format and contain the message transmission date time stamp.

In addition the TransactTime (60) is included in the body of the relevant messages such as a NewOrderSingle (35=D) message and is always in UTC format. This field contains the date / time stamp of a transaction.

Seconds and Milliseconds will be ignored on inbound messages and set to zero on outbound messages.

4.12. Encryption

The FIX 5.0 interface does not use session layer encryption. Please refer to section 3.1.2 Network Security, for further details on security controls that are used.

4.13. Drop Copy Sessions (Copy To)

The FIX 5.0 interface supports Drop Copy (Copy To) functionality. When enabled, this allows all interactive and unsolicited messages for a specific Trader Group to be copied to a nominated USAP/CompID. Drop Copy functionality can be used by a Member Firm offering Direct Market Access (DMA) services, allowing them to retain visibility of the actions that are being undertaken by a particular DMA client.

Drop Copy functionality can also be used outside of DMA services for those participants wishing to maintain a duplicate copy of trading histories at an alternative site or system.

A unique USAP and CompID will be set-up to be used for any Drop Copy activity to ensure that all duplicate messages are routed to the correct FIX session independent of the original transmission session. The same Trader Group must be assigned to each session.

Drop Copy messages will include all original message information including identification fields except ClOrdID (11). This is due to there being the possibility of duplicate ClOrdID (11) fields if the receiver is handling messages from multiple sources. Please treat messages without ClOrdID (11) as possible copies or duplicates for processing purposes.

4.14. Session Level Rejects

A FIX SessionReject message (35=3) will be sent by the FIX 5.0 interface when a standard FIX session error occurs, such as when a message is received but cannot be properly processed due to a session-level rule violation. For example, a message will be rejected if it contains invalid basic data (e.g. MsgType (35) set to "&") but successfully passes CheckSum (10) and BodyLength (9) checks.

In these cases a SessionReject (35=3) message will be sent with the applicable SessionRejectReason (373) value set.

A FIX SessionReject (35=3) message will also be sent if a message is rejected by TradElect at the session level for any reason. For example if a message is sent when the market is closed, the Exchange will return a session level advisory code (in this case an E023E 'Market Closed' error). Session level Advisory Codes are in the format E001x - E999x).

In these cases a SessionReject (35=3) message will be sent with SessionRejectReason (373) set to 99 and Text (58) containing the applicable Session Advisory Code.

In situations where the SessionReject message (35=3) is returned to the participant, the reference to the message being rejected is provided in the RefSeqNum (45) field.

SessionReject (35=3) messages are also sent where TradElect does not support the value specified in one or more fields on the FIX message. This can occur for a variety of reasons but details of the field(s) that have caused the failure will be contained in the Text (58) field.

In situations where a SessionReject message (35=3) is sent by a participant to the FIX 5.0 interface, this will not be acknowledged but will be logged internally for support purposes.

A full description of Exchange session and application Advisory Codes is provided in the Data Formats Specification (Ref: TIS104), available on the Exchange's website at:

<http://www.londonstockexchange.com/en-gb/products/membershiptrading/techlib/techspecs.htm>

4.15. Don't Know Trade DK Messages

The FIX 5.0 interface does not support Don't Know Trade DK (35=Q or 35=BN) messages from participants. If sent to the FIX 5.0 interface, the DK (35=Q or 35=BN) message will not be responded to. If a participant has a trade query, they should contact Market Supervision.



Market Supervision at the London Stock Exchange can be contacted on +44 20 7797 3666, or STX 33666.

4.16. Order Routing

In the interests of performance for all participants, the FIX 5.0 interface is not enabled to act as an order router or hub. Responsibility for tracking routed, client or 'OnBehalfOf' orders remains with the participant.

However, to facilitate order routing services, DeliverToCompID (128) and OnBehalfOfCompID (115) are supported and will be returned to participants in FIX messages sent by the Exchange. For example if a participant's message contained OnBehalfOfCompID (115), the response sent back from the Exchange will be provided with the same data in DeliverToCompID (128).

4.17. FIX Session Recovery

In the event that a FIX session is lost, it should be recovered using the standard methods described in the FIX protocol specifications. In summary the sequence of events is:

- Logon
- Gap-fill
- Resend request and
- Sequence reset negotiation (note that we can only negotiate sequence numbers up through the messaging interface, not down)

For detailed information about session recovery, please refer to the FIXT1.1 Session Protocol Specification:

<http://www.fixprotocol.org/fixt1.1spec>

4.18. FIX Intraday Session Restarts

A participant may request that their FIX session is restarted intraday with sequence numbers reset to one (1) in order to resynchronise a FIX session that has entered a failed session state.

It is expected that prior to a participant requesting that a FIX session be restarted intraday, they would have attempted to recover the FIX session using standard recovery procedures.

There are several implications of restarting a FIX session intraday with sequence numbers set to one (1), they are:

- ResendRequest (35=2) messages will only function for the new session sequence range i.e. a participant will not be able to request the resending of messages from the previous session (the session that failed) that day.
- Order executions and deletions may occur during the restart process while the FIX session is down, notifications of these events will not be sent to the participant as they will be associated with the previous FIX session.
- Participants will need to manage the reconciliation of their order book and trade positions by using the Own Order Book (OOBD) and Own Trades Book Download (OTBD) facilities.

In the event that a participant encounters difficulties with a FIX session intraday restart e.g. they have not been able to recover using standard recovery processes, they should contact the London Stock Exchange operational support facilities.



Support personnel can be contacted via the London Stock Exchange's Service Control Desk on +44 20 7797 3100, or STX 33100.

In this situation the participant will need to decide whether they want all open orders cancelled. For further details, please refer to [Member firm system problems](#) [1500] of the Rules of the London Stock Exchange at:

<http://www.londonstockexchange.com/en-gb/products/membershiptrading/rulesreg/ruleslse/rulesoflse.htm>

The Exchange will then cancel participant orders, (if required) and restart the FIX session with sequence numbers reset to one (1). The participant should then connect to a new FIX session and perform an Own Order Book and Own Trades Book Download as required.

Participants will manage their order book and trade positions by using the following methods:

1. Restarting the FIX session and
 - Using the next ExecutionReport (35=8) to update the order state (there may be missing execution details however the order state will be current).
 - Performing an Own Trades Book Download (OTBD) to understand all the trade executions for the order book, at that point in time.
 - Performing an Own Order Book Download (OOBD) to understand the order states.
2. Cancelling all open orders prior to a FIX session intraday restart and

- Performing an Own Trades Book Download (OTBD) to understand the trade executions for the old FIX session.
- The participant may receive unsolicited order delete messages (ExecutionReport (35=8)) relating to the previous FIX session (the session that has just been restarted). In this case the participant is unlikely to be able to reference the deleted order messages (ExecutionReport (35=8)) to the original order; participants should cater for this situation.

Customers should note that whilst the deletion process is taking place any orders on the book may still be executed.

Participants connecting to the new session should be aware that they will not be able to enter orders/quotes with a ClOrdID (11) that has been used in the previous session; as these would be rejected as a duplicate.

4.19. Site Failure Session Failover

In the event of an Exchange primary data centre site failure all FIX sessions running on that site will be terminated and all associated orders will be deleted from the order book. No order cancellation messages will be sent, however customers may receive cancellation messages that were already “in flight” at the time of the failure when they reconnect.

Participants should follow failover procedure and establish a new connection when available using a new session (sequences numbers set to 1) as if for a new trading day. Participants will need to manage the reconciliation of their order book and trade positions by using the Own Order Book (OOBD) and Own Trades Book Download (OTBD) facilities.

Note: In this scenario, all customer orders would be removed from the order book whether they were entered via the native interface or the FIX 5.0 interface.

In the event of an incident, the Exchange may use Service Announcements and the incident management website to communicate with, and gather information from, its customers.

Service Announcements are available on the Exchange’s website at:

<http://www.londonstockexchange.com/en-gb/products/membershiptrading/techlib/servannounce/serviceannouncements.htm>

The Incident Communications website can be found on the Exchange’s website at:

http://www.londonstockexchange.com/incident_website

In normal operations, the Incident Communications website will carry the banner heading “Incident Communications Website - Currently Inactive”.

5. Application Messages

This section presents an overview of the application level FIX messages that are used by the FIX 5.0 interface.

The FIX 5.0 interface includes support for the following functionality:

Lifecycle Stage	Business Activity	FIX 5.0 Interface
Trade	Order Handling	Trading
Trade	Quote Handling	Trading
Post Trade	Trade Reporting	Trading
Retransmission Service	Market Data Retransmission	Interactive
Retransmission Service	Own Trades Download	Interactive
Retransmission Service	Own Order Book Download	Interactive
Post Trade	Modify Client Reference	Trading

Order Handling

The FIX 5.0 interface supports order entry, order modification, order cancellation, mass order cancellations and trade executions. Orders are automatically executed and the resultant trade details are returned to participants in ExecutionReport (35=8) messages.

Quote Handling

Market Makers create prices and provide liquidity by offering dual sided quotes. The FIX 5.0 interface uses the MassQuote (35=i) FIX message for quote entry. TradElect supports two different quote types: executable and firm.

An executable quote is a named pair of executable orders used to display a two-way offer to trade on an order book. Executable quotes behave like two independent limit orders (with no expiry) and may execute immediately upon entry, or remain on the book to await passive execution.

A firm quote is a named non-executable quote. Firm quotes are used in quote-driven trading services where executions take place outside TradElect.

The field QuoteType (537) is used to describe a quote as executable or firm.

Trade Reporting

The FIX 5.0 interface supports single and dual sided trade reporting. Dual sided trade reporting is based on the one party pass through model; however as with the native interface dual sided trade reports are only available to JSE market participants trading the JSE and Namibian markets. The FIX 5.0 interface uses the TradeCaptureReport (35=AE) FIX message for single and dual trade report entry.

Market Data Retransmission

The FIX 5.0 interface has the capability to retransmit market data encoded in either a native fixed width message format or in a FAST message format. Market data is re-transmitted as a payload inside a MarketDataIncrementalRefresh (35=X) message. The payload format will match the original transmission format. Participants using the FIX 5.0 interface to re-request market data will use the ApplicationMessageRequest (35=BW) message.

Participants also have the option of re-requesting broadcast messages via the native (fixed width) interface. Both FAST and non-FAST (native) encoded messages will be supported via this mechanism. As a result the following options will be available for market data retransmission:

- Native - non-FAST encoded
- Native - FAST encoded
- FIX - non-FAST encoded
- FIX - FAST encoded

Timescales for the implementation of FAST encoded messages for each market will be provided to customers at a later date.

Own Order Book Download (OOBD)

The current order book of a participant may be downloaded to reconcile open positions. An OOBD request will be responded to with a stream of ExecutionReport (35=8) messages for all open orders for the specified Trader Group. Participants will use the OrderMassStatusRequest (35=AF) FIX message to perform an OOBD using the FIX 5.0 interface.

Own Trades Book Download (OTBD)

A participant can choose to download copies of all trade executions that they have been party to. This includes both manual and automatic trade executions. This function allows participants to reconcile their trade positions. An OTBD request will be responded to with a stream of TradeCaptureReport (35=AE) messages for all trades that have taken place for the specified Trader Group. Participants will use the TradeCaptureReportRequest (35=AD) FIX message to perform an OTBD using the FIX 5.0 interface.

Modify Client Reference

JSE participants may update Client Reference information to ensure correct settlement details are provided for trades. Modify Client Reference is not supported on the London Stock Exchange or Borsa Italiana markets. Participants will use the RegistrationInstructions (35=o) FIX message to modify a Client Reference using the FIX 5.0 interface.

5.1. Quantities

Quantities must be a whole number with no decimals.

Decimals in Quantity fields supplied in FIX messages with float data types will be truncated where the underlying data type is an integer in the trading system i.e. 4.1 becomes 4 and 4.9 becomes 4.

This includes:

- LastQty (32)
- OrderQty (38)
- MinQty (110)
- BidSize (134)
- OfferSize (135)
- PegOffsetValue (211)
- DisplayQty (1138)

5.2. Symbology

The Exchange uses a 4 way key to route orders to the correct order book. The 4 way key is a concatenation of the following fields in the exact order below:

- Tradable Instrument Code, ISIN (12 Character Code - ISO 6166)
- Country of Register (2 Letter Code - ISO 3166)
- Currency Code (3 Character Code ISO 4217 plus GBX, ZAC and USX)
- Segment Code (4 Character Code Exchange defined)

For all order handling and trade reporting, the security will be identified using:

- SecurityIDSource (22) = 8 (Exchange Key)
- SecurityID (48) = 4 Way Key (as specified above).

For all Quote functionality the security will be identified using:

- UnderlyingSecurityIDSource (305) = 8 (Exchange Key)
- UnderlyingSecurityID (309) = 4 Way Key (as specified above).

No other symbology or order of fields will be accepted.

For OrderMassCancelRequest (35=q) and OrderMassCancelReport (35=r) messages, the segment will be identified using:

- UnderlyingSecurityIDSource (305) = 8 (Exchange Key)
- UnderlyingSecurityID (309) = Segment.

An example of how the 4 way key should be used is shown in the following diagram.

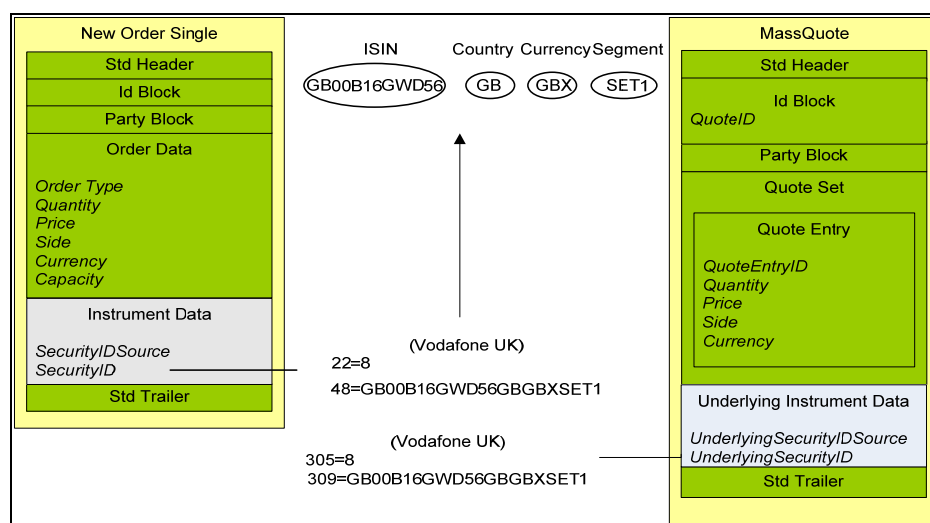


Diagram 3: 4 way key

Where the 4 Way Key is used, it must always be made up of 21 chars, where the component data does not make 21 chars the padded to 21 chars e.g. if the ISIN component is not 12 chars it must be padded at the end up to 12 chars, or where only the Segment is used the 3 preceding data elements must be replaced with spaces.

5.3. Use of Parties Component Block and Root Parties Component Block

The Exchange makes use of the Parties component block and the Root Parties component block for participant identification as described below.

5.3.1. Definition of Trader Groups and Trader IDs in FIX 5.0 messages

Trader Group and Trader ID details should be sent in the Parties component block and the Root Parties component block as defined in the FIX 5.0 protocol, as follows:

- TradeCaptureReport (35=AE): Use the "Root Parties" component block
- All other messages : Use the "Parties" component block

For example, a NewOrderSingle (35=D) message would use the Parties component block as shown below:

Tag	Name	Content
453	NoPartyIDs	1 or 2 (if Trader ID is present)
448	PartyID	Trader Group (mandatory)
447	PartyIDSource	D (custom static value)
452	PartyRole	76 (static value)
448	PartyID	Trader ID (optional)
447	PartyIDSource	D (custom static value)
452	PartyRole	12 (static value)

A Trader Group must be sent as part of each application level message. Trader IDs are optional. Please note that the above PartyIDSource (447) and PartyRole (452) values are static for the FIX 5.0 interface when supplying Trader Group or Trader ID.

An example of how a client should use the parties block is shown below:

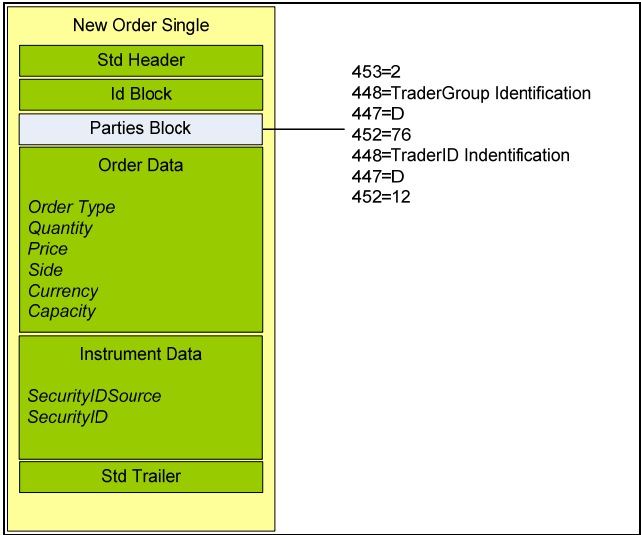


Diagram 4: Trader Groups and Trader IDs

5.3.2. Definition of Member IDs in FIX 5.0 messages

The Member ID is used by market participants when reporting trades.

Depending on usage, the Member ID is presented in either the Parties component block or the NestedParties4 component block. This is dependent on the message type as shown below:

- TradeCaptureReport (35=AE) = Parties Component Block
- All other messages = NestedParties4 Component Block

The PartyRole (452) values assigned against the participants Member ID values depend on the side of the trade carried out by the participant. Please see the usage tables below.

Parties Component Block Usage (Bi-directional)

PartyRole (452)	PartyID(448)	PartyIDSource (447)
1=Executing Firm	MemberID	D
17=ContraFirm*	MemberID	D

NestedParties4 Component Block Usage (Exchange to Participant only)

Nested4PartyRole(1417)	Nested4PartyID(1415)	Nested4PartyIDSource (1416)
1=Executing Firm	MemberID	D
17=ContraFirm*	MemberID	D

* ContraFirm = counterparty to the trade

Essentially if the executing firm is on the buy side then the PartyRole (452) of the buy side party should be '1' and the counterparty (sell) side '17', vice versa if the executing firm is on the sell side. The PartyRole (452) should not be set to '1' or '17' on both sides or the trade report will reject. Note: in this example the Trader Group and Trader ID are identified using the Root Parties Block.

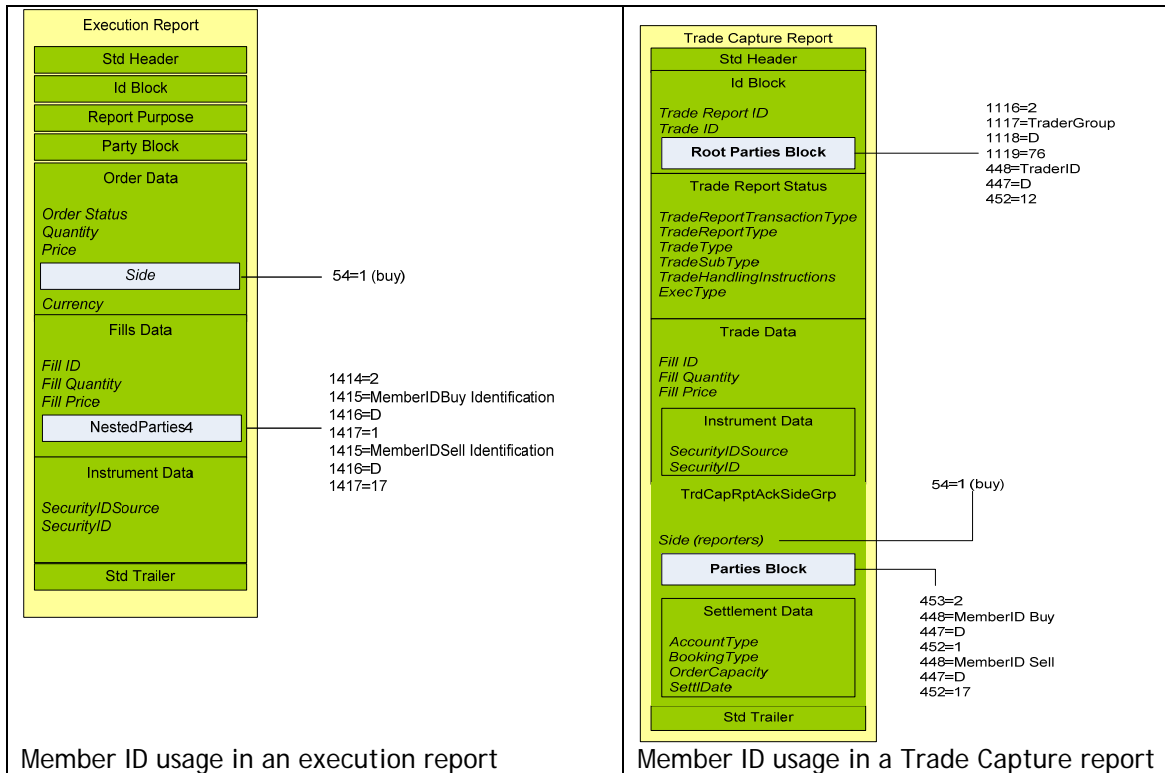


Diagram 5: Member ID component block usage

5.3.3. Definition of Client Reference Buy / Sell IDs in FIX 5.0 messages

The Client Reference Buy or Client Reference Sell ID is used by market participants when reporting trades. Client Reference Buy or Client Reference Sell should be sent in the Parties component block

of the TradeCaptureReport (35=AE) message. The link to side is provided by placing the Client Reference in the Parties block in the appropriate side of the TrdCapRptSideGrp.

Parties Component Block Usage

PartyRole (452)	PartyID(448)	PartyIDSource (447)
3=ClientID	Client Reference	D

5.4. Application Level Rejects

Section 4.13 provides details on when a FIX SessionReject message (35=3) is sent if a standard FIX session error occurs or if a message is rejected by TradElect at the session level. For example if a message is sent when the market is closed, a session level advisory code will be returned (in this case, E023E 'Market Closed'). Session level Advisory Codes are in the format E001x - E999x.

Application level Advisory Codes will be returned by the Exchange using the relevant FIX response message. For example for order entry, this will be an ExecutionReport (35=8). The FIX 5.0 interface does not use the BusinessMessageReject (35=j) message. In situations where a BusinessMessageReject (35=j) message is sent by a participant to the FIX 5.0 interface, this will not be acknowledged but will be logged internally for support purposes. A full list of Exchange session and application Advisory Codes is provided in Appendix C.

Application Advisory Codes will be returned to participants within the following messages.

Functional Area	Application Advisory Code	FIX Message	FIX fields
Market Data Request Rejects	Q001x - Q999x	ApplicationMessageRequestAck (35=BX)	1347=0; 1348=2; 58=AAC*
Order Mass Status Request Reject	Q001x - Q999x	TradeCaptureReportRequestAck (35=AQ)	750=2; 749=99; 58=AAC*
Order Entry	Q001x - Q999x	ExecutionReport (35=8)	39=8;150=8; 103=99; 58=AAC*
Order Modification/Cancellation	Q001x - Q999x	OrderCancelReject (35=9)	150=8; 102=99; 58=AAC*
Quote (Entry)	Q001x - Q999x	MassQuoteAcknowledgement (35=b)	1167=5; 368=99; 58=AAC*
Quotes (Cancels)	Q001x - Q999x	QuoteStatusReport (35=AI)	939=1; 751=99; 58=AAC*
Trade Reporting (Entry, Cancellation)	Q001x - Q999x	TradeCaptureReportAck (35=AR)	297=5; 300=99; 58=AAC*
Modify Client	Q001x - Q999x	RegistrationInstructionsResponse (35=p)	506=R; 507=99; 496=AAC*

*AAC = Application Advisory Code

Order Mass Cancellation	Q001x - Q999x	OrderMassCancelReport (35=r)	531=0; 532=99; 58=AAC*
Trade Book/Own Order Book Download Reject	Q001x - Q999x	TradeCaptureReportRequestAck (35=AQ)	750=2; 749=99; 58=AAC*

5.5. Exceptions (Positive Advisory Codes)

There are a small number of instances where a positive advisory code (a non error related advisory code) is sent to a participant. The following positive advisory codes will be populated inside the Text (58) field of the relevant application message.

Application Advisory Code	Description
Q405I	Potential Breach of Price Monitoring Tolerance
Q418I	Contra Trade Request Submitted
Q419I	Contra Trade Acceptance Submitted
Q449I	Deletion only as below Min Order Size
Q501I	Remaining volume rejected due to technical limits

6. Order Handling

There are several Exchange specific values and attributes which are used in FIX 5.0 interface but are not documented in the FIX Protocol. These are described below along with other key information. The FIX 5.0 interface supports the following order handling functionality:

- Entering an order
- Deleting a single order
- Modifying an order
- Deleting multiple orders
- Modify order client reference

The following FIX 5.0 messages are supported:

Order Entry

FIX Message	FIX Message Function	Direction
35=D	Enter Order	Participant to Exchange
35=8	Order Ack/Reject	Exchange to Participant
35=8	Execution Report	Exchange to Participant

Order Cancel/Expire

FIX Message	FIX Message Function	Direction
35=F	Cancel Order	Participant to Exchange
35=9	Reject Cancel Order	Exchange to Participant
35=8	Order Deleted/Expired	Exchange to Participant

Order Modification

FIX Message	FIX Message Function	Direction
35=G	Modify Order	Participant to Exchange
35=9	Reject Modify Order	Exchange to Participant
35=8	Order Modified	Exchange to Participant

Mass Order Cancel Message Summary

FIX Message	FIX Message Function	Direction
35=q	Mass Order Cancel	Participant to Exchange
35=r	Mass Order Cancel Ack/Reject	Exchange to Participant
35=9	Individual Order Cancel Reject	Exchange to Participant
35=8	Individual Order Cancel Ack	Exchange to Participant

Client Reference Modification Message Summary (JSE only)

FIX Message	FIX Message Function	Direction
35=o	Registration Instructions	Participant to Exchange

35=p	Registration Instructions Response	Exchange to Participant
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6.1. Order Identification

A participant must assign a unique ClOrdID (11) value to any incoming order message (NewOrderSingle (35=D), OrderCancelRequest (35=F), OrderCancelReplaceRequest (35=G), OrderMassCancelRequest (35=q) and RegistrationInstructions (35=o)).

Where an order is cancelled by the Exchange, the ExecutionReport (35=8) will carry the last known ClOrdID (11) of the order.

ClOrdID uniqueness rules are:

- ClOrdID must be unique within CompID within the trading day
- ClOrdID must be unique within TraderGroup and Security for the life of the order

The rule is applied to any message containing a ClOrdID (Order entry/modification/deletion) or QuoteEntryID (E/FQ entry/modification).

The only slight exceptions to this rule are

- System initiated deletions or expiries, where the ClOrdID for the deletion is set to the same value as the OrigClOrdID
- Mass order deletions, where the ClOrdID supplied on the mass order deletion request is used for all individual order/quote deletions triggered by the request.

The Account (1) field can be used to carry client reference identification data.

The Exchange will assign a unique identifier to each order using OrderID (37). The OrderID (37) is a globally unique ID and is the Public Order Code published by Infolect. Participants will receive this field in the ExecutionReport (35=8) sent by the Exchange in response to the order entry. The ExecutionReport can also contain a SecondaryClOrdID (526) field which is used to carry a participant defined order reference. This field should not be used to manage routing of messages from the Exchange.

6.2. Order Entry

The Exchange supports the following order types:

- Limit Order
- Market Order
- Named Limit Order
- Hidden Limit Order
- Iceberg Order
- Mid Price Pegged Order
- Best bid and Best offer Pegged orders

The Exchange uses the following FIX OrdType (40) values.

Value	Description
1	Market
2	Limit*
P	Pegged

* Iceberg orders are entered as Limit orders

For a full detailed description of each order type, please refer to the "Guide to TradElect":

<http://www.londonstockexchange.com/en-gb/products/membershiptrading/tradingservices/>

Each order uses the TimelnForce (59) field to control when it is valid. For example, if a participant wanted to specify that a Limit order should only be effective during the Closing Auction, he would enter a Limit order with the TimelnForce (59) set to '7'. The TimelnForce (59) field is also known as the 'Validity Type'. The FIX 5.0 interface uses the following FIX TimelnForce (59) values:

Value	Description
0	Good for Day (GFD)
1	Good Till Cancel (GTC)
2	At the Opening (ATO)
3	Execute and Eliminate (ENE)
4	Fill Or Kill (FOK)
6	Good Till Time (GTT)
7	At the Close (ATC)
8	Good for Auction (GFA)
9	Good for Intra-Day Auction (GFX)

The FIX 5.0 interface uses ExpireTime (126) to support Good Till Date/Time orders, using UTC time.

BookingType (775) is used to define the Booking Type of an order.

If the field is not present then the default TradElect configuration value will be taken for the participant and segment (recommended). Do not populate for Oslo trades.

Value	Description
0	Cash

BookingType (775) is also known as 'Clearing Type' when using the native interface (CSH - Cash and CFD - Contract For Difference).

As shown in the table below, AccountType (581) is used to define the Settlement Account Type of an order.

Value	Description
1	Client
3	House

If AccountType (581) is not present the default 'standing' value will be applied from trading system config.

As shown in the table below, OrderCapacity (528) is used to define the Capacity Type of an order.

Value	Description
A	Agent
P	Principal
R	Riskless Principal

When OrderCapacity (528) = "A" then client reference information is required in Account (1). Please see section 6.2.1 Order Identification for further details.

The following tables specify the values that should be used for each order type and validity type

Market Order

Exchange Order Mechanism Type	Exchange Order Validity Type	Order Type	Time In Force
Market Order	'GFD' Good for Day	1	0
Market Order	'ENE' Execute and Eliminate	1	3
Market Order	'ATO' At the Open	1	2
Market Order	'ATC' At the Close	1	7
Market Order	'GFA' Good for Auction	1	8
Market Order	'GFX' Good for Intra-Day Auction	1	9

Limit Order

Exchange Order Mechanism Type	Exchange Order Validity Type	Order Type	Time In Force	Expire Time*	Price (44)*
Limit Order	'ATO' At the Open	2	2	N	Y
Limit Order	'ATC' At the Close	2	7	N	Y
Limit Order	'ENE' Execute and Eliminate	2	3	N	O
Limit Order	'FOK' Fill or Kill	2	4	N	O
Limit Order	'GFA' Good for Auction	2	8	N	Y
Limit Order	'GFD' Good for Day	2	0	N	Y
Limit Order	'GFX' Good for Intra-Day Auction	2	9	N	Y
Limit Order	'GTC' Good till Cancelled	2	1	N	Y
Limit Order	'GTT' Good till Time	2	6	Y	Y

* Y = Required, O = Optional

Limit Order Named

Exchange Order Mechanism Type	Exchange Order Validity Type	Order Type	PreTrade Anonymity (1091)*	Time In Force	Expire Time	Price **
Named Order (Limit)	'ATO' At the Open	2	N	2	N	Y
Named Order (Limit)	'ATC' At the Close	2	N	7	N	Y
Named Order (Limit)	'ENE' Execute and Eliminate	2	N	3	N	O
Named Order (Limit)	'FOK' Fill or Kill	2	N	4	N	O
Named Order (Limit)	'GFA' Good for Auction	2	N	8	N	Y
Named Order	'GFD' Good for Day	2	N	0	N	Y

Exchange Order Mechanism Type	Exchange Order Validity Type	Order Type	PreTrade Anonymity (1091)*	Time In Force	Expire Time	Price **
(Limit)						
Named Order (Limit)	'GFX' Good for Intra-Day Auction	2	N	9	N	Y
Named Order (Limit)	'GTC' Good till Cancelled	2	N	1	N	Y
Named Order (Limit)	'GTT' Good till Time	2	N	6	Y	Y

* N = Not Anonymous (show Name on this order)

** Y = Required, O = Optional

Limit Order Hidden

Hidden orders are implemented using the Display Instruction Components block. An order is hidden if the DisplayMethod (1084) = "4" Undisclosed (invisible order).

Exchange Order Mechanism Type	Exchange Order Validity Type	Order Type	Time In Force	Expire Time	Price *	Display Method
Limit Order Hidden	'ATO' At the Open	2	2	N	Y	4
Limit Order Hidden	'ATC' At the Close	2	7	N	Y	4
Limit Order Hidden	'ENE' Execute and Eliminate	2	3	N	O	4
Limit Order Hidden	'FOK' Fill or Kill	2	4	N	O	4
Limit Order Hidden	'GFA' Good for Auction	2	8	N	Y	4
Limit Order Hidden	'GFD' Good for Day	2	0	N	Y	4
Limit Order Hidden	'GFX' Good for Intra-Day Auction	2	9	N	Y	4
Limit Order Hidden	'GTC' Good till Cancelled	2	1	N	Y	4
Limit Order Hidden	'GTT' Good till Time	2	6	Y	Y	4

* Y = Required, O = Optional

Iceberg Limit Orders

FIX Field	Name	Description
1138	DisplayQty	The value of the total order displayed as an Iceberg
1083	DisplayWhen	Must be set to 2, for a full refresh of the DisplayQty (1138) amount, as a result of the peak being fully executed

Exchange Order Mechanism Type	Exchange Order Validity Type	Order Type	Time In Force	Expire Time	Price	Display Qty	Display When
Iceberg Order	'ATO' At the Open	2	2	N	Y	Y	2
Iceberg Order	'ATC' At the Close	2	7	N	Y	Y	2

Exchange Order Mechanism Type	Exchange Order Validity Type	Order Type	Time In Force	Expire Time	Price	Display Qty	Display When
Iceberg Order	'GFA' Good for Auction	2	8	N	Y	Y	2
Iceberg Order	'GFD' Good for Day	2	0	N	Y	Y	2
Iceberg Order	'GFX' Good for Intra-Day Auction	2	9	N	Y	Y	2
Iceberg Order	'GTC' Good till Cancelled	2	1	N	Y	Y	2
Iceberg Order	'GTT' Good till Time	2	6	Y	Y	Y	2

Limit Order Hidden Minimum Execution Size

The minimum execution size that may be executed against an order is defined using MinQty (110).

Exchange Order Mechanism Type	Exchange Order Validity Type	Order Type	Time In Force	Expire Time	Price	Min Qty	Display Method
Limit Order Hidden Min Ex Size	'ATO' At the Open*	2	2	N	Y	Y	4
Limit Order Hidden Min Ex Size	'ATC' At the Close*	2	7	N	Y	Y	4
Limit Order Hidden Min Ex Size	'ENE' Execute and Eliminate	2	3	N	Y	Y	4
Limit Order Hidden Min Ex Size	'GFA' Good for Auction *	2	8	N	Y	Y	4
Limit Order Hidden Min Ex Size	'GFD' Good for Day	2	0	N	Y	Y	4
Limit Order Hidden Min Ex Size	'GFX' Good for Intra-Day Auction *	2	9	N	Y	Y	4
Limit Order Hidden Min Ex Size	'GTC' Good till Cancelled	2	1	N	Y	Y	4
Limit Order Hidden Min Ex Size	'GTT' Good till Time	2	6	Y	Y	Y	4

* Minimum Execution Size is ignored during auctions

Pegged Hidden Order

SecurityExchange (207) is used to identify the price to which the price of the pegged order is pegged. At go-live, only one SecurityExchange (207) code will be permitted (XLON - relating to the internal book BBO) because external price pegging will not be supported.

When a pegged order is parked (e.g. due to its reference price being unavailable) the participant is sent an '8' message with OrdStatus and ExecType both set to '9', indicating suspension.

Tag <44> Price will also be included on the message and will be set to

- 0 – if no reference was available on order entry
- last price update – if the order is parked having already been on the book
-

It is however possible that an 8 denoting suspension (OrdStatus and ExecType = 9) also contains trades, if a pegged order executes in the same event in which it is parked. This happens if the only visible order(s) on the buy or sell side are removed as part of the event.

Exchange Order Mechanism Type	Exchange Order Validity Type	Order Type	Time In Force	Expire Time	Display Method	Min Qty (110)*	Peg Insrtn	Security Exchange
Pegged Hidden Order	'ENE' Execute and Eliminate	P	3	N	4	0	Y	Y
Pegged Hidden Order	'FOK' Fill or Kill	P	4	N	4	0	Y	Y
Pegged Hidden Order	'GTC' Good till Cancelled	P	1	N	4	0	Y	Y
Pegged Hidden Order	'GTT' Good till Time	P	6	Y	4	0	Y	Y

* 0 = Optional

Pegged Orders are described using the following fields in the PegInstructions component block.

FIX Fields	Mandatory?	Allowable Value	Description
PegOffsetValue (211)	N	Float	Amount (signed) added to the peg price in the context of the PegOffsetType (836). Will default to zero if not present.
PegMoveType (835)	Y	0	0= Floating is the only valid value for the Exchange
PegOffsetType (836)	Y	2	2 = Ticks is the only valid value for the ExchangeE
PegLimitType (837)	Y	0	0= Or better i.e. price improvement allowed is the only valid value for the Exchange
PegPriceType (1094)	Y	2,4,5	2=Mid 4=Market i.e. Buy at Offer, Sell at Bid 5=Primary i.e. Buy at Bid, Sell at Offer
DisplayMethod (1084)	Y	4	A Pegged order must be set to hidden.

Peg Order Source Identification

FIX Fields	Mandatory?	Allowable Value	Description
SecurityExchange (207)	Y	MIC code	Refer to Exchange allowable MIC codes for Market source of price feeds for Peg orders. At go-live only 'XLON' will be valid relating to the internal book BBO.

FIX Fields	Mid Price Peg		Offer Price Peg		Bid Price Peg	
Side (54)	Buy	Sell	Buy	Sell	Buy	Sell
Order Type (40)	P	P	P	P	P	P
Quantity (38)	User Defined	User Defined	User Defined	User Defined	User Defined	User Defined
Display Method (1084)	4	4	4	4	4	4
Security Exchange (207)	XLON	XLON	XLON	XLON	XLON	XLON
Min Exec Size (110)	User Defined	User Defined	User Defined	User Defined	User Defined	User Defined
<Peg Instructions>						
PegOffsetValue (211)	User Defined	User Defined	User Defined	User Defined	User Defined	User Defined
PegMoveType (835)	0	0	0	0	0	0
PegOffsetType (836)	2	2	2	2	2	2
PegLimitType (837)	0	0	0	0	0	0
PegPriceType (1094)	2	2	4	5	5	4

6.3. Order Cancel

An order can be cancelled using the OrderCancelRequest (35=F) message. The ExecutionReport (35=8) message notifies the participant of the status of a cancellation request as it is processed.

On an OrderCancelRequest (35=F) message the OrdQty (38) must be set to 0.

When an Order Cancel request is rejected the CxlRejResponseTo (343) tag will always be set to 1.

6.4. Order Modification

An order can be modified by using the OrderCancelReplaceRequest (35=G) message. The ExecutionReport (35=8) message notifies the participant of the status of a modification request as it is processed. The OrderCancelReplace (35=G) message must:

- Include all the original order data
- Always have OrderQty (38) set
- Include tags: TimeInForce (59) and OrderCapacity (528)
- Modify at least one of the following fields
 - Price
 - Order Quantity
 - Expire Time
 - Account (Client Reference)
 - Secondary Client Order ID
 - Minimum Execution Size

A successful modification request that has execution/s occurring in the same processing round as the modification will always have an Order State of Filled or Partial Fill and an Execution Type of replaced. The presence of the <FillsGrp> indicates executions have also taken place.

If an order is modified, a new Client Order ID is assigned to the order and the original Client Order ID is sent back to the participant in the OrigClOrdID (41) field. This 'chaining' of cancellation and

modification messages to the original order message enables a participant to keep track of each order's history.

An example of this chaining is shown below:

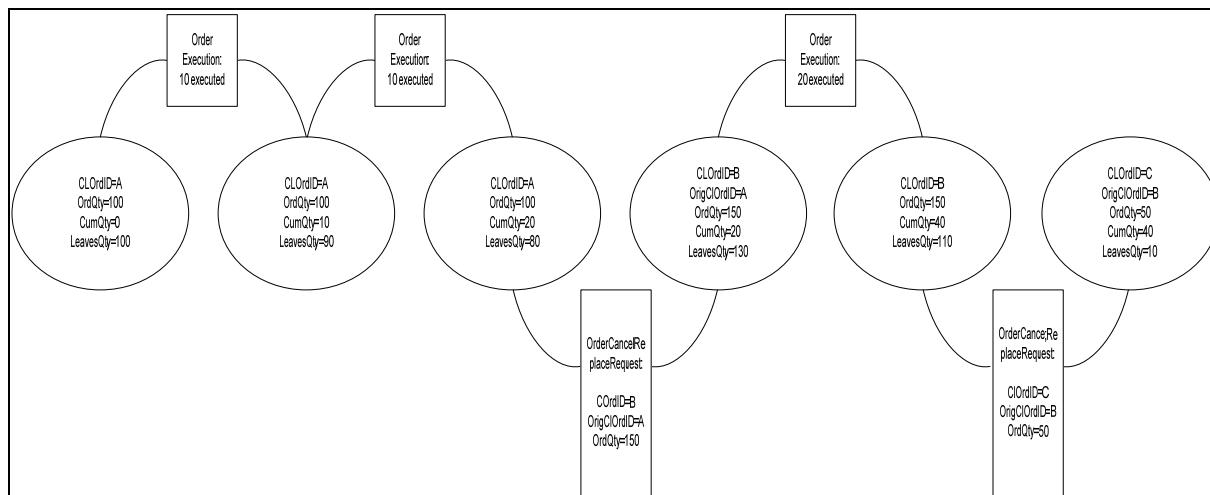


Diagram 6: Order chaining

When an order is modified a new OrderID (37) is allocated to the order (only if the Price Time Priority of the order changes).

When an Order CancelReplace request is rejected the CxlRejResponseTo (343) tag will always be set to 1.

6.5. Order Mass cancel

A participant may request a mass cancellation of their orders using the OrderMassCancelRequest (35=q) message. The cancel criterion is based on all orders for a Trader Group within a Segment, the segment must be provided in SecurityID (48). Please note that this would effect all CompiDs (sessions) associated with that same Trader Group. The MassCancelRequestType (530) field must be set to "9" (Cancel orders for a market segment).

An OrderMassCancelAcknowledgement (35=r) message is sent to the participant, followed by individual ExecutionReport (35=8) messages for each order confirming whether they have been cancelled or whether the cancellation has been unsuccessful.

The CIOrdID quoted on every '8' message is the one supplied on the q message (i.e. it can be used multiple times). The OrigCIOrdID is the previous CIOrdID of the order.

Please note that should a customer send in a subsequent OrderMassCancelRequest (35=q) for messages that have already been cancelled, a valid OrderMassCancelResponse (35=r) message will be returned with a MassCancelResponse = Cancel order for Market Segment (531=9), rather than Cancel Request Rejected (531=0) and appropriate error text.

6.6. Client Reference modification (JSE only)

The Modify Client Reference functionality allows a JSE market participant to update a client settlement reference for an order using the RegistrationInstructions (35=0) message. This is illustrated below:

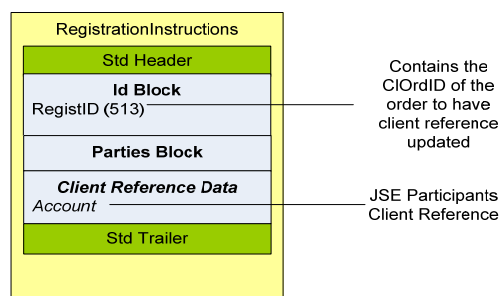


Diagram 7: Modify Client Reference

Criteria	FIX	Description
4 Way Key	RegistRefID (508)	<u>Mandatory</u> , the Exchange 4 way key
Client Reference	Account (1)	Holds the Client Reference
Original ClOrdID	RegistID (513)	Holds the ClOrdID of the order to have its client reference updated

6.7. Order Acknowledgement and Execution

Orders will be acknowledged on entry by an ExecutionReport (35=8) message even if they do not immediately execute. Subsequent fills will also be sent back in ExecutionReports (35=8) messages. Aggressive orders will be acknowledged with an ExecutionReport (35=8) message detailing the executions that have taken place as a result of the aggressive order. This is the only acknowledgment that will be sent.

ExecutionReport (35=8) messages use the following ExecType (150) values:

Value	Description
0	New
F	Trade (partial fill or fill)
C	Expired
I	Order Status
4	Canceled
5	Replaced
8	Rejected
9	Suspended

At any given time an order will be in a given state, depending on if it is new, partially matched, filled, cancelled, rejected or suspended.

Order States are defined using the OrdStatus (39) and contained within the ExecutionReport (35=8) message:

Value	Description
0	New
1	Partially filled
2	Filled
4	Cancelled
8	Rejected
9	Suspended
C	Expired

FillLiquidityInd (1443) shows whether the participant's order that the execution resulted from was passive, aggressive or from an uncrossing. FillLiquidityInd (1443) is part of the <FillsGrp> component block.

Value	Description
1	Passive (Added Liquidity)
2	Aggressive (Removed Liquidity)
4	Uncrossing

The ExecutionReport (35=8) message is identified using the ExecID (17). ExecID (17) is not an identifier of trades, it is an identifier assigned to each unique ExecutionReport (35=8) message produced with no duplicate allowed during the entire FIX session. If an ExecutionReport (35=8) is fragmented the ExecID (17) will be the same across the fragmented ExecutionReport (35=8) messages. It should be noted that ExecID (17) will be set to '0' on order status update messages (when ExecType (150) = 'I').

The Fills Group component block relays information about individual fills and is a repeating group that allows multiple fills to be reported within one ExecutionReport (35=8) message. The Fills Group should be used as the indicator that executions are reported in the message especially if many actions have taken place in the matching engine such as order modification and executions in one processing round.

FillExecID (1363) is the identifier for the individual execution or fill. There may be many FillExecID's within an ExecutionReport (35=8) message. As a result, one ExecID (17) may have many FillExecID (1363).

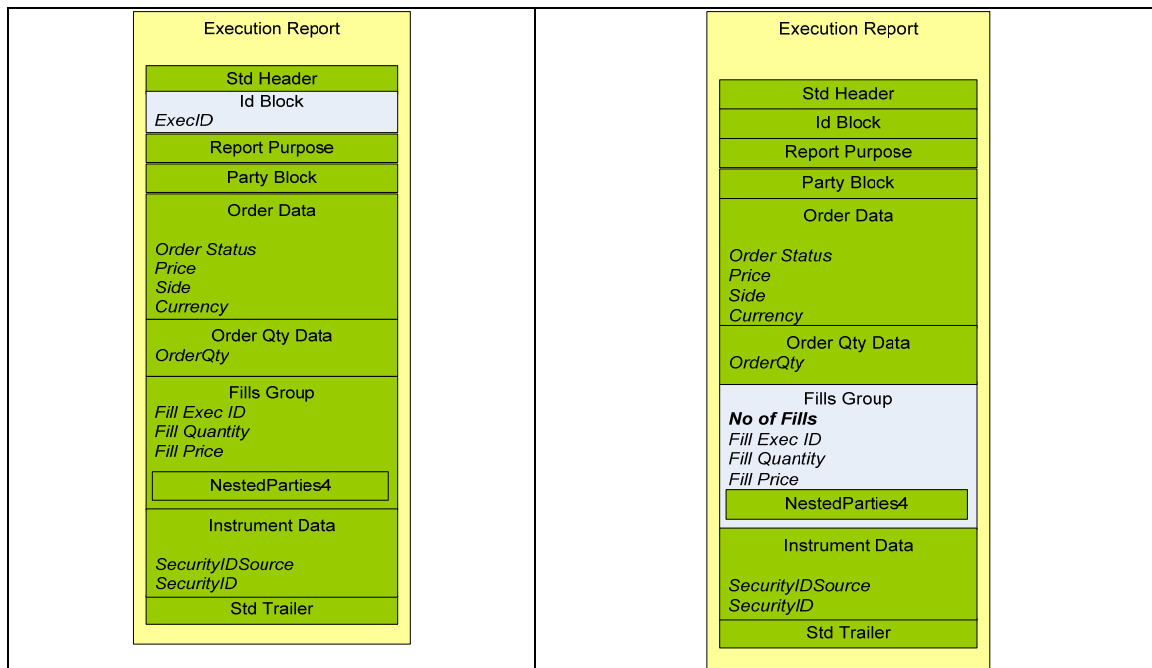


Diagram 8: Execution report (left) and bundled Execution report

7. Quote Handling

Market Makers create prices and provide liquidity by offering dual sided quotes. The FIX 5.0 interface uses the MassQuote (35=i) FIX message for single quote entry. Please note that basket functionality for quote entry is not supported via the FIX 5.0 interface. TradElect supports two different quote types: executable and firm.

An executable quote (EQ) is a named pair of executable orders used to display a firm two-way offer to trade on an order book. Executable quotes behave like two independent limit orders (with no expiry) and may execute immediately upon entry, or remain on the book to await passive execution.

A firm quote (FQ) is a named non-executable quote. Firm quotes are used in quote-driven trading services where executions take place outside TradElect.

The field QuoteType (537) is used to describe a quote as executable or firm.

The FIX 5.0 interface supports the following quote handling functionality:

- Entering a quote
- Deleting a single quote
- Updating a quote

The following FIX 5.0 messages are supported for quote handling.

FIX Message	FIX Message Type	Direction
35=i	Mass Quote entry	Participant to Exchange
35=b	Quote Ack/Reject	Exchange to Participant
35=8	Quote originator execution report (fills)	Exchange to Participant
35=Z	Quote Cancel Request	Participant to Exchange
35=AI	Quote Cancel Ack/Reject	Exchange to Participant

7.1. Quote Identification

An Exchange dual sided quote contains a buy and a sell leg for the same security. For executable quotes, the MassQuote (35=i) message containing the two quote legs is transformed into two orders (buy and sell) and placed on the appropriate order book.

Within the MassQuote (35=i) message, two QuoteEntryID (299) fields are populated; one for each side of the quote. For executable quotes, the QuoteEntryID (299) of the relevant side of the quote will appear within the ClOrdID (11) field within the ExecutionReport (35=8) message upon execution of that side of the quote. This is illustrated in the diagram below. Please note that QuoteEntryID (299) cannot be used for the purposes of deleting either an executable or firm quote.

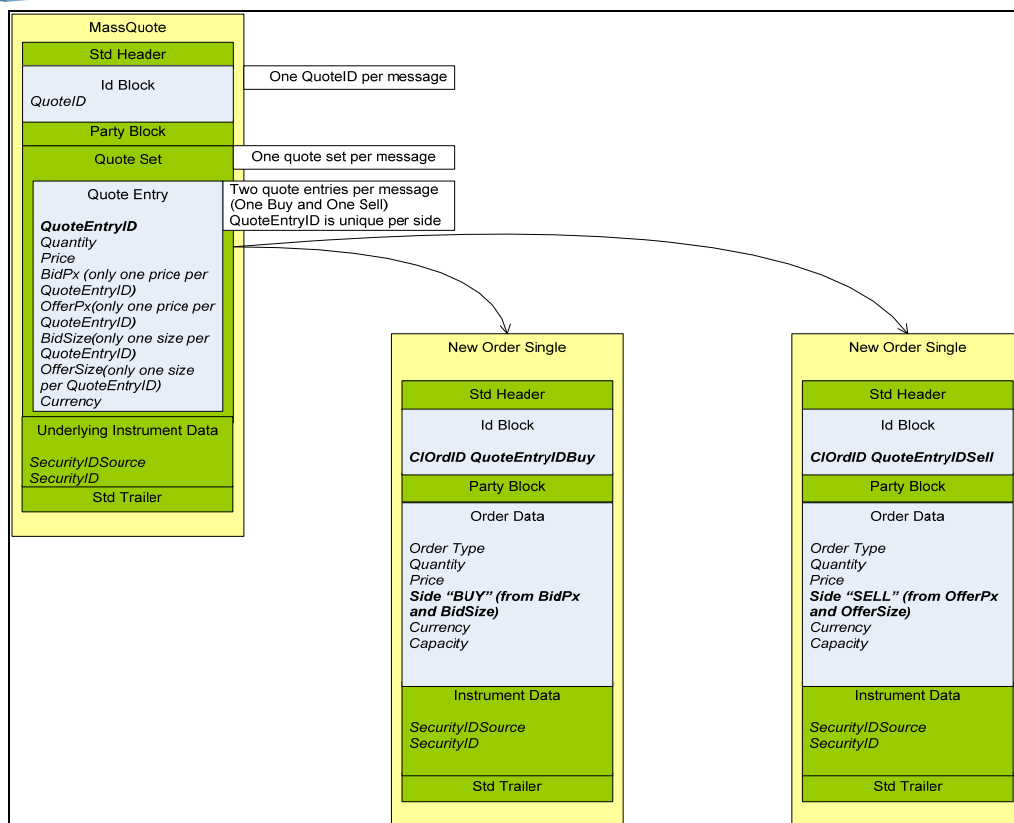


Diagram 9: Quote Identification for an EQ - resulting in 2 NewOrderSingle (35=D) messages

7.2. Quote Entry

The following table shows how TradElect quote types are described using the FIX 5.0 interface. QuoteType (537) is used to describe a quote as Executable or Firm.

Value	Description	Price (44)
1	Executable Quote	Y*
0	Firm Quote	Y*

* It is possible to have a zero priced bid side of a quote. Participants would specify that a bid side of a quote is not to be updated by setting the size to be zero.

The following values must be set in the MassQuote (35=i) Repeating block structure.

FIX Field	Name	Value
296	NoQuoteSets	1
302	QuoteSetID	1
304	TotNoQuoteEntries	2

Only one <QuotSetGrp> is to be used, the security is identified in the <UnderlyingSecurity> component block using the 4 way key. The QuoteSetID (302) must be set to 1.

The individual quote details of price and quantity are to be provided in two <QuotEntryGrp> component blocks, with one <QuotEntryGrp> to be used for the Buy side and one <QuotEntryGrp> to be used for the sell side. The order of tags in these <QuotEntryGrp> component blocks is as follows:

295 NoQuoteEntries
 299 QuoteEntryID
 775 BookingType
 528 OrderCapacity
 529 OrderRestrictions
 132 BidPx
 133 OfferPx
 134 BidSize
 135 OfferSize
 15 Currency

For executable quotes the QuoteEntryID (299) for each <QuotEntryGrp> will be used to create the ClOrdID (11) of the dual-sided quotes that are placed on the book.

AccountType (581) is used to describe a quote as having one of the following Settlement Attributes.

Value	Description
3	House
1	Client
Not present	Standing/Default

7.3. Quote Cancel

A single QuoteCancelRequest (35=Z) message must contain

- QuotID (117)
- QuoteCancelType (298) = "6"
- QuoteType (537)
- UnderlyingSecurityIDSource (305) = "8" (Exchange Key)
- UnderlyingSecurityID (309) = 4 Way Key
- Trader Group (Parties component block)

7.4. Quote Acknowledgment

Advisory Codes for quote messages are presented back to the participant in the following fields in the MassQuoteAck (35=b) message.

FIX Field	Name	Description
58	Text	Holds the Application Advisory Code
368	QuoteEntryRejectReason	If Application Advisory Code <> Null then 99
1167	QuoteEntryStatus	If Application Advisory Code <> Null then 5

8. Trade Reporting

The FIX 5.0 interface as implemented by the Exchange supports single and dual-sided trade reporting, pre-releasing of trade reports and trade cancellations.

The following Trade Reporting Models are supported:

8.1. Trade Reporting Models by Market

Trade Report Model	Market
Single Sided	<ul style="list-style-type: none"> London Equities Oslo Equities
Dual Sided (Request Confirm and Deny)	<ul style="list-style-type: none"> Oslo Fixed Income
Dual Sided (Request Confirm Only)	<ul style="list-style-type: none"> JSE equities
Single Sided Cancellation	<ul style="list-style-type: none"> London Equities JSE Equities Oslo Equities
Dual Sided Cancellation	<ul style="list-style-type: none"> Oslo Fixed Income
Prereleasing a delayed trade	<ul style="list-style-type: none"> London Equities JSE Equities Oslo Equities

Customers should consult the latest version of the TradElect Technical Specification for a description of these Trade Reporting Models.

8.1.1. Trade Reporting Messages

The Trade Reporting Models supported by TradElect use the following FIX 5.0 messages:

Function	FIX Message	Direction
Trade Report Entry/Prerelease/Cancel	35=AE	Participant to Exchange Exchange to Participant
Trade Report Entry Ack/Reject	35=AR	Exchange to Participant

8.2. Trade Reporting Tags

A full description of those FIX 5.0 tags used to support TradElect trade reporting functionality is provided below.

8.2.1. Trade Reporting Workflow Types

The user is required to define the Trade Reporting Model being. TradeHandlingInstr (1123) is used when entering the first TradeCaptureReport (35=AE) in the workflow. TradeHandlingInstr (1123) is not required in subsequent inbound trade reporting messages, e.g. pre-release, cancellation, confirmation or denial of a dual sided trade.

Trade Reporting Workflow Model	TradeHandlingInstr (1123)
One sided	0
Two sided	3

8.2.2. Inbound Trade Report Request Types

Inbound Trade Reporting messages sent to the Exchange by participants will have trade report request state conveyed as follows.

Trade Report Request Type	TradeReportType (856)	TradeHandlingInstr (1123)
Single Sided Trade Report Entry	0	0
Dual Sided Trade Report Entry	0	3
Confirm Trade Report	2	
Deny Trade Report	3	
Cancel/Contra Trade Report	6	

8.2.3. Outbound Trade Status Types

Outbound Trade Reporting messages sent to participants by the Exchange will have Trade Status conveyed as follows.

Exchange Trade Status	TradeReportType (856)	MatchStatus (573)	TradeReportRejectReason (751)
M Matched	2	0	
D Denied	3	2	
U Unmatched	1	1	
X Cancelled	6	0	
A Awaiting Cancellation	14	0	
S Single Sided	0	0	
Rejected	8	2	99

8.2.4. Agreement Currency

A Trade Report must carry an AgreementCurrency (918). If AgreementCurrency (918) is different from Currency (15) then the settlement currency is different from the trade currency. If AgreementCurrency (918) is the same as Currency (15) then the trade settles in the same currency as the trade execution.

8.2.5. Trade Sub Types

TrdSubType (829) is used to describe the type of trade. Valid Exchange values are detailed in the table below:

FIX Trade Sub Type Enum	LSE Trade Type Indicator Code	Description
17	LC	LATE TRADE CORRECTION
20	NM	NOT TO MARK
24	PC	PREVIOUS DAY CONTRA. USED WHEN REPORTING A CONTRA TRADE WHEN THE CONTRA DATE IS NOT THE TRADE DATE.
		LSE Shared Trade Types Values 1000+
1000	O	ORDINARY TRADE
1001	UT	UNCROSSING TRADE
1002	AT	AN AUTOMATIC TRADE GENERATED BY THE SYSTEM
1003	CT	CONTRA TRADE. USED TO PUBLISH A CONTRA TRADE
1004	IF	INTER FUND CROSS DELAYED PUBLICATION REQUESTED
1005	NK	NEGOTIATED TRADE DELAYED PUBLICATION REQUESTED
1006	NT	NEGOTIATED TRADE IMMEDIATE PUBLICATION
1007	OC	OTC LATE CORRECTION
1008	OK	ORDINARY TRADE DELAYED PUBLICATION REQUESTED
1009	OT	OTC TRADE IMMEDIATE PUBLICATION
1010	SC	SI LATE CORRECTION
1011	SI	SI TRADE IMMEDIATE PUBLICATION
1012	SK	SI TRADE DELAYED PUBLICATION REQUESTED
1013	TK	OTC TRADE DELAYED PUBLICATION REQUESTED
		JSE Trade Types Values 2000+
2000	AS	ASSET SWAP
2001	BT	JSE BLOCK TRADE
2002	CF	CORPORATE FINANCE TRADE
2003	LT	LATE TRADE (AFTER HOURS)
2004	NX	NAMIBIA TRADE
2005	OD	OPTION DELTA
2006	OP	OFF ORDER BOOK PRINCIPAL
2007	OX	OPTION EXERCISED
2008	TX	TRADE OPTION EXERCISED
2009	PF	PORTFOLIO TRADE
2010	SS	SETTLEMENT SPECIFIED TRADE
2011	WX	WARRANT EXERCISED
2012	BU	BOOK BUILD
2013	GU	GIVE UP

FIX Trade Sub Type Enum	LSE Trade Type Indicator Code	Description
		Oslo Trade Types Values 3000+
3000	ON	NON STANDARD SETTLEMENT
3001	OR	REPO
3002	OH	OTHER
3003	OL	ODD LOT
3004	OU	OUTSIDE OPENING HOURS
3005	OE	EXCHANGE GRANTED TRADE
3006	DE	EXCHANGE GRANTED TRADE DELAYED PUBLICATION
3007	DN	NON STANDARD SETTLEMENT DELAYED PUBLICATION
3008	DR	REPO DELAYED PUBLICATION
3009	DH	OTHER DELAYED PUBLICATION
3010	DL	ODD LOT DELAYED PUBLICATION
3011	DU	OUTSIDE OPENING HOURS DELAYED PUBLICATION
3012	DT	DERIVATIVES TRADE
3013	VW	VWAP TRADE

8.2.6. Trade Type

TradeType (828) is used to describe any special conditions associated with the trade. Exchange accepted values are:

FIX Trade Type Enum	Description (MiFID)
30	Special price (SP)

8.2.7. Trade Report ID

TradeReportID (571) may be specified in the first Trade Report message and is used as the customer specified unique reference ID for the Trade. TradeReportID (571) is not validated.

8.2.8. Trade ID

TradeID (1003) is populated by the Exchange in the first response to a Trade Report request and is the unique Tradelect identifier for the Trade.

8.2.9. Transact Time

TransactTime (60) must be included in the first Trade Report message specifying the time and date the Trade took place.

8.2.10. Settlement Date

SettleDate (64) is must be included in the first Trade Report message specifying the settlement date for the trade. SettleDate (64) is used for Equity and Fixed Income trades only, not repo's.

8.2.11. Start Date & End Date

StartDate (916) & EndDate (917) are used to carry the timeframe for a repo trade.

8.2.12. Order Capacity

OrderCapacity (528) must be included in the first Trade Report message and shows whether the trade was carried out as Agency, Principle or Riskless Principle capacity.

8.2.13. Order Type

OrderType (581) shows whether the trade was carried out against a House or Client account. If this tag is not present, then the default "Standing" value will be used.

8.2.14. Booking Type

BookingType (775) shows the booking method for the trade, 775=0 is the only valid value. However, this field is not supported for Oslo Trade Reporting so as to allow default clearing venue to be set to Oslo Clearing for relevant securities.

8.2.15. Parties Block

The parties block is used to carry information about:

- Member ID's
- Client references

8.2.16. Root Parties Block

The RootParties block is used to carry information about:

- Trader Group
- Trader ID

8.2.17. Text

Text (58) can be used to carry a reason for trade description. Note that if the Exchange rejects or adds an advisory code to a trade report response the reason text in Text (58) will be overwritten with an advisory code on the message returned to the customer.

8.2.18. Security ID

SecurityID (48) is used to carry the 4 way key of the security that trade was carried out in. SecurityIDSource (22) must be 8.

8.2.19. Trade Report Transaction Type

When prereleasing a delayed trade, the TradeReportTransType (487) must be set to 3.

9. Retransmission Services

A participant may request the following retransmission services via the FIX 5.0 Interactive interface.

- Retransmission of Broadcast Market Data Messages
- Own Trades Book Download (OTBD)
- Own Order Book Download (OOBD)

A separate FIX session should be initiated to request retransmission of messages via a separate USAP.

The Following FIX messages are supported on the retransmission service:

Market Data Retransmission Messages

Function	FIX Message	FIX Message Type	Direction
Request Market Data	35=BW	Application Message Request	Participant to Exchange
Request Market Data Ack/Reject	35=BX	Application Message Request Ack	Exchange to Participant
Resend Market Data	35=X	Incremental Market Data Refresh	Exchange to Participant
Request Market Data Cancel	35=BW	Application Message Request	Participant to Exchange
Request Market Data Cancel Ack	35=BX	Application Message Request Ack	Exchange to Participant

Own Trades Book Download (OTBD) Messages

Function	FIX Message	FIX Message Type	Direction
Own Trades Download Request	35=AD	Trade Capture Report Request	Participant to Exchange
Own Trades Download Request Ack/Rej	35=AQ	Trade Capture Report Request Ack	Exchange to Participant
Own Trades Download Request Response	35=AE	Trade Capture Report	Exchange to Participant

Own Order Book Download (OOBD) Messages

Function	FIX Message	FIX Message Type	Direction
Own Book Download Request	35=AF	Order Mass Status Request	Participant to Exchange
Own Order Book Download Request Ack/Rej	35=AQ	Trade Capture Report Request Ack	Exchange to Participant
Own Book Download Request Response	35=8	Execution Report	Exchange to Participant

9.1. Retransmission of Market Data

The FIX 5.0 interface has the capability to retransmit market data encoded in either a native fixed width message format or in a FAST message format. Market data is re-transmitted as a payload inside a MarketDataIncrementalRefresh (35=X) message. The payload format will match the original transmission format. Participants using the FIX 5.0 interface to re-request market data will use the ApplicationMessageRequest (35=BW) message stating the data channel and message sequence range required for retransmission.

Initially only Fixed Width will be provided as payload in retransmission messages.

Please note that all requests will be assigned the same priority on entry (1).

Please note that the current native 5FR 'Re-request First Response' message contains the Re-Request High Sequence Number field, but this is not included in the FIX equivalent: ApplicationMessageRequestAck (35=BX). Also, unlike the native protocol, there is no message contained in the first response, this will be in the subsequent response.

The layout of a retransmission message is shown below:

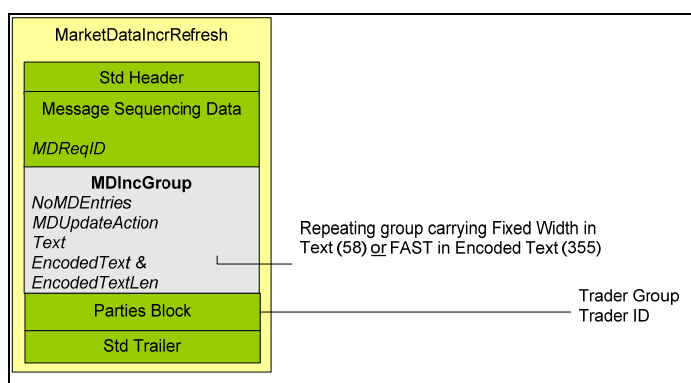


Diagram 10: Market Data retransmission Message

If retransmission takes place with messages embedded in the response encoded in Fixed Width format the following fields are used to hold the retransmitted market data.

Type	FIX No	FIX Field	Description
Fixed Width	58	Text	Holds Fixed Width market data

If retransmission takes place with messages embedded in the response encoded in FAST format the following fields are used to hold the retransmitted market data.

Type	FIX No	FIX Field	Description
FAST	355	EncodedText	Holds FAST encoded market data
FAST	354	EncodedTextLen	Hold the length of the FAST data in EncodedText (355)

The ApplReqType (1347) tag is used to determine whether the ApplicationMessageRequest (35=BW) message is to be used for an initial request (ApplReqType (1347) = "0") or a cancel (ApplReqType (1347) = "5").

In the ApplicationMessageRequestAck (35=BX) that is returned, an ApplReqType = "0" signifies that the request was successful, whereas an ApplicationMessageRequestAck (35=BX) = "2" signifies that the request was rejected. In this scenario an Application Advisory Code will be contained in the Test (58) field.

Participants will have the ability to cancel market data re-requests performed via the native interface using the FIX 5.0 interface. This can be done by quoting the ApplReqID (1346) specified on the original request in the cancellation ApplicationMessageRequest (35=BW) message.

9.2. Own Trades Book Download (OTBD) Service

The Own Trades Book Download (OTBD) service enables a participant to reconcile their trade positions by downloading copies of all trade executions that they have been party to. This includes both manual and automatic trade executions. An OTBD request will be responded to with a stream of Trade Capture Reports for all trades that have taken place for the specified Trader Group.

The request may be filtered by specifying any of the following conditions within a Trader Group using the TradeCaptureReportRequest (35=AD). The TradeRequestType (569) field should be set to "0".

Criteria	FIX	Description
Date	TradeDate (75)	<u>Mandatory</u> , the request must be for a trade date that is within the period that trades are stored on the trading system (3 working days).
Segment	SecurityID (48)	<u>Mandatory</u> , can contain a 4 way key or a segment padded with leading spaces up to 21 chars
Execution Type	TrdType (828)	<u>Optional</u> , the request may specify to include automatic trades (828=0), manual trades (828=54) or both (tag not included). Default value is all.
Trade Status	Text (58)	<u>Optional</u> , the status of an enhanced dual-sided manual trade. M = matched D = denied U = unmatched X = cancelled A = awaiting cancellation S = singled sided
Client Reference	FirmTradeID (1041)	<u>Optional</u> , a Client reference identifier.

If the request was successful, a TradeCaptureReportRequestAck (35=AQ) will be returned with TradeRequestResult (749) set to "99" and TradeRequestStatus (750) field set to "0".

If the request was unsuccessful, a TradeCaptureReportRequestAck (35=AQ) will be returned with TradeRequestResult (749) set to "99", TradeRequestStatus (750) field set to "2" and an Application Advisory Code will be detailed in the Text (58) field.

The Own Trades Book Download request and response is shown below:

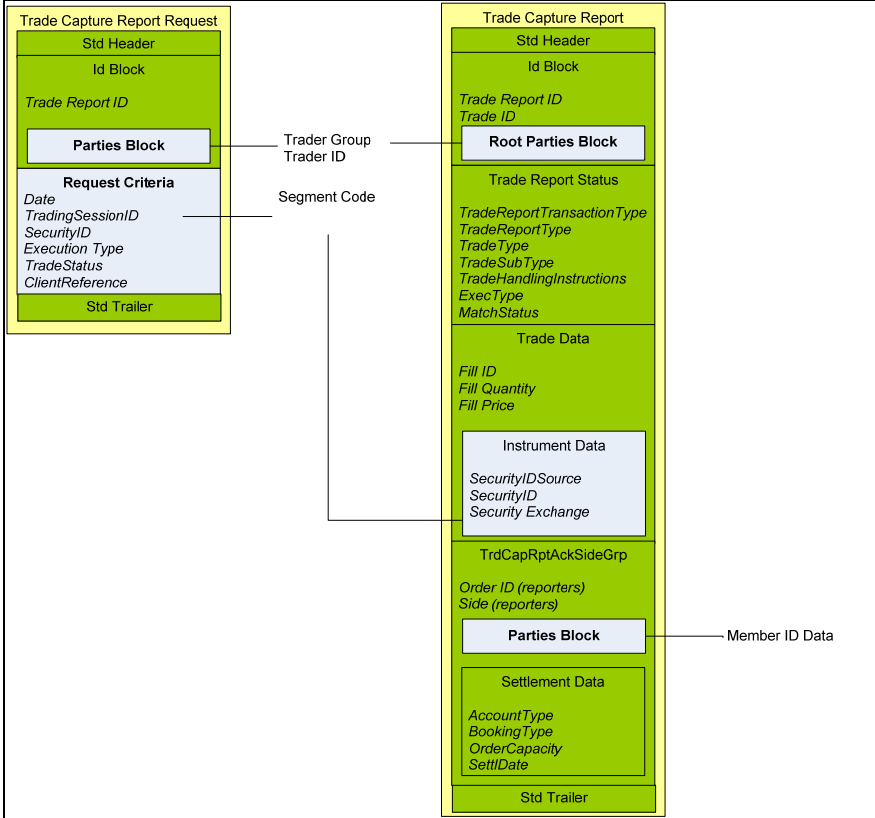


Diagram 11: Own Trades Book Download Service

9.3. Own Order Book Download (OOBD) Service

The Own Order Book Download (OOBD) service enables participants using the trading service to receive a download of their own open orders. Although orders may be requested at any time, the primary purpose of the service is to provide the participant with details of their open orders to assist them during system recovery. A participant may request a download of their existing orders residing on the Trading System using the OrderMassStatusRequest (35=AF) message and ExecutionReport (35=8) message. This facility allows a participant to request by Trader Group.

Criteria	FIX	Description
Trader Group	Parties Block	<u>Mandatory</u> , the request must be for a valid Trader Group.
Order selection	MassStatusReqType (585) = "7"	<u>Mandatory</u> , status for all orders

The Own Order Book Download request and response is shown below:

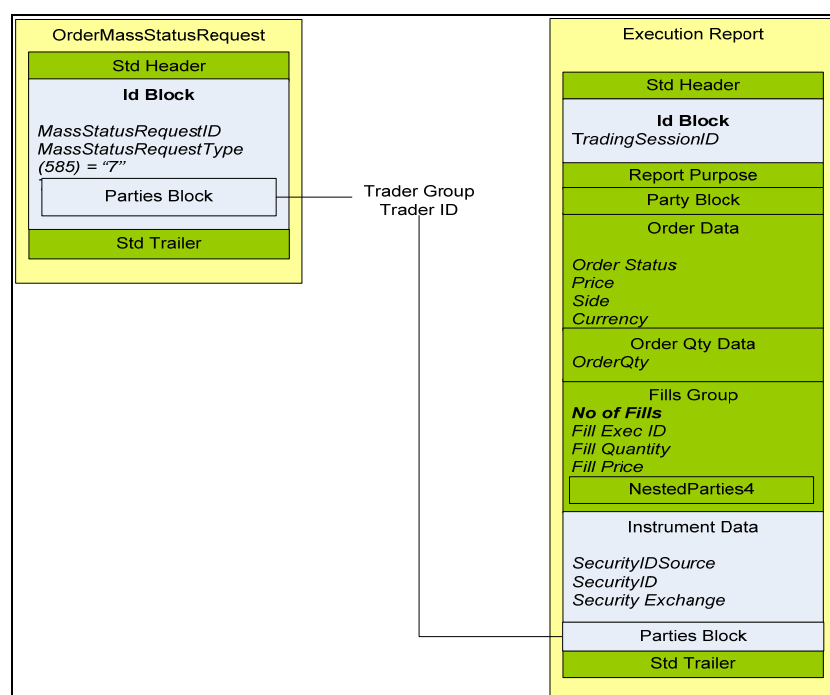


Diagram 12: Own Order Book Download Service

If the OOBD request was successful, a TradeCaptureReportRequestAck (35=AQ) will be returned with TradeRequestResult (749) set to "99" and TradeRequestStatus (750) field set to "0".

If the OOBD request was unsuccessful, a TradeCaptureReportRequestAck (35=AQ) will be returned with TradeRequestResult (749) set to "99", TradeRequestStatus (750) field set to "2" and an Application Advisory Code will be detailed in the Text (58) field.

ExecType (150) will be set to "I" (order status) on the Own Order Book Download ExecutionReports (35=8) messages.

Appendix A: Message Workflow Diagrams

This section shows examples of how participants can use the FIX 5.0 interface to interact with TradElect.

Order Message Flows

Order rejected

<u>Time</u>	<u>Message Received</u> (ClOrdID, OrigClOrdID)	<u>Message Sent</u> (ClOrdID, OrigClOrdID)	<u>ExecType</u>	<u>OrdStatus</u>	<u>OrderQty</u>	<u>CumQty</u>	<u>LeavesQty</u>	<u>LastQty</u>	<u>Comment</u>	<u>FIX Message Type</u>
1	New Order(X)				10000					NewOrderSingle(35=D)
2		Execution(X)	Rejected	Rejected	10000	0	0	0	If order is rejected by Exchange	ExecutionReport (35=8)

Partial execution

<u>Time</u>	<u>Message Received</u> (COrdID, OrigCOrdID)	<u>Message Sent</u> (COrdID, OrigCOrdID)	<u>ExecType</u>	<u>OrdStatus</u>	<u>OrderQty</u>	<u>CumQty</u>	<u>LeavesQty</u>	<u>LastQty</u>	<u>Comment</u>	<u>FIX Message Type</u>
1	New Order(X)				10000					NewOrderSingle(FIX 35=D)
2		Execution(X)	New	New	10000	0	10000	0		ExecutionReport (FIX 35=8)
Time Elapsed										
3		Execution (X)	Trade	Partially Filled	10000	1000	9000	1000	Execution for 1000	ExecutionReport (FIX 35=8)

Aggressive full execution

<u>Time</u>	<u>Message Received</u> (COrdID, OrigCOrdID)	<u>Message Sent</u> (COrdID, OrigCOrdID)	<u>ExecType</u>	<u>OrdStatus</u>	<u>OrderQty</u>	<u>CumQty</u>	<u>LeavesQty</u>	<u>LastQty</u>	<u>Comment</u>	<u>FIX Message Type</u>
1	New Order(X)				10000					NewOrderSingle(35=D)
2		Execution(X)	Trade	Filled	10000	10000	0	10000	Execution of 10000	ExecutionReport (35=8)

Passive full execution

<u>Time</u>	<u>Message Received</u> (COrdID, OrigCOrdID)	<u>Message Sent</u> (COrdID, OrigCOrdID)	<u>ExecType</u>	<u>OrdStatus</u>	<u>OrderQty</u>	<u>CumQty</u>	<u>LeavesQty</u>	<u>LastQty</u>	<u>Comment</u>	<u>FIX Message Type</u>
1	New Order(X)				10000					NewOrderSingle (35=D)
2		Execution(X)	New	New	10000	0	10000	0		ExecutionReport (35=8)
Time Elapsed										
3		Execution(X)	Trade	Partially Filled	10000	2000	8000	2000	Execution of 2000	ExecutionReport (35=8)
4		Execution(X)	Trade	Partially Filled	10000	3000	7000	1000	Execution of 1000	ExecutionReport (35=8)
5		Execution(X)	Trade	Filled	10000	10000	0	7000	Execution of 7000	ExecutionReport (35=8)

Execute and eliminate

<u>Time</u>	<u>Message Received</u> (CLOrdID, OrigCLOrdID)	<u>Message Sent</u> (CLOrdID, OrigCLOrdID)	<u>ExecType</u>	<u>OrdStatus</u>	<u>OrderQty</u>	<u>CumQty</u>	<u>LeavesQty</u>	<u>LastQty</u>	<u>Comment</u>	<u>FIX Message Type</u>
1	New Order(X)				10000				Order is ENE	NewOrderSingle(35=D)
2		Execution(X) Partial Fill	Trade	Cancelled	10000	1000	0	0	Order cancelled after first "round" of executions. Fill data relayed on cancelled state execution report	ExecutionReport (35=8)
OR										
2		Execution(X) No Fill Cancelled	Cancelled	Cancelled	10000	0	0	0	No execution and cancelled	ExecutionReport (35=8)
OR										
2		Execution(X) Filled	Trade	Filled	10000	10000	0	0	Fully filled	ExecutionReport (35=8)

Fill or kill

Killed

<u>Time</u>	<u>Message Received</u> (COrdID, OrigCOrdID)	<u>Message Sent</u> (COrdID, OrigCOrdID)	<u>ExecType</u>	<u>OrdStatus</u>	<u>OrderQty</u>	<u>CumQty</u>	<u>LeavesQty</u>	<u>LastQty</u>	<u>Comment</u>	<u>FIX Message Type</u>
1	New Order(X)				10000				Order is FOK	NewOrderSingle(35=D)
3		Execution(X)	Cancelled	Cancelled	10000	0	0	0	If order cannot be immediately filled	ExecutionReport (35=8)

Filled

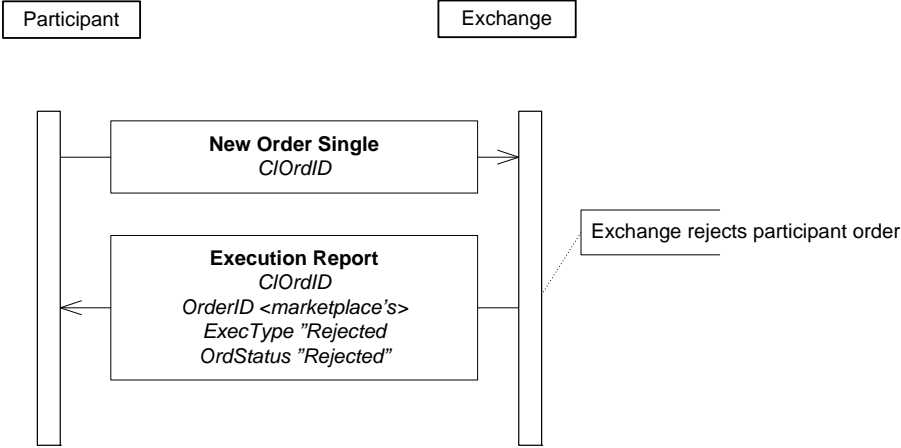
<u>Time</u>	<u>Message Received</u> (COrdID, OrigCOrdID)	<u>Message Sent</u> (COrdID, OrigCOrdID)	<u>ExecType</u>	<u>OrdStatus</u>	<u>OrderQty</u>	<u>CumQty</u>	<u>LeavesQty</u>	<u>LastQty</u>	<u>Comment</u>	<u>FIX Message Type</u>
1	New Order(X)				10000				Order is FOK	NewOrderSingle(35=D)
2		Execution(X)	Trade	Filled	10000	10000	0	10000		ExecutionReport (35=8)

Order parking and injection

Pegged order suspended

<u>Time</u>	<u>Message Received</u> (CLOrdID, OrigCLOrdID)	<u>Message Sent</u> (CLOrdID, OrigCLOrdID)	<u>ExecType</u>	<u>OrdStatus</u>	<u>OrderQty</u>	<u>CumQty</u>	<u>LeavesQty</u>	<u>LastQty</u>	<u>Comment</u>	<u>FIX Message Type</u>
1	New Order(X)				10000					NewOrderSingle(35=D)
2		Execution(X)	Trade	Partially Filled	10000	1000	9000	1000	Execution for 1000	ExecutionReport (35=8)
3		Execution(X)	Suspended	Suspended	10000	1000	9000	1000	Order is Parked	ExecutionReport (35=8)
4		Execution(X)	Order Status	Partially Filled	10000	1000	9000	1000	Order Injected with previous OrdStatus and ExecState of 'Order Status'.	ExecutionReport (35=8)

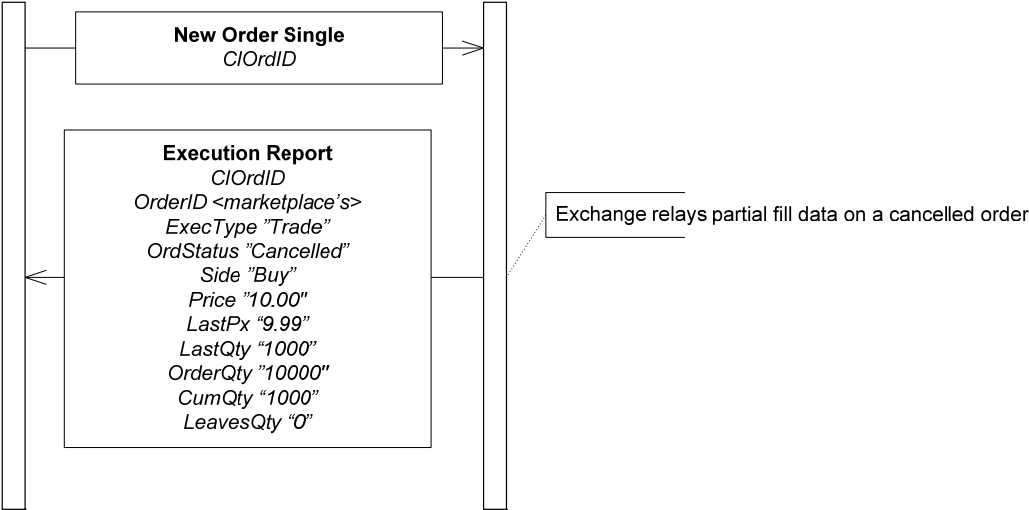
Order rejected



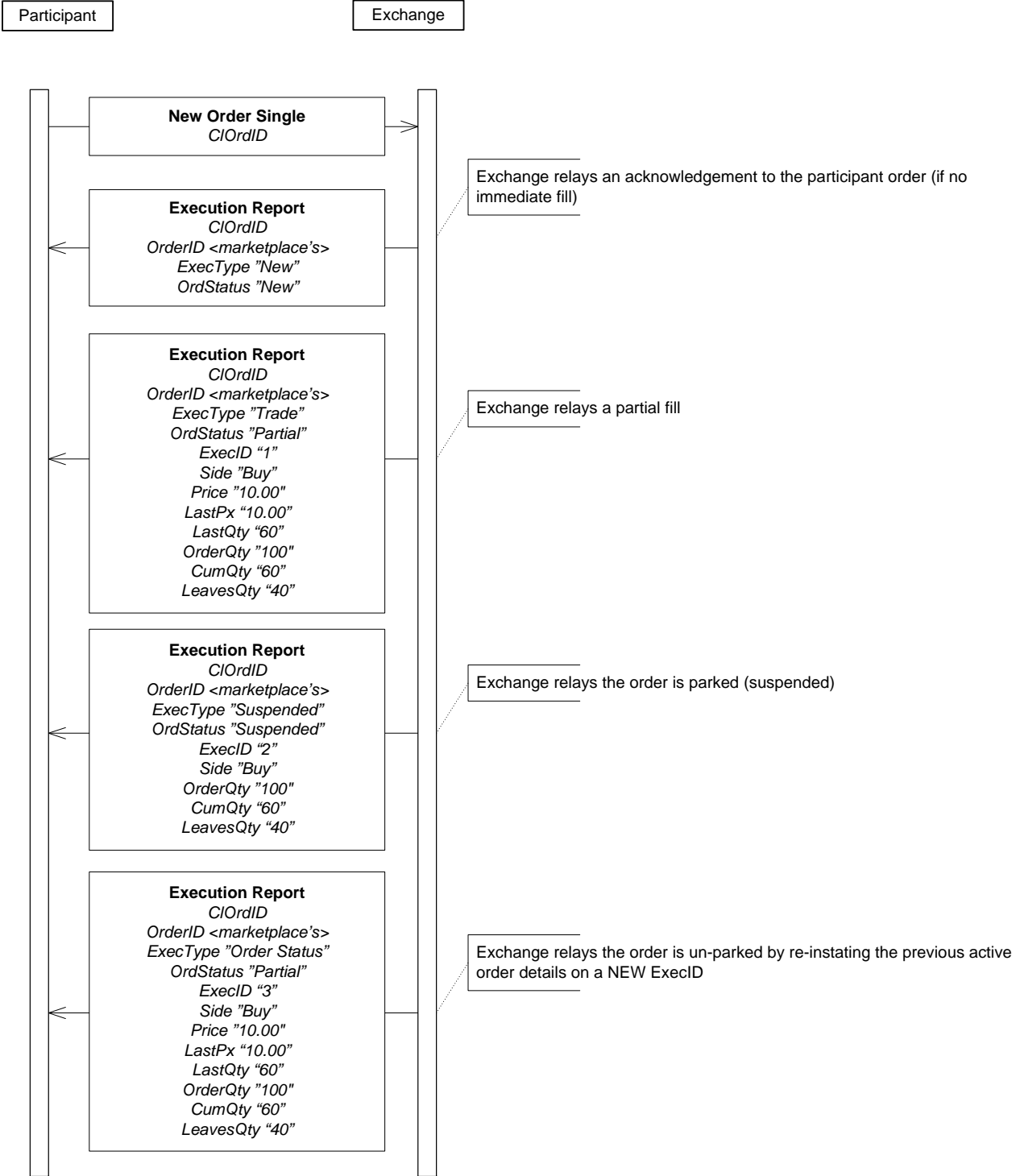
Execute and eliminate

Participant

Exchange



Order parking and re-injection on peg feed dropping



Order Cancel Workflow

Cancel success (generic)

<u>Time</u>	<u>Message Received</u> (COrdID, OrigCOrdID)	<u>Message Sent</u> (COrdID, OrigCOrdID)	<u>ExecType</u>	<u>OrdStatus</u>	<u>OrderQty</u>	<u>CumQty</u>	<u>LeavesQty</u>	<u>LastQty</u>	<u>Comment</u>	<u>FIX Message Type</u>
1	New Order(X)				10000					NewOrderSingle(35=D)
2		Execution(X)	New	New	10000	0	10000	0		ExecutionReport (35=8)
3	Cancel Request(Y,X)				0					OrderCancelRequest (35=F)
4		Execution (Y,X)	Cancelled	Cancelled	10000	0	0	0	Confirm that order has been cancelled	ExecutionReport (35=8)

Cancel success (partial fill occurs before cancel request processed)

<u>Time</u>	<u>Message Received</u> (CLOrdID, OrigCLOrdID)	<u>Message Sent</u> (CLOrdID, OrigCLOrdID)	<u>ExecType</u>	<u>OrdStatus</u>	<u>OrderQty</u>	<u>CumQty</u>	<u>LeavesQty</u>	<u>LastQty</u>	<u>Comment</u>	<u>FIX Message Type</u>
1	New Order(X)				10000					NewOrderSingle(35=D)
2	Cancel Request(Y,X)				0					OrderCancelRequest (35=F)
3		Execution(X)	Trade	Partial Fill	10000	5000	5000	5000		ExecutionReport (35=8)
4		Execution (Y,X)	Cancelled	Cancelled	10000	5000	0	0	Confirm that order has been cancelled	ExecutionReport (35=8)

Cancel failure (generic)

<u>Time</u>	<u>Message Received</u> (COrdID, OrigCOrdID)	<u>Message Sent</u> (COrdID, OrigCOrdID)	<u>ExecType</u>	<u>OrdStatus</u>	<u>OrderQty</u>	<u>CumQty</u>	<u>LeavesQty</u>	<u>LastQty</u>	<u>Comment</u>	<u>FIX Message Type</u>
1	New Order(X)				10000					NewOrderSingle(35=D)
2	Cancel Request(Y,X)				10000					OrderCancelRequest (35=F)
3		Cancel Reject (Y,X)		Rejected*					Application Advisory Code and reject reason presented	OrderCancelReject (35=9)

* Refers to the COrdID of the OrderCancelRequest (35=F)

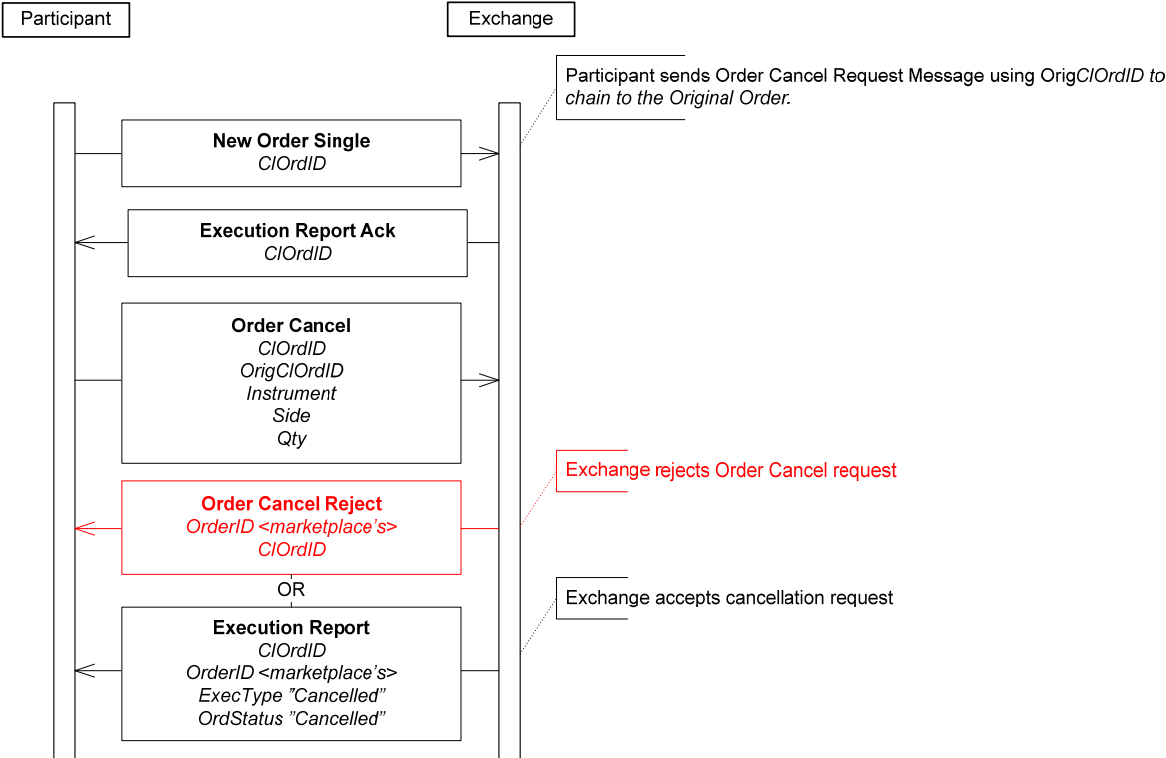
Cancel failure (order filled before cancel request processed)

<u>Time</u>	<u>Message Received</u> (COrdID, OrigCOrdID)	<u>Message Sent</u> (COrdID, OrigCOrdID)	<u>ExecType</u>	<u>OrdStatus</u>	<u>OrderQty</u>	<u>CumQty</u>	<u>LeavesQty</u>	<u>LastQty</u>	<u>Comment</u>	<u>FIX Message Type</u>
1	New Order(X)				10000					NewOrderSingle(35=D)
2	Cancel Request(Y,X)				10000					OrderCancelRequest (35=F)
3		Execution(X)	Trade	Filled	10000	10000	0	10000		ExecutionReport (35=8)
4		Cancel Reject (Y,X)		Rejected*	10000	10000	0	0	Application Advisory Code and Reject Reason Present	OrderCancelReject (35=9)

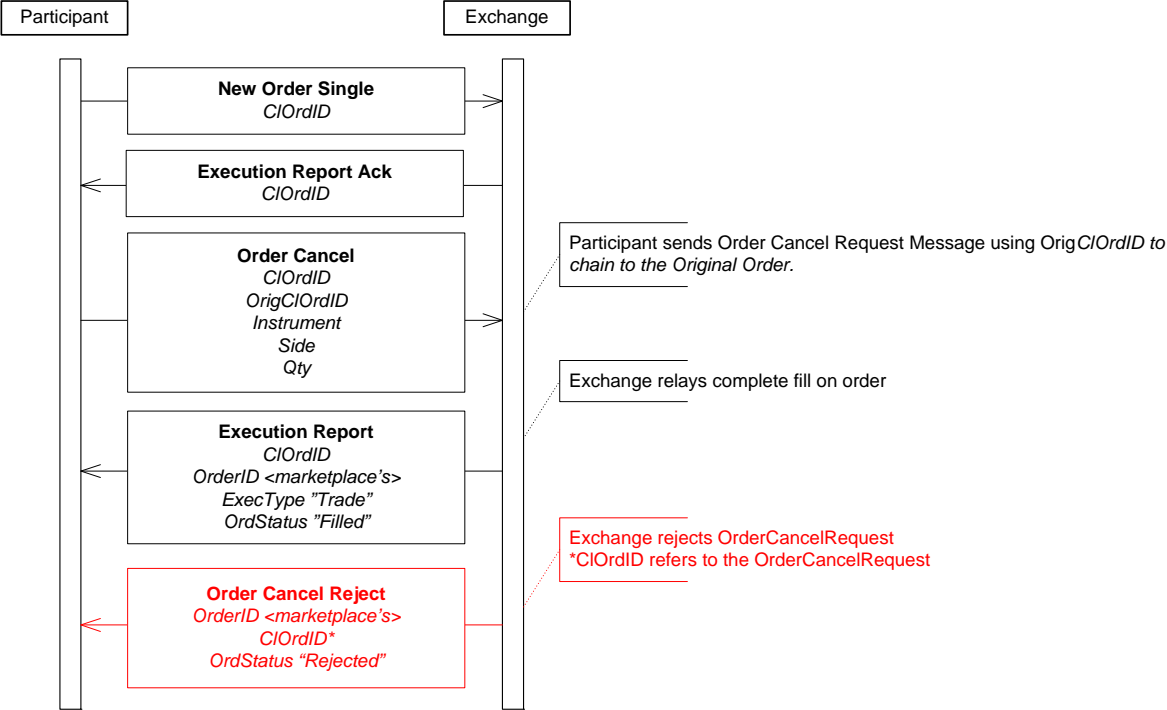
* Refers to the COrdID of the OrderCancelRequest (35=F)

Order Cancel Workflow Diagrams

Order cancel request (generic)



Order cancel reject (order filled)



Order Cancel Replace (Modify) Workflow

Order cancel replace success (generic)

<u>Time</u>	<u>Message Received</u> (CIOrdID, OrigCIOrdID)	<u>Message Sent</u> (CIOrdID, OrigCIOrdID)	<u>ExecType</u>	<u>Ord Status</u>	<u>Order Qty</u>	<u>Cum Qty</u>	<u>Leaves Qty</u>	<u>Last Qty</u>	<u>Comment</u>	<u>FIX Message Type</u>
1	New Order(X)				10000					NewOrderSingle (35=D)
2		Execution(X)	Trade	Partial	10000	5000	5000	5000		ExecutionReport (35=8)
3	Replace Request(Y,X)				11000				increase order qty to 11000	CancelReplace Request (35=G)
4		Execution (Y,X)	Replaced	Partial	11000	10000	1000	5000	Population of the <FillsGrp> block indicates executions have taken place.	ExecutionReport (35=8)

Order cancel replace success (modify OrdQty <= LeavesQty)

<u>Time</u>	<u>Message Received</u> (COrdID, OrigCOrdID)	<u>Message Sent</u> (COrdID, OrigCOrdID)	<u>ExecType</u>	<u>OrdStatus</u>	<u>OrderQty</u>	<u>CumQty</u>	<u>LeavesQty</u>	<u>LastQty</u>	<u>Comment</u>	<u>FIX Message Type</u>
1	New Order(X)				10000					NewOrderSingle (35=D)
2		Execution(X)	Trade	Partial Fill	10000	5000	5000	5000		ExecutionReport (35=8)
3	Replace Request(Y,X)				4000				decrease order qty to 4000	CancelReplace Request (35=G)
4		Execution (Y,X)	Cancelled	Cancelled	5000	5000	0	0	Confirm replaced	ExecutionReport (35=8)

Order cancel replace reject (generic)

<u>Time</u>	<u>Message Received</u> (CLOrdID, OrigCLOrdID)	<u>Message Sent</u> (CLOrdID, OrigCLOrdID)	<u>ExecType</u>	<u>OrdStatus</u>	<u>OrderQty</u>	<u>CumQty</u>	<u>LeavesQty</u>	<u>LastQty</u>	<u>Comment</u>	<u>FIX Message Type</u>
1	New Order(X)				10000					NewOrderSingle (35=D)
2		Execution(X)	New	New	10000	0	10000	0		ExecutionReport (35=8)
3	Replace Request(Y,X)				11000				increase order qty to 11000	CancelReplace Request (35=G)
4		Cancel Reject (Y,X)		Rejected					Application Advisory Code and Reject reason will be present *	OrderCancelReject (35=9)

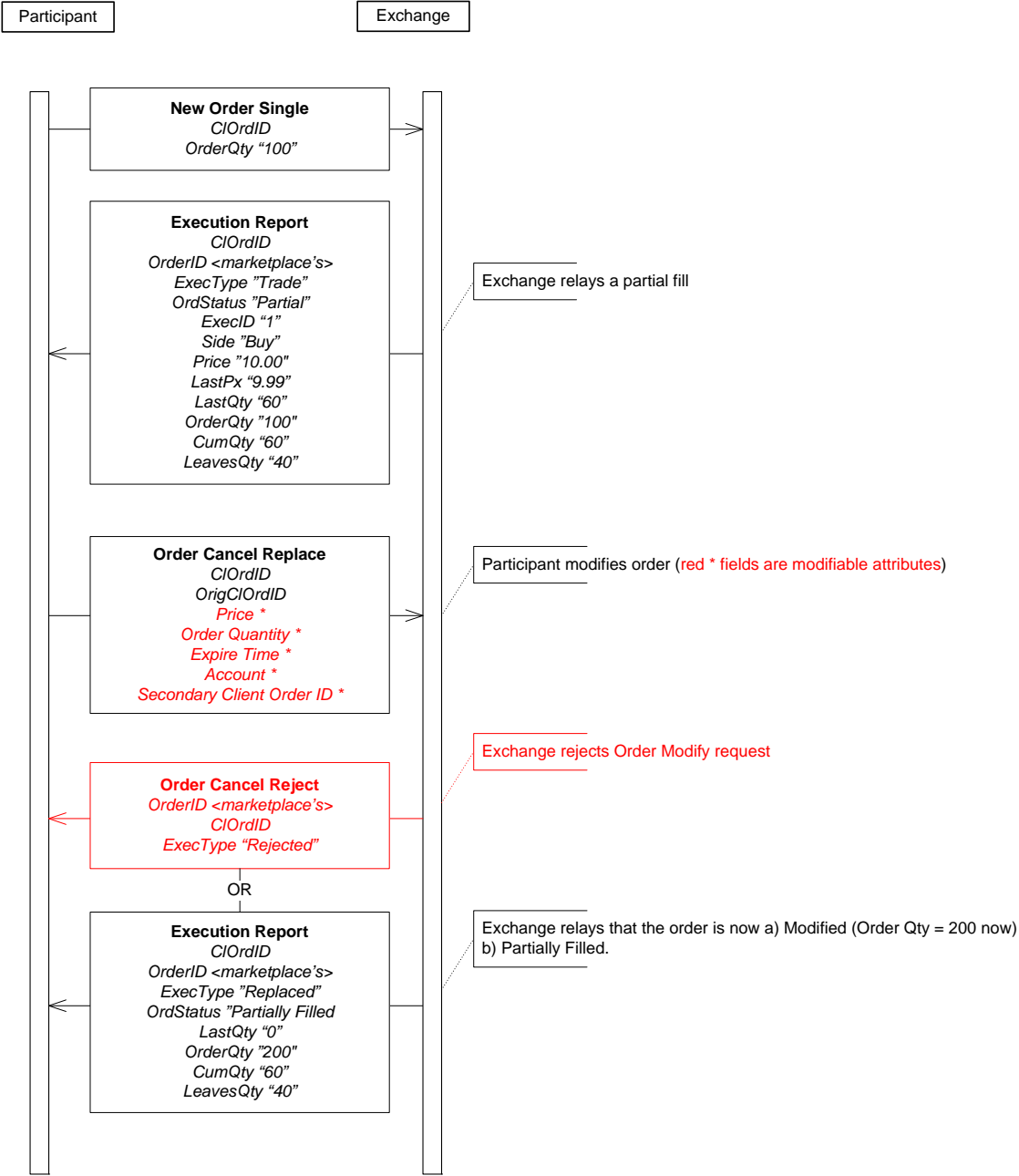
* As a result of a Tradelect application error. If this were a FIX session/unsupported field error; a SessionReject (35=3) message would be returned

Order cancel replace reject (order filled before modification processed)

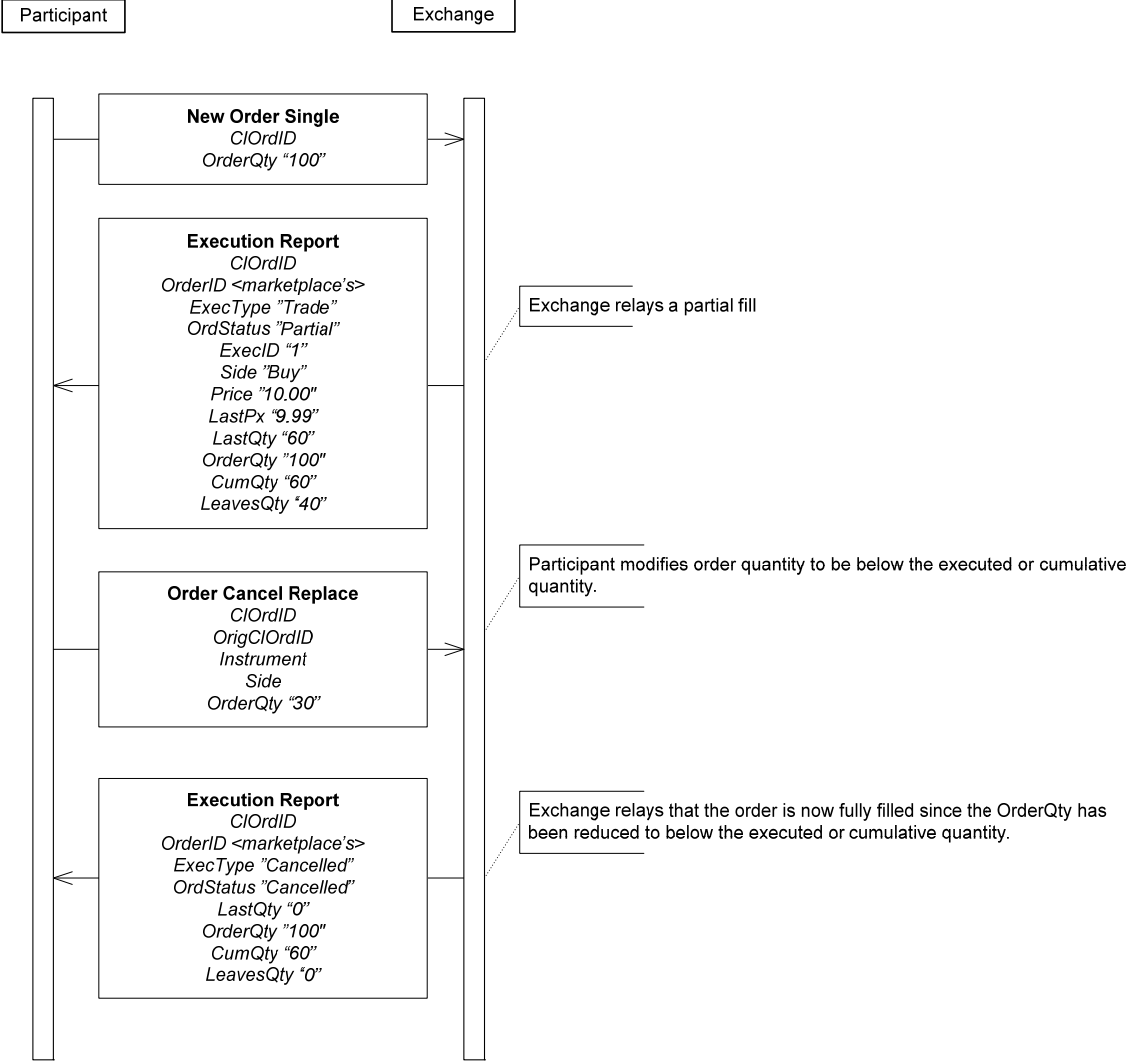
<u>Time</u>	<u>Message Received</u> (COrdID, OrigCOrdID)	<u>Message Sent</u> (COrdID, OrigCOrdID)	<u>ExecType</u>	<u>OrdStatus</u>	<u>OrderQty</u>	<u>CumQty</u>	<u>LeavesQty</u>	<u>LastQty</u>	<u>Comment</u>	<u>FIX Message Type</u>
1	New Order(X)				10000					NewOrderSingle (35=D)
2		Execution(X)	Trade	Filled	10000	10000	0	10000		ExecutionReport (35=8)
3	Replace Request(Y,X)				11000				increase order qty to 11000	CancelReplace Request (35=G)
4		Cancel Reject (Y,X)		Rejected					Application Advisory Code and Reject reason will be present	OrderCancelReject (35=9)

Order Cancel Replace (Modify) Workflow Diagrams

Order cancel replace (generic)



Order quantity cancel replace at or below LeavesQty



Mass Cancel Workflow

Mass cancel success

<u>Time</u>	<u>Message Received</u> (COrdID)	<u>Message Sent</u> (COrdID, OrigCOrdID)	<u>MassCancel RequestType</u>	<u>MassCancel Response</u>	<u>MassCancel RejectReason</u>	<u>Comment</u>	<u>FIX Message Type</u>
1	Mass Cancel Request(X)		9				OrderCancelRequest (35=q)
2		Mass Cancel Report (X)	9	9		Acknowledges the Mass Cancel request	MassCancelReport (35=r)

Cancellation notifications (cancelled or rejected) for each order within scope of the mass cancellation will be sent in individual messages as part of the standard cancellation workflow illustrated below.

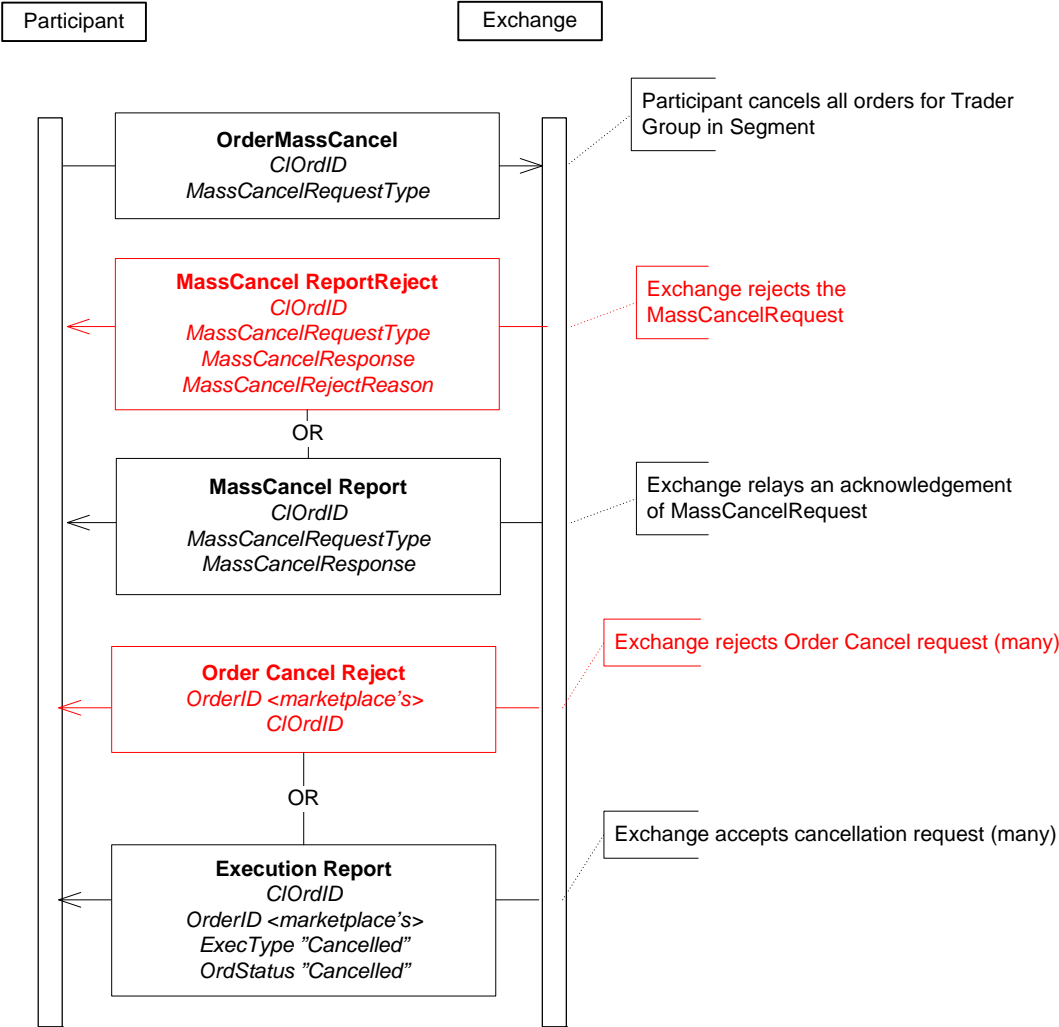
<u>Time</u>	<u>Message Received</u> (COrdID, OrigCOrdID)	<u>Message Sent</u> (COrdID, OrigCOrdID)	<u>ExecType</u>	<u>OrdStatus</u>	<u>OrderQty</u>	<u>CumQty</u>	<u>LeavesQty</u>	<u>LastQty</u>	<u>Comment</u>	<u>FIX Message Type</u>
4		Execution (X, Y)	Cancelled	Partial Fill	10000	5000	0	0	Confirm that order has been cancelled	ExecutionReport (35=8)
5		Cancel Reject (Y, Z)		Rejected						OrderCancelReject (35=9)

Mass cancel failure

<u>Time</u>	<u>Message Received</u> (CIOrdID, OrigCIOrdID)	<u>Message Sent</u> (CIOrdID, OrigCIOrdID)	<u>MassCancel RequestType</u>	<u>MassCancel Response</u>	<u>MassCancel RejectReason</u>	<u>Comment</u>	<u>FIX Message Type</u>
1	Mass Cancel Request(Y,X)		9				OrderMassCancelRequest (35=q)
2		Mass Cancel Report (Reject)	9	0	99 (Other i.e. see Text (58) Application Advisory Code)	If rejected by Exchange	MassCancelReport (35=r)

Mass Cancel Workflow Diagram

Mass cancel (generic)



Quote Message Flows

Executable quote aggressive partial execution

<u>Time</u>	<u>Message Received</u> (QuoteID QuoteEntryID Buy, QuoteEntryID Sell)	<u>Message Sent</u>	<u>ExecType</u>	<u>Ord Status</u>	<u>Quote Status</u>	<u>Order Qty</u>	<u>Cum Qty</u>	<u>Leaves Qty</u>	<u>Last Qty</u>	<u>Comment</u>	<u>FIX Message Type</u>
1	MassQuote(X, Y, Z)					10000 (X, Y)					MassQuote (35=i)
2		MassQuoteAck (X) Quote ID			0						MassQuoteAck (35=b)
3		Execution(Y) COrdID	Trade	Partially Filled		10000	2000	8000	2000	Buy Side Execution of 2000	ExecutionReport (35=8)

Quote entry failure

<u>Time</u>	<u>Message Received</u> (QuoteID QuoteEntryID Buy, QuoteEntryID Sell)	<u>Message Sent</u> (QuoteID)	<u>Quote Status</u>	<u>Quote Reject Reason</u>	<u>Text</u>	<u>FIX Message Type</u>
1	MassQuote(X,Y,Z)					MassQuote (35=i)
2		MassQuoteAck (X)	5	99	Application Advisory Code	MassQuoteAck (35=b)

Cancel quote

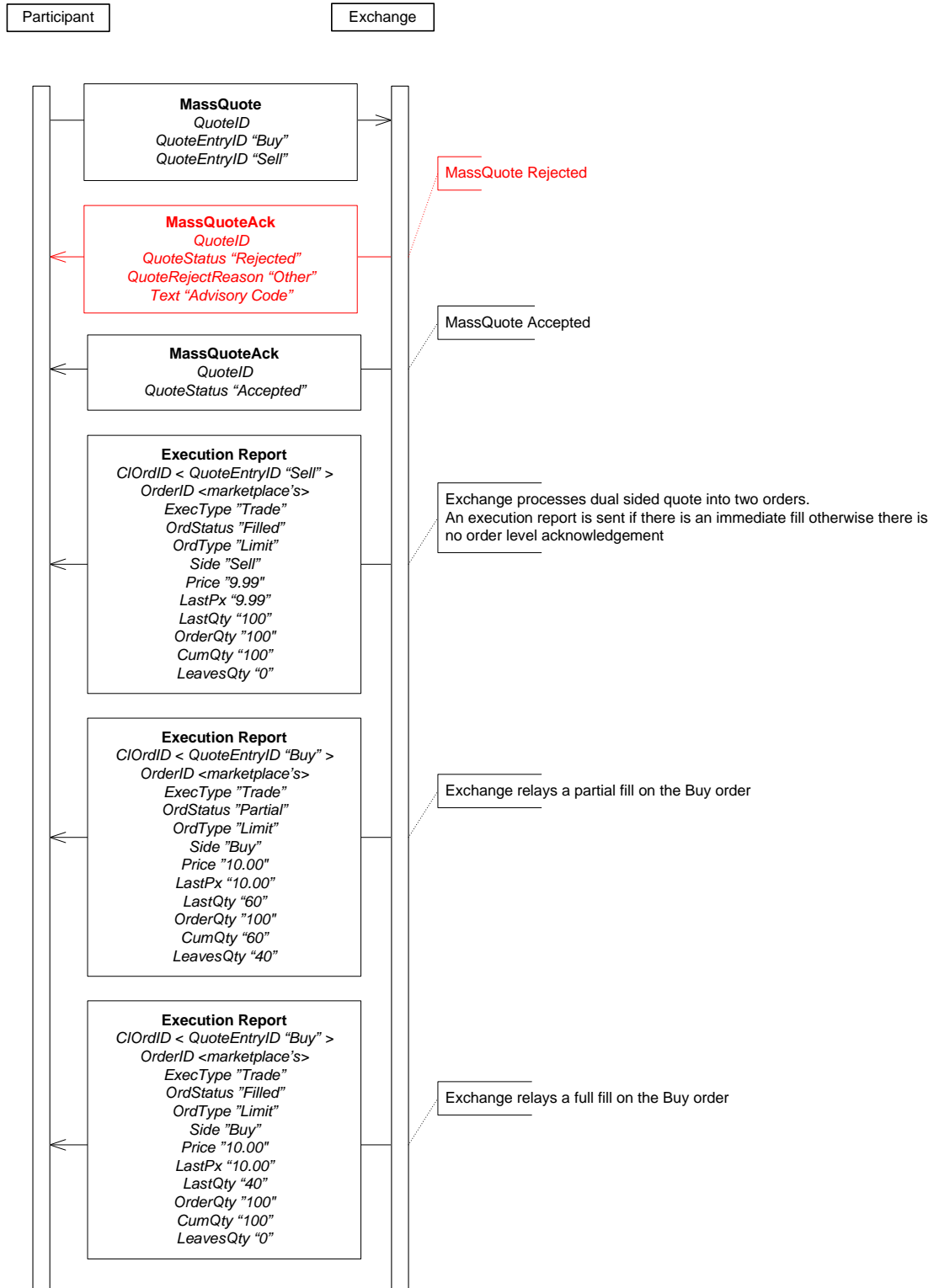
<u>Time</u>	<u>Message Received</u> (QuoteID)	<u>Message Sent</u> (QuoteID)	<u>Quote Status</u>	<u>Quote Cancel Type</u>	<u>Comment</u>	<u>FIX Message Type</u>
1	Quote Cancel(X)			5	QuoteID and 4 way key routes the cancel to the correct book.	QuoteCancelRequest (35=Z)
2		QuoteStatus(X)	Cancelled			QuoteStatusReport (35=AI)

Cancel quote (rejected)

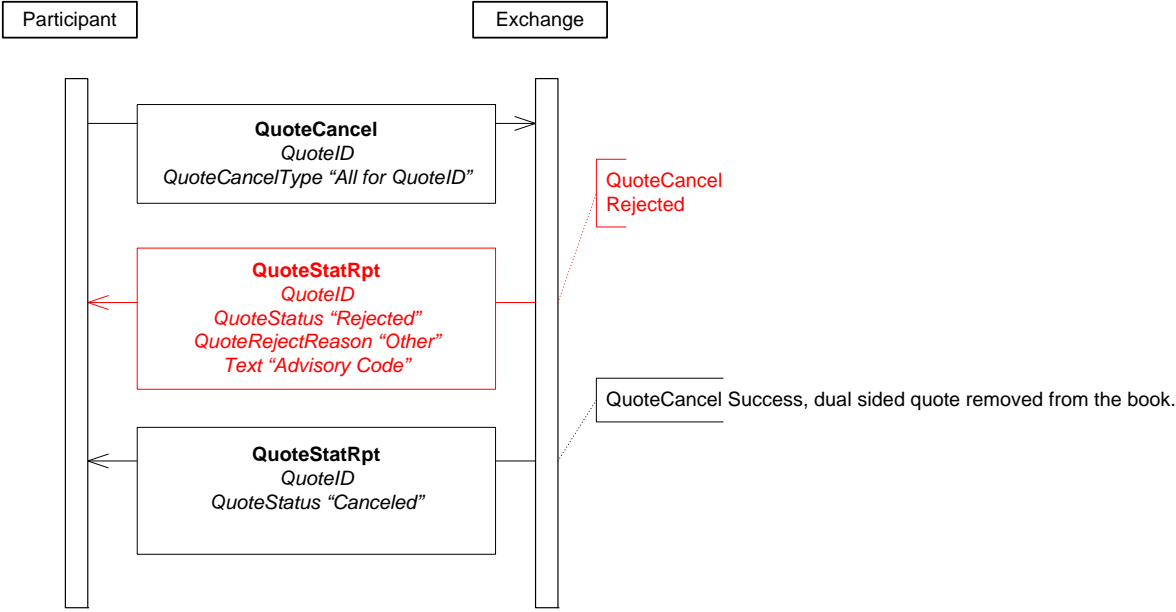
Time	Message Received (QuoteID)	Message Sent (QuoteID)	Quote Status	Quote Cancel Type	Comment	FIX Message Type
1	Quote Cancel(X)			5	QuoteID and 4 way key routes the cancel to the correct book.	QuoteCancelRequest (35=Z)
2		QuoteStatus(X)	Reject			QuoteStatusReport (35=AI)

Quote Workflow Diagrams

Executable quote entry and execution



Quote cancel



Trade Reporting Message Flows

Single sided (London and Oslo equities) trade report

Name	Direction	F	Trade Request Status	Trade Status		Match	Trade Report	Trade Handling	Trade Report	Trade ID
		I			>>	Status	Type	Instr	Reject Reason	
		X				573	856	1123	751	1003
Trade Capture Report	Participant to Exchange	AE	Single Sided				0	0		
Trade Capture Report Ack	Exchange to Participant	AR		Single Sided		0	0			Y
OR										
Trade Capture Report Ack	Exchange to Participant	AR		Rejected		2	8		99	Y

Dual sided (JSE equities) trade reporting

Name	Direction	F	Trade Request Status	Trade Status	>>	Match	Trade Report	Trade Handling	Trade Report	Trade ID
		I				Status	Type	Instr	Reject Reason	
		X				573	856	1123	751	
Trade Capture Report	Participant (1) to Exchange	AE	Request				0	3		
Trade Capture Report Ack	Exchange to Participant (1)	AR		Unmatched		1	1			Y
Trade Capture Report Ack	Exchange to Participant (1)	AR		Rejected		2	8		99	Y
Trade Capture Report	Exchange to Participant (2)	AE		Unmatched		1	1			Y
Trade Capture Report	Participant (2) to Exchange	AE	Confirm				2			Y
Trade Capture Report Ack	Exchange to Participant (2)	AR		Matched		0	2			Y
Trade Capture Report Ack	Exchange to Participant (2)	AR		Rejected		2	8		99	Y
Trade Capture Report	Exchange to Participant (1)	AE		Matched		0	2			Y

Cancel (London, JSE or Oslo equities) trade report

Name	Direction	F	Trade Status	Trade Status	>>	Match	Trade	Trade	Trade
		I				Status	Report	Report	ID
		X				573	856	751	1003
Trade Capture Report	Participant to Exchange	AE	Cancel/Contra Single				6		Y
Trade Capture Report Ack	Exchange to Participant	AR		Cancelled		0	6		Y
OR									
Trade Capture Report Ack	Exchange to Participant	AR		Rejected		2	8	99	Y

Cancel an Automated Trade

Name	Direction	F	Trade Request Status	Trade Status	>>	Match	Trade Report	Trade Handling	Trade Report	Trade ID
		I				Status	Type	Instr	Reject Reason	
		X				573	856	1123	751	
Trade Capture Report	Participant (1) to Exchange	AE	Request				6			Y
Trade Capture Report Ack	Exchange to Participant (1)	AR		Awaiting Cancellation		0	14			Y
Trade Capture Report Ack	Exchange to Participant (1)	AR		Rejected		2	8		99	Y
Trade Capture Report	Exchange to Participant (2)	AE		Awaiting Cancellation		0	14			Y
Trade Capture Report	Participant (2) to Exchange	AE	Cancel				6			Y
Trade Capture Report Ack	Exchange to Participant (2)	AR		Rejected		2	8		99	Y
Trade Capture Report Ack	Exchange to Participant (2)	AR		Cancelled		0	6			Y
Trade Capture Report	Exchange to Participant (1)	AE		Cancelled		0	6			Y

Dual sided (Oslo fixed income) trade reporting

Name	Direction	F	Trade Request Status	Trade Status		Match Status	Trade Report Type	Trade Handling Instr	Trade Report Reject Reason	Trade ID
		I								
						573	856	1123	751	1003
Trade Capture Report	Participant (1) to Exchange	AE	Request				0	3		
Trade Capture Report Ack	Exchange to Participant (1)	AR		Unmatched		1	1			Y
Trade Capture Report Ack	Exchange to Participant (1)	AR		Rejected		2	8		99	Y
Trade Capture Report	Exchange to Participant (2)	AE		Unmatched		1	1			Y
Trade Capture Report	Participant (2) to Exchange	AE	Confirm				2			Y
Trade Capture Report Ack	Exchange to Participant (2)	AR		Rejected		2	8		99	Y
Trade Capture Report Ack	Exchange to Participant (2)	AR		Matched		0	2			Y
Trade Capture Report	Exchange to Participant (1)	AE		Matched		0	2			Y
OR										
Trade Capture Report	Participant (2) to Exchange	AE	Denied				3			Y
Trade Capture Report Ack	Exchange to Participant (2)	AR		Rejected		2	8		99	Y
Trade Capture Report Ack	Exchange to Participant (2)	AR		Denied		2	3			Y
Trade Capture Report	Exchange to Participant (1)	AE		Denied		2	3			Y

Cancel (Oslo fixed income) trade report

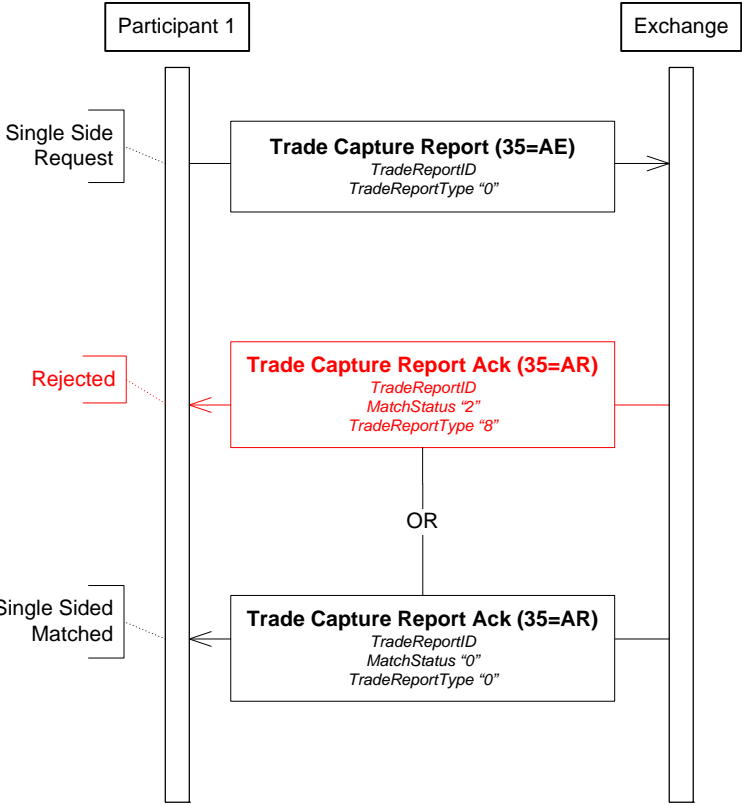
Name	Direction	F	Trade Request Status	Trade Status		Match Status	Trade Report	Trade Handling	Trade Report	Trade ID
		I					Type	Instr	Reject Reason	
		X			>>	573	856	1123	751	1003
Trade Capture Report	Participant (1) to Exchange	AE	Request				6			Y
Trade Capture Report Ack	Exchange to Participant (1)	AR		Awaiting Cancellation		0	14			Y
Trade Capture Report Ack	Exchange to Participant (1)	AR		Rejected		2	8		99	Y
Trade Capture Report	Exchange to Participant (2)	AE		Awaiting Cancellation		0	14			Y
Trade Capture Report	Participant (2) to Exchange	AE	Cancel				6			Y
Trade Capture Report Ack	Exchange to Participant (2)	AR		Rejected		2	8		99	Y
Trade Capture Report Ack	Exchange to Participant (2)	AR		Cancelled		0	6			Y
Trade Capture Report	Exchange to Participant (1)	AE		Cancelled		0	6			Y

Pre-release (London, JSE and Oslo equities) trade report

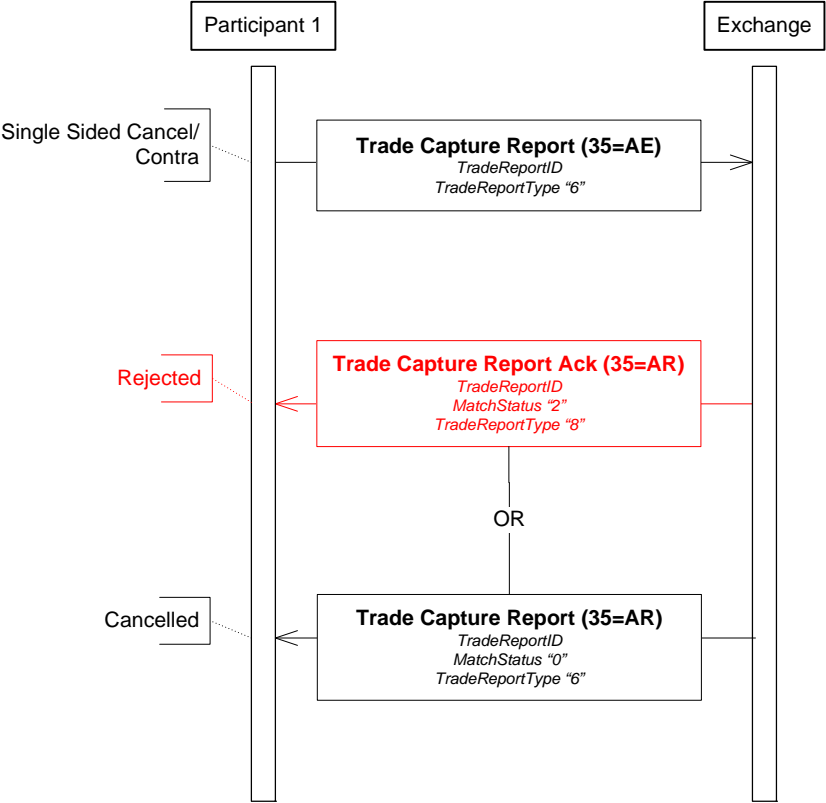
Name	Direction	F		Trade Report Trans Type	Trade Report Reject Reason	Trade ID
		I				
		X	>>	487	751	1003
Trade Capture Report (Request)	Participant to Exchange	AE		3		Y
Trade Capture Report Ack (Ack)	Exchange to Participant	AR		3		Y
Trade Capture Report Ack (Reject)	Exchange to Participant	AR		3	99	Y

Trade Reporting Workflow Diagrams

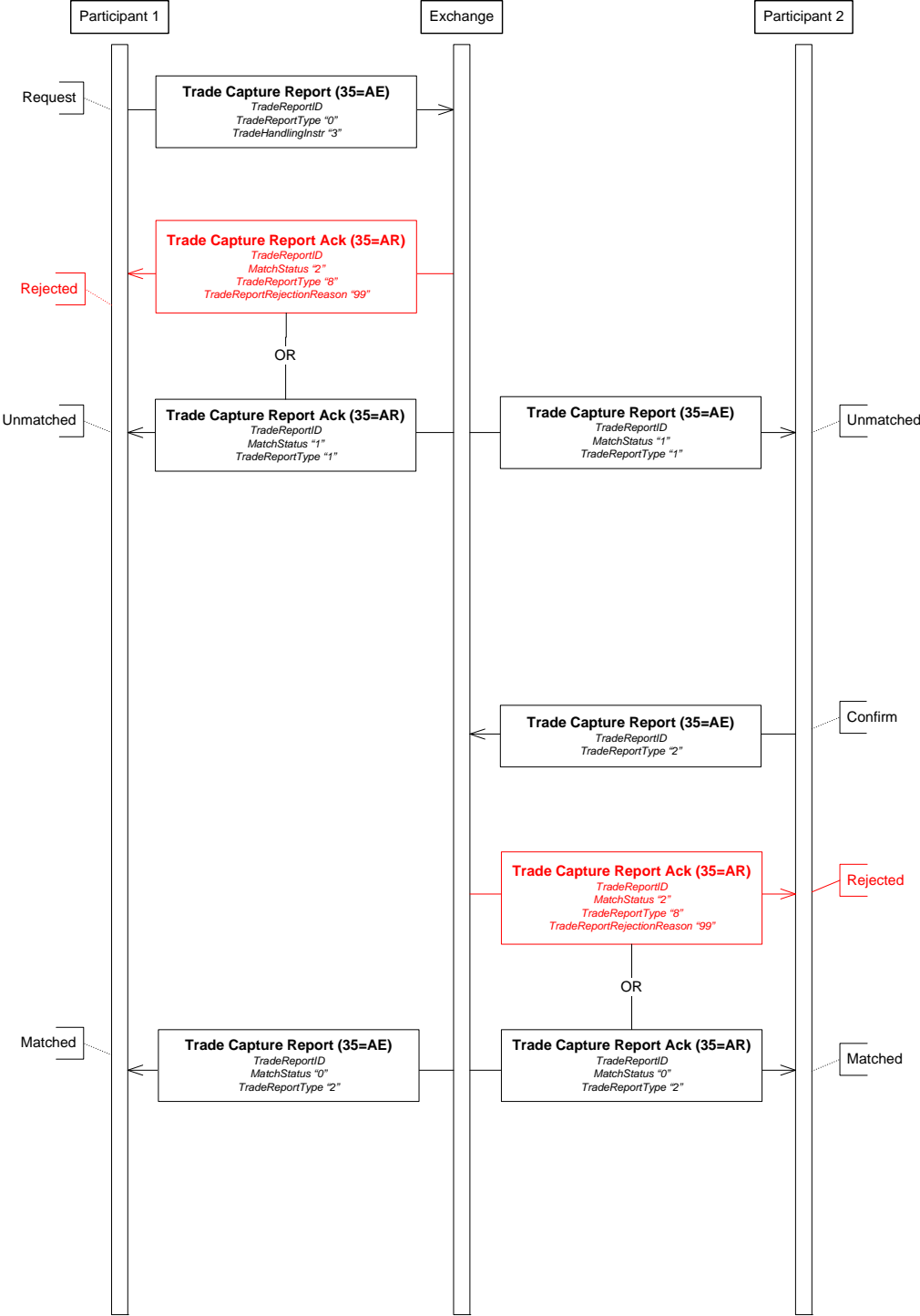
Single sided trade reporting



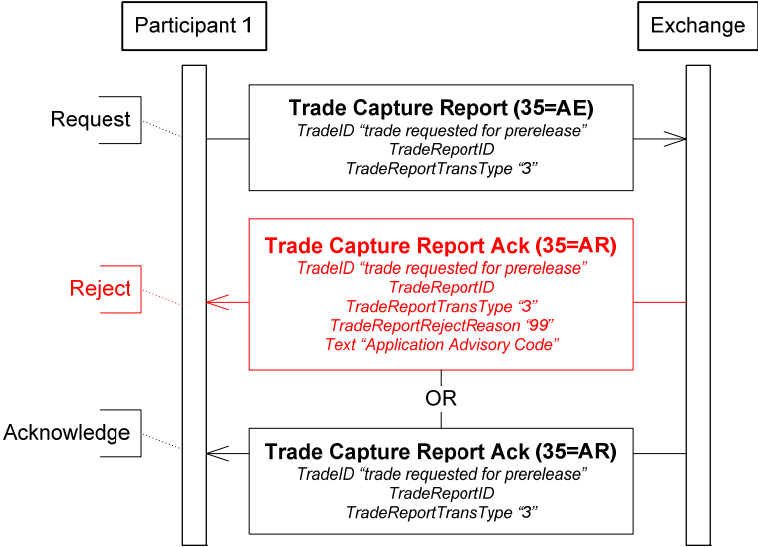
Cancel (London, JSE or Oslo equities) trade report



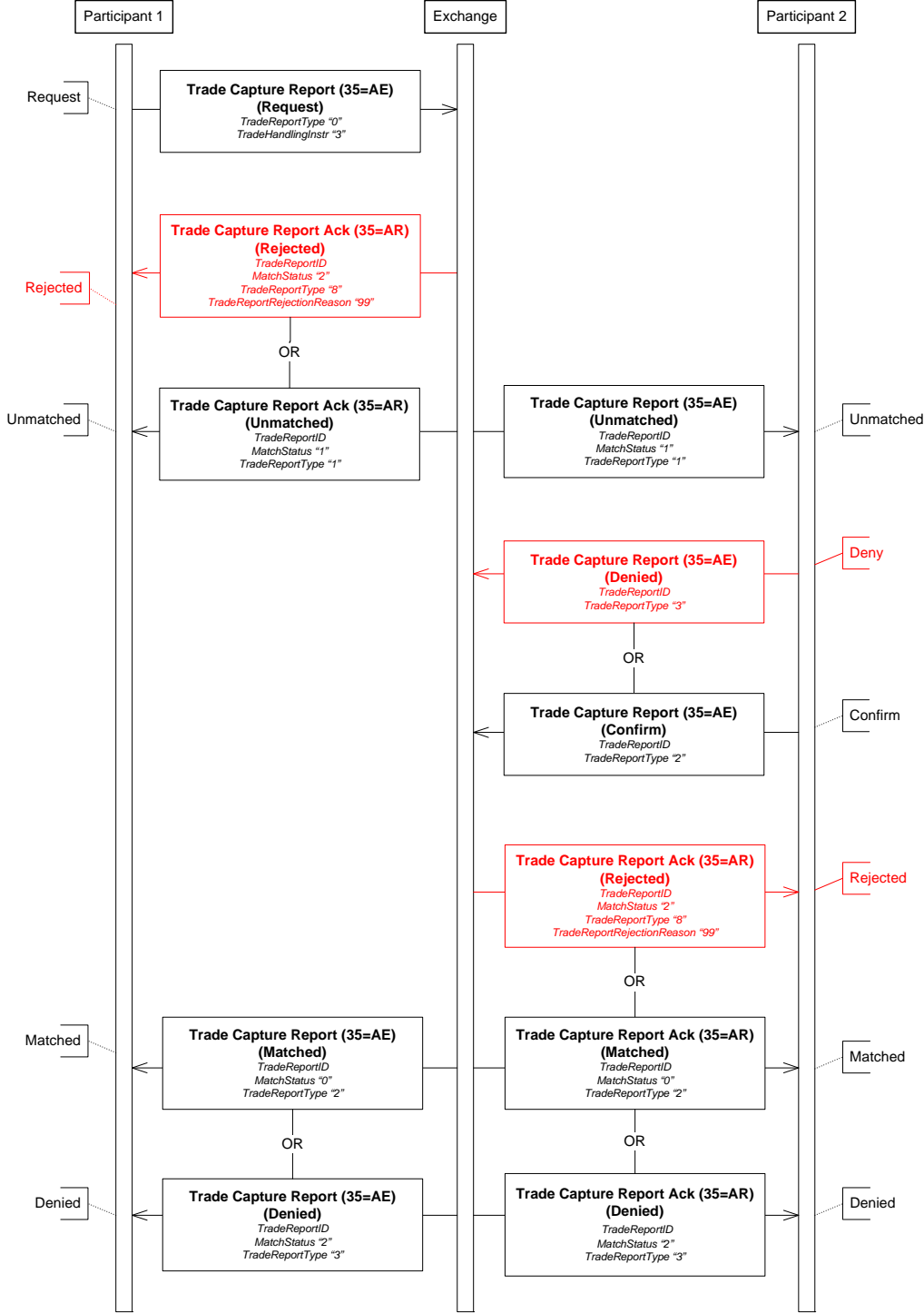
Dual sided (JSE equities) trade reporting



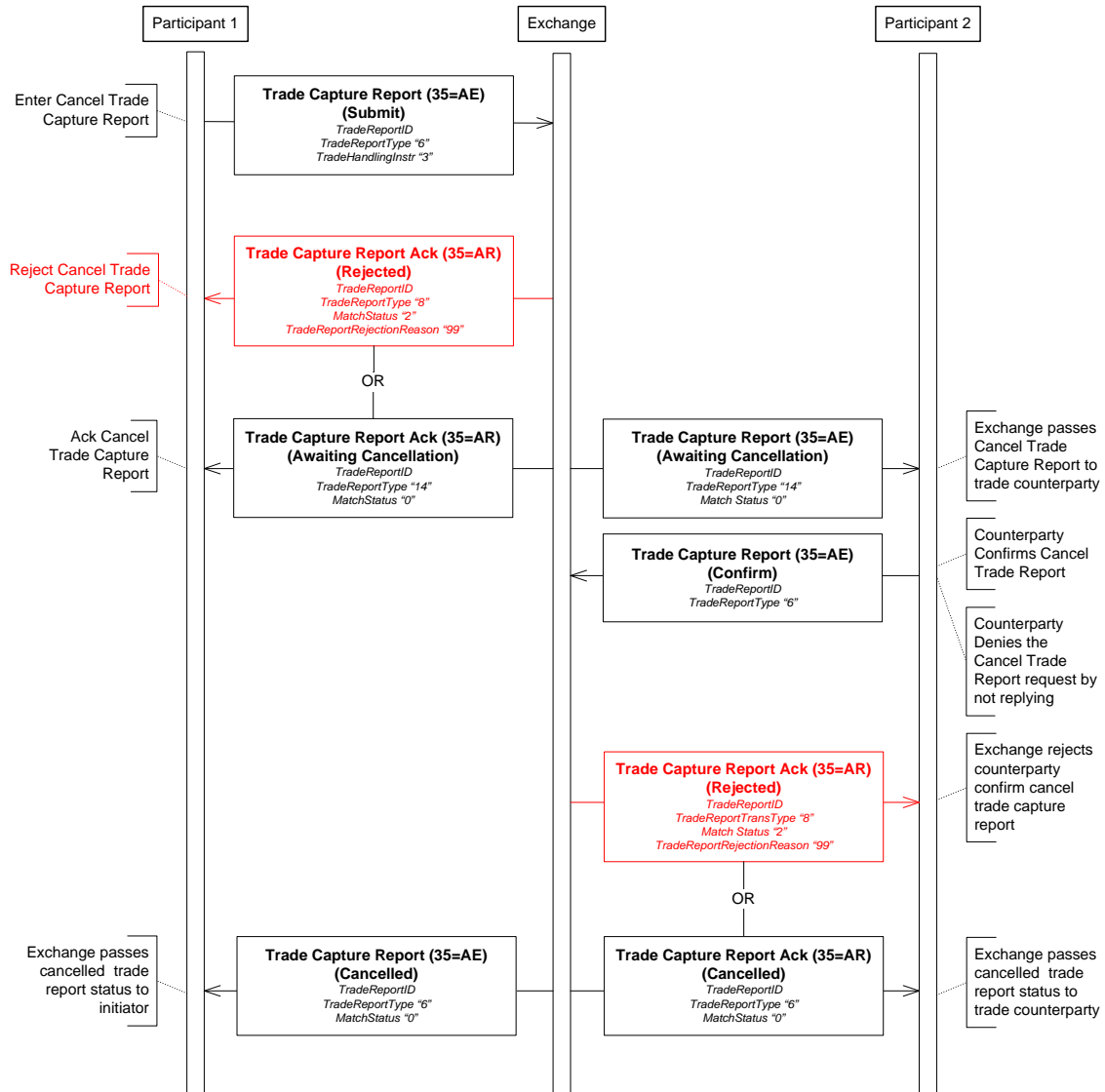
Pre-release (London, JSE, Oslo equities) trade report



Dual sided (Oslo Fixed Income) trade reporting



Dual sided Cancel (Oslo Fixed income) trade report



Market Data Re-request Workflow

Success

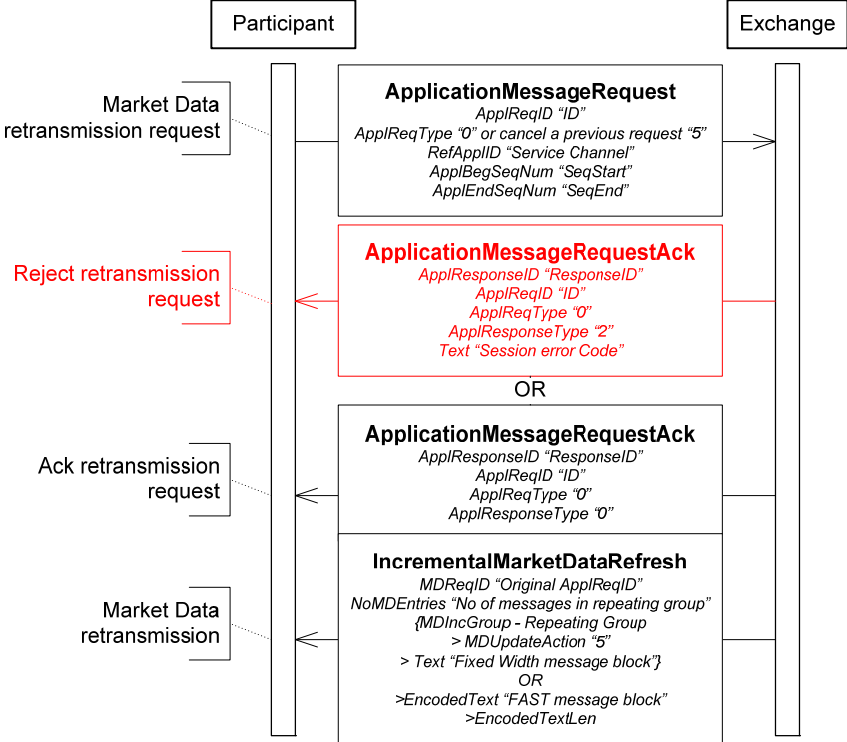
<u>Time</u>	<u>Message Received</u>	<u>Message Sent</u>	<u>Comment</u>	<u>FIX Message Type</u>
1	Application Message Request		Used to re-request messages based upon the high and low sequence number (inclusive) or to cancel a previous request.	ApplicationMessageRequest (35=BW)
2		Application Message Request Ack	Used to acknowledge re-request messages based upon the high and low sequence number (inclusive).	ApplicationMessageRequestAck (35=BX)
3		Market Data	Can hold FAST or Fixed Width payload.	MarketDataIncrementalRefresh (35=X)

Failure

<u>Time</u>	<u>Message Received</u>	<u>Message Sent</u>	<u>Comment</u>	<u>FIX Message Type</u>
1	Application Message Request		Used to re-request messages based upon the high and low sequence number (inclusive).	ApplicationMessageRequest (35=BW)
2		Application Message Request Ack	Used to reject a re-request message and includes an Application Advisory Code.	ApplicationMessageRequestAck (35=BX)

Market Data Re-request Workflow Diagrams

Market data re-request



Own Trades Book Download (OTBD) Message Flows

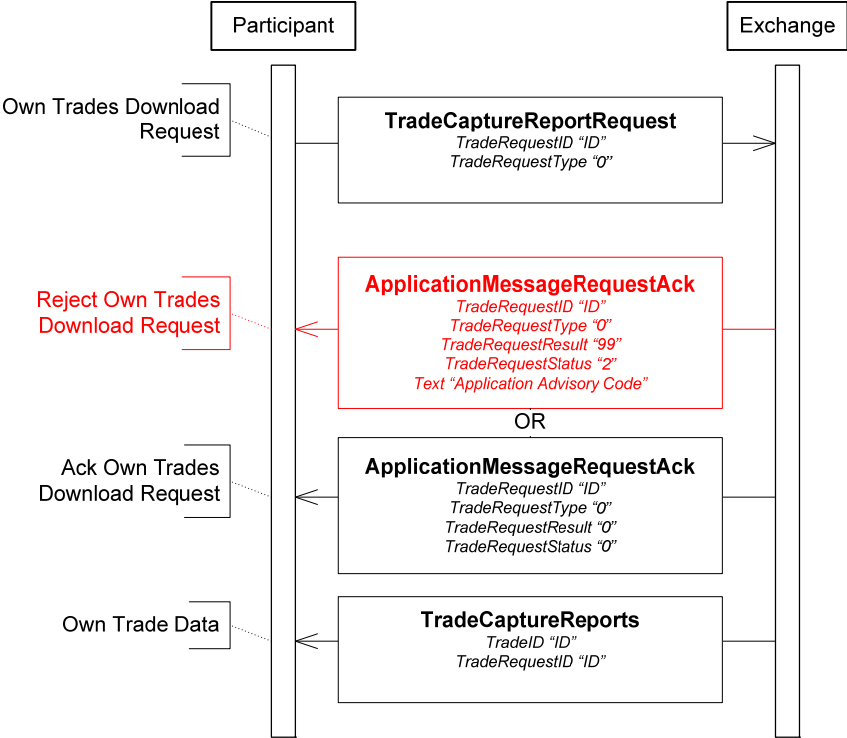
Own Trades Book Download success

<u>Time</u>	<u>Message Received</u> (TradeRequestID, Trader Group)	<u>Message Sent</u> (TradeRequestID, Trader Group)	<u>Comment</u>	<u>FIX Message Type</u>
1	Trade Capture Report Request Message(Y,Z)			TradeCaptureReportRequest Message (35=AD)
2		Acknowledgement		TradeCaptureReportRequestAck (35=AQ)
3		N x Trade Report(Y,Z)	Multiple trade reports will be sent to illustrate each existing trade on the book which matches the mass status criteria	TradeCaptureReport (35=AE)

Own Trades Book Download failure

<u>Time</u>	<u>Message Received</u> (TradeRequestID, Trader Group)	<u>Message Sent</u> (TradeRequestID, Trader Group)	<u>Comment</u>	<u>FIX Message Type</u>
1	Trade Capture Report Request Message(Y,Z)			TradeCaptureReportRequest Message (FIX 35=AD)
2		TradeCapture ReportRequestAck (Y,Z)	TradeRequestStatus is "rejected"	TradeCaptureReportRequest Message (FIX 35=AQ)

Own Trades Book Download (OTBD) Workflow Diagram



Own Order Book Download (OBD) Message Flows

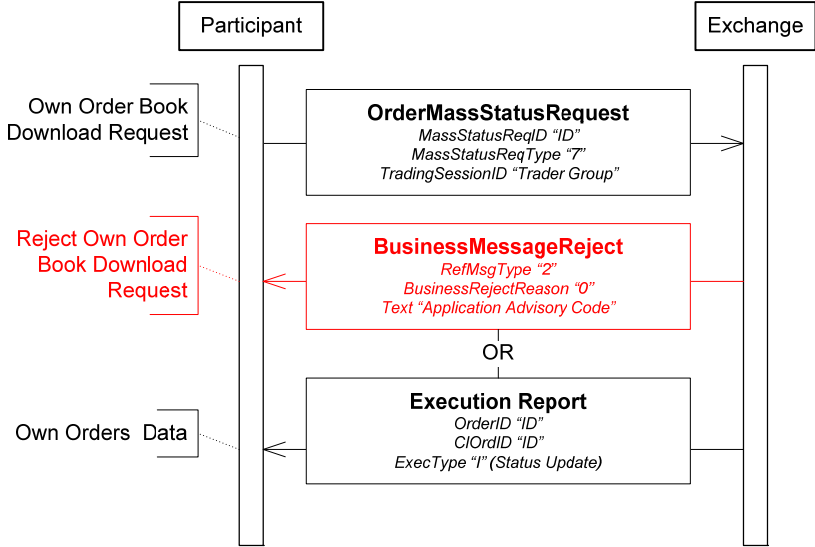
Own Order Book Download success

<u>Time</u>	<u>Message Received</u> (MassStatusReqID , Trader Group)	<u>Message Sent</u> (MassStatusReqID, Trader Group)	<u>ExecType</u>	<u>OrdStatus</u>	<u>Comment</u>	<u>FIX Message Type</u>
1	OrderMassStatus Request(Y,Z))					Order Mass Status Request (35=AF)
2		OrderMassStatus Request Ack (AQ)			750=0	35=AQ (Ack)
3		N x Execution Report(Y,Z)	Matches current order status	Matches current order status	Multiple Execution reports will be sent to illustrate each existing order on the book	Execution Reports (35=8)

Own Order Book Download failure

<u>Time</u>	<u>Message Received</u> (MassStatusReqID, Trader Group)	<u>Message Sent</u> (MassStatusReqID, Trader Group)	<u>ExecType</u>	<u>OrdStatus</u>	<u>Comment</u>	<u>FIX</u> <u>Message Type</u>
1	OrderMassStatus Request (Y,Z)					Order Mass Status Request (35=AF)
2		OrderMassStatus Request Ack (AQ)			750=2 & 749=99 58=Application Advisory Code.	Reject (35=AQ)

Own Order Book Download (OOBD) Workflow Diagram



Modify Client Reference Workflow

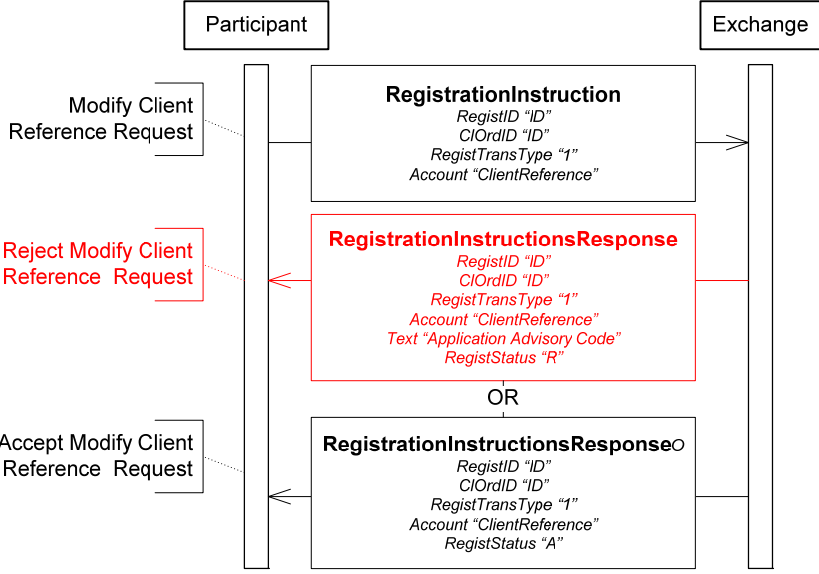
Modify client reference success

<u>Time</u>	<u>Message Received</u> (RegistID, CIOrdID)	<u>Message Sent</u> (RegistID, CIOrdID)	<u>Regist Status</u>	<u>RegistRej ReasonCode</u>	<u>RegistRej ReasonText</u>	<u>FIX Message Type</u>
1	Registration Instruction (X, Y)					RegistrationInstructions (35=o)
2		Acknowledge Registration Instructions (X, Y)	A			AcknowledgeRegistrationInstructions (35=p)

Modify client reference failure

<u>Time</u>	<u>Message Received</u> (RegistID, CIOrdID)	<u>Message Sent</u> (RegistID, CIOrdID)	<u>Regist Status</u>	<u>RegistRej ReasonCode</u>	<u>RegistRej ReasonText</u>	<u>FIX Message Type</u>
1	Registration Instructions (X, Y)					RegistrationInstructions (35=o)
2		Acknowledge Registration Instructions (X, Y)	R	99	Application Advisory Code	AcknowledgeRegistrationInstructions (35=p)

Modify Client Reference Workflow Diagram



Appendix B: Message Overview

The following summary table provides a list of all valid session and application messages that form this service.

Trading lifecycle	Functional Use	FIX	FIX Message Description	Direction
Session	Logon	35=A	Logon	Bi-directional
Session	Logoff	35=5	Logoff	Bi-directional
Session	Heartbeat	35=0	Heartbeat	Bi-directional
Session	Test Request	35=1	Test Request	Bi-directional
Session	Resend Request	35=2	Resend Request	Bi-directional
Session	Sequence Reset	35=4	Sequence Reset	Bi-directional
Session	Session Reject	35=3	Reject	Bi-directional
Admin	Modify JSE Client Reference	35=o	Registration Instructions	Participant to Exchange
Admin	Modify JSE Client Reference Ack	35=p	Registration Instructions Response	Exchange to Participant
Pre-Trade	Re-Request Market Data	35=BW	Application Message Request	Participant to Exchange
Pre-Trade	Re-Request Market Data Ack	35=BX	Application Message Request Ack	Exchange to Participant
Pre-Trade	Resend Market Data	35=X	Market Data Incremental Refresh	Exchange to Participant
Pre-Trade	Re-Request Market Data Cancel	35=BW	Application Message Request	Participant to Exchange
Pre-Trade	Re-Request Market Data Cancel Ack	35=BX	Application Message Request Ack	Exchange to Participant
Trade	Quote Entry	35=i	Mass Quote	Participant to Exchange
Trade	Quote Entry Ack	35=b	Mass Quote Ack	Exchange to Participant
Trade	Quote Execution	35=8	Execution Report	Exchange to Participant
Trade	Quote Cancel	35=Z	Quote Cancel Request	Participant to Exchange
Trade	Quote Cancel Ack	35=AI	Quote Status Report	Exchange to Participant
Trade	Order Entry	35=D	New Order Single	Participant to Exchange
Trade	Order Entry Reject	35=8	Execution Report	Exchange to Participant
Trade	Order Entry Ack	35=8	Execution Report	Exchange to Participant
Trade	Order Modify	35=G	Order Cancel Replace Request	Participant to Exchange

Trading lifecycle	Functional Use	FIX	FIX Message Description	Direction
Trade	Order Modify Reject	35=9	Order Cancel Reject	Exchange to Participant
Trade	Order Modify Ack	35=8	Execution Report	Exchange to Participant
Trade	Order Cancel	35=F	Order Cancel Request	Participant to Exchange
Trade	Order Cancel Reject	35=9	Order Cancel Reject	Exchange to Participant
Trade	Order Cancel Ack	35=8	Execution Report	Exchange to Participant
Trade	Order Mass Cancel	35=q	Order Mass Cancel Request	Participant to Exchange
Trade	Order Mass Cancel Ack/Reject	35=r	Order Mass Cancel Report	Exchange to Participant
Post Trade	Trade Report Entry (Single)	35=AE	Trade Capture Report	Participant to Exchange
Post Trade	Trade Report Entry Ack/Reject (Single)	35=AR	Trade Capture Report Ack	Exchange to Participant
Post Trade	Trade Report Cancel (Single)	35=AE	Trade Capture Report	Participant to Exchange
Post Trade	Trade Report Cancel Ack/Reject (Single)	35=AR	Trade Capture Report Ack	Exchange to Participant
Post Trade	Trade Report Request (Dual)	35=AE	Trade Capture Report	Participant (1) to Exchange
Post Trade	Trade Report Request Ack (Dual)	35=AR	Trade Capture Report Ack	Exchange to Participant (1)
Post Trade	Trade Report Confirmation Request (Dual)	35=AE	Trade Capture Report	Exchange to Participant (2)
Post Trade	Trade Report Confirmation Reply (Dual)	35=AE	Trade Capture Report	Participant (2) to Exchange
Post Trade	Trade Report Confirmation Reply Ack (Dual)	35=AR	Trade Capture Report Ack	Exchange to Participant (2)
Post Trade	Trade Report Confirmation (Dual)	35=AE	Trade Capture Report	Exchange to Participant (1)
Post Trade	Trade Report Cancel (Dual)	35=AE	Trade Capture Report	Participant to Exchange
Post Trade	Trade Report Cancel Ack (Dual)	35=AR	Trade Capture Report Ack	Exchange to Participant
Post Trade	Trade Report PreRelease	35=AE	Trade Capture Report	Participant to Exchange
Post Trade	Trade Report PreRelease Ack	35=AR	Trade Capture Report Ack	Exchange to Participant
Records Update	Own Book Download Request	35=AF	Order Mass Status Request	Participant to Exchange
Records Update	Own Book Download Request Response	35=8	Execution Report	Exchange to Participant
Records Update	Own Book Download Request Reject	35=AQ	Trade Capture Report Request Ack	Exchange to Participant
Records	Own Trades Download	35=AD	Trade Capture	Participant to

Trading lifecycle	Functional Use	FIX	FIX Message Description	Direction
Update	Request		Report Request	Exchange
Records Update	Own Trades Download Request Ack/Rej	35=AQ	Trade Capture Report Request Ack	Exchange to Participant
Records Update	Own Trades Download Request Response	35=AE	Trade Capture Report	Exchange to Participant

Appendix C: Advisory Codes

ApplicationAdvisoryCode	Description
E023E	Market for message closed
E080I	DisasterOccurredPrimarySiteNotAvailable
E102A	Max Transport Connections Exceeded
E113A	USAP Invalid
E136A	Suspended Line Connection Attempt
E137W	Message Authentication Code Failed
E143A	General Transport Authorisation Failure
E146A	ServiceAccessPointAlreadyLoggedIn
E147A	USAP Is Not Authorised To Logon
E148I	User Not Logged On
E159A	USAP From Wrong IP Address
E166E	MessageTimeOut
E174E	Size Error in Calculation
E175E	Input Date Invalid
E176E	InputTimeInvalid
E214E	InvalidMessageTypeOrVersionIdentifier
E215A	InvalidInterchangeType
E285E	InvalidMessageTypeAndVersionForService
E595I	Generic feed shutdown
E599I	Disseminator received logoff frm downstream system
E600I	Connection Made to Remote System
E601I	Disseminator received logon from downstream system
E603E	Link to remote system broken
E610E	Remote System disconnected for protocol violation
E626E	TechnicalEventRaised
E668E	Unable To Determine Market For Segment
E677W	Send Operation Failure On TCP/IP Socket
E693W	USAP Polling Too Frequently
E704W	Protocol First EyeCatcher Invalid
E705W	Protocol Second EyeCatcher Invalid
E706W	Protocol Incorrect Header Version
E707W	Protocol Incorrect Header Length
E708W	Protocol Wrong Length For Type
E709W	Protocol Not Expecting This Type
E712W	USAP Not Responding To Polls
E713W	ConnectionTimeLimitExceeded
E716E	InvalidRSPBuySellIndicator
E720I	FIXMessageMappingFailure
E800A	DuplicateMessageDetectedWithNoOutbound
E801A	No Service Codes found for Message Function
E802A	Service code specified is not SETS protocol
E803A	No Reference To Ack In Unsolicited Msg Log
E804A	Non Valid Business Day For Market
E805A	Invalid Message Type or Version
E806A	Disseminator to Downstream connection made
E807A	Incorrect Link Identifier in logon message
E809E	SequenceNumberNonNumeric

ApplicationAdvisoryCode	Description
E810E	Invalid Message Sequence Number
E900E	A technical error has occurred
E920E	Invalid CompID Address Combination
E921E	FIX Session For USAP Currently Active
E922E	Heartbeat Exceeds Allowable Threshold
E927E	Duplicate FIX Message Detected
E928E	FIX Engine Message Validation Failed
E929E	Connection Not Found For FIX Participant
E931W	Reject Message Received From Participant
E933E	Invalid Sender Comp ID
E934E	Invalid On Behalf Of Relationship
E935E	FIX Party Can Only Send Messages Via Intermediary
E936E	Max Message Size Exceeds Allowable Threshold
EXXXX	FIX Protocol Version Not Supported
FIX00	DisconnectingFIXParticipant
Q002I	Period Authorisation Failed
Q003I	Message Authorisation Failed
Q004I	Authorisation Suspended
Q005I	Authorisation Outside Date
Q006I	Order not found for the Instrument
Q007I	Participant Does Not Match
Q008I	Segment Does Not Match
Q010E	InvalidRequestMessageReferenceToCancel
Q011E	OriginalRequestNotProcessedValidationFailure
Q012E	OriginalRequestAlreadySatisfiedByFirstResponse
Q014E	NotAuthorisedForService
Q015E	RequestedRangeValueGreaterThanMaxOnBroadcastData
Q016E	TooManyRequestForUSAPOutstanding
Q017I	RequestCancelledSuccessfully
Q019I	ReRequestSatisfiedInteractively
Q040E	RequestSatisfiedByFirstAndSubsequentResponse
Q043E	MessagePriorityNonNumeric
Q094I	Participant Registration Suspended
Q094I	ParticipantRegistrationToPerformRequestSuspended
Q095I	Registration Outside Valid Dates
Q096I	Participant In Sec Not Effective
Q104I	Participant Suspended in Segment
Q105I	NoRecordFoundForSegmentCode
Q107I	Participant not Found In Segment
Q112I	Security ID not Found based on the 4-way key
Q113I	Mandatory fields not specified.
Q115I	NumericFieldContainsNonNumerics
Q134I	Message Contains Invalid Field
Q135I	Tradable Instrument Suspended Or Not Effective
Q136I	Price Format Invalid
Q137I	Field must be blank
Q138I	Order Size Field Invalid
Q139I	Single Fill Indicator Invalid
Q140I	Date Validity Field Invalid
Q141I	Time validity field is invalid.
Q156I	Participant Sell not found in Segment

ApplicationAdvisoryCode	Description
Q157I	Participant Buy not found in Segment
Q161I	Market Mechanism Type Invalid
Q189I	Trade Date/Time Invalid
Q197I	Invalid Trade Type Indicator
Q203I	Size must be greater than zero
Q217I	Not in Trade Reporting Period
Q218I	Rules prevent participant trade messages
Q219I	No Trade Report Exists For Trade Code
Q220I	Trade Report cannot be Pre-Released
Q221I	Only delayed Trade Report Pre-Released
Q228I	No Matching Has Occurred (FOK order unfilled)
Q244I	Trade Report cannot be cancelled
Q247I	Bargain Condition Invalid
Q248I	TradeDate Invalid
Q249I	TradeTime Invalid
Q250I	Buy Participant Equals Sell Participant
Q273I	Offer Price must be greater than Bid Price
Q274I	Price must be greater than zero
Q276I	Size must be less than or equal to maximum size.
Q278I	SIZE/CONSIDERATION must be a multiple of Lot Size
Q279I	Size must be greater or equal to minimum size.
Q286I	Quote Already Deleted Or Fully Executed
Q306I	Dealing Capacity Must Be Principle
Q317I	Quote Is Already Closed
Q326I	Capacity Invalid
Q327I	Client Ref Must Be Entered
Q328I	Client Ref Must Be Entered
Q329I	Client Ref Buy/Sell fields must be entered
Q330I	Converted Price Indicator Invalid
Q331I	Settlement Due Date Invalid
Q337I	PRICE MONITORING OVERRIDE
Q404I	No Last Trade Price
Q405I	Potential Breach Of Price Monitoring Tolerance
Q411I	FOK Order Rejected - Price Monitoring Override
Q418I	Contra Trade Request Submitted
Q419I	Contra Trade Acceptance Submitted
Q421I	TradeLMDate does not match the CurrentLMDate
Q430I	SegCode in msg does not match original trade.
Q435I	Client Reference Not Changed
Q437I	Trade Details do not match
Q448A	Segment Does Not Exist
Q449I	Delete Only As Below Min Order Size
Q450I	Relative Size change is invalid
Q451I	Order Must Be Modified
Q452I	4-way key on msg does not match Order/Trade.
Q456I	Buy-Sell Indicator Does Not Match
Q457I	Peak size cannot be more than Total size.
Q462I	No Unsuspended Role For Segment
Q468I	Trade Request Status is Invalid
Q469I	TraderGroup not valid for Member
Q470I	Settlement venue is invalid

ApplicationAdvisoryCode	Description
Q471I	Trader ID not Populated
Q472I	Trader ID not valid for Trader Group
Q474I	No Unsuspended Role For Market Mechanism Type
Q475I	No Role-Invalid Role For Order Type
Q477I	Trader ID Suspended
Q479I	Trade Size is invalid
Q481I	Consideration Invalid
Q482I	Invalid TraderGroupID
Q483I	No Role For Trade Type
Q484I	Order/Quote Size Invalid for Role
Q485I	No Role For Security
Q487I	QUOTE SPREAD must be <= to max for Security/Role
Q489I	Trader group suspended for security
Q490I	Invalid number of messages in basket
Q491I	Consideration must be less or equal to maximum.
Q492I	Consideration must be greater or equal to maximum.
Q493I	ORDER/QUOTE Consideration Invalid for Role
Q494I	Trade Reporting basis is invalid for Denial
Q495I	Executable Quote Not Modified
Q496I	Extension Periods not Enabled
Q498I	Order Entry restricted to Sell side for MMT
Q499I	Order Entry restricted to Buy side for MMT
Q500I	Settlement venue suspended for security
Q501I	Remaining Volume Rejected Due To Technical Limits
Q502I	Only one order type allowed on one side of Book
Q503I	Trade Price Outside Thresholds
Q505I	Trade Date outside allowable range
Q506I	MustModifyOneSideOfQuote
Q507I	Quote Must Be Refreshed
Q508I	SettlementVenue,Account,Capacity Invalid For TG
Q509I	SettlementVenue,Account,Capacity Suspended For TG
Q510I	Invalid Capacity For Trade Type In Segment
Q511I	Potential Trade Price Outside Thresholds
Q512I	Order or Quote Price Outside Thresholds
Q513I	Visible Pegged Order Not Allowed
Q514I	PegDifferential Greater Than Maximum Allowed
Q515I	Peg Differential Not Allowed for Mid Price Peg
Q516I	Price Source Not Valid For Instrument
Q517I	Minimum Execution Size Not Permitted
Q518I	Orders with Minimum Execution Size must be hidden
Q519I	Minimum Execution Size greater than Order Size
Q520I	NegativePegPrice
Q523I	IllegalFieldModification
Q524I	End Date is less than Start Date
Q525I	Settlement Due Date Missing
Q526I	Invalid Execution Restriction Type
Q601I	OrderBook Too Large For Security
Q701W	Yield calculation warning
Z100I	Maximum number of unsolicited resends reached



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