Document title

LUXEMBOURG STOCK EXCHANGE – OPTIQ® CCG TO OEG CHANGE HIGHLIGHTS

Migration Phase 2

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PREFACE

PURPOSE

The purpose of this document is to explain changes and improvements to the messages and processes, between the current Common Customer Gateway (CCG) used by customers to connect to the Universal Trading Platform (UTP) and the Optiq Order Entry Gateway (OEG). The second phase of the migration to the Optiq systems will cover the full trading chain migration to the Optiq platform.

The intended audience of this document is any client currently connecting to the Luxembourg Stock Exchange market via CCG.

Note: This document is for informational purposes only, and should be consulted alongside its associated documents, as outlined below.

SCOPE

Optiq Segment	Coverage
Luxembourg Stock Exchange	✓
Drop Copy	✓

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WHAT'S NEW?

The following lists only the most recent modification made to this revision/version. For the Document History table, see the Appendix.

REVISION NO./ VERSION NO.	DATE	CHANGE DESCRIPTION
1.0.0	February 2018	First version for Luxembourg Stock Exchange on Optiq

ASSOCIATED DOCUMENTS

Luxembourg Stock Exchange documents:

- Luxembourg Stock Exchange - Optiq OEG Client Specifications – SBE Interface
- Luxembourg Stock Exchange - Optiq OEG Client Specifications – FIX 5.0 Interface
- Luxembourg Stock Exchange - Optiq Kinematics Specifications
- Luxembourg Stock Exchange - Optiq OEG Connectivity Configuration specifications
- Luxembourg Stock Exchange - Optiq MDG Client Specifications
- Luxembourg Stock Exchange - Optiq Error List

Optiq documents & files:

- Optiq File Specification
- Optiq Technical Note SBE
- Optiq OEG SBE XML message template

Clients are advised to also refer to the Luxembourg Stock Exchange Rules and Regulations documents for more details.

CONTENTS

1. OVERVIEW

The aim of this document is to explain changes and improvements between the existing CCG private messages and the new Optiq Order Entry Gateway (OEG) providing access to the Optiq matching engine (ME) for Luxembourg Stock Exchange market for the second phase of migration to the Optiq trading platform.

The OEG client specifications provide a full description of static message structures that will be used and disseminated in order entry. Some of the fields currently used in CCG messages were removed, and some will have a change in behaviour due to the phased migration process.

The Kinematics document provides the dynamic rules that drive message publication.

This document provides:

- High level description of:
  - technical changes
  - functional changes
  - message sending logic
- Details of:
  - mapping between existing CCG private messages & new Optiq OEG messages
  - details of changes made to the structure of message and format / values of fields

1.1 FUTURE USE

In preparation for various functionalities expected to be implemented in the future on Optiq a number of messages and fields were added and flagged “For Future Use”.

Details of functionalities flagged in the specifications as for ‘Future Use’ are provided for information purposes only, and may change significantly until such time as the finalised specifications for the relevant service are communicated to clients.

The associated messages and effective use of fields will not be technically supported on day 1 implementation of Optiq.

2. TECHNICAL CHANGES

2.1 ACCESSES AND CONNECTIVITY

In UTP, access to Luxembourg Stock Exchange market was provided through SLE Order Entry, which supported the connectivity from client application to UTP Common Customer Gateway (CCG).

In Optiq, the Order Entry Gateway (OEG) replaces the CCG, and access to Exchange is provided through the notions of OEG Logical Access and OE Sessions, that are in line with the newly introduced instrument segregation.

In UTP, an SLE is a logical session that allows network communication between the CCG and Luxembourg Stock Exchange.

In Optiq, a Logical Access represents the same notion, which provides a member with access to an Optiq Segment (for more information client may refer to the dedicated section: Optiq Segment and Logical Access). For each Logical Access, clients may establish one or several OE Sessions to the partitions that make up the Optiq Segment.

OE Partition ID will be a unique identifier of a partition across all segments and throughout the Optiq system.

An OE Session is a physical connection through which a client is able to reach directly a specific Optiq Partition. Further details are provided in the dedicated section: Partition and OE Sessions.

2.2 NEW BINARY MESSAGE PROTOCOL - SBE

In Optiq for order entry binary protocol will be provided using the SBE standard. SBE uses binary data format to reduce the size of messages as much as possible, uses bitmap fields to further optimize the data use, and follows the specifications of the SBE protocol.

SBE offers the possibility to have backward and forward compatibility. It means that clients are not required to be on the last version of Schema Version (message structure version) to be able to read the message.

Exchange provides SBE Template XML files that contain all message types supported by the system. Client systems can decode and encode SBE message using the schema and the template files.

While general use of SBE protocol has been described for MDG, clients are encouraged to carefully review the SBE OEG client specifications in order not to miss anything specific to order entry.

2.3 FIX 5.0

Luxembourg Stock Exchange market CCGs support FIX 4.2 protocol, and are being upgraded to the FIX 5.0, with adjustments required to be in line with new Optiq architecture and for MIFID II compliance.

2.4 HARMONIZED MESSAGES AND FIELDS

2.4.1 Messages

A number of messages that for CCGs are similar in structure are combined into one, less specialized messages, to reduce complexity.

The table below provides mapping of messages used for the same functionalities in SBE and FIX.

OEG SBE – Label (ID)	OEG FIX – Label (ID)	Notes
Administrative Messages		
Logon (100)	Logon (A)	
Logon Ack (101)	- / -	Handled by Logon (A) in FIX
Logon Reject (102)	Reject (3)	
Logout (103)	Logout (5)	
Heartbeat (106)	HeartBeat (0)	
TestRequest (107)	TestRequest (1)	
Technical Reject (108)	- / -	Handled by Reject (3) in FIX
- / -	ResendRequest (2)	No equivalent in SBE
- / -	SequenceReset (4)	No equivalent in SBE
Application Messages		
New Order (01)	NewOrderSingle (D)	
Ack (03)	ExecutionReport (8)	
Fill (04)	- / -	Handled by ExecutionReport (8) in FIX
Kill (05)	- / -	
Cancel Replace (06)	OrderCancelReplaceRequest (G)	
Reject (07)	OrderCancelReject (9)	
Cancel Request (12)	OrderCancelRequest (F)	
Mass Cancel (13)	OrderMassCancelRequest (q)	
Mass Cancel Ack (14)	OrderMassCancelReport (r)	
Open Order Request (15)	OrderMassStatusRequest (AF)	
Trade Bust Notification (19)	- / -	Handled by ExecutionReport (8) in FIX
Price Input (28)	PriceInput (UI)	
Liquidity Provider command (32)	LiquidityProviderCommand (UZ)	
- / -	RequestAckMessage (Uy)	RequestAckMessage (Uy) [FIX] is sent in response to OwnershipRequest (U18) OrderMassStatusREquest (AF) messages
Ownership Request Ack (17)	OwnershipRequestAck (U29)	
Ownership Request (18)	OwnershipRequest (U18)	
Collar Breach Confirmation (20)	- / -	Handled by OrderCancelReplaceRequest (G) in FIX
User Notification (39)	UserNotification (CB)	
InstrumentSynchronizationList (50)	InstrumentSynchronizationList (U50)	
SynchronizationTime (51)	SynchronizationTime (U51)	New message, replacing part of the functionality previously covered in message Class Event (Q). Used as part of recovery functionalities

2.4.2 Fields

New fields are added to support new Optiq architecture, as well as MIFID II compliance. Existing fields are also adjusted to be MIFID II compliant.

2.4.3 Error Text and Codes

Error text previously provided in the response messages will be replaced with error codes only, which are enriched to provide more details and granularity for the errors. For the text corresponding to the error codes please see the Error codes document.

The values of the Error codes provided currently in UTP will be replaced by a new set of codes, which will be identified in dedicated document “Optiq Error List”. While the error codes used in Optiq are different from the ones sent by UTP, they cover the full scope of functional cases covered by UTP and in many cases provide more granularity and details about the case that caused the error.

Because the error messages have been rearranged, some of the UTP errors will no longer appear in the list. In the Error codes document, each new code is mapped, when relevant, with a UTP code.

The list of deleted UTP error codes is below:

UTP Error Code	Text
20104	Bad ExpireTimeFlag, not a GTD
20105	Bad ExpireTimeFlag, not a GTT
20116	Can't change Side
20117	Can't change to Discretion
20132	Cannot change side
20140	Class closed or early monitoring
20141	Class closed
20142	ClOrdID already exists
20153	Discretion order forbidden
20185	Invalid Account on bulk cancel
20186	Invalid class
20192	Invalid ExecInst on cross
20193	Invalid ExecInst on Mkt to Limit order
20195	Invalid ExecInst on order
20196	Invalid ExecInst on peg
20202	Invalid OnBehalfOfCOmpID on bulk cancel
20203	Invalid OnBehalfOfCompID
20211	Invalid PegDifference, must be = 0
20243	Missing Class/Instrument on bulk cancel
20245	Missing OnBehalfOfCompID
20292	No ExecInst on Mkt to Limit order
20293	No ExecInst on MOC/LOC
20343	Not same ClOrdID (F11-F41)
20344	Not same OnBehalfOfCompID (F115)
20359	OrderID not found
20404	technical error

UTP Error Code	Text
20411	Too late to cancel
20413	Too late to modify
20417	Type of price invalid for this phase
20429	Cancelled for LACP change
20430	Cancelled for LTP change
20431	Invalid OnBehalfOfCompID
20507	MinQty forbidden
20510	Invalid number of quotes
20512	Duplicated Symbol
20520	Instrument ineligible to KIBI/KOBI/TAKO
20527	Class must have at least 4 decimals
20625	Max amount reached for order on Equities
20626	Max qty reached for order on Bonds
21234	Invalid mkt phase for this TIF
21235	Midpoint peg must have Peg type
21236	Type forbidden during this market phase
21237	SmartPool : Maxfloor forbidden
21238	Cancel/Replace invalid on routed order
21240	Min quantity must be >= MIQ
21242	Mid Point pricetoo high
21243	Mid Point pricetoo low
21506	SmartPool : MaxFloor forbidden
23015	Update of dark order forbidden
29020	Field (side) invalid
30001	Field (MinQty) invalid

2.5 NEW INSTRUMENT SEGREGATION

Optiq introduces a new classification for instrument management in the Exchange trading system. As detailed in the OEG messaging specifications, for performance purpose, concepts of Optiq Segment and Optiq Partition are introduced. While the Trading Classes, as they existed in UTP, will no longer have the same use they could still be used as a grouping of instruments for some functionalities (e.g. Mass Cancel).

2.5.1 Optiq Segments and Logical Accesses

An Optiq Segment defines a universe of instruments sharing common trading and financial properties, it allows Exchange to segregate instruments among several independent universes that aim to simplify clients' organisation toward Exchange.

In Optiq Luxembourg Stock Exchange market is hosted within a dedicated segment.

Referential standing data provided on a daily basis for each instrument via messages and files identifies to which Optiq Segment an instrument belongs to.

Since Optiq Segments are technically independent from one another, access to each Optiq Segment requires a dedicated Logical Access.

2.5.2 Partitions and OE Sessions

Individual Optiq Segments may be comprised of at least one or several Optiq Partitions.

For the day 1 implementation of Optiq, Luxembourg Stock Exchange market is hosted on a single partition, but could be upgraded in the future to multiple partitions if required.

An Optiq Partition is a technical subdivision of an Optiq Segment. Each Partition relies on an optimized technical environment, physically independent from one another, but connected.

Access to Optiq Partitions is managed through Order Entry Sessions. For each Logical Access, an OE Session can be set up to a given Partition. However, since a Logical Access allows trading on the whole Optiq Segment two technical paths are possible for a market participant to reach an instrument order book:

- A direct path through an OE Session established to the partition hosting the targeted instrument
- An indirect path through an OE Session established to another partition (within the same Optiq Segment), relying on internal connectivity between Matching Engines of the various partitions.

In the second case, extra latency is introduced due to the additional step involved in forwarding messages by the system between partitions via the indirect connection.

2.5.1 Load Balancing Process within Optiq segment

Within the same Optiq segment load balancing process may result in instruments being assigned a different partition and as such different routing information from one day to another. Due to this, clients are encouraged to download and incorporate the standing data on a daily basis and to ensure correct routing of their messages. For more information please refer to the OEG Message specifications documents.

The ownership of the orders is with the OE session id (the physical connection to the individual segment / partition). In case where an instrument is re-balanced over partitions, or if client chooses to access the market with some, but not all available partitions of a segment from one day to another, to ensure receipt of all messages and the lowest possible latency, clients are advised to ensure that the OE session set as the owner of orders for any given day matches the ME partition on which the instrument resides. To facilitate any necessary adjustment for this, clients may use the **Ownership Request** (18) / (FIX U18) message.

Please note: For the day 1 implementation of Optiq, Luxembourg Stock Exchange market is hosted within a dedicated Optiq Segment, and on a single partition. However this functionality will apply if in the future the market is to be hosted on multiple partitions.

2.5.2 Symbol Indexes & EMM

Each instrument for Luxembourg Stock Exchange is uniquely identified by a Symbol Index. Symbol Index represents a combination of the ISIN, MIC and Currency and is valid for the lifetime of the instrument. Symbol Index may be impacted by a Corporate Event; however whether the Symbol Index value will change depends on the nature of the corporate even applied. Information on the action taken on the instrument and its identifier is communicated by the notices for the Corporate Events.

In Optiq Symbol Indexes is used as the system-wide identifier of an instrument. Thus, both public and private messaging systems rely on this identification, which also allow easier reconciliation of public and private messages.

In the message instrument identification via Symbol Index and *EMM* fields replaces the use of the Symbol, MIC, and Currency fields.

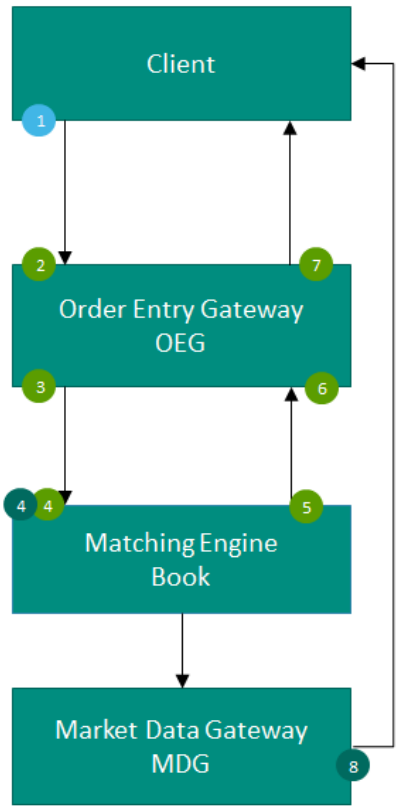
Identifier	SBE Field Name	FIX Field Name	FIX Tag
Symbol Index	Symbol Index	SecurityID	*48*
		SecurityIDSource	*22*
EMM	EMM	EMM	*20020*

2.6 IMPROVED TIMESTAMPS IN PRIVATE MESSAGES

Optiq will deliver an improvement in the data and format of timestamps within the private messages that identify the events occurring in a book. With UTP trading platform they were provided in microseconds (µs), while with Optiq they are provided with a higher granularity, which is in most cases represented in number of nanoseconds (ns) after Unix epoch (since 1970, January the 1st). All Timestamps communicated by the Exchange will be in UTC to match MiFID II requirements. To allow for consistent data of Timestamps clients are encouraged to specify data in the same format & time zone. Timestamps listed below are provided to the clients in each Ack message, and will include the following fields / information:

Timestamp Identifier	SBE Field Name	FIX Field Name	FIX Tag	Short Description of Data Provided
T1	*Message Sending Time*	*Sending Time*	*52*	is assigned by the Client in his inbound message.
		Client Message Sending Time	*21005*	Present only in outbound messages. Populated with the same value provided by the client in the field Sending Time in the inbound messages
T2	*OEG IN From Member*	*OEGINFromMember*	*5979*	is assigned by the OEG after decoding the inbound message.
T3	*OEG Out To ME*	*OEGOUTToME*	*7764*	is assigned by the OEG when sending the inbound message to the matching engine.
T4	*Book IN Time*	*BookINTime*	*21002*	is assigned by the ME when receiving the inbound message from the OEG. Matches *Event Time* field in the following MDG public feed messages: • 1001 – Market update, when sent for a trade • 1002 – Order Update • 1004 – Full Trade Information
T4'	*Event Time [MDG]*	N/A	N/A	Maps to *Book In Time* in private messages
T5	*Book OUT Time*	*BookOUTTime*	*21003*	is assigned by the ME when sending the outbound message to the OEG.
T6	*OEG IN From ME*	*OEGINFromME*	*7765*	is assigned by the OEG when receiving the outbound message from the ME.
T7	*OEG OUT To Member*	*SendingTime*	*52*	is assigned by the OEG when sending the outbound message to the client.
T8	*Packet Time [MDG]*	*PacketTime*	N/A	is assigned by the MDG when sending the message to the market.

Timestamp Identifier	SBE Field Name	FIX Field Name	FIX Tag	Short Description of Data Provided
TT	*Trade Time*	*Transact Time*	*60*	Assigned by the ME at the time the match occurs. For aggressive orders that are matched immediately, this value is same as *Book In Time*



COLOR CODES

Sent by client in private inbound messages
Sent back to the client by Exchange in outbound messages

Sent by Exchange in private Outbound messages

Sent by Exchange in public Outbound messages

2.7 DROPCOPY CHANGES

The scope of data in Drop Copy would allow clients to receive messages for all of their Logical Accesses, across the different Optiq Segments, or receive only messages for a specific Segment or Logical Access. This flexibility of setup is available on setup or modification of the dedicated Logical Access for the Drop Copy service.

The changes to functionalities of Drop Copy service are as follows:

Drop Copy Protocol:

- Drop Copy service will be provided in FIX 5.0 protocol only
  - As with other messages in FIX, the format for Order & Trade messages in Drop Copy for Luxembourg Stock Exchange market will be updated to version 5.0 and will include updates to be in line with the latest FIX extension packs.

Increased Flexibility and Granularity in Setup:

- With Optiq clients will have the ability to setup which trading (OEG) Logical Accesses belonging to their firm would be received per Drop Copy Logical access. The default settings for the Luxembourg Stock Exchange market will remain as currently, with single firm ID receiving data for all Logical Accesses setup for that Firm ID, however, if required, clients could choose to segregate their Drop Copy connections to receive information for some and not all Logical Accesses, per individual Drop Copy Logical access; this will be done on the setup of the individual Drop Copy Logical access connections.

- To identify the scope of data to be received by a connection clients may select:
  - one or more member codes (Firm IDs) belonging to the same Legal entity, or managed by the same Risk Manager
  - all, or some Logical Accesses belonging to the same Firm ID
  - Specific Optiq segment, or a set of segments
- Information for a single Logical access or Firm ID (member code) may be setup to be sent to multiple different Drop Copy sessions, and individual Logical connections (e.g. a Logical access for Sponsored access) could request a Drop Copy connection of their own activity.

Addition of Order related messages:

- Order messages in Drop Copy, just like the existing trade messages, will be provided in the format of the **Execution Report** (FIX 8) message.

  Clients will be able to choose on setup of their Drop Copy logical access connection whether they'd like to receive (a) order messages only (b) trade messages only or (c) both order and trade messages.

Drop Copy provision & scope:

- Drop Copy services will be provided via a dedicated gateway and will cover, as currently, all instruments and transactions available on the market.

Note:

Clients are urged to carefully review the guidelines of format identified in the message specifications for both SBE and FIX protocols, in which data should be sent in private messages, to ensure the most appropriate correct interpretation of the data sent back via Drop Copy.

3. FUNCTIONAL CHANGES

3.1 RECONCILING ORDERS IN PUBLIC & PRIVATE FEEDS

Clients may reconcile their order messages between public (MDG) and private (OEG) feeds by using the MDG **Order Update** (1002) message and private **Ack** (03) message, using the *Order Priority* field available in both messages.

Some of the cases when clients may want to perform the reconciliation are:

- Ack message in response to a NewOrder or a CollarBreachConfirmation (corresponding Order Update message – Market Data Action type : New Order)
- Ack message for a triggered Stop/Stop-limit order (corresponding Order Update message – Market Data Action Type : Modification of an existing order)
- Ack message for a refilled Iceberg Order (corresponding Order Update message – Market Data Action Type : Modification of an existing order)

3.2 CHANGES IN ACK MESSAGES

The Optiq private Ack message has been redesigned in order to (1) harmonize between several existing messages on UTP trading platform, and also (2) to introduce enhancements of several functionalities as identified below.

3.2.1 Harmonization of Ack messages

In Optiq a single Ack message replaces several acknowledgement messages available in UTP that have similar data and behaviour. The new SBE Ack message is also built to provide harmonization with the acknowledgements in FIX protocol. To identify the reason for an Ack message, please use the *Ack Type* field.

The following table provides the list of existing UTP messages being combined into the single Ack in Optiq:

UTP Messages				Optiq messages		
Market	Binary Code	FIX Code	Description	Binary Code	FIX Code	Description
LuxSE	**a**	**8**	Order Acknowledgement	**03**	**8**	Ack
LuxSE	**6**	**8**	Cancel Request Ack	**03**	**8**	Ack
LuxSE	**E**	**8**	Cancel/Replace Ack	**03**	**8**	Ack
LuxSE	**5**	**8**	Order Replaced	**03**	**8**	Ack

3.2.2 Introduction of New Acknowledgments

New types of acknowledgement are introduced for the market events on which no data was provided within UTP. These new cases are also indicated in the Ack Type field.

Table below provides the list of different types of acknowledgements to be covered by the **Ack** (03) message and identifies (1) the value to be provided in these cases in the *Ack Type* field and (2) when feasible the mapping to the associated FIX fields *ExecType* (150) and *OrdStatus* (39):

	Acknowledgements					
SBE Ack Type	**SBE Code**	**FIX ExecType (150) value**	**FIX OrdStatus (39) value**	**New / Existing / Merged**	**On request / Unsolicited**	**Description**
New Order Ack	0	0 = New	0 = New	**Existing**	**On request**	Response to a New Order (01) / FIX (D) request
Replace Ack	1	5 = Replaced	5 = Replaced	**Existing**	**On request**	Response to a CancelReplace (06) / (FIX G) request
Order Creation by Market Operations	2	i = Order Creation By Market Operations	0 = New	**Existing**	**Unsolicited**	
Stop Triggered Ack	3	L = Triggered or Activated by System	S = Stop Triggered Ack	**New**	**Unsolicited**	Notification of a triggered Stop/Stop Limit order
Collar Confirmation Ack	4	d = Collar Confirmation Ack	5 = Replaced	**Merged**	**On request**	Response to a CollarBreachConfiration (20) / (FIX 8) request
Refilled Iceberg Ack	5	e = Refilled Iceberg Ack	0 = New	**New**	**Unsolicited**	Notification of a refilled Iceberg Order
MTL Second Ack	6	L = Triggered or Activated by System	T = MTL Second Ack	**New**	**Unsolicited**	Notification of a resting MTL order transformed into a Limit Order
Price Input Ack	10	N/A Note: Covered in field "LPActionCode" (tag: 10076) in message RequestAckMessage (Uy)	N/A Note: Covered in field "LPActionCode" (tag: 10076) in message RequestAckMessage (Uy)	**Merged**	**On request**	Response to a Price Input (20) / (FIX UI) request
Iceberg Conversion Ack	14	h = Iceberg Transformed to Limit due to Minimum size	0 = New	**New**	**On request**	Notification to clients when an Iceberg order is transformed into a Limit order when it is below the minimum allowed size
Ownership Request Ack	15	k = Ownership Request Ack	I = Order Status	**New**	**On request**	Response to the corresponding OwnershipRequest (18) / (FIX U18) request
VFA / VFC Ack	16	L = Triggered or Activated by System	Q = VFA VFC Triggered Ack	**New**	**Unsolicited**	Notification of a triggered Valid for Uncrossing (VFU) *[previously VFA]* or Valid for Closing Uncrossing order *[previously VFC]*
Open Order Request Ack	17	I = OrderMassStatusRequest Ack	I = Order Status	**New**	**On request**	Response to the corresponding Open Order (15) / (FIX AF) request

3.3 DISSEMINATION OF DAY ORDER CANCELLATION AT THE CLOSE OF BUSINESS

Based on client feedback, the dissemination of messages indicating cancellation of orders that have reached end of their validity at the end of the trading session will only cover the orders with Day validity. For orders with validities of (1) Good Till Cancelled (GTC) and cancelled on the current date and (2) Good Till Date (GTD) with expiration date set to the current date, as well as cancellation of orders triggered by corporate actions, elimination messages will continue to be disseminated at the start of the session on the next business day.

The messages for expired Day orders will be disseminated at the beginning of the last Closed phase at the end of the trading session without any expected additional delay. These messages will not be re-disseminated at the start of the next trading session.

3.4 NEW CANCEL ON DISCONNECT MECHANISM

Setup of Cancel on Disconnect (CoD) functionality will migrate from a configurable setting of connections, to being a value managed for each individual order.

To ensure fairness, all order messages will be checked for CoD. Clients may choose on each individual order messages, independent of type of order or its validity whether it will be subject to CoD or if the order is to be persisted.

As currently, CoD setting for the order will apply only to the orders submitted during the current trading day. With exception of "Inaccessible" phase, CoD will be active and will be triggered, in all other trading phases and for all types of disconnections, including disconnection following sending of the new message of Logout.

Clients will no longer need to contact the Exchange to set up CoD for their connections on the market, as it will be available to all connections by default.

The response message that should be issued in case of triggering of CoD will be a **Kill** (05) (FIX 8) message for each individual killed order, and will follow the same kinematics as for **MassCancel** (13) (FIX q) message.

3.5 MODIFICATION OF MARKET TO LIMIT (MTL) BEHAVIOUR

Market to Limit (MTL) orders that were entered in the Call phase, did not get matched during the Uncrossing (Auction), and then enter into the Continuous phase against an empty order book will no longer halt the instrument and would instead be rejected to reduce the inconvenience the halt brings to the market. This is in line with the behaviour of the MTL orders when they enter directly in continuous phase in similar conditions (i.e. against an empty book).

3.6 ADJUSTMENT OF GOOD TILL TIME (GTT) VALIDITY

Handling of Good Till Time (GTT) validity are subject to a minor adjustment; in Optiq orders flagged with GTT will be eliminated within one second of the indicated expiration time.

3.7 ORDER CANCELLATION MECHANISM : KINEMATICS CHANGES

In UTP the order cancellation mechanism for both single cancellation and mass cancel uses the following CCG messages: **Order Cancel Request** (F) (FIX F), **Cancel Request Ack** (6) (FIX 8), **Order Killed** (4) (FIX 8), and **Bulk Cancel Report Ack** (K) (FIX 8). In Optiq, the messages to be used for this purposes as well as the associated kinematic logic, have changed. The new messages that would be used in Optiq for cancellation are: **Cancel Request** (12) (FIX F), **Mass Cancel** (13) (FIX q), **Kill** (05) (FIX 8) and **Mass Cancel Ack** (14) (FIX r).

The message behaviour will change as following:

- A cancellation instruction for multiple orders has been separated from the message to cancel a single order into a dedicated **Mass Cancel** (13) (FIX q) message
- Feedback for the single cancellation will no longer provide an Ack message before the actual cancellation message

For further details on how the single and multiple order cancellation mechanisms will function clients should refer to the OEG client kinematics document.

- Additionally, In Optiq mass cancellation of order by Order Type is not supported

3.8 ORDER OWNERSHIP AND MIGRATION MANAGEMENT

3.8.1 Order Ownership

Technical ownership of an order in Optiq identifies the OE session that would receive the unsolicited messages for that order. An OE Session is the login identifier for each physical connection represented by the combination of the Logical Access ID and the OE Partition ID. Orders for the same instrument may be submitted by clients from different OE partitions, and each such order will be owned by the OE Session that submitted it (i.e. which includes the identification of the OE partition from which it was submitted).

3.8.2 Order Ownership Migration Management

Please note: For the day 1 implementation of Optiq, Luxembourg Stock Exchange market is hosted within a dedicated Optiq Segment, and on a single partition and this message is not of practical use. However this functionality will apply if in the future the market is to be hosted on multiple partitions.

In some cases order ownership may need to be transferred to a different physical connection (OE Sessions) or the Logical access of the same Firm ID. This need may arise in case of instrument re-balancing or technical failure of the connection that originally submitted the order. In all cases, Optiq will not perform any automatic re-assignments of ownership of orders.

When order ownership migration is required, (and to get the best possible response times,) clients would need to request ownership of their orders if they plan to start submitting other orders to the same partition where instrument moved. In case connection that submitted the orders originally is not connected, clients lose access to the orders, and the associated unsolicited messages, until they request ownership back.

In case of business continuity events of the Exchange systems it is expected that the same OE Partitions and IDs would be available and no changes should be required, provided client tries to access their orders from the equivalent partition.

In response to the order ownership request Optiq will reply with the **Ack** (03) / (FIX 8) message in OEG. In parallel of the Ack client will be sent full order information via Drop Copy.

Order ownership requests could be submitted with one of the following granularities:

Criteria	Granularity Description
Order ID (or Original Client Order Id) + SymbolIndex + EMM + Firm ID	Single Order
SymbolIndex + EMM + Logical Access + OE Partitions ID + Firm ID	All orders for the instrument owned by a OE Session
Symbol Index + EMM + Logical Access (OE Partition ID is optional) + Firm ID	All orders for an instrument owned by a firm's Logical Access on all partitions of the Optiq Segment

3.9 PEG ORDERS ON THE LIT MARKET (FOR FUTURE USE)

⚠ **Important note**: Peg orders will not be available in Optiq for the day 1 of phase 2 implementation, and are now flagged for Future use.

In Optiq Peg orders on the Lit market will be recalculated by the matching engine on a tick-by-tick basis, with every modification of the BBO. Lit COB market would have only the Primary Peg with non-aggressive offset (same as currently on UTP). Peg orders (lit or Dark[1]) can only peg to the Limit orders on Lit COB.

Peg orders from the Lit and Dark market could interact, if eligible, without any additional specific restrictions for such interaction.

Peg order offset is measured in tick sizes, and is restricted to maximum of 20 tick sizes.

Every update of Peg order will be considered as a Cancelled order, and will be included into the calculation of the Order / Trade ratio.

All the fields required to represent these orders are already included in the message specifications. For more information on how Peg orders function clients are urged to review the Luxembourg Stock Exchange Trading manual and Rule book, which will be updated in due course to reflect associated changes.

3.9.1 Dissemination of Peg orders in Market data [MDG] (For Future Use)

Peg orders are included in the dissemination of limits in MDG [**Market Update** (1001) message], with the inclusion of the volume of the associated orders in the overall volume disseminated at the price they are pegging to.

Peg orders in the Market by Order in MDG [**Order Update** (1002) message] will be disseminated as following:

- On creation order will be disseminated with its characteristics
- On partial fill the updated order information will be disseminated with its characteristics
- On updates of BBO, the order will not be re-disseminated. Clients are urged to follow the updates of best limits and adjust information about the Peg orders in their systems according to these updates, and characteristics of the Peg order (e.g. offset).

3.10 TICK SIZE AND NUMBER OF DECIMALS

With MiFIDI II requirements it is expected that the tick sizes will be restricted by the ESMA specified values for individual instrument.

Field PriceScale is removed in both OEG and MDG messages. The PriceScale values will be defined per instrument, and provided in the Referential standing data. Most prices are to be calculated using the Price value and the Scale code (also referred to as Price/Index Level Decimals), which can be obtained from the referential Standing data. A similar mechanism applies to the calculation of Quantities, Ratio and Amounts for Optiq / trading related fields. A dedicated section in the SBE / FIX specifications explains how to calculate prices using these values.

[1] For Future Use, Pending regulatory approval

3.11 COLLARS

- Kinematics are corrected for the case “Breaching a Collar with Confirmation (No Halt)” to reintroduce an **Ack** (03) / (FIX 8) message following receipt of an order which breaches the collars, followed by a **Reject** (07) / (FIX 8), and if appropriate a Fill message.
- Static collars are now included in the MDG start of day initialization, and would also be communicated in case of any changes to the static collars during the day.

3.12 ICEBERG ORDERS MODIFICATION

- Minimum amount check of Iceberg orders

  With implementation of Optiq Iceberg orders will be checked to respect the minimum amount (size) of the order. MIFID II requires the size of such orders to be at minimum 10 000 Euro, or equivalent to if trading currency of the instrument is other than Euro. To accommodate this, in Optiq

  - Any Iceberg order that is entered into the book that is below this amount will be automatically converted into a Limit order. This conversion will be indicated to the clients in the **Ack** (03) / (FIX 8) message, by a dedicated value in the Ack Type field.
  - Any modification of previously not traded Iceberg order that aims to reduce the total amount of that order below the minimum size will be automatically rejected.
  - Any Iceberg orders for which the amount reaches below minimum amount through trading remain unaffected.
  - The same behavior will be enforced for the Lit and Dark books.
- In Optiq, Iceberg orders are identified via their own dedicated Order Type value. The value “Iceberg” must be set in the field Order Type and the field disclosed quantity must be provided.

All the fields required to represent data for the Iceberg orders is included in the message specifications. For information on management of Iceberg orders clients are advised to review the Luxembourg Stock Exchange Trading manual and Rule book, which will be updated in due course to reflect associated changes.

3.13 STOP ORDERS CHANGES

3.13.1 Triggered Stop Time in Force

The new feature Triggered Stop Time in Force allows the Stop Orders to enter the Central Order Book (COB) while triggered with a Time in Force different from the original order had while entering the Stop Order Book (SOB). The field *Triggered Stop Time in Force* in SBE & *TriggeredStopTimeInForce* (20175) in FIX has exactly the same set of values as the field *Time in Force*.

While entering the COB after being triggered, the Stop Orders behave then like new orders with a time in force equal to the Triggered Stop Time in Force. The values for this functionality enhancement will be managed via the field *Trigger Stop Time in Force* in SBE & *TriggeredStopTimeInForce* (20175) in FIX.

Example:

New Stop order #1 entered with the *Time in Force* field set to ‘0’ (Day), and *Triggered Stop Time in Force* field set to ‘6’ (Good till Date)

If never triggered, the Stop order will expire at the end of the trading session due to its Time in Force being Day

If the Stop order is triggered, it will enter the book as a Limit order with the Time in Force of that Limit order being Good till Date due to the *Triggered Stop Time in Force* of the original Stop order being set to this value.

3.13.2 Order Priority for Stop Orders

In Optiq newly submitted Stop orders re assigned a value in the field Order Priority. Modifications of such orders should not result in modification of this priority.

Order Priority will be provided in the private **Ack** (03) / (FIX 8) message upon their first creation. This order priority indicates the rank of the stop order on its arrival and processing into the system. If multiple stop orders exist with the same price conditions they would be triggered in the order of the priority assigned to the stop orders upon entry.

When Stop orders are triggered, a new **Ack** (03) / (FIX 8) message is issued, with the field Ack Type set to "Stop Triggered Ack", they will be assigned a new order priority that indicates their priority vs. the rest of the book.

3.14 CLEARING INSTRUCTIONS

Values used for Clearing instructions are defined to map existing values to the standard values used by the FIX 5.0 protocol.

Mapping of values used currently in CCG messages to the values setup for use in Optiq is provided below:

Value in Optiq Step 2	Value in CCG v4.2 ClearingHandlingType / TagL 9938
0 = Process normally	Value: Currently filled as blank Label: Systematic posting
10 = Automatic give-up mode (trade give-up to the give-up destination number specified)	Value: Currently filled as 2 (two) Label: Automatic allocation
8 = Manual mode (pre-posting and/or pre-give-up)	Value: Currently filled as 0 (zero) Label: Manual mode
9 = Automatic posting mode (trade posting to the position account number specified)	Value: Currently filled as 1 (one) Label: Automatic extraction

3.15 ORDER ID

The *Order ID* (SBE) / *OrderID* tag: 37 (FIX) field used in the messages for trading purposes is a numerical order identifier assigned by the matching engine, unique per order book (Symbol Index + EMM) over the entire lifetime of the order, which means that this value remains unchanged, even upon submission of the modifications of the order using **CancelReplace** (06) (FIX G) message.

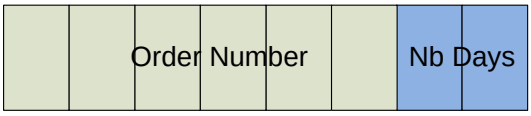
3.15.1 Conversion for clearing partners

For reconciliation purposes with clearing & settlement partners clients may obtain the Order Number and the Order Entry Date, which is forwarded to the clearing partners, from the *Order ID* (SBE) / *OrderID* tag: 37

(FIX) field, provided in the private messages via OEG, which is composed of two parts required for this, as depicted below:

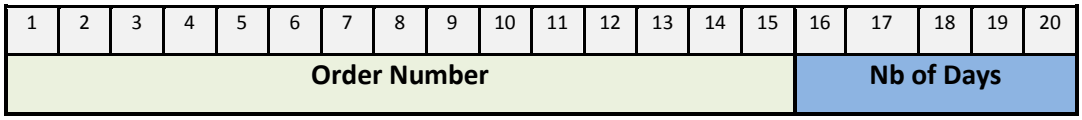
Representation in SBE:

- The least-significant 2-bytes include the relative calendar days number since 1-jan-1970 at 0:00 UTC (EPOCH); (Please note, currently the clearing partners may use the date corresponding to this value in ASCII format)
- The remaining most-significant 6-bytes will include the Order Number



Representation in FIX:

- The least-significant 5 characters include the relative calendar days number since 1-jan-1970 at 0:00 UTC (EPOCH); (Please note, currently the clearing partners may use the date corresponding to this value in ASCII format)
- The remaining most-significant 15 characters will include the Order Number



3.16 CHANGE IN MODIFICATION MESSAGE BEHAVIOR

Based on limited use the following modifications of existing order will no longer be available in Optiq:

- Modification of *Order Type* for Orders
  - If different Order Type information is provided in the modification of an existing order, the modification message will be rejected with an appropriate Error code
- Modification of *Account Type* for Orders
  - If different Account Type information is provided in the modified order, this data will be ignored
  - The same behavior / rule will apply to the new field *LP Role*. It isn't modifiable and will be ignored if different information is provided
- Modification of *Disclosed Quantity* for Iceberg orders
  - If different Disclosed Quantity information is provided in a modification of an existing order, the modification message will be rejected, with an appropriate Error code

4. MIFID II RELATED CHANGES

The following sections describe the changes introduced in the messages or system functionalities based on the MiFID II requirements and related services provided by Exchange to its clients.

4.1 MAINTENANCE OF RELEVANT DATA RELATING TO ORDERS IN FINANCIAL INSTRUMENTS

The delegated act "supplementing Regulation (EU) No 600/2014 of the European Parliament and of the Council with regard to regulatory technical standards for the maintenance of relevant data relating to orders in financial instruments" issued by ESMA within the MiFID II requires trading venues to be able to supply to the regulators a wide range of order related data. In order to fulfil this requirement, members are requested to provide data in the additional fields introduced in the Optiq messages, e.g. **New Order** (01) / (FIX D) message. The list of fields added for compliance with act* are listed in the table below and is provided in the description of each individual message:

Field in the Act	Optiq Fields (SBE)	FIX Fields
Client identification code	ClientIdentificationShortCode	Covered by the combination of fields and values in the Parties, NestedParties, OrderAttributeGrp components. Detailed explanation on use of fields is provided on a message by message basis within the FIX message specifications document.
Investment decision within firm	InvestmentDecisionWFirmShortCode	
Execution within firm	ExecutingWithinFirmShortCode	
Non-executing broker	NonExecutingBrokerShortCode	
MiFID Indicators	MiFIDIndicators	
Trading Capacity	TradingCapacity	LastCapacity (Tag 29)

To reduce latency impacts associated to the addition of these new fields and to avoid sensitive information from being routed over the non-encrypted order interface, the optimized representation of this data will be transmitted to the Exchange via short codes, which may be provided by clients by end of business on the trading day when trade has occurred using the process described below:

- Short codes in order entry messages
  - A range of "MIFID II short code" fields is being added to all incoming application messages and command messages
  - To provide flexibility to its clients in use of short codes, clients are required to generate their own short codes (change from what was identified in v1.0), and provide these short codes to the Exchange systems. System will check that short codes are provided, in the format specified.
  - Clients will have access to the Customer Web portal where they will be able to input the MiFID II compliant data for each required field. This data could be associated to the short codes, which may also be provided by the clients via the Customer Web Portal. For Example:
    - To identify a non-DEA client on behalf of which an order was entered in the system, members are requested to enter their MiFID II Client identification code (as described in the associated act): Where the client is a legal entity, the LEI code of the client shall be used. Where the client is not a legal entity, the National ID shall be used.
    - When this code is entered, the clients will be able to assign a short code to it in the Customer Web Portal. This short code may be used in the New Order message in the SBE field ClientIdentificationShortCode (SBE) or in the combination of FIX fields corresponding to the values explained in the messages description under ClientIdentificationShortCode.

- The message specifications include the guidelines, rules and conditions for filling the short code fields and the types of checks that would be done on this data.
- For clients using algorithms in their trading, guidelines are provided for the way clients should generate and populate the short codes associated to the executing and investment decision making have the following guidelines for completion
  - When an order message is flagged to indicate that algorithm is not involved, then in the associated short code field all positive values (from 0 to 2^31-1) would represent a human trader.
  - If an order is indicated as having involvement of an algorithm, clients are requested to populate the associated short code field with the ranges of values identified below. No checks would be performed to validate correctness of the ranges used, by the system:
    - In–house algorithms: with positive range of values between 0 to 2^31-1
    - ISV algorithms: negative range of values between -2^31+1 to -1

4.2 USER NOTIFICATION MESSAGE

To provide clients with a status of their connection, associated to the possible blocking of access and /or cancellation of orders by the Market Operation, a new outbound message, **User Notification** (39) / (FIX CB), is added to the specifications. Details of the message are provided in the message specifications. Message is sent to the clients as a response either to the Kill or Block action by Market Operations users, or upon clients' attempt to interact with Optiq after they're access has been blocked, with a possible cancellation of their orders.

5. SBE (BINARY) PROTOCOL - CHANGES IN MESSAGES FOR OPTIQ

The messaging system of the private exchange of data with clients has been completely redesigned with Optiq, and this was driven by the following objectives:

- A simpler messaging system: Reduction of overall number of messages types and harmonization between similarly behaving messages in CCG. Technically, this has been achieved with the introduction of new Simple Binary Encoding (SBE) field types, allowing the use of bitmaps.
- An agile messaging system: with SBE technology, messages can evolve without a retro-compatibility impact, giving Exchange's customers more flexibility and options for adaptability.
- Message content and behaviour that are MIFID II compliant.
- The section below describes changes to the messages exchanged between client systems and the exchange. Short description of differences in behaviour is provided for those messages that have significant changes (and are listed in this section), including mapping of merged messages and identification of those being deprecated with Optiq. However clients should review the Optiq message specifications and kinematics documents to obtain full description of the messages and values setup for Optiq.

5.1 HEADER

With the introduction of the SBE protocol, fields belonging to the technical SBE header are described in the OEG Client Specifications.

Since Optiq follows SBE recommendations, legacy CCG technical fields common to all messages are considered as obsolete.

5.2 MAPPING OF MESSAGES CCG BINARY TO OEG SBE

Table below provides the mapping of messages between CCG Binary and OEG SBE protocols. More details on removed or merged are identified in a dedicated section in this document.

CCG Binary – Label (ID)	OEG SBE – Label (ID)	Notes
New Order (D) and (e)	New Order (01)	
Order Ack (a)	Ack (03)	Please review section on Ack harmonization
Cancel Request Ack (6)	Ack (03)	Please review section on Ack harmonization
Cancel/Replace Request Ack (E)	Ack (03)	Please review section on Ack harmonization
Order Replaced (5)	Ack (03)	Please review section on Ack harmonization
Generic Response (y)	Ack (03)	Please review section on Ack harmonization
Order Fill (2)	Fill (04)	
Order Killed (4)	Kill (05)	
Cancel/Replace Order (G)	Cancel Replace (06)	
Order Cancel/Replace Reject (8)	Reject (07)	
Cancel Request (F)	Cancel Request (12)	
Cancel Request (F)	Mass Cancel (13)	New message for existing functionality
Bulk Cancel Ack Report (K)	Mass Cancel Ack (14)	

CCG Binary – Label (ID)	OEG SBE – Label (ID)	Notes
Order Status Request (H)	Open Order Request (15)	
Bust/Correct (C)	Trade Bust Notification (19)	
Price Input (I)	Price Input (28)	
Logon (A)	Logon (100)	
Logon Reject (l)	Logon Reject (102)	
Heartbeat (0)	Heartbeat (106)	
Test Request (1)	TestRequest (107)	
N/A	Technical Reject (108)	New message
N/A	Logout (103)	New message
N/A	Logon Ack (101)	New message
N/A	Ownership Request Ack (17)	New
N/A	Ownership Request (18)	New, replaces one of the functionalities of CCG Order Status Request (H) message
N/A	Collar Breach Confirmation (20)	New, replaces one of the functionalities of CCG Cancel/Replace Order (G) message
N/A	User Notification (39)	New message
N/A	InstrumentSynchronizationList (50)	New message, used as part of recovery functionalities
Class Event (Q)	SynchronizationTime (51)	New message, replacing part of the functionality previously covered in message Class Event (Q). Used as part of recovery functionalities
Trading Session Status (h)	N/A	Removed
Extended Response (x)	N/A	Removed

5.3 ADMINISTRATION MESSAGES

5.3.1 Logon (100)

- In Optiq Logon message will be enriched to allow clients to specify what type of behaviour they'd like to have for messages over the throttling limit: Queue or Reject. If nothing is specified, the system will assume that default setting of Reject is chosen. Clients can overwrite this setting on every logon into the system.
- The protocol version in the Logon previously required for the BIN messages is being replaced by the Schema Version provided in SBE header.
- Client must note the following about the Message Sequence Number : '0' is the first value for the day. If the SBE 'Null' value is sent, it means that the message is to be skipped. In UTP the same functionality was supported through '-1' value set in the field.
- Identification of individual physical connections & OE session ID

  To trade on any of the Optiq segments, clients will need to establish one or more physical connections to partitions within the segment.

For each established physical connection clients will be able to construct and provide within the logon message the unique identifier, referred to elsewhere as OE Session ID, which will now be represented by two fields: Logical Access ID and OE Partition ID.

For this purpose changes are being made to the field associated to this data, in the Logon message as listed in the table of field mapping. Similar changes are being included in the following other incoming messages: Logout, Ownership Request and Mass Cancel (as an optional criteria). Associated changes to these messages are listed in their respective sections.

- Software Provider

  To assist Exchange in providing the best possible level of service to its clients, knowing which provider's software a client is using improves aspects of conformance testing and assists in troubleshooting. To facilitate this an optional field "software provider" is added in the Logon message, where clients may provide a free text description / name of the vendor that provides the software they use to connect and trade on Optiq.

5.3.2 Logon Ack (101)

In UTP, if logon is successful, CCG Binary sends back a Logon message to the client. In Optiq, in its place the **Logon Ack** (101) message is introduced. The new **Logon Ack** (101) message provides back to the client the Partition ID to which the OE Session that sent the message is connected to.

Note that the logic of message sequence numbers based on Last Message Sequence Number remains unchanged.

5.3.3 Logon Reject (102)

The **Logon Reject** (102) message is sent if logon authentication fails, but was in a correct technical format and with sufficient recognized information to assess to which OE session it should be sent back to. The message provides also the identifier of the Optiq Partition to which OE Session attempted to connect to.

The sequence number is no longer provided in the reject message. Since the logon failed no message that could have been sent after the logon attempt will be processed.

5.3.4 Heartbeat (106)

The **Heartbeat** (106) message is used to notify the client during periods of inactivity that the system is still available and not encountering any technical issues.

In UTP the Heartbeat message was sent in response to a CCG Test Request (1) message sent by the client. In Optiq, the Heartbeat is an unsolicited message, sent on a pre-determined time interval, in case of no activity from the client. The time period after which heartbeat message is issued is identified in the *Luxembourg Stock Exchange – Optiq Kinematics Specifications* document.

The Optiq **Heartbeat** (106) message is composed only of the SBE technical header.

5.3.5 Test Request (107)

The **Test Request** (107) message is used to check if network and client systems are not encountering any technical issues.

As in UTP the message will be available to both client and exchange side to perform this check towards each other. The message is sent by the Exchange after *n* second(s) of inactivity from the client.

Client should answer the message within the same delay period once the **Test Request** (107) message is received to avoid being disconnected. The predefined parameter "delay of inactivity" is provided in the *Luxembourg Stock Exchange – Optiq OEG Connectivity Configuration Specifications* document.

This message can also be sent by the client to the OEG at any moment and the OEG will answer with a **Heartbeat** (106) message.

As an answer from client to an Optiq **Test Request** (107) client may send back either an application message or an Optiq **Heartbeat** (106) message.

5.3.6 Logout message (103)

The **Logout** (103) message is introduced with Optiq on the Luxembourg Stock Exchange. Logout message is being introduced to improve session management processes.

This message helps to identify to the exchange if the client has disconnected on purposes or due to technical issue. Logout message will trigger Cancel on Disconnect during all active trading phase, except during Inaccessible.

For the full description and behaviour of the messages please refer to the OEG client specification, kinematics or CoD background documents.

5.4 APPLICATION MESSAGES

The sections below describe the main technical and functional changes for the messages listed below. Mapping of fields between the existing CCG messages and the OEG messages with which they are being replaced are provided in dedicated section.

For the complete definition of message structures and field values, and to view the expected message behaviour clients should review the *Luxembourg Stock Exchange - Optiq OEG Client Specifications - SBE Interface* and the *Luxembourg Stock Exchange - Optiq Kinematics Specifications* documents.

General Notes

- Due to implementation of Symbol Index system-wide MIC and Currency fields have been removed from all the messages. Please see section dedicated to Symbol Index for more details.
- Execution ID is provided in various messages (Fill / Trade Bust notification) following a full or partial execution of an orders. This value is unique to the trade, and the uniqueness of this field will be managed per instrument on the System-wide level.

5.4.1 New Order (01)

In Optiq use of SBE allows to combine the data from message (D) and (e) into a single **NewOrder** (01) message.

A number of fields are combined in SBE in bitmap fields. Where possible, in the table of field mapping below, they are all indicated together opposite the single bitmap field that will represent them. Please refer to the bitmap section in the document for more information.

Value previously provided in the ExpireTimeFlag, STPIndicator and DisplayQtyRdm will be added to the existing values of the Execution Instruction, and included in the single bitmap field of Execution Instruction. All of the fields that were specific to the Dark[2] orders in message (e) (i.e. DarkIndicator, DisplayedOrderInteraction, MinQtyType, DefTradReq and SweepOrder) are combined in the field Dark Execution Instruction.

The acknowledgement and rejection of the New Order message changes are described in the sections for the Ack and Rejection messages, due to harmonization of Ack messages and modification of how Optiq will handle rejection of requests throughout the system.

For the information about the MIFID II shortcodes please refer to the dedicated MIFID II section.

5.4.2 Ack (03)

All functional changes related to the harmonization of acknowledgements in Optiq through one single **Ack** (03) message, are covered in a dedicated section.

Additionally, no **Ack** (03) message is sent in case of collars breach when entering an order for which price lies outside the collars. The order gets rejected and the rejection is provided via the **Reject** (07) message.

5.4.3 Fill (04)

The Optiq **Fill** (4) message is an unsolicited message sent by the Matching Engine to notify the client of a partial or complete fill of an order. Its behaviour is the same as the CCG Order Fill (2) message. However, the data provided through the **Fill** (4) message differs, and is enriched with additional information.

5.4.4 Kill (05)

In UTP, the CCG binary Order Killed (4) message is either an unsolicited one notifying the clients of expired orders or a response to a CCG Order Cancel Request (F) message. In Optiq, the behaviour of these messages is enriched and is provided via new messages as described below.

- The introduction of the SBE **Mass Cancel** (13) message, whose functionality is dedicated to the cancellation of multiple orders, and which leads to the sending of a single **Kill** (05) message which will contain information about all the cancelled orders for the SymbolIndex or the Instrument Group specified. As currently on UTP, the **Mass Cancel** (13) message will allow clients to request cancellation of multiple orders belonging to an instrument group code (previously referred to as ClassID) or a SymbolIndex.

[2] *For Future Use, Pending Regulatory Approval*

In UTP the Order Killed (4) message is sent to the client when cancelling a single order on a single instrument while the CCG Order Cancel Request (F) message manages both mass and single order cancellation instruction. This means that for a single mass cancellation message sent by client, UTP responds with multiple Order Kill (4) messages for each single order.

In Optiq, only one message will be sent for multiple orders killed on mass cancellation instruction, with each order being provided through SBE repeating section functionality, with each repeating section identifying a single order and the instrument concerned.

- As in UTP single order cancellation could be requested by the clients, by sending the **CancelRequest** (12) message, which will be replied to by the **Kill** (05) message containing information for that single order.
- Too many collar breaches will no longer be sent via the **Kill** (05) message, but will rather be replied to by the **Reject** (07) message, with dedicated fields that would provide the associated information.
- Also, as in UTP, the **Kill** (05) message is used for sending notification to clients about other cancellation reasons (e.g. expired orders, orders cancelled by Market Operations**,** etc.). The event that led to the cancellation of order(s) is provided to the client in the **Kill** (05) message in the *Kill Reason* field, previously provided in field OrderStatus. This list of values has been enriched to provide more information on the reason for which the orders are cancelled. Comparison table below provides a mapping of existing CCG Binary and new OEG SBE values. For the full list of possible values please refer to the specifications document.

CCG Binary	OEG SBE	Notes
3 = Done for Day	5 = Done for day	
4 = Cancelled	1 = Order Cancelled	
C = Expired	2 = Order Expired	
S = Cancelled by Market Operations	3 = Order Cancelled by Market Operations	
O = Eliminated by Corporate Event	4 = Order Eliminated due to Corporate Event	
P = Cancelled by STP	*7 = Cancelled by STP*	*Not used by Luxembourg Stock Exchange*
Z = Too many collar breach attempts	N/A	Replaced. Collar breach will be replied to by a Reject (07) message
N/A	6 = Cancelled MTL in an empty Order Book	New value
N/A	8 = Remaining quantity killed (IOC)	New value
N/A	11 = Order Cancelled due to Cancel On Disconnect Mechanism	New value
N/A	17 = Order cancelled due to a Suspend command	New value

Those fields are identified as 'For Future Use' in the specifications and would not be available for use until further communication.

The main technical change for the **Kill** (05) message consist of:

- The use of the SBE repeating sections in order to acknowledge several order cancellation
- The introduction of the Kill Reason field – whereas in UTP only the Order Status was provided with its updated value once the order is killed

5.4.5 Cancel Replace (06)

The **Cancel Replace** (06) message is the equivalent of the UTP Cancel/Replace Order (G) message.

Its behaviour remains the same with the main difference being the introduction of the possibility to modify the Dark[3] orders. In UTP, in order to modify a Dark order client needs to cancel the old order and enter a new one. In Optiq, this can be directly done using the Cancel/Replace mechanism, with specific rules for the field dedicated to Dark orders described in the Optiq Client Specification.

The differences in the message structure / field mapping is described in the section below.

Upon submission of the **Cancel Replace** (06) message, the order will keep its originally assigned Order Id value.

Additionally, the fields indicating the Account type, LP role, Order side and Order type are kept in the message, even though their associated values cannot be changed through cancel replace mechanism, as it was in UTP. The fields are expected to be populated with the same value given in the original order. Please review section "Change in Modification Message Behaviour" for further details.

5.4.6 Reject (07)

In Optiq rejection behaviour is unified across the message types and behaviours.

To reduce complexity and improve response times, a single **Reject** (07) message will be used as the response for all application messages.

The type of collar and the limit breached is indicated in the message in new conditional fields, in case orders are rejected due to a collar breach.

The type of error that triggered the rejection will be provided via the Error code only. As text will no longer be part of the messages the list of error messages associated to the Error codes in Optiq is made more granular and is provided in a dedicated *Luxembourg Stock Exchange - Optiq Error List* document.

5.4.7 Cancel Request (12)

The **Cancel Request** (12) message is the equivalent of the CCG Order Cancel Request (F) message.

In Optiq it will be used for cancellation only of the explicitly indicated individual order(s). This message will no longer be used for Mass Cancel functionality, which can be used to cancel unspecified number of orders. Feedback for the single cancellation will no longer provide an Ack message before the actual cancellation message.

5.4.8 Mass Cancel (13)

The **Mass Cancel** (13) message is introduced with Optiq in replacement of the Bulk Cancelation mechanism provided in UTP via the CCG Order Cancel Request (F) message.

The functionality remains the same: giving client the possibility to cancel several orders for a single instrument (*SymbolIndex*) or for an Instrument Trading Group (*Instrument Group Code*) (multiple orders on multiple instruments). Either the *Instrument Group Code* field or the *Symbol Index* field must be populated within the message to determine the scope of the mass cancel.

[3] *For Future Use, Pending Regulatory Approval*

For more details on changes in message behaviour clients may refer to the dedicated section ”Order Cancellation Mechanism: Kinematics Changes” in this document.

For the details of the structure of this new message, clients should refer to the OEG client specifications.

5.4.9 Mass Cancel Ack (14)

In UTP, a mass cancellation is processed by the bulk cancellation mechanism and is requested via the Order Cancel Request (F) message. The cancellation is acknowledged by UTP sending back a Bulk Cancel Ack Report (K). In Optiq the **Mass Cancel Ack** (14) message replaces the CCG Bulk Cancel Ack Report message. This logic of the functionality is similar to that in UTP. Clients may refer to the dedicated section “Order Cancellation Mechanism : Kinematics Changes” in this document, for more details of the change.

5.4.10 Open Order Request (15)

In UTP, Order Status Request (H) is used for both order retransmission functionality and ownership migration between connections own by the same client. In Optiq they are processed separately and are based on two different messages.
In Optiq **Open Order Request** (15) message will only manage functionality of providing clients with status of their order, namely whether it is still active (present in the order book), or if it was partially executed.

The granularity of the message will be a single order, indeitifed by Order ID or Original Client Order ID, and in response client will receive the **Ack** (03) message.

5.4.11 Ownership Request (18) (Future Use)

This message is replacing part of the functionality that in UTP have been managed via Order Status Request (H) message. The message can be used by the clients to change the ownership of an active order from one OE Session to another belonging to the same Firm. Ownership of an order identifies the OE Session that will receive all outbound messages associated to the targeted order. The scope of the ownership is executed per instrument (*SymbolIndex*) can cover from a single order (identified by *Order ID*) to all the orders of a specific OE Session, or a Logical Access ID.

Upon submitting such a request client will receive an **Ack** (03) message in their OEG, which will also be accompanied by the full order information sent via Drop Copy.

5.4.12 Ownership Request Ack (17) (Future Use)

This message is sent to [a] confirm receipt and processing of the **Ownership Request** (18) message, and [b] the end of the ownership transfer processes. This is a new message created for this response and is sent twice. The information about the orders that are being transferred is provided via **Ack** (03) message(s) and in parallel also being re-sent to the Drop Copy with full order information. After all orders, even if there is only one, that were part of the ownership transfer processes are sent out, the second instance of the message is sent to confirm the successful change of ownership. The field *Total Affected Orders* in initial acknowledgement message is set to -1, and in the second instance of this message this field contains the total number of orders that changed ownership.

5.4.13 Trade Bust (Cancellation) Notification (19)

The UTP Bust/Correct (C) message will be represented in Optiq by **Trade Bust Notification** (19) message. Behaviour of the message remains the same and notable differences are listed below:

- Client order ID is no longer provided in this dedicated message, as it was not providing any useful data for the Trade bust notification.
- Field *TradeChangeType* has been removed from the message, as trade correction is not permitted on the Luxembourg Stock Exchange.

5.4.14 Collar Breach Confirmation (20)

In UTP, confirmation of a rejected order due to collar breach is a functionality that is part of the Cancel/Replace logic.

In Optiq **Collar Breach Confirmation** (20) message is new. For instruments with appropriate collar logic, in case an order submission is rejected due to collar breach, clients have the possibility to confirm the submission of such order by submitting a **Collar Breach Confirmation** (20) within 30 seconds after the rejection. Such submission must take into account that threshold will be impacted. Once the threshold recalculated as a consequence, the order is either accepted or rejected again due to collar breach.

Clients may refer to OEG Message Kinematics Specifications for the full description of the process.

For a full description of the message, clients should refer to the Optiq OEG client specifications document.

5.4.15 Price input (28)

In UTP, the submission of a reference price from a primary market by the client (alternative indicative price) is done through a Price Input (I) message. In Optiq, the **Price Input** (28) message will manage the same functionality. Changes in behaviour are the following:

- If the input price of the message stands for an alternative indicative price: in UTP (respectively Optiq Step 1) the given price was disseminated to the market through a public Execution Report (respectively MDG **Price Update** (1003)) message. If the message is accepted, then a public MDG **Price Update** (1003) message is sent for one lot size at the reference price.
- Acknowledgement to a **Price Input** (28) message is done via the harmonized **Ack** (03) message, replacing the Generic Response (y) used in UTP.

5.5 MESSAGES ASSOCIATED TO NEW FUNCTIONALITIES

5.5.1 User Notification (39)

A new message added – please see section “MiFID II related Changes” for more information.

5.5.2 InstrumentSynchronizationList (50)

A new message added for use as part of the recovery functionalities–

Please review SBE specifications, as well as a dedicated document on High Availability and Business Continuity for more information.

5.5.3 SynchronizationTime (51)

A new message added for use as part of the recovery functionalities–

Please review SBE specifications, as well as a dedicated document on High Availability and Business Continuity for more information.

5.5.4 Technical Reject message (108)

A new technical message added in Optiq SBE to manage various cases of technical rejection, e.g. rejection of messages over the Throttling limit.

5.6 MERGED & REMOVED BINARY MESSAGES

5.6.1 Transformed / Removed Messages

Some of the functionalities existing in UTP are removed, or migrated to be provided via a different solution, and the associated messages are being removed. The table below identifies the messages removed and if they are being replaced, the method by which the functionality would be provided in Optiq.

Removed Functionality (SBE / FIX)	Change Description
Trading Session Status (h / h)	Trading session status (also known as the Class events) will change to be issued on Instrument level, and will only be disseminated as part of public message **Market Status Change** (1005) message. Please see Market data specifications for this message and the change highlights for step 1 (XDP vs. MDG) for more information on the mapping.
Order Status Request (H / H)	Functionality has been split to be covered by two messages **Ownership Request** (18) and **Open Order Request** (15)

5.6.2 Merged Messages

To reduce complexity and harmonize existing functionalities, a number of messages in Optiq are being merged. As a result the original "duplicate" messages are removed. The table below provides these messages and the target messages that would take on the associated merged functionality, fields and/or values.

Merged Message				Target Optiq Message	
Market	Binary Code	FIX Code	Description	Binary Code	Description
LuxSE	**a**	8	Order Acknowledgement	**03**	Ack
LuxSE	**E**	8	Cancel/Replace Ack	**03**	Ack
LuxSE	**6**	8	Cancel Request Ack	**03**	Ack
LuxSE	**5**	8	Order Replaced	**03**	Ack
LuxSE	**y**	Uy	Generic Response	**03**	Ack
LuxSE	**D**	D	New Order (Single)	**01**	New Order
	e				

6. FIX PROTOCOL (FIX 5.0) - CHANGES IN MESSAGES FOR OPTIQ

6.1 GENERAL NOTES & UPDATES

With migration to Optiq Exchange will upgrade its FIX protocol to version 5.0. The FIX message specifications will cover the details of the messages, fields and values. The combined Kinematics document will indicate the behaviour for FIX messages, and identify when it is to be the same as for SBE and when it will differ.

- The section below describes changes to the messages exchanged between client systems and the exchange. Short description of differences in behaviour is provided for those messages that have significant changes (and are listed in this section), including mapping of merged messages and identification of those being deprecated with Optiq.
- While attempts were made to keep in line with the guidelines identified by the FIX protocol v5.0, FIX messages in Optiq will also adhere to and use the same general Optiq concepts that have been defined elsewhere in this document, as well as in the other Optiq specifications and kinematics documents, and the specificities of the Exchange's services.
- In addition to changes required due to architecture of Optiq described in other sections of this document, the FIX messages and fields were updated to be as much as possible in line with the Binary protocol (SBE).
- The major changes expected to be included in the specifications and kinematics for the FIX protocol in Optiq are provided in a brief summary below.
  - Addition of new messages with enhancement of the Optiq system
  - New fields added to match new Optiq architecture and alignment with new binary protocol (SBE)
  - Inclusion of new fields required for
    - Technical Timestamps
    - MIFID II compliance and MIFID II specific services
  - Replacement of fields decommissioned since v 4.2 protocol with either defined fields and field group behaviour identified for v5.0 or required custom tags; e.g.
    - Field representing account type Rule80A {48} field is replaced with two fields *AccountCode* (6399) and *LPRole* (20021)
    - Field ExecTransType {20} is removed
  - Removal of unused or merged messages
- Identification of the Trading session will be provided via a same single field and the previously identified associated repeating group NoTradingSessions is removed
- Management of the updated mechanisms of Self-Trade Prevention (STP) and Cancel on Disconnect (CoD) will change the use of fields as following:
  - For STP: field *STPAggressorIndicator* (21015) will replace the use of field STPIndicator
  - For CoD: CancelOnDisconnectionIndicator (21018) is added to the message

  For more details on changes in the services please refer to the dedicated sections within this document.
- Technical field changes in the Header:
  - The field *SenderLocationID* (142) will no longer be used in the FIX messages

- Newly fields added:
  - *OrigSendingTime* (122) new conditional field;
  - *LastMsgSeqNumProcessed* (369) new mandatory field

⚠ **Important note**: There are more individual details than those provided in the brief summary above, and some are further explained in the sub-sections of this document. However clients should review the Optiq message specifications and kinematics documents to obtain full description of the messages and values setup for Optiq.

6.2 MAPPING OF MESSAGES CCG FIX 4.2 TO OEG FIX 5.0

Table below provides the mapping of messages between CCG FIX 4.2 and OEG FIX 5.0 protocols. More details on removed or merged messages are identified in a dedicated section in this document.

CCG FIX 4.2 – Label (ID)	OEG FIX 5.0 – Label (ID)	Notes
New Order Single (D)	NewOrderSingle (D)	
Order Cancel Request (F)	OrderCancelRequest (F)	
Order Mass Cancel Request (q)	OrderMassCancelRequest (q)	
Order Cancel/Replace Request (G)	OrderCancelReplaceRequest (G)	
Order Status Request (H)	OrderMassStatusRequest (AF)	
Price Input (UI)	PriceInput (UI)	
Execution Report (8)	ExecutionReport (8)	
Order Cancel Reject (9)	OrderCancelReject (9)	
Order Mass Cancel Report (r)	OrderMassCancelReport (r)	
Request Ack Message (Uy)	RequestAckMessage (Uy)	
Logon (A)	Logon (A)	
Heartbeat (0)	Heartbeat (0)	
Test Request (1)	Test Request (1)	
Resend Request (2)	Resend Request (2)	
Reject (3)	Reject (3)	
Logout (5)	Logout (5)	
Sequence Reset (4)	Sequence Reset (4)	
N/A	UserNotification (CB)	New
N/A	OwnershipRequestAck (U29)	New
N/A	OwnershipRequest (U18)	New, replaces some of the functionality of CCG Order Status Request (H) message
N/A	InstrumentSynchronizationList (U50)	New message, used as part of recovery functionalities
Class Event (UQ)	SynchronizationTime (U51)	New message, replacing part of the functionality previously covered in message Class Event (Q). Used as part of recovery functionalities
Trading Session Status (h)	N/A	Removed
Business Message Reject (j)	N/A	Removed

6.3 ADMINISTRATION MESSAGES

6.3.1 Logon (A)

- Behaviour of the message remains the same as in UTP and in line with FIX standard, and this message is used to both initiate the Logon by the client, and is also sent back to the client when the Logon is successful.
- Field *NextExpectedMsgSeqNum* (789) was made mandatory to address re-synchronization needs.
- At the first logon of the trading day the member must set the field *NextExpectedMsgSeqNum* (789) to 1, as no message can be received before a successful logon. Null value can be provided as in UTP, to indicate to the Exchange that a message in the sequence is to be ignored.
- In Optiq Logon message will be enriched to allow clients to specify what type of behaviour they'd like to have for messages over the throttling limit: Queue or Reject using the field *QueueingIndicator* (21020) If nothing is specified, the system will assume that default setting of Reject is chosen. Clients can overwrite this setting on every logon into the system.
- Identification of individual physical connections & OE session ID

  To trade on any of the Optiq segments, clients will need to establish one or more physical connections to partitions within the segment.

  For each established physical connection clients will be able to construct and provide within the logon message the unique identifier, referred to elsewhere as OE Session ID, which will now be represented by two fields: *LogicalAccessID* (21021) and *OEPartitionID* (21019).
- Software Provider

  To assist Exchange in providing the best possible level of service to its clients, knowing which provider's software a client is using improves aspects of conformance testing and assists in troubleshooting. To facilitate this an optional field *SoftwareProvider* (21050) is added in the Logon message, where clients may provide a free text description / name of the vendor that provides the software they use to connect and trade on Optiq.
- Technical field modifications:
  - *DefaultApplVerID* (1137) added in Optiq, and is always set to 9 = FIX50SP2
  - *HeartBtInt* (108) - To improve performance predictability in Optiq field *HeartBtInt* (108) will always be set to the value defined by the exchange and provided in the connectivity documentation.
  - *ResetSeqNumFlag* (141) will no longer be used in Optiq
  - *OrigSendingTime* (122) new conditional field;
  - *LastMsgSeqNumProcessed* (369) new mandatory field

6.3.2 Heartbeat (0)

Functionality of **Heartbeat** (0) message will predominantly remain the same. However, for efficiency reasons, maximum time for heartbeat interval will be restricted to a maximum value set by the Exchange. With this change clients will always set the value of the interval in the connectivity documentation.

Message with any values outside of the those set per segment and not recognized by the exchange would be rejected.

6.3.3 TestRequest (1)

The functionality for the **TestRequest** (1) message predominantly remains the same, however, as for the heartbeat messages, **TestRequest** (1) message will be subject to the imposed maximum interval identified by the Exchange.

6.3.4 Reject (3)

In the FIX **Reject** (3) message the field *Text* (58) is removed and only the *SessionRejectReason* (373) will be kept for reporting of errors & rejections. In case of issues with specific fields the message follows the FIX standard of identifying the field impacted in the *RefTagID* (371) field.

6.3.5 Logout (5)

In the FIX **Logout** (5) message the field *Text* (58) is replaced with the field *SessionStatus* (1409). In most cases sending of the Logout message will trigger Cancel on Disconnect (CoD) mechanism. Otherwise behaviour of the message remains unchanged.

6.4 APPLICATION MESSAGES

The sections below describe the main technical and functional changes for the messages listed below. Mapping of fields between the existing CCG messages and the OEG messages with which they are being replaced are provided in dedicated section.

For the complete definition of message structures and field values, and to view the expected message behaviour clients should review the *Luxembourg Stock Exchange - Optiq OEG Client Specifications – FIX 5.0 Interface* and the *Luxembourg Stock Exchange - Optiq Kinematics Specifications* documents.

6.4.1 NewOrderSingle (D)

The **NewOrderSingle** (D) message is used for similar functionality as in UTP, however it is updated to use fields within the FIX 5.0 standard and enriched to reflect the new fields required for the adjusted functionalities in Optiq, with key changes identified below:

- Management of values and associated functionalities that were provided via field ExecInstr are redistributed into a number of fields and repeating groups for management of future use Peg orders.
- Clearing data fields are moved to be managed using the fields of the NestedParties [*NoNestedPartyIDs* (539)] repeating group instead of the NoClearingEntries group
- The changes to the acknowledgement of the New Order message is described in the sections for the harmonization of acknowledgement of private messages.
- For the information about the MIFID II shortcodes, associated fields and how they should be completed in different cases please refer to the dedicated MIFID II section and the description within the Optiq FIX 5.0 message specifications.

- "Future Use" fields present in this message: *PegPriceType* (1094), *PegOffsetValue* (211), *SelfMatchPreventionID* (2362), *CustOrderCapacity* (582), *DarkExecutionInstruction* (20052), *UndisclosedIcebergType* (20005)

6.4.2 ExecutionReport (8)

The **ExecutionReport** (8) message is used for similar functionality as in UTP, however it is enhanced to incorporate the functionality of UTP message One Side Only Period Ack, in the acknowledgement message harmonization effort. To manage additional functionalities and updated to use fields within the FIX 5.0 standard and enriched to reflect the new fields required for the adjusted functionalities in Optiq, with key changes identified below:

- Enhancements in information provided in Execution Report for Trades include addition of the fields *ExecPhase* (21023), *TradeQualifier* (21080), *MinQty* (20), *TradeType* (21010)
- For the information about the MIFID II shortcodes, associated fields and how they should be completed in different cases please refer to the dedicated MIFID II section and the description within the Optiq FIX 5.0 message specifications.
- Enhancements in identifying acknowledgement messages includes the following changes:
  - Additional sub-types of acknowledgement and responses are included in the *ExecType* (150) field with Optiq to cover the cases identified in section within this document on harmonization of acknowledgement messages
  - Fields added to provide additional information as following:
    - *AckPhase* (21013) - provides indication of the trading phase during which the acknowledgement being reported has occurred
    - *AckQualifiers* (21014) – sends back to client to echo back Dark indicator, and Queueing indicator
    - *OrderPriority* (21004) for the order acknowledgement to indicate order priority
    - *QtyDelta* (8011) to indicate type of change in quantity
    - *OrderCapacity* (528) to indicate capacity of the firm placing the order
- Clearing data fields are moved to be managed using the fields of the NestedParties [*NoNestedPartyIDs* (539)] repeating group instead of the NoClearingEntries group
- Field *OrdRejReason* (103) is removed as the reasons for rejection would be provided by the error codes, the list of which is being enhanced to include more specific cases and provide more granularity
- Management of values and associated functionalities that were provided via field ExecInstr are redistributed into a number of fields to manage and repeating groups for management of future use Peg orders.
- **ExecutionReport** (8) message will be used in Drop Copy to provide both Order and Trade information. Please review the Drop Copy section in this document for more information.
- As identified above, the identification of individual physical connections & OE session ID is represented in this message by two fields: *LogicalAccessID* (21021) and *OEPartitionID* (21019).
- "Future Use" fields present in this message: *PegPriceType* (1094), *PegOffsetValue* (211), *SelfMatchPreventionID* (2362), *CustOrderCapacity* (582), *DarkExecutionInstruction* (20052), and *PackageID* (5883)

6.4.3 OrderCancelReject (9)

The **OrderCancelReject** (9) message is used for similar functionality as in UTP, and is updated to use fields within the FIX 5.0 standard, and enriched to reflect the new fields required for the adjusted functionalities in Optiq, with key changes identified below. As in UTP the message is sent to provide rejection for functional reasons.

- The type of collar and the limit breached is indicated in the message in new conditional fields, in case orders are rejected due to a collar breach. For this reason two fields are added to the message *CollarRejType* (9962) and *BreachedCollarPrice* (21001).
- Fields *CxlRejReason* (102) and *Text* (58) are removed as the reasons for rejection would be provided by the error codes. The list of error messages associated to the Error codes in Optiq is made more granular and is provided in a dedicated *Luxembourg Stock Exchange - Optiq Error List* document.
- Management of values and associated functionalities that were provided via field ExecInstr are redistributed into a number of fields to manage and repeating groups for management of future use Peg orders.

6.4.4 OrderCancelRequest (F)

The **OrderCancelRequest** (F) message is used in a similar fashion as in UTP with key changes identified below.

- To improve system performance fields *OrdType* (40) and *Side* (54) are added to the **OrderCancelRequest** (F) message. If values in these fields do not match the original submission it will lead to the rejection of the message. For triggered Stop orders, the value in field OrdType must be equal to Limit, for Stop-limit, or Market for Stop-market order, corresponding to the type of stop order originally submitted.
- Clearing data fields are moved to be managed using the fields of the NestedParties [*NoNestedPartyIDs* (539)] repeating group instead of the NoClearingEntries group
- "Future Use" fields present in this message: *PegPriceType* (1094), *SelfMatchPreventionID* (2362), *DarkExecutionInstruction* (20052)

6.4.5 OrderCancelReplaceRequest (G)

The **OrderCancelReplaceRequest** (G) message is used in a similar fashion as in UTP with key changes identified below.

- As in other messages, management of values and associated functionalities that were provided via field ExecInstr are redistributed into a number of fields to manage and repeating groups for management of future use Peg orders.
- While some fields associated to it are present in the message structure, modification of various fields is no longer accepted in Optiq as described in the section Change in Modification Message Behavior within this document.
- For the information about the MIFID II shortcodes, associated fields and how they should be completed in different cases please refer to the dedicated MIFID II section and the description within the Optiq FIX 5.0 message specifications.
- Clearing data fields are moved to be managed using the fields of the NestedParties [*NoNestedPartyIDs* (539)] repeating group instead of the NoClearingEntries group

- "Future Use" fields present in this message: *PegPriceType* (1094), *PegOffsetValue* (211), *SelfMatchPreventionID* (2362), *DarkExecutionInstruction* (20052), *UndisclosedIcebergType* (20005)

6.4.6 OrderMassCancelReport (r)

The **OrderMassCancelReport** (r) message is used in a similar way to the one in UTP with key changes identified below.

- To improve identification of individual messages and events, the **OrderMassCancelReport** (r) message will be assigned an ID by the exchange and provided to client within the *MassActionReportID* (1369) field
- As the scope of **OrderMassCancelRequest** (q) message is modified to accommodate identification of cancellation for specific connection in line with connectivity changes in Optiq the **OrderMassCancelReport** (r) message is modified similarly. The field CancelByLocationID is replaced by the fields used to identify individual physical connections & OE session ID: *LogicalAccessID* (21021) and *OEPartitionID* (21019).

6.4.7 OrderMassCancelRequest (q)

The **OrderMassCancelRequest** (q) message is used in a similar fashion as in UTP with key changes identified below.

- The scope of **OrderMassCancelRequest** (q) message will allow, as currently the cancellation either for a specific instrument, or a group of instruments, with possibility of identifying other variables to refine that scope further. To allow for this with the connectivity changes in Optiq the field CancelByLocationID is replaced by the fields used to identify individual physical connections & OE session ID: *LogicalAccessID* (21021) and *OEPartitionID* (21019).
- For the information about the MIFID II shortcodes, associated fields and how they should be completed in different cases please refer to the dedicated MIFID II section and the description within the Optiq FIX 5.0 message specifications.

6.4.8 RequestAckMessage (Uy)

The **RequestAckMessage** (Uy) message is used for similar functionality as in UTP with key changes identified below.

- UTP messages One Side Only Period (UO) and Liquidity Provider Command (UZ) are merged into a single message **LiquidityProviderCommand** (UZ) in Optiq, as they provide similar services to the same population of clients. To address this change field *LPActionCode* (10076) is added to **RequestAckMessage** (Uy) message to provide required granularity in responding to the newly merged message.
- Field *Text* (58) is removed as the reasons for rejection would be provided by the error codes. The list of error messages associated to the Error codes in Optiq is made more granular and is provided in a dedicated *Luxembourg Stock Exchange - Optiq Error List* document.

6.4.9 OrderMassStatusRequest (AF)

In UTP, Order Status Request (H) is used for both order retransmission functionality and ownership migration between connections own by the same client. In Optiq they are processed separately and are based on two different messages.
In Optiq **OrderMassStatusRequest** (AF) message will only manage functionality of providing clients with status of their order, namely whether it is still active (present in the order book), or if it was partially executed.

The scope of the message is reduced to a single order identified by the OrderID (37)_field. As the field OrderID (37) is used to target a specific order to obtain the status of, the field MassStatusReqID (584) is provided in the message to identify the message ID.

The granularity of the message is the Order ID and in response client will receive the **Execution Report** (8) message.

Client may refer to OEG FIX message specification document for the full description of the message structure and to Optiq OEG kinematics document for the details of the behaviour.

6.4.10 OwnershipRequest (U18) (Future Use)

This message is replacing part of the functionality that in UTP have been managed via Order Status Request (H) message. The message can be used by the clients to change the ownership of an active order from one OE Session to another belonging to the same Firm. Ownership of an order identifies the OE Session that will receive all outbound messages associated to the targeted order. The scope of the ownership is executed per instrument [Symbol Index / *SecurityID* (48)] can be cover from a single order [identified by *OrderID* (37)] to all the orders of a specific OE Session, or a Logical Access ID.

As identified above, the identification of individual physical connections & OE session ID is represented in this message by two fields: *LogicalAccessID* (21021) and *OEPartitionID* (21019).

6.4.11 OwnershipRequestAck (U29) (Future Use)

This message is sent to [a] confirm receipt and processing of the **OwnershipRequest** (U18) message, and [b] the end of the ownership transfer processes. This is a new message created for this response and is sent twice. The information about the orders that are being transferred is provided via **Execution Report** (8) message(s). After all orders, even if there is only one, that were part of the ownership transfer processes are sent out, the second instance of the message is sent to confirm the successful change of ownership. The field *TotalAffectedOrders* (533) in initial acknowledgement message is set to -1, and in the second instance of this message this field contains the total number of orders that changed ownership.

As identified above, the identification of individual physical connections & OE session ID is represented in this message by two fields: *LogicalAccessID* (21021) and *OEPartitionID* (21019).

6.5 MESSAGES ASSOCIATED TO NEW FUNCTIONALITIES (NEW MESSAGES)

6.5.1 UserNotification (CB)

A new message added – please see section “MiFID II related Changes” for more information.

6.5.2 InstrumentSynchronizationList (U50)

A new message added for use as part of the recovery functionalities–

Please review FIX specifications, as well as a dedicated document on High Availability and Business Continuity for more information.

6.5.3 SynchronizationTime (U51)

A new message added for use as part of the recovery functionalities–

Please review FIX specifications, as well as a dedicated document on High Availability and Business Continuity for more information.

6.6 REMOVED FIX MESSAGES

6.6.1 Transformed / Removed Messages

Some of the functionalities existing in UTP are removed, or migrated to be provided via a different solution, and the associated messages are being removed. The table below identifies the messages removed and if they are being replaced, the method by which the functionality would be provided in Optiq.

Removed Functionality (FIX / SBE)	Change Description
Trading Session Status (h / h)	Trading session status (also known as the Class events) will change to be issued on Instrument level, and will only be disseminated as part of public message **Market Status Change** (1005) message. Please see Market data specifications for this message and the change highlights for step 1 (XDP vs. MDG) for more the mapping.
Order Status Request (H / H)	Functionality has been split to be covered by two messages **Ownership Request** (U18) and **OrderMassStatusRequest** (AF)
Business Message Reject (j)	Functional rejection of messages will be managed by other methoed, depending on the type of functionality.

6.6.2 Merged Messages

To reduce complexity and harmonize existing functionalities, a number of messages in Optiq are being merged. As a result the original “duplicate” messages are removed. The table below identifies the messages that are removed as part of the merger and the target messages into which they were incorporated in Optiq.

Merged Message				Target Optiq Message	
Market	FIX Code	Binary Code	Description	FIX Code	Description
LuxSE	**Uy**	y	Generic Response	**3**	Ack
LuxSE	**D**	D e	New Order (Single)	**01**	New Order

APPENDIX A: REVIEW LOG, DOCUMENT HISTORY, SIGN-OFF

SUMMARY OF CHANGES

Version	Change Description
1.0.0	First version for Luxembourg Stock Exchange on Optiq

DOCUMENT HISTORY

REVISION NO.	DATE	AUTHOR	CHANGE DESCRIPTION
1.0.0	February 2018	IT Solutions	First version for Luxembourg Stock Exchange on Optiq