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PREFACE

PURPOSE

This document is for the migration to Production of all Euronext Cash markets / segments to the Euronext Optiq® full trading chain (Phase 2), including Order Entry Gateway, Matching Engine and Market Data Gateway.

ASSOCIATED DOCUMENTS

The following list identifies the associated documents, which either should be read in conjunction with this document, or which provide other relevant information for the users:

- Euronext Cash Markets – Optiq OEG Client Specifications – SBE Interface
- Euronext Cash Markets – Optiq OEG Client Specifications – FIX 5.0 Interface
- Euronext Cash Markets – Optiq Kinematics Specifications
- Euronext Cash Markets – Optiq CCG to OEG Changes Highlight
- Euronext Cash Markets – Optiq & TCS Error List
- Euronext Cash and Derivatives Markets – Optiq File Specification
- Euronext Cash Markets – Optiq MDG Client Specifications
- Euronext Cash Markets – Change Highlights – Optiq MDG Phase 1 to 2
- Optiq Technical Note SBE

Clients are advised to also refer to the Euronext Rules and Regulations documents for more details.

For the latest version of documentation please visit <http://www.euronext.com/optiq>

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DOCUMENT REVISION HISTORY

Version	Change Description
1.0	Optiq detailed information on scope and services for the full cash markets migration to Production

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1. INTRODUCTION

Euronext announced the launch of its new generation technology program in May 2016, which is delivering improved customer experience through the migration from its current technology platform, Euronext UTP, to its new leading edge platform: Optiq®.

This document is a description of the scope and services for the migration to Production of all Cash markets / segments to the Euronext Optiq® full trading chain (Phase 2), including Order Entry Gateway, Matching Engine and Market Data Gateway.

2. OVERVIEW OF AVAILABLE FUNCTIONALITIES FOR ALL CASH MARKETS

Below is the overview of the available functionalities and messages for All Cash markets / segments migrated to Optiq full trading chain.

Note: For full details of functionalities, message structures and behaviour, clients are advised to review the Optiq OEG and MDG Phase 2 specification documents.

2.1 OEG MESSAGES

2.1.1 Administrative Messages: All Segments

SBE Messages	FIX Messages
■ Logon (100)	■ Logon (A)
■ Logon Ack (101)	<i>Handled by Logon (A) in FIX</i>
■ Logon Reject (102)	■ Reject (3)
■ Technical Reject (108)	<i>Handled by Reject (3) in FIX</i>
■ Logout (103)	■ Logout (5)
■ HeartBeat (106)	■ HeartBeat (0)
■ TestRequest (107)	■ TestRequest (1)
N/A	■ ResendRequest (2)
N/A	■ SequenceReset (4)

2.1.2 Application Messages: All Segments

SBE Messages	FIX Messages
■ New Order (01)	■ NewOrderSingle (D)
■ Ack (03)	■ ExecutionReport (8)
■ Fill (04)	<i>Handled by ExecutionReport (8) in FIX</i>
■ Kill (05)	<i>Handled by ExecutionReport (8) in FIX</i>
■ Trade Bust Notification (19)	<i>Handled by ExecutionReport (8) in FIX</i>
■ Cancel Replace (06)	■ OrderCancelReplaceRequest (G)
■ Collar Breach Confirmation (20)	<i>Handled by OrderCancelReplaceRequest (G) in FIX</i>
■ Reject (07)	■ OrderCancelReject (9)
<i>Handled by SBE via Reject (07)</i>	■ RequestAckMessage (Uy)
■ Cancel Request (12)	■ OrderCancelRequest (F)
■ Mass Cancel (13)	■ OrderMassCancelRequest (q)
■ Mass Cancel Ack (14)	■ OrderMassCancelReport (r)
■ Price Input (28)	■ PriceInput (UI)
■ InstrumentSynchronizationList (50)	■ InstrumentSynchronizationList (U50)
■ SynchronizationTime (51)	■ SynchronizationTime (U51)
■ User Notification (39)	■ UserNotification (CB)
■ Open Order Request (15)	■ OrderMassStatusRequest (AF)
■ Ownership Request (18)	■ OwnershipRequest (U18)
■ Ownership Request Ack (17)	■ OwnershipRequestAck (U29)

2.1.3 Application Messages: Warrants Specific

Find below the list of application messages available for use with the Warrants and Certificates instruments on the Hybrid Market Model (aka Request For Execution Market Model):

SBE Messages	FIX Messages
■ Quotes (08)	■ MassQuote (i)
■ Quote Ack (09)	■ MassQuoteAck (b)
<i>In case of issues with quotes, in SBE the response is provided within QuoteAck (09) message</i>	■ QuoteRequestReject (AG)
<i>In case of issues with mandatory fields, in SBE the response is provided by Reject (07) message</i>	
■ Liquidity Provider Command (32)	■ LiquidityProviderCommand (UZ)
	■ RequestAckMessage (Uy) ¹
■ Ask For Quote (33)	■ AskForQuote (UL)
■ Request For Execution (34)	■ RequestForExecution (UM)

2.1.4 Application Messages: Trade Confirmation System (TCS) Specific Messages

Find below the list of application messages available for sending order entry messages to Trade Confirmation System (TCS).

To use TCS messages via OEG service client's logical access must be enabled for use of this service.

SBE Messages	FIX Messages
■ Declaration Entry (40)	■ TradeCaptureReport (AE)
■ Declaration Entry Ack (41)	■ TradeCaptureReportAck (AR)
■ Declaration Notice (42)	<i>Handled by TradeCaptureReportAck (AR) in FIX</i>
■ Declaration Cancel and Refusal (43)	<i>Handled by TradeCaptureReport (AE) in FIX</i>
■ Fund Price Input (44)	■ FundPriceInput (U44)
■ Fund Price Input Ack (45)	■ FundPriceInputAck (U45)
■ Declaration Entry Reject (46)	<i>Handled by TradeCaptureReportAck (AR) in FIX</i>

2.2 SERVICES & FUNCTIONALITIES

2.2.1 All Market Segments

The functionalities below are available:

- Order types: Limit, Market, Market To Limit, Cross, Iceberg, Stop (all types)
- Validity types: Day, IOC, FOK, GTC, GTD, VFU (VFA) / VFC²

Please note: Validity Type of Good Till Time (GTT) is not delivered in Optiq day 1 implementation, and the associated fields will be set to Future Use in the specifications

- Client order id, including with Service Bureau connections
- Cancel on Disconnect

¹ RequestAckMessage (Uy) [FIX] is also sent in response to "all segment" messages OwnershipRequest (U18) and OrderMassStatusRequest (AF)

² In FIX protocol reference for VFU (VFA) / Valid for Uncrossing is "Good for Auction", and for VFC / Valid for Closing is "At the Close"

- Self-Trade Prevention
- Internal Matching Service
- Best of Book service
- OEG Throttling
- Non Clearable (or alike) instruments (e.g. Euronext Expert Market)
 - ◆ With availability of this functionality messages for the instruments managed under the Euronext Expert Market and those flagged as non-Clearable, will be populated with the counterparty ID.
- MIFID II Kill switch functionality, supported by Market operations & User notification messages
- Member recovery through Sequence Number synchronization (in non-HA situations)
- High Availability & Business Continuity (DR) and associated member recovery
- Drop Copy Optiq Phase 2 for all segments
- Double Cap Management
- Valuation Price management (automatic & via AIP messages)

- End of Day Application – Trade files for Optiq only
 - ◆ Order files for Optiq are not available for day 1

Please note: Pre-trade safeguard, e.g. Bonds with minimum denomination, order maximum quantity, etc., are applicable according to the rules of the individual market segments and instrument types.

2.2.2 Warrants and Certificates Instruments on the Hybrid Market Model (aka Request For Execution Market Model) specific functionalities:

The following list of Warrants and Certificates segment specific functionalities is available:

- Submission and management of functionalities under the Request For Execution market model (formerly known as LP Quote Driven), and its interaction with Orders. This includes the functionalities dedicated for Liquidity providers:
 - ◆ One-sided presence of instruments
 - ◆ Knock-In by Issuer (KIBI)
 - ◆ Knock-Out by Issuer (KOBI)
 - ◆ Payment After Knock-Out (PAKO)

2.2.3 Trade Confirmation System (TCS) Specific Functionalities

The following lists TCS specific functionalities that are available:

- Submission and management of message to TCS via an OEG for:
 - ◆ For All Instruments:
 - Declarations of trades off-market, on secondary market & VWAP
 - ◆ For Funds:
 - Declarations in quantity and amount
 - Price input (for Fund agent)
- Inclusion of Waiver indicator in TCS OEG messages
- Price Control for off-book declarations for MIFID II compliance (in TCS)
- Differed Trade Publication from TCS

- Double Cap Management

2.3 EURONEXT FILE SERVICES (EFS)

Files available on Euronext Files Services for Production are the following:

- OEG SBE template File – version 103 for use on all Cash segments
- MDG SBE template File – version 103 for use on all Cash segments
- Cash Standing Data File – in Phase 2 format for all Cash segments
- Cash Tick Size Referential File
- Timetable File
- Repo Settlement Price File
- Previous Day Cap and Volume Trade File

3. NOTABLE REMINDERS

3.1 ALL SEGMENTS

- Clients are advised that if they disconnect from OEG before receiving all the messages for the day, they may miss the Acknowledgement messages which indicate conversion of orders, e.g. Market to Limit orders changing to a Limit. In this case, in the next trading session clients may submit cancellation or modification of orders with an order type that is no longer applicable to the order. To avoid this, clients should use Order Status request or Ownership request messages at the start of the session to confirm information of all open / active orders.
- SBE & FIX: As mentioned in protocol specific documentation, and in the connectivity specifications, sending messages that are unknown for the product in Production result in immediate disconnection. On the Warrants segment this control is done on the instrument level and for instruments that are order driven submitting quote messages is considered as an unknown message, and vice versa, resulting in immediate disconnection.
- Clients should take the following into consideration for population of short codes in inbound messages:
 - a) ExecutionWithinFirmShortCode is mandatory to be provided in all inbound application messages;
 - b) InvestmentDecisionWFirmShortCode is mandatory to be provided in when the order is flagged as Liquidity Provider, Related Party or House. It is optional in other cases.
 - c) ClientIdentificationShortCode is mandatory when an order is flagged as Client, RO or DEA. It is optional in other cases.
 - d) NonExecutingBrokerShortCode is optional in all cases.

In order messages short codes are used for regulatory reporting. In most other messages these codes are identified to be used for Kill command

3.2 WARRANTS & CERTIFICATES SPECIFIC

- Reminder of removal of opening auction and IMP: Warrants on the Request for Execution market model will use the same mechanism for uncrossing at the beginning of the session as they do for any other time an LP representing the instrument comes back to the market (referred to as Continuous Uncrossing). After the opening Call phase these instruments will go directly into Continuous phase and IMP will not be disseminated during Call for these instruments.

4. SPECIFICATION CLARIFICATIONS

4.1 FOR ALL SEGMENTS (NON-TCS MESSAGES)

- FIX: Section 5.3.5 **OrderCancelRequest** (F) message incorrectly contains field *DarkExecutionInstruction* (tag 20052). The field is not expected in this message.
- FIX: Values for field *LastMsgSeqNumProcessed* (tag 369) in the specifications incorrectly start from value 1. Correct range starts from zero (From 0 to $2^{32}-2$). As a result, when the first Logon (A) of the day is rejected the *LastMsgSeqNumProcessed* (369) of the Reject (3) is set to zero (0).
- FIX: Conditions of the EMM field mention incorrect reference id for the Reject message, in place of (07) it should be (3)
- SBE & FIX: Modification of Time in Force [field Time in Force (tag 59)] results will result in rejection of such messages, in case orders are modified from a validity that is against market's rules or can't be executed. Such cases includes Modification of VFA / VFC to any other validity
- SBE: Conditions of the field Client Order ID field have an incorrect reference to the Reject and Ack message id. Reject message should be (07), and for the Ack messages should be (03)
- SBE: For New Order message, field Free text is incorrectly indicated as having possible number of repeating groups: 0, 1. Correct number of possible number of repeating groups for this are 0,1 or 2
- SBE & FIX: In the specifications field *EMM* (tag 20020) is incorrectly identified as Optional in the **Mass Cancel** (13) / (FIX q) message, however this field is mandatory.
- SBE & FIX: **Kill** (05) / (FIX 8) messages for cancellation of orders that result following a Mass Cancel (13) / (FIX q) message is considered to be unsolicited, and will not provide a *Client Order ID / ClOrdID* (tag 11)
- FIX: Description of conditions in which *ClientIdentificationShortCode* is mandatory is missing the case of Account Type being RO. (complete list of account types in which this condition applies is Client, RO or DEA.)
- FIX: In the description of field *PostingAction* (tag 7443) please disregard text in the description concerning the first characters ("*The first character will be used to indicate whether this field is being actively used or not (1 = Actively Used; 0 = Field Not Used)*"). This practice applies to SBE only. The first character in FIX represents the leg of the trade, and should be populated with values indicating the posting action: 0 means Open and 1 means Close.
- FIX: For identification of *ClientIdentificationShortCode*, in case client is also flagged as DEA it is identified that the short code should be provided using the NestedParties group. However the specifications should indicate that to indicate DEA client should set field *OrderOrigination* (tag 1724) to value 5, and provide a Client Short code, with one of the possible combinations identified in the various cases, including AGGR and PNAL, which are provided using the OrderAttributeGrp group
- FIX: For identification of *ClientIdentificationShortCode*, when clients provide this data using the NestedParties group it is identified that the first instance represents the buys side, and the second represents the sell side. This rule applies equivalently to the provision of the Client Short code information using the OrderAttributeGrp repeating group.
- SBE & FIX: In rare cases where due to technical issue Exchange didn't send out expiration messages for Day orders, such messages may be resent during the next trading session upon client's reconnection. If such messages were sent by the exchange at the end of the session, while client was disconnected, such messages wouldn't be resent.
- SBE & FIX: Conditions of the field *Disclosed Quantity / DisplayQty* (tag 1138) are missing clarification that if upon entry an Iceberg order immediately matches, its acknowledgement message will contain the disclosed quantity that is adjusted for the amount that has matched

4.2 WARRANTS & CERTIFICATES SPECIFIC

- SBE & FIX: Contrary to what is identified for management of Order IDs and modification of Clearing data for the quotes:
 - When a new quote is entered on at least one side, (as such exchange will assign a new Order ID to at least one side of a quote,) Clearing data will be updated for both sides of the quote
 - Removal of only one side of a quote will lead attribution of a new Order ID upon submission of new quantity on this side; and thus will lead of an update of the Clearing data for both sides of the quotes
 - As previously specified, full matching on one side of a quote will not lead to a new attribution of Order ID upon submission of new quantity on this side; thus in case of refill of quantity Clearing data will not be updated

4.3 ERROR CODE LIST

- In release of the Error code list document in April, the error code 5002, which stands for “System Unavailable”, was incorrectly updated by a different text “Suspend has failed”. Error code for the “Suspend has failed” will be remove, and System Unavailable will continue being represented by error code 5002
- In case clients receive error code 402 for TCS specific messages, this is due to a technical issue in TCS. In this case clients should contact the Euronext Market Services for further assistance.

4.4 TCS SPECIFIC MESSAGES

- SBE: **DeclarationCancelandRefusal** (43) message is missing *Symbol Index* and *EMM* fields in the specifications document, which are correctly present in the SBE template. These fields should be provided via OEG in the associated SBE messages.
- FIX: Fields *VWAPBegTime* (10026) and *VWAPEndTime* (10027) are shown with a different format than the one in section "format" and should be updated. Format of fields of type UTCTimestamp should have format YYYYMMDD-HH:MM:SS.ssssssss
- FIX: *NestedPartyID* (tag 524) field used for purpose of providing Clearing Firm ID and Counter Party ID are restricted in size to 8 characters, while the field provided for it allows for up to 11 characters, in order to accommodate other data managed through this repeating group. Clients are advised to provide this information with only up to 8 character long values, otherwise the message is rejected. Please note, for the Clearing Firm ID this is already identified in the conditions for overall FIX specifications, but is missing in the document for FIX messages.
- SBE: If a TCS specific message is technically incorrect (e.g. a Mandatory value is missing) the messages will be rejected with a standard SBE **Reject** (07) message.
- SBE: In case a logical access is not setup for TCS, the message used to respond is **Technical Reject** (108) with all optional and conditional fields not provided, and error code 1149 “Unknown message”.
 - In FIX such messages are responded to **Reject** (3) message, with field *SessionRejectReason* (tag 373) set to value 11 = Invalid MsgType
- In case of rejection of declarations in TCS due to breach of Double Volume Cap (DVC) the error code sent to the client does not correspond to this reason. Error code sent is 234, which represents “PRICE EXCEEDS SPREAD”.
- SBE: In field *MiFID Indicators* value 4 = Deferral Indicator is still flagged in the specifications as to be used for future use, but is now available for use via OEG in TCS messages.

- FIX: Table below provides conditions for the fields indicated as Conditional or Optional in the outbound AR message and for which conditions are missing in the TCS specifications. Other Conditional or Optional fields that have conditions explaining their presence are not listed in the table.

Tag	Field	Description	Conditions
552	NoSides	Number of sides.	In outbound TradeCaptureReportAck (AR) messages provided when TrdRptStatus (939) is one of the following values: 10 = Verified, 19 = Filled or 18 = Pre-Matched.
1	Account	Account Number. Client account number identifying the investor's account. This field is part of the clearing aggregate.	In outbound TradeCaptureReportAck (AR) messages provided only to the sender, and only if originally provided by the client in the Inbound message, and when TrdRptStatus (939) is one of the following values: 19 = Filled or 18 = Pre-Matched.
6399	AccountCode	Indicates the account type for which the order is entered. For example, an order can be entered for a client account, a house account or a liquidity provider account.	In outbound TradeCaptureReportAck (AR) messages provided when TrdRptStatus (939) is one of the following values: 10 = Verified, 19 = Filled or 18 = Pre-Matched.
29	LastCapacity	MiFID II field that indicates whether the order submission results from trading as matched principal, on own account or as any other capacity.	In outbound TradeCaptureReportAck (AR) messages provided when TrdRptStatus (939) is one of the following values: 19 = Filled or 18 = Pre-Matched.
58	Text	Free Text is manually entered by the trader issuing the order. This field is part of the clearing aggregate.	In outbound TradeCaptureReportAck (AR) messages provided only to the sender, and only if originally provided by the client in the Inbound message, and when TrdRptStatus (939) is one of the following values: 19 = Filled or 18 = Pre-Matched.
20155	PrincipalCode	Identifies the beneficiary of the transaction when trading on behalf of another establishment.	In outbound TradeCaptureReportAck (AR) messages provided only to the sender, and only if originally provided by the client in the Inbound message, and when TrdRptStatus (939) is one of the following values: 19 = Filled or 18 = Pre-Matched.
53	Quantity	Number of traded or ordered units (to be calculated with Quantity Decimals).	In outbound TradeCaptureReportAck (AR) messages provided when TrdRptStatus (939) is one of the following values: 10 = Verified, 19 = Filled or 18 = Pre-Matched.
44	Price	Instrument price per quantity unit (to be calculated with Price/Index Level Decimals).	In outbound TradeCaptureReportAck (AR) messages provided only when TrdType is different from '1003' AND when TrdRptStatus (939) is one of the following values: 10 = Verified, 19 = Filled or 18 = Pre-Matched.
453	NoPartyIDs	Number of PartyID entries.	In outbound TradeCaptureReportAck (AR) messages provided only to indicate the combination of fields indicating the CounterParty ID, when it is applicable, and when TrdRptStatus (939) is set to: 10 = Verified, 19 = Filled or 18 = Pre-Matched.
448	PartyID	Party identifier/code. See PartyIDSource (447) and PartyRole (452).	In outbound TradeCaptureReportAck (AR) messages provided only to indicate the combination of fields indicating the CounterParty ID, when it is applicable, and when TrdRptStatus (939) is set to: 10 = Verified, 19 = Filled or 18 = Pre-Matched.
447	PartyIDSource	Source of PartyID value.	In outbound TradeCaptureReportAck (AR) messages provided only to indicate the combination of fields indicating the CounterParty ID, when it is applicable, and when TrdRptStatus (939) is set to: 10 = Verified, 19 = Filled or 18 = Pre-Matched.
452	PartyRole	Identifies the type or role of the PartyID (448) specified.	In outbound TradeCaptureReportAck (AR) messages provided only to indicate the combination of fields indicating the CounterParty ID, when it is applicable, and when TrdRptStatus (939) is set to: 10 = Verified, 19 = Filled or 18 = Pre-Matched.

2376	PartyRoleQualifier	Used to further qualify the value of PartyRole (452).	In outbound TradeCaptureReportAck (AR) messages provided only to indicate the combination of fields indicating the CounterParty ID, when it is applicable, and when TrdRptStatus (939) is set to: 10 = Verified, 19 = Filled or 18 = Pre-Matched.
539	NoNestedPartyIDs	Number of NestedPartyID entries.	In outbound TradeCaptureReportAck (AR) messages provided only to indicate the combination of fields indicating the Clearing Firm ID AND only when it is provided in the original message sent by the client, and when TrdRptStatus (939) is set to: 19 = Filled or 18 = Pre-Matched.
524	NestedPartyID	Party identifier/code. See NestedPartyIDSource (525) and NestedPartyRole (538).	In outbound TradeCaptureReportAck (AR) messages provided only to indicate the combination of fields indicating the Clearing Firm ID AND only when it is provided in the original message sent by the client, and when TrdRptStatus (939) is set to: 19 = Filled or 18 = Pre-Matched.
525	NestedPartyIDSource	Source of NestedPartyID value.	In outbound TradeCaptureReportAck (AR) messages provided only to indicate the combination of fields indicating the Clearing Firm ID AND only when it is provided in the original message sent by the client, and when TrdRptStatus (939) is set to: 19 = Filled or 18 = Pre-Matched.
538	NestedPartyRole	Identifies the type or role of the NestedPartyID (524) specified.	In outbound TradeCaptureReportAck (AR) messages provided only to indicate the combination of fields indicating the Clearing Firm ID AND only when it is provided in the original message sent by the client, and when TrdRptStatus (939) is set to: 19 = Filled or 18 = Pre-Matched.
2384	NestedPartyRoleQualifier	Used to further qualify the value of NestedPartyRole (538).	In outbound TradeCaptureReportAck (AR) messages provided only to indicate the combination of fields indicating the Clearing Firm ID AND only when it is provided in the original message sent by the client, and when TrdRptStatus (939) is set to: 19 = Filled or 18 = Pre-Matched.
10026	VWAPBegTime	Start time for the Volume Weight Average price computation period.	In outbound TradeCaptureReportAck (AR) messages provided only if TrdType (828) is set to 51 = Volume weighted average trade; field was provided in the original inbound message; AND only when it is provided in the original message sent by the client, and when TrdRptStatus (939) is set to: 19 = Filled or 18 = Pre-Matched.
10027	VWAPEndTime	End time for the Volume Weight Average price computation period.	In outbound TradeCaptureReportAck (AR) messages provided only if TrdType (828) is set to 51 = Volume weighted average trade; field was provided in the original inbound message; AND only when it is provided in the original message sent by the client, and when TrdRptStatus (939) is set to: 19 = Filled or 18 = Pre-Matched.
9952	PreviousDayFlag	Flag indicator whether declaration matched at D or D-1. (0: [indicated as False] means "matched at D" ; 1: [indicated as True] means "matched at D-1")	In outbound TradeCaptureReportAck (AR) provided only when TrdRptStatus (939) is set to: 19 = Filled or 18 = Pre-Matched.
137	MiscFeeAmt	Miscellaneous Fee Value. Total order fees related to the funds share creation or redemption applied by the Asset Manager per order.	In outbound TradeCaptureReportAck (AR) provided only for Fund related transactions, and when TrdRptStatus (939) is set to: 19 = Filled or 18 = Pre-Matched.
21068	CentralisationDate	Cut-off for the trading cycle / session on the Euronext Funds Service	Not provided in outbound messages

1003	TradeID	The unique ID assigned by the matching engine to the trade entity, once it is received or matched.	<p>In outbound TradeCaptureReportAck (AR) message,</p> <ul style="list-style-type: none"> • in case of a declaration acknowledgment or notice it provides the identifier of the declaration. • in case of a declaration cancel and refusal it provides the identifier of the declaration refused/to be cancelled • in case of a functional rejection of a message by TCS this field is not provided <p>In inbound TradeCaptureReport (AE) message, provided by the client requesting cancellation of a previously matched declaration.</p>
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4.5 FOR OPTIQ OEG THROTTLING MECHANISM - FUNCTIONALITY DESCRIPTION

- Section “2.3.5 Behaviour for Excessive Breaches of Rate” states *In case client’s connection continuously breaches their limits... such connections will be disconnected*
The notion of “continuously” breaches is incorrect. Clients will be immediately disconnected upon going over of the Excessive Breach of rate limits.

4.6 FOR OPTIQ HIGH AVAILABILITY & BUSINESS CONTINUITY FUNCTIONAL OVERVIEW

- Section “3.1.1.5 Detecting Duplicates in COB messages” doesn’t sufficiently address detection of duplicates for multiple modification / replacement messages. In this case clients are advised to add the Client Order ID to differentiate multiple modification messages for the same order
- For requests impacting multiple instruments or orders (e.g. Mass Cancel) that are sent on the multi-partition segment (i.e. Equities) clients should take into consideration the behaviour associated to one of the partitions failing over. In case one of the partitions is failing over, the request impacting multiple instruments or orders, sent from another partition will not send back the associated acknowledgement or kill messages from the partition failing over. If client receives Synchronization Time 51 / (FIX U51) messages, this indicates failover of a partition has occurred and the partition is once again available, and client may try re-sending the message (e.g. Mass cancel) to the affected partition.
- Notes for member recovery (in case of client disconnection) and High Availability (HA) for TCS specific messages
 - In case of client re-connection or late connection during the session, as well as in case of HA event - all messages from TCS that were sent while client wasn’t connected, and are part of the message sequence range requested by client upon logon will be sent together with all the other OEG message, intermixed with the COB messages, in the order they were issued by COB and TCS.
 - In case of HA event TCS messages are not taken into consideration by the **Synchronization Time** (51) / (FIX U51) messages. Any messages processed and stored by TCS are re-sent, and unlike the COB messages, clients must not eliminate TCS messages that are not in line with the timestamp provided in these messages.
 - FIX: In case of client recovery, either due to client’s disconnection, late connection or OEG failover, OEG messages from TCS that normally do not contain a value in the field *TradeReportID* (tag 571) may be filled with zero (0).
- Notes on Disaster Recovery for TCS specific messages
 - Following a DR event, when client connects to the DR instance, similarly to HA all messages from TCS that were stored by TCS, and are part of the message sequence range requested by client upon logon, will be sent to client’s connection, together with all the other OEG message, intermixed with the COB messages, in the order they were issued by COB and TCS.

- In rare cases, when connecting to the DR it is possible that the OEG re-sends to the member a TCS Declaration from the Production queue, that wasn't stored in the DR instance. As such that declaration no longer exists.
- For TCS **Synchronization Time** (51) / (FIX U51) messages are not sent, and TCS messages are not taken into consideration when generating these synchronization time messages. As such, for ensure complete resynchronization for TCS message, clients are advised to use Market data retransmitted from DR to resynchronize their TCS declarations, or contact Euronext Market Services for more information.

4.7 LUXSE SPECIFIC CLARIFICATIONS

- LuxSE referential contains instruments for which no private messages could be submitted via an OEG. Such instruments are set with the *EMM* value of 99 = Not Applicable (For indices and iNAV)

5. LIST OF KNOWN DEFECTS

5.1 OEG / ME: ALL SEGMENTS

- In FIX, **Reject** (3) doesn't provide the *RefTagID* (tag 371) when sent in the field *SoftwareProvider* (tag: 21050) values out of range
- In FIX, in case of incorrectly formatted **Logon** (A) message, that either doesn't contain or has invalid data in the mandatory *EncryptMethod* (tag 98) or *BodyLength* (tag 9), this message is not replied to but if a correctly formatted Logon (A) message is sent immediately after - it will be rejected.
It is expected that this issue doesn't occur in Production, as all clients must pass conformance which includes verification of correct sending of administrative messages.
- Stop market orders submitted with a trigger price of zero are not rejected by the OEG. However such orders would never be triggered and as such won't participate in matching. Clients may modify the stop trigger price after submission, but this may result in missed triggering / matching opportunities.
- In the acknowledgement of New order messages the field *Ack Qualifier* (tag 21014) is not providing correctly the queuing indicator. Value in position 1 = Queue Indicator is always set to 0 (No).
- In case an order is modified from any validity (Time In Force) into IOC or FOK, and if this order partially matches, the remaining quantity is not killed. Clients are advised not to perform such modifications, and if required, to cancel the original order, and submit a new order with required validity for IOC or FOK.
- In FIX, following modification of an order that hasn't traded, clients may receive unexpected values in fields *CumQty* (tag 14) and *LeaveQty* (tag 151). In this case clients can rely on the field *OrderQty* (tag 38) which contains the correct quantity of the order.
- SBE & FIX: In the specific case described below, the first acknowledgement message for the re-fill of an Iceberg order contain incorrect value in the field *Ack Phase* (tag 21013). Instead of providing value 1 (Continuous) message indicates value 7 (Suspended).
The case where this occurs is as follows: An Iceberg order enters the book during continuous phase and then before matching the book state of the instrument changes to Suspended. Upon re-opening of the book this order matches, and receives a re-fill acknowledgement message. If there are multiple re-fill messages for this Iceberg order, only the first one contains the incorrect Ack Phase value.

5.2 OEG / ME: WARRANTS & CERTIFICATES SPECIFIC

- In case a new mass **Quote** (08) / (FIX i) message is sent by a client immediately before an HA event, this message will not be acknowledged upon completion of failover. If there are Fill or Kill messages associated to this quote, they may be sent after the failover.
In this case clients may not have the Order ID and need to associate these messages as follows:
 - a) for Kill messages - use the instrument specified in the message
 - b) for Fill messages - use the instrument and price in the message.
- On the Warrants segment for RFE driven instruments modification of Iceberg orders is not taken into consideration upon triggering of an RFE period.
- On the Warrants segment, Rejection of a cancel or modification sent for an unknown order is sent with the field *OrderID* set to zero (0) in place of the incorrect value provided in the client's message. Clients should rely on the Client Order ID to match the rejection to the originally sent message.

5.3 MDG

- In MDG Full Trade Information messages some fields (e.g. Notional Amount) are set with "-" for Cash instruments.
- In a rare case when an Iceberg order is partially filled following re-opening after suspension or reservation, which causes a Stop order to be triggered, and then these two orders (an Iceberg and the triggered Stop) match against each other, then the field Quantity, in the MDG Market Update message is displaying the largest possible value of the field. At the moment of matching this Market update message is for BBO, however this value may remain incorrect for this limit for the rest of the session.

5.4 DROP COPY

- In Drop copy, fields related to the clearing, often identified as "clearing aggregate" when not filled in within the OEG messages may result in unexpected data being provided in these fields in Drop Copy.
- In Drop copy, for orders with validity GTD [represented by field Time in Force (FIX tag 59) set to 6 = Good till Date (GTD)], field *ExpireDate* (tag 432) is not provided, in all states of the order (new, modified, cancelled).
- In Drop copy, **ExecutionReport** (8) messages sent for New orders contain the following defects:
 - a) Incorrect values when sending back the ExecutionWithinFirmShortCode combination in Parties repeat group
 - b) Is missing short codes for ClientIdentificationShortCode and InvestmentDecisionwithinShortCode that should be provided via the NestedParties repeating group
 - c) Field *MinQty* (tag 110) is are not populated
- In Drop Copy, cancellation of trade sent via **ExecutionReport** (8) contains the following defects:
 - a) Doesn't contain a value in the field *ExecRefID* (tag 19). As a workaround clients may use the value in field *ExecID* (tag 17). In case of Cancellation of Trade this field contains the same value as the one that should be provided in field *ExecRefID*, which identifies the ID of the trade being cancelled. The *ExecID* is unique per instrument and per day and is the unique identifier of a trade per instrument.
 - b) Provides incorrect values when sending back the ExecutionWithinFirmShortCode combination in Parties repeat group
 - c) Is missing field / field combinations listed below:
 - i) Short codes for ClientIdentificationShortCode and InvestmentDecisionwithinShortCode that should be provided via the NestedParties repeating group
 - ii) *TradeType* (tag 21010)
 - iii) *TradingSessionID* (tag 336)
 - iv) *Account* (tag 1)

5.5 TCS SPECIFIC

- SBE & FIX: OEG messages sent to cancel previously Filled declarations or Cross orders are not acknowledged or rejected by TCS. Client should contact Euronext Market Services if requiring cancelling such declarations.
- In FIX, for TCS specific **Trade Capture Report Ack** (AR) messages, contain fields that are part of the *NestedPartiesGroup* with unexpected values. This combination of fields contains values that are indicative of the Clearing Firm ID, and is populated when this data isn't provided in the inbound message.

- In SBE, the **DeclarationNotice** (42) message sent for Fill of a TCS VWAP transaction, contains values in the fields *Start Time Vwap* and *End Time Vwap* are provided in format HHMMSS, which doesn't comply with the specifications.

5.6 HIGH AVAILABILITY (HA)

- In some cases, following an HA event, **Synchronization Time** (51) / (FIX U51) messages may be sent twice for the same synchronization id. While the message sending times and sequence numbers are different, they indicate the same *lastBookInTime* for the concerned *ResynchronizationID*. Clients are advised to ignore duplicate messages.
- On the Equities segment, which uses multiple cross-linked partitions, if client submits a message targeting an instrument or order hosted on a partition which is experiencing HA event, the responding rejection message provides error code 3013 (Invalid Symbol Index). Clients will receive **Synchronization time** (51) / (FIX U51) messages when the partition experiencing failover becomes available. Synchronization ID within these messages can be used to identify which partition is failed over.

APPENDIX A: REVISION HISTORY

SUMMARY OF CHANGES

Version	Change Description
1.0	Optiq detailed information on scope and services for the full cash markets migration to Production

DOCUMENT HISTORY

REVISION NO.	DATE	AUTHOR	CHANGE DESCRIPTION
1.0	June 2017	Euronext	Optiq detailed information on scope and services for the full cash markets migration to Production