Luxembourg Stock ExchangeCash Market – Optiq MDG Client Specifications

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2.0.0

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137

PREFACE

PURPOSE

The purpose of this document is to describe all the specifications of Optiq™ Market Data Gateway.

TARGET AUDIENCE

This document must be read by Luxembourg Stock Exchangeclients developing a Market Data Feed Handler.

SCOPE

The scope of this document is listed below (✓ In scope, ✘ Out of scope):

Products	
Equities	✓
Funds	✘
Fixed Income	✓
Warrants and Certificates	✓
Options	✘
Futures	✘
Commodities	✘
Indices	✓
Trade Reporting and Publication	✘

ASSOCIATED DOCUMENTS

Please read the following documents along with these specifications:

Title	Description
Euronext Cash Market – Optiq Kinematics Specifications	Description of the message kinematics for Cash
Euronext Cash and Derivatives - File Specifications	Description of the files for Cash and Derivatives
Euronext Optiq™ Market Data Gateway Production Environment	Description of the Production feed configuration
Euronext Optiq™ Market Data Gateway External User acceptance Environment	Description of the External User Acceptance feed configuration

Please visit www.euronext.com/optiq.

SUPPORT

Optiq Support Desk

Tel: +33 1 70 48 25 55

Email: optiq@euronext.com

WHAT'S NEW?

The following lists only the most recent modifications made to this version. For the Document History table see the Document History in appendix.

Version	Date	Change Description
2.0.0	19 Mar 2018	**First draft version**

CONTENTS

1. LUXEMBOURG STOCK EXCHANGE OPTIQ MARKET DATA GATEWAY SOLUTION

1.1 INTRODUCTION

The Luxembourg Stock Exchange Optiq Market Data Gateway (MDG) provides high-speed, real-time market data for Luxembourg Stock Exchange markets.

The data feed has the following high-level features:

- **Multicast technology**
- **Ultra-low latency**
- **MiFID II compliance**
- **Optimized feed for each type of connectivity**
- **High availability**
- **Reliable network solution**
- **High level of scalability**

This document provides detailed information about the features of the feed to support the development of client applications.

1.2 MIFID II

Markets in Financial Instruments Directive 2 (MiFID II) is a European Commission set of new regulations to reduce systemic risk and guarantee more transparency for clients.

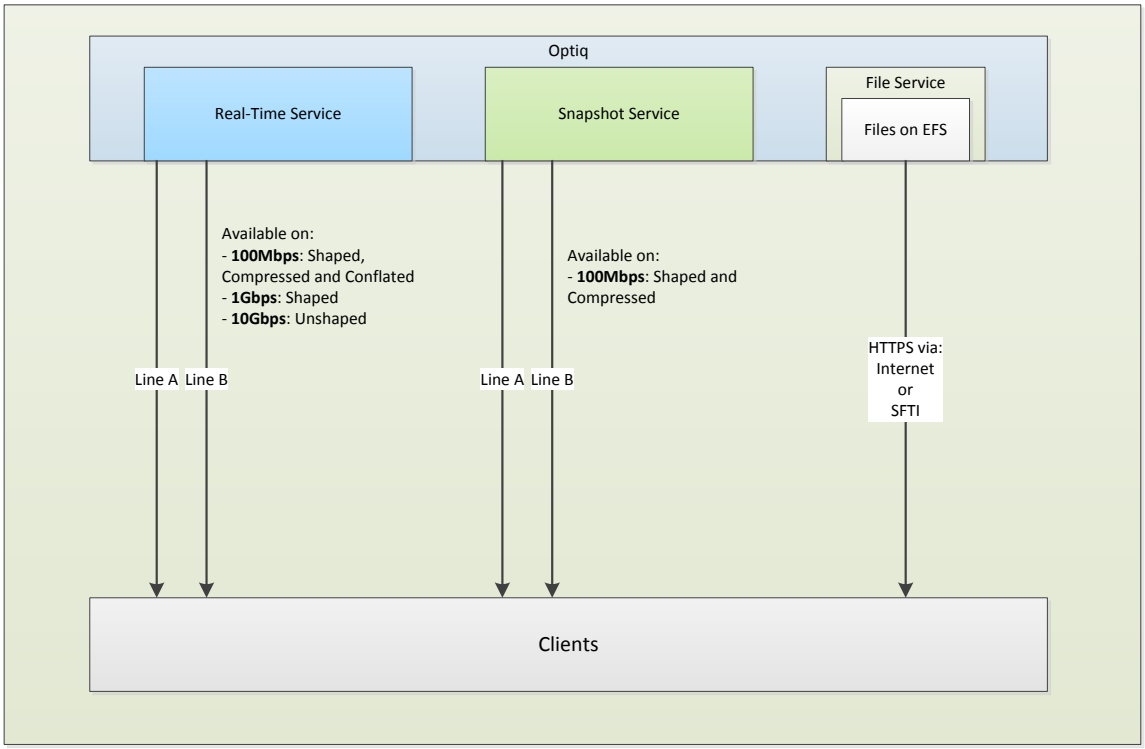
Luxembourg Stock Exchange Market Data Gateway is MiFID II compliant by offering:

- **Market Data channel disaggregation** Each multicast channel published by MDG is disaggregated as follows: asset class, currency and country. Additionally, there are dedicated channels for pre-trade and post-trade.
- **Higher Transparency** The Full Trade Information message (1004) delivered by Optiq MDG will carry MMT Trade flags and other fields as required by MiFID II.

2. MARKET DATA CHANNELS

2.1 ACCESS TO MARKET DATA

The following diagram presents the Optiq MDG services:



Clients access Market Data as follows:

- **Real-Time service** Clients connect to multicast UDP/IP channels to receive Market Data messages in real-time
- **Snapshot service** Clients connect to multicast UDP/IP channels to receive unsolicited Snapshots sent periodically on dedicated multicast channels to recover from packet loss or for intraday starts.
- **File service** Clients connect to a file server
  - Every morning to download XML files containing static and daily data (Standing Data, Timetables, Tick Tables, XML SBE template, Pattern IDs and Feed Configurations)
  - During the trading day to download the Full Trade Information files containing all the trades of the day

Market Data are available in the following modes:

- **Shaped** Allow optimized emission of Market Data with low latency, optimized bandwidth use and packet loss prevention (service available on the 100 Mbps and 1 Gbps lines)
- **Compressed** Messages are compressed in order to reduce the use of bandwidth (available on 100 Mbps lines)

Other methods could be available in the future upon performance analysis study.

Two recovery mechanisms are available:

- **Line arbitration** Identical packets are sent on two lines (line A and line B). Clients are strongly invited to use this first recovery mechanism in case of message loss
- **Snapshot service** If messages are lost on both lines or if a client connects intra-day

2.2 MESSAGING PROTOCOL AND PUBLISHING MODEL

Real-time and Snapshot Market Data are message-based over the UDP/IP protocol with SBE (Simple Binary Encoding).

This binary encoding is optimized for low latency encoding and decoding while keeping bandwidth utilization reasonably small, and is used across all asset classes.

The process of subscribing to a multicast group ID is also known as “joining” a multicast group. Upon session termination, the member’s host system should issue an “unjoin” message. This will terminate delivery of data to that local host network. If a client application terminates without issuing an “unjoin” message, the network will eventually issue a “timeout” for the multicast group subscription that will automatically terminate delivery of the multicast packets to the local host network.

The “join” and “unjoin” processes are standard functions. No specific instructions are provided here, as they are specific to the user’s operating system and programming language.

2.3 TYPE OF MARKET DATA CHANNELS

2.3.1 Market Data Channels

Luxembourg Stock Exchange offers real-time and snapshot Market Data through different channels that clients can subscribe to. Each channel is linked to a unique IP multicast group address and a unique port.

- **Real-time or Snapshot** Real-time and snapshot messages are sent through different channels
- **Types of data:**
  - Full Order Book Market Update (FBMU) channel provides full order book depth and BBO using the Market Update message.
  - Full Order Book Order Update (FBOU) channel provides full order book depth using the Order Update message and BBO with Market Update.
  - Best Bid and Offer (BBBO) channel will only provide the best limits when they are updated.

- Reference Data and Full Trade Information channel (REFT) provides all instrument characteristics, scheduled phases, market administration messages and MiFID II compliant trade messages. Index messages are included in this channel only for Luxembourg Stock Exchange (LuxSE).
- Reference Data and Index Package channel (REFI) provides all instrument characteristics, scheduled phases, market administration messages and Index messages.

- **Shaping** Channels are either unshaped, shaped to 1 Gbps or shaped to 100 Mbps.
- **Scalability** For performance reasons, a channel can be split into several channels. It is also possible for an instrument to move from one channel to another, although intraday changes will not occur.

2.3.2 Client Connectivity

The subscription to a set of channels depends on the type of client connectivity. For example, if a client has a 100 Mbps line, then he cannot subscribe to the shaped BBO channels, which are only available on 1 Gbps lines. Conversely, a client with a 1 Gbps line can subscribe to all available channels like the Full Order Book channels (shaped (1 Gbps)) as well as to the compressed and shaped channels (100 Mbps).

2.3.3 Market Data Messages per Channel

Optiq MDG will provide the Full Order Book (FOB) in two different ways based on instrument type:

- **Market by Order** The Order Update (1002) message will be disseminated for each new order, modification or cancellation, and is available for Cash Equities, ETF's and Fixed Income.
- **Market by Limit** Aggregated price limits are published using the Market Update (1001) message, and are available for Warrants & Certificates, BoB, Equity, Index/Currency and Commodity Derivatives.

The following table provides an overview of all Optiq MDG messages. The aim is to provide a better understanding of the message types per channel table.

Message Name	Message type	Description
Start Of Day	1101	First message of the day sent by the Market Data Gateway
End Of Day	1102	Last message of the day sent by the Market Data Gateway
Health Status	1103	Heartbeat message sent at regular intervals throughout the day
Technical Notification	1106	Informs on the start or end retransmission
Timetable	1006	Scheduled Trading Mode and Phase Types for each instrument
Market Status Change	1005	Indicates the change in the state of an instrument (either scheduled or manually processed)
Standing Data	1007	Provides characteristics for all instruments on Cash
Market Update	1001	Provides information generated by market events, including limit updates and trades
Order Update	1002	Indicates new orders, modifications, cancellations or retransmissions
Price Update	1003	Provides all updated reference prices

Message Name	Message type	Description
Full Trade Information	1004	Contains trade information, including all MiFID II regulatory fields
Real Time Index	1008	Provides all Index-related statistics
Statistics	1009	Provides statistics on prices and volumes on an instrument
Index Summary	1011	Provides index level summaries in closing phases
Start Of Snapshot	2101	Identifies the beginning of a snapshot sequence
End Of Snapshot	2102	Identifies the end of a snapshot sequence

The following table explains which message types are available for each real-time channel:

2.3.3.1 Real Time Channels for Cash

This is composed of: Luxembourg Stock Exchange (LuxSE).

	1 Gbps Shaped		100 Mbps Shaped, Compressed and Conflated		
	Pre-Trade				Post-Trade
	Full Order Book Order Update	Full Order Book Market Update	Full Order Book Order Update	Full Order Book Market Update	Reference Data[1] and Full Trade Information
Start Of Day (1101)	X	X	X	X	X
End Of Day (1102)	X	X	X	X	X
Health Status (1103)	X	X	X	X	X
Technical Notification (1106)	X	X	X	X	X
Timetable (1006)					X
Market Status Change (1005)	X	X	X	X	
Standing Data (1007)					X
Market Update (1001)	X[2]	X	X[2]	X	
Order Update (1002)	X		X		
Price Update (1003)	X[3]	X[3]	X[3]	X[3]	X[4]
Full Trade Information (1004)					X
Real Time Index (1008)					X
Statistics (1009)					X
Index Summary (1011)					X

[1] Reference Data represents: all instruments characteristics, scheduled phases and market administration messages.

[2] This message will not provide: New Bid (3)/New Offer (4), Updated Bid (5) /Updated Offer (6), New Bid With Liquidity Provider (58)/New Offer With Liquidity Provider (59), Updated Bid With Liquidity Provider(60)/ Updated Offer With Liquidity Provider (61), New Bid RLP (Retail Liquidity Provider) (16)/ New Offer RLP (Retail Liquidity Provider) (17) and Updated Bid RLP Retail Liquidity Provider) (18)/ Updated Offer RLP (Retail Liquidity Provider) (19).

[3] This message will only provide: Indicative Matching Price (14)

[4] This message will **not** provide: Indicative Matching Price (14)

2.3.3.2 Snapshot Channels for Cash

This is composed of: Luxembourg Stock Exchange (LuxSE).

	Compressed and Shaped		
	100 Mbps		
	Full Order Book Order Update	Full Order Book Market Update	Reference Data[1] and Full Trade Information
Start Of Day (1101)	X	X	X
End Of Day (1102)	X	X	X
Health Status (1103)	X	X	X
Start Of Snapshot (2101)	X	X	X
End Of Snapshot (2102)	X	X	X
Technical Notification (1106)			
Timetable (1006)			X
Market Status Change (1005)	X	X	
Standing Data (1007)			X
Market Update (1001)	X[2]	X	
Order Update (1002)	X		
Price Update (1003)	X[3]	X[3]	X[4]
Full Trade Information (1004)			X
Real Time Index (1008)			X
Statistics (1009)			X
Index Summary (1011)			X

[1] Reference Data represents: all instruments characteristics, scheduled phases and market administration messages.
[2] This message will not provide: New Bid (3)/New Offer (4), Updated Bid (5) /Updated Offer (6), New Bid With Liquidity Provider (58)/New Offer With Liquidity Provider (59), Updated Bid With Liquidity Provider(60)/ Updated Offer With Liquidity Provider (61), New Bid RLP (Retail Liquidity Provider) (16)/ New Offer RLP (Retail Liquidity Provider) (17) and Updated Bid RLP Retail Liquidity Provider) (18)/ Updated Offer RLP (Retail Liquidity Provider) (19).
[3] This message will only provide: Indicative Matching Price (14)
[4] This message will **not** provide: Indicative Matching Price (14)

3. MARKET DATA GATEWAY FEATURES

3.1 START AND END OF DAY

"Start Of Day" (1101) messages are sent on each channel once the Market Data Gateway starts. These messages will be sent periodically until another MDG message is sent on any channel of an aggregator (please refer to The Market Data Sequence Number paragraph for aggregator description). After the Start of Day messages, the "Health Status" messages (1103) will be sent periodically.

This mechanism guarantees that "Start Of Day" (1101) messages are the first messages sent by MDG.

At end of day, MDG will stop sending messages (including "Health Status" (1103)) and will periodically send "End Of Day" (1102) messages during a specified period before shutting down.

3.2 BOOK RETRANSMISSION

Retransmission is the process used by the Market Data Gateway to retransmit data in real-time to ensure trades and full book consistency. This is used each day to retransmit order books at the start of the day but can also be used intraday to recover from an Exchange failure.

3.2.1 Clear the Book

Before any market retransmission, Optiq MDG will send a clear book request.

- For the first clear book, at the beginning of the day, customers are expected to clear any stored information for any Market Data Update Type received the previous day.
- For any intraday clear book request, customers are expected to clear only the Market Data Update Types related to the specific order book, listed below, and keep all other Market Data Update Type unchanged.

  1 - Best Bid (Cash and Derivatives)
  2 - Best Offer (Cash and Derivatives)
  3 - New Bid (Cash and Derivatives)
  4 - New Offer (Cash and Derivatives)
  5 - Updated Bid (Cash and Derivatives)
  6 - Updated Offer (Cash and Derivatives)
  14 - High Dynamic Collar (Cash Only)
  15 - Low Dynamic Collar (Cash Only)
  58 - New Bid With Liquidity Provider (Cash Only)
  59 - New Offer With Liquidity Provider (Cash Only)
  60 - Updated Bid With Liquidity Provider (Cash Only)
  61 - Updated Offer With Liquidity Provider (Cash Only)
  63 - Low Static Collar (Cash Only)
  64 - High Static Collar (Cash Only)
  70 - Low LP Collar (Cash Only)

71 - High LP Collar (Cash Only)

- For market by orders, clients will receive an Order Update (1002) with Market Data Action Type set to "3 - Deletion of all orders for the given instrument", quantity set to '0' (zero) and all other fields set to null according to the SBE protocol.

3.2.2 Book Retransmission

Book retransmission consists of resubmitting the depth of the book on real-time channels. This book retransmission occurs:

- Every morning at the start of the day.
- Intraday to recover in case of MDG message loss.

3.2.2.1 Morning Book Retransmission

Morning book retransmission is not harmonized between cash and derivatives since, in phase 2, they are not using the same matching engine.

For cash:

The broadcasting sequence is the following:

For each instrument:

1. Clear Book on Order Update (1002)
   - Market Data Action Type: 3 - Deletion of all orders for the given instrument
   - Rebroadcast Indicator: 0
2. Clear Book on Market Update (1001)
   - Market Data Update Type: 254 – Clear Book
   - Rebroadcast Indicator: 0
3. Price Update (1003)
   - Market Data Price Type: 12 = Adjusted Closing Price
   - Rebroadcast Indicator: 0
4. Full depth book in Order Update (1002)
   - Market Data Action Type: 5 - Retransmission of all orders for the given instrument
   - Rebroadcast Indicator: 1
5. BBO in Market Update (1001)
   - Market Data Update Type: 1 - Best Bid and 2 - Best Offer
   - Rebroadcast Indicator: 1
6. Full depth book in Market Update (1001)
   - Market Data Update Type: 3 - New Bid and 4 - New Offer
   - Rebroadcast Indicator: 1
7. Collars in Market Update (1001)
   - Market Data Update Type: 3 - New Bid and 4 - New Offer
   - Rebroadcast Indicator: 1
8. Technical Notification (1106)
   - Technical Notification Type: 3 – Instrument Book Retransmission End
   - Rebroadcast Indicator: 1

3.2.2.2 Intraday Book Retransmission

In case of HA, a Market Update (1001) or Order Update (1002) message will be sent for each instrument, respectively filled with Market Data Update Type = “254 - Clear Book” or Market Data Action Type = “3 - Deletion of all orders for the given instrument”. Then the full book depth will be resent with “Rebroadcast Indicator” set to “1”.

For Market Update messages (1001): limits will be aggregated and the Market Data Update Type field will be “5 - Updated Bid” or “6 - Updated Offer” (or “Updated Bid/Offer RLP” etc.).

For Order Update messages (1002): each order will be resent with Market Data Action Type = “5 - Retransmission of all orders for the given instrument”.

3.3 SNAPSHOTS

Snapshot is a service providing an image of the market data at a giving time of the day to allow clients to recover from packet loss or for intraday starts. Customers can ‘hop on’ (connect) and ‘hop off’ the Snapshot multicast channels as needed.

Each real time channel has a matching snapshot channel. Real time channels giving the same information through different bandwidth speed share the same snapshot channel. An image contains all instruments broadcasted on this channel.

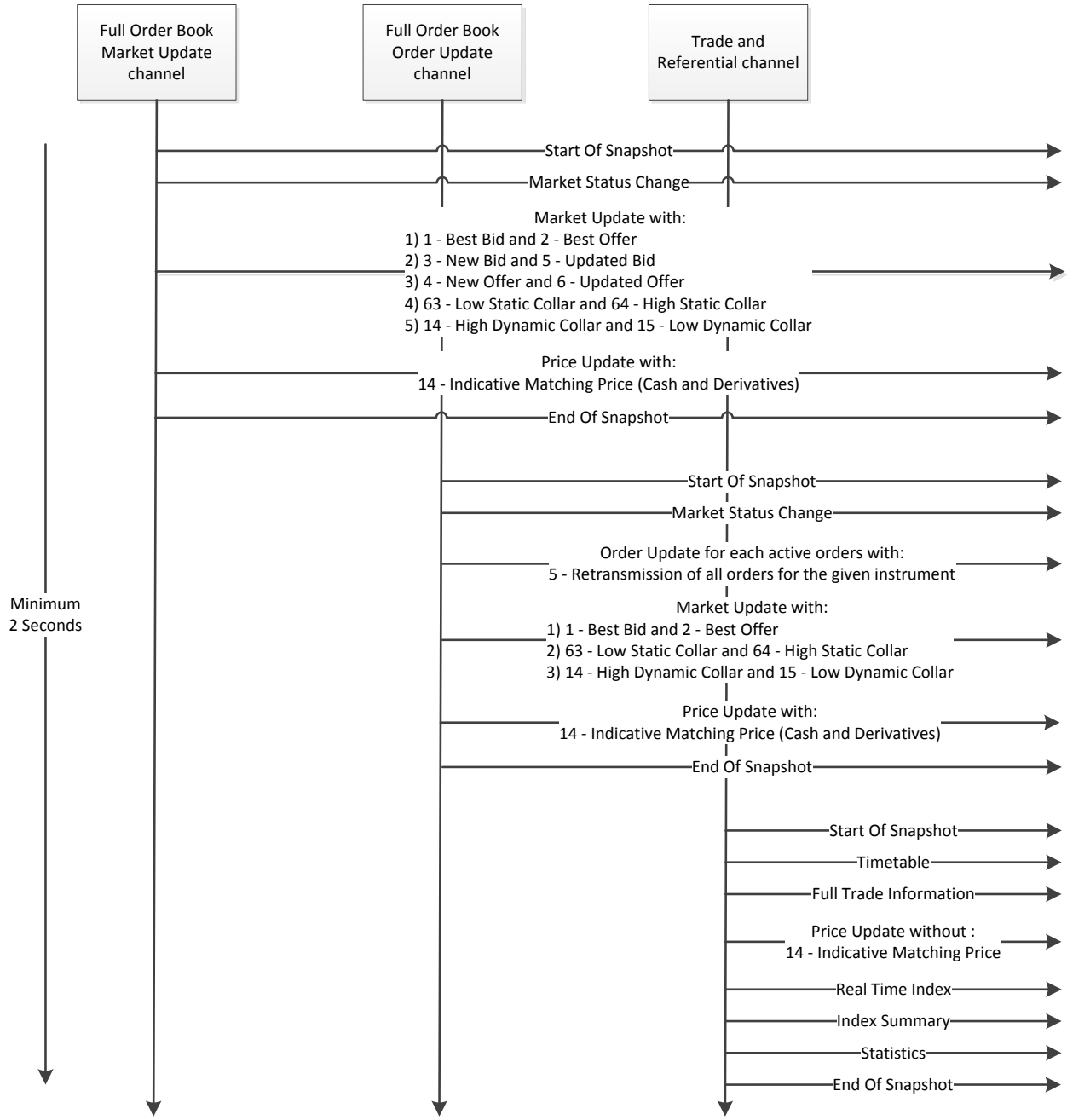
An image sent in the snapshot is linked to real time with the Last Market Data Sequence Number from the real time channel.

This broadcasted image of all channels of an aggregator (see section on Market Data Sequence Number) is a snapshot sequence and cannot be sent more than 1 every 2 seconds. The order of each channel images in a snapshot sequence is fixed for a day but can change from 1 day to another.

They will use the same messages as real time messages with Rebroadcast indicator set to “1”.

Here are the snapshot sequences for Cash, Derivatives, Indices and Best of Book (BoB).

- Snapshot sequence for Cash (Warrants excluded):



Both “Start Of Snapshot” and “End Of Snapshot” messages contain the last “Market Data Sequence Number” of the last real-time message taken into account by the snapshot (see Sequence Numbers and Snapshot Sequence behaviour for explanations on the “Market Data Sequence Number”). This last MDSN has been sent on each channel speed.

In the 2 following situations:

- Late connection to the exchange
- Loss of packets on both lines A and B

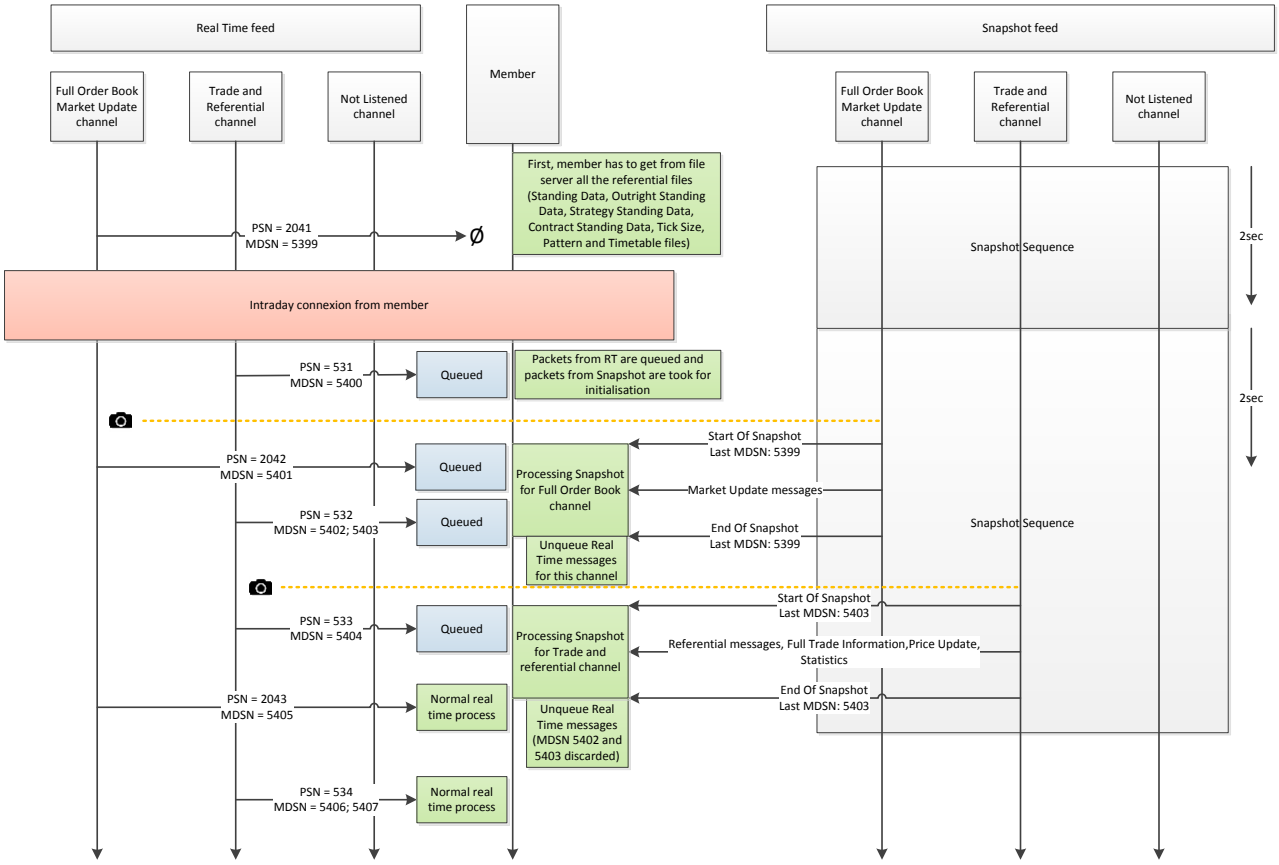
Members have to process as follow:

- Clear all the market data sent on this channel.
- Listen to the real time channel and start queuing all messages.
- Identify the lowest MDSN from real time feed.
- Wait for a Start Of Snapshot with a “Last Market Data Sequence Number” that is higher or equal to the MDSN identified just before on real time. Otherwise the Snapshot might not contain all the missing messages.
- Listen to the entire snapshot image until the End Of Snapshot.
- Discard all the real time messages with a MDSN lower or equal than the Last Market Data Sequence Number of the Start or End Of Snapshot message.
- Integrate all the remaining real time messages into the snapshot image.
- Keep listening real time as normal.

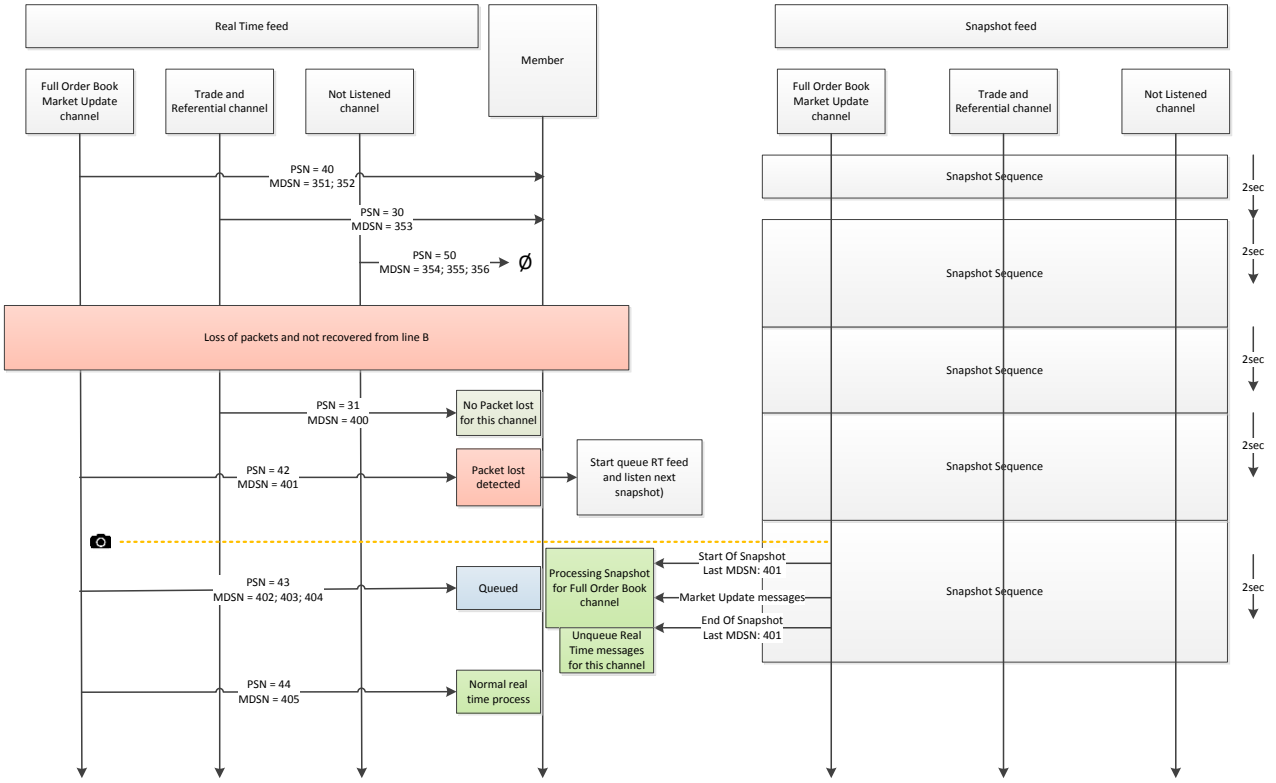
If in the snapshot a packet is missing, then try to get this packet from the second line. If it has not been retrieve with the second line then use the next snapshot for this channel.

It is important to note that since the Market Data Sequence Number of snapshot channels does not necessarily increment by 1, the sequence number in the start or end snapshot messages might belong to another channel, and was in fact not actually lost. In order to correctly identify which packets are indeed lost, please refer to section Gap Detection and Line Arbitration.

- Example of a late connection to the exchange:



- Example of a packet loss:



- How to use information type

MDG offers another mechanism in the snapshot to resynchronize only for a subset of the information whatever the Symbol Index.

These information are functionally gathered into information type:

- For Market Update, the information types are BBO, Full Depth and Collars (Please refer to the table below in this section to have all the Market Data Update Type for each Information Type)
- For the other messages, every message type is in a single information type (ex: all the order update messages are in the information type “Order Update”)

For example, if members are only interested into the information type BBO and they have lost a packet in the real-time and they have to use the snapshot to recover, they can detect if the lost packet was containing BBO information.

To do so, members have to look at the Market Data Sequence Number (MDSN) of snapshotted messages. If for one information type, the MDSN in a snapshot message is lower or equals to the MDSN of a message received in real time (for this information type), it means that no messages have been lost for this information type.

The following table provides the exact mapping between Market Data Update Types and Information Types.

Market Data Update Type	Information Type
1 - Best Bid (Cash and Derivatives)	BBO
2 - Best Offer (Cash and Derivatives)	
3 - New Bid (Cash and Derivatives)	Full Depth
4 - New Offer (Cash and Derivatives)	
5 - Updated Bid (Cash and Derivatives)	
6 - Updated Offer (Cash and Derivatives)	
14 - High Dynamic Collar (Cash Only)	Collars
15 - Low Dynamic Collar (Cash Only)	
63 - Low Static Collar (Cash Only)	
64 - High Static Collar (Cash Only)	
70 - Low LP Collar (Cash Only)	
71 - High LP Collar (Cash Only)	

Members that connect late just have to take the full snapshot and synchronize with real-time.

Example 1:

If members have the following from the real time:
MDSN for BBO = 98
MDSN for Full Depth = 80
MDSN for Collars = 45

And if in snapshot the Last Market Data Sequence Number is 100 with:
MDSN for BBO = 100 (meaning all the Market Data Update Type with a value that matches BBO Information Type have a MDSN equal to 100)
MDSN for Full Depth = 80
MDSN for Collars = 45

It means that members need to recover all the BBO Information Type but not Full Depth and Collars.

Example 2:

If the last MSC message sent had MDSN 80, then all MSC messages in snapshot have MDSN 80

Example 3:

If the last Best Bid sent has MDSN 1000 in the real-time channel, then all Market Update message for Best Bid and Best Ask updates (types 1 and 2) will have MDSN 1000 in the snapshot too.

3.4 CONFLATION

Performance analysis studies will be conducted in order to assess the need and the type of bandwidth optimization.

3.5 COMPRESSION

Optiq MDG will use LZ4 compression in block mode with no headers. It will be available for real-time market data used on low bandwidth connections (100Mbps) and for all snapshots. Only the body of the Market Data packets will be compressed, excluding the packet header. It should be noted that a compressed market data packet can contain several different messages, which are all compressed into a single packet.

On compressed channels, it is possible to have compressed and uncompressed packets. The compression flag in the packet header defines if the packet is compressed or not.

The maximum extracted packet size cannot be greater than 8192 bytes.

Please see Appendix A: Disclaimers for LZ4 disclaimers.

3.6 SHAPING

■ Optiq MDG Traffic Shaping

Optiq MDG Traffic shaping is used for 1Gbps connections on real-time market data and for 100Mbps connections on real-time and snapshot market data. Traffic shaping by Optiq MDG is used to:

- Optimize the use of available bandwidth on 1 Gbps and 100 Mbps connections
- Prevent packet loss: Optiq MDG will keep track of what is being sent out per millisecond and will use this information to guarantee packets will be sent respecting the available bandwidth
- Guarantee performance available on 1 Gbps and 100 Mbps connections
- Minimize latency

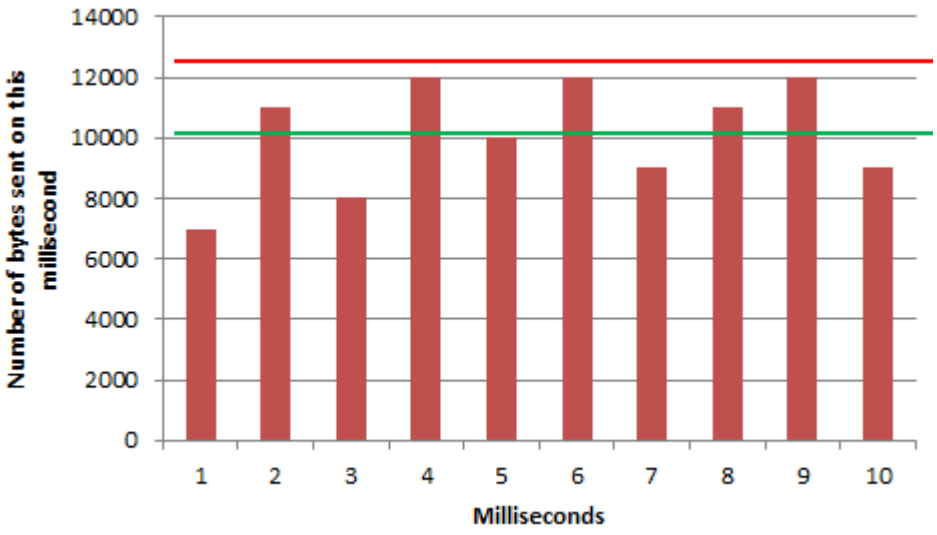
The following simplified examples illustrate how a shaped channel behaves when no shaping happens and in case of shaping.

This shows the number of bytes to emit for each millisecond. Hence on a 100Mbps channel, we have a maximum bandwidth capacity per millisecond of 12 500 bytes (100 000 000 bits / 8 (to get bytes) / 1 000 (to get milliseconds)).

With the following set of data (no shaping):

Millisecond number	Number of bytes to send on this millisecond	Remaining from previous millisecond
1	7 000.00	0
2	11 000.00	0
3	8 000.00	0
4	12 000.00	0
5	10 000.00	0
6	12 000.00	0
7	9 000.00	0
8	11 000.00	0
9	12 000.00	0
10	9 000.00	0

We have this in the feed:



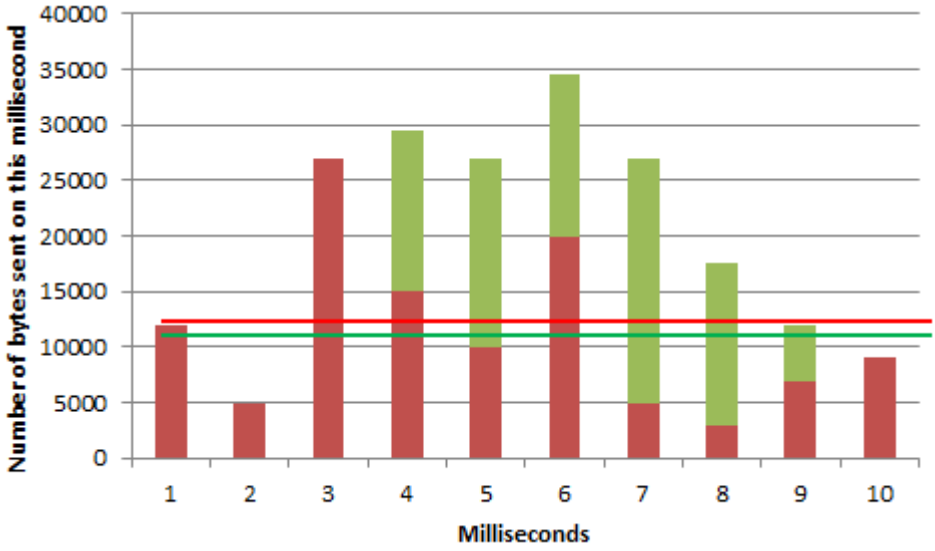
We can see that nothing uses more than the bandwidth acceptance (red line) and the average use of the bandwidth (green line) is lower (10 100 bytes per millisecond).

Now if we take the following set of data (shaping):

Millisecond number	Number of bytes to send on this millisecond	Remaining from previous millisecond
1	12 000.00	0
2	5 000.00	0

3	27 000.00	0
4	15 000.00	14 500.00
5	10 000.00	17 000.00
6	20 000.00	14 500.00
7	5 000.00	22 000.00
8	3 000.00	14 500.00
9	7 000.00	5 000.00
10	9 000.00	0

We will have shaping:



In green the packet that will be sent the next millisecond since it was not possible to send it immediately.

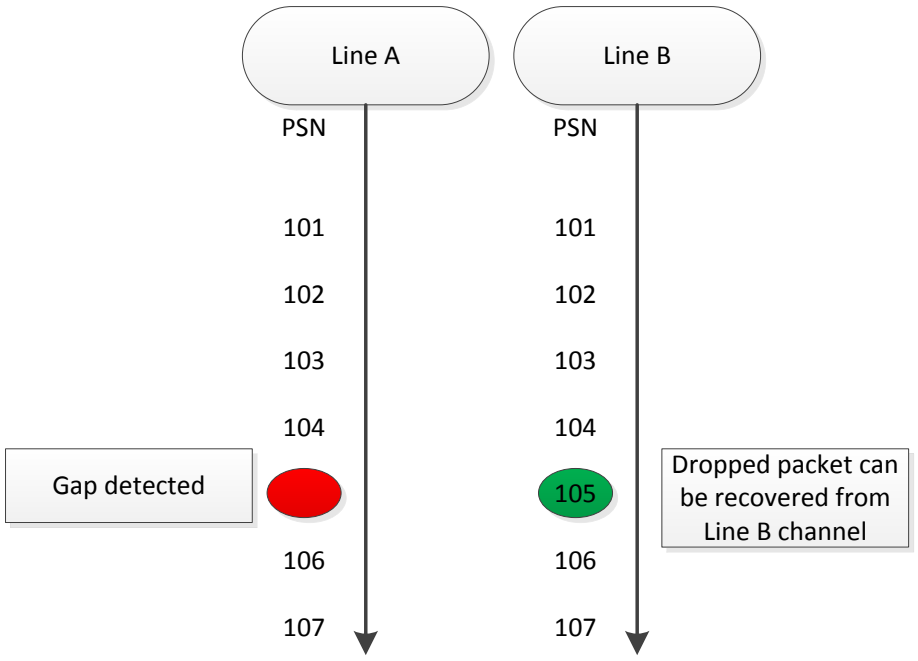
Hence on the feed the emission will be the following for this second:

Millisecond number	Bandwidth use per millisecond
1	12 000.00
2	5 000.00
3	12 500.00
4	12 500.00
5	12 500.00
6	12 500.00
7	12 500.00

8	12 500.00
9	12 000.00
10	9 000.00

3.7 GAP DETECTION AND LINE ARBITRATION

The Packet Sequence Number (please see Market Data Packet Header) should be used to detect gaps in the transmission of packets.



Using this method, a lost packet can be recovered from the second line. In case of packet loss on both lines, then the snapshot mechanism should be used.

UDP packets can potentially arrive unordered and potentially sent twice. As such, systems should be able to reorder the packets and detect duplicate packets.

3.8 SYSTEM FAILURES

- High Availability

The High Availability (HA) functionality of Optiq MDG is set up to ensure that there is no loss of service during an outage on the primary publisher, such as a hardware failure. Failover to a secondary publisher can be identified by the change of sequence in the Packet headers (the Packet Sequence Number restarts

to “1” and bits between 1 and 3 in the “Packet Flags” field increase by “1”. Keep in mind that these 3 bits can overflow and it will result with a “0” again). The HA failover is designed to be as transparent as possible, and multicast groups and ports will not change. However, there are specific details that must be considered.

When a market data source restarts and is not able to keep its sequential behaviour, the Market Data Gateway initiates a new start sequence for this source. The Market Data Gateway then sends an order book retransmission sequence, and a list of corrected trades asynchronously inside the real-time channel used for trades. These messages are flagged as a retransmission (rebroadcast Indicator set to “1”).

As the system is asynchronous, some trades might be lost in case of a matching engine failure. Therefore, the trade retransmission should be used to update the status of each trade that is resent, to complete trades not already taken into account, and even in certain cases, to indicate that some trades should be removed.

Please refer to Book and Trades Retransmission to have all details on how are retransmitted books and trades.

- Disaster Recovery Site

In order to mitigate any serious outage in the primary data centre, a secondary data centre is online in standby mode.

Clients should ensure that all configurations surrounding the secondary data centre are included, as described in the Optiq™ Market Data Gateway Production or External User Acceptance Environment document.

- Client System Failure

Real-time and snapshot market data will be available on two different multicast groups, and will allow clients the possibility to set up more than one receiving system processing the same data. In case of client system failure, the backup client system should continue to process the real-time and snapshot data sent on the second multicast group.

3.9 TRADE RETRANSMISSION

Trade retransmission will only be used in case of internal MDG message loss and will be sent on the real-time channels. The retransmission will always start with the “Technical Notification” message (1106) with “Technical Notification Type”: “Trade Retransmission Start” (10) and contains the “Retransmission Start Time” and the “Retransmission End Time” fields. These times define a time window: all trades previously received with an “Event time” included in this time window must be considered invalid. A new “Full Trade Information” message (1004) with the “Rebroadcast Indicator” field set to “1” will be sent. The trade retransmission ends with the “Technical Notification” message (1106) and “Technical Notification Type”: “Trade Retransmission End” (11).

Note: if for a time window that contains trade(s) on real-time feed but no "Full Trade Information" (1004) are rebroadcasted in between the "Technical Notification" (1106) messages, then members have to remove the trade(s) received in real-time.

3.10 HEALTH STATUS MECHANISM

The Health Status messages will be broadcasted on all channels repeatedly during the day, from the time the Standing Data messages are broadcasted until the End of Day messages are sent. The Market Data Sequence Number for this message will be the last Market Data Sequence Number of the message sent by the aggregator of this channel (please be advised that this message can have been sent on another channel managed by this aggregator).

Please for aggregators and detailed description, refer to: the Market Data Sequence Number.

For Snapshot, please refer to: Technical messages in Snapshot channels.

3.11 PRODUCTION TIMETABLE

The **Timetable** is an overview of the events during a trading day that impact market data activity. Clients should also refer to the "Timetable" message (1006) specifications for full details.

Event	Time (CET) for Cash	Comment
File Download (except for Indices)	2:00 am CET	Clients will connect via HTTPS to download: XML SBE templates, Standing Data files, Timetable files, Tick tables, Feed configuration files and Pattern ID files
Application start-up	2:00 am CET	Sending Start Of Day message (1101) and frequently repeated (with Rebroadcast Indicator set to "1") until the beginning of the Standing Data emission in the morning.
Standing Data and Timetables in the feed (except for Indices)	3:00 am CET	The Exchange will send Standing Data messages (1007) for each instrument and on all markets, followed by the Timetable message (1006) for Cash markets only.
Book Retransmission	4:00 am CET	Retransmission of books and associated messages from previous day. This will contain Market Update message (1001) or Order Update message (1002) and for some instruments the Price Update message (1003).
Indices files and messages sent	6:00 am CET	Clients will have access to Indices standing data on EFS and received them in the feed.
Broadcast Indices	7:00 am CET	Start of Indices emission in the feed.
Market Pre-Open Time	7:15 am CET	This is announced with a Market Status Change message (1005)

Event	Time (CET) for Cash	Comment
Market Open Time	Warrants and Certificates: 8:00 am CET All other cash: 9:00 am CET	This is the opening time as scheduled in the Timetable message (1006) and announced with a Market Status Change message (1005)
Market Closing Time	All except Warrants and Certificates: 5:40 pm CET Warrants and Certificates: 6:30 pm CET	It should be noted that the shutdown of the application depends on the dissemination of the Timetable (1006) and Market Status Changes message (1005). These two messages can provide scheduled or non-scheduled extended trading hours.
Optiq MDG system close	11:00 pm CET	The market closes on the End Of Day message (1102) emission. It will be sent for 15 minutes with snapshot messages. No other messages will follow for a given trading Day.

4. MESSAGING PROTOCOL

4.1 OVERVIEW

MDG messages will be sent within a Market Data Packet that will be broadcast using multicast UDP/IP standards. A Market Data Packet will be composed of N complete messages. A single message will never spread across multiple packets.

The maximum length of a packet is 1400 bytes and does not include UDP/IP protocol fields.

Each message is enriched with a "Frame" field followed by a SBE header. The "Frame" field contains the length of the message including the length of the "Frame" and "SBE header" fields. The following diagram shows the structure of a packet:

<table>
<tr><td colspan="11">IP</td></tr>
<tr><td rowspan="4">Header IP</td><td colspan="10">UDP</td></tr>
<tr><td rowspan="3">Header UDP</td><td colspan="9">Packet</td></tr>
<tr><td rowspan="3">Market Data Packet Header</td><td colspan="8">SBE Message Structure</td></tr>
<tr><td colspan="7">1st Message</td><td>Next Message(s)</td></tr>
<tr><td rowspan="2">Frame</td><td rowspan="2">SBE Header</td><td rowspan="2">Block</td><td colspan="4">Repeating Section 1</td><td>...</td></tr>
<tr><td>Repeating Section Header</td><td>Rep. Sec. 1.a</td><td>Rep. Sec. 1.b</td><td>...</td><td>Rep. Sec. 1.n</td><td>...</td></tr>
<tr><td>n bytes</td><td>8 bytes</td><td>16 bytes</td><td>2 bytes</td><td>8 bytes</td><td>n bytes</td><td>2 bytes</td><td>x_1 bytes</td><td>x_1 bytes</td><td>...</td><td>x_1 bytes</td><td>...</td></tr>
</table>

Client applications should check that the length of the Market Data Packet (indicated in the UDP datagram) matches $16\ bytes\ (Packet\ Header\ size) + \sum message\ size\ (indicated\ in\ the\ Frame\ field)$. If not, then the packet should be considered corrupted.

A message can contain n repeating sections for a trading event but clients should not base algorithms on repeating sections since these repeating sections can also be in n messages.

4.2 MARKET DATA PACKET HEADER

The packet header is described below:

Field	Description	Length	Values
Packet Time	Time when the packet is pushed to the clients (Time in number of nanoseconds since 01/01/1970 UTC).	8 bytes	From 0 to 2^64-1

Packet Sequence Number (PSN)	Each channel has its own PSN sequence. Starting from 1 at every MDG start and increasing by step of 1. In case of overflow (over 4.2 billon) Packet Flags will increase for bits 4-6. With this mechanism the PSN has 35 bits available.	4 bytes	From 0 to 2^32-1
Packet Flags	Used to flag information: - Bit 0: Compression - 0 = body of the packet is not compressed (the body is the packet without the packet header) - 1 = body of the packet is compressed - Bit 1 to 3: will be set to 0 every morning and incremented for each restart of MDG in the same day (wrapping to 0 if the field overflows) - Bit 4 to 6: used if the Packet Sequence Number (PSN) goes over (2^32)-1. They are PSN high weight bits - Bit 7: is set to 1 when in the packet there is a Start Of Snapshot (2101) message, 0 otherwise - Bit 8: is set to 1 when in the packet there is a End Of Snapshot (2102) message, 0 otherwise - Bit 9: is set to 1 when in the packet there is a Health Status (1103) message, Start Of Day (1101) message or End Of Day (1102) message, 0 otherwise - Bit 10 to 15: for future use.	2 bytes	From 0 to 2^16-1
Channel ID	Identifies the channel.	2 bytes	From 0 to 2^16-1

Client applications should check that the length of the Market Data Packet Body matches the sum of message sizes (indicated in the Frame field). If not, then the packet has to be considered corrupted.

The Market Data Packet Body size is also the:

- UDP datagram payload size minus 16 bytes for Packet Header size
- Uncompressed body size if the packet was compressed

Note: The Packet Header will not be compressed in compressed messages.

4.3 SBE MESSAGE STRUCTURE

A Market Data message is composed of the following parts:

SBE Message Structure								
Frame	SBE Header	Block	Repeating Section 1					...
			Repeating Section Header	Rep. Sec. 1.a	Rep. Sec. 1.b	...	Rep. Sec. 1.n	...
2 bytes	8 bytes	n bytes	2 bytes	x_1 bytes	x_1 bytes	...	x_1 bytes	...

The maximum length of a message is 1384 bytes (maximum packet length (1400 bytes) minus the packet header length (16 bytes)).

The SBE Header is defined as follows:

Field	Description	Length	Values
Block Length	Length of the block. The Block is the message without the repeating sections. This is useful for new message versions in case the exchange adds fields at the end of the block. Clients will be able to process the block fields and identify where the repeating sections starts.	2 bytes	From 0 to 2^16-2
Template ID	Identifier of the message template. This is the **message type** of the Market Data messages.	2 bytes	From 0 to 2^16-2
Schema ID	Identifier of the message schema that contains the template. Used to differentiate exchange Specifications.	2 bytes	From 0 to 2^16-2
Schema version	Version of the message schema in which the message is defined. Used to add messages and/or modify some others.	2 bytes	From 0 to 2^16-2

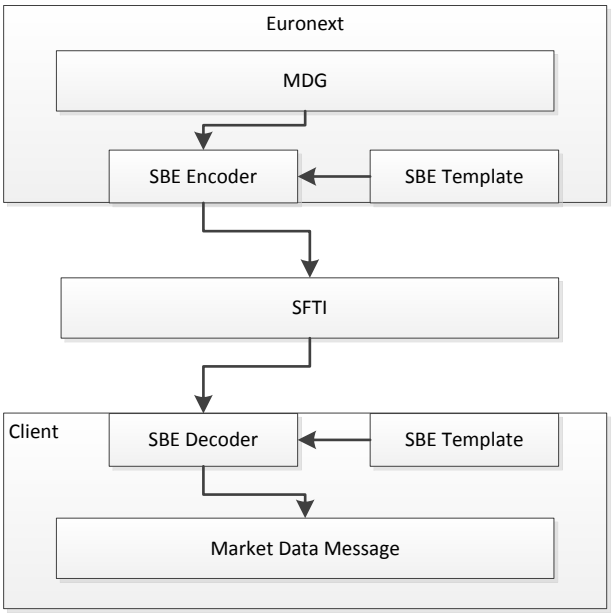
The Repeating Section Header is defined as follows:

Field	Description	Length	Values
Repeating section header	Defines how many times the repeating section is repeated and the length in bytes of a repeating section. It is set to “0” if there is no repeating section.	2 bytes (the first byte for the length and the second byte for the count)	From 0 to 254 for both

A Schema ID is composed of Template IDs (or message types) and each Template ID has its own Schema version (message version).

Please note that the SBE Header and Repeated Section Header must be present on the wire for each message (SBE Repeated Section Header only for messages that have a repeated section), but for readability purpose it is not represented in the message structures in this document.

The Exchange provides SBE Template XML files that contain all message types supported by MDG. Client systems can decode SBE messages from MDG using the schema and template files as below:



4.4 SBE BACKWARD AND FORWARD COMPATIBILITY

The aim of backward and forward SBE compatibility is to allow members to choose to update to the latest SBE version or remain in previous versions.

To do so, the main element is the SBE version provided in SBE Template file. This SBE version is in the attribute: “version”. In addition, each changes on message, field or possible value (for enumerated or bitmap) in the SBE Template file, are flagged with attributes:

- sinceVersion for additions
- deprecated for removals

Each above attributes will be set with the value of the SBE version when the change occurred. So their value cannot be greater than the SBE version.

It is crucial for members to check for each new SBE Template if the compatibility is insured and until which version in order to update if necessary.

These compatibilities are not insured for:

- New field added wherever except the end of the block or the repeated section
- Existing field length changed
- Field, message or possible value name changed
- For enumerated field, if the value is changed (example: in field “EMM”, value Not Applicable changes from 254 to 99)

The following describes the mechanism for each compatibility:

- New field compatibility

Consider SBE version is set to 5.

If in a message a field has been added at the end of the block and before the repeated section with “sinceVersion = 5” then members that are not interesting by this new field can ignore it.

To ignore it, members are using the SBE Version 4 (or lower) that has not this new field. Therefore, the block length in the SBE header does not include the field added in version 5. Then SBE Decoder when processing the new message will process all fields inside the block length in SBE version 4 and ignore the new fields in version 5 to continue processing the message with the repeated section header.

Same logic is used for field added at the end of the repeated section. The length of the repeated section is in the Repeated Section Header and it is not the same size between version 4 and 5.

- New possible value compatibility

If a new possible value is added in SBE version 5, it will be flagged with “sinceVersion = 5”. Members that are not interested by this new possible value will potentially receive this new value but will have to define a specific behaviour. They can for example ignore it.

- New message compatibility

In case a new message is created and until the member wants to use it by updating the SBE version, this message will be ignored.

- Removals

The field or message or possible value will still be sent with a coherent value in order to ensure the compatibility, and will be flagged with the attribute “deprecated”.

NOTE: In case exchange would break the SBE compatibility, client will be made aware in timely manner.

5. MESSAGE OVERVIEW

5.1 TECHNICAL FORMAT FIELDS

The field formats contained in the messages will adhere to these rules:

- Binary data are in Intel byte order (Little-Endian).
- All integers are unsigned numeric or signed binary using two's complement method.
- All message fields will be sent for every message. Only their value will be broadcasted (field names in this document are only for reference purpose).
- All field sizes are fixed and constant.
- Segmentation of messages across packets will not be supported, so a message will never straddle a packet boundary.
- Even if it is not always mandatory to be able to process last message version (Schema Version), it is mandatory to check each update for important or regulation updates.

If a mandatory field is received with a null value, then the member has to process this as an error.

NULL VALUES

- SBE allows optional fields with a null value. The applicable NULL value is defined in the SBE Template file. In message and field specifications, only the not null values are indicated in the "Values" column.
- All text fields (Text and Alphanumerical Id that have more than 1 character) have a specific null value that is not defined in SBE Template. This null value is binary 0 (/0) for each character.
- All "Alphanumerical ID" and "Text" fields are alphanumeric based on UTF-8, left aligned and null padded (\0).

Format fields	Description	Null value
Alphanumerical ID	String type identifying an element, left aligned and completed with null padding (\0).	Each character is a UTF-8 null code point (\0)
Amount	Signed or unsigned numerical field representing the price multiplied by the quantity. See the description in Price, Quantity, Ratio And Amount Formats.	Null value defined in SBE Template
Bitmap	Array of bits, each bit specifying whether an optional value is present (set to "1") or not (set to "0") (in Little-Endian). E.g. For the Trade Qualifier bitmap field if its bit in position zero (0) is set to one (1) then it defines the trade as an Uncrossing Trade. In the same time bit in position one (1) can also be set to one (1) which will in this case indicates that this is also a First Traded Price.	No null value
Boolean	This field acts as an enumerated field with the possible values 0 (false), 1 (true) or null value.	Null value defined in SBE Template
Date	Date of an event (in number of days since 01/01/1970 UTC - 01/01/1970 is the day "0").	Null value defined in SBE Template

Format fields	Description	Null value
Decimal Places	Number of decimals associated to a numerical field. See the description in Price, Quantity, Ratio And Amount Formats.	Null value defined in SBE Template
Enumerated	Information having a delimited set of possible values.	Null value defined in SBE Template Note: The null value here depends on the technical type which can be unsigned integer or character.
Epoch Time in Nanoseconds	UTC Timestamp indicating the number of nanoseconds since epoch (January the 1st 1970).	Null value defined in SBE Template
Integer Time in hhmmss	UTC Timestamp using an integer to define the time as hhmmss.	Null value defined in SBE Template
Intraday Time in Seconds	UTC Timestamp indicating the number of seconds since the beginning of the day.	Null value defined in SBE Template
Numerical	Generic numerical field on unsigned integer.	Null value defined in SBE Template
Numerical ID	Numerical field identifying an element.	Null value defined in SBE Template
Price	Signed numerical field representing a price. See the description in Price, Quantity, Ratio And Amount Formats.	Null value defined in SBE Template
Quantity	Unsigned numerical field representing a quantity of elements (for example a number of shares). See the description in Price, Quantity, Ratio And Amount Formats.	Null value defined in SBE Template
Sequence	See the description in §5.3 - Sequence Numbers.	Null value defined in SBE Template
Signed Numerical	Generic numerical field on signed integer.	Null value defined in SBE Template
Text	Text in UTF-8, left aligned and completed with null padding (\0).	Each character is a UTF-8 null code point (\0)

5.2 DATE AND TIME CONVENTIONS

Times and Timestamps are expressed in UTC (Universal Time, Coordinated) and are synchronised using Precision Time Protocol (PTP). They are defined in number of nanoseconds since 01/01/1970 UTC based on Unix Epoch or number of seconds since the beginning of the day.

Phase Time and Scheduled Event Time for cash are expressed in an unsigned integer 32 to define a time in hhmmss UTC. Thus this time is in the range 0 to 235 959. Each time 60 (seconds) is reached, it increments the hundreds by 1 and seconds are reset to 0. The same apply every 60 minutes (or for each increments of a second when we have 59 minutes and 59 seconds), it increments the 10 thousands by 1 and reset all the inferior figures to 0.

Example: if we have 25959 (2h 59m 59s), the next second will be 30000 (3h 0m 0s).

Dates are defined in number of days since 01/01/1970 UTC (01/01/1970 is the day “0”).

Dates and Times formatted for ESMA reporting (MiFID II) are defined with a 27 bytes character string following ISO 8601:

YYYY-MM-DDThh:mm:ss.ddddddZ.

Where:

- “YYYY” is the year.
- “MM” is the month.
- “DD” is the day.
- “T” is a constant letter used as a separator between “YYYY-MM-DD” and “hh:mm:ss.ddddddZ”.
- “hh” is the hour.
- “mm” is the minute.
- “ss.dddddd” is the second and its fraction of a second.
- “Z” is a constant letter standing for UTC time.

Note: Until the Optiq Matching Engine migration for Derivatives, timestamps will have a microsecond precision.

5.3 SEQUENCE NUMBERS

The feed contains two sequence numbers:

5.3.1 The Packet Sequence Number (PSN)

The Packet Sequence Number (PSN) is part of the packet header and should be used for UDP gap detection and packet ordering. Each channel has its own PSN sequence.

5.3.2 The Market Data Sequence Number

Aggregators are MDG internal components that are dealing with a set of channels. The Market Data Sequence Numbers are managed at the aggregator level. Each one of them has its own sequence, starting from 0 and incrementing by step of 1 along the day. Since clients may listen to only a subset of the channels managed by one aggregator, they won’t see all the Market Data Sequence Numbers in the messages they get from the channels they listen to. Therefore on one channel the Market Data Sequence Numbers will increment all along the day but not necessarily by step of 1.

The behaviour of the Market Data Sequence Numbers for the following messages is different. Please refer to their message definition for further explanations:

- “Start Of Day” (1101)

- "End Of Day" (1102)
- "Health Status" (1103)

Reminder: For gap detection: please use the Packet Sequence Number (PSN).

5.4 PRICE, QUANTITY, RATIO AND AMOUNT FORMATS

All prices must be processed with two values: the price value in an integer and its scale code. Each instrument must be linked to the associated Price / Index Level Decimals from the Standing Data message or file.

Prices must be calculated according to the following formula:

$$\text{Price} = \frac{Integer}{10^{\,Price/Index\ Level\ Decimals}}$$

For example, a price of 27.56 can be represented by an Integer of 275600 and a Price / Index Level Decimals of 4.

Only 2 prices are not using the generic field above: "Issue Price" and "Strike Price". Since these fields have decimals computed instrument per instrument, they have a dedicated decimal location field that are respectively: "Issue Price Decimals" and "Strike Price Decimals".

Note 1: The same mechanism is used for:

- All quantities with Quantity Decimals
- All ratios and percentages with Ratio / Multiplier Decimals
- All amounts with Amount Decimals

Note 2: Prices, quantities and amounts for MiFID 2 do not follow this Price / Index Level Decimals behaviour. The complete format is described in the Field Description.

5.5 INSTRUMENT TICKS

- For Cash instruments:

A Tick Size Index Identifier, within the Standing Data message (1007) and Cash Tick Size Referential File, will link the instrument to a tick table (only in file). This tick table gives a security the "Tick Size Index ID" to apply the base range of the entered price.

- For Derivatives instruments:

The Instrument Decimals Ratio field is a numeric value indicating how to convert a price, which is denoted in absolute number, to a displayable price. It represents the number of absolute ticks after a decimal point.

Note that Instrument Decimals Ratio and Instrument Tick Size are available in the Contract Standing Data message and in XML file.

The same logic applies on EDSP (Exchange Delivery Settlement Price) with the Instrument EDSP Tick Size and on the Settlement Prices (at maturity) with Instrument Settlement Tick Size.

5.6 INSTRUMENT IDENTIFIERS

An instrument is identified by its Symbol Index.

5.6.1 Symbol Index

The Symbol Index is assigned by the exchange and will not change over the lifetime of the instrument, nor used again after instrument expiration.

Any Corporate Action leading to a change of ISIN will lead to change of Symbol Index. These Corporate Actions are generally part of the mandatory reorganisation events; the most frequent ones being stock split, reverse stock split, change of name / denomination. However the ISIN change is not systematic and will be in any case communicated upfront through the Corporate Action notices.

The following rules apply to the Symbol Index:

Symbol Index value	Used for
From 1 to 99,999	Indices
From 100,000 to 1,109,999	Luxembourg Stock Exchange instruments
From 1,110,000 to 9,999,999	Cash
From 10,000,000 to 4,290,099,999	Derivatives

The standard security identifier (for example ISIN), mnemonic, tick size, instrument name and other instrument characteristics are carried only in the Standing Data message (1007), Outright Standing Data (1014), Strategy Standing Data (1012), Contract Standing Data (1013) and in the Standing Data files on servers. As such, the client applications must link the Symbol Index which is sent in all messages, with other instrument characteristics present in the Standing Data messages or files.

6. HOW TO …

6.1 … PROCESS CANCELLATIONS

6.1.1 Trade Cancellation

The trade will be cancelled with all the details of the trade in:

- Market Update (1001) message with Market Data Update Type “50 – Trade Cancellation”. It will not be possible from this message to make the link with the original trade.
- Full Trade Information (1004) with Trade Type “24 – Trade Cancellation” and MMT Modification Indicator “CANC – Trade Cancellation”. All other fields will be set with original trade details including the MiFID Execution Id field which allows client to easily identify the trade cancelled for this Symbol Index.

6.1.2 Order Cancellation with Order Update message

For an order deletion an Order Update (1002) message is sent with a Market Data Action type set to “2 - Deletion of order identified by Previous Priority” with the Previous Priority set to identify the order to remove from the book. Price and Order Priority will be set to the null value and quantity set to ‘0’. Order side and order type will be populated according to the deleted order.

6.1.3 Limit Cancellation with Market Update message

In the Market Update message, if there is no more volume for a given price, the limit will be updated with an “Updated Bid” or “Updated Ask” with the quantity set to ‘0’.

If the BBO has no more volume, then it will be updated with a “Best Bid” or “Best Offer” with quantity set to ‘0’. If the book side is empty, the BBO will be sent with Price set to null according to the SBE protocol and quantity ‘0’. It will be followed by a limit update with the price of the limit to update and quantity set to ‘0’.

6.2 … DETERMINE THE MESSAGE TYPE

Each message has a type that uniquely defines its structure and its content, and is represented by a numeric identifier. For example the message “Market Update” has the type “1001”. In the SBE message header the “Template ID” field contains this type (see SBE Message Structure).

6.3 … DETERMINE THE NUMBER OF REPEATING SECTIONS IN A MESSAGE

The number of repeating sections is defined in the second byte of the “Repeating Section Header” (see SBE Message Structure).

6.4 … DETERMINE THE LENGTH OF A PACKET

The length of the packet is set in the UDP header. It includes the UDP header length.

6.5 … DETERMINE THE LENGTH OF A MESSAGE

The length of a message (including the length of the “Frame” and “SBE header” fields) is in the field “Frame” (see 3.1 - Overview).

6.6 … MANAGE A NEW VERSION OF A MESSAGE IF THE CLIENT HAS NOT IMPLEMENTED THE NEW FIELDS

Please refer to the explanations in the paragraph SBE Backward and Forward Compatibility.

6.7 … LOOK FOR A TRADE

This is possible by checking in Full Trade Information message (1004) the MiFID Execution ID field. It is the association of Symbol Index, EMM and Execution ID completed with null on the right to complete until the 52 bytes of the field are filled.

6.8 … LOOK FOR AN ORDER

For a given Symbol Index and EMM, the order can be found using its Order Priority that uniquely identifies an order. This value is given in the “Ack” message sent by Order Entry Gateway (OEG).

Since updated orders might have a loss of priority, members have to use Previous Priority field to find the order in the book. Previous Priority, when set, has to be matched with Order Priority in the existing orders.

6.9 … RESYNCHRONIZE WITH SNAPSHOT AFTER PACKET LOSS

Please refer to the explanations on the Snapshot: Snapshots.

6.10 … MANAGE BBO

Best Bid and Offer (BBO) updates are sent with a price and a quantity to indicate the best limit on bid or offer side. When the Best Bid or Best Offer changes, a new Best Bid or Best Offer update is sent out and replaces the previous sent Best Bid or Best Offer. If a side of the book becomes empty, then a Best Bid or Best Offer is sent with quantity set to 0 and price set to null to clear the Best Bid or Best offer.

~~6.10~~6.11 … BUILD THE BOOK

Optiq Market Data provides market by limits (with Market Update messages (1001)) or by orders (with Order Update messages (1002)) depending on the instrument type.

- For markets built using aggregated limits (Market Update (1001)), clients have to order the limits by prices (only one price by line):
  - On a new bid or ask, clients must add the new limit
  - On an updated bid or ask, clients must update the current limit with the new limit. This update can be on the limit: type, quantity or number of order.
  - On a limit deletion, clients will receive an update with quantity set to '0' and the price matching the limit to delete.
- For markets built using Order Updates (1002), clients have to arrange each order by its Order Priority (The order with the lowest value of Order Priority has the highest priority):
  - On a New Order, clients must add the new order identified by its Order Priority
  - On an order modification with loss of priority, clients must remove the order identified by the Previous Priority and add a new order identified by its Order Priority.
  - On an order modification without loss of priority, clients must update the order identified by its Order Priority.
  - On an order cancelation, clients must remove the order identified by its Previous Priority.

Clients should not process both the BBO and limits to construct the book. If Best Bid and Offer updates are sent as a part of the same message, then they should be processed as one update to the BBO and not individually. Otherwise, the order book might appear crossed.

~~6.11~~6.12 … DETERMINE A CLOSING PRICE

The Closing Price is determined using the last trade price once the Phase Id becomes "Closed".

If no trade took place during the day, the Last Adjusted Closing Price should be used as the closing price. The Last Adjusted Closing Price is sent every morning in the reference data. It is the previous day's last trade price, adjusted for corporate events (if applicable).

7. MESSAGES

The message specification format is as follow:

Field	Description	Length
Block	The block is all the non-repeated fields.	Variable (in bytes)
Repeating section header	This is how many times the repeating section is repeated and the length of a repeating section. It will not been displayed in any below message. It is set to 0 if there is no repeating section.	2 bytes (1byte for the length 1byte for the count)
Repeating section	All the fields that are repeated. All these fields are in bold and green table borders	Variable (in bytes)

All field lengths are in bytes.

Field definition might not be exhaustive, please go to the Field Description section. Further details will be provided.

7.1 TECHNICAL MESSAGES

7.1.1 Start Of Day (1101)

These messages will be sent periodically until another MDG message is sent on any channel of an aggregator. After the Start of Day messages, the “Health Status” messages (1103) will be sent periodically.

This mechanism guarantees that “Start Of Day” (1101) messages are the really first messages sent by MDG.

Message Sending Rules:

“Start Of Day” (1101) messages are sent every 2 seconds on each channel once the Market Data Gateway starts.

Note:

- Start Of Day Market Data Sequence Number will always be set to "0".

Field	Short Description	Format	Len	Values	Presence	Page
Market Data Sequence Number	Assigned by MDG for each message. Each channel has its own Market Data Sequence Number sequence.	Sequence	8	From 0 to 2^64-2	Mandatory	95

Field	Short Description	Format	Len	Values	Presence	Page
Session Trading Day	Date of the current trading session (in number of days since the 1st of January 1970).	Date	2	From 0 to 2^16-2	Mandatory	120

7.1.2 End Of Day (1102)

"End Of Day" (1102) messages are sent at end of day to inform that MDG will shut down 15 minutes after the first "End Of Day" (1102) message is sent. During these 15 minutes, MDG will stop sending messages (including "Health Status" (1103)).

Message Sending Rules:

At the end of day, based on the production timetable, MDG will send "End Of Day" (1102) messages every 2 seconds during 15 minutes.

Note:

- The Market Data Sequence Number of all the "End Of Day" (1102) messages is the Market Data Sequence Number of the last message sent by the aggregator for this set of channels (be aware that this last message can have been sent on another channel managed by this aggregator).

Field	Short Description	Format	Len	Values	Presence	Page
Market Data Sequence Number	Assigned by MDG for each message. Each channel has its own Market Data Sequence Number sequence.	Sequence	8	From 0 to 2^64-2	Mandatory	95
Session Trading Day	Date of the current trading session (in number of days since the 1st of January 1970).	Date	2	From 0 to 2^16-2	Mandatory	120

7.1.3 Health Status (1103)

The Health Status messages are broadcasted on all channels repeatedly all along the day as soon as the Standing Data messages are broadcasted and until End of Day messages are broadcasted. The Market Data Sequence Number for this message will be the last Market Data Sequence Number of the message sent by the aggregator of this channel (be aware that this message can be sent on another channel managed by this aggregator).

The Event time indicates the time of the generation of the Health Status message.

This message is alone in the packet.

Message Sending Rules:

- Health Status are sent every 2 seconds even if there are market data messages sent on a channel.

Field	Short Description	Format	Len	Values	Presence	Page
Market Data Sequence Number	Assigned by MDG for each message. Each channel has its own Market Data Sequence Number sequence.	Sequence	8	From 0 to 2^64-2	Mandatory	95
Event Time	Time when an event has been processed (Time in number of nanoseconds since 01/01/1970 UTC).	Epoch Time in Nanoseconds	8	From 0 to 2^64-2	Mandatory	85

7.1.4 Technical Notification (1106)

Technical Notification message is used to notify the beginning of Start and End Retransmissions.

Message Sending Rules:

- At the end of each book retransmission on a single instrument (they start with a clear book request in Order Update or Market Update message). Field "Symbol Index" will have the value of the instrument book sent. "Retransmission Start Time" will be set to null.
- At the beginning and end of a trade retransmission, providing the time window to clear previous trades and to be replaced by the resubmitted trades. Field "Symbol Index" will be set to null.

Field	Short Description	Format	Len	Values	Presence	Page
Market Data Sequence Number	Assigned by MDG for each message. Each channel has its own Market Data Sequence Number sequence.	Sequence	8	From 0 to 2^64-2	Optional	95
Technical Notification Type	Indicates the technical notification sent.	Enumerated	1	1 = Instrument Book Retransmission End 10 = Trade Retransmission Start 11 = Trade Retransmission End	Mandatory	125
Rebroadcast Indicator	Indicates if this message is resent or new (1 if resent, 0 otherwise). For a snapshot, this field will always be set to '1'.	Numerical ID	1	From 0 to 2^8-2	Mandatory	118

Field	Short Description	Format	Len	Values	Presence	Page
Retransmission Start Time	Indicates when the retransmission starts. For trade retransmission, all the trades previously received by the clients that have an "Event time" strictly lower than this field are valid (Time in number of nanoseconds since 01/01/1970 UTC).	Epoch Time in Nanoseconds	8	From 0 to 2^64-2	Optional	119
Retransmission End Time	Indicates when the retransmission ends. For trade retransmission, all the trades previously received by the clients that have an "Event time" strictly higher than this field are valid (Time in number of nanoseconds since 01/01/1970 UTC).	Epoch Time in Nanoseconds	8	From 0 to 2^64-2	Optional	119
Symbol Index	Exchange identification code of the instrument.	Numerical ID	4	From 0 to 2^32-2	Optional	124

7.2 REFERENTIAL MESSAGES

7.2.1 Standing Data (1007)

The Standing Data message provides instrument characteristics for Cash and Index products, valid for the current trading day.

Message Sending Rules:

- Every morning following the Session Start messages.

Multi-Listing – Market of Reference – Single Order Book

An instrument can be listed on more than one of the market places operated by the Exchange. Multi-Listed instruments can be identified in the feed by using the field MIC List in the Standing Data (1007) message.

If an instrument is multi-listed, then a Market of Reference (MoR) is designated and Luxembourg Stock ExchangeEuropean Single Order Book will consolidate liquidity in such instruments by ensuring that all order flow in that instrument is concentrated on a single order book in the designated MoR. Companies can

decide to be multi-listed on more than one Luxembourg Stock Exchange market to benefit from increased visibility and exposure.

The MIC List will show an instrument being listed on more than one of Euronext markets and it always begins with the MIC of the MoR.

The Euronext website should be used as the reference for correct display of multi-listed instruments; the display of a multi-listed instrument should include the relevant markets on which the instrument is listed and show the real-time quotes of the relevant instrument (based on the single order book in the designated Market of Reference).

Notes:

- Standing Data messages are also available in XML file.
- The repeating section links the “Exchange Market Mechanism” (EMM) with its “Pattern ID”.

Field	Short Description	Format	Len	Values	Presence	Page
Market Data Sequence Number	Assigned by MDG for each message. Each channel has its own Market Data Sequence Number sequence.	Sequence	8	From 0 to 2^64-2	Mandatory	95
Rebroadcast Indicator	Indicates if this message is resent or new (1 if resent, 0 otherwise). For a snapshot, this field will always be set to '1'.	Numerical ID	1	From 0 to 2^8-2	Mandatory	118
Symbol Index	Exchange identification code of the instrument.	Numerical ID	4	From 0 to 2^32-2	Mandatory	124
Optiq Segment	An Optiq segment is a universe of instruments sharing common trading properties.	Enumerated	1	(See field description)	Mandatory	110
Partition ID	Identifies uniquely an Optiq partition across all the Exchange partitions.	Numerical ID	2	From 0 to 2^16-2	Mandatory	112
Full Instrument Name	Full Instrument Name.	Text	102	(See field description)	Optional	86
Instrument Name	Instrument Name	Text	18	(See field description)	Mandatory	89
Instrument Trading Code	Is the AMR code on derivatives and the Trading Code on cash.	Alphanumerical ID	15	(See field description)	Optional	90
Instrument Group Code	Instrument Group / Class Identifier.	Alphanumerical ID	2	(See field description)	Mandatory	89
ISIN Code	Instrument ISIN following ISO 6166.	Alphanumerical ID	12	(See field description)	Mandatory	90
Price / Index Level Decimals	Indicates the number of decimals for each Price / Index Level related to this Symbol Index	Decimal Places	1	From 0 to 2^8-2	Mandatory	115

Field	Short Description	Format	Len	Values	Presence	Page
Quantity Decimals	Indicates the number of decimals for each Quantity related to this Symbol Index	Decimal Places	1	From 0 to 2^8-2	Optional	117
Amount Decimals	Indicates the number of decimals for each Amount related to this Symbol Index	Decimal Places	1	From 0 to 2^8-2	Optional	80
Ratio / Multiplier Decimals	Indicates the number of decimals for each Ratio / Multiplier related to this Symbol Index	Decimal Places	1	From 0 to 2^8-2	Mandatory	118
CFI	Classification code of a financial instrument defined by the ISO-10962:2015 standard.	Text	6	(See field description)	Mandatory	81
Instrument Event Date	Date of the last instrument characteristic modification(s) except for some exceptions.	Date	2	From 0 to 2^16-2	Mandatory	89
Strike Price	The strike price of an option/warrant is the specified price at which the underlying can be bought (in the case of a call/right to buy) or sold (in case of a put/right to sell) by the holder (buyer) of the option/warrant contract, at the moment he exercises his right against a writer (seller) of the option/warrant.	Price	8	From -2^63+1 to 2^63-1	Optional	123
Dark Eligibility	Indicates the Eligibility to dark. 0 is not eligible, 1 is eligible.	Boolean	1	0 = False 1 = True	Optional	83
Dark LIS Threshold	Defines the minimum amount of an order to benefit from the LIS (Large In Scale) pre-transparency waiver.	Amount	8	From 0 to 2^64-2	Optional	83
Dark Minimum Quantity	Defines the minimum quantity required for an order to be filled in the Dark liquidity. 0 indicates that no minimum amount is required.	Quantity	4	From 0 to 2^32-2	Optional	83
Date Of Last Trade	Date of the Last Price for the Instrument (in number of days since the 1st of January 1970).	Date	2	From 0 to 2^16-2	Optional	83
Depositary List	Identifies the possible main depository organizations (maximum four) for shares or fixed income.	Text	20	(See field description)	Optional	84
Main Depositary	Identifies the default (or main) depository organization of the instrument (between the possible 4 depositaries registered) used by priority for the settlement (for example: multi-listed instruments which have several depositories).	Alphanumerical ID	5	(See field description)	Optional	93
First Settlement Date	Represents the first possible settlement date for a given instrument.	Date	2	From 0 to 2^16-2	Optional	86

Field	Short Description	Format	Len	Values	Presence	Page
Guarantee Indicator	Indicates if the trade is guaranteed or not (for clearing purpose)	Enumerated	1	0 = This instrument is not guaranteed 1 = This instrument is guaranteed 2 = This instrument is not clearable 8 = This instrument is part of Cleared Borrowing and Lending Service (CBLM) and is guaranteed	Optional	86
ICB	Identifies for a listed instrument, the economic subsector of the issuing company in the ICB (Industry Classification Benchmark) classification.	Alphanumerical ID	16	(See field description)	Optional	87
Issuing Country	Issuing country.	Alphanumerical ID	3	(See field description)	Optional	91
Last Adjusted Closing Price	Last traded price of the previous trading day after application of the adjustment coefficient (to be calculated with the Price/Index Level Decimals).	Price	8	From -2^63+1 to 2^63-1	Optional	91
Lot Size	For cash instruments with Quantity Notation = “UNT”: The Lot Size is the minimum tradable quantity that is set for each instrument by the Exchange. The quantity has to be a multiple of the Lot Size.	Quantity	8	From 0 to 2^64-2	Optional	93
Maturity Date	Maturity Date of the instrument (text formatted as YYYYMMDD).	Text	8	(See field description)	Optional	98
Maximum Decimals In Quantity	Maximum Decimals In Quantity was introduced for Euronext Fund Services Paris and indicates the maximum of relevant decimal number for trading.	Numerical	1	From 0 to 2^8-2	Optional	98
MIC	Identifies the market to which an instrument belongs by its MIC (Market Identification Code), segment MIC according to ISO 10383.	Alphanumerical ID	4	(See field description)	Mandatory	98
MIC List	Identifies the Euronext markets on which an instrument is listed by its MIC (Market Identification Code).	Alphanumerical ID	20	(See field description)	Optional	99
Country Of Exchange	Country of exchange is the Country associated to the MIC following ISO 3166 Alpha-3.	Alphanumerical ID	3	(See field description)	Optional	82

Field	Short Description	Format	Len	Values	Presence	Page
Mnemonic	Mnemonic code of the instrument. This field is not populated for every instrument.	Alphanumerical ID	5	(See field description)	Optional	108
Underlying MIC	Identifies the market to which an instrument' underlying belongs by its MIC (Market Identification Code), according to ISO 10383. Refer to MIC field to have all the authorized values.	Alphanumerical ID	4	(See field description)	Optional	131
Underlying ISIN Code	Underlying ISIN.	Alphanumerical ID	12	(See field description)	Optional	130
Trading Currency	Code of the currency (ISO 4217-3A).	Alphanumerical ID	3	(See field description)	Optional	127
Currency Coefficient	When an actual price is displayed in a different 'price expression' than the official instrument trading currency, the Currency Coefficient represents the ratio 'price expression' divided by 'official currency' (To be calculated with Ratio / Multiplier Decimals).	Numerical ID	4	From 0 to 2^32-2	Optional	82
Trading Currency Indicator	Indicates whether the 'price expression' is in the Currency or in a ratio of this Currency. Use Currency Coefficient field to identify the ratio to apply.	Enumerated	1	0 = Change rate not applied to the traded price 1 = Change rate applied to the traded price	Optional	127
Strike Currency Indicator	Indicates whether the 'price expression' is in the Currency or in a ratio of this Currency. Use Currency Coefficient field to identify the ratio to apply.	Enumerated	1	0 = Change rate not applied to the strike price 1 = Change rate applied to the strike price	Optional	123
Number Instrument Circulating	For stocks: this is the total number of shares issued by the company. For Fix Income: this is the number of Fix Income still to be repaid.	Quantity	8	From 0 to 2^64-2	Optional	108
Par Value	Par Value (also called Nominal value) for Instrument. For Fixed Income it represents the par amount to be repaid at maturity (not including interest revenue) (to be calculated with the Amount Decimals).	Amount	8	From 0 to 2^64-2	Optional	112
Quantity Notation	Indication of the type of measurement (e.g. number of units, nominal, monetary value, etc.) in which the transaction is expressed.	Text	3	(See field description)	Optional	117
Instrument Unit Expression	Unit in which the instrument is quoted.	Enumerated	1	(See field description)	Optional	90

Field	Short Description	Format	Len	Values	Presence	Page
Settlement Delay	Gives the number of trading days that represents the period between the trade date and the settlement date (delivery and payment) for an instrument to be cleared and settled.	Alphanumerical ID	2	(See field description)	Optional	121
Strike Currency	Code of the strike currency (ISO 4217-3A).	Alphanumerical ID	3	(See field description)	Optional	123
Tax Code	Tax deduction code to which the instrument belongs.	Enumerated	1	0 = Not eligible to PEA 3 = Eligible to PEA 9 = Not Applicable	Optional	124
Type Of Corporate Event	Indicates the last type of corporate event that has occurred on an instrument, such as detachment of rights, or of coupons. The data item is automatically calculated by the adjustment application but in case of problem or error, the data item value could be modified manually, particularly for purging the order book in case of absence of corporate event. This data has to be treated in consideration of the date of the event included into the header of the message.	Alphanumerical ID	2	(See field description)	Optional	129
Type Of Market Admission	Indicates the type of market to which an instrument has been listed.	Enumerated	1	(See field description)	Optional	130
Repo Indicator	Indicates whether the instrument listed underlies any loan contracts, meaning it has been admitted to the Deferred Settlement system and/or to the lending market.	Enumerated	1	(See field description)	Optional	118
Issue Price	Issuing price of the instrument (to be calculated with Issue Price Decimals).	Price	8	From -2^63+1 to 2^63-1	Optional	91
Nominal Currency	Code of the nominal currency (ISO 4217-3A).	Alphanumerical ID	3	(See field description)	Optional	108
Issue Price Decimals	Indicates the number of decimals for Issue Price related to this Symbol Index	Decimal Places	1	From 0 to 2^8-2	Optional	91
Strike Price Decimals	Indicates the number of decimals for Strike Price related to this Symbol Index	Decimal Places	1	From 0 to 2^8-2	Optional	124
Liquid Instrument Indicator	Indicates whether the instrument is liquid or not, as defined per MiFID II. (0 = Illiquid ; 1 = Liquid)	Boolean	1	0 = False 1 = True	Optional	92

Field	Short Description	Format	Len	Values	Presence	Page
Market Of Reference MIC	Indicates the instrument Exchange of Reference by its MIC (Market Identification Code according to ISO 10383) (For Future Use).	Alphanumerical ID	4	(See field description)	Optional	97
EMM	Defines the Exchange Market Mechanism applied on each platform.	Enumerated	1	(See field description)	Mandatory	84
Pattern ID	Numerical Pattern identifier available as a characteristic of an instrument in Standing Data file and message, and used in the MDG timetable message. Cash Markets only.	Numerical ID	2	From 0 to 2^16-2	Optional	113
Tick Size Index ID	ID of the tick size table available in the Tick Table file.	Numerical ID	2	From 0 to 2^16-2	Optional	125
Market Model	Market Model identifier.	Enumerated	1	(See field description)	Optional	97

7.2.2 Timetable (1006)

The timetable message is available on cash markets and indicates the instrument trading patterns (state change sequence) for the current trading day.

Instrument books are linked to their trading patterns in the Standing Data Message (1007).

Message Sending Rules:

- Automatically for each Trading Pattern, after the Session Start and Referential messages
- On an exceptional basis, it may be sent during the trading day in case scheduled hours have changed due to manual intervention by Market Operations or if there are multiple openings during the day. If it indicates a Pattern ID, then the change applies on all instruments linked to this Pattern ID, otherwise it only applies on the Symbol Index and EMM.

Field	Short Description	Format	Len	Values	Presence	Page
Market Data Sequence Number	Assigned by MDG for each message. Each channel has its own Market Data Sequence Number sequence.	Sequence	8	From 0 to 2^64-2	Mandatory	95
Rebroadcast Indicator	Indicates if this message is resent or new (1 if resent, 0 otherwise). For a snapshot, this field will always be set to '1'.	Numerical ID	1	From 0 to 2^8-2	Mandatory	118
EMM	Defines the Exchange Market Mechanism applied on each platform.	Enumerated	1	(See field description)	Optional	84

Field	Short Description	Format	Len	Values	Presence	Page
Pattern ID	Numerical Pattern identifier available as a characteristic of an instrument in Standing Data file and message, and used in the MDG timetable message. Cash Markets only.	Numerical ID	2	From 0 to 2^16-2	Optional	113
Symbol Index	Exchange identification code of the instrument.	Numerical ID	4	From 0 to 2^32-2	Optional	124
Phase Time	Time of Phase start (Time in an integer on 4 bytes expressed as hhmmss).	Integer Time in hhmmss	8	From 0 to 2^64-2	Mandatory	114
Phase Id	Indicates the phase of the instrument.	Enumerated	1	(See field description)	Mandatory	114
Phase Qualifier	Indicates the Phase Qualifier (no multiple phase possible at the same time even if this field is a bitmap).	Bitmap	2	(See field description)	Optional	114
Trading Period	Provides the current trading period.	Enumerated	1	1 = Opening (Cash and Derivatives) 2 = Standard (Cash and Derivatives) 3 = Closing (Cash and Derivatives)	Mandatory	128
Order Entry Qualifier	Field indicating the state of the Order Entry for the current market state.	Enumerated	1	0 = Order Entry/Cancel/Modify Disabled 1 = Order Entry/Cancel/Modify Enabled 2 = Cancel and Modify Only (Derivatives Only) 3 = Cancel Only	Optional	110
Session	Current market session.	Enumerated	1	(See field description)	Mandatory	120

7.3 APPLICATION MESSAGES

7.3.1 Market Update (1001)

The Market Update Message provides following data to the market in order to build the limits for the order book depth (COB and BoB), publish trade prices and collars:

- Best limits (BBO)

- Full depth limits
- Clear Book
- Short trade
- Requests
- Collars
- All the wholesales Request For Cross (RFC)
- Best implied limits
- Best of Book (BoB) full depth limits

Message Sending Rules:

- For the book retransmission every morning or in case of HA.
- For new or updated price and/or volume in the book (including BBO).
- As a short trade message indicating its trade type, traded price and traded quantity.
- For new Collars when the update is caused by a new trade which impact collar.

Market Data Update Types

The following table defines for each Market Data Update Type on which instruments it applies.

Market Data Update Type		BdL	
		Full Order Book (OU)	Full Order Book (MU)
BBO	1 - Best Bid (Cash and Derivatives)	X	X
	2 - Best Offer (Cash and Derivatives)		
Full Depth	3 - New Bid (Cash and Derivatives)		X
	4 - New Offer (Cash and Derivatives)		
	5 - Updated Bid (Cash and Derivatives)		
	6 - Updated Offer (Cash and Derivatives)		
	58 - New Bid With Liquidity Provider (Cash Only)		
	59 - New Offer With Liquidity Provider (Cash Only)		
	60 - Updated Bid With Liquidity Provider (Cash Only)		
	61 - Updated Offer With Liquidity Provider (Cash Only)		
Clear Book	254 - Clear Book (Cash and Derivatives)	X	X
Trades Types	7 - Total Traded Volume		
	24 - Conventional Trade (Cash and Derivatives)	X	X
	30 - Guaranteed Cross Trade (Cash and Derivatives)		
	50 - Trade Cancellation (Cash and Derivatives)		
	35 - Dark Trade (Cash Only)		
	46 - BoB Trade (Cash Only)		
	51 - Out of Market Trade (Cash Only)		
	54 - Euronext Fund Service Trade (Cash Only)		
	55 - Secondary Listing Trade (Cash Only)	X	X
	36 - Exchange for Physical Trade - Cash Leg (Cash Only)		
	52 - Delta Neutral Trade - Underlying Cash Leg (Cash Only)		
Requests	10 - Request for Quote (Cash and Derivatives)		
	11 - Request for Quote Bid (Cash and Derivatives)		
	13 - Request for Quote Offer (Cash and Derivatives)		
	12 - Request for Size (Cash and Derivatives)		
	66 - Request for Size Bid (Cash and Derivatives)		
	67 - Request for Size Offer (Cash and Derivatives)		
Collars	14 - High Dynamic Collar (Cash Only)	X	X
	15 - Low Dynamic Collar (Cash Only)		
	63 - Low Static Collar (Cash Only)		
	64 - High Static Collar (Cash Only)		
	70 - Low LP Collar (Cash Only)		
	71 - High LP Collar (Cash Only)		

Limits (BBO and Full Depth):

The "Market Data Update Type" field indicates the type of price/volume update as follows:

- The Best Bid/Offer are the best explicit buy or sell limit price and aggregated volume at the best limit price. When best orders are Market Orders or Market To Limit orders, the Best Bid/Offer is sent out with a price set to null and a quantity equal to the aggregated volume of Market Order (MO) and Market To Limit (MTL).
- A Market Order is sent in Market Data with a price set to null value and the quantity is the one from the client order.
- When there is no more Limit on a book side, last BBO is sent with quantity set to '0' and Price set to null value.
- The Bid/Offer updates are the explicit buy or sell price and aggregated volume at any price level. When the Bid/Offer is the best price, both the Bid/Offer and the Best Bid/Offer will be sent.
- On Warrants, all updates with a "Liquidity Provider" flag, with a limit will contain at least one liquidity provider order. "Liquidity Provider" limits contain one or several liquidity provider orders along with zero to several non-liquidity provider orders.

Collars:

Collars are sent as follow:

- For dynamic collars:
  - On each book retransmission (including morning and HA book retransmission)
  - On each dynamic collar price changes
  - On action from Market Operation
- For static collars:
  - On each book retransmission (including morning and HA book retransmission)
  - On Market Operation request
  - For some instruments, on the first trade of the day

Clear Book:

- A Clear Book requests clients to clear the entire book for a given Symbol Index. Quantity will be '0' and Price set to null value.

Short trades:

Trades will also be notified using the Market Update message.

Customers that are only using short trade messages can retrieve MMT levels 1 (MMT Market Mechanism), 2 (MMT Trading Mode) and 3 (MMT Transaction Category). Rules to get this information with Market Update messages are available in appendix of this document. Please refer to both appendix sections:

- MMT Flags Rules
- Link Between EMM and Trade Types

Field	Short Description	Format	Len	Values	Presence	Page
Market Data Sequence Number	Assigned by MDG for each message. Each channel has its own Market Data Sequence Number sequence.	Sequence	8	From 0 to 2^64-2	Mandatory	95
Rebroadcast Indicator	Indicates if this message is resent or new (1 if resent, 0 otherwise). For a snapshot, this field will always be set to '1'.	Numerical ID	1	From 0 to 2^8-2	Mandatory	118
EMM	Defines the Exchange Market Mechanism applied on each platform.	Enumerated	1	(See field description)	Mandatory	84
Event Time	Time when an event has been processed (Time in number of nanoseconds since 01/01/1970 UTC).	Epoch Time in Nanoseconds	8	From 0 to 2^64-2	Mandatory	85
Market Data Update Type	Type of market data update.	Enumerated	1	(See field description)	Mandatory	96
Symbol Index	Exchange identification code of the instrument.	Numerical ID	4	From 0 to 2^32-2	Mandatory	124
Number Of Orders	Number of orders at the current price limit.	Numerical	2	From 0 to 2^16-2	Optional	109
Price	Price per unit of quantity (to be calculated with the Price/Index Level Decimals).	Price	8	From -2^63+1 to 2^63-1	Optional	115
Quantity	Number of traded or ordered units (to be calculated with Quantity Decimals).	Quantity	8	From 0 to 2^64-2	Optional	117

7.3.2 Order Update (1002)

On Cash markets, the Order Update Message provides the market with the information needed to build the order book.

Multiple changes can be disseminated within a single Order Update (1002) message.

This message takes into account all order types, with the exception of Stop Loss and Stop Limit orders. Stop orders are not broadcasted to market participants until they are triggered.

Message Sending Rules:

- In the morning, before market opening, when the trading engine is initialized, to retransmit orders remaining in the book from previous days (taking into account expired orders and order book purges). This is known as the 'order book retransmission' or 'market sheet retransmission'.
- During the day, on each new order, modify order or deletion order from a member firm.

- During the day, in case of order book retransmission. This is a failsafe in case of order book resynchronization.

Market Data Action Types

The Market Data Action Types apply for all cash instrument on central order book. Therefore, no Order Update messages are sent on derivatives.

Order Modifications

For modification of orders, the field Market Data Action Type will flag if there is a loss of priority or not. The order will lose its priority for:

- a price change
- an amendment with an increase of its displayed quantity

Peg Orders (for future use)

Peg orders will be communicated on its creation with its characteristics:

- Type of peg order
- Peg Offset
- Quantity

On a BBO update no peg order update will be disseminated. Members will have then to update the peg orders for each BBO without changing the previous priority of the original order. Indeed this will identify the order in case of a partial fill or update.

If a peg is partially filled or updated then it loses its priority and the message will contain the new quantity.

To be noted:

- Symbol Index, EMM and Order Priority identify the rank of the order in the order book.
- Order Priority identifies the priority of the order in the order book (the order book is identified with Symbol Index and EMM).
- In case of a Deletion (Market Data Action Type '2' or '3'), the quantity will be set to '0' and the price set to default value.
- Orders for cash must be arranged according to:
  - Order type: Priority should be given first to Market order and Market to limit followed by Limits and Peg orders
  - Order price
  - Order priority
- For Market Orders the price will be set to null value and the quantity is the one from the client order.

Client applications should do the following in order to build the market sheet:

- Determine the Market Data Action Type (add, modify, delete)
- Determine the priority of an order based on Order Type, Order Price, and the Order Priority. The priority of orders of the same type and price depends on their order priority. The order with the lowest

value of Order Priority has the highest priority. Bid orders with higher prices have higher priority; ask orders with lower price have higher priority.

- Determine the price and size of an order.

Field	Short Description	Format	Len	Values	Presence	Page
Market Data Sequence Number	Assigned by MDG for each message. Each channel has its own Market Data Sequence Number sequence.	Sequence	8	From 0 to 2^64-2	Mandatory	95
Rebroadcast Indicator	Indicates if this message is resent or new (1 if resent, 0 otherwise). For a snapshot, this field will always be set to '1'.	Numerical ID	1	From 0 to 2^8-2	Mandatory	118
EMM	Defines the Exchange Market Mechanism applied on each platform.	Enumerated	1	(See field description)	Mandatory	84
Event Time	Time when an event has been processed (Time in number of nanoseconds since 01/01/1970 UTC).	Epoch Time in Nanoseconds	8	From 0 to 2^64-2	Mandatory	85
Symbol Index	Exchange identification code of the instrument.	Numerical ID	4	From 0 to 2^32-2	Mandatory	124
Market Data Action Type	Identifies if the order is a New Order, a Deletion, a Modification or a Retransmission.	Enumerated	1	(See field description)	Mandatory	94
Order Priority	Rank giving the priority of the order. The order with the lowest value of Order Priority has the highest priority.	Numerical ID	8	From 0 to 2^64-2	Optional	111
Previous Priority	Previous Priority is populated only when there is a "Modification of existing order With Loss Of Priority" or order deletions. Then clients have to remove from their market sheet the order identified with the field "Previous Priority" and add a new order with the field "Order Priority" newly provided.	Numerical ID	8	From 0 to 2^64-2	Optional	115
Order Type	Type of Order.	Enumerated	1	(See field description)	Optional	111
Order Price	Instrument price per quantity unit (To be calculated with Price/Index Level Decimals).	Price	8	From -2^63+1 to 2^63-1	Optional	110
Order Side	Indicates the side of the order.	Enumerated	1	1 = Buy 2 = Sell 3 = Cross [i]	Optional	111
Order Quantity	Total order quantity, per quantity unit.(To be calculated with Quantity Decimals)	Quantity	8	From 0 to 2^64-2	Optional	111
Peg Offset	(Future Use) Tick offset for a pegged order.	Numerical ID	1	From -127 to 127	Optional	113

7.3.3 Price Update (1003)

The Price Update message provides reference prices.

Message Sending Rules:

Price Update message are sent each time a reference price is updated.

Market Data Price Types

Reference prices are availablefor the following instruments:

	BdL
10 - Net Asset Value (+/-) for the instruments eligible to the NAV Trading Facility (Cash Only)	
12 - Adjusted Closing Price (Cash Only)	X
13 - Subscription Price (Cash Only)	
14 - Indicative Matching Price (Cash and Derivatives)	X
19 - Min Price Out of Session Trades (Cash Only)	
20 - Max Price Out of Session Trades (Cash Only)	
21 - Min Price Out of Session Block Trades (Cash Only)	
22 - Max Price Out of Session Block Trades (Cash Only)	
23 - Valuation Price (Cash Only)	
24 - Fund Subscription (Cash Only)	
25 - Fund Redemption (Cash Only)	
26 - Uncrossing Price (Cash and Derivatives)	X
27 - Last Traded Price (Cash and Derivatives)	X
28 - Alternative Indicative Price (AIP) (Cash Only)	X

Indicative Matching Price:

A Price Update message with Market Data Price Type: 14 (Indicative Matching Price) indicates the instrument theoretical opening conditions which consist of:

- The Indicative Matching Price (IMP): price at which the instrument would trade if it opened at the moment the price is calculated
- The Indicative Matching Volume (IMV): quantity that would trade at the IMP if the instrument opened at the moment the price is calculated
- The indicative imbalance volume: remaining unmatched quantity at the IMP
- The indicative imbalance volume side: side of the indicative imbalance volume
- An Indicative Matching Price is sent if at least one of the instrument's theoretical opening conditions changes: (indicative matching price or indicative matching volume or imbalance volume or imbalance volume side varies).
- If the Indicative Matching Price remains undetermined, but the reason for this undetermined changes, then an Indicative Matching Price is sent with null values (in field Price).

Quantity field will be set to null for the following Market Data Price Type:

- 13 - Subscription Price
- 23 - Valuation Price
- 27 - Last Traded Price
- 28 - Alternative Indicative Price (AIP)

For Cash markets, all reference prices are published through a Price Update message, for both Central Order Book and Out of Session contexts:

- Closing Price
- Uncrossing Price
- Valuation Price
- Min/Max Out of Session Trade Price
- Net Asset value for eligible instruments

Fund features (subscription and redemption) are also communicated through a Price Update Message.

Field	Short Description	Format	Len	Values	Presence	Page
Market Data Sequence Number	Assigned by MDG for each message. Each channel has its own Market Data Sequence Number sequence.	Sequence	8	From 0 to 2^64-2	Mandatory	95
Rebroadcast Indicator	Indicates if this message is resent or new (1 if resent, 0 otherwise). For a snapshot, this field will always be set to '1'.	Numerical ID	1	From 0 to 2^8-2	Mandatory	118
EMM	Defines the Exchange Market Mechanism applied on each platform.	Enumerated	1	(See field description)	Mandatory	84
Event Time	Time when an event has been processed (Time in number of nanoseconds since 01/01/1970 UTC).	Epoch Time in Nanoseconds	8	From 0 to 2^64-2	Mandatory	85
Market Data Price Type	Type of price update (note: 1 to 9 are settlement price type).	Enumerated	1	(See field description)	Mandatory	94
Symbol Index	Exchange identification code of the instrument.	Numerical ID	4	From 0 to 2^32-2	Mandatory	124
Price	Price per unit of quantity (to be calculated with the Price/Index Level Decimals).	Price	8	From -2^63+1 to 2^63-1	Optional	115
Quantity	Number of traded or ordered units (to be calculated with Quantity Decimals).	Quantity	8	From 0 to 2^64-2	Optional	117
Imbalance Quantity	Imbalance volume quantity if Uncrossing occurs at this moment. This volume includes hidden quantity (to be calculated with Quantity Decimals).	Quantity	8	From 0 to 2^64-2	Optional	87

Field	Short Description	Format	Len	Values	Presence	Page
Imbalance Quantity Side	Side of the imbalance volume if the Uncrossing occurs at this moment.	Enumerated	1	0 = No imbalance 1 = Buy 2 = Sell	Optional	88

7.3.4 Full Trade Information (1004)

The Full Trade Information Message feeds the Market with a MiFID II compliant trade summary (A short trade message is provided in the Market Update message (1001) for all markets).

Message Sending Rules:

- For each trade notification.
- For each trade retransmission.

If the Transaction Type is "Summary Report", then it will be a differed publication of aggregated trades. Therefore, only the MiFID Notional Amount will be filled and the high and low prices will be in the Statistics message (1009).

On Derivatives, field MiFID Price will be set to null, due to market convention, for:

- Against Actual trades (Trade Type 6)
- Exchange for Swap Trade (Trade Type 9)
- Strategy Leg Against Actual Trade (Trade Type 15)
- Strategy Leg Exchange For Swap Trade (Trade Type 18)

MiFID 2 flags are populated using the Market Model Typology (MMT) in version 3.01. For more information please visit: http://www.fixtradingcommunity.org/pg/group-types/mmt

Field	Short Description	Format	Len	Values	Presence	Page
Market Data Sequence Number	Assigned by MDG for each message. Each channel has its own Market Data Sequence Number sequence.	Sequence	8	From 0 to 2^64-2	Mandatory	95
Rebroadcast Indicator	Indicates if this message is resent or new (1 if resent, 0 otherwise). For a snapshot, this field will always be set to '1'.	Numerical ID	1	From 0 to 2^8-2	Mandatory	118

Field	Short Description	Format	Len	Values	Presence	Page
EMM	Defines the Exchange Market Mechanism applied on each platform.	Enumerated	1	(See field description)	Mandatory	84
Event Time	Time when an event has been processed (Time in number of nanoseconds since 01/01/1970 UTC).	Epoch Time in Nanoseconds	8	From 0 to 2^64-2	Mandatory	85
Symbol Index	Exchange identification code of the instrument.	Numerical ID	4	From 0 to 2^32-2	Optional	124
Trading Date Time	Date and time when the transaction was executed.	Text	27	(See field description)	Mandatory	127
Publication Date Time	Date and time when the transaction was published by a trading venue or Approved Publication Arrangement (APA).	Text	27	(See field description)	Optional	116
Trade Type	Type of trade.	Enumerated	1	(See field description)	Mandatory	126
MiFID Instrument ID Type	Code type used to identify the financial instrument.	Text	4	(See field description)	Optional	101
MiFID Instrument ID	Code used to identify the financial instrument. This code has to be processed with the MiFID Instrument ID Type.	Alphanumerical ID	12	(See field description)	Optional	100
MiFID Execution ID	MiFID Transaction Identification Code is composed of the Symbol Index (on 10 characters), the EMM (on 3 characters) and the Execution ID (on 10 characters). It is a unique Execution ID by instrument per day on the different available EMM.	Alphanumerical ID	52	(See field description)	Mandatory	100
MiFID Price	Traded price of the transaction excluding, where applicable, commission and accrued interest.	Text	20	(See field description)	Optional	101
MiFID Quantity	Number of units of the financial instrument. The nominal or monetary value of the financial instrument.	Text	20	(See field description)	Mandatory	102
MiFID Price Notation	Indication as to whether the price is expressed in monetary value, in percentage or in yield.	Text	4	(See field description)	Optional	102
MiFID Currency	Currency in which the price is expressed (applicable if the price is expressed as monetary value) following ISO 4217 standard.	Alphanumerical ID	3	(See field description)	Optional	99
MiFID Qty in Measurement Unit Notation	Indication of measurement units in which the quantity in measurement unit is expressed.	Text	25	(See field description)	Optional	102

Field	Short Description	Format	Len	Values	Presence	Page
MiFID Quantity Measurement Unit	The equivalent amount of commodity or emission allowance traded expressed in measurement unit	Text	20	(See field description)	Optional	103
MiFID Notional Amount	Nominal amount or notional amount.	Text	20	(See field description)	Optional	101
Notional Currency	Currency in which the notional is denominated following ISO 4217 standard.	Alphanumerical ID	3	(See field description)	Optional	108
MiFID Clearing Flag	Code to identify whether the transaction will be cleared.	Text	5	(See field description)	Optional	99
MMT Market Mechanism	Defines the fundamental functional market mechanism that has facilitated the trade following MMT level 1.	Enumerated	1	(See field description)	Optional	104
MMT Trading Mode	Differentiates transactions by defining the trading mode under which the trade was executed following MMT level 2.	Enumerated	1	(See field description)	Optional	107
MMT Transaction Category	Defines the transaction category following MMT level 3.1.	Text	4	(See field description)	Optional	107
MMT Negotiation Indicator	Defines the negotiation indicator or pre-trade transparency waiver following MMT level 3.2.	Text	4	(See field description)	Optional	105
MMT Agency Cross Trade Indicator	Defines the agency cross trade indicator following MMT level 3.3.	Text	4	(See field description)	Optional	103
MMT Modification Indicator	Defines the modification indicator following MMT level 3.4.	Text	4	(See field description)	Optional	105
MMT Benchmark Indicator	Defines the benchmark indicator or the reference price indicator following MMT level 3.5.	Text	4	(See field description)	Optional	103
MMT Special Dividend Indicator	Defines the special dividend indicator following MMT level 3.6.	Text	4	(See field description)	Optional	107
MMT Off Book Automated Indicator	Defines the off book automated indicator following MMT level 3.7.	Enumerated	1	M = Off Book Non-Automated Q = Off Book Automated - = (Hyphen) Unspecified or does not apply	Optional	105
MMT Contribution to Price	Defines the contribution to price or the price discovery process following MMT level 3.8.	Text	4	(See field description)	Optional	104
MMT Algorithmic Indicator	Defines the algorithmic indicator following MMT level 3.9.	Text	4	(See field description)	Optional	103

Field	Short Description	Format	Len	Values	Presence	Page
MMT Publication Mode	Defines the publication mode or post-trade deferral reason following MMT level 4.1.	Text	4	(See field description)	Optional	106
MMT Post Trade Deferral	Defines the post trade deferral or enrichment type following MMT level 4.2.	Text	4	(See field description)	Optional	106
MMT Duplicative Indicator	Defines the duplicative indicator following MMT level 5.	Text	4	(See field description)	Optional	104
Trade Qualifier	Trade Qualifier. Values specified, in the list of possible values, indicate the bit positions that should be used to set zero (0) or one (1) values. A single field contains multiple values provided in different positions.	Bitmap	1	(See field description)	Optional	125
Transaction Type	Transaction type or publication type.	Enumerated	1	(See field description)	Optional	128
Effective Date Indicator	Indicates if the trade is introduced on the trading session day or earlier.	Enumerated	1	0 = If the seller declaration is received on the current trading session day 1 = If seller declaration is received before the current trading session day	Optional	84
Block Trade Code	Indicates if trade relates to a block or a negotiated deal following MiFID rules.	Enumerated	1	B = Block Trade N = Regular trade or Negotiated deal - = (Hyphen) Undefined	Optional	80
Trade Reference	Reference of the trade reported to the Exchange.	Alphanumerical ID	30	(See field description)	Optional	126
Original Report Timestamp	Timestamp of trade reporting to the Exchange (Time in number of nanoseconds since 01/01/1970 UTC).	Epoch Time in Nanoseconds	8	From 0 to 2^64-2	Optional	112
Transparency Indicator	Used to define the transparency of the trade.	Enumerated	1	0 = Lit/Regular Trade 1 = Dark Trade and Immediate Publication 2 = Dark Trade and Deferred Publication	Optional	129
Currency Coefficient	When an actual price is displayed in a different 'price expression' than the official instrument trading currency, the Currency Coefficient represents the ratio 'price expression' divided by 'official currency' (To be calculated with Ratio / Multiplier Decimals).	Numerical ID	4	From 0 to 2^32-2	Optional	82

Field	Short Description	Format	Len	Values	Presence	Page
Price Multiplier	Number of units of the financial instrument that are contained in a trading lot. Price multiplier coefficient for instrument unit price.	Numerical	4	From 0 to 2^32-2	Optional	116
Price Multiplier Decimals	Number of decimals for the field Price Multiplier.	Numerical	1	From 0 to 2^8-2	Optional	116
Venue	Identification of the venue where the transaction was executed using the ISO 10383 segment MIC for transactions executed on a trading venue.	Alphanumerical ID	11	(See field description)	Mandatory	131
Start Time Vwap	Start time for the Volume Weight Average price computation period (Number of seconds since the beginning of the day).	Intraday Time in Seconds	4	From 0 to 2^32-2	Optional	121
End Time Vwap	End time for the Volume Weight Average price computation period (Number of seconds since the beginning of the day).	Intraday Time in Seconds	4	From 0 to 2^32-2	Optional	85
MiFID Emission Allowance Type	This field is only applicable for emission allowances.	Text	4	(See field description)	Optional	100
Market Of Reference MIC	Indicates the instrument Exchange of Reference by its MIC (Market Identification Code according to ISO 10383) (For Future Use).	Alphanumerical ID	4	(See field description)	Optional	97

7.3.5 Market Status Change (1005)

Market Status Change message informs the market of the following changes on the instrument:

- Book State
- Status Reason
- Phase Qualifier
- Trading Period
- Trading Side
- Order Entry Qualifier
- Session
- Price Limits
- Quote Spread Multiplier
- Plan a Scheduled Event

Message Sending Rules:

The Market Status Change message is sent for:

- Each Time above parameter change. It can be:
  - A change on the predefined pattern
  - A change on wholesales scheduled
  - An unscheduled status change
- For Dutch Funds to notify the cut-off and move to the next session

This message is sent on cash on instrument level and on derivatives on contract level except for the following cases, it is sent on instrument level:

- Future expiries
- Instrument intra-day creation
- Instrument Suspension

For suspension and all other cases it is sent on contract level and applies for all inherited instruments that have not a dedicated Market Status Change (1005) message.

Status changes following the predefined pattern

A Market Status Change (1005) message is sent to notify each phase change as defined in the Timetable (1006) message.

On an exceptional basis, scheduled hours in pattern can change. A new Timetable message is sent and Market Status Change message will follow this new pattern.

Following is an example of content that are sent in Market Status Change message through the day.

- For Cash:

	Start Of the Tradng Day (not in pattern)	First Closed Phase defined in the timetable	Fisrt Call phase defined in the timetable	First Uncrossing phase defined in the Timetable	Continuous Phase	Last Call Phase defined in the timetable (cash only)	Last Uncrossing Phase defined in the timetable (cash only)	TAL Cash Only	Last Closed Phase defined in the timetable	End Of the Trading Day
Market Data Change Type	Status Change(s) (0)									
Event Time	Time when the change is effective									
Book State	Inaccessible (1)	Closed (2)	Call (3)	Uncrossing (4)	Continuous (5)	Call (3)	Uncrossing (4)	Continuous (5)	Closed (2)	Inaccessible (1)
Status	Scheduled (0)									
Phase Qualifier	No Qualifier (000001)	No Qualifier (000001)	No Qualifier (000001)	No Qualifier (000001) or Random Uncrossing (Cash Only) (000100)	No Qualifier (000001)	No Qualifier (000001)	No Qualifier (000001) or Random Uncrossing (Cash Only) (000100)	Trading At Last (Cash Only) (000010)	No Qualifier (000001)	No Qualifier (000001)
Trading Period	Opening (1)	Opening (1)	- Opening (1) if there is another Call in the timetable - Closing (3) if there is no other Call in	- Opening (1) if there is another Call in the timetable - Closing (3) if there is no other Call in the timetable	Standard (2)	Closing (3)	Closing (3)	Standard (2) or Closing (3)	Closing (3)	Closing (3)
Trading Side	Null	Null	- Both (4) for Cash RM - Bid Only (1), Offer Only (2), PAKO (3) or Both (4) for Warrants	- Both (4) for Cash RM - Bid Only (1), Offer Only (2), PAKO (3) or Both (4) for Warrants	- Both (4) for Cash RM - Bid Only (1), Offer Only (2), PAKO (3) or Both (4) for Warrants	- Both (4) for Cash RM - Bid Only (1), Offer Only (2), PAKO (3) or Both (4) for Warrants	- Both (4) for Cash RM - Bid Only (1), Offer Only (2), PAKO (3) or Both (4) for Warrants	- Both (4) for Cash RM - Bid Only (1), Offer Only (2), PAKO (3) or Both (4) for Warrants	Null	Null
Price Limits	Null									
Quote Spread Multiplier	Null									
Order Entry Qualifier	Order Entry/ Cancel/ Modify Disabled (0)	Any	Any	Any	Any	Any	Any	Any	Any but Order Entry/ Cancel/ Modify	Order Entry/ Cancel/ Modify Disabled (0)
Session	1									
Scheduled Event	Null									
Scheduled Event Time	Null									

Unscheduled status changes

For book state, the difference between suspension, reservation and halted are:

- Suspension is a manual suspension on instrument level
- Halted is a manual suspension for all the Instrument Group Code
- Reservation is an automatic suspension for an instrument

In addition Market Status Change can be sent from Market Operation team. In these cases, the following tables are providing the complete list of possible values for each case.

- For Cash:

  - Cancel Previous Scheduled Event

Field	Possible values
Market Data Change Type	Scheduled Event Notification (1)
Event Time	Time when the change is effective
Book State	Value at the moment the message is generated
Status Reason	Action by Market Operations (Cash and Derivatives) (15)
Phase Qualifier	Value at the moment the message is generated
Trading Period	Value at the moment the message is generated
Trading Side	Value at the moment the message is generated
Price Limits	Value at the moment the message is generated
Quote Spread Multiplier	Value at the moment the message is generated
Order Entry Qualifier	Value at the moment the message is generated
Session	Value at the moment the message is generated
Scheduled Event	Cancel Previously Scheduled Event(Cash and Derivatives) (0)
Scheduled Event Time	Scheduled time of the event that is cancelled

- Suspension:

Field	Possible values
Market Data Change Type	Status Change(s) (0)
Event Time	Time when the change is effective
Book State	Suspended (8)
Status Reason	Knock-Out by Exchange (Cash Only) (12) Knock-Out by Issuer (Cash Only) (13) Action by Market Operations (Cash and Derivatives) (15) New Listing (20) Due to Underlying (21) Technical (23) (Only for Bourse de Luxembourg)
Phase Qualifier	Same as the one of the instrument when suspended
Trading Period	Same as the one of the instrument when suspended
Trading Side	Same as the one of the instrument when suspended
Price Limits	Same as the one of the instrument when suspended but can also be changed by Market Operation
Quote Spread Multiplier	Same as the one of the instrument when suspended but can also be changed by Market Operation
Order Entry Qualifier	Any
Session	Same as the one of the instrument when suspended
Scheduled Event	Null
Scheduled Event Time	Null

- Reservation

Field	Possible values
Market Data Change Type	Status Change(s) (0)
Event Time	Time when the change is effective
Book State	9 - Reserved
Status Reason	4 = Collars Breach (Cash Only) 8 = No Liquidity Provider (Cash Only) 22 = Outside of LP quotes (Cash Only)
Phase Qualifier	000001 - No Qualifier
Trading Period	Any
Trading Side	Any
Price Limits	Null
Quote Spread Multiplier	Null
Order Entry Qualifier	Any
Session	Same as the one defined in the timetable at the reserved
Scheduled Event	Null or Reopening (1) when Status Reason is Collars Breach (4)
Scheduled Event Time	Null or set when Status Reason is Collars Breach (4)

- Reopening

Field	Possible values
Market Data Change Type	Status Change(s) (0)
Event Time	Time when the change is effective
Book State	Same Book State as the one defined in timetable for this instrument when reopened. Except

	for Continuous phase which reopens with Uncrossing (4) or Continuous Uncrossing (7) Can also be: - Reserved (9) for immediate reservation or PAKO (Payment After Knock-Out) - Call (3) for PAKO (Payment After Knock-Out)
Status Reason	Collars Breach (Cash Only) (4) No Liquidity Provider (Cash Only) (8) Knock-In by Issuer (Cash Only) (11) Action by Market Operations (Cash and Derivatives) (15) Due to Underlying (Cash Only) (21) Outside of LP quotes (Cash Only) (22)
Phase Qualifier	Same Phase Qualifier as the one defined in timetable for this instrument when reopened (except for TaL where the uncrossing is not flagged as TaL)
Trading Period	Same as the one defined in the timetable at the reopening
Trading Side	Same as the one defined in the timetable at the reopening
Price Limits	Same as the one of the instrument when reopened but can also be changed by Market Operation
Quote Spread Multiplier	Same as the one of the instrument when reopened but can also be changed by Market Operation
Order Entry Qualifier	Any
Session	Same as the one defined in the timetable at the reopening
Scheduled Event	Null
Scheduled Event Time	Null

– Halt

Field	Possible values
Market Data Change Type	Status Change(s) (0)
Event Time	Time when the change is effective
Book State	Halted (6)
Status Reason	15 = Action by Market Operations (Cash and Derivatives)
Phase Qualifier	no qualifier
Trading Period	standard
Trading Side	Any
Price Limits	Null
Quote Spread Multiplier	Null
Order Entry Qualifier	Any
Session	1
Scheduled Event	Null
Scheduled Event Time	Null

– Resume Halted Trading Group

♦ Immediate

Field	Possible values
Market Data Change Type	Status Change(s) (0)
Event Time	Time when the change is effective
Book State	Same Book State as the one in timetable for this instrument when reopened. Except for Continuous phase which reopens with Uncrossing (4) or Continuous Uncrossing (7)
Status Reason	Action by Market Operations (Cash and Derivatives) (15)
Phase Qualifier	Same Phase Qualifier as the one defined in timetable for this instrument when reopened (except for TaL where the uncrossing is not flagged as TaL)
Trading Period	Same as the one defined in the timetable at the reopening
Trading Side	Same as the one defined in the timetable at the reopening
Price Limits	Null
Quote Spread Multiplier	Null
Order Entry Qualifier	Any
Session	Same as the one defined in the timetable at the reopening
Scheduled Event	Null
Scheduled Event Time	Null

Note: A resume halt can lead to Book State: “Suspended (8)”.

♦ Scheduled

Field	Possible values
Market Data Change Type	Scheduled Event Notification (1)
Event Time	Time when the change is effective
Book State	Halted (6)
Status Reason	Action by Market Operations (Cash and Derivatives) (15)
Phase Qualifier	Same Phase Qualifier as the one defined in timetable for this instrument when reopened (except for TaL where the uncrossing is not flagged as TaL)
Trading Period	Same as the one defined in the timetable at the reopening
Trading Side	Same as the one defined in the timetable at the reopening
Price Limits	Null
Quote Spread Multiplier	Null
Order Entry Qualifier	Any
Session	Same as the one defined in the timetable at the reopening
Scheduled Event	Resumption of trading (3)
Scheduled Event Time	Time when the change will be effective

At the time of the effective change, an immediate resume halted is sent to clients.

Field	Short Description	Format	Len	Values	Presence	Page
Market Data Sequence Number	Assigned by MDG for each message. Each channel has its own Market Data Sequence Number sequence.	Sequence	8	From 0 to 2^64-2	Mandatory	95
Rebroadcast Indicator	Indicates if this message is resent or new (1 if resent, 0 otherwise). For a snapshot, this field will always be set to '1'.	Numerical ID	1	From 0 to 2^8-2	Mandatory	118
EMM	Defines the Exchange Market Mechanism applied on each platform.	Enumerated	1	(See field description)	Mandatory	84
Market Data Change Type	Type of scheduled change.	Enumerated	1	0 = Status Change(s) 1 = Scheduled Event Notification 2 = Status Change(s) and Scheduled Event Notification	Mandatory	94
Symbol Index	Exchange identification code of the instrument.	Numerical ID	4	From 0 to 2^32-2	Mandatory	124
Event Time	Time when an event has been processed (Time in number of nanoseconds since 01/01/1970 UTC).	Epoch Time in Nanoseconds	8	From 0 to 2^64-2	Mandatory	85
Book State	Book State.	Enumerated	1	(See field description)	Optional	80
Status Reason	Provides the reason for Book State changes.	Enumerated	1	(See field description)	Optional	122
Phase Qualifier	Indicates the Phase Qualifier (no multiple phase possible at the same time even if this field is a bitmap).	Bitmap	2	(See field description)	Mandatory	114

Field	Short Description	Format	Len	Values	Presence	Page
Trading Period	Provides the current trading period.	Enumerated	1	1 = Opening (Cash and Derivatives) 2 = Standard (Cash and Derivatives) 3 = Closing (Cash and Derivatives)	Optional	128
Trading Side	Indicates the Trading Side.	Enumerated	1	1 = Bid Only (Cash Only) 2 = Offer Only (Cash Only) 3 = PAKO (Cash Only) 4 = Both Sides (Cash Only)	Optional	128
Price Limits	Indicates the Price Limits mode.	Enumerated	1	1 = Price Limits Enabled - Normal (Derivatives Only) 2 = Price Limits Enabled - Wide (Derivatives Only) 3 = Price Limits Enabled - Widest (Derivatives Only) 4 = Price Limits Disabled (Derivatives Only)	Optional	115
Quote Spread Multiplier	Indicates the Quote Spread Multiplier.	Enumerated	1	1 = Quote Spread Multiplier 1 (Derivatives Only) 2 = Quote Spread Multiplier 2 (Derivatives Only) 3 = Quote Spread Multiplier 3 (Derivatives Only)	Optional	117
Order Entry Qualifier	Field indicating the state of the Order Entry for the current market state.	Enumerated	1	0 = Order Entry/Cancel/Modify Disabled 1 = Order Entry/Cancel/Modify Enabled 2 = Cancel and Modify Only (Derivatives Only) 3 = Cancel Only	Optional	110
Session	Current market session.	Enumerated	1	(See field description)	Mandatory	120
Scheduled Event	Type of Scheduled Event.	Enumerated	1	(See field description)	Optional	119
Scheduled Event Time	Scheduled Time for the event to happen (On cash: time in an integer on 8 bytes expressed as hhmmss UTC; On derivatives: time in number of nanoseconds since 01/01/1970 UTC).	Epoch Time in Nanoseconds	8	From 0 to 2^64-2	Optional	120

7.3.6 Statistics (1009)

This message provides statistics on:

- High and Low
- Percent Variation Previous Close
- Last Traded Price
- Variation Last Price
- Open Price
- Trade Count
- Cumulative quantities

Stats Update Type:

The following table lists the statistics available per instrument:

Statistics	BdL
5 - Daily High (Cash and Derivatives)	x
6 - Daily Low (Cash and Derivatives)	x
7 - Yearly High (Derivatives Only)	
8 - Yearly Low (Derivatives Only)	
9 - Lifetime High (Derivatives Only)	
10 - Lifetime Low (Derivatives Only)	
14 - Variation Last Price (Cash Only)	x
15 - Open Price (Cash and Derivatives)	x
16 - Trade Count (Cash and Derivatives)	x
17 - Last Traded Price (Cash and Derivatives)	x
18 - Percent Variation Previous Close (Cash and Derivatives)	x
19 - Off Book Cumulative Quantity (Cash Only)	
21 - On Book Auction Cumulative Quantity (Cash Only)	x
22 - On Book Continuous Cumulative Quantity (Cash Only)	x
23 - On and Off Book Cumulative Quantity (Cash and Derivatives)	x

Message Sending Rules:

Statistics message is sent each time a statistic is modified.

High and Low

- Daily High: Highest traded price for the current trading day.
- Daily Low: Lowest traded price for the current trading day.
- Yearly High: Highest traded price for the current Year, since January the first.
- Yearly Low: Lowest traded price for the current Year, since January the first.
- Lifetime High: Highest traded price for the instrument lifetime for booked trades only.

- Lifetime Low: Lowest traded price for the instrument lifetime for booked trades only.

Cumulative quantities

On Cash: MDG will deliver 4 cumulative quantity fields that will allow clients to compute all possible statistics based on this. These fields are:

- Off Book Cumulative Quantity: Cumulated volume traded outside the central order book and on regulated market since the start of the current trading session.
- On Book Auction Cumulative Quantity: Cumulated volume of regulated market trades done in Auction phase since the start of the current trading session.
- On Book Continuous Cumulative Quantity: Cumulated volume of regulated market trades done in Continuous phase since the start of the current trading session.
- On and Off Book Cumulative Quantity: Cumulated volume of trades on regulated market (in or outside the central order book) since the start of the current trading session. This is the sum of Off Book Cumulative Quantity, On Book Auction Cumulative Quantity and On Book Continuous Cumulative Quantity.

On Derivatives there is only one cumulative quantity:

- On and Off Book Cumulative Quantity: Cumulated volume of on-book and off-book trades since the start of the current trading session.

Other Statistics

- Percentage Variation Previous Close: Percentage of variation for price (or index) versus Last Adjusted Closing Price (LACP).
- Variation Last Price: Percentage variation of price with last reference price.
- Last Traded Price: The Last Traded Price indicates the price of last fill on an instrument.
- Open Price: Opening Price of the instrument.
- Trade Count: The number of trades done intra-day on the instrument.
  - For cash it is only for on-book trades.
  - For derivatives it is for both on-book and off-book on exchange.

Decimals for Statistics

For Statistics, the decimal field to apply on the “Stats Update Value” field will depend on the “Stats Update Type” field as follow:

- For prices and index levels, use the “Price/Index Decimals” field for:
  - High and Low (Stats Update Types: 5 to 10)
  - Open Price (Stats Update Type: 15)
  - Last Traded Price (Stats Update Type: 17)
- For quantities, use the “Quantity Decimals” field for:
  - Cumulatives Quantities (Stats Update Types: 19 to 23)
- For Ratio, use the « Ratio / Multiplier Decimals” field for:
  - Variation Last Price (Stats Update Type: 14)
  - Percentage Variation Previous Close (Stats Update Type: 18)

Trade cancellation in statistics

In case of a trade cancellation the statistics message will broadcast all the statistics updates. If the cancellation cancelled the only trade and there is no Valuation Price then the statistics will be set to null except for the Trade Count and the cumulative quantities.

Statistics after HA (for cash only)

The first statistics messages after a MDG HA will carry the most accurate and up to date statistics since some trades may not have been persisted (Clients can detect the a MDG restart with the “Packet Flags” when counter on bits between position 1 and 3 changes).

Field	Short Description	Format	Len	Values	Presence	Page
Market Data Sequence Number	Assigned by MDG for each message. Each channel has its own Market Data Sequence Number sequence.	Sequence	8	From 0 to 2^64-2	Mandatory	95
Rebroadcast Indicator	Indicates if this message is resent or new (1 if resent, 0 otherwise). For a snapshot, this field will always be set to '1'.	Numerical ID	1	From 0 to 2^8-2	Mandatory	118
Symbol Index	Exchange identification code of the instrument.	Numerical ID	4	From 0 to 2^32-2	Mandatory	124
Stats Update Type	Indicates the type of published statistics update.	Enumerated	1	(See field description)	Mandatory	122
Stats Update Value	Indicates the value of the published statistics update.	Signed Numerical	8	From -2^63+1 to 2^63-1	Optional	122

7.3.7 Real Time Index (1008)

A Real-Time Index message handles the real-time characteristics of an index: the level of the index, type of index level (opening index level, real-time, indicative level). This message is sent for:

- Stock Indices
- Strategy Indices
- Volatility Indices
- Indicative Net Asset Value (iNAV) of an ETF

Message Sending Rules:

Sending of these messages for a given index is conditioned by a flag configured at the index level. These conditions and the nature of these messages that are sent for each index are dependent on two factors:

- The publication mode of the index; there are three publication modes:
  - Continuous: Calculated index levels are published periodically, at a frequency that can be configured for each index. Currently an index that is published continuously can either be published every 15 seconds or every 30 seconds.
  - Discontinuous: A single Closing level (level 5) before the provisional closing phase, occurring at a time (a 'fixed time') that can be configured for each index
  - At closing only: No broadcast before the provisional closing phase
- The current calculation phase of the index

The following sections provide an overview of the different conditions at which an index level can be sent.

CAC 40 Index

At System Start-up

The Closing level of the index of the previous trading day (level 5) is sent at the start of each trading day in the referential.

During the Trading Session

Opening Kinematics

At the reception of the first trade price of any instrument that is part of the composition of the CAC 40, the index moves into the Session phase. If at this point 65% or more of the market cap of the index has traded, the Official Opening level (level 1) is calculated and published. The Official Opening level is based on the last trade prices or the last-adjusted closing price if a last traded price is not available. Subsequently, real-time Session levels (level 2) are calculated and published every 15 seconds.

If, at the opening of the index, less than 65% of the market cap of the index has traded, an Automatic Indicative level (level 3) is published every 15 seconds following the opening of the market until at least 65% of the market cap of the index has traded. Once this threshold of 65% has been reached (and the index is not in the 'Indicative' phase), the Official Opening level (level 1) is calculated and published. Subsequently, real-time Session levels (level 2) are calculated and published every 15 seconds.

For most other French indices, there are two thresholds that need to be reached for the index to send an official opening level:

At the opening of the market, at least 65% of the market cap needs to have traded. If at the opening of the market this threshold of 65% has not been reached, an Automatic indicative level (level 3) is sent every 15 seconds.

The Automatic indicative level continues to be sent every 15 seconds until a second threshold has been reached. For most French indices this second threshold is configured at 95% of the market cap. Once this second threshold has been reached, the Official Opening level (level 1) is calculated and published. Subsequently, real-time Session levels (level 2) are calculated and published every 15 seconds.

If the index remains in an Automatic Indicative state the entire day, the last Automatic Indicative index level (level 3) is considered to be the official close. (There is no official opening level in this case.)

As soon as 100% of the market cap of the non-regulated-halted constituents of the index has traded (and the index is not in 'indicative' state), the Reference level (level 4) is calculated and broadcasted. This level is calculated using only the opening (first trade) prices of its constituents.

Following the Opening

Once the Official Opening level (level 1) has been published, the real-time Session levels (level 2) are calculated and published every 15 seconds.

In the case of an 'Indicative' Phase:

The compiler can decide, following the opening of the index, to change the status of the index. This decision can be made if it is believed that circumstances prevent the proper calculation of the index. In this case, instead of the real-time Session level (level 2), an indicative level (level 0) is sent every 15 seconds. This level 0 is calculated by using the last-traded price or the last-adjusted closing price if a last traded price is not available.

The index levels that are calculated during the 'Indicative' status of an index are not taken into account to update the highest and the lowest levels of the index.

Once the compiler is sure that the index level is representative again, the real-time index levels (level 2) are calculated and published again every 15 seconds.

Options Liquidation Index (Level 7) for CAC 40

Definition / Purpose

- The liquidation index is used as a basis for the automatic exercise of options that are within the price range on their expiration date, as well as for the calculation of resulting payments.
- It is the average of the index level calculated every 15 seconds between 15:40 (CET) and 16:00 (CET). The result of the calculation is published every 15 seconds during the same time interval.
- This average is sent at each expiry date.

At the End of the Trading Day

When all Index instruments are closed, the index moves into the Temporary Closing phase. On a normal trading day, this occurs around 18:00:00 (CET). During this phase, the first Closing level (level 5), the first confirmation of the Reference level (level 6) and the first Index Summary message (message 1011) are published. During the Temporary Closing phase, Euronext can make any necessary adjustments to the index if deemed necessary. The Temporary Closing phase currently lasts 5 minutes.

At the end of the Closing delay, the index moves into the Final Closing phase. The second Closing level, the second confirmation of the Reference level (level 6) and the second Index summary message (message 1011) are published. Any adjustments that are made during the Temporary Closing Phase are taken into account in the second Closing level and the Index Summary message.

The first and second Closing levels (level 5) are calculated based on the last trades of the instruments that take part in the index. This level represents the official Closing Reference Level of the CAC 40.

The confirmation of the Reference level (level 6) is calculated using only the opening (first trade) prices of its constituents not taking into account any cancellation of opening trades.

AEX Index, BEL 20 Index and PSI 20 Index

At System Start-up

The Closing level of the index of the previous trading day (level 5) is sent at the start of each trading day in the referential.

During the Trading Session

Opening Kinematics

At the reception of the first trade price of any instrument that is part of the composition of the index, the index moves into the Session phase. If at this point 100% or more of the market cap of the index has traded, the Official Opening level (level 1) is calculated and published. The Official Opening level is based on the last trade prices, including previous day, adjusted closing prices. Subsequently, real-time Session levels (level 2) are calculated and published every 15 seconds.

If by 9:05 the threshold of 100% is still not met, the threshold is dropped to 80% (second threshold). As soon as 80% of the market cap is available any time after 09:05, the Official Opening level (level 1) is calculated and published followed by real-time Session levels (level 2).

From the opening of the index up until the first or second threshold is met, an Automatic Indicative level (level 3) is published every 15 seconds.

If the index remains in an Automatic Indicative state the entire day, the last Automatic Indicative index level (level 3) is considered to be the official close. (There is no official opening level in this case.)

Following the Opening

Once the Official Opening level (level 1) has been published, the real-time Session levels (level 2) are calculated and published every 15 seconds.

In the case of an 'Indicative' Phase:

The compiler can decide, following the opening of the index, to change the status of the index. This decision can be made if it is believed that circumstances prevent the proper calculation of the index. In this case, instead of the real-time Session level (level 2), an indicative level (level 0) is sent every 15 seconds. This level 0 is calculated by using the last-traded price or the last-adjusted closing price if a last-traded price is not available.

The index levels that are calculated during the 'Indicative' status of an index are not taken into account to update the highest and the lowest levels of the index.

Once the compiler is sure that the index level is representative again, the real-time index levels (level 2) are calculated and published again every 15 seconds.

Options Liquidation Index (Level 7) for AEX Index

Definition / Purpose

- The liquidation index is used as a basis for the automatic exercise of options that are within the price range on their expiration date, as well as for the calculation of resulting payments.
- It is the average of the index level calculated every 15 seconds between 15:30 (CET) and 16:00 (CET). The result of the calculation is published every minute during the same time interval.

At the End of the Trading Day

When all Index instruments are closed, the index moves into the Temporary Closing phase. On a normal trading day this occurs around 18:00:00 (CET). During this phase, the first Closing level (level 5) and the first Index Summary message (message 1011) are published. During the Temporary Closing phase, Euronext can make any necessary adjustments to the index if deemed necessary. The temporary Closing phase currently lasts 5 minutes.

At the end of the Closing delay, the index moves into the Final Closing phase. The second Closing level (level 5) and the second Index Summary message (message 1011) are published. Any adjustments that are made during the Temporary Closing Phase are taken into account in the second closing level and the Index Summary message.

The first and second Closing levels (level 5) are calculated based on the last trades of the instruments that take part of the composition of the index. This level represents the official Closing Reference Level of the index.

Field	Short Description	Format	Len	Values	Presence	Page
Market Data Sequence Number	Assigned by MDG for each message. Each channel has its own Market Data Sequence Number sequence.	Sequence	8	From 0 to 2^64-2	Mandatory	95
Rebroadcast Indicator	Indicates if this message is resent or new (1 if resent, 0 otherwise). For a snapshot, this field will always be set to '1'.	Numerical ID	1	From 0 to 2^8-2	Mandatory	118
EMM	Defines the Exchange Market Mechanism applied on each platform.	Enumerated	1	(See field description)	Mandatory	84
Event Time	Time when an event has been processed (Time in number of nanoseconds since 01/01/1970 UTC).	Epoch Time in Nanoseconds	8	From 0 to 2^64-2	Mandatory	85
Symbol Index	Exchange identification code of the instrument.	Numerical ID	4	From 0 to 2^32-2	Mandatory	124
Index Level	The value of the last level for the index that is the subject of this message (to be calculated with the Price/Index Level Decimals).	Price	8	From -2^63+1 to 2^63-1	Mandatory	88
Percentage of Capitalization	Percentage of capitalization for the active instruments in the index (to be calculated with the Ratio / Multiplier Decimals).	Numerical	8	From 0 to 2^64-2	Optional	113

Field	Short Description	Format	Len	Values	Presence	Page
Percentage Var from Prev Close	Percentage of variation for last price (or index) versus previous closing price (or closing reference price) (to be calculated with the Ratio / Multiplier Decimals).	Signed Numerical	8	From -2^63+1 to 2^63-1	Mandatory	113
Number Of Traded Instruments in Index	Number of traded instruments in the index.	Quantity	2	From 0 to 2^16-2	Optional	109
Index Level Type	Type of Index Level.	Enumerated	1	(See field description)	Mandatory	88
Index Price Code	Type of Price as positioned in Session High/Low or to indicate the trend or at the contrary the reference value from which the price may change.	Enumerated	1	(See field description)	Mandatory	88

7.3.8 Index Summary (1011)

The Index Summary message is sent twice at the end of the day in order to disseminate the final statistics related to an index, which aggregates daily data.

Message Sending Rules:

- Every trading day, for each index type 'stock index', two types of index summary messages are sent (this rules out iNAVs):
  - The first summary is sent when the index enters the provisional closing phase.
  - The second summary is sent when the index enters the final closing phase.

Field	Short Description	Format	Len	Values	Presence	Page
Market Data Sequence Number	Assigned by MDG for each message. Each channel has its own Market Data Sequence Number sequence.	Sequence	8	From 0 to 2^64-2	Mandatory	95
Rebroadcast Indicator	Indicates if this message is resent or new (1 if resent, 0 otherwise). For a snapshot, this field will always be set to '1'.	Numerical ID	1	From 0 to 2^8-2	Mandatory	118
EMM	Defines the Exchange Market Mechanism applied on each platform.	Enumerated	1	(See field description)	Mandatory	84
Event Time	Time when an event has been processed (Time in number of nanoseconds since 01/01/1970 UTC).	Epoch Time in Nanoseconds	8	From 0 to 2^64-2	Mandatory	85
Symbol Index	Exchange identification code of the instrument.	Numerical ID	4	From 0 to 2^32-2	Mandatory	124

Field	Short Description	Format	Len	Values	Presence	Page
Opening Level	Official Opening Index Level. This level corresponds to the Index Level Type 1 of the Real Time Index (1008) of the corresponding index (to be calculated with the Price/Index Level Decimals).	Price	8	From -2^63+1 to 2^63-1	Mandatory	109
Opening Time	Time of Official Opening level (Time in number of nanoseconds since 01/01/1970 UTC).	Epoch Time in Nanoseconds	8	From 0 to 2^64-2	Mandatory	109
Confirmed Reference Level	Confirmed Reference level. This level corresponds to the index Level Type 6 of the message Real Time Index (1008) of the corresponding index (to be calculated with the Price/Index Level Decimals).	Price	8	From -2^63+1 to 2^63-1	Optional	81
Confirmed Reference Time	Time of (Confirmed) Reference level (Time in number of nanoseconds since 01/01/1970 UTC).	Epoch Time in Nanoseconds	8	From 0 to 2^64-2	Optional	82
Closing Reference Level	Reference closing index level. This level corresponds to the Index Level Type 5 of the message Real Time Index (1008) of the corresponding index (to be calculated with the Price/Index Level Decimals).	Price	8	From -2^63+1 to 2^63-1	Mandatory	81
Closing Reference Time	Time of provisional closing reference index level (Time in number of nanoseconds since 01/01/1970 UTC).	Epoch Time in Nanoseconds	8	From 0 to 2^64-2	Mandatory	81
Percentage Var from Prev Close	Percentage of variation for last price (or index) versus previous closing price (or closing reference price) (to be calculated with the Ratio / Multiplier Decimals).	Signed Numerical	8	From -2^63+1 to 2^63-1	Mandatory	113
High Level	Highest index level (to be calculated with the Price/Index Level Decimals).	Price	8	From -2^63+1 to 2^63-1	Mandatory	87
High Time	Time of provisional highest index level (Time in number of nanoseconds since 01/01/1970 UTC).	Epoch Time in Nanoseconds	8	From 0 to 2^64-2	Mandatory	87
Low Level	Lowest index level (to be calculated with the Price/Index Level Decimals).	Price	8	From -2^63+1 to 2^63-1	Mandatory	93
Low Time	Time of provisional lowest index level (Time in number of nanoseconds since 01/01/1970 UTC).	Epoch Time in Nanoseconds	8	From 0 to 2^64-2	Mandatory	93

Field	Short Description	Format	Len	Values	Presence	Page
Liquidation Level	Index Level of reference at expiration settlement (to be calculated with the Price/Index Level Decimals).	Price	8	From -2^63+1 to 2^63-1	Optional	92
Liquidation Time	Time of provisional expiration settlement index level (Time in number of nanoseconds since 01/01/1970 UTC).	Epoch Time in Nanoseconds	8	From 0 to 2^64-2	Optional	92

7.4 SNAPSHOT MESSAGES

The Snapshot mechanism uses the same messages as the real-time feed.

When used for the snapshot, the messages have the field “Rebroadcast Indicator” set to “1”.

Message	Purpose	Sending rules
Start Of Snapshot (2101)	Defines the start of a snapshot sequence on all channels	This is the first message of a snapshot sequence. It contains the last Market Data Sequence Number from real-time that is contained in this snapshot sequence.
End Of Snapshot (2102)	Defines the end of a snapshot sequence on all channels	This is the last message of a snapshot sequence. It contains the last Market Data Sequence Number from real-time that is contained in this snapshot sequence.
Timetable (1006)	Provides all the scheduled events for the instruments	Only intraday modifications will be snapshotted. Otherwise, use the file servers to retrieve data.
Market Status Change (1005)	Notifies of a market status change along with its reason	Only the Last Market Status Change per Symbol Index and EMM will be sent.
Market Update (1001) for BBO (with Market Data Update Type set to “1” or “2” only)	Provides the Best Bid and the Best Offer for each instrument	Only the last Best Bid and the last Best Offer will be resent.
Market Update (1001)	Allows clients to rebuilt the book with full depth	Only for market by limits.
Order Update (1002)		Only for market by orders.
Price Update (1003)	Provides all last updated reference prices	Only last Price Update, for each Market Data Price Type, will be sent.
Full Trade Information (1004)	Provides Trade reporting for last trades	Only last 50 intraday trades and if they are not older than 15 minutes, for the whole instrument set on a given channel will be resent. Otherwise, refer to Full Trade Information files on file servers.
Statistics (1009)	Provides full statistics per instruments	Only last statistics will be sent. Clients might receive, in snapshot, statistics for an instrument in more than one packet.
Index Summary (1011)	Provides end of day index summary	Only the last message will be resent.
Real Time Index (1008)	Provides real-time index data	Only the last message will be resent.

Any message that is not in the above table will not be disseminated using the Snapshot mechanism.

7.4.1 Technical messages in Snapshot channels

Start of Day, Health Status and End of Day are also sent on the snapshot channels. They are not part of the Snapshot Sequence and should be processed separately by the clients. Customers need to take into account that they can also be sent between a Start of Snapshot and an End of snapshot messages.

In the Health Status, still on the snapshot channels, the Market Data Sequence Number is the MDSN of the last message sent by the aggregator of this channel. Please note that this Market Data Sequence Number may be different from the Last Market Data Sequence Number in the Start / End of Snapshot messages that matches the last real time message taken into account to build the snapshot.

7.4.2 Snapshot Sequence behaviour

The snapshot sequences start as soon as MDG is ready to broadcast messages (and not after the first real-time message is sent on the real-time channels) and stops only when MDG stops. So Start of Day, Health Status and End of Day messages will be sent along with the snapshots at the beginning of the day, during the day and at the end of the day respectively. At the beginning of the day the snapshots will contain only Start of Snapshot and End of Snapshot messages with no snapshotted messages in between and the Market Data Sequence Number in Start of Snapshot and End of Snapshot will be set to null.

The minimum period between two snapshot sequences for a given channel is set to 2 seconds all along the day.

The snapshot sequence provides messages for all instruments of the channel at the same time, as opposed to instrument by instrument.

7.4.3 Start Of Snapshot (2101)

Provides the Market Data Sequence Number of the last real-time message processed for this snapshot.

Last Market Data Sequence Number is set to null at the beginning of the day until another message than Start Of Day (1101) is broadcasted.

Message Sending Rules:

Start Of Snapshot message is always the first message of a snapshot sequence, and indicates the beginning of a snapshot sequence.

Field	Short Description	Format	Len	Values	Presence	Page
Last Market Data Sequence Number	Indicates the Market Data Message Sequence Number of the last real-time message processed for this snapshot.	Sequence	8	From 0 to 2^64-2	Optional	92
Snapshot Time	Indicates the time when snapshot generation has respectively started/ended in the Start Of Snapshot/End Of Snapshot message (Time in number of nanoseconds since 01/01/1970 UTC).	Epoch Time in Nanoseconds	8	From 0 to 2^64-2	Mandatory	121

7.4.4 End Of Snapshot (2102)

The End Of Snapshot message indicates the end of a snapshot sequence.

It provides the Market Data Sequence Number of the last real time message processed for this snapshot. It also indicates that processing queued messages from the real-time feed with a higher Market Data Sequence member is now possible.

Message Sending Rules:

End Of Snapshot message is always the last message of a snapshot sequence.

Field	Short Description	Format	Len	Values	Presence	Page
Last Market Data Sequence Number	Indicates the Market Data Message Sequence Number of the last real-time message processed for this snapshot.	Sequence	8	From 0 to 2^64-2	Optional	92
Snapshot Time	Indicates the time when snapshot generation has respectively started/ended in the Start Of Snapshot/End Of Snapshot message (Time in number of nanoseconds since 01/01/1970 UTC).	Epoch Time in Nanoseconds	8	From 0 to 2^64-2	Mandatory	121

8. FIELD DESCRIPTION

A

Amount Decimals

Field Name	Amount Decimals
Description	Indicates the number of decimals for each Amount related to this Symbol Index
Used For	Cash and Derivatives
Format	Decimal Places
Length	1
Possible Values	From 0 to 2^8-2
Used In	Standing Data (1007)

B

Block Trade Code

Field Name	Block Trade Code
Description	Indicates if trade relates to a block or a negotiated deal following MiFID rules.
Used For	Cash
Format	Enumerated
Length	1
Possible Values	B = Block Trade N = Regular trade or Negotiated deal - = (Hyphen) Undefined
Used In	Full Trade Information (1004)

Book State

Field Name	Book State
Description	Book State.
Used For	Cash and Derivatives
Format	Enumerated
Length	1
Possible Values	1 = Inaccessible 2 = Closed 3 = Call 4 = Uncrossing 5 = Continuous 6 = Halted 7 = Continuous Uncrossing (Warrants and Certificates Only) 8 = Suspended 9 = Reserved

Used In	Market Status Change (1005)

C

CFI

Field Name	CFI
Description	Classification code of a financial instrument defined by the ISO-10962:2015 standard.
Used For	Cash and Derivatives
Format	Text
Length	6
Possible Values	(See field description)
Used In	Standing Data (1007)

Closing Reference Level

Field Name	Closing Reference Level
Description	Reference closing index level. This level corresponds to the Index Level Type 5 of the message Real Time Index (1008) of the corresponding index (to be calculated with the Price/Index Level Decimals).
Used For	Cash
Format	Price
Length	8
Possible Values	From -2^63+1 to 2^63-1
Used In	Index Summary (1011)

Closing Reference Time

Field Name	Closing Reference Time
Description	Time of provisional closing reference index level (Time in number of nanoseconds since 01/01/1970 UTC).
Used For	Cash
Format	Epoch Time in Nanoseconds
Length	8
Possible Values	From 0 to 2^64-2
Used In	Index Summary (1011)

Confirmed Reference Level

Field Name	Confirmed Reference Level
Description	Confirmed Reference level. This level corresponds to the index Level Type 6 of the message Real Time Index (1008) of the corresponding index (to be calculated with the Price/Index Level Decimals).
Used For	Cash
Format	Price
Length	8
Possible Values	From -2^63+1 to 2^63-1

Used In	Index Summary (1011)

Confirmed Reference Time

Field Name	Confirmed Reference Time
Description	Time of (Confirmed) Reference level (Time in number of nanoseconds since 01/01/1970 UTC).
Used For	Cash
Format	Epoch Time in Nanoseconds
Length	8
Possible Values	From 0 to 2^64-2
Used In	Index Summary (1011)

Country Of Exchange

Field Name	Country Of Exchange
Description	Country of exchange is the Country associated to the MIC following ISO 3166 Alpha-3.
Used For	Cash and Derivatives
Format	Alphanumerical ID
Length	3
Possible Values	(See field description)
Used In	Standing Data (1007)

Currency Coefficient

Field Name	Currency Coefficient
Description	When an actual price is displayed in a different 'price expression' than the official instrument trading currency, the Currency Coefficient represents the ratio 'price expression' divided by 'official currency' (To be calculated with Ratio / Multiplier Decimals). For example a UK-listed instrument with its trading currency GBP having a price expressed in Pence, the Currency Coefficient will be 0.01 expressed with Currency Coefficient set to 1 and Ratio / Multiplier Decimals set to 2. The Currency Coefficient may be used for the Instrument Trading Price (the Referential field Trading Currency Indicator is then set to 1), and/or for the Derivatives and Warrants Instrument Strike Price (the Referential field Strike Currency Indicator is then set to 1).
Used For	Cash
Format	Numerical ID
Length	4
Possible Values	From 0 to 2^32-2
Used In	Standing Data (1007) Full Trade Information (1004)

D

Dark Eligibility

Field Name	Dark Eligibility
Description	Indicates the Eligibility to dark. 0 is not eligible, 1 is eligible.
Used For	Cash
Format	Boolean
Length	1
Possible Values	0 = False 1 = True
Used In	Standing Data (1007)

Dark LIS Threshold

Field Name	Dark LIS Threshold
Description	Defines the minimum amount of an order to benefit from the LIS (Large In Scale) pre-transparency waiver.
Used For	Cash
Format	Amount
Length	8
Possible Values	From 0 to 2^64-2
Used In	Standing Data (1007)

Dark Minimum Quantity

Field Name	Dark Minimum Quantity
Description	Defines the minimum quantity required for an order to be filled in the Dark liquidity. 0 indicates that no minimum amount is required.
Used For	Cash
Format	Quantity
Length	4
Possible Values	From 0 to 2^32-2
Used In	Standing Data (1007)

Date Of Last Trade

Field Name	Date Of Last Trade
Description	Date of the Last Price for the Instrument (in number of days since the 1st of January 1970).
Used For	Cash
Format	Date
Length	2
Possible Values	From 0 to 2^16-2
Used In	Standing Data (1007)

Depositary List

Field Name	Depositary List
Description	Identifies the possible main depository organizations (maximum four) for shares or fixed income. Use the clearing house to determine the relevant system for settling trades. Valid values are: - '00001' – Euroclear France - '00002' – CIK (Belgium) - '00003' – NECIGEF (the Netherlands) - '00004' – X/N (BoB service) - '00005' – VIF (non-fungible Belgian instruments) - '00006' – Euroclear Bank - '00007' – NIEC - '00008' – Physical - '00009' – Euronext Paris non Euroclear France - '00010' – Interbolsa - '00000' – No depository organization - 'Nulls' – Not significant
Used For	Cash
Format	Text
Length	20
Possible Values	(See field description)
Used In	Standing Data (1007)

E

Effective Date Indicator

Field Name	Effective Date Indicator
Description	Indicates if the trade is introduced on the trading session day or earlier.
Used For	Cash and Derivatives
Format	Enumerated
Length	1
Possible Values	0 = If the seller declaration is received on the current trading session day 1 = If seller declaration is received before the current trading session day
Used In	Full Trade Information (1004)

EMM

Field Name	EMM
Description	Defines the Exchange Market Mechanism applied on each platform.
Used For	Cash and Derivatives
Format	Enumerated
Length	1
Possible Values	1 = Cash and Derivative Central Order Book (COB) 2 = NAV Trading Facility (Cash Only) 4 = Derivative Wholesales (Derivatives Only)

	5 = Cash On Exchange Off book (Cash Only) 6 = Euronext off-exchange trade reports 7 = Derivative On Exchange Off book (Derivatives Only) 8 = ETF MTF - NAV Central Order Book (Cash Only) 99 = Not Applicable (For indices and iNAV) (Cash Only)
Used In	Standing Data (1007) Timetable (1006) Market Update (1001) Order Update (1002) Price Update (1003) Full Trade Information (1004) Market Status Change (1005) Real Time Index (1008) Index Summary (1011)

End Time Vwap

Field Name	End Time Vwap
Description	End time for the Volume Weight Average price computation period (Number of seconds since the beginning of the day).
Used For	Cash
Format	Intraday Time in Seconds
Length	4
Possible Values	From 0 to 2^32-2
Used In	Full Trade Information (1004)

Event Time

Field Name	Event Time
Description	Time when an event has been processed (Time in number of nanoseconds since 01/01/1970 UTC).
Used For	Cash and Derivatives
Format	Epoch Time in Nanoseconds
Length	8
Possible Values	From 0 to 2^64-2
Used In	Health Status (1103) Market Update (1001) Order Update (1002) Price Update (1003) Full Trade Information (1004) Market Status Change (1005) Real Time Index (1008) Index Summary (1011)

F

First Settlement Date

Field Name	First Settlement Date
Description	Represents the first possible settlement date for a given instrument. This information is always populated when instruments are admitted to listing / trading under an As If and When Issued / Delivered scheme (or “Promesses”). When this date is not provided, it means that the first possible settlement date is the same as the first trading date (in number of days since the 1st of January 1970).
Used For	Cash
Format	Date
Length	2
Possible Values	From 0 to 2^16-2
Used In	Standing Data (1007)

Full Instrument Name

Field Name	Full Instrument Name
Description	Full Instrument Name.
Used For	Cash
Format	Text
Length	102
Possible Values	(See field description)
Used In	Standing Data (1007)

G

Guarantee Indicator

Field Name	Guarantee Indicator
Description	Indicates if the trade is guaranteed or not (for clearing purpose)
Used For	Cash
Format	Enumerated
Length	1
Possible Values	0 = This instrument is not guaranteed 1 = This instrument is guaranteed 2 = This instrument is not clearable 8 = This instrument is part of Cleared Borrowing and Lending Service (CBLM) and is guaranteed
Used In	Standing Data (1007)

H

High Level

Field Name	High Level
Description	Highest index level (to be calculated with the Price/Index Level Decimals).
Used For	Cash
Format	Price
Length	8
Possible Values	From -2^63+1 to 2^63-1
Used In	Index Summary (1011)

High Time

Field Name	High Time
Description	Time of provisional highest index level (Time in number of nanoseconds since 01/01/1970 UTC).
Used For	Cash
Format	Epoch Time in Nanoseconds
Length	8
Possible Values	From 0 to 2^64-2
Used In	Index Summary (1011)

I

ICB

Field Name	ICB
Description	Identifies for a listed instrument, the economic subsector of the issuing company in the ICB (Industry Classification Benchmark) classification.
Used For	Cash
Format	Alphanumerical ID
Length	16
Possible Values	(See field description)
Used In	Standing Data (1007)

Imbalance Quantity

Field Name	Imbalance Quantity
Description	Imbalance volume quantity if Uncrossing occurs at this moment. This volume includes hidden quantity (to be calculated with Quantity Decimals).
Used For	Cash
Format	Quantity
Length	8
Possible Values	From 0 to 2^64-2

Used In	Price Update (1003)

Imbalance Quantity Side

Field Name	Imbalance Quantity Side
Description	Side of the imbalance volume if the Uncrossing occurs at this moment.
Used For	Cash
Format	Enumerated
Length	1
Possible Values	0 = No imbalance 1 = Buy 2 = Sell
Used In	Price Update (1003)

Index Level

Field Name	Index Level
Description	The value of the last level for the index that is the subject of this message (to be calculated with the Price/Index Level Decimals).
Used For	Cash
Format	Price
Length	8
Possible Values	From -2^63+1 to 2^63-1
Used In	Real Time Index (1008)

Index Level Type

Field Name	Index Level Type
Description	Type of Index Level.
Used For	Cash
Format	Enumerated
Length	1
Possible Values	0 = Indicative Index 1 = Official Opening Index 2 = Real-Time Index 3 = Automatic Indicative Index 4 = (Preliminary) Reference Index 5 = Closing Reference Index 6 = (Confirmed) Reference Index 7 = Options Liquidation Index
Used In	Real Time Index (1008)

Index Price Code

Field Name	Index Price Code
Description	Type of Price as positioned in Session High/Low or to indicate the trend or at the contrary the reference

	value from which the price may change.
Used For	Cash
Format	Enumerated
Length	1
Possible Values	0 = Only Index 1 = Index and Session High 2 = Index and Session Low 3 = Index and Session High and Low (typically first price) 4 = Only Session High 5 = Only Session Low 6 = Previous Day Close
Used In	Real Time Index (1008)

Instrument Event Date

Field Name	Instrument Event Date
Description	Date of the last instrument characteristic modification(s) except for some exceptions. The following exceptions (since they are modified every day) are not updating the Event Date and allow members to know when a change occurs on instrument characteristics: - Previous day's adjusted closing price (LastAdjPrice) - Previous day capital traded (Prev Day Capital Traded) - Number of shares for this instrument traded on previous day (Previous Volume Traded) - Date instrument last traded (DateOfLastTrade) (in number of days since the 1st of January 1970).
Used For	Cash and Derivatives
Format	Date
Length	2
Possible Values	From 0 to 2^16-2
Used In	Standing Data (1007)

Instrument Group Code

Field Name	Instrument Group Code
Description	Instrument Group / Class Identifier.
Used For	Cash
Format	Alphanumerical ID
Length	2
Possible Values	(See field description)
Used In	Standing Data (1007)

Instrument Name

Field Name	Instrument Name
Description	Instrument Name
Used For	Cash
Format	Text
Length	18

Possible Values	(See field description)
Used In	Standing Data (1007)

Instrument Trading Code

Field Name	Instrument Trading Code
Description	Is the AMR code on derivatives and the Trading Code on cash. Cash: Trading code is a 12-character string, the only instrument identifier that is unique in the feed in addition to the symbol index. Derivatives: The AMR code is a 15-character string, allocated by the trading engine. It is unique per instrument.
Used For	Cash and Derivatives
Format	Alphanumerical ID
Length	15
Possible Values	(See field description)
Used In	Standing Data (1007)

Instrument Unit Expression

Field Name	Instrument Unit Expression
Description	Unit in which the instrument is quoted.
Used For	Cash and Derivatives
Format	Enumerated
Length	1
Possible Values	1 = Units 2 = Percentage of Nominal Excluding Accrued Interest (Clean) 3 = Basis Points 5 = Percentage of Nominal Including Accrued Interest (Dirty) 8 = Kilograms 9 = Ounces
Used In	Standing Data (1007)

ISIN Code

Field Name	ISIN Code
Description	Instrument ISIN following ISO 6166. Identifier of a product. Combined with MIC and Currency, identifies an instrument traded on a given market using a given currency.
Used For	Cash and Derivatives
Format	Alphanumerical ID
Length	12
Possible Values	(See field description)
Used In	Standing Data (1007)

Issue Price

Field Name	Issue Price
Description	Issuing price of the instrument (to be calculated with Issue Price Decimals).
Used For	Cash
Format	Price
Length	8
Possible Values	From -2^63+1 to 2^63-1
Used In	Standing Data (1007)

Issue Price Decimals

Field Name	Issue Price Decimals
Description	Indicates the number of decimals for Issue Price related to this Symbol Index
Used For	Cash
Format	Decimal Places
Length	1
Possible Values	From 0 to 2^8-2
Used In	Standing Data (1007)

Issuing Country

Field Name	Issuing Country
Description	Issuing country. Provides the ISO 3166 (Alpha 3) code for the country of headquarter company that issued the instrument.
Used For	Cash
Format	Alphanumerical ID
Length	3
Possible Values	(See field description)
Used In	Standing Data (1007)

L

Last Adjusted Closing Price

Field Name	Last Adjusted Closing Price
Description	Last traded price of the previous trading day after application of the adjustment coefficient (to be calculated with the Price/Index Level Decimals). Not provided for European instruments.
Used For	Cash
Format	Price
Length	8
Possible Values	From -2^63+1 to 2^63-1
Used In	Standing Data (1007)

Last Market Data Sequence Number

Field Name	Last Market Data Sequence Number
Description	Indicates the Market Data Message Sequence Number of the last real-time message processed for this snapshot.
Used For	Cash and Derivatives
Format	Sequence
Length	8
Possible Values	From 0 to 2^64-2
Used In	Start Of Snapshot (2101) End Of Snapshot (2102)

Liquid Instrument Indicator

Field Name	Liquid Instrument Indicator
Description	Indicates whether the instrument is liquid or not, as defined per MiFID II. (0 = Illiquid ; 1 = Liquid)
Used For	Derivatives
Format	Boolean
Length	1
Possible Values	0 = False 1 = True
Used In	Standing Data (1007)

Liquidation Level

Field Name	Liquidation Level
Description	Index Level of reference at expiration settlement (to be calculated with the Price/Index Level Decimals).
Used For	Cash
Format	Price
Length	8
Possible Values	From -2^63+1 to 2^63-1
Used In	Index Summary (1011)

Liquidation Time

Field Name	Liquidation Time
Description	Time of provisional expiration settlement index level (Time in number of nanoseconds since 01/01/1970 UTC).
Used For	Cash
Format	Epoch Time in Nanoseconds
Length	8
Possible Values	From 0 to 2^64-2
Used In	Index Summary (1011)

Lot Size

Field Name	Lot Size
Description	For cash instruments with Quantity Notation = “UNT”: The Lot Size is the minimum tradable quantity that is set for each instrument by the Exchange. The quantity has to be a multiple of the Lot Size. For cash instruments with Quantity Notation = “FMT”: The Lot Size has to be considered with the data “Par value”, and the order quantity has to be a multiple of this Par value. For derivatives: The Lot Size represents the amount of underlying instrument per one unit of a derivative contract (to be calculated with the Quantity Decimals).
Used For	Cash and Derivatives
Format	Quantity
Length	8
Possible Values	From 0 to 2^64-2
Used In	Standing Data (1007)

Low Level

Field Name	Low Level
Description	Lowest index level (to be calculated with the Price/Index Level Decimals).
Used For	Cash
Format	Price
Length	8
Possible Values	From -2^63+1 to 2^63-1
Used In	Index Summary (1011)

Low Time

Field Name	Low Time
Description	Time of provisional lowest index level (Time in number of nanoseconds since 01/01/1970 UTC).
Used For	Cash
Format	Epoch Time in Nanoseconds
Length	8
Possible Values	From 0 to 2^64-2
Used In	Index Summary (1011)

M

Main Depositary

Field Name	Main Depositary
Description	Identifies the default (or main) depository organization of the instrument (between the possible 4 depositaries registered) used by priority for the settlement (for example: multi-listed instruments which have several depositories). For Cash Markets this data has to be treated in consideration of the data Depositary List used by the clearing house to determine the relevant system for settling trades. Valid values are the same as for “Depositary List”. Valid values are:

	- '00001' – Euroclear France - '00002' – Euroclear Belgium - '00003' – Euroclear Nederland - '00004' – X/N National Bank of Belgium - '00005' – VIF (non-fungible Belgian instruments) - '00006' – Euroclear Bank - '00008' – Physical - '00010' – Interbolsa - '00000' – No depository organization - 'Nulls' – Not significant
Used For	Cash and Derivatives
Format	Alphanumerical ID
Length	5
Possible Values	(See field description)
Used In	Standing Data (1007)

Market Data Action Type

Field Name	Market Data Action Type
Description	Identifies if the order is a New Order, a Deletion, a Modification or a Retransmission.
Used For	Cash
Format	Enumerated
Length	1
Possible Values	1 = New Order 2 = Deletion of order identified by Previous Priority 3 = Deletion of all orders for the given instrument (depending on the side. If side is not provided, it means both) 4 = Modification of existing order Without Loss Of Priority 5 = Retransmission of all orders for the given instrument 6 = Modification of existing order With Loss Of Priority
Used In	Order Update (1002)

Market Data Change Type

Field Name	Market Data Change Type
Description	Type of scheduled change.
Used For	Cash and Derivatives
Format	Enumerated
Length	1
Possible Values	0 = Status Change(s) 1 = Scheduled Event Notification 2 = Status Change(s) and Scheduled Event Notification
Used In	Market Status Change (1005)

Market Data Price Type

Field Name	Market Data Price Type

Description	Type of price update (note: 1 to 9 are settlement price type).
Used For	Cash and Derivatives
Format	Enumerated
Length	1
Possible Values	2 = Official Daily (Derivatives Only) 4 = Official Market Close (Derivatives Only) 6 = Official Expiry (Derivatives Only) 7 = Provisional Intraday (Derivatives Only) 8 = Official Intraday (Derivatives Only) 9 = Official YDSP (Derivatives Only) 10 = Net Asset Value (+/-) for the instruments eligible to the NAV Trading Facility (Cash Only) 12 = Adjusted Closing Price (Cash Only) 13 = Subscription Price (Cash Only) 14 = Indicative Matching Price (Cash and Derivatives) 19 = Min Price Out of Session Trades (Cash Only) 20 = Max Price Out of Session Trades (Cash Only) 21 = Min Price Out of Session Block Trades (Cash Only) 22 = Max Price Out of Session Block Trades (Cash Only) 23 = Valuation Price (Cash Only) 24 = Fund Subscription (Cash Only) 25 = Fund Redemption (Cash Only) 26 = Uncrossing Price (Cash and Derivatives) 27 = Last Traded Price (Cash and Derivatives) 28 = Alternative Indicative Price (AIP) (Cash Only) 30 = Net Asset Value (Cash Only)(NAV)
Used In	Price Update (1003)

Market Data Sequence Number

Field Name	Market Data Sequence Number
Description	Assigned by MDG for each message. Each channel has its own Market Data Sequence Number sequence. This sequence will always increment but not by 1 during the day, except for “Health Status” messages that will contain the Market Data Sequence Number of the last message (that is not a “Health Status” message) sent on the channel.
Used For	Cash and Derivatives
Format	Sequence
Length	8
Possible Values	From 0 to 2^64-2
Used In	Start Of Day (1101) End Of Day (1102) Health Status (1103) Technical Notification (1106) Standing Data (1007) Timetable (1006) Market Update (1001) Order Update (1002) Price Update (1003) Full Trade Information (1004) Market Status Change (1005) Statistics (1009) Real Time Index (1008)

	Index Summary (1011)

Market Data Update Type

Field Name	Market Data Update Type
Description	Type of market data update.
Used For	Cash and Derivatives
Format	Enumerated
Length	1
Possible Values	1 = Best Bid (Cash and Derivatives) 2 = Best Offer (Cash and Derivatives) 3 = New Bid (Cash and Derivatives) 4 = New Offer (Cash and Derivatives) 5 = Updated Bid (Cash and Derivatives) 6 = Updated Offer (Cash and Derivatives) 7 = Total Traded Volume (Derivatives Only) 8 = Implied Bid (Derivatives Only) 9 = Implied Offer (Derivatives Only) 10 = Request for Quote (Cash and Derivatives) 11 = Request for Quote Bid (Cash Only) 12 = Request for Size (Cash Only) 13 = Request for Quote Offer (Cash) 14 = High Dynamic Collar (Cash Only) 15 = Low Dynamic Collar (Cash Only) 16 = New Bid RLP (Retail Liquidity Provider) (Cash Only) 17 = New Offer RLP (Retail Liquidity Provider) (Cash Only) 18 = Updated Bid RLP Retail Liquidity Provider) (Cash Only) 19 = Updated Offer RLP (Retail Liquidity Provider) (Cash Only) 24 = Conventional Trade (Cash and Derivatives) 25 = Request for Cross (RFC) Queued (Derivatives Only) 26 = Request for Cross (RFC) (Derivatives Only) 27 = Large in Scale (LiS) Trade (Derivatives Only) 28 = Basis Trade (Derivatives Only) 29 = Large in Scale (LiS) Package Trade (Derivatives Only) 30 = Guaranteed Cross Trade (Cash and Derivatives) 31 = Against Actual Trade (Derivatives Only) 32 = Asset Allocation Trade (Derivatives Only) 34 = Exchange for Swap Trade (Derivatives Only) 35 = Dark Trade (Cash Only) 36 = Exchange for Physical Trade - Cash Leg (Cash Only) 37 = Strategy Leg Conventional Trade (Derivatives Only) 38 = Strategy Leg Large in Scale (LiS) Trade (Derivatives Only) 39 = Strategy Leg Basis Trade (Derivatives Only) 40 = Strategy Leg Guaranteed Cross Trade (Derivatives Only) 41 = Strategy Leg Against Actual Trade (Derivatives Only) 42 = Strategy Leg Asset Allocation Trade (Derivatives Only) 44 = Strategy Leg Exchange For Swap Trade (Derivatives Only) 45 = Strategy Leg Exchange For Physical Trade (Derivatives Only) 46 = BoB Trade (Cash Only) 48 = AtomX Trade (Derivatives Only) 50 = Trade Cancellation (Cash and Derivatives) 51 = Out of Market Trade (Cash Only)

	52 = Delta Neutral Trade - Underlying Cash Leg (Cash Only) 53 = Delta Neutral Trade - Underlying Future Leg (Derivatives Only) 54 = Euronext Fund Service Trade (Cash Only) 55 = Secondary Listing Trade (Cash Only) 56 = Request for Cross Trade (Derivatives Only) 57 = Request for Cross Strategy Leg Trade (Derivatives Only) 58 = New Bid With Liquidity Provider (Cash Only) 59 = New Offer With Liquidity Provider (Cash Only) 60 = Updated Bid With Liquidity Provider (Cash Only) 61 = Updated Offer With Liquidity Provider (Cash Only) 63 = Low Static Collar (Cash Only) 64 = High Static Collar (Cash Only) 65 = Market VWAP Operation Trade 66 = Request for Size Bid(Cash Only) 67 = Request for Size Offer(Cash Only) 70 = Low LP Collar (Cash Only) 71 = High LP Collar (Cash Only) 72 = ETF-MTF NAV Trade (price in basis points) (Cash Only) - For Future Use 73 = ETF-MTF NAV Dark Trade (price in basis points) (Cash Only) - For Future Use 74 = New Bid on Wholesale RFC 75 = New Offer on Wholesale RFC 76 = Updated Bid on Wholesale RFC 77 = Updated Offer on Wholesale RFC 78 = Clear Wholesale RFC 254 = Clear Book (Cash and Derivatives)
Used In	Market Update (1001)

Market Model

Field Name	Market Model
Description	Market Model identifier.
Used For	Cash
Format	Enumerated
Length	1
Possible Values	1 = Order Driven 2 = Quote Driven 3 = IPO 4 = Primary Market 5 = RFQ
Used In	Standing Data (1007)

Market Of Reference MIC

Field Name	Market Of Reference MIC
Description	Indicates the instrument Exchange of Reference by its MIC (Market Identification Code according to ISO 10383) (For Future Use).
Used For	Cash
Format	Alphanumerical ID
Length	4
Possible Values	(See field description)

Used In	Standing Data (1007) Full Trade Information (1004)

Maturity Date

Field Name	Maturity Date
Description	Maturity Date of the instrument (text formatted as YYYYMMDD). For contracts with one expiry per month the day component may be "00" (text formatted as YYYYMMDD). For AtomX instruments this field contains the exact expiry date. For repo (repurchase agreement) it represents the inclusive date until which a lending/borrowing contract can be traded.
Used For	Cash and Derivatives
Format	Text
Length	8
Possible Values	(See field description)
Used In	Standing Data (1007)

Maximum Decimals In Quantity

Field Name	Maximum Decimals In Quantity
Description	Maximum Decimals In Quantity was introduced for Euronext Fund Services Paris and indicates the maximum of relevant decimal number for trading.
Used For	Cash
Format	Numerical
Length	1
Possible Values	From 0 to 2^8-2
Used In	Standing Data (1007)

MIC

Field Name	MIC
Description	Identifies the market to which an instrument belongs by its MIC (Market Identification Code), segment MIC according to ISO 10383. Euronext owns the following MICs: - 'ALXA' – ALTERNEXT AMSTERDAM - 'ALXB' – EURONEXT GROWTH BRUSSELS - 'ALXL' - EURONEXT GROWTH LISBON - 'ALXP' – EURONEXT GROWTH PARIS - 'EMTF' – EURO MTF - 'ENXB' – EURONEXT - EASY NEXT - 'ENXL' – EURONEXT ACCESS LISBON - 'MFOX' - EURONEXT - MERCADO DE FUTUROS E OPÇÕES - 'MLXB' - EURONEXT ACCESS BRUSSELS - 'TNLA' – EURONEXT - TRADED BUT NOT LISTED AMSTERDAM - 'TNLB' – EURONEXT – TRADING FACILITY BRUSSELS - 'VPXB' - EURONEXT - VENTES PUBLIQUES BRUSSELS - 'WQXL' – EURONEXT - MARKET WITHOUT QUOTATIONS LISBON - 'XAMS' – EURONEXT - EURONEXT AMSTERDAM - 'XBRD' - EURONEXT - EURONEXT BRUSSELS - DERIVATIVES

	- 'XBRU' – EURONEXT - EURONEXT BRUSSELS - 'XEUC' - EURONEXT COM, COMMODITIES FUTURES AND OPTIONS - 'XEUE' - EURONEXT EQF, EQUITIES AND INDICES DERIVATIVES - 'XEUI' - EURONEXT IRF, INTEREST RATE FUTURE AND OPTIONS - 'XLDN' – EURONEXT - EURONEXT LONDON - 'XLIS' – EURONEXT - EURONEXT LISBON - 'XLUX' – LUXEMBOURG STOCK EXCHANGE - 'XMAT' - EURONEXT PARIS MATIF - 'XMLI' – EURONEXT ACCESS PARIS - 'XMON' - EURONEXT PARIS MONEP - 'XOTH' - Others - This MIC is not registered. It is use for testing purpose in both p-EUA and Production. - 'XPAR' – EURONEXT - EURONEXT PARIS - 'XSPM' - EURONEXT STRUCTURED PRODUCTS MTF
Used For	Cash and Derivatives
Format	Alphanumerical ID
Length	4
Possible Values	(See field description)
Used In	Standing Data (1007)

MIC List

Field Name	MIC List
Description	Identifies the Euronext markets on which an instrument is listed by its MIC (Market Identification Code). For an instrument listed on a single Euronext market, the listing MIC code is the same than “Market Identification Code (MIC) of the listed instrument” For an instrument listed on several Euronext Markets: - The first MIC is the same than the “Market Identification Code (MIC) of the listed instrument - The others MIC indicate the other listing places
Used For	Cash and Derivatives
Format	Alphanumerical ID
Length	20
Possible Values	(See field description)
Used In	Standing Data (1007)

MiFID Clearing Flag

Field Name	MiFID Clearing Flag
Description	Code to identify whether the transaction will be cleared. - 'true': Transaction to be cleared. - 'false': Transaction not to be cleared.
Used For	Derivatives
Format	Text
Length	5
Possible Values	(See field description)
Used In	Full Trade Information (1004)

MiFID Currency

Field Name	MiFID Currency

Description	Currency in which the price is expressed (applicable if the price is expressed as monetary value) following ISO 4217 standard.
Used For	Cash and Derivatives
Format	Alphanumerical ID
Length	3
Possible Values	(See field description)
Used In	Full Trade Information (1004)

MiFID Emission Allowance Type

Field Name	MiFID Emission Allowance Type
Description	This field is only applicable for emission allowances. Possible values: - 'EUAE' – European Union Allowances (EUA) - 'CERE' - Certified Emission Reductions (CER) - 'ERUE' - Emission Reduction Units (ERU) - 'EUAA' - European Union Aviation Allowances (EUAA) - 'OTHR' – Other (for derivatives only)
Used For	Derivatives
Format	Text
Length	4
Possible Values	(See field description)
Used In	Full Trade Information (1004)

MiFID Execution ID

Field Name	MiFID Execution ID
Description	MiFID Transaction Identification Code is composed of the Symbol Index (on 10 characters), the EMM (on 3 characters) and the Execution ID (on 10 characters). It is a unique Execution ID by instrument per day on the different available EMM. Example: Trade done with Execution Id: 42 on the Symbol Index: 1384659 on EMM: 1 (COB) will have this MiFID Execution ID: 00013846590010000000042.
Used For	Cash and Derivatives
Format	Alphanumerical ID
Length	52
Possible Values	(See field description)
Used In	Full Trade Information (1004)

MiFID Instrument ID

Field Name	MiFID Instrument ID
Description	Code used to identify the financial instrument. This code has to be processed with the MiFID Instrument ID Type.
Used For	Cash and Derivatives
Format	Alphanumerical ID
Length	12

Possible Values	(See field description)
Used In	Full Trade Information (1004)

MiFID Instrument ID Type

Field Name	MiFID Instrument ID Type
Description	Code type used to identify the financial instrument. Possible values: - 'ISIN' = ISIN code, where ISIN is available. - 'OTHR' = other identifier.
Used For	Cash and Derivatives
Format	Text
Length	4
Possible Values	(See field description)
Used In	Full Trade Information (1004)

MiFID Notional Amount

Field Name	MiFID Notional Amount
Description	Nominal amount or notional amount. For spread bets, the notional amount shall be the monetary value wagered per point movement in the underlying financial instrument. For credit default swaps, it shall be the notional amount for which the protection is acquired or disposed of. Possible values: - Maximum of 18 digits with a maximum of 5 decimals. Note: Decimal separator is '.' (full stop).
Used For	Cash and Derivatives
Format	Text
Length	20
Possible Values	(See field description)
Used In	Full Trade Information (1004)

MiFID Price

Field Name	MiFID Price
Description	Traded price of the transaction excluding, where applicable, commission and accrued interest. Where price is reported in monetary terms, it shall be provided in the major currency unit. Where price is currently not available but pending, the value should be 'PNDG'. Where price is not applicable the field shall not be populated. Possible values: - For price expressed as monetary value: maximum of 18 digits with a maximum of 13 decimals. - For price expressed as percentage or yield: maximum of 11 digits with a maximum of 10 decimals. - For not available price (only for derivatives): 'PNDG'. Note 1: Decimal separator is '.' (full stop). Note 2: Negative numbers are prefixed with '-' (minus).

	Note 3: Where applicable, values shall be rounded and not truncated.
Used For	Cash and Derivatives
Format	Text
Length	20
Possible Values	(See field description)
Used In	Full Trade Information (1004)

MiFID Price Notation

Field Name	MiFID Price Notation
Description	Indication as to whether the price is expressed in monetary value, in percentage or in yield. Possible values: 'MONE' – Monetary value 'PERC' – Percentage 'YIEL' – Yield 'BAPO' – Basis points.
Used For	Cash and Derivatives
Format	Text
Length	4
Possible Values	(See field description)
Used In	Full Trade Information (1004)

MiFID Qty in Measurement Unit Notation

Field Name	MiFID Qty in Measurement Unit Notation
Description	Indication of measurement units in which the quantity in measurement unit is expressed. Possible values: 'TOCD' – tons of carbon dioxide equivalent Or {ALPHANUM-25} otherwise.
Used For	Cash and Derivatives
Format	Text
Length	25
Possible Values	(See field description)
Used In	Full Trade Information (1004)

MiFID Quantity

Field Name	MiFID Quantity
Description	Number of units of the financial instrument. The nominal or monetary value of the financial instrument. Possible values: - For quantity expressed as number of units: maximum of 18 digits with a maximum of 17 decimals. - For quantity expressed as monetary or nominal value: maximum of 18 digits with a maximum of 5 decimals. Note 1: Decimal separator is '.' (full stop).
Used For	Cash and Derivatives
Format	Text

Length	20
Possible Values	(See field description)
Used In	Full Trade Information (1004)

MiFID Quantity Measurement Unit

Field Name	MiFID Quantity Measurement Unit
Description	The equivalent amount of commodity or emission allowance traded expressed in measurement unit Possible values: - For quantity expressed as number of units: maximum of 18 digits with a maximum of 17 decimals. Note: Decimal separator is '.' (full stop).
Used For	Cash and Derivatives
Format	Text
Length	20
Possible Values	(See field description)
Used In	Full Trade Information (1004)

MMT Agency Cross Trade Indicator

Field Name	MMT Agency Cross Trade Indicator
Description	Defines the agency cross trade indicator following MMT level 3.3. Possible values: - 'ACTX': Agency Cross Trade - '-': No Agency Cross Trade
Used For	Cash and Derivatives
Format	Text
Length	4
Possible Values	(See field description)
Used In	Full Trade Information (1004)

MMT Algorithmic Indicator

Field Name	MMT Algorithmic Indicator
Description	Defines the algorithmic indicator following MMT level 3.9. Possible values: - 'ALGO': Algorithmic Trade - '-': No Algorithmic Trade
Used For	Cash
Format	Text
Length	4
Possible Values	(See field description)
Used In	Full Trade Information (1004)

MMT Benchmark Indicator

Field Name	MMT Benchmark Indicator

Description	Defines the benchmark indicator or the reference price indicator following MMT level 3.5. Possible values: - 'BENC': Benchmark Trade - 'RFPT': Reference Price Trade - '-': No Benchmark or Reference Price Trade
Used For	Cash and Derivatives
Format	Text
Length	4
Possible Values	(See field description)
Used In	Full Trade Information (1004)

MMT Contribution to Price

Field Name	MMT Contribution to Price
Description	Defines the contribution to price or the price discovery process following MMT level 3.8. Possible values: - 'P': Plain-Vanilla Trade - 'NPFT': Non-Price Forming Trade (formerly known as the Technical Trade) - 'TNCP': Trade not Contributing to the Price Discovery Process
Used For	Cash and Derivatives
Format	Text
Length	4
Possible Values	(See field description)
Used In	Full Trade Information (1004)

MMT Duplicative Indicator

Field Name	MMT Duplicative Indicator
Description	Defines the duplicative indicator following MMT level 5. Possible values: - 'DUPL': Duplicative Trade Report (reported to more than one APA) - '-': Unique Trade Report
Used For	Cash
Format	Text
Length	4
Possible Values	(See field description)
Used In	Full Trade Information (1004)

MMT Market Mechanism

Field Name	MMT Market Mechanism
Description	Defines the fundamental functional market mechanism that has facilitated the trade following MMT level 1.
Used For	Cash and Derivatives
Format	Enumerated
Length	1
Possible Values	1 = Central Limit Order Book

	2 = Quote Driven Market 3 = Dark Order Book 4 = Off Book (including Voice or Messaging Trading) 5 = Periodic Auction (= Uncrossing) 6 = Request for Quotes
Used In	Full Trade Information (1004)

MMT Modification Indicator

Field Name	MMT Modification Indicator
Description	Defines the modification indicator following MMT level 3.4. Possible values: - 'CANC': Trade Cancellation - 'AMND': Trade Amendment - '-': New Trade
Used For	Cash and Derivatives
Format	Text
Length	4
Possible Values	(See field description)
Used In	Full Trade Information (1004)

MMT Negotiation Indicator

Field Name	MMT Negotiation Indicator
Description	Defines the negotiation indicator or pre-trade transparency waiver following MMT level 3.2. Possible values: - 'N': Negotiated Trade - 'NLIQ': Negotiated Trade in Liquid Financial Instruments - 'OILQ': Negotiated Trade in Illiquid Financial Instruments - 'PRIC': Negotiated Trade Subject to Conditions Other Than The Current Market Price - 'ILQD': Pre-Trade Transparency Waiver for illiquid instrument on an Side - 'SIZE': Pre-Trade Transparency Waiver for above standard market size on an SI - '-': No Negotiated Trade
Used For	Cash
Format	Text
Length	4
Possible Values	(See field description)
Used In	Full Trade Information (1004)

MMT Off Book Automated Indicator

Field Name	MMT Off Book Automated Indicator
Description	Defines the off book automated indicator following MMT level 3.7.
Used For	Cash and Derivatives
Format	Enumerated
Length	1
Possible Values	M = Off Book Non-Automated

	Q = Off Book Automated - = (Hyphen) Unspecified or does not apply
Used In	Full Trade Information (1004)

MMT Post Trade Deferral

Field Name	MMT Post Trade Deferral
Description	Defines the post trade deferral or enrichment type following MMT level 4.2. Possible values for the original trade: - 'LMTF': Limited Details Trade - 'DATF': Daily Aggregated Trade - 'VOLO': Volume Omission Trade - 'FWAF': Four Weeks Aggregation Trade - 'IDAF': Indefinite Aggregation Trade - 'VOLW': Volume Omission Trade, Eligible for Subsequent Enrichment in Aggregated Form Possible values for the subsequent enrichment trade: - 'FULF': Full Details of Earlier "Limited Details Trade (LMTF)" - 'FULA': Full Details of Earlier "Daily Aggregated Trade (DATF)" - 'FULV': Full Details of Earlier "Volume Omission Trade (VOLO)" - 'FULJ': Full Details of Earlier "Four Weeks Aggregation Trade (FWAF)" - 'COAF': Full Details in Aggregated Form of Earlier "Volume Omission Trade, Eligible for Subsequent Enrichment in Aggregated Form (VOLW)" Possible values if neither apply: - '-': Not Applicable / No Relevant Deferral or Enrichment Type
Used For	Cash and Derivatives
Format	Text
Length	4
Possible Values	(See field description)
Used In	Full Trade Information (1004)

MMT Publication Mode

Field Name	MMT Publication Mode
Description	Defines the publication mode or post-trade deferral reason following MMT level 4.1. Possible values: - '-': Immediate Publication - '1': Non-Immediate Publication - 'LRGS': Non-Immediate Publication: Deferral for "Large in Scale" - 'ILQD': Non-Immediate Publication: Deferral for "Illiquid Instrument" - 'SIZE': Non-Immediate Publication: Deferral for "Size Specific"
Used For	Cash and Derivatives
Format	Text
Length	4
Possible Values	(See field description)
Used In	Full Trade Information (1004)

MMT Special Dividend Indicator

Field Name	MMT Special Dividend Indicator
Description	Defines the special dividend indicator following MMT level 3.6. Possible values: - 'SDIV': Special Dividend Trade - '-': No Special Dividend Trade
Used For	Cash
Format	Text
Length	4
Possible Values	(See field description)
Used In	Full Trade Information (1004)

MMT Trading Mode

Field Name	MMT Trading Mode
Description	Differentiates transactions by defining the trading mode under which the trade was executed following MMT level 2.
Used For	Cash and Derivatives
Format	Enumerated
Length	1
Possible Values	1 = Undefined Auction (= Uncrossing) 2 = Continuous Trading 3 = At Market Close Trading 4 = Out of Main Session Trading 5 = Trade Reporting (On Exchange) 6 = Trade Reporting (Off Exchange) 7 = Trade Reporting (Systematic Internaliser) I = Scheduled Intraday Auction (= Uncrossing) K = Scheduled Closing Auction (= Uncrossing) O = Scheduled Opening Auction (= Uncrossing) U = Unscheduled Auction (= Uncrossing)
Used In	Full Trade Information (1004)

MMT Transaction Category

Field Name	MMT Transaction Category
Description	Defines the transaction category following MMT level 3.1. Possible values: - 'D': Dark Trade - 'RPRI': Trade that has Received Price Improvement - 'TPAC': Package Trade (excluding Exchange for Physicals) - 'XFPH': Exchange for Physicals Trade - '-': None apply (a standard trade for the Market Mechanism and Trading Mode)
Used For	Cash and Derivatives
Format	Text
Length	4
Possible Values	(See field description)

Used In	Full Trade Information (1004)

Mnemonic

Field Name	Mnemonic
Description	Mnemonic code of the instrument. This field is not populated for every instrument.
Used For	Cash
Format	Alphanumerical ID
Length	5
Possible Values	(See field description)
Used In	Standing Data (1007)

N

Nominal Currency

Field Name	Nominal Currency
Description	Code of the nominal currency (ISO 4217-3A).
Used For	Cash
Format	Alphanumerical ID
Length	3
Possible Values	(See field description)
Used In	Standing Data (1007)

Notional Currency

Field Name	Notional Currency
Description	Currency in which the notional is denominated following ISO 4217 standard.
Used For	Cash
Format	Alphanumerical ID
Length	3
Possible Values	(See field description)
Used In	Full Trade Information (1004)

Number Instrument Circulating

Field Name	Number Instrument Circulating
Description	For stocks: this is the total number of shares issued by the company. For Fix Income: this is the number of Fix Income still to be repaid.
Used For	Cash
Format	Quantity
Length	8
Possible Values	From 0 to 2^64-2
Used In	Standing Data (1007)

Number Of Orders

Field Name	Number Of Orders
Description	Number of orders at the current price limit.
Used For	Cash and Derivatives
Format	Numerical
Length	2
Possible Values	From 0 to 2^16-2
Used In	Market Update (1001)

Number Of Traded Instruments in Index

Field Name	Number Of Traded Instruments in Index
Description	Number of traded instruments in the index.
Used For	Cash
Format	Quantity
Length	2
Possible Values	From 0 to 2^16-2
Used In	Real Time Index (1008)

O

Opening Level

Field Name	Opening Level
Description	Official Opening Index Level. This level corresponds to the Index Level Type 1 of the Real Time Index (1008) of the corresponding index (to be calculated with the Price/Index Level Decimals).
Used For	Cash
Format	Price
Length	8
Possible Values	From -2^63+1 to 2^63-1
Used In	Index Summary (1011)

Opening Time

Field Name	Opening Time
Description	Time of Official Opening level (Time in number of nanoseconds since 01/01/1970 UTC).
Used For	Cash
Format	Epoch Time in Nanoseconds
Length	8
Possible Values	From 0 to 2^64-2
Used In	Index Summary (1011)

Optiq Segment

Field Name	Optiq Segment
Description	An Optiq segment is a universe of instruments sharing common trading properties. Instruments have the flexibility to be moved from one partition to another within an Optiq segment.
Used For	Cash and Derivatives
Format	Enumerated
Length	1
Possible Values	1 = Equities 2 = Funds 3 = Fixed Income 4 = Warrants and Certificates 5 = Bourse de Luxembourg 6 = Financial Options 7 = Financial Futures 8 = Commodity Derivatives 9 = Indices 10 = Trade Reporting and Publication
Used In	Standing Data (1007)

Order Entry Qualifier

Field Name	Order Entry Qualifier
Description	Field indicating the state of the Order Entry for the current market state.
Used For	Cash and Derivatives
Format	Enumerated
Length	1
Possible Values	0 = Order Entry/Cancel/Modify Disabled 1 = Order Entry/Cancel/Modify Enabled 2 = Cancel and Modify Only (Derivatives Only) 3 = Cancel Only
Used In	Timetable (1006) Market Status Change (1005)

Order Price

Field Name	Order Price
Description	Instrument price per quantity unit (To be calculated with Price/Index Level Decimals). For the Market Data feed: -Set to Null Value for priceless orders. For the Order Entry -It is mandatory for priced orders (Limit, Stop-limit) and must be set to Null Value where the price is irrelevant (Market, Stop-market, Peg, MTL).
Used For	Cash and Derivatives
Format	Price
Length	8
Possible Values	From -2^63+1 to 2^63-1
Used In	Order Update (1002)

Order Priority

Field Name	Order Priority
Description	Rank giving the priority of the order. The order with the lowest value of Order Priority has the highest priority. Order Priority is unique per Symbol Index and EMM, therefore, it is also used as the unique order identifier in the market data feed. Order Priority should then allow clients to reconcile their orders between private order entry and market data feed. Used in conjunction with Previous Priority, for market data only.
Used For	Cash
Format	Numerical ID
Length	8
Possible Values	From 0 to 2^64-2
Used In	Order Update (1002)

Order Quantity

Field Name	Order Quantity
Description	Total order quantity, per quantity unit.(To be calculated with Quantity Decimals)
Used For	Cash and Derivatives
Format	Quantity
Length	8
Possible Values	From 0 to 2^64-2
Used In	Order Update (1002)

Order Side

Field Name	Order Side
Description	Indicates the side of the order. Please note that the value Cross is used only for the Order Entry, it will never be populated in the Market Data feed.
Used For	Cash
Format	Enumerated
Length	1
Possible Values	1 = Buy 2 = Sell 3 = Cross [i]
Used In	Order Update (1002)

Order Type

Field Name	Order Type
Description	Type of Order. Please note that the values Stop-market/Stop-market-on-Quote, Stop limit/Stop-limit-on-quote, Average Price, Iceberg and Mid-Point Peg are used only for the Order Entry, they will never be populated in the

	Market Data feed.
Used For	Cash
Format	Enumerated
Length	1
Possible Values	1 = Market 2 = Limit 3 = Stop-market or Stop-market-on-quote (Cash Only) 4 = Stop-limit or Stop-limit-on-quote (Cash Only) 5 = Primary Peg (Cash Only) 6 = Market to limit 7 = Market Peg (For Future Use) (Cash Only) 8 = Mid-Point Peg (For Future Use) (Cash Only) 9 = Average Price (For Future Use) (Cash Only) 10 = Iceberg (Cash Only)
Used In	Order Update (1002)

Original Report Timestamp

Field Name	Original Report Timestamp
Description	Timestamp of trade reporting to the Exchange (Time in number of nanoseconds since 01/01/1970 UTC).
Used For	Cash and Derivatives
Format	Epoch Time in Nanoseconds
Length	8
Possible Values	From 0 to 2^64-2
Used In	Full Trade Information (1004)

P

Par Value

Field Name	Par Value
Description	Par Value (also called Nominal value) for Instrument. For Fixed Income it represents the par amount to be repaid at maturity (not including interest revenue) (to be calculated with the Amount Decimals).
Used For	Cash
Format	Amount
Length	8
Possible Values	From 0 to 2^64-2
Used In	Standing Data (1007)

Partition ID

Field Name	Partition ID
Description	Identifies uniquely an Optiq partition across all the Exchange partitions.
Used For	Cash and Derivatives
Format	Numerical ID
Length	2

Possible Values	From 0 to 2^16-2
Used In	Standing Data (1007)

Pattern ID

Field Name	Pattern ID
Description	Numerical Pattern identifier available as a characteristic of an instrument in Standing Data file and message, and used in the MDG timetable message. Cash Markets only.
Used For	Cash
Format	Numerical ID
Length	2
Possible Values	From 0 to 2^16-2
Used In	Standing Data (1007) Timetable (1006)

Peg Offset

Field Name	Peg Offset
Description	(Future Use) Tick offset for a pegged order. Used to indicate the signed tick added to the peg reference for a pegged order.
Used For	Cash
Format	Numerical ID
Length	1
Possible Values	From -127 to 127
Used In	Order Update (1002)

Percentage of Capitalization

Field Name	Percentage of Capitalization
Description	Percentage of capitalization for the active instruments in the index (to be calculated with the Ratio / Multiplier Decimals).
Used For	Cash
Format	Numerical
Length	8
Possible Values	From 0 to 2^64-2
Used In	Real Time Index (1008)

Percentage Var from Prev Close

Field Name	Percentage Var from Prev Close
Description	Percentage of variation for last price (or index) versus previous closing price (or closing reference price) (to be calculated with the Ratio / Multiplier Decimals).
Used For	Cash and Derivatives
Format	Signed Numerical
Length	8

Possible Values	From -2^63+1 to 2^63-1
Used In	Real Time Index (1008) Index Summary (1011)

Phase Id

Field Name	Phase Id
Description	Indicates the phase of the instrument.
Used For	Cash and Derivatives
Format	Enumerated
Length	1
Possible Values	1 = Inaccessible 2 = Closed 3 = Call 4 = Uncrossing 5 = Continuous 7 = Continuous Uncrossing (Warrants and Certificates Only)
Used In	Timetable (1006)

Phase Qualifier

Field Name	Phase Qualifier
Description	Indicates the Phase Qualifier (no multiple phase possible at the same time even if this field is a bitmap). - bit in position 0 – No Qualifier: indicates that no phase qualifier are applicable (0: No ; 1: Yes) - bit in position 1 – Call BBO Only (Cash Only): indicates a call on BBO only phase (0: No ; 1: Yes) - bit in position 2 – Trading At Last (Cash Only): indicates a trading at last phase (TaL) phase (0: No ; 1: Yes) - bit in position 3 – Random Uncrossing (Cash Only): indicates a random uncrossing phase (0: No ; 1: Yes) - bit in position 4 – Suspended (Derivatives Only): indicates a suspended phase (0: No ; 1: Yes) - bit in position 5 – Wholesale Allowed (Derivatives Only): indicates a wholesale allowed phase (0: No ; 1: Yes)
Used For	Cash and Derivatives
Format	Bitmap
Length	2
Possible Values	0 = No Qualifier 1 = Call BBO Only (Cash Only) 2 = Trading At Last (Cash Only) 3 = Random Uncrossing (Cash Only) 4 = Suspended (Derivatives Only) 5 = Wholesale Allowed (Derivatives Only)
Used In	Timetable (1006) Market Status Change (1005)

Phase Time

Field Name	Phase Time
Description	Time of Phase start (Time in an integer on 4 bytes expressed as hhmmss).
Used For	Cash and Derivatives
Format	Integer Time in hhmmss

Length	8
Possible Values	From 0 to 2^64-2
Used In	Timetable (1006)

Previous Priority

Field Name	Previous Priority
Description	Previous Priority is populated only when there is a "Modification of existing order With Loss Of Priority" or order deletions. Then clients have to remove from their market sheet the order identified with the field "Previous Priority" and add a new order with the field "Order Priority" newly provided. Used in conjunction with Order Priority.
Used For	Cash
Format	Numerical ID
Length	8
Possible Values	From 0 to 2^64-2
Used In	Order Update (1002)

Price

Field Name	Price
Description	Price per unit of quantity (to be calculated with the Price/Index Level Decimals).
Used For	Cash and Derivatives
Format	Price
Length	8
Possible Values	From -2^63+1 to 2^63-1
Used In	Market Update (1001) Price Update (1003)

Price / Index Level Decimals

Field Name	Price / Index Level Decimals
Description	Indicates the number of decimals for each Price / Index Level related to this Symbol Index
Used For	Cash and Derivatives
Format	Decimal Places
Length	1
Possible Values	From 0 to 2^8-2
Used In	Standing Data (1007)

Price Limits

Field Name	Price Limits
Description	Indicates the Price Limits mode.
Used For	Derivatives
Format	Enumerated
Length	1

Possible Values	1 = Price Limits Enabled - Normal (Derivatives Only) 2 = Price Limits Enabled - Wide (Derivatives Only) 3 = Price Limits Enabled - Widest (Derivatives Only) 4 = Price Limits Disabled (Derivatives Only)
Used In	Market Status Change (1005)

Price Multiplier

Field Name	Price Multiplier
Description	Number of units of the financial instrument that are contained in a trading lot. Price multiplier coefficient for instrument unit price.
Used For	Cash
Format	Numerical
Length	4
Possible Values	From 0 to 2^32-2
Used In	Full Trade Information (1004)

Price Multiplier Decimals

Field Name	Price Multiplier Decimals
Description	Number of decimals for the field Price Multiplier.
Used For	Cash
Format	Numerical
Length	1
Possible Values	From 0 to 2^8-2
Used In	Full Trade Information (1004)

Publication Date Time

Field Name	Publication Date Time
Description	Date and time when the transaction was published by a trading venue or Approved Publication Arrangement (APA). Date and time in the following format: YYYY-MM-DDThh:mm:ss.dddddddZ. Where: - 'YYYY' is the year. - 'MM' is the month. - 'DD' is the day. - 'T' constant 'T' letter used as separator between YYYY-MM-DD and hh:mm:ss.dddddddZ. - 'hh' is the hour. - 'mm' is the minute. - 'ss.dddddd' is the second and its fraction of a second. - 'Z' constant 'Z' letter that stands for UTC time.
Used For	Cash and Derivatives
Format	Text
Length	27
Possible Values	(See field description)
Used In	Full Trade Information (1004)

Q

Quantity

Field Name	Quantity
Description	Number of traded or ordered units (to be calculated with Quantity Decimals).
Used For	Cash and Derivatives
Format	Quantity
Length	8
Possible Values	From 0 to 2^64-2
Used In	Market Update (1001) Price Update (1003)

Quantity Decimals

Field Name	Quantity Decimals
Description	Indicates the number of decimals for each Quantity related to this Symbol Index
Used For	Cash and Derivatives
Format	Decimal Places
Length	1
Possible Values	From 0 to 2^8-2
Used In	Standing Data (1007)

Quantity Notation

Field Name	Quantity Notation
Description	Indication of the type of measurement (e.g. number of units, nominal, monetary value, etc.) in which the transaction is expressed. Possible values: "UNT" - Units "FMT" - Facial Amount "-" - Not Applicable
Used For	Cash
Format	Text
Length	3
Possible Values	(See field description)
Used In	Standing Data (1007)

Quote Spread Multiplier

Field Name	Quote Spread Multiplier
Description	Indicates the Quote Spread Multiplier.
Used For	Derivatives
Format	Enumerated

Length	1
Possible Values	1 = Quote Spread Multiplier 1 (Derivatives Only) 2 = Quote Spread Multiplier 2 (Derivatives Only) 3 = Quote Spread Multiplier 3 (Derivatives Only)
Used In	Market Status Change (1005)

R

Ratio / Multiplier Decimals

Field Name	Ratio / Multiplier Decimals
Description	Indicates the number of decimals for each Ratio / Multiplier related to this Symbol Index
Used For	Cash and Derivatives
Format	Decimal Places
Length	1
Possible Values	From 0 to 2^8-2
Used In	Standing Data (1007)

Rebroadcast Indicator

Field Name	Rebroadcast Indicator
Description	Indicates if this message is resent or new (1 if resent, 0 otherwise). For a snapshot, this field will always be set to '1'.
Used For	Cash and Derivatives
Format	Numerical ID
Length	1
Possible Values	From 0 to 2^8-2
Used In	Technical Notification (1106) Standing Data (1007) Timetable (1006) Market Update (1001) Order Update (1002) Price Update (1003) Full Trade Information (1004) Market Status Change (1005) Statistics (1009) Real Time Index (1008) Index Summary (1011)

Repo Indicator

Field Name	Repo Indicator
Description	Indicates whether the instrument listed underlies any loan contracts, meaning it has been admitted to the Deferred Settlement system and/or to the lending market.
Used For	Cash
Format	Enumerated

Length	1
Possible Values	0 = Instrument neither eligible for the SRD, nor eligible for the Loan and Lending Market 1 = Instrument eligible for the SRD and for the Loan and Lending Market 2 = Instrument eligible for the SRD long only 3 = Instrument eligible for the Loan and Lending Market and for the SRD long only 4 = Easy-to-borrow Instrument eligible for the SRD and the for Loan and Lending Market 5 = Instrument eligible for the Loan and Lending Market 8 = Non significant
Used In	Standing Data (1007)

Retransmission End Time

Field Name	Retransmission End Time
Description	Indicates when the retransmission ends. For trade retransmission, all the trades previously received by the clients that have an “Event time” strictly higher than this field are valid (Time in number of nanoseconds since 01/01/1970 UTC).
Used For	Cash and Derivatives
Format	Epoch Time in Nanoseconds
Length	8
Possible Values	From 0 to 2^64-2
Used In	Technical Notification (1106)

Retransmission Start Time

Field Name	Retransmission Start Time
Description	Indicates when the retransmission starts. For trade retransmission, all the trades previously received by the clients that have an “Event time” strictly lower than this field are valid (Time in number of nanoseconds since 01/01/1970 UTC).
Used For	Cash and Derivatives
Format	Epoch Time in Nanoseconds
Length	8
Possible Values	From 0 to 2^64-2
Used In	Technical Notification (1106)

S

Scheduled Event

Field Name	Scheduled Event
Description	Type of Scheduled Event. Notifies an event that will occur at the Scheduled Event Time.
Used For	Cash and Derivatives
Format	Enumerated
Length	1
Possible Values	0 = Cancel Previously Scheduled Event (Cash and Derivatives) 1 = Reopening (Cash Only)

	3 = Resumption of trading (Cash Only) 4 = Closed (Derivatives Only) 5 = Expiry (Derivatives Only) 6 = Wholesale Large in Scale (LiS) trades open extension (Derivatives Only) 7 = Wholesale Basis trades open extension (Derivatives Only) 8 = Wholesale Against Actuals trades open extension (Derivatives Only) 9 = Wholesale Large in Scale (LiS) Package trades open extension (Derivatives Only) 10 = Wholesale Exchange For Swaps trades open extension (Derivatives Only) 11 = Wholesale Trades Open Extension (Derivatives Only)
Used In	Market Status Change (1005)

Scheduled Event Time

Field Name	Scheduled Event Time
Description	Scheduled Time for the event to happen (On cash: time in an integer on 8 bytes expressed as hhmmss UTC; On derivatives: time in number of nanoseconds since 01/01/1970 UTC).
Used For	Cash and Derivatives
Format	Epoch Time in Nanoseconds
Length	8
Possible Values	From 0 to 2^64-2
Used In	Market Status Change (1005)

Session

Field Name	Session
Description	Current market session.
Used For	Cash and Derivatives
Format	Enumerated
Length	1
Possible Values	0 = Session 0 1 = Session 1 2 = Session 2 3 = Session 3 4 = Session 4 5 = Session 5 6 = Session 6 7 = Session 7 8 = Session 8 9 = Session 9
Used In	Timetable (1006) Market Status Change (1005)

Session Trading Day

Field Name	Session Trading Day
Description	Date of the current trading session (in number of days since the 1st of January 1970).
Used For	Cash and Derivatives
Format	Date

Length	2
Possible Values	From 0 to 2^16-2
Used In	Start Of Day (1101) End Of Day (1102)

Settlement Delay

Field Name	Settlement Delay
Description	Gives the number of trading days that represents the period between the trade date and the settlement date (delivery and payment) for an instrument to be cleared and settled. This is generally a standard period for Euronext Cash markets. Permitted Values - From 0 to 30 (Standard values) - X: This value is assigned for a lot of products and internal management rules shared by Euronext and LCH-Clearnet (D+2). - Z: This value is assigned for Lending/Borrowing instruments. This value is especially interpreted to manage the associated management rules (D+3).
Used For	Cash
Format	Alphanumerical ID
Length	2
Possible Values	(See field description)
Used In	Standing Data (1007)

Snapshot Time

Field Name	Snapshot Time
Description	Indicates the time when snapshot generation has respectively started/ended in the Start Of Snapshot/End Of Snapshot message (Time in number of nanoseconds since 01/01/1970 UTC).
Used For	Cash and Derivatives
Format	Epoch Time in Nanoseconds
Length	8
Possible Values	From 0 to 2^64-2
Used In	Start Of Snapshot (2101) End Of Snapshot (2102)

Start Time Vwap

Field Name	Start Time Vwap
Description	Start time for the Volume Weight Average price computation period (Number of seconds since the beginning of the day).
Used For	Cash
Format	Intraday Time in Seconds
Length	4
Possible Values	From 0 to 2^32-2
Used In	Full Trade Information (1004)

Stats Update Type

Field Name	Stats Update Type
Description	Indicates the type of published statistics update.
Used For	Cash and Derivatives
Format	Enumerated
Length	1
Possible Values	5 = Daily High (Cash and Derivatives) 6 = Daily Low (Cash and Derivatives) 7 = Yearly High (Cash and Derivatives) 8 = Yearly Low (Cash and Derivatives) 9 = Lifetime High (Cash and Derivatives) 10 = Lifetime Low (Cash and Derivatives) 14 = Variation Last Price (Cash Only) 15 = Open Price (Cash and Derivatives) 16 = Trade Count (Cash and Derivatives) 17 = Last Traded Price (Cash and Derivatives) 18 = Percent Variation Previous Close (Cash and Derivatives) 19 = Off Book Cumulative Quantity (Cash) 21 = On Book Auction Cumulative Quantity (Cash) 22 = On Book Continuous Cumulative Quantity (Cash) 23 = On and Off Book Cumulative Quantity (Cash and Derivatives)
Used In	Statistics (1009)

Stats Update Value

Field Name	Stats Update Value
Description	Indicates the value of the published statistics update. This field has to be calculated with a scale code field depending on the "Stats Update Type" as follow: - Price / Index Level Decimals for "Stats Update Type": "5 - Daily High", "6 - Daily Low", "7 - Yearly High", "8 - Yearly Low", "9 - Lifetime High", "10 - Lifetime Low", "15 - Open Price" and "17 - Last Trade Price" - Quantity Decimals for "Stats Update Type": "19 - Off Book Cumulative Quantity", "21 - On Book Auction Cumulative Quantity", "22 - On book Continuous Cumulative Quantity" and "23 - On and Off Book Cumulative Quantity" - Ratio / Multiplier Decimals for "Stats Update Type": "14 - Variation Last Price" and "18 - Percent Variation Previous Close" "16 - Trade Count" has no scale code.
Used For	Cash and Derivatives
Format	Signed Numerical
Length	8
Possible Values	From -2^63+1 to 2^63-1
Used In	Statistics (1009)

Status Reason

Field Name	Status Reason
Description	Provides the reason for Book State changes.
Used For	Cash and Derivatives
Format	Enumerated

Length	1
Possible Values	0 = Scheduled (Cash and Derivatives) 4 = Collars Breach (Cash Only) 7 = Automatic Reopening (Cash Only) 8 = No Liquidity Provider (Cash Only) 11 = Knock-In by Issuer (Cash Only) 12 = Knock-Out by Exchange (Cash Only) 13 = Knock-Out by Issuer (Cash Only) 15 = Action by Market Operations (Cash and Derivatives) 16 = Waiting for Tradable State (Derivatives Only) 20 = New Listing (Cash Only) 21 = Due to Underlying (Cash Only) 22 = Outside of LP quotes (Cash Only) 23 = Technical (BdL Only)
Used In	Market Status Change (1005)

Strike Currency

Field Name	Strike Currency
Description	Code of the strike currency (ISO 4217-3A).
Used For	Cash
Format	Alphanumerical ID
Length	3
Possible Values	(See field description)
Used In	Standing Data (1007)

Strike Currency Indicator

Field Name	Strike Currency Indicator
Description	Indicates whether the 'price expression' is in the Currency or in a ratio of this Currency. Use Currency Coefficient field to identify the ratio to apply. This is the case for strike instruments in pennies. The currency will be 'GBP', Strike Currency Indicator sets to '1' and Currency Coefficient set to '0.001'.
Used For	Cash
Format	Enumerated
Length	1
Possible Values	0 = Change rate not applied to the strike price 1 = Change rate applied to the strike price
Used In	Standing Data (1007)

Strike Price

Field Name	Strike Price
Description	The strike price of an option/warrant is the specified price at which the underlying can be bought (in the case of a call/right to buy) or sold (in case of a put/right to sell) by the holder (buyer) of the option/warrant contract, at the moment he exercises his right against a writer (seller) of the option/warrant. Only provided for warrants or other derivatives instruments. To be calculated with Strike Price Decimals.
Used For	Cash and Derivatives

Format	Price
Length	8
Possible Values	From -2^63+1 to 2^63-1
Used In	Standing Data (1007)

Strike Price Decimals

Field Name	Strike Price Decimals
Description	Indicates the number of decimals for Strike Price related to this Symbol Index
Used For	Cash
Format	Decimal Places
Length	1
Possible Values	From 0 to 2^8-2
Used In	Standing Data (1007)

Symbol Index

Field Name	Symbol Index
Description	Exchange identification code of the instrument. This identifier is unique per triplet: MIC, ISIN and currency. The correspondence of the Symbol Index and with the instrument characteristics is provided in the standing data messages and associated files.
Used For	Cash and Derivatives
Format	Numerical ID
Length	4
Possible Values	From 0 to 2^32-2
Used In	Technical Notification (1106) Standing Data (1007) Timetable (1006) Market Update (1001) Order Update (1002) Price Update (1003) Full Trade Information (1004) Market Status Change (1005) Statistics (1009) Real Time Index (1008) Index Summary (1011)

T

Tax Code

Field Name	Tax Code
Description	Tax deduction code to which the instrument belongs.
Used For	Cash
Format	Enumerated
Length	1

Possible Values	0 = Not eligible to PEA 3 = Eligible to PEA 9 = Not Applicable
Used In	Standing Data (1007)

Technical Notification Type

Field Name	Technical Notification Type
Description	Indicates the technical notification sent.
Used For	Cash and Derivatives
Format	Enumerated
Length	1
Possible Values	1 = Instrument Book Retransmission End 10 = Trade Retransmission Start 11 = Trade Retransmission End
Used In	Technical Notification (1106)

Tick Size Index ID

Field Name	Tick Size Index ID
Description	ID of the tick size table available in the Tick Table file.
Used For	Cash
Format	Numerical ID
Length	2
Possible Values	From 0 to 2^16-2
Used In	Standing Data (1007)

Trade Qualifier

Field Name	Trade Qualifier
Description	Trade Qualifier. Values specified, in the list of possible values, indicate the bit positions that should be used to set zero (0) or one (1) values. A single field contains multiple values provided in different positions. - bit in position 0 - Uncrossing Trade: indicates whether the trade occurred during an Uncrossing, or not. (0: No ; 1: Yes) - bit in position 1 - First Trade Price: indicates whether the price of the trade is the first trade price of the day, or not. (0: No ; 1: Yes) Please note that there can be multiple Trades with the “First Trade Price” flag set to Yes. - bit in position 2 - Passive Order: indicates whether the corresponding order was passive, or not. (0: No ; 1: Yes) - bit in position 3 - Aggressive Order: indicates whether the corresponding order was aggressive, or not. (0: No ; 1: Yes) - bit in position 4 - Trade Creation by Market Operations: indicates whether the trade results from a creation by Market Operations, or not. (0: No ; 1: Yes) - For future use - bit in position 5 - NAV Trade expressed in bps: indicates whether the trade results from a NAV trade expressed in basis point on the ETF MTF platform. (0: No ; 1: Yes) - bit in position 6 - NAV Trade expressed in price currency: indicates whether the trade is a NAV trade expressed in price currency. This trade is always an update from a previous NAV trade expressed in basis point on the ETF MTF platform. (0: No ; 1: Yes)

	If all bits are set to 0, then it means that no Trade Qualifier applies. For the Market Data feed: - The values Passive Order and Aggressive Order always qualify the Buy order.
Used For	Cash and Derivatives
Format	Bitmap
Length	1
Possible Values	0 = Uncrossing Trade 1 = First Trade Price 2 = Passive Order 3 = Aggressive Order 4 = Trade Creation by Market Operations 5 = NAV Trade expressed in bps (Cash Only) 6 = NAV Trade expressed in price currency (Cash Only)
Used In	Full Trade Information (1004)

Trade Reference

Field Name	Trade Reference
Description	Reference of the trade reported to the Exchange.
Used For	Cash and Derivatives
Format	Alphanumerical ID
Length	30
Possible Values	(See field description)
Used In	Full Trade Information (1004)

Trade Type

Field Name	Trade Type
Description	Type of trade.
Used For	Cash and Derivatives
Format	Enumerated
Length	1
Possible Values	1 = Conventional Trade (Cash and Derivatives) 2 = Large in Scale (LiS) Trade (Derivatives Only) 3 = Basis Trade (Derivatives Only) 4 = Large in Scale (LiS) Package Trade (Derivatives Only) 5 = Guaranteed Cross Trade (Cash and Derivatives) 6 = Against Actual Trade (Derivatives Only) 7 = Asset Allocation Trade (Derivatives Only) 9 = Exchange for Swap Trade (Derivatives Only) 10 = Exchange for Physical Trade - Cash Leg (Cash Only) 11 = Strategy Leg Conventional Trade (Derivatives Only) 12 = Strategy Leg Large in Scale (LiS) Trade (Derivatives Only) 13 = Strategy Leg Basis Trade (Derivatives Only) 14 = Strategy Leg Guaranteed Cross Trade (Derivatives Only) 15 = Strategy Leg Against Actual Trade (Derivatives Only) 16 = Strategy Leg Asset Allocation Trade (Derivatives Only) 18 = Strategy Leg Exchange For Swap Trade (Derivatives Only)

	19 = Strategy Leg Exchange For Physical Trade (Derivatives Only) 20 = BoB Trade (Cash Only) 22 = AtomX Trade (Derivatives Only) 24 = Trade Cancellation (Cash and Derivatives) 25 = Out of Market Trade (Cash Only) 26 = Delta Neutral Trade - Underlying Cash Leg (Cash Only) 27 = Market VWAP Operation Trade (Cash Only) 28 = Euronext Fund Service Trade (Cash Only) 29 = Secondary Listing Trade (Cash Only) 30 = Request for Cross Trade (Derivatives Only) 31 = Request for cross strategy Leg Trade (Derivatives Only) 32 = Trade Publication (Cash Only) 33 = Dark Trade (Cash Only) - For future use 34 = Delta Neutral Trade - Underlying Future Leg (Derivatives Only) 36 = Total Traded Volume (For future use) 37 = ETF-MTF NAV Trade (price in basis points) (Cash Only) - For future use 38 = ETF-MTF NAV Dark Trade (price in basis points) (Cash Only) - For future use
Used In	Full Trade Information (1004)

Trading Currency

Field Name	Trading Currency
Description	Code of the currency (ISO 4217-3A).
Used For	Cash and Derivatives
Format	Alphanumerical ID
Length	3
Possible Values	(See field description)
Used In	Standing Data (1007)

Trading Currency Indicator

Field Name	Trading Currency Indicator
Description	Indicates whether the 'price expression' is in the Currency or in a ratio of this Currency. Use Currency Coefficient field to identify the ratio to apply. This is the case for instruments traded in pennies. The currency will be 'GBP', Trading Currency Indicator sets to '1' and Currency Coefficient set to '0.001'.
Used For	Cash
Format	Enumerated
Length	1
Possible Values	0 = Change rate not applied to the traded price 1 = Change rate applied to the traded price
Used In	Standing Data (1007)

Trading Date Time

Field Name	Trading Date Time
Description	Date and time when the transaction was executed. Date and time in the following format: YYYY-MM-DDThh:mm:ss.ddddddZ.

	Where: - 'YYYY' is the year. - 'MM' is the month. - 'DD' is the day. - 'T' constant 'T' letter used as separator between YYYY-MM-DD and hh:mm:ss.ddddddZ. - 'hh' is the hour. - 'mm' is the minute. - 'ss.dddddd' is the second and its fraction of a second. - 'Z' constant 'Z' letter that stands for UTC time.
Used For	Cash and Derivatives
Format	Text
Length	27
Possible Values	(See field description)
Used In	Full Trade Information (1004)

Trading Period

Field Name	Trading Period
Description	Provides the current trading period.
Used For	Cash and Derivatives
Format	Enumerated
Length	1
Possible Values	1 = Opening (Cash and Derivatives) 2 = Standard (Cash and Derivatives) 3 = Closing (Cash and Derivatives)
Used In	Timetable (1006) Market Status Change (1005)

Trading Side

Field Name	Trading Side
Description	Indicates the Trading Side.
Used For	Cash
Format	Enumerated
Length	1
Possible Values	1 = Bid Only (Cash Only) 2 = Offer Only (Cash Only) 3 = PAKO (Cash Only) 4 = Both Sides (Cash Only)
Used In	Market Status Change (1005)

Transaction Type

Field Name	Transaction Type
Description	Transaction type or publication type.
Used For	Cash
Format	Enumerated

Length	1
Possible Values	1 = Plain Vanilla Trade 2 = Dark Trade 3 = Benchmark Trade 4 = Technical Trade 5 = Give-up/Give-in Trade 6 = Ex/Cum dividend Trade 7 = Trade With Condition 15 = Summary Report
Used In	Full Trade Information (1004)

Transparency Indicator

Field Name	Transparency Indicator
Description	Used to define the transparency of the trade.
Used For	Cash
Format	Enumerated
Length	1
Possible Values	0 = Lit/Regular Trade 1 = Dark Trade and Immediate Publication 2 = Dark Trade and Deferred Publication
Used In	Full Trade Information (1004)

Type Of Corporate Event

Field Name	Type Of Corporate Event
Description	Indicates the last type of corporate event that has occurred on an instrument, such as detachment of rights, or of coupons. The data item is automatically calculated by the adjustment application but in case of problem or error, the data item value could be modified manually, particularly for purging the order book in case of absence of corporate event. This data has to be treated in consideration of the date of the event included into the header of the message. Valid values are: - "00" – No specific event - "01" – Dividend payment in cash or in stocks - "02" – Interest payment (Fix Income for which the price is not expressed in% of the nominal, only) - "04" – Split - "05" – Bonus (i.e. attribution) - "06" – Subscription - "07" – Share allocation - "08" – Share swap - "09" – Reverse split - "10" – Merger - "11" – Final Fix Income redemption - "12" – Capital amortization - "13" – Draw announcement (Belgian Fix Income only) - "14" – Block trade of controlling interest - "15" – Optional corporate events(dividend option) - "16" – Complex corporate event - "17" – Purge of the order book (purge is initiated manually in the absence of a corporate event, for example, following the modification of the variable tick of the listed instrument) - "22" Luxembourg Stock Exchange corporate event

Used For	Cash
Format	Alphanumerical ID
Length	2
Possible Values	(See field description)
Used In	Standing Data (1007)

Type Of Market Admission

Field Name	Type Of Market Admission
Description	Indicates the type of market to which an instrument has been listed.
Used For	Cash
Format	Enumerated
Length	1
Possible Values	A = Instruments traded on the primary market B = Instruments traded on the secondary market C = Instruments traded on the New Market D = Non-regulated market / instruments traded on the free market ('Marche Libre') E = Non-regulated market / Alternext F = Non listed G = Regulated Market / Non equities H = Regulated Market / Equities / Segment A I = Regulated Market / Equities / Segment B J = Regulated Market / Equities / Segment C K = Regulated Market / All securities / Special Segment L = Regulated Market / Equities / Other instruments S = OPCVM, SICOMI non listed (French Investment Funds) 6 = Off Market 7 = Gold, Currencies, and Indices 9 = Foreign
Used In	Standing Data (1007)

U

Underlying ISIN Code

Field Name	Underlying ISIN Code
Description	Underlying ISIN. For Repo: Underlying instrument (instrument used in the loan quotation system) for loan contracts on centralized lending market. For Warrant: Gives the trading code of the underlying listed instrument of a warrant.
Used For	Cash and Derivatives
Format	Alphanumerical ID
Length	12
Possible Values	(See field description)
Used In	Standing Data (1007)

Underlying MIC

Field Name	Underlying MIC
Description	Identifies the market to which an instrument' underlying belongs by its MIC (Market Identification Code), according to ISO 10383. Refer to MIC field to have all the authorized values.
Used For	Cash and Derivatives
Format	Alphanumerical ID
Length	4
Possible Values	(See field description)
Used In	Standing Data (1007)

V

Venue

Field Name	Venue
Description	Identification of the venue where the transaction was executed using the ISO 10383 segment MIC for transactions executed on a trading venue. Otherwise the BIC is sent following ISO 9362.
Used For	Derivatives
Format	Alphanumerical ID
Length	11
Possible Values	(See field description)
Used In	Full Trade Information (1004)

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APPENDIX B: TRADE TYPE ASSOCIATED WITH EMM

	1 = Cash Central Order Book (COB)	5 = Cash On Exchange Off book	99 = Not Applicable (For indices and iNAV)
	On-Exchange On-Book	On-Exchange Off-Book	NA
Conventional Trade (Cash and Derivatives)	x		
Large in Scale (LiS) Trade (Derivatives Only)			
Basis Trade (Derivatives Only)			
Large in Scale (LiS) Package Trade (Derivatives Only)			
Guaranteed Cross Trade (Cash and Derivatives)	x		
Against Actual Trade (Derivatives Only)			
Asset Allocation Trade (Derivatives Only)			
Exchange for Swap Trade (Derivatives Only)			
Exchange for Physical Trade - Cash Leg (Cash Only)		x	
Strategy Leg Conventional Trade (Derivatives Only)	x		
Strategy Leg Large in Scale (LiS) Trade (Derivatives Only)			
Strategy Leg Basis Trade (Derivatives Only)			
Strategy Leg Guaranteed Cross Trade (Derivatives Only)			
Strategy Leg Against Actual Trade (Derivatives Only)			
Strategy Leg Asset Allocation Trade (Derivatives Only)			
Strategy Leg Exchange For Swap Trade (Derivatives Only)			
Strategy Leg Exchange For Physical Trade (Derivatives Only)	x		
BoB Trade (Cash Only)	x		
AtomX Trade (Derivatives Only)			
Trade Cancellation (Cash and Derivatives)	x	x	
Out of Market Trade (Cash Only)		x	
Delta Neutral Trade - Underlying Cash Leg (Cash Only)		x	
Market VWAP Operation Trade (Cash Only)		x	
Euronext Fund Service Trade (Cash Only)		x	
Secondary Listing Trade (Cash Only)		x	
Request for Cross Trade (Derivatives Only)			
Request for cross strategy Leg Trade (Derivatives Only)			
Trade Publication (Cash Only)			
Dark Trade (Cash Only)	x		
Delta Neutral Trade - Underlying Future Leg (Derivatives Only)			

APPENDIX C: MMT FLAGS RULES

LEVEL 1: MMT MARKET MECHANISM

Field	Value	Equities	Funds	Fixed Income	Warrants and Certificates	Bourse de Luxembourg	Financial Options	Financial Futures	Commodity Derivatives	Trade Reporting and Publication	Presence	Rules
MM Tmarket Mechanism	Central Limit Order Book	✓	✓	✓	✓	✓	✓	✓	✓	✗		**In Market Update message** field EMM equals to: - 1 = Cash and Derivative Central Order Book (COB) or - 8 = ETF MTF - NAV Central Order Book
	Quote Driven Market	✗	✗	✗	✗	✗	✗	✗	✗	✗		NA
	Dark Order Book	✗	✗	✗	✗	✗	✗	✗	✗	✗		NA
	Off Book (including Voice or Messaging Trading)	✓	✗	✓	✓	✗	✓	✓	✓	✓	*Opt*	**In Market Update message** field EMM equals to: - 2 = NAV Trading Facility or - 4 = Derivative Wholesales except for Request for Cross Trades or - 5 = Cash On Exchange Off book or - 6 = Euronext off-exchange trade reports or - 7 = Derivative On Exchange Off book
	Periodic Auction	✗	✗	✗	✗	✗	✓	✓	✓	✓		**In Market Update message** field Market Data Update Type equals to: - 56 = Request for Cross Trade (Derivatives Only)
	Request for Quotes	✗	✗	✗	✗	✗	✗	✗	✗	✗		NA

LEVEL 2: MMT TRADING MODE

Field	Value	Equities	Funds	Fixed Income	Warrants and Certificates	Bourse de Luxembourg	Financial Options	Financial Futures	Commodity Derivatives	Trade Reporting and Publication	Presence	Rules
MMTTradingMode	Scheduled Opening Auction	✓	✓	✓	✓	✓	✓	✓	✓	✗		**In Market Status Change message** field Book State equals to 4 = Uncrossing and field Trading Period equals to 1 = Opening and field Status Reason equals to 0 = Scheduled
	Scheduled Closing Auction	✓	✓	✓	✓	✓	✓	✓	✓	✗		**In Market Status Change message** field Book State equals to 4 = Uncrossing and field Trading Period equals to 3 = Closing and field Status Reason equals to 0 = Scheduled
	Scheduled Intraday Auction	✓	✓	✓	✓	✓	✓	✓	✓	✗		**In Market Status Change message** field Book State equals to 4 = Uncrossing and field Trading Period equals to 2 = Standard and field Status Reason equals to 0 = Scheduled
	Unscheduled Auction	✓	✓	✓	✓	✓	✓	✓	✓	✗		**In Market Status Change message** field Book State equals to 4 = Uncrossing and field Status Reason equals to - 2 = Unhalted by Market Operations or - 7 = Automatic Unhalting by Matching Engine or - 15 = Action by Market Operations
	Continuous Trading	✓	✓	✓	✓	✓	✓	✓	✓	✗	*Opt*	**In Market Status Change message** field Book State equals to 5 = Continuous
	At Market Close Trading	✓	✓	✓	✓	✓	✗	✓	✗	✗		**In Market Status Change message** field Phase Qualifier equals to 2 = Trading At Last
	Out of Main Session Trading	✗	✗	✗	✗	✗	✓	✓	✓	✗		**In Market Status Change message** field Session equals to 3 or field Scheduled Event equals to 11 - Wholesale Trades Open Extension
	Trade Reporting (On Exchange)	✓	✓	✓	✓	✓	✓	✓	✓	✗		**In Market Update message** field EMM equals to: - 5 = Cash On Exchange Off book - 7 = Derivative On Exchange Off book
	Trade Reporting (Off Exchange)	✗	✗	✗	✗	✗	✗	✗	✗	✓		**In Market Update message** field EMM equals to: - 6 = Euronext off-exchange trade reports
	Trade Reporting (Systematic Internaliser)	✗	✗	✗	✗	✗	✗	✗	✗	✗		NA
	Undefined Auction	✓	✓	✓	✓	✓	✓	✓	✓	✗		All other cases

LEVEL 3: MMT TRANSACTION CATEGORY

Field	Value	Equities	Funds	Fixed Income	Warrants and Certificates	Bourse de Luxembourg	Financial Options	Financial Futures	Commodity Derivatives	Trade Reporting and Publication	Presence	Rules
MMTTransactionCategory	Dark Trade	✓ (in the future)	✓ (in the future)	✗	✗	✗	✗	✗	✗	✗		**In Market Update message** field Market Data Update Type equals to Dark Trade
	Trade that has Received Price Improvement	✗	✗	✗	✗	✗	✗	✗	✗	✓		**In Market Update message** Price has to be between Best bid and Best offer
	Package Trade (excluding Exchange for Physicals)	✗	✗	✗	✗	✗	✓	✓	✓	✓	*Opt*	**In Market Update message** field Market Data Update Type equals to: - 52 = Delta Neutral Trade - Underlying Cash Leg or - 37 = Strategy Leg Conventional Trade (Derivatives Only) or - 38 = Strategy Leg Large in Scale (LiS) Trade (Derivatives Only) or - 39 = Strategy Leg Basis Trade (Derivatives Only) or - 40 = Strategy Leg Guaranteed Cross Trade (Derivatives Only) or - 41 = Strategy Leg Against Actual Trade (Derivatives Only) or - 42 = Strategy Leg Asset Allocation Trade (Derivatives Only) or - 44 = Strategy Leg Exchange For Swap Trade (Derivatives Only)
	Exchange for Physicals Trade	✗	✗	✗	✗	✗	✓	✓	✓	✓		**In Market Update message** field Market Data Update Type equals to - 36 = Exchange for Physical Trade - Cash Leg - 45 = Strategy Leg Exchange For Physical Trade **In Contract Standing Data & Strategy Standing Data message** field Strategy Code equals to m = Exhange for Physical
	None apply (a standard trade for the Market Mechanism and Trading Mode)	✓	✓	✓	✓	✓	✓	✓	✓	✓		All other cases

APPENDIX D: DOCUMENT HISTORY

Version	Date	Author	Change Description
2.0.0	19 Mar 2018	IT Solutions – BA Team BGA	**First draft version**