London Stock Exchange Group

LONDON STOCK EXCHANGE GROUP

GROUP TICKER PLANT

GTP 002 - TECHNICAL GUIDE

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Guide Disclaimer

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For further information, please contact your usual London Stock Exchange Group contact.

1. Documentation

1.1 This Guide

The purpose of this document is to provide a detailed guide to the various message types and message formats as employed by the interface of the Group Ticker Plant. It also provides information on the behavior and characteristics of our service lines, including Level 1, Level 2 snapshot, Level 2 incremental and FTSE Indices as supported by the Group Ticker Plant protocol.

This guide will be updated and reissued when appropriate to do so.

1.2 Readership

This document is particularly relevant to trading, market data and technical teams within member firms, information vendors and other market participants who currently receive or are interested in receiving London Stock Exchange Group market data.

When read in conjunction with other Group Ticker Plant documents it is intended to provide all required information to develop to, and interact with, our real-time information systems.

1.3 Document Series

This guide, **GTP002 – Technical Guide**, forms part of the documentation library supporting those clients interacting with the Group Ticker Plant. For information, the full series of currently available documentation is outlined below:

- GTP001 – Product Guide;
- GTP002 – Technical Guide (this document);
- GTP003 – Statistics Guide;
- GTP004 – Parameters Guide;
- GTP005 – Testing Guide;
- GTP006 – External Sources Guide;
- GTP007 – GTP Lite Guide.
- GTP008 – Market Attributes Guide.

Further documentation to support activities such as testing and displaying our data will be released in due course.

The full library of Group Ticker Plant documentation can be found at:

www.londonstockexchange.com/oneproductinfinitepossibilities

1.4 Document History

This document has been subject to the following iterations:

Issue	Date	Description
1.0	27 June 2012	First issue of this document
2.0	15 November 2012	Second issue of this document with minor changes as highlighted in red.
3.0	8 February 2013	3.6 and 3.11.17 – Inclusion of FTSE Low Latency information.
3.1	14 February 2014	Updated to include EuroTLX information
3.2	6 March 2014	Updated to include full-depth message details.
4.0	13 August 2013	Multiple changes to document issued to support Phase 2.0 services.
5.0	17 April 2014	Document baselined following customer feedback on Phase 2.0 services and to support the inclusion of EuroTLX and GTP Lite services.
6.0	19 September 2014	Document updated to reflect customer feedback. All changes highlighted.
7.0	11 May 2015	Document updated to reflect introduction of new security sub-types for Borsa Italiana and T2S settlement services introduction. Trading status details applied to EuroTLX market. Changes highlighted.
8.0	25 June 2015	Document updated to support the launch of the Phase 2 services. Changes highlighted.
9.0	21 October 2015	Document updated to reflect corrections identified and to support the launch of scheduled Level 1 intraday auctions.
10.0	8 July 2016	Document updated to include corrections and support the 1.2.4.2 release.
11.0	30 September 2016	Updated to support the impending launch of TRADEcho and some minor corrections and clarifications.
12.0	26 October 2016	Document updated to include corrections and support 1.4.0.6 Product release Updated IDEM security type codes. Removed Closing Price Publication session for LSE (delivered in Release 9.1).
13.0	10 January 2017	Updated to support the launch of TRADEcho.
14.0	17 February 2017	Updated to include corrections as indicated.

15.0	10 March 2017	Updated to remove Order Modify message from TRADEcho channels and update to encoding of Trade ID in Off-Book Trade message.
16.0	13 March 2017	Updated to support Turquoise Go-Live
16.1	24 April 2017	3.10.7 – Symbol field text updated to highlight possible truncation for Turquoise symbol IDs
16.2	01 May 2017	Document updated to include corrections and support 1.4.0.7 Product release. 3.9.3 – Added System Event to Recovery Type field 3.10.5 – Update to the Trading Status field description 3.11.12 – Order Book Clear Message removed from TRADEcho Trades channels 3.11.13, 3.11.14, 3.11.15 – update to the Trade ID field description 6.6 – Updated Security Types for Turquoise venue
16.3	25 May 2017	3.7 – System Event message amended to indicate the use for trading status on TRADEcho. 3.11.1 – Table updated to reflect System Event recoverability
16.4	26 June 2017	3.10.7 – Updated to reflect an enhancement to the 'Instrument Directory – Equities' message
16.5	06 July 2017	6.7 – Updated Security Subtype Codes 6.8 – Updated with Idem Underlying Security Type definitions Section 7 added about Order ID and Trade ID decoding, alphabets and negative prices representation
17.0	03 April 2017	Updated with support to MIFID II 3.5 – Added new Data Type: Date and Time - MiFID Decimal

		3.7 – Added new Application Messages 3.11.8 – Added RFQ ID to Add Order Incremental message 3.11.13 – Updated fields Transaction Time, Price, Trade Type, Flags 3.11.14 – Updated fields Trade Date and Time, Flags 3.11.15 – Updated fields Transaction Time, Flags 3.11.21 – Indicative Quote Information (new) 3.11.22 – MIFID II Trade (new) 3.11.23 – MIFID II Trade Report (new) 3.11.24 – MIFID II Trade Cross (new) 4.2.3 – Recovery logic updated with references to private RFQ book
17.1	03 April 2017	3.10.7 – Removed SRP and DRP from Instrument Directory Equities message. 3.10.6 – Added SRP and DRP to Statistic Snapshot message 3.11.17 – Added SRP and DRP to Statistic Update message 3.10.7 – Symbol Field in Instrument Directory Equity changed from 6 to 8 to accommodate the MTF Common Symbol length
17.2	05 May 2017	Changes from versions 16.1 and 16.2 included Added messages availability tables for 3.11.21 – Indicative Quote Information (new) 3.11.22 – MIFID II Trade (new) 3.11.23 – MIFID II Trade Report (new) 3.11.24 – MIFID II Trade Cross (new)
17.3	25 May 2017	Incorporated changes from V16.3

		3.10.9 – SRP and DRP fields removed 3.11.2 – SRP and DRP fields removed
17.4	26 June 2017	Incorporated changes from V16.4 Corrections to previous version and removal of existing Off-Book Trade message and Off Book Trade types 3.11.14 – Existing Off Book Trade Message removed 3.11.23 – Correction to offset of message fields 3.11.24 – Four additional fields added to the message 6.10 – Off Book Trade Types removed.
17.5	07 July 2017	Incorporated changes from V16.5 3.11.23 – two additional fields added to the message. Venue Type Enum values changed
17.6	25 September 2017	Minor corrections made to the document: All references to MMD Instrument ID changed to GTP Instrument ID. 3.11.4 – Removed Off Book Trade cancellation field from the decommissioned off book trade message. 3.11.23 – Off-book trade type replaced with reserved field 3.11.23 – New ‘unspecified’ value added to the Venue Type field
17.7	06 October 2017	3.10.7 – Reserved Fields ‘Types’ changed 3.10.7 – Currency field description updated 3.10.8 – Currency field description updated 3.10.9 – Currency field description updated 3.11.2 – Reserved Fields ‘Types’ changed 3.11.2 – Currency field description updated 3.11.2 – Invalid statement removed from Group ID field description 3.11.11 – updated to inform customers of the un-suppression of the TOB message during

		auctions 3.11.22 – Important note in the MiFID Quantity field 3.11.22 – OTHR and BAPO Enums added Instrument Identification code and Price Notation fields respectively 3.11.22 – Currency field description updated 3.11.22 – Transaction to be Cleared field Type and Enum meanings updated 3.11.23 – Original Price field converted to reserved field 3.11.23 – Currency field description updated 3.11.23 – Note added to Instrument Identifier field. 3.11.24 – OTHR and BAPO Enums added Instrument Identification code and Price Notation fields respectively 3.11.24 – Transaction to be Cleared field Type and Enum meanings updated 6.14 – Additional Values Currency section added
17.8	31 October 2017	3.10.9 – Reserved Field types change to ‘Price’ in the Instrument Directory – Fixed Income message 3.11.22 – note added regarding ALGO flag for Bulk Trades 3.11.23 – Important note regarding MiFID Quantity field added 3.11.24 – Important note regarding MiFID Quantity field added 6.14 – GBX, ZAC, ITL and TRY currencies added
18.6	25 September 2017	Incorporated changes from version 17.6 **Turquoise branding updated throughout** **Updates related to the introduction of Turquoise Lit Auctions s™:** 3.10.6 – Frequent Lit Auctions added to Auction Type Field

		3.10.7 – Underscore A added to the text relating to new **Turquoise Lit Auctions™** for Venue Instrument ID 3.11.2 – Underscore A added to the text relating new **Turquoise Lit Auctions™** for Venue Instrument ID 3.11.13 – Frequent Lit Auction type added to Trade message 3.11.13 – 3.11.22 – Auction type field will now be relevant when Trade Type field is set to 2 3.11.17 – Frequent Lit Auction type added to Statistics Update message 3.11.22 – Frequent Lit Auction type added to MiFID Trade message 3.11.22 – Auction type field will now be relevant when Trade Type field is set to 2 6.1 – **Turquoise Lit Auctions™** added to Source Venues 6.7 – Frequent Lit Auctions added to Trading Statuses 7.2 – **Turquoise Lit Auctions™** added to section
18.7	1 November 2017	Additional changes incorporated from version 17.6 Incorporated changes from 17.7 and 17.8 3.11.13 – Removed **Turquoise Lit Auctions™** from Auction Type field (note, clients should rely on the Source venue to identify a Lit Auction Trade) 3.11.22 – Removed **Turquoise Lit Auctions™** from Auction Type field (note, clients should rely on the Source venue to identify a Lit Auction Trade)
18.8	27 November 2017	3.11.22 – Updated to specify attributes applicable to non-equity instruments

		3.11.24 – Updated to specify attributes applicable to non-equity instruments 6.15 – Tick ID mapping added 6.11- security definitions added (bond/non-bond) to Security Types table 7.1 – Updated description of conversion of Order ID
18.9	05 December 2017	6.11 – Corrections to Security Type definition
19.0	13 December 2017	Decommission of FTSE Low Latency service in Production 19 Dec and CDS 18 Dec. 3.7 – Removed FTSE Low Latency 3.11.9 – Removed FTSE Low Latency Removed FTSE Low Latency across diagrams
19.1	21 December 2017	6.15 – Added new Tick ID definitions 3.11.22 – Added comment on Transaction to be Cleared 3.11.24 - Added comment on Transaction to be Cleared
19.2	3 January 2018	6.15 - Updated Spanish MIC code from XMCE to XMAD Updated MIC code from XMCE to XMAD across diagrams

In subsequent issues of this document, where amendments have been made, these changes will be indicated through the use of red text.

1.5 Enquiries

For further information on Group Ticker Plant, please contact either your Technical Account Manager or the Client Technology Group (UK):

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Further information can also be found on our project websites:

www.londonstockexchange.com/oneproductinfinitepossibilities

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2. Connectivity

2.1 Transmission Standards

The Group Ticker Plant employs industry standard data delivery and recovery transmission techniques. Further details are provided below.

Clients should note that network addressing is included as part of GTP004 – Parameters Guide.

2.1.1 Multicast Channels

The Group Ticker Plant delivers real-time market data over a number of load balanced IP multicast channels. Details of the service line allocation across multicast channels can be found in GTP001 – Product Guide.

The real-time channels transmit in UDP network packets over IP version 4 (IPv4) Ethernet standards. UDP header information is as defined in the IETF RFC 791 (IPv4) and RFC 768 (UDP) transmission standards. Whilst each UDP network packet will contain a single Unit Header, multiple application messages may be packaged in a single network packet. This is done in an effort to manage client bandwidth requirements. Further details are contained in section 4.3.1 of GTP001 – Product Guide.

Clients should subscribe to both primary and secondary market data feeds. Whilst, during normal service, replay and recovery services are only available on the primary market data gateway, through subscription to both primary and secondary feeds clients are able to arbitrage messages – recovering any missed messages on the primary market data feed from the secondary market data feed.

2.1.2 Recovery and Replay Services

The Recovery and Replay unicast channels will guarantee data delivery though use of TCP over IP version 4 (IPv4) Ethernet standards. TCP Header information is defined in the IETF RFC 793 standard and IPv4 is defined in the RFC 791 standard.

2.2 Client Identification

All clients are required to request enablement on Group Ticker Plant service lines ahead of access to either CDS or Production environments. Access is permissioned on both the Group Ticker Plant gateways and at our network firewalls.

Upon successful completion of access request, the Group will allocate clients their CompID(s). The CompID should be used by clients to login to either the replay or recovery services. Each CompID will be permissioned to access all Group Ticker Plant multicast gateways for which a client has the correct commercial agreement(s) in place, each CompID can only be logged in to one replay or recovery service at any one time.

Unlike the existing Millennium Exchange market data solution, the Group Ticker Plant does not require a password to access the replay or recovery services. The removal of password validation was in direct response to client feedback on our existing product provision.

3 Message Formats

Group Ticker Plant delivers all real-time data in a single, bespoke, binary protocol. Whilst key characteristics of the Group's popular Level 2-MITCH service are retained, the Group Ticker Plant protocol has been developed to deliver multi-asset class information and a richer suite of functionality. In close collaboration with clients, the Group worked to build an improved library of messages which are intuitive and clear; we believe we have made significant improvements to our existing Level 2-MITCH service and other legacy market data protocols. Some of these improvements include:

- Removal of password validation on both replay and recovery services;
- Removal of logout process from both replay and recovery services;
- Decommission of the Level 2-MITCH Time message, replacing with nanosecond time-stamping on all application messages;
- Collapse of Level 2-MITCH Auction Trade, Trade, Trade Break and Order Executed messages into a single Trade message;
- Introduction of the Statistics and the Statistics Update message to support the publication of derived information;
- Introduction of asset-specific Symbol Directory messages available on the recovery solution to support the publication of instrument-specific reference data;
- Introduction of the FTSE Russell Indices Update message to support the publication of FTSE Russell indices as calculated by FTSE Russell;
- Inclusion of the 'Allowed Book Types' field in the Symbol Directory messages to facilitate the identification of applicable trading models for an instrument;
- Introduction of the Top of Book message to support our new real-time streaming level 1 service – this includes a flag to indicate additional executable depth below the Best Bid and Offer.

The Group protocol has been developed to be as generic as possible, facilitating the introduction of additional services as we develop and enhance the Group Ticker Plant product. In some cases, due to differences in trading models of the source systems, it was not possible to maintain a generic implementation, suitable for all systems. Behaviors which are specific to a source system or venue, are separately documented in **GTP008 – Market Attributes Guide.**

3.1 Packet Composition

The Unit Header is used to deliver all administrative and application messages to and from the server on all multicast and unicast channels. Whilst a Unit Header may contain multiple application messages, it will never contain more than one administrative message. A Unit Header will not contain a combination of both application and administrative messages.

3.2 Message Types

The Group Ticker Plant broadcasts a library of messages. The messages are categorized as either administrative or application messages. The administrative messages are used on the TCP/IP replay and recovery services. The application messages are used to broadcast our real-time data service lines on the multicast channels.

Clients should treat each application message as a single standalone instruction, updating their order books and systems appropriately based on the content of the application message. Clients should not program to a multicast stream of messages in an attempt to identify patterns or system logics as the stream of messages disseminated is subject to change as we optimize our trading and market data technologies. If a client processes each application message in real-time as a standalone instruction, order books will be a true state of the trading engines of the supported markets.

3.3 Sequence Numbers

All application messages transmitted by the server on the multicast channels and the replay services are sequenced. The Unit Header only contains the sequence number of the first message; the sequence numbers of any other messages included in the same packet are implied. The sequence number of the next packet can be determined by adding the value in the Message Count field of the Unit Header to the value in the Sequence Number field.

The application messages sent from the server by the recovery service and all administrative messages (including those sent by the client) are un-sequenced.

3.4 Timestamps

All Group Ticker Plant application messages contain a timestamp with nanosecond granularity and will be sent in UTC. Timestamps are derived from the supporting infrastructure timestamp, which is synched through various processes including industry standards such as NTP - guaranteeing accuracy to the millisecond - and PTP allowing accuracy to microsecond.

Transaction times included in both the Trade and Off-Book Trade messages will be disseminated as reported to the Group Ticker Plant by upstream systems. Where granularity to nanosecond does not exist the timestamp will be rounded to the nearest microsecond and disseminated to clients. It is assumed that each upstream system, by adhering to the level of accuracy requested in MIFID II RTS25 Table 2, will ensure the appropriate timestamp granularity is transmitted to Group Ticker Plant.

3.5 Data Types

The fields of the messages utilised by the server will support the data types outlined below:

Data Type	Length	Description
Alpha	Variable	These fields use standard ASCII character bytes. They are left justified and padded on the right with spaces.
Bit Field	1	A single byte used to hold up to eight 1-bit flags. Each bit will represent a Boolean flag. The 0 bit is the lowest significant bit and the 7 bit is the highest significant bit.
Byte	1	A single byte used to hold one ASCII character.
Date	8	Date specified in the YYYYMMDD format using ASCII characters.
Time	6	Time specified in HHMMSS format using ASCII characters in a 24 hour clock format.
UDT (Unix Date Time)	8	64bit unsigned integer where; time stamp (in UTC) = (date time per second resolution in unix time format) * 1,000,000,000 + (nanoseconds component)
Price	8	Signed Little-Endian encoded 64bit integer field with eight implied decimal places.
Size	8	Little-Endian encoded 64 bit unsigned integer with eight implied decimal places.
Price4	8	Signed Little-Endian encoded 64bit integer field with four implied decimal places.
Size4	8	Little-Endian encoded 64 bit unsigned integer with four implied decimal places.
UInt8	1	8 bit unsigned integer.
UInt16	2	Little-Endian encoded 16 bit unsigned integer.
UInt32	4	Little-Endian encoded 32 bit unsigned integer.
UInt64	8	Little-Endian encoded 64 bit unsigned integer.

Date and Time	27	ISO 8601 date and time in the following string format:YYYY-MM-DDThh:mm:ss.ddddddZ. - ‘YYYY’ is the year; - ‘MM’ is the month; - ‘DD’ is the day; - ‘T’ – means that the letter ‘T’ shall be used - ‘hh’ is the hour; - ‘mm’ is the minute; - ‘ss.dddddd’ is the second and its fraction of a second; - Z is UTC time. Dates and times shall be reported in UTC.
MiFID Decimal	20	These fields use standard ASCII character bytes to represent numeric values. They are left justified and padded on the right with spaces. {DECIMAL-n/m} - Decimal number of up to ‘n’ digits in total of which up to ‘m’ digits can be fraction digits. Decimal separator is '.' (Full stop). Negative numbers are prefixed with '-' (minus). Where applicable, values shall be rounded and not truncated.

Please note that some field descriptions in this document include ‘blank’ as valid values. ‘Blank’ should be considered as ‘space filled’ for Alpha data types and ‘0’ (zero) for data types Byte, Price, Size, UInt8, UInt16, UInt32 and UInt64.

3.6 Message Overview – Administrative Messages

Name	Message Type		Usage
	ASCII	Hex	
Heartbeat	-	-	Used by the server, on the real-time service, to exercise the communication line during periods of inactivity.
Instrument Directory - Equities	R	0x52	Used to disseminate reference data information of equity instruments.
Instrument Directory - Derivatives	v	0x76	Used to disseminate reference data information of derivative instruments.
Instrument Directory – Fixed Income	n	0x6e	Used to disseminate reference data information of fixed income instruments.
Instrument Directory – Strategies	o	0x6f	Used to disseminate reference data information of strategy (combination) instruments.
Login Request	(soh)	0x01	Used by the client to login to the replay or recovery channel.
Login Response	(stx)	0x02	Used by the server to accept or reject a login request to the replay or recovery channel.
Replay Request	(etx)	0x03	Used by the client to request a retransmission of messages on the replay channel.
Replay Response	(eot)	0x04	Used by the server to respond to a retransmission request on the replay channel.
Recovery Request	•	0x81	Used by the client to request data on the recovery channel.
Recovery Response	,	0x82	Used by the server to respond to a snapshot request on the Snapshot channel.
Replay and Recovery Complete	ƒ	0x83	Used by the server to indicate the successful completion of servicing a message replay or a recovery request.
Statistics Snapshot	k	0x6b	A snapshot of an instrument's statistics that is used for recovery.

3.7 Message Overview – Application Messages

Name	Message Type		Intelligent Throttling Applied?	Usage
	ASCII	Hex		
System Event	S	0x53	Yes	Sent to indicate the start and end of the day. For TRADEcho, recoverable to provide the trading session.
Instrument Directory	p	0x70	Yes	Used to disseminate a common and limited set of data for all configured instrument types (except strategy instruments) on the real-time channels.
Trade Cross	q	0x71	No	Sent to indicate a cross trade execution.
Instrument Status	H	0x48	No	Used to communicate scheduled and unscheduled session changes. When sent in the recovery channel, used to indicate the current trading status of an instrument.
Add Order	A	0x41	Yes	Indicates the first order of a given side of an MBO snapshot
Add Order Short	e	0x65	Yes	Used to indicate individual orders of an MBO snapshot.
Add Order MBP	f	0x66	Yes	Indicates the first price point of a given side of an MBP snapshot.
Add Order Short MBP	g	0x67	Yes	Used to indicate individual price points of an MBP snapshot.

Add Order Incremental	F	0x46	No	Sent to instruct recipients to add a new displayable order to the retrospective order book.
Delete Order	D	0x44	No	Sent to instruct recipients to delete an order from the retrospective order book.
Modify Order	U	0x55	No	Sent to instruct recipients to update an order's price and/or size on the retrospective order book.
Top of Book	i	0x69	No	Used to update the level 1 service following any change to the consolidated Best Bid and Offer.
Order Book Clear	y	0x79	No	Sent to instruct recipients to remove all orders from the order book for the specified instrument.
Trade	P	0x50	No	Sent to indicate trades executed on supported markets.
Off Book Trade	x	0x78	Yes	Sent to report the details of a privately negotiated trade.
Statistics	w	0x77	No	Contains a set of statistics that are updated frequently, usually as a result of executions.
Statistics Update	j	0x6A	No	Contains a set of statistics that are not updated frequently.
FTSE Russell Indices Update	l	0x6c	No	Used to redistribute index values for a set of FTSE Russell indices.

~~FTSE Low Latency Indices Update~~	{	~~0x7b~~	~~No~~	~~Used to distribute FTSE Low Latency index updates.~~
Announcements	u	0x75	Yes	Used to disseminate announcements.
Indicative Quote Information	Ç	0x80	No	Indicates the simple average of the bid and ask of a RFQ session
MiFID Trade	Q	0x51	No	Sent to represent different types of MiFID compliant trades published by markets.
MiFID Trade Report	T	0x54	Yes	Sent to report the MiFID compliant details of a privately negotiated trade.
MiFID Trade Cross	V	0x56	No	Sent to indicate a MiFID compliant cross trade.

3.8 Unit Header

Field	Offset	Length	Type	Description
Length	0	2	UInt16	Length of the message block including the header and all payload messages.
Message Count	2	1	UInt8	Number of payload messages that will follow the header.
Market Data Group	3	1	Byte	Identity of the market data group the payload messages relate to.
Sequence Number	4	4	UInt32	Sequence number of the first payload message.
Payload	8	Variable	-	One or more payload messages.

3.9 Administrative Messages (Client-Initiated)

3.9.1 Login Request

Market Data Group	Source Venue	Channel Content	Level 1	Level 2 MBO	Level 2 MBP	Level 2 Incremental	MIFID II Post Trade	Replay	Recovery
Channel A/a	London Stock Exchange	FTSE 100	N	N	N	N	N	Y	Y
Channel B/b	London Stock Exchange	FTSE 100	N	N	N	N	N	Y	Y
Channel C/c	London Stock Exchange	FTSE 250	N	N	N	N	N	Y	Y
Channel D/d	London Stock Exchange	Structured Products	N	N	N	N	N	Y	Y
Channel E/e	London Stock Exchange	Miscellaneous	N	N	N	N	N	Y	Y
Channel F/f	London Stock Exchange	European (EQS)	N	N	N	N	N	Y	Y
Channel G/g	London Stock Exchange	International (IOB and ITR)	N	N	N	N	N	Y	Y
Channel H/h	Borsa Italiana	MTA	N	N	N	N	N	Y	Y
Channel I/i	Borsa Italiana	MTA and Sedex	N	N	N	N	N	Y	Y
Channel J/j	Borsa Italiana	Structured Products	N	N	N	N	N	Y	Y
Channel K/k	Borsa Italiana	Miscellaneous	N	N	N	N	N	Y	Y
Channel L/l	Borsa Italiana	IDEM	N	N	N	N	N	Y	Y
Channel M/m	Borsa Italiana	IDEM	N	N	N	N	N	Y	Y
Channel Q/q	EuroTLX	EuroTLX	N	N	N	N	N	Y	Y
Channel R/r	EuroTLX	EuroTLX	N	N	N	N	N	Y	Y
Channel S/s	EuroTLX	EuroTLX	N	N	N	N	N	Y	Y
Channel T/t	Turquoise	XLON				N	N	Y	Y
Channel U/u	Turquoise	XPAR				N	N	Y	Y
Channel V/v	Turquoise	XETR				N	N	Y	Y
Channel W/w	Turquoise	XCSE, XHEL, XMAD, XSTO, XSWX, XVTX				N	N	Y	Y
Channel X/x	Turquoise	MTAA, XOSL, WBAH, XDUB, ARCX...				N	N	Y	Y
Channel Y/y	Turquoise	XMAS, XBRU, XLIS and XLUX				N	N	Y	Y
Channel Z/z	Borsa Italiana	TAH and MiFID	N	N	N	N	N	Y	Y
Channel 1/5	TradEcho	SI Quoting				N		Y	Y
Channel 2/6	TradEcho	Trades					N	Y	Y
Channel 3/7	TradEcho	SI Quoting				N		Y	Y
Channel 4/8	TradEcho	Trades					N	Y	Y
Channel N/n	London Stock Exchange / Borsa Italiana		N					Y	
Channel O/o	FTSE	FTSE Indices	N					Y	
Channel P/p	Borsa Admin	Borsa Italiana Announcements	N					Y	Y

Field	Offset	Length	Type	Description
Length	0	2	UInt16	Length of message including this field.
Message Type	2	1	Byte	**Hex** **Meaning** 0x01 Login Request
Username	3	8	Alpha	CompID assigned to the client.

3.9.2 Replay Request

Market Data Group	Source Venue	Channel Content	Level 1	Level 2 MBO	Level 2 MBP	Level 2 Incremental	MiFID II Post Trade	Replay	Recovery
Channel A/a	London Stock Exchange	FTSE 100	N	N	N	N	N	Y	N
Channel B/b	London Stock Exchange	FTSE 100	N	N	N	N	N	Y	N
Channel C/c	London Stock Exchange	FTSE 250	N	N	N	N	N	Y	N
Channel D/d	London Stock Exchange	Structured Products	N	N	N	N	N	Y	N
Channel E/e	London Stock Exchange	Miscellaneous	N	N	N	N	N	Y	N
Channel F/f	London Stock Exchange	European (EQS)	N	N	N	N	N	Y	N
Channel G/g	London Stock Exchange	International (IOB and ITR)	N	N	N	N	N	Y	N
Channel H/h	Borsa Italiana	MTA	N	N	N	N	N	Y	N
Channel I/i	Borsa Italiana	MTA and Sedex	N	N	N	N	N	Y	N
Channel J/j	Borsa Italiana	Structured Products	N	N	N	N	N	Y	N
Channel K/k	Borsa Italiana	Miscellaneous	N	N	N	N	N	Y	N
Channel L/l	Borsa Italiana	IDEM	N	N	N	N	N	Y	N
Channel M/m	Borsa Italiana	IDEM	N	N	N	N	N	Y	N
Channel Q/q	EuroTLX	EuroTLX	N	N	N	N	N	Y	N
Channel R/r	EuroTLX	EuroTLX	N	N	N	N	N	Y	N
Channel S/s	EuroTLX	EuroTLX	N	N	N	N	N	Y	N
Channel T/t	Turquoise	XLON				N	N	Y	N
Channel U/u	Turquoise	XPAR				N	N	Y	N
Channel V/v	Turquoise	XETR				N	N	Y	N
Channel W/w	Turquoise	XCSE, XHEL, XMAD, XSTO, XSWX, XVTX				N	N	Y	N
Channel X/x	Turquoise	MTAA, XOSL, WBAH, XDUB, ARCX...				N	N	Y	N
Channel Y/y	Turquoise	XMAS, XBRU, XLIS and XLUX				N	N	Y	N
Channel Z/z	Borsa Italiana	TAH and MiFID	N	N	N	N	N	Y	N
Channel 1/5	TradEcho	SI Quoting				N		Y	N
Channel 2/6	TradEcho	Trades					N	Y	N
Channel 3/7	TradEcho	SI Quoting				N		Y	N
Channel 4/8	TradEcho	Trades					N	Y	N
Channel N/n	London Stock Exchange / Borsa Italiana		N					Y	
Channel O/o	FTSE	FTSE Indices	N					Y	
Channel P/p	Borsa Admin	Borsa Italiana Announcements	N					Y	N

<table>
<tr><th>Field</th><th>Offset</th><th>Length</th><th>Type</th><th>Description</th></tr>
<tr><td>Length</td><td>0</td><td>2</td><td>UInt16</td><td>Length of message including this field.</td></tr>
<tr><td>Message Type</td><td>2</td><td>1</td><td>Byte</td><td><table><tr><th>Hex</th><th>Meaning</th></tr><tr><td>0x03</td><td>Replay Request</td></tr></table></td></tr>
<tr><td>First Message</td><td>3</td><td>4</td><td>UInt32</td><td>Sequence number of the first message in range to be retransmitted.</td></tr>
<tr><td>Count</td><td>7</td><td>4</td><td>UInt32</td><td>Number of messages to be resent.</td></tr>
<tr><td>Request ID</td><td>11</td><td>4</td><td>UInt32</td><td>The value set in this will be echoed back in the corresponding Replay Response. The system will not validate uniqueness of the set value.</td></tr>
</table>

3.9.3 Recovery Request

Market Data Group	Source Venue	Channel Content	Level 1	Level 2 MBO	Level 2 MBP	Level 2 Incremental	MiFID II Post Trade	Replay	Recovery
Channel A/a	London Stock Exchange	FTSE 100	N	N	N	N	N	N	Y
Channel B/b	London Stock Exchange	FTSE 100	N	N	N	N	N	N	Y
Channel C/c	London Stock Exchange	FTSE 250	N	N	N	N	N	N	Y
Channel D/d	London Stock Exchange	Structured Products	N	N	N	N	N	N	Y
Channel E/e	London Stock Exchange	Miscellaneous	N	N	N	N	N	N	Y
Channel F/f	London Stock Exchange	European (EQS)	N	N	N	N	N	N	Y
Channel G/g	London Stock Exchange	International (IOB and ITR)	N	N	N	N	N	N	Y
Channel H/h	Borsa Italiana	MTA	N	N	N	N	N	N	Y
Channel I/i	Borsa Italiana	MTA and Sedex	N	N	N	N	N	N	Y
Channel J/j	Borsa Italiana	Structured Products	N	N	N	N	N	N	Y
Channel K/k	Borsa Italiana	Miscellaneous	N	N	N	N	N	N	Y
Channel L/l	Borsa Italiana	IDEM	N	N	N	N	N	N	Y
Channel M/m	Borsa Italiana	IDEM	N	N	N	N	N	N	Y
Channel Q/q	EuroTLX	EuroTLX	N	N	N	N	N	N	Y
Channel R/r	EuroTLX	EuroTLX	N	N	N	N	N	N	Y
Channel S/s	EuroTLX	EuroTLX	N	N	N	N	N	N	Y
Channel T/t	Turquoise	XLON				N	N	N	Y
Channel U/u	Turquoise	XPAR				N	N	N	Y
Channel V/v	Turquoise	XETR				N	N	N	Y
Channel W/w	Turquoise	XCSE, XHEL, XMAD, XSTO, XSWX, XVTX				N	N	N	Y
Channel X/x	Turquoise	MTAA, XOSL, WBAH, XDUB, ARCX...				N	N	N	Y
Channel Y/y	Turquoise	XMAS, XBRU, XLIS and XLUX				N	N	N	Y
Channel Z/z	Borsa Italiana	TAH and MiFID	N	N	N	N	N	N	Y
Channel 1/5	TradEcho	SI Quoting				N		N	Y
Channel 2/6	TradEcho	Trades					N	N	Y
Channel 3/7	TradEcho	SI Quoting				N		N	Y
Channel 4/8	TradEcho	Trades					N	N	Y
Channel N/n	London Stock Exchange / Borsa Italiana		N					N	
Channel O/o	FTSE	FTSE Indices	N					N	
Channel P/p	Borsa Admin	Borsa Italiana Announcements	N					N	Y

Field	Offset	Length	Type	Description
Length	0	2	UInt16	Length of message including this field.
Message Type	2	1	Byte	**Hex** **Meaning** 0x81 Recovery Request
Request Level	3	1	UInt8	Defines the level of the request: **Value** **Meaning** 0 Instrument 1 Group (Segment) 2 Multicast Channel
Instrument	4	8	UInt64	GTP Instrument identifier if Request Level is 0. Blank if not.
Group ID	12	6	Alpha	Group/Segment ID if Request Level is 1. Blank if not.
Order Book Type	18	1	UInt8	Only considered if the Request Level is 0. If specified, only data related to the specified order book type is provided. If not specified, data for all available book types for the instrument are provided. For Recovery Type = 3 (Statistics) this has to be set to ‘0’ = All. Please refer the Additional Field Values section of this document for valid values.
Source Venue	19	2	UInt16	Mandatory field if Request Level = 1. Not considered for other Request Levels. Please refer the Additional Field Values section of this document for valid values.

Recovery Type	21	1	UInt8	The type of messages to be replayed: **Value** **Meaning** 0 Instrument Directory 1 Order book 2 All Trades 3 Statistics 4 Instrument Status 5 Announcements 6 System Event
Sequence Number	22	4	UInt32	Only valid if Recovery Type = 2 (Trades) or 5 (Announcements). If specified, the trades or announcements reported with an equal or higher sequence number will be sent.
Request ID	26	4	UInt32	The value set in this will be echoed back in the corresponding Recovery Response and Recovery Complete. The system will not validate uniqueness of the set value.

3.10 Administrative Messages (Server-Initiated)

3.10.1 Heartbeat

A Unit Header with a Message Count of zero will be used by the server as the Heartbeat message. Such a message will never increment the sequence number of the real-time multicast channel. The next anticipated sequence number will be included in the Sequence Number to enable recipients to detect gaps on the real-time channel.

3.10.2 Login Response

Market Data Group	Source Venue	Channel Content	Level 1	Level 2 MBO	Level 2 MBP	Level 2 Incremental	MIFID II Post Trade	Replay	Recovery
Channel A/a	London Stock Exchange	FTSE 100	N	N	N	N	N	Y	Y
Channel B/b	London Stock Exchange	FTSE 100	N	N	N	N	N	Y	Y
Channel C/c	London Stock Exchange	FTSE 250	N	N	N	N	N	Y	Y
Channel D/d	London Stock Exchange	Structured Products	N	N	N	N	N	Y	Y
Channel E/e	London Stock Exchange	Miscellaneous	N	N	N	N	N	Y	Y
Channel F/f	London Stock Exchange	European (EQS)	N	N	N	N	N	Y	Y
Channel G/g	London Stock Exchange	International (IOB and ITR)	N	N	N	N	N	Y	Y
Channel H/h	Borsa Italiana	MTA	N	N	N	N	N	Y	Y
Channel I/i	Borsa Italiana	MTA and Sedex	N	N	N	N	N	Y	Y
Channel J/j	Borsa Italiana	Structured Products	N	N	N	N	N	Y	Y
Channel K/k	Borsa Italiana	Miscellaneous	N	N	N	N	N	Y	Y
Channel L/l	Borsa Italiana	IDEM	N	N	N	N	N	Y	Y
Channel M/m	Borsa Italiana	IDEM	N	N	N	N	N	Y	Y
Channel Q/q	EuroTLX	EuroTLX	N	N	N	N	N	Y	Y
Channel R/r	EuroTLX	EuroTLX	N	N	N	N	N	Y	Y
Channel S/s	EuroTLX	EuroTLX	N	N	N	N	N	Y	Y
Channel T/t	Turquoise	XLON				N	N	Y	Y
Channel U/u	Turquoise	XPAR				N	N	Y	Y
Channel V/v	Turquoise	XETR				N	N	Y	Y
Channel W/w	Turquoise	XCSE, XHEL, XMAD, XSTO, XSWX, XVTX				N	N	Y	Y
Channel X/x	Turquoise	MTAA, XOSL, WBAH, XDUB, ARCX...				N	N	Y	Y
Channel Y/y	Turquoise	XMAS, XBRU, XLIS and XLUX				N	N	Y	Y
Channel Z/z	Borsa Italiana	TAH and MiFID	N	N	N	N	N	Y	Y
Channel 1/5	TradEcho	SI Quoting				N		Y	Y
Channel 2/6	TradEcho	Trades					N	Y	Y
Channel 3/7	TradEcho	SI Quoting				N		Y	Y
Channel 4/8	TradEcho	Trades					N	Y	Y
Channel N/n	London Stock Exchange / Borsa Italiana		N					Y	
Channel O/o	FTSE	FTSE Indices	N					Y	
Channel P/p	Borsa Admin	Borsa Italiana Announcements	N					Y	Y

<table>
<tr><th>Field</th><th>Offset</th><th>Length</th><th>Type</th><th>Description</th></tr>
<tr><td>Length</td><td>0</td><td>2</td><td>UInt16</td><td>Length of message including this field.</td></tr>
<tr><td>Message Type</td><td>2</td><td>1</td><td>Byte</td><td><table><tr><th>Hex</th><th>Meaning</th></tr><tr><td>0x02</td><td>Login Response</td></tr></table></td></tr>
<tr><td>Status</td><td>3</td><td>1</td><td>Byte</td><td>Status of the login request.<table><tr><th>Value</th><th>Meaning</th></tr><tr><td>A</td><td>Login Accepted</td></tr><tr><td>a</td><td>CompID Inactive/Suspended</td></tr><tr><td>b</td><td>Login Limit Reached</td></tr><tr><td>c</td><td>Service Unavailable</td></tr><tr><td>d</td><td>Maximum Connections Limit Reached</td></tr><tr><td>e</td><td>Failed (other)</td></tr><tr><td>f</td><td>Invalid CompID or IP Address</td></tr></table></td></tr>
</table>

3.10.3 Replay Response

Market Data Group	Source Venue	Channel Content	Level 1	Level 2 MBO	Level 2 MBP	Level 2 Incremental	MIFID II Post Trade	Replay	Recovery
Channel A/a	London Stock Exchange	FTSE 100	N	N	N	N	N	Y	N
Channel B/b	London Stock Exchange	FTSE 100	N	N	N	N	N	Y	N
Channel C/c	London Stock Exchange	FTSE 250	N	N	N	N	N	Y	N
Channel D/d	London Stock Exchange	Structured Products	N	N	N	N	N	Y	N
Channel E/e	London Stock Exchange	Miscellaneous	N	N	N	N	N	Y	N
Channel F/f	London Stock Exchange	European (EQS)	N	N	N	N	N	Y	N
Channel G/g	London Stock Exchange	International (IOB and ITR)	N	N	N	N	N	Y	N
Channel H/h	Borsa Italiana	MTA	N	N	N	N	N	Y	N
Channel I/i	Borsa Italiana	MTA and Sedex	N	N	N	N	N	Y	N
Channel J/j	Borsa Italiana	Structured Products	N	N	N	N	N	Y	N
Channel K/k	Borsa Italiana	Miscellaneous	N	N	N	N	N	Y	N
Channel L/l	Borsa Italiana	IDEM	N	N	N	N	N	Y	N
Channel M/m	Borsa Italiana	IDEM	N	N	N	N	N	Y	N
Channel Q/q	EuroTLX	EuroTLX	N	N	N	N	N	Y	N
Channel R/r	EuroTLX	EuroTLX	N	N	N	N	N	Y	N
Channel S/s	EuroTLX	EuroTLX	N	N	N	N	N	Y	N
Channel T/t	Turquoise	XLON				N	N	Y	N
Channel U/u	Turquoise	XPAR				N	N	Y	N
Channel V/v	Turquoise	XETR				N	N	Y	N
Channel W/w	Turquoise	XCSE, XHEL, XMAD, XSTO, XSWX, XVTX				N	N	Y	N
Channel X/x	Turquoise	MTAA, XOSL, WBAH, XDUB, ARCX...				N	N	Y	N
Channel Y/y	Turquoise	XMAS, XBRU, XLIS and XLUX				N	N	Y	N
Channel Z/z	Borsa Italiana	TAH and MiFID	N	N	N	N	N	Y	N
Channel 1/5	TradEcho	SI Quoting				N		Y	N
Channel 2/6	TradEcho	Trades					N	Y	N
Channel 3/7	TradEcho	SI Quoting				N		Y	N
Channel 4/8	TradEcho	Trades					N	Y	N
Channel N/n	London Stock Exchange / Borsa Italiana		N					Y	
Channel O/o	FTSE	FTSE Indices	N					Y	
Channel P/p	Borsa Admin	Borsa Italiana Announcements	N					Y	N

Field	Offset	Length	Type	Description
Length	0	2	UInt16	Length of message including this field.
Message Type	2	1	Byte	**Hex** **Meaning** 0x04 Replay Response
First Message	3	4	UInt32	Sequence number of the first message in range to be retransmitted. This will be zero if Status is not "A".
Count	7	4	UInt32	Number of messages to be resent, not including any Replay and Recovery Complete messages. This will be zero if Status is not "A".
Status	11	1	Byte	**Value** **Meaning** A Request Accepted D Request Limit Reached O Out of Range U Replay Unavailable c Concurrent Limit Reached e Failed (Other)
Request ID	12	4	UInt32	Will include the value set as Request ID in the Replay Request message.

3.10.4 Recovery Response

Market Data Group	Source Venue	Channel Content	Level 1	Level 2 MBO	Level 2 MBP	Level 2 Incremental	MIFID II Post Trade	Replay	Recovery
Channel A/a	London Stock Exchange	FTSE 100	N	N	N	N	N	N	Y
Channel B/b	London Stock Exchange	FTSE 100	N	N	N	N	N	N	Y
Channel C/c	London Stock Exchange	FTSE 250	N	N	N	N	N	N	Y
Channel D/d	London Stock Exchange	Structured Products	N	N	N	N	N	N	Y
Channel E/e	London Stock Exchange	Miscellaneous	N	N	N	N	N	N	Y
Channel F/f	London Stock Exchange	European (EQS)	N	N	N	N	N	N	Y
Channel G/g	London Stock Exchange	International (IOB and ITR)	N	N	N	N	N	N	Y
Channel H/h	Borsa Italiana	MTA	N	N	N	N	N	N	Y
Channel I/i	Borsa Italiana	MTA and Sedex	N	N	N	N	N	N	Y
Channel J/j	Borsa Italiana	Structured Products	N	N	N	N	N	N	Y
Channel K/k	Borsa Italiana	Miscellaneous	N	N	N	N	N	N	Y
Channel L/l	Borsa Italiana	IDEM	N	N	N	N	N	N	Y
Channel M/m	Borsa Italiana	IDEM	N	N	N	N	N	N	Y
Channel Q/q	EuroTLX	EuroTLX	N	N	N	N	N	N	Y
Channel R/r	EuroTLX	EuroTLX	N	N	N	N	N	N	Y
Channel S/s	EuroTLX	EuroTLX	N	N	N	N	N	N	Y
Channel T/t	Turquoise	XLON				N	N	N	Y
Channel U/u	Turquoise	XPAR				N	N	N	Y
Channel V/v	Turquoise	XETR				N	N	N	Y
Channel W/w	Turquoise	XCSE, XHEL, XMAD, XSTO, XSWX, XVTX				N	N	N	Y
Channel X/x	Turquoise	MTAA, XOSL, WBAH, XDUB, ARCX...				N	N	N	Y
Channel Y/y	Turquoise	XMAS, XBRU, XLIS and XLUX				N	N	N	Y
Channel Z/z	Borsa Italiana	TAH and MiFID	N	N	N	N	N	N	Y
Channel 1/5	TradEcho	SI Quoting				N		N	Y
Channel 2/6	TradEcho	Trades					N	N	Y
Channel 3/7	TradEcho	SI Quoting				N		N	Y
Channel 4/8	TradEcho	Trades					N	N	Y
Channel N/n	London Stock Exchange / Borsa Italiana		N					N	
Channel O/o	FTSE	FTSE Indices	N					N	
Channel P/p	Borsa Admin	Borsa Italiana Announcements	N					N	Y

Field	Offset	Length	Type	Description
Length	0	2	UInt16	Length of message including this field.
Message Type	2	1	Byte	**Hex** **Meaning** 0x82 Recovery Response
Sequence Number	3	4	UInt32	Sequence number on the real-time channel with which the snapshot is synchronised when Recovery Type = 1, 2, 3, 4 and 5. This will be zero for other Recovery Types or if Status is not “A”.
Count	7	4	UInt32	Number of messages to follow, not including any Replay and Recovery Complete messages. This will be zero if Status is not “A”.
Status	11	1	Byte	**Value** **Meaning** A Request Accepted O Out of Range a Invalid Group or Instrument b Request Limit Reached c Concurrent Limit Reached d Invalid Recovery Type or Request Level e Failed (Other)
Request ID	12	4	UInt32	Will include the value set as Request ID in the Recovery Request message.

3.10.5 Replay and Recovery Complete

Market Data Group	Source Venue	Channel Content	Level 1	Level 2 MBO	Level 2 MBP	Level 2 Incremental	MIFID II Post Trade	Replay	Recovery
Channel A/a	London Stock Exchange	FTSE 100	N	N	N	N	N	Y	Y
Channel B/b	London Stock Exchange	FTSE 100	N	N	N	N	N	Y	Y
Channel C/c	London Stock Exchange	FTSE 250	N	N	N	N	N	Y	Y
Channel D/d	London Stock Exchange	Structured Products	N	N	N	N	N	Y	Y
Channel E/e	London Stock Exchange	Miscellaneous	N	N	N	N	N	Y	Y
Channel F/f	London Stock Exchange	European (EQS)	N	N	N	N	N	Y	Y
Channel G/g	London Stock Exchange	International (IOB and ITR)	N	N	N	N	N	Y	Y
Channel H/h	Borsa Italiana	MTA	N	N	N	N	N	Y	Y
Channel I/i	Borsa Italiana	MTA and Sedex	N	N	N	N	N	Y	Y
Channel J/j	Borsa Italiana	Structured Products	N	N	N	N	N	Y	Y
Channel K/k	Borsa Italiana	Miscellaneous	N	N	N	N	N	Y	Y
Channel L/l	Borsa Italiana	IDEM	N	N	N	N	N	Y	Y
Channel M/m	Borsa Italiana	IDEM	N	N	N	N	N	Y	Y
Channel Q/q	EuroTLX	EuroTLX	N	N	N	N	N	Y	Y
Channel R/r	EuroTLX	EuroTLX	N	N	N	N	N	Y	Y
Channel S/s	EuroTLX	EuroTLX	N	N	N	N	N	Y	Y
Channel T/t	Turquoise	XLON				N	N	Y	Y
Channel U/u	Turquoise	XPAR				N	N	Y	Y
Channel V/v	Turquoise	XETR				N	N	Y	Y
Channel W/w	Turquoise	XCSE, XHEL, XMAD, XSTO, XSWX, XVTX				N	N	Y	Y
Channel X/x	Turquoise	MTAA, XOSL, WBAH, XDUB, ARCX…				N	N	Y	Y
Channel Y/y	Turquoise	XMAS, XBRU, XLIS and XLUX				N	N	Y	Y
Channel Z/z	Borsa Italiana	TAH and MiFID	N	N	N	N	N	Y	Y
Channel 1/5	TradEcho	SI Quoting				N		Y	Y
Channel 2/6	TradEcho	Trades					N	Y	Y
Channel 3/7	TradEcho	SI Quoting				N		Y	Y
Channel 4/8	TradEcho	Trades					N	Y	Y

Channel N/n	London Stock Exchange / Borsa Italiana		N					Y	
Channel O/o	FTSE	FTSE Indices	N					Y	
Channel P/p	Borsa Admin	Borsa Italiana Announcements	N					Y	Y

Field	Offset	Length	Type	Description
Length	0	2	UInt16	Length of message including this field.
Message Type	2	1	Byte	**Hex** / **Meaning**: 0x83 – Replay and Recovery Complete
Request ID	3	4	UInt32	Will include the value set as Request ID in the Recovery Request message.
Trading Status	7	1	Byte	Current Trading status of the Instrument. Populated only when the message is sent at the end of individual order book snapshots during a trading session. Please refer the Additional Field Values section of this document for valid values.

3.10.6 Statistics Snapshot

Market Data Group	Source Venue	Channel Content	Level 1	Level 2 MBO	Level 2 MBP	Level 2 Incremental	MIFID II Post Trade	Replay	Recovery
Channel A/a	London Stock Exchange	FTSE 100	N	N	N	N	N	N	Y
Channel B/b	London Stock Exchange	FTSE 100	N	N	N	N	N	N	Y
Channel C/c	London Stock Exchange	FTSE 250	N	N	N	N	N	N	Y
Channel D/d	London Stock Exchange	Structured Products	N	N	N	N	N	N	Y
Channel E/e	London Stock Exchange	Miscellaneous	N	N	N	N	N	N	Y
Channel F/f	London Stock Exchange	European (EQS)	N	N	N	N	N	N	Y
Channel G/g	London Stock Exchange	International (IOB and ITR)	N	N	N	N	N	N	Y
Channel H/h	Borsa Italiana	MTA	N	N	N	N	N	N	Y
Channel I/i	Borsa Italiana	MTA and Sedex	N	N	N	N	N	N	Y
Channel J/j	Borsa Italiana	Structured Products	N	N	N	N	N	N	Y
Channel K/k	Borsa Italiana	Miscellaneous	N	N	N	N	N	N	Y
Channel L/l	Borsa Italiana	IDEM	N	N	N	N	N	N	Y
Channel M/m	Borsa Italiana	IDEM	N	N	N	N	N	N	Y
Channel Q/q	EuroTLX	EuroTLX	N	N	N	N	N	N	Y
Channel R/r	EuroTLX	EuroTLX	N	N	N	N	N	N	Y
Channel S/s	EuroTLX	EuroTLX	N	N	N	N	N	N	Y
Channel T/t	Turquoise	XLON				N	N	N	Y
Channel U/u	Turquoise	XPAR				N	N	N	Y
Channel V/v	Turquoise	XETR				N	N	N	Y
Channel W/w	Turquoise	XCSE, XHEL, XMAD, XSTO, XSWX, XVTX				N	N	N	Y
Channel X/x	Turquoise	MTAA, XOSL, WBAH, XDUB, ARCX...				N	N	N	Y
Channel Y/y	Turquoise	XMAS, XBRU, XLIS and XLUX				N	N	N	Y
Channel Z/z	Borsa Italiana	TAH and MiFID	N	N	N	N	N	N	Y
Channel 1/5	TradEcho	SI Quoting				N		N	Y
Channel 2/6	TradEcho	Trades					N	N	Y
Channel 3/7	TradEcho	SI Quoting				N		N	Y
Channel 4/8	TradEcho	Trades					N	N	Y
Channel N/n	London Stock Exchange / Borsa Italiana		N					N	
Channel O/o	FTSE	FTSE Indices	N					N	
Channel P/p	Borsa Admin	Borsa Italiana Announcements	N					N	Y

Field	Offset	Length	Type	Description
Length	0	2	UInt16	Length of message including this field.
Message Type	2	1	Byte	**Hex** **Meaning** 0x6b Statistics Snapshot
Timestamp	3	8	UDT	Time the message was generated.
Instrument	11	8	UInt64	GTP Instrument identifier.
Source venue	19	2	UInt16	Please refer the Additional Field Values section of this document for valid values.
Volume	21	8	Size4	Cumulative volume of all trades for the trading day.
Volume (on-book only)	29	8	Size4	Cumulative volume for the trading day excluding off-book trades.
VWAP	37	8	Price4	Volume weighted average price for the day for all trades.
VWAP (on-book only)	45	8	Price4	Volume weighted average price for the day excluding off-book trades.
Number of Trades	53	4	UInt32	Count of all trades for the day.
Number of trades (on-book only)	57	4	UInt32	Count of trades for the day excluding off-book trades.
Turnover	61	8	Price4	Turnover of all trades for the day.
Turnover (on-book only)	69	8	Price4	Turnover for the day excluding off-book trades.
Official Opening Price	77	8	Price	Official Opening Price for the instrument. If the Opening Price is cleared manually by the venue '-1' will be stamped.

Official Closing Price	85	8	Price	Official Closing Price for the instrument. If the Closing Price is cleared manually by the venue '-1' will be stamped.
Trade High (on-book only)	93	8	Price	Current trading day high price excluding off-book trades.
Trade Low (on-book only)	101	8	Price	Current trading day low price excluding off-book trades.
Trade High	109	8	Price	Current trading day high price of all trades.
Trade Low	117	8	Price	Current trading day low price of all trades.
52-week Trade High	125	8	Price	52-week high price of all trades.
52-week Trade Low	133	8	Price	52-week low price of all trades.
Opening Price Indicator	141	1	Byte	Please refer Description in Statistics Update message for valid values. This will be blank if no Opening Price is contained within the snapshot.
Closing Price Indicator	142	1	Byte	Please refer Description in Statistics Update message for valid values. This will be blank if no Closing Price is contained within the snapshot.
IAU Price	143	8	Price	Contains the last reported Indicative Auction Crossing Price/Yield.
IAU Paired Size	151	8	Size	Quantity to be matched at the last reported indicative price.
Imbalance Quantity	159	8	Size	Quantity that was eligible to be matched at the indicative price but was not to be matched at the last indicative price.

Imbalance Direction	167	1	Byte	**Value** **Meaning** B Buy Imbalance N No Imbalance O Insufficient Orders for Auction S Sell Imbalance
Best Closing Bid Price	168	8	Price	The best bid price at the time the instrument moves into closing auction session.
Best Closing Ask Price	176	8	Price	The best offer price at the time the instrument moves into closing auction session.
Best Closing Bid Size	184	8	Size	The best bid size at the time the instrument moves into closing auction session.
Best Closing Ask Size	192	8	Size	The best offer size at the time the instrument moves into closing auction session.
Trade High Off-Book	200	8	Price	Current trading day high price of off-book trades.
Trade Low Off-Book	208	8	Price	Current trading day low price of off-book trades.
Open Interest	216	8	Size	Total of unsettled derivatives contracts.
Volatility	224	8	Price	Derivatives volatility.
Auction Type	232	1	Byte	**Value** **Meaning** C Closing Auction O Opening Auction A AESP B EDSP (Specific to LSE) P OPA (Specific to Borsa Italiana) E Resume Auction F Periodic Auction L Frequent Lit Auctions

Last Trade Price	233	8	Price	Executed price at which the instrument was last traded. If no relevant trades have taken place the value '0' will be populated.
Last Trade Quantity	241	8	Size	Executed quantity of the trade which set the 'Last Trade Price'. If no relevant trades have taken place the value '0' will be populated.
Last Trade Time	249	8	UDT	Transaction time of the trade which set the 'Last Trade Price'. If no relevant trades have taken place the value '0' will be populated.
Static Reference Price	257	8	Price	Reference Price as reported by the source venue.
Dynamic Reference Price	265	8	Price	Reference Price as reported by the source venue.

3.10.7 Instrument Directory – Equities

Market Data Group	Source Venue	Channel Content	Level 1	Level 2 MBO	Level 2 MBP	Level 2 Incremental	MIFID II Post Trade	Replay	Recovery
Channel A/a	London Stock Exchange	FTSE 100	N	N	N	N	N	N	Y
Channel B/b	London Stock Exchange	FTSE 100	N	N	N	N	N	N	Y
Channel C/c	London Stock Exchange	FTSE 250	N	N	N	N	N	N	Y
Channel D/d	London Stock Exchange	Structured Products	N	N	N	N	N	N	Y
Channel E/e	London Stock Exchange	Miscellaneous	N	N	N	N	N	N	Y
Channel F/f	London Stock Exchange	European (EQS)	N	N	N	N	N	N	Y
Channel G/g	London Stock Exchange	International (IOB and ITR)	N	N	N	N	N	N	Y
Channel H/h	Borsa Italiana	MTA	N	N	N	N	N	N	Y
Channel I/i	Borsa Italiana	MTA and Sedex	N	N	N	N	N	N	Y
Channel J/j	Borsa Italiana	Structured Products	N	N	N	N	N	N	Y
Channel K/k	Borsa Italiana	Miscellaneous	N	N	N	N	N	N	Y
Channel L/l	Borsa Italiana	IDEM	N	N	N	N	N	N	N
Channel M/m	Borsa Italiana	IDEM	N	N	N	N	N	N	N
Channel Q/q	EuroTLX	EuroTLX	N	N	N	N	N	N	Y
Channel R/r	EuroTLX	EuroTLX	N	N	N	N	N	N	Y
Channel S/s	EuroTLX	EuroTLX	N	N	N	N	N	N	Y
Channel T/t	Turquoise	XLON				N	N	N	Y
Channel U/u	Turquoise	XPAR				N	N	N	Y
Channel V/v	Turquoise	XETR				N	N	N	Y
Channel W/w	Turquoise	XCSE, XHEL, XMAD, XSTO, XSWX, XVTX				N	N	N	Y
Channel X/x	Turquoise	MTAA, XOSL, WBAH, XDUB, ARCX...				N	N	N	Y
Channel Y/y	Turquoise	XMAS, XBRU, XLIS and XLUX				N	N	N	Y
Channel Z/z	Borsa Italiana	TAH and MiFID	N	N	N	N	N	N	N
Channel 1/5	TradEcho	SI Quoting				N		N	N
Channel 2/6	TradEcho	Trades					N	N	N
Channel 3/7	TradEcho	SI Quoting				N		N	N
Channel 4/8	TradEcho	Trades					N	N	N

Market Data Group	Source Venue	Channel Content	Level 1 / Level 2 MBO / Level 2 MBP / Level 2 Incremental / MIFID II Post Trade	Replay	Recovery
Channel N/n	London Stock Exchange / Borsa Italiana		N	N	
Channel O/o	FTSE	FTSE Indices	N	N	
Channel P/p	Borsa Admin	Borsa Italiana Announcements	N	N	N

<table>
<tr><th>Field</th><th>Offset</th><th>Length</th><th>Type</th><th>Description</th></tr>
<tr><td>Length</td><td>0</td><td>2</td><td>UInt16</td><td>Length of message including this field.</td></tr>
<tr><td>Message Type</td><td>2</td><td>1</td><td>Byte</td><td><table><tr><th>Hex</th><th>Meaning</th></tr><tr><td>0x52</td><td>Instrument Directory – Equities</td></tr></table></td></tr>
<tr><td>Timestamp</td><td>3</td><td>8</td><td>UDT</td><td>Time the message was generated.</td></tr>
<tr><td>Instrument</td><td>11</td><td>8</td><td>UInt64</td><td>GTP Instrument identifier.</td></tr>
<tr><td>ISIN</td><td>19</td><td>12</td><td>Alpha</td><td>ISIN code of the instrument.</td></tr>
<tr><td>SEDOL</td><td>31</td><td>8</td><td>Alpha</td><td>SEDOL code of the instrument.</td></tr>
<tr><td>Allowed Book Types</td><td>39</td><td>1</td><td>Bit Field</td><td>Defines the order-book types that are allowed for the instrument. Each designated bit represents a book type. 0 Means not allowed and 1 means allowed:<table><tr><th>Bit</th><th>Name</th></tr><tr><td>0</td><td>All</td></tr><tr><td>1</td><td>Firm Quote Book</td></tr><tr><td>2</td><td>Off-book</td></tr><tr><td>3</td><td>Electronic Order Book</td></tr><tr><td>4</td><td>Private RFQ</td></tr></table></td></tr>
<tr><td>Source Venue</td><td>40</td><td>2</td><td>UInt16</td><td>Please refer the Additional Field Values section of this document for valid values.</td></tr>
<tr><td>Venue Instrument ID</td><td>42</td><td>11</td><td>Alpha</td><td>Instrument identifier used by the source venue.
For Turquoise the MTF symbol will contain the suffix _I, _M or _A to indicate the instrument belongs to the Turquoise Lit™, Turquoise Plato™ or Turquoise Lit Auctions™ Order Books respectively.</td></tr>
</table>

Group ID	53	6	Alpha	Segment or instrument group ID as identified by the trading market.
Currency	59	3	Alpha	Currency code as per ISO 4217. For additional currencies supported refer to the Additional Field Values section of this document
Tick ID	62	2	Alpha	The tick structure applicable for the instrument.
Previous Day's Closing Price	64	8	Price	Closing price reported for the previous trading day. This field contains a closing price for suspended instruments.
Price Band Tolerances (%)	72	8	Price	Price Band Tolerance (%) of the instrument.
Dynamic Circuit Breaker Tolerances (%)	80	8	Price	Dynamic Circuit Breaker Tolerance (%) of the instrument.
Static Circuit Breaker Tolerances (%)	88	8	Price	Static Circuit Breaker Tolerance (%) of the instrument.
Flags	96	1	Bit Field	Reserved for future use
Security Subtype	97	1	UInt8	Different instrument security subset types. Please refer the Additional Field Values section of this document for valid values
Expiration Date	98	8	Date	Expiration date of the instrument.
Listing Start Date	106	8	Date	Listing start date of the instrument.
Listing End Date	114	8	Date	Listing end date of the instrument.

Minimum Lot/Minimum Execution Size	122	8	Size	Indicates the minimum quantity/nominal value tradable on the market for a security.
Last Price In Preceding Session	130	8	Price	Last execution price in a session prior to the current trading day.
Last Price In Preceding Session Date	138	8	Date	Last execution date in a session prior to current trading day.
Settlement System	146	1	UInt8	Settlement system type: **Value** **Meaning** 1 RRG 2 Express I 3 Express II 4 Clear stream 5 Undefined value 6 T2S
Last Validity Date	147	8	Date	Last validity date in the DDMMYYYY format.
Settlement Date	155	8	Date	Settlement date in the DDMMYYYY format.
Ex Marker Code	163	2	Alpha	The value of an Ex-Marker pertaining to a tradable instrument.
Security Type	165	1	UInt8	Type of security. Please refer the Additional Field Values section of this document for valid values.
Country Of Register	166	3	Alpha	Country of Register.
Exchange Market Size	169	8	Size	The Exchange Market Size (EMS) is set to show the minimum size a market maker must quote in an individual security for all executable and non executable quotes.

Minimum Peak Size Multiplier	177	8	Size	Used to specify the minimum size of an iceberg peak for an instrument in conjunction with EMS.
Security Maximum Spread	185	8	Price	This field informs Participants of the maximum spread allowable for an instrument when submitting quote messages, calculated as a percentage of mid-price.
Clearing Type	193	1	UInt8	Indicates the settlement mode of the security: **Value** **Meaning** 0 Not Cleared 1 Cleared
Strike Price	194	8	Price	Strike Price (exercise price for warrants).
Venue Underlying ID	202	11	Alpha	Venue specified instrument ID of the underlying.
Underlying ISIN Code	213	12	Alpha	Underlying ISIN code.
Underlying Type	225	1	UInt8	Underlying Type: **Value** **Meaning** 0 Underlying type is not codified in basic data 1 Share 2 Foreign currency 3 Indices 4 Commodity 5 Foreign Indices 6 Future 7 Foreign Share 8 Basket 9 Exchange Rate

Number Of Shares In Circulation	226	8	UInt64	Indicates the number of shares which constitute the share capital. A value is set for shares only.
Leverage Certificates Barrier	234	8	Size	Leverage Certificates Barrier.
Option Style	242	1	Byte	Instrument's option style: **Value** **Meaning** E: European option style A: American option style P: Periodic option style
Parity	243	8	Size	The parity of the instrument.
Reserved field	251	8	Price	Reserved for future use.
Reserved field	259	4	UInt32	Reserved for future use.
Reserved Field	263	2	UInt16	Reserved for future use.
Symbol	265	8	Alpha	Symbol of the instrument For Turquoise the MTF Common Symbol
Description	273	40	Alpha	Description of the instrument.

3.10.8 Instrument Directory – Derivatives

Market Data Group	Source Venue	Channel Content	Level 1	Level 2 MBO	Level 2 MBP	Level 2 Incremental	MIFID II Post Trade	Replay	Recovery
Channel A/a	London Stock Exchange	FTSE 100	N	N	N	N	N	N	N
Channel B/b	London Stock Exchange	FTSE 100	N	N	N	N	N	N	N
Channel C/c	London Stock Exchange	FTSE 250	N	N	N	N	N	N	N
Channel D/d	London Stock Exchange	Structured Products	N	N	N	N	N	N	N
Channel E/e	London Stock Exchange	Miscellaneous	N	N	N	N	N	N	N
Channel F/f	London Stock Exchange	European (EQS)	N	N	N	N	N	N	N
Channel G/g	London Stock Exchange	International (IOB and ITR)	N	N	N	N	N	N	N
Channel H/h	Borsa Italiana	MTA	N	N	N	N	N	N	N
Channel I/i	Borsa Italiana	MTA and Sedex	N	N	N	N	N	N	N
Channel J/j	Borsa Italiana	Structured Products	N	N	N	N	N	N	N
Channel K/k	Borsa Italiana	Miscellaneous	N	N	N	N	N	N	N
Channel L/l	Borsa Italiana	IDEM	N	N	N	N	N	N	Y
Channel M/m	Borsa Italiana	IDEM	N	N	N	N	N	N	Y
Channel Q/q	EuroTLX	EuroTLX	N	N	N	N	N	N	N
Channel R/r	EuroTLX	EuroTLX	N	N	N	N	N	N	N
Channel S/s	EuroTLX	EuroTLX	N	N	N	N	N	N	N
Channel T/t	Turquoise	XLON				N	N	N	N
Channel U/u	Turquoise	XPAR				N	N	N	N
Channel V/v	Turquoise	XETR				N	N	N	N
Channel W/w	Turquoise	XCSE, XHEL, XMAD, XSTO, XSWX, XVTX				N	N	N	N
Channel X/x	Turquoise	MTAA, XOSL, WBAH, XDUB, ARCX...				N	N	N	N
Channel Y/y	Turquoise	XMAS, XBRU, XLIS and XLUX				N	N	N	N
Channel Z/z	Borsa Italiana	TAH and MiFID	N	N	N	N	N	N	N
Channel 1/5	TradEcho	SI Quoting				N		N	N
Channel 2/6	TradEcho	Trades					N	N	N
Channel 3/7	TradEcho	SI Quoting				N		N	N
Channel 4/8	TradEcho	Trades					N	N	N
Channel N/n	London Stock Exchange / Borsa Italiana		N					N	
Channel O/o	FTSE	FTSE Indices	N					N	
Channel P/p	Borsa Admin	Borsa Italiana Announcements	N					N	N

<table>
<tr><th>Field</th><th>Offset</th><th>Length</th><th>Type</th><th>Description</th></tr>
<tr><td>Length</td><td>0</td><td>2</td><td>UInt16</td><td>Length of message including this field.</td></tr>
<tr><td>Message Type</td><td>2</td><td>1</td><td>Byte</td><td><table><tr><th>Hex</th><th>Meaning</th></tr><tr><td>0x76</td><td>Instrument Directory – Derivatives</td></tr></table></td></tr>
<tr><td>Timestamp</td><td>3</td><td>8</td><td>UDT</td><td>Time the message was generated.</td></tr>
<tr><td>Instrument</td><td>11</td><td>8</td><td>UInt64</td><td>GTP Instrument identifier.</td></tr>
<tr><td>ISIN</td><td>19</td><td>12</td><td>Alpha</td><td>ISIN code of the instrument.</td></tr>
<tr><td>Allowed Book Types</td><td>31</td><td>1</td><td>Bit Field</td><td>Defines the order-book types that are allowed for the instrument. Each designated bit represents a book type. 0 means not allowed and 1 means allowed:<table><tr><th>Bit</th><th>Name</th></tr><tr><td>0</td><td>All</td></tr><tr><td>1</td><td>Firm Quote</td></tr><tr><td>2</td><td>Off-book</td></tr><tr><td>3</td><td>Electronic</td></tr><tr><td>4</td><td>Private RFQ</td></tr></table></td></tr>
<tr><td>Source Venue</td><td>32</td><td>2</td><td>UInt16</td><td>Venue from which market data is received for the instrument. Restricted to one currently.</td></tr>
<tr><td>Venue Instrument ID</td><td>34</td><td>11</td><td>Alpha</td><td>Instrument identifier used by the source venue.</td></tr>
<tr><td>Start Date</td><td>45</td><td>8</td><td>Date</td><td>Date the instrument becomes tradable.</td></tr>
<tr><td>Expiration Date</td><td>53</td><td>8</td><td>Date</td><td>Date an instrument expires or matures. This field will contain only spaces if the instrument is not a derivative or fixed income instrument.</td></tr>
<tr><td>Settlement Date</td><td>61</td><td>8</td><td>Date</td><td>Date of settlement.</td></tr>
</table>

Underlying ISIN Code	69	12	Alpha	ISIN of the underlying instrument.
Venue Underlying ID	81	11	Alpha	Venue specified instrument ID of the underlying.
Strike Price	92	8	Price	Strike price of an option. The price will be zero if the instrument is not an option.
Group ID	100	6	Alpha	Segment or instrument group ID as identified by the trading market.
Country	106	3	Alpha	Country code as per ISO 3166
Currency	109	3	Alpha	Currency code as per ISO 4217 For additional currencies supported refer to the Additional Field Values section of this document
Tick ID	112	2	Alpha	The tick structure applicable for the instrument
Previous Day’s Closing Price	114	8	Price	Closing price reported for the previous trading day.
Flags	122	1	Bit Field	Reserved for future use.
Corporate Action Level	123	1	UInt8	**Value** **Meaning** 0 ‘ ‘ 1 X 2 Y 3 Z 4 Q 5 R 6 S 7 G 8 U 9 V
Commodity Code	124	30	Alpha	Commodity Code.

<table>
<tr><td>Series Name</td><td>154</td><td>30</td><td>Alpha</td><td>External Symbol.</td></tr>
<tr><td>Instrument ClassID</td><td>184</td><td>20</td><td>Alpha</td><td>Class Symbol.</td></tr>
<tr><td>Contract Size</td><td>204</td><td>8</td><td>Size</td><td>Contract Size.</td></tr>
<tr><td>Security Type</td><td>212</td><td>1</td><td>UInt8</td><td>Type of security.
Please refer the Additional Field Values section of this document for valid values.</td></tr>
<tr><td>Underlying Delivery Type</td><td>213</td><td>1</td><td>Byte</td><td>Type of settlement delivery:<table><tr><th>Value</th><th>Meaning</th></tr><tr><td>C</td><td>Cash</td></tr><tr><td>P</td><td>Physical</td></tr></table></td></tr>
<tr><td>Underlying Security Type</td><td>214</td><td>1</td><td>UInt8</td><td>Type of security
Please refer the Additional Field Values section of this document for valid values.</td></tr>
</table>

3.10.9 Instrument Directory – Fixed Income

Market Data Group	Source Venue	Channel Content	Level 1	Level 2 MBO	Level 2 MBP	Level 2 Incremental	MIFID II Post Trade	Replay	Recovery
Channel A/a	London Stock Exchange	FTSE 100	N	N	N	N	N	N	N
Channel B/b	London Stock Exchange	FTSE 100	N	N	N	N	N	N	N
Channel C/c	London Stock Exchange	FTSE 250	N	N	N	N	N	N	N
Channel D/d	London Stock Exchange	Structured Products	N	N	N	N	N	N	N
Channel E/e	London Stock Exchange	Miscellaneous	N	N	N	N	N	N	N
Channel F/f	London Stock Exchange	European (EQS)	N	N	N	N	N	N	N
Channel G/g	London Stock Exchange	International (IOB and ITR)	N	N	N	N	N	N	N
Channel H/h	Borsa Italiana	MTA	N	N	N	N	N	N	N
Channel I/i	Borsa Italiana	MTA and Sedex	N	N	N	N	N	N	N
Channel J/j	Borsa Italiana	Structured Products	N	N	N	N	N	N	N
Channel K/k	Borsa Italiana	Miscellaneous	N	N	N	N	N	N	Y
Channel L/l	Borsa Italiana	IDEM	N	N	N	N	N	N	N
Channel M/m	Borsa Italiana	IDEM	N	N	N	N	N	N	N
Channel Q/q	EuroTLX	EuroTLX	N	N	N	N	N	N	Y
Channel R/r	EuroTLX	EuroTLX	N	N	N	N	N	N	Y
Channel S/s	EuroTLX	EuroTLX	N	N	N	N	N	N	Y
Channel T/t	Turquoise	XLON				N	N	N	N
Channel U/u	Turquoise	XPAR				N	N	N	N
Channel V/v	Turquoise	XETR				N	N	N	N
Channel W/w	Turquoise	XCSE, XHEL, XMAD, XSTO, XSWX, XVTX				N	N	N	N
Channel X/x	Turquoise	MTAA, XOSL, WBAH, XDUB, ARCX...				N	N	N	N
Channel Y/y	Turquoise	XMAS, XBRU, XLIS and XLUX				N	N	N	N
Channel Z/z	Borsa Italiana	TAH and MiFID	N	N	N	N	N	N	N
Channel 1/5	TradEcho	SI Quoting				N		N	N
Channel 2/6	TradEcho	Trades					N	N	N
Channel 3/7	TradEcho	SI Quoting				N		N	N
Channel 4/8	TradEcho	Trades					N	N	N
Channel N/n	London Stock Exchange / Borsa Italiana		N					N	
Channel O/o	FTSE	FTSE Indices	N					N	
Channel P/p	Borsa Admin	Borsa Italiana Announcements	N					N	N

Field	Offset	Length	Type	Description
Length	0	2	UInt16	Length of message including this field.
Message Type	2	1	Byte	**Hex** **Meaning** 0x6e Instrument Directory – Fixed Income
Timestamp	3	8	UDT	Time the message was generated
Instrument	11	8	UInt64	GTP Instrument identifier.
ISIN	19	12	Alpha	ISIN code of the instrument.
SEDOL	31	8	Alpha	SEDOL code of the instrument.
Allowed Book Types	39	1	Bit Field	Defines the order-book types that are allowed for the instrument. Each designated bit represents a book type. 0 means not allowed and 1 means allowed: Bit Name 0 All 1 Firm Quote Book 2 Off-book 3 Electronic Order Book 4 Private RFQ
Source Venue	40	2	UInt16	Venue from which market data is received for the instrument. Restricted to one currently.
Venue Instrument ID	42	11	Alpha	Instrument identifier used by the source venue.
Group ID	53	6	Alpha	Segment or instrument group ID as identified by the trading market.

Currency	59	3	Alpha	Currency code as per ISO 4217 For additional currencies supported refer to the Additional Field Values section of this document
Tick ID	62	2	Alpha	The tick structure applicable for the instrument.
Previous Day's Closing Price	64	8	Price	Closing price reported for the previous trading day.
Price Band Tolerances (%)	72	8	Price	Price Band Tolerance (%) of the instrument.
Dynamic Circuit Breaker Tolerances (%)	80	8	Price	Dynamic Circuit Breaker Tolerance (%) of the instrument.
Static Circuit Breaker Tolerances (%)	88	8	Price	Static Circuit Breaker Tolerance (%) of the instrument.
Flags	96	1	Bit Field	Reserved for future use.
Security Subtype	97	1	UInt8	Different instrument security subset types. Please refer the Additional Field Values section of this document for valid values.
Expiration Date	98	8	Date	Expiration date of the instrument.
Listing Start Date	106	8	Date	Listing start date of the instrument.
Listing End Date	114	8	Date	Listing end date of the instrument.
Minimum Lot/ Minimum Execution Size	122	8	Size	Indicates the minimum quantity/nominal value tradable on the market for a security.

Last Price In Preceding Session	130	8	Price	Last execution price in a session prior to the current trading day.
Last Price In Preceding Session Date	138	8	Date	Last execution date in a session prior to the current trading day.
Settlement System	146	1	UInt8	Settlement system type: **Value** **Meaning** 1 RRG 2 Express I 3 Express II 4 Clear stream 5 Undefined value 6 T2S
Last Validity Date	147	8	Date	Last validity date.
Settlement Date	155	8	Date	Settlement date.
Ex Marker Code	163	2	Alpha	The value of an Ex-Marker pertaining to a tradable instrument.
Security Type	165	1	UInt8	Type of security. Please refer the Additional Field Values section of this document for valid values.
Country Of Register	166	3	Alpha	Country of Register.
Exchange Market Size	169	8	Size	The Exchange Market Size (EMS) is set to show the minimum size a market maker must quote in an individual security for all executable and non executable quotes.
Minimum Peak Size Multiplier	177	8	Size	Used to specify the minimum size of an iceberg peak for an instrument in conjunction with EMS.

Security Maximum Spread	185	8	Size	This field informs Participants of the maximum spread allowable for an instrument when submitting quote messages, calculated as a percentage of mid-price.
Clearing Type	193	1	UInt8	Indicates the settlement mode of the security: **Value** **Meaning** 0 Not Cleared 1 Cleared
Dirty/Clean Price	194	1	UInt8	Dirty/Clean price (TIPO CORSO): **Value** **Meaning** 0 Unspecified 1 SECCO 2 TEL QUEL
Gross Settlement Indicator	195	1	Byte	Indicates if the instrument in settled in gross or not: **Value** **Meaning** ‘Y’ Gross settlement ‘N’ or “ “ Net (non-gross) settlement
Time To Maturity	196	6	Alpha	Time to maturity.
Pool factor	202	8	UInt64	Pool Factor, defines the percentage of the security that is yet to be repaid by the issuer. Please note that there are 15 implied decimals.
Coupon	210	8	Size	Current Coupon.
Inverse Orderbook	218	1	Uint8	**Value** **Meaning** 0 No 1 Yes
Reseverd Field	219	8	Price	Reserved for future use.
Reserved FIeld	227	8	Price	Reserved for future use.

Description	235	40	Alpha	Description of the instrument.

3.10.10 Instrument Directory – Strategies

Market Data Group	Source Venue	Channel Content	Level 1	Level 2 MBO	Level 2 MBP	Level 2 Incremental	MIFID II Post Trade	Replay	Recovery
Channel A/a	London Stock Exchange	FTSE 100	N	N	N	N	N	N	N
Channel B/b	London Stock Exchange	FTSE 100	N	N	N	N	N	N	N
Channel C/c	London Stock Exchange	FTSE 250	N	N	N	N	N	N	N
Channel D/d	London Stock Exchange	Structured Products	N	N	N	N	N	N	N
Channel E/e	London Stock Exchange	Miscellaneous	N	N	N	N	N	N	N
Channel F/f	London Stock Exchange	European (EQS)	N	N	N	N	N	N	N
Channel G/g	London Stock Exchange	International (IOB and ITR)	N	N	N	N	N	N	N
Channel H/h	Borsa Italiana	MTA	N	N	N	N	N	N	N
Channel I/i	Borsa Italiana	MTA and Sedex	N	N	N	N	N	N	N
Channel J/j	Borsa Italiana	Structured Products	N	N	N	N	N	N	N
Channel K/k	Borsa Italiana	Miscellaneous	N	N	N	N	N	N	N
Channel L/l	Borsa Italiana	IDEM	Y	Y	Y	Y	Y	Y	Y
Channel M/m	Borsa Italiana	IDEM	Y	Y	Y	Y	Y	Y	Y
Channel Q/q	EuroTLX	EuroTLX	N	N	N	N	N	N	N
Channel R/r	EuroTLX	EuroTLX	N	N	N	N	N	N	N
Channel S/s	EuroTLX	EuroTLX	N	N	N	N	N	N	N
Channel T/t	Turquoise	XLON				N	N	N	N
Channel U/u	Turquoise	XPAR				N	N	N	N
Channel V/v	Turquoise	XETR				N	N	N	N
Channel W/w	Turquoise	XCSE, XHEL, XMAD, XSTO, XSWX, XVTX				N	N	N	N
Channel X/x	Turquoise	MTAA, XOSL, WBAH, XDUB, ARCX...				N	N	N	N
Channel Y/y	Turquoise	XMAS, XBRU, XLIS and XLUX				N	N	N	N
Channel Z/z	Borsa Italiana	TAH and MiFID	N	N	N	N	N	N	N
Channel 1/5	TradEcho	SI Quoting				N		N	N
Channel 2/6	TradEcho	Trades					N	N	N
Channel 3/7	TradEcho	SI Quoting				N		N	N
Channel 4/8	TradEcho	Trades					N	N	N
Channel N/n	London Stock Exchange / Borsa Italiana		N					N	
Channel O/o	FTSE	FTSE Indices	N					N	
Channel P/p	Borsa Admin	Borsa Italiana Announcements	N					N	N

Field	Offset	Length	Type	Description
Length	0	2	UInt16	Length of message including this field.
Message Type	2	1	Byte	**Hex** **Meaning** 0x6f Instrument Directory - Strategies
Timestamp	3	8	UDT	Time the message was generated.
Instrument	11	8	UInt64	GTP Instrument identifier.
Source Venue	19	2	UInt16	Venue from which market data is received for the instrument. Restricted to one currently.
Venue Instrument ID	21	11	Alpha	Instrument identifier used by the source venue.
Leg 1	32	8	UInt64	GTP Instrument ID of Leg 1.
Leg 1 Weight	40	8	Price	Relative size. Sign indicates buy or sell.
Leg 2	48	8	UInt64	GTP Instrument ID of Leg 2.
Leg 2 Weight	56	8	Price	Relative size. Sign indicates buy or sell.
Leg 3	64	8	UInt64	GTP Instrument ID of Leg 3.
Leg 3 Weight	72	8	Price	Relative size. Sign indicates buy or sell.
Leg 4	80	8	UInt64	GTP Instrument ID of Leg 4.
Leg 4 Weight	88	8	Price	Relative size. Sign indicates buy or sell.
Series Name	96	30	Alpha	External symbol.
Activation Date	126	8	Date	Date the strategy becomes tradable.
Activation Time	134	6	Time	Time the strategy becomes tradable.
Expiration Date	140	8	Date	Date the instrument expires of matures.

<table>
<tr><td>Strategy Pricing</td><td>148</td><td>1</td><td>Byte</td><td>Indicates the pricing method for the strategy. This field will contain a space if it’s not configured in the source venue or if the instrument is not a Strategy.<table><tr><th>Value</th><th>Meaning</th></tr><tr><td>L</td><td>Same as legs</td></tr><tr><td>N</td><td>Notional</td></tr></table></td></tr>
<tr><td>Reserved Field</td><td>149</td><td>20</td><td>Alpha</td><td>Reserved for Future Use</td></tr>
</table>

3.11 Application Messages

3.11.1 System Event

Market Data Group	Source Venue	Channel Content	Level 1	Level 2 MBO	Level 2 MBP	Level 2 Incremental	MIFID II Post Trade	Replay	Recovery
Channel A/a	London Stock Exchange	FTSE 100	Y	Y	Y	Y	Y	Y	Y
Channel B/b	London Stock Exchange	FTSE 100	Y	Y	Y	Y	Y	Y	Y
Channel C/c	London Stock Exchange	FTSE 250	Y	Y	Y	Y	Y	Y	Y
Channel D/d	London Stock Exchange	Structured Products	Y	Y	Y	Y	Y	Y	Y
Channel E/e	London Stock Exchange	Miscellaneous	Y	Y	Y	Y	Y	Y	Y
Channel F/f	London Stock Exchange	European (EQS)	Y	Y	Y	Y	Y	Y	Y
Channel G/g	London Stock Exchange	International (IOB and ITR)	Y	Y	Y	Y	Y	Y	Y
Channel H/h	Borsa Italiana	MTA	Y	Y	Y	Y	Y	Y	Y
Channel I/i	Borsa Italiana	MTA and Sedex	Y	Y	Y	Y	Y	Y	Y
Channel J/j	Borsa Italiana	Structured Products	Y	Y	Y	Y	Y	Y	Y
Channel K/k	Borsa Italiana	Miscellaneous	Y	Y	Y	Y	Y	Y	Y
Channel L/l	Borsa Italiana	IDEM	Y	Y	Y	Y	Y	Y	Y
Channel M/m	Borsa Italiana	IDEM	Y	Y	Y	Y	Y	Y	Y
Channel Q/q	EuroTLX	EuroTLX	Y	Y	Y	Y	Y	Y	Y
Channel R/r	EuroTLX	EuroTLX	Y	Y	Y	Y	Y	Y	Y
Channel S/s	EuroTLX	EuroTLX	Y	Y	Y	Y	Y	Y	Y
Channel T/t	Turquoise	XLON				Y	Y	Y	Y
Channel U/u	Turquoise	XPAR				Y	Y	Y	Y
Channel V/v	Turquoise	XETR				Y	Y	Y	Y
Channel W/w	Turquoise	XCSE, XHEL, XMAD, XSTO, XSWX, XVTX				Y	Y	Y	Y
Channel X/x	Turquoise	MTAA, XOSL, WBAH, XDUB, ARCX…				Y	Y	Y	Y
Channel Y/y	Turquoise	XMAS, XBRU, XLIS and XLUX				Y	Y	Y	Y
Channel Z/z	Borsa Italiana	TAH and MiFID	Y	Y	Y	Y	Y	Y	Y
Channel 1/5	TradEcho	SI Quoting				Y		Y	Y
Channel 2/6	TradEcho	Trades					Y	Y	Y
Channel 3/7	TradEcho	SI Quoting				Y		Y	Y
Channel 4/8	TradEcho	Trades					Y	Y	Y
Channel N/n	London Stock Exchange / Borsa Italiana		N					N	
Channel O/o	FTSE	FTSE Indices	N					N	
Channel P/p	Borsa Admin	Borsa Italiana Announcements	N					N	N

Field	Offset	Length	Type	Description
Length	0	2	UInt16	Length of message including this field.
Message Type	2	1	Byte	**Hex** / **Meaning** 0x53 – System Event
Timestamp	3	8	UDT	Time the message was generated.
Event Code	11	1	Byte	**Value** / **Meaning** C – End of Day O – Start of Day T – Start of Open (applicable to TRADEcho only) P – Start of Pre Close (applicable to TRADEcho only)
Source Venue	12	2	UInt16	Venue from which market data is received for the instrument. Please refer the Additional Field Values section of this document for valid values.

3.11.2 Instrument Directory

Market Data Group	Source Venue	Channel Content	Level 1	Level 2 MBO	Level 2 MBP	Level 2 Incremental	MIFID II Post Trade	Replay	Recovery
Channel A/a	London Stock Exchange	FTSE 100	Y	Y	Y	Y	Y	Y	N
Channel B/b	London Stock Exchange	FTSE 100	Y	Y	Y	Y	Y	Y	N
Channel C/c	London Stock Exchange	FTSE 250	Y	Y	Y	Y	Y	Y	N
Channel D/d	London Stock Exchange	Structured Products	Y	Y	Y	Y	Y	Y	N
Channel E/e	London Stock Exchange	Miscellaneous	Y	Y	Y	Y	Y	Y	N
Channel F/f	London Stock Exchange	European (EQS)	Y	Y	Y	Y	Y	Y	N
Channel G/g	London Stock Exchange	International (IOB and ITR)	Y	Y	Y	Y	Y	Y	N
Channel H/h	Borsa Italiana	MTA	Y	Y	Y	Y	Y	Y	N
Channel I/i	Borsa Italiana	MTA and Sedex	Y	Y	Y	Y	Y	Y	N
Channel J/j	Borsa Italiana	Structured Products	Y	Y	Y	Y	Y	Y	N
Channel K/k	Borsa Italiana	Miscellaneous	Y	Y	Y	Y	Y	Y	N
Channel L/l	Borsa Italiana	IDEM	Y	Y	Y	Y	Y	Y	N
Channel M/m	Borsa Italiana	IDEM	Y	Y	Y	Y	Y	Y	N
Channel Q/q	EuroTLX	EuroTLX	Y	Y	Y	Y	Y	Y	N
Channel R/r	EuroTLX	EuroTLX	Y	Y	Y	Y	Y	Y	N
Channel S/s	EuroTLX	EuroTLX	Y	Y	Y	Y	Y	Y	N
Channel T/t	Turquoise	XLON				Y	Y	Y	N
Channel U/u	Turquoise	XPAR				Y	Y	Y	N
Channel V/v	Turquoise	XETR				Y	Y	Y	N
Channel W/w	Turquoise	XCSE, XHEL, XMAD, XSTO, XSWX, XVTX				Y	Y	Y	N
Channel X/x	Turquoise	MTAA, XOSL, WBAH, XDUB, ARCX...				Y	Y	Y	N
Channel Y/y	Turquoise	XMAS, XBRU, XLIS and XLUX				Y	Y	Y	N
Channel Z/z	Borsa Italiana	TAH and MiFID	Y	Y	Y	Y	Y	Y	Y
Channel 1/5	TradEcho	SI Quoting				Y		Y	Y
Channel 2/6	TradEcho	Trades					Y	Y	Y
Channel 3/7	TradEcho	SI Quoting				Y		Y	Y
Channel 4/8	TradEcho	Trades					Y	Y	Y
Channel N/n	London Stock Exchange / Borsa Italiana		N					N	
Channel O/o	FTSE	FTSE Indices	N					N	
Channel P/p	Borsa Admin	Borsa Italiana Announcements	N					N	N

Field	Offset	Length	Type	Description
Length	0	2	UInt16	Length of message including this field.
Message Type	2	1	Byte	**Hex** **Meaning** 0x70 Instrument Directory
Timestamp	3	8	UDT	Time the message was generated.
Instrument	11	8	UInt64	GTP Instrument identifier.
ISIN	19	12	Alpha	ISIN Code of an instrument.
Allowed Book Types	31	1	Bit Field	Defines the order-book types that are allowed for the instrument. Each designated bit represents a book type. 0 means not allowed and 1 means allowed: **Bit** **Name** 0 All 1 Firm Quote Book 2 Off-book 3 Electronic Order Book 4 Private RFQ
Source Venue	32	2	UInt16	Venue from which market data is received for the instrument. Please refer the Additional Field Values section of this document for valid values.
Venue Instrument ID	34	11	Alpha	Instrument identifier used by the source venue. For Turquoise the MTF symbol will contain the suffix _I, _M or _A to indicate the instrument belongs to the **Turquoise Lit™**, **Turquoise Plato™** or **Turquoise Lit Auctions™** Order Books respectively.
Tick ID	45	2	Alpha	The tick structure applicable for the instrument.

Price Band Tolerances (%)	47	8	Price	Price Band Tolerance (%) of the instrument.
Dynamic Circuit Breaker Tolerances (%)	55	8	Price	Dynamic Circuit Breaker Tolerance (%) of the instrument.
Static Circuit Breaker Tolerances (%)	63	8	Price	Static Circuit Breaker Tolerance (%) of the instrument.
Group ID	71	6	Alpha	Segment the instrument is assigned to.
Underlying ISIN Code	77	12	Alpha	ISIN of the underlying instrument. This field will contain only spaces if the instrument is not a derivative.
Underlying Instrument ID	89	11	Alpha	Venue specified instrument ID of the underlying.
Currency	100	3	Alpha	Currency Code as per ISO 4217. For additional currencies supported refer to the Additional Field Values section of this document
Reserved Field	103	1	Byte	Reserved for future use.
Reserved Field	104	4	Alpha	Reserved for future use.
Average Daily Turnover (ADT)	108	8	Price	Average Daily Turnover as reported by the Source Venue. Applicable to TRADEcho only.
Reserved Field	116	8	Alpha	Reserved for future use.
Flags	124	1	Bit Field	**Bit** **Name** **Meaning** 0 Inverse Order Book 0: No 1: Yes

Reserved Field	125	8	Price	Reserved for future use
Reserved Field	133	8	Price	Reserved for future use

3.11.3 Instrument Status

Market Data Group	Source Venue	Channel Content	Level 1	Level 2 MBO	Level 2 MBP	Level 2 Incremental	MIFID II Post Trade	Replay	Recovery
Channel A/a	London Stock Exchange	FTSE 100	Y	Y	Y	Y	Y	Y	Y
Channel B/b	London Stock Exchange	FTSE 100	Y	Y	Y	Y	Y	Y	Y
Channel C/c	London Stock Exchange	FTSE 250	Y	Y	Y	Y	Y	Y	Y
Channel D/d	London Stock Exchange	Structured Products	Y	Y	Y	Y	Y	Y	Y
Channel E/e	London Stock Exchange	Miscellaneous	Y	Y	Y	Y	Y	Y	Y
Channel F/f	London Stock Exchange	European (EQS)	Y	Y	Y	Y	Y	Y	Y
Channel G/g	London Stock Exchange	International (IOB and ITR)	Y	Y	Y	Y	Y	Y	Y
Channel H/h	Borsa Italiana	MTA	Y	Y	Y	Y	Y	Y	Y
Channel I/i	Borsa Italiana	MTA and Sedex	Y	Y	Y	Y	Y	Y	Y
Channel J/j	Borsa Italiana	Structured Products	Y	Y	Y	Y	Y	Y	Y
Channel K/k	Borsa Italiana	Miscellaneous	Y	Y	Y	Y	Y	Y	Y
Channel L/l	Borsa Italiana	IDEM	Y	Y	Y	Y	Y	Y	Y
Channel M/m	Borsa Italiana	IDEM	Y	Y	Y	Y	Y	Y	Y
Channel Q/q	EuroTLX	EuroTLX	Y	Y	Y	Y	Y	Y	Y
Channel R/r	EuroTLX	EuroTLX	Y	Y	Y	Y	Y	Y	Y
Channel S/s	EuroTLX	EuroTLX	Y	Y	Y	Y	Y	Y	Y
Channel T/t	Turquoise	XLON				Y	Y	Y	Y
Channel U/u	Turquoise	XPAR				Y	Y	Y	Y
Channel V/v	Turquoise	XETR				Y	Y	Y	Y
Channel W/w	Turquoise	XCSE, XHEL, XMAD, XSTO, XSWX, XVTX				Y	Y	Y	Y
Channel X/x	Turquoise	MTAA, XOSL, WBAH, XDUB, ARCX…				Y	Y	Y	Y
Channel Y/y	Turquoise	XMAS, XBRU, XLIS and XLUX				Y	Y	Y	Y
Channel Z/z	Borsa Italiana	TAH and MiFID	Y	Y	Y	Y	Y	Y	Y
Channel 1/5	TradEcho	SI Quoting				Y		Y	Y
Channel 2/6	TradEcho	Trades					Y	Y	Y
Channel 3/7	TradEcho	SI Quoting				Y		Y	Y
Channel 4/8	TradEcho	Trades					Y	Y	Y
Channel N/n	London Stock Exchange / Borsa Italiana		N					N	
Channel O/o	FTSE	FTSE Indices	N					N	
Channel P/p	Borsa Admin	Borsa Italiana Announcements	N					N	N

<table>
<tr><th>Field</th><th>Offset</th><th>Length</th><th>Type</th><th>Description</th></tr>
<tr><td>Length</td><td>0</td><td>2</td><td>UInt16</td><td>Length of message including this field.</td></tr>
<tr><td>Message Type</td><td>2</td><td>1</td><td>Byte</td><td><table><tr><th>Hex</th><th>Meaning</th></tr><tr><td>0x48</td><td>Instrument Status</td></tr></table></td></tr>
<tr><td>Timestamp</td><td>3</td><td>8</td><td>UDT</td><td>Time the message was generated.</td></tr>
<tr><td>Instrument</td><td>11</td><td>8</td><td>UInt64</td><td>GTP Instrument identifier.</td></tr>
<tr><td>Source venue</td><td>19</td><td>2</td><td>UInt16</td><td>Venue from which market data is received for the instrument.
Please refer the Additional Field Values section of this document for valid values.</td></tr>
<tr><td>Trading Status</td><td>21</td><td>1</td><td>Byte</td><td>Please refer the Additional Field Values section of this document for valid values.</td></tr>
<tr><td>Session Change Reason</td><td>22</td><td>1</td><td>UInt8</td><td><table><tr><th>Value</th><th>Meaning</th></tr><tr><td>0</td><td>Scheduled Transition</td></tr><tr><td>1</td><td>Extended by Market Ops</td></tr><tr><td>2</td><td>Shortened by Market Ops</td></tr><tr><td>3</td><td>Market Order Imbalance</td></tr><tr><td>4</td><td>Price Outside Range</td></tr><tr><td>5</td><td>AESP/Circuit Breaker Tripped</td></tr><tr><td>6</td><td>Specialist Not Present (Borsa Italiana only)</td></tr><tr><td>9</td><td>Unavailable</td></tr></table></td></tr>
</table>

New End Time	23	6	Time	New time the session will end. The field will contain only spaces if Session Change Reason is “0” or the Session Change Reason is not present. New End Time will be in terms of the local time on the server (i.e. not UTC).
Order Book Type	29	1	UInt8	Please refer the Additional Field Values section of this document for valid values.

3.11.4 Add Order - MBO

Market Data Group	Source Venue	Channel Content	Level 1	Level 2 MBO	Level 2 MBP	Level 2 Incremental	MIFID II Post Trade	Replay	Recovery
Channel A/a	London Stock Exchange	FTSE 100	N	Y	N	N	N	Y	Y
Channel B/b	London Stock Exchange	FTSE 100	N	Y	N	N	N	Y	Y
Channel C/c	London Stock Exchange	FTSE 250	N	Y	N	N	N	Y	Y
Channel D/d	London Stock Exchange	Structured Products	N	Y	N	N	N	Y	Y
Channel E/e	London Stock Exchange	Miscellaneous	N	Y	N	N	N	Y	Y
Channel F/f	London Stock Exchange	European (EQS)	N	Y	N	N	N	Y	Y
Channel G/g	London Stock Exchange	International (IOB and ITR)	N	Y	N	N	N	Y	Y
Channel H/h	Borsa Italiana	MTA	N	Y	N	N	N	Y	Y
Channel I/i	Borsa Italiana	MTA and Sedex	N	Y	N	N	N	Y	Y
Channel J/j	Borsa Italiana	Structured Products	N	Y	N	N	N	Y	Y
Channel K/k	Borsa Italiana	Miscellaneous	N	Y	N	N	N	Y	Y
Channel L/l	Borsa Italiana	IDEM	N	Y	N	N	N	Y	Y
Channel M/m	Borsa Italiana	IDEM	N	Y	N	N	N	Y	Y
Channel Q/q	EuroTLX	EuroTLX	N	Y	N	N	N	Y	Y
Channel R/r	EuroTLX	EuroTLX	N	Y	N	N	N	Y	Y
Channel S/s	EuroTLX	EuroTLX	N	Y	N	N	N	Y	Y
Channel T/t	Turquoise	XLON				N	N	N	N
Channel U/u	Turquoise	XPAR				N	N	N	N
Channel V/v	Turquoise	XETR				N	N	N	N
Channel W/w	Turquoise	XCSE, XHEL, XMAD, XSTO, XSWX, XVTX				N	N	N	N
Channel X/x	Turquoise	MTAA, XOSL, WBAH, XDUB, ARCX...				N	N	N	N
Channel Y/y	Turquoise	XMAS, XBRU, XLIS and XLUX				N	N	N	N
Channel Z/z	Borsa Italiana	TAH and MiFID	N	Y	N	N	N	Y	Y
Channel 1/5	TradEcho	SI Quoting				N		N	N
Channel 2/6	TradEcho	Trades					N	N	N
Channel 3/7	TradEcho	SI Quoting				N		N	N
Channel 4/8	TradEcho	Trades					N	N	N
Channel N/n	London Stock Exchange / Borsa Italiana		N					N	
Channel O/o	FTSE	FTSE Indices	N					N	
Channel P/p	Borsa Admin	Borsa Italiana Announcements	N					N	N

Field	Offset	Length	Type	Description
Length	0	2	UInt16	Length of message including this field.
Message Type	2	1	Byte	**Hex** **Meaning** 0x41 Add Order - MBO
Timestamp	3	8	UDT	Time the message was generated.
Order ID	11	8	UInt64	Unique identifier of the order.
Side	19	1	Byte	**Value** **Meaning** B Buy Order S Sell Order
Size	20	8	Size	Displayed size of the order.
Instrument	28	8	UInt64	GTP Instrument identifier.
Price	36	8	Price	Limit price of the order. Implied price if instrument trades in yield.
Yield	44	8	Price	Yield, if the instrument trades in yield.
Source venue	52	2	UInt16	Venue from which market data is received for the instrument. Please refer the Additional Field Values section of this document for valid values.
Order Book Type	54	1	UInt8	Please refer the Additional Field Values section of this document for valid values.
Participant	55	11	Alpha	Identity of trading participant that submitted the order.
Depth	66	1	UInt8	Total number of orders disseminated including this one, on this side of the book as indicated by Side field.

3.11.5 Add Order Short - MBO

Market Data Group	Source Venue	Channel Content	Level 1	Level 2 MBO	Level 2 MBP	Level 2 Incremental	MIFID II Post Trade	Replay	Recovery
Channel A/a	London Stock Exchange	FTSE 100	N	Y	N	N	N	Y	Y
Channel B/b	London Stock Exchange	FTSE 100	N	Y	N	N	N	Y	Y
Channel C/c	London Stock Exchange	FTSE 250	N	Y	N	N	N	Y	Y
Channel D/d	London Stock Exchange	Structured Products	N	Y	N	N	N	Y	Y
Channel E/e	London Stock Exchange	Miscellaneous	N	Y	N	N	N	Y	Y
Channel F/f	London Stock Exchange	European (EQS)	N	Y	N	N	N	Y	Y
Channel G/g	London Stock Exchange	International (IOB and ITR)	N	Y	N	N	N	Y	Y
Channel H/h	Borsa Italiana	MTA	N	Y	N	N	N	Y	Y
Channel I/i	Borsa Italiana	MTA and Sedex	N	Y	N	N	N	Y	Y
Channel J/j	Borsa Italiana	Structured Products	N	Y	N	N	N	Y	Y
Channel K/k	Borsa Italiana	Miscellaneous	N	Y	N	N	N	Y	Y
Channel L/l	Borsa Italiana	IDEM	N	Y	N	N	N	Y	Y
Channel M/m	Borsa Italiana	IDEM	N	Y	N	N	N	Y	Y
Channel Q/q	EuroTLX	EuroTLX	N	Y	N	N	N	Y	Y
Channel R/r	EuroTLX	EuroTLX	N	Y	N	N	N	Y	Y
Channel S/s	EuroTLX	EuroTLX	N	Y	N	N	N	Y	Y
Channel T/t	Turquoise	XLON				N	N	N	N
Channel U/u	Turquoise	XPAR				N	N	N	N
Channel V/v	Turquoise	XETR				N	N	N	N
Channel W/w	Turquoise	XCSE, XHEL, XMAD, XSTO, XSWX, XVTX				N	N	N	N
Channel X/x	Turquoise	MTAA, XOSL, WBAH, XDUB, ARCX...				N	N	N	N
Channel Y/y	Turquoise	XMAS, XBRU, XLIS and XLUX				N	N	N	N
Channel Z/z	Borsa Italiana	TAH and MiFID	N	Y	N	N	N	Y	Y
Channel 1/5	TradEcho	SI Quoting				N		N	N
Channel 2/6	TradEcho	Trades					N	N	N
Channel 3/7	TradEcho	SI Quoting				N		N	N
Channel 4/8	TradEcho	Trades					N	N	N
Channel N/n	London Stock Exchange / Borsa Italiana		N					N	
Channel O/o	FTSE	FTSE Indices	N					N	
Channel P/p	Borsa Admin	Borsa Italiana Announcements	N					N	N

Field	Offset	Length	Type	Description
Length	0	2	UInt16	Length of message including this field.
Message Type	2	1	Byte	**Hex** / **Meaning** 0x65 / Add Order Short - MBO
Order ID	3	8	UInt64	Unique identifier of the order.
Size	11	8	Size	Displayed size of the order.
Price	19	8	Price	Limit price of the order. Implied price if instrument trades in yield.
Yield	27	8	Price	Yield, if the instrument trades in yield.
Participant	35	11	Alpha	Identity if trading participant that submitted the order.

3.11.6 Add Order – MBP

Market Data Group	Source Venue	Channel Content	Level 1	Level 2 MBO	Level 2 MBP	Level 2 Incremental	MIFID II Post Trade	Replay	Recovery
Channel A/a	London Stock Exchange	FTSE 100	N	N	Y	N	N	Y	Y
Channel B/b	London Stock Exchange	FTSE 100	N	N	Y	N	N	Y	Y
Channel C/c	London Stock Exchange	FTSE 250	N	N	Y	N	N	Y	Y
Channel D/d	London Stock Exchange	Structured Products	N	N	Y	N	N	Y	Y
Channel E/e	London Stock Exchange	Miscellaneous	N	N	Y	N	N	Y	Y
Channel F/f	London Stock Exchange	European (EQS)	N	N	Y	N	N	Y	Y
Channel G/g	London Stock Exchange	International (IOB and ITR)	N	N	Y	N	N	Y	Y
Channel H/h	Borsa Italiana	MTA	N	N	Y	N	N	Y	Y
Channel I/i	Borsa Italiana	MTA and Sedex	N	N	Y	N	N	Y	Y
Channel J/j	Borsa Italiana	Structured Products	N	N	Y	N	N	Y	Y
Channel K/k	Borsa Italiana	Miscellaneous	N	N	Y	N	N	Y	Y
Channel L/l	Borsa Italiana	IDEM	N	N	Y	N	N	Y	Y
Channel M/m	Borsa Italiana	IDEM	N	N	Y	N	N	Y	Y
Channel Q/q	EuroTLX	EuroTLX	N	N	Y	N	N	Y	Y
Channel R/r	EuroTLX	EuroTLX	N	N	Y	N	N	Y	Y
Channel S/s	EuroTLX	EuroTLX	N	N	Y	N	N	Y	Y
Channel T/t	Turquoise	XLON				N	N	N	N
Channel U/u	Turquoise	XPAR				N	N	N	N
Channel V/v	Turquoise	XETR				N	N	N	N
Channel W/w	Turquoise	XCSE, XHEL, XMAD, XSTO, XSWX, XVTX				N	N	N	N
Channel X/x	Turquoise	MTAA, XOSL, WBAH, XDUB, ARCX...				N	N	N	N
Channel Y/y	Turquoise	XMAS, XBRU, XLIS and XLUX				N	N	N	N
Channel Z/z	Borsa Italiana	TAH and MiFID	N	N	Y	N	N	Y	Y
Channel 1/5	TradEcho	SI Quoting				N		N	N
Channel 2/6	TradEcho	Trades					N	N	N
Channel 3/7	TradEcho	SI Quoting				N		N	N
Channel 4/8	TradEcho	Trades					N	N	N
Channel N/n	London Stock Exchange / Borsa Italiana		N					N	
Channel O/o	FTSE	FTSE Indices	N					N	
Channel P/p	Borsa Admin	Borsa Italiana Announcements	N					N	N

Field	Offset	Length	Type	Description
Length	0	2	UInt16	Length of message including this field.
Message Type	2	1	Byte	**Hex** **Meaning** 0x66 Add Order MBP
Timestamp	3	8	UDT	Time the message was generated.
Side	11	1	Byte	**Value** **Meaning** B Buy Order S Sell Order
Size	12	8	Size	Displayed size of the order.
Instrument	20	8	UInt64	GTP Instrument identifier.
Price	28	8	Price	Limit price of the order. Implied price if instrument trades in yield.
Yield	36	8	Price	Yield, if the instrument trades in yield.
Source venue	44	2	UInt16	Venue from which market data is received for the instrument. Please refer the Additional Field Values section of this document for valid values.
Order Book Type	46	1	UInt8	Please refer the Additional Field Values section of this document for valid values.
Splits	47	2	UInt16	Number of orders at this price point.
Depth	49	1	UInt8	Total number of orders disseminated including this one, on this side of the book as indicated by Side field.

3.11.7 Add Order Short – MBP

Market Data Group	Source Venue	Channel Content	Level 1	Level 2 MBO	Level 2 MBP	Level 2 Incremental	MIFID II Post Trade	Replay	Recovery
Channel A/a	London Stock Exchange	FTSE 100	N	N	Y	N	N	Y	Y
Channel B/b	London Stock Exchange	FTSE 100	N	N	Y	N	N	Y	Y
Channel C/c	London Stock Exchange	FTSE 250	N	N	Y	N	N	Y	Y
Channel D/d	London Stock Exchange	Structured Products	N	N	Y	N	N	Y	Y
Channel E/e	London Stock Exchange	Miscellaneous	N	N	Y	N	N	Y	Y
Channel F/f	London Stock Exchange	European (EQS)	N	N	Y	N	N	Y	Y
Channel G/g	London Stock Exchange	International (IOB and ITR)	N	N	Y	N	N	Y	Y
Channel H/h	Borsa Italiana	MTA	N	N	Y	N	N	Y	Y
Channel I/i	Borsa Italiana	MTA and Sedex	N	N	Y	N	N	Y	Y
Channel J/j	Borsa Italiana	Structured Products	N	N	Y	N	N	Y	Y
Channel K/k	Borsa Italiana	Miscellaneous	N	N	Y	N	N	Y	Y
Channel L/l	Borsa Italiana	IDEM	N	N	Y	N	N	Y	Y
Channel M/m	Borsa Italiana	IDEM	N	N	Y	N	N	Y	Y
Channel Q/q	EuroTLX	EuroTLX	N	N	Y	N	N	Y	Y
Channel R/r	EuroTLX	EuroTLX	N	N	Y	N	N	Y	Y
Channel S/s	EuroTLX	EuroTLX	N	N	Y	N	N	Y	Y
Channel T/t	Turquoise	XLON				N	N	N	N
Channel U/u	Turquoise	XPAR				N	N	N	N
Channel V/v	Turquoise	XETR				N	N	N	N
Channel W/w	Turquoise	XCSE, XHEL, XMAD, XSTO, XSWX, XVTX				N	N	N	N
Channel X/x	Turquoise	MTAA, XOSL, WBAH, XDUB, ARCX...				N	N	N	N
Channel Y/y	Turquoise	XMAS, XBRU, XLIS and XLUX				N	N	N	N
Channel Z/z	Borsa Italiana	TAH and MiFID	N	N	Y	N	N	Y	Y
Channel 1/5	TradEcho	SI Quoting				N		N	N
Channel 2/6	TradEcho	Trades					N	N	N
Channel 3/7	TradEcho	SI Quoting				N		N	N
Channel 4/8	TradEcho	Trades					N	N	N
Channel N/n	London Stock Exchange / Borsa Italiana		N					N	
Channel O/o	FTSE	FTSE Indices	N					N	
Channel P/p	Borsa Admin	Borsa Italiana Announcements	N					N	N

<table>
<tr><th>Field</th><th>Offset</th><th>Length</th><th>Type</th><th>Description</th></tr>
<tr><td>Length</td><td>0</td><td>2</td><td>UInt16</td><td>Length of message including this field.</td></tr>
<tr><td>Message Type</td><td>2</td><td>1</td><td>Byte</td><td><table><tr><th>Hex</th><th>Meaning</th></tr><tr><td>0x67</td><td>Add Order Short - MBP</td></tr></table></td></tr>
<tr><td>Size</td><td>3</td><td>8</td><td>Size</td><td>Displayed size of the order.</td></tr>
<tr><td>Price</td><td>11</td><td>8</td><td>Price</td><td>Limit price of the order. Implied price if instrument trades in yield.</td></tr>
<tr><td>Yield</td><td>19</td><td>8</td><td>Price</td><td>Yield, if the instrument trades in yield.</td></tr>
<tr><td>Splits</td><td>27</td><td>2</td><td>UInt16</td><td>Number of orders at this price point.</td></tr>
</table>

3.11.8 Add Order Incremental

Market Data Group	Source Venue	Channel Content	Level 1	Level 2 MBO	Level 2 MBP	Level 2 Incremental	MIFID II Post Trade	Replay	Recovery
Channel A/a	London Stock Exchange	FTSE 100	N	N	N	Y	N	Y	Y
Channel B/b	London Stock Exchange	FTSE 100	N	N	N	Y	N	Y	Y
Channel C/c	London Stock Exchange	FTSE 250	N	N	N	Y	N	Y	Y
Channel D/d	London Stock Exchange	Structured Products	N	N	N	Y	N	Y	Y
Channel E/e	London Stock Exchange	Miscellaneous	N	N	N	Y	N	Y	Y
Channel F/f	London Stock Exchange	European (EQS)	N	N	N	Y	N	Y	Y
Channel G/g	London Stock Exchange	International (IOB and ITR)	N	N	N	Y	N	Y	Y
Channel H/h	Borsa Italiana	MTA	N	N	N	Y	N	Y	Y
Channel I/i	Borsa Italiana	MTA and Sedex	N	N	N	Y	N	Y	Y
Channel J/j	Borsa Italiana	Structured Products	N	N	N	Y	N	Y	Y
Channel K/k	Borsa Italiana	Miscellaneous	N	N	N	Y	N	Y	Y
Channel L/l	Borsa Italiana	IDEM	N	N	N	Y	N	Y	Y
Channel M/m	Borsa Italiana	IDEM	N	N	N	Y	N	Y	Y
Channel Q/q	EuroTLX	EuroTLX	N	N	N	Y	N	Y	Y
Channel R/r	EuroTLX	EuroTLX	N	N	N	Y	N	Y	Y
Channel S/s	EuroTLX	EuroTLX	N	N	N	Y	N	Y	Y
Channel T/t	Turquoise	XLON				Y	N	Y	Y
Channel U/u	Turquoise	XPAR				Y	N	Y	Y
Channel V/v	Turquoise	XETR				Y	N	Y	Y
Channel W/w	Turquoise	XCSE, XHEL, XMAD, XSTO, XSWX, XVTX				Y	N	Y	Y
Channel X/x	Turquoise	MTAA, XOSL, WBAH, XDUB, ARCX...				Y	N	Y	Y
Channel Y/y	Turquoise	XMAS, XBRU, XLIS and XLUX				Y	N	Y	Y
Channel Z/z	Borsa Italiana	TAH and MiFID	N	N	N	Y	N	Y	Y
Channel 1/5	TradEcho	SI Quoting				Y		Y	Y
Channel 2/6	TradEcho	Trades					N	N	N
Channel 3/7	TradEcho	SI Quoting				Y		Y	Y
Channel 4/8	TradEcho	Trades					N	N	N
Channel N/n	London Stock Exchange / Borsa Italiana		N					N	
Channel O/o	FTSE	FTSE Indices	N					N	
Channel P/p	Borsa Admin	Borsa Italiana Announcements	N					N	N

Field	Offset	Length	Type	Description
Length	0	2	UInt16	Length of message including this field.
Message Te	2	1	Byte	**Hex** **Meaning** 0x46 Add Order Incremental
Timestamp	3	8	UDT	Time the message was generated
Order ID	11	8	UInt64	Unique identifier of the order.
Side	19	1	Byte	**Value** **Meaning** B Buy Order S Sell Order
Size	20	8	Size	Displayed Size of the order.
Instrument	28	8	UInt64	GTP Instrument identifier.
Price	36	8	Price	Limit price of the order. Implied price if instrument trades in yield
Yield	44	8	Price	Yield, if the instrument trades in yield
Source venue	52	2	UInt16	Please refer the Additional Field Values section for valid values.
Order Book Type	54	1	UInt8	Please refer the Additional Field Values section of this document for valid values
Participant	55	11	Alpha	Identity of trading participant that submitted the order
Order Type	66	1	UInt8	**Value** **Meaning** 0 Limit Order / Firm Quote (default) 1 Market Order 2 Implied Order 3 Named Limit 4 Named Market 5 Executable Quotes

RFQ ID	67	10	Alpha	Unique ID assigned to a particular RFQ by the system Only relevant when Order Book Type is 4 = Private RFQ

3.11.9 Order Modify

Market Data Group	Source Venue	Channel Content	Level 1	Level 2 MBO	Level 2 MBP	Level 2 Incremental	MIFID II Post Trade	Replay	Recovery
Channel A/a	London Stock Exchange	FTSE 100	N	N	N	Y	N	Y	N
Channel B/b	London Stock Exchange	FTSE 100	N	N	N	Y	N	Y	N
Channel C/c	London Stock Exchange	FTSE 250	N	N	N	Y	N	Y	N
Channel D/d	London Stock Exchange	Structured Products	N	N	N	Y	N	Y	N
Channel E/e	London Stock Exchange	Miscellaneous	N	N	N	Y	N	Y	N
Channel F/f	London Stock Exchange	European (EQS)	N	N	N	Y	N	Y	N
Channel G/g	London Stock Exchange	International (IOB and ITR)	N	N	N	Y	N	Y	N
Channel H/h	Borsa Italiana	MTA	N	N	N	Y	N	Y	N
Channel I/i	Borsa Italiana	MTA and Sedex	N	N	N	Y	N	Y	N
Channel J/j	Borsa Italiana	Structured Products	N	N	N	Y	N	Y	N
Channel K/k	Borsa Italiana	Miscellaneous	N	N	N	Y	N	Y	N
Channel L/l	Borsa Italiana	IDEM	N	N	N	Y	N	Y	N
Channel M/m	Borsa Italiana	IDEM	N	N	N	Y	N	Y	N
Channel Q/q	EuroTLX	EuroTLX	N	N	N	Y	N	Y	N
Channel R/r	EuroTLX	EuroTLX	N	N	N	Y	N	Y	N
Channel S/s	EuroTLX	EuroTLX	N	N	N	Y	N	Y	N
Channel T/t	Turquoise	XLON				Y	N	Y	N
Channel U/u	Turquoise	XPAR				Y	N	Y	N
Channel V/v	Turquoise	XETR				Y	N	Y	N
Channel W/w	Turquoise	XCSE, XHEL, XMAD, XSTO, XSWX, XVTX				Y	N	Y	N
Channel X/x	Turquoise	MTAA, XOSL, WBAH, XDUB, ARCX...				Y	N	Y	N
Channel Y/y	Turquoise	XMAS, XBRU, XLIS and XLUX				Y	N	Y	N
Channel Z/z	Borsa Italiana	TAH and MiFID	N	N	N	Y	N	Y	N
Channel 1/5	TradEcho	SI Quoting				N		N	N
Channel 2/6	TradEcho	Trades					N	N	N
Channel 3/7	TradEcho	SI Quoting				N		N	N
Channel 4/8	TradEcho	Trades					N	N	N
Channel N/n	London Stock Exchange / Borsa Italiana		N					N	
Channel O/o	FTSE	FTSE Indices	N					N	
Channel P/p	Borsa Admin	Borsa Italiana Announcements	N					N	N

Field	Offset	Length	Type	Description
Length	0	2	UInt16	Length of message including this field.
Message Type	2	1	Byte	**Hex** **Meaning** 0x55 Modify Order
Timestamp	3	8	UDT	Time the message was generated
Order ID	11	8	UInt64	Unique identifier of the order.
Instrument	19	8	UInt64	GTP Instrument identifier.
Side	27	1	Byte	**Value** **Meaning** B Buy Order S Sell Order
Flags	28	1	Bit Field	**Bit** **Name** **Meaning** 0 Priority Flag 0: Priority Lost 1: Priority Retained
Order Book Type	29	1	UInt8	Please refer the Additional Field Values section of this document for valid values.
New Quantity	30	8	Size	New displayed quantity of the order.
New Price	38	8	Price	New price of the order.
New Yield	46	8	Price	New Yield, if the instrument trades in yield.
Source venue	54	2	UInt16	Please refer the Additional Field Values section for valid values.
Previous Price	56	8	Price	Previous price of the order.
Previous Quantity	64	8	Size	Previous displayed quantity of the order.

Previous Yield	72	8	Price	Previous Yield (if traded in yield) of the order.

3.11.10 Order Delete

Market Data Group	Source Venue	Channel Content	Level 1	Level 2 MBO	Level 2 MBP	Level 2 Incremental	MIFID II Post Trade	Replay	Recovery
Channel A/a	London Stock Exchange	FTSE 100	N	N	N	Y	N	Y	N
Channel B/b	London Stock Exchange	FTSE 100	N	N	N	Y	N	Y	N
Channel C/c	London Stock Exchange	FTSE 250	N	N	N	Y	N	Y	N
Channel D/d	London Stock Exchange	Structured Products	N	N	N	Y	N	Y	N
Channel E/e	London Stock Exchange	Miscellaneous	N	N	N	Y	N	Y	N
Channel F/f	London Stock Exchange	European (EQS)	N	N	N	Y	N	Y	N
Channel G/g	London Stock Exchange	International (IOB and ITR)	N	N	N	Y	N	Y	N
Channel H/h	Borsa Italiana	MTA	N	N	N	Y	N	Y	N
Channel I/i	Borsa Italiana	MTA and Sedex	N	N	N	Y	N	Y	N
Channel J/j	Borsa Italiana	Structured Products	N	N	N	Y	N	Y	N
Channel K/k	Borsa Italiana	Miscellaneous	N	N	N	Y	N	Y	N
Channel L/l	Borsa Italiana	IDEM	N	N	N	Y	N	Y	N
Channel M/m	Borsa Italiana	IDEM	N	N	N	Y	N	Y	N
Channel Q/q	EuroTLX	EuroTLX	N	N	N	Y	N	Y	N
Channel R/r	EuroTLX	EuroTLX	N	N	N	Y	N	Y	N
Channel S/s	EuroTLX	EuroTLX	N	N	N	Y	N	Y	N
Channel T/t	Turquoise	XLON				Y	N	Y	N
Channel U/u	Turquoise	XPAR				Y	N	Y	N
Channel V/v	Turquoise	XETR				Y	N	Y	N
Channel W/w	Turquoise	XCSE, XHEL, XMAD, XSTO, XSWX, XVTX				Y	N	Y	N
Channel X/x	Turquoise	MTAA, XOSL, WBAH, XDUB, ARCX...				Y	N	Y	N
Channel Y/y	Turquoise	XMAS, XBRU, XLIS and XLUX				Y	N	Y	N
Channel Z/z	Borsa Italiana	TAH and MiFID	N	N	N	Y	N	Y	N
Channel 1/5	TradEcho	SI Quoting				Y		Y	N
Channel 2/6	TradEcho	Trades					N	N	N
Channel 3/7	TradEcho	SI Quoting				Y		Y	N
Channel 4/8	TradEcho	Trades					N	N	N
Channel N/n	London Stock Exchange / Borsa Italiana		N					N	
Channel O/o	FTSE	FTSE Indices	N					N	
Channel P/p	Borsa Admin	Borsa Italiana Announcements	N					N	N

<table>
<tr><th>Field</th><th>Offset</th><th>Length</th><th>Type</th><th colspan="2">Description</th></tr>
<tr><td>Length</td><td>0</td><td>2</td><td>UInt16</td><td colspan="2">Length of message including this field.</td></tr>
<tr><td rowspan="2">Message Type</td><td rowspan="2">2</td><td rowspan="2">1</td><td rowspan="2">Byte</td><td>Hex</td><td>Meaning</td></tr>
<tr><td>0x44</td><td>Delete Order</td></tr>
<tr><td>Timestamp</td><td>3</td><td>8</td><td>UDT</td><td colspan="2">Time the message was generated</td></tr>
<tr><td>Order ID</td><td>11</td><td>8</td><td>UInt64</td><td colspan="2">Unique identifier of the order.</td></tr>
<tr><td>Instrument</td><td>19</td><td>8</td><td>UInt64</td><td colspan="2">GTP Instrument identifier.</td></tr>
<tr><td rowspan="3">Side</td><td rowspan="3">27</td><td rowspan="3">1</td><td rowspan="3">Byte</td><td>Value</td><td>Meaning</td></tr>
<tr><td>B</td><td>Buy Order</td></tr>
<tr><td>S</td><td>Sell Order</td></tr>
<tr><td>Order Book Type</td><td>28</td><td>1</td><td>UInt8</td><td colspan="2">Please refer the Additional Field Values section of this document for valid values</td></tr>
<tr><td>Source venue</td><td>29</td><td>2</td><td>UInt16</td><td colspan="2">Please refer the Additional Field Values section for valid values.</td></tr>
<tr><td>Previous Price</td><td>31</td><td>8</td><td>Price</td><td colspan="2">Price of the order that was deleted from the book</td></tr>
<tr><td>Previous Quantity</td><td>39</td><td>8</td><td>Size</td><td colspan="2">Quantity of the order that was deleted from the book</td></tr>
<tr><td>Previous Yield</td><td>47</td><td>8</td><td>Price</td><td colspan="2">Yield of the order (if traded in yield) that was deleted from the book</td></tr>
</table>

3.11.11 Top of Book

Note: *during auction periods, Milan based markets currently suppress this message. With MiFID II go live, this message will be un-suppressed and so visible to clients*

Market Data Group	Source Venue	Channel Content	Level 1	Level 2 MBO	Level 2 MBP	Level 2 Incremental	MIFID II Post Trade	Replay	Recovery
Channel A/a	London Stock Exchange	FTSE 100	Y	N	N	N	N	Y	Y
Channel B/b	London Stock Exchange	FTSE 100	Y	N	N	N	N	Y	Y
Channel C/c	London Stock Exchange	FTSE 250	Y	N	N	N	N	Y	Y
Channel D/d	London Stock Exchange	Structured Products	Y	N	N	N	N	Y	Y
Channel E/e	London Stock Exchange	Miscellaneous	Y	N	N	N	N	Y	Y
Channel F/f	London Stock Exchange	European (EQS)	Y	N	N	N	N	Y	Y
Channel G/g	London Stock Exchange	International (IOB and ITR)	Y	N	N	N	N	Y	Y
Channel H/h	Borsa Italiana	MTA	Y	N	N	N	N	Y	Y
Channel I/i	Borsa Italiana	MTA and Sedex	Y	N	N	N	N	Y	Y
Channel J/j	Borsa Italiana	Structured Products	Y	N	N	N	N	Y	Y
Channel K/k	Borsa Italiana	Miscellaneous	Y	N	N	N	N	Y	Y
Channel L/l	Borsa Italiana	IDEM	Y	N	N	N	N	Y	Y
Channel M/m	Borsa Italiana	IDEM	Y	N	N	N	N	Y	Y
Channel Q/q	EuroTLX	EuroTLX	Y	N	N	N	N	Y	Y
Channel R/r	EuroTLX	EuroTLX	Y	N	N	N	N	Y	Y
Channel S/s	EuroTLX	EuroTLX	Y	N	N	N	N	Y	Y
Channel T/t	Turquoise	XLON				N	N	N	N
Channel U/u	Turquoise	XPAR				N	N	N	N
Channel V/v	Turquoise	XETR				N	N	N	N
Channel W/w	Turquoise	XCSE, XHEL, XMAD, XSTO, XSWX, XVTX				N	N	N	N
Channel X/x	Turquoise	MTAA, XOSL, WBAH, XDUB, ARCX...				N	N	N	N
Channel Y/y	Turquoise	XMAS, XBRU, XLIS and XLUX				N	N	N	N
Channel Z/z	Borsa Italiana	TAH and MiFID	Y	N	N	N	N	Y	Y
Channel 1/5	TradEcho	SI Quoting				N		N	N
Channel 2/6	TradEcho	Trades					N	N	N
Channel 3/7	TradEcho	SI Quoting				N		N	N
Channel 4/8	TradEcho	Trades					N	N	N
Channel N/n	London Stock Exchange / Borsa Italiana		N					N	
Channel O/o	FTSE	FTSE Indices	N					N	
Channel P/p	Borsa Admin	Borsa Italiana Announcements	N					N	N

Field	Offset	Length	Type	Description
Length	0	2	UInt16	Length of message including this field.
Message Type	2	1	Byte	**Hex** **Meaning** 0x69 TOB
Timestamp	3	8	UDT	Time the message was generated.
Instrument	11	8	UInt64	GTP Instrument identifier.
Source venue	19	2	UInt16	Venue from which market data is received for the instrument. Please refer the Additional Field Values section of this document for valid values.
Bid Market Size	21	8	Size	Aggregated size of all bid market orders. Value will be 0 if there are no market orders.
Bid Limit Price	29	8	Price	Price of the best buy limit order. The Implied Bid Price for an instrument only traded on yield.
Bid Yield	37	8	Price	Yield of the best buy Limit order.
Bid Limit Size	45	8	Size	Aggregated size of all orders at the best buy limit price.
Offer Market Size	53	8	Size	Aggregated size of all offer market orders. Value will be 0 if there are no market orders.
Offer Limit Price	61	8	Price	Price of the best sell limit order. Implied Offer Price for an instrument only traded on yield.
Offer Yield	69	8	Price	Yield of the best offer Limit order
Offer Limit Size	77	8	Size	Aggregated size of all orders at the best sell limit price.
Order Book Type	85	1	UInt8	Please refer the Additional Field Values section of this document for valid values.

<table>
<tr><td rowspan="3">Flags</td><td rowspan="3">86</td><td rowspan="3">1</td><td rowspan="3">Bit Field</td><td>Bit</td><td>Name</td><td>Meaning</td></tr>
<tr><td>0</td><td>Bid Depth</td><td>0 – No
1 – Yes</td></tr>
<tr><td>1</td><td>Offer Depth</td><td>0 – No
1 – Yes</td></tr>
</table>

3.11.12 Order Book Clear

Market Data Group	Source Venue	Channel Content	Level 1	Level 2 MBO	Level 2 MBP	Level 2 Incremental	MIFID II Post Trade	Replay	Recovery
Channel A/a	London Stock Exchange	FTSE 100	Y	Y	Y	Y	N	Y	N
Channel B/b	London Stock Exchange	FTSE 100	Y	Y	Y	Y	N	Y	N
Channel C/c	London Stock Exchange	FTSE 250	Y	Y	Y	Y	N	Y	N
Channel D/d	London Stock Exchange	Structured Products	Y	Y	Y	Y	N	Y	N
Channel E/e	London Stock Exchange	Miscellaneous	Y	Y	Y	Y	N	Y	N
Channel F/f	London Stock Exchange	European (EQS)	Y	Y	Y	Y	N	Y	N
Channel G/g	London Stock Exchange	International (IOB and ITR)	Y	Y	Y	Y	N	Y	N
Channel H/h	Borsa Italiana	MTA	Y	Y	Y	Y	N	Y	N
Channel I/i	Borsa Italiana	MTA and Sedex	Y	Y	Y	Y	N	Y	N
Channel J/j	Borsa Italiana	Structured Products	Y	Y	Y	Y	N	Y	N
Channel K/k	Borsa Italiana	Miscellaneous	Y	Y	Y	Y	N	Y	N
Channel L/l	Borsa Italiana	IDEM	Y	Y	Y	Y	N	Y	N
Channel M/m	Borsa Italiana	IDEM	Y	Y	Y	Y	N	Y	N
Channel Q/q	EuroTLX	EuroTLX	Y	Y	Y	Y	N	Y	N
Channel R/r	EuroTLX	EuroTLX	Y	Y	Y	Y	N	Y	N
Channel S/s	EuroTLX	EuroTLX	Y	Y	Y	Y	N	Y	N
Channel T/t	Turquoise	XLON				Y	N	Y	N
Channel U/u	Turquoise	XPAR				Y	N	Y	N
Channel V/v	Turquoise	XETR				Y	N	Y	N
Channel W/w	Turquoise	XCSE, XHEL, XMAD, XSTO, XSWX, XVTX				Y	N	Y	N
Channel X/x	Turquoise	MTAA, XOSL, WBAH, XDUB, ARCX...				Y	N	Y	N
Channel Y/y	Turquoise	XMAS, XBRU, XLIS and XLUX				Y	N	Y	N
Channel Z/z	Borsa Italiana	TAH and MiFID	Y	Y	Y	Y	N	Y	N
Channel 1/5	TradEcho	SI Quoting				Y		Y	N
Channel 2/6	TradEcho	Trades					N	N	N
Channel 3/7	TradEcho	SI Quoting				Y		Y	N
Channel 4/8	TradEcho	Trades					N	N	N
Channel N/n	London Stock Exchange / Borsa Italiana		N					N	
Channel O/o	FTSE	FTSE Indices	N					N	
Channel P/p	Borsa Admin	Borsa Italiana Announcements	N					N	N

Field	Offset	Length	Type	Description
Length	0	2	UInt16	Length of message including this field.
Message Type	2	1	Byte	**Hex** **Meaning** 0x79 Order Book Clear
Timestamp	3	8	UDT	Time the message was generated.
Source venue	11	2	UInt16	Venue from which market data is received for the instrument. Please refer the Additional Field Values section of this document for valid values.
Instrument	13	8	UInt64	GTP Instrument identifier.
Order Book Type	21	1	UInt8	Please refer the Additional Field Values section of this document for valid values.

3.11.13 Trade

Market Data Group	Source Venue	Channel Content	Level 1	Level 2 MBO	Level 2 MBP	Level 2 Incremental	MiFID II Post Trade	Replay	Recovery
Channel A/a	London Stock Exchange	FTSE 100	Y	Y	Y	Y	N	Y	Y
Channel B/b	London Stock Exchange	FTSE 100	Y	Y	Y	Y	N	Y	Y
Channel C/c	London Stock Exchange	FTSE 250	Y	Y	Y	Y	N	Y	Y
Channel D/d	London Stock Exchange	Structured Products	Y	Y	Y	Y	N	Y	Y
Channel E/e	London Stock Exchange	Miscellaneous	Y	Y	Y	Y	N	Y	Y
Channel F/f	London Stock Exchange	European (EQS)	Y	Y	Y	Y	N	Y	Y
Channel G/g	London Stock Exchange	International (IOB and ITR)	Y	Y	Y	Y	N	Y	Y
Channel H/h	Borsa Italiana	MTA	Y	Y	Y	Y	N	Y	Y
Channel I/i	Borsa Italiana	MTA and Sedex	Y	Y	Y	Y	N	Y	Y
Channel J/j	Borsa Italiana	Structured Products	Y	Y	Y	Y	N	Y	Y
Channel K/k	Borsa Italiana	Miscellaneous	Y	Y	Y	Y	N	Y	Y
Channel L/l	Borsa Italiana	IDEM	Y	Y	Y	Y	N	Y	Y
Channel M/m	Borsa Italiana	IDEM	Y	Y	Y	Y	N	Y	Y
Channel Q/q	EuroTLX	EuroTLX	Y	Y	Y	Y	N	Y	Y
Channel R/r	EuroTLX	EuroTLX	Y	Y	Y	Y	N	Y	Y
Channel S/s	EuroTLX	EuroTLX	Y	Y	Y	Y	N	Y	Y
Channel T/t	Turquoise	XLON				Y	N	Y	Y
Channel U/u	Turquoise	XPAR				Y	N	Y	Y
Channel V/v	Turquoise	XETR				Y	N	Y	Y
Channel W/w	Turquoise	XCSE, XHEL, XMAD, XSTO, XSWX, XVTX				Y	N	Y	Y
Channel X/x	Turquoise	MTAA, XOSL, WBAH, XDUB, ARCX...				Y	N	Y	Y
Channel Y/y	Turquoise	XMAS, XBRU, XLIS and XLUX				Y	N	Y	Y
Channel Z/z	Borsa Italiana	TAH and MiFID	Y	Y	Y	Y	N	Y	Y
Channel 1/5	TradEcho	SI Quoting				N		N	N
Channel 2/6	TradEcho	Trades					N	N	N
Channel 3/7	TradEcho	SI Quoting				N		N	N
Channel 4/8	TradEcho	Trades					N	N	N
Channel N/n	London Stock Exchange / Borsa Italiana		N					N	
Channel O/o	FTSE	FTSE Indices	N					N	
Channel P/p	Borsa Admin	Borsa Italiana Announcements	N					N	N

Field	Offset	Length	Type	Description
Length	0	2	UInt16	Length of message including this field.
Message Type	2	1	Byte	**Hex** **Meaning** 0x50 Trade
Timestamp	3	8	UDT	Time the message was generated.
Transaction Time	11	8	UDT	Execution timestamp as reported by the supported market. If a trade is cancelled or amended, this field will contain the transaction time of the original trade.
Source venue	19	2	UInt16	Venue from which market data is received for the instrument. Please refer the Additional Field Values section of this document for valid values.
Executed Size	21	8	Size	Total executed quantity.
Instrument	29	8	UInt64	GTP Instrument identifier.
Price	37	8	Price	Executed price. Will be set to 1 if the price is pending. Implied price if instrument is traded in yield.
Yield	45	8	Price	Yield at which the trade was done, if the instrument trades in yield. Blank if not.
Trade ID	53	8	UInt64	Unique identifier of the trade – for IDEM this is unique only within an instrument.

<table>
<tr><td>Trade Type</td><td>61</td><td>1</td><td>UInt8</td><td>
Value | Meaning
0 | Regular Trade
1 | Auction Trade – Bulk
2 | Auction Trade – Individual[1][2]
5 | Late Trade (Trade Amend in IDEM)
~~8~~ | ~~Off-Book Trade Cancellation~~
9 | On-book Trade Cancellation
10 | Strategy vs. Strategy Trade
11 | Trade Correction
22 | RFQ Trade
23 | RFQ Trade Cancellation
</td></tr>
<tr><td>Auction Type</td><td>62</td><td>1</td><td>Byte</td><td>
The value in this field is only relevant when Trade Type is 1:
Value | Meaning
C | Closing Auction
O | Opening Auction
A | AESP
B | EDSP (Specific to LSE)
P | OPA (Specific to Borsa Italiana)
E | Resume Auction (Specific to LSE)
F | Periodic Auction (Specific to LSE)
G | Intraday Level 1 Auction
</td></tr>
</table>

[1] When the Source Venue = 6 (**Turquoise Plato™**), trades executed in **Turquoise Plato™** will have the Trade Type set to 2

[2] When source venue is set to 12 (**Turquoise Lit Auctions™)**, individual auction trades will be published with Trade Type 2

Flags	63	1	Bit Field	**Bit** / **Name** / **Meaning** 0 / Trade Cancellation / 0: No, 1: Yes 1 / Trade Correction / 0: No, 1: Yes 2 / Pending Price / 0: No, 1: Yes
Reserved	64	1	Alpha	Reserved for future use.

~~3.11.14 Off-Book Trade~~

This message will no longer exist following the introduction of the fully MiFID II compliant Off Book Trade message to on the TRADEcho Phase 2 post trade channels

Market Data Group	Source Venue	Channel Content	Level 1	Level 2 MBO	Level 2 MBP	Level 2 Incremental	MIFID II Post Trade	Replay	Recovery
Channel A/a	London Stock Exchange	FTSE 100	N	N	N	N	N	N	N
Channel B/b	London Stock Exchange	FTSE 100	N	N	N	N	N	N	N
Channel C/c	London Stock Exchange	FTSE 250	N	N	N	N	N	N	N
Channel D/d	London Stock Exchange	Structured Products	N	N	N	N	N	N	N
Channel E/e	London Stock Exchange	Miscellaneous	N	N	N	N	N	N	N
Channel F/f	London Stock Exchange	European (EQS)	N	N	N	N	N	N	N
Channel G/g	London Stock Exchange	International (IOB and ITR)	N	N	N	N	N	N	N
Channel H/h	Borsa Italiana	MTA	N	N	N	N	N	N	N
Channel I/i	Borsa Italiana	MTA and Sedex	N	N	N	N	N	N	N
Channel J/j	Borsa Italiana	Structured Products	N	N	N	N	N	N	N
Channel K/k	Borsa Italiana	Miscellaneous	N	N	N	N	N	N	N
Channel L/l	Borsa Italiana	IDEM	N	N	N	N	N	N	N
Channel M/m	Borsa Italiana	IDEM	N	N	N	N	N	N	N
Channel Q/q	EuroTLX	EuroTLX	N	N	N	N	N	N	N
Channel R/r	EuroTLX	EuroTLX	N	N	N	N	N	N	N
Channel S/s	EuroTLX	EuroTLX	N	N	N	N	N	N	N
Channel T/t	Turquoise	XLON				N	N	N	N
Channel U/u	Turquoise	XPAR				N	N	N	N
Channel V/v	Turquoise	XETR				N	N	N	N
Channel W/w	Turquoise	XCSE, XHEL, XMAD, XSTO, XSWX, XVTX				N	N	N	N
Channel X/x	Turquoise	MTAA, XOSL, WBAH, XDUB, ARCX...				N	N	N	N
Channel Y/y	Turquoise	XMAS, XBRU, XLIS and XLUX				N	N	N	N
Channel Z/z	Borsa Italiana	TAH and MiFID	Y	Y	Y	Y	N	Y	Y
Channel 1/5	TradEcho	SI Quoting				N		N	N
Channel 2/6	TradEcho	Trades					N	N	N
Channel 3/7	TradEcho	SI Quoting				N		N	N
Channel 4/8	TradEcho	Trades					N	N	N
Channel N/n	London Stock Exchange / Borsa Italiana		N					N	
Channel O/o	FTSE	FTSE Indices	N					N	
Channel P/p	Borsa Admin	Borsa Italiana Announcements	N					N	N

~~Field~~	~~Offset~~	~~Length~~	~~Type~~	~~Description~~
~~Length~~	~~0~~	~~2~~	~~UInt16~~	~~Length of message including this field.~~
~~Message Type~~	~~2~~	~~1~~	~~Byte~~	~~Hex~~ ~~Meaning~~ ~~0x78~~ ~~Off-Book Trade~~
~~Timestamp~~	~~3~~	~~8~~	~~UDT~~	~~Time the message was generated.~~
~~Executed Size~~	~~11~~	~~8~~	~~Size~~	~~Size executed.~~
~~Instrument ID~~	~~19~~	~~8~~	~~UInt64~~	~~GTP Instrument Identifier.~~
~~Reserved~~	~~27~~	~~1~~	~~Byte~~	~~Reserved field.~~
~~Reserved~~	~~28~~	~~1~~	~~Byte~~	~~Reserved field.~~
~~Price~~	~~29~~	~~8~~	~~Price~~	~~Executed price.~~
~~Trade ID~~	~~37~~	~~8~~	~~UInt64~~	~~Unique identifier of the trade – for IDEM this is unique only within an instrument.~~ ~~Base 36 encoded for LSE and Turquoise markets,~~ ~~TradeEcho will be decimal value in Base 64 encoded..~~ ~~Base 62 encoded for other supported markets.~~
~~Off-Book Trade Type~~	~~45~~	~~4~~	~~Alpha~~	~~Please refer the Additional Field Values section of this document for valid values.~~
~~Trade Date and Time~~	~~49~~	~~8~~	~~UDT~~	~~Date off-book trade was executed.~~ ~~If a trade is cancelled or amended, this field will contain the Trade Date and Time of the original trade.~~

~~Traded Currency~~	~~57~~	~~3~~	~~Alpha~~	~~Currency in which an off book trade has occurred other than for the trading currency of the relevant instrument.~~ ~~The possible values will be the ISO 4217 codes for currency. However the following values too will be disseminated:~~ **~~Value~~ – ~~Meaning~~** ~~GBX~~ – ~~GB Pennies~~ ~~ZAC~~ – ~~100th of RAND~~ ~~ITL~~ – ~~Italian LIRA~~ ~~TRY~~ – ~~Turkish LIRA~~
~~Original Price~~	~~60~~	~~8~~	~~Price~~	~~Price in the execution currency. The field should contain only zeros if the trade did not take place in a currency other than for the trading currency of the instrument.~~
~~Source venue~~	~~68~~	~~2~~	~~UInt16~~	~~Venue from which market data is received for the instrument.~~ ~~Please refer the Additional Field Values section of this document for valid values.~~
~~Reported Execution Venue~~	~~70~~	~~11~~	~~Alpha~~	~~Place of execution as reported by the Source venue. The possible values will be the ISO 10383 codes for Exchange ID.~~
~~Flags~~	~~81~~	~~1~~	~~Bit Field~~	**~~Bit~~ – ~~Name~~ – ~~Meaning~~** ~~5~~ – ~~Bargain Condition Indicator~~ – ~~0: No~~ ~~1: Yes~~ ~~6~~ – ~~Off Book Trade Cancellation~~ – ~~0: No~~ ~~1: Yes~~

3.11.15 Trade Cross

Market Data Group	Source Venue	Channel Content	Level 1	Level 2 MBO	Level 2 MBP	Level 2 Incremental	MIFID II Post Trade	Replay	Recovery
Channel A/a	London Stock Exchange	FTSE 100	Y	Y	Y	Y	N	Y	Y
Channel B/b	London Stock Exchange	FTSE 100	Y	Y	Y	Y	N	Y	Y
Channel C/c	London Stock Exchange	FTSE 250	Y	Y	Y	Y	N	Y	Y
Channel D/d	London Stock Exchange	Structured Products	Y	Y	Y	Y	N	Y	Y
Channel E/e	London Stock Exchange	Miscellaneous	Y	Y	Y	Y	N	Y	Y
Channel F/f	London Stock Exchange	European (EQS)	Y	Y	Y	Y	N	Y	Y
Channel G/g	London Stock Exchange	International (IOB and ITR)	Y	Y	Y	Y	N	Y	Y
Channel H/h	Borsa Italiana	MTA	Y	Y	Y	Y	N	Y	Y
Channel I/i	Borsa Italiana	MTA and Sedex	Y	Y	Y	Y	N	Y	Y
Channel J/j	Borsa Italiana	Structured Products	Y	Y	Y	Y	N	Y	Y
Channel K/k	Borsa Italiana	Miscellaneous	Y	Y	Y	Y	N	Y	Y
Channel L/l	Borsa Italiana	IDEM	Y	Y	Y	Y	N	Y	Y
Channel M/m	Borsa Italiana	IDEM	Y	Y	Y	Y	N	Y	Y
Channel Q/q	EuroTLX	EuroTLX	N	N	N	N	N	N	N
Channel R/r	EuroTLX	EuroTLX	N	N	N	N	N	N	N
Channel S/s	EuroTLX	EuroTLX	N	N	N	N	N	N	N
Channel T/t	Turquoise	XLON				N	N	N	N
Channel U/u	Turquoise	XPAR				N	N	N	N
Channel V/v	Turquoise	XETR				N	N	N	N
Channel W/w	Turquoise	XCSE, XHEL, XMAD, XSTO, XSWX, XVTX				N	N	N	N
Channel X/x	Turquoise	MTAA, XOSL, WBAH, XDUB, ARCX…				N	N	N	N
Channel Y/y	Turquoise	XMAS, XBRU, XLIS and XLUX				N	N	N	N
Channel Z/z	Borsa Italiana	TAH and MiFID	Y	Y	Y	Y	N	Y	Y
Channel 1/5	TradEcho	SI Quoting				N		N	N
Channel 2/6	TradEcho	Trades					N	N	N
Channel 3/7	TradEcho	SI Quoting				N		N	N
Channel 4/8	TradEcho	Trades					N	N	N
Channel N/n	London Stock Exchange / Borsa Italiana		N					N	
Channel O/o	FTSE	FTSE Indices	N					N	
Channel P/p	Borsa Admin	Borsa Italiana Announcements	N					N	N

Field	Offset	Length	Type	Description
Length	0	2	UInt16	Length of message including this field.
Message Type	2	1	Byte	**Hex** **Meaning** 0x71 Trade Cross
Timestamp	3	8	UDT	Time the message was generated.
Transaction Time	11	8	UDT	Execution timestamp as reported by the supported market. If a trade is cancelled or amended, this field will contain the transaction time of the original trade.
Source venue	19	2	UInt16	Venue from which market data is received for the instrument. Please refer the Additional Field Values section of this document for valid values.
Executed Size	21	8	Size	Size executed.
Instrument	29	8	UInt64	GTP Instrument identifier.
Price	37	8	Price	Executed price. Implied price if instrument is traded in yield.
Yield	45	8	Price	Yield at which the trade was done, if the instrument trades in yield.
Trade ID	53	8	UInt64	Unique identifier of the trade – for IDEM this is unique only within an instrument.
Cross ID	61	20	Alpha	The unique ID of the Cross/BTF Order.

<table>
<tr>
<td>Cross Type</td>
<td>81</td>
<td>1</td>
<td>UInt8</td>
<td>The type of the Cross/BTF Order:
<table>
<tr><th>Value</th><th>Meaning</th></tr>
<tr><td>5</td><td>Internal Cross</td></tr>
<tr><td>6</td><td>Internal BTF</td></tr>
<tr><td>7</td><td>Committed Cross</td></tr>
<tr><td>8</td><td>Committed BTF</td></tr>
<tr><td>9</td><td>EG1</td></tr>
<tr><td>10</td><td>EG2</td></tr>
</table>
</td>
</tr>
<tr>
<td>Flags</td>
<td>82</td>
<td>1</td>
<td>Bit Field</td>
<td>
<table>
<tr><th>Bit</th><th>Name</th><th>Meaning</th></tr>
<tr><td>0</td><td>Cross Trade Cancellation</td><td>0: No
1: Yes</td></tr>
<tr><td>1</td><td>Cross Trade Correction</td><td>0: No
1: Yes</td></tr>
</table>
</td>
</tr>
</table>

3.11.16 Statistics

Market Data Group	Source Venue	Channel Content	Level 1	Level 2 MBO	Level 2 MBP	Level 2 Incremental	MIFID II Post Trade	Replay	Recovery
Channel A/a	London Stock Exchange	FTSE 100	Y	Y	Y	Y	N	Y	Y
Channel B/b	London Stock Exchange	FTSE 100	Y	Y	Y	Y	N	Y	Y
Channel C/c	London Stock Exchange	FTSE 250	Y	Y	Y	Y	N	Y	Y
Channel D/d	London Stock Exchange	Structured Products	Y	Y	Y	Y	N	Y	Y
Channel E/e	London Stock Exchange	Miscellaneous	Y	Y	Y	Y	N	Y	Y
Channel F/f	London Stock Exchange	European (EQS)	Y	Y	Y	Y	N	Y	Y
Channel G/g	London Stock Exchange	International (IOB and ITR)	Y	Y	Y	Y	N	Y	Y
Channel H/h	Borsa Italiana	MTA	Y	Y	Y	Y	N	Y	Y
Channel I/i	Borsa Italiana	MTA and Sedex	Y	Y	Y	Y	N	Y	Y
Channel J/j	Borsa Italiana	Structured Products	Y	Y	Y	Y	N	Y	Y
Channel K/k	Borsa Italiana	Miscellaneous	Y	Y	Y	Y	N	Y	Y
Channel L/l	Borsa Italiana	IDEM	Y	Y	Y	Y	N	Y	Y
Channel M/m	Borsa Italiana	IDEM	Y	Y	Y	Y	N	Y	Y
Channel Q/q	EuroTLX	EuroTLX	Y	Y	Y	Y	N	Y	Y
Channel R/r	EuroTLX	EuroTLX	Y	Y	Y	Y	N	Y	Y
Channel S/s	EuroTLX	EuroTLX	Y	Y	Y	Y	N	Y	Y
Channel T/t	Turquoise	XLON				Y	N	Y	Y
Channel U/u	Turquoise	XPAR				Y	N	Y	Y
Channel V/v	Turquoise	XETR				Y	N	Y	Y
Channel W/w	Turquoise	XCSE, XHEL, XMAD, XSTO, XSWX, XVTX				Y	N	Y	Y
Channel X/x	Turquoise	MTAA, XOSL, WBAH, XDUB, ARCX...				Y	N	Y	Y
Channel Y/y	Turquoise	XMAS, XBRU, XLIS and XLUX				Y	N	Y	Y
Channel Z/z	Borsa Italiana	TAH and MiFID	Y	Y	Y	Y	N	Y	Y
Channel 1/5	TradEcho	SI Quoting				N		N	N
Channel 2/6	TradEcho	Trades					Y	Y	Y
Channel 3/7	TradEcho	SI Quoting				N		N	N
Channel 4/8	TradEcho	Trades					Y	Y	Y
Channel N/n	London Stock Exchange / Borsa Italiana		N					N	
Channel O/o	FTSE	FTSE Indices	N					N	
Channel P/p	Borsa Admin	Borsa Italiana Announcements	N					N	N

Field	Offset	Length	Type	Description
Length	0	2	UInt16	Length of message including this field.
Message Type	2	1	Byte	**Hex** **Meaning** 0x77 Statistics
Timestamp	3	8	UDT	Time the message was generated.
Instrument	11	8	UInt64	GTP Instrument identifier.
Source venue	19	2	UInt16	Venue from which market data is received for the instrument. Please refer the Additional Field Values section of this document for valid values.
Volume	21	8	Size4	Cumulative volume of all trades for the trading day.
Volume (on-book only)	29	8	Size4	Cumulative volume for the trading day excluding off-book trades.
VWAP	37	8	Price4	Volume weighted average price for the day for all trades.
VWAP (on-book only)	45	8	Price4	Volume weighted average price for the day excluding off-book trades.
Number of Trades	53	4	UInt32	Count of all trades for the day
Number of trades (on-book only)	57	4	UInt32	Count of trades for the day excluding off-book trades.
Turnover	61	8	Price4	Turnover of all trades for the day.
Turnover (on-book only)	69	8	Price4	Turnover for the day excluding off-book trades.

3.11.17 Statistics Update

Market Data Group	Source Venue	Channel Content	Level 1	Level 2 MBO	Level 2 MBP	Level 2 Incremental	MIFID II Post Trade	Replay	Recovery
Channel A/a	London Stock Exchange	FTSE 100	Y	Y	Y	Y	N	Y	Y
Channel B/b	London Stock Exchange	FTSE 100	Y	Y	Y	Y	N	Y	Y
Channel C/c	London Stock Exchange	FTSE 250	Y	Y	Y	Y	N	Y	Y
Channel D/d	London Stock Exchange	Structured Products	Y	Y	Y	Y	N	Y	Y
Channel E/e	London Stock Exchange	Miscellaneous	Y	Y	Y	Y	N	Y	Y
Channel F/f	London Stock Exchange	European (EQS)	Y	Y	Y	Y	N	Y	Y
Channel G/g	London Stock Exchange	International (IOB and ITR)	Y	Y	Y	Y	N	Y	Y
Channel H/h	Borsa Italiana	MTA	Y	Y	Y	Y	N	Y	Y
Channel I/i	Borsa Italiana	MTA and Sedex	Y	Y	Y	Y	N	Y	Y
Channel J/j	Borsa Italiana	Structured Products	Y	Y	Y	Y	N	Y	Y
Channel K/k	Borsa Italiana	Miscellaneous	Y	Y	Y	Y	N	Y	Y
Channel L/l	Borsa Italiana	IDEM	Y	Y	Y	Y	N	Y	Y
Channel M/m	Borsa Italiana	IDEM	Y	Y	Y	Y	N	Y	Y
Channel Q/q	EuroTLX	EuroTLX	Y	Y	Y	Y	N	Y	Y
Channel R/r	EuroTLX	EuroTLX	Y	Y	Y	Y	N	Y	Y
Channel S/s	EuroTLX	EuroTLX	Y	Y	Y	Y	N	Y	Y
Channel T/t	Turquoise	XLON				Y	N	Y	Y
Channel U/u	Turquoise	XPAR				Y	N	Y	Y
Channel V/v	Turquoise	XETR				Y	N	Y	Y
Channel W/w	Turquoise	XCSE, XHEL, XMAD, XSTO, XSWX, XVTX				Y	N	Y	Y
Channel X/x	Turquoise	MTAA, XOSL, WBAH, XDUB, ARCX...				Y	N	Y	Y
Channel Y/y	Turquoise	XMAS, XBRU, XLIS and XLUX				Y	N	Y	Y
Channel Z/z	Borsa Italiana	TAH and MiFID	Y	Y	Y	Y	N	Y	Y
Channel 1/5	TradEcho	SI Quoting				N		N	N
Channel 2/6	TradEcho	Trades					Y	Y	Y
Channel 3/7	TradEcho	SI Quoting				N		N	N
Channel 4/8	TradEcho	Trades					Y	Y	Y
Channel N/n	London Stock Exchange / Borsa Italiana		N					N	
Channel O/o	FTSE	FTSE Indices	N					N	
Channel P/p	Borsa Admin	Borsa Italiana Announcements	N					N	N

Field	Offset	Length	Type	Description
Length	0	2	UInt16	Length of message including this field.
Message Type	2	1	Byte	**Hex** **Meaning** 0x6A Statistics Update
Timestamp	3	8	UDT	Time the message was generated.
Instrument	11	8	UInt64	GTP Instrument identifier.
Source venue	19	2	UInt16	Venue from which market data is received for the instrument. Please refer the Additional Field Values section of this document for valid values.

Statistic Type	21	2	UInt16	The statistic that is disseminated with this message instance: **Value** **Meaning** 1 Indicative Auction Uncrossing Data 2 Official Opening Price 3 Official Closing Price 4 Trade High On-Book 5 Trade Low On-Book 6 Trade High All Trades 7 Trade Low All Trades 8 52-week Trade High All Trades 9 52-week Trade Low All Trades 10 Best Closing Bid 11 Best Closing Ask 12 Trade High Off-Book 13 Trade Low Off-Book 14 Open Interest 15 Volatility 16 Static Reference Price (Specific to BIT/TLX) 17 Dynamic Reference Price (Specific to BIT/TLX)
Statistic Price	23	8	Price	The value of price type statistics. If the Opening or Closing Price is cleared manually by the venue '-1' will be stamped.
Statistic Size	31	8	Size	The value of size type statistics.

Auction Type	39	1	Byte	Populated if the Statistic Type is 1: **Value** – **Meaning** C – Closing Auction O – Opening Auction A – AESP B – EDSP (Specific to LSE) P – OPA (Specific to Borsa Italiana) E – Resume Auction (Specific to LSE) F – Periodic Auction (Specific to LSE) G – Intraday Level 1 Auction L – Frequent Lit Auctions
Imbalance Quantity	40	8	Size	Quantity that is eligible to be matched at the indicative price but will not be matched.
Auction Info	48	1	Byte	**Value** – **Meaning** B – Buy Imbalance N – No Imbalance O – Insufficient Orders for Auction S – Sell Imbalance M – Call Market (Specific to **Turquoise Plato™**)
Opening/ Closing Price Indicator	49	1	Byte	Populated if the Statistic Type is 2 or 3. This will be empty for the IDEM market. Please refer the Additional Field Values section of this document for valid values.

3.11.18 FTSE Russell Indices Update

Market Data Group	Source Venue	Channel Content	Level 1	Level 2 MBO	Level 2 MBP	Level 2 Incremental	MIFID II Post Trade	Replay	Recovery
Channel A/a	London Stock Exchange	FTSE 100	N	N	N	N	N	N	N
Channel B/b	London Stock Exchange	FTSE 100	N	N	N	N	N	N	N
Channel C/c	London Stock Exchange	FTSE 250	N	N	N	N	N	N	N
Channel D/d	London Stock Exchange	Structured Products	N	N	N	N	N	N	N
Channel E/e	London Stock Exchange	Miscellaneous	N	N	N	N	N	N	N
Channel F/f	London Stock Exchange	European (EQS)	N	N	N	N	N	N	N
Channel G/g	London Stock Exchange	International (IOB and ITR)	N	N	N	N	N	N	N
Channel H/h	Borsa Italiana	MTA	N	N	N	N	N	N	N
Channel I/i	Borsa Italiana	MTA and Sedex	N	N	N	N	N	N	N
Channel J/j	Borsa Italiana	Structured Products	N	N	N	N	N	N	N
Channel K/k	Borsa Italiana	Miscellaneous	N	N	N	N	N	N	N
Channel L/l	Borsa Italiana	IDEM	N	N	N	N	N	N	N
Channel M/m	Borsa Italiana	IDEM	N	N	N	N	N	N	N
Channel Q/q	EuroTLX	EuroTLX	N	N	N	N	N	N	N
Channel R/r	EuroTLX	EuroTLX	N	N	N	N	N	N	N
Channel S/s	EuroTLX	EuroTLX	N	N	N	N	N	N	N
Channel T/t	Turquoise	XLON				N	N	N	N
Channel U/u	Turquoise	XPAR				N	N	N	N
Channel V/v	Turquoise	XETR				N	N	N	N
Channel W/w	Turquoise	XCSE, XHEL, XMAD, XSTO, XSWX, XVTX				N	N	N	N
Channel X/x	Turquoise	MTAA, XOSL, WBAH, XDUB, ARCX…				N	N	N	N
Channel Y/y	Turquoise	XMAS, XBRU, XLIS and XLUX				N	N	N	N
Channel Z/z	Borsa Italiana	TAH and MiFID	N	N	N	N	N	N	N
Channel 1/5	TradEcho	SI Quoting				N		N	N
Channel 2/6	TradEcho	Trades					N	N	N
Channel 3/7	TradEcho	SI Quoting				N		N	N
Channel 4/8	TradEcho	Trades					N	N	N
Channel N/n	London Stock Exchange / Borsa Italiana		N	N	N	N	N	N	
Channel O/o	FTSE	FTSE Indices	Y	Y	Y	Y	Y	Y	
Channel P/p	Borsa Admin	Borsa Italiana Announcements	N	N	N	N	N	N	N

<table>
<tr><th>Field</th><th>Offset</th><th>Length</th><th>Type</th><th>Description</th></tr>
<tr><td>Length</td><td>0</td><td>2</td><td>UInt16</td><td>Length of message including this field.</td></tr>
<tr><td>Message Type</td><td>2</td><td>1</td><td>Byte</td><td><table><tr><th>Hex</th><th>Meaning</th></tr><tr><td>0x6c</td><td>FTSE Indices Update</td></tr></table></td></tr>
<tr><td>Timestamp</td><td>3</td><td>8</td><td>UDT</td><td>Time the message was generated.</td></tr>
<tr><td>Index Code</td><td>11</td><td>10</td><td>Alpha</td><td>Please refer to GTP006 – External Sources Guide.</td></tr>
<tr><td>Index Value</td><td>21</td><td>8</td><td>Price</td><td>As provided by FTSE.</td></tr>
<tr><td>Index Status</td><td>29</td><td>1</td><td>Alpha</td><td>As provided by FTSE. This field is only populated when the status is changed (as per FTSE practice). Blank when status is not changed.<table><tr><th>Value</th><th>Meaning</th></tr><tr><td>N</td><td>Normal</td></tr><tr><td>I</td><td>Indicative</td></tr><tr><td>H</td><td>Held</td></tr><tr><td>C</td><td>Closed</td></tr><tr><td>K</td><td>Part Calculated Value</td></tr><tr><td>P</td><td>Pre Market</td></tr></table></td></tr>
<tr><td>Total Return Value</td><td>30</td><td>8</td><td>Price</td><td>As provided by FTSE.</td></tr>
<tr><td>Net Change Previous Day</td><td>38</td><td>8</td><td>Price</td><td>As provided by FTSE.</td></tr>
<tr><td>Index Time</td><td>46</td><td>6</td><td>Time</td><td>As stamped by FTSE.</td></tr>
</table>

~~3.11.19 FTSE Low Latency Indices Update~~

Note: *FTSE Low Latency service decommissioned in Production on 15 December 2017 and CDS on 14 December 2017*

~~Market Data Group~~	~~Source Venue~~	~~Channel Content~~	~~Level 1~~	~~Level 2 MBO~~	~~Level 2 MBP~~	~~Level 2 Incremental~~	~~MIFID II Post Trade~~	~~Replay~~	~~Recovery~~
~~Channel A/a~~	~~London Stock Exchange~~	~~FTSE 100~~	~~N~~	~~N~~	~~N~~	~~N~~	~~N~~	~~N~~	~~N~~
~~Channel B/b~~	~~London Stock Exchange~~	~~FTSE 100~~	~~N~~	~~N~~	~~N~~	~~N~~	~~N~~	~~N~~	~~N~~
~~Channel C/c~~	~~London Stock Exchange~~	~~FTSE 250~~	~~N~~	~~N~~	~~N~~	~~N~~	~~N~~	~~N~~	~~N~~
~~Channel D/d~~	~~London Stock Exchange~~	~~Structured Products~~	~~N~~	~~N~~	~~N~~	~~N~~	~~N~~	~~N~~	~~N~~
~~Channel E/e~~	~~London Stock Exchange~~	~~Miscellaneous~~	~~N~~	~~N~~	~~N~~	~~N~~	~~N~~	~~N~~	~~N~~
~~Channel F/f~~	~~London Stock Exchange~~	~~European (EQS)~~	~~N~~	~~N~~	~~N~~	~~N~~	~~N~~	~~N~~	~~N~~
~~Channel G/g~~	~~London Stock Exchange~~	~~International (IOB and ITR)~~	~~N~~	~~N~~	~~N~~	~~N~~	~~N~~	~~N~~	~~N~~
~~Channel H/h~~	~~Borsa Italiana~~	~~MTA~~	~~N~~	~~N~~	~~N~~	~~N~~	~~N~~	~~N~~	~~N~~
~~Channel I/i~~	~~Borsa Italiana~~	~~MTA and Sedex~~	~~N~~	~~N~~	~~N~~	~~N~~	~~N~~	~~N~~	~~N~~
~~Channel J/j~~	~~Borsa Italiana~~	~~Structured Products~~	~~N~~	~~N~~	~~N~~	~~N~~	~~N~~	~~N~~	~~N~~
~~Channel K/k~~	~~Borsa Italiana~~	~~Miscellaneous~~	~~N~~	~~N~~	~~N~~	~~N~~	~~N~~	~~N~~	~~N~~
~~Channel L/l~~	~~Borsa Italiana~~	~~IDEM~~	~~N~~	~~N~~	~~N~~	~~N~~	~~N~~	~~N~~	~~N~~
~~Channel M/m~~	~~Borsa Italiana~~	~~IDEM~~	~~N~~	~~N~~	~~N~~	~~N~~	~~N~~	~~N~~	~~N~~
~~Channel Q/q~~	~~EuroTLX~~	~~EuroTLX~~	~~N~~	~~N~~	~~N~~	~~N~~	~~N~~	~~N~~	~~N~~
~~Channel R/r~~	~~EuroTLX~~	~~EuroTLX~~	~~N~~	~~N~~	~~N~~	~~N~~	~~N~~	~~N~~	~~N~~
~~Channel S/s~~	~~EuroTLX~~	~~EuroTLX~~	~~N~~	~~N~~	~~N~~	~~N~~	~~N~~	~~N~~	~~N~~
~~Channel T/t~~	~~Turquoise~~	~~XLON~~				~~N~~	~~N~~	~~N~~	~~N~~
~~Channel U/u~~	~~Turquoise~~	~~XPAR~~				~~N~~	~~N~~	~~N~~	~~N~~
~~Channel V/v~~	~~Turquoise~~	~~XETR~~				~~N~~	~~N~~	~~N~~	~~N~~
~~Channel W/w~~	~~Turquoise~~	~~XCSE, XHEL, XMCE, XSTO, XSWX, XVTX~~				~~N~~	~~N~~	~~N~~	~~N~~
~~Channel X/x~~	~~Turquoise~~	~~MTAA, XOSL, WBAH, XDUB, ARCX…~~				~~N~~	~~N~~	~~N~~	~~N~~
~~Channel Y/y~~	~~Turquoise~~	~~XMAS, XBRU, XLIS and XLUX~~				~~N~~	~~N~~	~~N~~	~~N~~
~~Channel Z/z~~	~~Borsa Italiana~~	~~TAH and MiFID~~	~~N~~	~~N~~	~~N~~	~~N~~	~~N~~	~~N~~	~~N~~
~~Channel 1/5~~	~~TradEcho~~	~~SI Quoting~~				~~N~~		~~N~~	~~N~~
~~Channel 2/6~~	~~TradEcho~~	~~Trades~~					~~N~~	~~N~~	~~N~~
~~Channel 3/7~~	~~TradEcho~~	~~SI Quoting~~				~~N~~		~~N~~	~~N~~
~~Channel 4/8~~	~~TradEcho~~	~~Trades~~					~~N~~	~~N~~	~~N~~
~~Channel N/n~~	~~London Stock Exchange / Borsa Italiana~~	~~FTSE Low Latency~~	~~Y~~					~~Y~~	
~~Channel O/o~~	~~FTSE~~	~~FTSE Indices~~	~~N~~					~~N~~	
~~Channel P/p~~	~~Borsa Admin~~	~~Borsa Italiana Announcements~~	~~N~~					~~N~~	~~N~~

~~Field~~	~~Offset~~	~~Length~~	~~Type~~	~~Description~~
~~Length~~	~~0~~	~~2~~	~~UInt16~~	~~Length of message including this field.~~
~~Message Type~~	~~2~~	~~1~~	~~Byte~~	~~Hex~~ – ~~Meaning~~ ~~0x7b~~ – ~~FTSE Low Latency Indices Update~~
~~Timestamp~~	~~3~~	~~8~~	~~UDT~~	~~Time the message was generated~~
~~Index Code~~	~~11~~	~~10~~	~~Alpha~~	~~The official index code assigned by FTSE, which is used for dissemination.~~
~~Index Value~~	~~21~~	~~8~~	~~Price~~	~~The Index value calculated by the Ticker Plant.~~
~~Index Status~~	~~29~~	~~1~~	~~Alpha~~	~~As provided by FTSE. This field will be populated in every update and not only when the status changes.~~ ~~Value~~ – ~~Meaning~~ ~~N~~ – ~~Normal~~ ~~I~~ – ~~Indicative~~ ~~H~~ – ~~Held~~ ~~C~~ – ~~Closed~~ ~~K~~ – ~~Part Calculated Value~~ ~~P~~ – ~~Pre Market~~

3.11.20 Announcements

Market Data Group	Source Venue	Channel Content	Level 1	Level 2 MBO	Level 2 MBP	Level 2 Incremental	MIFID II Post Trade	Replay	Recovery
Channel A/a	London Stock Exchange	FTSE 100	N	N	N	N	N	N	N
Channel B/b	London Stock Exchange	FTSE 100	N	N	N	N	N	N	N
Channel C/c	London Stock Exchange	FTSE 250	N	N	N	N	N	N	N
Channel D/d	London Stock Exchange	Structured Products	N	N	N	N	N	N	N
Channel E/e	London Stock Exchange	Miscellaneous	N	N	N	N	N	N	N
Channel F/f	London Stock Exchange	European (EQS)	N	N	N	N	N	N	N
Channel G/g	London Stock Exchange	International (IOB and ITR)	N	N	N	N	N	N	N
Channel H/h	Borsa Italiana	MTA	Y	Y	Y	Y	N	Y	Y
Channel I/i	Borsa Italiana	MTA and Sedex	Y	Y	Y	Y	N	Y	Y
Channel J/j	Borsa Italiana	Structured Products	Y	Y	Y	Y	N	Y	Y
Channel K/k	Borsa Italiana	Miscellaneous	Y	Y	Y	Y	N	Y	Y
Channel L/l	Borsa Italiana	IDEM	Y	Y	Y	Y	N	Y	Y
Channel M/m	Borsa Italiana	IDEM	Y	Y	Y	Y	N	Y	Y
Channel Q/q	EuroTLX	EuroTLX	Y	Y	Y	Y	N	Y	Y
Channel R/r	EuroTLX	EuroTLX	Y	Y	Y	Y	N	Y	Y
Channel S/s	EuroTLX	EuroTLX	Y	Y	Y	Y	N	Y	Y
Channel T/t	Turquoise	XLON				N	N	N	N
Channel U/u	Turquoise	XPAR				N	N	N	N
Channel V/v	Turquoise	XETR				N	N	N	N
Channel W/w	Turquoise	XCSE, XHEL, XMAD, XSTO, XSWX, XVTX				N	N	N	N
Channel X/x	Turquoise	MTAA, XOSL, WBAH, XDUB, ARCX...				N	N	N	N
Channel Y/y	Turquoise	XMAS, XBRU, XLIS and XLUX				N	N	N	N
Channel Z/z	Borsa Italiana	TAH and MiFID	Y	Y	Y	Y	Y	Y	Y
Channel 1/5	TradEcho	SI Quoting				N		N	N
Channel 2/6	TradEcho	Trades					N	N	N
Channel 3/7	TradEcho	SI Quoting				N		N	N
Channel 4/8	TradEcho	Trades					N	N	N
Channel N/n	London Stock Exchange / Borsa Italiana		N					N	
Channel O/o	FTSE	FTSE Indices	N					N	
Channel P/p	Borsa Admin	Borsa Italiana Announcements	Y					Y	Y

Field	Offset	Length	Type	Description
Length	0	2	UInt16	Length of message including this field.
Message Type	2	1	Byte	**Hex** **Meaning** 0x75 Announcements
Timestamp	3	8	UDT	Time the message was generated.
Urgency	11	1	UInt8	**Value** **Meaning** 0 Regular 1 High Priority 2 Low Priority
Headline	12	50	Alpha	Headline or subject of the announcement.
Text	62	120	Alpha	Text of the announcement.
Instruments	182	30	Alpha	Pipe separated Identification numbers of the securities for which the announcement has been sent for.
Underlying/ Market	212	30	Alpha	Pipe separated Identification numbers of the underlying securities/markets for which the announcement has been sent for.

3.11.21 Indicative Quote Information

Market Data Group	Source Venue	Channel Content	Level 1	Level 2 MBO	Level 2 MBP	Level 2 Incremental	MIFID II Post Trade	Replay	Recovery
Channel A/a	London Stock Exchange	FTSE 100	N	N	N	Y	N	Y	Y
Channel B/b	London Stock Exchange	FTSE 100	N	N	N	Y	N	Y	Y
Channel C/c	London Stock Exchange	FTSE 250	N	N	N	Y	N	Y	Y
Channel D/d	London Stock Exchange	Structured Products	N	N	N	Y	N	Y	Y
Channel E/e	London Stock Exchange	Miscellaneous	N	N	N	Y	N	Y	Y
Channel F/f	London Stock Exchange	European (EQS)	N	N	N	Y	N	Y	Y
Channel G/g	London Stock Exchange	International (IOB and ITR)	N	N	N	Y	N	Y	Y
Channel H/h	Borsa Italiana	MTA	N	N	N	Y	N	Y	Y
Channel I/i	Borsa Italiana	MTA and Sedex	N	N	N	Y	N	Y	Y
Channel J/j	Borsa Italiana	Structured Products	N	N	N	Y	N	Y	Y
Channel K/k	Borsa Italiana	Miscellaneous	N	N	N	Y	N	Y	Y
Channel L/l	Borsa Italiana	IDEM	N	N	N	N	N	N	N
Channel M/m	Borsa Italiana	IDEM	N	N	N	N	N	N	N
Channel Q/q	EuroTLX	EuroTLX	N	N	N	Y	N	Y	Y
Channel R/r	EuroTLX	EuroTLX	N	N	N	Y	N	Y	Y
Channel S/s	EuroTLX	EuroTLX	N	N	N	Y	N	Y	Y
Channel T/t	Turquoise	XLON				N	N	N	N
Channel U/u	Turquoise	XPAR				N	N	N	N
Channel V/v	Turquoise	XETR				N	N	N	N
Channel W/w	Turquoise	XCSE, XHEL, XMAD, XSTO, XSWX, XVTX				N	N	N	N
Channel X/x	Turquoise	MTAA, XOSL, WBAH, XDUB, ARCX...				N	N	N	N
Channel Y/y	Turquoise	XMAS, XBRU, XLIS and XLUX				N	N	N	N
Channel Z/z	Borsa Italiana	TAH and MiFID	N	N	N	Y	N	Y	Y
Channel 1/5	TradEcho	SI Quoting				N		N	N
Channel 2/6	TradEcho	Trades					N	N	N
Channel 3/7	TradEcho	SI Quoting				N		N	N
Channel 4/8	TradEcho	Trades					N	N	N
Channel N/n	London Stock Exchange / Borsa Italiana		N					N	
Channel O/o	FTSE	FTSE Indices	N					N	
Channel P/p	Borsa Admin	Borsa Italiana Announcements	N					N	N

Field	Offset	Length	Type	Description
Length	0	2	UInt16	Length of message including this field.
Message Type	2	1	Byte	**Hex** **Meaning** 0x80 Indicative Quote Information
Timestamp	3	8	UDT	Message dissemination time
Source Venue	11	2	UInt16	Please refer to the Additional Field Values section for valid values
Bid Indicative Price	13	8	Price	Indicative price of the quotes on the buy side of the RFQ. Will indicate the yield if the instrument is traded on yield.
Ask Indicative Price	21	8	Price	Indicative price of the quotes on the sell side of the RFQ. Will indicate the yield if the instrument is traded on yield.
Instrument ID	29	8	UInt64	GTP Instrument Identifier
RFQ ID	37	10	Alpha	Unique ID assigned to a particular RFQ by the system

3.11.22 MiFID II Trade

Market Data Group	Source Venue	Channel Content	Level 1	Level 2 MBO	Level 2 MBP	Level 2 Incremental	MIFID II Post Trade	Replay	Recovery
Channel A/a	London Stock Exchange	FTSE 100	N	N	N	N	Y	Y	Y
Channel B/b	London Stock Exchange	FTSE 100	N	N	N	N	Y	Y	Y
Channel C/c	London Stock Exchange	FTSE 250	N	N	N	N	Y	Y	Y
Channel D/d	London Stock Exchange	Structured Products	N	N	N	N	Y	Y	Y
Channel E/e	London Stock Exchange	Miscellaneous	N	N	N	N	Y	Y	Y
Channel F/f	London Stock Exchange	European (EQS)	N	N	N	N	Y	Y	Y
Channel G/g	London Stock Exchange	International (IOB and ITR)	N	N	N	N	Y	Y	Y
Channel H/h	Borsa Italiana	MTA	N	N	N	N	Y	Y	Y
Channel I/i	Borsa Italiana	MTA and Sedex	N	N	N	N	Y	Y	Y
Channel J/j	Borsa Italiana	Structured Products	N	N	N	N	Y	Y	Y
Channel K/k	Borsa Italiana	Miscellaneous	N	N	N	N	Y	Y	Y
Channel L/l	Borsa Italiana	IDEM	N	N	N	N	Y	Y	Y
Channel M/m	Borsa Italiana	IDEM	N	N	N	N	Y	Y	Y
Channel Q/q	EuroTLX	EuroTLX	N	N	N	N	Y	Y	Y
Channel R/r	EuroTLX	EuroTLX	N	N	N	N	Y	Y	Y
Channel S/s	EuroTLX	EuroTLX	N	N	N	N	Y	Y	Y
Channel T/t	Turquoise	XLON				N	Y	Y	Y
Channel U/u	Turquoise	XPAR				N	Y	Y	Y
Channel V/v	Turquoise	XETR				N	Y	Y	Y
Channel W/w	Turquoise	XCSE, XHEL, XMAD, XSTO, XSWX, XVTX				N	Y	Y	Y
Channel X/x	Turquoise	MTAA, XOSL, WBAH, XDUB, ARCX...				N	Y	Y	Y
Channel Y/y	Turquoise	XMAS, XBRU, XLIS and XLUX				N	Y	Y	Y
Channel Z/z	Borsa Italiana	TAH and MiFID	N	N	N	N	Y	Y	Y
Channel 1/5	TradEcho	SI Quoting				N		N	N
Channel 2/6	TradEcho	Trades					N	N	N
Channel 3/7	TradEcho	SI Quoting				N		N	N
Channel 4/8	TradEcho	Trades					N	N	N
Channel N/n	London Stock Exchange / Borsa Italiana		N					N	
Channel O/o	FTSE	FTSE Indices	N					N	
Channel P/p	Borsa Admin	Borsa Italiana Announcements	N					N	N

<table>
<tr><th>Field</th><th>Offset</th><th>Length</th><th>Type</th><th>Description</th></tr>
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<tr><td>Timestamp</td><td>3</td><td>8</td><td>UDT</td><td>Message dissemination time</td></tr>
<tr><td>Source venue</td><td>11</td><td>2</td><td>UInt16</td><td>Please refer the Additional Field Values section for valid values.</td></tr>
<tr><td>Instrument</td><td>13</td><td>8</td><td>UInt64</td><td>GTP Instrument identifier.</td></tr>
<tr><td>Transaction identification code</td><td>21</td><td>52</td><td>Alpha</td><td>A unique trade identifier.

The value will be right aligned.</td></tr>
<tr><td>Trade Type</td><td>73</td><td>1</td><td>UInt8</td><td><table><tr><th>Value</th><th>Meaning</th></tr><tr><td>0</td><td>Regular Trade</td></tr><tr><td>1</td><td>Auction Trade – Bulk</td></tr><tr><td>2</td><td>Auction Trade – Individual</td></tr><tr><td>5</td><td>Late Trade (Trade Amend in IDEM)</td></tr><tr><td>8</td><td>Reserve</td></tr><tr><td>9</td><td>Trade Cancellation</td></tr><tr><td>10</td><td>Strategy Vs Strategy</td></tr><tr><td>11</td><td>Trade Correction</td></tr><tr><td>22</td><td>RFQ Trade</td></tr><tr><td>23</td><td>RFQ Trade Cancellation</td></tr></table></td></tr>
<tr><td>Auction Type</td><td>74</td><td>1</td><td>Byte</td><td>The value in this field is only relevant when Trade Type is 1<table><tr><th>Value</th><th>Meaning</th></tr><tr><td>C</td><td>Closing Auction</td></tr><tr><td>O</td><td>Opening Auction</td></tr><tr><td>A</td><td>AESP</td></tr><tr><td>B</td><td>EDSP (Specific to LSE)</td></tr><tr><td>P</td><td>OPA (Specific to Borsa Italiana)</td></tr><tr><td>E</td><td>Resume Auction</td></tr><tr><td>F</td><td>Periodic Auction</td></tr><tr><td>G</td><td>Intra-day level 1 auction</td></tr></table></td></tr>
</table>

MiFID Price	75	20	MiFID Decimal	Mifid compliant Price field populated using either Price or Yield. Will contain the text "PNDG" (right aligned) when there is a pending price. {DECIMAL-18/13} in case the price is expressed as monetary value. {DECIMAL-11/10} in case the price is expressed as percentage or yield.[1]
MiFID Quantity	95	20	MiFID Decimal	Number of units of the financial instrument. {DECIMAL-18/17} **Note:** in contrast to RTS1, whereby the Unit quantity should be displayed for Bond instruments, on London markets this field will display the executed quantity at Go-Live. This will not be the case for Milan markets, and will be corrected on London markets soon after the 20th November Go-Live.
Trading Date and Time	115	27	Date and Time	Date and time when the transaction was executed / agreed upon. If a trade is cancelled or amended, this field will contain the Trading Date and Time of the original trade.

<table>
<tr><td>Instrument Identification Code Type</td><td>142</td><td>4</td><td>Alpha</td><td>Instrument Identification Code Type. Only valid value will be ‘ISIN’.
Possible values:
<table>
<tr><th>Value</th><th>Meaning</th></tr>
<tr><td>ISIN</td><td>International Securities Identification Number</td></tr>
<tr><td>OTHR</td><td>Applicable to strategy instruments, specific to IDEM market</td></tr>
</table>
Only relevant for non-equity instruments.
Empty for equity and equity-like instruments</td></tr>
<tr><td>Instrument Identification Code</td><td>146</td><td>12</td><td>Alpha</td><td>Instrument identification number. (ISIN code)</td></tr>
<tr><td>Price Notation</td><td>158</td><td>4</td><td>Alpha</td><td>Indicates if the price is expressed in monetary value, in percentage or yield.
Possible values:
<table>
<tr><th>Value</th><th>Meaning</th></tr>
<tr><td>MONE</td><td>Monetary value</td></tr>
<tr><td>PERC</td><td>Percentage</td></tr>
<tr><td>YIEL</td><td>Yield</td></tr>
<tr><td>BAPO</td><td>Basis Points</td></tr>
</table>
Only relevant for non-equity instruments.</td></tr>
<tr><td>Price Currency</td><td>162</td><td>3</td><td>Alpha</td><td>Currency in which the price is expressed (applicable if the price is expressed as monetary value).
Currency Code as per ISO 4217.

For additional currencies supported refer to the Additional Field Values section of this document</td></tr>
<tr><td>Notional Amount</td><td>165</td><td>20</td><td>MiFID Decimal</td><td>Notional value relevant to the security.
{DECIMAL-18/5}
Only relevant for non-equity instruments.</td></tr>
</table>

Notional Currency	185	3	Alpha	Currency in which the notional amount is denominated. Only relevant for non-equity instruments.
Venue of Execution	188	4	Alpha	Identification of the venue where the transaction was executed.
Publication Date and Time	192	27	Date and Time	Date and time when the transaction was published .
PTRefPriceWaiverFlag	219	4	Alpha	Possible values: **Value** RFPT
PTSizeFlag	223	4	Alpha	Possible values: **Value** SIZE ILQD
PTLargeInScaleFlag	227	4	Alpha	Possible values: **Value** LRGS
PTAlgoTrade	231	4	Alpha	Possible values: **Value** ALGO[3]
PTCancellationFlag	235	4	Alpha	Possible values: **Value** CANC
PTAmendmentFlag	239	4	Alpha	Possible values: **Value** AMND
Transaction to be Cleared	243	1	Byte	Indicates whether the trade will be cleared. **Value** – **Meaning** 0 – false 1 – true Only applicable to IDEM. Set to false on other venues.
Measurement Unit	244	3	Alpha	Notation of the Quantity in Measurement Unit
Quantity in Measurement Unit	247	20	MiFID Decimal	The quantity of the Measurement Unit for commodity derivatives.

[3] ALGO flag not disseminated on Auction Bulk Trades

<table>
<tr><td>PTTransTypeFlag</td><td>267</td><td>4</td><td>Alpha</td><td>Indicates the type of transaction.<table><tr><th>Value</th><th>Meaning</th></tr><tr><td>TPAC</td><td>Package Transaction</td></tr><tr><td>XFPH</td><td>Exchange for Physical Transaction</td></tr></table></td></tr>
</table>

3.11.23 MiFID II Trade Report

Market Data Group	Source Venue	Channel Content	Level 1	Level 2 MBO	Level 2 MBP	Level 2 Incremental	MIFID II Post Trade	Replay	Recovery
Channel A/a	London Stock Exchange	FTSE 100	N	N	N	N	N	N	N
Channel B/b	London Stock Exchange	FTSE 100	N	N	N	N	N	N	N
Channel C/c	London Stock Exchange	FTSE 250	N	N	N	N	N	N	N
Channel D/d	London Stock Exchange	Structured Products	N	N	N	N	N	N	N
Channel E/e	London Stock Exchange	Miscellaneous	N	N	N	N	N	N	N
Channel F/f	London Stock Exchange	European (EQS)	N	N	N	N	N	N	N
Channel G/g	London Stock Exchange	International (IOB and ITR)	N	N	N	N	N	N	N
Channel H/h	Borsa Italiana	MTA	N	N	N	N	N	N	N
Channel I/i	Borsa Italiana	MTA and Sedex	N	N	N	N	N	N	N
Channel J/j	Borsa Italiana	Structured Products	N	N	N	N	N	N	N
Channel K/k	Borsa Italiana	Miscellaneous	N	N	N	N	N	N	N
Channel L/l	Borsa Italiana	IDEM	N	N	N	N	N	N	N
Channel M/m	Borsa Italiana	IDEM	N	N	N	N	N	N	N
Channel Q/q	EuroTLX	EuroTLX	N	N	N	N	N	N	N
Channel R/r	EuroTLX	EuroTLX	N	N	N	N	N	N	N
Channel S/s	EuroTLX	EuroTLX	N	N	N	N	N	N	N
Channel T/t	Turquoise	XLON				N	N	N	N
Channel U/u	Turquoise	XPAR				N	N	N	N
Channel V/v	Turquoise	XETR				N	N	N	N
Channel W/w	Turquoise	XCSE, XHEL, XMAD, XSTO, XSWX, XVTX				N	N	N	N
Channel X/x	Turquoise	MTAA, XOSL, WBAH, XDUB, ARCX...				N	N	N	N
Channel Y/y	Turquoise	XMAS, XBRU, XLIS and XLUX				N	N	N	N
Channel Z/z	Borsa Italiana	TAH and MiFID	N	N	N	N	N	N	N
Channel 1/5	TradEcho	SI Quoting				N		N	N
Channel 2/6	TradEcho	Trades					Y	Y	Y
Channel 3/7	TradEcho	SI Quoting				N		N	N
Channel 4/8	TradEcho	Trades					Y	Y	Y

Market Data Group	Source Venue	Channel Content	Level 1 – MIFID II Post Trade	Replay	Recovery
Channel N/n	London Stock Exchange / Borsa Italiana		N	N	
Channel O/o	FTSE	FTSE Indices	N	N	
Channel P/p	Borsa Admin	Borsa Italiana Announcements	N	N	N

Field	Offset	Length	Type	Description
Length	0	2	UInt16	Length of message including this field.
Message Type	2	1	Byte	Hex: 0x54 — Meaning: MiFID Trade Report
Timestamp	3	8	UDT	Time the message was generated
Instrument	11	8	UInt64	GTP Instrument Identifier. This field will be populated with 0 for Non-Exchange listed instruments
Transaction identification code	19	52	Alpha	A unique trade identifier. The value will be right aligned.
Reserved Field	71	4	Alpha	Reserved for future use
Reserved Field	75	8	Price	Reserved for future use
Source venue	83	2	UInt16	Please refer the Additional Field Values section for valid values.
MiFID Price	85	20	MiFID Decimal	Mifid compliant Price field populated using either Price or Yield. Will contain the text "PNDG" (right aligned) when there is a pending price. {DECIMAL-18/13} in case the price is expressed as monetary value. {DECIMAL-11/10} in case the price is expressed as percentage or yield.
MiFID Quantity	105	20	MiFID Decimal	Number of units of the financial instrument. {DECIMAL-18/17} **Note:** in contrast to RTS2, whereby the Unit quantity should be displayed for Bond instruments, on London markets this field will display the executed quantity at Go-Live. This will not be the case for Milan markets, and will be corrected on London markets soon after the 20th November Go-Live.
MiFID Trading Date and Time	125	27	Date and Time	Date and time when the transaction was executed / agreed upon. If a trade is cancelled or amended, this field will contain the MiFID Trading Date and Time of the original trade.
Instrument	152	4	Alpha	Instrument Identification Code

<table>
<tr><td>Identification Code Type</td><td></td><td></td><td></td><td>Type. Only valid value will be ‘ISIN’.
Possible values:<table><tr><th>Value</th><th>Meaning</th></tr><tr><td>ISIN</td><td>International Securities Identification Number</td></tr><tr><td>OTHR</td><td>Applicable to strategy instruments, specific to IDEM Market</td></tr></table></td></tr>
<tr><td>Instrument Identification Code</td><td>156</td><td>12</td><td>Alpha</td><td>Instrument identification number. (ISIN code)</td></tr>
<tr><td>Price Notation</td><td>168</td><td>4</td><td>Alpha</td><td>Indicates if the price is expressed in monetary value, in percentage or yield.
Possible values:<table><tr><th>Value</th><th>Meaning</th></tr><tr><td>MONE</td><td>Monetary value</td></tr><tr><td>PERC</td><td>Percentage</td></tr><tr><td>YIEL</td><td>Yield</td></tr><tr><td>BAPO</td><td>Basis Point</td></tr></table></td></tr>
<tr><td>Price Currency</td><td>172</td><td>3</td><td>Alpha</td><td>Currency in which the price is expressed (applicable if the price is expressed as monetary value).

Currency Code as per ISO 4217.
For additional currencies supported refer to the Additional Field Values section of this document</td></tr>
<tr><td>Notional Amount</td><td>175</td><td>20</td><td>MiFID Decimal</td><td>Notional value relevant to the security.
{DECIMAL-18/5}</td></tr>
<tr><td>Notional Currency</td><td>195</td><td>3</td><td>Alpha</td><td>Currency in which the notional amount is denominated.</td></tr>
<tr><td>Venue of Execution</td><td>198</td><td>4</td><td>Alpha</td><td>Identification of the venue where the transaction was executed.
Possible Values:<table><tr><th>Value</th><th>Meaning</th></tr><tr><td>XOFF</td><td>OTC</td></tr><tr><td>SINT</td><td>Systematic Internaliser</td></tr><tr><td>{MIC}</td><td>Reported by RM/MTF/OTF (the MIC corresponding to</td></tr></table></td></tr>
</table>

				the relevant venue)"
Publication Date and Time	202	27	Date and Time	Date and time when the transaction was published.
Benchmark Transaction Flag	229	4	Alpha	Possible values: **Value** BENC
Agency CrossTrade Flag	233	4	Alpha	Possible values: **Value** ACTX
Non Price Forming Transactions Flag	237	4	Alpha	Possible values: **Value** NPFT
Non Price Contribution to Discovery	241	4	Alpha	Possible values: **Value** TNCP
Special Dividend Flag	245	4	Alpha	Possible values: **Value** SDIV
LargeInScale Flag	249	4	Alpha	Possible values: **Value** LRGS
Reference Price Transaction Flag	253	4	Alpha	Possible values: **Value** RFPT
NT Liquidity Flag	257	4	Alpha	Possible values: **Value** NLIQ OILQ
NT Price Conditions Flag	261	4	Alpha	Possible values: **Value** PRIC
Algo Transaction Flag	265	4	Alpha	Possible values: **Value** ALGO
SizeIlqdFlag	269	4	Alpha	Possible values: **Value** SIZE ILQD
Price Improvement Flag	273	4	Alpha	Possible values: **Value** RPRI
CancellationFlag	277	4	Alpha	Possible values: **Value** CANC
AmendmentFlag	281	4	Alpha	Possible values: **Value**

<table>
<tr><td></td><td></td><td></td><td></td><td><table><tr><td>AMND</td></tr></table></td></tr>
<tr><td>DuplicateFlag</td><td>285</td><td>4</td><td>Alpha</td><td>Possible values:<table><tr><th>Value</th></tr><tr><td>DUPL</td></tr><tr><td>ORGN</td></tr></table></td></tr>
<tr><td>Exchange For Physicals Flag</td><td>289</td><td>4</td><td>Alpha</td><td>Possible values:<table><tr><th>Value</th></tr><tr><td>TPAC</td></tr><tr><td>XFPH</td></tr></table></td></tr>
<tr><td>Limited Details Flag</td><td>293</td><td>4</td><td>Alpha</td><td>Possible values:<table><tr><th>Value</th></tr><tr><td>LMTF</td></tr></table></td></tr>
<tr><td>LDFull Details Flag</td><td>297</td><td>4</td><td>Alpha</td><td>Possible values:<table><tr><th>Value</th></tr><tr><td>FULF</td></tr></table></td></tr>
<tr><td>Daily Aggregated Transaction Flag</td><td>301</td><td>4</td><td>Alpha</td><td>Possible values:<table><tr><th>Value</th></tr><tr><td>DATF</td></tr></table></td></tr>
<tr><td>DAFull Details Flag</td><td>305</td><td>4</td><td>Alpha</td><td>Possible values:<table><tr><th>Value</th></tr><tr><td>FULA</td></tr></table></td></tr>
<tr><td>Volume Omission Flag</td><td>309</td><td>4</td><td>Alpha</td><td>Possible values:<table><tr><th>Value</th></tr><tr><td>VOLO</td></tr></table></td></tr>
<tr><td>VOFull Details Flag</td><td>313</td><td>4</td><td>Alpha</td><td>Possible values:<table><tr><th>Value</th></tr><tr><td>FULV</td></tr></table></td></tr>
<tr><td>Four Weeks Aggregation Flag</td><td>317</td><td>4</td><td>Alpha</td><td>Possible values:<table><tr><th>Value</th></tr><tr><td>FWAF</td></tr></table></td></tr>
<tr><td>FAFull Details Flag</td><td>321</td><td>4</td><td>Alpha</td><td>Possible values:<table><tr><th>Value</th></tr><tr><td>FULJ</td></tr></table></td></tr>
<tr><td>Indefinite Aggregation Flag</td><td>325</td><td>4</td><td>Alpha</td><td>Possible values:<table><tr><th>Value</th></tr><tr><td>IDAF</td></tr></table></td></tr>
<tr><td>Volume Omission Flag</td><td>329</td><td>4</td><td>Alpha</td><td>Possible values:<table><tr><th>Value</th></tr><tr><td>VOLW</td></tr></table></td></tr>
<tr><td>Consecutive Aggregation Flag</td><td>333</td><td>4</td><td>Alpha</td><td>Possible values:<table><tr><th>Value</th></tr><tr><td>COAF</td></tr></table></td></tr>
<tr><td>Secondary Publication</td><td>337</td><td>1</td><td>UInt8</td><td>Possible values:<table><tr><th>Value</th><th>Meaning</th></tr><tr><td>0</td><td>First time publication (default)</td></tr><tr><td>1</td><td>Secondary publication</td></tr></table></td></tr>
</table>

<table>
<tr><td>Venue Type</td><td>338</td><td>1</td><td>UInt8</td><td>Type sent by the venue.
Possible values:<table><tr><th>Value</th><th>Meaning</th></tr><tr><td>0</td><td>Unspecified</td></tr><tr><td>1</td><td>MTF</td></tr><tr><td>2</td><td>OTF</td></tr><tr><td>3</td><td>Regulated Market</td></tr></table></td></tr>
<tr><td>Venue Book Definition ID</td><td>339</td><td>1</td><td>UInt8</td><td>Book Definition ID sent by the venue.<table><tr><th>Value</th><th>Meaning</th></tr><tr><td>0</td><td>On Book</td></tr><tr><td>1</td><td>Off Book</td></tr></table></td></tr>
<tr><td>Venue Measurement Unit Notation</td><td>340</td><td>25</td><td>Alpha</td><td>Notation of the Quantity in Measurement Unit</td></tr>
<tr><td>Quantity in Measurement Unit</td><td>365</td><td>20</td><td>MiFID Decimal</td><td>The Quantity in Measurement Unit</td></tr>
</table>

3.11.24 MiFID II Trade Cross

Market Data Group	Source Venue	Channel Content	Level 1	Level 2 MBO	Level 2 MBP	Level 2 Incremental	MIFID II Post Trade	Replay	Recovery
Channel A/a	London Stock Exchange	FTSE 100	N	N	N	N	Y	Y	Y
Channel B/b	London Stock Exchange	FTSE 100	N	N	N	N	Y	Y	Y
Channel C/c	London Stock Exchange	FTSE 250	N	N	N	N	Y	Y	Y
Channel D/d	London Stock Exchange	Structured Products	N	N	N	N	Y	Y	Y
Channel E/e	London Stock Exchange	Miscellaneous	N	N	N	N	Y	Y	Y
Channel F/f	London Stock Exchange	European (EQS)	N	N	N	N	Y	Y	Y
Channel G/g	London Stock Exchange	International (IOB and ITR)	N	N	N	N	Y	Y	Y
Channel H/h	Borsa Italiana	MTA	N	N	N	N	Y	Y	Y
Channel I/i	Borsa Italiana	MTA and Sedex	N	N	N	N	Y	Y	Y
Channel J/j	Borsa Italiana	Structured Products	N	N	N	N	Y	Y	Y
Channel K/k	Borsa Italiana	Miscellaneous	N	N	N	N	Y	Y	Y
Channel L/l	Borsa Italiana	IDEM	N	N	N	N	Y	Y	Y
Channel M/m	Borsa Italiana	IDEM	N	N	N	N	Y	Y	Y
Channel Q/q	EuroTLX	EuroTLX	N	N	N	N	N	N	N
Channel R/r	EuroTLX	EuroTLX	N	N	N	N	N	N	N
Channel S/s	EuroTLX	EuroTLX	N	N	N	N	N	N	N
Channel T/t	Turquoise	XLON				N	N	N	N
Channel U/u	Turquoise	XPAR				N	N	N	N
Channel V/v	Turquoise	XETR				N	N	N	N
Channel W/w	Turquoise	XCSE, XHEL, XMAD, XSTO, XSWX, XVTX				N	N	N	N
Channel X/x	Turquoise	MTAA, XOSL, WBAH, XDUB, ARCX...				N	N	N	N
Channel Y/y	Turquoise	XMAS, XBRU, XLIS and XLUX				N	N	N	N
Channel Z/z	Borsa Italiana	TAH and MiFID	N	N	N	N	Y	Y	Y
Channel 1/5	TradEcho	SI Quoting				N		N	N
Channel 2/6	TradEcho	Trades					N	N	N
Channel 3/7	TradEcho	SI Quoting				N		N	N
Channel 4/8	TradEcho	Trades					N	N	N
Channel N/n	London Stock Exchange / Borsa Italiana		N					N	
Channel O/o	FTSE	FTSE Indices	N					N	
Channel P/p	Borsa Admin	Borsa Italiana Announcements	N					N	N

<table>
<tr><th>Field</th><th>Offset</th><th>Length</th><th>Type</th><th>Description</th></tr>
<tr><td>Length</td><td>0</td><td>2</td><td>UInt16</td><td>Length of message including this field.</td></tr>
<tr><td>Message Type</td><td>2</td><td>1</td><td>Byte</td><td><table><tr><th>Hex</th><th>Meaning</th></tr><tr><td>0x56</td><td>MiFID Trade Cross</td></tr></table></td></tr>
<tr><td>Timestamp</td><td>3</td><td>8</td><td>UDT</td><td>Message dissemination time</td></tr>
<tr><td>Source venue</td><td>11</td><td>2</td><td>UInt16</td><td>Please refer the Additional Field Values section for valid values.</td></tr>
<tr><td>Instrument</td><td>13</td><td>8</td><td>UInt64</td><td>GTP Instrument identifier.</td></tr>
<tr><td>Transaction identification code</td><td>21</td><td>52</td><td>Alpha</td><td>A unique trade identifier.
The value will be right aligned.</td></tr>
<tr><td>Cross ID</td><td>73</td><td>20</td><td>Alpha</td><td>The unique ID of the Cross/BTF Order.</td></tr>
<tr><td>Cross Type</td><td>93</td><td>1</td><td>UInt8</td><td>The type of the Cross/BTF Order.<table><tr><th>Value</th><th>Meaning</th></tr><tr><td>5</td><td>Internal Cross</td></tr><tr><td>6</td><td>Internal BTF</td></tr><tr><td>7</td><td>Committed Cross</td></tr><tr><td>8</td><td>Committed BTF</td></tr><tr><td>9</td><td>EG1</td></tr><tr><td>10</td><td>EG2</td></tr></table></td></tr>
<tr><td>MiFID Price</td><td>94</td><td>20</td><td>MiFID Decimal</td><td>Mifid compliant Price field populated using either Price or Yield. Will contain the text “PNDG” (right aligned) when there is a pending price.
{DECIMAL-18/13} in case the price is expressed as monetary value.
{DECIMAL-11/10} in case the price is expressed as percentage or yield.</td></tr>
<tr><td>MiFID Quantity</td><td>114</td><td>20</td><td>MiFID Decimal</td><td>Number of units of the financial instrument. {DECIMAL-18/17}

Note: in contrast to RTS1, whereby the Unit quantity should be displayed for Bond instruments, on London markets this field will display the executed quantity at Go-Live. This will not be the case for Milan markets, and will be corrected on London markets soon after the 20th November Go-Live</td></tr>
</table>

<table>
<tr><td>Trading Date and Time</td><td>134</td><td>27</td><td>Date and Time</td><td>Date and time when the transaction was executed / agreed upon.
If a trade is cancelled or amended, this field will contain the MiFID Trading Date and Time of the original trade.</td></tr>
<tr><td>Instrument Identification Code Type</td><td>161</td><td>4</td><td>Alpha</td><td>Instrument Identification Code Type. Only valid value will be 'ISIN'.
Possible values:<table><tr><th>Value</th><th>Meaning</th></tr><tr><td>ISIN</td><td>International Securities Identification Number</td></tr><tr><td>OTHR</td><td>Applicable to strategy instruments, specific to IDEM market</td></tr></table>
Only relevant for non-equity instruments.</td></tr>
<tr><td>Instrument Identification Code</td><td>165</td><td>12</td><td>Alpha</td><td>Instrument identification number. (ISIN code)</td></tr>
<tr><td>Price Notation</td><td>177</td><td>4</td><td>Alpha</td><td>Indicates if the price is expressed in monetary value, in percentage or yield.
Possible values:<table><tr><th>Value</th><th>Meaning</th></tr><tr><td>MONE</td><td>Monetary value</td></tr><tr><td>PERC</td><td>Percentage</td></tr><tr><td>YIEL</td><td>Yield</td></tr><tr><td>BAPO</td><td>Basis Points</td></tr></table>
Only relevant for non-equity instruments.</td></tr>
<tr><td>Price Currency</td><td>181</td><td>3</td><td>Alpha</td><td>Currency in which the price is expressed (applicable if the price is expressed as monetary value).</td></tr>
<tr><td>Notional Amount</td><td>184</td><td>20</td><td>MiFID Decimal</td><td>Notional value relevant to the security.
{DECIMAL-18/5}

Only relevant for non-equity instruments.</td></tr>
</table>

Notional Currency	204	3	Alpha	Currency in which the notional amount is denominated. Only relevant for non-equity instruments.
Venue of Execution	207	4	Alpha	Identification of the venue where the transaction was executed.
Publication Date and Time	211	27	Date and Time	Date and time when the transaction was published.
PTSizeFlag	238	4	Alpha	Possible values: **Value** SIZE ILQD
PTLargeInScaleFlag	242	4	Alpha	Possible values: **Value** LRGS
PTAlgoTrade	246	4	Alpha	Possible values: **Value** ALGO
PTLiquidityFlag	250	4	Alpha	Possible values: **Value** NLIQ OILQ
PTCancellationFlag	254	4	Alpha	Possible values: **Value** CANC
PTAmendmentFlag	258	4	Alpha	Possible values: **Value** AMND
Transaction to be Cleared	262	1	Byte	Indicates whether the trade will be cleared. **Value** – **Meaning** 0 – false 1 – true Only applicable to IDEM. Set to false on other venues.
Measurement Unit	263	3	Alpha	Notation of the Quantity in Measurement Unit
Quantity in Measurement Unit	266	20	MiFID Decimal	The quantity of the Measurement Unit of commodity derivatives.
PTTradeTypeFlag	286	4	Alpha	Indicates the type of transaction. **Value** – **Meaning** TPAC – Package Transaction XFPH – Exchange for Physical Transaction

4 Client Data Recovery

The Group Ticker Plant operates with similar data recovery solutions as the existing Millennium Exchange market data product: replay and recovery service.

Should a gap in sequence numbers be noticed on both the primary and secondary feed, or following a failure at client site, clients should assume that instrument order books are stale and should initiate one of the below data recovery processes to refresh systems.

4.1 Replay Channel

The replay service provides clients the ability to request a finite number of application messages as disseminated on the real-time multicast channel. Provisioned to facilitate client recovery following a small scale data loss, the replay service caches the last 65,000 application messages published for each multicast channel.

Clients are permitted to logon to the replay service a finite number of times each day, and following successful login subsequently submit a finite number of requests each day. Whilst these counters can be reset intraday by the Group, this will be done only in an emergency situation and should not be relied upon as normal practice. Each client CompID is permitted to logon to the Production replay service 3,000 times per day, submitting a maximum of 3,000 requests per day. Clients are permitted to queue a maximum of 10 requests at any one time. Should any of these parameters be reached, the replay server will respond with an explanatory reason code.

4.1.1 Establishing a Connection

Clients should send a Login Request message to the appropriate target replay service IP gateway address and port. Validation of appropriate credentials as configured on the Group Ticker Plant will be done against both the CompID as supplied in the message sent by the client and the incoming source IP address. Upon successful validation, the replay service responds with a Login Response message of Status ‘A’ – the session should now be considered active. Clients should wait for the server’s response prior to submitting replay requests. Any requests submitted prior to authentication will be ignored.

Should the attempted connection fail for any reason, the server will respond with a Login Response message which will contain a reason code. This reason code will facilitate the diagnosis of the failed login request.

4.1.2 Sending a Request

Once successful connection is established, clients can queue requests for retransmission of missed messages. The Replay Request message should include the first sequence number of the range of messages to be retransmitted and the total number of messages subsequent to the first missed message required. A Request ID can also be included if required – this is not validated by the replay service.

Should the server accept the request for message retransmission, clients will receive a Replay Response message of Status 'A.' If a Request ID was specified, this will be included in the Replay Response message. This will be immediately followed by the requested message stream. The completion of the request will be marked by the sending of a Replay and Recovery Complete message. This will include the original Request ID if specified but will not include the current Trading Status of the instrument.

Should the replay request fail, the server will respond with a Replay Response message which will contain a reason code. This reason code will facilitate the diagnosis of the failed replay request.

Submitted requests will be processed serially, but the capability of the replay service will be split across any logged in CompID. This may mean that the performance of the replay solution may differ dependent upon the number of CompIDs logged in to the service at any given time.

4.1.3 Terminating a Connection

Clients will not be required to logout from the replay service. Instead, immediately after the completion of the request, the replay server will terminate the connection with the client.

Clients should note that upon successful login to the replay service, a request should be submitted within five seconds or the server will force logout the client.

4.2 Recovery Channel

The recovery service facilitates a clients resychronisation with the order book following a large scale data loss for the which the replay service is insufficient. Clients are able, following successful login, to request the following:

- a snapshot of the order book for any active instrument in the Market Data Group;
- all trades reported for the trading day (both on and off book);
- a snapshot of an instrument's current statistics;
- the current trading status of an instrument;
- the full set of reference data for an instrument;
- announcements issued on the specified channel (Borsa Italiana only).

In a similar approach to that of the replay service, clients are permitted to login to the recovery service a finite number of times each day, and following successful login subsequently submit a finite number of requests each day. Whilst these counters can be reset intraday by the Group, this will be done only in an emergency and should not be relied upon as normal practice. Each client CompID is permitted to logon to the Production recovery service 3,000 times per day, submitting a maximum of 3,000 requests per day. Clients are permitted to queue a maximum of 10 requests at any one time. Should any of these parameters be reached, the recovery server will respond with an explanatory reason code.

4.2.1 Establishing a Connection

Clients should send a Login Request message to the appropriate target recovery service IP gateway address and port. Validation of appropriate credentials as configured on the Group Ticker Plant will be done against both the CompID as supplied in the message by the client and the incoming source IP address. Upon successful validation, the recovery service will respond with a Login Response message of Status ‘A’ – the session should now be considered active. Clients should wait for the server’s response prior to submitting recovery requests. Any requests submitted prior to authentication will be ignored.

Should the attempted connection fail for any reason, the server will respond with a Login Response message which will contain a reason code. This reason code will facilitate the diagnosis of the failed login request.

4.2.2 Sending a Request for an Instrument Level Order Book Snapshot

Following receipt of a Login Response message of Status ‘A,’ used to confirm successful login to the recovery service, clients may submit a request for a snapshot of the current order book using the Recovery Request message. The Recovery Request message should indicate that the client requires an instrument order book snapshot – the Recovery Type field should be ‘1,’ and the Request Level field should be ‘0.’ Clients are also permitted to request a specific order book, either Electronic or Firm Quote, in the Order Book Type field. Clients may also include a Request ID in the Recovery Request message – this is not validated by the server.

The server will transmit a Recovery Response message which should indicate the successful acceptance of the request. The Recovery Response message will also include the Request ID if specified by the client. The Recovery Response message will also include the real-time channel sequence number with which the snapshot is syncronised. Clients should buffer all messages as received on the real-time channel with a sequence number greater than that received in the Recovery Response message.

The server will immediately transmit a message stream to allow the rebuild of the order book. The MBO and MBP snapshot service line order book recovery will be disseminated through a number of Add Order messages. The order book should be built in the same way as on the real-time channel – further details are contained within section 3.1.2 of GTP001 – Product Guide. The level 2 incremental services should be rebuilt by processing all Add Order Incremental messages as disseminated following the Recovery Response message. The buy side will always be transmitted first. The level 1 order book recovery will be provided in a single TOB message – similar to that of the real-time service.

If the snapshot request was for more than one order book as specified in the Order Book Type field of the Recovery Request message, the Electronic Order Book will always be provided first. Following transmission of each requested order book, the server will disseminate a Replay and Recovery Complete message. This message includes the real-time trading status of the instrument if the instrument is currently in a trading session. To complete the request, following transmission of all requested order books for an instrument, the server will disseminate a final Replay and Recovery Complete message. If a Request ID was specified by the client this will be included.

If a request is submitted successfully but no orders reside on the requested order book(s), the server will immediately respond with a Replay and Recovery Complete message following the Recovery Response message. If a Request ID was specified by the client this will be included.

4.2.3 Sending a Request for a Group or Channel Level Order Book Snapshot

Following receipt of a Login Response message of Status 'A,' used to confirm successful login to the recovery service, clients may submit a request for a snapshot of the current order book using the Recovery Request message. The Recovery Request message should indicate that the client requires Group or Channel level order book snapshots – the Recovery Type field should be '1,' and the Request Level field should be either '1' or '2'. If a Group or Channel level recovery is requested by the client, all order books will be disseminated – the Order Book Type field is not processed by the server. Clients may also include a Request ID in the Recovery Request message – this is not validated by the server.

The server will transmit a Recovery Response message which should indicate the successful acceptance of the request. The Recovery Response message will also include the Request ID if specified by the client. The Recovery Response message will also include the real-time channel sequence number with which the snapshot is syncronised. Clients should buffer all messages as received on the real-time channel with a sequence number greater than that received in the Recovery Response message.

The server will immediately transmit a message stream to allow the rebuild of the order book. The MBO and MBP snapshot service line order book recovery will be disseminated through a number of Add Order and Add Order Short messages. The order book should be built in the same way as on the real-time channel – further details are contained within section 3.1.2 of GTP001 – Product Guide. The level 2 incremental services should be rebuilt by processing all Add Order Incremental messages as disseminated following the Recovery Response message. The buy side will always be transmitted first. Order books will be transmitted to clients serially, with the Electronic Order Book always transmitted prior to the Firm Quote book if applicable. If private RFQ book is applicable, a series of Add Order Incremental message or a series of Indicative Quote Information messages will be transmitted pertaining to private RFQ book depending on the RFQ Transparency regime. All applicable order books will be transmitted prior to dissemination of the next instrument's snapshot. The level 1 order book recovery will be provided in a single TOB message – similar to that of the real-time service.

Following transmission of each order book, the server will disseminate a Replay and Recovery Complete message. This message includes the real-time trading status of the instrument if the instrument is currently in a trading session. For the private RFQ book, the Trading Status will always be set to No Active Session (w). If no orders reside on a specific order book, no Replay and Recovery Complete message will be disseminated for this instrument. To complete the full request, following transmission of all requested order books, the server will disseminate a final Replay and Recovery Complete message. If a Request ID was specified by the client this will be included. The final Replay and Recovery Complete message will not contain a value in the Trading Status field.

If a request is submitted successfully but no orders reside on the requested order books, the server will immediately respond with an Replay and Recovery Complete message following the Recovery Response message. If a Request ID was specified by the client this will be included.

4.2.4 Sending a Request for the Instrument Directory (Reference Data)

Following receipt of a Login Response message of Status ‘A,’ used to confirm successful login to the recovery service, clients may submit a request for Instrument Directory messages using the Recovery Request message. The Recovery Request message should indicate that the client requires Instrument Directory messages – the Recovery Type field should be ‘0.’ Clients should also indicate the level of the request – an individual instrument, a segment or for all instruments on the multicast channel. Clients may also include a Request ID in the Recovery Request message – this is not validated by the server.

The server will transmit a Recovery Response message which should indicate the successful acceptance of the request. The Recovery Response message will also include the Request ID if specified by the client. The Recovery Response message will also include the real-time channel sequence number of the last Instrument Directory message sent. This will be followed by the Instrument Directory message(s) as requested by the client. Successful ‘Group’ or ‘Multicast Channel’ requests will result in the dissemination of all configured instruments on the Group Ticker Plant at that request level, irrespective of their trading status.

Customers should note that should a request be made for an instrument not supported by the targeted multicast group, the server will respond with the rejection Status of ‘e.’

The completion of the recovery request will be indicated through the dissemination of a Replay and Recovery Complete message. The Trading Status field of the Replay and Recovery Complete message will only be populated if the original request level was ‘Instrument.’ The Replay and Recovery Complete message will also include the Request ID if specified by the client.

4.2.5 Sending a Request for Trades

Following receipt of a Login Response message of Status ‘A,’ used to confirm successful login to the recovery service, clients may submit a request for trades as reported by supported markets using the Recovery Request message. The Recovery Request message should indicate that the client requires trade recovery – the Recovery Type field should be ‘2.’ Clients should also indicate the level of the request – an individual instrument, a segment or for all instruments on the multicast channel. Clients may also include a Request ID in the Recovery Request message – this is not validated by the server.

The server will transmit a Recovery Response message which should indicate the successful acceptance of the request. The Recovery Response message will include the Request ID as specified by the client. This message will also include the real-time multicast channel sequence number of the last trade to be disseminated as part of the request, with the total number of trade messages to be disseminated indicated in the Count field.

The Recovery Response message will be immediately followed by a stream of execution messages as disseminated on the multicast channel. All trade types will be disseminated, including Trade, Off-book Trade, and Trade Cross (Borsa Italiana only) messages, in their original sequence. It is not possible to request a subset of trade types on the trade recovery service. Trade cancellations as originally disseminated will be included in the recovery service message stream. Whilst clients cannot specify a subset of trade types on the recovery service, clients may include a real-time channel sequence number on the Recovery Request message. When a sequence number is included, the recovery service will transmit only trade messages with an equal or greater sequence number to that specified.

The completion of the recovery request will be indicated through the dissemination of a Replay and Recovery Complete message. The Trading Status field of the Replay and Recovery Complete message will only be populated if the original request level was ‘Instrument.’ The Replay and Recovery Complete message will also include the Request ID if specified by the client.

If no trade messages exist which satisfy the original request, the server will transmit a Recovery Response message followed immediately by a Replay and Recovery Complete message.

Sending a Request for a Statistics Snapshot

Following receipt of a Login Response message of Status ‘A,’ used to confirm successful login to the recovery service, clients may submit a request for an instrument’s statistics as calculated by the Group Ticker Plant by using the Recovery Request message. The Recovery Request message should indicate that the client requires statistics – the Recovery Type field should be ‘3.’ Clients should also indicate the level of the request – an individual instrument, a segment or for all instruments on the multicast channel. Clients may also include a Request ID in the Recovery Request message – this is not validated by the server.

The server will transmit a Recovery Response message which should indicate the successful acceptance of the request. The Recovery Response message will include the Request ID as specified by the client. This message will also include the real-time multicast channel sequence number of the last message sent on the multicast channel. Clients should buffer all messages as received on the real-time channel with a sequence number greater than specified. The total number of Statistic Snapshot messages to be disseminated will be indicated in the Count field.

Following dissemination of the Recovery Response message the server will disseminate one or more Statistic Snapshot messages, the number dependent upon the level of the original request. The Statistic Snapshot message will provide clients all current statistics as calculated by the Group Ticker Plant.

The server will disseminate a Replay and Recovery Complete message to indicate the successful completion of the request. The Trading Status field will only be populated if the request level was ‘Instrument’. The Replay and Recovery Complete message will also include the Request ID if specified by the client.

If no statistics exist to satisfy the original request, the server will transmit a Recovery Response message followed immediately by a Replay and Recovery Complete message.

Sending a Request for a Announcements (Borsa Italiana only)

Following receipt of a Login Response message of Status ‘A,’ used to confirm successful login to the recovery service, clients may submit a request for announcements as disseminated for the supported markets by using the Recovery Request message. The Recovery Request message should indicate that the client requires announcement recovery – the Recovery Type field should be ‘5.’ Clients may only request all announcements as disseminated on the channel – ‘Instrument’ or ‘Group’ requests will be inferred to be ‘Multicast Channel’ requests. Clients may include a Request ID in the Recovery Request message – this is not validated by the server.

The server will transmit a Recovery Response message which should indicate the successful acceptance of the request. The Recovery Response message will include the Request ID as specified by the client. This message will also include the real-time multicast channel sequence number of the last announcement to be sent as part of the request, with the total number of announcements to be disseminated indicated in the Count field.

Following dissemination of the Recovery Response message the server will transmit all available announcements in the same sequence as originally disseminated on the real-time multicast channel. Clients may include a real-time channel sequence number on the Recovery Request message. When a sequence number is included, the recovery service will transmit only announcements with an equal or greater sequence number to that specified.

The server will disseminate a Replay and Recovery Complete message to indicate the successful completion of the request. The Trading Status field of this message will not be populated. The Replay and Recovery Complete message will also include the Request ID if specified by the client.

If no announcements exist to satisfy the original request, the server will transmit a Recovery Response message followed immediately by a Replay and Recovery Complete message.

4.2.6 Sending a Request for an Instrument Status

Following receipt of a Login Response message of Status 'A,' used to confirm successful login to the recovery service, clients may submit a request for the current Trading Status of an instrument on any supported market by using the Recovery Request message. The Recovery Request message should indicate that the client requires Instrument Status messages – the Recovery Type field should be '4.' Clients should also indicate the level of the request – an individual instrument, a segment or full all instruments on the multicast channel. Clients may also include a Request ID in the Recovery Request message – this is not validated by the server.

The server will transmit a Recovery Response message which should indicate the successful acceptance of the request. The Recovery Response message will include the Request ID as specified by the client. This message will also include the real-time multicast channel sequence number of the last real-time message disseminated. Clients should buffer all messages as received on the real-time channel with a sequence number greater than specified. The total number of Instrument Status messages to be disseminated will be indicated in the Count field.

Following dissemination of the Recovery Response message the server will transmit one or more Instrument Status messages, the number dependent upon the level of the original request. The current Trading Status of an instrument is indicated in the Instrument Status message.

The server will disseminate a Replay and Recovery Complete message to indicate the successful completion of the request. The Trading Status field will only be populated if the request level was 'Instrument'. The Replay and Recovery Complete message will also include the Request ID if specified by the client.

If no Instrument Status messages exist to satisfy the original request, the server will transmit a Recovery Response message followed immediately by a Replay and Recovery Complete message.

4.2.8 Terminating a Connection

Clients will not be required to logout from the recovery service. Instead, immediately after the completion of the request, the recovery server will terminate the connection with the client.

Clients should note that upon successful login to the recovery service, a request should be submitted within five seconds or the server will force logout the client.

5 Product Failure

The Group Ticker Plant is designed to be as resilient as possible; all key components, both software and hardware, operate with resiliency and component failure is designed to be transparent to clients wherever possible.

5.1 Unexpected Disconnection from Service

Clients should maintain connection to both primary and secondary market data feeds. Should an unexpected disconnection occur from the primary market data gateway, clients should attempt reconnection three times – each time with a timeout value of three seconds. Should these connection attempts fail, clients should target the secondary market data gateway. Upon successful connection to the secondary market data gateway, clients should treat this gateway as master. Should this gateway become unavailable for any period, clients should reattempt connection to the primary gateway – if this gateway is unresponsive clients should contact the Group for guidance.

5.2 Primary Feed Failure

In the unlikely event of the primary market data feed failing to an unrecoverable extent, the secondary market data gateway, located at our Secondary Data Centre, will continue to disseminate real-time market data and will become master. Replay and recovery solutions will be activated on the secondary market data gateway.

Should this failover scenario occur, clients should expect to experience a reset of message sequence numbers to one on the secondary market data feed. The market data group will also be amended following the failover. If an instrument’s order book has changed, a new snapshot will be issued. Clients should not use the recovery services unless necessary. Clients should then continue to process real-time market data, refreshing order books and statistics displays upon receipt of the market data updates.

Clients should note that secondary replay services will only contain those messages broadcast following failover. Any statistics set for the trading day will be persisted following failover.

Dependent upon the nature of failure, the primary market data feed may or may not be reinstated at a later time. Clients should contact the Group for further guidance.

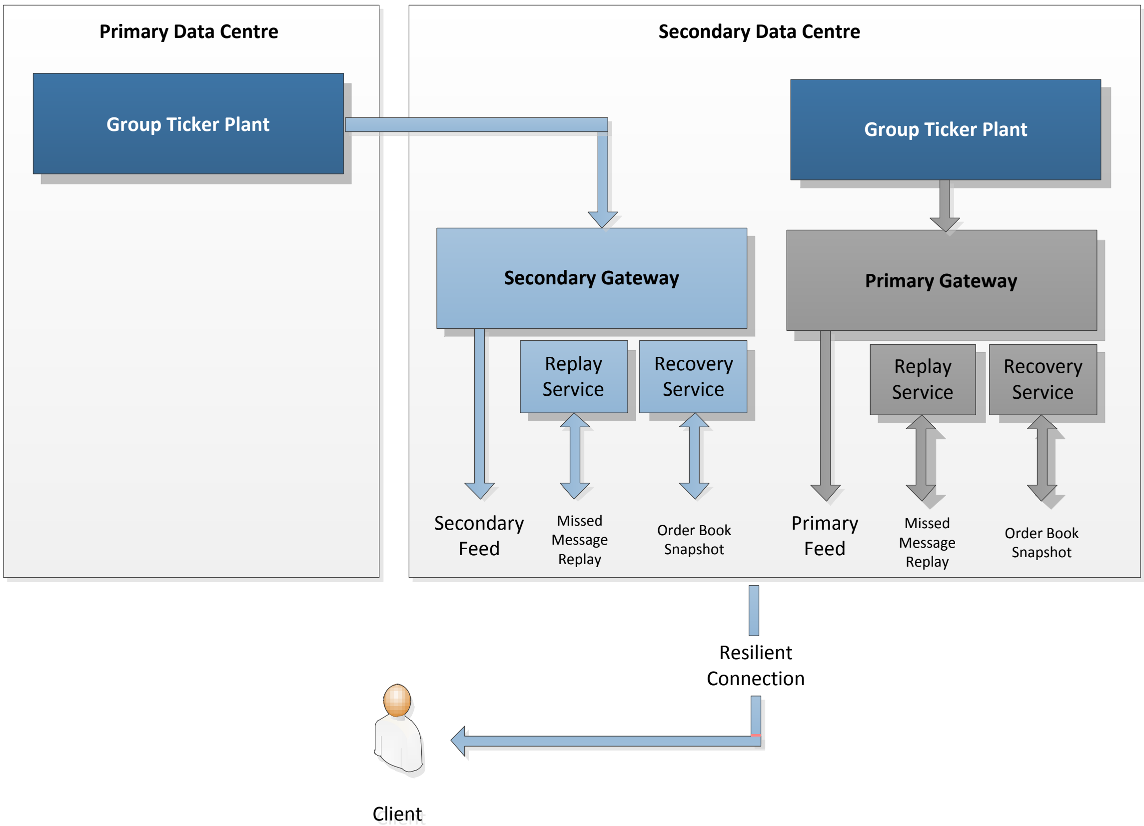

Figure 1: Schematic of Group Ticker Plant architecture following primary gateway failover.

5.3 Secondary Feed Failure

Should the secondary market data feed fail for any reason, clients should continue to process market data as disseminated by the primary market data gateway. The primary market data feed will not be impacted by the failure of the secondary market data feed. Clients will no longer be able to arbitrage between the primary and secondary market data feeds.

Dependent upon the nature of the failure, the secondary market data feed may, or may not be reinstated at a later time. Clients should contact the Group for further guidance.

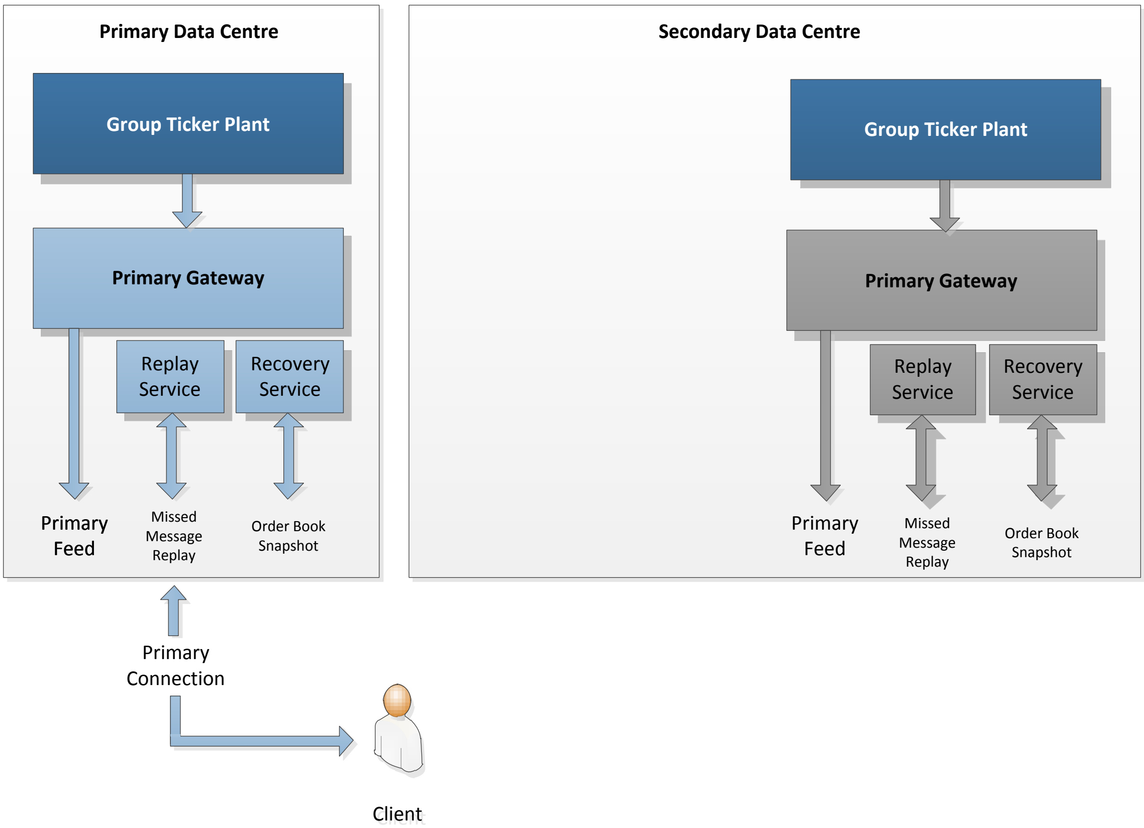

Figure 2: Schematic of Group Ticker Plant architecture following secondary gateway failure.

5.4 Instance Failure

In limited circumstances, minor internal component failure may require clients to refresh order books and statistics for a finite number of instruments. Should this be required, the market data gateways, both primary and secondary, will broadcast an Order Book Clear message for each affected instrument. Clients should disregard the contents of their order book and statistics displays for these instruments, refreshing them upon receipt of the first market data snapshot.

In the unlikely event of a catastrophic instance failure, whereby core internal architecture becomes unavailable or is subject to product failure, market data dissemination from both primary and secondary market data feeds may become disrupted. Should this occur, the Group will invoke crisis management procedures and may invoke the Secondary Data Centre Group Ticker Plant instance – this will be clearly communicated to clients. Our Secondary Data Centre Group Ticker Plant instance operates a single market data gateway for each service line, broadcasting real-time market data on clients' resilient connections.

All data services will broadcast on the secondary feed network topology, with the exception of both Borsa Italiana and EuroTLX which will support the hot/hot nature of the upstream trading architecture and broadcast on the tertiary feed. Further details, including network addressing, is available in GTP004 – Parameters Guide.

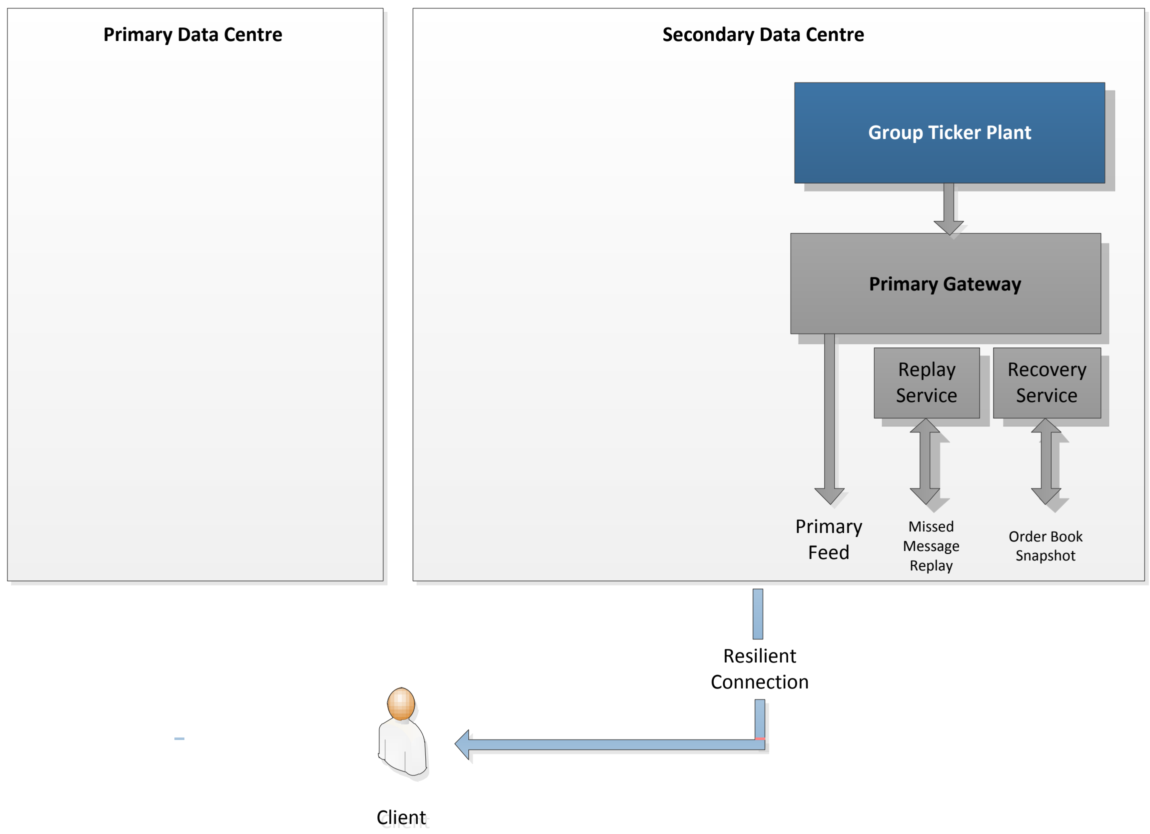

Figure 3: Schematic of Group Ticker Plant architecture following a failover from the Primary Data Centre to the Secondary Data Centre

Through the process of service restoration, provisioned by our Secondary Data Centre, the Group will reset Sequence numbers to 1. The market data group will be in lower case following the site failover. The Group Ticker Plant will broadcast an order book snapshot for all instruments configured on the Group Ticker Plant, unless an order book has been emptied during the failover, which will result in an Order Book Clear message being disseminated. Clients should not use the recovery services unless necessary

Trades executed, statistics calculated, announcements issued and instrument status messages sent prior or during failover will be available through the recovery service.

6 Additional Field Values

6.1 Order Book Type

Value	Meaning
0	All Books
1	Firm Quote
2	Off-book
3	Electronic
4	Private RFQ

6.1 Source Venue

Value	Description
1	London Stock Exchange
2	Borsa Italiana – Cash Equities and Fixed Income
3	Borsa Italiana – Derivatives (IDEM)
5	**Turquoise Lit™**
6	**Turquoise Plato™**
8	Borsa Italiana – Trading After Hours (TAH)
10	EuroTLX
11	TRADEcho
12	**Turquoise Lit Auctions™**

6.2 Trading Status

6.3 London Stock Exchange

Value	Description
H	Halt
J	Halt – Matching partition Suspended
K	Halt – System Suspended
T	Regular Trading/Start Trade Reporting
P	Halt - Regulatory
t	End Trade Reporting
a	Opening Auction Call
b	Post-Close
c	Closed
d	Closing Auction Call
e	AESP Auction Call
f	Resume Auction Call
l	Pause
m	Pre-Mandatory
n	Mandatory
o	Post-Mandatory
q	EDSP Auction Call
r	Periodic Auction Call
G	Intraday Level 1 Auction Call
1	Inactive
2	Suspended
w	No Active Session
x	End of Post Close
u	Closing Price Crossing session

6.4 Borsa Italiana – Cash Equity and Fixed Income Markets

Value	Description
H	Halt
J	Halt – Matching partition Suspended
K	Halt – System Suspended
T	Regular Trading/Start Trade Reporting
P	Halt - Regulatory
R	Resume Order Deletion period
S	Trading Stop
L	Halt – Instrument Level Circuit Breaker Tripped
Q	Quoting Period
I	Re-Opening (AESP or Resume) Auction Call – Instrument Level Circuit Breaker Tripped
t	End Trade Reporting
a	Pre-Open
b	Post-Close
c	Closed
d	Closing Auction Call
e	Re-Opening (AESP or Resume) Auction Call
f	Frozen
g	OPA Auction Call
u	Closing Price Crossing Session
v	End of Trade Reporting
w	No Active Session
x	End of Post Close
y	Pre-Trading (Start of Trading)
z	Closing Price Publication
1	Inactive/Underlying Suspended
2	Suspended

6.5 Borsa Italiana – Derivatives Markets (IDEM)

Value	Description
N	Market Operation Centre Intervention
F	Consultation End
C	Consultation Start
E	No Cancel Period
P	Pre-opening scheduled transition
O	Opening
M	Mini Batch
B	Post Session
I	Prohibited
Z	Interrupted
f	Forbidden
r	Pre-opening extension/Intraday auction
c	Not Trading
h	Hidden
s	Suspended
S	Continuous Trading Session

6.6 EuroTLX Market

Value	Description
H	Halt
J	Halt – Matching partition Suspended
K	Halt – System Suspended
P	Halt – Regulatory Halt
L	Halt – Instrument Level Circuit Breaker Tripped
T	Regular Trading/Start Trade Reporting

R	Resume Order Deletion period
S	Trading Stop
b	Post-Close
c	Market Closed
w	No Active Session
x	End of Post Close
y	Pre-Trading (Start of Trading)
z	Closing Price Publication
Q	Quoting Period
1	Inactive/Underlying Suspended
2	Suspended

6.7 Turquoise

Value	Description
H	Halted
J	Halted – Matching Partition Suspended
K	Halted – System Suspended
P	Halted – Regulatory Halt
T	Regular Trading/Trade Reporting
t	End Trade Reporting
c	Closed
1	Inactive
2	Suspended
w	No Active Session
A	Frequent Lit Auctions

6.8 TRADEcho Market

Value	Description
1	Inactive/Underlying Suspended
2	Suspended
3	Active
P	Halt – Regulatory Halt

6.9 Opening and Closing Price Derivation Indicators

Value	Description
A	UT
B	AT
C	Mid of BBO
D	Last AT
E	Last UT
F	Manual
G	Mid point average (Specific to Borsa Italiana)
H	VWAP n mins (not required for LSE)
I	Previous Close
i	Normal Hours Closing Price
Z	Price Unavailable (Specific to Borsa Italiana)
M	Quote Mid Average (Specific to Borsa Italiana)

6.10 Off-Book Trade Types

Value	Description
~~17~~	~~LC - Late correction~~
~~24~~	~~PC – Previous days' contra~~
~~1000~~	~~O – Ordinary trade~~
~~1004~~	~~IF – Inter-fund transfer with delayed publication~~

~~1005~~	~~NK - Negotiated trade with delayed publication~~
~~1006~~	~~NT - Negotiated trade with immediate publication~~
~~1007~~	~~OC - Cancellation of OTC trade more than three days old~~
~~1008~~	~~OK - Ordinary trade with delayed publication requested~~
~~1009~~	~~OT - OTC trade with immediate publication~~
~~1010~~	~~SC - SI late correction~~
~~1011~~	~~SI - SI trade~~
~~1012~~	~~SK - SI trade with delayed publication requested~~
~~1013~~	~~TK - OTC trade with delayed publication requested~~
~~1018~~	~~BF - Inter-fund cross with delayed publication requested~~ ~~(MTF 1 TBA)~~
~~1019~~	~~BC - Cancellation of OTC trade after date of publication (MTF 1 TBA)~~
~~1020~~	~~QT - OTC trade (MTF 2 TBA)~~
~~1021~~	~~QK - OTC trade with delayed publication requested (MTF 2 TBA)~~
~~1022~~	~~QF - Inter-fund cross with delayed publication requested (MTF 2 TBA)~~
~~1023~~	~~QC - Cancellation of OTC trade after date of publication (MTF 2 TBA)~~
~~1024~~	~~MT - Inter-fund cross with delayed publication requested (MTF 3 TBA)~~
~~1025~~	~~MK - OTC trade with delayed publication requested (MTF 3 TBA)~~

~~1026~~	~~MF - Inter-fund cross with delayed publication requested (MTF 3 TBA)~~
~~1027~~	~~MC - Cancellation of OTC trade after date of publication (MTF 3 TBA)~~
~~1028~~	~~CT - OTC trade (MTF 4 TBA)~~
~~1029~~	~~CK - OTC trade with delayed publication requested (MTF 4 TBA)~~
~~1031~~	~~CC - Cancellation of OTC trade after date of publication (MTF 4 TBA)~~
~~1032~~	~~GC - Delayed publication late correction~~
~~2001~~	~~BT - OTC trade (MTF 1 TBA)~~
~~2002~~	~~CF - Inter-fund cross with delayed publication requested (MTF 4 TBA)~~
~~2003~~	~~LT - Late trade - after hours~~
~~3001~~	~~BK - OTC Trade with delayed publication requested (MTF 1 TBA)~~

6.11 Security Types

Value	Code	Source Venue	Description	Security Definition
1	IE	Borsa Italiana/ETLX/ LSE	International Equity	Non-bond
2	IT	Borsa Italiana/LSE	Italian Equity	Non-bond
3	FS	Borsa Italiana/LSE	Foreign Share	Non-bond
4	CN	Borsa Italiana/LSE	Convertible Bond	Bond
5	RT	Borsa Italiana/LSE	Right	Non-bond
6	WR	Borsa Italiana/LSE	Warrant	Non-bond
7	CF	Borsa Italiana/LSE	Closed End Fund	Non-bond
8	SV	Borsa Italiana	Special Vehicles	Non-bond
9	UN	Borsa Italiana	Units	Non-bond

10	TA	Borsa Italiana/London Stock Exchange	Tradable Active Fund	Non-bond
11	TC	Borsa Italiana/London Stock Exchange	Tradable Commodities	Non-bond
12	TR	Borsa Italiana/London Stock Exchange	Tradable in Regulated Segment	Non-bond
13	TF	Borsa Italiana/London Stock Exchange/Turquoise	Tradable Fund	Non-bond
14	TN	Borsa Italiana	Tradable Notes	Non-bond
15	FX	Borsa Italiana/ETLX/LSE	Fixed Rate	Bond
16	FR	Borsa Italiana/ETLX/LSE	Floating Rate	Bond
17	ZC	Borsa Italiana/ETLX/LSE	Zero Coupon	Bond
18	OC	Borsa Italiana/ETLX/LSE	One Coupon	Bond
19	MC	Borsa Italiana/ETLX/LSE	Multi Coupon	Bond
20	RV	Borsa Italiana/ETLX/LSE	Reverse	Bond
21	SC	Borsa Italiana/ETLX/LSE	Step Coupon	Bond
22	WC	Borsa Italiana/ETLX/LSE	Leverage Products – Covered Warrant (call)	Non-bond
23	WP	Borsa Italiana/ETLX/LSE	Leveraged Products – Covered Warrant (put)	Non-bond
24	LC	Borsa Italiana/ETLX/LSE	Leveraged Products – Bull	Non-bond
25	LP	Borsa Italiana/ETLX/LSE	Leveraged Products – Bear	Non-bond
26	LE	Borsa Italiana/ETLX/LSE	Leveraged Products – Exotic	Non-bond
27	IP	Borsa Italiana/ETLX/LSE	Investment Products	Non-bond
28	XEC	IDEM	European Option Call	Non-bond
29	F	IDEM	Future	Non-bond

32	XAC	IDEM	American Option Call	Non-bond
33	XAP	IDEM	American Option Put	Non-bond
34	XEP	IDEM	European Option Put	Non-bond
37	AI	London Stock Exchange	Automated Input Facility Notification	Non-bond
38	AL	London Stock Exchange	Allotment Letters	Non-bond
39	BD	London Stock Exchange	Bonds	Bond
40	BG	London Stock Exchange	Bulldogs	Non-bond
41	BO	London Stock Exchange	Bonds	Non-bond
42	CP	London Stock Exchange	Commercial Paper	Non-bond
43	CW	London Stock Exchange	Covered Warrants	Non-Bond
44	DB	London Stock Exchange	Debenture	Bond
45	DE	London Stock Exchange	UK Equity	Non-bond
46	DR	London Stock Exchange	Deposit Receipts	Non-bond
47	EW	London Stock Exchange	Equity Warrants	Non-bond
48	FB	London Stock Exchange	Foreign Government Bonds	Bond
49	FC	London Stock Exchange	Financial Certificates	Non-bond
50	FL	London Stock Exchange	Fully Paid Letter	Non-bond
51	FT	London Stock Exchange	Foreign Unit Trusts	Non-bond
52	FU	London Stock Exchange	Fund Units	Non-bond
53	GT	London Stock Exchange	Gilts	Bond
54	GW	London Stock Exchange	Gilt Warrants	Non-bond
55	KR	London Stock Exchange	Kruger Rand Group	Non-bond
56	LS	London Stock Exchange	Loan Stock	Bond

57	ML	London Stock Exchange	Medium Term Loans	Bond
58	NA	London Stock Exchange	News Announcement	Non-bond
59	NL	London Stock Exchange	Nil Paid Letter	Non-bond
60	OS	London Stock Exchange	Provisional JSE Ordinary Share	Non-bond
61	PC	London Stock Exchange	Primary Capital Certificates	Non-bond
62	PL	London Stock Exchange	Partially Paid Letter	Non-bond
63	PN	London Stock Exchange	Portfolio Notification	Non-bond
64	PR	London Stock Exchange	Preference Shares	Non-bond
65	PS	London Stock Exchange	Preferences Share	Non-bond
66	PU	London Stock Exchange	Package Units	Non-bond
67	RG	London Stock Exchange	Rights	Non-bond
68	SH	London Stock Exchange	Share	Non-bond
69	SP	London Stock Exchange	Structured Products	Non-bond
70	SU	London Stock Exchange	Stapled Unit	Non-bond
71	UT	London Stock Exchange	Unit Trust	Non-bond
72	WA	London Stock Exchange	Warrants	Non-bond
73	ZP	London Stock Exchange	Zero Coupon Commercial Paper	Non-bond
75	PS	London Stock Exchange	Professional Segment	Bond
76	CU	Turquoise	Exchange Traded Currency	Non-bond
77	EQ	Turquoise	Equity	Non-bond
78	CO	Turquoise	Exchange Traded Commodity	Non-bond
79	E	IDEM	Equity	Non-bond

80	I	IDEM	Index	Non-bond
81	Y	IDEM	Futures Option	Non-bond
82	Z	IDEM	Sponsored Option	Non-bond
83	CV	Borsa Italiana/EuroTLX	Convertible Bond Special Vehicle	Bond

6.12 Security Sub-Types (Borsa Italiana Cash Equity and Fixed Income Markets and EuroTLX)

Value	Description
1	Ordinary
3	Registered Savings
5	Depository Receipt
6	Other Government Bond
7	BTP Indexed
8	BTAN
10	Preferred
11	Special Share
13	BTF
14	Government Security C.C.T.
15	Government Security B.T.P.
16	Government Security C.T.E.
17	Government Security B.O.T
22	C.T.O
23	C.T.Z
27	Emerging Market Bonds
28	Financial Bonds
31	B.O.C
32	B.O.P
33	Foreign Bonds

34	Foreign Government Securities
35	ABS
36	Convertible Bonds
42	Exotic or Structured
43	Investments Certificates
47	Subscription Rights
48	Closed End Funds (Property)
49	Warrant
50	Ordinary (OPA)
51	Preferred (OPA)
52	Convertible Saving (OPA)
54	Warrant (OPA)
55	Units
56	ETF
57	Structured ETF
58	ETN
59	ETC
60	Bonds
61	Euro Bonds
62	Others International
63	Credito Opere Pubbliche
64	Credito Fondiario
65	Plain Vanilla
66	Leverage Certificate
67	Convertible Saving
68	Bonds (OPA)
69	ABS (OPA)
70	Eurobond (OPA)
71	Foreign Bonds (OPA)
72	Closed End Funds (Estate)

73	OICR (Open)
74	Bonds in Distribution
75	Government Bonds in Distribution
76	Conditional Right of Assessment
77	Supranational or Agency Bonds
78	Debt Securities
79	Other Non-European Government Bonds
80	OAT
81	OAT Indexed
82	BOBL
83	Bund
84	Schatze
85	T-Note
86	T-Bond
87	Tips
88	Corporate Bonds
89	Sovereign
90	New Europe
91	Non Eurobond Bank Bond
92	Covered Bond
93	Commercial Paper
94	Foreign Commercial Paper
95	Convertible Bond
96	Convertible Bond Foreign
97	Share in Public Offer

6.13 Underlying Security Type (Borsa Italiana Derivatives Markets - IDEM)

Value	Code	Description
33	!	Others
65	A	Interest Rate Index
66	B	Basket
67	C	Currency
68	D	Dividend
69	E	Equity
70	F	Future
72	H	Forward
73	I	Index
74	J	Forward Rate Agreements
75	K	Spreadbet
77	M	Commodity
78	N	Dividend Index
79	O	Option
80	P	Paneuropean
81	Q	Contracts for Difference
82	R	Interest Rate
83	S	Strategy
84	T	Debt
85	U	Paneuropean Index
86	V	Volatility Variance Index
87	W	Swap
88	X	Equity Option
89	Y	Future Option
90	Z	Sponsored Option

49	1	Agrics
50	2	Extraction
51	3	Industrial
52	4	Service
53	5	Energy Power
54	6	Energy Gas
55	7	Environmental
56	8	Polypropylene products
57	9	Generated resources
63	?	Unknown

6.14 Supported Currencies

Code	Description
BAD	Dinar
EEK	Kroon
EUX	Euro – Cents
GWP	Peso
MGF	Franc
MLT	Lira
SKK	Koruna
ZAE	Zar to EUIR for BIT
ZYX	ZYX
AYM	Manat
BRE	BRL to EUR for BIT
ESB	Convertible Peseta – Accounts
GBE	GBPO to EUR for BIT
MZM	Metical
RUR	Ruble
SDP	Pound
SIT	Tolar
SRG	Guilder
TRE	TRY to EUR for BIT
USE	USD to EUR for BIT
USX	Cent
ZWR	Zimbabwe Dollar
GBX	GB Pennies
ZAC	100th of RAND
ITL	Italian LIRA
TRY	Turkish LIRA

6.15 Tick ID

MARKET	GTP Tick ID	Table ID	Description	Min Value	Max Value	Tick Value
MTA MIV AIM MAC TAH	**MT**	**TS_MTA**	MTA MIV AIM BEM	0.0001	0.5	0.0001
				0.5	1	0.0005
				1	2	0.001
				2	5	0.002
				5	10	0.005
				10	50	0.01
				50	100	0.05
				100	500	0.1
				500	1000	0.5
				1000	5000	1
				5000	10000	5
				10000	20000	10
				20000	30000	20
				30000	40000	30
				40000	50000	40
				50000	60000	50
				60000	70000	60
				70000	80000	70
				80000	90000	80
				90000	100000	90
				100000	10000000	100
MTA MIV AIM MAC TAH	**M1**	**TS_01MF**	MTA MIV AIM BEM	0.0005	0.1	0.0005
				0.1	0.2	0.001
				0.2	0.5	0.002
				0.5	1	0.005
				1	2	0.01
				2	5	0.02

MARKET	GTP Tick ID	Table ID	Description	Min Value	Max Value	Tick Value
				5	10	0.05
				10	20	0.1
				20	50	0.2
				50	100	0.5
				100	200	1
				200	500	2
				500	1000	5
				1000	2000	10
				2000	5000	20
				5000	10000	50
				10000	20000	100
				20000	50000	200
				50000	10000000	500
MTA **MIV** **AIM** **MAC** **TAH**	**M2**	**TS_02MF**	MTA MIV AIM BEM	0.0002	0.1	0.0002
				0.1	0.2	0.0005
				0.2	0.5	0.001
				0.5	1	0.002
				1	2	0.005
				2	5	0.01
				5	10	0.02
				10	20	0.05
				20	50	0.1
				50	100	0.2
				100	200	0.5
				200	500	1
				500	1000	2
				1000	2000	5
				2000	5000	10
				5000	10000	20
				10000	20000	50
				20000	50000	100
				50000	10000000	200

MARKET	GTP Tick ID	Table ID	Description	Min Value	Max Value	Tick Value
MTA MIV AIM MAC TAH	M3	TS_03MF	MTA MIV AIM BEM	0.0001	0.1	0.0001
				0.1	0.2	0.0002
				0.2	0.5	0.0005
				0.5	1	0.001
				1	2	0.002
				2	5	0.005
				5	10	0.01
				10	20	0.02
				20	50	0.05
				50	100	0.1
				100	200	0.2
				200	500	0.5
				500	1000	1
				1000	2000	2
				2000	5000	5
				5000	10000	10
				10000	20000	20
				20000	50000	50
				50000	10000000	100
MTA MIV AIM MAC TAH	M4	TS_04MF	MTA MIV AIM BEM	0.0001	0.1	0.0001
				0.1	0.2	0.0001
				0.2	0.5	0.0002
				0.5	1	0.0005
				1	2	0.001
				2	5	0.002
				5	10	0.005
				10	20	0.01
				20	50	0.02
				50	100	0.05
				100	200	0.1
				200	500	0.2
				500	1000	0.5

MARKET	GTP Tick ID	Table ID	Description	Min Value	Max Value	Tick Value
				1000	2000	1
				2000	5000	2
				5000	10000	5
				10000	20000	10
				20000	50000	20
				50000	10000000	50
MTA MIV AIM MAC TAH	**M5**	**TS_05MF**	MTA MIV AIM BEM	0.0001	0.1	0.0001
				0.1	0.2	0.0001
				0.2	0.5	0.0001
				0.5	1	0.0002
				1	2	0.0005
				2	5	0.001
				5	10	0.002
				10	20	0.005
				20	50	0.01
				50	100	0.02
				100	200	0.05
				200	500	0.1
				500	1000	0.2
				1000	2000	0.5
				2000	5000	1
				5000	10000	2
				10000	20000	5
				20000	50000	10
				50000	10000000	20
MTA MIV AIM MAC TA ETFP	**M6**	**TS_06MF**	MTA MIV AIM BEM ETFP	0.0001	0.1	0.0001
				0.1	0.2	0.0001
				0.2	0.5	0.0001
				0.5	1	0.0001
				1	2	0.0002
				2	5	0.0005
				5	10	0.001

MARKET	GTP Tick ID	Table ID	Description	Min Value	Max Value	Tick Value
				10	20	0.002
				20	50	0.005
				50	100	0.01
				100	200	0.02
				200	500	0.05
				500	1000	0.1
				1000	2000	0.2
				2000	5000	0.5
				5000	10000	1
				10000	20000	2
				20000	50000	5
				50000	10000000	10
ETFP	**ME**	**TS_ETFMF**	ETFP	0.0001	0.1	0.0001
				0.1	0.2	0.0001
				0.2	0.5	0.0001
				0.5	1	0.0001
				1	2	0.0002
				2	5	0.0005
				5	10	0.001
				10	20	0.002
				20	50	0.005
				50	100	0.01
				100	200	0.01
				200	500	0.01
				500	1000	0.01
				1000	2000	0.01
				2000	5000	0.01
				5000	10000	0.01
				10000	20000	0.01
				20000	50000	0.01
				50000	10000000	0.01
ETFP	**ET**	**TS_ETF**	ETFP	0.0001	0.25	0.0001

MARKET	GTP Tick ID	Table ID	Description	Min Value	Max Value	Tick Value
				0.25	1	0.0005
				1	2	0.001
				2	5	0.0025
				5	50	0.005
				50	10000000	0.01
SEDEX	S1	TS_SDQ_10	SDQ	0.001	0.03	0.001
				0.03	3	0.005
				3	15	0.01
				15	30	0.05
				30	300	0.1
				300	100000000	0.5
	S2	TS_SDQ_100	SDQ	0.01	0.3	0.01
				0.3	30	0.05
				30	150	0.1
				150	300	0.5
				300	3000	1
				3000	1000000000	5
	SD	TS_SDX	SDX	0.0001	0.003	0.0001
				0.003	0.3	0.0005
				0.3	1.5	0.001
				1.5	3	0.005
				3	30	0.01
				30	10000000	0.05
MOT	MO	TS_MOT	MOT	0.0001	10000000	0.0001
MIFID	MF	TS_MFD	MIFID	0.0001	10000000	
ALL MARKETS (Exceptions)	01	TS_01		0.0001	10000000	0.0001
	02	TS_02		0.0005	10000000	0.0005
	03	TS_03		0.001	10000000	0.001
	04	TS_04		0.002	10000000	0.002
	05	TS_05		0.0025	10000000	0.0025
	06	TS_06		0.005	10000000	0.005
	07	TS_07		0.01	10000000	0.01

MARKET	GTP Tick ID	Table ID	Description	Min Value	Max Value	Tick Value
	08	**TS_08**		0.05	10000000	0.05
	09	**TS_09**		0.1	10000000	0.1
	10	**TS_10**		0.5	10000000	0.5
	11	**TS_11**		1	10000000	1
	12	**TS_12**		5	10000000	5
	13	**TS_13**		10	10000000	10
	14	**TS_14**		20	10000000	20
	15	**TS_15**		30	10000000	30
	16	**TS_16**		40	10000000	40
	17	**TS_17**		50	10000000	50
	18	**TS_18**		60	10000000	60
	19	**TS_19**		70	10000000	70
	20	**TS_20**		80	10000000	80
	21	**TS_21**		90	10000000	90
	22	**TS_22**		100	10000000	100
	23	**TS_23**		0.0002	10000000	0.0002
IDEM IDEX AGREX	**IF**	**IF**	AGREX Future	0.0001	999999999	0.25
	IO	**IO**	FTSE MIB DIV INDEX FUTURE	1	999999999	1
	EF	**EF**	FTSE100 MINI Future	0.0001	999999999	0.5
	EO	**EO**	IDEM FTSE MIB Future	5	999999999	5
	XF	**XF**	IDEM FTSE MIB Option	1	999999999	1
				100	999999999	2
				500	999999999	5
	DV	**DV**	IDEM FTSE MIB Weekly	1	999999999	1
	SS	**SS**	IDEM Stock Future	0.0001	999999999	0.0001

MARKET	GTP Tick ID	Table ID	Description	Min Value	Max Value	Tick Value
	IW	**IW**	IDEM Stock Option	0.0005	999999999	0.0005
	MF	**MF**	IDEX Future	0.01	999999999	0.01
	AG	**AG**	Strategies	0.0001	999999999	0.0001
EUROTLX (EQUITY, FIXED INCOME, CERTIFICATE Segments)	**EQ**	**TS_EQT**	Dynamic Tick	0,0001	0,003	0,0001
				0,003	0,3	0,0005
				0,3	1,5	0,001
				1,5	3	0,005
				3	10000000	0,01
	CE	**TS_CER**	Dynamic Tick	0,0001	0,003	0,0001
				0,003	0,3	0,0005
				0,3	1,5	0,001
				1,5	3	0,005
				3	10000000	0,01
	BO	**TS_BON**	Static Tick	0,0001	10000000	0,0001
	A	**TS_A**	Static Tick	0,0001	10000000	0,0001
	B	**TS_B**	Static Tick	0,0005	10000000	0,0005
	C	**TS_C**	Static Tick	0,001	10000000	0,001
	D	**TS_D**	Static Tick	0,005	10000000	0,005
	E	**TS_E**	Static Tick	0,01	10000000	0,01
EUROTLX (EQUITY, FIXED INCOME, CERTIFICATE Segments)	**TS_EQT1MF**	**M1**	Dynamic Tick	0.0005	0,1	0.0005
				0,1	0,2	0.001
				0,2	0,5	0.002
				0,5	1	0.005
				1	2	0.01
				2	5	0.02
				5	10	0.05
				10	20	0.1
				20	50	0.2

MARKET	GTP Tick ID	Table ID	Description	Min Value	Max Value	Tick Value
				50	100	0.5
				100	200	1
				200	500	2
				500	1000	5
				1000	2000	10
				2000	5000	20
				5000	10000	50
				10000	20000	100
				20000	50000	200
				50000	10000000	500
EUROTLX (EQUITY, FIXED INCOME, CERTIFICATE Segments)	TS_EQT2MF	M2	Dynamic Tick	0.0002	0,1	0.0002
				0,1	0,2	0.0005
				0,2	0,5	0.001
				0,5	1	0.002
				1	2	0.005
				2	5	0.01
				5	10	0.02
				10	20	0.05
				20	50	0.1
				50	100	0.2
				100	200	0.5
				200	500	1
				500	1000	2
				1000	2000	5
				2000	5000	10
				5000	10000	20
				10000	20000	50
				20000	50000	100
				50000	10000000	200
EUROTLX	TS_EQT3MF	M3	Dynamic Tick	0.0001	0,1	0.0001

MARKET	GTP Tick ID	Table ID	Description	Min Value	Max Value	Tick Value
(EQUITY, FIXED INCOME, CERTIFICATE Segments)				0,1	0,2	0.0002
				0,2	0,5	0.0005
				0,5	1	0.001
				1	2	0.002
				2	5	0.005
				5	10	0.01
				10	20	0.02
				20	50	0.05
				50	100	0.1
				100	200	0.2
				200	500	0.5
				500	1000	1
				1000	2000	2
				2000	5000	5
				5000	10000	10
				10000	20000	20
				20000	50000	50
				50000	10000000	100
EUROTLX (EQUITY, FIXED INCOME, CERTIFICATE Segments)	TS_EQT4MF	M4	Dynamic Tick	0.0001	0,1	0.0001
				0,1	0,2	0.0001
				0,2	0,5	0.0002
				0,5	1	0.0005
				1	2	0.001
				2	5	0.002
				5	10	0.005
				10	20	0.01
				20	50	0.02
				50	100	0.05
				100	200	0.1
				200	500	0.2

MARKET	GTP Tick ID	Table ID	Description	Min Value	Max Value	Tick Value
				500	1000	0.5
				1000	2000	1
				2000	5000	2
				5000	10000	5
				10000	20000	10
				20000	50000	20
				50000	10000000	50
EUROTLX (EQUITY, FIXED INCOME, CERTIFICATE Segments)	TS_EQT5MF	M5	Dynamic Tick	0.0001	0,1	0.0001
				0,1	0,2	0.0001
				0,2	0,5	0.0001
				0,5	1	0.0002
				1	2	0.0005
				2	5	0.001
				5	10	0.002
				10	20	0.005
				20	50	0.01
				50	100	0.02
				100	200	0.05
				200	500	0.1
				500	1000	0.2
				1000	2000	0.5
				2000	5000	1
				5000	10000	2
				10000	20000	5
				20000	50000	10
				50000	10000000	20
EUROTLX (EQUITY, FIXED INCOME, CERTIFICATE Segments)	TS_EQT6MF	M6	Dynamic Tick	0.0001	0,1	0.0001
				0,1	0,2	0.0001
				0,2	0,5	0.0001
				0,5	1	0.0001

MARKET	GTP Tick ID	Table ID	Description	Min Value	Max Value	Tick Value
				1	2	0.0002
				2	5	0.0005
				5	10	0.001
				10	20	0.002
				20	50	0.005
				50	100	0.01
				100	200	0.02
				200	500	0.05
				500	1000	0.1
				1000	2000	0.2
				2000	5000	0.5
				5000	10000	1
				10000	20000	2
				20000	50000	5
				50000	10000000	10
XLON (London Stock Exchange), XPAR (NYSE Euronext Paris), XETR (Deutsche Borse – Xetra), XCSE, XHEL, XMAD, XSTO, XSWX, XVTX MTAA, XOSL, WBAH, XDUB, ARCX, XBUD, XNGS, XNMS, XNYS, XPRA XAMS, XBRU,	**01**	**Dark**		0.00005	0	0.00005
	02	**ETF_GBP**		0.0005	0	0.0005
				0.001	0.1	0.001
				0.0025	5	0.0025
				0.005	10	0.005
				0.01	25	0.01
	03	**ETF_GBX**		0.05	0	0.05
				0.1	10	0.1
				0.25	500	0.25
				0.5	1000	0.5
				1	2500	1
	04	**ETF_USD**		0.0005	0	0.0005
				0.001	0.1	0.001
				0.0025	5	0.0025

MARKET	GTP Tick ID	Table ID	Description	Min Value	Max Value	Tick Value
XLIS, XLUX				0.01	10	0.01
	05	EUROZONE		0.001	0	0.001
				0.005	10	0.005
	06	Equity		0.00005	0	0.00005
	07	FESE1		0.0001	0	0.0001
				0.0005	1	0.0005
				0.001	5	0.001
				0.005	10	0.005
				0.01	50	0.01
				0.05	100	0.05
				0.1	500	0.1
				0.5	1000	0.5
				1	5000	1
				5	10000	5
	08	FESE2		0.0001	0	0.0001
				0.0005	0.5	0.0005
				0.001	1	0.001
				0.005	5	0.005
				0.01	10	0.01
				0.05	50	0.05
				0.1	100	0.1
				0.5	500	0.5
				1	1000	1
				5	5000	5
				10	10000	10
	09	FESE2B		0.0001	0	0.0001
				0.0005	0.5	0.0005
				0.001	1	0.001

MARKET	GTP Tick ID	Table ID	Description	Min Value	Max Value	Tick Value
				0.002	2	0.002
				0.005	5	0.005
				0.01	10	0.01
				0.05	50	0.05
				0.1	100	0.1
				0.5	500	0.5
				1	1000	1
				5	5000	5
				10	10000	10
				20	20000	20
				40	40000	40
				50	50000	50
				80	80000	80
				100	100000	100
	10	FESE3		0.0005	0	0.0005
				0.001	0.5	0.001
				0.005	1	0.005
				0.01	5	0.01
				0.05	10	0.05
				0.1	50	0.1
				0.5	100	0.5
				1	500	1
				5	1000	5
				10	5000	10
				50	10000	50
	11	FESE4		0.001	0	0.001
				0.005	10	0.005
				0.01	50	0.01

MARKET	GTP Tick ID	Table ID	Description	Min Value	Max Value	Tick Value
				0.05	100	0.05
	12	MTAA_1		0.0001	0	0.0001
				0.0005	0.25	0.0005
				0.001	1	0.001
				0.0025	2	0.0025
				0.005	5	0.005
				0.01	10	0.01
	13	MTAA_ETF		0.0001	0	0.0001
				0.0005	0.25	0.0005
				0.001	1	0.001
				0.0025	2	0.0025
				0.005	5	0.005
				0.01	50	0.01
	14	PX		0.05	0	0.05
				0.1	200	0.1
				1	1000	1
	15	TEST		0.1	0	0.1
	16	T_0.0001		0.0001	0	0.0001
	17	T_0.0005		0.0005	0	0.0005
	18	T_0.001		0.001	0	0.001
	19	T_0.0025		0.0025	0	0.0025
	20	T_0.005		0.005	0	0.005
	21	T_0.01		0.01	0	0.01
	22	T_0.025		0.025	0	0.025
	23	T_0.05		0.05	0	0.05
	24	T_0.1		0.1	0	0.1
	25	T_0.25		0.25	0	0.25
	26	T_1		1	0	1

MARKET	GTP Tick ID	Table ID	Description	Min Value	Max Value	Tick Value
	27	T_5		5	0	5
	28	XBUD_1		0.1	0	0.1
				1	10	1
				5	10000	5
	29	XCSE_1		0.001	0	0.001
				0.005	0.5	0.005
				0.01	1	0.01
				0.05	5	0.05
				0.1	10	0.1
				0.5	50	0.5
				1	500	1
				10	5000	10
				100	20000	100
	30	XETR_ETF		0.001	0	0.001
				0.005	5	0.005
				0.01	10	0.01
	31	XETR_ETF2		0.001	0	0.001
				0.005	5	0.005
	32	XHEL_1		0.001	0	0.001
				0.005	0.5	0.005
				0.01	1	0.01
	33	XLON_1		0.01	0	0.01
				0.25	10	0.25
				0.5	500	0.5
				1	1000	1
	34	XLON_2		0.0001	0	0.0001
				0.0025	0.1	0.0025
				0.005	5	0.005

MARKET	GTP Tick ID	Table ID	Description	Min Value	Max Value	Tick Value
				0.01	10	0.01
	35	XMCE_1		0.01	0	0.01
				0.05	50	0.05
	36	XOSL_1		0.01	0	0.01
				0.05	10	0.05
				0.1	15	0.1
				0.25	50	0.25
				0.5	100	0.5
				1	250	1
	37	XOSL_ETF		0.01	0	0.01
				0.05	50	0.05
				0.1	250	0.1
				0.5	1000	0.5
	38	XSTO_1		0.001	0	0.001
				0.005	0.5	0.005
				0.01	1	0.01
				0.05	5	0.05
				0.1	15	0.1
				0.25	50	0.25
				0.5	150	0.5
				1	500	1
				5	5000	5
	39	XSTO_ETF		0.01	0	0.01
				0.05	5	0.05
				0.1	500	0.1
				1	5000	1
	40	XSWX_1		0.01	0	0.01
				0.05	10	0.05

MARKET	GTP Tick ID	Table ID	Description	Min Value	Max Value	Tick Value
				0.1	100	0.1
				0.25	250	0.25
				0.5	500	0.5
				1	1000	1
				5	5000	5
	41	XSWX_ETF		0.001	0	0.001
				0.005	5	0.005
				0.01	20	0.01
	42	XWAR_1		0	100	0.01
				100	999999999	0.05
	43	US_1		0	1	0,0001
				1	999999999	0.01

7 Data Mapping

7.1 Conversion of Order ID

<table>
<tr><th>Venue</th><th>Representation</th></tr>
<tr><td>London Stock Exchange</td><td rowspan="7">Base 62 decoded value form source venue ASCII format

To obtain GTP Order ID, from the source venue ASCII format:
Step 1: Remove the left most Byte '0' → 04Xj7Wu76ta
Step 2: Convert the rest of the digits to decimal using the base 62 dictionary</td></tr>
<tr><td>Turquoise Lit™</td></tr>
<tr><td>Turquoise Plato™</td></tr>
<tr><td>Borsa Italiana – Trading After Hours (TAH)</td></tr>
<tr><td>Borsa Italiana – Cash Equities and Fixed Income</td></tr>
<tr><td>Borsa Italiana – Derivatives (IDEM)</td></tr>
<tr><td>EuroTLX</td></tr>
<tr><td>TRADEcho</td><td>Base 64 (URL Safe) decoded value from source venue ASCII format, but will be prefixed with B or A to indicate Bid or Ask order type.</td></tr>
</table>

7.2 Conversion of Trade ID

<table>
<tr><th>Venue</th><th>Representation</th></tr>
<tr><td>London Stock Exchange</td><td rowspan="4">Base 36 decoded value form source venue ASCII format</td></tr>
<tr><td>Turquoise Lit™</td></tr>
<tr><td>Turquoise Plato™</td></tr>
<tr><td>Turquoise Lit Auctions™</td></tr>
<tr><td>Borsa Italiana – Trading After Hours (TAH)</td><td rowspan="4">Base 62 decoded value form source venue ASCII format</td></tr>
<tr><td>Borsa Italiana – Cash Equities and Fixed Income</td></tr>
<tr><td>EuroTLX</td></tr>
<tr><td>Borsa Italiana – Derivatives (IDEM)</td></tr>
</table>

TRADEcho	Base 64 (URL Safe) decoded value from source venue ASCII format

7.3 Base36, Base62, Base64 decoding alphabets

7.3.1 Base 36

HEX	ASCII	HEX	ASCII
0	G	18	Y
1	H	19	Z
2	I	20	0
3	J	21	1
4	K	22	2
5	L	23	3
6	M	24	4
7	N	25	5
8	O	26	6
9	P	27	7
10	Q	28	8
11	R	29	9
12	S	30	A
13	T	31	B
14	U	32	C
15	V	33	D
16	W	34	E
17	X	35	F

7.3.2 Base 62

HEX	ASCII	HEX	ASCII	HEX	ASCII	HEX	ASCII
0	0	18	I	36	a	54	s

HEX	ASCII	HEX	ASCII	HEX	ASCII	HEX	ASCII
1	1	19	J	37	b	55	t
2	2	20	K	38	c	56	u
3	3	21	L	39	d	57	v
4	4	22	M	40	e	58	w
5	5	23	N	41	f	59	x
6	6	24	O	42	g	60	y
7	7	25	P	43	h	61	z
8	8	26	Q	44	i		
9	9	27	R	45	j		
10	A	28	S	46	k		
11	B	29	T	47	l		
12	C	30	U	48	m		
13	D	31	V	49	n		
14	E	32	W	50	o		
15	F	33	X	51	p		
16	G	34	Y	52	q		
17	H	35	Z	53	r		

7.3.3 Base 64 (URL Safe)

HEX	ASCII	HEX	ASCII	HEX	ASCII	HEX	ASCII
0	A	18	S	36	k	54	2
1	B	19	T	37	l	55	3
2	C	20	U	38	m	56	4
3	D	21	V	39	n	57	5
4	E	22	W	40	o	58	6
5	F	23	X	41	p	59	7
6	G	24	Y	42	q	60	8

HEX	ASCII	HEX	ASCII	HEX	ASCII	HEX	ASCII
7	H	25	Z	43	r	61	9
8	I	26	a	44	s	62	-
9	J	27	b	45	t	63	_
10	K	28	c	46	u		
11	L	29	d	47	v		
12	M	30	e	48	w		
13	N	31	f	49	x		
14	O	32	g	50	y		
15	P	33	h	51	z		
16	Q	34	i	52	0		
17	R	35	j	53	1		

7.4 Conversion of Negative Values in Price Fields

Signed data types, such as Price and Price4, might indicate negative values where applicable. Negative numbers are represented using the “Sign and magnitude” method. Encoding and decoding examples are provided in the following sections.

7.5 Encoding Negative Values in Price Fields

Decimal value = -1
Decimal value with eight implied decimal places = -100000000
Remove sign bit = 100000000
Convert to binary = 00000000 00000000 00000000 00000000 00000101 11110101 11100001 00000000
Add sign bit = 10000000 00000000 00000000 00000000 00000101 11110101 11100001 00000000
Hex value = 80 00 00 00 05 f5 e1 00
Hex value converted to Little endian = 00 e1 f5 05 00 00 00 80

7.6 Decoding Negative Values in Price Fields

Received bytes in hex = 00 e1 f5 05 00 00 00 80
Change the byte order to big endian = 80 00 00 00 05 f5 e1 00
Convert to binary = 10000000 00000000 00000000 00000000 00000101 11110101 11100001 00000000
Most significant bit is set. Therefore this is a negative value.

Remove the sign bit = 00000000 00000000 00000000 00000000 00000101 11110101 11100001 00000000
Convert to decimal = 100000000
Add sign to decimal = -100000000
Mark eight implied decimal places -1.00000000