

T7 Release 5.0

Extended Market Data Service

Trade Prices, Settlement Prices and Open Interest Data Manual - Production Version

Version V5.05

Date 20. April 2017

T7 Release 5.0	Deutsche Börse Group		
Extended Market Data Service	<u>V5.05</u>		

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1. Introduction

The Trading System T7 provides market and reference data via a set of multicast interfaces.

In addition to the Market Data Interface (MDI) for netted market data, the Enhanced Market Data Interface (EMDI) for un-netted market data, Enhanced Order Book Interface (EOBI) and the Reference Data Interface (RDI) for reference data, the Extended Market Data Service (EMDS) is also provided.

All interfaces distribute information via UDP multicast, following FIX 5.0 SP2 semantics and are FAST 1.1/1.2 encoded (except EOBI). Messages are in general published on two identical services (A and B) with different multicast addresses (live-live concept).

The present document describes the Extended Marked Data Service for Xetra and Eurex.

The Extended Market Data Service provides participants of T7 with:

- Intraday Settlement prices and Open Interest data (for Derivatives only)
- Trade Price information

This document lists the multicast addresses and describes the message layouts of the interface. FAST 1.1 and 1.2 templates will be provided for this Interface on the Eurex website at www.eurexchange.com and on the Xetra website www.eurexchange.com and on the Yetra website <a href="https://www.eurexchange.com

Starting with T7 R5.0 there is a new service for the cash market products: Based on an internal, reliable data stream an All Trade Price (ATP) stream is offered which disseminates in real time all trade prices for the T7 cash markets (comparable to the ATP stream offered in Xetra EnBS).

Furthermore an additional 'Replay Service' is provided which allows users to 'recover' from loss for the following data items:

- Intraday Settlement prices,
- Open Interest data and
- Trades from T7 (on-exchange and off-book trades)

The Replay service is simply a re-send of the data that was sent out before in realtime to give applications a chance to re-capture data again in its full format. There is no linkage in sequence numbers etc. between the realtime data and the replay data. The replay service for the cash market products is based on the ATP stream mentioned above.

As this service is based on multicast, no individual requests are possible. Instead these messages are sent out at predefined times in replay cycles which start with a heading 'start of service' message and end with a trailing 'end of service' message (MDReport message). The number of messages is provided at each start of a cycle. All replay messages are sequenced within the appropriate multicast channel. Each cycle for the Eurex replay service for the US-allowed and the US-restricted products is triggered separately. The replay service should be processed for each channel separately. There are at least two replay cycles per multicast channel per trading day. Within one replay cycle the data is replayed several times directly in a row.

Please note: The present document explains the Extended Market Service only. The other market and reference data interfaces listed above are described in the Market and Reference Data Interfaces

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Manual, which explains the general rules regarding FIX messages, FAST encoding and the live-live concept.

The Extended Market Data Interface described in this manual has a version number. The version number is also listed at the beginning of the FAST XML templates.

This manual relates to the interface version number 005.001.100.

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2. Multicast addresses

The Settlement prices, Open Interest and Trade prices are disseminated via the following multicast addresses and port combinations in the Deutsche Börse Group network:

2.1 Production multicast addresses and ports

2.1.1 For Real-time Service

Service	Multicast Groups Service A	Multicast Groups Service B	Ports
Settlement prices – Eurex T7 Settlement prices – Eurex T7/FX	224.0.50.77 224.0.29.64	224.0.50.205 224.0.30.64	Eurex T7: US-allowed products: 59000
Adj. Open Interest – Eurex T7 Adj. Open Interest – Eurex T7/FX	224.0.50.78 224.0.29.65	224.0.50.206 224.0.30.65	US-restricted products: 59032 Eurex T7/FX: US-allowed products: 57000 US-restricted products: 57032
Xetra trades (XETR) - ATP	224.0.161.64	224.0.163.64	59000
Xetra trades (XDUB) - ATP Xetra trades (XVIE) - ATP	224.0.161.72 224.0.161.68	224.0.163.72 224.0.163.68	

The ATP (All Trade Price) stream for Xetra trades is based on an internal, reliable feed and is disseminated for the cash market products only (comparable to the ATP stream in Xetra EnBS).

2.1.2 For Replay Service

Service	Multicast Groups Service A	Multicast Groups Service B	Ports
Settlement prices – Eurex T7 Settlement prices – Eurex T7/FX	224.0.50.77 224.0.29.66	224.0.50.205 224.0.30.66	Eurex T7: US-allowed products: 59001
Adj. Open Interest – Eurex T7 Adj. Open Interest – Eurex T7/FX	224.0.50.78 224.0.29.67	224.0.50.206 224.0.30.66	US-restricted products: 59033 <u>Eurex T7/FX:</u>
Eurex T7 trades Eurex T7/FX trades	224.0.50.79 224.0.29.68	224.0.50.207 224.0.30.66	US-allowed products: 57001 US-restricted products: 57033
Xetra trades (XETR) – ATP based	224.0.161.64	224.0.163.64	59001
Xetra trades (XDUB) – ATP based Xetra trades (XVIE) – ATP based	224.0.161.72	224.0.163.72 224.0.163.68	

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2.2 Simulation multicast addresses and ports

2.2.1 For Real-time Service

Service	Multicast Groups Service A	Multicast Groups Service B	Ports
Settlement prices – Eurex T7 Settlement prices – Eurex T7/FX	224.0.50.93 224.0.29.80	224.0.50.221 224.0.30.80	T7: US-allowed products: 59500
Adj. Open Interest – Eurex T7 Adj. Open Interest – Eurex T7/FX	224.0.50.94 224.0.29.81	224.0.50.222 224.0.30.81	US-restricted products: 59532 T7/FX: US-allowed products: 57500 US-restricted products: 57532
Xetra trades (XETR) - ATP	224.0.164.120	224.0.165.120	59500
Xetra trades (XDUB) - ATP	224.0.164.122	224.0.165.122	
Xetra trades (XVIE) - ATP	224.0.164.121	224.0.165.121	

2.2.2 For Replay Service

Service	Multicast Groups Service A	Multicast Groups Service B	Ports
Settlement prices – Eurex T7 Settlement prices – Eurex T7/FX	224.0.50.93 224.0.29.82	224.0.50.221 224.0.30.82	T7: US-allowed products: 59501
Adj. Open Interest – Eurex T7 Adj. Open Interest – Eurex T7/FX	224.0.50.94 224.0.29.83	224.0.50.222 224.0.30.83	US-restricted products: 59533 T7/FX:
Eurex T7 trades Eurex T7/FX trades	224.0.50.95 224.0.29.84	224.0.50.223 224.0.30.84	US-allowed products: 57501 US-restricted products: 57533
Xetra trades (XETR) – ATP based	224.0.164.120	224.0.165.120	59501
Xetra trades (XDUB) – ATP based	224.0.164.122	224.0.165.122	
Xetra trades (XVIE) – ATP based	224.0.164.121	224.0.165.121	

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2.3 Service availability

The required bandwidth for this service will be limited to 50 kbit/second per channel. The service will be technically available at least between 7:00 CET and 22:30 CET.

The Adjusted Open Interest will be available after 13:00 CET. The intraday Settlement Prices will be available as soon as they are determined by Eurex in the afternoon (different product groups have different schedules).

Replay dissemination schedule

•	1:00 pm CET	Xetra trades – 1 st cycle
•	2:00 pm CET	Adjusted Open interest – 1st cycle
•	5:45 pm CET	Eurex trades – 1 st cycle
•	6 :00 pm CET	Xetra trades – 2 nd cycle
•	6:15 pm CET	Settlement prices – 1st cycle
•	6:30 pm CET	Adjusted Open interest – 2 nd cycle
•	8:15 pm CET	Eurex trades – 2 nd cycle
•	10:30 pm CET	Eurex trades – 3 rd cycle
•	10:40 pm CET	Settlement prices – 2 nd cycle
•	10:55 pm CET	Adjusted Open interest – 3 rd cycle

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3. Data and service messages

3.1 Settlement prices (TID = 172)

FIX Tag	FIX Field Name	Req'd	FAST Data Type	Description			
35	MsgType	Υ	string	Message type			
				Always 'W' = MarketDataSnapshotFullRefresh			
48	SecurityID	Y	Int64	Instrument ID from T7 Trading System			
22	SecurityIDSource	Y	string	Source Identification			
				Always 'M' = Marketplace-assigned Identifier			
1300	MarketSegmentID	Y	ulnt32	Product ID from T7 Trading System			
<mdfull0< td=""><td colspan="7"><mdfullgrp> sequence starts</mdfullgrp></td></mdfull0<>	<mdfullgrp> sequence starts</mdfullgrp>						
268	NoMDEntries	Y	length	Defines the number of entries to follow.			
269	> MDEntryType	Y	MDEntryType	Type of Market Data entry			
			(enum)	Always '6' = Settlement Price			
270	> MDEntryPx	Y	decimal	Intraday Settlement Price			
29830	> MDSecPx	N	decimal	Settlement Price in trading notation (only for Variance Futures)			
273	> MDEntryTime	Y	timestamp	Time of entry			
<mdfullgrp> sequence ends</mdfullgrp>							

Note: The settlement prices of the previous business day are provided with Reference data feed RDI in the instrument snapshot message and the Reference data from file (RDF).

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3.2 Adjusted open Interest (TID = 171)

FIX Tag	FIX Field Name	Req'd	FAST Data Type	Description		
35	МѕдТуре	Y	string	Message type		
				Always 'W' = MarketDataSnapshotFullRefresh		
48	SecurityID	Y	Int64	Instrument ID from T7 Trading System		
22	SecurityIDSource	Υ	string	Source Identification		
				Always 'M' = Marketplace-assigned Identifier		
1300	MarketSegmentID	Y	ulnt32	Product ID from T7 Trading System		
<mdf< td=""><td colspan="6"><mdfullgrp> sequence starts</mdfullgrp></td></mdf<>	<mdfullgrp> sequence starts</mdfullgrp>					
268	NoMDEntries	Υ	length	Defines the number of entries to follow.		
				Here always '1'.		
269	> MDEntryType	Υ	MDEntryType	Type of Market Data entry		
			(enum)	Always 'C' = Open Interest		
271	> MDEntrySize	Y	ulnt32	Adjusted Open Interest Quantity		
273	> MDEntryTime	Y	timestamp	Time of entry		
<mdf< td=""><td colspan="5"><mdfullgrp> sequence ends</mdfullgrp></td></mdf<>	<mdfullgrp> sequence ends</mdfullgrp>					

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3.3 Trade prices (TID = 175)

For the dissemination of the trades from T7 Trading System template id 175 is used which closely resembles the template id 94 that is defined for EMDI/MDI trades (DepthIncremental messages), but those parts that relate to orderbook information and trade volume information were removed.

FIX Tag	FIX Field Name	Req' d	FAST Data Type	Description
35	MsgType	Υ	string	Message type
				Always 'X' = MarketDataIncrementalRefresh
34	MsgSeqNum	Y	ulnt32	The sequence number is incremented per product across all message types on a particular feed.
49	SenderCompID	Υ	ulnt32	Unique ID of a sender.
1300	MarketSegmentID	Υ	ulnt32	Technical Product ID from T7 Trading System
<mdinc0< td=""><td>Grp> sequence starts</td><td></td><td></td><td></td></mdinc0<>	Grp> sequence starts			
268	NoMDEntries	Y	length	Defines the number of entries to follow.
				Here always '1'.
1024	> MDOriginType	Υ	MDOriginT	Market Data origin
			ype (enum)	0 = Book / On-exchange
				1 = Off-Book (Eurex TES trades only)
279	> MDUpdateAction	Υ	MDUpdate	Type of Market Data update action
			Action (enum)	0 = New
			,	1 = Change
				2 = Delete
269	> MDEntryType	Υ	MDEntryTy	Type of Market Data entry
			pe (enum)	'2' = Trade
				'B' = Trade Volume
48	> SecurityID	Y	Int64	Technical Instrument ID from T7 Trading System
22	> SecurityIDSource	Υ	string	Source Identification
				Always 'M' = Marketplace-assigned Identifier
270	> MDEntryPx	N	decimal	Trade Price
271	> MDEntrySize	N	ulnt32	Quantity or trade volume when MDEntryType = "2" or "B". Off-Book disclosed quantity when MDOriginType is 1 (Eurex TES trades only)

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273	> MDEntryTime	N	timestamp	Official time of execution (in nanoseconds)
828	> TrdType	N	TrdType (enum)	Trade Type 1 = Off-book Block Trade 2 = Exchange for Physical (EFP) 12 = Exchange for Swap (EFS) 55 = Exchange Basis Facility 1000 = Vola Trade 1001 = EFP-Fin Trade 1002 = EFP-Index-Futures Trade 1004 = Block Trade At Market 1100 = Opening Auction Trade 1101 = Intraday Auction Trade 1102 = Volatility Auction Trade 1103 = Closing Auction Trade 1104 = Cross Auction Trade
277	> TradeCondition	N	TradeCond ition (set)	Defines the type of price for MDEntryPx. U = Exchange Last R = Opening Price AX = High Price AY = Low Price AJ = Official Close Price AW = Last Auction Price k = Out of Sequence BD = Previous Closing Price a = Volume only
2445	> AggressorTime	N	timestamp	Entry time of the incoming order that triggered the trade. Only present for MDEntryType = 2.
2446	> AggressorSide	N	Side (enum)	Side of the incoming order which created the trade. 1 = Buy 2 = Sell Only present for MDEntryType = 2.
2449	> NumberOfBuyOrders	N	ulnt32	Number of buy orders involved in this trade. Only present for MDEntryType=2 and Trade Condition other than "a" (Volume Only).

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2450	> NumberOfSellOrders	N	ulnt32	Number of sell orders involved in this trade. Only present for MDEntryType=2 and Trade Condition other than "a" (Volume Only).
6139	> TotalNumOfTrades	N	ulnt32	Total number of trades during the day. Only present for MDEntryType=2. Applicable for cash market products only.
28869	> RestingCxlQty	N	ulnt32	Quantity of orders that are deleted due to a SMP event. Only present for MDEntryType = 2.
278	> MDEntryID	N	ulnt32	Represents the T7 match step ID. This field is unique on product level and origin type for each business day.
28873	> NonDisclosedTrade Volume	N	ulnt32	Contains the Eurex TES trade volume that is not displayed during the day. Only present for MDEntryType = B (Trade Volume). Used when trade volume is finally disclosed and also for recovery.
<mdincgrp> sequence ends</mdincgrp>				

3.4 Packet header (TID = 75)

Each datagram contains a packet header which is used for identification of datagrams and is sent on a channel basis. Each header contains the following fields:

Field Name	FAST Data Type	Description
SenderCompID	ulnt32	Unique id for a sender Each multicast channel uses the same logic. Constant value: Standard Value Failover Value
PacketSeqNum	ByteVector	Datagram/packet sequence number Contiguous. Can be used for gap detection. Sequenced for each multicast channel itself. The PacketSeqNum's in the packet header are contiguous per SenderCompID, multicast address and port combination.
SendingTime	ByteVector	Time at which this packet left the sender (in nanoseconds since epoch).

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The following table shows the structure of the block header before FAST-decoding:

1 Byte	1 Byte	1 Byte	1 Byte	4 Bytes	1 Byte	8 Bytes
PMAP	TID	Sender Comp ID	Length	PacketSeqNum	Length	SendingTime
1	2	3	4	8	9	17

3.5 Extended technical heartbeat (TID = 170)

The heartbeat message is sent periodically as a 'line active' indicator when there are no messages generated on the feed for a preconfigured period of time. Each heartbeat contains the following fields:

Field Name	FAST Data Type	Description
SenderCompID	ulnt32	Unique id for a sender. Each multicast channel uses the same logic.
		Constant value: Standard Value Failover Value
LastPacketSeqNum	ulnt32	Contains the last PacketSeqNum of the corresponding multicast channel.

3.6 Market Data Report Message (TID = 152)

The MDReport message is used for the Replay Service. It is sent as a wraparound bracket for distributing the product and instrument snapshots. Since the replay service is also a dissemination cycle, start and end marks are needed. Each MDReport contains the following fields:

FIX Tag	FIX Field Name	Req'd	FAST Data Type	Description
35	MsgType	Υ	string	U20 - MarketDataReport
2536	MDReportCount	N	ulnt32	Count of messages in the replay cycle. Only sent for MDReportEvent 3, 5, 7 and 9
369	LastMsgSeqNumProce ssed	N	ulnt32	
2535	MDReportEvent	Y	MDReport Event (enum)	1 = Start of instrument reference Data (not used) 2 = End of instrument reference Data (not used) 3 = Start of off-market trades (not used)

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				4 = End of off-market trades (not used)
				5 = Start of order book (exchange) trades
				6 = End of order book (exchange) trades
				7 = Start of open interest
				8 = End of open interest
				9 = Start of settlement prices
				10 = End of settlement prices
				11 = Start of statistics reference data
				12 = End of statistics reference data
				13 = Start of statistics (not used)
				14 = End of statistics (not used)
60	TransactTime	Υ	timestamp	Transaction Time

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4. Change log

No	Chapter, page	Date	Change
1.0	General	July 18, 2012	Creation of document
1.1	General	Oct. 9, 2012	Created Simulation Version of this document
			Added the description for the Replay Service
1.2	Ch. 1, Pg.5	Nov 21,2012	Updated the related xml template number
	Ch. 3.3, Pg. 10		Changed tag 1020 (TradeVolume) to optional
	Ch. 3.4, Pg. 11		Changed tag 762 (SecuritySubType) to optional
	Ch. 3.4, Pg. 12		Changed tag 1020 (TradeVolume) to optional
	Ch. 3.4, Pg. 12		Moved the <instrmntleggrp> sequence end</instrmntleggrp>
	Ch. 3.7, Pg. 14		Added tag 60 (TransactTime)
	Ch. 3.7, Pg. 14		Changed tag 369 to optional
	Ch. 3.8, Pg. 16		Changed tag 1020 (TradeVolume) to optional
2.0	Ch. 1, Pg. 4	Aug 12, 2013	Clarified relation between realtime and replay data
	Ch. 1, Pg. 5		Adjusted interface version number
	Ch. 3.3, Pg. 9		Added enum value 1 for MDUpdateAction
	Ch. 3.4, Pg. 11		Added enum value 1 for MDUpdateAction
	Ch. 3.4, Pg. 11		Corrected FAST Data Type for ProductComplex to uInt32
	Ch. 3.5, Pg. 13		Added sentence for PacketSeqNum
	Ch. 3.8, Pg. 14		Added enum value 1 and 2 for MDReportEvent
	Ch. 3.9, Pg. 17		Added Ticker Message
2.01	Ch. 3.8, Pg. 16	Nov 12, 2013	"PreviousClosingPrice" moved to the end of the TradeConditionSet bitmask flag
2.02	Ch. 3.1, 3.2, 3.3, 3.4 and 3.8	Nov 20, 2013	Changed FAST Data Type for SecurityID and LegSecurityID from uInt64 to Int64
2.03	Ch. 3.4, Pg. 11	Nov 26, 2013	Changed FAST Data Type for ProductComplex to enum
2.1.0	Ch. 1, Pg. 5	Jan 30, 2014	Updated interface version number
	Ch. 3.5, Pg. 13		Updated Template ID for Packet Header to TID=114
	Ch. 3.8, Pg. 16		Added set value 'a' for Fix tag 277 (TradeCondition)
2.1.1	Ch. 3.8, Pg. 15	Feb 14, 2014	Changed tag 270 (MDEntryPx) to optional (Volume only)
	Ch. 3.8, Pg. 16		Changed tag 278 (MDEntryID) to mandatory
2.5	Ch. 1, Pg. 5	Jul 31, 2014	Updated interface version number
	General		Renamed OTC to Off-book
	Ch. 2, Pg. 6		Removed IP addresses for Ticker Data
	Ch. 3.1, 3.2, 3.3,		Changed FAST Data Type for MDEntryType from string to

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	3.4 and 3.8		enum
	Ch. 3.3, 3.4, 3.8		Removed tag 1020 (TradeVolume)
	Ch. 3.3, 3.4		Tag 269: Added MDEntryType=B
	Ch. 3.9, Pg. 17		Removed Eurex Underlying Ticker Message
2.5.1	General	Oct 13, 2014	Creation of 'Final version'
3.0	General	July 16, 2015	Created Simulation Version for Eurex T7 3.0
	Ch. 1, Pg. 5		Updated interface version number
	Ch. 3.1, Pg. 8		Added tag 29830 (MDSecPx) for Settlement Prices for Variance Futures in Trading Notation
	Ch. 3.5, Pg. 13		Updated Template ID for Packet Header to TID=76
4.0	General	June 27, 2016	Created Simulation Version for Eurex T7 4.0
	Ch. 1, Pg. 5		Updated interface version number
	Ch. 2. Pg. 6		Removed multicast addresses for off-book trade prices
	Ch. 2, Pg. 7		Removed replay schedules for off-book trades
	Ch. 3, Pg. 9		Removed Template IDs 173 and 174 for off-book trades
	Ch. 3, Pg. 15		Moved and Renamed chapter 3.8 for Template ID 175 (Trades)
	Ch. 3.3, Pg. 10		Template 175: Added FIX tags 28869 and 28873 and values for T7 4.0. Updated some FIX tags and names to latest FIX standard
	Ch. 3.4, Pg. 12		Updated Template ID for Packet Header to TID=77
4.01	Ch. 3.6, Pg.13		Replaced FIX tags 5488 and 28827 by 2536 and 2535
4.02	Ch. 3.3, Pg. 10		Added MDEntryType 'B' for dissemination of Trade Volume in Eurex Trades (TID=175)
			Changed tag 271 (MDEntrySize) and tag 278 (MDEntryID) to optional. Removed tag 5979 (RequestTime)
4.03	General	Sep 07, 2016	Created Production Version for Eurex T7 4.0
4.04	Ch. 1, Pg. 4	Sep 16, 2016	Minor updates regarding Eurex interface landscape
4.05	Ch. 2.1, Pg. 6-7	Sep 29, 2016	Added Eurex T7/FX multicast addresses
5.0	General	Dec 01, 2016	Created Preliminary Version for T7 Release 5.0
5.01	General	Jan 27, 2017	Created Simulation Version for T7 5.0
	Ch. 2.2, Pg. 6		Updated Port numbers for Xetra trades in Simulation
	Ch. 3.3, Pg. 12		Added FIX tag 6139 (TotalNumberOfTrades)
5.02	Ch. 2 , Pg. 5	Feb 03, 2017	Updated Port numbers for T7/FX to 57xxx
	Ch. 3.4, Pg. 12		Updated Template ID for Packet Header to TID=75

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5.03	Ch. 1, Pg.5	Feb 15, 2017	Added 2 sentences in Introduction regarding Cash market migration and ATP stream
	Ch. 6, Pg. 6		Replaced 'T7' with more specific wording regarding 'Eurex T7' or similar
	Ch. 3.3, Pg. 11		More clearly stated that the IDs for products and instruments are the technical T7 IDs (and not e.g. ISIN)
5.04	General	Apr 10, 2017	Creation of Production Version for T7 5.0
5.05	Ch. 3.4, Pg. 12	Apr 20, 2017	Updated Template ID for Packet Header to TID=75