

# T7 Release 6.0

## Extended Market Data Service

Trade Prices, Settlement Prices and Open Interest Data

Manual - Production Version

Version	V6.03
Date	26. October 2017

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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 Market 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](http://www.eurexchange.com) and on the Xetra website [www.xetra.com](http://www.xetra.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.

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)

Concerning undeferred market data, 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.

Concerning TES trades (trades from the T7 Entry Service) which under MiFID II regulations are eligible for *deferred publication* (e.g. due to the size of a block trade), the Replay service is the mechanism for publication via multicast channels. The only other feed disseminating deferred TES trade reports is CEF Core – there are no such trade messages available on EMDI, however. The deferred messages are of type Trade Price (TID=175).

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 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 006.001.100.

Details regarding the EMDS Service 'Ticker data' are described in the separate document 'T7 Extended Market Data Service - Underlying Ticker Data Manual.

## 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	<u>Eurex T7:</u> US-allowed products: 59000 US-restricted products: 59032
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	<u>Eurex T7/FX:</u> 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	224.0.161.72	224.0.163.72	
Xetra trades (XVIE) - ATP	224.0.161.68	224.0.163.68	

#### 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	<u>Eurex T7:</u> 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 (incl. TES) Eurex T7/FX trades (incl. TES)	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	224.0.161.72	224.0.163.72	
Xetra trades (XVIE) – ATP based	224.0.161.68	224.0.163.68	

Non-disclosed (deferred) TES trades are disseminated under the same MC addresses like the other T7 trades.

## 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	224.0.50.93	224.0.50.221	<u>T7</u> : US-allowed products: 59500
Settlement prices – Eurex T7/FX	224.0.29.80	224.0.30.80	
Adj. Open Interest – Eurex T7	224.0.50.94	224.0.50.222	<u>T7/FX</u> : US-allowed products: 57500 US-restricted products: 57532
Adj. Open Interest – Eurex T7/FX	224.0.29.81	224.0.30.81	
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	224.0.50.93	224.0.50.221	<u>T7</u> : US-allowed products: 59501
Settlement prices – Eurex T7/FX	224.0.29.82	224.0.30.82	
Adj. Open Interest – Eurex T7	224.0.50.94	224.0.50.222	<u>T7/FX</u> : US-allowed products: 57501 US-restricted products: 57533
Adj. Open Interest – Eurex T7/FX	224.0.29.83	224.0.30.83	
Eurex T7 trades (incl. TES)	224.0.50.95	224.0.50.223	59501
Eurex T7/FX trades (incl. TES)	224.0.29.84	224.0.30.84	
Xetra trades (XETR) – ATP based	224.0.164.120	224.0.165.120	
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	

Non-disclosed (deferred) TES trades are disseminated under the same MC addresses like the other T7 trades.

## 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<sup>st</sup> cycle
- 2:00 pm CET Adjusted Open interest – 1<sup>st</sup> cycle
- 5:45 pm CET Eurex trades – 1<sup>st</sup> cycle
- 6 :00 pm CET Xetra trades – 2<sup>nd</sup> cycle
- 6:15 pm CET Settlement prices – 1<sup>st</sup> cycle
- 6:30 pm CET Adjusted Open interest – 2<sup>nd</sup> cycle
- 8:15 pm CET Eurex trades – 2<sup>nd</sup> cycle
- 10:30 pm CET Eurex trades – 3<sup>rd</sup> cycle
- 10:40 pm CET Settlement prices – 2<sup>nd</sup> cycle
- 10:55 pm CET Adjusted Open interest – 3<sup>rd</sup> cycle
- 11:00 pm CET Eurex non-disclosed TES trades



### 3. Data and service messages

#### 3.1 Settlement prices (TID = 172)

FIX Tag	FIX Field Name	Req'd	FAST Data Type	Description
35	MsgType	Y	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	uInt32	Product ID from T7 Trading System
<MDFullGrp> sequence starts				
268	NoMDEntries	Y	length	Defines the number of entries to follow.
269	> MDEntryType	Y	MDEntryType (enum)	Type of Market Data entry 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				

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).

### 3.2 Adjusted open Interest (TID = 171)

FIX Tag	FIX Field Name	Req'd	FAST Data Type	Description
35	MsgType	Y	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	uInt32	Product ID from T7 Trading System
<MDFullGrp> sequence starts				
268	NoMDEntries	Y	length	Defines the number of entries to follow. Here always '1'.
269	> MDEntryType	Y	MDEntryType (enum)	Type of Market Data entry Always 'C' = Open Interest
271	> MDEntrySize	Y	uInt32	Adjusted Open Interest Quantity
273	> MDEntryTime	Y	timestamp	Time of entry
<MDFullGrp> sequence ends				

### 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 were removed.

FIX Tag	FIX Field Name	Req'd	FAST Data Type	Description
35	MsgType	Y	string	Message type Always 'X' = MarketDataIncrementalRefresh
34	MsgSeqNum	Y	uint32	The sequence number is incremented per product across all message types on a particular feed.
49	SenderCompID	Y	uint32	Unique ID of a sender.
1300	MarketSegmentID	Y	uint32	Technical Product ID from T7 Trading System
<MDIncGrp> sequence starts				
268	NoMDEntries	Y	length	Defines the number of entries to follow. Here always '1'.
1024	> MDOriOriginType	Y	MDOriOriginType (enum)	Market Data origin 0 = Book / On-exchange 1 = Off-Book (Eurex TES trades only)
279	> MDUpdateAction	Y	MDUpdateAction (enum)	Type of Market Data update action 0 = New 1 = Change 2 = Delete
269	> MDEntryType	Y	MDEntryType (enum)	Type of Market Data entry '2' = Trade 'B' = Trade Volume
48	> SecurityID	Y	Int64	Technical Instrument ID from T7 Trading System
22	> SecurityIDSource	Y	string	Source Identification Always 'M' = Marketplace-assigned Identifier
270	> MDEntryPx	N	decimal	Trade Price
271	> MDEntrySize	N	uint32	Quantity or trade volume when MDEntryType = "2" or "B". Off-Book disclosed quantity when MDOriOriginType is 1 (Eurex TES trades only)

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 1107 = IPO Auction Trade
2667	> AlgorithmicTrade- Indicator	N	Algorithmic Trade- Indicator (enum)	A trade has to be flagged as "algorithmic", if at least one of the matched orders was submitted by a trading algorithm. Applicable for cash market products only. 1 = Algorithmic 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 AZ = Systematic Internalizer BB = Midpoint price
442	> MultiLegReportingType	N	MultiLeg- Reporting-	Only applicable for TES trades of derivatives market products.

			Type (enum)	1 = Single Security 2 = Individual Leg Of A Multileg Security - Used to report a TES leg trade price of a complex instrument trade 3 = Multi Leg Security - Used to report a TES trade price on the complex instrument.
28750	> MultiLegPriceModel	N	MultiLeg-PriceModel (enum)	Only applicable for TES trades of derivatives market products. 0 = Standard 1 = User Defined - Used to report TES leg trade prices entered by a user.
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 that triggered the trade. Only present for MDEntryType = 2. 1 = Buy 2 = Sell
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).
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. An increment of TotalNumberOfTrades is defined as the maximum of NumberOfBuyOrders (2449) and NumberOfSell-Orders (2450) per trade.
28869	> RestingCxlQty	N	ulnt32	Quantity that was deleted due to SMP. Only present for MDEntryType = 2.
278	> MDEntryID	N	ulnt32	Represents the T7 match step ID. This field is unique together with MarketSegmentID.
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				

### 3.4 Packet header (TID = 76)

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: <ul style="list-style-type: none"> <li>Standard Value</li> <li>Failover Value</li> </ul>
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).

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
P MAP	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: <ul style="list-style-type: none"> <li>Standard Value</li> </ul>

		<ul style="list-style-type: none"> <li>Failover Value</li> </ul>
LastPacketSeqNum	uint32	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	Y	string	U20 - MarketDataReport
2536	MDReportCount	N	uint32	Count of messages in the replay cycle. Only sent for MDReportEvent 3, 5, 7 and 9
369	LastMsgSeqNumProcessed	N	uint32	
2535	MDReportEvent	Y	MDReportEvent (enum)	1 = Start of instrument reference Data (not used) 2 = End of instrument reference Data (not used) 3 = Start of off-market trades 4 = End of off-market trades 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	Y	timestamp	Transaction Time

## 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 Ch. 3.3, Pg. 10 Ch. 3.4, Pg. 11 Ch. 3.4, Pg. 12 Ch. 3.4, Pg. 12 Ch. 3.7, Pg. 14 Ch. 3.7, Pg. 14 Ch. 3.8, Pg. 16	Nov 21,2012	Updated the related xml template number Changed tag 1020 (TradeVolume) to optional Changed tag 762 (SecuritySubType) to optional Changed tag 1020 (TradeVolume) to optional Moved the <InstrmntLegGrp> sequence end Added tag 60 (TransactTime) Changed tag 369 to optional Changed tag 1020 (TradeVolume) to optional
2.0	Ch. 1, Pg. 4 Ch. 1, Pg. 5 Ch. 3.3, Pg. 9 Ch. 3.4, Pg. 11 Ch. 3.4, Pg. 11 Ch. 3.5, Pg. 13 Ch. 3.8, Pg. 14 Ch. 3.9, Pg. 17	Aug 12, 2013	Clarified relation between realtime and replay data Adjusted interface version number Added enum value 1 for MDUpdateAction Added enum value 1 for MDUpdateAction Corrected FAST Data Type for ProductComplex to ulnt32 Added sentence for PacketSeqNum Added enum value 1 and 2 for MDReportEvent 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 ulnt64 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 Ch. 3.5, Pg. 13 Ch. 3.8, Pg. 16	Jan 30, 2014	Updated interface version number Updated Template ID for Packet Header to TID=114 Added set value 'a' for Fix tag 277 (TradeCondition)
2.1.1	Ch. 3.8, Pg. 15 Ch. 3.8, Pg. 16	Feb 14, 2014	Changed tag 270 (MDEntryPx) to optional (Volume only) Changed tag 278 (MDEntryID) to mandatory
2.5	Ch. 1, Pg. 5 General Ch. 2, Pg. 6 Ch. 3.1, 3.2, 3.3,	Jul 31, 2014	Updated interface version number Renamed OTC to Off-book Removed IP addresses for Ticker Data Changed FAST Data Type for MDEntryType from string to



	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

5.03	Ch. 1, Pg.5 Ch. 6, Pg. 6 Ch. 3.3, Pg. 11	Feb 15, 2017	Added 2 sentences in Introduction regarding Cash market migration and ATP stream  Replaced 'T7' with more specific wording regarding 'Eurex T7' or similar  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
6.00	General	Aug 13, 2017	Created initial simulation version for T7 6.0
6.01	Ch. 2, Pg. 7	Aug. 30, 2017	Added hint for (deferred) TES trade dissemination
6.02	General	Oct. 06, 2017	Creation of production version for T7 6.0
6.03	Ch. 1, Pg. 4	Oct. 26, 2017	Clarification regarding deferred and non-deferred TES trades.