EUREX

Eurex Clearing C7

Eurex Clearing FIXML Interface

Interface Specification

Volume 1: Overview

Document version C7 Release 7.1

- Simulation valid from 10 May 2021
- Production valid from 05 July 2021

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Change History

Date	Ver.	Change
28 February 2014	1.0.0	Initial version for C7 Release 1.0
10 June 2014	1.1.0	Promoted simulation version to production version
29 October 2014	2.0	Initial version for C7 Release 2.0
14 November 2014	2.1	7.2: Clarification: Message ID property in the header cannot be used for duplicate detection.
26 January 2014	3.0	Initial version for C7 Release 3.0
11 June 2015	3.1	Promoted preliminary version to simulation version
18 November 2015	3.2	6.1; Clarification: Namespace declaration required for request messages sent by member applications
18 March 2016	3.3	- Promoted simulation version to production version - Added footnote regarding reference data sources for contract/series information
28 July 2016	3.4	- Simulation version for Release 3.1 - Removed TES Workflows
17 October 2016	3.5	- Production version for Release 3.1 - Minor typo corrections, no change of content
8 May 2017	4.0	- Initial version for C7 Release 4.0 - Removed Collateral Broadcasts
30 July 2018	4.1	- Cancel support for special characters for text fields due to security concerns - Add message level identifier to support an easier duplicate detection
28 January 2019	4.2	- Add ECC as valid value for SID

Date	Release	Change
26 May 2020	7.0	- remove chapter “Exceptional circumstances: internal timeout” - remove reference to comment line in the schema files
	7.0.1	No update for C7 Release 7.0.1
25 January 2021	7.1	- remove End-of-stream message

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1 Introduction

The Eurex Clearing FIXML Interface provides Eurex and ECC Members with a highly flexible, standards-compliant and cost-effective way to enter, access and modify their clearing data. Based upon and compliant to the widely used FIX (**F**inancial **I**nformation e**X**change) standard, the interface allows members to choose and deploy their own operating systems and access interfaces. The transport layer is AMQP (**A**dvanced **M**essage **Q**ueueing **P**rotocol)/WebSphere MQ, the syntax is FIXML.

To learn more about connecting to the Eurex Clearing FIXML Interface, please refer to the Eurex Clearing Interfaces Connectivity documentation, which is available for download on the Eurex Clearing website.

1.1 Eurex Clearing FIXML Interface documentation

The Eurex Clearing FIXML Interface documentation is organized as follows:

- **Volume 1: Overview** (this document)
- Volume 3: Transaction & Position Confirmation
- Volume 4: Transaction & Position Maintenance
- Volume 5: Public Broadcasts
- Volume 6: Message Samples

All documents are available for download on Eurex Clearing website www.eurex.com/ec-en/ under the following path:

Tech > C7 > System documentation > Eurex Clearing Interfaces

The Eurex Clearing FIXML Interface documentation is of rather technical nature; for a more detailed functional description of the clearing functionality offered, please refer to the C7 Functional User Guide, the Quick Reference Guide Clearing and the Clearing GUI User Guide.

1.2 Eurex Clearing Messaging Interfaces – Connectivity documentation

The Eurex Clearing FIXML Interface, Eurex Clearing FpML Interface and Margin Calculator share common connectivity documents for AMQP and WebSphere MQ:

- A: Overview
- B: AMQP Programming Guide
- E: AMQP Setup & Internals

All “Eurex Clearing Messaging Interfaces – Connectivity” documents are available for download on the Eurex website www.eurex.com/ec-en/ under the following path:

Tech > C7 > System documentation > Eurex Clearing Interfaces

1.3 Conventions used in this document

Cross references to other chapters within this document are always clickable, but not marked separately.

Hyperlinks to websites are underlined.

Changes applied to this document after the last version has been published (other than grammar/spelling corrections) are marked with a change bar in the left margin as demonstrated in this paragraph. Old change bars will be removed from version to version.

1.4 FIX version

The Eurex Clearing FIXML Interface follows **FIX Version 5.0 SP2** with Extension Packs. In a few instances, additional valid values have been specified, which will be submitted for inclusion in the standard. To learn more about the standard, visit the FIX Protocol's website at:

https://www.fixtrading.org/standards/fix-5-0-sp-2/

The latest FIX version with extensions is available at https://fixtrading.org/packages/latest-fiximate.

2 Eurex Clearing FIXML Interface overview

2.1 Technology transition

As part of Deutsche Börse's IT strategy for the implementation of a new clearing infrastructure, Eurex has introduced the new Eurex Clearing FIXML Interface with Eurex Release 14.0, which allowed members to move away from the MISS infrastructure.

2.2 Benefits

The Eurex Clearing FIXML Interface offers a range of benefits to Eurex and ECC members. As a standards-based interface, it is easy to integrate into existing IT infrastructure on the member side. There are no operating system, hardware or programming language requirements.

- Members are free to choose the hardware, operating system and programming language that best fits their needs.
- An open standard technical transport layer (i.e. AMQP) is supported.
- Reduced roll-out effort.
- Message layouts are formatted using FIXML as a widely accepted industry standard.
- The interface provides high straight-through processing support.

In order to enable the most efficient straight-through processing for members, the Eurex Clearing FIXML Interface is centered around broadcasts for information dissemination and uses a request-response logic for instructions sent to Eurex by members. Inquiries are not supported for straight-through processing.

The interface's usage of the widely accepted FIXML standard allows members to develop and implement processing models using a common interface for various markets.

3 Supported functionality

3.1 Trade/transaction reporting

The Eurex Clearing FIXML Interface trade confirmation broadcast disseminates messages in the following events:

- New transaction reported in the clearing system (matched on the trading system)
- Successfully approved Off-book Trade
- Successfully approved Flexible Contracts Trade
- Successful Give-up/Take-up
- Updated trade information pursuant transaction adjustment

To learn more about transaction reporting, please refer to Volume 3 of the Eurex Clearing FIXML Interface Documentation.

3.2 Transaction & position management

The Eurex Clearing FIXML Interface supports the following transaction and position management features:

- Transaction Separation
- Transaction Account Transfer
- Open/Close Adjustment
- Transaction Adjustment (text fields and member/beneficiary information for cooperation products)
- Give-up/Take-up
- Exercise / Abandon
- Position Close-out
- Average Price Merge & De-Merge

To learn more about the transaction and position management features of the interface, please refer to Volume 4 of the Eurex Clearing FIXML Interface Documentation.

3.3 List of broadcasts

The Eurex Clearing FIXML Interface disseminates private and public broadcasts.

3.3.1 Transaction confirmation broadcast

All new transaction information is disseminated via the transaction confirmation broadcast, as FIXML *TradeCaptureReport* messages (see “Trade/transaction reporting” for a list of events triggering broadcasts). Exchange Members receive their own transaction information via transaction confirmation broadcast (*TradeConfirmation* queue), Clearing Members receive their own information in the *TradeConfirmation* queue and additionally data for their Non-Clearing Members in a dedicated *TradeConfirmationNCM* queue.

3.3.2 Position update confirmation broadcast

The Eurex Clearing FIXML Interface sends a *PositionMaintenanceReport* message via the *TradeConfirmation* queue to all affected parties once a position has been updated. Position update confirmation messages are sent for the following events:

- Position Close-out (Manual/Automatic)/Re-open
- Internal Position Transfer
- External Position Transfer (by Clearing House)
- External Position Transfer with/without Cash Amount
- Exercise (Manual/Automatic)
- Exercise Adjustment
- Abandon
- Assignment
- Position Adjustment Due to Capital Adjustment
- Notification
- Notification Adjustment
- Allocation
- Futures Position Creation
- Clearing House Transfer
- Position Conversion

3.3.3 Workflow broadcast

The workflow broadcast carries *AllocationReport* messages. Clearing Members have a dedicated *WorkflowNCM* queue for receiving drop-copies of messages sent to their Non-Clearing Members.

Broadcasts are sent for every give-up/take-up state change (*AllocationReport*):

- Allocation pending
  (Transaction has been designated for give-up and awaits approval/acceptance by both give-up and take-up side)
- Refused take-up
  (TU side refuses, status “refused”)
- Give-up cancelled
  (process cancelled by GU side, status “cancelled”)
  (process cancelled by system, status “cancelled”)
- Give-up/take-up successfully finished
  (Status “claimed”)

3.3.4 Public broadcasts

The interface sends broadcasts via the public broadcast queue for the following events:

- End-of-Assignment
  - Product
  - All options
  - All products
- Capital Adjustment/R-Factor
- Contract Changes[1]
  - Add contract
  - Change contract
  - Delete contract
- Settlement Prices
  - Regular series
  - Flexible Contracts
  - Underlying close price
  - Price correction for regular series
  - Price Corrections for special cases
    - Price Corrections for special cases (regular contracts)
    - Price Corrections for special cases (flexible contracts)
  - Final settlement price
- ~~End-of-Stream~~

[1]The interface is designed to exclusively provide delta information for contract reference data. Members are advised to use the current traded series file (available for download on the Eurex website) as daily reference data snapshots

4 Error handling

The interface returns acknowledgment messages whenever the system rejects a request by the member. Depending on the message workflow, the system uses:

- *TradeCaptureReportAck* message with *TrdRptStatus (939)=1 Rejected* for all workflows based on *TradeCaptureReport* messages,
- *AllocationInstructionAck* messages with *AllocStatus (87)=5 Rejected by Intermediary* for workflows based on *AllocationInstruction* messages, and
- *PositionMaintenanceReport* messages with *PosMaintStatus (722)=2 Rejected* for workflows based on *PositionMaintenanceRequest* messages.

Detail about the reason for rejection is contained in *RejectText (1328)*. Note that for messages originating on C7, no error codes will be sent. For full layouts of the *TradeCaptureReportAck*, *AllocationInstructionAck,* and *PositionMaintenanceReport* messages please refer to Volumes 3 and 4.

TradeCaptureReportAck/AllocationInstructionAck/*PositionMaintenanceReport* messages are only returned when the member submitted a properly formatted *TradeCaptureReport/AllocationInstruction/PositionMaintenanceRequest* i.e. they are sent as the result of a functional check. In all other cases the interface sends *BusinessMessageReject* messages. This includes, but is not limited to, unknown message types, functionally or technically unparsable messages and syntax errors in incoming messages.

4.1 BusinessMessageReject Structure

FIXML Name	Field/Component Name	Valid Values	FIX Tag	Pre	Remarks
BizMsgRej		–	–		
RefMsgTyp	RefMsgTyp	None	372	A	
BizRejRsn	BusinessRejectReason	0=Other	380	A	
Txt	Text		58	A	Contains reason for rejection.
Hdr					
SID	SenderCompID	ECAG or ECC	49		
TID	TargetCompID		56		Member ID, e.g. ABCFR or ABCEX
Snt	SendingTime		52		

Sample Message

```
  <BizMsgRej RefMsgTyp="None" BizRejRsn="0" Txt="Opening and ending tag mismatch:
TrdCapt
   line 4 and TrdCaptRpt">
    <Hdr SID="ECAG" TID="ABCFR" Snt="2012-12-16T11:40:37.790"/>
  </BizMsgRej>
```

4.2 Detect duplicate messages with the message level identifier

The FIXML interface is designed to guarantee at least once delivery for each message. In certain circumstances, it may happen that messages are delivered multiple times:

- The amqp receiver has lost the connection to the broker such that an acknowledgement message got lost. In this case the broker will re-deliver that message.

Error handling

- The amqp receiver ran into a timeout when sending the acknowledgement message to the broker. Again the broker will re-deliver that message.
- The amqp sender (C7) has lost the connection to the broker when sending a message. In this case, C7 will re-send the message.
- The amqp sender (C7) ran into a timeout when sending a message. In this case, C7 will re-send the message.
- A member has requested to re-send all messages of a day due to some emergency processing. In this case, C7 will re-send the messages.
- In a major disruption of the entire market it might be necessary that all messages of a day get re-distributed. C7 will re-send all messages of that day.

Each message can be recognized uniquely by the functional key of the transaction which is contained in the FIXML payload of the message as sketched in section 7. In order to ease the detection of a duplicate message, Eurex Clearing adds a message level identifier (MLID) to all amqp 1.0 messages that are distributed on the FIXML interface:

1. The MLID is attached as an application property to each amqp 1.0 message that contains the public or private FIXML content
2. The MLID is a string composed of letters and digits with a length of up to 25 chars
3. The MLID is a unique identifier of the amqp message
4. Uniqueness is guaranteed for one month.

With the MLID, it is not necessary to parse the FIXML message to detect that this has already been received because the MLID is attached as an amqp property.

Examples:

- C7C00000000002606974838 (valid MLID example, 23 chars)
- EC20180606000009 (valid MLID example, 16 chars)
- XXX1122222222222222222229 (invalid MLID example has 26 chars)

5 Interface limits

5.1 Feature limits

By design, the following (technical) features are not supported by the Eurex Clearing FIXML Interface:

- Inquiries
- Batch Messages i.e. bundled and/or compressed FIXML messages as defined by FIX protocol specification.

Please note that the list above is not exhaustive and may be amended in future versions of the document.

5.2 Field limits

5.2.1 Character set

The Eurex Clearing FIXML Interface supports **UTF-8 printable ASCII** characters in all fields of type “string”. Note that additional rules might apply on the individual field level. Such additional rules are documented in the layout tables of Volumes 3 and 4.

5.2.2 Text fields

Text fields for transactions on C7 can hold up to 36 characters each and support ASCII characters 32-126 with the exception of the exclamation mark (!), the pipe symbol (|), double quotes (“), single quotes (‘), apostrophe (`), ampersand (&), equal sign (=), at sign (@), plus (+), lower than (<) and larger than (>). The asterisk sign (*) is fully supported, i.e. it can be the first character.

5.3 Connectivity limits

For connectivity limits (e.g. queue sizes), please refer to the ‘Eurex Clearing Messaging Interfaces – Connectivity E: AMQP Setup & Internals’ document.

6 Namespace declaration & schema files

6.1 Namespace declaration

All messages disseminated by the interface contain the following namespace declaration:

```
<FIXML xmlns="www.eurexchange.com/technology">
```

The system expects all incoming (Member → Eurex Clearing) messages to feature a properly formatted namespace declaration and will reject messages without.

6.2 Schema files

Schema files for message validation are available in the member section of the Eurex website for download. The schema package follows the format used by the FIX Protocol. The files are updated on a regular basis alongside the remainder of the documentation. Please note that the files have their own version number (as contained in the fixml-main-5-0-SP2_.xsd file), which does not necessarily align to the version numbers of the PDF volumes. The interface itself does not disseminate a version or configuration number.

Should you encounter any issues or questions with regards to the schema files publication date on the website when contacting support.

7 Failover and recovery

Important

This chapter provides a quick overview of failover and recovery processing. It only applies to the AMQP connectivity. This chapter should not be used as a technical guideline for developing member systems. Developers should always consult Eurex Clearing Interfaces – Connectivity Volumes A, B and E for development purposes.

The Eurex Clearing FIXML Interface AMQP brokers are setup to use reliable communication; the system reliably writes messages at least once. In exceptional circumstances duplicates may appear. Every message received by the client application should be acknowledged to the broker. Until it is acknowledged, it remains on the broker. Only after the acknowledgment is received by the broker, the message is removed. The client application software is responsible to send the acknowledge after the message has been processed correctly. For details, please refer to Volume A, chapter 4.4. Please note that the acknowledge is an AMQP feature and is not to be confused with the FIXML acknowledgment messages.

Alternatively, the message receivers can use a browse mode, when the messages are neither acknowledged by the client nor removed from the AMQP broker until the end of the business day.

7.1 Failover after connection loss

The Eurex Clearing FIXML Interface uses a single IP address for receiving connections from Eurex Members. This IP address always points to the active node of our AMQP cluster. In the unlikely event that a broker fails or that a client application loses connection to a broker, the client application should attempt to periodically reconnect to the same IP address. The IP address remains the same even in case of a reconnect using a line to different operation center.

Reconnecting to the AMQP broker with the same account means:

- **For persistent queues (broadcast queues)**: The client application will see all messages which were already read, but not acknowledged or their acknowledgment was not yet processed by the broker, as well as all new unread messages of the corresponding queue. A limited number of duplicate messages may appear in this situation. For methods of duplication detection, please see Failover to another account below.

7.2 Failover to another account

Should an exceptional situation, such as fatal database failure, occur in the member system it might be necessary to fail over to another account with the same Member ID in order to “replay” the current business day. To this end, another account has to be set up and configured with another valid certificate in the Member Section.

Please note the following regarding account failover:

- **Response Queue**: The client application can create up to 10 response queues per account upon connecting to the AMQP broker. Each request sent to the AMQP broker has to contain a routing key for the reply answer. It is not possible to route a reply message to another account. Additionally, these queues are deleted in case the connection is terminated. Consequently, the response queue of the second account does not contain any responses from the original account and all response messages are lost in case of failover.
- **Trade Confirmation Queue**: Transaction Confirmations (broadcasts) are sent into each trade confirmation queue with the correct Member ID. This means that the member will find the transaction confirmations of the whole business day in the trade confirmation queue of another account with the same member id. In order to identify a transaction, *TradeReportID*

(571) can be used. Please note that *TradeReportID* is unique across the clearing system. Note: Some messages contains a message ID property in the header, which cannot be used for duplicate detection.
A quicker method to detect if a message was already received is the message level identifier described in section 4.24.3.

- **Workflow Queue**: Broadcasts are sent into each workflow queue with the correct Member ID. For trade adjustments the *TradeReportRefID* (572) and for give-up/take-up processing the *AllocID* (70) can be used to identify messages already received.
A quicker method to detect if a message was already received is the message level identifier described in section 4.24.3.

8 Glossary

AMQP	**A**dvanced **M**essage **Q**ueuing **P**rotocol AMQP is an open standard for messaging middleware, with a specific focus on the financial services industry. For more information, see www.amqp.org
API	**A**pplication **P**rogramming **I**nterface
Derivatives Clearing GUI	The Derivatives Clearing GUI is a web-based GUI first introduced with C7 release 1.0.
FIXML	**F**inancial **I**nformation e**X**change **M**arkup **L**anguage The Financial Information eXchange (“FIX”) Protocol is a series of messaging specifications for the electronic communication of trade-related messages. FIXML is the protocol’s XML vocabulary.
ISV	**I**ndependent **S**oftware **V**endor
NCM	**N**on-**C**learing **Member** An exchange participant that does not hold a clearing license. Such a participant must have a clearing agreement in effect with a General Clearing Member or a company-affiliated Direct Clearing Member
Off-book Trades Eurex Trade Entry Services	At Eurex, these are transactions in Eurex-listed products where the price has been agreed off-exchange, and where the transaction has subsequently been recorded at Eurex for settlement and margining purposes. To learn more about the various kinds of Off-book Trades supported by Eurex, please refer to https://www.eurex.com/ex-en/trade/eurex-t7-entry-services.