DEUTSCHE BÖRSE
GROUP

Eurex Bonds Fiximulator

User Guide

Version 1.0

Versions

Version	Date	Comment
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Table of Content

1 **Introduction** **4**
1.1 Disclaimer 4
1.2 What is the Fiximulator 4
1.3 Why Fiximulator should be used 4

2 **Accessing the simulator** **5**
2.1 Supported Browsers 5
2.2 Session establishment 5
2.3 Connection 5

3 **FIX test scenarios** **6**
3.1 Request for Quote (RFQ) 6
3.1.1 Example of working RFQ test scenario 11
3.2 Request for Order (RFO) 14
3.3 Indication of Interest (IOI) 17

4 **Contact** **18**

5 **Appendix** **18**
5.1 Abbreviations 18

1 Introduction

This document specifies how to use the Eurex Bonds Fix Simulator (Fiximulator).

1.1 Disclaimer

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1.2 What is the Fiximulator

The Fiximulator is an online tool / webpage / FIX endpoint that simulates specific Eurex Bonds workflows. It provides a variety of FIX workflow scenarios to test and then run against your application.

1.3 Why Fiximulator should be used

Fiximulator decreases development effort and offers a possibility to test the FIX client implementation before connecting it to a simulation or production environment.

2 Accessing the simulator

The internet endpoint for the ENP simulator is as follows:

www.enp-fiximulator.de

To access this page please contact Eurex Bonds in order to include your IP address into the whitelist. See Chapter 4 for contact details.

2.1 Supported Browsers

The following browsers are supported:

- Internet Explorer (Version 11.X)
- Edge
- Mozilla Firefox
- Google Chrome

2.2 Session establishment

In order to establish a new FIX session, the following prerequisites have to be input in the FIX interface that needs to be tested:

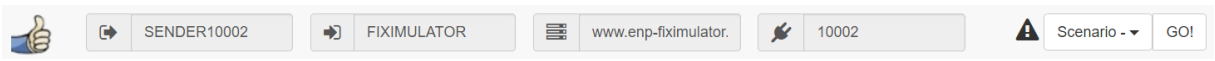
- Sender
- Target
- Host
- Port

All this information is to be found at the top of Fiximulator webpage.

2.3 Connection

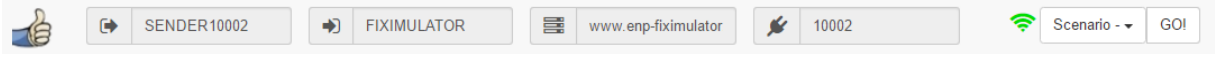
User cannot choose (i.e. load) and execute any scenario until your FIX client is connected. The Fiximulator frontend will display a warning sign next to the dropdown list with scenarios (See figure 2.3.1).

Figure 2.3.1 Connection is not established



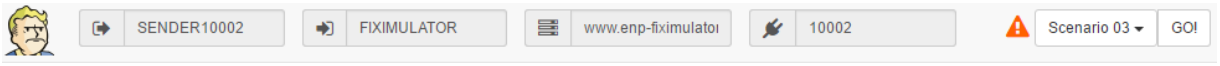
Pop-up window of Fiximulator's frontend and green sign next to dropdown list with scenarios (See Figure 2.3.2) will inform user that FIX endpoint is connected.

Figure 2.3.2 Connection established



If your FIX client loses connection with Fiximulator while one of the scenarios is running, a pop-up window and red sign (See Figure 2.3.3) will inform user about that.

Figure 2.3.3 Loss of connection while scenario is running



3 FIX test scenarios

Preliminary version, changes may follow.

Each scenario can be chosen from a dropdown list provided at the Fiximulator webpage only after successful connection of your FIX client to Fiximulator. Each FIX test scenario is linked to corresponding workflow in “Eurex Bonds Negotiation Platform - FIX Specification” document in the chapter 7 “Workflows”.

3.1 Request for Quote (RFQ)

A Request for Quote (RFQ) is a negotiation process in which one party (“Initiator”) starts the workflow with one or more counterparties (“Dealers”). The Initiator requests a quote from the Dealers in an instrument for a specified volume.

Dealers can respond to the RFQ in several ways:

- Reject
- Ignore (leads to timeout)
- Provides a Quote

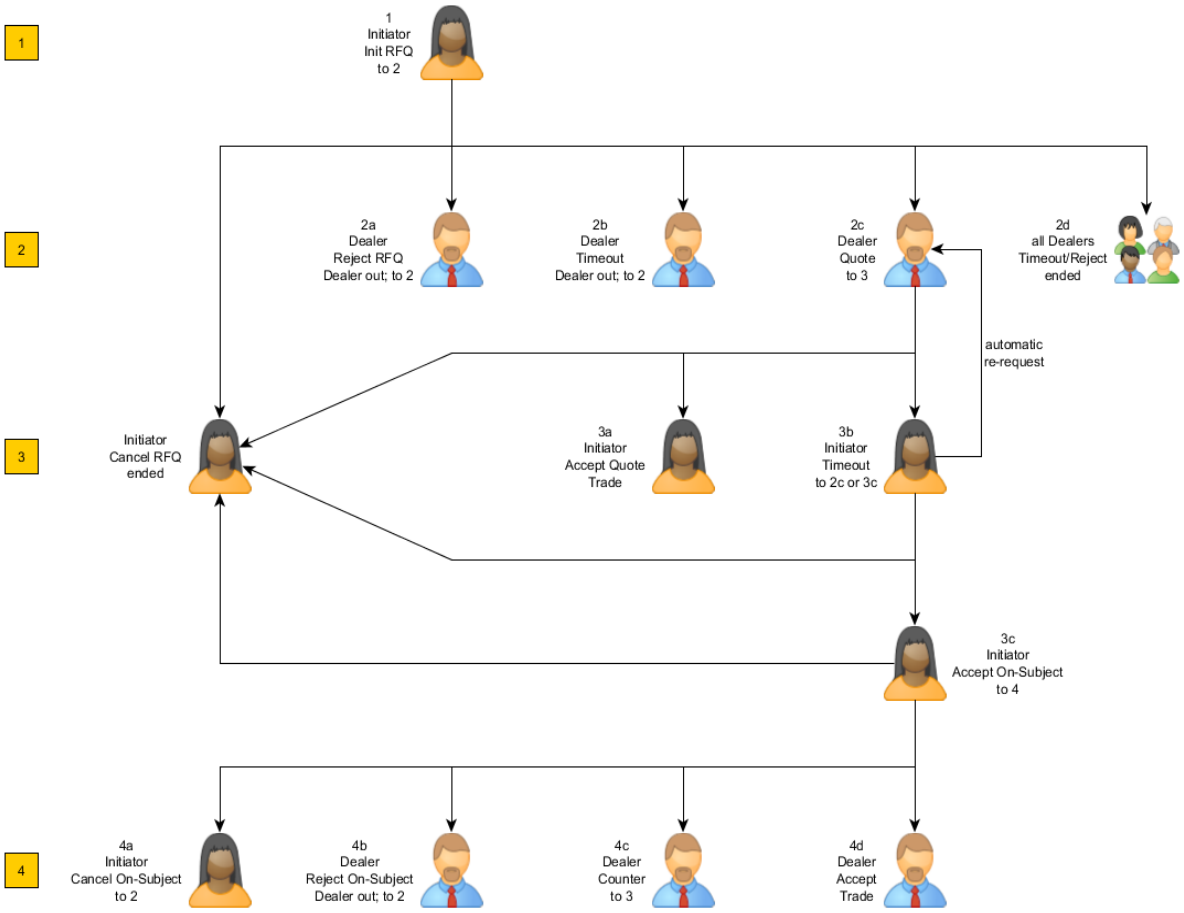
A quote is always firm for the wiretime that is sent together with the quote. After the wiretime has expired, the quote will be no longer firm (it will be “On-Subject”).

A quote that is On-Subject can be

- Updated by the Dealer – It will then again be on-wire for the specified wiretime
- Accepted by the Initiator – The quote will then be required to be accepted by the Dealer again

See the RFQ Workflow Diagram in **Error! Reference source not found.** for the detailed workflow.

Figure 3.1.1 RFQ Workflow Diagram



Fiximulator provides test scenarios to see whether the connected FIX client sends out and receives correct FIX messages that satisfy the RFQ workflow. For now Fiximulator can act as the initiator of RFQs (See Diagram 3.1.1 part 1 – "1 Initiator init RFQ to 2").

Table 3.1.2 contains possible scenarios where Fiximulator acts as Initiator (1) and the tested FIX client is a Dealer (2…).

To look up the messages that are sent out or should be received by Fiximulator "Eurex Bonds Negotiation Platform - FIX Specification" document, particularly chapter 10 "Trading Workflows and related messages" should be considered.

Table 3.1.2 **RFQ Dealer test scenarios**

#	Scenario	Behaviour
	Simple workflow	
1	RFQ D – Dealer Reject	Initiator (1) sends RFQ (sends message of type “R”). Dealer (2a) rejects or passes (message of type “AG”)
2	RFQ D – Dealer Timeout	Initiator (1) sends RFQ (sends message of type “R”). Dealer (2b) fails to answer and receives message of type “AG”
3	RFQ D – Initiator Accept	Initiator (1) sends RFQ (sends message of type “R”). Dealer (2c) sends a quote (message of type “S”) and Initiator (3a) accepts shortly after (message of type “AJ”). Execution report of the trade is sent out (message of type “8”)
4	RFQ D – Initiator Accept Other	Initiator (1) sends RFQ (sends message of type “R”). Dealer (2c) sends a quote (message of type “S”) and Initiator (3a) sends shortly after (message of type “AJ”) that he/she accepted another quote
5	RFQ D – Initiator Cancel	Initiator (1) sends RFQ (sends message of type “R”) and cancels the whole RFQ negotiation shortly after (message of type “AJ”)
6	RFQ D – Initiator Cancel after Quote	Initiator (1) sends RFQ (sends message of type “R”). Dealer (2c) sends a quote (message of type “S”) and Initiator (3a) and cancels the whole RFQ negotiation shortly after (message of type “AJ”)
7	RFQ D – Member Answer	Initiator (1) sends RFQ (sends message of type “R”). Shortly after Dealer (2c) receives information that other dealer answered with a quote (message of type “S”)

#	Scenario	Behaviour
	On-Subject Workflow	
8	RFQ D - On-Subject Dealer Accept Initiator Cancel	Initiator (1) sends RFQ (sends message of type “R”). Dealer (2c) sends a quote (message of type “S”), wiretime runs out and server sends Re-QuoteRequest (message of type “R”), Initiator (3c) accepts on-subject quote (message of type 'AJ') and Initiator (4a) then cancels the whole negotiation before Dealers have answered (message of type 'AJ')
9	RFQ D - On-Subject Dealer Accept Initiator Reject	Initiator (1) sends RFQ (sends message of type “R”). Dealer (2c) sends a quote (message of type “S”), wiretime runs out and server sends Re-QuoteRequest (message of type “R”), Initiator (3c) accepts on-subject quote (message of type 'AJ') and then Dealer (4b) rejects the on-subject accept of the initiator. (message of type 'AG')
10	RFQ D - On-Subject Dealer Accept Initiator Revoke	Initiator (1) sends RFQ (sends message of type “R”). Dealer (2c) sends a quote (message of type “S”), wiretime runs out and server sends Re-QuoteRequest (message of type “R”), Initiator (3c) accepts on-subject quote (message of type 'AJ') and then Initiator (4a) revokes his on-subject accept from Dealer. (message of type 'R')
11	RFQ D - On-Subject Dealer Accept Initiator Timeout	Initiator (1) sends RFQ (sends message of type “R”). Dealer (2c) sends a quote (message of type “S”), wiretime runs out and server sends Re-QuoteRequest (message of type “R”), Initiator (3c) accepts on-subject quote (message of type 'AJ') Dealer is then failing to answer within given time and server sends Re-QuoteRequest (message of type 'R'), timeout

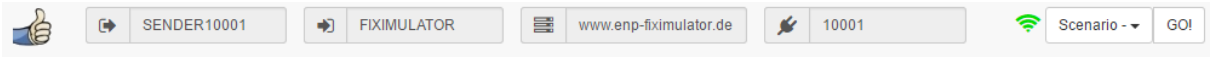
#	Scenario	Behaviour
12	RFQ D - On-Subject Dealer Accept Overall Timeout	Initiator (1) sends RFQ (sends message of type “R”). Dealer (2c) sends a quote (message of type “S”), wiretime runs out and server sends Re-QuoteRequest (message of type “R”), Initiator (3c) is timing out and accepts on-subject quote (message of type 'AJ'). After that RFQ overall time runs out (message of type “AJ”)
13	RFQ D - On-Subject Initiator Cancel	Initiator (1) sends RFQ (sends message of type “R”). Dealer (2c) sends a quote (message of type “S”), wiretime runs out and server sends Re-QuoteRequest (message of type “R”) and Initiator (4a) then cancels the whole negotiation before Dealers have answered (message of type 'AJ')
14	RFQ D - On-Subject Overall Timeout	Initiator (1) sends RFQ (sends message of type “R”). Dealer (2c) sends a quote (message of type “S”), wiretime runs out and server sends Re-QuoteRequest (message of type “R”). After that RFQ overall time runs out (message of type “AJ”)
15	RFQ D - On-Subject Trade	Initiator (1) sends RFQ (sends message of type “R”). Dealer (2c) sends a quote (message of type “S”), wiretime runs out and server sends Re-QuoteRequest (message of type “R”). Initiator (3c) accepts on-subject quote (message of type 'AJ'). Dealer (4d) accepts on-subject accept of the initiator (message of type “AI”). Initiator sends Initiator acknowledgement (message of type “AJ”). Execution report of the trade is sent out (message of type “8”)

#	Scenario	Behaviour
16	RFQ D - On-Subject Trade Other	Initiator (1) sends RFQ (sends message of type “R”). Dealer (2c) sends a quote (message of type “S”), wiretime runs out and server sends Re-QuoteRequest (message of type “R”). Initiator (3c) accepts on-subject quote (message of type 'AJ') and Initiator (3a) sends shortly after (message of type “AJ”) that he/she accepted another quote
17	RFQ D - Overall Timeout After Quote	Initiator (1) sends RFQ (sends message of type “R”). Dealer (2c) sends a quote (message of type “S”). After that RFQ overall time runs out (message of type “AJ”)

3.1.1 Example of working RFQ test scenario

To start testing a FIX interface using the FIXimulator, a session between the FIX interface and the FIXimulator needs to be established.
Credentials for session are situated at the top of the www.enp-fiximulator.de webpage (See Figure 3.1.1.1). FIX Version=FIX50SP2.

Figure 3.1.1.1 **Prerequisites for a session creation**

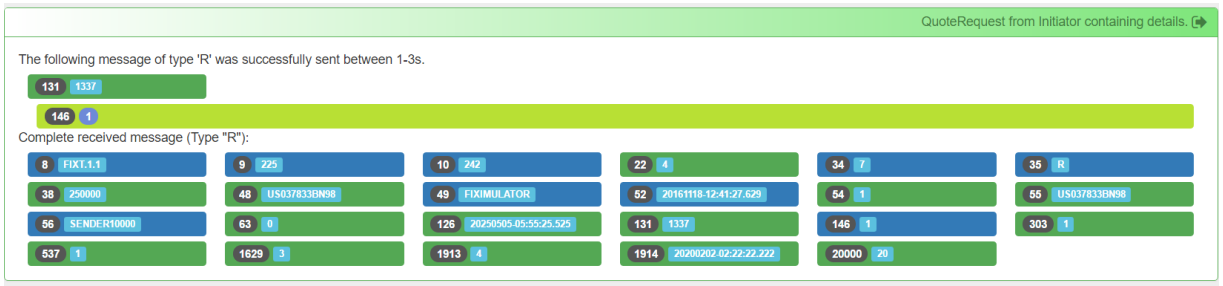


Sender Target Host Port Connection

Only after a session is created (user should see green sign as at the Figure 3.1.1.1) a scenario can be chosen. “RFQ D – Initiator Accept” will be described here as example.
In this scenario (See 3.1.1) Initiator (1) sends RFQ (sends message of type “R”). Dealer (2c) sends a quote (message of type “S”) and Initiator (3a) accepts shortly after (message of type “AJ”). Execution report of the trade is sent out (message of type “8”).

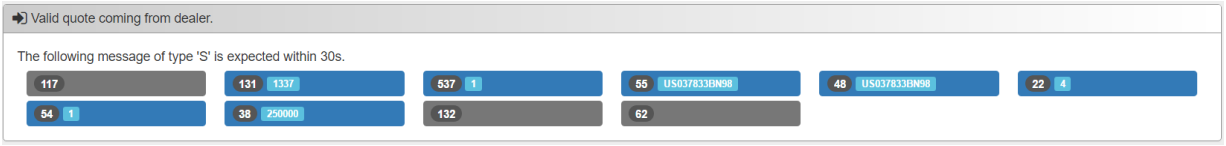
In this scenario Initiator (Fiximulator) sends RFQ, i.e. message of type “R” (See Figure 3.1.1.2).

Figure 3.1.1.2 **Quote Request from Initiator**



Dealer (FIX Interface) should answer with a quote (message of type “S”) within 30s. Figure 3.1.1.3 shows the fields that are to be sent by Dealer (FIX Interface). Grey coloured fields indicate that can include any string value. Blue coloured fields, on the contrary, should include specific values that can be seen in them.

Figure 3.1.1.3 **Valid quote from Dealer (FIX Interface)**

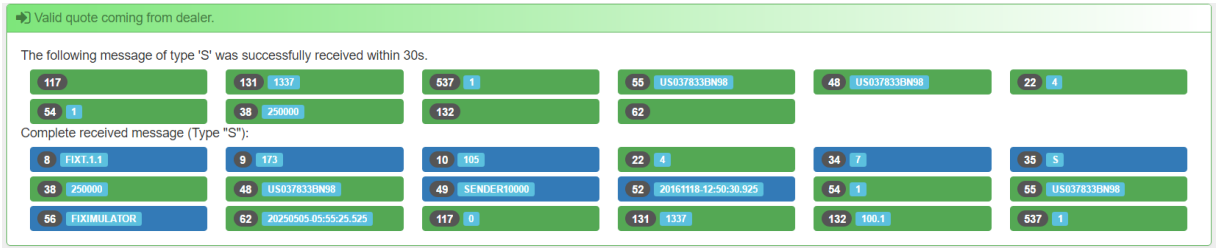


After FIX Interface sent out its message, Fiximulator processes received message.
Possible outcomes:

- **Correct behaviour**

Upper part of Figure 3.1.1.4 shows green fields indicating that received message contained correct fields with correct tags. Lower part of the Figure 3.1.1.4 shows the whole received message.

Figure 3.1.1.4 **Valid message from Dealer (FIX Interface)**



After Dealer answered with a quote, Initiator (Fiximulator) accepts quote shortly after and sends message of type “AJ”. Execution report of the trade is sent out in the next message of type “8” (See Figure 3.1.1.5). Test passed.

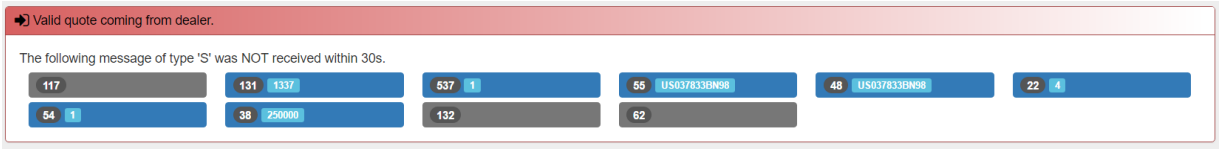
Figure 3.1.1.5 **Initiator is accepting the quote and sends out Execution report**



- **Timeout**

If message is not received within 30s after initiation of this test, box at the Figure 3.1.1.6 turns red. Test failed. Fiximulator does not sent out other messages.

Figure 3.1.1.6 **Timeout**



- **Malformed**

If the type of the message (“S”) is correct but values in some fields are wrong, Fiximulator will indicate it with red (See Figure 3.1.1.7). In the case on the Figure 3.1.1.7 field with tag “27” contains “3” but should have contained “4”. Test failed.

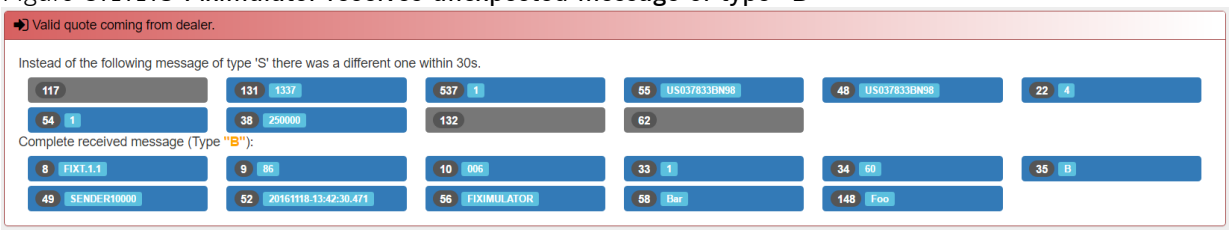
Figure 3.1.1.7 **Invalid message from Dealer (FIX Interface)**



- **Unexpected message**

If the message of the wrong type is received, Fiximulator indicates it by informing that received message differentiates from expected one (Figure 3.1.1.8). Test failed.

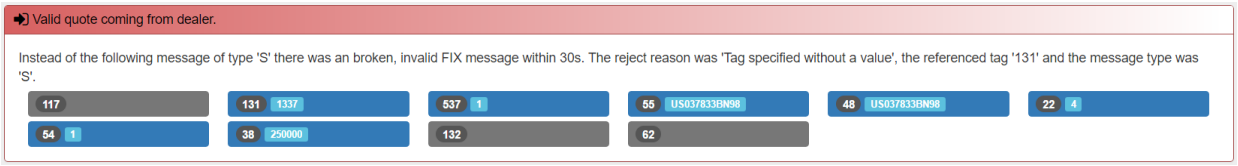
Figure 3.1.1.8 **Fiximulator receives unexpected message of type “B”**



- **Broken invalid message**

If the broken message is received, Fiximulator will also indicate it. As an example, the reject reason in the Figure 3.1.1.9 was 'Tag specified without a value', that is referenced to the tag '131'. That means that the specified field with tag “131” was empty which is not allowed.

Figure 3.1.1.9 **Fiximulator receives broken invalid message of type “S”**



3.2 Request for Order (RFO)

A Request for Order (RFO) is a negotiation process in which one party (“Initiator”) starts the workflow with exactly one counterparty (“Dealer”). The Initiator requests an order from the Dealer in an instrument for a specified volume and price.

The Initiator has the possibility to cancel, as long as the Dealer has not responded. Dealers can respond to the RFO in various ways:

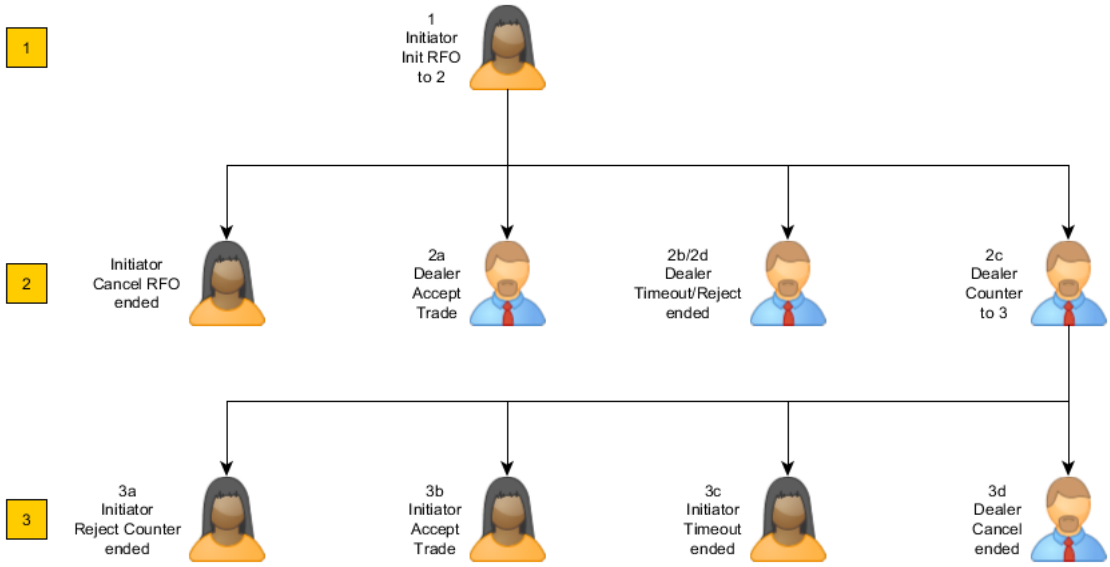
- Accept the RFO (leading directly to a trade)
- Reject / Ignore the RFO
- Counter

In case the Dealer counters the RFO, he has the possibility to cancel the workflow, as long as the Initiator has not responded to the counter. The Initiator has the following options to respond to the counter:

- Accept the counter (leading directly to a trade)

- Reject / Ignore the Counter

Figure 3.2.1 **RFO Workflow Diagram**



Fiximulator provides test scenarios to see whether the FIX interface sends out and receives correct FIX messages that satisfy RFO workflow. For now Fiximulator can act as the initiator of RFO (See Diagram 3.2.1 part 1 – "1 Initiator init RFO to 2").

Table 3.2.2 contains possible scenarios where Fiximulator acts as Initiator (1) and tested FIX interface is a Dealer (2…).

To look up the messages that are sent out or should be received by Fiximulator "Eurex Bonds Negotiation Platform - FIX Specification" document, particularly chapter 10 "Trading Workflows and related messages" should be considered to look into.

Please note that FIX specifications have only one type of message "R" for both RFQ and RFO. The difference by which FIX interfaces differenciate whether it is RFO or RFQ is field with tag "44" (price). That is the reason why Fiximulator always sends "QuoteRequest" and Dealers always answer with "quote".

Table 3.2.2 **RFO Dealer test scenarios**

#	Scenario	Behaviour
1	RFO D – Dealer Counter Cancel	Initiator (1) sends RFO (sends message of type "R"). Dealer (2c) sends a quote (message of type "S") and Dealer (3d) rejects shorly afterwards (sends a message of type "AG")

#	Scenario	Behaviour
2	RFO D – Dealer Counter Initiator Accept	Initiator (1) sends RFO (sends message of type “R”). Dealer (2c) counter by sending a quote (message of type “S”) and Initiator (3b) accepts shortly after (message of type “AJ”). Execution report of the trade is sent out (message of type “8”)
3	RFO D – Dealer Counter Initiator Reject	Initiator (1) sends RFO (sends message of type “R”). Dealer (2c) counter by sending a quote (message of type “S”) and Initiator (3a) rejects a counter by sending message of type "AJ"
4	RFO D – Dealer Counter Initiator Timeout	Initiator (1) sends RFO (sends message of type “R”). Dealer (2c) counter by sending a quote (message of type “S”) and Initiator (3c) fails to answer which leads to timeout (message of type 'AG')
5	RFO D – Dealer Reject	Initiator (1) sends RFO (sends message of type “R”) Dealer (2b/2d) rejects (pass) the RFO request (message of type “AG”)
6	RFO D – Dealer Timeout	Initiator (1) sends RFO (sends message of type “R”). Dealer (2b/2d) has timeout (message of type “AG”)
7	RFO D – Dealer Accept	Initiator (1) sends RFO (sends message of type “R”). Shortly after Dealer (2a) accepts trade (message of type "AJ"). After that Quote status report for the dealer after accepting is sent out (message of type "AI") as well as Execution report of the trade (message of type "8")
8	RFO D - Initiator Cancel	Initiator (1) sends RFO (sends message of type “R”) and then cancels the whole RFO negotiation shortly after (message of type “AJ”)
9	RFO D - Other dealer answers	Initiator (1) sends RFQ (sends message of type “R”) and shortly after Information that other dealer answered with a quote is sent out (message of type "S")

3.3 Indication of Interest (IOI)

IOI messages are used to broadcast Axes into the system and to all participants. For the detailed information see Figure 3.3.1 and/or “Eurex Bonds Negotiation Platform - FIX Specification” document, particularly chapter 10 “Trading Workflows and related messages”.

Figure 3.3.1 **Workflow Diagrams Axe**



Fiximulator provides one scenario “AXE D - New, Replace, Delete” that covers the entire workflow.

Initiator (Fiximulator) sends out the sequence of messages that contain different information:

- New IOI coming from Initiator (message of type “6”, IOITransType=N)

- IOI update coming from Initiator (message of type “6”, IOITransType=C)

- Initiator removing IOI (message of type “6”, IOITransType=R)

To see the difference between the messages please refer to “Eurex Bonds Negotiation Platform - FIX Specification” document, particularly chapter 10 “Trading Workflows and related messages”.

4 Contact

Eurex Bonds Helpdesk: +49 69 211 11 222

Eurex Bonds Support-Address: info@eurex-bonds.com

5 Appendix

5.1 Abbreviations

RFQ – Request for Quote

RFO – Request for Order

IOI - Indication of Interest

Axe - the interest that a person or trader shows in buying or selling a financial security

FIX - Financial Information eXchange protocol provided by the FIX Trading Community

D – Dealer

FIX client – FIX client that is to be tested