

Rational Integration Tester



Reference Guide for Financial Information eXchange (FIX)

Version 8.0.0



Note

Before using this information and the product it supports, read the information in “Notices” on page 19.

This edition applies to version 8.0.0 of Rational Integration Tester and to all subsequent releases and modifications until otherwise indicated in new editions.

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About this Publication

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Intended Audience

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This guide describes how to use the Financial Information eXchange (FIX) transport and FIX dictionaries in IBM® Rational® Integration Tester to help you test trade-related messages and the systems that use them.

Intended Audience

This document intended to be read by those with a fair understanding and exposure to the concepts involved in both testing and development and in enterprise integration.

Scope

This document discusses the use of IBM Rational Integration Tester with the FIX transport and FIX dictionaries. Information about other features and functionality in Rational Integration Tester is beyond the scope of this document.

If you wish to familiarize yourself with Rational Integration Tester, please refer to the online help or any of the documentation that is provided with the product.

Typographical Conventions

The following typographical conventions are observed throughout this document:

Type	Usage
Constant Width	Program output, listings of code examples, file names, commands, options, configuration file parameters, and literal programming elements in running text.
<i>Italic</i>	Document title names in statements that refer you to other documents. Also used to highlight concepts when first introduced.
Bold	Menu items in graphical user interface windows (such as Microsoft Windows-based or UNIX X Window applications) from which you select options or execute macros and functions. Submenus and options of a menu item are indicated with a “greater than” sign, such as Menu > Submenu or Menu > Option .

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FIX Dictionaries

Contents

Overview

Adding FIX Dictionaries

Applying FIX Dictionaries to Messages

This chapter provides information about how to add FIX dictionaries to Rational Integration Tester and apply them to messages for testing FIX messages and messaging systems.

1.1 Overview

FIX dictionaries can be added to Rational Integration Tester and applied to messages, allowing you to construct messages in a format that is meaningful to the system under test.

The FIX Protocol is a series of messaging specifications for the electronic communication of trade-related messages. It has been developed through the collaboration of banks, broker-dealers, exchanges, industry utilities and associations, institutional investors, and information technology providers from around the world.¹

NOTE: A FIX dictionary can be applied as a schema (that is, a node formatter) to text (String) nodes in text-based messages.

1. <http://www.fixprotocol.org>

1.2 Adding FIX Dictionaries

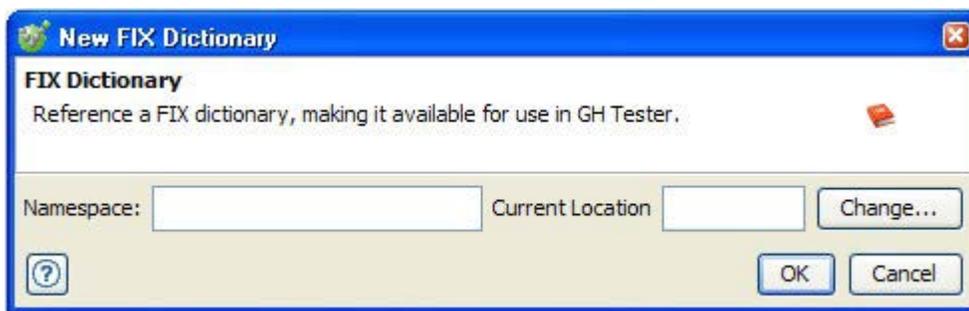
This section describes how to add a FIX Dictionary to the Schema Library in Rational Integration Tester's Architecture School perspective.

NOTE: Rational Integration Tester uses QuickFIX/J, so any dictionaries added must be in QuickFIX format.

1. Open the Architecture School perspective (**F7**) and select the Schema Library view.
2. Click the **FIX Dictionary** icon in the Schema Library toolbar.



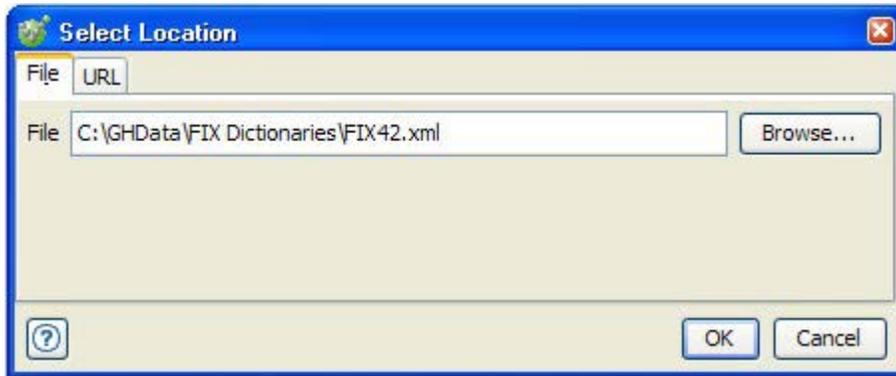
The **New FIX Dictionary** dialog is displayed.



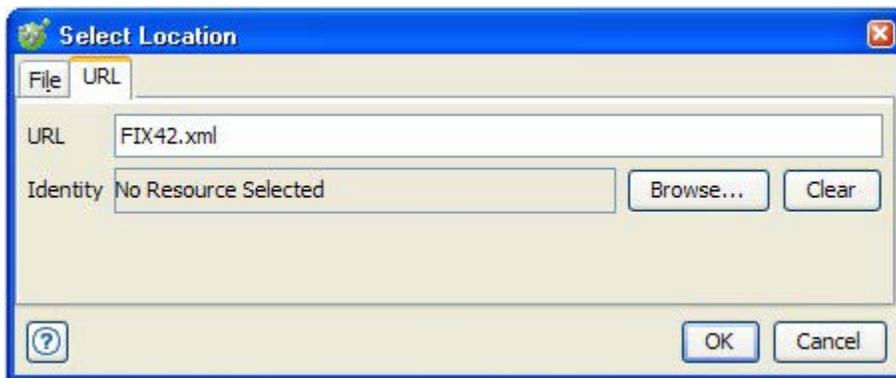
3. Configure the options to use for the new dictionary, as follows:

Type	Usage
Namespace	A string describing the version of the added dictionary in the format of "FIX.x.y" (x is the major version and y is the minor version). For example, FIX.4.2 .
Current Location	Denotes the full path (system or URL) to the file containing the dictionary (click Select to enter path or URL, see next step).

-
- In the **Select Location** dialog, click **Browse** to locate and select a local schema file, or click the **URL** tab to enter the URL of a remote file.



NOTE: Rational Integration Tester includes the QuickFIX 4.0 through 4.4 dictionaries as defined by the FIX specification (see <http://www.fixprotocol.org>). As such, you can specify any of these dictionaries by URL using just the dictionary filename (for example, FIX42.xml).



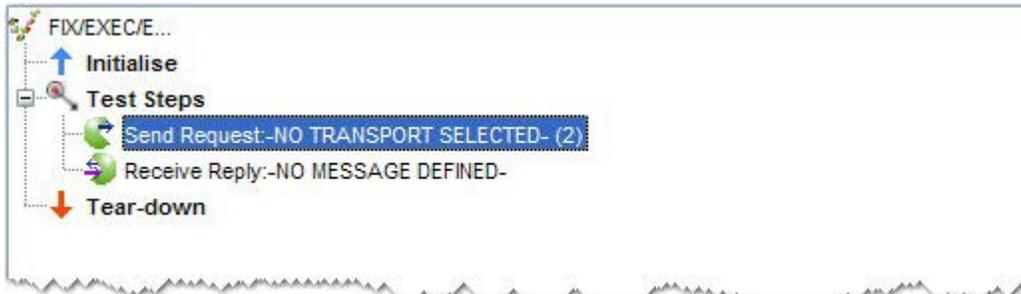
- Click **OK** when finished, and click **OK** in the **New FIX Dictionary** dialog.
- The selected FIX dictionary is now available to be applied to messages as a schema.

NOTE: If desired, you can drag and drop FIX dictionaries into the Schema Library to import several files at once.

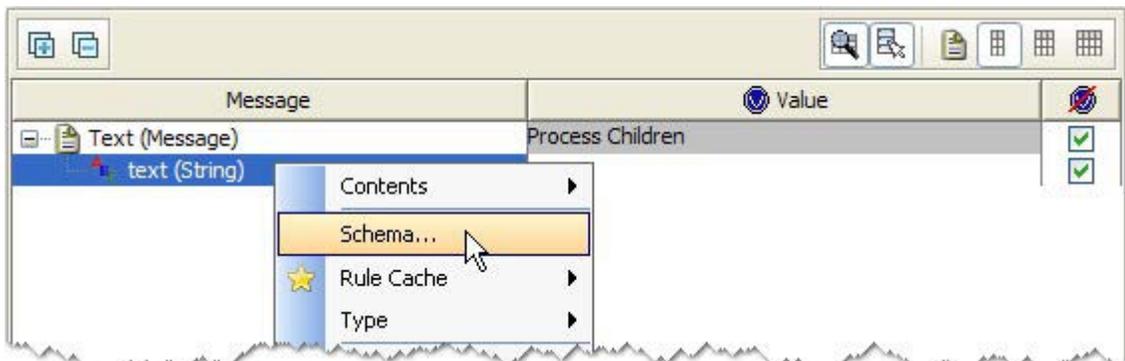
1.3 Applying FIX Dictionaries to Messages

Once your FIX dictionary has been added to Rational Integration Tester, it can be applied to messages in applicable test actions (that is, to text nodes). The following example illustrates how to apply an existing FIX dictionary to a message.

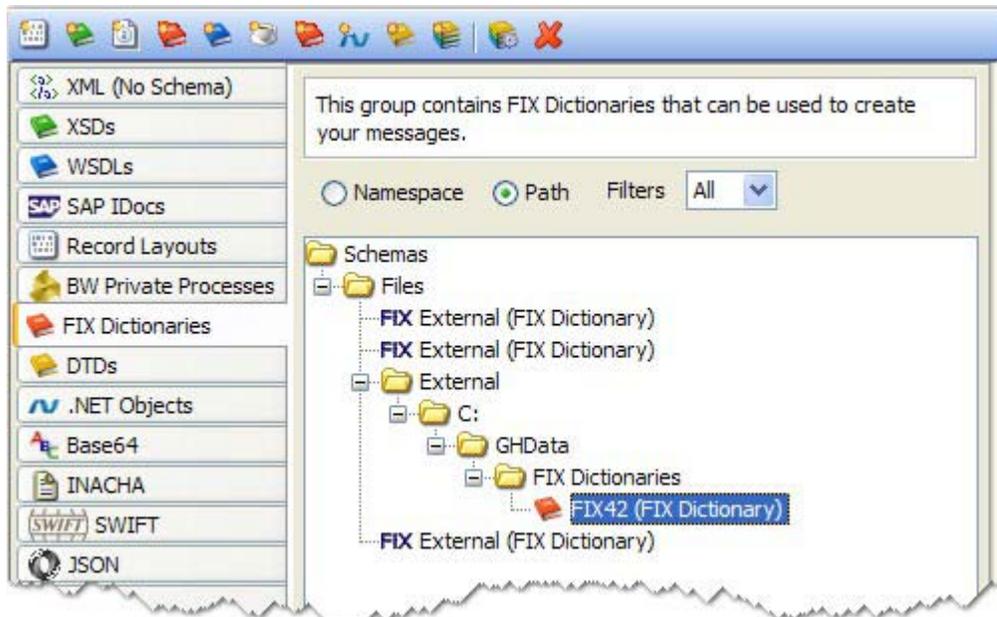
1. Create a new test in an operation that contains a reference to a transport supporting messages of type **Text**.
2. Add an outbound or inbound messaging action to the **Test Steps** phase of the test (for example, Publish, Send Request, and so on).



3. Open the messaging action for editing.
4. Select your transport and Text formatter.
5. In the message area, right-click the **text (String)** element and select **Schema** from the context menu.



- In the **Select Schema** wizard, select the **FIX Dictionaries** tab and select the schema that was imported into Rational Integration Tester's Schema Library.



- Under the **Roots** tab on the right side of the wizard, select the desired schema root.



- Click **Next** to proceed and set the desired Content and Assert options in the next wizard dialog, then click **Finish**.

-
- The schema will be applied to the original message, including the structure and content that is defined in the selected dictionary and root.

Message	Value	
Text (Message)	Process Children	<input checked="" type="checkbox"/>
text (String) {FDX}	Expanded Content	<input checked="" type="checkbox"/>
A (Logon)	Process Children	<input checked="" type="checkbox"/>
98 (EncryptMethod)		<input checked="" type="checkbox"/>
108 (HeartBtInt)		<input checked="" type="checkbox"/>
95 (RawDataLength)		<input checked="" type="checkbox"/>
96 (RawData)		<input checked="" type="checkbox"/>
141 (ResetSeqNumFlag)		<input checked="" type="checkbox"/>
383 (MaxMessageSize)		<input checked="" type="checkbox"/>
384 (NoMsgTimes)	Process Children	<input checked="" type="checkbox"/>

NOTE: For more information about messages, schemas, and validation, refer to *IBM Rational Integration Tester Reference Guide*.

The FIX Transport

Contents

Overview

Creating the FIX Transport

Configuring the FIX Transport

FIX Messages

Monitoring FIX Conversations

This chapter describes how to create and configure the FIX transport.

2.1 Overview

The FIX transport allows Rational Integration Tester to connect to FIX applications, acting as a client (initiator) or as a server (acceptor). Additionally, the FIX transport allows Rational Integration Tester to record FIX conversations (by means of pcap).

Rational Integration Tester supports FIX versions 4.0 through 4.4. The FIX transport is created with a physical FIX Connection component in Architecture School.

Creating the transport also creates a schema that can be viewed/modified in the Schema Library and applied to messages as a schema the same way a FIX dictionary can be (see [FIX Dictionaries](#)).

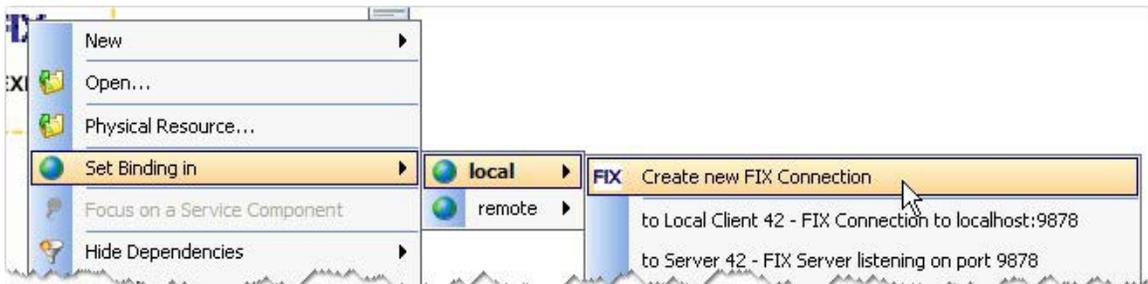
NOTE: Rational Integration Tester utilizes the QuickFIX/J engine (Java version of QuickFIX) for its FIX implementation. More information can be found at <http://www.quickfixj.org>.

2.2 Creating the FIX Transport

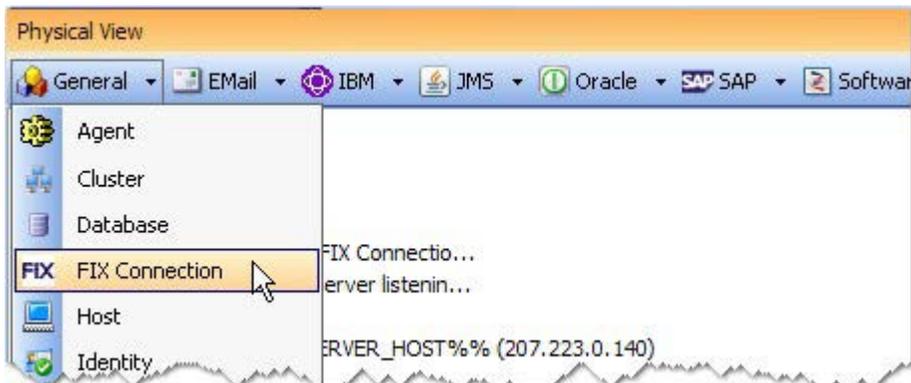
The FIX transport is created when you create a physical FIX Connection resource in Rational Integration Tester's Architecture School.

In Architecture School, you can create a new resource in two ways:

- In the Logical View, right-click on a TIBCO Rendezvous Bus and select the **Set Binding in > [environment] > Create new FIX Connection** option.



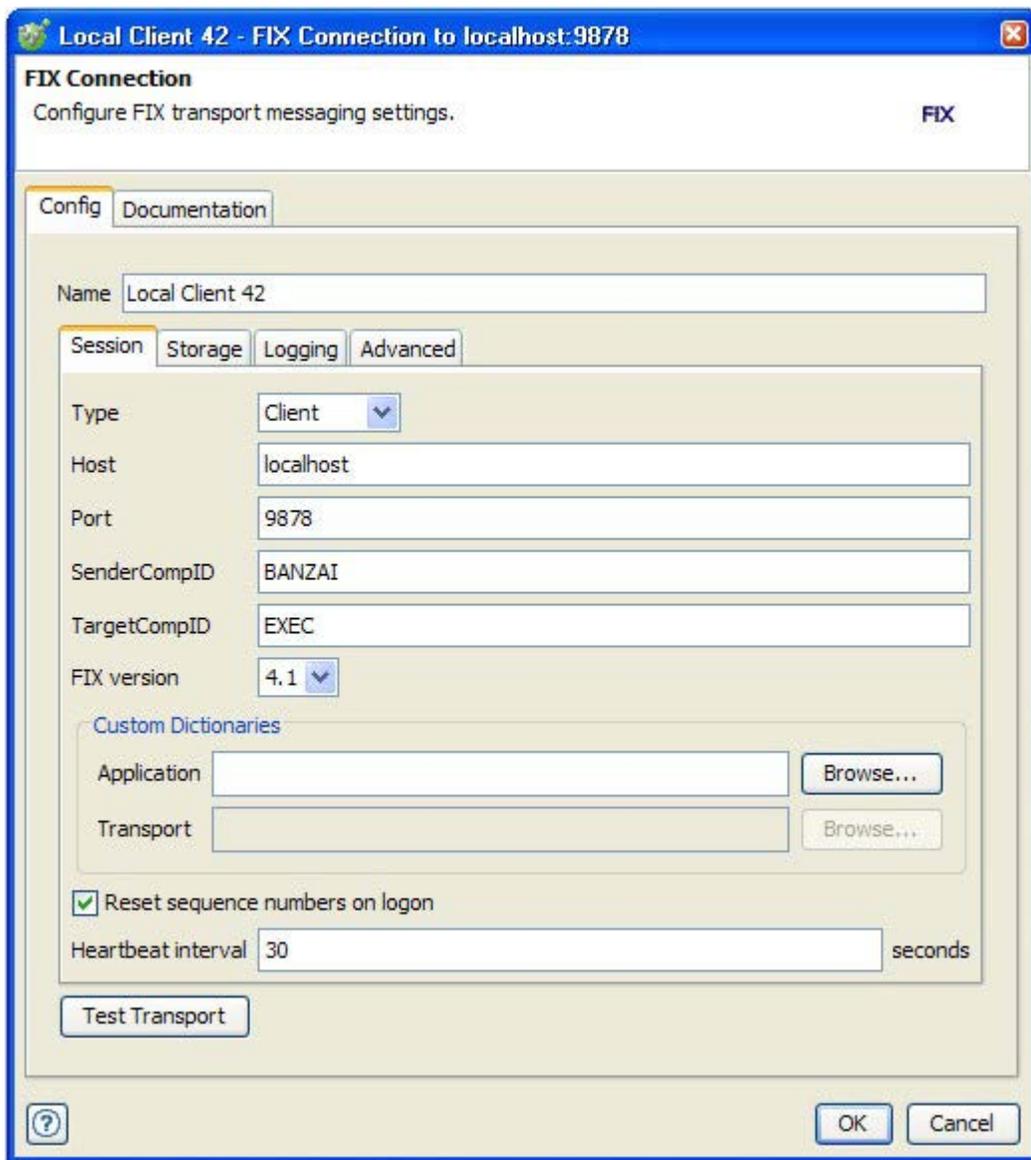
- In the Physical View, select the **General > FIX Connection** option.



Each physical FIX Connection resource will represent a FIX transport that can be selected and configured later on.

2.3 Configuring the FIX Transport

To configure a FIX transport, double-click the appropriate FIX Connection resource in Architecture School's Physical View.



If desired, enter a name for the transport in the **Name** field. The various transport settings are configured under the [Session](#), [Storage](#), [Logging](#), and [Advanced](#) tabs – all fields support tags, which can be entered manually or by using the context menu.

NOTE: You can test the connection parameters at any time by clicking the **Test Transport** button.

2.3.1 Session

The configuration options under the **Session** tab are described below:

Option	Description
Type	Defines if the session acts as an initiator (Client) or acceptor (Server).
Host	The host name or IP address of the server to which the initiator should connect (only available for Client sessions).
Port	The port to use when connecting to a session (client) or for listening to incoming connections (server).
SenderCompID	The component ID of the sender for this FIX session.
TargetCompID	The component ID of the target for this FIX session.
FIX version	The FIX version to use for this session.
Custom Dictionaries	Application: For all FIX versions, the path to an XML definition file to use for validating incoming FIX messages. If no file is supplied, only basic message validation will be done. Click Browse to locate and select a valid XML data dictionary file. Transport: Reserved for future use.
Reset sequence...	Determines if sequence numbers should be reset before sending/receiving a logon request.
Heartbeat interval	The heartbeat interval (in seconds) to be used by initiators.

2.3.2 Storage

The configuration options under the **Storage** tab are described below:

Option	Description
Persist messages	Determines if messages will be persisted.
Storage type	Determines how messages will be stored. If In Memory , messages are stored in memory and nothing else is configured. If File , then "Directory" is required.
Directory	The directory to store sequence number and message files. Click Browse to locate and select the desired directory.

2.3.3 Logging

The configuration options under the **Logging** tab are described below:

Option	Description
Logging type	Determines whether or not logging is enabled for sessions. If None , no logging information is saved. If File , logging details will be saved according to the remaining options.
Directory	The directory where log files should be saved. Click Browse to locate and select the logging directory.
Log heartbeats	Determines whether or not heartbeat messages will be logged.
Include milliseconds	Determines whether or not milliseconds are included in log time stamps.
Include timestamp for messages	Determines whether or not time stamps are included on message log entries.

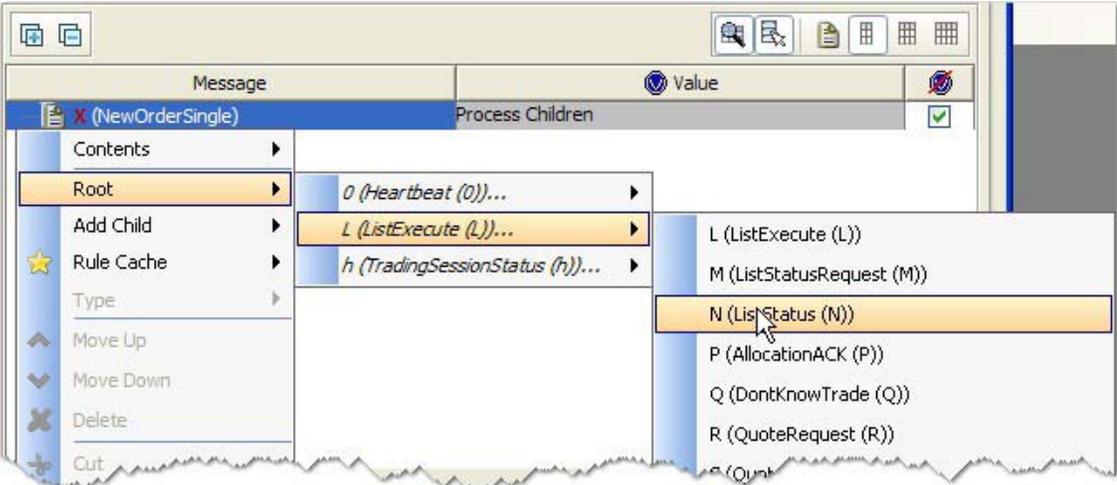
2.3.4 Advanced

The text field under the **Advanced** tab can be used to set any of the possible configuration options that are not made available under the **Session**, **Storage**, and **Logging** tabs. Configuration options should be entered one per line, in the following format: option=value (for example, StartTime=12:00:00).

Please refer to the QuickFIX/J User Manual (available at <http://www.quickfixj.org>) to learn more about possible configuration options.

2.4 FIX Messages

When sending and receiving messages using the FIX transport, FIX is the only formatter available, and no other schema can be applied to the message. Only the roots and child nodes available in the transport – determined by the FIX version used by the transport – can be applied to the message body.



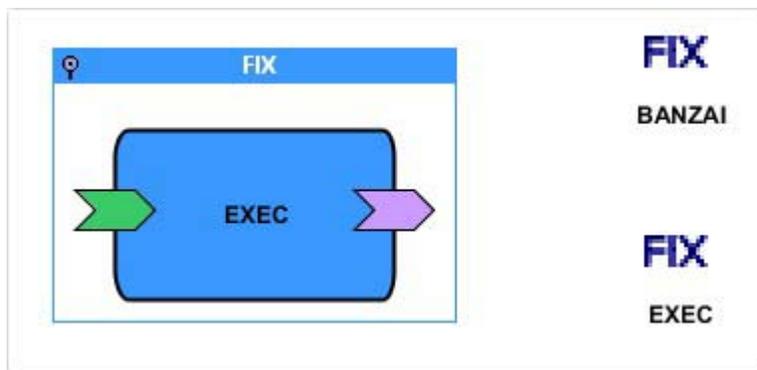
2.5 Monitoring FIX Conversations

Rational Integration Tester can record the conversation between a FIX client (initiator) and server (acceptor). Recording is illustrated by the following example, which utilizes the QuickFIX/J Banzai (client) and Executor (server) demo applications.

These applications are included in the binary and source code distributions of QuickFIX/J (available at the QuickFIX/J SourceForge project site).

NOTE: In the following example, Banzai is running on the same (local) machine as Rational Integration Tester and Executor is running on a remote machine.

The example Rational Integration Tester project contains a single operation “EXEC” that can be used to record the messages sent between Banzai and Executor running on the remote machine.



In the project, the logical “EXEC” FIX connection is bound to the physical FIX Connection that represents the remote Executor application, and the logical “BANZAI” FIX connection is bound to the local machine, which will run Banzai.

Once the transports and environments are set up as needed and Executor is running on the remote machine, recording can be started on the “EXEC” operation in Rational Integration Tester’s Recording Studio.

Banzai is launched on the local machine using a configuration file that points it to the remote host running Executor (that is, `SocketConnectHost=<remote-host>`).

In Banzai, a trade is submitted using the FIX 4.2 Session.

The screenshot shows the Banzai trading interface. At the top, there is a header bar with the title "Banzai". Below the header, there is a form for entering order details. The fields are: Symbol (GHS), Quantity (100), Side (Buy), Type (Market), Limit (empty), Stop (empty), and TIF (Day). Below these fields is a dropdown menu set to "FIX.4.2:BANZAI->EXEC" and a "Submit" button. Below the form, there are two tabs: "Orders" and "Executions". The "Executions" tab is active, showing a table with the following columns: Symbol, Quantity, Open, Execu..., Side, Type, Limit, Stop, AvgPx, and Target. The table is currently empty. At the bottom of the interface, there are buttons for "Cancel" and "Replace", and two input fields for "Quantity" and "Limit".

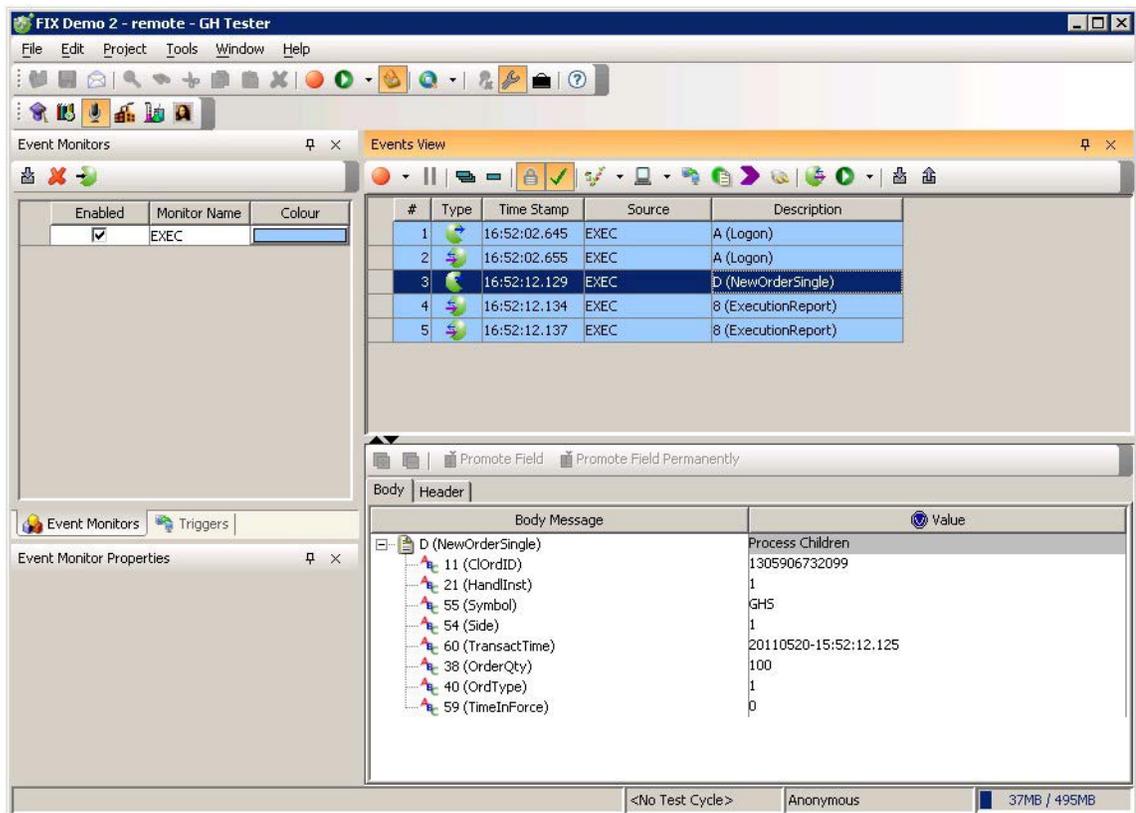
After submitting, the Executor should automatically fill the order.

The screenshot shows the Banzai trading interface after the order has been submitted. The "Submit" button is now disabled. The "Executions" tab is active, and the table now contains one row of data, highlighted in green:

Symbol	Quantity	Open	Execu...	Side	Type	Limit	Stop	AvgPx	Target
GHS	100	-100	100	Buy	Market			12.3	EXEC

At the bottom of the interface, the "Cancel" and "Replace" buttons are still visible, along with the "Quantity" and "Limit" input fields.

In Recording Studio, the captured messages will be displayed in the Events View.



Glossary

The following table below lists some of the key terms used in this document, and provides a description of each.

Term	Description
Field	A bit of data constituent to a message. Most fields are scalar and therefore unitary, equivalent to data attributes. Vector fields are an aggregation of fields both scalar and vector, and are usually referred to as Messages. See also Message.
Message	A unit of information made up of a header consisting of meta-information and a body consisting of the message data.
Host	The computer on which a software process runs.
Publisher-Subscriber	A messaging paradigm whereby a messaging network consists of Publishers and Subscribers.
Transport	Informally, the messaging software in use. For instance, TIBCO Rendezvous, TIBCO ActiveEnterprise, IBM WebSphere® MQ (JMS).
Publishing	Making a message (data) available on a message channel.
Subscribing	Receiving a stream of messages (data) on a given message channel.
Server	A host computer on a network shared by more than one user.

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