

# Basic Guide for Testing

## **SET FIX**

### The SET-FX FIX GATEWAY

Bogotá, January 2018

Version 0.3

## TEXT OF PROPRIETARY INFORMATION

This document is property of SET-FX, and is intended to be used exclusively by people involved in the SET-FIX project and may content confidential information.

## WARNING:

This document is intended to provide a guide to test the FIX Gateway of the affiliate and suggests basic test cases, thus it could not cover all cases the affiliate might request. It is on the affiliate's responsibility to execute the tests considering the functionality explained in the document "20171222 CO v3.62 FIX Specification for Datatec Systems".

### Review History and document information

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# 1 INTRODUCTION

## 1.1 Objective

The objective of this document is to describe all messages of the protocol FIX v5.0 SP2 that are implemented for SET-FIX, and the test cases that verify that the system complies with the requirements.

## 1.2 Scope

This document is a guide that allows clients to validate their development and test them against the SET-FIX so that they comply with the implementation.

This document is addressed to the IT área and all people involved in the execution of the test cases.

**Notice: *This document is NOT a certification of the development, it is intended to help clients test their development only.***

Test cases are organized by functional messages types according to the messages described in the following table:

Area	Sent by FIX Client	FIX Message Type	Sent by DFIX Gateway	FIX Message Type
Logon and Authentication	FIX Session Logon and Authentication Request	A	FIX Session Authenticated	A
			Authentication Failure	5
	FIX Session Logoff Request	5	FIX Session Logoff Response	5
Markets Definition	Market Definition Subscription Request	BT	Market Definition Response	BU
	N/A		Market Definition Update	BV
Market Data	Market Data Subscription Request	V	Subscription Reject	Y
			Subscription Response (snapshot/full refresh)	W
	N/A		Incremental Updates	X
	Market Data Unsubscribe Request	V	N/A	
Credit Limits	Credit Limits Subscription Request	CL	Credit limits Response	CM
	N/A		Credit limits Update	CR
	Credit Limits Unsubscribe Request	CL	N/A	
Order Management	Submit Order Request	D TimeInForce=1	Execution Report	8
	N/A		Execution Report (changes in status of an order)	8
	Order Amend Request	G	Execution Report	8
			Order Amend Reject	9
	Order Interrupt Request	F	Execution Report	8
			Order Interrupt Reject	9
	Interrupt All Orders Request	CA	Interrupt All Orders Accepted plus Execution Report (changes in status of orders)	BZ 8
			Interrupt All Orders Reject	BZ
	Hit/Take Order Request – specific amount	D TimeInForce=3	Execution Report (Cancelled when is not filled)	8
			Execution Report (Partial fill or filled)	8
	Order Status Request	H	Execution Report (order status)	8
			Order Status Reject	8
Area	Sent by FIX Client	FIX Message Type	Sent by DFIX Gateway	FIX Message Type
Post Trade	Trade Capture Report Request (Subscription)	AD	Trade Capture Reports	AE
			Request Reject	AQ
	Trade Capture Report Request (Unsubscribe)	AD	N/A	
	Trade Registration Request	AE	Trade Registration Request rejected or accepted	AR
			Trade Registration Request sent to counterpart	AE
	Confirm Trade Registration	AE	Confirm Trade Registration rejected	AR
			Trade Capture Report	AE
	Reject Trade Registration	AE	Reject Trade Registration sent to counterpart	AE





## 2 DEFINITION OF TEST CASES

### 2.1 Logon and Authentication

Logon and Authentication	CP-001	
<b>Description:</b>  Test if a corresponding FIX session profile can be established with different user profiles.		
<b>FIX Messages in this test</b>  Logon(35=A) Logout(35=5) Reject(35=3) ResendRequest(35=2) SequenceReset(35=4) TestRequest(35=1) Heartbeat(35=0) BusinessMessageReject(35=j)		
<b>Scope:</b> For more details Refer to section 6. Logon and Authentication (6.1 through 6.12) , in the <b>FIX Specification for Datatec Systems</b> document to cover all tests required for this section.  The test must cover: <ul style="list-style-type: none"> <li>6.1 Standard Header &amp; Trailer</li> <li>6.2 FIX Session Logon and Authentication</li> <li>6.3 FIX Session Logout</li> <li>6.4 Logon Failures and Account Locked</li> <li>6.5 Password Expired and Password Change</li> <li>6.6 Logon Submitted Tags, ckeck if table matches return of message.</li> <li>6.7 Scenarios and establish FIX Sessions</li> <li>6.8 Error Handling Messaging</li> <li>6.9 Resend Request</li> <li>6.10 Sequence Reset</li> <li>6.11 Test Request</li> <li>6.12 Heartbeat</li> </ul>		
<b>Exceptional cases:</b>  At least, include the following escenarios: <ul style="list-style-type: none"> <li>- Logon with unauthorized user id</li> <li>- Logon with unauthorized password</li> <li>- Logon with an expired password</li> <li>- Logon into a session that the user is not authorized</li> <li>- Test ResendRequest after dropping an active session. Try with different user profiles and session profiles.</li> <li>- Logon with valid userid and password, but add a "tag" that is not used or defined in the message.</li> </ul>		

## 2.2 Reference Data

Reference Data (Market Definition)	CP-002
<b>Description:</b>  Once the FIX Client has established a FIX session, the FIX Client using MarketData or OrderManagement profiles must send a message requesting the definition of the markets to which the user is authorized to access. This test case intends to confirm that all subsequent changes to the state of the market is properly published to the subscribed client.	
<b>FIX Messages in this test</b>  MarketDefinitionRequest (35=BT) MarketDefinition (35=BU) MarketDefinitionUpdateReport (35=BV)	
<b>Scope:</b>  For more details Refer to section 7. Markets Definition, in the <b><i>FIX Specification for Datafeed Systems</i></b> document to cover all tests required for this section.	
<b>Exceptional cases:</b> <ul style="list-style-type: none"> <li>- Start operating (sending orders or subscribing to market data) without sending a MarketDefinitionRequest message.</li> <li>- Send the MarketDefinitionRequest message, but add a "tag" that is not used or defined in the message.</li> <li>- Once subscribed to the MarketDefinition, change the state of the market in SetFX "Matching Engine" to "close", you should receive the update. Then try to send an order to that market.</li> </ul>	

## 2.3 Market Data

Market Data	CP-003
<p><b>Description:</b></p> <p>Market data is a profile for both DFIX Gateway and FIX Client, which provides real-time information of OrderBook (current bids and offers), market trades, trades summary and best prices per hour. This section explains how clients should request and deal this information.</p> <p>Test all posible combination between FIX Market data subscription (in FIX) and DM Cliente checkbox settings. Also, verify that Order Book (market Depth), market trades, trades summary and best prices per hour (Top of Book) are working properly abd correspondly.</p>	
<p><b>FIX Messages in this test</b></p> <p>MarketDataRequest(35=V)  MarketDataRequestReject(35=Y)  MarketDataSnapshotFullRefresh(35=W)  MarketDataIncrementalRefresh(35=X)</p>	
<p><b>Scope:</b></p> <p>For more details Refer to section 8. Market Data (8.1 through 8.9), in the <b>FIX Specification for Datatec Systems</b> document to cover all tests required for this section.</p> <p>The test must cover:</p> <p>8.1 Order Book  8.2 Market Trades  8.3 Trades Summary  8.4 Best Prices per Hour  8.5 Market Data Subscription  8.6 Market Data Subscription Rejected  8.7 Market Data Subscription Accepted  8.8 Market Data Incremental Refresh  8.9 Market Data Unsubscribe</p>	
<p><b>Exceptional cases:</b></p> <ul style="list-style-type: none"> <li>- Subscribe to “bid” and “offer” columns with Depth in SET-FIX. Check if you have a user with “bank” profile for SET-FIX. Run the test.  Then, change your subscription (without Unsubscribe) to NoMDEntryTypes=*, and wait for the correspondig W message type. If you receive the full book plus Top of Book, then there is an error.</li> <li>- Subscribe to Market Data full on an Order Management session</li> <li>- Subscribe to Market data full (as an authorized user) and get the corresponging W, enter an order and get the Incremental message (X), drop abruptly the session. Reestablish the session , subscribe again, see what happen, enter a new order in the book, see what happen.</li> <li>- Document your results.</li> </ul>	

## 2.4 Credit Limits

Credit Limits	CP-004
<p><b>Description:</b></p> <p>Test that it is possible to request:</p> <ul style="list-style-type: none"> <li>- credit limits information for specific parties, specific party roles or specific instruments.</li> </ul> <p>A firm may only request information about its own credit limits extended to other counterparties in the market segment or request credit limits extended to its own firm by the clearing house.</p> <p><b>Bilateral Limits</b></p> <p>FX Spot markets on Datatec like USD/COP, USD/CLP and USD/PEN use bilateral credit limits, where each firm that wants to trade in a market must define the amount of credit limits against their counterparties. The amounts are defined in three ways:</p> <ol style="list-style-type: none"> <li>1) <b>Buy/Sell Credit Limits:</b> Defined as separate limit amounts, one for purchases (buy limit) and other for sales (sell limit). For each one the remaining credit balance is calculated as the credit limit minus traded amounts (utilized amount) for the given side. The side is from the perspective of the party setting the limit against counterparties.  Example:  <i>Customer A extends 10 million buy credit and 12 million sell credit to CustomerB</i>  <i>If Customer A buys 4 million from CustomerB, the resulting buy credit limit balance will be 6 million. Subsequently, if Customer A sells 1 million to CustomerB, the resulting sell credit limit balance will be 11 million.</i> </li> <li>2) <b>Netted Credit Limits:</b> Defined as separate limit amounts, one for purchases and other for sales, where the remaining credit balance is calculated as the limit minus traded amounts for one side plus traded amounts of the other side.  Example:  <i>Customer A extends 10 million buy credit and 12 million sell credit to CustomerB.</i>  <i>If Customer A buys 4 million from CustomerB, the resulting netted credit limit balance will be 6 million for buy credit and 16 million for sell credit. Subsequently, if Customer A sells 1 million to CustomerB, the resulting netted credit limit balance will now be 7 million for buy credit and 15 million for sell credit.</i>  <p>Note the difference compared to Buy/Sell Credit Limits. With netted credit limits, buys affect the balance of the buy credit limit <b>and</b> the balance of the sell credit limit. Similarly, sells also affect both sell and buy credit limit balances.</p> </li> <li>3) <b>Gross Credit Limits:</b> Defined as a single gross amount, the remaining credit balance is calculated as the limit minus all traded amounts (purchases and sales).  Example:  <i>CustomerA extends 10 million gross credit to CustomerB. If CustomerA buys 4 million from CustomerB, the resulting gross credit limit balance will be 6 million. Subsequently, if Customer A sells 1 million to CustomerB, the resulting gross credit limit balance will be 5 million.</i>  <p>For bilateral credit limits there is a credit limit owner (the party setting the limit) and the counterparty. Only the owner can see and change the amounts assigned to their counterparties. The counterparty can never see the amount of credit that others have assigned to it. Only authorized users within a firm can change the amounts of credit limits for their own firm and only on a schedule that is set in each market. It's normally configured to allow changes to credit limits only outside of market hours.</p> </li> </ol> <p><b>Clearinghouse Limits</b></p> <p>For USD/COP FX Spot market, there is a Clearinghouse (Cámara de Compensación de Divisas – CCD) which also assigns a netted buy and sell credit limit for each participant to trade with all the other counterparties. Each counterparty is only entitled to see the amount of their own clearinghouse assigned credit limit and the current</p>	

balance.

For both bilateral and clearinghouse limits, a party's credit balance is used to determinate if orders displayed in the market are tradable or not tradable for each counterparty. This condition is indicated for each order in the MDQuoteType(1070) field.

#### FIX Messages in this test

**PartyRiskLimitsRequest(35=CL)**

**PartyRiskLimitsReport(35=CM)**

**PartyRiskLimitsUpdateReport(35=CR)**

Los cupos deben estar ingresados previamente para esta prueba.

#### Scope:

For more details Refer to section 9. Credit Limits (9.1 through 9.5) , in the **FIX Specification for Datatec Systems** document to cover all tests required for this section.

The test must cover:

9.1 Credit Limits Request

9.2 Credit Limits Request Rejected

9.3 Credit Limits Request Accepted

9.4 Credit Limits Update Report

9.5. Credit Limits Unsubscribe

#### Exceptional cases:

- Play with limits beyond authorized maximum.
- Play with limits that are not multiple of authorized trading values.

## 2.5 Order Management

Order Management	CP-005
<b>Description:</b>  The order management section consists of a description of how messages are used for entering, modifying and canceling (withdraw) orders. This section also describes how messages are used for hit and take operations.	
<b>FIX Messages in this test</b>  NewOrderSingle(35=D) OrderCancelRequest(35=F) OrderCancelReplaceRequest(35=G) OrderCancelReject(35=9) OrderMassActionRequest(35=CA) OrderMassActionReport(35=BZ) OrderStatusRequest(35=H) ExecutionReport(35=8)	
<b>Scope:</b>  For more details Refer to section 10. Order Management (10.1 through 10.14), in the <b>FIX Specification for Datatec Systems</b> document to cover all tests required for this section.  The test must cover:  10.1 Uniqueness of ClOrdID 10.2 Order Identification 10.3 Cross Protocol Order Management 10.4 Workflows, check clarity only 10.5. Order Status, check clarity only 10.6 Order Submit Request (New Order Single) 10.7 IOC Orders 10.8 Execution Report (together with 10.6) 10.9 Order Amend 10.10 Order Interrupt Request 10.11 Order Cancel Reject 10.12 Interrupt All Orders Request 10.13 Order Status Request 10.14 Execution Report Returned Tags, check if table matches return of message.	
<b>Exceptional cases:</b> <ul style="list-style-type: none"> <li>- Enter an order with ClOrdId=20. Get acceptance. Then Modify the order setting ClOrdId=20, OrigClOrdId=30 (non existing order). You should get 2 errors.</li> <li>- Enter a new bid order, without waiting for the response, enter a CancelRequest of the same order.</li> <li>- Enter a valid order message, but add a "tag" that is not used or defined in the message.</li> <li>- Enter a valid order message, try to cancel the order using only tag OrderID</li> <li>- Enter a valid order message, try to cancel the order using only tag ExecID</li> <li>- Enter a valid order message, try to cancel the order using only tag OrigClOrdId</li> <li>- Once an Order Management session is established with valid UserID=AAA (example), <ul style="list-style-type: none"> <li>o Enter a valid bid order with PartyID=AAA, PartySource=C, PartyRole=11</li> <li>o Enter a valid bid order with PartyID=BBB (same client, different operator), PartySource=C, PartyRole=11</li> </ul> </li> </ul>	

- Enter an ICEBERG order with OrderQty=1000, DisplayQty=50, TimeInForce=1(GTC), see what happen.
- Enter an ICEBERG order with OrderQty=1000, DisplayQty=50, TimeInForce=3(IOC), see what happen. Here the order is treated as full (should ignore the iceberg condition)
- Enter a valid order outside of the opening market (when the market is not open yet)
- Review/Test when the tag **PtysSubGrp** is used (in Execution Report message), where does it get the information from?
- Review/Test if TradeClearingInstruction (tag 1925) is taken into account when setting clearing instructions.
- Verify that only the following tags are allowed to be changed in an existing order:
  - o OrderQty (38)
  - o Price (44)
  - o TradeClearingInstruction(1925)
  - o MinQty(110)
  - o DisplayQty (1138)
- For an OrderMassActionRequest, run the message without setting tag 54 (Side). See if all orders for this client are cancelled.

## 2.6 Post Trade

Post Trade	CP-006	
Description:		

Post Trade messages capture the state of an order that has been matched.

The TradeCaptureReport(35=AE) message is used for a number of reasons, including:

- Relaying Confirmed Trades to various parties not involved in the execution, such as clearing houses, regulatory bodies, the exchange's back office systems.
- Relaying Confirmed Trades to counterparties of the trade.

In both cases, those messages are outbound from the marketplace as a reply to a TradeCaptureReportRequest(35=AD) message.

Trades occur when the Matching Engine identifies matching conditions between buy and sell orders. On Datatec platforms Trades generated by the Matching Engine do not need confirmation from any counterparty, so the trades are sent as confirmed.

#### **FIX Messages in this test**

TradeCaptureReportRequest(35=AD)

TradeCaptureReport(35=AE)

TradeCaptureReportRequestAck(35=AQ)

#### **Scope:**

For more details Refer to section 11. Trade Capture Reporting (11.1 through 11.5), in the **FIX Specification for Datatec Systems** document to cover all tests required for this section.

The test must cover:

- 11.1 Workflows, check clarity only
- 11.2. Trade Capture Report Request
- 11.3 Trade Capture Report Request Ack
- 11.4 Trade Capture Report
- 11.5 Trade Capture Report Submitted and Returned Tags, ckeck if table matches return of message.

#### **Exceptional cases:**

##### **No exceptional cases, Verify this condition:**

"Eligible trades" mean that SET-FIX will send only the trades that client is authorized to receive. For example, Clearing Houses, Regulatory, Exchange Back Office Systems have the right to receive all market trades; however, participant firms will only receive trades where the firm is one of the counter-parties involved in the trade.

## **2.7 Trade Registration**

<b>Trade Registration</b>	<b>CP-007</b>	
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### Description:

When a trade is agreed between two counterparties outside the electronic exchange system, this trade can be entered into the system. Trade registration allows two counterparties to formally agree that a trade took place outside the electronic markets on the platform, usually to comply with reporting requirements. This section details the message flows and specific messaging considerations for implementation of a privately negotiated two party trade confirmation.

The implementation will use what FIX calls the "entity-based model" of identifying the trade. What this means is each side should supply their own trade identifier and DFIX Gateway will also supply a centrally assigned trade identifier. The identifiers will not change during the life of the trade.

The entire workflow uses the TradeCaptureReport(35=AE) and TradeCaptureReportAck(35=AR) messages. The way the flow works is: Initiator sends in a TradeCaptureReport(35=AE) with all the trade details to the DFIX Gateway indicating they did this trade with the identified counterparty. DFIX will send an "alleged trade" TradeCaptureReport(35=AE) message to the counterparty telling them the initiator alleged the trade against them. The counterparty has to accept or reject the alleged trade. The counterparty responds with an answer sent to DFIX Gateway. Finally DFIX will send the confirmed trade to both parties if the counterparty accepts the alleged trade.

### FIX Messages in this test

TradeCaptureReport(35=AE)  
TradeCaptureReportAck(35=AR)

### Scope:

For more details Refer to section 12. Trade Registration (12.1 through 12.2), in the **FIX Specification for Datatec Systems** document to cover all tests required for this section.

The test must cover:

- 12.1 Workflows, check clarity only
- 12.2. Trade Capture Report Ack

### Exceptional cases:

**No exceptional cases.**

## 2.8 FIX Implementation compliance

FIX Implementation standard compliance	CP-008
<b>Description:</b>  Verify if your implementation of FIX for SET-FIX is compliance with the standard FIX set up in the <b><i>FIX Specification for Datatec Systems</i></b> document.	
<b>FIX Messages in this test</b>	
<b>Scope:</b>  Review the <b><i>FIX Specification for Datatec Systems</i></b> document to cover this test Case.	
<b>Exceptional cases:</b>  Not applicable	

Performance levels		CP-009	
<b>Description:</b>			
Verify if your implementation of FIX for SET-FIX performs according to the following table.			
Escenario	Orders per second	during	Result
Send orders on a continuos basis of	25	10 seconds	All orders accepted and processed
Send orders one time	100	1 second	Orders are enqueued beyond the 25th, but all get to be processed
<b>FIX Messages in this test</b>			
<b>Scope:</b>			
Review the <b><i>FIX Specification for Datatec Systems</i></b> document to cover this test Case.			
<b>Exceptional cases:</b>			
NA			