Tehran Securities Exchange Technology Management Company (TSETMC)

Computer to Computer Interface (CTCI)

FIX Implementation Manual

Revision 2013/12

Disclaimer

Summary of Changes

Revision 2013-001 contains the following changes and additions:

- Initial Version.

Introduction

This manual describes the way Tehran Securities Exchange Technology Management Company ("TSETMC") implements industry standard Financial Information Exchange (FIX™) Protocol[1] as specific for TSETMC clients and vendors who connect to TSETMC using a Computer to Computer Interface ("CTCI"). TSETMC currently supports FIX versions 4.1 or 4.2. In addition, TSETMC uses some tags specific to FIX version 4.3 and 4.4 as well as custom TSETMC tags. This manual documents messages supported by TSETMC and their particular implementation. For a complete guide to the FIX standard please refer to the official FIX home page at the following URL: http://www.fixprotocol.org

This document assumes the default definition of the FIX standard unless otherwise noted. Only message types and fields (tags and values) which are supported by TSETMC FIX engine are included in this manual. Not supported fields are not guaranteed to be included in FIX messages sent by TSETMC. If an unsupported field is received by TSETMC, it is not validated for processing purposes. FIX messages with unknown tags are not rejected as long as they include all necessary supported tags. Messages of types that are not supported are rejected.

[1] † "FIX Protocol", Financial Information Exchange", "FIXML" and "FIX" are trademarks or service marks of FIX Protocol Limited. The marks "FIX Protocol", "FIXML" and "FIX" are registered trademarks in the European Community.

Session Management

Telecommunication Link Types

TSETMC requires that FIX CTCI customers/vendors establish a FIX session over TCP using one of the following telecommunication link types:

- Extranet Provider. Extranet providers guarantee a secure dedicated connection between client and IB data centers. The client must be connected to chosen extranet provider in order to use this connectivity option. Extranet Provider is not available yet.
- Dedicated Line. Client can opt for ordering a dedicated network connection into an TSETMC data center.
- Virtual Private Network (VPN). This type allows for connection over public Internet using secure tunnel. VPN allows for a private peer-to-peer telecommunication connection without a need for a dedicated leased line or an extranet provider. VPN is not available yet.
- TSETMC Gateway Client. Connection through public Internet using IB Gateway Client application (or TSETMC Trader Workstation). The client must run the TSETMC provided client application locally and use it as a gateway to TSETMC system.
- In addition IB supports direct unprotected FIX connectivity over public Internet for Quality Assurance ("QA") and User Acceptance Testing ("UAT") only. IB provides dedicated IP and port in its QA/UAT environment for customer testing and certification. TSETMC Gateway Client is not available yet.

Authentication

For Dedicated Line clients the authentication is accomplished by cross checking the source IP of the client, SenderCompID (FIX tag 49) and dedicated TCP port assigned to the client. No additional authentication is required due to the private nature of telecommunication link.

Sequence Number Management

A FIX session consists of a series of messages with a continuous set of sequence numbers. Resetting the inbound and outbound sequence numbers back to 1 establishes a new FIX session. A client can establish a new FIX session by setting tag 141 (ResetSeqNumFlag) to "Y" in the login message. TSETMC does not initiate sequence number resets.

Inbound and outbound sequence numbers should be tracked independently. This is to identify gaps in message delivery. After authentication, the client and host must synchronize their message sequence numbers before any new messages can be sent. In the event that the

received sequence number is higher then the expected sequence number, the client should respond with a Resend Request specifying the range of missing sequence numbers in tag 7 (BeginSeqNo) and tag 16 (EndSeqNo) tags. TSETMC supports the value of 0 in tag 16 which would indicate the highest available sequence number. If the sequence number received is less then the expected sequence number and tag

43 (PosDupFlag) is not set to “Y”, it will not be possible to establish a FIX session until the sent sequence number is equal to or greater than the one expected. A reject message will be sent with the expected sequence number sent in the text tag. By default, IB does not reset the sequence numbers each night. However it is possible to configure your account to do so. Sequence numbers would then be reset to 1 (inbound and outbound) each night during system restart. Weekly sequence number resets are also supported.

Session Protocol

Message Format and Field Delimiter

TSETMC currently supports the standard “Tag=Value” FIX syntax. The general format of a FIX message applies. Messages consist of a series of “Tag=Value” fields separated by a field delimiter. The delimiter is ASCII 1 (SOH) symbol. Examples in this manual will represent that delimiter with a space. All messages begin with a standard header and are terminated with a standard trailer.

Message Recovery

Message gaps may occur during login or in the middle of a FIX session that require message recovery. When this occurs, a Resend Request message can be sent requesting a range of missing messages. The re-sender will then respond with a Sequence Reset message that has tag 123 (GapFillFlag) set to “Y” and tag 43 (PossDupFlag) set to “Y”. Tag 36 (NewSeqNo) will be set to the sequence number of the message to be redelivered next. Following this, the missing Application level messages will be resent. Most Administrative messages will not be resent. The administrative messages that will not be resent are: Logon, Logout, ResendRequest, Heartbeat, TestRequest and SeqReset-Reset and SeqReset-GapFill. This process of Sequence Reset / message delivery will continue until all of the relevant messages within the specified range have been delivered.

Standard Message Header

Every administrative or application message must begin with a standard header. TSETMC Supports the fields listed below.

Tag #	Field Name	Req’d	Comments
8	BeginString	Y	FIX.4.1, FIX.4.2 or FIX.4.3 are supported in this tag *If FIX 4.3 is specified, see Appendix A
9	Body Length	Y	Message length, in bytes, forward to checksum field
35	Msg Type	Y	TSETMC Supports the following values: 0 = Heartbeat 1 = Test Request 2 = Resend Request 3 = Reject 4 = Sequence Reset 5 = Logout A = Logon B = News/Bulletin Message CIR = Client Info Request CIS = Client Info Response
49	SenderCompID	Y	For TSETMC FIX sessions, this is the username.
50	SenderSubID	N	Optional
56	TargetCompID	Y	Default is “FIXHUB”.
57	TargetSubID	N	Per Standard
34	MsgSeqNum	Y	Per Standard. Please note that IB currently supports

			sequence numbers up to 999999. Sequence numbers must be reset once they reach that value. IB recommends daily or weekly sequence number resets to avoid this issue.
43	PossDupFlag	N	Per Standard
97	PossResend	N	Per Standard
52	SendingTime	Y	Per Standard
122	OrigSendingTime	N	Per Standard

Standard Message Trailer

Each message, administrative or application, is terminated by a standard trailer. TSETMC only requires tag 10 (CheckSum).

Tag #	Field Name	Req'd	Comments
10	CheckSum	Y	3 byte simple checksum. Always represented as 3 ASCII characters.

Message Compression

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Administrative Messages

Administrative messages are used for session management and address the utility needs of the protocol. IB uses the following Administrative messages:

- Logon
- Heartbeat
- Test Request
- Resend Request
- Reject (Session Level)
- Sequence Reset (Gap Fill)
- Logout

This section describes the administrative messages that IB uses and provides the layout for each message.

Logon

The logon message is used to establish a FIX connection with IB. It therefore must be the first message sent.

Tag #	Field Name	Req'd	Comments
	Standard Header	Y	MsgType = A

98	EncryptMethod	Y	Valid Value = 0 (none, encryption is currently not supported)
108	HeartBtInt	Y	A heartbeat interval of 30 seconds is suggested. The initiator may set it to any value, but the acceptor (TSETMC) may override this interval when necessary. That means that the initiator has to be prepared to receive and respond to Test Request and Heartbeat messages in any case.
141	ResetSeqNumFlag	N	is field is required when a new session is to be opened.
	Standard Trailer	Y	

Heartbeat

If either end of the connection has not sent any data in the amount of time specified in the heartbeat interval, a heartbeat message will be sent. If a heartbeat message is not received within the specified heartbeat interval, the connection should be considered lost. IB recommends a heartbeat interval of 30 seconds.

Tag #	Field Name	Req'd	Comments
	Standard Header	Y	MsgType = 0
112	TestReqID	N	Required when the heartbeat is the result of a Test Request message.
	Standard Trailer	Y	

Test Request

The test request message forces a heartbeat from the opposing application. If either end of the connection has not received any data within the specified heartbeat interval a test request message will be sent. IB suggests the use of a timestamp in the TestReqID field as it is useful to verify that the Heartbeat is the result of the Test Request and not as the result of a regular timeout.

Tag #	Field Name	Req'd	Comments
	Standard Header	Y	MsgType =
	Standard Trailer	Y	

Resend Request

The Resend Request initiates the retransmission of messages. It can be used to request a single message, a range of messages, or all messages which follow a particular message.

Tag #	Field Name	Req'd	Comments

	Standard Header	Y	MsgType =
	Standard Trailer	Y	

Sequence Reset and Gap Fill

The sequence reset message is used by the sending application to reset the incoming sequence number on the opposing side.

Tag #	Field Name	Req'd	Comments
	Standard Header	Y	MsgType =
	Standard Trailer	Y	

Session Level Reject

The reject message is issued when a message is received but cannot be properly processed due to a session-level rule violation.

Tag #	Field Name	Req'd	Comments
	Standard Header	Y	MsgType =
	Standard Trailer	Y	

Logout

The logout message initiates or confirms the termination of a FIX session. Disconnection without the exchange of logout messages should be interpreted as an abnormal condition.

Tag #	Field Name	Req'd	Comments
	Standard Header	Y	MsgType =
	Standard Trailer	Y	

Application Messages

IB supports the following Application Messages:

- Client Info Request [CIR]
- Client Info Response [CIS]
- Trade Cancellation Notice [SLE100]
- Execution Notice [SLE105]
- Order Elimination [SLE138]
- Confirmation of Order Creation, Modification or Cancellation [SLE172]

Client Info Request

This message is used to request Client Info from Broker Back Office.

Tag #	Field Name	Req'd	Comments
	Standard Header	Y	MsgType =CIR
1100	AccountID	Y	AccountID BrokerID+ClientCode (ex: 17292063302343)
1101	RequestID	Y	ID Assign to this Request. Responder use this ID in the Response Message.
1102	OrderValue	N	Value of Order in IRAN Rial. OrderValue is optional. If provided
	Standard Trailer	Y	

Client Info Response

This message is used to send Client Info from Broker Back Office to TSETMC.

Tag #	Field Name		Req'd	Comments
	Standard Header		Y	MsgType =CIS
1100	AccountID			AccountID BrokerID+ClientCode (ex: 17292063302343)
1101	RequestID		Y	Responder use this ID in the Response Message.
1103	ClientStatus		N	1: Trader is allowed to send Order. 0: Trader isn't allowed to send Order.
1104	NoCAttrib		Y	Number of Attrib (Desc,Value)
↘	1105	ClientAttribDesc	Y	Description of Attribute
↘	1106	ClientAttribValue	Y	Value of Attribute
	Standard Trailer		Y	

Trade Cancellation Notice

In case of Trade Cancellation, NSC sends a Trade Cancellation Notice message to the two SLEs involved in the trade (the SLEs can belong either to two different brokerage firms or to the same brokerage firm). This message provides values for all parameters related to the cancelled trade.

Tag #	Field Name	Req'd	Comments
	Standard Header	Y	MsgType =SLE100
1200	LRfIntAdfMsg	Y	Internal subscriber reference
1201	DSeaBsEven	Y	Order entry date (in the Central Trading System)
1202	CValISIN	Y	Instrument Identification (NSC code)
1203	DSaiOM	Y	Order entry date (in the Central Trading System)
1204	NSeqOM	Y	Host Order Number (HON)
1205	PTran	Y	Trade Price
1206	QTitTran	Y	Traded quantity
1207	HTRAN	Y	Trade Time
1208	NMsgRepoN	Y	Response Sequence Number
1209	HMsgRepoN	Y	Response Sequence Number Time
1210	CIdAdfCie	Y	Counterpart Broker Identification
1211	NTran	Y	Trade Number
1212	ISensOM	Y	Order side
1213	NTranKL	Y	TRS Trade Number Bis
	Standard Trailer	Y	

Execution Notice

In case of Trade Creation by the Market Control, NSC sends a Trade Creation Notice to the SLEs of the two brokerage firms involved in the trade.

Tag #	Field Name	Req'd	Comments
	Standard Header	Y	MsgType =SLE105
1200	LRfIntAdfMsg	Y	Internal subscriber reference
1201	DseaBsEven	Y	Order entry date (in the Central Trading System)
1204	NseqOM	Y	Host Order Number (HON)
1202	CValISIN	Y	Instrument Identification (NSC code)
1213	CidGrc	Y	Instrument group identification
1212	IsensOM	Y	Order side
1206	QtitTran	Y	Traded quantity
1205	Ptran	Y	Trade Price
1214	IprsQTitRest	Y	Remaining quantity flag
1215	QtitRestOm	Y	Remaining Quantity of the Order
1210	CidAdfCie	Y	Counterpart Broker Identification
1216	YCpteOMCie	Y	Order Origin for the counterpart Broker
1217	YOM	Y	Order technical origin
1208	NmsgRepoN	Y	Response Sequence Number
1218	DmsgRepoN	Y	Response Sequence Number Date
1209	HmsgRepoN	Y	Response Sequence Number Time
1211	Ntran	Y	Trade Number
1219	Dtran	Y	Trade Date
1220	YPLimSaiOM	Y	Order type
1221	YValiOmNSC	Y	Validity type
1222	CgdsVal	Y	Code of the instrument category
1213	NtranKL	Y	TRS Trade Number Bis
1223	CidNgSai	Y	ID of Trader issuing the order or declaration
1224	YcpteOM	Y	Order origin
1225	NcptePosIptOm	Y	Client account number
1226	CidOmNg	Y	Trader Order Number (TON)
1227	DHSaiOmAdf	Y	Order Entry Date and Time
1228	CBIC	Y	BIC code of the Broker
1229	LsaiOM	Y	Free Text
1230	CidMbrDestGupOm	Y	Give-up Broker ID
	Standard Trailer	Y	

Order Elimination

Generated as a result of order elimination "by the system," as opposed to order elimination as a result of an "Order cancellation" message.

The Order Elimination message is sent to the SLE owning each order that is eliminated because of:

- Cancellation by Market Control of all orders for an instrument or group,
- Global cancellation by Market Operation of the orders of a brokerage firm or an SLE during the Market Session,
- Global cancellation by a brokerage firm of the orders of that brokerage firm or one of its SLEs during the Market Session,
- Elimination of an order during the Post-Market Session because of an corporate events,
- Elimination of an order during the Post-Market Session because of the validity of the order has been reached.

Tag #	Field Name	Req'd	Comments
	Standard Header	Y	MsgType =SLE138
1200	LrfIntAdfMsg	Y	Internal subscriber reference
1203	DSaiOM	Y	Order entry date in the Central Trading System
1204	NSeqOM	Y	Host Order Number (HON)
1231	YMajOmNSC	Y	Order Status
1202	CValISIN	Y	Instrument Identification (NSC code)
1215	QTitRestOm	Y	Remaining Quantity of the Order
1232	PLimSaiOM	Y	Price entered
1233	CIdAdfEmet	Y	ID of Broker issuing the order
1221	YValiOmNSC	Y	Validity type
1234	DValiOM	Y	Order validity date
1212	IsensOM	Y	Order side
1220	YPLimSaiOM	Y	Order type
1208	NmsgRepoN	Y	Response Sequence Number
1209	HmsgRepoN	Y	Response Sequence Number Time
1223	CidNgSai	Y	ID of Trader issuing the order or declaration
1224	YcpteOM	Y	Order origin
1225	NcptePosIptOm	Y	Client account number
1226	CidOmNg	Y	Trader Order Number (TON)
1227	DHSaiOmAdf	Y	Order Entry Date and Time
1228	CBIC	Y	BIC code of the Broker
1229	LsaiOM	Y	Free Text
1230	CidMbrDestGupOm	Y	Give-up Broker ID
	Standard Trailer	Y	

Confirmation of Order Creation, Modification or Cancellation

Generated in response to a valid order entry, order modification, or order cancellation. This message is sent to the Brokerage firm who sent the order entry, the order modification, or the order cancellation.

Tag #	Field Name	Req'd	Comments
	Standard Header	Y	MsgType =SLE172
1200	LrfIntAdfMsg	Y	Internal subscriber reference
1203	DSaiOM	Y	Order entry date in the Central Trading System
1204	NSeqOM	Y	Host Order Number (HON)
1231	YMajOmNSC	Y	Order Status
1202	CValISIN	Y	Instrument Identification (NSC code)
1235	QTitTotOM	Y	Order total quantity
1212	IsensOM	Y	Order side
1232	PLimSaiOM	Y	Price entered
1233	CIdAdfEmet	Y	ID of Broker issuing the order
1208	NmsgRepoN	Y	Response Sequence Number
1209	HmsgRepoN	Y	Response Sequence Number Time
1220	YPLimSaiOM	Y	Order type
1236	QTitXteIntrOM	Y	Matched quantity at order entry
1237	CFonOrg	Y	Original NSC function code
1238	DSaiOmIni	Y	Original order date
1239	NSeqOMIni	Y	Original Host Order Number (HON)
1221	YValiOmNSC	Y	Validity type
1234	DValiOM	Y	Order validity date
1240	QTitMinOM	Y	Order minimum quantity
1241	QTitDvlOM	Y	Order disclosed quantity
1217	YOM	Y	Order technical origin
1242	ICfmOM	Y	Order confirmation flag
1243	QTitRestOmIni	Y	Original Order remaining quantity
1244	PDchOmStop	Y	Order trigger price
1223	CidNgSai	Y	ID of Trader issuing the order or declaration
1224	YcpteOM	Y	Order origin
1225	NcptePosIptOm	Y	Client account number
1226	CidOmNg	Y	Trader Order Number (TON)
1227	DHSaiOmAdf	Y	Order Entry Date and Time
1228	CBIC	Y	BIC code of the Broker
1229	LsaiOM	Y	Free Text
1230	CidMbrDestGupOm	Y	Give-up Broker ID
1245	DHPriOM	Y	Order priority date time
	Standard Trailer	Y	

TSETMC Customized Fields

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