BLUE OCEAN
ATS

(v2.0.1) BOATS FIX Top of Book

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1 Overview

The BOATS FIX Top of Book protocol is the application layer message standard used by subscribers to receive top of book bid, offer, and trade data from the BOATS platform. BOATS FIX Top of Book protocol is a text key=value formatted protocol based on the FIX Trading Community FIX specifications.

2 Transport Layer

The BOATS FIX Top of Book protocol uses the Transmission Control Protocol (TCP) to provide reliable and ordered delivery of messages between clients and servers.

3 Session Layer

The BOATS FIX Top of Book protocol uses the FIXT 1.1 specification session messages to establish and maintain a session.

4 Application Layer

BOATS FIX Top of Book protocol application layer messages are based on the Financial Information Exchange (FIX) Protocol version 5.0 and are key=value text encoded.

5 Headers and Trailers

All messages begin with a *Standard Header* and must end with a *Standard Trailer*.

5.1 Standard Header

The *Standard Header* must contain the required fields listed and can contain any of the non-required listed fields:

Tag	Field Name	Req'd	Meaning/Values
8	BeginString	Y	"FIXT.1.1" This must be the first field in the message.
9	BodyLength	Y	The length of the FIX message. This must be the second field in the message.
35	MsgType	Y	The type of message. This must be the third field in the message.
49	SenderCompID	Y	The sender's id, assigned by at on-boarding time.
56	TargetCompID	Y	“BLUE”
34	MsgSeqNum	Y	The message sequence number.
52	SendingTime	Y	The time of message transmission in Universal Time coordinated. See UTCTimestamp in FIX 5.0 SP2 specification.
43	PossDupFlag	N	Always required for retransmitted messages, whether prompted by the sending system or as the result of a resend request.
97	PossResend	N	Required when message may be duplicate of another message sent under a different sequence number.
122	OrigSendingTime	N	Required for message resent as a result of a ResendRequest. If data is not available set to same value as SendingTime.

5.2 Standard Trailer

The *Standard Trailer* must contain the CheckSum field.

Tag	Field Name	Req'd	Meaning/Values
10	CheckSum	Y	The message checksum. This must be the last field in the message.

6 Messages

This section defines the messages that make up the protocol. For each message, it lists the fields in the message by tag id and name, whether the field is required and acceptable values or description of the field.

6.1 Session Messages

This section defines the session level messages supported.

6.2 Heartbeat (Sent by exchange and client)

The Heartbeat message confirms the status of the communication link.

Tag	Field Name	Req'd	Meaning/Values
	Standard Header	Y	With tag 35 (MsgType) = 0
112	TestReqID	N	Identifier included in Test Request message to be returned in resulting Heartbeat. (Max Length: 64 characters)
	Standard Trailer	Y	

6.3 Logon

The logon message is sent by the client to establish a connection to the exchange.

A logon message must be the first message sent by the application initiating a FIX session.

Tag	**Field Name**	**Req'd**	**Meaning/Values**
	Standard Header	Y	With tag 35 (MsgType) = A
98	EncryptMethod	Y	Required to be 0.
108	HeartBtInt	Y	Heartbeat interval, in seconds. An interval of 0 indicates there are no heartbeats. The maximum supported interval is 90 seconds.
	Standard Trailer	Y	

6.4 Logout

The logout message initiates or confirms the termination of a FIX session. This message may be sent by the exchange or by the client.

Tag	**Field Name**	**Req'd**	**Meaning/Values**
	Standard Header	Y	With tag 35 (MsgType) = 5
58	Text	N	Text explaining reason for logout. (Max Length: 128 characters)
	Standard Trailer	Y	

6.5 Reject

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

Tag	Field Name	Req'd	Meaning/Values
	Standard Header	Y	With tag 35 (MsgType) = 3
45	RefSeqNum	Y	Reference message sequence number.
58	Text	N	Explanatory reason. (Max Length: 128 characters)
	Standard Trailer	Y	

6.6 ResendRequest

The resend request is sent by the receiving application to initiate the retransmission of messages.

Tag	Field Name	Req'd	Meaning/Values
	Standard Header	Y	With tag 35 (MsgType) = 2
7	BeginSeqNo	Y	Message sequence number of first message in range to be resent.
16	EndSeqNo	Y	Message sequence number of last message in range to be resent.
	Standard Trailer	Y	

6.7 SequenceReset

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

Tag	Field Name	Req'd	Meaning/Values
	Standard Header	Y	With tag 35 (MsgType) = 4
123	GapFillFlag	N	Indicates that this message is replacing administrative or application messages which will not be resent.
36	NewSeqNo	Y	New sequence number.
	Standard Trailer	Y	

6.8 TestRequest

The test request message forces a heartbeat from the opposing application.

The opposing application responds to the Test Request with a Heartbeat containing the TestReqID.

Tag	Field Name	Req'd	Meaning/Values
	Standard Header	Y	With tag 35 (MsgType) = 1
112	TestReqID	Y	Identifier included in Test Request message to be returned in resulting Heartbeat. (Max Length: 64 characters)

Tag	Field Name	Req'd	Meaning/Values
	Standard Trailer	Y	

7 Session Management

The client establishes a session by opening a TCP connection to the exchange BOATS FIX Top of Book (server) and sending a FIX logon message with the appropriate credentials and MsgSeqNum. The SenderCompID and TargetCompID will be provisioned by the exchange and will be verified by the server at Logon. If the Logon message is accepted, the server will send a logon response. If the MsgSeqNum on the inbound logon is less than expected by the server, the logon will be rejected.

If the MsgSeqNum of the inbound Logon message is greater than expected, the server will reply with a Logon, and shall send a ResendRequest for the missing messages. The client application should gap fill any session level messages (see FIXT 1.1 specification Message Recovery), but may opt to issue sequence reset messages with the GapFillFlag set.

There are no client to server business level messages specified in this BOATS FIX Top of Book specification. When the client application receives the Logon response, it should compare the MsgSeqNum to the expected server sequence number. If a gap is detected, it should send a ResendRequest message to the server. The server will resend any missing business level messages with the PossDup flag set. Instead of sending session-level messages during a backfill, the server will issue sequence reset messages with the GapFillFlag set.

When the client terminates a session it should send a Logout message and wait for the Logout response from the server before closing the connection. This procedure facilitates gap detection and processing before the connection is closed.

At the end of a logical session, the FIX inbound and outbound sequence numbers are set to 1. All inbound FIX messages will be rejected if a FIX session has not been established. If the server receives a message with a MsgSeqNum less than the expected client sequence number, and that message does not have the PossDup flag set, the server will disconnect the client.

8 Application Messages From Server to Client

8.1 Top of Book Snapshot

Tag	Field Name	Req'd	Meaning/Values
	Standard Header	Y	MsgType = W
262	MDReqID	Y	Unsolicited messages = 0.
55	Symbol	Y	Identifier for the symbol
65	SymbolSfx	N	
268	NoMDEntries	Y	Number of market data entries in this snapshot.
→ 269	MDEntryType	Y	Type of market data entry. Valid values: 0 = Bid 1 = Offer 2 =Trade
→ 270	MDEntryPx	Y	Price
→ 271	MDEntrySize	N	Number of shares
	Standard Trailer	Y	