CURRENEX®
A State Street Company

Itch US Treasury Specification

Contents

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1 Introduction

1.1 Purpose

The purpose of this document is to present in detail the Itch protocol subset used by the Currenex Executable Streaming Prices (ESP) service.

The Currenex Itch service uses a low latency protocol and is delivered over reliable high-speed physical networks such as LAN cross connects or metro area direct circuits.

Itch is supported on Transmission Control Protocol (TCP) as well as User Datagram Protocol (UDP), with minimal differences between the two (2). As a UDP service, Itch is intended for use on low datagram[1] loss networks. Itch is not supported on Public Internet or low performance connections.

1.2 Itch

- Achieves lower processing and latency times by not compressing messages.
- Enables faster and easier message parsing and memory management through the use of fixed field sizes and the use of integer values where possible.
- Supports fast messaging delivery via UDP and reliable message delivery via TCP.

Customers co-located in the Currenex datacenter can achieve microsecond scale performance on Itch.

1 The terms “datagram” and “packet” are nearly identical in meaning. In this document “datagram” is used with the unreliable UDP service.

2 Executable Streaming Prices

Itch delivers US Treasury executable streaming prices (ESP) from Market Makers (MM) to Market Participants (MP), who can then place orders against the ESP received.

3 Protocol

Itch supports the following network protocols:

- TCP
- UDP

4 Message Data

A message data block consists of one or multiple messages and can be of no more than 1,000 bytes in length.

4.1 Message Data Delimiters

The start and end of a message block are indicated by the one (1) byte ASCII character code decimal equivalents for "SOH" (1) and "ETX" (3):

- SOH (1) – indicates message block start
- ETX (3) – indicates message block end

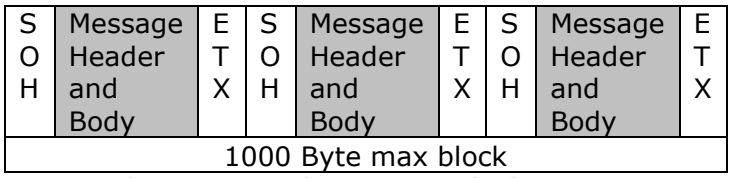

Figure 1: Sample Message Block Layout

4.2 Message Data

4.2.1 Integer, Long, Short

All integer, long and short fields are signed big-endian binary encoded numbers transmitted in network byte order

4.2.2 Amount

Amount uses Long as a transfer data type, meaning it is an 8 bytes (64-bit) signed number with a minimum value of -9,223,372,036,854,775,808 and a maximum value of 9,223,372,036,854,775,807, inclusive.

Zero (0) is a valid value for some amount related fields; e.g., MinAmt. Amount values less than zero (0) are not valid.

4.2.2.1 Outright Instruments

Amounts associated with Itch US Treasury rates are always the notional amount of the instrument.

To account for values to the right of the decimal place, the amount value is a two (2) decimal place scaled value.

A decimal amount of 1,000,000.00 (1M) in notional amount would be represented as 0x5F5E100.

4.2.2.2 Spread Instruments

Amounts associated with Spread US Treasury instrument rates are always expressed in the integer number of contracts of that spread instrument.

Users should consult the Instrument Info message for the Spread Instrument to obtain the notional amount for each underlying leg that would be bought or sold for each one unit of the spread instrument purchased.

4.2.3 Rate

Rate fields are delivered as hexadecimal numbers. They are scaled to nine (9) places to the right of the decimal point into Long fields by multiplying 10^9. E.g., 99.001953125 is represented as 0x170CF9EB65 or 99001953125 in decimal format. The maximum rate value allowed is 0x8000000000000000 or 9223372036854775807 in decimal, which represents a very high rate of 9223372036.854775807.

For a US Treasury instrument, bid and offer prices are quoted as a price as a percentage of par.

Information on the US Treasury instrument can be extracted from the "Instrument Info" message's InstrumentID field.

4.2.4 Date / Time

Dates and times are handled as longs and counted in milliseconds from January 1, 1970 midnight coordinated universal time (UTC), more commonly known as Greenwich Mean Time (GMT).

There are three (3) types of date and timestamp reporting:

1. Message Header Timestamp is the number of milliseconds past midnight GMT on the current day.
2. “Instrument Info” message SettlementDate is the settlement date measured as the number of milliseconds since Jan 1, 1970 GMT.
3. “Instrument Info” message Maturity Date and Issue Date are in integer decimal format. i.e. 20111203 means 2011-12-03

Note:

Value date changes are applied at 5:30 PM ET

4.2.5 Text

The “Text” field can vary in size, contains alphanumeric characters and is left justified padded with spaces on the right.

5 Invalid Message Handling

Currenex responds with a Reject message to incorrectly formatted messages; messages with invalid headers are ignored.

6 Message Sequence Numbers

The initial sequence number count for a new session must start at one (1) and be incremented by one (1) on each message sent to Currenex afterwards.

6.1 UDP Message Sequence Number

To minimize the impact of lost messages, the UDP Itch implementation overloads the “Sequence Number” definition with two (2) separate counts: 1) message header count and 2) instrument specific message count.

The message header sequence number count is used on all messages except Price and Price Cancel messages. A separate instrument specific sequence count is maintained for each currency pair for Price and Price Cancel messages.

6.2 TCP Message Sequence Number

TCP connections should always preserve the sequence number order with no gaps. If a sequence number gap is detected, the session should be closed and restarted.

7 Datagram

There should be only one (1) message in or out per datagram with the only exception being the price message. For enhanced performance, a single datagram can contain multiple price messages.

An Itch message should never be split across multiple datagrams.

8 Session

8.1 Open Session

A MP initiates a session by submitting a Logon message to Currenex. The session is established when the MP receives a Logon message in response from Currenex.

8.2 Terminate Session

Currenex or a MP can terminate a session by sending a Logout message. The recipient of a Logout message should respond with its own Logout message.

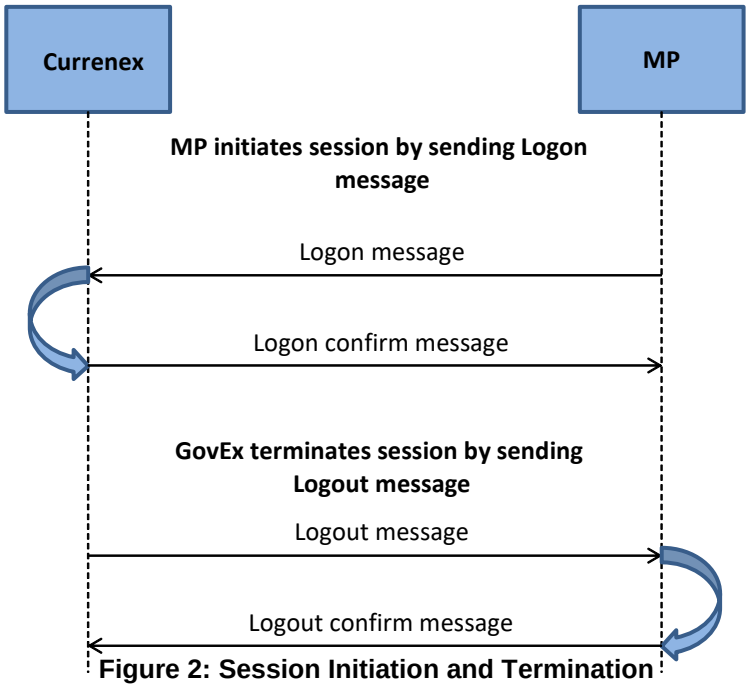

Figure 2: Session Initiation and Termination

9 Heartbeat Messages

To ensure ITCH session integrity, Currenex sends a Heartbeat (HB) messages every fifteen (15) seconds. Upon receipt, a user must respond with its own HB message. Currenex will wait fifteen (15) seconds for the HB response. If none is received, Currenex will send another HB, again waiting fifteen (15) seconds. If still no HB response is received, the session will be treated as inactive and explicitly closed by Currenex.

In effect, if two (2) consecutive HB messages from a client are missed, Currenex will treat the connection as inactive and close it.

An ITCH user should send HB messages only in response to a HB received from Currenex. HB messages received in any other context are ignored by Currenex.

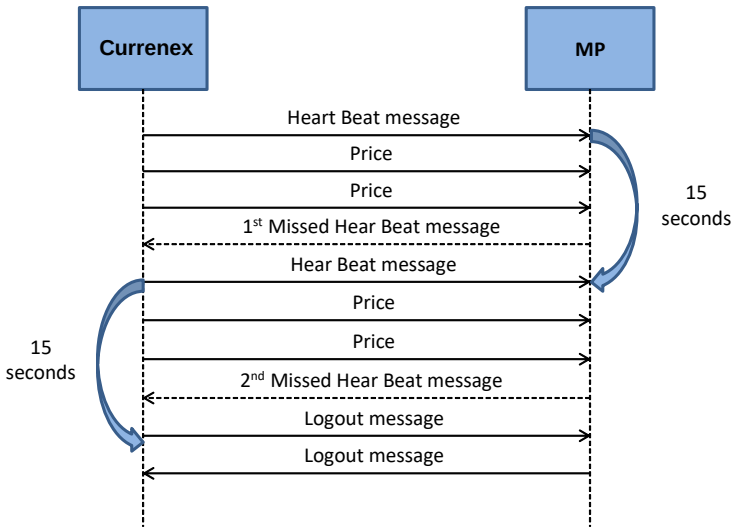

Figure 3: Missed Heart Beat Messages

10 Instrument Info Message

Upon successful logon, Currenex will send “Instrument Info” messages automatically, i.e. clients do not need to send an “Instrument Info Request” message. Instrument Info messages are sent for Outright instruments using message type “D”. Instrument Info messages are sent for Spread Instruments using message type “e”.

A MP should respond to each received “Instrument Info” message with an “Instrument Info Ack” message. If no acknowledgment is received within a set time period, Currenex will resend an “Instrument Info” message.

Included in the “Instrument Info” message is “Instrument Type,” a free form instrument definition and the “Instrument Index” used to request prices, settlement date, etc.

In response to specific data changes, Currenex will resend the “Instrument Info” message; e.g., due to a settlement date roll over.

Note: the ‘InstrumentIndex’ returned in the ‘Instrument Info’ message is static for the scope of the session, only. The same value is not guaranteed to be used for a currency pair from session to session or across Ouch and Itch services.

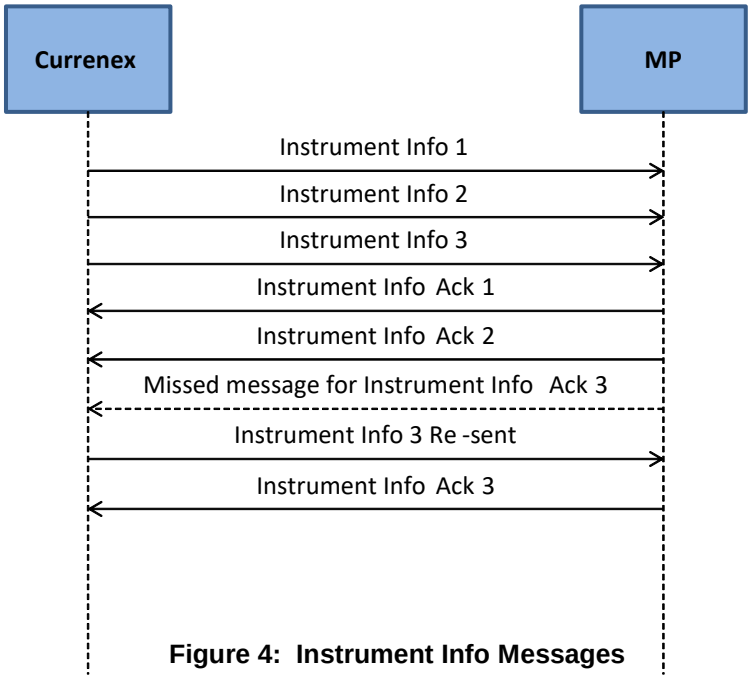

Figure 4: Instrument Info Messages

11 Subscription Request

11.1 Requesting Market Data

Currenex will stream ESP messages to a MP once it receives a "Subscription Request" message for the pair. Currenex responds to a "Subscription Request" with a "Subscription Reply" message. One "Subscription Request" message must be sent per Instrument.

A MP can cancel an instrument subscription by sending a "Subscription Request" message with the SubscriptionType field set to unsubscribe.

ESP prices will be streamed only for configured US Treasury and Spread instruments. The Currenex Customer Support desk must be contacted to make any modifications.

12 Processing Streamed Prices

Once a MP's subscription request has been received and acknowledged, Currenex will stream prices via UDP messages containing a list of "Price" and "Price Cancel" messages.

Prices are sent in data sizes optimized to 768 bytes in which there can be more than one (1) price.

For example, Currenex might send the following data

010000006404c02bbc4800030000003731000000003B9ACA000000000005F5E100000000174894B5653141
424320030100000006404c02bbc4800030000003732000000007735940000000000005F5E1000000001748A3F
7A5314142432003

Though sent as one group of data, it contains two (2) separate price messages, distinguished by the 01 and 03 message start and end indicators highlighted in blue:

010000006404c02bbc4800030000003731000000003B9ACA000000000005F5E100000000174894B5653141
42432003

010000006404c02bbc4800030000003732000000007735940000000000005F5E1000000001748A3F7A53141
42432003

This works out, assuming an OTR-2Y index, to be an OTR-2Y bid and offer price pair:

OTR-2Y BID 100.001953125 10m/1m (max/min)

OTR-2Y OFFER 100.002953125 20m/1m (max/min)

A new "Price" replaces in the book any outstanding price with the same "PriceId."
A "Price Cancel" message cancels from the book any outstanding price with the same "PriceId."

A single packet may include multiple Price messages for the same InstrumendIndex, but each price will have a unique value of "PriceId." Therefore a PriceCancel message will always refer to a unique "PriceID."

12.1 New Order Inserted into Order Book

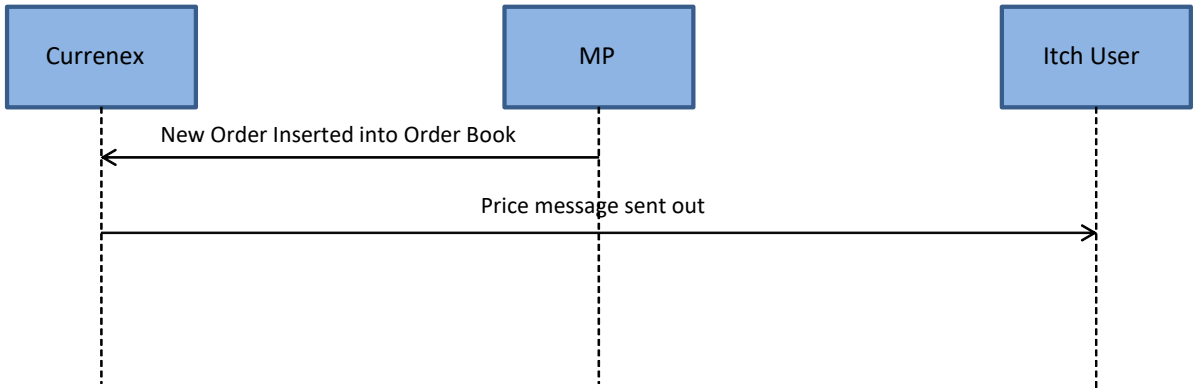

Figure 6: New Order Inserted into Order Book

12.2 Order Size Amended Down via Order Place

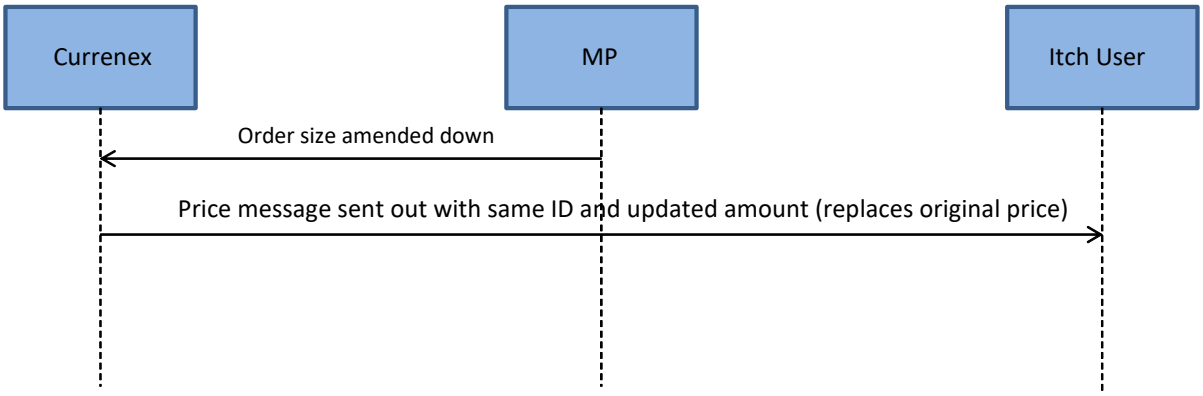

Figure 7: Order Size Amended Down via Order Place

12.3 Order Size Amended Up

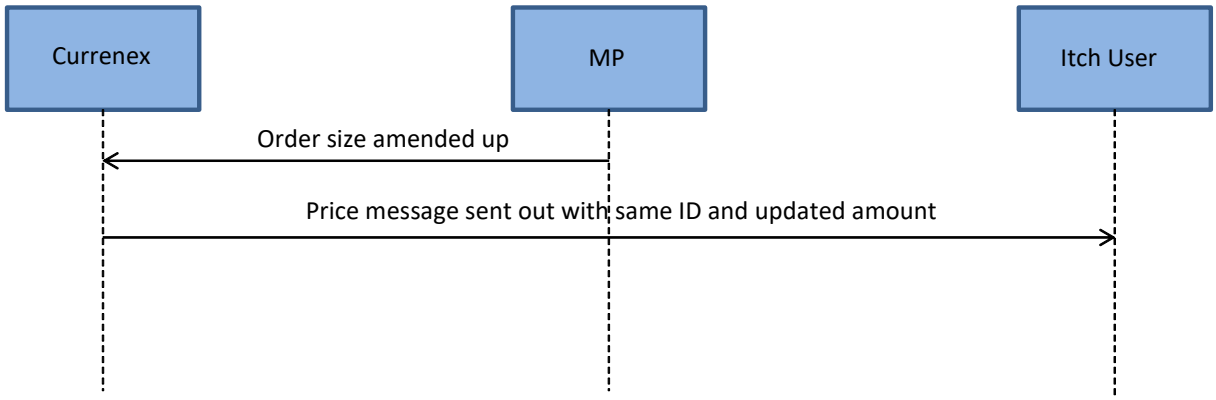

Figure 8: Order Size Amended Up

12.4 Order Price Amended

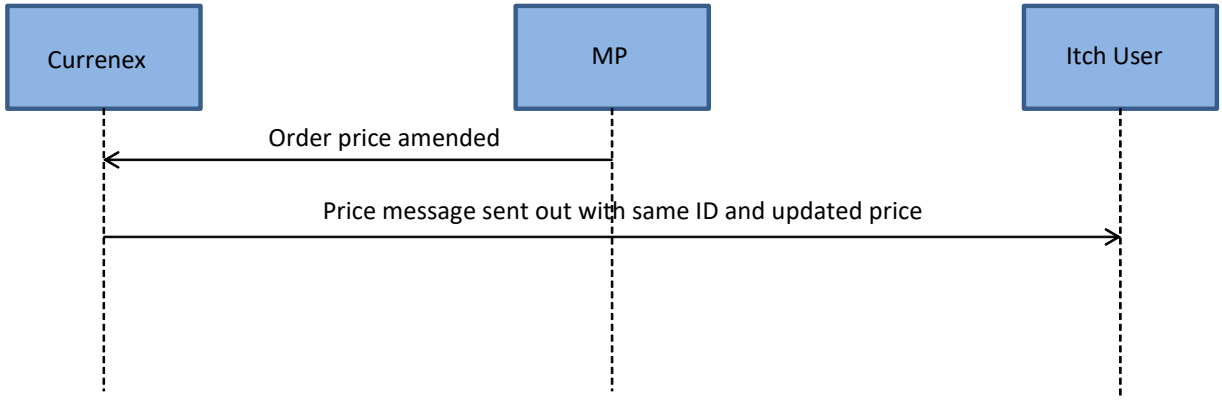

Figure 9: Order Price Amended

12.5 Order Price and Size Amended (either up or down)

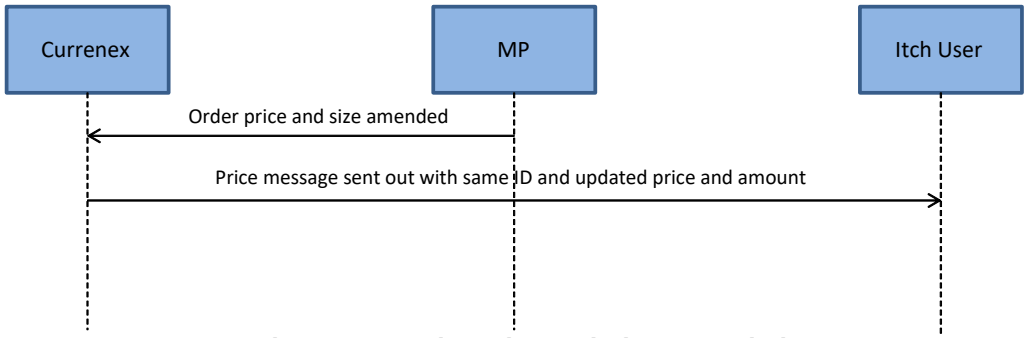

Figure 10: Order Price and Size Amended

12.6 Order Partially Filled

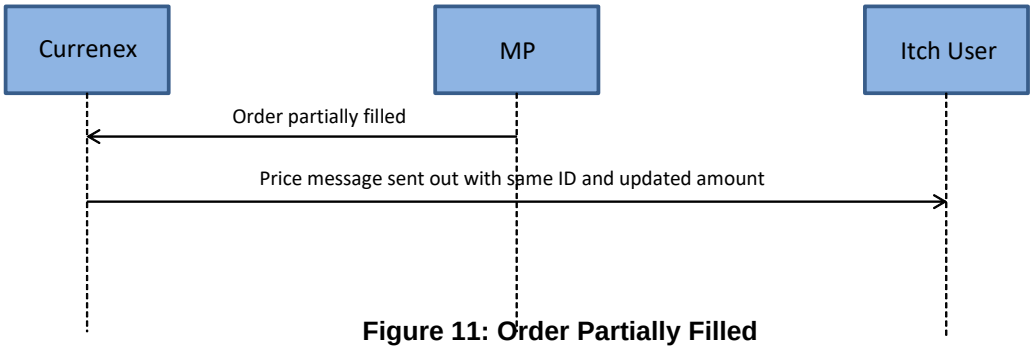

Figure 11: Order Partially Filled

12.7 Order Fully Filled

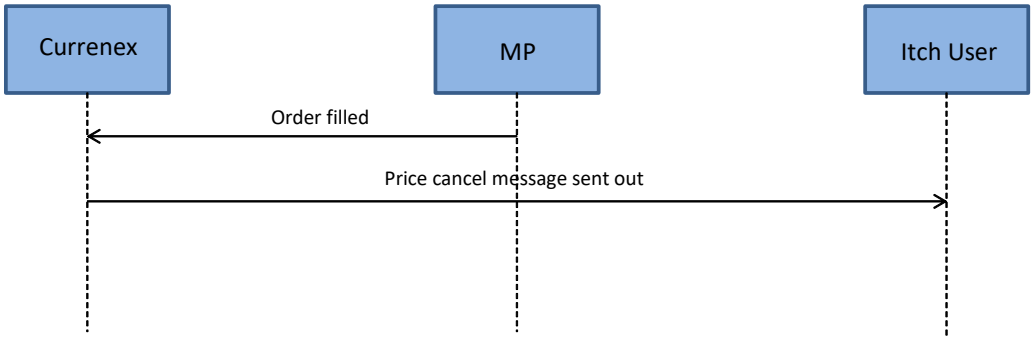

Figure 12: Order Fully Filled

12.8 Order Cancelled

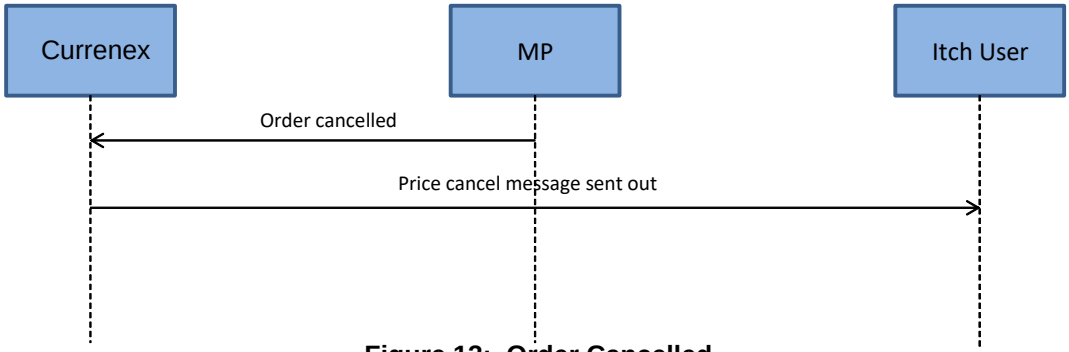

Figure 13: Order Cancelled

13 Message Recovery

Message losses or order inconsistencies can be identified by tracking the sequence number in the header of the message.

13.1 TCP Message Recovery

The TCP protocol by design guarantees message delivery and order. No additional action is required on the part of the Itch service user. In the event of message inconsistencies, the session should be closed.

13.2 UDP Message Recovery

The UDP protocol by design does not guarantee message delivery or order. In the event of dropped or out of order datagram, the Itch UDP user has two (2) choices for ensure data integrity: Natural Rebuild and Re-Subscription.

13.2.1 Rebuild

In this method, if a dropped datagram is detected, the MP drops its internal book representation for the currency pair in which the sequence gap occurred; i.e., all cached prices for the associated currency pair are discarded. The MP then waits as new prices are received. Any price cancel messages received for a PriceID not in the cache is ignored as the price was discarded with the book.

The advantage to this method is that no additional network traffic is generated. Its disadvantage is the time needed to rebuild and synchronize the book, though low, is indeterminate.

13.2.2 Re-Subscription

In this method, if a dropped datagram is detected, upon perceiving dropped messages, the MP drops the internal book representation, all cached prices, and all cached PriceIds. It then un-subscribes and re-subscribes for the instrument experiencing the sequence number gap. Currenex will then resend the current book prices with a sequence number starting at one (1).

This method has as an advantage the immediate reconstruction of the MP's book. Its disadvantage is that a lot of messages will be generated at a time when the network might be prone to drop datagrams, potentially aggravating the datagram loss. See below caveat.

Currenex will respond with "Subscription Reject" message to failed re-subscription requests.
A MP should analyze the number of missed sequence numbers, i.e., lost datagrams, experienced each day. If the number of missed sequence numbers is excessive, the MP should escalate the issue to its network providers and Currenex network engineering.

Any MP that implements Re-Subscription must also implement the Natural Rebuild recovery method as a fallback method.

CAVEAT*:* Currenex recommends no more than two re-subscription requests be issued per five (5) minute period per session. Currenex may throttle a session that exceeds this threshold.

14 Message Header

Field Name	Offset	Length	Type	Description	Example
Sequence number	0	4	Integer	Directional session based sequence number.	00000001_{hex} (1_{dec})
Timestamp	4	4	Integer	Number of milliseconds past midnight.	03010b37hex (50400055_{dec}ms = 14:00:00,055)
Message Type	8	1	Alpha	Message type	41_{hex} (A_{char})

15 Messages

15.1 Logon

Message Type A (41_{hex}) – Logon					
Field Name	**Offset**	**Length**	**Type**	**Description**	**Example**
UserID	9	20	Alpha	User session login id	416263557365720202020 0202020202020 202020_{hex} ($AbcUser_{char}$)
Password	29	20	Alpha	User password	313233707377642020202 0202020202020 202020_{hex} ($123pswd_{char}$)
SessionID	49	4	Integer	Unique session ID provided by Currenex. NOTE: This field is only used by Currenex in response to Logon requests.	$4300015f_{hex}$ (1124073823_{dec})

15.2 Logout

Message Type B (42_{hex}) – Logout					
Field Name	**Offset**	**Length**	**Type**	**Description**	**Example**
UserID	9	20	Alpha	User session login id	4162635573657202020200 202020202020 202020_{hex} ($AbcUser_{char}$)
SessionID	29	4	Integer	Unique session ID provided by Currenex	$4300015f_{hex}$ (1124073823_{dec})
Reason	33	3	Alpha	Optional text. See Appendix "Logout Message Reason Codes" for listing of codes returned by Currenex.	004131_{hex} ($A1_{char}$)

15.3 Heartbeat

Message Type C (43_{hex}) – Heartbeat					
Field Name	**Offset**	**Length**	**Type**	**Description**	**Example**
SessionID	9	4	Integer	Unique session ID provided by Currenex.	$4300015f_{hex}$ (1124073823_{dec})

15.4 Instrument Info (Outright Instruments)

Message Type D (44_{hex}) – Instrument Info					
Field Name	**Offset**	**Length**	**Type**	**Description**	**Example**
SessionID	9	4	Integer	Unique session ID provided by Currenex.	$4300015f_{hex}$ (1124073823_{dec})
InstrumentIndex	13	2	Short	Numeric identifier for instrument identified by the InstrumentID; unique for the session scope, only. Not guaranteed to be the same from session to session or across Ouch and Itch services.	0055_{hex} (85_{dec})
InstrumentType	15	1	Alpha	Instrument Type: 31_{hex} (1_{char})=Foreign Exchange 32_{hex} (2_{char})=Cash Metals 33_{hex} (3_{char})=Treasury	33_{hex} (3_{char})
InstrumentID	16	20	Alpha	Free form instrument definition string.	$4f54522d325952_{hex}$ ($OTR\text{-}2YR_{char}$)
SettlementDate	36	8	Long	Settlement date in milliseconds since Jan 1, 1970 GMT	$000001390b416a00_{hex}$ (20120809-12:00:00,000_{dec})
Security ID	44	9	Alpha	CUSIP	$912828SJ0_{hex}$ (152208000_{dec})
Security Type	53	1	Alpha	31_{hex} (49_{dec}) = Tbill 32_{hex} (50_{dec}) = Tnote 33_{hex} (51_{dec}) = Tbond	31_{hex} (49_{dec})
Maturity Date	54	8	Long	Date of Maturity in millis from Jan 1, 1970 GMT. NOTE: in case of maturity date being absent. 0 will be set as the value.	$0000013c00483e00_{hex}$ (20130103-12:00:00,000_{dec})
Issue Date	62	8	Long	Date on which offering is issued in milliseconds from Jan 1, 1970 GMT. NOTE: in case of issue date being absent. 0 will be set as the value.	$3c00483e00000001_{hex}$ (1370093420514-09:34:08,000_{dec})
Coupon Rate	70	8	Long	Coupon Rate NOTE: in case of coupon rate being absent. 0 will be set as the value.	$1CBBF2F34E_{hex}$ (123.412345678_{dec})
Price Type	78	1	Alpha	Supported Values: 31_{hex} (1_{char})=Price (percent of par) 32_{hex} (2_{char})=Discount 33_{hex} (3_{char})=Yield	31_{hex} (1_{char})
Instrument State	79	10	Alpha	Instrument State Supported values: 5749_{hex} (WI_{char}) – when-issued $4f5452_{hex}$ (OTR_{char}) – On-the-Run contracts $4f4c44_{hex}$ (OLD_{char}) – first Off-the-Run contracts $4f4c44_{hex}$(n) ($OLD(n)_{char}$) – other Off-the-Run contracts where n is from 1 to 60	$4f4c4420202020202020_{hex}$ (OLD_{char})
Instrument Tenor	89	10	Alpha	Instrument Tenor	$20334d2020202020202_{hex}$ ($3M_{char}$)

15.5 Instrument Info (Spread Instruments)

Message Type e (x65) – Spread Instrument Info					
Field Name	**Offset**	**Length**	**Type**	**Description**	**Example**
SessionID	9	4	Integer	Unique session ID provided by Currenex.	0000051b$_{hex}$ (1307$_{dec}$)
InstrumentIndex	13	2	Short	Numeric identifier for currency pair identified by the InstrumentID; unique for the session scope, only. Not guaranteed to be the same from session to session or across Ouch and Itch services.	0005$_{hex}$ (5$_{dec}$)
InstrumentType	15	1	Alpha	Instrument Type: 31$_{hex}$ (1$_{char}$) – MLEG	31$_{hex}$ (1$_{char}$)
Instrument ID	16	20	Alpha	Free form instrument definition string.	4f54522f4f54522f412d3259522f335952$_{hex}$ (OTR/OTR/A-2YR/3YR$_{char}$)
Instrument State	36	15	Alpha	Instrument State	4f5452 2f4f54522f41$_{hex}$ (OTR/OTR/A$_{char}$)
Instrument Tenor	51	10	Alpha	Instrument Tenor	32592f3359$_{hex}$ (2Y/3Y$_{char}$)
Instrument Tick Size	61	8	Rate	Tick Size on the Spread Instrument. Values set as follows: • WI Rolls = 0.125 • All others = 0.05	2FAF080$_{hex}$ (0.05$_{dec}$)
Anchor Leg Instrument Index	69	2	Short	Numeric identifier for underlying Anchor leg instrument identified by the InstrumentID; unique for the session scope, only. Not guaranteed to be the same from session to session or across Ouch and Itch services.	0055$_{hex}$ (85$_{dec}$)
Anchor Leg Instrument ID	71	10	Alpha	Free form instrument definition string.	4f54522d3259$_{hex}$ (OTR-2Y$_{char}$)
Anchor Leg Instrument State	81	10	Alpha	Underlying Anchor Leg Instrument State	4f545220202020202020$_{hex}$ (OTR$_{char}$)
Anchor Leg Instrument Tenor	91	5	Alpha	Underlying Anchor Leg Instrument Tenor	32591f$_{hex}$ (2Y$_{char}$)
Anchor Leg Security ID	96	9	Alpha	CUSIP of the Anchor leg	393132373935354732$_{hex}$ (9127955G2$_{char}$)
Anchor Leg Ratio	105	8	Amount	Quantity of Underlying Anchor leg for each 1 unit of Spread Instrument	400000
Anchor Leg Side	113	1	Alpha	Direction of interest on underlying anchor leg for a buy of the spread instrument B$_{char}$ (42$_{hex}$) = Buy S$_{char}$ (53$_{hex}$) = Sell	B$_{char}$ (42$_{hex}$)
Anchor Leg Maturity Date	114	8	Long	Maturity Date of Anchor Leg	Anchor Leg Maturity Date
Anchor Leg Issue Date	122	8	Long	Issue Date of Anchor Leg	Anchor Leg Issue Date
Anchor Leg Coupon Rate	130	8	Long	Coupon Rate of Anchor Leg	Anchor Leg Coupon Rate
Calculated Leg Instrument Index	138	2	Short	Numeric identifier for underlying Calculated leg instrument identified by the InstrumentID; unique for the	0055$_{hex}$ (85$_{dec}$)

Message Type e (x65) – Spread Instrument Info					
Field Name	**Offset**	**Length**	**Type**	**Description**	**Example**
				session scope, only. Not guaranteed to be the same from session to session or across Ouch and Itch services.	
Calculated Leg Instrument ID	140	10	Alpha	Free form instrument definition string.	4f54522d3359$_{hex}$ (OTR-3Y$_{char}$)
Calculated Leg Instrument State	150	10	Alpha	Underlying Calculated Leg Instrument State	4f545220202020202020$_{hex}$ (OTR$_{char}$)
Calculated Leg Instrument Tenor	160	5	Alpha	Underlying Calculated Leg Instrument Tenor	33591f$_{hex}$ (3Y$_{char}$)
Calculated Leg Security ID	165	9	Alpha	CUSIP of the Calculated leg	393132373935354732$_{hex}$ (9127955G2$_{char}$)
Calculated Leg Ratio	174	8	Amount	Quantity of Underlying Calculated leg for each 1 unit of Spread Instrument	300000
Calculated Leg Side	182	1	Alpha	Direction of interest on underlying calculated leg for a buy of the spread instrument B$_{char}$ (42$_{hex}$) = Buy S$_{char}$ (53$_{hex}$) = Sell	S$_{char}$ (53$_{hex}$)
Calculated Leg Maturity Date	183	8	Long	Maturity Date of Calculated Leg	
Calculated Leg Issue Date	191	8	Long	Issue Date of Calculated Leg	
Calculated Leg Coupon Rate	199	8	Long	Coupon Rate of Calculated Leg	

15.6 Instrument Info Ack

Message Type E (45$_{hex}$) – Instrument Info Ack					
Field Name	**Offset**	**Length**	**Type**	**Description**	**Example**
SessionID	9	4	Integer	Unique session ID provided by Currenex.	4300015f$_{hex}$ (1124073823$_{dec}$)
InstrumentIndex	13	2	Short	Numeric identifier for instrument identified by the InstrumentID; unique for the session scope, only. Not guaranteed to be the same from session to session or across Ouch and Itch services.	0055$_{hex}$ (85$_{dec}$)

15.7 Subscription Request

Message Type F (46$_{hex}$) – Subscription Request					
Field Name	**Offset**	**Length**	**Type**	**Description**	**Example**
SessionID	9	4	Integer	Unique session ID provided by Currenex.	4300015f$_{hex}$ (1124073823$_{dec}$)
SubscriptionType	13	1	Alpha	Subscription Type: 30$_{hex}$ (0$_{char}$)=Subscribe 31$_{hex}$ (1$_{char}$)=Unsubscribe 32$_{hex}$ (2$_{char}$)=Re-Subscribe	30$_{hex}$ (0$_{char}$)

Message Type F (46_{hex}) – Subscription Request					
Field Name	**Offset**	**Length**	**Type**	**Description**	**Example**
InstrumentIndex	14	2	Short	Numeric identifier for instrument identified by the InstrumentID; unique for the session scope, only. Not guaranteed to be the same from session to session or across Ouch and Itch services.	0055_{hex} (85_{dec})
SubscribeToTicker	16	1	Alpha	Liquidity Edge (LE) does not currently support ticker updates, so this value should always be set to not subscribe. SubscriptionType=0. Type: 31_{hex} (1_{char}) = Do not subscribe	31_{hex} (1_{char})

15.8 Subscription Reply

Message Type G (47_{hex}) – Subscription Reply					
Field Name	**Offset**	**Length**	**Type**	**Description**	**Example**
SessionID	9	4	Integer	Unique session ID provided by Currenex.	$4300015f_{hex}$ (1124073823_{dec})
InstrumentIndex	13	2	Short	Numeric identifier for instrument identified by the InstrumentID; unique for the session scope, only. Not guaranteed to be the same from session to session or across Ouch and Itch services.	0055_{hex} (85_{dec})
Type	15	1	Alpha	Instrument Type: 31_{hex} (1_{char}) = Accepted 32_{hex} (2_{char}) = Rejected	31_{hex} (1_{char})
Reason	16	50	Alpha	Free form reject reason text, specified if AckType is set to 2 – Rejected	

15.9 Price

Message Type H (48_{hex}) – Price					
Field Name	**Offset**	**Length**	**Type**	**Description**	**Example**
InstrumentIndex	9	2	Short	Numeric identifier for instrument identified by the InstrumentID; unique for the session scope, only. Not guaranteed to be the same from session to session or across Ouch and Itch services.	0055_{hex} (85_{dec})
PriceID	11	4	Integer	Id, unique across all instruments, assigned to the price	00003218_{hex} (12824_{dec})

Message Type H (48_{hex}) – Price					
Side	15	1	Alpha	Price Side: 31_{hex} (49_{dec}) = Bid 32_{hex} (50_{dec}) = Offer	31_{hex} (49_{dec})
MaxAmount	16	8	Amount	The maximum amount being offered at this Price.	$0000000005f5e100_{hex}$ (1000000.00_{dec})
MinAmount	24	8	Amount	The minimum amount that can be filled at this Price	$00000000003d0900_{hex}$ (40000.00_{dec})
Price	32	8	Rate	Divide decimal equivalent by 10^9 to get the actual rate	$000000170CF9EB65_{hex}$ (99.001953125_{dec})
Attributed	40	1	Alpha	Is attributed price: 31_{hex} (49_{dec}) = attributed 32_{hex} (50_{dec}) = not attributed	32_{hex} (50_{dec})
PriceProvider	41	4	Alpha	Market Maker id.	

15.10 Price Cancel

Message Type I (49_{hex}) – Price Cancel					
Field Name	**Offset**	**Length**	**Type**	**Description**	**Example**
InstrumentIndex	9	2	Short	Numeric identifier for instrument identified by the InstrumentID; unique for the session scope, only. Not guaranteed to be the same from session to session or across Ouch and Itch services.	0055_{hex} (85_{dec})
PriceID	11	4	Integer	Unique Id of outstanding price to be cancelled. NOTE: the id is unique within boundaries of the Instrument index	00003218_{hex} (12824_{dec})

15.11 Reject

Message Type K ($4B_{hex}$) – Reject					
Field Name	**Offset**	**Length**	**Type**	**Description**	**Example**
SessionID	9	4	Integer	Unique session ID provided by Currenex.	$4300015f_{hex}$ (1124073823_{dec})
RejectMsgType	13	1	Alpha	Rejected message type	46_{hex} (F_{char})
Reason	14	50	Alpha	Reason for rejecting message	496e76616c6964206d657373616765 20666f7 26d617420202020202020202020202 020202 $02020202020202020202020202020_{hex}$ (Invalid message $format_{char}$)

16 Appendix

16.1 Logout Message Reason Codes

Logout Message Reason Codes	
Reason Codes	**Description**
A1	Replaced by New Session
A2	Session Timed Out
A3	Invalid Session Id
A4	Internal Session Error
A5	Authentication Failure
A6	User Logout
A7	Failed Message Delivery
A8	Internal Session Closed
A9	Second Missed Heartbeat
A10	Invalid First Sequence Number

16.2 Revision History

Revision Number	Revision Date	Page Number	Update
1	22 January 2015	*	Document Created
2	9 January 2018	*	Support for spread instruments added and new template applied.
3	10 January 2018	22-23	Added Maturity Date, Issue Date and Coupon Rate for the underlying Anchor and Calculated Legs in the InstrumentInfo (Spread Instruments) message
4	22 January 2018	13, 22	InstrumentInfo messages for Spread Instruments updated to message type “e.”
5	31 January 2018	22	InstrumentInfo messages for Spread Instruments updated to message type “65.”
6	01 March 2018	*	Ticker references and message removed. Subscription change to make clear LE does not support ticker.
7	17 April 2018	26	Logout Message Reason Code A10 added to Appendix.
8	10 December 2018	All Price References	Updated price granularity to support extra decimal digit required for 1/16th of 1/32nd. All price values (outright and spread) will have a scaling of 10^9
9	11 March 2021	12 15	Heartbeat interval changed to 15 seconds. Section 12: Added info about uniqueness of PriceID
10	02 September 2021	15	Corrected example prices in Section 12.