INVESTORS EXCHANGE DEEP+ SNAP SPECIFICATION

Version 1.05

Updated: June 4, 2026

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OVERVIEW

Participants of Investors Exchange ("IEX" or the "Exchange") may use DEEP+ to receive real-time, order-by-order, depth of book quotations and last sale information direct from IEX. DEEP+ also supports several security-related administrative messages and provides event controls, such as start of day and end of day, to participants.

The depth of book quotations received via DEEP+ provide an order-by-order view of resting displayed orders at each price and side. Non-displayed orders and non-displayed portions of reserve orders are not represented in DEEP+. DEEP+ also provides last trade price and size information. Trades resulting from either displayed or non-displayed orders matching on IEX will be reported. Routed executions are not reported.

DEEP+ provides short sale restriction status, trading status, operational halt status, and security event information via security-related administrative messages. Lastly, DEEP+ provides event information about the market and data feed via administrative messages.

DEEP+ cannot be used to enter orders. For order entry, refer to the IEX FIX Specification.

Please refer to IEX DEEP+ Specification for more specific DEEP+ feed information.

The DEEP+ SNAP service is intended to augment the planned DEEP+ gap-fill retransmission service by adding a separate snapshot protocol to allow consumers to accelerate late-start recovery. The service does not modify the existing DEEP+ feed or retransmission protocols.

For ordering information, contact IEX Market Operations at 646.343.2310 or marketops@iextrading.com or simply submit completed IEX Data Subscriber Agreement and Forms.

TRANSPORT PROTOCOL OPTIONS

DEEP+ SNAP uses a request-response TCP/IP unicast protocol.

Note: Snapshot Responses contain data messages detailed in the IEX DEEP+ Specification and the IEX Transport Specification.

ARCHITECTURE

DEEP+ SNAP is a request-response protocol with no unsolicited messages (i.e. heartbeats). Applications would start to receive and buffer DEEP+ multicast before connecting to a DEEP+ SNAP server on a well-known port and would issue a SnapshotRequest Message.

In response, the DEEP+ SNAP server will either provide a Snapshot Response or ErrorResponse Message.

A Snapshot Response provides a point-in-time snapshot of the DEEP+ order data and trading status data for all IEX Symbols along with the associated DEEP+ feed Sequence number.

On receipt of a Snapshot Response the applications would initialize their internal Price level books for each Symbol using data from the Snapshot Response, then apply any buffered real-time updates with higher sequence numbers.

Applications would then disconnect from the DEEP+ SNAP server and continue to process the DEEP+ feed real-time multicast as normal.

Connections may be timed-out and disconnected by either client or server if no data has been transmitted for a significant period (10 seconds).

DATA TYPES

These are identical to the planned DEEP+ Specifications:

- String: Fixed-length ASCII byte sequence, left justified and space filled on the right
- Long: 8 bytes, signed integer
- Price: 8 bytes, signed integer containing a fixed-point number with 4 digits to the right of an implied decimal point
- Integer: 4 bytes, unsigned integer
- Byte: 1 byte, unsigned integer
- Timestamp: 8 bytes, signed integer containing a counter of nanoseconds since POSIX (Epoch) time UTC
- Event Time: 4 bytes, unsigned integer containing a counter of seconds since POSIX (Epoch) time UTC

All binary fields are in **little endian** format.

Note that each byte is represented by two hexadecimal digits in the examples within this specification.

NETWORK DETAILS

DEEP+ SNAP TCP/IP

Snapshot Configuration

- Supported Retransmission Protocol(s): TCP
- Maximum Requests: Quota restricted (1000/channel/day)
- Simultaneous Requests: Unlimited
- Supported Request Type(s): SnapshotRequest

DEEP+ SNAP Single Channel Server Addresses

SITE	XC Type	Server	Port	Credentials
IEX POP (Equinix NY5)	Primary (A)	23.226.155.172	11379	Contact Market Ops
	Secondary (B)	23.226.155.236	11379	Contact Market Ops
Disaster Recovery (Equinix CH4)	Tertiary (C)	23.226.155.253	11379	Contact Market Ops
IEX Testing Facility (Equinix NY5)	ITF (I)	23.226.155.22	33381	Contact Market Ops

DEEP+ SNAP Multi-Channel Server Addresses

ChannelID	Port	POP (A)	POP (B)	DR [1]	ITF
1	13337	23.226.155.137	23.226.155.203		23.226.155.29
2	13338	23.226.155.137	23.226.155.203		23.226.155.29
3	13339	23.226.155.137	23.226.155.203		23.226.155.29
4	13340	23.226.155.137	23.226.155.203		23.226.155.29
5	13341	23.226.155.137	23.226.155.203		23.226.155.29
6	13342	23.226.155.137	23.226.155.203		23.226.155.29
7	13343	23.226.155.137	23.226.155.203		23.226.155.29
8	13344	23.226.155.137	23.226.155.203		23.226.155.29
9	13345	23.226.155.142	23.226.155.194		23.226.155.29
10	13346	23.226.155.142	23.226.155.194		23.226.155.29
11	13347	23.226.155.142	23.226.155.194		23.226.155.29

12	13348	23.226.155.142	23.226.155.194		23.226.155.29
13	13349	23.226.155.142	23.226.155.194		23.226.155.29
14	13350	23.226.155.142	23.226.155.194		23.226.155.29
15	13351	23.226.155.142	23.226.155.194		23.226.155.29
16	13352	23.226.155.142	23.226.155.194		23.226.155.29

[1] Multi-channel server addresses for DR will be communicated at a later date before launch.

DEEP+ MULTI-CHANNEL DISTRIBUTION

For POP and DR Channels unused channels are reserved for future use and only heartbeat messages will be sent over these channels until further notice.

For ITF channels 3 through 16 are reserved for future use and only heartbeat messages will be sent over these channels until further notice.

Note - IEX reserves the right to update channel assignments and add new channels with a minimum of two business days' notice to Subscribers.

ChannelID	Symbol Start Range		
	POP (A/B) [2]	DR [2]	ITF
1			A
2			K
3			-
4			-
5			-
6			-
7			-
8			-
9			-
10			-
11			-
12			-
13			-
14			-
15			-
16			-

[2] Symbol assignments for POP and DR will be communicated at a later date before launch.

Please contact marketops@iextrading.com to procure DEEP+ SNAP credentials.

Please contact itfsupport@iextrading.com for support help related to the ITF.

MESSAGE FORMATS

SnapshotRequest Message - r (0x72)

The SnapshotRequest message is sent from the Client to the DEEP+ SNAP Server to authenticate and request a Snapshot Response.

Field Name	Offset	Length	Type	Description/Notes
Message Length	0	2	Integer	Length of message in bytes not including this field (57)
Message Type	2	1	Byte	'r' (0x72) – SnapshotRequest
Authentication Token	3	40	Byte	Token supplied by IEX Market Ops. Left justified string space padded on right.
ChannelID	43	4	Integer	Channel Identifier (1 – 16)
SessionID	47	4	Integer	Session Identifier
Minimum Sequence Number	51	8	Long	Minimum Sequence Number useable by client

Total Message Data length is 59 bytes.

Applications will normally wait until they receive and start buffering DEEP+ Feed Multicast messages before connecting and sending a SnapshotRequest to the DEEP+ SNAP Server. The SnapshotRequest's ChannelID, SessionID and Minimum Sequence Number fields should be populated with values from the DEEP+ FEED IEX TP-Header in the Multicast packet. A value of 0 (zero) in the Minimum Sequence Number field will return the latest Snapshot available.

Example

```
Message Length            39 00                              // 57
Message Type              72                                 // r = SnapshotRequest
Authentication Token      41 54 4F 4B 45 4E 31 20 20 ... 20  // ATOKEN1 (Space padded on right)
ChannelID                 01 00 00 00                        //
SessionID                 F0 81 18 4B                        // 1259897328
Minimum Sequence Number   D4 01 00 00 00 00 00 00            // 468
```

ErrorResponse Message - e (0x65)

Sent by the DEEP+ SNAP server to the client when a SnapshotRequest is rejected.

Field Name	Offset	Length	Type	Description/Notes
Message Length	0	2	Integer	Length of message in bytes not including this field (2)
Message Type	2	1	Byte	'e' (0x65) – ErrorResponse
Reject Reason Code	3	1	Byte	Reason the SnapshotRequest was rejected

Total Message Data length is 4 bytes.

Reject Reason Code

'A' (0x41) – Authentication Failure
'C' (0x43) – Incorrect ChannelID in SnapshotRequest
'E' (0x45) – Snapshot Request already active
'Q' (0x51) – Quota Exceeded
'R' (0x52) – Snapshot Not Yet Available (no snapshot >= requested Minimum Sequence Number is available)
'S' (0x53) – Incorrect SessionID in SnapshotRequest
'U' (0x55) – Unknown Message

Example

```
Message Length          02 00                   // 2
Message Type            65                      // e = ErrorResponse
Reject Reason Code      51                      // Q = Quota Exceeded
```

Snapshot Response

A Snapshot Response is sent from the DEEP+ SNAP server to the client when a client SnapshortRequest is successful. A Snapshot Response consists of a SnapshotStart message, followed by SnapshotData messages, and concluded by a SnapshotEnd message.

SnapshotStart Message - s (0x73)

Field Name	Offset	Length	Type	Description/Notes
Message Length	0	2	Integer	Length of message in bytes not including this field (9)
Message Type	2	1	Byte	's' (0x73) – SnapshotStart
SnapshotLength	3	8	Long	Length in bytes of the complete Snapshot Response. Includes this SnapshotStart message, all SnapshotData messages and the SnapshotEnd message

Example

```
Message Length      09 00                   // 9
Message Type        73                      // s = SnapshotStart
SnapshotLength      C7 1E 70 00 00 00 00 00 // Variable (7347911)
                                            // Length of SnapshotStart(11) +
                                            // SnapshotData (variable) +
                                            // SnapshotEnd(11)
```

SnapshotData Message - d (0x64)

Field Name	Offset	Length	Type	Description/Notes
Message Length	0	2	Integer	Length of message in bytes not including this field (Message Type Length + IEX-TP Header Length + IEX-TP Message Block Length + **Variable** IEX-TP Message Data Length)
Message Type	2	1	Byte	'd' (0x64) – SnapshotData
IEX-TP Header	3	40	Byte	see IEX Transport specification
IEX-TP Message Block Length	43	2	Integer	see IEX Transport specification
IEX-TP Message Data	45	Variable	Byte	see IEX Transport specification

Example

```
Message Length              4C 00                    // Variable (76)
Message Type                64                       // d = SnapshotData
IEX-TP Header
   Version                  01                       // 1
   (Reserved)               00                       // 0
   ProtocolID               05 80                    // DEEP+ Protocol ID
   ChannelID                01 00 00 00              // 1
   SessionID                F0 81 18 4B              // 1259897328
   Payload Length           23 00                    // Variable (35)
   Message Count            01 00                    // ALWAYS = 1
   Stream Offset            04 4F 0E 00 00 00 00 00  // 937732
   First Message Sequence Number
                            62 AC 00 00 00 00 00 00  // 44130
   Send Time                C1 8F 8B D9 4F 1E 0C 17  // 2022-08-17 07:28:10.893922241
IEX-TP Message Block Length 21 00                    // 33
IEX-TP Message Data
   Message Length           1F 00                    // 31
IEX-TP Message Data*                                 // DEEP+
        Message Type        44                       // D = Security Directory
        Flags               80                       // Test Security, not an ETP,
                                                        Not a When Issued security
        Timestamp           51 B8 08 8F 4F 1E 0C 17  // 2022-08-17 07:28:09.643833425
        Symbol              5a 49 45 58 54 20 20 20  // ZIEXT
        Round Lot Size      64 00 00 00              // 100 shares
        Adjusted POC Price  24 1d 0f 00 00 00 00 00  // $99.05
        LULD Tier           01                       // Tier 1 NMS Stock
```

*The IEX-TP Message Block contains a complete IEX DEEP+ formatted message and may include any DEEP+ message type.

SnapshotEnd Message - x (0x78)

Field Name	Offset	Length	Type	Description/Notes
Message Length	0	2	Integer	Length of message in bytes not including this field (9)
Message Type	2	1	Byte	'x' (0x78) – SnapshotEnd
Snapshot Sequence Number	3	8	Long	Sequence at which the Snapshot was created

Example

```
Message Length            09 00                   // 9
Message Type              78                      // x = SnapshotEnd
Snapshot Sequence Number  62 AC 00 00 00 00 00 00 // 44130
```

DEEP+ Feed messages in Snapshot Response

The IEX-TP Message Data returned in the SnapshotData messages will contain DEEP+ Feed messages required to rebuild the current state of the DEEP+ Feed books for each symbol at the SequenceNumber the Snapshot was created.

Snapshot Content:

1. *SnapshotStart* message

2. For each IEX Listed symbol (at time of snapshot)
   - Latest **SecurityDirectory** Message

3. Latest **SystemEvent** message (if exists at time of snapshot)

4. For each symbol (at time of snapshot)
   - Latest **TradingStatus** Message (if exists at time of snapshot)
   - Latest **SecurityEvent** Message (if exists at time of snapshot)
   - Latest **OperationalHaltStatus** Message (if exists at time of snapshot)
   - Latest **ShortSalePriceTestStatus** Message (if exists at time of snapshot)
   - All **AddOrder** Messages necessary to build the book (that are active at time of snapshot)*
   - Latest **RetailLiquidityIndicatorMessage** (if exists at time of snapshot)

5. *SnapshotEnd* Message (includes SnapshotSequenceNumber)

Note: All DEEP+ Feed messages (shown in **bold**) are wrapped within a DEEP+ SNAP *SnapshotData* Message that includes an IEX-TP Header providing DEEP+ Feed sequencing and timing information.

* **AddOrder** Messages will not be in the original DEEP+ Feed Sequence or SendTime order. **AddOrder** Messages will be net of any order modifications.

As an illustrative example, for the following sequence:

```
Add Order:       Time=0, OrderSide=Buy, OrderID=1, Size=200, Price=10.10
Add Order:       Time=1, OrderSide=Buy, OrderID=2, Size=200, Price=10.10
Order Executed:  Time=2, OrderID=1, Size=100, Price=10.10, TradeID=1
Order Modify:    Time=3, OrderID=1, Flag=ResetPriority
```

The snapshot would contain:

```
Add Order:       Time=1, OrderSide=Buy, OrderID=2, Size=200, Price=10.10
Add Order:       Time=3, OrderSide=Buy, OrderID=1, Size=100, Price=10.10
```

REVISION HISTORY

Version	Date	Change
1.00	September 3, 2024	Document created.
1.01	January 14, 2025	• Removed OfficialPrice Message from “Snapshot Content” example. • Updated overview to reflect feed launch.
1.02	March 26, 2025	• Updated network details for DEEP+ SNAP in the IEX Testing Facility
1.03	June 11, 2025	• Updated ErrorResponse Message Reject Reason Code definitions.
1.04	June 2, 2026	• Updated SnapshotStart Message Example • Added DEEP+ Channelized IP, Ports and Channel Breakdown
1.05	June 4, 2026	• Updated DEEP+ SNAP Multi-Channel Server Addresses for ITF