



# **INVESTORS EXCHANGE TOPS SNAP SPECIFICATION**

Version 1.6

Updated: June 2, 2026



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# OVERVIEW

Participants of Investors Exchange (“IEX” or the “Exchange”) may use TOPS to receive real-time top of book quotations, last sale information, short sale restriction status, regulatory trading status, and auction information direct from IEX. Market data distributors may use TOPS to feed dynamically updating stock tickers, portfolio trackers, trade alert programs, time and quote graphs, and other display systems.

The quotations received via TOPS provide an aggregated size and do not indicate the number or size of individual orders at the best bid or ask. Non-displayed orders and non-displayed portions of reserve orders are not represented in TOPS. TOPS also provides last trade price and size information. Trades resulting from either displayed or non-displayed orders matching on IEX are reported. Routed executions are not reported.

Complete depth of book market data can be received via the IEX DEEP protocol (aggregated by price level) or via the IEX DEEP+ protocol (order-by-order).

TOPS also provides short sale restriction and regulatory trading status information. For IEX-listed securities, TOPS provides current price, size, imbalance information, auction collar information, and other relevant information about upcoming auctions.

TOPS cannot be used to enter orders. For order entry, refer to the [IEX FIX Specification](#).

Please refer to [IEX TOPS Specification](#) for more specific TOPS feed information.

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

For ordering information, contact IEX Market Operations at 646.343.2310 or [marketops@iextrading.com](mailto:marketops@iextrading.com) or simply submit completed [IEX Data Agreements and Forms](#).

# TRANSPORT PROTOCOL OPTIONS

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

**Note:** Snapshot Responses contain data messages detailed in the [IEX TOPS Specification](#) and the [IEX Transport Specification](#).



# ARCHITECTURE

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

In response the TOPS SNAP server will either provide a Snapshot Response or ErrorResponse Message.

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

On receipt of a Snapshot Response the applications would initialize their internal top of 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 TOPS SNAP server and continue to process the TOPS 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 TOPS Specification:

- 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

## TOPS SNAP TCP/IP

### Snapshot Configuration

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

### TOPS SNAP Server Addresses

| SITE                                  | XC Type       | Server         | Port  | Credentials        |
|---------------------------------------|---------------|----------------|-------|--------------------|
| IEX POP<br>(Equinix NY5)              | Primary (A)   | 23.226.155.163 | 11380 | Contact Market Ops |
|                                       | Secondary (B) | 23.226.155.227 | 11380 | Contact Market Ops |
| Disaster Recovery<br>(Equinix CH4)    | Tertiary (C)  | 23.226.155.250 | 11380 | Contact Market Ops |
| IEX Testing Facility<br>(Equinix NY5) | ITF (I)       | 23.226.155.19  | 33380 | Contact Market Ops |

Please contact [marketops@iextrading.com](mailto:marketops@iextrading.com) to procure TOPS SNAP credentials.

Please contact [itfsupport@iextrading.com](mailto: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 TOPS 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.  |
| 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 TOPS Feed Multicast messages before connecting and sending a SnapshotRequest to the TOPS SNAP Server. The SnapshotRequest's ChannelID, SessionID and Minimum Sequence Number fields should be populated with values from the TOPS 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                       // ALWAYS = 1
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 TOPS 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 TOPS SNAP server to the client when a client [SnapshotRequest](#) 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) - <a href="#">SnapshotStart</a>   |
| SnapshotLength | 3      | 8      | Long    | Length in bytes of the complete <a href="#">Snapshot Response</a> . Includes this <a href="#">SnapshotStart</a> message, all <a href="#">SnapshotData</a> messages and the <a href="#">SnapshotEnd</a> 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 + <b>Variable</b> IEX-TP Message Data Length) |
| Message Type                | 2      | 1        | Byte    | 'd' (0x64) - <a href="#">SnapshotData</a>   |
| IEX-TP Header               | 3      | 40       | Byte    | see <a href="#">IEX Transport specification</a>   |
| IEX-TP Message Block Length | 43     | 2        | Integer | see <a href="#">IEX Transport specification</a>   |
| IEX-TP MessageData          | 45     | Variable | Byte    | see <a href="#">IEX Transport specification</a>   |

### Example

```

Message Length          4C 00          // Variable (76)
Message Type           64              // d = SnapshotData
IEX-TP Header
  Version              01              // 1
  (Reserved)          00              // 0
  ProtocolID          03 80           // TOPS 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*
    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 Data will contain messages in [IEX TOPS](#) format and may include any TOPS message types.

### 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) - <a href="#">SnapshotEnd</a>                |
| 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
```



## TOPS Feed messages in Snapshot Response

The IEX-TP Message Data returned in the SnapshotData messages will contain TOPS Feed messages required to rebuild the current state of the TOPS 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)
  - Latest **OfficialPrice** Message (if exists at time of snapshot)
  - All **QuoteUpdate** Messages (that are active at time of snapshot)
  - Latest **RetailLiquidityIndicator** Message (if exists at time of snapshot)
5. [SnapshotEnd](#) Message (includes [SnapshotSequenceNumber](#))

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

Note: **QuoteUpdate** Messages will not be in the original TOPS Feed Sequence or SendTime order.



# REVISION HISTORY

| Version | Date              | Change   |
|---------|-------------------|--|
| 1.0     | June 30, 2021     | <ul style="list-style-type: none"><li>• Document created.</li></ul>  |
| 1.1     | October 5, 2021   | <ul style="list-style-type: none"><li>• Added interim Retail Liquidity Indicator message details with highlights.</li></ul>  |
| 1.2     | October 19, 2021  | <ul style="list-style-type: none"><li>• Removed interim highlights.</li><li>• Added full support for Retail Liquidity Indicator message and associated details.</li></ul>  |
| 1.3     | November 18, 2022 | <ul style="list-style-type: none"><li>• Added TOPS Snapshot Message Examples.</li><li>• Added Simultaneous Request limit details.</li><li>• Updated ITF Credentials example.</li><li>• Expanded description of SnapshotRequest message behavior under certain scenarios.</li></ul> |
| 1.4     | January 14, 2025  | <ul style="list-style-type: none"><li>• Updated SnapshotData Message Example</li><li>• Updated SnapshotEnd Message Example</li><li>• Updated overview section to improve clarity</li></ul>   |
| 1.5     | June 11, 2025     | <ul style="list-style-type: none"><li>• Updated ErrorResponse Message Reject Reason Code definitions.</li></ul>  |
| 1.6     | June 2, 2026      | <ul style="list-style-type: none"><li>• Updated SnapshotStart and SnapshotData Message Examples</li></ul>  |