UTP Snap-Shot 1.0

Version 1.0
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1 Overview

UTP Snap-Shot is a new optional service for UTP Direct Access Data Feed Recipients ("Recipients"). Using the UTP Snap-Shot service will allow the Recipients to obtain the current set of relevant quote and issue state messages sent on the UTP Data Service during the trading day. Firms may use the UTP Snap-Shot service to validate order book displays or to recover from major data gaps during the trading day. Last sale and other trade related information will not be available.

UTP Snap-Shot is intended to be an optional add-on service for Recipients; this service does not replace the existing preferred retransmission service. UTP Snap-Shot uses the same message formats as the UTP Data Services.

UTP Snap-Shot will be based on a similar architecture as the existing UTP SIP and will use the same the same data formats and will follow the 6 alpha-split channel model similar to the existing UTP Data Services

Upon initial implementation the UTP Snap-Shot service will facilitate quote services and security state information. Last sale and other trade related information will not be available.

Service availability

The service will be available during the operational hours of the UTP SIP, between 4:00 AM to 8:00 PM. Please refer to the UTP SIP Transmission Schedule on the UTP Plan website for a detailed listing of the operational hours.

The service will be operational in both Carteret and Chicago data center. User applications can connect to either of the data centers.

2 Architecture

UTP Snap-Shot is a point-to-point data feed product comprised of a series of sequenced messages. Each message is variable in length based on the message type. The messages that make up the UTP Snap-Shot protocol are typically delivered using a higher level protocol that takes care of sequencing and delivery guarantees.

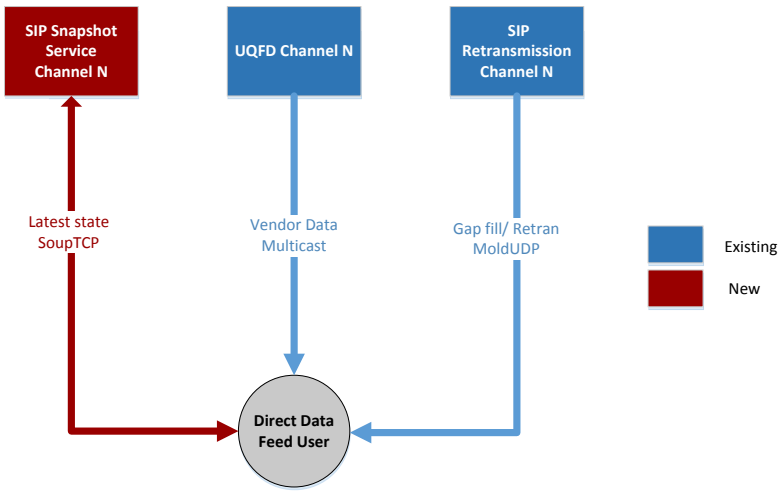
UTP will offer the Snap-Shot data feed in the SoupBinTCP protocol option only. Please note that users must login to SoupBinTCP for **sequence 1** to correctly receive data and it is expected that the user will disconnect after they have completed their receipt of the request. The service will not allow multiple simultaneous connections.

In order to minimize the impact to service and availability to other clients the system will prevent connection availability after the 999 connection attempt (reset daily).

In the market data messages, instruments are identified by security identifier (symbol), and communicated via the Issue Symbol Directory message. The security identifier (symbol) code appears in all messages.

The system will follow the 6 alpha-split channel model similar to the existing UTP Data Services. The user application can connect to one or all of the channels to get the data about those

symbols in that channel. All relevant messages will be transmitted once the user application connects to a channel.



3 Data Types

All integer fields are unsigned big-endian (network byte order) binary encoded numbers.

All alpha fields are ASCII fields which are left justified and padded on the right with spaces.

Prices are integer fields, supplied with an associated precision. When converted to a decimal format, prices are in fixed point format, where the precision defines the number of decimal places. For example, a field flagged as Price (6) has an implied 6 decimal places.

Timestamps are represented as nanoseconds since Epoch.

4 Message Formats

Upon logon to the UTP Snap-Shot service, firms will receive the following data elements with the relevant system time stamp:

- Control Messages disseminated from start of day;
- Issue Symbol Directory messages for all NASDAQ-listed securities in the UTP system;
- Regulation SHO Short Sale Price Test Restricted Indicator Message for symbols which have restrictions;
- Cross SRO Trading Action messages only for symbol that are currently halted, in a Quote Resumption or in a LULD pause;
- Market Center Trading Action messages if the Market is in a market-center specific halted state for any symbol.
- Market Wide Circuit Breaker (MWCB) Levels message;
- Limit Up – Limit Down Price Band Message reflecting the current band for LULD eligible securities (if exists);
- Auction Collar Messages for any securities that are currently in a LULD pause state;
- UTP Quotation Message for each participant active in the security along with the National Best Bid and Offer (NBBO); NBBO is appended to the last quote in the spin for the symbol and
- Snap-Shot message that provides the most recent sequence reflected in the transmission. This is a new message and only on this service.

Please note that UTP Snap-Shot uses the same message formats as the UTP Data Services Specifications.

At the end of the spins, UTP Snap-Shot will send a Snap-Shot message to denote where firms should begin processing real-time updates via the UTP Data Services quotation product.

4.1 Control Message

UTP Snap-Shot product is designed to support the same control messages as the UTP Data Services data feed. On Snap-Shot, UTP will send out system event messages for those events that that occurred up to the time of the Snap-Shot snapshot request.

Name	Offset	Length	Type	Notes
version	0	1	byte	1 – Protocol Version
msgCategory	1	1	byte	C – Control Messages
msgType	2	1	byte	Various Message Types
orig	3	1	byte	Market Center Originator ID
subMarketId	4	1	byte	Sub Market Center ID
sipTime	5	8	long	SIP Timestamp
timestamp1	13	8	long	Participant Timestamp
partToken	21	8	long	Participant Token

UTP supports the following msgType codes on a daily basis on the UTP Data Services for the quotation data feed.

Code	Explanation
"I"	***Start of Day***. Each day, the Start of Day message will be sent to inform SIP subscribers that all subsequent data transmitted will be real-time updates and should be treated accordingly. Prior to 03:58 the data feed handler may be broadcasting heartbeats.
"O"	***Market Session Open***. This message signifies the opening of market systems for the Normal Market Session. Please note that each UTP participant may choose to provide a Market Session Open control message.
"C"	***Market Session Close***. This message signals the closing of market systems for the Normal Market Session.
"J"	***End of Day***. The message signals the end of active message dissemination for the UTP SIP operational cycle.
"Z"	***End of Transmissions***. The message will be sent to inform SIP subscribers that there will be no further transmissions of production data sent through the UTP SIP line for that day. This message will be transmitted at the end of the day, and will be the last production message of the day.

4.2 Issue Symbol Directory Message (AB)

As part of each Snap-Shot transmission, the UTP SIP will disseminate Issue Symbol Directory messages for all Nasdaq-listed securities in the UTP system for the current trading day for the appropriate channel. Please note that the Symbol Directory spin may include halted issues. Firms must process the Cross SRO Trading Action message for current trading state information.

Name	Offset	Length	Type	Notes
version	0	1	byte	1 – Protocol Version
msgCategory	1	1	byte	A – Administrative Messages
msgType	2	1	byte	B – Issue Symbol Directory Message
orig	3	1	byte	Market Center Originator ID
subMarketId	4	1	byte	Sub Market Center ID
sipTime	5	8	long	SIP Timestamp
timestamp1	13	8	long	Participant Timestamp
partToken	21	8	long	Participant Token
symbol	29	11	byte[]	Security Identifier
oldSymbol	40	11	byte[]	Old Security Identifier
name	51	30	byte[]	Issue Name
type	81	1	byte	Issue Type
subtype	82	2	byte[]	Issue Subtype
mktTier	84	1	byte	Market Tier
auth	85	1	byte	Authenticity
sstInd	86	1	byte	Short Sale Threshold Indicator
roundLotSz	87	2	short	Round Lot Size
finStatInd	89	1	byte	Financial Status Indicator

The *roundLotSz* indicates the number of shares that make up a round lot for the given security. Allowable values are 00001 to 99999. For most Nasdaq issues, the round lot size is 100 shares. Currently the participants submit quotation messages in increments of a round lot and trades in actual shares.

4.3 Reg SHO Short Sale Price Test Restricted Indicator

For Nasdaq-listed issues, the UTP SIP receives, from the listing market, a full pre-opening spin of Reg SHO Short Sale Price Test Restricted Indicator messages indicating the Rule 201 status for all active issues. The listing market also sends the Reg SHO Short Sale Price Test Restricted Indicator message in the event of an intraday status change.

The Snap-Shot service will provide a full spin of all active securities reflecting the current Reg SHO Action at the time of the snap-shot transmission.

Name	Offset	Length	Type	Notes
version	0	1	byte	1 – Protocol Version
msgCategory	1	1	byte	A – Administrative Messages
msgType	2	1	byte	V – Reg SHO Restriction Indicator Message
orig	3	1	byte	Market Center Originator ID
subMarketId	4	1	byte	Sub Market Center ID
sipTime	5	8	long	SIP Timestamp
timestamp1	13	8	long	Participant Timestamp
partToken	21	8	long	Participant Token
symbol	29	11	byte[]	Security Identifier
regShoAction	40	1	byte	Reg SHO Action

4.4 Cross SRO Trading Action message

UTP SIP uses this administrative message to indicate the current regulatory trading status of a security to the trading community.

In the Snap-Shot transmission, UTP will send out a Cross SRO Trading Action message for only those Nasdaq listed issues that are currently halted, in a Quote Resumption or in a LULD pause state.

If the Snap-Shot transmission includes a Stock Directory message, but not a Cross SRO Trading Action message, for an issue, firms may assume that the issue is eligible for normal quoting and trading.

Name	Offset	Length	Type	Notes
version	0	1	byte	1 – Protocol Version
msgCategory	1	1	byte	A – Administrative Messages
msgType	2	1	byte	H – Trading Action Message
orig	3	1	byte	Market Center Originator ID
subMarketId	4	1	byte	Sub Market Center ID
sipTime	5	8	long	SIP Timestamp
timestamp1	13	8	long	Participant Timestamp
partToken	21	8	long	Participant Token
symbol	29	11	byte[]	Security Identifier
action	40	1	byte	Trading Action Code
actionSequence	41	4	int	Trading Action Sequence Number
actionTime	45	8	long	Timestamp of when the action occurred.
reason	53	6	byte[]	Reason for the Trading Action

The *actionSequence* field is intended for UTP SIP internal use only and Data Recipients should ignore/disregard this field to the extent that it does not impact their normal data processing.

4.5 Market Center Trading Action Message (AK)

UTP SIP uses this fixed format message to inform UTP data feed subscribers of when a UTP participant invokes or releases a market center-specific trading halt for a Nasdaq-listed security.

In contrast to the Cross SRO Trading Action (Category A – Type H) data format, the Market Center Trading Action (Category A – Type K) message impacts trading activity only for the UTP participant identified in the Market Center (MC) ID field.

Other UTP participants may continue to quote and trade the issue as normal. Because the issue remains active on other markets, the UTP participant are expected to remove their quotes or mark their quotes as non-NBBO eligible during the market center-specific trading halt.

Name	Offset	Length	Type	Notes
version	0	1	byte	1 – Protocol Version
msgCategory	1	1	byte	A – Administrative Messages
msgType	2	1	byte	K – Market Center Trading Action Message
orig	3	1	byte	Market Center Originator ID
subMarketId	4	1	byte	Sub Market Center ID
sipTime	5	8	long	SIP Timestamp
timestamp1	13	8	long	Participant Timestamp
partToken	21	8	long	Participant Token
symbol	29	11	byte[]	Security Identifier
action	40	1	byte	Trading Action Code
actionTime	41	8	long	Timestamp of when the action occurred.
mcId	49	1	byte[]	Market Center Identifier

4.6 Market Wide Circuit Breaker Decline Level Message (AC)

Name	Offset	Length	Type	Notes
version	0	1	byte	1 – Protocol Version
msgCategory	1	1	byte	A – Administrative Messages
msgType	2	1	byte	C – MWCB Decline Message
orig	3	1	byte	Market Center Originator ID
subMarketId	4	1	byte	Sub Market Center ID
sipTime	5	8	long	SIP Timestamp
timestamp1	13	8	long	Participant Timestamp
partToken	21	8	long	Participant Token
mwcbLevel1	29	8	long	MWCB Level 1
mwcbLevel2	37	8	long	MWCB Level 2
mwcbLevel3	45	8	long	MWCB Level 3

A Market Wide Circuit Breaker (MWCB) Level message will inform participants and the UTP data recipients what the daily MWCB breach points are set to for the current trading day.

The MWCB Levels will generally remain in effect for the remainder of the current trading day and will be reset each trading day based on the prior day's closing value of the S&P 500 index.

However, there can be situations where the breach levels were set due to erroneous activity. In this case the breach levels may reset and disseminate the MWCB breach levels again. Participants and UTP data recipients should process and use the most recently disseminated levels for that trading day.

4.7 Limit Up – Limit Down Price Band Message

The Securities and Exchange Commission (SEC) adopted a Plan, to be implemented in two phases, to provide for a market-wide Limit Up–Limit Down (LULD) mechanism intended to address extraordinary market volatility in NMS Stocks. The new LULD procedures are designed to prevent trades in individual NMS Stocks from occurring outside of specified Upper and Lower Limit Price Bands.

Name	Offset	Length	Type	Notes
version	0	1	byte	1 – Protocol Version
msgCategory	1	1	byte	A – Administrative Messages
msgType	2	1	byte	P – LULD Price Band Message
orig	3	1	byte	Market Center Originator ID
subMarketId	4	1	byte	Sub Market Center ID
sipTime	5	8	long	SIP Timestamp
timestamp1	13	8	long	Participant Timestamp
partToken	21	8	long	Participant Token
symbol	29	11	byte[]	Security Identifier
luldPriceBandInd	40	1	byte	LULD Price Band Indicator
luldTime	41	8	long	LULD Price Band Effective Time
limitDownPrice	49	8	long	Limit Down Price
limitUpPrice	57	8	long	Limit Up Price

4.8 Auction Collar Message (AE)

Name	Offset	Length	Type	Notes
version	0	1	byte	1 – Protocol Version
msgCategory	1	1	byte	A – Administrative Messages
msgType	2	1	byte	E – Auction Collar Message
orig	3	1	byte	Market Center Originator ID
subMarketId	4	1	byte	Sub Market Center ID
sipTime	5	8	long	SIP Timestamp
timestamp1	13	8	long	Participant Timestamp
partToken	21	8	long	Participant Token
symbol	29	11	byte []	Security Identifier
actionSequence	40	4	int	Trading Action Sequence Number
CollarReferencePrice	44	8	long	Reference price used to set collar
CollarUpPrice	52	8	long	Collar Up Price
CollarDownPrice	60	8	long	Collar Down Price
CollarExtension	68	1	byte	Collar Extension Indicator

Primary markets using an automated reopening will calculate new Auction Collars, in compliance with rules around prices for re-opening, when applicable and publish this new Auction Collar Message (Category A – Type E) to SIP.

The initial Auction Collars will be published immediately after the LULD Trading Pause.

Subsequent Auction Collars will be published approximately every five minutes, while in an LULD Trading Pause, until the primary market is able to reopen.

The collar extension indicator will be used to reflect when a new collar has been published. The first collar extension, at the time of the pause, will be set to zero indicating the first collar message and will increment by 1 for each new message received by the primary market and disseminated via the SIP, during the pause event.

Should a security have multiple pause events during the trading day, at every new pause, the collar extension indicator is reset to zero by the primary market.

Only the latest Auction collar message is sent over the snapshot service.

4.9 UTP Quote BBO / NBBO Spin

The UTP Quote BBO / NBBO Spin will use the UTP Quote Message Long-form (QF) to provide a current state of all active participants in the identified security.

In order to provide efficiency in dissemination of the messages via the Snap-Shot transmission, the NBBO Appendage Indicator will be set to "1" No National BBO can be calculated, until the **final participant BBO** has been disseminated at which time the appropriate NBBO appendage indicator will be populated.

4.9.1 UTP Quote Message Long-form (QF)

Name	Offset	Length	Type	Notes
version	0	1	byte	1 – Protocol Version
msgCategory	1	1	byte	Q – Quote Messages (UTP Quote Feed Only)
msgType	2	1	byte	F – Long-format UTP Quotation Message
orig	3	1	byte	Market Center Originator ID
subMarketId	4	1	byte	Sub Market Center ID
sipTime	5	8	long	SIP Timestamp
timestamp1	13	8	long	Participant Timestamp
partToken	21	8	long	Participant Token
timestamp2	29	8	long	FINRA Timestamp
symbol	37	11	byte[]	Security Identifier
bidPrice	48	8	long	Bid Price
bidSize	56	4	int	Bid Size
askPrice	60	8	long	Ask Price
askSize	68	4	int	Ask Size
quoteCond	72	1	byte	Quote Condition
sipGenUpdate	73	1	byte	SIP Generated Update Flag
luldBboIndicator	74	1	byte	LULD BBO Indicator
rii	75	1	byte	Retail Interest Indicator
nbboIndicator	76	1	byte	NBBO Appendage Indicator
luldNbboIndicator	77	1	byte	LULD National BBO Indicator
finraAdfMpidIndicator	78	1	byte	FINRA ADF MPID Appendage Indicator*

*the Finra ADF MPID Appendage Indicator and Finra Appendage will be populated with the Finra ADF update if necessary.

4.9.2 National BBO Appendage Long-form

Name	Offset	Length	Type	Notes
nbboQuoteCond	0	1	byte	NBBO Quote Condition
nbBidMarketCenter	1	1	byte	National Best Bid Market Center
nbBidPrice	2	8	long	National Best Bid Price
nbBidSize	10	4	int	National Best Bid Size
nbAskMarketCenter	14	1	byte	National Best Ask Market Center
nbAskPrice	15	8	long	National Best Ask Price
nbAskSize	23	4	int	National Best Ask Size

4.10 Snapshot message

The snapshot message reflects the UTP Data Service sequence number at the time that the UTP Snap-Shot spin was requested.

To maintain a real-time order display, firms should process real-time UTP Data Service messages beginning with the next message sequence number reflected in this snapshot message.

Name	Offset	Length	Type	Notes
version	0	1	byte	1 – Protocol Version
msgCategory	1	1	byte	A – Administrative Message
msgType	2	1	byte	S – Snapshot Sequence #
Orig	3	1	byte	Market Center Originator ID
subMarketId	4	1	byte	Sub Market Center ID
sipTime	5	8	long	SIP Timestamp
timestamp1	13	8	long	Participant Timestamp
partToken	21	8	long	Participant Token
sequenceNumber	29	8	long	UTP Data Service, for quotation data feed, sequence number when the UTP Snap-Shot snapshot was taken. To keep current, firms should process real-time UTP Data service messages beginning with the **next** message sequence number reflected in this snapshot message.

5 Support

- For general product/technical support for UTP Data Services, please contact products@utpplan.com.

Appendix A

Documentation Revision Control Log

October 2018 - UTP Snap-Shot Version 1.00

UTP releases initial Snap-Shot v1.0 specifications to public.