



Snapshot Recovery Service Specification (Binary Version)

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System response times may vary for a number of reasons including market conditions, trading volumes and system performance.

VERSION HISTORY

VERSION	DESCRIPTION	DATE
6.5p1	First Release	31-05-2021

1 Introduction

Chi-X Australia (“Chi-X”) provides a high performance, low latency trading system. The information processed by the Chi-X trading system is made available to market participants and data vendors.

The Snapshot Recovery Service (SRS-Binary) allows a client to retrieve the latest snapshot of market data. It can also be used in conjunction with Chi-X Market Data Binary Feed to recover market data intra-day.

1.1 Relevant documents

TITLE
Market Data Feed Specification (Binary Version)
Multicast Market Data Feed Specification (Binary Version)

Figure 1: Relevant Document(s)

2 Data Types

This section describes the available data types that are used in the SRS-Binary.

2.1 Numeric

Numeric fields consist of digits which are ASCII coded. They are presented in right justification and are space-filled from the left.

2.2 Alphanumeric

Alphanumeric text fields consist of alphabetical letters or digits (or both). They are presented in left justification and are padded with spaces to the right.

2.3 Prices

Price data fields are unsigned 8-byte big-endian binary encoded integer. After decoded, the last 7 digits are the decimal places and the remaining parts are digits. The maximum value of this type is 922,337,203,685.4775807 (0x7fffffffffffff)

2.4 Integer

Integer fields are unsigned big-endian (network byte order) binary encoded numbers. These fields are either 2 bytes, 4 bytes or 8 bytes. The maximum value of 2-byte integer is 32,767 (0x7fff), the maximum value of 4-byte integer is 2,147,483,647 (0x7fffffff), and the maximum value of 8-byte integer is 9,223,372,036,854,775,807 (0x7fffffffffffff).

2.5 LocalTimestamp

String fields representing date and time combination represented in Local Time in the YYYYMMDDHHMMSSsss format. Valid values: YYYY = 0000-9999, MM = 01-12, DD = 01-31, HH = 00-23, MM = 00-59, SS = 00-60 (60 only if UTC leap second), sss=000-999 (indicating milliseconds).

3 Session

3.1 Session Protocol

1. Snapshot Recovery Service is built on a session layer on top of TCP/IP sockets. Sessions include sequenced and non-sequenced messages in which sequenced messages are the actual data, while the non-sequenced messages are the session level interfaces.
2. Sequenced messages include system event, stock status, add orders, etc.
3. Login, logout and heartbeat messages are the examples of non-sequenced messages.

The following diagram describes a typical snapshot recovery scenario:

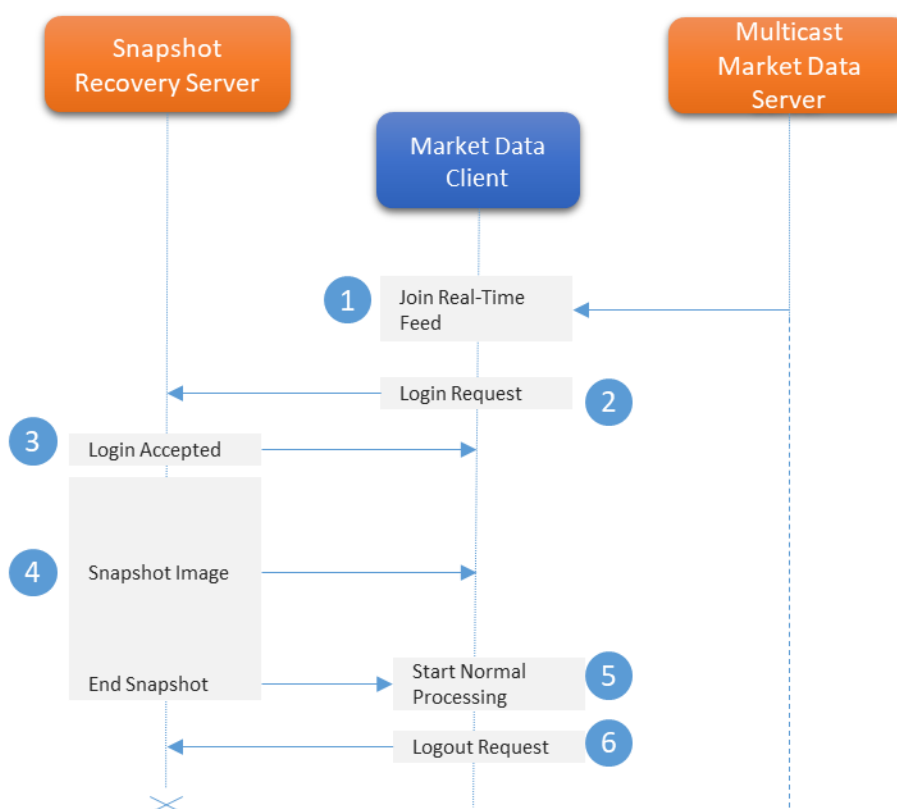


Figure 2: Example of Snapshot Recovery Scenario

In the diagram, there are 6 steps involved in the snapshot recovery process.

Step 1: Market Data Client join the Real-Time Multicast Market Data Feed and buffer market data received.

Step 2: Market Data Client then establish a TCP connection with the Snapshot Recovery Server and format a Login Request message to request snapshot, the request mode may be

- 0: Trade Summary only
- 1: Order Book only
- 2: Trade Summary and Order Book

Step 3: After receiving the login request, the Snapshot Recovery Server will validate the user authentication information in the request. A Login Accepted message will be replied to the client to indicate the request is accepted and snapshot transmission will start soon.

Step 4: The Snapshot Recovery Server starts replying the snapshot.

Step 5: When the client receives the End Message, it should:

1. Discard market data with sequence less than the 'Sequence Number' in End Message
2. Process remaining buffered message
3. Start processing message from Real-Time Multicast Market Data Feed

Step 6: Client send a Logout Request to disconnect the recovery session. After the request is sent, the client may close the TCP connection immediately.

Snapshot Recovery Server will only reply the snapshot once for each connection. Only heartbeat message will be sent from the server once the snapshot is transferred. It will terminate the session after received Logout Request or a few seconds after sending out End Message.

4 Session Messages

4.1 Debug Message (to Client)

Debug Messages are used for giving useful information to developers assisting them in application development and troubleshooting. They are used during development processes only.

DEBUG MESSAGE				
NAME	OFFSET	LENGTH	VALUE	REMARKS
Message Length	0	2	Integer	Message Length excluded this field
Message Type	2	1	“+”	Debug Message
Text	3	Variable	Alphanumeric	Free form text

4.2 Login Request (to Chi-X)

Login Request Message is sent to the server when client tries to establish connection to the server by sending login request packet.

Since data is sent in ASCII, it must be padded with spaces; for example, the field lengths of Username and Sequence are 6 and 10 alphanumeric characters respectively, if Username is “JOHN”, it should be sent as “JOHN_ _”, and if the mode is 1, it should be sent as “_ _ _ _ _ _ _ _ _ _ 1” (“_” represents a space).

LOGIN REQUEST MESSAGE				
NAME	OFFSET	LENGTH	VALUE	REMARKS
Message Length	0	2	Integer	Message Length excluded this field
Message Type	2	1	“L”	Login Request Message
Username	3	6	Alphanumeric	Username
Password	9	10	Alphanumeric	Password
Session	19	10	Alphanumeric	Login requested session ID. Leave this field blank for initial login; and provide Session ID for subsequent logins.
Mode	29	10	Numeric	The requested information from snapshot “0” indicates trade summary only. “1” indicates order book and calculated values. “2” indicates trade summary, order book and calculated values.

4.3 Login Accepted (to Client)

Login Accepted message is used for acknowledging a login request packet sent by client upon successful login.

LOGIN ACCEPTED MESSAGE				
NAME	OFFSET	LENGTH	VALUE	REMARKS
Message Length	0	2	Integer	Message Length excluded this field
Message Type	2	1	“A”	Login Accepted Message

LOGIN ACCEPTED MESSAGE				
NAME	OFFSET	LENGTH	VALUE	REMARKS
Session	3	10	Alphanumeric	The session ID currently logged into.
Mode	13	10	Numeric	The requested mode
Comma	23	1	“,”	Separator
Messages Total	24	10	Numeric	Always zero

4.4 Login Rejected (to Client)

Login Rejected message is used for acknowledging the failure of a login request packet sent by client.

LOGIN REJECTED MESSAGE				
NAME	OFFSET	LENGTH	VALUE	REMARKS
Message Length	0	2	Integer	Message Length excluded this field
Message Type	2	1	“J”	Login Rejected Message
Reject Reason	3	1	“A” or “S” or “M”	Reason of the login rejection: “A” – Invalid username/password “S” – Invalid session ID “M” – Invalid mode

4.5 Logout Request (to Chi-X)

Logout Request Message is used for sending session termination request to the server. Session will be closed immediately when receiving logout request packet sent by client.

LOGOUT REQUEST MESSAGE				
NAME	OFFSET	LENGTH	VALUE	REMARKS
Message Length	0	2	Integer	Message Length excluded this field
Message Type	2	1	“O”	Logout Request Message

4.6 Server Heartbeat Message (to Client)

If session is left idle for more than one second, server will send a heartbeat message.

SERVER HEARTBEAT MESSAGE				
NAME	OFFSET	LENGTH	VALUE	REMARKS
Message Length	0	2	Integer	Message Length excluded this field
Message Type	2	1	“H”	Server Heartbeat Message

4.7 Client Heartbeat Message (to Chi-X)

Client Heartbeat Message is used for sending heartbeat messages to server from the client side on a regular interval. Since the server assumes the client is no longer active if it does not receive a heartbeat message from client for more than 15 seconds, the session will be terminated.

CLIENT HEARTBEAT MESSAGE				
NAME	OFFSET	LENGTH	VALUE	REMARKS
Message Length	0	2	Integer	Message Length excluded this field
Message Type	2	1	"R"	Client Heartbeat Message

4.8 Sequenced Data Message (to Client)

Sequenced Data Message is the message sent by the server which contains actual snapshot content.

SEQUENCED DATA MESSAGE				
NAME	OFFSET	LENGTH	VALUE	REMARKS
Message Length	0	2	Integer	Message Length excluded this field
Message Type	2	1	"S"	Sequenced Data Message
Data	3	Variable	Snapshot Recovery Message	Snapshot Recovery Message

5 Snapshot Content

The following table describe the content to be included in the snapshot according to the request mode. The composition of the snapshot follows the table's order

	MODE 0	MODE 1	MODE2
Second Message	Y	Y	Y
System Event Message	Y	Y	Y
Stock Summary Message	Y		Y
Stock Status Message (Trading Status)		Y	Y
Add Order Message (For rebuilding order book)		Y	Y
Calculated Value Message (Latest calculated market values)		Y	Y
End Message	Y	Y	Y

6 Snapshot Recovery Messages

6.1 Second Message

The Second Message is sent every second for which there is at least one payload.

SECOND EVENT MESSAGE				
NAME	OFFSET	LENGTH	VALUE	REMARKS
Time - second	0	4	Integer	The number of seconds since mid-night
Message Type	4	1	"T"	Second Message

6.2 System Event Message

The System Event Message is used to signal an event which affects the Chi-X system.

SYSTEM EVENT MESSAGE				
NAME	OFFSET	LENGTH	VALUE	REMARKS
Time - nanosecond	0	4	Integer	The number of nanoseconds since last Second Message Time Format: nnnnnn000
Message Type	8	1	"S"	System Event Message
Event Code	9	1	Alphanumeric	Please see System Event Codes below
Market ID	10	4	Alphanumeric	Right-padded with spaces. If no market ID available (which means the Event Code applies to the whole system), then filled with space.

6.2.1 Market IDs

MARKET ID	DESCRIPTION	REMARKS
AUS	Australia Stock Market	Chi-X Continuous On-Market Trading
CXAW	Chi-X Australia - Warrants	Chi-X Warrants Trading
CXAE	Chi-X Australia - ETF	Chi-X ETF Trading
CXAR	Chi-X Australia - TraCR	Chi-X TraCR Trading
CXAQ	Chi-X Australia – QMF	Chi-X QMF Trading

6.2.2 System Event Codes

SYSTEM EVENT CODE	DESCRIPTION	REMARKS
O	Start of Messages	This is the first message of the day.
S	Chi-X Open	This message indicates that Chi-X is open for on-market continuous trading and accepting orders. Before the Chi-X Open message you may receive Off-Exchange Trade messages. Market ID field value is also provided in the event message which indicates which market this event belongs to.
E	Chi-X Close	This message indicates that Chi-X's continuous

SYSTEM EVENT CODE	DESCRIPTION	REMARKS
		trading session is closed. Chi-X will not accept any more orders, except Market on Close (“ MOC ”) orders, for the continuous trading session. Clients may still receive a Trade Message for MOC executions, Broken Trade, Order Cancel and Off-Exchange Trade messages after this session state. Market ID field value is also provided in the event message which indicates which market this event belongs to.
M	Chi-X MOC Close	This message indicates that MOC orders can no longer execute. Clients may still receive MOC Executions after this session state closes. Market ID field value is also provided in the event message which indicates which market this event belongs to.
H	Chi-X Halt	This message indicates that Chi-X is halted. Chi-X will not accept any order or Off-exchange trade report during this period. Clients may still receive Broken Trade and Order Cancel messages during this period. Market ID field value is also provided in the event message which indicates which market this event belongs to.
R	Chi-X Resume	This message indicates that Chi-X is resumed from halted state and accepting orders and Off-Exchange Trade Reports. Market ID field value is also provided in the event message which indicates which market this event belongs to.
C	End of Messages	This is the last message of the day.

6.3 Stock Summary Message

This message contains trading statistics of a stock. It is sent only upon client’s request.

STOCK SUMMARY MESSAGE				
NAME	OFFSET	LENGTH	VALUE	REMARKS
Time - nanosecond	0	4	Integer	The number of nanoseconds since last Second Message Time Format: nnnnnn000
Message Type	4	1	“V”	Stock SummaryMessage
Stock	5	6	Alphanumeric	Stock Symbol
High Price	11	8	Price	Highest trade price
Low Price	19	8	Price	Lowest trade price
Open Price	27	8	Price	First trade price
Last Price	35	8	Price	Last trade price
Closing Price	43	8	Price	CXA closing price. Zero if not available
Total CLOB Turnover	51	8	Price	Total CLOB turnover

STOCK SUMMARY MESSAGE				
NAME	OFFSET	LENGTH	VALUE	REMARKS
Total CLOB Volume	59	8	Integer	Total CLOB shares traded
Total CLOB Count	67	8	Integer	Total CLOB number of trades
Total Trade Report Turnover	75	8	Price	Total turnover of trade reports, excluding type X
Total Trade Report Volume	83	8	Integer	Total shares of trade reports, excluding type X
Total Trade Report Count	91	8	Integer	Total trade reports received, excluding type X
Total MOC Turnover	99	8	Price	Total MOC turnover
Total MOC Volume	107	8	Integer	Total MOC shares traded
Total MOC count	115	8	Integer	Total MOC number of trades
Reserved	123	8	Price	<i>This field exists in the message but it is reserved for future use. Value should be ignored.</i>
Reserved	131	8	Integer	<i>This field exists in the message but it is reserved for future use. Value should be ignored.</i>
Reserved	139	8	Integer	<i>This field exists in the message but it is reserved for future use. Value should be ignored.</i>

6.4 Stock Status Message

This message indicates the current trading status of a stock.

STOCK STATUS MESSAGE				
NAME	OFFSET	LENGTH	VALUE	REMARKS
Time - nanosecond	0	4	Integer	The number of nanoseconds since last Second Message Time Format: nnnnnn000
Message Type	4	1	"H"	Stock Trading Action Message
Stock	5	6	Alphanumeric	Stock Symbol
Security Status	11	1	Alphanumeric	"T" = Active "H" = Halted "S" = Suspended
Reserved	12	1	Alphanumeric	<i>This field exists in the message but it is reserved for future use. Value should be ignored.</i>

6.5 Add Order Message

Add Order Message is used for acknowledging the acceptance of a visible order into the Chi-X book. The message contains an Order Reference which is a unique key of the day assigned to the order by Chi-X.

ADD ORDER MESSAGE				
NAME	OFFSET	LENGTH	VALUE	REMARKS
Time - nanosecond	0	4	Integer	The number of nanoseconds since last Second Message Time Format: nnnnnn000
Message Type	4	1	"A"	Add Order Message
Order Reference	5	4	Integer	Unique order reference number of the day.
Buy/Sell Indicator	9	1	"B" or "S"	"B" = Buy Order "S" = Sell Order
Shares	10	4	Integer	Total number of shares being added to the book. For undisclosed order, number of shares is zero. (The number of shares added to the book may be less than the actual number of shares entered because part of the order may trade before being posted to the book).
Stock	14	6	Alphanumeric	Stock symbol (which is right-padded with spaces).
Price	20	8	Price	The display price of the order.
Display	28	1	"Y"	"Y" = displayed in quote
Order Source	29	1	"C"	"C" = Visible Limit order

ADD ORDER MESSAGE (ATTRIBUTED MARKET)				
NAME	OFFSET	LENGTH	VALUE	REMARKS
Time - nanosecond	0	4	Integer	The number of nanoseconds since last Second Message Time Format: nnnnnn000
Message Type	4	1	"F"	Add Order Message
Order Reference	5	4	Integer	Unique order reference number of the day.
Buy/Sell Indicator	9	1	"B" or "S"	"B" = Buy Order "S" = Sell Order
Shares	10	4	Integer	Total number of shares being added to the book. For undisclosed order, number of shares is zero. (The number of shares added to the book may be less than the actual number of shares entered because part of the order may trade before being posted to the book).
Stock	14	6	Alphanumeric	Stock symbol (which is right-padded with spaces).
Price	20	8	Price	The displayprice of the order.
Display	28	1	"Y"	"Y" = displayed in quote
Order Source	29	1	"C"	"C" = Visible Limit order
PID	30	5	Alphanumeric	Participant ID (which is right-padded with spaces)

6.6 Calculated Value Message

The snapshots of Chi-X calculated market values are conveyed through this message.

CALCULATED VALUE MESSAGE				
NAME	OFFSET	LENGTH	VALUE	REMARKS
Time - nanosecond	0	4	Integer	The number of nanoseconds since last Second Message Time Format: nnnnnn000
Message Type	4	1	"Y"	Calculated Value Message
Stock	5	6	Alphanumeric	Symbol of the Calculated Value
Value Category	11	1	Alphanumeric	Category of the data conveyed in the "Value" field 1 – Closing Price 2 – iNAV values (ETF) 3 – Index values 4 – FX values 5 – EOD NAV from Issuer
Value	12	8	Price	Calculated Value

CALCULATED VALUE MESSAGE				
NAME	OFFSET	LENGTH	VALUE	REMARKS
Value Generation Time	20	17	LocalTimestamp	Indicates when the Calculated Value is generated

6.7 End Message

This message signals the end of snapshot. It also indicates a sequence number of the message from Chi-X MD Binary Feed that should be processed after the snapshot.

END MESSAGE				
NAME	OFFSET	LENGTH	VALUE	REMARKS
Time - nanosecond	0	4	Integer	The number of nanoseconds since last Second Message Time Format: nnnnnn000
Message Type	4	1	"G"	End Message
Sequence Number	5	4	Integer	Next expected sequence number

7 Snapshot Recovery Service - Sample Message and Data

7.1 Second Message

ACTION	HEX	MEANING
Second Message	00 06 53 00 01 11 0a 54	Time(Second) : 69898 Message Type: T

7.2 CTS Start of Day and Market Open

ACTION	HEX	MEANING
System Start of Day	00 0b 53 08 75 34 f8 53 4f 20 20 20 20	Time(Nanosecond) : 141899000 Message Type: S Event Code : O Market ID : <4 spaces>
CXAW Market OPEN	00 0b 53 08 75 34 f8 53 53 43 58 41 57	Time(Nanosecond) : 141899000 Message Type: S Event Code : S Market ID : CXAW
CXAR Market OPEN	00 0b 53 08 75 34 f8 53 53 43 58 41 52	Time(Nanosecond) : 141899000 Message Type: S Event Code : S Market ID : CXAR
CXAQ Market OPEN	00 0b 53 08 75 34 f8 53 53 43 58 41 51	Time(Nanosecond) : 141899000 Message Type: S Event Code : S Market ID : CXAQ
CXAE Market OPEN	00 0b 53 08 75 34 f8 53 53 43 58 41 45	Time(Nanosecond) : 141899000 Message Type: S Event Code : S Market ID : CXAE
AUS Market OPEN	00 0b 53 08 75 34 f8 53 53 41 55 53 20	Time(Nanosecond) : 141899000 Message Type: S Event Code : S Market ID : AUS

7.3 Stock Summary of Snapshot

ACTION	HEX	MEANING
Stock SummaryMessage indicate XXX's snapshot summary	00 94 53 08 70 76 20 56 58 58 58 20 20 20 00 00 00 00 03 87 52 00 00 00 00 00 03 4b cf a0 00 00 00 00 03 58 04 a0 00 00 00 00 03 7b 1d 00 00 00 00 00 00 00 00 00 00 00 00 05 54 f2 45 00 00 00 00 00 00 00 01 90 00 00 00 00 00 00 00 04 00 00 00 01 56 ba 09 80 00 00 00 00 00 00 00 64 00 00 00 00 00 00 00 01 00 00 00 02 ba 91 02 00 00 00 00 00 00 00 00 c8 00 00 00 00 00 00 00 01 00	Time(Nanosecond) : 141588000 Message Type: V Stock: XXX High Price: 5.92 Low Price: 5.53 Open Price: 5.61 Last Price: 5.84 Closing Price: 5.725 Total CLOB Turnover: 2290 Total CLOB Volume: 400 Total CLOB Count: 4 Total Trade Report Turnover: 575 Total Trade Report Volume: 100 Total Trade Report Count: 1 Total MOC turnover: 1172 Total MOC Volume: 200 Total MOC Count: 1

7.4 Stock Status of Snapshot

ACTION	HEX	MEANING
Stock Status Message indicates: XX1's trading status is ACTIVE	00 0e 53 08 70 76 20 48 58 58 31 20 20 20 54 4e	Time(Nanosecond) : 141588000 Message Type: H Stock: XX1 Security Status: T
Stock Status Message indicates: XX2's trading status is HALT	00 0e 53 08 70 76 20 48 58 58 32 20 20 20 48 4e	Time(Nanosecond) : 141588000 Message Type: H Stock: XX2 Security Status: H
Stock Status Message indicates: XX3's trading status is SUSPEND	00 0e 53 08 70 76 20 48 58 58 33 20 20 20 53 4e	Time(Nanosecond) : 141588000 Message Type: H Stock: XX3 Security Status: S

7.5 Add Order Message of Snapshot

ACTION	HEX	MEANING
Add Order Message indicates a sell order for XX1 with qty 100 and limit price 1.00. Order reference 75 assigned.	00 1f 53 08 70 76 20 41 00 00 00 4b 53 00 00 00 64 58 58 31 20 20 20 00 00 00 00 00 98 96 80 59 43	Time(Nanosecond) : 141588000 Message Type: A Order Reference: 75 Buy/Sell Indicator: S Shares: 100 Stock: XX1 Price: 1.00 Display: Y Order Source: C
Add Order Message indicates a sell order for XX2 with qty 100 and limit price 4.41. Order reference 83 assigned.	00 24 53 08 70 76 20 46 00 00 00 53 53 00 00 00 64 58 58 32 20 20 20 00 00 00 00 02 a0 e9 a0 59 43 49 4d 43 20 20	Time(Nanosecond) : 141588000 Message Type: F Order Reference: 83 Buy/Sell Indicator: S Shares: 100 Stock: XX2 Price: 4.41 Display: Y Order Source: C PID: IMC

7.6 List of Add Order Message of Snapshot

ACTION	HEX	MEANING																																				
List of Add order message to rebuild the order book.	00 1f 53 08 70 76 20 41 00 00 00 4c 53 00 00 00 64 58 58 58 20 20 20 00 00 00 00 02 a0 e9 a0 59 43	Time(Nanosecond) : 141588000 Message Type: A Order Reference: 76 Buy/Sell Indicator: S Shares: 100 Stock: XXX Price: 4.41 Display: Y Order Source: C																																				
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="3">Buy Side</th> <th colspan="3">Sell Side</th> </tr> <tr> <th>Order Reference</th> <th>Price</th> <th>Qty</th> <th>Order Reference</th> <th>Price</th> <th>Qty</th> </tr> </thead> <tbody> <tr> <td>79</td> <td>4.33</td> <td>300</td> <td>76</td> <td>4.41</td> <td>100</td> </tr> <tr> <td>80</td> <td>4.33</td> <td>500</td> <td>77</td> <td>4.43</td> <td>300</td> </tr> <tr> <td>81</td> <td>4.31</td> <td>100</td> <td>78</td> <td>4.45</td> <td>500</td> </tr> <tr> <td>82</td> <td>4.00</td> <td>100</td> <td></td> <td></td> <td></td> </tr> </tbody> </table>	Buy Side			Sell Side			Order Reference	Price	Qty	Order Reference	Price	Qty	79	4.33	300	76	4.41	100	80	4.33	500	77	4.43	300	81	4.31	100	78	4.45	500	82	4.00	100				00 1f 53 08 70 76 20 41 00 00 00 4d 53 00 00 01 2c 58 58 58 20 20 20 00 00 00 00 02 a3 f6 e0 59 43	Time(Nanosecond) : 141588000 Message Type: A Order Reference: 77 Buy/Sell Indicator: S Shares: 300 Stock: XXX Price: 4.43 Display: Y Order Source: C
Buy Side			Sell Side																																			
Order Reference	Price	Qty	Order Reference	Price	Qty																																	
79	4.33	300	76	4.41	100																																	
80	4.33	500	77	4.43	300																																	
81	4.31	100	78	4.45	500																																	
82	4.00	100																																				

ACTION	HEX	MEANING
	00 1f 53 08 70 76 20 41 00 00 00 4e 53 00 00 01 f4 58 58 58 20 20 20 00 00 00 00 02 a7 04 20 59 43	Time(Nanosecond): 141588000 Message Type: A Order Reference: 78 Buy/Sell Indicator: S Shares: 500 Stock: XXX Price: 4.45 Display: Y Order Source: C
	00 1f 53 08 70 76 20 41 00 00 00 4f 42 00 00 01 2c 58 58 58 20 20 20 00 00 00 00 02 94 b4 a0 59 43	Time(Nanosecond): 141588000 Message Type: A Order Reference: 79 Buy/Sell Indicator: B Shares: 300 Stock: XXX Price: 4.33 Display: Y Order Source: C
	00 1f 53 08 70 76 20 41 00 00 00 50 42 00 00 01 f4 58 58 58 20 20 20 00 00 00 00 02 94 b4 a0 59 43	Time(Nanosecond): 141588000 Message Type: A Order Reference: 80 Buy/Sell Indicator: B Shares: 500 Stock: XXX Price: 4.33 Display: Y Order Source: C
	00 1f 53 08 70 76 20 41 00 00 00 51 42 00 00 00 64 58 58 58 20 20 20 00 00 00 00 02 91 a7 60 59 43	Time(Nanosecond): 141588000 Message Type: A Order Reference: 81 Buy/Sell Indicator: B Shares: 100 Stock: XXX Price: 4.31 Display: Y Order Source: C
	00 1f 53 08 70 76 20 41 00 00 00 52 42 00 00 00 64 58 58 58 20 20 20 00 00 00 00 02 62 5a 00 59 43	Time(Nanosecond): 141588000 Message Type: A Order Reference: 82 Buy/Sell Indicator: B Shares: 100 Stock: XXX Price: 4.00 Display: Y Order Source: C

7.7 Calculated Value Message of Snapshot

ACTION	HEX	MEANING
Closing Price 11.11 for Symbol XXX at 2021-05-27 19:19:57.155	00 26 53 08 70 ef 38 59 58 58 58 20 20 20 31 00 00 00 00 06 9f 40 60 32 30 32 31 30 35 32 37 31 39 31 39 35 37 31 35 35	Time(Nanosecond): 141619000 Message Type: Y Stock: XXX Value Category: 1 Value: 11.11 Value Generation Time: 20210527191957155

7.8 End Message of Snapshot

ACTION	HEX	MEANING
Next sequence number to begin with the snapshot is 18	00 0a 53 08 74 00 60 47 00 00 00 12	Time(Nanosecond): 141820000 Message Type: G Sequence Number: 18

