BSE Direct NFCAST

Manual

Version 1.0

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Contents

1 Introduction

BSE offers public market data as part of the BSE Exchange's new trading architecture. The interfaces distribute information via UDP multicast. The Direct NFCAST Interface (netted) interface is designed for participants who do not need to see every order book update, this has the advantage of keeping the infrastructure costs low. The updates of the order book are sent at regular intervals; they are not provided for every order book change and are sent significantly less frequently than the other feeds. This interface aggregates the order book changes over a specified time interval. Currently, BSE plans to provide market data with a netting interval of 0.80 sec and depth of 5. Only statistical information is provided for on-exchange trades as well as the price and quantity of the last on-exchange trade in the netting interval.

The Direct NFCAST provides the following information to the participant:

- ✓ Price level aggregated order book depth and on-exchange trade statistics.
- ✓ Product state change message.
- ✓ Index message.
- ✓ Miscellaneous messages.

1.1 Purpose of this document

The purpose of this document is to provide guidance for programmers during development of applications that read the BSE Market Data Interface.
It covers a complete reference for market data interface, describes the general business behavior and provides concepts for the implementation.

The most recent version is available at: www.bseindia.com/nta.aspx

1.2 Main audience

The target audience of this interface specification is experienced software developers support staff that may be involved in development/support activities for the BSE Market Data Interfaces.

Prior knowledge of developing for a capital market is beneficial but not a prerequisite. Knowledge in a programming language is expected.

1.3 Data feeds

BSE supports multiple market data interfaces with each having its unique characteristics. Though this document describes the Direct NFCAST interface in detail, a brief overview of other market data streams is provided here for better understanding the difference between various streams.

Area	EOBI	EMDI	MDI	Direct NFCAST
Stream Description	The **Enhanced Order Book Interface** (un-netted) disseminates every order book change **for the entire book** and all on-exchange trades without netting. This interface is designed for participants that rely on low-latency order book updates and data completeness. The un-netted market data is partitioned over several channels; each channel provides information about a group of similar products. As the market becomes busier, the number of messages (and therefore bandwidth usage) increases.	The **Enhanced Market Data Interface** (un-netted) disseminates every order book change **up to the configured depth** and all on-exchange trades without netting. This interface is designed for participants that rely on low-latency order book updates and data completeness. The un-netted market data is partitioned over several channels; each channel provides information about a group of similar products. As the market becomes busier, the number of messages (and therefore bandwidth usage) increases.	The Market **Data Interface** (netted) has a lower bandwidth requirement compared to the un-netted version. This interface is designed for participants who do not need to see every order book update, this has the advantage of keeping the infrastructure costs low. Snapshot and incremental updates are sent via the same channel This interface aggregates the order book changes over a specified time interval	The **Direct NFCAST Interface** (netted) has a lower bandwidth requirement compared to the un-netted version. This interface is designed for participants who do not need to see every order book update, this has the advantage of keeping the infrastructure costs low. Only Snapshot updates are sent in this stream. The interface aggregates the order book changes over a specified interval of time.
In-band/Out-of-band delivery	Incremental and snapshots are delivered via different channels, i.e. out-of-band delivery LastMsgSeqNumProcessed. In the snapshot feed provides a link between incremental and snapshot feed, as it carries the sequence number of the last message sent on the	Incremental and snapshots are delivered via different channels, i.e. out-of-band delivery LastMsgSeqNumProcessed In the snapshot feed provides a link between incremental and snapshot feed, as it carries the sequence number of the last message sent on the incremental feed.	Incremental and snapshots are delivered on the same channel, i.e. in-band delivery. Snapshots might contain new information. A flag (RefreshIndicator) within the snapshot indicates whether it has to be applied or not. LastMsgSeqNumProcessed is not used.	Only Snapshot are delivered on the channel. Each snapshot will be complete in nature. Snapshot will always have some new information and must be applied on order book.

	incremental feed. Snapshots are needed only for start-up/recovery.	Snapshots are needed only for start-up/recovery.		
Sequence numbers on message level	Messages on the market data incremental feed have their own sequence number range per product; MsgSeqNum's exist on the depth incremental feed only.	Messages on the market data incremental feed have their own sequence number range per product; MsgSeqNum's exist on the depth incremental feed only.	Messages on the combined market data incremental + snapshot feed have one sequence number range per product.	There is no product or stream specific sequence number. Every snapshot will have complete information.
Trade Volume Reporting	Trade Volume Reporting is provided. Each on-exchange trade is reported individually.	Trade Volume Reporting is provided. Each on-exchange trade is reported individually.	Trade Volume Reporting is provided. Statistical information (daily high/low price and total traded quantity) and last trade information is provided.	Trade Volume Reporting is provided. Statistical information (daily high/low price and total traded quantity) and last trade information is provided.

2 Overview of the Direct NFCAST Interface

This chapter describes the Direct NFCAST Interface in brief. It provides the overview of the peculiar characteristics of this market data stream.

2.1 Infrastructure requirements

The BSE Direct NFCAST market data interfaces disseminate market data over the BSE multicast network. A router which is capable of handling IP multicast is required for accessing this inter-face. The multicast management protocol is IGMPv2. When utilizing IGMPv3, the IGMPv2 compatibility mode must be enabled.

2.2 Overview of the various message types

There are many functional messages and technical messages delivered in this interface. The various message types can be divided into **"Service Messages"** and **"Data Messages".**

The Service Messages are technical in nature and are not associated with any product or instrument. The Data Messages ae functional in nature and are always related to product or instrument.

2.2.1 Service Messages

- ✓ Time broadcast message is sent out periodically by the BSE system on multicast address. The current periodicity is one minute.
- ✓ Auction keep alive message is network related message. It is used to keep spanning tree alive for the auction related broadcast messages

2.2.2 Data Messages

- ✓ Market picture message is used to send a snapshot of 5 price levels of the order book and statistical information about on-exchange trades.
- ✓ Product state change message (Session Broadcast) is used to publish the state of the BSE products.
- ✓ Index change message is used to publish the indices current values and day's high, low open and close values. The message is sent periodically at a defined interval.
- ✓ Auction market picture message is used to send snapshot of 5 price level of auction order book. The auction here refers to defaulter auction or shortage auction and thus the order book contains only the sell price levels.

- ✓ Close price message is used to send the close price for all instruments in the closing session and at start of the day.
- ✓ Open Interest message is used to send the open interest in the market for derivatives contracts.
- ✓ RBI Reference Rate is used to send the Reference rate for USD published by RBI.
- ✓ VaR Percentage Message is used to send the approximate applicable margin percentage for the trade.

A detailed description of the message types listed above is given in section Detailed data feed description and layout

2.3 What is not included in these interfaces

The following information is not provided via the new interface:

- ✓ In case of derivatives contracts, the prices for underlying are not provided. These prices will be available in multicast form in the multicast stream of the respective segment.
- ✓ Implied prices are only sent for Best Market, they are not sent for the order book depth except for top of book.

2.4 Freedom of choice

BSE does not need to provide any software for accessing the services offered. The BSE market data interfaces can be accessed using any platform capable of receiving multicast data feeds. Participants can use any operating system, compiler version or programming language to develop or use specific third-party applications that are tailored to their requirements.

2.5 Structure of Messages

The market data interfaces disseminate data in UDP datagram in network byte order also known as big endian byte order. A UDP datagram has the following structure:

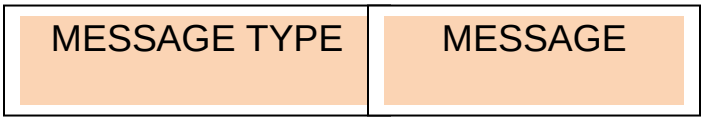

Figure 1: Structure of a UDP datagram

- ✓ The UDP datagram starts with message type followed by the actual message (Message).
- ✓ One packet will always have one message only

Each message shown in the picture above has the following sub structure:

- ✓ Message Type (Template ID) – a unique identifier for each message type which is sent by BSE

- ✓ Data Part (Message) – the actual message as per the structure defined in API.

Due to the unreliable nature of UDP, every UDP datagram is self-contained; there is no dependency across datagram.

2.6 Compression

BSE adopts native compression to reduce the packet size over the wire. The compression is applied on specific messages only. The entire message is not compressed. The compression is applied on frequently changing price and quantity field. The client application must apply the decompression logic on specific messages only while other messages can be read directly as per the structure defined in API.

2.7 Recovery

Due to the unreliable nature of UDP multicast it is possible that some packets may either be delayed or may be missing. Furthermore, the UDP packets may be duplicated at the network level. There is no recovery mechanism defined for this channel. Each packet delivered on this stream has complete information and there is no dependency on earlier or subsequent packet. Every packet received should be applied by member application and thus receiving applications need not handle the recovery.

3 Trading states for a sample business day

All instruments traded on BSE is classified into various groups called as products. Each product incorporates a set of instruments. The product is also referred as MarketSegment ID. State maintenance or session change in BSE happens at a product level. Each product can transition from one state to another independent of other products. All instruments belonging to a product will follow the same state transition. The product state change message (Session change) is also disseminated at product level. The message Product state change will convey the state change and the product ID also for which the state change or session change is applicable. The master files of the respective segment provide the product identifier against each instrument. Refer section Product Identifiers in master files to identify the field and their positions in various master files.

This section describes a typical trading day with the new BSE Trading system. Different product may follow different schedule during the day. For example, some products will be eligible for call auction session followed by continuous trading while some may be eligible for call auction only whereas some may be eligible for continuous trading only. Based on their eligibility the products are classified into different product types and each type will have different schedule. The different product types and their different schedule is presented below along with the possible values in each field of the message for each state. The client application can expect the Product state change message (2002) messages in the same sequence for each product belonging to a product type along with the same values as shown below.

3.1 Product type: Pre-open

All products falling in this category will have a call auction session at the start of market and it will be followed by continuous session. A Product state change message (2002) will be sent for each transition and for each product. The possible combination and sequence of market type and current session number received by TPS would be as follows.

Time	Market Type	Session Number	Start and End Flag	Description
7:50 AM	0	0	N/A	Logon
9:00 AM	0	1	N/A	Pre-open Order Entry Start
9:07 AM – 9:08 AM	0	0	N/A	Pre-open Order Entry End (Random end during the minute)
9:08 AM – 9:12 AM	0	2	N/A	Pre-open Matching End (Random)

9:15 AM	0	3	N/A	Continuous Session
3:30 PM	0	4	N/A	Closing
3:40 PM	0	5	N/A	Post-Closing session Start
4:00 PM	0	7	N/A	Member Query Session Start
6:03 PM	0	6	N/A	End of day

3.2 Product type: Special Pre-open (SPOS)

All products having an IPO or relisting instrument will fall in this category. The products will have a call auction session at the start of market, and it will be followed by continuous session. A Product state change message (2002) will be sent in for each state transition. The possible combination and sequence of market type and current session number received by TPS would be as follows.

Time	Market Type	Session Number	Start and End Flag	Description
7:50 AM	0	0	N/A	Logon
9:00 AM	0	1	N/A	SPOS Order Entry Start
9:44 AM – 9:45 AM	0	10	N/A	SPOS Order Entry End (Random)
9:45 AM – 9:55 AM	0	12	N/A	SPOS Matching End (Random)
9:15 AM	0	13	N/A	Continuous Session
3:30 PM	0	4	N/A	Closing
3:40 PM	0	5	N/A	Post-Closing session Start
4:00 PM	0	7	N/A	Member Query Session Start
6:03 PM	0	6	N/A	End of day

3.3 Product type: Periodic Call Auction (PCAS)

All products that are classified as illiquid instruments fall under this category. The products operate in call auction session only throughout the day. Call auction sessions is scheduled every hour. A Product state change message (2002) will be sent for each product. The possible combination and sequence of market type and current session number received by TPS would be as follows.

Time	Market Type	Session Number	Start and End Flag	Description
7:50 AM	0	0	N/A	Logon
9:30 AM	20	1	S	PCAS Order Entry Start
10:14 AM – 10:15AM	20	1	E	PCAS Order Entry End (Random)
10:15 AM – 10:30 AM	20	2	E	PCAS Matching End (Random)
10:30 AM	20	1	S	PCAS Order Entry Start
11:14 AM – 11:15AM	20	1	E	PCAS Order Entry End (Random)
11:15 AM – 11:30 AM	20	2	E	PCAS Matching End (Random)
3:30 PM	0	4	N/A	Closing
4:00 PM	0	7	N/A	Member Query Session Start
6:03 PM	0	6	N/A	End of day

* The same schedule as published above for 2 sessions is applicable other PCAS sessions also which will be conducted every hour during the day till 3:30 PM.

3.4 Product type: Continuous

All products falling in this category will have only continuous session. A Product state change (2002) will be sent for each transition and for each product. The possible combination and sequence of market type and current session number received by TPS would be as follows.

Time	Market Type	Session Number	Start and End Flag	Description
7:50 AM	0	0	N/A	Logon
9:15 AM	0	3	N/A	Continuous Session Start
3:30 PM	0	4	N/A	Closing
3:40 PM	0	5	N/A	Post-Closing Session Start
4:00 PM	0	7	N/A	Member Query Session Start
6:03 PM	0	6	N/A	End of day

* The above schedule is applicable for currency derivatives and commodities derivatives segment also. However, the time for each state defined above will be different. For details on time for those market, kindly refer the BSEINDIA website.

3.5 Market Halt

In case the trading is halted due to breach of circuit limits then the market halts and resumes differently from a normal trading day. The below tables represent session values expected only in case of Market Halt

Time	Market Type	Session Number	Start and End Flag	Description
In case when Normal market starts				
7:50 AM	0	0	N/A	Logon
9:00 AM	0	1	N/A	Pre-open Order Entry Start
9:07 AM – 9:08 AM	0	0	N/A	Pre-open Order Entry End (Random)
9:08 AM – 9:12 AM	0	2	N/A	Pre-open Matching End (Random)
In case Market Halt is triggered at this stage i.e. during Pre-open matching then product state change message with session value as 0 will be sent to indicate market halt. After the halt period, market will resume with Call auction and sequence of events will be same as above.				
9:15 AM	0	3	N/A	Continuous Session

In case Market Halt is triggered at this stage, End of Continuous session will be informed, by a Log-on session. Below mentioned session information will be disseminated, when scheduling of Normal Call auction and SPOS is done in parallel. This is the case between 9.15 a.m. to 10.00 a.m.				
	0	0	N/A	End of Continuous Session
	0	1	N/A	Normal Call auction, SPOS Order Entry Session start
	0	0	N/A	Random End of Normal Call auction Order Entry Session
	0	10	N/A	Random End of SPOS Order Entry Session [Freeze Session]
	0	2	N/A	End of Matching Session of Normal Call auction
	0	12	N/A	End of Matching Session of SPOS
	0	3	N/A	Start of Continuous Session
	0	13	N/A	Continuous Session for SPOS
This is a second scenario, when Market Halt is triggered post 10.00 a.m in which case no SPOS session will be scheduled separately. At this stage, End of Continuous session will be informed by a Log-on session. Below mentioned session information will be disseminated, when scheduling of Normal Call auction prior to Continuous session				
	0	0	N/A	End of Continuous Session
	0	1	N/A	Normal Call auction Order Entry Session start
	0	0	N/A	Random End of Normal Call auction Order Entry Session [Freeze Session]
	0	2	N/A	End of Matching Session of Normal Call auction
	0	3	N/A	Start of Continuous Session

3.6 Block Deal Session

In equity segment, irrespective of the product type, the block deal session is conducted twice a day for all the instruments. The first block deal session starts before the start of market at 8:45 AM and ends at 9:00 AM. The second block deal session starts at 2:05 PM and ends at 2:15 PM. No product state change message is sent for block deal session any time during the day.

Fine tuning client applications

This chapter covers some aspects of application tuning which should be considered during the design process of receiving applications.

3.7 Buffer size

Each UDP packet sent from exchange will not exceed the network MTU which is currently set to 1500 bytes. The size of all the messages is kept within the MTU limits. Also, the messages which are compressed will also have packet size lesser then MTU however the packets on decompression may be higher than the MTU also. The application needs to handle this.

3.8 Packet and message processing

It is important that messages are removed from the network in a timely fashion to prevent them from being dropped by the client machine due to "receive buffer" overflow in the IP stack. It is recommended that the client application should always ask for 2000 bytes of data in single read call from the socket. The read call will give single packet always and the first 4 bytes will always convey the message type.
The client application can decide on processing or dropping of packet based on the message type received in the first 4 bytes of the message.

4 Detailed data feed description and layout

This chapter provides message layouts and field information. It is structured by service messages and data messages. The messages generally contain the service messages or market data messages.

4.1 Service messages

Service messages do not carry any market information. These messages are sent for synchronization or to indicate the status of the service. These messages are sent throughout the day independent of the trading hours and trading states.

4.1.1 Time Broadcast Message [2001]

Time broadcast message is sent by Exchange at an interval of 1 minute. Multiple packets for the same time are sent to compensate the loss of packets. The message is sent throughout the day with the start of the Trading Engine. The synchronization of clock with this time will not be accurate due to the distance and network involved between client application and exchange.

Applicable Segment : All Compression: No

Field Name	Type	Description	Values, meanings, Validations
Message Type	Long	Type of message	Value: 2001 — Description: Time Message
Reserved Field 1	Long	For Internal Use.	
Reserved Field 2	Long	For Internal Use.	
Reserved Field 3	unsigned short	For Internal Use.	
Hour	Short	The hour part of time when the message was sent from the exchange	
Minute	Short	The minute part of time when the message was sent from the	

		exchange	
Second	Short	The second part of time when the message was sent from the exchange	
Millisecond	Short	The millisecond part of time when the message was sent from the exchange	
Reserved Field 4	Short	For Internal Use.	
Reserved Field 5	Short	For Internal Use.	
Reserved Field 6	Short	For Internal Use.	
Reserved Field 7	Char	For Internal Use.	
Reserved Field 8	Char	For Internal Use.	
Reserved Field 9	Char [2]	For Internal Use.	

4.1.2 Auction Keep Alive Message [2030]

Auction keep alive message is network related message. It is used to keep spanning tree alive for the auction related broadcast messages. The message is sent by Exchange periodically. The message is of no functional relevance to the client application and should be dropped.

Applicable Segment: Equity Compression: No

Field Name	Type	Description	Values, meanings, Validations
Message Type	Long	Type of message	**Value** / **Description**: 2030 – Keep Alive

4.2 Market data messages

The market data messages are generally instrument specific messages and market level messages. Instrument specific messages include the market picture message, close price message, VaR message etc. while the market level messages include the index message, Product state change message etc.

4.2.1 Product State Change Message [2002 and 2003]

This message is sent by the exchange whenever there is a transition of state for a product. The transition state is depicted by a unique session number. The message is sent for each product which is identified by product ID field.

Applicable Segment: All Compression: No

Field Name	Type	Description	Values, meanings, Validations
Message Type	Long	Type of message	<table><tr><th>Value</th><th>Description</th></tr><tr><td>2002</td><td>Session Change</td></tr><tr><td>2003</td><td>Auction Session Change (Shortage)</td></tr></table>
Reserved Field 1	Long	For Internal Use.	
Reserved Field 2	Long	For Internal Use.	
Reserved Field 3	unsigned short	For Internal Use.	
Hour	Short	The hour part of time when the message was sent from the exchange	
Minute	Short	The minute part of time when the message was sent from the exchange	
Second	Short	The second part of time when the message was sent from the exchange	
Millisecond	Short	The millisecond part of time when the message was sent from the exchange	
Product ID or Market Segment ID	Short	The identifier of the product for which the session is sent	Refer the master files for the details on the product ID or the Market segment ID.

<table>
<tr><td>Reserved Field 4</td><td>Short</td><td>For Internal Use.</td><td></td></tr>
<tr><td>Filler</td><td>Short</td><td>For Future Use</td><td></td></tr>
<tr><td>Market Type</td><td>Short</td><td>Type of market running in the segment</td><td>Possible values for Market Type are
20 – PCAS
0 – All other market

Refer Section Trading states for sample business day for possible values and sequence of events</td></tr>
<tr><td>Session Number</td><td>Short</td><td>The current trading session</td><td>Possible values for Session Number are:

<table><tr><th>Value</th><th>Description</th></tr><tr><td>0</td><td>Logon Session or End of Session</td></tr><tr><td>1</td><td>Call Auction Order Entry Start</td></tr><tr><td>2</td><td>Call Auction Matching End</td></tr><tr><td>3</td><td>Continuous Start</td></tr><tr><td>4</td><td>Closing Start</td></tr><tr><td>5</td><td>Post-Closing Start</td></tr><tr><td>6</td><td>End of Day</td></tr><tr><td>7</td><td>Member Query</td></tr><tr><td>10</td><td>SPOS Order Entry End</td></tr><tr><td>11</td><td>SPOS Matching End</td></tr><tr><td>13</td><td>SPOS Continuous Start</td></tr></table>

Refer Section Trading states for sample business day for possible values and sequence of events</td></tr>
<tr><td>Reserved Field 5</td><td>Long</td><td>For Internal Use.</td><td></td></tr>
<tr><td>Start End Flag</td><td>Char</td><td>Indication for start or End of session</td><td>Applicable for PCAS market only</td></tr>
</table>

			S – Start of Session E – End of Session
Reserved Field 6	Char	For Internal Use.	
Reserved Field 7	Char [2]	For Internal Use.	

4.2.2 News Headline [2004]

This message informs about the company news (Announcement Data or notices). The message is sent whenever there is some news or corporate action in a company. This message gives the url for the corporate announcement.

Applicable Segment: Equity & Equity Derivatives Compression: No

Field Name	Type	Description	Values, meanings, Validations
Message Type	Long	Type of message	Value: 2004 – Description: News Headline
Reserved Field 1	Long	For Internal Use.	
Reserved Field 2	Long	For Internal Use.	
Reserved Field 3	unsigned short	For Internal Use.	
Hour	Short	The hour part of time when the message was sent from the exchange	
Minute	Short	The minute part of time when the message was sent from the exchange	
Second	Short	The second part of time when the message was sent from the exchange	
Millisecond	Short	The millisecond part of time when the message was sent from the exchange	
Reserved Field 4	Short	For Internal Use.	
Reserved Field 5	Short	For Internal Use.	
Reserved Field 6	Short	For Internal Use.	
News Category	Short	The category of this news.	

Reserved Field 7	Short	For Internal Use.	
News Id	Long	The news identifier of this news	
News Headline	Char (39+1)	The actual news headlines.	The weblink for the corporate announcement
Reserved Field 8	Char	For Internal Use	
Reserved Field 9	Char	For Internal Use.	
Reserved Field 10	Char [2]	For Internal Use.	

4.2.3 Market Picture Broadcast [2020 and 2021]

This message is sent by the Exchange whenever there is a change in order book of an instrument/contract. The message is not sent on every update in the order book. Instead it is sent whenever there is a change in a defined snapshot interval. The interval is currently defined as 800 milliseconds.

To optimally use the network resources, updates for multiple instrument/ contracts is packaged in a single market picture message. The market picture message is the most frequently sent message and it has the largest size. Thus, to reduce the size of packet over the network, the message is compressed further using native compression algorithm.

The member application must apply the decompression algorithm to retrieve the message. The decompression logic is explained in detail in section Decompression of Market Picture Message.

Applicable Segment: All Compression: Yes

<table>
<tr><th>Field Name</th><th>Type</th><th>Description</th><th>Values, meanings, Validations</th></tr>
<tr><td>Message Type</td><td>Long</td><td>Type of message</td><td><table><tr><th>Value</th><th>Description</th></tr><tr><td>2020</td><td>Market Picture</td></tr><tr><td>2021</td><td>Market Picture (Complex Instruments)</td></tr></table></td></tr>
<tr><td>Reserved Field 1</td><td>Long</td><td>For Internal Use.</td><td></td></tr>
<tr><td>Reserved Field 2</td><td>Long</td><td>For Internal Use.</td><td></td></tr>
<tr><td>Reserved Field 3</td><td>unsigned short</td><td>For Internal Use.</td><td></td></tr>
</table>

Hour	Short	The hour part of time when the message was sent from the exchange	Hour
Minute	Short	The minute part of time when the message was sent from the exchange	Minute
Second	Short	The second part of time when the message was sent from the exchange	Second
Millisecond	Short	The millisecond part of time when the message was sent from the exchange	Millisecond
Reserved Field 4	Short	For Internal Use.	
Reserved Field 5	Short	For Internal Use.	
No of Records	Short	No. of market picture records sent	This can have a maximum of 6 records
The following sub-structure will repeat no. of times as specified in the “No. of Records” field above.			
Instrument /Contract Code	Long or Long Long	Instrument code of the Instrument for which details are being sent.	Instrument /contract code. Datatype is to be treated as long for message 2020 and long-long for message type 2021
No of Trades	Long	Number of trades took place during the day for the Instrument	The cumulative no. of trades during the day
Traded Volume	Long	Total traded quantity during the day for the Instrument.	The cumulative no. of shares traded during the day.
Traded Value	Long	Total traded value during the day for the instrument.	The cumulative value traded during the day. The value is always disseminated in paise. The Unit for this field will be provided in field “Trade Value Flag” below. If the Flag is not set then the absolute value should be considered.
Trade Value Flag	Char	Unit for field “Traded Value”	'l' denotes lacs ‘c’ denotes for crores

<table>
<tr><td>Reserved Field 6</td><td>Char</td><td>For Internal Use.</td><td></td></tr>
<tr><td>Reserved Field 7</td><td>Char</td><td>For Internal Use.</td><td></td></tr>
<tr><td>Reserved Field 8</td><td>Char</td><td>For Internal Use.</td><td></td></tr>
<tr><td>Market Type</td><td>Short</td><td>The type of market</td><td>Possible values for Market Type are
20 – PCAS
0 – All other market</td></tr>
<tr><td>Session Number</td><td>Short</td><td></td><td>Possible values are
<table><tr><th>Value</th><th>Description</th></tr><tr><td>1</td><td>Call Auction Order Entry Start</td></tr><tr><td>2</td><td>Call Auction Matching</td></tr><tr><td>3</td><td>Continuous</td></tr><tr><td>4</td><td>Closing</td></tr><tr><td>5</td><td>Post-Closing</td></tr><tr><td>10</td><td>SPOS Order Entry</td></tr><tr><td>11</td><td>SPOS Matching</td></tr></table></td></tr>
<tr><td>LTP Hour</td><td>Char</td><td>The hour part of time when the message was sent from the exchange</td><td>Hour</td></tr>
<tr><td>LTP Minute</td><td>Char</td><td>The minute part of time when the message was sent from the exchange</td><td>Minute</td></tr>
<tr><td>LTP Second</td><td>Char</td><td>The second part of time when the message was sent from the exchange</td><td>Second</td></tr>
<tr><td>LTP Millisecond</td><td>Char [3]</td><td>The millisecond part of time when the message was sent from the exchange</td><td>Millisecond</td></tr>
<tr><td>Reserved Field 8</td><td>Char [2]</td><td>For Internal Use.</td><td></td></tr>
</table>

Reserved Field 9	Short	For Internal Use.	
No of Price points	Short	Number of Price points in the depth substructure below	Currently “n” = 5
Timestamp	Long Long	Time at which the market data was generated at Exchange	The time is in Julian format.
Close Rate	Long	Close price for the current trading day. The field will be populated once close price for the day is determined else it would be 0	For decimal precision refer Price Precision Table
LTQ (Last Traded Quantity)	Long	Quantity which got executed in the last trade	The total quantity traded in the last trade.
LTP (Last Traded Price)	Long	Price at which last trade took place.	For decimal precision refer Price Precision Table
Open Rate	Long	Opening rate of the Instrument.	For decimal precision refer Price Precision Table
Previous Close Rate	Long	Previous trading day closing rate of the Instrument.	For decimal precision refer Price Precision Table
High Rate	Long	Highest traded rate of the Instrument	For decimal precision refer Price Precision Table
Low Rate	Long	Lowest traded rate of the Instrument	For decimal precision refer Price Precision Table
Reserved Field 10	Long	For Internal Use.	

Indicative Equilibrium Price	Long	The tentative equilibrium price determined during the order entry session of call auction.	For decimal precision refer Price Precision Table Applicable for equity segment instruments only. The field will be populated in order entry session if tentative equilibrium price is established else it would be 0.
Indicative Equilibrium Quantity	Long	The tentative match able quantity determined during the order entry session of call auction	Applicable for equity segment instruments only. The field will be populated in order entry session if tentative equilibrium price is established else it would be 0.
Total Bid Quantity	Long	Total Buy Quantity present in order book across all the price points.	Total quantity present in the buy order book
Total Offer Quantity	Long	Total Sell Quantity present in order book across all the price points.	Total quantity present in the sell order book
Lower Circuit Limit	Long	Lower Price band for Instrument/ Contract	The lowest rate at which order can be placed during the day.
Upper Circuit Limit	Long	Upper Price band for Instrument/Contract	The highest rate at which order can be placed during the day.
Weighted Average price	Long	Weighted Average traded rate for Instrument	For decimal precision refer Price Precision Table
Following sub-structure will repeat number of times as specified in the "No. of Price points" field above.			
Best Bid Rate	Long	Best bid rate in the order book	For decimal precision refer Price Precision Table

Total Bid Quantity	Long	Total quantity available at best bid rate.	In case of equity derivatives and currency derivatives the total quantity will include the implied quantity if it is available. Total Bid Qty = Actual Order qty + Implied Quantity The implied quantity is applicable for the best price point only.
No. of Bid at the price points	Long	No. of Orders at the Buy Price point	It will always show the number of actual orders in the order book. It will not consider the orders contributing towards implied price. It will be 0 in case only implied quantity is available at the best price point.
Implied Buy Quantity	Long	The quantity implied at the best price point of this contract due to orders in other related contracts.	If only implied quantity is available at the best price point then total quantity field and implied quantity field will be same. If no implied quantity is available at the best price point then implied quantity field will be 0.
Best Offer Rate	Long	Best offer rate	For decimal precision refer Price Precision Table

Total Offer Qty	Long	Total quantity available at best offer rate	In case of equity derivatives and currency derivatives the total quantity will include the implied quantity if it is available. Total Offer Qty = Actual Order qty + Implied Quantity The implied quantity is applicable for the best price point only.
No. of Ask at the price point	Long	No. of Orders at the Sell Price point	It will always show the number of direct orders in the order book. It will not consider the orders contributing towards implied price. It will be 0 in case only implied quantity is available at the best price point.
Implied Sell Quantity	Long	The quantity implied at the best price point of this contract due to orders in other related contracts.	The implied quantity is applicable for the best price point only If only implied quantity is available at the best price point then total quantity field and implied quantity field will be same. If no implied quantity is available at the best price point then implied quantity field will be 0.

4.2.4 Auction Market Picture Broadcast [2017]

This broadcast is sent by Auction system whenever there is a shortage auction scheduled during the day. This message provides information on the seller bids participating in the shortage auction.

Applicable Segment: Equity Compression: No

<table>
<tr><th>Field Name</th><th>Type</th><th>Description</th><th>Values, meanings, Validations</th></tr>
<tr><td>Message Type</td><td>Long</td><td>Type of message</td><td><table><tr><th>Value</th><th>Description</th></tr><tr><td>2017</td><td>Auction Market Picture</td></tr></table></td></tr>
<tr><td>Reserved Field 1</td><td>Long</td><td>For Internal Use.</td><td></td></tr>
<tr><td>Reserved Field 2</td><td>Long</td><td>For Internal Use.</td><td></td></tr>
<tr><td>Reserved Field 3</td><td>unsigned short</td><td>For Internal Use.</td><td></td></tr>
<tr><td>Hour</td><td>Short</td><td>The hour part of time when the message was sent from the exchange</td><td>Hour</td></tr>
<tr><td>Minute</td><td>Short</td><td>The minute part of time when the message was sent from the exchange</td><td>Minute</td></tr>
<tr><td>Second</td><td>Short</td><td>The second part of time when the message was sent from the exchange</td><td>Second</td></tr>
<tr><td>Millisecond</td><td>Short</td><td>The millisecond part of time when the message was sent from the exchange</td><td>Millisecond</td></tr>
<tr><td>Auction Number</td><td>Short</td><td>The number of the shortage auction</td><td></td></tr>
<tr><td>Auction Trading Session</td><td>Short</td><td>The current action trading session</td><td></td></tr>
<tr><td>No of Records</td><td>Short</td><td>No. of market picture records sent</td><td>This can have a maximum of 10 records</td></tr>
<tr><td>Notice Number</td><td>Char [10+1]</td><td>Notice Number</td><td>The notice number of</td></tr>
<tr><td>Reserved Field 4</td><td>Char</td><td>For Internal Use</td><td></td></tr>
<tr><td colspan="4">The following sub-structure will repeat no. of times as specified in the “No. of Records” field above.</td></tr>
</table>

Instrument /Contract Code	Long	Instrument code of the Instrument for which details are being sent.	Instrument /contract code.
Reserved Field 5	Long	For Internal Use	
Auction Qty	Long	Total Auction Quantity	
Ceiling Price	Long	Highest Price	2 decimal precision
Floor Price	Long	Lowest Price	2 decimal precision
Cut-off Rate	Long		
Lowest Offered Rate	Long	Lowest offered rate in auction.	
Cumulative Qty	Long	Total Offered quantity	
Reserved Field 6	Long	For Internal Use.	
Reserved Field 7	Short	For Internal Use.	
Reserved Field 8	Short	For Internal Use.	
Reserved Field 9	Char	For Internal Use.	
Reserved Field 10	Char	For Internal Use.	
Reserved Field 11	Char	For Internal Use.	
Reserved Field 12	Char	For Internal Use.	
The following sub-structure will repeat 5 times.			
Likely Cut-off Rate	Long	The likely highest rate at which execution will take place	
Offer Qty	Long	The cumulative quantity at the likely cut-off rate	

4.2.5 Odd-lot Market Picture Messages [2027]

This broadcast is sent by BOLTPLUS whenever there is trade in odd-lot market. The Odd-lot market trading does not take place on BOLTPLUS platform. This message provides only the trade information

and order information is not provided through broadcast message. The TPS applications can drop this message if the odd-lot market trades are not useful for them.

Applicable Segment: Equity Compression: No

<table>
<tr><th>Field Name</th><th>Type</th><th>Description</th><th>Values, meanings, Validations</th></tr>
<tr><td>Message Type</td><td>Long</td><td>Type of message</td><td><table><tr><th>Value</th><th>Description</th></tr><tr><td>2027</td><td>Odd-lot Market Picture</td></tr></table></td></tr>
<tr><td>Reserved Field 1</td><td>Long</td><td>For Internal Use.</td><td></td></tr>
<tr><td>Reserved Field 2</td><td>Long</td><td>For Internal Use.</td><td></td></tr>
<tr><td>Reserved Field 3</td><td>unsigned short</td><td>For Internal Use.</td><td></td></tr>
<tr><td>Hour</td><td>Short</td><td>The hour part of time when the message was sent from the exchange</td><td>Hour</td></tr>
<tr><td>Minute</td><td>Short</td><td>The minute part of time when the message was sent from the exchange</td><td>Minute</td></tr>
<tr><td>Second</td><td>Short</td><td>The second part of time when the message was sent from the exchange</td><td>Second</td></tr>
<tr><td>Millisecond</td><td>Short</td><td>The millisecond part of time when the message was sent from the exchange</td><td>Millisecond</td></tr>
<tr><td>Reserved Field 4</td><td>Short</td><td>For Internal Use.</td><td></td></tr>
<tr><td>Reserved Field 5</td><td>Short</td><td>For Internal Use.</td><td></td></tr>
<tr><td>No of Records</td><td>Short</td><td>No. of market picture records sent</td><td>This can have a maximum of 6 records</td></tr>
<tr><td colspan="4">The following sub-structure will repeat no. of times as specified in the “No. of Records” field above.</td></tr>
<tr><td>Instrument /Contract Code</td><td>Long</td><td>Instrument code of the Instrument for which details are being sent.</td><td>Instrument /contract code.</td></tr>
</table>

Open Rate	Long	Opening rate of the Instrument.	2 decimal precision
Previous Close Rate	Long	Previous trading day closing rate of the Instrument.	2 decimal precision
High Rate	Long	Highest traded rate of the Instrument	2 decimal precision
Low Rate	Long	Lowest traded rate of the Instrument	2 decimal precision
No of Trades	Long	Number of trades took place during the day for the Instrument	The cumulative no. of trades during the day
Traded Volume	Long Long	Total traded quantity during the day for the Instrument.	The cumulative no. of shares traded during the day.
Traded Value	Long	Total traded value during the day for the instrument.	The cumulative value traded during the day. The Unit for this field will be provided in field “Trade Value Flag” below.
LTQ (Last Traded Quantity)	Long Long	Quantity which got executed in the last trade	The total quantity traded in the last trade.
LTP (Last Traded Price)	Long	Price at which last trade took place.	2 decimal precision
Close Rate	Long	Close price for the current trading day. The field will be populated once close price for the day is determined else it would be 0	2 decimal precision
Trade Value Flag	Char	Unit for field “Traded Value”	'l' denotes lacs ‘c’ denotes for crores
Reserved Field 7	Char	For Internal Use.	
Reserved Field 8	Char	For Internal Use.	
Reserved Field 9	Char	For Internal Use.	
Lower Circuit Limit	Long	Lower Price band for Instrument/ Contract	The lowest rate at which order can be placed during the day.

Upper Circuit Limit	Long	Upper Price band for Instrument/Contract	The highest rate at which order can be placed during the day.
Weighted Average price	Long	Weighted Average traded rate for Instrument	The weighted average traded rate for the day.
Market Type	Short	The type of market	Not applicable
Session Number	Short		Not applicable
LTP Hour	Char	The hour part of time when the message was sent from the exchange	Hour
LTP Minute	Char	The minute part of time when the message was sent from the exchange	Minute
LTP Second	Char	The second part of time when the message was sent from the exchange	Second
LTP Millisecond	Char [3]	The millisecond part of time when the message was sent from the exchange	Millisecond
Reserved Field 10	Char [2]	For Internal Use.	

4.2.6 Debt Market Picture [2033]

This broadcast is sent by the BOLTPLUS whenever there is a change in order book of a debt instrument/contract. The message is applicable for debt instrument where trading takes place on clean price.

The message is not sent on every update in the order book. Instead it is sent whenever there is a change in a defined snapshot interval. The interval is currently defined as 800 milliseconds.
In order to optimally use the network resources, updates for multiple instrument/ contracts is packaged in a single market picture message. The market picture message is the most frequently sent message with highest packet size. Thus, in order to reduce the size of packet over the network, the message is compressed further using native compression algorithm.

The member application must apply the decompression algorithm in order to retrieve the message.

Applicable Segment: Equity Compression: Yes

<table>
<tr><th>Field Name</th><th>Type</th><th>Description</th><th>Values, meanings, Validations</th></tr>
<tr><td>Message Type</td><td>Long</td><td>Type of message</td><td><table><tr><th>Value</th><th>Description</th></tr><tr><td>2033</td><td>Debt Market Picture</td></tr></table></td></tr>
<tr><td>Reserved Field 1</td><td>Long</td><td>For Internal Use</td><td></td></tr>
<tr><td>Reserved Field 2</td><td>Long</td><td>For Internal Use</td><td></td></tr>
<tr><td>Reserved Field 3</td><td>unsigned short</td><td>For Internal Use</td><td></td></tr>
<tr><td>Hour</td><td>Short</td><td>Time : HH</td><td></td></tr>
<tr><td>Minute</td><td>Short</td><td>Time : MM</td><td></td></tr>
<tr><td>Second</td><td>Short</td><td>Time : SS</td><td></td></tr>
<tr><td>Millisecond</td><td>Short</td><td>Time : sss</td><td></td></tr>
<tr><td>Reserved Field 4</td><td>Short</td><td>For Internal Use</td><td></td></tr>
<tr><td>Reserved Field 5</td><td>Short</td><td>For Internal Use</td><td></td></tr>
<tr><td>No of Records</td><td>Short</td><td>No. of market picture records sent</td><td>This can have a maximum of 6 records</td></tr>
<tr><td colspan="4">The following sub-structure will repeat no. of times as specified in the “No. of Records” field above.</td></tr>
<tr><td>Instrument Code</td><td>Long</td><td>Instrument code of the Instrument for which Touchline details are being sent.</td><td></td></tr>
<tr><td>No of Trades</td><td>Long</td><td>Number of trades took place during the day for the Instrument</td><td>The cumulative no. of trades during the day</td></tr>
<tr><td>Volume</td><td>Long</td><td>Total Traded qty during the day for the Instrument</td><td>The cumulative no. of shares traded during the day</td></tr>
<tr><td>Value</td><td>Long</td><td>Total Traded value during the day for the instrument</td><td>The cumulative value traded during the day</td></tr>
<tr><td>Trade Value Flag</td><td>Char</td><td>Unit for value</td><td>'l' for lacs, 'c' for crores</td></tr>
<tr><td>Reserved Field 6</td><td>Char</td><td>For Internal Use</td><td></td></tr>
<tr><td>Reserved Field 7</td><td>Char</td><td>For Internal Use</td><td></td></tr>
</table>

<table>
<tr><td>Reserved Field 8</td><td>Char</td><td>For Internal Use</td><td></td></tr>
<tr><td>Market Type</td><td>Short</td><td>The type of market</td><td>Possible values for Market Type are
20 – PCAS
0 – All other market</td></tr>
<tr><td>Session Number</td><td>Short</td><td>The Session of the Instrument</td><td>Possible values are
<table><tr><th>Value</th><th>Description</th></tr><tr><td>1</td><td>Call Auction Order Entry Start</td></tr><tr><td>2</td><td>Call Auction Matching</td></tr><tr><td>3</td><td>Continuous</td></tr><tr><td>4</td><td>Closing</td></tr><tr><td>5</td><td>Post-Closing</td></tr><tr><td>10</td><td>SPOS Order Entry</td></tr><tr><td>11</td><td>SPOS Matching</td></tr></table></td></tr>
<tr><td>LTP Hour</td><td>Char</td><td>Hour at which Last trade took place</td><td></td></tr>
<tr><td>LTP Minute</td><td>Char</td><td>Minute at which Last trade took place</td><td></td></tr>
<tr><td>LTP Second</td><td>Char</td><td>Second at which Last trade took place</td><td></td></tr>
<tr><td>LTP Millisecond</td><td>Char [3]</td><td>Millisecond at which Last trade took place</td><td></td></tr>
<tr><td>Reserved Field 9</td><td>Char [2]</td><td>For Internal Use</td><td></td></tr>
<tr><td>Reserved Field 10</td><td>Short</td><td>For Internal Use</td><td></td></tr>
<tr><td>No of Price points</td><td>Short</td><td>“n” Number of Price points</td><td>Currently “n” = 5</td></tr>
<tr><td>Timestamp</td><td>Long Long</td><td>Time at which the market data was generated at Exchange</td><td>The time is in Julian format.</td></tr>
</table>

Close Rate	Long	Close price for the current day once close price for the day is determined in closing session	The rate will be in basis points i.e. 4 decimal precision. The field will be populated once close price for the day is determined else it would be 0
YTM	Long	Yield to Maturity computed based on the last traded price of a bond	
YTP	Long	Yield to Put computed based on the last traded price of a bond. Applicable only if a bond is Putable	
YTC	Long	Yield to Call computed based on the last traded price of a bond. Applicable only if a bond is Callable	
Last Trade Qty	Long	Quantity which got executed in the Last trade	The total quantity traded in the last trade
LTP	Long	Price at which last trade took place.	The rate will be in basis points i.e. 4 decimal precision. The traded rate in the last trade
Open Rate	Long	Opening rate of the Instrument.	The rate will be in basis points i.e. 4 decimal precision.
Previous Close Rate	Long	Previous Closing rate of the Instrument	The rate will be in basis points i.e. 4 decimal precision. Previous day's close price in all sessions
High Rate	Long	Highest traded rate of the Instrument	The rate will be in basis points i.e. 4 decimal precision. .
Low Rate	Long	Lowest traded rate of the Instrument	The rate will be in basis points i.e. 4 decimal precision.
Reserved Field 11	Long	For Internal Use	
Indicative Equilibrium Price	Long	For Future Use	

Indicative Equilibrium Qty	Long	For Future Use	
Total Bid Qty	Long	Total Bid Qty	Total quantity present in the buy order book
Total Offer Qty	Long	Total Offer Qty	Total quantity present in the sell order book
Lower Circuit Limit	Long	Lower Circuit limit for Instrument	The rate will be in basis points i.e. 4 decimal precision. The lowest rate at which order can be placed during the day
Upper Circuit Limit	Long	Upper Circuit limit for Instrument	The rate will be in basis points i.e. 4 decimal precision. The highest rate at which order can be placed during the day
Weighted Average	Long	Weighted Average for Instrument	The rate will be in basis points i.e. 4 decimal precision.
Following sub-structure will repeat number of times as specified in the "No. of Price points" field above.			
Best Bid Rate	Long	Best bid rate in paise	The rate will be in basis points i.e. 4 decimal precision.
Total Bid Qty	Long	Total quantity available at best bid rate.	
Buy YTM	Long	Yield to Maturity computed based on the Buy price of a bond	
Buy YTP	Long	Yield to Call computed based on the Buy price of a bond. Applicable only if a bond is Callable	
Buy YTC	Long	Yield to Call computed based on the Buy price of a bond. Applicable only if a bond is Callable	
No. of Bid at the price points	Long	No. of Orders at the Buy Price point	It will always show the number of actual orders in the order book.

Filler	Long		
Best Offer Rate	Long	Best offer rate in paise	The rate will be in basis points i.e. 4 decimal precision.
Total Offer Qty	Long	Total quantity available at best offer rate	
Sell YTM	Long	Yield to Maturity computed based on the Sell price of a bond	
Sell YTP	Long	Yield to Call computed based on the Sell price of a bond. Applicable only if a bond is Callable	
Sell YTC	Long	Yield to Call computed based on the Sell price of a bond. Applicable only if a bond is Callable	
No. of Ask at the price point	Long	No. of Orders at the Sell Price point	It will always show the number of direct orders in the order book.
Filler	Long		

4.2.7 Index Change Message [2011 and 2012]

This message provides information for the change in the index value for the indices. The message is delivered in the equity multicast stream only. Different Indices are disseminated at different frequencies in two different messages. Indices with lower dissemination frequency are sent in message (2011) and others are sent in message (2012).

Applicable Segment: Equity Compression: No

<table>
<tr><th>Field Name</th><th>Data Type</th><th>Description</th><th>Values, meanings, Validations</th></tr>
<tr><td>Message Type</td><td>Long</td><td>Type of message.</td><td>
<table>
<tr><th>Value</th><th>Description</th></tr>
<tr><td>2011</td><td>Index broadcast 1</td></tr>
<tr><td>2012</td><td>Index broadcast 2</td></tr>
</table>
The dissemination frequency is</td></tr>
</table>

			different in above 2 messages. Currently defined frequency is: 2011 = 1 second. 2012 = 8 second. Critical Indices like Sensex BSE100 etc. are sent in 2011 and others in 2012.
Reserved Field 1	Long	For Internal Use.	
Reserved Field 2	Long	For Internal Use.	
Reserved Field 3	unsigned short	For Internal Use.	
Hour	Short	The hour part of time when the message was sent from the exchange	
Minute	Short	The minute part of time when the message was sent from the exchange	
Second	Short	The second part of time when the message was sent from the exchange	
Millisecond	Short	The millisecond part of time when the message was sent from the exchange	
Reserved Field 4	Short	For Internal Use.	
Reserved Field 5	Short	For Internal Use.	
No. of Records	Short	Number of records.	Maximum no. of records = 24
The following sub-structure will repeat no. of times as specified in the “No. of Records” field above.			
Index Code	Long	The Index Code assigned to the index.	Refer Section Index Code Mapping for details on Index codes
Index High	Long	Day’s highest index value.	
Index Low	Long	Day’s lowest index value.	
Index Open	Long	Day’s opening index value.	

Previous Index Close	Long	Previous day's index closing value.	
Index Value	Long	Current index value.	In Continuous session it will contain current index value and closing session onwards it would contain the day's closing index value. The field has two decimal precision.
Index ID	Char (6+1)	The Index Identifier of the index for which values are being sent.	E.g. SENSEX, BSE100 etc.
Reserved Field 6	Char	For Internal Use.	
Reserved Field 7	Char	For Internal Use.	
Reserved Field 8	Char	For Internal Use.	
Reserved Field 9	Char [2]	For Internal Use.	
Reserved Field 10	Short	For Internal Use.	
Reserved Field 11	Short	For Internal Use.	

4.2.8 Close Price [2014]

Close price message will be sent in closing session when the close price of the instrument is calculated. The message will have day's close price. Additionally, the close price message will be sent in the morning before the start of the market. In this case the close price will be previous day's close price.

Applicable Segment: All Compression: No

Field Name	Type	Description	Values, meanings, Validations
Message Type	Long	Type of message	<table><tr><th>Value</th><th>Description</th></tr><tr><td>2014</td><td>Close Price</td></tr></table>

Reserved Field 1	Long	For Internal Use.	
Reserved Field 2	Long	For Internal Use.	
Reserved Field 3	unsigned short	For Internal Use.	
Hour	Short	The hour part of time when the message was sent from the exchange	
Minute	Short	The minute part of time when the message was sent from the exchange	
Second	Short	The second part of time when the message was sent from the exchange	
Millisecond	Short	The millisecond part of time when the message was sent from the exchange	
Reserved Field 4	Short	For Internal Use.	
Reserved Field 5	Short	For Internal Use.	
No of Records	Short	Number of Instruments in this message	Maximum no. of records = 80
The following sub-structure will repeat no. of times as specified in the “No. of Records” field above.			
Instrument Code	Long	Instrument Id of the Instrument	
Price	Long	The close price for the Instrument	For decimal precision refer Price Precision Table
Reserved Field 6	Char	For Internal Use	
Traded Flag	Char	Traded Today.	Y- Yes N- No
Reserved Field 7	Char	For Internal Use.	
Reserved Field 8	Char	For Internal Use.	

4.2.9 Open Interest Message [2015]

Open Interest message will be sent by BOLTPLUS in a specific interval for the Derivatives instrument listed in the Exchange. The broadcast will be sent whenever there is change in the OI of an instrument.

For recovery purpose the OI will be sent for all contracts periodically throughout the day irrespective if there was any change in the OI.

Applicable Segment: All Derivatives Compression: No

<table>
<tr><th>Field Name</th><th>Type</th><th>Description</th><th>Values, meanings, Validations</th></tr>
<tr><td>Message Type</td><td>Long</td><td>Type of message</td><td><table><tr><th>Value</th><th>Description</th></tr><tr><td>2015</td><td>Open Interest</td></tr></table></td></tr>
<tr><td>Reserved Field 1</td><td>Long</td><td>For Internal Use</td><td></td></tr>
<tr><td>Reserved Field 2</td><td>Long</td><td>For Internal Use</td><td></td></tr>
<tr><td>Reserved Field 3</td><td>unsigned short</td><td>For Internal Use</td><td></td></tr>
<tr><td>Hour</td><td>Short</td><td>The hour part of time when the message was sent from the exchange</td><td></td></tr>
<tr><td>Minute</td><td>Short</td><td>The minute part of time when the message was sent from the exchange</td><td></td></tr>
<tr><td>Second</td><td>Short</td><td>The second part of time when the message was sent from the exchange</td><td></td></tr>
<tr><td>Millisecond</td><td>Short</td><td>The millisecond part of time when the message was sent from the exchange</td><td></td></tr>
<tr><td>Reserved Field 4</td><td>Short</td><td>For Internal Use.</td><td></td></tr>
<tr><td>Reserved Field 5</td><td>Short</td><td>For Internal Use.</td><td></td></tr>
<tr><td>No. of Records</td><td>Short</td><td>Number of records</td><td>Maximum no. of records = 26</td></tr>
<tr><td colspan="4">The following sub-structure will repeat no. of times as specified in the “No. of Records” field above.</td></tr>
<tr><td>Instrument Id</td><td>long</td><td>Instrument Id of the Instrument</td><td></td></tr>
<tr><td>Open</td><td>long</td><td>The Open Interest in the market</td><td>For Currency Derivatives</td></tr>
</table>

Interest Quantity		in QTY terms	segment, the value will be in lots while for equity derivatives the value will be in qty
Open Interest Value	long long	The Open interest values.	2 decimal precision
Open Interest Change	long	Change in open interest in term of quantity	For Currency Derivatives segment, the value will be in lots while for equity derivatives the value will be in qty
Reserved Field 6	Char(4)	For Internal Use.	
Reserved Field 7	Long	For Internal Use.	
Reserved Field 8	Short	For Internal Use.	
Reserved Field 9	Short	For Internal Use.	
Reserved Field 10	Char	For Internal Use	
Reserved Field 11	Char	For Internal Use.	
Reserved Field 12	Char[2]	For Internal Use.	

4.2.10 VaR Percentage [2016]

VAR Percentage message will be sent by Exchange at periodic interval. The latest Instrument wise VAR and ELM VAR Percentages will be sent by Exchange. This message is applicable for equity instruments and it will be available in Equity multicast stream only

Applicable Segment: All Compression: No

Field Name	Type	Description	Values, meanings, Validations

Message Type	long	Type of message	<table><tr><th>Value</th><th>Description</th></tr><tr><td>2016</td><td>VaR Percentage</td></tr></table>
Reserved Field 1	Long	For Internal Use.	
Reserved Field 2	Long	For Internal Use	
Reserved Field 3	unsigned short	For Internal Use	
Hour	Short	The hour part of time when the message was sent from the exchange	
Minute	Short	The minute part of time when the message was sent from the exchange	
Second	Short	The second part of time when the message was sent from the exchange	
Millisecond	Short	The millisecond part of time when the message was sent from the exchange	
Reserved Field 4	Short	For Internal Use.	
Reserved Field 5	Short	For Internal Use.	
No. of Records	Short	Number of records	Maximum no. of records = 40
The following sub-structure will repeat no. of times as specified in the “No. of Records” field above.			
Instrument code	Long	Instrument Id of the Instrument	
VAR/IM Percentage	Long	The applicable VaR for the current period.	2 decimal precision
ELM VAR Percentage	Long	The applicable ELM for the current period.	2 decimal precision
Reserved Field 6	Long	For Internal Use.	

Reserved Field 7	Short	For Internal Use.	
Reserved Field	Short	For Internal Use.	
Reserved Field 8	Char	For Internal Use	
Identifier	Char	Identifier is used to identify the market for which the message is sent	E = Equity
Reserved Field 9	Char[2]	For Internal Use.	

Note: If the VAR and ELMVAR values received from the CTE are 975 and 1425, it means that the VAR percentage and the ELMVAR percentage are 9.75% and 14.25% respectively.

4.2.11 RBI Reference Rate [2022]

This message is used to disseminate the reference rate published by RBI for foreign exchange. The rate is published multiple times during the day. The date field specifies the date for which the rate is applicable. This field can be used to identify if the new rate is published by RBI.

Applicable Segment: Currency Derivatives Compression: No

Field Name	Type	Description	Remarks
Message Type	Long	Type of message	Value: 2022 — Description: RBI Reference Rate
Reserved Field 1	Long		
Reserved Field 2	Long	For Internal Use	
Reserved Field 3	unsigned short	For Internal Use	
Hour	Short	The hour part of time when the message was sent from the exchange	
Minute	Short	The minute part of time when the message was sent from the exchange	
Second	Short	The second part of time when	

		the message was sent from the exchange	
Millisecond	Short	The millisecond part of time when the message was sent from the exchange	
Reserved Field 4	Short		
Reserved Field 5	Short	For Internal Use	
No. Of Records	Short	Number of records	Indicates the number of times the following sub structure will repeat
The following sub-structure will repeat no. of times as specified in the "No. of Records" field above.			
Underlying Asset Id	Long	The underlying Asset	600 – USD 601 – GBP 602- JPY 603 - EUR
RBI Rate	Long	The reference rate in bps	The rate should be divided by 10000 to get rate in decimal.
Reserved Field 6	Short	For future use	
Reserved Field 7	Short	For future use	
Date	Char(11)	The date for which the reference rate is applicable.	Format of the field DD-MM-YYYY
Filler	Char(1)	Pad	

5 Decompression of Market Depth Message

BSE applies the compression only on market picture messages viz Message type 2020 and 2021 only. All other market data messages can be read from the socket directly as per the structure defined in API. The compression principle used is proprietary.

In case of market picture message, the entire market picture message is not sent in compressed format. For each record present in the market picture packet, the compression starts with the open rate field and ends with the last field for that record. All data points from open rates onwards are in compressed format. The decompression logic is detailed with an example in section Example for full market picture reading

It is suggested that the user should read 2000 bytes of data by default in a single read call. This single read call will get single packet only. The first 4 bytes will convey the message type and depending upon the message type the user should process the required messages or drop the message if not required. Since the size of market picture message cannot be ascertain due to compression logic, the market picture message needs to be read byte by byte. It cannot be mapped to the structure directly as defined in the API.

Binary values are presented in big-endian byte order so the TPS application needs to convert it to little-endian byte order.

- ✓ Big-Endian means that the most significant byte of any multibyte data field is stored at the lowest memory address, which is also the address of the larger field.
- ✓ Little-Endian means that the least significant byte of any multibyte data field is stored at the lowest memory address, which is also the address of the larger field.

5.1 Compression Principle

The idea used in compression is that rate fields in the structure are defined as long (4 bytes) however since all the prices for an instrument usually operates in nearby range thus instead of using 4 bytes for each price, if differential value with respect to a base price is sent then the differential value would generally be no exceeding 2 bytes capacity. Thus 2 bytes on each price field can be saved. Similar is the idea behind the quantity related field in the structure.

5.2 Decompression Mechanism

For decompression 2 fields marked as base fields. One base field (LTP) is used for price and the other base field (LTQ) is used for Quantity. All the compressed fields contain the difference value with respect to base fields in 2 bytes. The user needs to add this 2-byte field value with the base field value to arrive the actual value of the next filed.

In case the difference value exceeds 2 bytes then the actual value is sent in next 4 bytes. So, for all compressed fields the user needs to read 2 bytes first then depending upon the value in the 2 bytes field the user needs to decide what to do next.

If the 2 bytes field value is 32767 the user needs to read the next 4 bytes to have the actual value as the diff value exceeds 2 bytes. The logic is explained in detail with an example in the example section Example for full market picture packet reading

5.3 Decompression Mechanism for Best 5 substructure

In case of best 5 structures, 3 additional aspects are covered in decompression mechanism

5.3.1 Reading Sequence

The best 5 structure needs to be read for buy side and sell side independently i.e. the best 5 Bid structure is read first followed by best 5 offer structure.

Read 5 Best Bid Fields in following order i.e.

- ✓ Best Bid Rate1, Total Bid Qty1, No. of Bid at the price points1, Implied Buy Quantity 1
- ✓ Best Bid Rate2, Total Bid Qty2, No. of Bid at the price points2, Implied Buy Quantity 2
- ✓ Best Bid Rate3, Total Bid Qty3, No. of Bid at the price points3, Implied Buy Quantity 3

- ✓ Best Bid Rate4, Total Bid Qty4, No. of Bid at the price points4, Implied Buy Quantity 4
- ✓ Best Bid Rate5, Total Bid Qty5, No. of Bid at the price points5, Implied Buy Quantity 5

Once 5 Best Bid Fields completed then start reading the 5 Best Offer Fields in similar order

5.3.2 Decompression logic

The general decompression mechanism mentioned above hold true for best 5 structures also. Additionally, the base fields used to decompress best 5 structure changes with each level.

The base field used for different level is different i.e. for e.g. the base fields used in level 1 are different than base fields used in level 2.

For each level the base fields are previous level field values. The table below provides the base filed used in each level for the buy side best 5 structure

Level 1	Best Bid 1	Best Bid Qty 1	No of orders 1	Implied Buy Qty 1
Base	LTP	LTQ	LTQ	LTQ
Level 2	Best Bid 2	Best Bid Qty 2	No of orders 2	Implied Buy Qty 2
Base	Best Bid 1	Best Bid Qty 1	No of orders 1	Implied Buy Qty 1
Level 3	Best Bid 3	Best Bid Qty 3	No of orders 3	Implied Buy Qty 3
Base	Best Bid 2	Best Bid Qty 2	No of orders 2	Implied Buy Qty 2
Level 4	Best Bid 4	Best Bid Qty 4	No of orders 4	Implied Buy Qty 4
Base	Best Bid 3	Best Bid Qty 3	No of orders 3	Implied Buy Qty 3
Level 5	Best Bid 5	Best Bid Qty 5	No of orders 5	Implied Buy Qty 5
Base	Best Bid 4	Best Bid Qty 4	No of orders 4	Implied Buy Qty 4

Similar is the decompression logic for the sell side best 5 structure.

5.3.3 Handling condition when no orders present at a price point

In the best 5 structure, it is possible that the orders may not be present on all 5 price points thus the price points where there are no orders are present are not sent in the structure. Thus, during decompression of the best 5 substructure, additionally following logic needs to be also applied

If during reading the 5 Best Bid Fields if any Best Bid Rate is equals to 32766 then the remaining Best Bid Fields will not be present so 32766 indicates there are no more buy price points available in the book.

Similarly, during reading the 5 Best Offer Fields if any Best Offer Rate is equals to -32766 then the remaining 5 Best Offer Fields will not be present.

5.4 Repetition of Instruments

Once the compression of first instrument is completed the user needs to know the number of bytes he has read. Let's assume after first instrument the number of bytes read as 160.

So, the user needs to start reading 4 bytes from 160 bytes to get instrument code. Read next 4 bytes for number of trades and continue till compression starts. Store the base values in memory for the second instrument. Then apply the compression logic.

5.5 Summary of decompression mechanism

- ✓ Identify the base values
- ✓ Store the base values in memory
- ✓ Read next 2 bytes and add the value to the base value to get final value
- ✓ If value is 32767 means diff value is exceeded, thus read next 4 bytes to have the actual value.

For Best 5 structure Read 2 bytes

- ✓ If value is 32767 means diff value is exceeded, thus read next 4 bytes to have the actual value.
- ✓ If value is 32766 or -32766 means end of best bid or best offer.
- ✓ The base value for level 1 is LTP and LTQ
- ✓ The base value for all subsequent level (level n) is its previous level (level n-1

5.6 Example of Decompression Logic

Following are 3 examples explaining the decompression logic for the market picture message.

5.6.1 Example for General Decompression Mechanism

Let's say base field for Rate is Last Traded Rate and its value is 1000. Open Rate as 500 and Previous Close Rate as 40000 and High Rate as 1000.

Field	**Compressed/ Base**	**Value**	**Byte**	**Action**
Last Traded Rate	Base	1000	4	Read 4 bytes to get 1000 and store it in memory
Open Rate	Compressed	-500	2	Read next 2 bytes to get -500 and apply it to LTR to get the final value as 500.
Previous Close Rate	Compressed	32767 40000	2 4	Read 2 bytes to get 32767 and this value is an indicator that diff value exceeds 2 bytes Read next 4 bytes to have the actual value 40000. No need to apply base value.
High Rate	Compressed	0	2	Read next 2 bytes to get 0 and apply it to LTR to get the final value as 1000.

5.6.2 Example for Best 5 structure decompression mechanism.

For example, for an instrument only one bid rate and no offer rate are available as below

Best Bid Rate1 as 1000, Total Bid Qty1=25, No. of Bid at the price points1= 5, Implied Buy Qty=0 and no Offer Rate

Base LTP is 1000 and Base LTQ is 10

Field	Compressed/ Base	Value	Byte	Action
Last Traded Rate	Base	1000	4	Assume already available in memory
Last Traded Quantity	Base	10	4	Assume already available in memory
Best Bid Rate1	Compressed	0	2	Read next 2 bytes to get 0 and apply it to LTR to get the final value as 1000.
Total Bid Qty1	Compressed	15	2	Read next 2 bytes to get 15 and apply it to LTQ to get the final value as 25.
Bid at the price points1	Compressed	-5	2	Read next 2 bytes to get -5 and apply it to LTQ to get the final value as 5.
Implied Buy Quantity 1	Compressed	-10	2	Read next 2 bytes to get -10 and apply it to LTQ to get the final value as 0.
Best Bid Rate2	Compressed	32766	2	Read next 2 bytes to get 32766 indicates end of Best bid [Not available]
Total Bid Qty2	Compressed	NA	0	Not Available
Bid at the price points2	Compressed	NA	0	Not Available
Implied Buy Quantity 2	Compressed	NA	0	Not Available
Best Bid Rate3	Compressed	NA	0	Not Available
Total Bid Qty3	Compressed	NA	0	Not Available
Bid at the price points3	Compressed	NA	0	Not Available
Implied Buy Quantity 3	Compressed	NA	0	Not Available
Best Bid Rate4	Compressed	NA	0	Not Available
Total Bid Qty4	Compressed	NA	0	Not Available
Bid at the price points4	Compressed	NA	0	Not Available
Implied Buy Quantity 4	Compressed	NA	0	Not Available
Best Bid Rate5	Compressed	NA	0	Not Available
Total Bid Qty5	Compressed	NA	0	Not Available
Bid at the price points5	Compressed	NA	0	Not Available
Implied Buy Quantity 5	Compressed	NA	0	Not Available
Best Offer Rate1	Compressed	-32766	2	Read next 2 bytes to get -32766 indicates end of Best offer [Not available]
Total Offer Qty1	Compressed	NA	0	Not Available

Offer at the price points1	Compressed	NA	0	Not Available
Implied Sell Quantity 1	Compressed	NA	0	Not Available

5.6.3 Example for full market picture packet reading

Field Name	Type	Action
Message Type	Long	Read 4 bytes
Reserved Field	Long	Read next 4 bytes
Reserved Field	Long	Read next 4 bytes
Reserved Field	unsigned short	Read next 2 bytes
Hour	Short	Read next 2 bytes
Minute	Short	Read next 2 bytes
Second	Short	Read next 2 bytes
Millisecond	Short	Read next 2 bytes
Reserved Field	Short	Read next 2 bytes
Reserved Field	Short	Read next 2 bytes
No of Records	Short	Read next 2 bytes
Following is a market picture structure appearing repeatedly (Max 5 times)		
Instrument Code	Long	Read next 4 bytes for message 2020 / 8 bytes for 2021
No of Trades	Long	Read next 4 bytes
Volume	Long	Read next 4 bytes
Value	Long	Read next 4 bytes
Trade Value Flag	Char	Read next 1 byte
Trend	Char	Read next 1 byte
Six Lakh Flag	Char	Read next 1 byte
Reserved Field	Char	Read next 1 byte
Market Type	Short	Read next 2 bytes
Session Number	Short	Read next 2 bytes
LTP Hour	Char	Read next 1 byte
LTP Minute	Char	Read next 1 byte
LTP Second	Char	Read next 1 byte
LTP Millisecond	Char[3]	Read next 3 bytes
Reserved Field	Char[2]	Read next 2 bytes
Reserved Field	Short	Read next 2 bytes
No of Price points	Short	Read next 2 bytes
Timestamp	Long Long	Read next 8 bytes
Close Rate	Long	Read next 4 bytes

Last Trade Qty	Long	Read next 4 bytes and save as Qty base
LTP	Long	Read next 4 bytes and save as Rate base
Open Rate	Long	Read next 2 bytes and apply compression logic with base as LTP
Previous Close Rate	Long	Read next 2 bytes and apply compression logic with base as LTP
High Rate	Long	Read next 2 bytes and apply compression logic with base as LTP
Low Rate	Long	Read next 2 bytes and apply compression logic with base as LTP
Reserved Field	Long	Read next 2 bytes and apply compression logic with base as LTP
Indicative Equilibrium Price	Long	Read next 2 bytes and apply compression logic with base as LTP
Indicative Equilibrium Qty	Long	Read next 2 bytes and apply compression logic with base as LTQ
Total Bid Qty	Long	Read next 2 bytes and apply compression logic with base as LTQ
Total Offer Qty	Long	Read next 2 bytes and apply compression logic with base as LTQ
Lower Circuit Limit	Long	Read next 2 bytes and apply compression logic with base as LTP
Upper Circuit Limit	Long	Read next 2 bytes and apply compression logic with base as LTP
Weighted Average	Long	Read next 2 bytes and apply compression logic with base as LTP
Following buy sub-structure will repeat number of times as specified in the “No. of Price points” field above or the buy sub structure will terminate if the value 32766 encountered.		
Best Bid Rate	Long	Read next 2 bytes and apply compression logic with base as LTP. For level 2 base is 1st level and so on
Total Bid Qty	Long	Read next 2 bytes and apply compression logic with base as LTQ. For level 2 base is 1st level and so on
No. of Bid at the price points	Long	Read next 2 bytes and apply compression logic with base as LTQ. For level 2 base is 1st level and so on
Implied Buy Price	Long	Read next 2 bytes and apply compression logic with base as LTQ. For level 2 base is 1st level and so on
Following sell sub-structure will repeat number of times as specified in the “No. of Price points” field above or the sell sub structure will terminate if the value -32766 encountered.		
Best Offer Rate	Long	Read next 2 bytes and apply compression logic with base as LTP. For level 2 base is 1st level and so on
Total Offer Qty	Long	Read next 2 bytes and apply compression logic with base as LTQ. For level 2 base is 1st level and so on
No. of Ask at the price point	Long	Read next 2 bytes and apply compression logic with base as LTQ. For level 2 base is 1st level and so on
Implied Sell Price	Long	Read next 2 bytes and apply compression logic with base as LTQ. For level 2 base is 1st level and so on

6 Appendix

6.1 Index Code Mapping Table

Index Code	Index Name	Description
1	SENSEX	BSE sensitive index
2	BSE100	BSE 100 scrips index
3	BSE200	BSE 200 scrips index
4	BSE500	BSE 500 scrips index
34	BSE IT	S&P BSE Information Technology
32	BSEFMC	S&P BSE Fast Moving Consumer Goods
7	BSE CG	BSE Capital Goods Index
8	BSE CD	BSE Consumer Durables index
33	BSE HC	S&P BSE Healthcare
10	BSE PSU	BSE Public Sector Unit Index
11	TECK	BSE Teck Index
12	BANKEX	BSE Bank Index
13	AUTO	BSE AUTO index
14	METAL	BSE METAL index
15	OILGAS	BSE OIL&GAS index
30	MIDCAP	S&P BSE MidCap
31	SMLCAP	S&P BSE SmallCap
18	DOL30	Dollex-30
19	DOL100	Dollex-100
20	DOL200	Dollex-200
21	REALTY	BSE Realty Index
22	POWER	BSE Power Index
23	BSEIPO	BSE IPO Index
25	GREENX	BSE GREENEX
26	CARBON	BSE CARBON
27	SMEIPO	BSE SME IPO
28	INFRA	S&P BSE India Infrastructure Index
29	CPSE	S&P BSE CPSE
35	MFG	S&P BSE MFG
36	ALLCAP	S&P BSE AllCap
37	BASMTR	S&P BSE Basic Matrl
38	CDGS	S&P BSE Cons Discr

39	ENERGY	S&P BSE Energy
40	FIN	S&P BSE Finance
41	INDSTR	S&P BSE Industrials
42	LRGCAP	S&P BSE LargeCap
43	MIDSEL	S&P BSE MidCap Sel
44	SMLSEL	S&P BSE SmallCapSel
45	TELCOM	S&P BSE Telecom
46	UTILS	S&P BSE Utilities

** The List above is not comprehensive list of all indices.

6.2 Product Identifier in Master Files

Following table gives the master file names and different fields in each file which provides information about the product ID.

Segment	File name	Field name and Position
Equity	SCRIP_ddmmyy.TXT	Name: Partition ID and Product ID Position :5
Equity Derivatives	EQD_COddmmyy.csv, EQD_SPD_COddmmyy.csv	Name: Product ID Position: 29
Currency Derivatives	BFX_COddmmyy.csv, BFX_SPD_COddmmyy.csv	Name: Product ID Position: 29
Commodities Derivatives	BCX_COddmmyy.csv	Name: Product ID Position: 29

6.3 Price Precision Table

Segment	Price Precision	Description
Equity	2 decimals	The value needs to be divided with 100.
Equity Derivatives	2 decimals	The value needs to be divided with 100.
Currency Derivatives	4 decimals	The value needs to be divided with 10000
Commodities Derivatives	2 decimals	The value needs to be divided with 100.

7 Change log

This document has been through the following iterations:

7.1 Changes compared to NFCAST with IML

This section is meant for application developers who are already using the NFCAST data via IML and want to know the incremental changes that needs to be done in their application to read Direct NFCAST. The section gives you details of changes and the section to refer in the document without going through the entire document.

Sr. No.	Description	NFCAST through IML	Direct NFCAST
1.	Reading Mode	In IML mostly the UDP is received by broadcast mode. The Receiver application reads data from socket in broadcast mode	In BSE Direct NFCAST mode the broadcast will be received in multicast mode. Thus, the change is required at receiving application end to read in multicast mode
2.	Packet Header	In broadcast via IML, every broadcast packet has a 8 bytes header consisting of: - 4 bytes for slot no. - 4 bytes for message length	In BSE Direct NFCAST mode, the member application should read 2000 bytes of data in each read call. The first 4 byte will always be the message type.
3.	Swapping	In broadcast via IML, the packet is read directly in little endian format.	In BSE Direct NFCAST mode, each packet needs to be swapped from big endian format to little endian format
4.	Compression	There is no decompression required by member application for any message	The member application needs to decompress the following messages only as per the decompression logic Specified in Decompression section - Market picture Message (2020, 2021, 2033).
`5.	Market Picture message [2021] (Applicable for Spread contracts in derivatives segment)	There was no market picture message [2021] defined in IML API however market picture message [2021] was sent from exchange to IML and IML application used to convert to market picture message to 2020 format and forward to member application. The scripcode field in message 2021	In BSE Direct NFCAST, the market picture 2020 and 2021 will be sent independently to member application. The member application has to read message 2021 with 8 bytes scripcode field. The member application can either convert the 8 bytes scripcode to 4 bytes as per mapping provided in contract

		is 8 bytes field and contains 17 digit contract tokens applicable for spread contracts. The IML application converts the 8 bytes scripcode to 4 bytes scripcode based on mapping provided in contract master file.	master file or it can continue to use the 8 bytes scripcode in their application
6.	Session Change Broadcast (2002) Product state change message	The session broadcast message is sent product wise from exchange to IML. The IML application however forwards only first 36 product wise messages.	There will not be any filters applied so member application will receive session broadcast messages for all the products. It can be in the range of 100 to 200 messages. Each product wise message can be considered as message for that product only ot it Can be treated at session change at market level with first product message as well (as it is done currently)
7.	Test Product Session change broadcast (2002)	Exchange host some test products and instruments for internal testing, and they are not published in master files. The session change broadcast message for these products are sent every day in the morning before the start of the normal market. Such messages are received by IML but are not forwarded to member application	The session broadcast for test products will also be sent to the member applications. The member application must ignore the session broadcast message for these test products The test products defined as of now are 11,149,150,829,830, 352 to 366.