



NSE - MARKET FEED (CM LEVEL - 2)

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Revision History

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Version 1.1	Correction in ST_COMP_BATCH_HEADER Point no 3.	November 30, 2012
Version 1.2	S&P is removed from the indices name Point no 10	February 12, 2013
Version 1.3	New Index addition "CPSE INDEX"	March 11, 2014
Version 1.4	New Index addition "NI15"	May 28, 2014
Version 1.5	Addition of 4 New Indices	September 30, 2014
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Version 1.7	Index Name Rebranding	September 29, 2015
Version 1.8	10 New Index Addition and Index Rename Change	March 08, 2016

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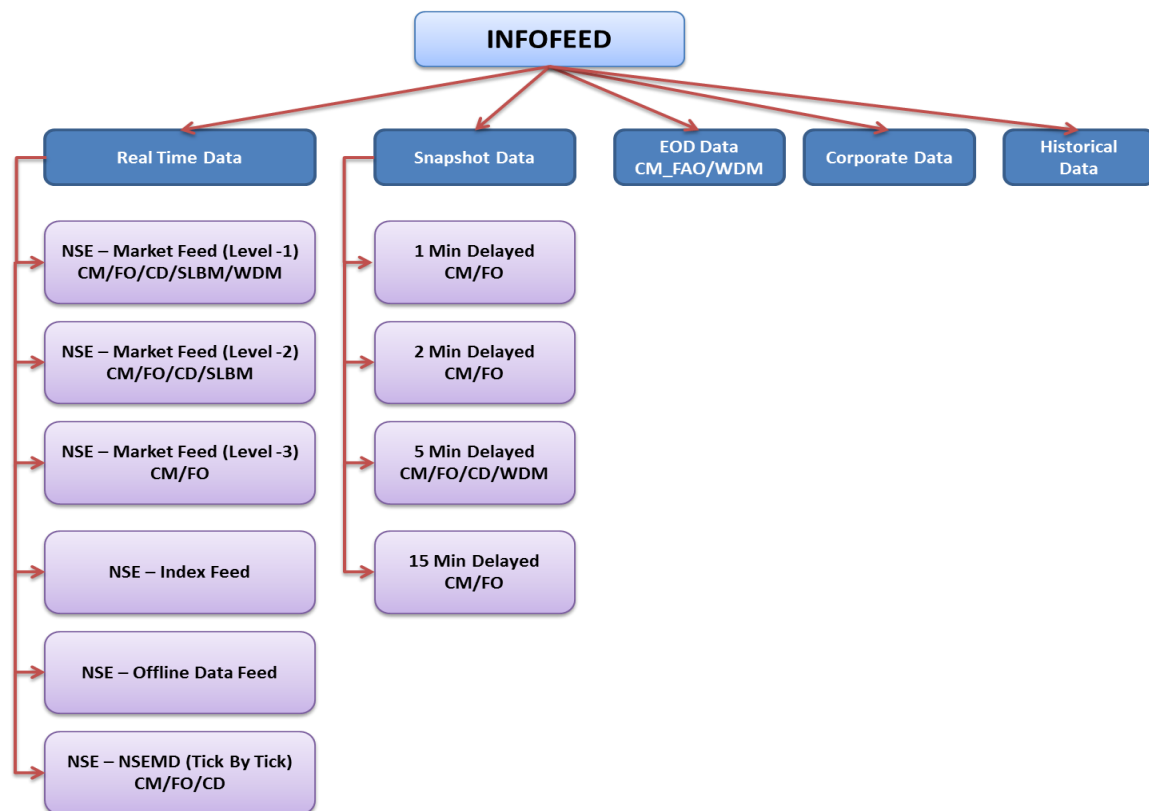
NSE – Market Feed (CM Level 2)

1. Introduction

DotEx International Ltd. disseminates NSEIL’s real time broadcast data to various information agencies. It provides the 5 different types of data products viz.

- A. Real Time Data
- B. Snapshot Data
- C. End of Day Data
- D. Corporate Data
- E. Historical Data

The real time data and corporate data is a packet broadcast available in TCP/IP format, whereas the snapshot data, end of day data and historical data is available in the form of files. All these data products come under in Infofeed application.



In Infofeed's Real Time Data product following sub-products are available

- a. NSE - Market Feed (CM/FO/CD/SLBM/WDM Level 1)
- b. NSE - Market Feed (CM/FO/CD/SLBM Level 2)
- c. NSE - Market Feed (CM/FO Level 3)
- d. NSE - Index Feed
- e. NSE - Offline Data Feed
- f. NSE - NSEMD (CM/FO/CD Tick By Tick)

This document explains about the NSE – Market Feed (CM Level 2) product. Through this product on real time basis all the NSE's market update information is disseminated.

The information agencies connect to the Market Feed Server through Leased Lines. These leased lines are terminated on Infofeed Router and their data specific pneumatic calls are forwarded to Infofeed server. The Infofeed server accepts these pneumatic calls and creates a socket connection. The TCP/IP data flows to the information agencies through these socket connections.

The feed consist of series of sequenced and unsequenced variable length compressed messages. The compression algorithm used over here is LZ0 – Compression.

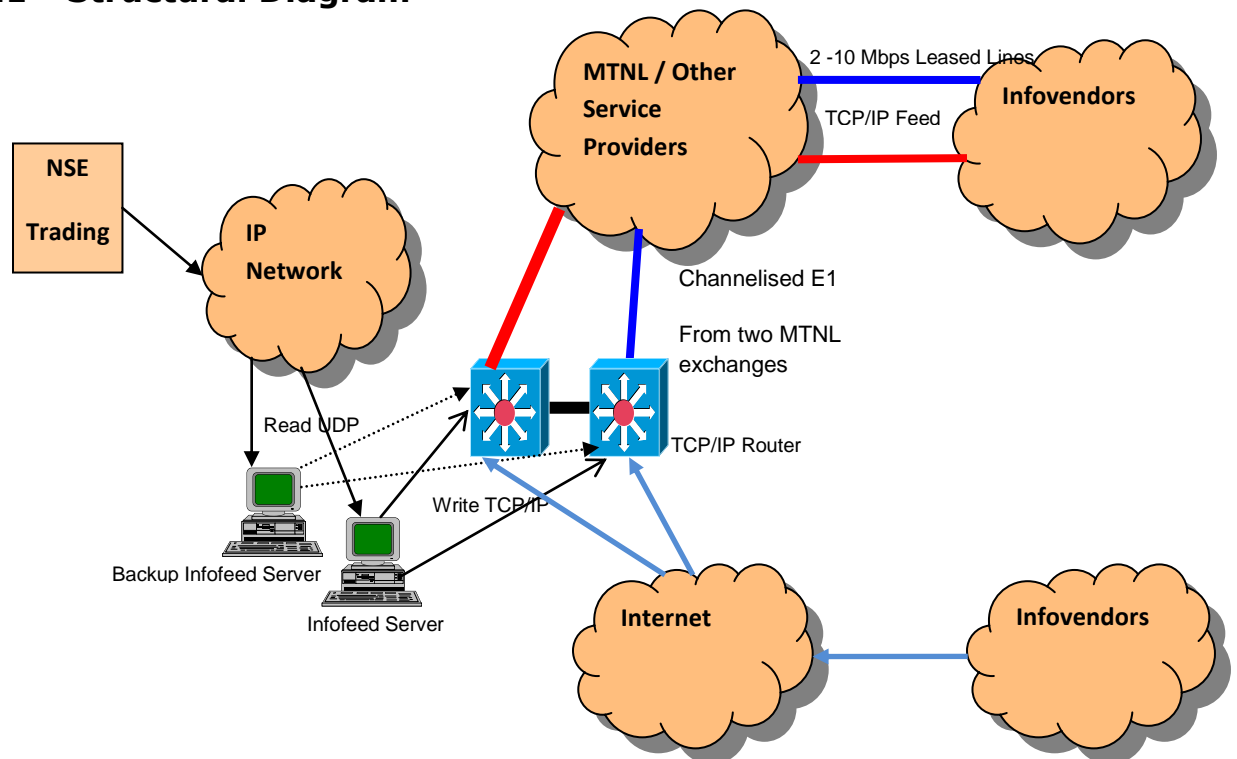
2. Session Initialization

NSE Market Feed is built on TCP/IP socket connection. This feed consists of sequenced and unsequenced messages. Unsequenced messages provides the login and connection related messages such as login and heartbeats messages. Unsequenced messages are not part of the data. The sequenced data contains the actual market data and are reliable and recoverable.

A session begins with client establishing a TCP connection and sending the login request packet. Once the login request received the server authenticate it and send the login response. If the login is successful server will begin to send the sequenced data, or reject the login and terminate the connection.

Data packet consist of sequence number as one field. The first sequenced message of the day will send the sequence number as 1 and after that it will be incremented by 1 for each sequenced message. Client can recover the missed out data from separate NSE Offline Data system.

2.1 Structural Diagram



2.2 Online Requirements

- a) A Router / Switch or a card with TCP/IP capabilities to connect to 2 Mbps transmission lines for receiving NSEIL's Real time information.
- b) The Information agency should develop applications that initiate TCP/IP calls through 2 Mbps Leased Line.
- c) Information agency can connect to the Infofeed servers through the internet also. For IP validation at application level, information agencies has to provide the public static IP from which they will connect to Infofeed servers. Connectivity through internet is available for some products only.

2.3 Data Types

Data types used in feed,

Data Type	Size In Bytes
CHAR	1
INT	4
LONG	4
DOUBLE	8

Byte order - Big Endean.

2.4 Acronyms Used

BOD	Begin Of Day Information
EOD	End Of Day Information
ONLINE	Information Sent During Market Timing
CM	Cash Market
F&O	Future & Options Market
CD	Currency Derivatives Market
SLBM	Securities Lending & Borrowing Market
WDM	Whole Sale & Debt Market

3. Packet Format

Server sends all the packets in following format

typedef struct

```
{
    CHAR        cCompOrNot
    SHORT       nDataSize;
    SHORT       iNoOfPackets;
}ST_COMP_BATCH_HEADER
```

typedef struct

```
{
    SHORT       iCode;
    SHORT       iLen;
    LONG        lSeqNo;
} ST_INFO_HEADER;
```

typedef struct

```
{
    .
    .
}ST_DATA_INFO;
```

typedef struct

```
{
    SHORT       iChecksum;
    CHAR        cEOT;
} ST_INFO_TRAILER;
```

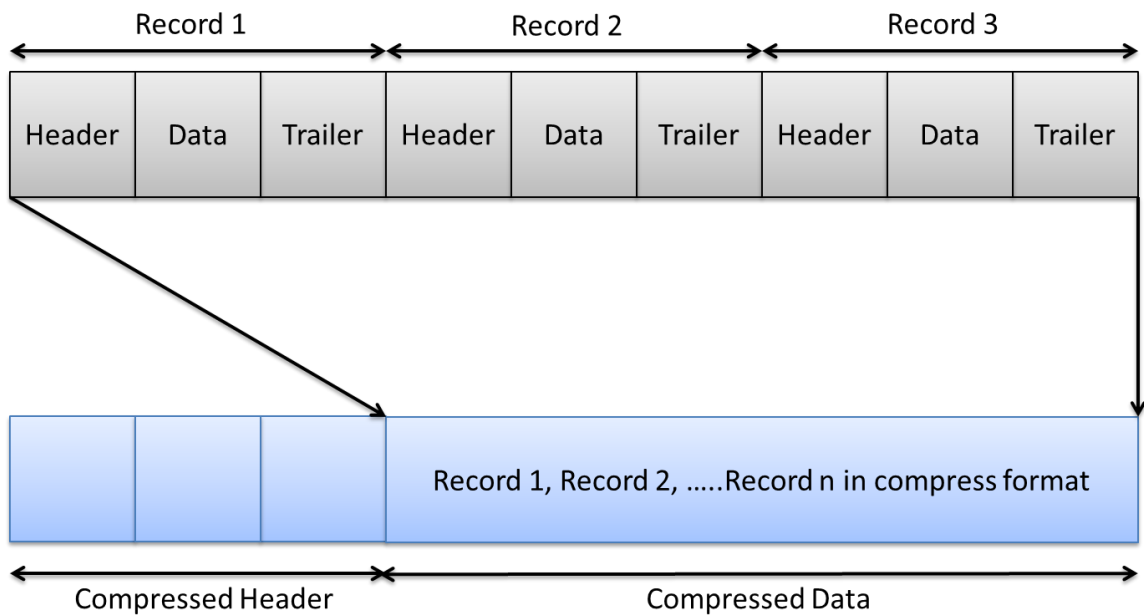
typedef struct

```
{
    ST_INFO_HEADER stInfoHdr;
    ST_DATA_INFO   stDataInfo;
    ST_INFO_TRAILER stInfoTrailer;
    .
}ST_DATA_PACKET
```

All the packets received from server consist of compress batch header. Compress batch header gives the information about the data packet compressed or not, number of packets in the following data packet and the

total size of data packet. Client needs to decompress the data packet using LZO decompression algorithm. After decompression each data packet consists of ST_INFO_HEADER, which has the iCode field to identify the type of the packet. Using iCode field, data info packet is mapped to the respective data packet.

3.1 Diagrammatic Representation of Packet Format:



Compressed Header

1. Compressed/ Uncompressed = 0 then compressed/ 1 uncompressed
2. Number of packets = Number of records in compressed data
3. Data Size = Compressed data size

As the data packets are sent in compressed format there is a need to decompress them. The compression algorithm used is LZO.

4. Session Messages

Session messages are not considered as market data messages. These messages provide the connection and login related messages such as login, and heartbeat messages.

4.1 Login Request (Sent by client)

Login request packet is sent by the client immediately after connecting to the server. This packet doesn't contain the compress batch header. If the client wants to change his default password then he needs to send "New Password" and "Confirm Password" in the request otherwise it should be kept blank. Password is case sensitive.

Field Name	Data Type	Value	Remark
INFO HEADER			
Code	SHORT	'CQ'	
Length	SHORT	Numeric	Size of (INFO HEADER + INFO DATA + INFO TRAILER)
Sequence Number	LONG	Numeric	0(Zero) for login request
INFO DATA			
User Id	CHAR[10]	Alphanumeric	Exchange provided user id (Null terminated)
Password	CHAR[8]	Alphanumeric	Password (Null terminated)
New Password	CHAR[8]	Alphanumeric	New password (Null terminated)
Confirm Password	CHAR[8]	Alphanumeric	Confirm password (Null terminated)
INFO TRAILER			
Check Sum	SHORT	Numeric	Refer point no. 7
End Of Trailer	CHAR	'\r'	Carriage Return

4.2 Login Response (Sent by server)

Login response packet will be sent by server after receiving the login request packet. This packet does contain the compress batch header.

This packet contains the error code from which the client can identify the status of the login.

Field Name	Data Type	Value	Remark
INFO HEADER			
Code	SHORT	'CR'	
Length	SHORT	Numeric	Size of (INFO HEADER + INFO DATA + INFO TRAILER)
Sequence Number	LONG	Numeric	0(Zero) for login response
INFO DATA			
Error Code	LONG		1000- Successful Login 1001- Password Update Successfully 1002- Wrong UserId- Password Combination 1003- Password is not valid in password change request. 1004- Login request is not correct. Error code other than above - Error in receiving logon response
Error Message	CHAR[50]	Character	Description about the error code
INFO TRAILER			
Check Sum	SHORT	Numeric	Refer point no. 7
End Of Trailer	CHAR	'\r'	Carriage Return

4.3 Heartbeat Message (Sent by server)

Heartbeat message will be sent every 2 second if data is not available.

Field Name	Data Type	Value	Remark
INFO HEADER			
Code	SHORT	'CH'	
Length	SHORT	Numeric	Size of (INFO HEADER + INFO DATA + INFO TRAILER)
Sequence Number	LONG	Numeric	0(Zero) for heart beat message
INFO DATA			
Not associated with any data			

INFO TRAILER			
Check Sum	SHORT	Numeric	Refer point no. 7. Check sum is not calculated sent as 0(Zero),
End Of Trailer	CHAR	'\r'	Carriage Return

5. Sequenced Data Message (Sent by server)

Sequenced data messages will be sent by server and will contain the actual market data. These messages are reliable and recoverable as sequence number is assigned for each data message. For recovery please refer the NSE- Offline Data Feed technical specifications

5.1 BOD - Master Information

These packets are sent at the beginning of the each trading day before market open. This feed contains the information about the securities valid in the CM Market for trading.

Field Name	Data Type	Value	Remark
INFO HEADER			
Code	SHORT	'CT'	
Length	SHORT	Numeric	Size of (INFO HEADER + INFO DATA + INFO TRAILER)
Sequence Number	LONG	Numeric	Application sequence number
INFO DATA			
Token Number	CHAR[10]	Character	Unique identifier for the securities listed on NSE.
Symbol	CHAR[10]	Character	Security symbol
Series	CHAR[2]	Character	Series
ISIN Number	CHAR[12]	Character	An International Securities Identification Number (ISIN) uniquely identifies a security.
Is Deleted	CHAR	Character	'Y' = Deleted 'N' = Not Deleted
Low Price Range	CHAR[10]	Character	Minimum price at which order can be placed without causing a price freeze
High Price range	CHAR[10]	Character	Maximum price at which order can be placed without

			causing a price freeze
Security Eligibility Per Market	ST_SECURITY_ELIGIBILITY_PER_MARKET[6]	Structure	Refer the table given below ST_SECURITY_ELIGIBILITY_PER_MARKET
INFO TRAILER			
Check Sum	SHORT	Numeric	Refer point no. 7.
End Of Trailer	CHAR	'\r'	Carriage Return

Field Name	Data Type	Value	Remark
ST_SECURITY_ELIGIBILITY_PER_MARKET			
Market Type	CHAR	Character	'N'=Normal 'S'=Spot 'O'=Odd Lot 'A'=Auction 'C'=Call Auction 'G'=Reserved Market
Eligibility	CHAR	Character	'1'=Allowed to trade '0'=Not allowed to trade
Security Status	CHAR	Character	'1'=Open '0'=Suspended

5.2 ONLINE - Market Status Message

This message is sent by the server, whenever the market status changes.

Field Name	Data Type	Value	Remark
INFO HEADER			
Code	SHORT	'PO' 'PC' 'CO' 'CC' 'CK' 'CL'	'PO' = Pre-open / Call Auction session start 'PC' = Pre-open / Call Auction session end 'CO' = Normal market open 'CC' = Normal market close 'CK' = Post close session start 'CL' = Post close session end

Length	SHORT	Numeric	Size of (INFO HEADER + INFO DATA + INFO TRAILER)
Sequence Number	LONG	Numeric	Application sequence number
INFO DATA			
Market Type	CHAR	Character	'N'-Normal 'S'- Spot 'O'- Odd Lot 'A'-Auction 'C' – Call Auction 'G' – Reserved Market
INFO TRAILER			
Check Sum	SHORT	Numeric	Refer point no. 7. Check sum is not calculated sent as 0(Zero),
End Of Trailer	CHAR	'\r'	Carriage Return

5.3 ONLINE - Indices Information

NSE-online indices information is sent through this message. For the list of the indices please refer the Annexure -1.

Field Name	Data Type	Value	Remark
INFO HEADER			
Code	SHORT	'CX'	
Length	SHORT	Numeric	Size of (INFO HEADER + INFO DATA + INFO TRAILER)
Sequence Number	LONG	Numeric	Application sequence number
INFO DATA			
Index Name	CHAR[17]	Character	Name of the Index
Current Index Value	CHAR[8]	Character	Current value of the Index. During pre-open session (i.e. between PO & PC msg with market type 'N') indicative index value is disseminated.
Open Index Value	CHAR[8]	Character	Current dates Opening

			value
Close Index Value	CHAR[8]	Character	Closing value of the Index. Before market close previous trading day's close value is sent.
High Index Value	CHAR[8]	Character	Current days high value of the index
Low Index Value	CHAR[8]	Character	Current days low value of the index
Percentage Change	CHAR[8]	Character	Percentage change in the index value
Yearly High Index Value	CHAR[8]	Character	Last 52 week high index value
Yearly Low Index Value	CHAR[8]	Character	Last 52 week low index value
INFO TRAILER			
Check Sum	SHORT	Numeric	Refer point no. 7.
End Of Trailer	CHAR	'\r'	Carriage Return

5.4 ONLINE - Normal Market Security Update Information

NSE securities update information for pre-open and normal market is sent through this Message.

Field Name	Data Type	Value	Remark
INFO HEADER			
Code	SHORT	'PN' 'CN'	PN = Pre-open session updates CN = Normal market updates
Length	SHORT	Numeric	Size of (INFO HEADER + INFO DATA + INFO TRAILER)
Sequence Number	LONG	Numeric	Application sequence number
INFO DATA			
Symbol	CHAR[10]	Character	Symbol of the security
Series	CHAR[2]	Character	Series
Market Type	CHAR	Character	'N' = Normal 'S' = Spot 'O' = Odd Lot 'A' = Auction

Time Stamp	CHAR[11]	Character	No of seconds from 01-01-1970 00:00:00 (DD-MM-YYYY HH:MM:SS)
Best Buy-Order price-1	CHAR[10]	Character	Best 5 buy sides outstanding orders price and quantity information In case of PN packets best 4 buy side outstanding orders price and quantity information is sent. In the 5 th price and quantity field buy side ATO orders information is sent.
Best Buy-Order Quantity-1	CHAR[12]	Character	
Best Buy-Order price-2	CHAR[10]	Character	
Best Buy-Order Quantity-2	CHAR[12]	Character	
Best Buy-Order price-3	CHAR[10]	Character	
Best Buy-Order Quantity-3	CHAR[12]	Character	
Best Buy-Order price-4	CHAR[10]	Character	
Best Buy-Order Quantity-4	CHAR[12]	Character	
Best Buy-Order price-5	CHAR[10]	Character	
Best Buy-Order Quantity-5	CHAR[12]	Character	
Best Sell-Order price-1	CHAR[10]	Character	
Best Sell-Order quantity-1	CHAR[12]	Character	
Best Sell-Order price-2	CHAR[10]	Character	
Best Sell-Order quantity-2	CHAR[12]	Character	
Best Sell-Order price-3	CHAR[10]	Character	
Best Sell-Order quantity-3	CHAR[12]	Character	
Best Sell-Order price-4	CHAR[10]	Character	
Best Sell-Order quantity-4	CHAR[12]	Character	
Best Sell-Order price-5	CHAR[10]	Character	
Best Sell-Order quantity-5	CHAR[12]	Character	

Last Traded Price(LTP)	CHAR[10]	Character	Price of the last trade happened on the security. If no trade has happened for the day then previous day's trade price is taken or the base price is taken.
Last Traded Quantity	CHAR[12]	Character	Quantity of the last trade happened on the security. If no trade has happened for the day then previous day's trade quantity is taken or zero is sent
Total Traded Quantity (TTQ)	CHAR[12]	Character	Volume traded today
Security Status	CHAR	Character	'S' = Suspended '` = Non-suspended
Opening Price	CHAR[10]	Character	In pre-open session the indicative open price is sent if security is available in pre-open session. Open price of the security for the day.
High Price	CHAR[10]	Character	High price of the security for the day
Low Price	CHAR[10]	Character	Low price of the security for the day
Close Price	CHAR[10]	Character	Close price of the security. During the day previous day's close price is sent. After market close current day's close price is calculated and sent through this field
Average Trade Price	CHAR[10]	Character	Weighted average

			price of the security. i.e. value / quantity
Total Buy Quantity	CHAR[12]	Character	Total quantity of the outstanding orders available on buy side
Total Sell Quantity	CHAR[12]	Character	Total quantity of the outstanding orders available on sell side
Total Turnover	CHAR[25]	Character	Security traded value i.e. Average Trade Price * TTQ
Online Index	CHAR[8]	Character	NIFTY 50 index value
INFO TRAILER			
Check Sum	SHORT	Numeric	Refer point no. 7.
End Of Trailer	CHAR	'\r'	Carriage Return

5.5 ONLINE - Call Auction Market Security Update Information

Two new market types Call Auction and Reserved (for future use) are introduced in the capital market trading system. These markets securities update information is sent through these messages.

Call Auction Market (Call Auction 1)

SME (Small & Medium Enterprise) securities call auction session is conducted in this market type. For detailed explanation please refer point number 8.4.

Reserved Market (Call Auction 2)

IPO, Relisting & illiquid securities call auction session is conducted in this market type. For detailed explanation please refer point number 8.5.

Field Name	Data Type	Value	Remark
INFO HEADER			
Code	SHORT	'SN'	
Length	SHORT	Numeric	Size of (INFO HEADER + INFO DATA + INFO TRAILER)
Sequence Number	LONG	Numeric	Application sequence number

INFO DATA			
Symbol	CHAR[10]	Character	Symbol of the security
Series	CHAR[2]	Character	Series
Market Type	CHAR	Character	'C' = Call Auction 'G' = Reserved Market
Time Stamp	CHAR[11]	Character	No of seconds from 01-01-1970 00:00:00 (DD-MM-YYYY HH:MM:SS)
Best Buy-Order price-1	CHAR[10]	Character	Best 5 buy side's outstanding orders price, quantity & BBMM flag information. For BBMM Flag refer point no 8.6 In case of Call Auction 1, best 4 buy side's outstanding orders price, quantity & BBMM flag information is sent. In the 5 th price, quantity and BBMM flag fields buy side's ATO orders information is sent. In case of Call auction 2 , best 5 buy side's outstanding orders information is sent
Best Buy-Order Quantity-1	CHAR[12]	Character	
Buy BBMM Flag-1	CHAR	Character	
Best Buy-Order price-2	CHAR[10]	Character	
Best Buy-Order Quantity-2	CHAR[12]	Character	
Buy BBMM Flag-2	CHAR	Character	
Best Buy-Order price-3	CHAR[10]	Character	
Best Buy-Order Quantity-3	CHAR[12]	Character	
Buy BBMM Flag-3	CHAR	Character	
Best Buy-Order price-4	CHAR[10]	Character	
Best Buy-Order Quantity-4	CHAR[12]	Character	
Buy BBMM Flag-4	CHAR	Character	
Best Buy-Order price-5	CHAR[10]	Character	
Best Buy-Order Quantity-5	CHAR[12]	Character	
Buy BBMM Flag-5	CHAR	Character	
Best Sell-Order price-1	CHAR[10]	Character	Best 5 sell side's outstanding orders price, quantity & BBMM flag information. For BBMM Flag refer point no 8.6
Best Sell-Order quantity-1	CHAR[12]	Character	
Sell BBMM Flag-1	CHAR	Character	
Best Sell-Order price-2	CHAR[10]	Character	
Best Sell-Order	CHAR[12]	Character	

quantity-2			In case of Call Auction 1, best 4 sell side's outstanding orders price, quantity & BBMM flag information is sent. In the 5 th price, quantity and BBMM flag fields sell side's ATO orders information is sent. In case of Call auction 2 , best 5 buy side's outstanding orders information is sent
Sell BBMM Flag-2	CHAR	Character	
Best Sell-Order price-3	CHAR[10]	Character	
Best Sell-Order quantity-3	CHAR[12]	Character	
Sell BBMM Flag-3	CHAR	Character	
Best Sell-Order price-4	CHAR[10]	Character	
Best Sell-Order quantity-4	CHAR[12]	Character	
Sell BBMM Flag-4	CHAR	Character	
Best Sell-Order price-5	CHAR[10]	Character	
Best Sell-Order quantity-5	CHAR[12]	Character	
Sell BBMM Flag-5	CHAR	Character	
Buy BBMM Order Exists	CHAR	Character	
Sell BBMM Order Exists	CHAR	Character	Refer point no 8.6
Last Traded Price(LTP)	CHAR[10]	Character	During order collection as well as during matching it contains LTP of the security
Last Traded Quantity	CHAR[12]	Character	During order collection as well as during matching, it contains the quantity at which the last trade took place in a security.
Total Traded Quantity (TTQ)	CHAR[12]	Character	This field contains the total quantity of a security traded on the current day
Indicative Traded Quantity	CHAR[12]	Character	During order collection period this field will contain Indicative Equilibrium Quantity
Security Status	CHAR	Character	'S' = Suspended ' ' = Non-suspended
Opening Price	CHAR[10]	Character	This field contains the

			indicative opening price (IOP) of a security for order collection period session and Final Open Price of a security in matching period.
High Price	CHAR[10]	Character	During order collection period it will always be zero. Once matching starts it will be updated.
Low Price	CHAR[10]	Character	During order collection period it will always be zero. Once matching starts it will be updated.
Close Price	CHAR[10]	Character	This field contains the closing price of a security.
Average Trade Price	CHAR[10]	Character	Weighted average price of the security. i.e. value / quantity During order collection period it will always be zero. Once matching starts it will contain the Average Trade Price.
First Open Price	CHAR[10]	Character	During first call auction order collection period this field will be zero. Once matching starts it will contain the First Trade Price. Once updated for all subsequent call auctions it will not change. This field may remain zero till the first trade

			happens
Total Buy Quantity	CHAR[12]	Character	This field contains the total quantity of buy orders in a security.
Total Sell Quantity	CHAR[12]	Character	This field contains the total quantity of sell orders in a security.
Total Turnover	CHAR[25]	Character	During order collection period it will always be zero. Once matching starts it will updated
INFO TRAILER			
Check Sum	SHORT	Numeric	Refer point no. 7.
End Of Trailer	CHAR	'\r'	Carriage Return

5.6 ONLINE - Broadcast Message

These packets consist of the messages broadcast during the Trading time containing information like changes in the price bands of particular script and market-related information.

Field Name	Data Type	Value	Remark
INFO HEADER			
Code	SHORT	'CB'	
Length	SHORT	Numeric	Size of (INFO HEADER + INFO DATA + INFO TRAILER) (Variable length depending upon Message Length field of INFO DATA structure)
Sequence Number	LONG	Numeric	Application sequence number
INFO DATA			
Message Code	CHAR[3]	Character	NSE / AUC
Message Length	CHAR[3]	Character	Broadcast Message Length
Message String	CHAR [Message Length]	Character	Broadcast Message
INFO TRAILER			
Check Sum	SHORT	Numeric	Refer point no. 7.

End Of Trailer	CHAR	'\r'	Carriage Return
----------------	------	------	-----------------

5.7 EOD – Master Addition/Modification/Deletion

This packet consists of information about addition, modification or deletion any of the securities. After market close this information is disseminated to client as the "End of Day" (EOD) feed.

Field Name	Data Type	Value	Remark
INFO HEADER			
Code	SHORT	'CA' 'CM' 'CD'	CA = Security added CM = Security modified CD = Security deleted
Length	SHORT	Numeric	Size of (INFO HEADER + INFO DATA + INFO TRAILER) (Variable length depending upon Message Length field of INFO DATA structure)
Sequence Number	LONG	Numeric	Application sequence number
INFO DATA			
Symbol	CHAR[10]	Character	Security symbol
Series	CHAR[2]	Character	Series
Security Description	CHAR[30]	Character	Security Name
Regular Lot	CHAR[5]	Character	Regular Lot
Market Type	CHAR	Character	'N'=Normal 'S'= Spot 'O'=Odd Lot 'A'=Auction 'C'=Call Auction 'G'=Reserved Market
Tick Size	CHAR[6]	Character	Security tick size
Face Value	CHAR[9]	Character	Security face value
Issue Capital	CHAR[12]	Character	Security issued capital
Market Index Participation	CHAR[1]	Character	'Y'= Yes 'N'= No
Last Update Date & Time	CHAR[20]	Character	Format: DD-MON-YYYY HH:MM:SS
INFO TRAILER			
Check Sum	SHORT	Numeric	Refer point no. 7.
End Of Trailer	CHAR	'\r'	Carriage Return

5.8 EOD – Market Status

The end of day status of the securities is sent through these messages. After market close this information is disseminated to client as the “End of Day” (EOD) feed.

Field Name	Data Type	Value	Remark
INFO HEADER			
Code	SHORT	`CS`	
Length	SHORT	Numeric	Size of (INFO HEADER + INFO DATA + INFO TRAILER) (Variable length depending upon Message Length field of INFO DATA structure)
Sequence Number	LONG	Numeric	Application sequence number
INFO DATA			
Symbol	CHAR[10]	Character	Security symbol
Series	CHAR[2]	Character	Series
Market Type	CHAR	Character	`N`=Normal `S`= Spot `O`=Odd Lot `A`=Auction `C`=Call Auction `G`=Reserved Market
Trade High Price	CHAR[10]	Character	Security high price for the day
Trade Low Price	CHAR[10]	Character	Security low price for the day
Opening Price	CHAR[10]	Character	Security open price for the day
Closing Price	CHAR[10]	Character	Security close price for the day
Last Traded Price	CHAR[10]	Character	Security last traded price for the day
Previous Close Price	CHAR[10]	Character	Security previous day's close price
Total Traded Quantity	CHAR[12]	Character	Volume traded today for the security
Total Traded Value	CHAR[25]	Character	Total traded value for the security

INFO TRAILER			
Check Sum	SHORT	Numeric	Refer point no. 7.
End Of Trailer	CHAR	'\r'	Carriage Return

5.9 EOD – Index Information

After market close this information is disseminated to client as the “End of Day” (EOD) feed.

Field Name	Data Type	Value	Remark
INFO HEADER			
Code	SHORT	'CI'	
Length	SHORT	Numeric	Size of (INFO HEADER + INFO DATA + INFO TRAILER)
Sequence Number	LONG	Numeric	Application sequence number
INFO DATA			
Date	CHAR[11]		Format: DD-MON-YYYY
Index Name	CHAR[17]	Character	Name of the Index
Opening Index Value	CHAR[8]	Character	Current day's Opening value of the index
Closing Index Value	CHAR[8]	Character	Current day's Closing value of the index.
High Index Value	CHAR[8]	Character	Current day's high value of the index
Low Index Value	CHAR[8]	Character	Current day's low value of the index
Previous Closing Index	CHAR[8]	Character	Previous day's closing value of the index
INFO TRAILER			
Check Sum	SHORT	Numeric	Refer point no. 7.
End Of Trailer	CHAR	'\r'	Carriage Return

5.10 EOD – Corporate Action Update

After market close this information is disseminated to client as the “End of Day” (EOD) feed.

Field Name	Data Type	Value	Remark
INFO HEADER			

Code	SHORT	'CU'	
Length	SHORT	Numeric	Size of (INFO HEADER + INFO DATA + INFO TRAILER) (Variable length depending upon Message Length field of INFO DATA structure)
Sequence Number	LONG	Numeric	Application sequence number
INFO DATA			
Symbol	CHAR[10]	Character	Security symbol
Series	CHAR[2]	Character	Series
Instrument Type	CHAR		'0'-Equities '1'- Preference Shares '2' - Debentures '3' - Warrants '4' - Miscellaneous '5'- Others
Issue Capital	CHAR[12]	Character	Security Issue Capital
Face Value	CHAR[9]	Character	Security Face value
Market Lot	CHAR[5]	Character	Security market lot
Dividend/Interest Rate	CHAR[6]	Character	Dividend/Interest Rate
Record Date	CHAR[10]	Character	Format: YYYY-MM-DD
Book Closure Start Date	CHAR[10]	Character	Format: YYYY-MM-DD
Book Closure End Date	CHAR[10]	Character	Format: YYYY-MM-DD
Ex-Date	CHAR[10]	Character	Format: YYYY-MM-DD
No Delivery Start Date	CHAR[10]	Character	Format: YYYY-MM-DD
No Delivery End Date	CHAR[10]	Character	Format: YYYY-MM-DD
Dividend	CHAR	Character	'D' or Blank
Rights Flag	CHAR	Character	'R' or Blank
Bonus Flag	CHAR	Character	'B' or Blank
Interest Flag	CHAR	Character	'I' or Blank
AGM Flag	CHAR	Character	'A' or Blank

EGM Flag	CHAR	Character	'E' or Blank
Others Flag	CHAR	Character	'O' or Blank
Corp Data Type	CHAR	Character	'B' =Book Closure 'R'=Record Date, 'N'=None
Corp Action Description	CHAR[25]	Character	Corp Action Description
INFO TRAILER			
Check Sum	SHORT	Numeric	Refer point no. 7.
End Of Trailer	CHAR	'\r'	Carriage Return

5.11 BOD & EOD Check Sum Information

This message gives the information about the number of messages (i.e. count) sent for each BOD & EOD message. This message will be sent multiple times in a day. (i.e. After complete dissemination of any BOD/EOD messages this message will be sent sent.)

Field Name	Data Type	Value	Remark
INFO HEADER			
Code	SHORT	'CZ'	
Length	SHORT	Numeric	Size of (INFO HEADER + INFO DATA + INFO TRAILER) (Variable length depending upon Message Length field of INFO DATA structure)
Sequence Number	LONG	Numeric	Application sequence number
INFO DATA			
Data Code	SHORT	CT/CA/CM/CD/CI/CS/CU	Message code for which the count is sent
Messages Count	CHAR[10]	Character	Message count for the Data Code.
INFO TRAILER			
Check Sum	SHORT	Numeric	Refer point no. 7. Check sum is not calculated sent as 0(Zero),
End Of Trailer	CHAR	'\r'	Carriage Return

5.12 EOD – End Of Feed Information

This end of the packet indicates that all the parts of EOD feed have been completed. Only once this message is sent through the Feed. After receiving this message clients can stop their application i.e. no new update information will be disseminated from the server.

Field Name	Data Type	Value	Remark
INFO HEADER			
Code	SHORT	'CE'	
Length	SHORT	Numeric	Size of (INFO HEADER + INFO DATA + INFO TRAILER) (Variable length depending upon Message Length field of INFO DATA structure)
Sequence Number	LONG	Numeric	Application sequence number
INFO DATA			
Not associated with any data			
INFO TRAILER			
Check Sum	SHORT	Numeric	Refer point no. 7. Check sum is not calculated sent as 0(Zero),
End Of Trailer	CHAR	'\r'	Carriage Return

6. Steps for Decompressing the Data Packets

6.1 LZO Algorithm Details

LZO is a data compression library which is suitable for data de-/compression in real-time. This means it favors speed over compression ratio.

LZO is written in ANSI C. Both the source code and the compressed data format are designed to be portable across platforms.

LZO implements a number of algorithms with the following feature

- Decompression is simple and *very* fast.
- Requires no memory for decompression.
- Requires 64 KB of memory for compression.
- Allows you to dial up extra compression at a speed cost in the compressor.
- The speed of the decompression is not reduced.
- Includes compression levels for generating pre-compressed data which achieve a quite competitive compression ratio.
- There is also a compression level which needs only 8 KB for Compression.
- Algorithm is thread safe.
- Algorithm is lossless.
- LZO supports overlapping compression and in-place decompression.

6.2 Files required for LZO algorithm.

- Include files, source files (src) provided by LZO
- LZO.lib
- LZO library version used is 1.0.7

6.3 Decompression steps

Receive the packet in the temporary buffer i.e. array of characters.

The first field is compressed or not compresses?

The second field is the number of packet in the following data packet.

The third field is data packet length.

Use the following function of LZO to Decompress.

```
r = lzo1z_decompress ((lzo_byte*)cInputBuf, ipLength, (lzo_byte*)cOutputBuf, (lzo_uint*)&opLength, NULL);
```

lzo1z_decompress: Function which decompresses the data packet received

cInputBuf: Input buffer in which compressed data is received

ipLength: The length of the packet which application has received using Receive ().

cOutputBuf: The uncompressed output data which is result of decompression.

opLength: Length of uncompressed data
After decompression data will be available in Output Buffer.

Each output data packet contains the INFO HEADER, after mapping the output decompressed buffer to INFO HEADER find out the data packet and the according to it map the output buffer to respective data packet.

Algorithm:

```

ST_NIFO_HEADER    *pstInfoHeader;
for (i=0; i < iNoOfPackets; i++) // iNoOfPackets received in
                                // compressed data header
{
    pstInfoHeader = (ST_NIFO_HEADER *) cOutputBuf
    switch (pstInfoHeader->iCode)
    {
        case CX: //Indices Information
        {
            ST_INDEX_DATA *stIndexData = (ST_INDEX_DATA *)cOutputBuf;
            .
            .
            cOutputBuf = cOutputBuf + sizeof(ST_INDEX_DATA);
            break;
        }
    }
}

```


7. Checksum Calculation Algorithm

The Checksum routine followed for Info Vendor Feed is as follows:

// Following are the defines for checksum calculation

```

#define DC1      17
#define DC3      19
#define CR       13
#define LF       10
#define POLY    0x1021
// End of defines
unsigned check_sum (cData, iLength)
char *cData ;
int iLength;
{
    unsigned uAccum = 0;
    unsigned uData;
    unsigned char ucChk[2];
    int i,j;
    for (i=0;i<iLength;i++)
    {
        uData = *(cData+i);
        uData <= 8;
        for(j=8; j>0 ;j--){
            if((uData^uAccum)&0x8000)
                uAccum=(uAccum<<1)^POLY;
            /* SHIFT AND SUBTRACT POLY */
            else
                uAccum<<=1;
            uData<<=1;
        }
    }

    ucChk[0] = uAccum>>8;
    if (ucChk[0] == DC1 || ucChk[0] == DC3 || ucChk[0] == CR || ucChk[0] == LF )
        ucChk[0] -= 1;
    ucChk[1] = uAccum&0xFF;
    if (ucChk[1] == DC1 || ucChk[1] == DC3 || ucChk[1] == CR || ucChk[1] == LF )
        ucChk[1] -= 1;
    uAccum = ucChk[1];
    uAccum = (uAccum<<8) + ucChk[0];

    return(uAccum);
}

```

8. Notes

8.1 Normal Market Session

All orders which are of regular lot size or multiples thereof are traded in the Normal Market. Normal market consists of various book types wherein orders are segregated as Regular lot orders, Special Term orders, Negotiated Trade Orders and Stop Loss orders depending on their order attributes.

8.2 Auction Market Session

In the Auction Market, auctions are initiated by the Exchange on behalf of trading members for settlement related reasons. There are 3 participants in this market.

- Initiator - the party who initiates the auction process is called an initiator
- Competitor - the party who enters orders on the same side as of the initiator
- Solicitor - the party who enters orders on the opposite side as of the initiator

In the auction market the Open price and the Last Traded Price would be zero till the auction ends and the auction price is calculated by the system. Since Auction in any particular scrip is done at a fixed price the High Price, Low Price, Closing Price and Index values is zero for all scrips traded in the Auction Market.

8.3 Pre-Open Session

Pre-open session will be conducted for the Normal Market segment. The session will be conducted before the normal market start time. Exchange may decide to allow all or selective securities in pre-open session. During Pre-open session, only order entry, orders modification and order cancellation will be allowed. Once pre-open session ends, no order activity will be allowed and final open price (i.e. equilibrium price based on accumulated buy and sell orders) will be computed. Pre-open orders will be matched at this final open price resulting into trade execution. Pre-open orders that could not participate in the pre-open matching for the reasons such as demand-supply gap, order price worse than the equilibrium price etc. shall be carried forward to the normal market. The time priority of such orders shall be retained.

In the above context NSE – Market Feed (Level 2) product sends messages in following sequence

1. Pre-open session start (PO) – market type 'N'

2. Index Information (CX) – Indicative open index value in Current Index value
3. Security Update Information (PN) – Indicative open price in open price field
4. Pre-open session end (PC) - market type 'N'
5. Index Information (CX) – Derived final open price updated in open price field and current index value
6. Security Update Information (PN) – Derived final open price in open price field and current security information
7. Normal Market open (CO) - market type 'N'
8. Index Information (CX) – With current index information
9. Security Update Information (CN) – With current security
10. Normal Market Close (CC) - market type 'N'

8.4 Call Auction Session 1

SME (small and medium enterprises) securities call auction is done through this session. It is similar to the pre-open session. Multiple sessions of this can be held in a trading day. Market type for this session is 'C'

In the above context NSE – Market Feed (Level 2) product sends messages in following sequence in one call auction session.

1. Pre-open session start (PO) – market type 'C'
2. Call Auction Security Update Information (SN) – Indicative open price in open price field
3. Pre-open session end (PC) - market type 'C'
4. Security Update Information (SN) – Derived final open price in open price field and current security information

8.5 Call Auction Session 2

IPO, Relisting and illiquid securities call auction is done through this session. It is similar to the pre-open session. Multiple sessions of this can be held in a trading day. Market type for this session is 'G'. IPO/Relisted securities get transferred to normal market session after deriving the open.

In the above context NSE – Market Feed (Level 2) product sends messages in following sequence in one call auction session.

1. Pre-open session start (PO) – market type 'G'
2. Call Auction Security Update Information (SN) – Indicative open price in open price field
3. Pre-open session end (PC) - market type 'G'

4. Security Update Information (SN) – Derived final open price in open price field and current security information

8.6 Market Maker & Buy Back Flag (MMBB Flag)

In call auction session 1 & 2 the buy back and market maker orders are allowed. To identify the buy back or market maker orders BBMM flag is sent in the SN messages. For the probable values of BBMM flag refer the table given below

1. BuyBBMMOrderExists : Buy Back or Market Maker order exist at buy side but not in top five price points.
2. SellBBMMOrderExists : Buy Back or Market Maker order exist at sell side but not in top five price points.
3. Sell BBMM Flag : Buy Back or Market Maker order at that price point.
4. Buy BBMM Flag : Buy Back or Market Maker order at that price point.

Buy Back Order Exists	Market Maker Order Exists	BuyBBMMOrderExists/ SellBBMMOrderExists/ Sell BBMM Flag/ Buy BBMM Flag
No	No	'0'
Yes	No	'1'
No	Yes	'2'
Yes	Yes	'3'

E.g. If Buy Back and Market Maker orders exist at particular price point then the above fields will contain '3'.

9. Support Information

Name	Email	Contact Number
DOTEX Business	dotex@nse.co.in	91-22-26598385
Technical Support	infofeed_support@nse.co.in.	-

10. Annexure 1

List of indices available in ONLINE - Indices Information messages

Sr. No.	Index Name
1	NIFTY 50
2	NIFTY IT
3	NIFTY NEXT 50
4	NIFTY BANK
5	NIFTY MID100 FREE
6	NIFTY 500
7	NIFTY 100
8	NIFTY MIDCAP 50
9	NIFTY REALTY
10	NIFTY INFRA
11	INDIA VIX
12	NIFTY ENERGY
13	NIFTY FMCG,
14	NIFTY MNC
15	NIFTY PHARMA
16	NIFTY PSE
17	NIFTY PSU BANK
18	NIFTY SERV SECTOR
19	NIFTY AUTO
20	NIFTY MEDIA
21	NIFTY METAL
22	NIFTY SML100 FREE
23	NIFTY 200
24	NIFTY DIV OPPS 50
25	NIFTY COMMODITIES
26	NIFTY CONSUMPTION
27	NIFTY FIN SERVICE
28	NIFTY50 DIV POINT
29	NIFTY100 LIQ 15
30	NIFTY CPSE
31	NIFTY GROWSECT 15
32	NIFTY50 TR 2X LEV
33	NIFTY50 PR 2X LEV
34	NIFTY50 TR 1X INV
35	NIFTY50 PR 1X INV
36	NIFTY50 VALUE 20
37	NIFTY QUALITY 30

38	NIFTY MID LIQ 15
39	NIFTY PVT BANK
40	NIFTY GS 8 13YR
41	NIFTY GS 10YR
42	NIFTY GS 10YR CLN
43	NIFTY GS 4 8YR
44	NIFTY GS 11 15YR
45	NIFTY GS 15YRPLUS
46	NIFTY GS COMPOSITE