NSE - MARKET FEED (FO LEVEL - 2)

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Revision History

Name	Description	Date
Version 1.0	New Specification Issued	February 12, 2013
Version 1.1	Correction in FS message structure	April 25, 2013

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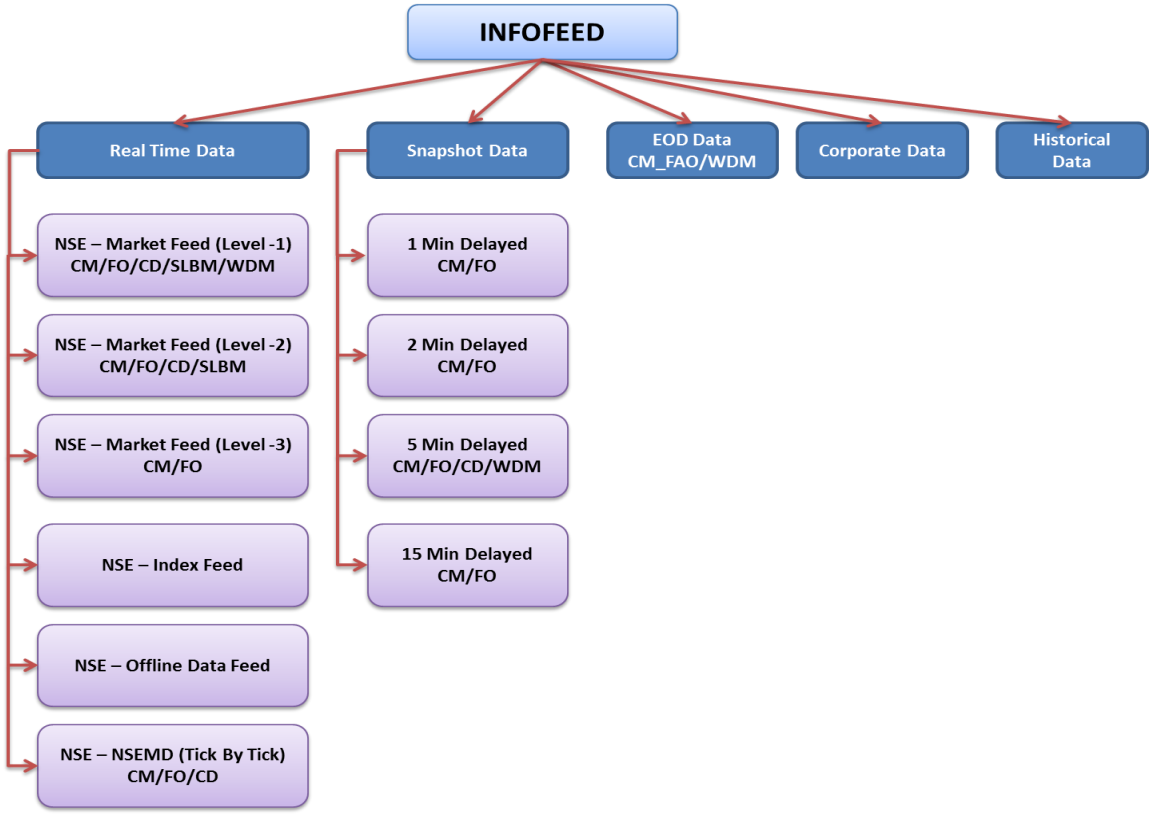
NSE – Market Feed (FO Level 2)

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 (FO 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 pneumonic calls are forwarded to Infofeed server. The Infofeed server accepts these pneumonic 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 LZO – Compression.

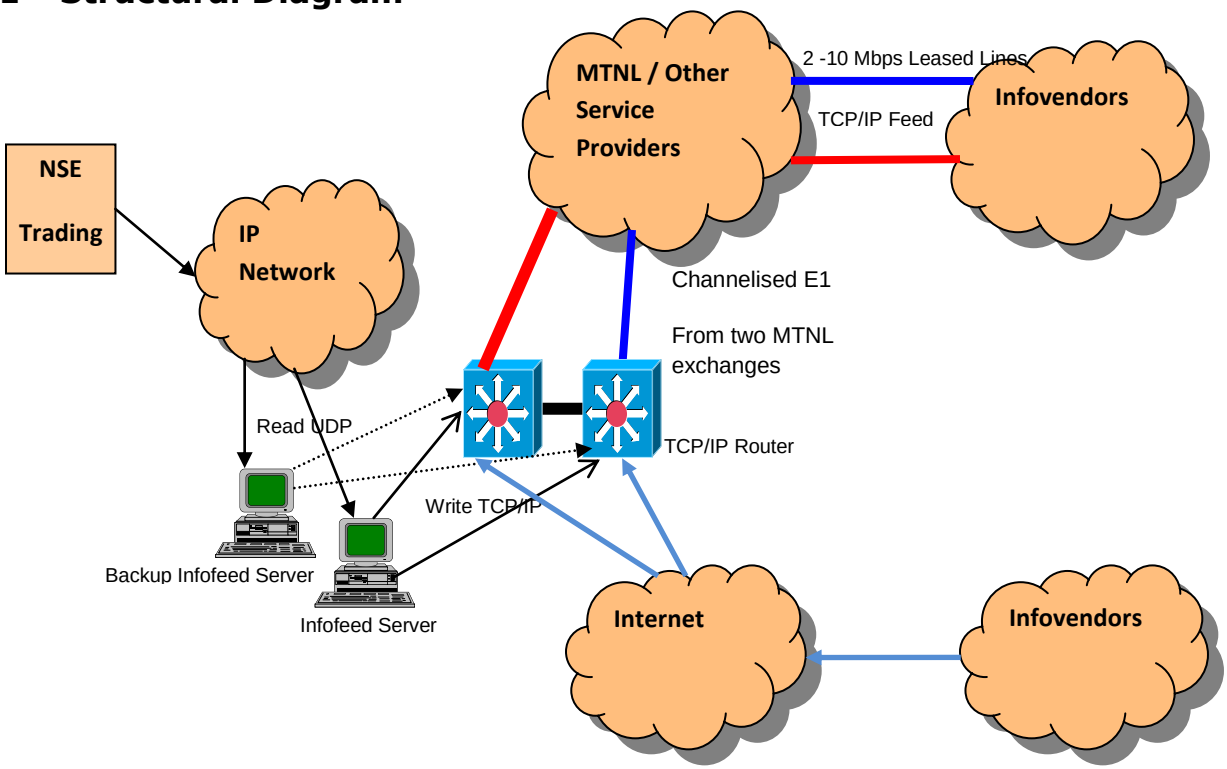
2. Session Initialization

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

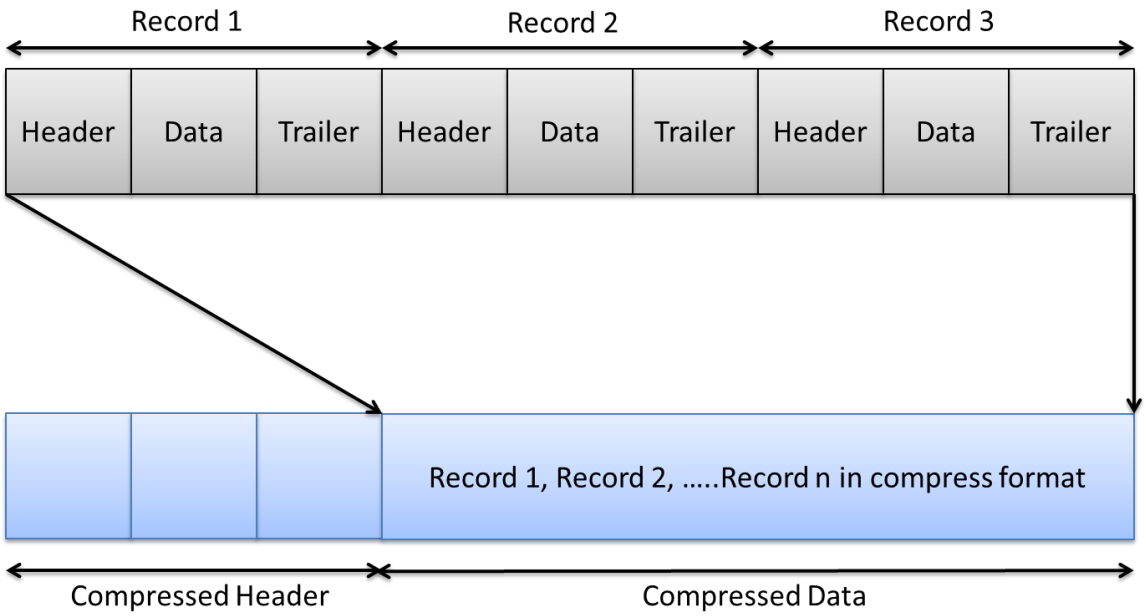
Server sends all the packets in following format

```
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	'FQ'	
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	'FR'	
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	'FH'	
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 contracts valid in the FO Market for trading.

Field Name	Data Type	Value	Remark
INFO HEADER			
Code	SHORT	'FT'	
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 contracts listed on NSE.
Instrument Type	CHAR[6]	Character	Instrument Type
Symbol	CHAR[10]	Character	Security Symbol
Expiry Date	CHAR[11]	Character	Expiry Date
Strike Price	CHAR[10]	Character	Strike Price
Option Type	CHAR[2]	Character	Option Type
Category	CHAR	Character	'1' = Regular Market Hours '2' = Extended Market Hours
Delete Flag	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
Contract Eligibility Per Market	ST_CONTRACT_ELIGIBILITY_PER_MARKET[4]	Structure	Refer the table given below ST_CONTRACT_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_CONTRACT_ELIGIBILITY_PER_MARKET			
Market Type	CHAR	Character	'N'=Normal
Eligibility	CHAR	Character	'1'=Allowed to trade '0'=Not allowed to trade
Contract 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	'FO' 'FC'	'FO' = Normal market open 'FC' = Normal market close
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 'X'=Extended
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 - Open Interest Information

This packet is sent during the trading hours and it indicates the Open Interest of the various contracts traded.

Field Name	Data Type	Value	Remark
INFO HEADER			
Code	SHORT	'FI'	
Length	SHORT	Numeric	Size of (INFO HEADER + INFO DATA + INFO TRAILER)
Sequence Number	LONG	Numeric	Application sequence number
INFO DATA			
Instrument Type	CHAR[6]	Character	Instrument Type
Symbol	CHAR[10]	Character	Symbol of the security
Expiry Date	CHAR[11]	Character	Expiry Date
Strike Price	CHAR[10]	Character	Strike Price
Option Type	CHAR[2]	Character	Option Type
Open Interest	CHAR[10]	Character	Open Interest of the contract
Market Type	CHAR	Character	'N' =Normal
Time Stamp	CHAR[11]	Character	No of seconds from 01-01-1970 00:00:00 (DD-MM-YYYY HH:MM:SS)
INFO TRAILER			
Check Sum	SHORT	Numeric	Refer point no. 7.
End Of Trailer	CHAR	'\r'	Carriage Return

5.4 ONLINE - Normal Market Contract Update Information

NSE contract update information for normal market is sent through this Message.

Field Name	Data Type	Value	Remark
INFO HEADER			
Code	SHORT	'FN'	FN = Normal market updates
Length	SHORT	Numeric	Size of (INFO HEADER + INFO DATA + INFO

			TRAILER)
Sequence Number	LONG	Numeric	Application sequence number
INFO DATA			
Instrument Type	CHAR[6]	Character	Instrument Type
Symbol	CHAR[10]	Character	Symbol of the security
Expiry Date	CHAR[11]	Character	Expiry Date
Strike Price	CHAR[10]	Character	Strike Price
Option Type	CHAR[2]	Character	Option Type
Market Type	CHAR	Character	'N' =Normal
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
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 5 sell sides outstanding orders price and quantity information
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 contract. If no trade has happened for the day then previous day's trade price is taken or the base price is taken.
Total Traded Quantity (TTQ)	CHAR[12]	Character	Volume traded today
Security Status	CHAR	Character	'S' = Suspended ' ' = Non-suspended
Opening Price	CHAR[10]	Character	Open price of the contract for the day.
High Price	CHAR[10]	Character	High price of the contract for the day
Low Price	CHAR[10]	Character	Low price of the contract for the day
Close Price	CHAR[10]	Character	Close price of the contract. 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 contract. 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	Contract traded value i.e. Average Trade Price * TTQ
INFO TRAILER			
Check Sum	SHORT	Numeric	Refer point no. 7.
End Of Trailer	CHAR	'\r'	Carriage Return

5.5 ONLINE – Spread Contract Update Information

NSE spread contract update information is sent through this Message.

Field Name	Data Type	Value	Remark
INFO HEADER			
Code	SHORT	'FP'	
Length	SHORT	Numeric	Size of (INFO HEADER + INFO DATA + INFO TRAILER)
Sequence Number	LONG	Numeric	Application sequence number
INFO DATA			
Instrument Type_1	CHAR[6]	Character	Instrument Type
Symbol_1	CHAR[10]	Character	Symbol of the security
Expiry Date_1	CHAR[11]	Character	Expiry Date
Strike Price_1	CHAR[10]	Character	Strike Price
Option Type_1	CHAR[2]	Character	Option Type
Instrument Type_2	CHAR[6]	Character	Instrument Type
Symbol_2	CHAR[10]	Character	Symbol of the security
Expiry Date_2	CHAR[11]	Character	Expiry Date
Strike Price_2	CHAR[10]	Character	Strike Price
Option Type_2	CHAR[2]	Character	Option Type
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 information
Best Buy-Order Quantity-1	CHAR[12]	Character	
Best Buy-Order	CHAR[10]	Character	

price-2			
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 5 sell side's outstanding orders price & quantity information
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 Difference (LTP)	CHAR[10]	Character	This field will contain price difference of the latest spread-spread trade.
Total Traded Quantity (TTQ)	CHAR[12]	Character	This field contains the total quantity of a contracts traded on the current day

Opening Price Difference	CHAR[10]	Character	This field will contain price difference of the first spread-spread trade of the day.
Day High Price Difference	CHAR[10]	Character	This field will contain maximum of the price difference of spread-spread trades during the day.
Day Low Price Difference	CHAR[10]	Character	This field will contain minimum of the price difference of spread-spread trades during the day.
Total Buy Quantity	CHAR[12]	Character	This field contains the total quantity of buy orders in a contract.
Total Sell Quantity	CHAR[12]	Character	This field contains the total quantity of sell orders in a contract.
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	'FB'	
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 added, deleted & regular contracts. 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	'FA' 'FM' 'FD'	FA = Contract added FM = Regular Contract FD = Contract 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			
Instrument	CHAR[6]	Character	Instrument Type
Symbol	CHAR[10]	Character	Security symbol
Expiry Date	CHAR[11]	Character	Expiry Date
Strike Price	CHAR[10]	Character	Strike Price
Option Type	CHAR[2]	Character	Option Type
Contract Description	CHAR[30]	Character	Contract Name
Regular Lot	CHAR[5]	Character	Regular Lot
Market Type	CHAR	Character	'N'=Normal
Tick Size	CHAR[6]	Character	Security tick size
Maturity Date	CHAR[11]	Character	Contract Maturity Date (DD-MON-YYYY)
Last Update Date &	CHAR[20]	Character	Format: DD-MON-YYYY HH:MM:SS

Time			
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 contracts 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	'FS'	
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			
Instrument	CHAR[6]	Character	Instrument Type
Symbol	CHAR[10]	Character	Security symbol
Expiry Date	CHAR[11]	Character	Expiry Date
Strike Price	CHAR[10]	Character	Strike Price
Option Type	CHAR[2]	Character	Option Type
Market Type	CHAR	Character	'N'=Normal
Opening Price	CHAR[10]	Character	Contract open price for the day
Trade High Price	CHAR[10]	Character	Contract high price for the day
Trade Low Price	CHAR[10]	Character	Contract low price for the day
Closing Price	CHAR[10]	Character	Contract close price for the day
Last Traded Price	CHAR[10]	Character	Contract last traded price for the day
Previous Close Price	CHAR[10]	Character	Contract previous day's close price
Settlement Price	CHAR[10]	Character	Contract settlement price for the day

Total Traded Quantity	CHAR[12]	Character	Volume traded today for the contract
Total Traded Value	CHAR[25]	Character	Total traded value for the security
Open Interest	CHAR[10]	Character	Contract open interest
Change In Open Interest	CHAR[10]	Character	Contract change in open interest
INFO TRAILER			
Check Sum	SHORT	Numeric	Refer point no. 7.
End Of Trailer	CHAR	'\r'	Carriage Return

5.9 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	'FZ'	
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	FT/FA/FM/FD/FS	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

5.10 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	'FE'	
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_INFO_HEADER     *) cOutputBuf
                switch (pstInfoHeader->iCode)
        {
                        case FI:          //Open Interest Information
                        {
                ST_OPEN_INT_DATA *stIndexData = (ST_OPEN_INT_DATA *)cOutputBuf;
                        .
                        .
                        cOutputBuf = cOutputBuf + sizeof(ST_OPEN_INT_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

Contract Descriptor comprises Instrument Name, Symbol, Expiry Date, Strike Price & Option Type. Symbol indicates the index on which the FUTURES or OPTIONS contract is based (viz. CNX NIFTY) in case of Index Futures or Index Options or any stock (like ACC) in case of Future / Options on Individual stocks.

9. Support Information

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