

TECHNICAL DOCUMENT

Market Data Platform – Real Time

SNAPSHOT DATA
Futures & Options Market

(STANDARD PRODUCT)

Version 1.1

06 NOV 2015



**DOTEX INTERNATIONAL LIMITED
EXCHANGE PLAZA,
PLOT NO. C/1, G BLOCK,
BANDRA-KURLA COMPLEX,
BANDRA (E), MUMBAI 400 051.
INDIA.**

COPYRIGHT NOTICE

All rights reserved. No part of this document may be reproduced or transmitted in any form and by any means without the prior permission of DotEx International Ltd.

Revision History

Name	Description	Date
Version 1.0	Final Specification Issued	April 23, 2015
Version 1.1	15-Min Delayed Product details added	November 6, 2015

Contents

1.	Introduction	5
2.	Connection Details	5
2.1	Structural diagram	5
2.2	Platform notes	6
3.	Overview	7
3.1	Products and "Product Root"	7
3.2	Types of files generated	7
3.3	Compression	7
4.	Data Details	8
4.1	Market Information	8
4.1.1	Market Files	8
4.1.2	OI Files.....	8
4.2	Contract Information	8
4.3	Bhavcopy Information	8
5.	Data Structure Details	9
5.1	Market Information	9
5.2	Open Interest Information.....	10
5.3	Contract Information	10
5.4	Bhavcopy Information	11
6.	File Transcode List	12
7.	Data Field Details.....	12
7.1	Security Token Number	12
7.2	Time Stamp	12
8.	About SFTP (Secure File Transfer Protocol).....	13
8.1	SFTP on Linux platform.....	13
8.1.1	Generation of the SSH RSA key-pair on Linux.....	13
8.1.2	SFTP Login	14
8.1.3	Fetching files over SFTP.....	14
8.1.4	Ending the SFTP session	15
8.1.5	SFTP commands help	15
8.2	SFTP on Windows platform.....	15
8.2.1	Generation of the SSH RSA key-pair on Windows.....	15
8.2.2	SFTP Client Software on Windows	16
8.3	Further support	17
9.	Contact Information	18

FUTURES & OPTIONS MARKET - SNAPSHOT DATA (STANDARD PRODUCT)

1. Introduction

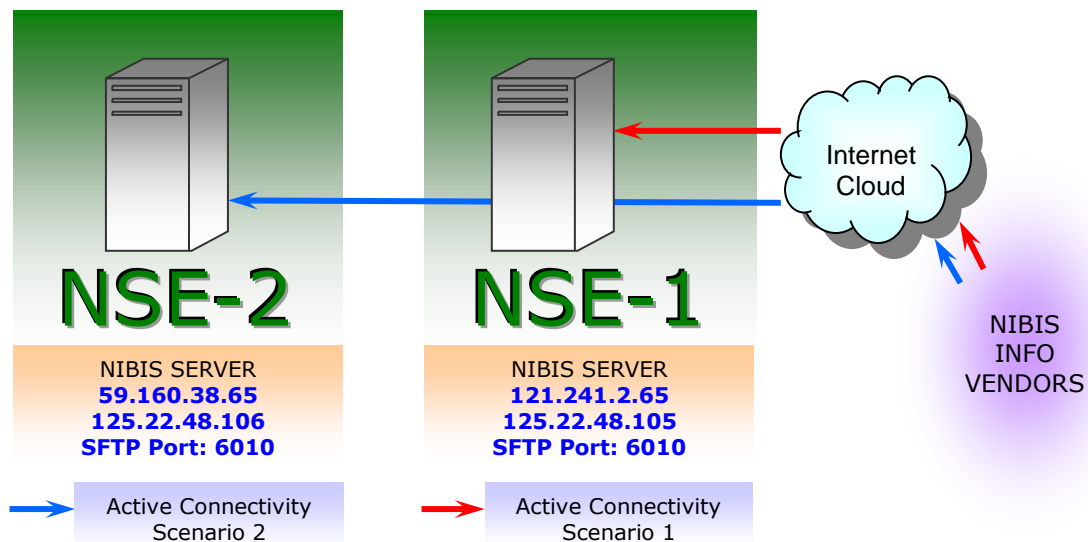
DotEx International Ltd. disseminates NSEIL's Real Time Broadcast data to various information agencies. It provides the 3 different types of data to Info Vendors, i.e. Real Time Data, Snapshot Data and End of Day Data. The Real Time Data is a packet broadcast available in TCP/IP packet format, whereas the Snapshot Data and End of day data are available in the form of files. Certain products based on the Real Time Data are also made available through files.

The NIBIS (NSE Internet Based Information System) server that caters the NIBIS Info Vendors is available through Internet. All NIBIS Info Vendors connect the server through internet and use SFTP protocol to download the files. The files on this server are generated on regular intervals. The Info Vendors are provided with credentials which are enabled for the agreement period.

2. Connection Details

The Info Vendors connect to NIBIS server over the Internet using SFTP protocol. In NSE premises two NIBIS Production Servers operate in an active-active configuration. Each server can be accessed using two IP addresses, for ISP-level redundancy, as shown in the Structural Diagram. In case a server becomes inaccessible through both its IP addresses, the Info Vendor software requires to fail-over to the other server.

2.1 Structural diagram



2.2 Platform notes

1. The SFTP service can be simultaneously accessed through both redundant IP addresses on each server. This is to enable Info Vendors to access the servers in case of link failure.
2. Info Vendors may use both IP addresses of a server during normal course of operations in order to put both available links to use.
3. There may be slight differences between the data disseminated by the two servers because of factors impacting sampling such as CPU clock skew, differences in routing of data, etc.
4. Time stamp on the files on the server is in 24-hour format.
5. Certain files are compressed using ZLIB (gzip). The files may be decompressed using the popular "gunzip" command on Unix/Linux systems. Tools to decompress these files are also freely available for Windows on the World Wide Web, Gzip for Windows and 7-Zip being popular examples.
6. The Exchange does not provide software or support for decompression, SFTP, etc.

3. Overview

3.1 Products and "Product Root"

The files are productized as per the generation frequency and are generated under their designated Product Roots on the server.

Product Root is the name of the top-level directory under which files for a product are generated.

Snapshot Frequency	Generation Frequency	Product Root
1 Minute Snapshot Product	Every 1 Minute	/FAO01
2 Minute Snapshot Product	Every 2 Minutes	/FAO02
5 Minute Snapshot Product	Every 5 Minutes	/FAO05
15 Minute Delayed Snapshot Product	Every 1 Minute, delayed by 15 Minutes	/FAO30

The Product Roots may further contain subdirectories as specified in the relevant sections of this document.

Info Vendors may subscribe to product of their choice depending on their data snapshot frequency requirement.

Delayed data products are also available, wherein the files generated on regular 1 minute interval basis are delayed by the specified time.

3.2 Types of files generated

The files are generated in binary format on the servers inside the corresponding type-wise sub-directories as specified in this document and can be broadly classified as follows:

Description	Frequency
Market Information Files	At a specific interval
Contract Information Files	Once a day (EOD)
Bhavcopy Information Files	Once a day (EOD)

For each trading day, files are generated in date-wise sub-directories prefixed with the full month name (MonthDDYYYY) as specified in the relevant sections of this document.

The files generated at fixed frequency are continuously numbered, starting from 1.

3.3 Compression

Certain files are compressed using ZLIB (gzip). The files may be decompressed using the popular "gunzip" command on Unix/Linux systems. Tools to decompress these files are also freely available for Windows on the World Wide Web, Gzip for Windows and 7-Zip being popular examples. It may be noted that the Exchange does not provide software or support for decompression.

4. Data Details

4.1 Market Information

The Market information data files (MBP and OI) are generated on the server at regular intervals.

4.1.1 Market Files

The *.sec ("*" stands for a number) files contain market statistics and order information of the contracts that are being traded during the last interval, including their open, high, low and close price. The file contains a single record for every contract that is traded during that file interval. These files are generated during normal trading period i.e. 09:15 hrs. To 15:30 hrs. These files are generated in incremental count number on a trading day starting from 1 (for example, 1.sec, 2.sec and so on).

4.1.2 OI Files

The *.ind ("*" stands for a number) files contain the details of open interest information of contracts. These files are generated at regular intervals. These files are generated during normal trading period i.e. 09:15 hrs. to 15:30 hrs.

4.2 Contract Information

The Securities.dat file is the master file that contains the updated information of all securities traded on the Exchange. The Info Vendors need to download this file and decode it to resolve the "token number" of required contract. The Token number of each contract is unique.

4.3 Bhavcopy Information

The Bhavcopy Information File is generated at around 17:00 hrs on each trading day. This file contains the End of the Day values of the securities that are traded on that trading day.

5. Data Structure Details

5.1 Market Information

Directory Path	/<Product Root>/DATA/<MonthDDYYYY>
File Name	*.sec
Compression	Compressed (.gz)
Generation Frequency	At fixed intervals

HEADER

Field	Data Type	Length
Transcode	Short	2 Bytes
Timestamp	Long	4 Bytes
Message Length	Short	2 Bytes
Filler	Char	1 Byte
Total Length		9 Bytes

DATA

Field	Data Type	Length
Security Token	Long	4 Bytes
Instrument Name	Char	6 Bytes
Symbol	Char	10 Bytes
Expiry Date	Char	11 Bytes
Strike Price	Char	10 Bytes
Option Type	Char	2 Bytes
Market Type	Char	1 Byte
Best Buy Price	Char	10 Bytes
Best Buy Quantity	Char	12 Bytes
Best Sell Price	Char	10 Bytes
Best Sell Quantity	Char	12 Bytes
Last Traded Price	Char	10 Bytes
Total Traded Quantity	Char	12 Bytes
Average Traded Price	Char	10 Bytes
Security Status	Char	1 Byte
Open Price	Char	10 Bytes
High Price	Char	10 Bytes
Low Price	Char	10 Bytes
Close Price	Char	10 Bytes
Interval High Price	Char	10 Bytes
Interval Low Price	Char	10 Bytes
Interval Open Price	Char	10 Bytes
Interval Close Price	Char	10 Bytes
Interval Total Traded Quantity	Char	12 Bytes
Total Length		213 Bytes

TRAILER

Field	Data Type	Length
-------	-----------	--------

Checksum	Short	2 Bytes
Filler	Char	1 Byte
Total Length		3 Bytes

5.2 Open Interest Information

Directory Path	/<Product Root>/DATA/<MonthDDYYYY>
File Name	*.ind
Compression	Compressed (.gz)
Generation Frequency	At fixed intervals

HEADER

Field	Data Type	Length
Transcode	Short	2 Bytes
Timestamp	Long	4 Bytes
Message Length	Short	2 Bytes
Filler	Char	1 Byte
Total Length		9 Bytes

DATA

Field	Data Type	Length
Security Token	Long	4 Bytes
Instrument Name	Char	6 Bytes
Symbol	Char	10 Bytes
Expiry Date	Char	11 Bytes
Strike Price	Char	10 Bytes
Option Type	Char	2 Bytes
Open Interest	Char	10 Bytes
Market Type	Char	1 Byte
Total Length		54 Bytes

TRAILER

Field	Data Type	Length
Checksum	Short	2 Bytes
Filler	Char	1 Byte
Total Length		3 Bytes

5.3 Contract Information

Directory Path	/<Product Root>/SECURITY/<MonthDDYYYY>
File Name	Securities.DAT
Compression	Not compressed
Generation Frequency	Once (EOD)

HEADER

Field	Data Type	Length
Transcode	Short	2 Bytes
Timestamp	Long	4 Bytes

Message Length	Short	2 Bytes
Total Length		8 Bytes

DATA

Field	Data Type	Length
Token Number	Long	4 Bytes
Instrument Name	Char	6 Bytes
Symbol	Char	10 Bytes
Series	Char	2 Bytes
Option Type	Char	2 Bytes
Expiry Date	Long	4 Bytes
Strike Price	Long	4 Bytes
Issue Start Date	Long	4 Bytes
Issue Maturity Date	Long	4 Bytes
Board Lot Quantity	Long	4 Bytes
Tick Size	Long	4 Bytes
Security Name	Char	25 Bytes
Record Date	Long	4 Bytes
Ex Date	Long	4 Bytes
No Delivery Start Date	Long	4 Bytes
No Delivery End Date	Long	4 Bytes
Book Closure Start Date	Long	4 Bytes
Book Closure End Date	Long	4 Bytes
Remarks	Char	25 Bytes
Category	Char	1 Byte
Filler	Char	1 Byte
Total Length		124 Bytes

5.4 Bhavcopy Information

This data file does not contain the Header field.

Directory Path	/<Product Root>/BHAVCOPY/<MonthDDYYYY>
File Name	faomktstatsDDMMYYYY.txt
Compression	Not compressed
Generation Frequency	Once (EOD)

DATA

Field	Data Type	Length
Instrument Name	Char	6 Bytes
Symbol	Char	10 Bytes
Expiry Date	Char	11 Bytes
Strike Price	Char	10 Bytes
Option Type	Char	2 Bytes
Market Type	Char	1 Byte
Opening Price	Char	10 Bytes
Trade High Price	Char	10 Bytes
Trade Low Price	Char	10 Bytes
Closing Price	Char	10 Bytes

Last Traded Price	Char	10 Bytes
Previous Close Price	Char	10 Bytes
Settlement Price	Char	10 Bytes
Total Traded Quantity	Char	12 Bytes
Total Traded Value	Char	25 Bytes
Current Open Interest	Char	10 Bytes
Change in Open Interest	Char	10 Bytes
Total Length		167 Bytes

6. File Transcode List

Details	Transcode number
MARKET INFORMATION	1
OPEN INTEREST INFORMATION	2
CONTRACT INFORMATION	3

7. Data Field Details

7.1 Security Token Number

The Security Token numbers uniquely identify each contract listed on the National Stock Exchange of India Ltd. The token number, Instrument, Symbol, Expiry Date, Strike Price and Option Type identify a single and unique contract. The Info Vendor will be provided with a binary file i.e. securities.dat giving the combinations of all contracts traded on the Exchange.

7.2 Time Stamp

The time stamp is the number of seconds elapsed from midnight Jan 1, 1970.

8. About SFTP (Secure File Transfer Protocol)

The file transfer takes place over SFTP (Secure FTP) protocol over the Internet.

The Info Vendor requires to provide the Exchange with the SSH RSA Public Key of their machine for receiving login details from the Exchange.

The following details will be provided once the request is processed by the Exchange:

- Server IP
- SSH Service Port
- User ID
- File Path

General information on SFTP has been provided in the following sections for popular OS platforms.

8.1 SFTP on Linux platform

The OpenSSH suite, which comes pre-installed in most Linux distributions, can be used for transferring files securely using SFTP.

The SSH key-pair is generally generated in the “.ssh” directory in the user’s home directory.

It is highly recommended that you consult your systems administrator to generate/locate the key-pair and set up SFTP for you.

Continue reading for information on how to generate the key-pair.

8.1.1 Generation of the SSH RSA key-pair on Linux

- Generate the new key-pair with following command:
`ssh-keygen -t rsa -C "user@host"`

- You will receive the following prompt:
`Generating public/private rsa key pair.
"Enter file in which to save the key".`
Press the Enter to continue with the defaults.

You will receive the following prompt:
`Enter file in which to save the key
(/host/users/user/.ssh/id_rsa):`

Press the Enter to continue with the defaults.

- If a file already exists with the same name, then you will receive the following prompt:
`/host/users/user/.ssh/id_rsa already exists.
Overwrite (y/n)?`

Type "y" and press Enter to overwrite.

- You will be prompted to enter a passphrase as follows:
`Enter passphrase (empty for no passphrase):`
Press Enter to continue without a passphrase.

You will be prompted to re-enter the passphrase:

`Enter same passphrase again:`

Press Enter again to continue without a passphrase.

- After you enter a passphrase, you will be presented with the "Fingerprint" (or ID) of your SSH key.

It will look something like this:

`Your identification has been saved in
/host/users/user/.ssh/id_rsa.`

`Your public key has been saved in
/host/users/user/.ssh/id_rsa.pub.`

`The key fingerprint is:
87:c4:85:90:91:16:39:de:c2:26:49:4a:b3:38:80:97
user@host`

After generating public key, user needs to share the Public Key file with exchange for requesting the credentials.

NOTE: In above steps the words "host" and "user" are used to represent the host name and user name of the machine. This is used for demo purpose only. The same will differ as per your server and user names.

8.1.2 SFTP Login

Login to the Exchange Server over SFTP using the following command:

```
sftp -o PORT=6010 remote_user@remote_host
```

Where remote_user is the User ID provided to you by the Exchange upon sharing your Public Key and remote_host is the Exchange Server IP.

You should get the SFTP prompt as below, upon successful login:

```
Connecting to [redacted]...  
"NOTICE TO USERS"  
  
"The system is to be used for AUTHORIZED business purpose only.  
All activities on this system are being monitored. Unauthorized access  
to this system may be subject to legal action, and/or prosecution"  
  
sftp> █
```

8.1.3 Fetching files over SFTP

The SFTP "get" command may be used at the SFTP prompt for fetching the files while logged into the host over SFTP.

8.1.4 Ending the SFTP session

The SFTP "bye" command may be used for terminating the session

8.1.5 SFTP commands help

Help may be obtained with SFTP commands by typing the "help" command at the SFTP prompt.

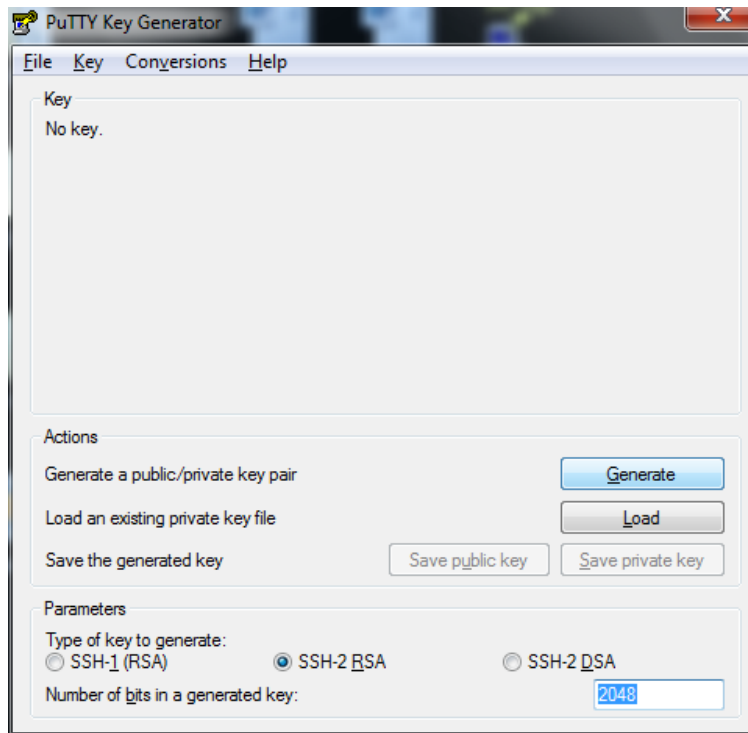
8.2 SFTP on Windows platform

8.2.1 Generation of the SSH RSA key-pair on Windows

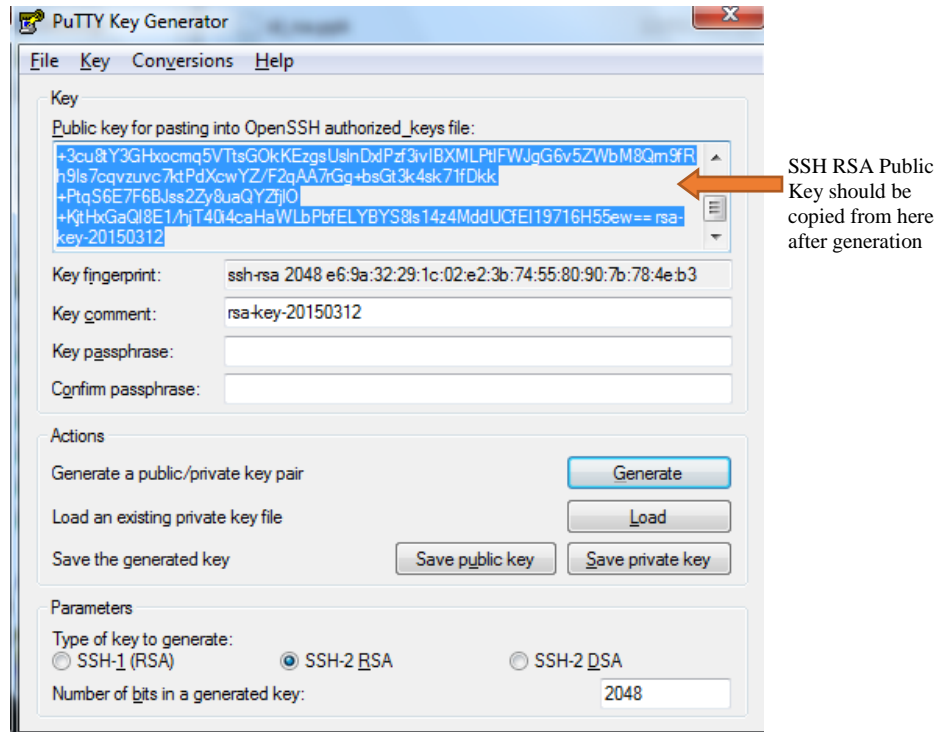
This guide explains how to generate the SSH RSA key-pair using the PuttyGen application.

Download the PuttyGen application (freely available on the Internet). Then follow these steps to generate the key-pair:

- Start the PuttyGen application.
You will be presented with a dialog which looks something like this:



- Select "SSH2RSA" with 2048 bit size or greater.
- Press the "Generate" button.
- After generating the key, you will be shown the screen below. Keep the "Key passphrase" and "Confirm passphrase" as blank.



- Create a blank file with the name "id_rsa.pub". This will be the public key file which will be populated with your Public Key and shared with the Exchange.
- Copy the public key content as presented on the screen (selected area in the below screenshot) and paste into newly created public key file (id_rsa.pub) and save the file.
- Share this Public Key File (id_rsa.pub) with the Exchange when requesting for SFTP credentials.

8.2.2 SFTP Client Software on Windows

There are multiple SFTP Client Programs (paid for and free) available for transferring files over SFTP.

One such software is WinSCP, available for free from the WinSCP website. This program is intuitive, user friendly and can be used in interactive mode (GUI) as well as from the command line (for automation/batch processing).

Information on using WinSCP can be found on the WinSCP website.

8.3 Further support

Apart from the above guide, many of the online resources can be referred on the World Wide Web for more information on how to set up and use SFTP at the Client's site on various OS platforms.

Note:

This "About SFTP" section is intended as a guide used to understand and become familiarized with this transfer protocol.

It may be noted that the Exchange does not provide SFTP software or support for configuring and using SFTP at Client site.

9. Contact Information

Name	Email	Contact Number
DOTEX Business	dotex@nse.co.in	91-22-26598385
Technical Support	infofeed_support@nse.co.in	91-22-26598270