
# MARKET FEED

# Futures and Options (FO)

**(Realtime Snapshot)**

**Version:** 1.5

**Date:** 08 December 2025

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## Revision History

| Name | Description | Date |
|---|---|---|
| Version 1.0 | Final Specification Issued | 23 April 2015 |
| Version 1.1 | 15-Min Delayed Product details added | 06 November 2015 |
| Version 1.2 | Addition of FAQs Section and Decoding Snapshot files | 20 September 2024 |
| Version 1.3 | Data type change for Date field in Contract Information from long to unsigned long | 07 April 2025 |
| Version 1.4 | Data type size change for Open Interest field in Open Interest Information and Bhavcopy Information to CHAR [12] | 02 September 2025 |
| Version 1.5 | • Introduction of pre-open session<br>• Renamed Security.dat to Contract.dat in Section 5.3: Contract Information<br>• Addition of Price discovery indicator in Contract Status in Market Information<br>• Addition of 2 FAQs in FAQ section. | 08 December 2025 |

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# Market Feed – Futures and Options (Snapshot Data)

## 1 Introduction

NSE Data & Analytics Ltd. offers real-time data and historical data products from NSEIL to a diverse range of clients. This includes 5 real-time products and 2 historical data products:

**Real Time data products**

1. Real Time Data
2. Snapshot Data
3. Corporate Data
4. Analytical Products data
5. Indicative NAV Data

**Historical data products**

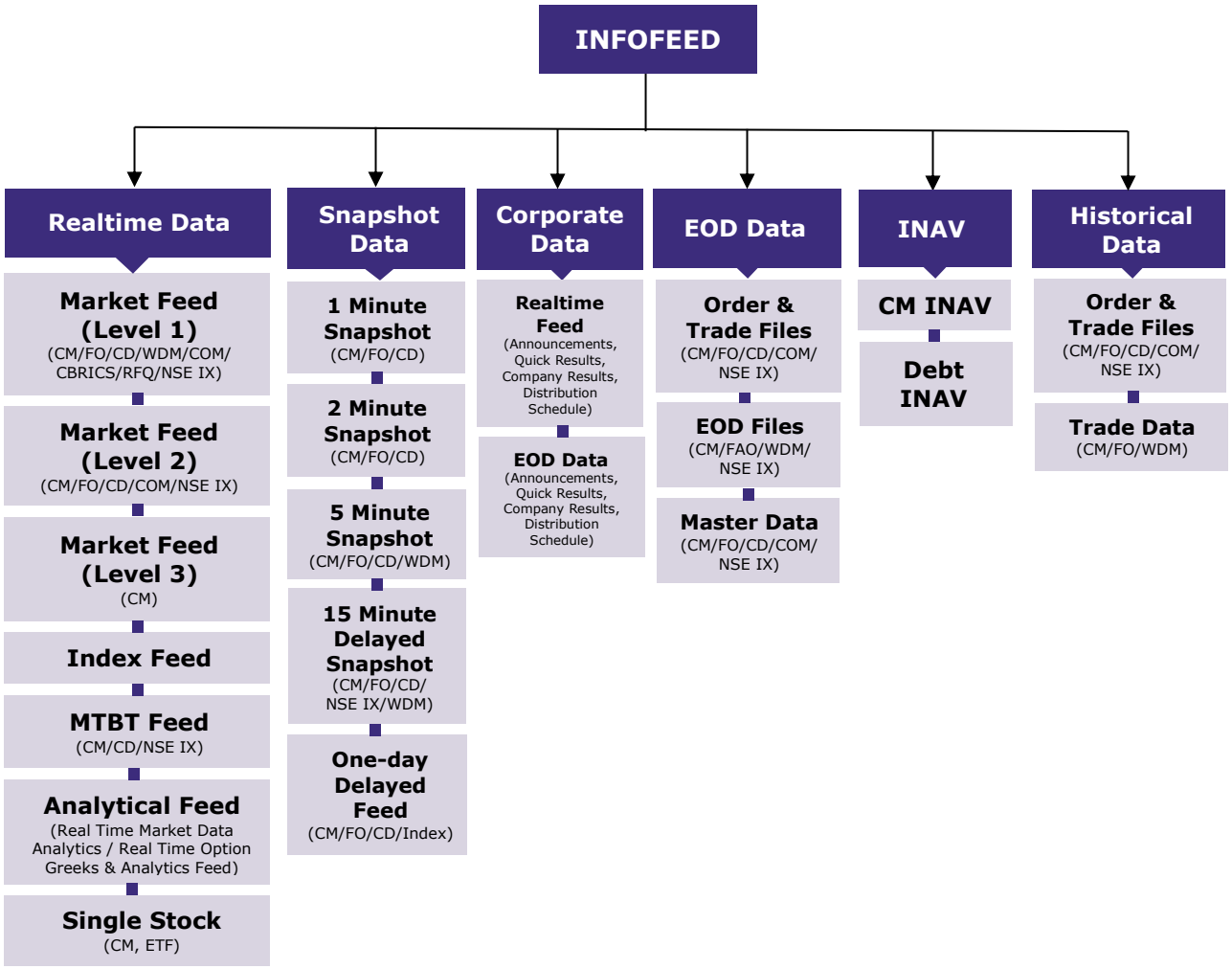
1. End of Day Data
2. Historical Data

The data products are provided through delivery modes mentioned below:

- **Real-time Data**: The information is transmitted as a packet broadcast, facilitating ongoing distribution through data feeds via point-to-point leased line.

- **Snapshot, End-of-Day, and Historical Data**: The data is delivered as downloadable files over the internet using the SFTP protocol.

All these data categories are integrated within the Infofeed platform, ensuring comprehensive coverage and streamlined access.



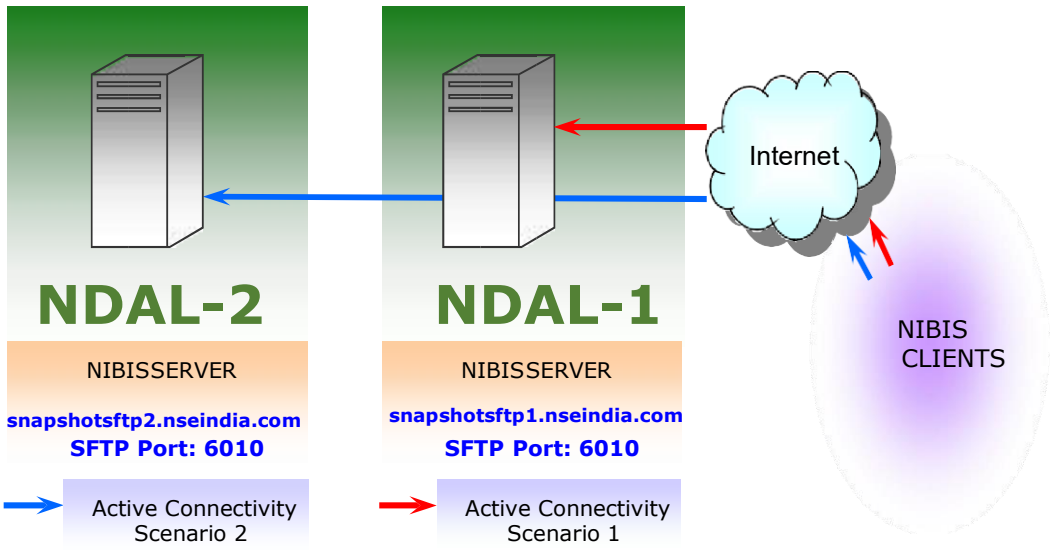

This document explains the NSE Real-time FAO Snapshot product, which provides market and open interest information in real-time. The data is delivered in file format via SFTP at a specified frequency.

The NIBIS (NSE Internet Based Information System) server, which serves NIBIS clients, is accessible via the internet. All clients connect to the server using the SFTP protocol to download files, which are generated at regular intervals. To gain access, clients must submit their server's public key and static public IP address. Upon verification, credentials are issued and remain valid for the duration specified in the service agreement.

## 2. Connection Details

The clients connect to the NIBIS server over the Internet using the SFTP protocol. Within the NSE premises, two NIBIS Production Servers operate in an active-active configuration. Each server is accessible via two IP addresses to ensure ISP-level redundancy, as illustrated in the Structural Diagram. If a server becomes unreachable through both of its IP addresses, the client software must automatically fail over to the other server.

### 2.1. Structural Diagram




### 2.2 Data Types

| Data Type | Size In Bytes |
|---|---|
| CHAR | 1 |
| SHORT | 2 |
| LONG | 4 |
| UNSIGNED LONG | 4 |
| DOUBLE | 8 |
| LONG LONG | 8 |

Byte order - Little Endian

## 2.3 Platform notes

1. The SFTP service can be simultaneously accessed through both redundant IP addresses on each server. This is to enable clients to access the servers in case of link failure.
2. Clients may use both IP addresses of a server during normal course of operations 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 Minutes Snapshot Product | Every 2 Minutes | /FAO02 |
| 5 Minutes Snapshot Product | Every 5 Minutes | /FAO05 |

The Product Roots may further contain subdirectories as specified in the relevant sections of this document. Clients 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 is 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 |
| Open Interest 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 IST To 15:30 IST. 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 IST to 15:30 IST.

### 4.2 Contract Information

The Contract.dat file is the master file that contains the updated information of all contracts traded on the Exchange. The clients 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 IST on each trading day. This file contains the End of the Day values of the contracts that are traded on that trading day.

## 4.4 Market Pre-Open Information

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 the Pre-open session, only order entry, orders modification and order cancellation will be allowed. Once the pre-open session ends, no order activity will be allowed and the 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 in trade execution.

Pre-open orders that could not participate in the pre-open matching for reasons such as a 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 – Realtime snapshot product sends messages in the following format:

Market Pre-open Information (.sec): During the pre-open session, a .sec file will be generated with transcode 4.

# 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 |

| Field Name | Data Type | Value | Brief Description |
|---|---|---|---|
| **INFO HEADER** | | | |
| Transcode | SHORT | Numeric | Transaction message number. This describes the type of message received or sent. |
| Timestamp | LONG | Numeric | This field should be set to numeric zero while sending to the host. This is used in host end. |
| Message Length | SHORT | Numeric | This field should be set to the length of the entire message, including the length of message header while sending to host. |
| Filler | CHAR [1] | Character | Filler |
| **Info Header Length** | | **9 Bytes** | |
| **INFO DATA** | | | |
| Contract Token | LONG | Numeric | This field contains the token number of contract |
| Instrument Name | CHAR [6] | Character | Instrument Name |
| Symbol | CHAR [10] | Character | Contract 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 [1] | Character | This field contains one of the following values.<br>• '1' for Normal market<br>• '2' for Odd lot market<br>• '3' for Spot market<br>• '4' for Auction market |

| | | | |
|---|---|---|---|
| Best Buy Price | CHAR [10] | Character | The highest price for a Buy order |
| Best Buy Quantity | CHAR [12] | Character | This field contains the total Buy Quantity for the order |
| Best Sell Price | CHAR [10] | Character | This is the lowest price for a Sell order |
| Best Sell Quantity | CHAR [12] | Character | This field contains the total Sell quantity for the order |
| Last Traded Price | CHAR [10] | Character | This field contains the price at which the latest trade in a contract has taken place. |
| Total Traded Quantity | CHAR [12] | Character | This field contains the total quantity of a contract traded on the current day |
| Average Traded Price | CHAR [10] | Character | This field contains the average price of all the trades in a contract. |
| Contract Status | CHAR [1] | Character | This field can have any one of the following values:<br>• '1' - Preopen<br>• **'2' - Open (Only for Normal market)**<br>• '3' - Suspended<br>• '4' - Preopen extended<br>• '5' - Stock Open with Market<br>• **'6' – Price discovery** |
| Open Price | CHAR [10] | Character | This field contains the open price of a contract |
| High Price | CHAR [10] | Character | This field contains the highest trade price |
| Low Price | CHAR [10] | Character | This field contains the lowest trade price |
| Close Price | CHAR [10] | Character | This field contains the closing price of a contract |
| Interval High Price | CHAR [10] | Character | This field contains the highest trade price during interval |
| Interval Low Price | CHAR [10] | Character | This field contains the lowest trade price during interval |
| Interval Open Price | CHAR [10] | Character | This field contains the open price of a contract during interval |

| | | | |
|---|---|---|---|
| Interval Close Price | CHAR [10] | Character | This field contains the closing price of a contract during interval |
| Interval Total Traded Quantity | CHAR [12] | Character | This field contains the total quantity of a contract traded during interval |
| **Info Data Length** | | **213 Bytes** | |

## 5.2 Open Interest Information

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

| Field Name | Data Type | Value | Brief Description |
|---|---|---|---|
| **INFO HEADER** | | | |
| Transcode | SHORT | Numeric | Transaction message number. This describes the type of message received or sent. |
| Timestamp | LONG | Numeric | This field should be set to numeric zero while sending to the host. This is used in host end. |
| Message Length | SHORT | Numeric | This field should be set to the length of the entire message, including the length of message header while sending to host. |
| Filler | CHAR [1] | Character | Filler |
| **Info Header Length** | | **9 Bytes** | |
| **INFO DATA** | | | |
| Contract Token | LONG | Numeric | This field contains the token number |
| Instrument Name | CHAR [6] | Character | Instrument Name |
| Symbol | CHAR [10] | Character | Contract symbol |
| Expiry Date | CHAR [11] | Character | Expiry Date |
| Strike Price | CHAR [10] | Character | Strike Price |
| Option Type | CHAR [2] | Character | Option Type |
| Open Interest | CHAR [12] | Character | This field contains the open interest value. |
| Market Type | CHAR [1] | Character | This field contains one of the following values.<br>• '1' for Normal market<br>• '2' for Odd lot market<br>• '3' for Spot market<br>• '4' for Auction market |
| **Info Data Length** | | **56 Bytes** | |

## 5.3 Contract Information

| | |
|---|---|
| **Directory Path** | /<Product Root>/CONTRACT /<MonthDDYYYY> |
| **File Name** | ~~Security.dat~~ Contract.dat |
| **Compression** | Not compressed |
| **Generation Frequency** | Once (EOD) |

| Field Name | Data Type | Value | Brief Description |
|---|---|---|---|
| **INFO HEADER** | | | |
| Transcode | SHORT | Numeric | Transaction message number. This describes the type of message received or sent. |
| Timestamp | LONG | Numeric | This field should be set to numeric zero while sending to the host. This is used in host end. |
| Message Length | SHORT | Numeric | This field should be set to the length of the entire message, including the length of message header while sending to host. |
| **Info Header Length** | | **8 Bytes** | |
| **INFO DATA** | | | |
| Token Number | LONG | Numeric | Token number of the contract being updated. |
| Instrument Name | CHAR [6] | Character | Instrument Name |
| Symbol | CHAR [10] | Character | This field contains the Symbol of the contract. |
| Series | CHAR [2] | Character | This field contains the series of a contract. |
| Option Type | CHAR [2] | Character | Option Type |
| Expiry Date | UNSIGNED LONG | Numeric | This field contains the last date of trading before any corporate action |
| Strike Price | LONG | Numeric | Strike Price |
| Issue Start Date | UNSIGNED LONG | Numeric | Date of issue of the contract. |
| Issue Maturity Date | UNSIGNED LONG | Numeric | Maturity date |
| Board Lot Quantity | LONG | Numeric | Regular lot size. |

| | | | |
|---|---|---|---|
| Tick Size | LONG | Numeric | Tick size/ Min spread size |
| Contract Name | CHAR [25] | Character | Name of the contract |
| Record Date | UNSIGNED LONG | Numeric | Date of record changed. |
| Ex Date | UNSIGNED LONG | Numeric | Last date of trading before any corporate action. |
| No Delivery Start Date | UNSIGNED LONG | Numeric | Date from when physical delivery of share certificates is stopped for book closure |
| No Delivery End Date | UNSIGNED LONG | Numeric | No delivery end date. |
| Book Closure Start Date | UNSIGNED LONG | Numeric | Date at which the record books in the company for shareholder names starts. |
| Book Closure End Date | UNSIGNED LONG | Numeric | Date at which the record books in the company for shareholder names ends |
| Remarks | CHAR [25] | Character | Remarks. |
| Category | CHAR [1] | Character | Market hours in which the contract is available to trade.<br>• '1': Regular market hours.<br>• '2': Extended market hours. |
| Filler | CHAR [1] | Character | Filler |
| **Info Data 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) |

| Field Name | Data Type | Value | Brief Description |
|---|---|---|---|
| **INFO DATA** | | | |
| Instrument Name | CHAR [6] | Character | Instrument Name |
| Symbol | CHAR [10] | Character | Contract 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 [1] | Character | This field contains one of the following values.<br>• '1' for Normal market<br>• '2' for Odd lot market<br>• '3' for Spot market<br>• '4' for Auction market |
| Opening Price | CHAR [10] | Character | This field contains the open price of a contract |
| Trade High Price | CHAR [10] | Character | This field contains the highest trade price |
| Trade Low Price | CHAR [10] | Character | This field contains the lowest trade price |
| Closing Price | CHAR [10] | Character | This field contains the closing price of a contract |
| Last Traded Price | CHAR [10] | Character | This field contains the price at which the latest trade in a contract has taken place. |
| Previous Close Price | CHAR [10] | Character | This field contains the previous day's closing price of the contract |
| Settlement Price | CHAR [10] | Character | Settlement Price |
| Total Traded Quantity | CHAR [12] | Character | This field contains the total quantity of a contract traded on the current day |

| | | | |
|---|---|---|---|
| Total Traded Value | CHAR [25] | Character | This field contains the total quantity of a contract traded on the current day |
| Current Open Interest | CHAR [12] | Character | This field contains the Current Open Interest of the underlying asset. |
| Change in Open Interest | CHAR [12] | Character | This field contains the change in value of open interest. |
| **Info Data Length** | | **171 Bytes** | |

# 6 File Transcode List

| Details | Transcode Number |
|---|---|
| MARKET OPEN INFORMATION | 1 |
| OPEN INTEREST INFORMATION | 2 |
| CONTRACT INFORMATION | 3 |
| MARKET PRE-OPEN INFORMATION | 4 |

# 7 Data Field Details

## 7.1 Contract Token Number

Each contract listed in the Futures and Options (F&O) segment is uniquely identified by following attributes mentioned below:

**Futures Contracts**
A Futures contract is uniquely defined by the combination of:

- Token Number
- Instrument Type
- Symbol
- Expiry Date

**Options Contracts**
An Options contract is uniquely defined by the combination of:

- Token Number
- Instrument Type
- Symbol
- Expiry Date
- Strike Price
- Option Type (Call/Put)

Clients are provided with a binary file named Contract.dat, which contains details of all contracts traded on the Exchange.

## 7.2. Timestamp

The timestamp is the number of seconds elapsed from midnight Jan 1, 1980.

# 8 About SFTP (Secure File Transfer Protocol)

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

The client is required to submit the SSH RSA Public Key of their machine along with their static public IP address to receive access details from NSE Data & Analytics (NDAL).

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

- URL
- 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 Open SSH 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.

Your 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.

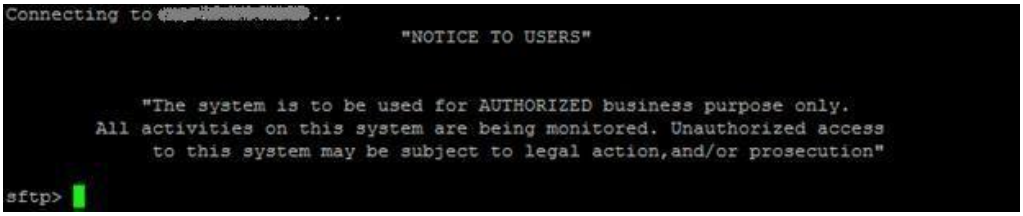
**NOTE:** In above steps the words "host" and "user" are used to represent the host name and username of the machine. This is used for demo purpose only. The same will differ as per your server and usernames.

### 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:




### 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.

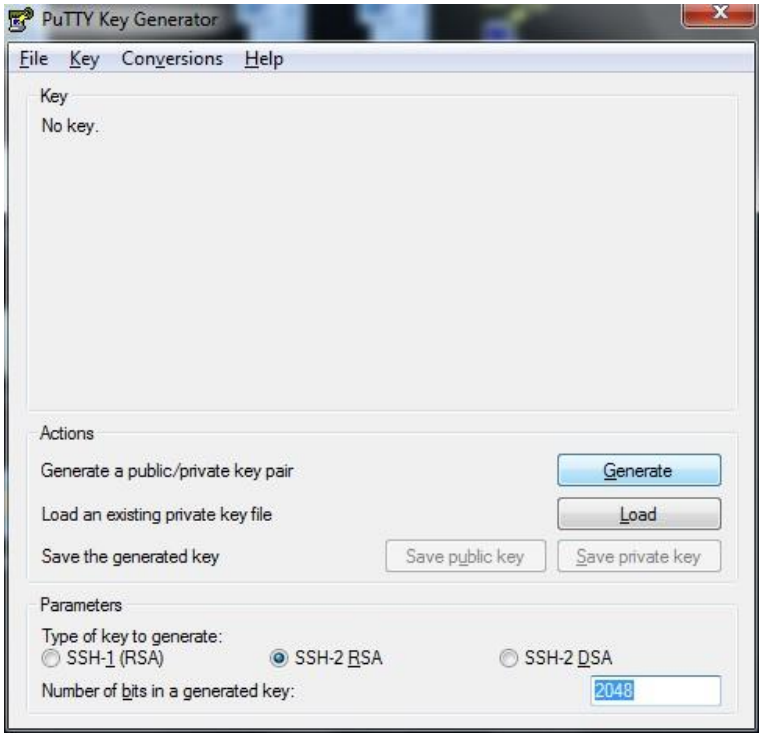
## 8.2. SFTP on Windows platform

### 8.2.1. Generation of the SSH RSA key-pair on Windows

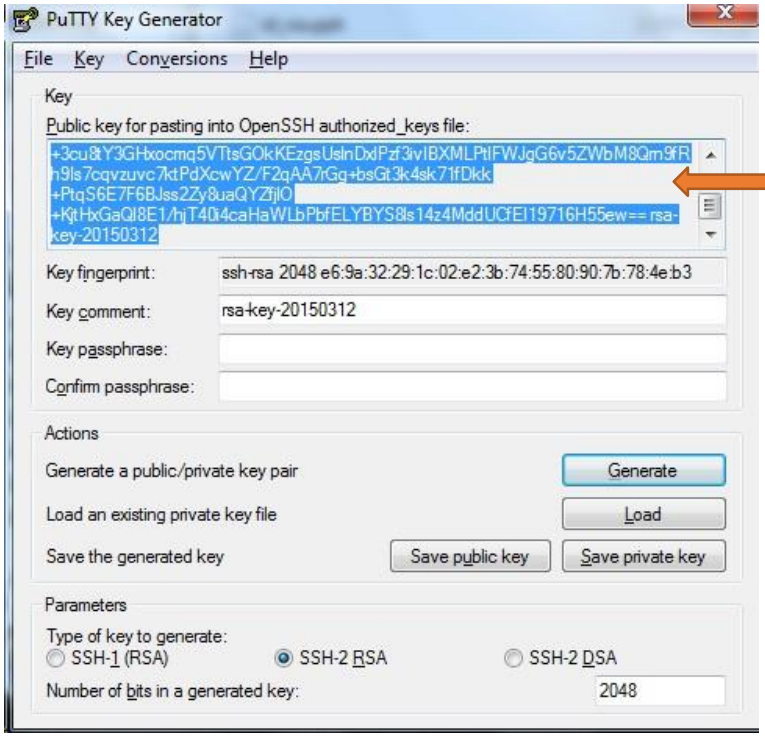
This guide explains how to generate the SSH RSA key-pair using the PuttyGen application.

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.




SSH RSA Public Key should be copied from here after generation

- 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 Decoding Snapshot files

Please refer following C snippet for decoding snapshot files:

```
HEADER header    = {0};
DATA_SEC data_sec = {0};
DATA_IND data_ind = {0};

int main()
{
  gzFile  fpFile = gzopen("1.sec.gz", "rb");
  while
  {
      int nRetVal = gzread(fpFile, &header ,sizeof(HEADER));
      if(header.nTranscode == SEC)
      {
            gzread(fpFile, &data_sec, sizeof(data_sec));
            print(&data_sec);
      }

      else if(header.nTranscode == IND)
      { gzread(fpFile, &data_ind, sizeof(data_ind)); }

      if(gzeof(fpFile) == 1)
      {
                  printf("EOF reached ");
                  break;
      }
  }
  gzclose(fpFile);
}

void print(DATA_SEC *data_sec)
{
 printf("Contract Token = %d ,Instrument Name = %s,
 Symbol = %s, ....." ,data_sec->ContractToken,
 data_sec->InstrumentName,data_sec->Symbol);
}
```

# 10 Annexure

## 10.1 Acronyms Used

| | |
|---|---|
| BOD | Begin Of Day Information |
| EOD | End Of Day Information |
| Online | Information Sent During Market Timing |
| CM | Cash Market |
| F&O/FAO | Future & Options Market |
| CD | Currency Derivatives Market |
| WDM | Wholesale & Debt Market |
| COM | Commodity Market |
| CBRICS | Corporate Bond Reporting and Integrated Clearing System |
| NSE IX | NSE International Exchange |
| MTBT | Multicast Tick By Tick |
| MBP | Market By Price |
| OI | Open Interest |

# 11 FAQs

1) Download of files through SFTP was working till last week, suddenly our connection to sftp is failing. How do we resolve it?

   If using SFTP on Windows, please ensure you are using the latest version of Winscp or any other equivalent tool.

   If you are using SFTP programmatically or through an API, please ensure you **don't use the following cipher**:

   - diffie-hellman-group-exchange-sha1
   - diffie-hellman-group14-sha1
   - diffie-hellman-group1-sha1

2) How do we decode compressed *.sec and *.ind files?

   Please refer section 9 for decoding Snapshot Files, which involves decompression and reading of *.sec and *.ind files.

3) What is file generation time of .sec and .ind files?

   The file generation time will be 9:00 AM to 3:30 PM.

## 12 Contact Information

| Name | Email | Contact Number |
|---|---|---|
| Business & Technical Support | marketdata@nse.co.in | +91-22-26598385 |