Member guide and FAQs on "Direct Connection" and Gateway Router Functionality

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Background:
Exchange had announced introduction of "Direct Connection functionality" vide circular Ref. No. NSE/FAOP/31548 and NSE/CD/31549 dated January 12, 2016 in Futures & Options (FO) and Currency Derivatives (CD) Segments, circular Ref. No. NSE/CMTR/31663 dated February 1, 2016 in Capital Market (CM) Segment and NSE/SLBS/45260 dated August 06, 2020 in Securities Lending and Borrowing Market (SLBM) for Non-Neat Frontend (NNF) Applications.

All Non-Neat Frontend (NNF) applications are required to mandatorily connect via "Direct Connection" w.e.f. November 07, 2020.
For further details regarding Protocol please refer following link:
https://www.nseindia.com/trade/platform-services-neat-trading-system-protocols

Members have been provided with "NEAT Adaptor" which shall support login for Exchange provided NEAT and NEAT Plus applications.

Accordingly, members currently have the following options to connect to the Exchange trading system in the CM, FO, CD, COM segments and SLBM.

Mode of Connection	Can be used for	Protocol
NEAT Adaptor	For "NEAT" and "NEAT +" Only.	
Direct Connection	For Non Neat Frontend (NNF) applications	Trimmed

The member queries on Direct Connection functionality have been summarized in the form of an FAQ.

1. **We do not use any NNF application. We only trade through NEAT. How do we connect to the Exchange for trading?**
   Exchange has provided "NEAT Adaptor" application for login using NEAT and NEAT Plus applications.

2. **Does NEAT Adaptor support login via NNF?**
   The "NEAT Adaptor" will not support login via NNF.

3. **Is "Direct Connection" available on all the existing modes of connectivity i.e. Lease Line, Colocation etc.?**
   Yes. "Direct Connection" is available on all the existing modes of connectivity.

4. **Can we use both the "NEAT Adaptor" and "Direct Connection" protocol?**
   Yes, NEAT Adaptor is to be used for login using NEAT/NEAT Plus application and Direct Connection for NNF users.

5. **How is the "Direct Connection" functionality different for NNF applications?**
   In Direct Connection, members need to connect directly to Exchange without using any middleware application provided by the Exchange. Member systems must initiate a TCP socket connection to the Gateway Router (GR) and the Gateway addresses (IP and Port details) given by the Exchange. For further details regarding direct connection feature, members can refer to the Trimmed Protocol documents.

6. **How does the Exchange allocate the gateway addresses to the member to connect?**

The process of allocating gateway servers is Exchange determined and highly simplified for the member. The Gateway Router (GR) Functionality has been implemented as follows:

Members must first connect to a gateway router server in the respective segment (Details mentioned in consolidated circular ref. no. 45703 dated September 15, 2020 and as updated by the Exchange from time to time).

The gateway router server will decide which gateway server is available for the member and will accordingly provide the details of the allocated gateway server to the member through the response message.

After getting the response message the member will need to connect to the allocated gateway server. Thus, the gateway router will decide the gateway server for the member for each trading day in the following manner:

- The gateway router will maintain the used capacity of each gateway server. The gateway router will allocate least used gateway server (according to capacity). The capacity is based on the no. of messages allotted for each Box Id.
- If all gateway servers have similar used capacity then a gateway server will be randomly allocated by the gateway router server.
- Once a member has been provided session key with gateway server details by gateway router server, the member is expected to connect and login to the allocated gateway server at any time during rest of the trading day.
- If the member gets logged off from the allocated gateway server, then the member has to request the gateway router server for getting new session key and gateway server details.
- A member will be directed to the same gateway server by the gateway router server, once it has been allocated for the trading day.
- Though the user will get directed to the same gateway, the user must ask the gateway router for getting the gateway details and session key as the old session key will be unique for that particular session and is cleaned up from the gateway once the user gets logged off.
- Also, if the gateway has a failure during the day, the user will be allocated a new gateway server. This will be done transparently for the user by the gateway router server.
- At the end of each trading day the gateway router server will clean up the used capacity and will have the same capacity (full capacity) available for all gateway servers for the next day.

7. **Can we connect multiple NNF applications through same IP in a segment using "Direct Connection"?**

Exchange has already introduced "Multi User Login Facility through DC" in the CM, FO, CD and COM segments, SLBM of the Exchange. This facility allows multiple users to connect from the same IP in a segment.

For NEAT Application the NEAT adaptor continues to support Multi User login.

8. **What points are important to consider for using NEAT Adapter along with Direct Connection?**
Members need to note the following:
Member can either connect through NEAT or through NNF from an IP in the segment. NEAT and NNF application cannot simultaneously connect through same IP in the segment.Member if logged in from NEAT will require separate IP for "Direct Connection".

Accordingly, following options are available for members who wish to login via NEAT as well as NNF Applications:
Option 1: NEAT and NNF on separate physical line with individual IP (Apply for separate connectivity scenarios)
Option 2: NEAT and NNF on same physical line but different IPs (Parent – Child).

Members can apply for child IP on the Existing IP. Exchange will issue additional (child) IPs in the same subnet as that of main (parent) IP. There is no change in process for message allocation across Parent – Child IP and/or across segment.
Members can shift their NEAT / NNF User ids on the child IP / alternate IP as per their requirement.

9. **Can the same IPs initially given for CD segment be used for other segments i.e. CM, FO and COM Segment simultaneously?**
Yes. Same IPs initially given for CD segment can be used for other segments i.e. CM, FO and COM Segment simultaneously.

10. **In a lease line scenario – For e.g. we have a B category line with 100 message per second and 50 user id limit IDs on the Lease line. So will the child IP be within this limit or additional?**
Existing message rate and user limits as applicable according to scenario would remain. Member will be required to bifurcate the message rate and user rate across IP and Segments so that the total message rate and user rate does not exceed the total allotted capacity for the said scenario i.e. in this case being 100 m.p.s.

For e.g. B scenario IP with all 100 messages per second allotted for CM segment only

IP Type	IP address*	Box ID in CM*	Message Rate setin CM
Parent	10.260.60.2	123	50
Child 1	10.260.60.12	456	25
Child 2	10.260.60.11	789	25
Total			100

* IP and Box ID mentioned for illustration purposes only

Members need to take care while allocating messages to respective segments on an IP in such manner that the overall rate applicable for that connectivity is not breached to avoid disconnection by the Exchange. (For details, kindly refer the Protocol documents)

11. **How many Child IPs can we apply on a parent IP in colocation and non-colocation facility?**

Member can apply for maximum 9 child IPs on a parent IP in Non-Colocation connectivity scenarios. There is no concept of child IP allotment in the colocation facility of the Exchange.

Members can apply for Child IPs under their Parent IP under below path in ENIT:
ENIT – New – Trade > Membership > Tcp IP Scenario > Activation > Activation Type

Members need to take care while allocating messages to respective segments on an IP in such manner that the overall rate applicable for that connectivity is not breached to avoid disconnection by the Exchange. (For details, kindly refer the Protocol documents)

12. **What will be our action on the messages which violates message rate cap? Also for order breach or breach in no of messages/sec what are the repercussions?**

Exchange trading system will control the Order message rate per second for each connected BOX id. Member systems must count the number of messages sent in a second and not exceed the message rate allocated by the member. (Member systems must maintain the message rate per second which the member has subscribed for). If there is breach, members shall experience disconnection from Exchange Trading System as the Exchange shall logoff the Box id. Effectively all user ids connected to the Box id shall also be disconnected.

The message flow control mechanism as applicable irrespective of "NEAT Adaptor" or "Direct Connection" mode of connecting to the Exchange is as follows:

For Members connecting on LAN i.e. through Colocation IPs:
The message threshold is currently set at "configured message rate per second +10%". Accordingly, the messages received beyond subscribed rate up and to 110% of subscribed rate are rejected by the Exchange. Further the Box id is disconnected if the messages exceed 110% of the subscribed rate for the respective segments.

For Members connecting on WAN i.e. through Non-Colocation IPs:
The message threshold is currently set at "configured message rate per second * X factor". Accordingly, the Box id is disconnected if the messages exceed the threshold calculated as mentioned above of the Subscribed rate for the respective segments. The X factor is internally decided by the Exchange in order to account for the network propagation delay faced by the members for connection via non-colocation facility.

Also "NEAT Adaptor" and "Direct Connection" both will continue to follow the existing logic of Gateway router functionality and will share common nets as currently done.

For effective message rate control, member systems can test their implementations in test market environment.

13. **How is the time window for order rate calculated at the exchange end? For e.g., if the order rate decided is 100 msgs/second, and the order rate is being counted separately by the trading system and the exchange host, it may happen sometimes that the order rate as seen by the exchange host exceeds 100 msgs/second, due to different time window calculations at both ends.**

    Clock time is not to be considered for message-rate. Member systems are expected to control their message rate per second (the 'second' is not of the clock, but of running time, i.e. sliding window). i.e. when an order is being sent, check how many messages are already sent in t-minus- 1000 milliseconds or t-minus-1000000 microseconds.

14. **Does the system implement automatic Logoff on TCP disconnect? Does a TCP disconnect trigger cancellation of Cancel-on-logoff marked orders?**

    Yes. All the business functionalities including COL will work with Direct Connection as with NEAT Adaptor.

15. **How are spread/2L/3L messages counted?**

    Each multi-leg order (Spread/ 2L/3L) message will be counted as 1.

16. **How multiple locking works in a scenario with Direct Connection?**

    Members can multiple lock their user id across maximum 4 IP. The IPs can be any i.e. Parent IP as well as child IP. There is no change in the existing rules of Multi-locking due to this change.

17. **Will there be invitation messages/ counts?**

    No, there will be no invitation message or counts.

18. **Is there any change in how Market Data is published or tick-by-tick price-feed?**

    No. There is no change in Market Data dissemination mechanism and in the Tick-by-tick price-feed.