NATIONAL COMMODITY & DERIVATIVES EXCHANGE LIMITED

Circular to all trading and clearing members of the Exchange

Circular No. : NCDEX/TECHNOLOGY-017/2021

Date : 18-Mar-2021

Subject : API Specification Update – Commodity Index (Agridex & NKrishi)

Members are requested to note that currently, Exchange is disseminating AGRIDEX index feed via a separate multicast channel apart from NKrishi.

Exchange is planning to disseminate NKrishi Index feed along with AGRIDEX Index feed. The Index value shall be disseminated in a snapshot mode every second. Indices feed will be sent to clients on a connectionless UDP Multicast. In future if any new Indices that are getting added by exchange, it will be disseminated via the same channel as AGRIDEX. The Index identification can be done by index code which is a new field added in the API.

Existing feed of the NKrishi index which is currently published through FAST will be **discontinued** from the day the changes are made live in production. Kindly refer **Annexure A** for the updated API Specification.

Empanelled CTCL vendors and members who have developed their CTCL trading software in-house are requested to take note of the same and do the needful to read and disseminate the updated Index feed in their trading software.

Empanelled CTCL vendors and Members using in-house CTCL are requested to ensure completion of necessary changes on or before April 15, 2021. On completion of development, vendors/in-house members are advised to inform the Exchange via email on askus@ncdex.com.

Members can test their software on the test environment from April 01, 2021. The Exchange is planning to Go-Live with these changes before April, 30 2021.

This circular is issued in terms of Bye-laws, Part A, 8.4(g) and 8.4 (i) and Regulation 4.1 of the Exchange Regulations.

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For and on behalf of
National Commodity & Derivatives Exchange Limited

Shreekanth Shivram

Vice President - Technology
Encl: Annexure

For further information / clarifications, please contact

1. Customer Service Group on toll free number: 1800 26 62339
2. Customer Service Group by e-mail to : askus@ncdex.com

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Annexure A

NCDEX Commodity Index Feed

1. Introduction

NCDEX will be disseminating the NKRISHI and AGRIDEX index with the updated API as mentioned below, earlier NKRISHI index was getting disseminated by Fast protocol which will be discontinued now and both the index will come as per below API specification.

This Commodity Index Feed will be disseminated to the clients in a snapshot mode per second. The feed consists of a series of variable length messages. Commodity Index Feed is sent to clients on a connectionless UDP Multicast.

2. Data Type

Data Type	Size In Bytes
CHAR	1
SHORT	2
INT	4
LONG	8
DOUBLE	8

Note-Byte order - Little Endian.

Pragma pack – 2

All the double values will be rounded to 2 decimal points.

Packet Format

The maximum size of the message buffer for receiving broadcast data has to be set to 1020 bytes.

Each broadcast message has a header section followed by data section. The header size is fixed

and needs to be interpreted first. Depending on value received in the field "number_of_records" of stream_header, the message buffer has to be mapped and interpreted for each index data record. Pragma pack (2) to be used for all structures

Server sends all the packets in following structure format:

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Index Message structure -

typedef struct {
    stream_header header;
    index_data index_records_list **[**Depends upon value received in the field "number_of_records" of stream_header**]**;
}index_message;

Stream Header structure -

typedef struct {
    long log_time;
    short transcode;
    short error_code;
    int sequence_number;
    short message_length;
    short number_of_records;
}stream_header;

Index Data structure -

typedef struct {
    short index_code;
    char index_name[22];
    double index_value;
    double high_index_value;
    double low_index_value;
    double opening_index_value;
    double closing_index_value;
    double prev_ind_close;
    double percent_change;
}index_data;

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Diagrammatic Representation of Index Message Packet Format:

If the value of field "number_of_records" in stream header is 5 then following is the format of Index Message

3. Index Message Details -

3.1 Stream Header –

Structure Name	Stream Header		
Packet Length	20		
Transaction Code	1000		
Field Name	**Data Type**	**Value**	**Remark**
log_time	Long	Numeric	This is the epoch time stamp of the packet generation
transcode	Short	Numeric	This is the transcode of the message
error_code	Short	Numeric	Error code if any
sequence_number	INT	Numeric	Sequence number of the message
message_length	Short	Numeric	Total length of the index message
number_of_records	Short	Numeric	Number of index_data packets

3.2 Index Data -

Index data messages consists of following fields -

Structure Name	Index Data		
Packet Length	80		
Field Name	**Data Type**	**Value**	**Remark**
Index_code	SHORT	Numeric	Index specific code number
index_name	CHAR[22]	Character String	Name of the index.
index_value	DOUBLE	Numeric	Current Index value.
high_index_value	DOUBLE	Numeric	Day High value of Index.

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low_index_value	DOUBLE	Numeric	Day Low value of Index.
opening_index_value	DOUBLE	Numeric	Today's Open value of Index.
closing_index_value	DOUBLE	Numeric	Today's Close value of Index.
prev_closing_index_value	DOUBLE	Numeric	Previous close value of Index
percent_changes	DOUBLE	Numeric	Percentage change in index value.

4 Tuning guidelines

4.1 NIC Recommendations

The minimum value of the Max Receive Buffer size on the NICs which are going to be used for receiving the Index Multicast should be 4 KB. NICs with the specified value below the recommended value may not be able to handle the incoming data bursts, resulting in UDP packet drops. In case of teamed NICs (NIC Bonds), this is applicable for both the underlying physical NICs.

Where: This is meant for the machine having application which subscribes to the Index Multicast.

4.2 Increase the Kernel Receiver Backlog

To find out the current value, as root, execute the following command:

sysctl -a | grep netdev_max_backlog

```
/tbtdv1/users/tbtdv> sysctl -a | grep netdev_max_backlog
net.core.netdev_max_backlog = 1000
```

Make a note of the value of this parameter.

If it is lower than 50000, as root, execute the following command to increase it as follows:

/sbin/sysctl -w sys.net.core.netdev_max_backlog=50000

Verify whether the parameter has been set as desired:

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```
/tbtdv1/users/tbtdv> sysctl -a | grep netdev_max_backlog
net.core.netdev_max_backlog = 50000
```

Where: This should be done on the machine which subscribes to the index Multicast.

4.3 Increase the NIC Ring Buffer Receive size on NICs:

As root, execute the following command for all of the NICs on the system which are used for receiving Index Multicast data:

ethtool -g ethX

.. where X corresponds to the NIC number (run the “ifconfig” command to list NICs on your system).

```
[idxmgr@indexdev1 ~]$ ethtool -g eth0
Ring parameters for eth0:
Pre-set maximums:
RX:             4078
RX Mini:        0
RX Jumbo:       0
TX:             511
Current hardware settings:
RX:             200
RX Mini:        0
RX Jumbo:       0
TX:             511
```

Make a note of the following values:

a -> "RX" parameter displayed in the "Pre-set maximums" (current receive buffer size).

b -> "RX" parameter displayed in the "Current hardware settings" (maximum receive buffer size which can be set).

If "b" is lower than "a", as root, execute the following command to increase such that it is set to the max:

ethtool -G ethX rx a

.. where X corresponds to the NIC number and ‘a’ corresponds to maximum value that can be set for the RX parameter.

In case of teamed NICs (NIC Bonds), this tuning should be performed for the underlying physical NICs.

Verify whether the parameter has been set as desired:

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```
[idxmgr@indexdev1 ~]$ ethtool -g eth0
Ring parameters for eth0:
Pre-set maximums:
RX:             4078
RX Mini:        0
RX Jumbo:       0
TX:             511
Current hardware settings:
RX:             4078
RX Mini:        0
RX Jumbo:       0
TX:             511
```

Where: This should be done on the machine which subscribes to the index Multicast.

4.4 Disclaimer

The methods provided in the Tuning Guidelines are in an effort to try and help Members tune their systems. Members must take into careful consideration the load on their systems, availability of system resources and their specific use-cases before embarking on any system tuning exercise. The Exchange does not officially mandate the use of any of the tuning methods mentioned here and is not responsible for the results of any tuning exercise carried out by the Member at their end. Currently these guidelines are available for Linux systems only.

4.5 Index Code –

a. **AGRIDEX-1**
b. **NKrishi-90**

4.6 Index Feed Dissemination - The Multicast server IP/Port is as per below -

Gateway	Multicast IP	Port
Index Multicast Gateway	239.31.4.97	10097

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