CBOE Financial Network

Network Specification

Version 4.1

March 12, 2010

OVERVIEW

The CBOE Financial Network (CFN) is disseminates multicast market data to CBOE Member Firms and Market Data Vendors. Different Market Data products are available via the CFN. The CFN is the only source for Current Quote / Last Sale (CQ/LS) information for the OneChicago Exchange (ONE) and for the CBOE Futures Exchange (CFE). Book Depth (BD) information for these two Exchanges are also available via the CFN.

CBOE, through its subsidiary, Market Data Express (MDX) offers a service comprised of various CBOE index values such as SPX, OEX, VIX, etc. This service is called Market Data Indices (MDI).

NETWORK DESIGN

The CFN uses IP multicast to efficiently and equitably distribute market data to all connected Firms simultaneously. Identical copies of the data are sent to different A and B multicast groups that follow diverse network paths so that a network outage cannot affect both sets of groups. Since there is no provision for retransmitting missed data, firms should read both A and B groups to fill in any gaps.

There are two ways for firms to connect to the CFN:

- Direct Connections
- CBOE Approved Extranet Service Provider

With Direct Connections firms are responsible for ordering and managing their own WAN circuits to CBOE as well as their routers on the CBOE premises. The source for both A and B groups is at the CBOE location in downtown Chicago. In the event of a disaster, only the A groups will be transmitted from CBOE's Disaster Recovery (DR) site.
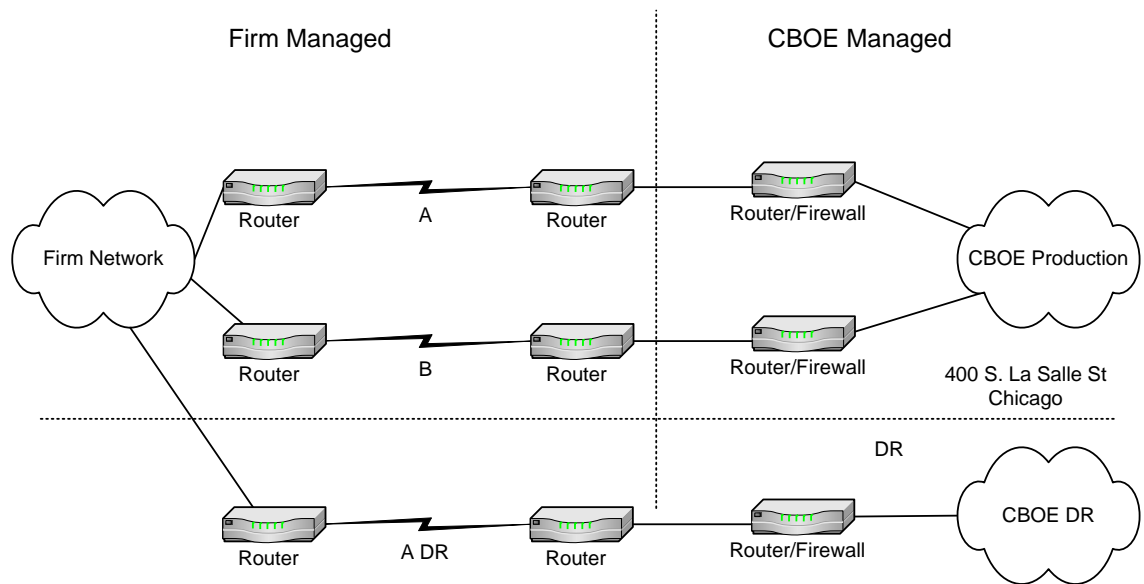
Figure 1 shows a Direct Connection.

Figure 1: Direct Connection

The second type of CFN connection is via a CBOE approved Extranet Service Provider. Firms must first complete the CFN Connection Request form at the end of this document and return it to CBOE at cfn@cboe.com before ordering the connection through their Extranet Service Provider representative. Firms will be billed by CBOE for the data and by the Extranet Service Provider for the connectivity. For redundancy, the Firm must have two Extranet connections.

Figure 2 shows a sample Extranet Service Provider.

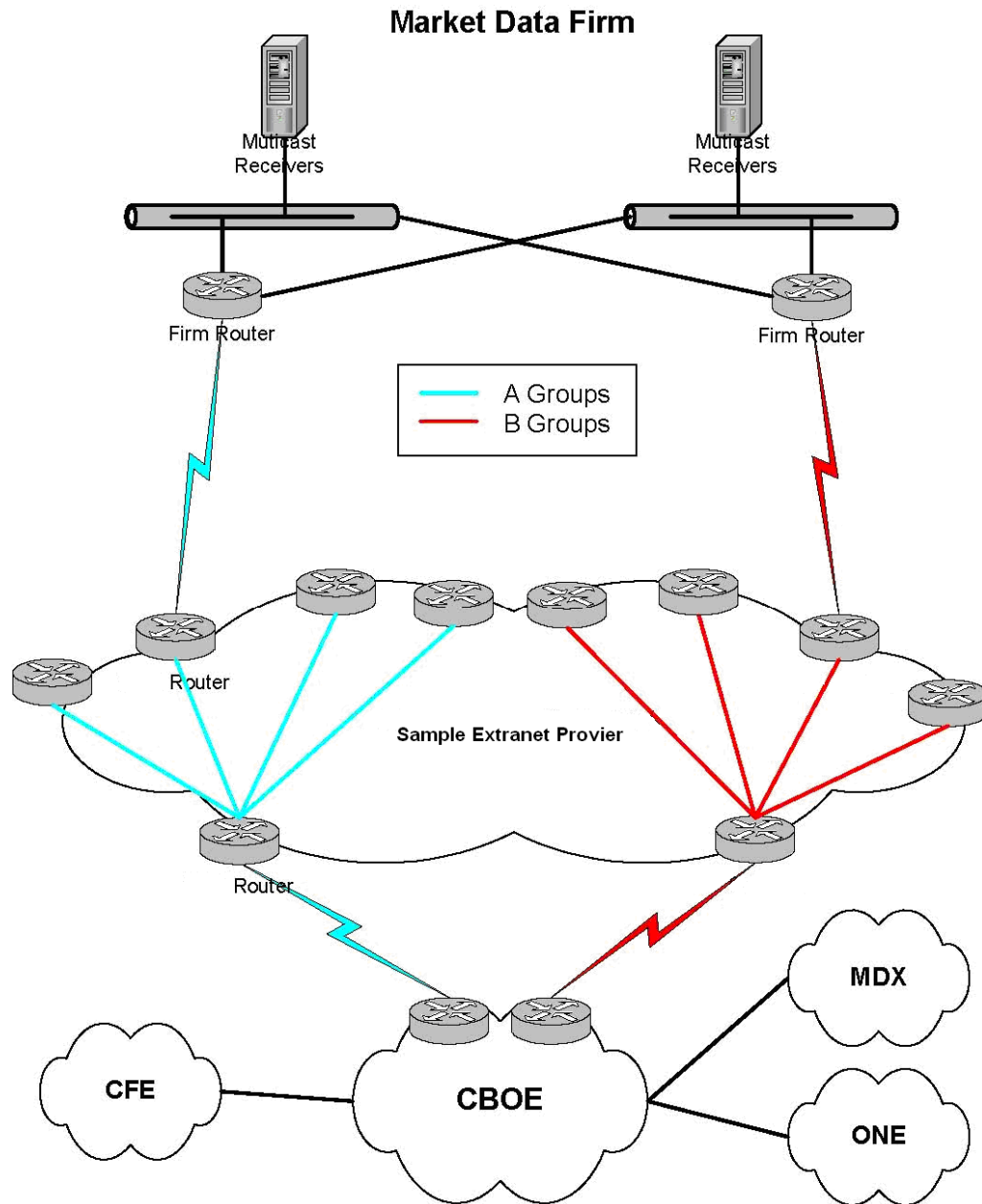**Note:** Not all Extranet Service Providers have connections to the CBOE DR site.

Figure 2: Extranet Service Provider

DATA CHANNEL INFORMATION

For each Data Channel, shown in Table 1 below, identical data is transmitted to two sets of multicast groups – A groups and B groups, with unique multicast group IP addresses and UDP port numbers. Bandwidth has been allocated to each Data Channel taking into consideration historical peak utilization and future growth.

The CFE and ONE Book Depth data channels use three multicast groups each. Products are distributed across the three groups alphabetically:

A-E - Multicast Group One
F-N - Multicast Group Two
O-Z - Multicast Group Three

Table 1: Data Channel Information

Data Channel	Bandwidth Allocation	A Groups		B Groups	
		Multicast IP Address	**UDP Port**	**Multicast IP Address**	**UDP Port**
ONE CQ/LS	15 Mbps	233.65.120.1	52101	233.65.120.2	52102
ONE BD	25 Mbps	233.65.120.3	52103	233.65.120.4	52104
		233.65.120.5	52105	233.65.120.6	52106
		233.65.120.7	52107	233.65.120.8	52108
CFE CQ/LS	450 Kbps	233.65.120.16	52116	233.65.120.17	52117
CFE BD	500 Kbps	233.65.120.18	52118	233.65.120.19	52119
		233.65.120.20	52120	233.65.120.21	52121
		233.65.120.22	52122	233.65.120.23	52123
MDI	50 Kbps	233.65.120.32	52132	233.65.120.33	52133

MULTICAST CONFIGURATION

Direct Connections require the use of PIM Sparse Mode. Configurations with Extranet Service Provider may be different. Firms will need to add routes to the appropriate multicast source networks listed in Table 2. The Rendezvous Points (RP) for the Data Channels is shown in Table 3.

Table 2: Multicast Source Networks

Data Channel	Groups	Source Network
ONE CQ/LS	A	170.137.92.0/24 170.137.100.0/28
	B	170.137.91.0/24
ONE BD	A	170.137.13.96/28
	B	170.137.13.112/28
CFE CQ/LS	A	170.137.92.0/24 170.137.100.0/28
	B	170.137.91.0/24
CFE BD	A	170.137.13.96/28
	B	170.137.13.112/28
MDI	A	170.137.13.96/28 170.137.100.0/28
	B	170.137.13.112/28

Table 3: Multicast Rendezvous Points

Product	Groups	Rendezvous Point
ONE, CFE, MDI	A	170.137.255.97/32
	B	170.137.255.98/32

DATA FORMATS

The CFN does not process the market data or modify the data formats in any way. For information on the specific data formats please see these documents:

- CFE CQ/LS http://systems.cboe.com/webAPI/CFEMarketDataSpec.pdf
- CFE BD http://systems.cboe.com/webAPI/CFEBookDepthSpec.pdf
- ONE CQ/LS http://systems.cboe.com/webAPI/OneMarketDataSpec.pdf
- ONE BD http://systems.cboe.com/webAPI/OneBookDepthSpec.pdf
- MDI http://systems.cboe.com/webAPI/MarketDataIndexSpec.pdf

CONTACT INFORMATION

To report a problem on an existing CFN connection, please call the CBOE Operations Department at 312-786-7642.

For all other inquiries, please send an email to cfn@cboe.com.

CFN Connection Request Form

Requestor Information

Billing information

Firm Name:_____

Address:_____

City:_____

State:_____

Zip Code:_____

Country:_____

Firm Contact: _____

Telephone: _____

E-Mail Address: _____

_____ Initial here if you approve the applicable fees for this service.
Note, service will not be activated if this is not initialed.

Requestor Contact (if different from above)

Name: _____

Title: _____

Telephone: _____

Cell Phone / Pager: _____

E-Mail Address: _____

Data Channels (Add_____ Delete _____)

_____ CFE CQ/LS (inc. COF)   _____ ONE CQ/LS

_____ CFE BD   _____ ONE BD

_____ MDI

Type of Connection

_____ Direct Connection   _____ Extranet Service Provider

Extranet Service Provider

Site A Information (A Groups)

Site Address

Street Address: _____

City / State / Zip Code:

_____

Site Contact Information

Name: _____

Title: _____

Telephone: _____

Cell Phone / Pager: _____

E-Mail Address: _____

Extranet Service Provider:_____

Site B Information (B Groups)

Check if same as above _____

Site Address

Street Address: _____

City / State / Zip Code:

_____

Site Contact Information

Name: _____

Title: _____

Telephone: _____

Cell Phone / Pager: _____

E-Mail Address: _____

Extranet Service Provider (if different)_____

Direct Connect Information

Equipment Location #1: (Floor/Cabinet#)_____

Equipment Location #2: (Floor/Cabinet#)_____