



ICE iMPact Multicast Feed Technical Specification

Version 1.1.17

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Revisions

Version	Date	Description of Changes
1.0.01	12/03/07	Initial draft
1.0.02	02/14/08	Split Europe Futures to Crude Oil and Non Crude channels, US Futures to Agricultures and Financials channels.
1.0.03	02/28/08	Put in multicast group addresses for production environment.
1.0.04	04/08/08	Added section 3.3 PerfTest/Conformance iMPact Multicast Feed IP Addresses
1.0.05	04/10/08	Options multicast is being enhanced for an upcoming release. Removed option related groups from specification until enhancements are ready.
1.0.07	06/18/08	Added the link to Network Connectivity Guide
1.0.08	11/24/08	Changed TCP server port from 2000 to 3000 for APITest and PerfTest
1.0.09	12/11/08	Just updated the version number to match that for the message spec
1.0.09	04/13/09	Added Demo multicast groups and TCP server information
1.0.09	05/19/09	Added Futures Europe Oil Full Implied beta addresses
1.0.09	06/18/09	Updated non-production environments connection information
1.0.10	08/03/09	Added Full Implied beta addresses for OTC and US Agricultures
1.0.11	09/08/09	Added Options addresses for EurOil and US Agricultures for Prod
1.0.12	06/10/09	Added Options addresses for UsFins and WCE for Prod
1.1.01	11/05/09	Added Options and Full Implied addresses in various environments
1.1.02	12/07/09	Changed version number to 1.1.02 to match message spec
1.1.03	04/21/10	Changed version number to 1.1.03 to match message spec
1.1.03	05/27/10	Changed “ICE Futures Europe Oil Options” to “ICE Europe Options”
1.1.03	06/14/10	Changed Options TOP5PL to TOB
1.1.03	06/24/10	Removed Production Connection Info section and referred to Multicast Connectivity Guide on ICE web site
1.1.03	08/04/10	Added new multicast groups for Brent, WTI, EurOil Others, Brent FI, WTI FI, and EurOil Others FI.
1.1.03	08/16/10	Added new section 3.1 for Multicast Group Terminology
1.1.04	09/22/10	Changed to 1.1.04 to match message spec
1.1.04	11/11/10	Removed Europe Oil and Full Implied Europe Oil groups from APITest and PerfTest; added CCX Options
1.1.04	11/24/10	Added ICE Europe Options in PerfTest
1.1.05	02/03/11	Changed to 1.1.05 to match message spec
1.1.05	02/09/11	Added ICE OTC Options in APITest
1.1.05	02/18/11	Added ICE Futures Europe Non Oil FI in APITest
1.1.06	03/01/11	Changed to 1.1.06 to match message spec
1.1.07	03/28/11	Changed to 1.1.07 to match message spec
1.1.07	04/29/11	Reassigned multicast addresses for APITest and PerfTest
1.1.08	06/17/11	Changed to 1.1.08 to match message spec
1.1.09	07/11/11	Changed to 1.1.09 to match message spec

1.1.09	07/20/11	Added US Agricultures Options and OTC Options in PerfTest
1.1.10	09/01/11	Changed to 1.1.10 to match message spec
1.1.11	10/31/11	Changed to 1.1.11 to match message spec
1.1.12	12/02/11	Changed to 1.1.12 to match message spec
1.1.12	01/17/12	Added ICE Futures Canada Options group in APITest Added ICE Futures US Financials Options group in PerfTest
1.1.13	07/25/12	Changed to 1.1.13 to match message spec
1.1.13	10/10/12	Added Griffin Markets in APITest
1.1.14	11/19/12	Changed to 1.1.14 to match message spec
1.1.14	09/13/13	Added ICE Endex and ICE Endex Options; removed Griffin in APITest
1.1.15	10/16/13	Changed to 1.1.15 to match message spec
1.1.16	11/26/13	Added ICE Endex Spot channels in APITest Added the following Options Top10PL live and snapshot channels to API Test: <ul style="list-style-type: none"> • ICE Futures Canada Options • ICE Endex Options • ICE Futures Europe Options • ICE Futures US Agricultures Options • ICE Futures US Financials Options • ICE OTC Options Added Liffe markets regular and FOD channels in API test
1.1.17	03/20/14	Changed to 1.1.17 to match message spec
1.1.17	03/25/14	APITest - Reassigned multicast group addresses for some groups to 233.156.208.232

1 Introduction

This document describes the key concepts and protocol, as well as connection and testing related info for iImpact Multicast Feed.

1.1 Related Documents

ICE iImpact Multicast Feed Message Specification

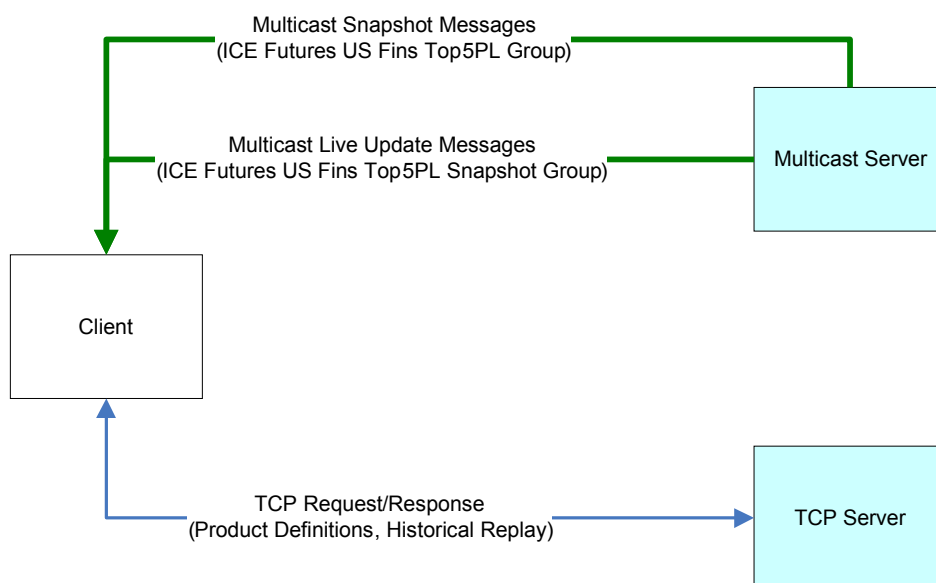
ICE iImpact Multicast Feed Network Connectivity Guide

(https://www.theice.com/publicdocs/technology/ICE_Multicast_Connectivity_Guide.pdf)

ICE iImpact Multicast Feed Getting Started

2 Overview

The iMPact multicast feed supports multicast of live update messages, and snapshots for client startup and recovery. TCP is used for obtaining product definitions, and historical replay, if needed. The multicast groups are defined based on criteria such as product and book depth, etc (see next section for connection info). The following diagram illustrates a client that is interested in ICE Futures US Financials Top 5 Price Level data only.



Typically, clients will initially connect to the TCP server to download product definitions. The next action is to listen to the live update and snapshot multicast channels. The snapshot channel is only needed for the initial client startup and recovery.

3 Connection Info

When integrating to this feed, clients must build in the ability to join various multicast groups. They must also support the ability to connect to the TCP servers. Please read the “ICE iMPact Multicast Feed Network Connectivity Guide” for more details. This document provides the most current address information for the multicast groups and TCP servers on Production, APITest, PerfTest, and Demo environments.

3.1 Multicast Group Terminology

The multicast groups are currently defined based on the following criteria:

- Products**
 Sets of products, such as ICE Futures US Financials, ICE Futures Canada, etc. (*defined in section 3.#.1 below*). It should be noted that the granularity of the multicast groupings by product may not be synchronized with the Market Type names that are used when permissioning user logins to the exchange. In other words, the ICE Futures US Financials multicast group disseminates market data

from each of the following market types: US Dollar Index, Russell Indices, Commodity Index Futures, and Foreign Exchange,. For a complete listing of multicast group to market type relationships, please view the “Supported Market Types” document at

https://www.theice.com/publicdocs/technology/Supported_Market_Types_on_ICE_API.pdf

- **Book depth**

Full Order Depth (FOD)

Top 5 Price Level (TOP5PL)

Top Of Book (TOB) – *Options Only*

- **Implied Prices**

The exchange supports implied prices for certain products (or contracts). There are two distinct categorizations of implied prices from a market data dissemination perspective. Each of them are sent out over a different multicast group. Please reference the table under #1 in the “ICE Futures Implied Prices FAQ” document at

https://www.theice.com/publicdocs/technology/Additional_Implieds_FAQ.pdf before proceeding.

1. The “Implied Range” column is the implied data that is disseminated via the “Full Implied” multicast groups. The Full Implied multicast groups will also include all of the regular (non-implied) market data as well, therefore if an application, for example, listens to the “ICE Futures US Agricultures FOD Full Implied Live Updates” group, it is not necessary to also listen to the “ICE Futures US Agricultures FOD Live Updates” group. The latter group is a subset of the market data of the former.
2. The “Broadcast Range” column is the implied data that is disseminated via the *regular* multicast groups. Using the same example from #1 above, the “Broadcast Range” data is disseminated over the “ICE Futures US Agricultures FOD Live Updates” group.

Recognizing that some groups like the Full Implied groups may have higher bandwidth demands, clients have the flexibility of subscribing to the multicast groups that are best suited to their individual needs. The TCP connection is serviced by a pool of servers that are connected via a single IP address. New criteria and groups (*e.g. FAST compacted groups*) will be considered for addition in future versions of the feed.

The followings are the IP addresses and ports assigned to different multicast groups and TCP servers on Production, APITest , PerfTest, and Demo environments.

3.2 Production iImpact Multicast Feed IP Addresses

Please refer to ICE iImpact Multicast Feed Network Connectivity Guide at the URL below:

https://www.theice.com/publicdocs/technology/ICE_Multicast_Connectivity_Guide.pdf

3.3 APITest iImpact Multicast Feed IP Addresses

3.3.1 Multicast Groups

For the APITest environment, since the multicast traffic cannot be routed through the Internet, ICE provides a tunnel proxy program that connects to ICE through TCP and re-broadcasts messages on the client's local network through multicast. Please read later section for more details on the tunnel proxy program.

The test tunnel IP address is the same for all multicast groups – 63.247.113.163, while the tunnel port varies according to the below table.

Group	IP Address	Port	Tunnel Port
ICE Futures US Agricultures FOD Live Updates	233.156.208.255	20255	3001
ICE Futures US Agricultures FOD Snapshots	233.156.208.254	20254	3001
ICE Futures US Agricultures TOP5PL Live Updates	233.156.208.253	20253	3001
ICE Futures US Agricultures TOP5PL Snapshots	233.156.208.252	20252	3001
ICE Futures US Financials FOD Live Updates	233.156.208.251	20251	3007
ICE Futures US Financials FOD Snapshots	233.156.208.250	20250	3007
ICE Futures US Financials TOP5PL Live Updates	233.156.208.249	20249	3007
ICE Futures US Financials TOP5PL Snapshots	233.156.208.248	20248	3007
ICE Futures Europe Non Oil FOD Live Updates	233.156.208.247	20247	3006
ICE Futures Europe Non Oil FOD Snapshots	233.156.208.246	20246	3006
ICE Futures Europe Non Oil TOP5PL Live Updates	233.156.208.245	20245	3006
ICE Futures Europe Non Oil TOP5PL Snapshots	233.156.208.244	20244	3006
ICE OTC FOD Live Updates	233.156.208.243	20243	3003
ICE OTC FOD Snapshots	233.156.208.242	20242	3003
ICE OTC TOP5PL Updates	233.156.208.241	20241	3003
ICE OTC TOP5PL Snapshots	233.156.208.240	20240	3003
ICE Futures Canada FOD Live Updates	233.156.208.239	20239	3004
ICE Futures Canada FOD Snapshots	233.156.208.238	20238	3004
ICE Futures Canada TOP5PL Updates	233.156.208.237	20237	3004
ICE Futures Canada TOP5PL Snapshots	233.156.208.236	20236	3004

ICE Futures Brent FOD Live Updates	233.156.208.231	20231	3014
ICE Futures Brent FOD Snapshots	233.156.208.230	20230	3014
ICE Futures Brent TOP5PL Live Updates	233.156.208.229	20229	3014
ICE Futures Brent TOP5PL Snapshots	233.156.208.228	20228	3014
ICE Futures WTI FOD Live Updates	233.156.208.227	20227	3015
ICE Futures WTI FOD Snapshots	233.156.208.226	20226	3015
ICE Futures WTI TOP5PL Live Updates	233.156.208.225	20225	3015
ICE Futures WTI TOP5PL Snapshots	233.156.208.224	20224	3015
ICE Futures Europe Oil Others FOD Live Updates	233.156.208.223	20223	3016
ICE Futures Europe Oil Others FOD Snapshots	233.156.208.222	20222	3016
ICE Futures Europe Oil Others TOP5PL Live Updates	233.156.208.221	20221	3016
ICE Futures Europe Oil Others TOP5PL Snapshots	233.156.208.220	20220	3016
ICE OTC FOD Full Implied Live Updates	233.156.208.219	20219	3009
ICE OTC FOD Full Implied Snapshots	233.156.208.218	20218	3009
ICE OTC TOP5PL Full Implied Live Updates	233.156.208.217	20217	3009
ICE OTC TOP5PL Full Implied Snapshots	233.156.208.216	20216	3009
ICE Futures US Agricultures FOD Full Implied Live Updates	233.156.208.215	20215	3010
ICE Futures US Agricultures FOD Full Implied Snapshots	233.156.208.214	20214	3010
ICE Futures US Agricultures TOP5PL Full Implied Live Updates	233.156.208.213	20213	3010
ICE Futures US Agricultures TOP5PL Full Implied Snapshots	233.156.208.212	20212	3010
ICE Futures Europe Non Oil FOD Full Implied Live Updates	233.156.208.211	20211	3022
ICE Futures Europe Non Oil FOD Full Implied Snapshots	233.156.208.210	20210	3022
ICE Futures Europe Non Oil TOP5PL Full Implied Live Updates	233.156.208.209	20209	3022
ICE Futures Europe Non Oil TOP5PL Full Implied Snapshots	233.156.208.208	20208	3022
ICE Futures Brent FOD Full Implied Live Updates	233.156.208.207	20207	3017
ICE Futures Brent FOD Full Implied Snapshots	233.156.208.206	20206	3017
ICE Futures Brent TOP5PL Full Implied Live Updates	233.156.208.205	20205	3017
ICE Futures Brent TOP5PL Full Implied Snapshots	233.156.208.204	20204	3017

ICE Futures WTI FOD Full Implied Live Updates	233.156.208.203	20203	3018
ICE Futures WTI FOD Full Implied Snapshots	233.156.208.202	20202	3018
ICE Futures WTI TOP5PL Full Implied Live Updates	233.156.208.201	20201	3018
ICE Futures WTI TOP5PL Full Implied Snapshots	233.156.208.200	20200	3018
ICE Futures Europe Oil Others FOD Full Implied Live Updates	233.156.208.199	20199	3019
ICE Futures Europe Oil Others FOD Full Implied Snapshots	233.156.208.198	20198	3019
ICE Futures Europe Oil Others TOP5PL Full Implied Live Updates	233.156.208.197	20197	3019
ICE Futures Europe Oil Others TOP5PL Full Implied Snapshots	233.156.208.196	20196	3019
ICE Futures Europe Options TOB Live Updates	233.156.208.195	20195	3011
ICE Futures Europe Options TOB Snapshots	233.156.208.194	20194	3011
ICE Futures US Financials Options TOB Live Updates	233.156.208.193	20193	3012
ICE Futures US Financials Options TOB Snapshots	233.156.208.192	20192	3012
ICE Futures US Agricultures Options TOB Live Updates	233.156.208.191	20191	3013
ICE Futures US Agricultures Options TOB Snapshots	233.156.208.190	20190	3013
ICE OTC Options TOB Live Updates	233.156.208.187	20187	3021
ICE OTC Options TOB Snapshots	233.156.208.186	20186	3021
ICE Futures Canada Options TOB Live Updates	233.156.208.185	20185	3023
ICE Futures Canada Options TOB Snapshots	233.156.208.184	20184	3023
ICE Endex Options TOB Live Updates	233.156.208.232	20159	3029
ICE Endex Options TOB Snapshots	233.156.208.232	20158	3029
ICE Endex FOD Live Updates	233.156.208.232	20163	3028
ICE Endex FOD Snapshots	233.156.208.232	20162	3028
ICE Endex TOP5PL Updates	233.156.208.232	20161	3028
ICE Endex TOP5PL Snapshots	233.156.208.232	20160	3028
ICE Futures Canada Options TOP10PL Live Updates	233.156.208.232	20153	3031
ICE Futures Canada Options TOP10PL Snapshots	233.156.208.232	20152	3031

ICE Endex Options TOP10PL Live Updates	233.156.208.232	20151	3032
ICE Endex Options TOP10PL Snapshots	233.156.208.232	20150	3032
ICE Futures Europe Options TOP10PL Live Updates	233.156.208.232	20149	3033
ICE Futures Europe Options TOP10PL Snapshots	233.156.208.232	20148	3033
ICE Futures US Agricultures Options TOP10PL Live Updates	233.156.208.232	20147	3034
ICE Futures US Agricultures Options TOP10PL Snapshots	233.156.208.232	20146	3034
ICE Futures US Financials Options TOP10PL Live Updates	233.156.208.232	20145	3035
ICE Futures US Financials Options TOP10PL Snapshots	233.156.208.232	20144	3035
ICE OTC Options TOP10PL Live Updates	233.156.208.232	20143	3036
ICE OTC Options TOP10PL Snapshots	233.156.208.232	20142	3036

3.3.2 TCP Servers

IP Address: 63.247.113.163 Port: 3000

3.3.3 Multicast Groups for Endex Spot Channels

The test tunnel IP address for Endex Spot Channels is 63.247.113.77, and the tunnel port is 3030.

Group	IP Address	Port	Tunnel Port
ICE Endex Spot FOD Live Updates	233.156.208.157	20157	3030
ICE Endex Spot FOD Snapshots	233.156.208.156	20156	3030
ICE Endex Spot TOP5PL Updates	233.156.208.155	20155	3030
ICE Endex Spot TOP5PL Snapshots	233.156.208.154	20154	3030

3.3.4 TCP Servers for Endex Spot Channels

IP Address: 63.247.113.77 Port: 3000

3.3.5 Multicast Groups for Liffe Channels

Group	IP Address	Port	Tunnel Port
ICE Futures Europe (Liffe) STIRS Other FOD Live Updates	233.156.208.232	21255	3037
ICE Futures Europe (Liffe) STIRS Other FOD Snapshots	233.156.208.232	21254	3037
ICE Futures Europe (Liffe) STIRS Other TOP5PL Live Updates	233.156.208.232	21253	3037
ICE Futures Europe (Liffe) STIRS Other TOP5PL Snapshots	233.156.208.232	21252	3037
ICE Futures Europe (Liffe) Three Month Euro and EONIA FOD Live Updates	233.156.208.232	21251	3038
ICE Futures Europe (Liffe) Three Month Euro and EONIA FOD Snapshots	233.156.208.232	21250	3038
ICE Futures Europe (Liffe) Three Month Euro and EONIA TOP5PL Live Updates	233.156.208.232	21249	3038
ICE Futures Europe (Liffe) Three Month Euro and EONIA TOP5PL Snapshots	233.156.208.232	21248	3038
ICE Futures Europe (Liffe) Medium and Long Term IR FOD Live Updates	233.156.208.232	21247	3039
ICE Futures Europe (Liffe) Medium and Long Term IR FOD Snapshots	233.156.208.232	21246	3039
ICE Futures Europe (Liffe) Medium and Long Term IR TOP5PL Live Updates	233.156.208.232	21245	3039
ICE Futures Europe (Liffe) Medium and Long Term IR TOP5PL Snapshots	233.156.208.232	21244	3039
ICE Futures Europe (Liffe) Equity and Indices FOD Live Updates	233.156.208.232	21243	3040
ICE Futures Europe (Liffe) Equity and Indices FOD Snapshots	233.156.208.232	21242	3040
ICE Futures Europe (Liffe) Equity and Indices TOP5PL Updates	233.156.208.232	21241	3040
ICE Futures Europe (Liffe) Equity and Indices TOP5PL Snapshots	233.156.208.232	21240	3040
ICE Futures Europe (Liffe) Agricultural FOD Live Updates	233.156.208.232	21239	3041
ICE Futures Europe (Liffe) Agricultural FOD Snapshots	233.156.208.232	21238	3041
ICE Futures Europe (Liffe) Agricultural TOP5PL Updates	233.156.208.232	21237	3041
ICE Futures Europe (Liffe) Agricultural TOP5PL Snapshots	233.156.208.232	21236	3041

ICE Futures Europe (Liffe) GCF and Eurodollar FOD Live Updates	233.156.208.232	21235	3042
ICE Futures Europe (Liffe) GCF and Eurodollar FOD Snapshots	233.156.208.232	21234	3042
ICE Futures Europe (Liffe) GCF and Eurodollar TOP5PL Live Updates	233.156.208.232	21233	3042
ICE Futures Europe (Liffe) GCF and Eurodollar TOP5PL Snapshots	233.156.208.232	21232	3042
ICE Futures US (Liffe) Metals FOD Live Updates	233.156.208.232	21231	3043
ICE Futures US (Liffe) Metals FOD Snapshots	233.156.208.232	21230	3043
ICE Futures US (Liffe) Metals TOP5PL Live Updates	233.156.208.232	21229	3043
ICE Futures US (Liffe) Metals TOP5PL Snapshots	233.156.208.232	21228	3043
ICE Futures US (Liffe) Equity Indices FOD Live Updates	233.156.208.232	21227	3044
ICE Futures US (Liffe) Equity Indices FOD Snapshots	233.156.208.232	21226	3044
ICE Futures US (Liffe) Equity Indices TOP5PL Live Updates	233.156.208.232	21225	3044
ICE Futures US (Liffe) Equity Indices TOP5PL Snapshots	233.156.208.232	21224	3044
ICE Futures Europe (Liffe) STIRS Other FOD Full Implied Live Updates	233.156.208.232	21223	3045
ICE Futures Europe (Liffe) STIRS Other FOD Full Implied Snapshots	233.156.208.232	21222	3045
ICE Futures Europe (Liffe) STIRS Other TOP5PL Full Implied Live Updates	233.156.208.232	21221	3045
ICE Futures Europe (Liffe) STIRS Other TOP5PL Full Implied Snapshots	233.156.208.232	21220	3045
ICE Futures Europe (Liffe) Three Month Euro and EONIA FOD Full Implied Live Updates	233.156.208.232	21219	3046
ICE Futures Europe (Liffe) Three Month Euro and EONIA FOD Full Implied Snapshots	233.156.208.232	21218	3046
ICE Futures Europe (Liffe) Three Month Euro and EONIA TOP5PL Full Implied Live Updates	233.156.208.232	21217	3046
ICE Futures Europe (Liffe) Three Month Euro and EONIA TOP5PL Full Implied Snapshots	233.156.208.232	21216	3046

ICE Futures Europe (Liffe) Medium and Long Term IR FOD Full Implied Live Updates	233.156.208.232	21215	3047
ICE Futures Europe (Liffe) Medium and Long Term IR FOD Full Implied Snapshots	233.156.208.232	21214	3047
ICE Futures Europe (Liffe) Medium and Long Term IR TOP5PL Full Implied Live Updates	233.156.208.232	21213	3047
ICE Futures Europe (Liffe) Medium and Long Term IR TOP5PL Full Implied Snapshots	233.156.208.232	21212	3047
ICE Futures Europe (Liffe) Equity and Indices FOD Full Implied Live Updates	233.156.208.232	21211	3048
ICE Futures Europe (Liffe) Equity and Indices FOD Full Implied Snapshots	233.156.208.232	21210	3048
ICE Futures Europe (Liffe) Equity and Indices TOP5PL Full Implied Live Updates	233.156.208.232	21209	3048
ICE Futures Europe (Liffe) Equity and Indices TOP5PL Full Implied Snapshots	233.156.208.232	21208	3048
ICE Futures Europe (Liffe) Agricultural FOD Full Implied Live Updates	233.156.208.232	21207	3049
ICE Futures Europe (Liffe) Agricultural FOD Full Implied Snapshots	233.156.208.232	21206	3049
ICE Futures Europe (Liffe) Agricultural TOP5PL Full Implied Live Updates	233.156.208.232	21205	3049
ICE Futures Europe (Liffe) Agricultural TOP5PL Full Implied Snapshots	233.156.208.232	21204	3049
ICE Futures Europe (Liffe) GCF and Eurodollar FOD Full Implied Live Updates	233.156.208.232	21203	3050
ICE Futures Europe (Liffe) GCF and Eurodollar FOD Full Implied Snapshots	233.156.208.232	21202	3050
ICE Futures Europe (Liffe) GCF and Eurodollar TOP5PL Full Implied Live Updates	233.156.208.232	21201	3050
ICE Futures Europe (Liffe) GCF and Eurodollar TOP5PL Full Implied Snapshots	233.156.208.232	21200	3050
ICE Futures US (Liffe) Metals FOD Full Implied Live Updates	233.156.208.232	21199	3051
ICE Futures US (Liffe) Metals FOD Full Implied Snapshots	233.156.208.232	21198	3051
ICE Futures US (Liffe) Metals TOP5PL Full Implied Live Updates	233.156.208.232	21197	3051
ICE Futures US (Liffe) Metals TOP5PL Full Implied Snapshots	233.156.208.232	21196	3051

ICE Futures US (Liffe) Equity Indices FOD Full Implied Live Updates	233.156.208.232	21195	3052
ICE Futures US (Liffe) Equity Indices FOD Full Implied Snapshots	233.156.208.232	21194	3052
ICE Futures US (Liffe) Equity Indices TOP5PL Full Implied Live Updates	233.156.208.232	21193	3052
ICE Futures US (Liffe) Equity Indices TOP5PL Full Implied Snapshots	233.156.208.232	21192	3052
ICE Futures Europe (Liffe) Options TOP10PL Live Updates	233.156.208.232	21191	3053
ICE Futures Europe (Liffe) Options TOP10PL Snapshots	233.156.208.232	21190	3053
ICE Futures Europe (Liffe) Options TOB Live Updates	233.156.208.232	21189	3054
ICE Futures Europe (Liffe) Options TOB Snapshots	233.156.208.232	21188	3054
ICE Futures US (Liffe) Options TOP10PL Live Updates	233.156.208.232	21187	3055
ICE Futures US (Liffe) Options TOP10PL Snapshots	233.156.208.232	21186	3055
ICE Futures US (Liffe) Options TOB Live Updates	233.156.208.232	21185	3056
ICE Futures US (Liffe) Options TOB Snapshots	233.156.208.232	21184	3056

3.3.6 TCP Servers for Liffe Channels

IP Address: 63.247.113.229 Port: 3000

3.4 PerfTest/Conformance iImpact Multicast Feed IP Addresses

3.4.1 Multicast Groups

For the PerfTest/conformance environment, since the multicast traffic cannot be routed through the Internet, ICE provides a tunnel proxy program that connects to ICE through TCP and re-broadcasts messages on the client's local network through multicast. Please read later section for more details on the tunnel proxy program.

The test tunnel IP address is the same for all multicast groups – 63.247.113.214, while the tunnel port varies according to the below table.

Group	IP Address	Port	Tunnel Port
ICE Futures US Agricultures FOD Live Updates	233.156.208.255	30255	3001
ICE Futures US Agricultures FOD Snapshots	233.156.208.254	30254	3001
ICE Futures US Agricultures TOP5PL Live Updates	233.156.208.253	30253	3001
ICE Futures US Agricultures TOP5PL Snapshots	233.156.208.252	30252	3001
ICE Futures US Financials FOD Live Updates	233.156.208.251	30251	3007
ICE Futures US Financials FOD Snapshots	233.156.208.250	30250	3007
ICE Futures US Financials TOP5PL Live Updates	233.156.208.249	30249	3007
ICE Futures US Financials TOP5PL Snapshots	233.156.208.248	30248	3007
ICE Futures Europe Non Oil FOD Live Updates	233.156.208.247	30247	3006
ICE Futures Europe Non Oil FOD Snapshots	233.156.208.246	30246	3006
ICE Futures Europe Non Oil TOP5PL Live Updates	233.156.208.245	30245	3006
ICE Futures Europe Non Oil TOP5PL Snapshots	233.156.208.244	30244	3006
ICE OTC FOD Live Updates	233.156.208.243	30243	3003
ICE OTC FOD Snapshots	233.156.208.242	30242	3003
ICE OTC TOP5PL Updates	233.156.208.241	30241	3003
ICE OTC TOP5PL Snapshots	233.156.208.240	30240	3003
ICE Futures Canada FOD Live Updates	233.156.208.239	30239	3004
ICE Futures Canada FOD Snapshots	233.156.208.238	30238	3004

ICE Futures Canada TOP5PL Updates	233.156.208.237	30237	3004
ICE Futures Canada TOP5PL Snapshots	233.156.208.236	30236	3004
ICE Futures Brent FOD Live Updates	233.156.208.231	30231	3011
ICE Futures Brent FOD Snapshots	233.156.208.230	30230	3011
ICE Futures Brent TOP5PL Live Updates	233.156.208.229	30229	3011
ICE Futures Brent TOP5PL Snapshots	233.156.208.228	30228	3011
ICE Futures WTI FOD Live Updates	233.156.208.227	30227	3012
ICE Futures WTI FOD Snapshots	233.156.208.226	30226	3012
ICE Futures WTI TOP5PL Live Updates	233.156.208.225	30225	3012
ICE Futures WTI TOP5PL Snapshots	233.156.208.224	30224	3012
ICE Futures Europe Oil Others FOD Live Updates	233.156.208.223	30223	3013
ICE Futures Europe Oil Others FOD Snapshots	233.156.208.222	30222	3013
ICE Futures Europe Oil Others TOP5PL Live Updates	233.156.208.221	30221	3013
ICE Futures Europe Oil Others TOP5PL Snapshots	233.156.208.220	30220	3013
ICE OTC FOD Full Implied Live Updates	233.156.208.219	30219	3009
ICE OTC FOD Full Implied Snapshots	233.156.208.218	30218	3009
ICE OTC TOP5PL Full Implied Updates	233.156.208.217	30217	3009
ICE OTC TOP5PL Full Implied Snapshots	233.156.208.216	30216	3009
ICE Futures US Agricultures FOD Full Implied Live Updates	233.156.208.215	30215	3010
ICE Futures US Agricultures FOD Full Implied Snapshots	233.156.208.214	30214	3010
ICE Futures US Agricultures TOP5PL Full Implied Live Updates	233.156.208.213	30213	3010
ICE Futures US Agricultures TOP5PL Full Implied Snapshots	233.156.208.212	30212	3010
ICE Futures Brent FOD Full Implied Live Updates	233.156.208.207	30207	3014
ICE Futures Brent FOD Full Implied Snapshots	233.156.208.206	30206	3014
ICE Futures Brent TOP5PL Full Implied Live Updates	233.156.208.205	30205	3014
ICE Futures Brent TOP5PL Full Implied Snapshots	233.156.208.204	30204	3014
ICE Futures WTI FOD Full Implied Live Updates	233.156.208.203	30203	3015
ICE Futures WTI FOD Full Implied Snapshots	233.156.208.202	30202	3015

ICE Futures WTI TOP5PL Full Implied Live Updates	233.156.208.201	30201	3015
ICE Futures WTI TOP5PL Full Implied Snapshots	233.156.208.200	30200	3015
ICE Futures Europe Oil Others FOD Full Implied Live Updates	233.156.208.199	30199	3016
ICE Futures Europe Oil Others FOD Full Implied Snapshots	233.156.208.198	30198	3016
ICE Futures Europe Oil Others TOP5PL Full Implied Live Updates	233.156.208.197	30197	3016
ICE Futures Europe Oil Others TOP5PL Full Implied Snapshots	233.156.208.196	30196	3016
ICE Futures Europe Options TOB Live Updates	233.156.208.195	30195	3017
ICE Futures Europe Options TOB Snapshots	233.156.208.194	30194	3017
ICE Futures US Financials Options TOB Live Updates	233.156.208.193	30193	3020
ICE Futures US Financials Options TOB Snapshots	233.156.208.192	30192	3020
ICE Futures US Agricultures Options TOB Live Updates	233.156.208.191	30191	3018
ICE Futures US Agricultures Options TOB Snapshots	233.156.208.190	30190	3018
ICE OTC Options TOB Live Updates	233.156.208.187	30187	3019
ICE OTC Options TOB Snapshots	233.156.208.186	30186	3019

3.4.2 TCP Servers

IP Address: 63.247.113.214 Port: 3000

3.5 Demo iImpact Multicast Feed IP Addresses

3.5.1 Multicast Groups

For the Demo environment, since the multicast traffic cannot be routed through the Internet, ICE provides a tunnel proxy program that connects to ICE through TCP and re-broadcasts messages on the client's local network through multicast. Please read later section for more details on the tunnel proxy program.

The test tunnel IP address is the same for all multicast groups - 63.247.113.225, while the tunnel port varies according to the below table.

Group	IP Address	Port	Tunnel Port
ICE Futures US Agricultures FOD Live Updates	239.200.5.0	20000	3001
ICE Futures US Agricultures FOD Snapshots	239.200.5.1	20001	3001
ICE Futures US Agricultures TOP5PL Live Updates	239.200.5.2	20002	3001
ICE Futures US Agricultures TOP5PL Snapshots	239.200.5.3	20003	3001
ICE Futures US Financials FOD Live Updates	239.200.5.4	20004	3007
ICE Futures US Financials FOD Snapshots	239.200.5.5	20005	3007
ICE Futures US Financials TOP5PL Live Updates	239.200.5.6	20006	3007
ICE Futures US Financials TOP5PL Snapshots	239.200.5.7	20007	3007
ICE Futures Europe Non Oil FOD Live Updates	239.200.5.12	20012	3006
ICE Futures Europe Non Oil FOD Snapshots	239.200.5.13	20013	3006
ICE Futures Europe Non Oil TOP5PL Live Updates	239.200.5.14	20014	3006
ICE Futures Europe Non Oil TOP5PL Snapshots	239.200.5.15	20015	3006
ICE OTC FOD Live Updates	239.200.5.16	20016	3003
ICE OTC FOD Snapshots	239.200.5.17	20017	3003
ICE OTC TOP5PL Updates	239.200.5.18	20018	3003
ICE OTC TOP5PL Snapshots	239.200.5.19	20019	3003
ICE Futures Canada FOD Live Updates	239.200.5.20	20020	3004
ICE Futures Canada FOD Snapshots	239.200.5.21	20021	3004

ICE Futures Canada TOP5PL Updates	239.200.5.22	20022	3004
ICE Futures Canada TOP5PL Snapshots	239.200.5.23	20023	3004
ICE Futures Brent FOD Live Updates	239.200.5.48	20048	3011
ICE Futures Brent FOD Snapshots	239.200.5.49	20049	3011
ICE Futures Brent TOP5PL Live Updates	239.200.5.50	20050	3011
ICE Futures Brent TOP5PL Snapshots	239.200.5.51	20051	3011
ICE Futures WTI FOD Live Updates	239.200.5.38	20038	3015
ICE Futures WTI FOD Snapshots	239.200.5.39	20039	3015
ICE Futures WTI TOP5PL Live Updates	239.200.5.40	20040	3015
ICE Futures WTI TOP5PL Snapshots	239.200.5.41	20041	3015
ICE Futures Europe Oil Others FOD Live Updates	239.200.5.28	20028	3012
ICE Futures Europe Oil Others FOD Snapshots	239.200.5.29	20029	3012
ICE Futures Europe Oil Others TOP5PL Live Updates	239.200.5.30	20030	3012
ICE Futures Europe Oil Others TOP5PL Snapshots	239.200.5.31	20031	3012
ICE OTC FOD Full Implied Live Updates	239.200.5.70	20070	3021
ICE OTC FOD Full Implied Snapshots	239.200.5.71	20071	3021
ICE OTC TOP5PL Full Implied Updates	239.200.5.72	20072	3021
ICE OTC TOP5PL Full Implied Snapshots	239.200.5.73	20073	3021
ICE Futures US Agricultures FOD Full Implied Live Updates	239.200.5.74	20074	3022
ICE Futures US Agricultures FOD Full Implied Snapshots	239.200.5.75	20075	3022
ICE Futures US Agricultures TOP5PL Full Implied Live Updates	239.200.5.76	20076	3022
ICE Futures US Agricultures TOP5PL Full Implied Snapshots	239.200.5.77	20077	3022
ICE Futures Europe Non Oil FOD Full Implied Live Updates	239.200.5.66	20066	3018
ICE Futures Europe Non Oil FOD Full Implied Snapshots	239.200.5.67	20067	3018
ICE Futures Europe Non Oil TOP5PL Full Implied Live Updates	239.200.5.68	20068	3018
ICE Futures Europe Non Oil TOP5PL Full Implied Snapshots	239.200.5.69	20069	3018
ICE Futures Brent FOD Full Implied Live Updates	239.200.5.54	20054	3019
ICE Futures Brent FOD Full Implied Snapshots	239.200.5.55	20055	3019

ICE Futures Brent TOP5PL Full Implied Live Updates	239.200.5.56	20056	3019
ICE Futures Brent TOP5PL Full Implied Snapshots	239.200.5.57	20057	3019
ICE Futures WTI FOD Full Implied Live Updates	239.200.5.58	20058	3020
ICE Futures WTI FOD Full Implied Snapshots	239.200.5.59	20059	3020
ICE Futures WTI TOP5PL Full Implied Live Updates	239.200.5.60	20060	3020
ICE Futures WTI TOP5PL Full Implied Snapshots	239.200.5.61	20061	3020
ICE Futures Europe Oil Others FOD Full Implied Live Updates	239.200.5.62	20062	3017
ICE Futures Europe Oil Others FOD Full Implied Snapshots	239.200.5.63	20063	3017
ICE Futures Europe Oil Others TOP5PL Full Implied Live Updates	239.200.5.64	20064	3017
ICE Futures Europe Oil Others TOP5PL Full Implied Snapshots	239.200.5.65	20065	3017
ICE Futures Europe Options TOB Live Updates	239.200.5.36	20036	3013
ICE Futures Europe Options TOB Snapshots	239.200.5.37	20037	3013
ICE Futures US Agricultures Options TOB Live Updates	239.200.5.34	20034	3009
ICE Futures US Agricultures Options TOB Snapshots	239.200.5.35	20035	3009
ICE OTC Options TOB Live Updates	239.200.5.52	20052	3016
ICE OTC Options TOB Snapshots	239.200.5.53	20053	3016
ICE Futures US Financials Options TOB Live Updates	239.200.5.46	20046	3010
ICE Futures US Financials Options TOB Snapshots	239.200.5.47	20047	3010

3.5.2 TCP Servers

IP Address: 63.247.113.225 Port: 3000

4 Multicast Message Format

4.1 Message Block, Session and Sequence Number

Each multicast packet contains a message block which could include multiple messages. Each block has a header with session number, sequence number, number of messages and sent timestamp. These are numeric fields in Big Endian format and are signed, consistent with those used in the feed messages. The maximum size for a block is configurable and can be up to 64K, theoretically.

Session Number (2 bytes)	Sequence Number (4 bytes)	Number of Msgs (2 bytes)	Sent DateTime (8 bytes)	Msg #1	Msg #n
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The session number is used so that a client can easily detect when a new session has started after the daily maintenance window or failure on the server side. It should stay the same for a given multicast channel until a new session has started. It should be noted that the same number can be used by different multicast channels.

The sequence number can be used for:

- detecting packet loss,
- duplicate messages,
- out of order messages
- historical replay
- snapshot synchronization

Each message is assigned a sequence number that increases monotonically on the server side. To save bandwidth, the sequence number is a field in the block header, instead of every message. The sequence number for the first message is used in the header, and the client is expected to derive the sequence numbers for subsequent messages in the block. In the case of a heartbeat which includes only header in the block, the expected next sequence number is used.

The following are a few examples that illustrate how sequence numbers increment under different scenarios. Please be aware that **the sequence number is not in the message payload**. However, it is displayed in the examples to make it easier to follow the scenarios.

Block #1000 (Non Heartbeat)

Session Number	Sequence Number	Number of Msgs	Sent DateTime	Msg #1	.....	Msg #5
100001	3200	5	.....	(seq 3200)		(seq 3204)

Next Expected Sequence Number = 3200 + 5 = 3205

Block #1001 (Heartbeat)

Session Number	Sequence Number	Number of Msgs	Sent DateTime
100001	3205	0	.....

Next Expected Sequence Number = 3205 + 0 = 3205

Block #1002 (Heartbeat)

Session Number	Sequence Number	Number of Msgs	Sent DateTime
100001	3205	0	.....

Next Expected Sequence Number = 3205 + 0 = 3205

Block #1003 (Non Heartbeat)

Session Number	Sequence Number	Number of Msgs	Sent DateTime	Msg #1 (seq 3205)	.....	Msg #10 (seq 3214)
100001	3205	10	.....		

Next Expected Sequence Number = 3205 + 10 = 3215

Block #1004 (Non Heartbeat)

Session Number	Sequence Number	Number of Msgs	Sent DateTime	Msg #1 (seq 3215)	.....	Msg #8 (seq 3222)
100001	3215	8	.....		

Next Expected Sequence Number = 3215 + 8 = 3223

Client should do the following to detect sequence number related problem.

IF (Seq Number in This Block == Seq Number + Number of Messages in Prev Block)

Good

**ELSE IF ((Seq Number in This Block == Seq Number in Prev Block)
AND (Number of Messages in Prev Block != 0))**

Duplicate packet, Log it and discard this block.

ELSE

Sequence gap, Log it and handle the failure scenario

END IF

4.2 Message Format

The messages in the message block use the same format as those that were defined in iMPact TCP Feed 1.1 with fixed length fields, with the exception of a few minor changes (only a few messages were modified, with irrelevant fields removed, or new fields added). All those messages are defined in “ICE iMPact Multicast Feed Message Specification”.

4.3 Multicast Heartbeats

The server sends out a heartbeat after a channel has been idle for 1 second. A multicast heartbeat is a message block with a header, only. Since the block doesn’t contain any message, the expected next sequence number is used. If the client hasn’t received any message, including the heartbeat, for a while, either the multicast channel is no longer active, or there is a network related issue that needs to be diagnosed.

5 Snapshot Multicast Channel

For startup and failure recovery, clients will need to obtain snapshots to reconstruct the book. A multicast group for snapshots exists per live update channel.

5.1 Snapshot Intervals

Snapshots are captured and sent out at fixed intervals. Although markets can be relatively idle, the server still needs to create and send out snapshot messages for them. There are two time intervals for snapshots: 15 seconds for active markets and 2 minutes for idle markets. A market is considered idle if there is no change in the last 10 minutes. For a particular market type, snapshots of some markets are done at the 15 second interval, while the 2 minute interval is used for others, depending whether they are active or not.

5.2 Synchronization with Live Updates

For a given market, the snapshot includes Market Snapshot message and Snapshot Order or Price Level messages. If there are no open orders, only the Market Snapshot message is sent. Please read “ICE iMPact Multicast Feed Message Specification” for a detailed description of the messages.

The LastSequenceNumber in Market Snapshot message is the last sequence number used for live update messages when the snapshot was captured in the server, and it can be used for synchronization. The primary steps that client applications should follow for accurate reconstruction of the market book are below:

1. Listen and queue live update messages first, before trying to get snapshots.
2. Make sure that the snapshot is more recent than the first message client receives through the live update channel. Although the client listens to the live update channel first, the live update and snapshot messages are sent through different multicast channels, therefore it is possible that the first few snapshot

messages are older than the first live update message the client receives. In that case, the client should discard the snapshot messages. Otherwise, the client may miss live update messages that are more recent than the snapshot for the given market.

After receiving the first multicast message block, the client should keep the sequence number of the block and use it for snapshot comparison. Also, clients should be cautious to not ignore the heartbeat messages. The heartbeat message contains the next expected sequence number, which can be used for synchronization with live updates. When markets are idle, it may take a while to receive messages that are not heartbeats.

Compare LastSequenceNumber in a snapshot message with the first sequence number captured from the live update channel. If LastSequenceNumber is smaller by more than 1, the snapshot message should be discarded and client should wait for another snapshot message for the given market. However, the client can continue to process other snapshot messages.

Example:

- 1) Client listens to live update channel, gets the first message block and the sequence number is 1000
 - 2) Client listens to snapshot channel, gets Market Snapshot message for market 121212, LastSequenceNumber in the snapshot is 998. It should discard this snapshot because we miss a live update message with sequence number 999.
 - 3) Client gets Market Snapshot message for market 131313. LastSequenceNumber in the snapshot is 999. This snapshot is good, because we did not miss any live update messages with sequence number greater than 999.
3. Before applying a live update message to a given market, make sure that it is more recent than the snapshot.

For a given market, if sequence number of a live update message is not greater than LastSequenceNumber in the snapshot, it should be discarded.

The comparison is required even after the queued live update messages have been processed, because there is a possibility that a live update message arrives after that and it is still older than the snapshot for a market.

Example #1:

- 1) Client listens to live update channel, gets two messages for market 121212 with sequence number 997 and 998.
- 2) Client listens to snapshot channel, gets Market Snapshot message for market 121212, LastSequenceNumber in the snapshot is 998.
- 3) Client processes queued messages for market 121212. The live update messages with sequence number 997 and 998 should be discarded.

Example #2:

- 1) Client listens to live update channel, gets a message with sequence number 997.
- 2) Client listens to snapshot channel, gets Market Snapshot message for market 121212, LastSequenceNumber in the snapshot is 998.

- 3) Client processes queued messages for market 121212. The live update message with sequence number 997 is discarded.
- 4) Client gets live update a live message for market 121212 with sequence number 998. Client should discard it because it is not greater than the LastSequenceNumber in the snapshot for the market.

5.3 Snapshot Multicast Session and Sequence Number

Since the snapshot channel is also a multicast channel, it uses the same format for message block with session and sequence number as that of the live update channel. However, it should be noted that the sequence number of the snapshot messages has nothing to do with the sequence numbers of the live update messages or LastSequenceNumber in Market Snapshot message.

The client should utilize session and sequence numbers to detect the failure scenarios for the snapshot channel, and handle them correctly. Please read the later section that discusses failure scenarios and recovery in detail.

6 Failure Scenarios and Recovery

The client is **required** to detect and handle the following failure scenarios for all multicast channels:

- Session number is different from previous one for a multicast channel. If this occurs in the middle of a trading day, most likely there was a failure on the server side, and a new session has started.
- There is sequence number gap in messages from a multicast channel. Read previous section on sequence number regarding how to detect it. When this happens, it is either a packet drop, or an out of order arrival issue.
- No heartbeats after an extended period of time (e.g. 20 seconds). If this happens outside the maintenance window, it is due to either a network or server issue.

When one of the above scenarios occurs, the client is required to be able to recover. Please carefully read Appendix A to understand the recommended practice for recovery.

7 TCP Services

Clients connect to the TCP server to make requests for product definitions and historical replays. Once a connection is successfully established, the client must send a login request. If the server does not receive a login request within 10 seconds, it will automatically close the connection.

All TCP messages including requests and responses are defined in “ICE iMPact Multicast Feed Message Specification”.

7.1 Product Definitions

Client can request for product definitions by market type. And client should have them available either in its cache or get them from the server through the product definition requests before processing any multicast messages.

7.2 Historical Replay

A client can request a historical replay of messages through TCP by providing information about the multicast group and a corresponding sequence number range. The server will return the messages through the same TCP connection. The replay is rate controlled, configurable by the exchange. **Historical replay is only available for live update messages. It is not provided for snapshot channels.**

7.3 TCP Heartbeats

The server sends a heartbeat message to the client whenever it has been idle for 1 second, for a session. If a client hasn't received any message (including heartbeat) from the server for more than 30 seconds, it should assume that the connection is bad and re-connect.

8 Feed Availability and Maintenance Window

At the end of trading day, the multicast servers will stop sending out any messages, and the TCP servers will disconnect all clients. The maintenance window currently is 6:30 PM to 7:30 PM EST/EDT Monday to Friday. Additionally, the servers could be down from 6:30PM Friday to 5:00PM Sunday if additional maintenance is required.

After the maintenance window, when multicast becomes available, a new session number will be used in the message block for a given multicast group.

9 Test Environment

APITest is the environment that should be used for functional testing. Please refer to the earlier “APITest iImpact Multicast Feed IP Addresses” section for the multicast group and TCP server addresses. To obtain multicast traffic, the client needs to run the tunnel proxy program provided by ICE.

9.1 Multicast Tunnel Proxy

The multicast tunnel proxy is a simple Java program that connects to ICE through TCP, gets all messages and multicast them out on a client’s local network. By running the proxy, a client can receive the same multicast messages as the original multicast messages.

Since the server on APITest can be connected through TCP and the Internet, most customers should be able to begin development and testing without many changes in network configurations, other than opening the firewall for the TCP connection.

Please read “ICE iImpact Multicast Feed Getting Started Guide” for instructions on how to install, configure and run the tunnel proxy.

10 Certification

For conformance, please contact us at conformancesupport@theice.com.

11 Support

For technical support, you can do one of the followings

- a) Open a ticket through our support ticketing portal <http://www.theice.com/integrate> . If you don't have the logon credentials, please send a mail to integrate@theice.com. This is preferred channel for support.
- b) Alternatively you can write to pricefeedsupport@theice.com

12 Appendices

Appendix A: Recommended Practice for Client Startup, Initialization and Recovery

Startup

When a feed client starts up, these are the recommended steps

- 1) Connect to the TCP server and Login
- 2) Request for product definitions
- 3) Build the map of markets (contracts) with the market ID as key
- 4) Start the initialization routine

Initialization

The initialization routine is not just for startup. It should be used when there is a need to refresh the books for failure recovery. The client should take the following steps to initialize:

- 1) Join and listen to the live update multicast channel.
- 2) Queue messages from the live update channel **by market**.
- 3) Join and listen to the snapshot channel.
- 4) Whenever a Market Snapshot message is obtained for a market, make sure that it is more recent than the first message from the live update channel. For a specific market, the client should use the snapshot messages (Market Snapshot plus the Snapshot Order or Price Level Messages) to build its local book, and start processing the live update messages that it has queued up for the market. The client should discard the live update messages with a sequence number that is NOT GREATER than the LastSequenceNumber in the snapshot.
- 5) For a given market, after the client has de-queued all messages, new live update messages should no longer be queued. However, continue to check and discard the messages with sequence numbers not greater than the LastSequenceNumber in the snapshot for the given market.
- 6) The client should continue listening to the snapshot channel, until snapshots for all interested markets are obtained.

Using the recommended approach above, the client doesn't need to queue all messages until it gets all snapshots. Instead, the messages are processed in parallel. This should result in faster startup or failure recovery times.

Recovery

When a failure scenario is detected, the client can take the following steps to recover.

- 1) Discard all live update messages
- 2) Clean up the local book for all markets.
- 3) Call the initialization routine described above for all markets again.

It is recommended that clients use snapshots in lieu of historical replay for failure recovery. Since the client is required to use snapshots at startup, it may be possible to leverage the same code for recovery, as well.