

Nasdaq Options Test Facility (NTF)

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Abstract

This document provides market participants of Nasdaq's U.S. Options Markets with the necessary information to use Nasdaq's Test Facility (NTF) environment for testing of their trading applications for the INET trading system.

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1. Introduction to NTF

Nasdaq offers a test environment, the Nasdaq Test Facility (NTF), where market participants can test their trading applications with the INET trading system. The NTF environment allows members to test sending and executing quotes and orders offered by our six options exchanges: Nasdaq PHLX (PHLX), Nasdaq BX Options (BX Options), Nasdaq Options Market (NOM), Nasdaq ISE (ISE), Nasdaq GEMX (GEMX), and Nasdaq MRX (MRX).

1.1. Intended Audience

This document is for programmers, analysts, and IT managers who are developing and testing applications on the INET Options trading system. It provides all the necessary information to access and utilize the NTF environment.

2. Environment Setup

The setup of the NTF environment is similar to the production INET environment.

2.1. Supported Interfaces

Below are the supported interfaces market participants can use to access the NTF environment which supports all six US Options exchanges.

- Specialized Quote Feed (SQF) supports market maker quoting and market maker protections.
- Ouch to Trae Options (OTTO) supports order entry providing for various market participant types
- FIX Order Routing System is an industry standard trading interface based on standard FIX version 4.2.
- Clearing Trade Interface (CTI) will provide trade details enriched with clearing and billing information.
- FIX Drop will provide trade and/or order details with clearing and billing information
- The multicast-based Market Data Feeds (MDF) provides market data for the PHLX trading system.

2.2. System Availability

To support development and testing for the broad range of market participants from different time zones, the NTF environment is available 16 hours a day from Monday to Friday, 4:00 a.m. to 8:00 p.m. ET. Technical support is only available during normal working hours from 8:00 a.m. to 5:30 p.m. ET.

The environment is available on most weekends as well; however, due to potential maintenance activities, full weekend access cannot be guaranteed. In general, technical support is not available on weekends.

The following table provides a schedule for the different phases of a trading day.

Nasdaq Test Facility (NTF) Hours of Operation

| Time (ET) | Action |
|------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 4:00 a.m. | <ul style="list-style-type: none">• System is available for logins |
| 4:15 a.m. | <ul style="list-style-type: none">• Market opens• System opens underlying products• System rotates instruments (series) of selected products to a regular state• System starts publishing reference and market data• System statically quotes instruments (series) of selected products on ISE, GEMX, MRX, PHLX, NOM & BX |
| 10:00 a.m. | <ul style="list-style-type: none">• Weekly on Wednesdays, the system will halt AAPL allowing participants to test participation in the opening process. Pre-opening interest is accepted at this time. |
| 10:30 a.m. | <ul style="list-style-type: none">• Weekly on Wednesdays, Market Opens for AAPL after the 10 AM halt |
| 8:00 p.m. | <ul style="list-style-type: none">• Environment closes for end-of-day processing |

2.3. Market Structure

The market structure of the NTF environment is identical to the structure of the production system with designated Specialists/Primary Market Makers (PMM), Market Makers, and Electronic Access Members (EAM) for each market. Primary Market Makers (PMMs) are assigned, as in production, to designated symbols. In order to provide continuous quoting for testing, a fictitious Market Maker, run by Nasdaq, automatically quotes selected products across the PHLX, ISE, NOM, GEMX, BX Options and MRX markets.

All members — PMMs, Market Makers, and EAMs — are provided the same rights and entitlements to the test environment as they have in the production environment.

2.4. Product Setup

Reference data in the NTF environment is similar to the production environment. Because each NTF environment (PHXL, ISE, GEMX, MRX, NOM and BX Options) is a discrete system, reference data cannot be shared between the six environments.

2.5. Automated Quoting of Instruments

In order to provide an active market for participants in the NTF environment, the system automatically opens all products and continuously quotes selected instruments in the market. In addition, the system will return order executions for orders in instruments that are auto-quoted.

There is one way of quoting selected instruments:

- Static quotes: The test market maker continuously quotes static quote prices.

NOTE: The following lists of auto-quoted products are subject to change without notice.

2.5.1. Statically quoted Products/Instruments:

The Market Maker will quote the following products/instruments continuously during the trading day, starting at 4:15 a.m., after the system has opened the instruments.

Statically Quoted Products/Instruments

| Market | Products | Price |
|--------|------------|-----------------|
| PHLX | | |
| NOM | | |
| BX | AAPL, SPY | \$1.50 - \$2.50 |
| GEMX | | |
| MRX | | |
| ISE | AMGN, GOOG | |

Static Underlying Stock Price for Stock Combo Orders

| Market | Products | Price |
|--------|------------|-----------------|
| PHLX | | |
| MRX | AAPL, CSCO | \$56.00-\$57.00 |

3. NTF for SQF/OTTO/CTI users

3.1. SQF/OTTO/CTI Access

Market participants who want to test their applications must establish a TCP/IP connection between their trading application and the SQF/ CTI gateways in the NTF environment. NTF does not support gateways at the market participants' premises.

For SQF/ CTI access in the NTF, market participants can connect to the Carteret, NJ data center (via IPSEC, cross-connects or Extranet Providers). A list of approved vendors is available here:

<http://www.nasdaqtrader.com/content/ProductsServices/Trading/extranets.pdf> Complete connectivity information is also available on the Nasdaq' website.

http://www.nasdaqtrader.com/content/ProductsServices/Trading/Direct_Connect_Providers.pdf

3.1.1. SQF, OTTO, CTI and FIX Drop Connectivity

The following table provides current connection details of SQF/ CTI interfaces in the NTF environment.

3.1.1.1. PHLX

| Market | Interface | IP Address | Port |
|--------|-----------|----------------|-----------|
| PHLX | SQF | 206.200.20.145 | 7000-7099 |
| PHLX | SQF | 206.200.20.146 | 7000-7099 |
| PHLX | SQF | 206.200.20.147 | 7000-7099 |
| PHLX | SQF | 206.200.20.148 | 7000-7099 |
| PHLX | SQF Purge | 206.200.20.144 | 7900-7999 |
| PHLX | CTI | 206.200.20.140 | 6000-6099 |
| PHLX | CTI | 206.200.20.141 | 6000-6099 |
| PHLX | CTI | 206.200.20.142 | 6000-6099 |
| PHLX | CTI | 206.200.20.143 | 6000-6099 |

3.1.1.2. NOM

| Market | Interface | IP Address | Port |
|--------|-----------|----------------|-------------|
| NOM | SQF | 206.200.20.156 | 6000-6099 |
| NOM | SQF | 206.200.20.157 | 7000-7099 |
| NOM | SQF | 206.200.20.158 | 7000-7099 |
| NOM | SQF | 206.200.20.159 | 7000-7099 |
| NOM | SQF Purge | 206.200.20.160 | 7000-7099 |
| NOM | CTI | 206.200.20.150 | 6000-6099 |
| NOM | CTI | 206.200.20.151 | 6000-6099 |
| NOM | CTI | 206.200.20.152 | 6000-6099 |
| NOM | CTI | 206.200.20.153 | 6000-6099 |
| NOM | OTTO | 206.200.20.162 | 7100-7199 |
| NOM | OTTO Drop | 206.200.20.164 | 6100-6199 |
| NOM | FIX Drop | 206.200.20.154 | 10500-10599 |

3.1.1.3. BX Options

| Market | Interface | IP Address | Port |
|------------|-----------|----------------|-----------|
| BX Options | SQF | 206.200.13.96 | 7000-7099 |
| BX Options | SQF | 206.200.13.97 | 7000-7099 |
| BX Options | SQF | 206.200.13.98 | 7000-7099 |
| BX Options | SQF | 206.200.13.99 | 7000-7099 |
| BX Options | SQF | 206.200.13.100 | 7000-7099 |
| BX Options | SQF | 206.200.13.101 | 7000-7099 |
| BX Options | SQF | 206.200.13.102 | 7000-7099 |
| BX Options | SQF | 206.200.13.103 | 7000-7099 |
| BX Options | SQF Purge | 206.200.13.121 | 7000-7099 |
| BX Options | CTI | 206.200.13.64 | 6000-6099 |
| BX Options | CTI | 206.200.13.65 | 6000-6099 |
| BX Options | CTI | 206.200.13.66 | 6000-6099 |
| BX Options | CTI | 206.200.13.67 | 6000-6099 |
| BX Options | CTI | 206.200.13.68 | 6000-6099 |
| BX Options | CTI | 206.200.13.69 | 6000-6099 |
| BX Options | CTI | 206.200.13.70 | 6000-6099 |
| BX Options | CTI | 206.200.13.71 | 6000-6099 |
| BX Options | CTI | 206.200.13.72 | 6000-6099 |
| BX Options | CTI | 206.200.13.73 | 6000-6099 |
| BX Options | CTI | 206.200.13.74 | 6000-6099 |
| BX Options | CTI | 206.200.13.75 | 6000-6099 |
| BX Options | FIX Drop | 206.200.13.81 | 6200-6299 |
| BX Options | FIX Drop | 206.200.13.82 | 6200-6299 |

3.1.1.4. ISE

| Market | Interface | IP Address | Port |
|--------|-----------|----------------|-----------|
| ISE | SQF | 206.200.20.229 | 7000-7099 |
| | | 206.200.20.230 | |
| | | 206.200.20.231 | |
| | | 206.200.20.232 | |
| | | 206.200.20.233 | |
| ISE | SQF Purge | 206.200.20.234 | 7900-7999 |
| | | 206.200.20.235 | |
| ISE | OTTO | 206.200.20.236 | 7100-7199 |
| | | 206.200.20.237 | |
| | | 206.200.20.238 | |
| | | 206.200.20.239 | |
| | | 206.200.20.240 | |
| ISE | CTI | 206.200.20.243 | 6000-6099 |
| | | 206.200.20.244 | |

3.1.1.5. MRX

| Market | Interface | IP Address | Port |
|--------|-----------|----------------|-----------|
| MRX | SQF | 206.200.36.192 | 7000-7099 |
| | | 206.200.36.193 | |
| | | 206.200.36.194 | |
| | | 206.200.36.195 | |
| | | 206.200.36.196 | |
| | | 206.200.36.197 | |
| | | 206.200.36.198 | |
| MRX | SQF Purge | 206.200.36.199 | 7000-7099 |
| MRX | OTTO | 206.200.36.200 | 7100-7199 |
| | | 206.200.36.201 | |
| | | 206.200.36.202 | |
| | | 206.200.36.203 | |
| | | 206.200.36.204 | |
| | | 206.200.36.205 | |
| MRX | CTI | 206.200.36.206 | 6000-6099 |
| | | 206.200.36.207 | |
| MRX | FIX Drop | 206.200.36.208 | 6200-6299 |

3.1.1.6. GEMX

| Market | Interface | IP Address | Port |
|--------|-----------|---------------|-----------|
| GEMX | SQF | 206.200.36.72 | 7000-7099 |
| | | 206.200.36.73 | |
| | | 206.200.36.74 | |
| | | 206.200.36.75 | |
| | | 206.200.36.76 | |
| | | 206.200.36.77 | |
| | | 206.200.36.78 | |
| GEMX | SQF Purge | 206.200.36.79 | 7000-7099 |
| GEMX | OTTO | 206.200.36.80 | 7100-7199 |
| | | 206.200.36.81 | |
| | | 206.200.36.82 | |
| | | 206.200.36.83 | |
| | | 206.200.36.84 | |
| | | 206.200.36.85 | |
| GEMX | CTI | 206.200.36.85 | 6000-6099 |
| GEMX | FIX Drop | 206.200.36.86 | 6200-6299 |

3.1.1.7. ISE Replat form (NTF Available April 15th- Prod Go Live September 9th)

| Market | Interface | IP Address | Port |
|----------------|-----------|----------------|-----------|
| ISE | SQF | 206.200.36.226 | 7000-7099 |
| | | 206.200.36.227 | |
| | | 206.200.36.228 | |
| | | 206.200.36.229 | |
| | | 206.200.36.230 | |
| | | 206.200.36.231 | |
| | | 206.200.36.232 | |
| | | 206.200.36.233 | |
| | | 206.200.36.234 | |
| | | 206.200.36.235 | |
| | | 206.200.36.236 | |
| | | 206.200.36.237 | |
| 206.200.36.238 | | | |
| 206.200.36.239 | | | |
| ISE | SQF Purge | 206.200.36.239 | 7900-7999 |
| ISE | OTTO | 206.200.36.240 | 7100-7199 |
| | | 206.200.36.241 | |
| | | 206.200.36.242 | |
| | | 206.200.36.243 | |
| | | 206.200.36.244 | |
| 206.200.36.245 | | | |
| ISE | CTI | 206.200.36.246 | 6000-6099 |
| | | 206.200.26.247 | |

3.2. Market Data Feeds Access

Market Data disseminates over a multicast network. Market data is not provided through SQF/ CTI. Reference data is provided across SQF, CTI and market data feeds.

Similar to the SQF/ CTI, for market data access in the NTF environment, market participants can connect to the Carteret, NJ data center via Cross-connects or Extranet Providers who support Multicast.

3.2.1. NTF Environment

3.2.1.1. PHLX

| Feed Name | Channel | Protocol | Group | Port | Source IP |
|--------------------------|------------|----------------------|----------------|--------------------------------|---------------|
| Market Data Feeds | | | | | |
| | Broadcast | mold64 | 233.56.159.120 | 18001 | 203.200.21.38 |
| | Re-request | mold64rewind/soupbin | | 18101 | 206.200.21.53 |
| TOPO Trade | Broadcast | mold64 | 233.56.159.120 | 18000 | 203.200.21.38 |
| | Re-request | mold64rewind/soupbin | | 18100 | 206.200.21.53 |
| TOPO Orders | Broadcast | mold64 | 233.56.159.121 | 18002- Quotes 18003- Trades | 206.200.21.38 |
| | Re-request | mold64rewind/soupbin | | 18002- Quotes 18003- Trades | 206.200.21.53 |

| Feed Name | Channel | Protocol | Group | Port | Source IP |
|--------------------------|------------|-----------------------|----------------|-------|---------------|
| Market Data Feeds | | | | | |
| Depth of Mkt | Broadcast | modal64 | 233.56.159.122 | 18004 | 206.200.21.38 |
| | Re-request | modal64rewind/soupbin | | 18104 | 206.200.21.53 |

3.2.1.2. NOM

| Feed Name | Channel | Protocol | Group | Port | Source IP |
|--------------------------|------------|-----------------------|----------------|-------|---------------|
| Market Data Feeds | | | | | |
| BONO | Broadcast | modal64 | 233.56.159.123 | 18001 | 206.200.21.54 |
| Trades 3.0 | Re-request | modal64rewind/soupbin | | 18101 | 206.200.21.54 |
| BONO | Broadcast | modal64 | 233.56.159.123 | 18002 | 206.200.21.54 |
| Quotes 3.0 | Re-request | modal64rewind/soupbin | | 18102 | 206.200.21.54 |
| | Broadcast | modal64 | 233.56.159.124 | 18004 | 206.200.21.54 |
| | Re-request | modal64rewind/soupbin | | 18104 | 206.200.21.54 |

3.2.1.3. BX Options

| Feed Name | Protocol | Group | Port | Source IP |
|--------------------------|-----------------------|----------------|-------|---------------|
| Market Data Feeds | | | | |
| Depth of | modal64 | 233.56.159.188 | 18000 | 206.200.13.48 |
| | modal64rewind/soupbin | | 18100 | 206.200.13.49 |
| Market Feed | Glimpse | | 18300 | 206.200.13.54 |
| Top Quote Feed | modal64 | 233.56.159.189 | 18001 | 206.200.13.50 |
| | modal64rewind/soupbin | | 18101 | 206.200.13.51 |
| | Glimpse | | 18301 | 206.200.13.55 |
| | modal64 | 233.56.159.190 | 18002 | 206.200.13.52 |
| | modal64rewind/soupbin | | 18102 | 206.200.13.53 |
| | Glimpse | | 18302 | 206.200.13.56 |

3.2.1.4. ISE

| Feed Name | Protocol | Group | Port | Source IP |
|--------------------------|-----------------------|----------------|-------|----------------|
| Market Data Feeds | | | | |
| Depth of Market Feed | modal64 | 233.56.159.181 | 18001 | 206.200.20.23 |
| | modal64rewind/soupbin | | 18101 | 206.200.21.143 |
| Top Quote Feed | modal64 | 233.56.159.181 | 18000 | 206.200.20.23 |
| | modal64rewind/soupbin | | 18100 | 206.200.21.142 |
| Trade Feed | modal64 | 233.56.159.181 | 18003 | 206.200.20.23 |
| | modal64rewind/soupbin | | 18103 | 206.200.21.145 |
| Order Feed | modal64 | 233.56.159.181 | 18002 | 206.200.20.23 |
| | modal64rewind/soupbin | | 18102 | 206.200.21.144 |
| Complex Top Quote Feed | modal64 | 233.56.159.181 | 18004 | 206.200.20.23 |
| | modal64rewind/soupbin | | 18104 | 206.200.21.146 |
| Complex Trade Feed | modal64 | 233.56.159.181 | 18007 | 206.200.20.23 |
| | modal64rewind/soupbin | | 18107 | 206.200.21.149 |

| Feed Name | Protocol | Group | Port | Source IP |
|--------------------------|----------------------|----------------|-------|----------------|
| Market Data Feeds | | | | |
| Complex Order Feed | mold64 | 233.56.159.181 | 18006 | 206.200.20.23 |
| | mold64rewind/soupbin | | 18106 | 206.200.21.148 |

3.2.1.5. MRX

MRX Multicast Channels

| Feed Name | Protocol | Group | Port | Source IP |
|------------------------------|----------------------|----------------|-------|----------------|
| Market Data Feeds | | | | |
| Depth of Market Feed | mold64 | 233.56.159.191 | 18001 | 206.200.36.161 |
| | mold64rewind/soupbin | | 18101 | 206.200.36.164 |
| | Glimpse | | 18301 | 206.200.36.164 |
| Top Quote Feed | mold64 | 233.56.159.191 | 18000 | 206.200.36.161 |
| | mold64rewind/soupbin | | 18100 | 206.200.36.162 |
| | Glimpse | | 18300 | 206.200.36.162 |
| Trade Feed | mold64 | 233.56.159.191 | 18003 | 206.200.36.161 |
| | mold64rewind/soupbin | | 18103 | 206.200.36.168 |
| Order Feed | mold64 | 233.56.159.191 | 18002 | 206.200.36.161 |
| | mold64rewind/soupbin | | 18102 | 206.200.36.166 |
| Complex Depth of Market Feed | mold64 | 233.56.159.192 | 18005 | 206.200.36.169 |
| | mold64rewind/soupbin | | 18105 | 206.200.36.172 |
| | Glimpse | | 18305 | 206.200.36.172 |
| Complex Top Quote Feed | mold64 | 233.56.159.192 | 18004 | 206.200.36.169 |
| | mold64rewind/soupbin | | 18104 | 206.200.36.170 |
| | Glimpse | | 18304 | 206.200.36.170 |
| Complex Trade Feed | mold64 | 233.56.159.192 | 18007 | 206.200.36.169 |
| | mold64rewind/soupbin | | 18107 | 206.200.36.176 |
| Complex Order Feed | mold64 | 233.56.159.192 | 18006 | 206.200.36.169 |
| | mold64rewind/soupbin | | 18106 | 206.200.36.174 |

3.2.1.6. GEMX

| Feed Name | Protocol | Group | Port | Source IP |
|--------------------------|----------------------|---------------|-------|---------------|
| Market Data Feeds | | | | |
| Depth of Market Feed | mold64 | 233.56.159.25 | 18001 | 206.200.36.56 |
| | mold64rewind/soupbin | | 18101 | 206.200.36.58 |
| | Glimpse | | 18301 | 206.200.36.58 |
| Top of Market Feed | mold64 | 233.56.159.24 | 18000 | 206.200.36.56 |
| | mold64rewind/soupbin | | 18100 | 206.200.36.57 |
| | Glimpse | | 18300 | 206.200.36.57 |
| | mold64 | 233.56.159.26 | 18002 | 206.200.36.56 |
| | mold64rewind/soupbin | | 18102 | 206.200.36.59 |
| Trade Feed | mold64 | 233.56.159.26 | 18003 | 206.200.36.56 |
| | mold64rewind/soupbin | | 18103 | 206.200.36.59 |

3.2.1.8. ISE Replatform (NTF Available April 15th, Production Go Live September 9th)

| Feed Name | Protocol | Group | Port | Source IP |
|------------------------------|----------------------|----------------|-------|----------------|
| Market Data Feeds | | | | |
| Depth of Market Feed | mold64 | 233.56.159.183 | 18001 | 206.200.36.99 |
| | mold64rewind/soupbin | | 18101 | 206.200.36.101 |
| | Glimpse | | 18301 | 206.200.36.109 |
| Top Quote Feed | mold64 | 233.56.159.183 | 18000 | 206.200.36.99 |
| | mold64rewind/soupbin | | 18100 | 206.200.36.100 |
| | Glimpse | | 18300 | 206.200.36.108 |
| Order Feed | mold64 | 233.56.159.183 | 18002 | 206.200.36.99 |
| | mold64rewind/soupbin | | 18102 | 206.200.36.102 |
| Trade Feed | mold64 | 233.56.159.183 | 18003 | 206.200.36.99 |
| | mold64rewind/soupbin | | 18103 | 206.200.36.103 |
| Complex Depth of Market Feed | mold64 | 233.56.159.184 | 18005 | 206.200.36.99 |
| | mold64rewind/soupbin | | 18105 | 206.200.36.105 |
| | Glimpse | | 18305 | 206.200.36.111 |
| Complex Top Quote Feed | mold64 | 233.56.159.184 | 18004 | 206.200.36.99 |
| | mold64rewind/soupbin | | 18104 | 206.200.36.104 |
| | Glimpse | | 18304 | 206.200.36.110 |
| Complex Trade Feed | mold64 | 233.56.159.184 | 18007 | 206.200.36.99 |
| | mold64rewind/soupbin | | 18107 | 206.200.36.107 |
| Complex Order Feed | mold64 | 233.56.159.184 | 18006 | 206.200.36.99 |
| | mold64rewind/soupbin | | 18106 | 206.200.36.106 |

3.3. Conformance Testing for SQF and OTTO Users

Market participants developing SQF and OTTO applications must conduct a conformance test in the NTF environment before they are allowed to access the INET production environment. All functions used by the application must be tested and certified.

3.3.1. Conformance Test Procedures

As soon as a market participant completes its internal development and testing for SQF or OTTO they should contact the Market Operations team to obtain the necessary conformance test scripts and schedule conformance testing.

During the conformance test, a representative of the Market Operations team will run through the test script with a market participant representative. The actual time taken to complete all of the required tests will depend upon the functionality used by the market participant. The Market Operations representative will advise the market participant of the probable duration of the test effort on a case-by-case basis.

Upon completion of the test scripts, the Market Operations representative will review the results of each individual conformance test script to ensure the test steps within each conformance test script have been completed correctly and match the expected results.

Once all of the scripts have been officially recorded as passed, a conformance test certificate will be issued to the market participant for that version of their application against the relevant version of the trading system.

4. NTF for INET FIX Users

FIX Order Routing System is available for all FIX users in the NTF environment.

New market participants who connect to Nasdaq markets using the FIX interface are required to test their FIX-based applications with the INET trading system.

4.1. How to access the FIX Interface in NTF

Market participants need to connect to INET FIX in the NTF environment in order to test their FIX applications for the INET trading system.

For FIX access to the NTF, market participants can connect to the Carteret, NJ data center (via IPSEC tunnel, cross-connects, or Extranet providers).

In order to establish a session to INET FIX in the NTF environment, each market participant is provided with an individual port. The following table outlines the connection details for FIX users.

IP Addresses for Access to FIX

4.1.1.1. PHLX

| Markets | Interface | IP Address | Port |
|---------|-----------|----------------|-----------|
| PHLX | FIX | 206.200.20.128 | 8200-8299 |
| | | 206.200.20.129 | |
| | | 206.200.20.130 | |

4.1.1.2. NOM

| Markets | Interface | IP Address | Port |
|---------|-----------|----------------|-----------|
| NOM | FIX | 206.200.20.131 | 8200-8299 |
| | | 206.200.20.132 | |
| | | 206.200.20.133 | |

4.1.1.3. BX Options

| Markets | Interface | IP Address | Port |
|------------|-----------|----------------|-----------|
| BX Options | FIX | 206.200.20.136 | 8200-8299 |
| | | 206.200.20.137 | |

4.1.1.4. ISE

| Markets | Interface | IP Address | Port |
|---------|-----------|----------------|-----------|
| ISE | FIX | 206.200.20.214 | 8200-8299 |
| | | 206.200.20.215 | |
| | | 206.200.20.216 | |
| | | 206.200.20.217 | |

4.1.1.5. MRX

| Markets | Interface | IP Address | Port |
|---------|-----------|----------------|-----------|
| MRX | FIX | 206.200.20.221 | 8200-8299 |
| | | 206.200.20.222 | |

4.1.1.6. GEMX

| Markets | Interface | IP Address | Port |
|---------|-----------|----------------------------------|-----------|
| GEMX | FIX | 206.200.20.130 206.200.20.131 | 8200-8299 |

4.1.1.7. ISE Replatform (NTF Available April 15th, Production Go Live September 9th)

| Markets | Interface | IP Address | Port |
|---------|-----------|----------------------------------|-----------|
| ISE | FIX | 206.200.20.132 206.200.20.135 | 8200-8299 |

4.2. FIX Certification Testing

All functionality that market participants with a FIX interface intend to use in the production system must be tested and certified in a FIX certification test before they are allowed to use the production environment.

For details on the FIX certification testing procedures, please contact market operations at OptionsTest@nasdaq.com.

5. Support

Nasdaq supports market participants in the NTF environment. The support offered includes phone and email support by the Market Operations team.

5.1. Support Hours

The Market Operation team will offer technical phone and email support to market participants Monday to Friday between 7:30 a.m. and 5:30 p.m. ET.

5.2. Contacts

For any questions or requests related to NTF or technical support requests, please contact the Market Operations team (215) 496-1571 or email OptionsTest@nasdaq.com

6. Revision Table

| Version | Date | Change | Section |
|---------|-------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|
| 1.2 | June 16, 2017 | Introducing PHLX, NOM, BX Options details | |
| 1.2 | June 27, 2017 | Adding MRX, NOM & BX Market Data Subnet IP details | |
| 1.2 | July 7, 2017 | Updating NOM ITTO IP Subnet IP details | |
| 1.3 | December 4, 2017 | Removing Dynamically Quoted Symbols Adding Statically Quoted Underlying Stock Price Updating Market Data IP Details for BX, GEMX & MRX Updating FIX Protocol IP Details for ISE, GEMX & MRX Removing former ISE Contact Information Updating Hours of Operation to extend support hours | |
| 1.3.1 | December 15, 2018 | Adding support for complex market data feed on MRX | |
| 1.4.0 | April, 2022 | Updating BX NTF IPs from prior migration Updating MRX NTF IPs for upcoming migration planned for November 2022 | |
| 1.4.1 | October 12, 2022 | Clarifying the GEMX FIX IPs and removing multicast IP addresses from Re-request feeds. | |
| 1.4.2 | May, 2023 | Updating GEMX NTF IPs for upcoming migration planned for November 2023 | |
| 1.4.3 | July, 2023 | Adding GEMX NTF FIX IPs for upcoming migration planned for November 2023 | |
| 1.4.3 | September, 2023 | Updating MRX market data Ips. | |
| 1.4.4 | March, 2024 | Updating ISE NTF IPs for upcoming migration planned for September 2024. | |
| 1.4.4 | March, 2024 | Removing GEMX replat form reference. | |