



Nasdaq Options Market - ITTO FPGA: Frequently Asked Questions

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GENERAL

What is being announced?

In the fourth quarter 2016, Nasdaq will introduce a new Nasdaq Options Market (NOM), ITCH to Trade Options (ITTO) depth feed offering using field-programmable gate array (FPGA) technology. This offering provides the same industry-leading performance you expect from the NOM ITTO feed with the additional benefit of no message queuing during peak market periods. Because FPGA hardware is more efficient at handling high data rates, it offers consistent and reliable service throughout the trading day, even during market peaks.

What is FPGA?

A [field-programmable gate array \(FPGA\)](#) is an integrated circuit designed to run user specified, high performance business applications and to provide a high degree of parallelism allowing for consistent, deterministic behavior.

What are the benefits to the ITTO FPGA feed?

- NOM ITTO FPGA is more efficient at handling traffic bursts from the Nasdaq® trading system than the traditional software-based feed handlers.
- NOM ITTO FPGA provides the highest level of determinism to the customer offered by Nasdaq.
- NOM ITTO FPGA uses the current ITTO messaging standard and MoldUDP64 protocol suite so it can be easily deployed in trading system and market data platforms.

TECHNICAL

How will the FPGA message formats vary from the current ITTO feed?

Nasdaq will use the same ITTO message formats and protocol standard for the ITTO FPGA product as it uses for the software-based version.

Where can I find the Nasdaq ITTO FPGA specification document?

Click [here](#) to view the Nasdaq Options ITTO FPGA specification document, which is the same as the ITTO software version.

What protocol options are available for the ITTO FPGA product?

The ITTO FPGA product is available via [MoldUDP64](#) only.

What are the IP addresses for the ITTO FPGA feed?

The UDP/IP address for ITTO FPGA product is as follows:

Site	Channel/Purpose	Group	Port	Source IP Address
New York Metro Area - FPGA ITTO	Broadcast - Channel 1 (A-E)	233.54.12.181	18000	206.200.43.128/27
	Broadcast - Channel 2 (F-M)	233.54.12.181	18001	206.200.43.128/27
	Broadcast - Channel 3 (N-S)	233.54.12.181	18002	206.200.43.128/27
	Broadcast - Channel 4 (T-Z)	233.54.12.181	18003	206.200.43.128/27

Given that the ITTO FPGA feed is only offered at the primary data center, what should I do in case of an outage?

For fault tolerance and disaster recovery reasons, Nasdaq advises all ITTO FPGA clients to subscribe to the standard ITTO data channels at both the New York Metro and Mid-Atlantic data centers.

As an ITTO FPGA client, how should I look to fill data gaps?

Nasdaq guarantees that the message sequencing is the same for all versions of the ITTO service, so firms may use the following IP addresses for packet re-requests at the primary data center:

Site	Channel/Purpose	Group	Port	Source IP Address
New York Metro Area - "A" re-request	UDP - Channel 1 (A-E)	233.54.12.88	18100	206.200.43.0
	TCP - Channel 1 (A-E)	233.54.12.88	18100	206.200.43.4
	UDP - Channel 2 (F-M)	233.54.12.88	18101	206.200.43.1
	TCP - Channel 2 (F-M)	233.54.12.88	18101	206.200.43.5
	UDP - Channel 3 (N-S)	233.54.12.88	18102	206.200.43.2
	TCP - Channel 3 (N-S)	233.54.12.88	18102	206.200.43.6
	UDP - Channel 4 (T-Z)	233.54.12.88	18103	206.200.43.3
	TCP - Channel 4 (T-Z)	233.54.12.88	18103	206.200.43.7

To obtain a state-of-the-book refresh, ITTO FPGA clients should also subscribe to the [Nasdaq Options GLIMPSE](#) service. While there is no additional charge for this add-on service, Nasdaq ITTO FPGA subscribers must complete the [Data Feed Request Form](#) to obtain access to Nasdaq Options GLIMPSE.

Will the ITTO FPGA packet size be similar to the standard ITTO product?

No. For the ITTO product, packet size varies by channel. Given the nature of the ITTO FPGA product, the packet sizes may be significantly larger during peak market periods.

What is the network connectivity requirement for the ITTO FPGA data feed?

Nasdaq requires that direct data feed subscribers have a 10 Gb network or a 40 Gb network [connection](#) at the primary data center (Carteret) to access the ITTO FPGA service.

What is the recommended bandwidth allocation for the ITTO FPGA service?

Nasdaq provides the same 120 Mb bandwidth recommendation for ITTO FPGA product as it does for the software-based version.

Is Nasdaq planning to offer the FPGA feed in a multi-channel (multi-thread) option?

No. For the initial implementation, Nasdaq will offer only a single channel version of the Nasdaq ITTO FPGA data feed.

ADMINISTRATION

How much does the Nasdaq ITTO FPGA product cost?

As outlined in [Nasdaq Rule 7026](#), firms subscribing to the Nasdaq ITTO FPGA will be subject to the following distributor fees **in addition to** the current NOM ITTO distributor and usage fees:

Distributor Type	Monthly Fee
Internal Only Distributor	\$10,000 per Distributor
External Only Distributor	\$1,000 per Distributor
Internal and External Distributor	\$11,000 per Distributor

For Managed Data Solutions (MDS) Distributors, firms will be subject to a tiered administration fee based on the number of downstream subscribers benefitting from the ITTO FPGA data.

Distributor Type	Monthly Fee
Managed Data Solutions (MDS) Distributor	1 Subscriber = \$1,000
	2 Subscribers = \$1,250
	3 Subscribers = \$1,500
	Additional Subscribers = \$250 each

For direct data feed subscribers, Nasdaq port fees also apply.

For the existing ITTO fee schedule, please refer to the [Nasdaq Global Data Products Price List](#) on the NasdaqTrader® website.

If you have questions about the Nasdaq ITTO FPGA fees, please contact your [Nasdaq Global Account Manager](#).

Is ITTO FPGA only available only as a direct data feed?

Nasdaq is allowing market data redistributors to use the ITTO FPGA product to feed downstream products. Please note, however, that retransmission data feeds and MDS devices sourced from the ITTO FPGA feed are subject to the new distributor fees above.

Do I need to migrate to the ITTO FPGA service?

No. The Nasdaq ITTO FPGA product is an **optional** service upgrade for Nasdaq depth data feed subscribers. Nasdaq plans to support the software-based version of the ITTO data feed indefinitely.

Please contact your [Nasdaq Global Account Manager](#) for details.

How do I subscribe to the Nasdaq ITTO FPGA product?

If your firm is a current ITTO subscriber upgrading to the FPGA product, you only need to complete the [Data Feed Request Form](#). No additional forms or agreements are required.

If your firm is not currently processing the Nasdaq ITTO product, you need to complete the following agreements:

- [Nasdaq Global Data Agreement](#) – Required only if your firm is not yet party to the agreement.
- [System Application](#) – Required of all first time ITTO clients.
- [Data Feed Request Form](#) – Required of all firms ordering a new or replacement Nasdaq data feed product.

If you need help with the application process, please contact your [Nasdaq Account Manager](#).

Do I need submit a Data Feed Request Form if I am only looking to test the ITTO FPGA product?

Yes, every firm must complete the Data Feed Request Form in order to receive access to the ITTO FPGA product.

What Nasdaq Policies apply to this new service?

Depending on whether the Information is used in display or non-display devices, different Nasdaq policies will apply. Please contact your [Nasdaq Account Manager](#) if you have any questions on the relevant policies and the impact on subscribing to this service.

If I only use ITTO FPGA for Non-Display purposes, do I need to complete all the agreements?

Yes, all firms, regardless of intended use, must execute the proper forms and agreements with Nasdaq prior to initiation of service. Even non-display requires a license to utilize the information. Please contact your [Nasdaq Account Manager](#) if you have questions on the non-display policy and the possible impacts of using FPGA in non-display.

Whom should I contact with Nasdaq pricing or data policy questions?

Please contact your [Nasdaq Account Manager](#) at +1 301 978 5307.