

## NASDAQ TotalView-ITCH 4.1 FPGA: Frequently Asked Questions

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### GENERAL

#### What is being announced?

On August 1, 2012, NASDAQ OMX® introduced a new NASDAQ TotalView-ITCH equities depth feed offering using field-programmable gate array (FPGA) technology. This offering provides the same industry-leading performance you expect from the NASDAQ OMX ITCH® feeds 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 TotalView-ITCH FPGA feed?

- TotalView-ITCH FPGA is more efficient at handling traffic bursts from the NASDAQ® trading system than the traditional software-based feed handlers.
- TotalView-ITCH FPGA provides the highest level of determinism to the customer offered by NASDAQ OMX.
- TotalView-ITCH FPGA uses the current ITCH 4.1 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 TotalView-ITCH 4.1 feed?

NASDAQ OMX will use the same ITCH 4.1 message formats and protocol standard for the TotalView-ITCH FPGA product as it uses for the software-based version.

#### Where can I find the NASDAQ TotalView-ITCH FPGA specification document?

Click [here](#) to view the NASDAQ TotalView-ITCH FPGA specification document, which is the same as the TotalView-ITCH 4.1 software version.

#### What protocol options are available for the TotalView-ITCH FPGA product?

The TotalView-ITCH FPGA product is available via [MoldUDP64](#) only.

### What are the IP addresses for the TotalView-ITCH FPGA feed?

The UDP/IP address for TotalView-ITCH FPGA product is as follows:

Site	Channel/Purpose	Group	Port	Source IP Address
New York Metro	NASDAQ TotalView-ITCH FPGA – Broadcast Channel	233.54.12.101	26400	206.200.81.129

### Given that the TotalView-ITCH 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 OMX advises all TotalView-ITCH FPGA clients to subscribe to the standard TotalView-ITCH 4.1 data channels at both the New York Metro and Mid-Atlantic data centers.

### As a TotalView-ITCH FPGA client, how should I look to fill data gaps?

NASDAQ OMX guarantees that the message sequencing is the same for all versions of the TotalView-ITCH 4.1 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	NASDAQ TotalView-ITCH 4.1 – 10 Gb Network Re-Requests	N/A	36987	206.200.81.198

To obtain a state-of-the-book refresh, TotalView-ITCH FPGA clients should also subscribe to the [NASDAQ GLIMPSE 4.1](#) service. While there is no additional charge for this add-on service, NASDAQ TotalView-ITCH FPGA subscribers must complete the [Data Feed Request Form](#) to obtain access to NASDAQ GLIMPSE 4.1.

### Will the TotalView-ITCH FPGA packet size be similar to the standard TotalView-ITCH product?

No. For the TotalView-ITCH product, packet size varies by channel. Given the nature of the TotalView-ITCH FPGA product, the packet sizes may be significantly larger during peak market periods. NASDAQ OMX advises all TotalView-ITCH FPGA clients to be prepared to handle packets up to 9,000 bytes in length.

### What is the network connectivity requirement for the TotalView-ITCH FPGA data feed?

NASDAQ OMX 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 TotalView-ITCH FPGA service.

### What is the recommended bandwidth allocation for the TotalView-ITCH FPGA service?

NASDAQ OMX does not have a specific bandwidth recommendation for TotalView-ITCH FPGA product. NASDAQ OMX would simply advise TotalView-ITCH FPGA firms to be prepared to handle milli-second data bursts of up to 2,000 messages.

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

No. For the initial implementation, NASDAQ OMX will offer only a single channel version of the NASDAQ TotalView-ITCH FPGA data feed.

## ADMINISTRATION

### How much does the NASDAQ TotalView-ITCH FPGA product cost?

As outlined in [NASDAQ Rule 7026](#), firms subscribing to the NASDAQ TotalView-ITCH FPGA will be subject to the following distributor fees **in addition to** the current NASDAQ TotalView® / NASDAQ OpenView distributor and usage fees:

Distributor Type	Monthly Fee
Internal Only Distributor	\$25,000 per Distributor
External Only Distributor	\$2,500 per Distributor
Internal and External Distributor	\$27,500 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 TotalView-ITCH FPGA data.

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

For direct data feed subscribers, NASDAQ OMX port fees also apply.

For the existing TotalView / OpenView fee schedule, please refer to the [NASDAQ OMX Global Data Products Price List](#) on the NASDAQ OMX Trader® website.

If you have questions about the NASDAQ TotalView-ITCH FPGA fees, please contact your [NASDAQ OMX Global Account Manager](#).

### Is TotalView-ITCH FPGA only available only as a direct data feed?

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

### Do I need to migrate to the TotalView-ITCH FPGA service?

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

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

### How do I subscribe to the NASDAQ TotalView-ITCH FPGA product?

If your firm is a current TotalView-ITCH 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 TotalView-ITCH product, you need to complete the following agreements:

- [NASDAQ OMX Global Data Agreement](#) – Required only if your firm is not yet party to the agreement.
- [System Application](#) – Required of all first time TotalView-ITCH clients.

- [Data Feed Request Form](#) – Required of all firms ordering a new or replacement NASDAQ OMX data feed product.

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

**Do I need submit a Data Feed Request Form if I am only looking to test the TotalView-ITCH FPGA product?**

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

**What NASDAQ OMX Policies apply to this new service?**

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

**If I only use TotalView-ITCH 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 OMX prior to initiation of service. Even non-display requires a license to utilize the information. Please contact your [NASDAQ OMX 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 OMX pricing or data policy questions?**

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