

**SECURITIES AND EXCHANGE COMMISSION**

**[Release No. 34-103038; File No. SR-MRX-2025-09]**

**Self-Regulatory Organizations; Nasdaq MRX, LLC; Notice of Filing and Immediate Effectiveness of Proposed Rule Change to Offer FPGA Technology as an Optional Delivery Mechanism for the Nasdaq MRX Depth of Market Data Feed**

May 13, 2025.

Pursuant to Section 19(b)(1) of the Securities Exchange Act of 1934 (“Act”),<sup>1</sup> and Rule 19b-4 thereunder,<sup>2</sup> notice is hereby given that on April 30, 2025, Nasdaq MRX, LLC (“MRX” or “Exchange”) filed with the Securities and Exchange Commission (“SEC” or “Commission”) the proposed rule change as described in Items I, II, and III below, which Items have been prepared by the Exchange. The Commission is publishing this notice to solicit comments on the proposed rule change from interested persons.

**I. Self-Regulatory Organization’s Statement of the Terms of Substance of the Proposed Rule Change**

The Exchange proposes to offer FPGA technology as an optional delivery mechanism for the Nasdaq MRX Depth of Market Data Feed.

The text of the proposed rule change is available on the Exchange’s Website at <https://listingcenter.nasdaq.com/rulebook/mrx/rulefilings>, at the principal office of the Exchange, and at the Commission’s Public Reference Room.

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<sup>1</sup> 15 U.S.C. 78s(b)(1).

<sup>2</sup> 17 CFR 240.19b-4.

II. Self-Regulatory Organization's Statement of the Purpose of, and Statutory Basis for, the Proposed Rule Change

In its filing with the Commission, the Exchange included statements concerning the purpose of and basis for the proposed rule change and discussed any comments it received on the proposed rule change. The text of these statements may be examined at the places specified in Item IV below. The Exchange has prepared summaries, set forth in sections A, B, and C below, of the most significant aspects of such statements.

A. Self-Regulatory Organization's Statement of the Purpose of, and Statutory Basis for, the Proposed Rule Change

1. Purpose

MRX proposes to offer field-programmable gate array (“FPGA”) technology as an optional delivery mechanism for the Nasdaq MRX Depth of Market Data Feed (“Depth of Market Feed”).<sup>3</sup> FPGA technology is currently available on the Nasdaq Stock Market, LLC, Nasdaq Phlx (for equities), and Nasdaq BX, as well as the Nasdaq Options Market.<sup>4</sup>

**FPGA**

FPGA is a hardware-based delivery mechanism that utilizes an integrated circuit that is programmed to reduce “jitter”—a technical term of art referring to the deviation in amplitude, phase timing or width of a signal pulse in a digital signal—that will allow data to be processed in a more predictable, or “deterministic,” fashion. Reducing jitter can be useful for certain customers due to the variability in the timing of market data packets transmitted by an exchange

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<sup>3</sup> See Equity 3, Section 23(a)(1). Proposals to make FPGA technology available for the ISE and GEMX exchanges are being submitted together with this proposal.

<sup>4</sup> See, e.g., Securities Exchange Act Release No. 98185 (August 21, 2023), 88 FR 58324 (August 25, 2023) (SR-Phlx-2023-37) (setting fees for the purchase of FPGA technology as an optional delivery mechanism for PSX TotalView); Securities Exchange Act Release No. 98158 (August 17, 2023), 88 FR 57505 (August 23, 2023) (SR-BX-2023-020) (setting fees for the purchase of FPGA technology as an optional delivery mechanism for BX TotalView).

over the course of the trading day. Orders, and therefore market data packets, typically accumulate in larger numbers at the beginning and end of the trading day, as well as during the peaks of activity that occur at random intervals during the day. These bursts of activity may alter the time interval between the delivery of data packets because software processes information at variable rates depending on load to the system. Processing times may increase at higher loads, and decrease during periods of lesser activity. FPGA technology processes data packets at a constant time interval, without regard to the number of packets processed. Higher levels of determinism means less variable queuing, which improves the predictability of data transfer, particularly during times of peak market activity.

The benefits of determinism depend on the use case of the customer, as well as the customer's specific system architecture.

Higher determinism does not necessarily mean lower latency. The concepts of determinism and latency are related, but distinct. Determinism refers to predictability in the rate of data transmission; latency refers to the time required to process data or transport it from one location to another. Low latency is not necessarily deterministic, and higher determinism does not necessarily mean low latency. As such, use of FPGA technology will increase determinism, but does not guarantee lower latency at all times.<sup>5</sup>

Among customers that seek a higher degree of determinism, the benefits of FPGA technology vary, as FPGA technology is one possible solution, among a catalog of possible solutions, for increasing the consistency and predictability of message throughput over the course of the trading day. Some customers are able to adequately control jitter without using

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<sup>5</sup> Because software can be impacted by workload, FPGA technology in general can provide lower latency during periods of peak activity. The same FPGA technology that will support the MRX FPGA service is also broadly commercially available for purchase from third-party sellers unrelated to the Exchange.

FPGA technology; other customers address jitter using specialized software, coding or other design solutions in conjunction with FPGA; still others use FPGA alone. The specific choice depends on a complex analysis of the customer's information technology systems in the context of their particular use cases.

FPGA is a broadly available, commonly used type of programmable circuit that can be modified to suit different use cases. It is used in a wide spectrum of industries, including consumer electronics, automotive, and aerospace, as well as in a variety of industrial applications. It is not unique to the financial services industry,<sup>6</sup> or to the Exchange.

FPGA technology has been offered by both the Nasdaq Stock Exchange and the Nasdaq Options Market for over a decade,<sup>7</sup> and has been cited by the SEC as an example of a technology useful in the distribution of market data products.<sup>8</sup>

The Exchange proposes to offer the MRX FPGA service in conjunction with the Exchange's Depth of Market Feed.<sup>9</sup> The Depth of Market Feed is a data feed that provides full order and quote depth information for individual orders and quotes on the Exchange book and last sale information for trades executed on the Exchange. The data provided for each option

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<sup>6</sup> See, e.g., Contrive Datum Insights, "Field-Programmable Gate Array (FPGA) Market is expected to reach around USD 22.10 Billion by 2030, Grow at a CAGR of 15.12% during Forecast Period 2023 to 2030," (February 21, 2023), available at <https://www.globenewswire.com/en/news-release/2023/02/21/2612772/0/en/Field-Programmable-Gate-Array-FPGA-Market-Is-Expected-To-Reach-around-USD-22-10-Billion-by-2030-Grow-at-a-CAGR-Of-15-12-during-Forecast-Period-2023-To-2030-Data-By-Contrive-Datum-1.html> (describing the general size and state of the FPGA market in 2023).

<sup>7</sup> See Securities Exchange Act Release No. 67297 (June 28, 2012), 77 FR 39752 (July 5, 2012) (SR-Nasdaq-2012-063) (introducing FPGA technology); see also Nasdaq Data News 2012-13, available at <http://www.nasdaqtrader.com/TraderNews.aspx?id=dn2012-13> (introducing TotalView FPGA service as of August 1, 2012); Securities Exchange Act Release No. 74745 (April 16, 2015), 80 FR 22588 (April 22, 2015) (SR-Nasdaq-2015-035) (establishing FPGA for the Nasdaq Options Market); The Nasdaq Stock Market LLC Rules, Equity 7, Section 126(c) (Hardware-Based Delivery of Nasdaq Depth data).

<sup>8</sup> See Securities Exchange Act Release No. 90610, 86 FR 18596, 18647 (April 9, 2021) (File No. S7-03-20) (listing field programmable gate array services as an example of a technological innovation that could be employed by competing consolidators as part of the Market Data Infrastructure rule).

<sup>9</sup> See Equity 3, Section 23(a)(1).

series includes the symbols (series and underlying security), put or call indicator, expiration date, the strike price of the series, and whether the option series is available for trading on the Exchange and identifies if the series is available for closing transactions only. The feed also provides order imbalances on opening/reopening (size of matched contracts and size of the imbalance).

Customers that choose to purchase the Depth of Market Feed without the MRX FPGA service will receive the same data as customers that elect to purchase the Depth of Market Feed with the MRX FPGA service.

The proposal to offer FPGA technology to customers of the MRX Depth of Market Feed is in response to customer demand.

The Exchange will submit a proposed fee schedule for this product in a separate filing.

The Exchange intends to make this product available on June 1, 2025.

## 2. Statutory Basis

The Exchange believes that its proposal is consistent with Section 6(b) of the Act,<sup>10</sup> in general, and furthers the objectives of Section 6(b)(5) of the Act,<sup>11</sup> in particular, in that it is designed to promote just and equitable principles of trade, to remove impediments to and perfect the mechanism of a free and open market and a national market system, and, in general to protect investors and the public interest.

The current proposal to offer the well-recognized FPGA technology with the MRX Depth of Market Feed is in response to changes in customer demand, as noted above. FPGA

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<sup>10</sup> 15 U.S.C. 78f(b).

<sup>11</sup> 15 U.S.C. 78f(b)(5).

technology has been used by The Nasdaq Stock Market since 2012,<sup>12</sup> and has been employed by the Nasdaq Options Market for approximately a decade.<sup>13</sup> Offering this well-recognized technology to customers in response to demand will facilitate their ingestion of exchange data. Customers that choose to purchase the Depth of Market Feed without the MRX FPGA service will receive the same data as customers that elect to purchase the Depth of Market Feed with the MRX FPGA service.

B. Self-Regulatory Organization's Statement on Burden on Competition

The Exchange does not believe that the proposed rule change will impose any burden on competition not necessary or appropriate in furtherance of the purposes of the Act.

This proposal will further promote competition by providing market participants with additional choices in the transmission of depth of book data. Nothing in the Proposal burdens inter-market competition (the competition among self-regulatory organizations) because approval of the proposal does not impose any burden on the ability of other exchanges to compete.

Nothing in the Proposal burdens intra-market competition (the competition among consumers of exchange data) because FPGA technology will be available to any market participant on a non-discriminatory basis.

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<sup>12</sup> See Securities Exchange Act Release No. 67297 (June 28, 2012), 77 FR 39752 (July 5, 2012) (SR-Nasdaq-2012-063) (introducing FPGA technology); see also Nasdaq Data News 2012-13, available at <http://www.nasdaqtrader.com/TraderNews.aspx?id=dn2012-13> (introducing TotalView FPGA service as of August 1, 2012).

<sup>13</sup> Securities Exchange Act Release No. 74745 (April 16, 2015), 80 FR 22588 (April 22, 2015) (SR-Nasdaq-2015-035) (establishing FPGA for the Nasdaq Options Market).

C. Self-Regulatory Organization's Statement on Comments on the Proposed Rule Change Received from Members, Participants, or Others

No written comments were either solicited or received.

III. Date of Effectiveness of the Proposed Rule Change and Timing for Commission Action

Because the foregoing proposed rule change does not: (i) significantly affect the protection of investors or the public interest; (ii) impose any significant burden on competition; and (iii) become operative for 30 days from the date on which it was filed, or such shorter time as the Commission may designate, it has become effective pursuant to Section 19(b)(3)(A)(iii) of the Act<sup>14</sup> and subparagraph (f)(6) of Rule 19b-4 thereunder.<sup>15</sup>

At any time within 60 days of the filing of the proposed rule change, the Commission summarily may temporarily suspend such rule change if it appears to the Commission that such action is necessary or appropriate in the public interest, for the protection of investors, or otherwise in furtherance of the purposes of the Act. If the Commission takes such action, the Commission shall institute proceedings to determine whether the proposed rule should be approved or disapproved.

IV. Solicitation of Comments

Interested persons are invited to submit written data, views and arguments concerning the foregoing, including whether the proposed rule change is consistent with the Act.

Comments may be submitted by any of the following methods:

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<sup>14</sup> 15 U.S.C. 78s(b)(3)(A)(iii).

<sup>15</sup> 17 CFR 240.19b-4(f)(6). In addition, Rule 19b-4(f)(6) requires a self-regulatory organization to give the Commission written notice of its intent to file the proposed rule change at least five business days prior to the date of filing of the proposed rule change, or such shorter time as designated by the Commission. The Exchange has satisfied this requirement.

Electronic Comments:

- Use the Commission's internet comment form (<https://www.sec.gov/rules/sro.shtml>); or
- Send an email to [rule-comments@sec.gov](mailto:rule-comments@sec.gov). Please include file number SR-MRX-2025-09 on the subject line.

Paper Comments:

- Send paper comments in triplicate to Secretary, Securities and Exchange Commission, 100 F Street NE, Washington, DC 20549-1090.

All submissions should refer to file number SR-MRX-2025-09. This file number should be included on the subject line if email is used. To help the Commission process and review your comments more efficiently, please use only one method. The Commission will post all comments on the Commission's internet website (<https://www.sec.gov/rules/sro.shtml>). Copies of the submission, all subsequent amendments, all written statements with respect to the proposed rule change that are filed with the Commission, and all written communications relating to the proposed rule change between the Commission and any person, other than those that may be withheld from the public in accordance with the provisions of 5 U.S.C. 552, will be available for website viewing and printing in the Commission's Public Reference Room, 100 F Street NE, Washington, DC 20549, on official business days between the hours of 10 a.m. and 3 p.m. Copies of the filing also will be available for inspection and copying at the principal office of the Exchange. Do not include personal identifiable information in submissions; you should submit only information that you wish to make available publicly. We may redact in part or



withhold entirely from publication submitted material that is obscene or subject to copyright protection. All submissions should refer to file number SR-MRX-2025-09 and should be submitted on or before [INSERT DATE 21 DAYS AFTER DATE OF PUBLICATION IN THE *FEDERAL REGISTER*].

For the Commission, by the Division of Trading and Markets, pursuant to delegated authority.<sup>16</sup>

**Sherry R. Haywood,**

*Assistant Secretary.*

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<sup>16</sup> 17 CFR 200.30-3(a)(12).