

SECURITIES AND EXCHANGE COMMISSION  
(Release No. 34-94335; File No. SR-EMERALD-2021-38)

March 1, 2022

Self-Regulatory Organizations; MIAX Emerald, LLC; Notice of Filing of Amendment No. 1 and Order Granting Accelerated Approval of a Proposed Rule Change, as Modified by Amendment No. 1, to Amend Exchange Rule 531 to Provide for a New Service Called the High Precision Network Time Signal Service

I. Introduction

On November 19, 2021, MIAX Emerald, LLC (“Exchange”) filed with the Securities and Exchange Commission (“Commission”), 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> a proposed rule change to amend Exchange Rule 531, Reports and Market Data Products, to provide for a new service called the “High Precision Network Time Signal Service.” The proposed rule change was published for comment in the Federal Register on December 7, 2021.<sup>3</sup> On January 19, 2022, pursuant to Section 19(b)(2) of the Act,<sup>4</sup> the Commission designated a longer period within which to approve the proposed rule change, disapprove the proposed rule change, or institute proceedings to determine whether to disapprove the proposed rule change.<sup>5</sup> On February 18, 2022, the Exchange filed Amendment No. 1 to the proposed rule change.<sup>6</sup> The Commission has received no comments on

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

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

<sup>3</sup> See Securities Exchange Act Release No. 93698 (December 1, 2021), 86 FR 69301 (December 7, 2021) (“Notice”).

<sup>4</sup> 15 U.S.C. 78s(b)(2).

<sup>5</sup> See Securities Exchange Act Release No. 94000 (January 19, 2022), 87 FR 3865 (January 25, 2022). The Commission designated March 7, 2022, as the date by which the Commission shall approve or disapprove, or institute proceedings to determine whether to disapprove, the proposed rule change.

<sup>6</sup> In Amendment No. 1, the Exchange amended the proposal to provide additional detail, clarification, and justification regarding the proposed rule change and make a non-

the proposed rule change. This order provides notice of the filing of Amendment No. 1 to the proposed rule change, and grants approval to the proposed rule change, as modified by Amendment No. 1, on an accelerated basis.

II. Description of the Proposed Rule Change, as Modified by Amendment No. 1

The Exchange proposes to provide for a new, optional service called the “High Precision Network Time Signal Service” (“Service”), which would enable members to synchronize their internal devices to the same time as the Exchange’s devices with high precision.<sup>7</sup>

According to the Exchange, the U.S. Government’s Global Positioning Satellite (“GPS”) clock time signal is the publicly-available benchmark that the Exchange and most, if not all, members use to synchronize their internal primary clock devices.<sup>8</sup> Typically, a recipient’s GPS antenna serves as a time signal receiver, which then feeds a primary clock device the Coordinated Universal Time (referred to as “UTC”)<sup>9</sup> using a Precision Time Protocol (“PTP”).<sup>10</sup>

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substantive change to streamline the proposed rule text. Amendment No. 1 is available on the Commission’s website at <https://www.sec.gov/comments/sr-emerald-2021-38/sremerald202138-20116580-268058.pdf>.

<sup>7</sup> See proposed Rule 531(c); Amendment No. 1, at 4. The Exchange states that the proposed Service would be available to all members who choose to subscribe, and that any member may discontinue its subscription at any time. See Amendment No. 1, at 4 n.4., 14. The Exchange also states that it intends to submit a separate rule filing with the Commission to propose fees for the Service. See *id.* at 4 n.4.

<sup>8</sup> See Amendment No. 1, at 5. The Exchange states that a “primary clock device” is a precision “parent” clock that provides timing signals to synchronized secondary “child” clocks as part of an independent clock network. See *id.* at 5 n.8.

<sup>9</sup> According to the Exchange, the term “Coordinated Universal Time” is defined as the international standard of time that is kept by atomic clocks around the world, and is the primary time standard by which the world regulates clocks and time. See *id.* at 5 n.8.

<sup>10</sup> See *id.* at 5. According to the Exchange, “Precision Time Protocol” is a method used to synchronize clocks through a computer network. See *id.* at 5 n.8.

Currently, in terms of the Exchange synchronizing its own devices, the Exchange states that its primary clock feeds a time signal to the Exchange’s timestamping devices within the Exchange’s own network and provides sub-nanosecond level synchronization using an enhanced PTP (“Enhanced PTP”).<sup>11</sup> This Enhanced PTP time signal is used to synchronize the Exchange’s capture devices (used to timestamp orders and messages as they travel through the Exchange’s System) with each other at a sub-nanosecond level.<sup>12</sup>

In terms of members synchronizing their internal devices, the Exchange states that many members today attempt to synchronize their primary clock devices to the publicly-available GPS time signal by receiving this time signal through a GPS-capable antenna.<sup>13</sup> Members can thereby synchronize their primary clock devices to the GPS network time to within an accuracy of approximately 30 nanoseconds.<sup>14</sup> Using PTP, members can then synchronize their internal devices to their primary clock devices to within a few nanoseconds of one another.<sup>15</sup> Alternatively, some members may use their own Enhanced PTP with their primary clock devices to synchronize their timestamping devices at a sub-nanosecond level.<sup>16</sup>

However, because the Exchange and members independently access time signals from the GPS network and synchronize those time signals with their own primary clock devices, the Exchange states that measurement times of market events by the Exchange and a member may

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<sup>11</sup> See id. at 6. According to the Exchange, “Enhanced PTP” is commonly defined as a precision time protocol that is at a sub-nanosecond level. See id. at 6 n.9.

<sup>12</sup> See id. at 6.

<sup>13</sup> See id.

<sup>14</sup> See id.

<sup>15</sup> See id.

<sup>16</sup> In those cases, the Exchange and these members use separate Enhanced PTP devices. See id.

oscillate by approximately 30 or more nanoseconds.<sup>17</sup> This may lead to a member's time calculations of how long it took for an order or message to leave their systems and reach the intended trading center to err by as many as 30 nanoseconds.<sup>18</sup> According to the Exchange, this discrepancy may impair the member's ability to fully understand latencies within their own systems and whether they need to adjust their systems or trading models.<sup>19</sup>

The proposed Service would provide members with the Exchange's time signal at a sub-nanosecond level, allowing members to synchronize their own primary clock devices to the Exchange's primary clock device.<sup>20</sup> The Exchange states that this sub-nanosecond time signal would tell the member the Exchange's time at a sub-nanosecond level at a particular point in time.<sup>21</sup> Subscribing members would receive the time signal from the Exchange via a 1 gigabit connection that is currently offered by the Exchange and used by members and non-members to connect to the Exchange's system.<sup>22</sup> By then employing an Enhanced PTP clock

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<sup>17</sup> See id. at 6-7.

<sup>18</sup> See id. at 7.

<sup>19</sup> See id.

<sup>20</sup> See id.

<sup>21</sup> See id. at 7. The Exchange states that the proposed Service would not include any trading data regarding the member's activity on the Exchange or include any data from other trading activity on the Exchange. See id. at 10.

<sup>22</sup> See id. See also MIAX Emerald Fee Schedule, Section 5, System Connectivity Fees. The Exchange states that it does not propose to include additional connectivity options or modify existing connectivity options as part of this proposal, and that members may continue to use their existing methods to connect and send orders to the Exchange. See Amendment No. 1, at 10.

synchronization device,<sup>23</sup> subscribing members could use that time signal to synchronize their own primary clock to the Exchange’s primary clock at the more acute sub-nanosecond level.<sup>24</sup>

The Exchange proposes to provide the Service in response to member demand for tighter and more accurate clock synchronization options with the Exchange’s network.<sup>25</sup> In this regard, the Exchange asserts that members may use the proposed Service for several purposes.<sup>26</sup> First, according to the Exchange, the proposed Service would enable members to more precisely measure latency between their network and that of the Exchange, as it would allow them to better understand the times at which an order or message reached certain points when traveling from their network to the Exchange.<sup>27</sup> Second, members may use the proposed Service to analyze the efficiency of their network and connections when receiving messages back from the Exchange (such as those regarding whether an order was accepted, rejected, or executed), measuring message traversal times by comparing their message’s timestamp to the Exchange’s matching engine timestamp from Exchange-generated acknowledgement messages.<sup>28</sup> Third,

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<sup>23</sup> According to the Exchange, an “Enhanced PTP clock synchronization device” captures time and coordinates time synchronization within a network at a sub-nanosecond level. See Amendment No. 1, at 8 n.13. In conjunction with the proposed Service, a member’s Enhanced PTP clock synchronization device would be used to synchronize clocks within the member’s own system at a sub-nanosecond level, enabling the member to record certain times an order or message traveled through and leaves the member’s system at a sub-nanosecond level. Some members may currently have an Enhanced PTP clock synchronization device within their own network. This device is not provided by the Exchange. The Exchange states that other members that do not currently have an Enhanced PTP clock synchronization device would need to acquire one from a third party vendor, of which there are several providers. See id. at 8.

<sup>24</sup> See id. at 7-8.

<sup>25</sup> See id. at 4-5.

<sup>26</sup> See id. at 8.

<sup>27</sup> See id.

<sup>28</sup> See id. at 8-9. The Exchange states that it sends members an acknowledgement message that their order or message was received by the Exchange, which includes the time of

members may then use these enhanced latency measurements to better analyze latencies within their own systems and better assess the health of their network and that their systems are working as intended, and leverage this information to optimize their network, models, and trading patterns to potentially improve their interactions with the Exchange.<sup>29</sup> Finally, the Exchange states that members may use the proposed Service to assist with determining compliance with certain regulatory requirements, trade surveillance, and evaluating compliance with certain clock synchronization requirements.<sup>30</sup>

Separately, to enhance the clarity of Rule 531 in light of the proposed addition of the Service, the Exchange proposes to amend the title of Exchange Rule 531 to include the phrase “and Services” so that the title would read as “Reports, Market Data Products and Services.”<sup>31</sup>

### III. Discussion and Commission Findings

After careful review, the Commission finds that the proposed rule change, as modified by Amendment No. 1, is consistent with the requirements of the Act and the rules and regulations thereunder applicable to a national securities exchange.<sup>32</sup> In particular, the Commission finds that the proposal is consistent with Section 6(b)(5) of the Act,<sup>33</sup> which requires, among other things, that the rules of a national securities exchange be designed to prevent fraudulent and

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receipt at a nanosecond level. See id. at 9 n.14.

<sup>29</sup> For example, according to the Exchange, a member may use this information when analyzing the efficacy of their various connections and whether a connection is performing as expected or experiencing a delay. A member may then decide to rebalance the amount of orders and/or messages over its various connections to ensure each connection is operating with maximum efficiency. See id. at 9.

<sup>30</sup> See id.

<sup>31</sup> See id. at 10.

<sup>32</sup> In approving this proposed rule change, the Commission has considered the proposed rule’s impact on efficiency, competition, and capital formation. See 15 U.S.C. 78c(f).

<sup>33</sup> 15 U.S.C. 78f(b)(5).

manipulative acts and practices, 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, and that those rules not be designed to permit unfair discrimination between customers, issuers, brokers, or dealers.

As discussed above, the Exchange's proposed Service would provide members with the ability to improve the degree of clock synchronization between their systems and the Exchange's systems. The Commission has stated previously that clock synchronization is a critical component of today's market structure,<sup>34</sup> and that it is reasonable to expect that finer clock synchronization for market participants will evolve over time.<sup>35</sup> The Commission believes that the finer clock synchronization enabled by the proposed Service is consistent with such evolution and advancements in technology, and would provide members with a tool that enables them to more precisely calculate and better understand order and message latencies. The Commission therefore believes that the proposal is reasonably designed to remove impediments to and perfect the mechanism of a free and open market and a national market system, consistent with Section 6(b)(5) of the Act. In addition, the proposal would promote just and equitable principles of trade and not permit unfair discrimination, consistent with Section 6(b)(5) of the Act, insofar as the proposed Service would be available to all Exchange members.

The Commission also believes that the proposal is consistent with Section 6(b)(5) of the Act because it would help protect investors and the public interest to the extent that improved

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<sup>34</sup> See Securities Exchange Act Release No. 77565 (April 8, 2016), 81 FR 22136, 22138 (April 14, 2016) (SR-FINRA-2016-005) (Order Approving a Proposed Rule Change To Reduce the Synchronization Tolerance for Computer Clocks That Are Used To Record Events in NMS Securities and OTC Equity Securities).

<sup>35</sup> See Securities Exchange Act Release No. 79318 (November 15, 2016), 81 FR 84696, 84785-86 (November 23, 2016) (File No. 4-698) (Order Approving the National Market System Plan Governing the Consolidated Audit Trail).

clock synchronization would enhance subscribing members' ability to comply with regulatory requirements and perform trade surveillance. In addition, the proposed revision of Exchange Rule 531's title to "Reports, Market Data Products and Services" should help market participants understand what is set forth in the rule, consistent with the Section 6(b)(5) goal of protecting investors and the public interest.

#### IV. Solicitation of Comments on Amendment No. 1

Interested persons are invited to submit written data, views, and arguments concerning the foregoing, including whether Amendment No. 1 is consistent with the Act. Comments may be submitted by any of the following methods:

##### Electronic comments:

- Use the Commission's Internet comment form (<http://www.sec.gov/rules/sro.shtml>); or
- Send an e-mail to [rule-comments@sec.gov](mailto:rule-comments@sec.gov). Please include File No. SR- EMERALD-2021-38 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 No. SR-EMERALD-2021-38. The file numbers should be included on the subject line if e-mail 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 (<http://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 10:00 a.m. and 3:00 p.m. Copies of such filing also will be available for inspection and copying at the principal office of the Exchange. All comments received will be posted without change. Persons submitting comments are cautioned that we do not redact or edit personal identifying information from comment submissions. You should submit only information that you wish to make publicly available. All submissions should refer to File No. SR-EMERALD-2021-38 and should be submitted on or before [insert date 21 days from date of publication in the Federal Register].

V. Accelerated Approval of Proposed Rule Change, as Modified by Amendment No. 1

The Commission finds good cause to approve the proposed rule change, as modified by Amendment No. 1, prior to the thirtieth day after the date of publication of notice of the amended proposal in the Federal Register. In Amendment No. 1, the Exchange amended the proposal to provide additional detail, clarification, and justification regarding the proposed rule change and make a non-substantive change to streamline the proposed rule text. Amendment No. 1 adds clarity and justification to the proposal, and does not alter the proposed Service functionality from what is set forth in the Notice, which was subject to a full comment period. Accordingly, the Commission finds good cause, pursuant to Section 19(b)(2) of the Act,<sup>36</sup> to approve the proposed rule change, as modified by Amendment No. 1, on an accelerated basis.

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<sup>36</sup> 15 U.S.C. 78s(b)(2).

VI. Conclusion

IT IS THEREFORE ORDERED, pursuant to Section 19(b)(2) of the Act,<sup>37</sup> that the proposed rule change (SR-EMERALD-2021-38), as modified by Amendment No. 1, be, and hereby is, approved on an accelerated basis.

For the Commission, by the Division of Trading and Markets, pursuant to delegated authority.<sup>38</sup>

J. Matthew DeLesDernier  
Assistant Secretary

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<sup>37</sup> Id.

<sup>38</sup> 17 CFR 200.30-3(a)(12).