

Equity Trading Initiatives: Synchronization of Business Clocks

FINRA Requests Comment on a Proposal to Tighten Business Clock Synchronization Requirements

Comment Period Expires: Friday, January 9, 2015

Executive Summary

FINRA is soliciting comment on a proposal to reduce the synchronization tolerance for computer clocks. The current clock synchronization requirements allow for a tolerance of one second from the National Institute of Standards and Technology (NIST) atomic clock. Under the proposal, the tolerance for computer clocks would be reduced to 50 milliseconds. The tolerance for mechanical time stamping devices would remain at one second.

The proposed rule text is set forth in Attachment A.

Questions regarding this *Notice* should be directed to:

- ▶ Shelly Bohlin, Vice President, Quality of Markets, at (240) 386-5029;
- ▶ Lisa Horrigan, Associate General Counsel, Office of General Counsel (OGC), at (202) 728-8190; or
- ▶ Alex Ellenberg, Assistant General Counsel, OGC, at (202) 728-8152.

November 2014

Notice Type

- ▶ Request for Comment

Suggested Routing

- ▶ Compliance
- ▶ Trade Reporting
- ▶ Legal
- ▶ Operations
- ▶ Systems
- ▶ Trading
- ▶ Training

Key Topics

- ▶ Books, Records and Reports
- ▶ Business Clocks
- ▶ Clock Drift
- ▶ OATS Reporting
- ▶ Recording of Order, Quotation, and Trade Information
- ▶ Time Stamping
- ▶ Trade Reporting

Referenced Rules

- ▶ FINRA Rule 7430
- ▶ SEC Rule 613

Action Requested

FINRA encourages all interested parties to comment on the proposal. Comments must be received by Friday, January 9, 2015.

Comments must be submitted through one of the following methods:

- ▶ Emailing comments to pubcom@finra.org; or
- ▶ Mailing comments in hard copy to:
Marcia E. Asquith
Office of the Corporate Secretary
FINRA
1735 K Street, NW
Washington, DC 20006-1506

To help FINRA process and review comments more efficiently, persons should use only one method to comment on the proposal.

Important Notes: The only comments that FINRA will consider are those submitted pursuant to the methods described above. All comments received in response to this *Notice* will be made available to the public on the FINRA website. Generally, FINRA will post comments as they are received.¹

Before becoming effective, the proposed rule change must be filed with the Securities and Exchange Commission (SEC) pursuant to Section 19(b) of the SEA.²

Background and Discussion

The proposal set forth in this *Notice* is one of seven FINRA initiatives relating to equity market structure and automated trading activities, including high frequency trading (HFT).³ These initiatives are designed to increase the scope of trading information FINRA receives, provide more transparency into trading activities to market participants and investors and require firms engaged in electronic trading and their employees to be trained, educated and accountable for their role in equity trading.

Current FINRA rules require that firms synchronize their business clocks in conformity with procedures prescribed by FINRA. Specifically, FINRA Rule 7430 requires that firms synchronize their business clocks that are used for purposes of recording the date and time of any event that must be recorded pursuant to the FINRA By-Laws or other FINRA rules (*e.g.*, the time a trade was executed or the time an order was received or routed), with reference to a time source as designated by FINRA. As specified in the current OATS technical specifications, all computer system clocks and mechanical time stamping devices must be synchronized to within one second of the NIST atomic clock.⁴ To maintain

clock synchronization, clocks should be checked against the NIST atomic clock and re-synchronized, if necessary, at pre-determined intervals throughout the day.⁵ FINRA understands that some firms synchronize their clocks continuously throughout the day, while others do so at various times during the day and still others do so only once a day.⁶

Given the increasing speed of trading in today's automated markets, FINRA believes the current one second tolerance is no longer appropriate for computer system clocks recording time under FINRA rules. Automated systems have evolved to the point where order placement and trading decisions are made on a millisecond, or finer, basis. In such an environment, the one second tolerance is insufficient for audit trail and surveillance purposes, particularly since firms are reporting to OATS in milliseconds and will begin trade reporting in milliseconds in the near future.⁷

As the SEC has recognized, it is critical for regulators to have the capability to accurately determine the sequence in which all reportable events occur.⁸ Timestamp accuracy at the millisecond level is essential for the accurate sequencing of order, quote and trade events across market participants and market centers. FINRA's surveillance programs rely on the timestamps firms report, among other things, to monitor for intentional manipulative trading practices such as spoofing or layering (*i.e.*, bidding or offering with the intent to cancel the bid or offer before execution) and to evaluate best execution and compliance with SEC Regulation NMS.

Accordingly, FINRA is proposing to tighten the synchronization requirement for computer system clocks. The allowable drift tolerance for mechanical time-stamping devices (*e.g.*, used for time-stamping an order ticket for a manual trade) would remain at one second. FINRA believes that a drift tolerance of 50 milliseconds for computer system clocks is the best option to facilitate surveillance of high frequency and algorithmic trading. In addition, FINRA and the exchanges have publicly stated their current belief that 50 milliseconds is the appropriate synchronization standard for purposes of the Consolidated Audit Trail (CAT) under SEC Rule 613.⁹ However, FINRA recognizes that it may be more burdensome for firms to comply with a 50 millisecond tolerance than a 100 or 200 millisecond tolerance and requests comments specifically on the costs and benefits of complying with the different synchronization requirements.¹⁰ In this regard, FINRA notes that the range across market participants could in fact be twice as large as the allowable drift. For example, if one firm's clock is 50 milliseconds behind and another firm's clock is 50 milliseconds ahead, the variance between events reported by these firms could be 100 milliseconds. Accordingly, FINRA believes it is important to set the shortest allowable drift that is reasonable and can be achieved by the majority of firms.

As part of the proposal, FINRA also would codify the existing OATS technical specifications cited above, along with the reduced drift tolerance for electronic business clocks, in the Rule 4500 Series (Books, Records and Reports). Thus, the clock synchronization rule would be moved from the OATS rule series to make clear that these requirements apply to the recording of the date and time of any event that must be recorded under FINRA By-Laws or rules, not just OATS requirements.

Economic Impacts

Anticipated Benefits

As discussed above, the proposal would allow FINRA to more accurately determine the sequence of order, quote and trade events across market participants and market centers, thereby improving FINRA's surveillance program and enhancing investor protection. In particular, the proposal would enhance FINRA's ability to monitor for manipulative trading practices, such as spoofing or layering, and to evaluate best execution and compliance with SEC Regulation NMS.

Anticipated Costs

Firms that receive or route orders or execute trades directly would likely incur costs associated with updating their systems and procedures to comply with a reduction in the allowable drift for computer system clocks. These costs may include costs to develop and maintain software programs that allow synchronization within 50 milliseconds. FINRA notes that there are third party software products that could help firms maintain synchronization within 50 or 100 milliseconds. Firms may find these software products to be more cost effective than developing and maintaining their own programs. Some firms may also need to update their technology hardware and servers to achieve the 50 millisecond drift standard.

These costs will likely vary across firms depending on their current technology systems and procedures, their business models and the frequency with which they synchronize their clocks, as well as their current drift standards. FINRA understands that some firms already synchronize their computer clocks within 50 milliseconds, and as a result, they will not incur any material costs associated with this proposal.

Request for Comment

FINRA requests comment on all aspects of the proposed requirement, including the incremental costs of complying with a synchronization standard of 50 milliseconds versus a standard of 100 or 200 milliseconds for computer system clocks. FINRA requests specific comment on the following questions:

- ▶ Does your firm currently synchronize its computer clocks to within less than a second of the NIST (*e.g.*, to within 50 or 100 milliseconds), and if so, what are the costs associated with maintaining that standard?
- ▶ What, if any, systems changes would firms need to make for purposes of complying with a reduction in the allowable drift tolerance for computer system clocks? What are the anticipated costs associated with these system changes?
 - ▶ FINRA understands that there may be off-the-shelf software products generally available that could help firms achieve a 100 millisecond, and possibly a 50 millisecond, drift standard. What would the costs be, including systems and labor costs, of using such software? What are the benefits and drawbacks of using these types of products?
 - ▶ Would the necessary systems changes and the associated costs vary depending on whether the synchronization standard is 50 milliseconds versus either 100 or 200 milliseconds?
 - ▶ Would the proposed adoption of a 50 milliseconds standard cause any residual or other “downstream” impacts on a firm’s systems? If so, would those impacts be mitigated if FINRA adopted a 100 or 200 millisecond standard instead?
- ▶ How much time would firms need to make any necessary systems changes to comply with a 50 millisecond standard?
 - ▶ Would the implementation timeframe change materially under a higher (*e.g.*, 100 or 200 millisecond) standard?
- ▶ If FINRA adopts a 50 millisecond standard, should a separate more permissive standard apply to firms with a de minimis amount of order and trading activity that are not engaged in algorithmic or high frequency trading, and if so, what should that standard be? How should FINRA define the universe of firms to which such a separate standard would apply?
- ▶ What would be the impact of a 50 millisecond standard on smaller firms? Would the impact change materially under a 100 or 200 millisecond standard?
 - ▶ If smaller firms had a longer implementation period, would this lessen the impact on these firms of complying with a 50 millisecond standard?

- ▶ What would be the impact of a 50 millisecond standard on firms that use their clearing firm's system for order routing and execution and regulatory reporting?
- ▶ As noted above, the synchronization standard for the CAT may be 50 milliseconds. Do firms have concerns about making systems changes in the near-term to comply with a higher drift tolerance under FINRA rules, *e.g.*, 100 milliseconds, given that they may have to comply with a 50 millisecond standard under CAT in the longer term?
- ▶ Should the one second requirement for manual clocks remain? If not, what is an appropriate standard for manual clocks?
- ▶ What other economic impacts might be associated with this proposed rule? Who might be affected and how?

FINRA requests that commenters provide empirical data or other factual support for their comments wherever possible.

Endnotes

1. FINRA will not edit personal identifying information, such as names or email addresses, from submissions. Persons should submit only information that they wish to make publicly available. See *NTM 03-73* (November 2003) (Online Availability of Comments) for more information.
2. See Section 19 of the Securities Exchange Act of 1934 (SEA) and rules thereunder. After a proposed rule change is filed with the SEC, the proposed rule change generally is published for public comment in the Federal Register. Certain limited types of proposed rule changes, however, take effect upon filing with the SEC. See SEA Section 19(b)(3) and SEA Rule 19b-4.
3. See FINRA September 19, 2014, News Release [“FINRA Board Approves Series of Equity Trading and Fixed Income Rulemaking Items.”](#)
4. Any time provider may be used for synchronization, however, all clocks and time stamping devices must remain accurate within a one-second tolerance of the NIST clock. This tolerance includes (1) the difference between the NIST standard and a time provider’s clock, (2) transmission delay from the source and (3) the amount of drift of the member firm’s clock. The OATS technical specifications further specify that computer system and mechanical clocks must be synchronized every business day before market open to ensure that recorded order event timestamps are accurate.
5. The OATS technical specifications also provide that compliance examinations include a review for the existence of adequate procedures and checks to fulfill this obligation, as well as a test of the degree of accuracy of clocks that are used for providing audit trail information against the NIST standard. To facilitate examinations, member firms must document and maintain their clock synchronization procedures. In addition, member firms should keep a log of the times when they synchronize their clocks and the results of the synchronization process. This log should include notice of any time the clock drifts more than one second.
6. FINRA generally believes that the firms that synchronize once daily are firms that accept manual orders.
7. Earlier this year, the SEC approved a proposed rule change to amend FINRA’s equity trade reporting and OATS rules to require firms to report time in trade reports and OATS reports in milliseconds, if their systems capture milliseconds. See [Regulatory Notice 14-21](#) (May 2014). For OATS, the rule change codified long-standing guidance and was implemented on April 7, 2014. The millisecond reporting requirement was implemented on November 10, 2014, for the ADF and TRFs, and will be implemented on November 17, 2014, for the ORF. As technology advances, FINRA expects to see an increasing percentage of firms both capturing milliseconds and making submissions to the FINRA trade reporting facilities and OATS reflecting time in milliseconds.

8. In its release adopting Rule 613 (Consolidated Audit Trail or “CAT”), the SEC noted that time drift is an issue that must be addressed to prevent a deterioration of the accuracy of the data in the consolidated audit trail. *See Securities Exchange Act Release No. 67457 (July 18, 2012), 77 FR 45722, 45774 (August 1, 2012)*
9. FINRA notes that the implementation of CAT is likely several years away and believes there are clear and important benefits to reducing the drift tolerance for computer system clocks in the near-term.
10. FINRA notes that NIST itself uses a 50 millisecond advance to account for network delays, see [NIST Internet Time Service](#), and, as a result, FINRA does not believe a tolerance of less than 50 milliseconds currently is necessary or appropriate.

ATTACHMENT A

Below is the text of the proposed rule change. Proposed new language is underlined; proposed deletions are in brackets.

4000. FINANCIAL AND OPERATIONAL RULES

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4500. BOOKS, RECORDS AND REPORTS

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[7430]4580. Synchronization of Member Business Clocks

(a) Each member shall synchronize its business clocks, including computer system clocks and mechanical time stamping devices, that are used for purposes of recording the date and time of any event that must be recorded pursuant to the FINRA By-Laws or other FINRA rules, with reference to a time source as designated by FINRA, and shall maintain the synchronization of such business clocks in conformity with such procedures as are prescribed by FINRA.

(b) All computer system clocks and mechanical time stamping devices must be synchronized to the National Institute of Standards and Technology (NIST) atomic clock. Any time provider may be used for synchronization, however, all computer system clocks must remain accurate within a 50-millisecond tolerance of the NIST clock and mechanical time stamping devices must remain accurate within a one-second tolerance of the NIST clock. This tolerance includes all of the following:

- (1) The difference between the NIST standard and a time provider's clock;
- (2) Transmission delay from the source; and
- (3) The amount of drift of the member's clock.

(c) Computer system and mechanical clocks must be synchronized every business day before market open to ensure that recorded event timestamps are accurate. To maintain clock synchronization, clocks must be checked against the standard clock and re-synchronized, as necessary, throughout the day.

• • • Supplementary Material: -----

.01 Compliance examinations include a review for the existence of adequate procedures and checks to fulfill the obligation under this Rule, as well as a test of the degree of accuracy of clocks that are used for providing audit trail information against the NIST standard. To facilitate examinations, members must document and maintain their clock synchronization procedures. In addition, members should keep a log of the times when they synchronize their clocks and the results of the synchronization process. This log should include notice of any time the clock drifts more than the tolerance specified in paragraph (b) of this Rule. This log should be maintained for the period of time and accessibility specified in SEC Rule 17a-4(b), and it should be maintained and preserved for the required time period in paper format or in a format permitted under SEC Rule 17a-4(f).

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