June 6, 2023

VIA EMAIL (tradingandmarkets@sec.gov)

Ms. Emily Westerberg Russell
Chief Counsel
Division of Trading and Markets
Securities and Exchange Commission
100 F Street, NE
Washington, DC 20549-1090

Re: Request for No-Action Relief regarding 2X Load Testing

Dear Ms. Russell:

The Consolidated Audit Trail, LLC ("CAT LLC" or "Company"), on behalf of the Participants[1] in the National Market System Plan Governing the Consolidated Audit Trail (the "CAT NMS Plan" or "Plan"), requests confirmation that the staff (the "Staff") of the Securities and Exchange Commission (the "Commission" or the "SEC") will not recommend enforcement action against the Participants pursuant to the CAT NMS Plan or the requirements to comply with the CAT NMS Plan as set forth in Rule 613(h) and 608(c) of Regulation NMS under the Exchange Act if CAT LLC does not perform "2X Load Testing," as defined below, on an annual basis, and instead tests the CAT System using a risk-based approach described below.

A. Definition of 2X Load Testing

For purposes of this letter, the term "2X Load Testing" means stress testing of the functioning of the CAT's data ingestion, linker and other data processing based on twice (2X) the historical peak day data volume for the most recent six years. Generally, load testing is a form of performance testing that measures the capability of a system to process high loads of data. 2X Load Testing is one form of load testing for measuring the capability of the CAT environment.

B. 2X Load Testing Conducted to Date

CAT LLC conducted 2X Load Testing in the fourth quarter of 2022, and the report with the results of these tests was provided to the Staff. Such testing is resource intensive and expensive. Based on current estimates for twice the peak volume, a 2X Load Test would involve approximately 1.2 trillion events per day for each of the four days used in the test. Such testing requires the generation of the necessary data, and then running the load test, a process that takes

[1] The twenty-five Participants of the CAT NMS Plan are: BOX Exchange LLC, Cboe BYX Exchange, Inc., Cboe BZX Exchange, Inc., Cboe EDGA Exchange, Inc., Cboe EDGX Exchange, Inc., Cboe C2 Exchange, Inc., Cboe Exchange, Inc., Financial Industry Regulatory Authority, Inc. ("FINRA"), Investors Exchange LLC, Long-Term Stock Exchange, Inc., MEMX LLC, Miami International Securities Exchange LLC, MIAX Emerald, LLC, MIAX PEARL, LLC, Nasdaq BX, Inc., Nasdaq GEMX, LLC, Nasdaq ISE, LLC, Nasdaq MRX, LLC, Nasdaq PHLX LLC, The NASDAQ Stock Market LLC, New York Stock Exchange LLC, NYSE American LLC, NYSE Arca, Inc., NYSE Chicago, Inc. and NYSE National, Inc.

several weeks. As a result of these efforts, the cost of performing 2X Load Testing, which includes technology and human resources expenses, is approximately $1 million - $1.25 million for each test, which would generally be conducted once per year.

C. CAT NMS Plan Requirements

As an initial matter, and although CAT LLC has conducted such testing, the CAT NMS Plan does not specifically require 2X Load Testing of its systems on an annual basis. Section 1.1 of Appendix D of the CAT NMS Plan, which describes the technical architecture requirements for the Central Repository, requires that the CAT "must be scalable and able to readily expand its capacity to process significant increases in data volumes beyond the baseline capacity," and that "[t]he initial baseline capacity requirements will be based on twice (2X) the historical peaks for the most recent six years, and the Plan Processor must be prepared to handle peaks in volume that could exceed this baseline for short periods." Section 1.1 of Appendix D further states that, after the Plan is approved, the Operating Committee will define the baseline metrics on an ongoing basis. While the CAT NMS Plan requires the CAT System to have adequate capacity to handle the initial baseline capacity of twice the historical peaks for the most recent six years, and for the baseline defined by the Operating Committee going forward, the CAT NMS Plan does not dictate the baseline metrics, manner or frequency in which the Plan Processor must test to ensure that the CAT System would satisfy the applicable baseline capacity requirements on an ongoing basis.

D. Proposed Cost-Effective Alternative Approach to 2X Load Testing

The Plan Processor has used, and CAT LLC proposes that the Plan Processor would continue to use, risk-based testing as an effective alternative to 2X Load Testing to analyze and address the ability of the CAT System to handle data volumes in excess of baseline metrics as they are defined on an ongoing basis. The CAT System itself is designed to automatically scale based on increased data volumes, and, based on consultation with the Plan Processor, CAT LLC believes that the Plan Processor can assess and address the CAT System's capacity needs by using risk-based testing. Therefore, CAT LLC does not believe that 2X Load Testing performed on an annual basis is necessary to evaluate the ability of the CAT System to handle volumes in excess of the baseline metrics as they are defined on an ongoing basis.

1. Design of the CAT System

The CAT System operates in a cloud environment that provides elasticity – that is, it can automatically expand or contract its processing capabilities as necessary at any given time, including at times of extreme market volatility and increased data volumes. Each component of the CAT System will scale based on the operating and testing parameters for such component. This system design has handled successfully the data volumes that the CAT System has experienced to date. For example, since March 29, 2019, the CAT System has completed all of the scheduled transaction reporting implementation milestones and has been able to handle data

volumes far greater than the 58 billion records a day contemplated by the CAT NMS Plan as demonstrated below.

Calendar Year	Average Daily Records	Peak Daily Records
2020	242.5 billion	429 billion
2021	296.5 billion	515 billion
2022	436 billion	613 billion

2. Risk-Based Testing Approach

a. Description of Risk-Based Testing

Rather than relying on 2X Load Testing, CAT LLC employs comprehensive and ongoing risk-based testing to evaluate the capacity needs for the CAT. Under this approach, CAT LLC performs risk-based assessments to determine when and what type of testing is necessary based on changes in technical architecture, data volumes, and other factors. Accordingly, testing is performed as warranted due to architecture changes or other factors, not at an arbitrarily determined point of time for all data (*e.g.*, annually). As a result, the risk-based approach is a more comprehensive testing approach than a single instance of 2X Load Testing conducted annually, and is standard practice in the industry. Generally, risk-based testing of the CAT System takes two forms:

First, CAT LLC conducts risk-based testing in connection with each software release. Specifically, with each release, CAT LLC conducts a variety of nominal and peak load testing consistent with its software development lifecycle ("SDLC") and capacity policies. The load testing related to each CAT release is tailored to address risks implicated by the relevant release and may include the following types of tests, as appropriate:

- *Performance Tests* – Assesses the CAT System response for a single transaction, a single activity and single user.

- *Load Tests* – Assesses the CAT System behavior under nominal and peak load conditions (*e.g.*, 1X or 2X peak days). Nominal and peak conditions are assessed by varying the concurrency of requests, users and actions, and by varying the volume of data, requests and actions.

- *Stress Test (tipping point)* – Assesses the CAT System's behavior when it is pushed beyond the failure point with respect to concurrency and volume.

- *Capacity Test* – Assesses how much infrastructure capacity may be required by the CAT System to support the non-functional requirements (*e.g.*, SLAs) over a future time horizon.

- *Long Running Tests* – Assesses the CAT System's performance (*e.g.*, with respect to SLAs) and any degradation over time. This type of testing is not specifically related to volume or concurrency, but rather time is used as the stress factor.

Second, in addition to testing in connection with software releases, the Plan Processor regularly conducts risk-based testing on an ad hoc basis to validate the CAT System's capabilities and capacity on an ongoing basis. In response to volume changes and other factors that may impact the CAT, the Plan Processor, in consultation with CAT LLC as needed, will evaluate the need for such ad hoc testing, and develop appropriate testing to analyze the CAT System's capabilities and capacity in response to such factors, including the use of the tests described above.

b. Cost of Risk-Based Testing

Continued risk-based testing is less costly and more efficient than, and as effective as, 2X Load Testing for measuring the capacity of the CAT System. As described above, risk-based testing can be efficiently tailored to test the relevant system components and conditions on an ongoing basis and in response to changes in CAT technical infrastructure, data volumes, and other factors. Because of these benefits, the Plan Processor would continue to perform risk-based testing, even if it were also required to perform 2X Load Testing on an annual basis. As a result, the $1 million - $1.25 million cost of the 2X Load Testing would be in addition to any risk-based testing costs. This substantial price tag is not warranted by regulatory concerns as the ability of the CAT to handle 2X loads (or the applicable baseline metrics as defined over time) can be evaluated effectively using the alternative, more cost-effective means of the risk-based approach. Moreover, mandating 2X Load Testing, regardless of changes in relevant factors, is an unreasonably rigid approach that imposes significant and unnecessary costs. Moreover, it does not take into consideration the Plan language providing that the Operating Committee will define the baseline metrics on an ongoing basis. For example, if volumes are down in the new year and there has been no change to the CAT environment, there would be no reason to incur the substantial costs of another annual 2X load test.

E. Request for No-Action Relief

Given that the CAT NMS Plan does not specifically require 2X Load Testing on an ongoing basis, as well as the Plan Processor's ability to evaluate the CAT's ability to handle 2X (or other applicable) loads using less-costly alternative means without reducing effectiveness, CAT LLC should not be obligated to require the Plan Processor to perform 2X Load Testing on an annual basis. Therefore, CAT LLC respectfully requests that the Staff not recommend enforcement action to the Commission against the Participants pursuant to the CAT NMS Plan or

the requirements to comply with the CAT NMS Plan as set forth in Rule 613(h) and 608(c) of Regulation NMS under the Exchange Act if CAT LLC relies upon the design of the CAT System and the alternative risk-based testing approach currently employed by the Plan Processor as described above to evaluate the CAT System's ability to perform under a 2X (or other applicable) load.

Respectfully submitted,

/s/ Brandon Becker

Brandon Becker
CAT NMS Plan Operating Committee Chair

cc: The Hon. Gary Gensler, Chair
The Hon. Hester M. Peirce, Commissioner
The Hon. Caroline A. Crenshaw, Commissioner
The Hon. Mark T. Uyeda, Commissioner
The Hon. Jaime Lizárraga, Commissioner
Mr. Hugh Beck, Senior Advisor for Regulatory Reporting
Mr. Haoxiang Zhu, Director, Division of Trading and Markets
Mr. David S. Shillman, Associate Director, Division of Trading and Markets
Mr. David Hsu, Assistant Director, Division of Trading and Markets
Mr. Mark Donohue, Senior Policy Advisor, Division of Trading and Markets
Ms. Erika Berg, Special Counsel, Division of Trading and Markets
CAT NMS Plan Participants