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OVERSIGHT OF THE STATUS OF THE CONSOLIDATED AUDIT TRAIL

HEARING

BEFORE THE

COMMITTEE ON BANKING, HOUSING, AND URBAN AFFAIRS UNITED STATES SENATE

ONE HUNDRED SIXTEENTH CONGRESS

FIRST SESSION

ON

EXAMINING THE EFFORTS TO IMPLEMENT THE CONSOLIDATED AUDIT TRAIL AND TO REVIEW ELEMENTS OF THE CAT NATIONAL MARKET SYSTEM PLAN NECESSARY TO THE MARKET REGULATORY FUNCTION

OCTOBER 22, 2019

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OVERSIGHT OF THE STATUS OF THE CONSOLIDATED AUDIT TRAIL

TUESDAY, OCTOBER 22, 2019

U.S. SENATE,
COMMITTEE ON BANKING, HOUSING, AND URBAN AFFAIRS,
Washington, DC.

The Committee met at 10 a.m., in room SD–538, Dirksen Senate Office Building, Hon. Mike Crapo, Chairman of the Committee, presiding.

OPENING STATEMENT OF CHAIRMAN MIKE CRAPO

Chairman CRAPO. Good morning. The Committee will come to order.

Today's hearing will focus on oversight of the status of the Consolidated Audit Trail, commonly referred to as the "CAT".

In 2010, in response to the flash crash and a number of other market disruption events, the SEC proposed the creation of a real-time tracking system to track securities orders across all markets throughout the life cycle of the order—from origination, to routing, to cancellation, modification, or execution.

At the time, the SEC estimated the creation of the CAT would cost $4 billion to launch and have an ongoing maintenance cost of $2.1 billion.

In 2012, I wrote a letter requesting that the SEC consider alternatives to establishing the CAT database, such as housing it on FINRA's existing Order Audit Trail System, or OATS.

It has been 9 years since the SEC's initial proposal for the CAT, and after multiple challenges and delays, it would appear that we have arrived at a version of CAT that realizes real-time, less accurate data is not necessary to the market function and that slightly delayed, more accurate information significantly reduces costs while still preserving the functional improvements that CAT is intended to provide. Further, the CAT now better leverages existing resources by recently selecting a subsidiary of FINRA to be the plan processor.

I continue to have concerns about the costs associated with the build, the volume of the information collected and what information will be collected, who has access to the information collected, and how that information will be secured.

Last year, Ranking Member Brown and I wrote a letter to SEC Chairman Clayton that emphasized our bipartisan belief that protecting individuals' personally identifiable information, or PII, is paramount to the American people.

We have continued to seek a better understanding of what type of PII is being collected, how that information is being used, who can access it, and how that data will be secured and protected.

Chairman Clayton's September 9th statement echoed this sentiment regarding the importance of protecting information collected and stored in the CAT, particularly Social Security numbers, account numbers, and dates of birth.

Chairman Clayton stated that he believes "the regulatory objectives of the CAT can still be achieved without these most sensitive pieces of investor information."

Last week, the SROs officially requested a modification to the CAT NMS Plan to exclude the collection of dates of birth, Social Security numbers, individual taxpayer identification numbers, and account numbers.

This request is long overdue, and I encourage the SEC to grant this amendment which, I agree with the SROs, will reduce the risk profile of the data collected and stored in the CAT while still preserving the CAT's intended regulatory use.

In his September 9th statement, Chairman Clayton went on to say that even if the SROs reduce the scope of the PII collected, the nature of the data to be included in the CAT "necessitates robust security protections."

I could not agree more, and I look forward to hearing from our witnesses on how they plan to address these important issues from each of their unique roles in the creation of the CAT.

I look forward to receiving an update from each of our witnesses on outstanding issues and challenges that remain to achieving an operational CAT.

Again I want to thank our witnesses for coming here and taking your time and bringing us your expertise today.

Senator Brown.

OPENING STATEMENT OF SENATOR SHERROD BROWN

Senator BROWN. Thank you, Mr. Chairman, and thanks to the witnesses. Ms. Bohlin, Ms. McDonald, and Mr. Simon, thank you for joining us.

We are just shy of 200 days from the 10th anniversary of the 2010 flash crash. Although there has not been a market disruption of that magnitude since, our markets have become faster, more sophisticated, and more fragmented. In that time, industry has spent billions on upgrading technology and developing faster and smarter trading systems.

Yet the SEC, whom we all rely on to maintain fair, orderly, and efficient markets, still lacks a comprehensive system that would allow it to effectively oversee the securities markets to protect Americans' college savings and retirement funds.

In an industry where cutting-edge technology is the name of the game and trading firms erect competing microwave towers so that computers in Chicago can communicate with computers on Wall Street in milliseconds, the SEC still cobbles together data from multiple sources in an attempt to have a complete understanding of our markets.

This is why the SEC called on FINRA and the firms that run our Nation's stock and options exchanges to build the Consolidated

Audit Trail, one system with a beginning-to-end view of how trading happens, so we can prevent insider trading, market manipulation, and other misconduct that cheats the system.

When the effort began in 2012, it was a huge undertaking. But 7 years later we are only at the first stage of data reporting; many details need to be finalized. Under the current timeline, the system will not be fully operational until 2022.

Some take issue with the SEC, or any Government agency, having this much data and call the system a "target for hackers."

I refuse to accept that we cannot both protect people's personal information and go after criminals who take advantage of the markets.

I know there are dozens of tech experts, data scientists, and market veterans working on this. Just last week, the CAT Operating Committee submitted to the SEC its proposal to exclude Social Security numbers and other personal information from the reported data.

This is just one of many creative solutions that balance the need for oversight with protecting sensitive information.

I trust that the very capable minds at the exchanges, FINRA, and the SEC can work out access to data concerns, tracking the use of the audit trail, and how to keep information secure to allow this long overdue oversight tool to be completed.

The bottom line is if you are smart enough to have information or strategies you think someone wants to steal, then you are smart enough to help come up with ways to protect them.

We cannot afford to wait.

Just last week, the SEC filed charges against 18 people, most of them in China, who engaged in a 6-year market manipulation scheme using dozens of accounts, across many brokerage firms, that resulted in $31 million, at least, of illicit profits.

While we will never know if the new system would have made it easier to uncover those crimes, it is that kind of activity the SEC should have the technology to uncover and detect.

We know the question is not if but when there will be another crash or major disruption. Everyone—Congress, Main Street, industry—will look to those represented by our panelists today and the SEC to understand what happened, how it will be fixed, and who was responsible. Not having an answer or waiting 5 months for one will then be unacceptable.

If another flash crash occurs or the delays or disagreements over what should be solvable questions continue, you can expect to be back before this Committee. We are expecting you all to cooperate and work diligently to finish the CAT project.

There are not many things that SEC Chair Clayton and I agree on, but finishing the Consolidated Audit Trail without further delay is one of them.

Every day we wait creates more risks for our markets and more opportunities for criminals to cheat our regulatory system.

Thanks for joining us.

Chairman CRAPO. Thank you, Senator Brown.

Today's witnesses are Ms. Shelly Bohlin, president and chief operating officer of FINRA CAT; Ms. Judy McDonald, Chair of the CAT NMS Plan Advisory Committee and associate director of Sus-

quehanna International Group; and Mr. Michael Simon, Chair of the CAT NMS Plan Operating Committee and independent senior adviser of Deloitte & Touche.

We welcome all of you with us, and I will ask you to give your statements in the order I introduced you. Ms. Bohlin, you may proceed.

STATEMENT OF SHELLY BOHLIN, PRESIDENT AND COO, FINRA CAT LLC, FINANCIAL INDUSTRY REGULATORY AUTHORITY

Ms. BOHLIN. Great. Thank you. Chairman Crapo, Ranking Member Brown, and Members of the Committee, on behalf of FINRA CAT, LLC, a subsidiary of FINRA, I would like to thank you for the opportunity to testify today. I serve as the president and chief operating officer of FINRA CAT, which was created to focus solely on performing the functions of the plan processor to build and operate CAT. FINRA CAT welcomes the Committee's invitation to discuss specific details of our work as the plan processor of the Consolidated Audit Trail, or CAT, since we stepped into this role 6 months ago.

The CAT is designed to be a centralized source of information on activity in the equities and listed options markets. The SEC adopted Rule 613 in the wake of the 2010 flash crash to create a comprehensive consolidated audit trail that allows the SEC, FINRA, and the national securities exchanges to efficiently and accurately track all activity in these securities throughout the U.S. markets in order to facilitate comprehensive market reconstructions, more robust market surveillance, and better analytics to support policymaking.

Given the size and complexity of the financial markets, the CAT must collect, process, and store a vast amount of data to achieve this goal. This is a highly complex project that requires deep technological expertise, sophisticated and proactively evolving security, close regulatory coordination with the SEC and the consortium of self-regulatory organizations, or SROs, responsible for managing the CAT and full-time engagement with broker-dealers that ultimately must report data to the CAT.

FINRA CAT appreciates that there is interest in the CAT from multiple perspectives, including how this system will support use by market regulators and how the sensitive data included in the CAT will be secured. FINRA CAT is fully committed to serving these interests. FINRA CAT leadership and staff have significant experience in developing audit trail technology and utilizing it for regulatory purposes. In addition, FINRA CAT has access to the full resources of FINRA and its long, successful work in this area and the expertise of the relevant exchanges. With this support, our work to build the CAT is on schedule.

Since becoming the plan processor in April, FINRA CAT has worked closely with the SRO consortium and SEC staff to expeditiously put in place a solution for the first scheduled phase of the CAT—specifically, the collection and processing of order and trade data from the equities and options exchanges and FINRA. FINRA CAT has used scalable technology to process, on average, over 100 billion market records a day during this period with no material operational issues or delays. We also have been dedicating substan-

tial resources to preparing for the next phase, industry member reporting, which is scheduled to be phased in from April 2020 to July 2022.

After a number of interim phases that will require the reporting of increasingly complex order and trade information, the final phase of industry member reporting calls for certain customer and account information reporting to begin in July 2022.

To achieve our goals, FINRA CAT is involved in full-time industry engagement through a variety of channels to ensure that the industry has a voice in development of the CAT particularly as it relates to industry member reporting requirements. Technical reporting specifications and extensive reporting guidance have been published to assist broker-dealers in meeting their CAT reporting obligations.

In addition, each week FINRA CAT participates in a call with SEC staff and the SRO consortium leadership team to provide an update on project development and progress.

Finally, I can assure the Committee that the security of customer account information and of all CAT data more broadly is of the utmost priority to FINRA CAT, and that a strong data security program has been put in place to meet the CAT NMS Plan's stringent security requirements.

FINRA CAT is directly subject to SEC Regulation SCI. In terms of FINRA CAT's overall information security program, we are led by a CISO with over 20 years of experience working on information security at FINRA, including as a security architect and a security engineer.

FINRA CAT's security program aligns with the strictest Government requirements of the National Institute and Standards of Technology, including stringent third-party reviews of critical security controls. The FINRA CAT security program also includes significant layers of architectural-level and program-level security controls. We are constantly evaluating evolving threats and security control opportunities to ensure that the CAT security posture remains strong.

In conclusion, thank you again for the opportunity to appear today. The CAT is a major regulatory undertaking meant to help the SEC, FINRA, and the exchanges better regulate our securities markets. I am happy to answer any questions that you may have.

Chairman CRAPO. Thank you.

Ms. McDonald.

STATEMENT OF JUDY MCDONALD, CHAIR, CAT NMS PLAN ADVISORY COMMITTEE

Ms. MCDONALD. My name is Judy McDonald. I am the head of Regulatory Technology at Susquehanna International Group, a global quantitative trading firm headquartered in Bala Cynwyd, Pennsylvania. In my role at SIG, I have been evaluating the CAT NMS Plan since its inception, and since February 2017, I have served along with 13 other industry participants on the Advisory Committee. Since March of 2019 I have served as the Chair.

Today I can confidently state that the effort to deliver CAT is moving forward in a very positive manner. Since February 2019, when FINRA CAT was selected as the new plan processor, the

SROS, FINRA CAT, and industry members have been in a virtuous cycle of iterative deliverables and collaboration on the Plan. FINRA CAT brings subject matter expertise, depth of resources, and leadership to the effort.

The Advisory Committee is satisfied that the intermediate milestones of the past year have been met and that significant progress has been made toward the processing of SRO reporting and the completion of industry member technical specifications.

However, there are a few areas of concern as the implementation of CAT progresses.

First, data security. This is undoubtedly the most significant concern as the CAT will gather and store an unprecedented amount of information that previously has not been centrally located nor specifically identifiable. The concerns can be broken down into three categories: trading records for institutions, personally identifiable information for retail customers, and the security policies of regulators.

Trading Records. There is significant concern about the security of the CAT data repository and the misuse of trading records by those with "authorized" access. Trading records will be less secure than PII and accessible by a broader set of individuals. This highly proprietary information results from significant investments, and broker-dealers are very concerned that trading strategies could be reverse-engineered by competitors, academics, or rogue actors. Further, SROs compete with each other and BDs; this is beneficial to investors and could be compromised with the misuse of data.

PII Data. We are encouraged by the progress to avoid the collection of Social Security numbers and other sensitive PII data. With this progress we believe some focus should be shifted to address the retirement of the legacy Electronic Blue Sheet system.

Security Policies. The Advisory Committee has little insight into the security programs at regulators and whether security policies and procedures have changed commensurate with the increased value of the CAT data and the increased threat of compromise. We cannot emphasize enough the harm that could come from an external bad actor gaining access to trade information once data is bulk downloaded from the central CAT repository.

In summary, I appreciate the critical nature of securing CAT data. Two of the best ways to achieve data security are to limit the number of people with access and to control the use of data as tightly as possible. The Advisory Committee urges reconsideration of allowing the 23 exchanges and the SEC to bulk download CAT data.

Second, verbal and manual quotes. There is a significant open issue with respect to the capture and reporting of verbal and manual quotes. Human interaction with highly electronic markets is a deeply challenging issue that affects a small but very important part of the market and, if disrupted, could dramatically reduce market liquidity particularly during moments of extraordinary volatility. The Advisory Committee recommends a stepwise approach for verbal and manual quotes.

Third, fees. Another area of concern is the lack of insight into fees that may be applied to broker-dealers. The absence of a fee

schedule creates uncertainty around the effort and unnecessarily challenges firms budgeting to comply with CAT.

Fourth, the SEC proposal for Financial Accountability Milestones. The SEC proposal centers around the best practice goals of increasing accountability and transparency of the CAT project. While we are supportive of these goals, legitimate unforeseen circumstances may occur where fixed deadlines work against the collective best interest of the CAT implementation. There must be some flexibility in place to address these unforeseen situations.

In closing, I look forward to continuing my work on the CAT project and will be happy to address any specific questions.

Chairman CRAPO. Thank you.

Mr. Simon.

STATEMENT OF MICHAEL J. SIMON, CHAIR, CAT NMS PLAN OPERATING COMMITTEE

Mr. SIMON. Good morning. My name is Michael Simon, and I am Chairman of the CAT Operating Committee. When completely implemented, the CAT will receive and process multiple records to create the entire life cycle of events from all of our securities markets. Only the participants and the SEC will be able to query the system and solely for regulatory purposes.

CAT is a massive undertaking. We currently receive, as Shelly mentioned, over 105 billion records per day on average and have processed the single-day peak of 182 billion records. This does not even begin to reflect the volume of data we will receive and store when broker-dealers begin submitting data.

Much of the interest in CAT has been on the inclusion of personally identifiable information as well as on the security and cost of the system. Before discussing these issues, I would like to update you on our progress. You already heard the reasons behind and history of the CAT. I will not repeat that.

During the plan review process, the participants conducted a request for proposal and ultimately selected Thesys as the CAT processor. Unfortunately, the relationship with Thesys did not proceed as hoped, and earlier this year we selected FINRA CAT to serve as the successor plan processor. With FINRA CAT now in place, we continue to work diligently with the SEC staff and the CAT Advisory Committee to build and operate the CAT safely and efficiently.

The participants began submitting CAT data to the CAT last November. FINRA CAT collects all the data from the participants, validates and links all equity data, and is now on target to validate and link all options data in February. FINRA CAT also is on target to commence broker-dealer testing next month and reporting in April. FINRA CAT has not experienced any production outages or major operational issues.

As to PII, this has been a topic of interest and concern. Rule 613 explicitly requires the CAT to be able to identify underlying customers. Indeed, the plan requires the system to include an individual's name, address, date of birth, an individual taxpayer identification or Social Security number. Due to the concerns of including PII in CAT, we have discussed with the SEC and the industry how best to preserve the regulatory benefits of the CAT while addressing legitimate concerns related to the inclusion of sensitive infor-

mation in the system. Based on these discussions, as noted, last week we requested that the SEC grant exemptions from relevant aspects of the plan to eliminate Social Security numbers, dates of birth, and account numbers from the CAT. We believe this will reduce the risk profile of data collected and stored in the CAT. Instead of collecting and storing Social Security numbers, FINRA CAT would generate a unique identifier for a customer, the so-called CCID. This would eliminate the inherent risk of the CAT holding Social Security numbers.

Regardless of any exemptive relief, security will always be a top priority in the CAT. To that end, we have instituted safeguards to protect the system and the data within it. CAT LLC has both a chief information security officer and chief compliance officer who are fiduciaries of CAT LLC. The CAT CISO creates and enforces controls to monitor and address data security issues. The CISO also evaluates if the participants have information security policies comparable to those of the plan processor. The participants in FINRA CAT designed and operate the system in accordance with stringent security standards that Shelly mentioned. The plan processor and independent third parties perform multiple layers of security assessments. These assessments test that the security controls are operating effectively and that the system is free of significant vulnerabilities.

Regulators can access the system only over dedicated private lines. The system is designed without any Internet-based query function. The system also requires multifactor authentication, strongly protecting against unauthorized access. Moreover, the system and relevant personnel continually monitor access and use of the system.

Last, cost. CAT requires a significant commitment of capital, both human and financial. We estimate the CAT budget to be upwards of $75 million a year, not including participant or broker-dealer compliance costs. Even though Rule 613 and the plan specifically provide for joint funding by the participants and broker-dealers, to date the participants have borne all costs. In 2017, the participants sought to implement the fee structure in the approved plan, but ultimately withdrew the filings when it became clear the SEC was going to disapprove them. Because it remains both important and reasonable that industry members contribute to funding the CAT, we are working on an amended fee proposal.

In closing, we remain committed to meeting our obligation to build and operate the CAT system and are making significant progress in that regard. We will continue to take all necessary precautions to safeguard the CAT system and the data within it.

Thank you for the opportunity to provide testimony today. I am happy to take your questions.

Chairman CRAPO. Thank you very much, Mr. Simon.

I will start out with—actually, this question is for each of you. I would like you to be as brief as you can, however, so I can get to some other questions. But one of the issues that I am concerned about is given that it appears that the PII information we have talked about already in the hearing is going to be excluded from collection, can the data that is collected be reverse-engineered in a way to identify the actual users? And maybe I will start with you,

Mr. Simon. You mentioned that there is an identifier for each individual called the "CCID."

Mr. SIMON. CCID.

Chairman CRAPO. OK. What is that?

Mr. SIMON. The CAT customer ID. Shelly can get into some of the specifics as to how it is generated, but it is important to note that broker-dealers will not be sending Social Security numbers to the CAT; the CAT will never receive or store them. Rather, we have a multistep system in place that FINRA CAT will be building so that the broker-dealers will be doing some hashing or changes to the Social Security number coming in and that will be the CCID that will be kept in the database. And, Shelly, I think——

Chairman CRAPO. Ms. Bohlin, could you address that and then also address—to me that seems like it just begs for reverse engineering.

Ms. BOHLIN. So I will start out by saying that the CCID—and as Mike described—is based on a Social Security number that never leaves the broker-dealer. But the objective is to be able to identify a single customer trading across all broker-dealers. So that is one of the primary functions that CAT brings that the regulators do not have the ability to do today.

But the CCID is only known by CAT. It is not returned to a broker-dealer. No one outside of CAT will ever have access to or know the CCID.

Further, the CCID as it comes into the customer and account section of—the customer and account data is segregated from the transaction data. The CCID, while it will have associated with it customer information in the customer and account database, it is not available to the transaction data. Only the actual CCID number itself, not knowing who it is, whether it is a natural person, an institution, anything else, only that is available with the transaction data for regulators to run queries against. So it is tightly controlled and not known outside of CAT.

Chairman CRAPO. Well, first, let me ask could CAT tell the broker-dealers to give them the ID, the information later on? I do not mean now. They are not collecting it now. But what if they decided they wanted to have it? Could they just create it?

Ms. BOHLIN. So to have the broker-dealer create the CCID I think would be difficult because you have to have the same identifier across every single broker-dealer. So CAT originally, as Rule 613 was originally approved, had the broker-dealers submitting a CCID that becomes difficult—it gets very detailed very fast. I know we have limited time here. I am happy to follow up on any of the details to this. But it is designed so that the broker-dealer—each individual broker-dealer does not have to have some uniform way to come up with the same number to give CAT for the same——

Chairman CRAPO. Well, I would like you to perhaps in writing following the hearing give me a little better explanation of this. Let me just give you a quick example. You will recall when the CFPB got rolling really aggressively, it decided it wanted to collect credit card transactions on virtually everybody for everything. And we got into a fight with the CFPB over that, and they finally said, "Oh, well, we are not collecting all of this PII," which goes way beyond the PII that we are talking about right now. And it turns out, as

we explored that with them, that they basically just were not collecting it, but they could easily, by flipping a switch, pick it up.

Mr. SIMON. I think it is important to note that when you say will CAT be able to get the underlying information, CAT will not be able to get the underlying information. Each of the SROs themselves as a self-regulatory organization and as they conduct their surveillance, at some point they will need to know the underlying customer involved, and the SROs, as part of their surveillance function, will have the ability to go back to broker-dealers and to try to identify the person who they do not know their specific identity from the CAT data, but that will be something in the surveillance function of each of the SROs and will not be a CAT function.

Chairman CRAPO. All right. Thank you. I would like you, all three, if you would, to fill in anything else you can for me following this in your written responses to the Committee.

I only have 30 seconds left, so let me ask whoever would like to jump in on this, who has access? There was a comment about the fact that both of the exchanges have the ability to download this data?

Mr. SIMON. Yeah, I will handle that from the consortium side.

Chairman CRAPO. OK.

Mr. SIMON. There are 23 SROs—23 exchanges plus FINRA as the SROs, plus the SEC. Each of them have regulatory responsibilities under the Federal securities laws. Each of them will have the ability to access the database to conduct their surveillance. They all conduct surveillance now, and they will have access to the CAT database in whatever manner they feel appropriate to discharge their regulatory responsibilities.

There will be controls in place, as Shelly mentioned, as to proper training and access and regulatory oversight over who does have access and how they use it. But its stated purpose, both in the rule and in the plan, is to help each of the regulators discharge their regulatory obligations.

Chairman CRAPO. All right. Thank you. I am going to probably send some questions to you to further elaborate on that.

Senator Brown.

Senator BROWN. Thank you, Chairman.

Ms. Bohlin, please describe for us the market oversight and enforcement benefits of the Consolidated Audit Trail for the SEC and FINRA, and how does this improve on current systems?

Ms. BOHLIN. So one of the biggest differences and improvements over current systems, it will be all in a central database that is reported by 8 a.m. on T+1. It will include data including all the equities exchanges and options exchanges. So today we have similar constructs in the equity markets to what CAT ultimately is, but not the options market. So bringing the options data in is a significant difference from what we have today; in addition, having the CCID and the ability to understand if the same entity is trading or trader is trading across multiple broker-dealers. So those are two of the biggest improvements and differences from what we have today.

Senator BROWN. Mr. Simon, do you want to add to that?

Mr. SIMON. I think that the main benefits are the first name in CAT, consolidated. It will be the first time there will be a Consoli-

dated Audit Trail of all the information from all the securities markets. Currently, as I mentioned before, each of the SROs has the obligation to conduct surveillance and regulation of their market, and they are doing it from separate databases. This will be consolidated. This will be the first time that we have end-user information although in a masked way through the CCID, which will enhance regulation and let you move a lot more quickly in your surveillance obligations. And, third, it is the first time we are going to have the life cycle of an entire order included in the system so that you can follow an order from the time it is entered through execution and clearing. So there will be a lot of benefits to the regulators in how they use this data.

Senator BROWN. Ms. Bohlin, you were at FINRA 10 years ago when the flash crash disrupted our market and undermined investor confidence. Comment on the impact that the flash crash had on working families' confidence then and still what kind of impact it had on their confidence in using the markets to save and invest for their futures.

Ms. BOHLIN. So that is definitely an issue that has, you know, broad impacts. Being here representing FINRA CAT today, that might be FINRA, the parent, and any of the other SROs might be able to more elaborate on that a little bit more. But having a market, knowing that the market can go down and so much value can be lost in such a short period of time, I think other steps have been taken in addition to CAT that prevent those wild swings, so to speak, like marketwide circuit breakers, limit up/limit down, things that have been put in place to try to prevent——

Senator BROWN. That is what you are saying from your perspective. What are people that are trying to save for their future, what impact did that have on their confidence back then and what kind of residue of that still remains?

Ms. BOHLIN. Just my personal view on it is that having uncertainty about the erratic movements or the fact that stocks could lose so much value in such a short period of time obviously is a detriment or may discourage people from investing. So having the tools in place to try to prevent these types of wild swings or have the tools we need to make sure we understood what happened is very important.

Senator BROWN. The point of the question was just to encourage you to think about—I mean, you seem to do your job well. You care about this. You understand the complexities and technicalities that probably most of us here do not. But I just want you to be thinking what completion of this, 2022 you cited earlier, what this means for the confidence of the investor public and pretty shaken a decade ago, maybe pretty forgotten now, but it cannot be forgotten by you, and that is the importance of—that was the reason for the question.

Ms. BOHLIN. Yes, absolutely. That is why I personally believe CAT is so important, and I have spent a lot of years and I very much believe in it.

Senator BROWN. OK, good. The bottom line is that markets work best when investors have confidence, as we know, and the Consolidated Audit Trail gives the opportunity to catch bad actors so

working Americans can be confident they are not investing in a rigged market.

Ms. BOHLIN. Exactly.

Senator BROWN. Mr. Chairman, I would like to submit a written statement for the record from Better Markets.

Chairman CRAPO. Without objection.

Senator BROWN. Thank you.

Chairman CRAPO. Senator Cotton.

Senator COTTON. Thank you, Mr. Chairman.

I will say I detected a note of skepticism in the Chairman's questioning. I will say that I will go beyond a note. I have been outright skeptical of the Consolidated Audit Trail now for a long time. I have to say what I have heard today just made me downright opposed to it. I have got real reservations about this.

Mr. Simon, I want to start with you. You said that so you have made the decision, as Mr. Clayton suggested in his recent letter to us, that you will not include Social Security numbers, account numbers, or dates of birth in the Consolidated Audit Trail?

Mr. SIMON. We have submitted an exemption request to the SEC asking them to grant that exemption so that we will not include that in the Consolidated Audit Trail. It is now in the hands of the SEC whether or not to grant that exemption. We have a fair level of confidence that he will grant the exemption since we work closely with the staff of the Commission, with Judy, with the Advisory Committee, and with the industry generally on a means of dealing with sensitive personal information that we think satisfies the needs and interests of the Commission and of the industry as well as the regulators.

Senator COTTON. And did I hear you say that 25 different organizations are going to have access to this information?

Mr. SIMON. There are 23 exchanges, there is FINRA, and there is the SEC. However, there are only eight specific organizations because multiple exchanges are owned by one holding company.

Senator COTTON. Any idea of the number of people that will have access to this information?

Mr. SIMON. Shelly will be able to answer that because she is going through the user authorizations and it will vary. Some of the SRO groups will contract out. Some will have their surveillance obligations. Some will have a significant number of people. But I think it is really FINRA and the SEC that will have the most people, and some of the exchange groups will also have a significant number of people——

Senator COTTON. Ms. Bohlin, I am not looking for an exact number. I would just like an order of magnitude. Are we talking about dozens? Hundreds? Thousands?

Ms. BOHLIN. So the plan has estimates of 3,000 users, and under our contract we are having to build to ensure we can support access by 3,000 users. That would be across the SEC——

Senator COTTON. So 3,000 users will have access to every trade from every account from every broker for every retail investor in America?

Ms. BOHLIN. Yeah.

Senator COTTON. So you are building the CCID, you said, so Social Security numbers do not have to be used, but you said that

would be based on the Social Security number at the broker-dealer. I know you talked about how good the audit trail security is going to be. How confident are you that all those broker-dealers, many of whom are small businesses, have equally good security in their databases?

Ms. BOHLIN. They are all required as registered broker-dealers to maintain adequate security programs themselves.

Senator COTTON. And the audit trail will not be able to get access to the underlying data. Do we think that, say, China or North Korea will be able to get access to that underlying data?

Ms. BOHLIN. We are certainly designing it so that is not the case.

Senator COTTON. But this is my point, and let me be clear. You all inherited this. Chairman Clayton inherited this. So I do not doubt your good intentions. I think, Ms. Bohlin, you said that the security of this information is your highest priority. You have "a strong data security plan." I would just point out that the Office of Personnel Management and the SEC probably thought they had the strongest data security plan as well, Government agencies that suffered massive hacks that exposed the information of millions of Americans, to say nothing of companies like Equifax and Sony and Target and Marriott and Yahoo. And I could go on and on and on even further.

There is huge costs to this program. Chairman Crapo outlined a bunch of the financial costs, billions of dollars up front and then continued in operating expenses, to say nothing of the cost of the personally identifiable information. It is not clear to me what benefit market participants and Americans at large get from having this in place. I know that Commissioner Peirce has recently written that the Enforcement Division at the SEC does a pretty good job of tracking down wrongdoers, and they could probably get almost all of the benefit out of the audit trail if they focused on large institutional investors as opposed to a single mom who is trying to invest money to save for their kid's college. So I just do not see where the benefits outweigh the costs. The game is worth the candle; the juice is worth the squeeze. I appreciate you are doing everything you can to try to protect the information of individual users, but you are creating a database that is so large and so valuable and so attractive, I cannot imagine that at some point in the future this Committee is going to be having an oversight hearing on how a breach of that database occurred.

Chairman CRAPO. Thank you, Senator Cotton.

Senator Warner.

Senator WARNER. Well, thank you, Mr. Chairman, and I appreciate you holding this hearing. I actually beg to differ with my friend, the Senator from Arkansas. There clearly are inherent challenges in this, but I would make the case that I do not think we still, almost 10 years after the flash crash, fully appreciate what led to the flash crash, the ability of a series of—and I do not think we are looking so much at the individual investor as we are looking at the ability to have market manipulation oftentimes by a series of very sophisticated investors who may be operating across a whole series of exchanges simultaneously. So there are clearly risks, Mr. Chairman, in this, but to not have the ability to reconstruct in a kind of orderly fashion how these type of market manip-

ulations could take place—and, frankly, I think the technology has gotten even better in terms of manipulation. So I actually applaud Chairman Clayton. I think he has taken on this challenge. I think it is kind of crazy that it has taken us 9 years to get here, and I think there clearly are market forces and market participants who want to do everything possible to slow this process down because they do not want this Consolidated Audit Trail. They do not want their activities demonstrated to the marketplace.

Now, we are going to obviously continue, Ms. Bohlin, to kind of follow your efforts. I actually wish—and I think we can get to a good-faith way to resolve some of these issues. I wish the SEC was here because I think the SEC—you know, we need their voice in this hearing. I would hope at some point, Mr. Chairman, you would consider bringing them into this discussion in a formal way so we can press them in particular.

Mr. Simon, one of the first questions I have got for you is, recognizing that the SROs are going to have this ability to access the database, should we require the SROs some kind of formal explanation process of why they are requesting information? It would not be an absolute guarantee, but it might—one of the things I am concerned about is not only the ability to be hacked into, but could the SROs access this information for their own financial interests? And can we put some kind of at least presumption that they have to give us an explanation why they are accessing the database?

Mr. SIMON. Well, it is clear under the rule and the plan that the SROs can access this data only for regulatory purposes and only for their surveillance purposes. The SROs already have regulatory and surveillance programs in place that are subject to barriers from the business side of the organization, and those will remain in place, and those are subject to review not only by the SROs and their internal audit department, but by the SEC and their inspections unit, and they are heavily regulated. And I think it is fair to say that the SROs operate with integrity in the regulatory system. And, as shown by the Consolidated Audit Trail that you have—while you might have the 24 different SROs, they are effectively competitors with each other. They are acting cooperatively for the joint good of the industry in developing the Consolidated Audit Trail. But Shelly and FINRA CAT are developing specific functions within the CAT system to oversee what the regulators are doing and what types of queries they are looking at and will have intelligence in the system to help ensure that they are being used for appropriate purposes. And perhaps you can talk to that for a second, Shelly.

Ms. BOHLIN. Sure. So part of the security program is logging of all access, logging and review, both automated and manually, looking for atypical queries coming from a particular regulatory user. Also from an——

Senator WARNER. Should we ask that SRO to kind of give an explanation of why they are making this request? I am not sure I agree 100 percent, but I would ask you to consider—I have only got 38 seconds left. You know, one of the things I have seen on kind of the SEC's amended 613 rule that they can start to charge fines or expenses if the participants do not meet certain of the timelines on a going-forward basis.

Mr. SIMON. Right.

Senator WARNER. I do have a concern that there are going to be folks in the market that will drag their feet because they do not want the CAT. They are going to throw up a lot of concerns, and there are legitimate concerns about PII. But they are going to throw up a lot of smoke screens, dragging their feet because they do not want this kind of exposure. How do we hold them accountable? Do you think the amended 613 rule does that?

Mr. SIMON. I think that Rule 613 does it. I think everybody is working cooperatively in order to build the CAT in a timely and efficient manner. I think, as Judy mentioned, that the industry is now on board with the timeline.

And just to your point before about coming up with reasons for doing inquiries, from a regulatory standpoint, you see abnormalities in trading, and you do not really know what you are looking for, and it is very difficult to say, "I am looking specifically for an insider trading violation" or this. You need to be able to look at the data, to analyze the data, to see when there are atypical patterns in there. So I think it is very difficult up front to put in a reason why you——

Senator WARNER. And I did not get a chance to ask you, Ms. McDonald, but maybe you could submit for me some of the—you do not have a vote on the Operating Committee. Are there structural governance changes we can do to, you know, improve this process.

Senator WARNER. I would simply say, Mr. Chairman, you raise I think appropriate questions about PII. I think there is a way we can sort through this. I think the net benefit for protecting the system will be of enormous value for oversight. And I frankly think that some of the folks who are part of the market manipulators, they have gotten substantially better since 2010. So I think we have got a healthy tension here, but I look forward to working with you. And I appreciate the Ranking Member's comments at the front end in terms of how long this has taken, and I completely agree with his earlier comments.

Thank you, Mr. Chairman.

Chairman CRAPO. Thank you.

Senator Rounds.

Senator ROUNDS. Thank you, Mr. Chairman.

I am just curious. I am going to start with Ms. McDonald, but if you want to defer, you may. I understand the concerns that have been expressed here by those individuals who are doing their best to find a way to limit the amount of insider trading and the type of trading activities that would hurt consumers who want to trust in a market.

I also understand the concerns of the loss of privacy, and somewhere in the middle of this, we have to be able in an oversight capacity to look at trying to resolve both issues.

Ms. McDonald, I had the impression that your organization has tried to do this, but specifically, can you share with us the security that you look at and the approaches that you have taken to try to make sure that the information which is being picked up will be secure? And what do you do to track down and to find problems that may already exist within the system? What are you doing to

rule it out and to make sure that any system operating even today has not been compromised?

Ms. MCDONALD. So as Shelly stated——

Senator ROUNDS. You may want to turn that on.

Ms. MCDONALD. So as Shelly stated, I think that broker-dealers are subject to both review by FINRA as well as adhering to best practices with regard to security practices. And so many broker-dealers, including SIG, have a very large and robust security program that follows along the same lines that have been outlined here. So basics of things like account and identity management, multifactor authentication, granular role-based access controls, and——

Senator ROUNDS. May I just—look, I appreciate that, but I guess what I a looking at, and maybe I am not explaining it very well, we require people to follow speed limits, but the way that we also enforce it is then to have a patrol officer on patrol that is checking to make sure. Who is the patrol officer in this particular case to make sure that the security requirements are actually being followed up? What is the follow-up that you are doing today to assure security as of right now? And perhaps Mr. Simon would like to answer that. You may defer if you want.

Ms. MCDONALD. Broker-dealers are subject to review by FINRA specifically around security programs, and so over the years, FINRA has conducted increasingly sophisticated security audits of their broker-dealer community, and these are conducted by security experts who dig deep into both the process and procedures and personnel behind these security programs.

Senator ROUNDS. Thank you.

Mr. Simon.

Mr. SIMON. I think what you are getting at is policing the security in the CAT system and who is responsible for that. Who is overseeing the system and ensuring that whatever controls we put in there are operational, that they are robust, and that they are working. And that is the obligation of the CAT Operating Committee, of the consortium of the SROs.

As Shelly mentioned and as I mentioned, we have hired a CISO, the chief information security officer. He will be the person who has the ultimate responsibility to implement and oversee the security in the system. The CISO is an employee of FINRA CAT, but is an officer at the CAT LLC, so he is going to be responsible for implementing the security.

In addition, the SROs, through the consortium, have what we call a "security working group" that is compromised of CISOs and security experts from all the SROs. The SEC is an active participant in that, including the SEC's chief security officer. So they all work together, oversee all the policies, work with the CISO, come up with the policies, including the policing of the system once it is up and running. And any of those policies have to come up to the Operating Committee, and they come up again and again as they are amended and put in place for approval by the Operating Committee. And at the same time, we work with Judy and the Advisory Committee and with SIFMA and a group of CISOs of the industry to make sure that they are comfortable with the security policies. But, ultimately, the buck stops with the Operating Committee.

They have the responsibility, and they are aware of it and are working actively to ensure the safety and soundness of the system.

Senator ROUNDS. What percent of the system is actually operational today? How far along in the process is it today?

Ms. BOHLIN. In terms of percentagewise?

Senator ROUNDS. Yes.

Ms. BOHLIN. This is just, you know, a total back-of-the-envelope. I would say maybe 50 percent, because you have the exchanges——

Senator ROUNDS. Fifty, 5–0?

Ms. BOHLIN. 5–0. We have the exchanges and——

Senator ROUNDS. OK. The reason why I ask is right now—how many incursions do you know of that are attempted per day within this particular segment?

Ms. BOHLIN. For what is operational in FINRA CAT today?

Senator ROUNDS. Yes.

Ms. BOHLIN. How many attempted intrusions there are each day?

Senator ROUNDS. On a daily basis.

Ms. BOHLIN. I would have to go back and get that information for you. I do not have that number. I do know we monitor that just as FINRA parent monitors it as well, so I could get that information for you.

Senator ROUNDS. Yeah, I think it would be good to know, number one, the number of attempts and also the number that have actually successfully stepped into it.

Ms. BOHLIN. So no actual successful attempts since FINRA CAT has been operational. And like I noted before, we are directly—FINRA CAT itself is an SCI entity directly, subject to SEC jurisdiction and Reg. SCI. We have to file any time we were to have an intrusion that was successful.

Senator ROUNDS. Mr. Chairman, I know I am going over my time, but I just want to make this—you are saying that you have 50 percent of your system operational today, and that while you know that there are incursions attempted, you are not aware of a single incursion that has been found within your system at this point?

Ms. BOHLIN. That has been successful—and I am not personally aware of any intrusions that have been attempted. I am assuming that there probably are because it happens all the time. But I would want to get that specific information for you. I am not aware of any successful intrusions, and we have not had any SCI events that we have had to file since we have been operational.

Mr. SIMON. If there was an intrusion, we would have known on the Operating Committee and would have had to report it immediately to the SEC and put our breach procedures in effect. And I am fairly certain—we will double-check and confirm with you—there have been no successful breaches into the system.

Senator ROUNDS. Yes, I apologize for taking the extra time, Mr. Chairman, but I think this is really important. Number one, if the Secretary of the Navy puts out a report showing that within the Department of Defense we get incursions, and we find some of them, and we know that they occur. To suggest that you have 50 percent of this thing operational right now today and you are not aware of any incursions to date——

Ms. BOHLIN. That have been successful.

Senator ROUNDS. ——that have actually successfully occurred within your system, that is pretty impressive or it—I would like to get a confirmation on that before you say that that is a fact. OK?

Ms. BOHLIN. Absolutely.

Senator ROUNDS. All right. Thank you.

Mr. SIMON. We will.

Senator ROUNDS. Thank you.

Chairman CRAPO. Thank you.

Senator Cortez Masto.

Senator CORTEZ MASTO. Thank you, and also thank you to the Chairman and Ranking Member for this hearing, and I do want to align myself with some of the comments that were made by my colleague from Virginia, Senator Warner.

Let me jump on this issue really quickly because I think there is this balance. We want to protect PII information, but at the same time I think we want to also protect against market manipulation. And so maybe getting in the weeds a little bit more, Mr. Simon, I am assuming that you have a formal cyberincident response plan or at least the committees are coming up with that, and maybe you want to address that, because that will, I hope, give us the information publicly at some point in time—or maybe not—that you are being asked by Senator Rounds. So does anybody want to address that with respect to a formal plan?

Mr. SIMON. Yes, we do, and I will defer to Shelly from FINRA CAT who is developing that as the head of FINRA CAT.

Ms. BOHLIN. Yes, we definitely have a formal cyberincident response plan, a very detailed plan. We have worked with the SROs closely, and their expertise, the expertise that we have from FINRA parent, who has a very mature system in place and has very mature cyberincident response plans. We are in the business of managing sensitive data. And that includes having, you know, available to us experts in cybersecurity breach management; that includes containment, forensic analysis of what happened, responses, any appropriate notifications. Of course, each depends on the facts and circumstances of any particular incident of what you may or may not have to disclose or do. It is a total facts and circumstances basis.

Senator CORTEZ MASTO. And as part of your security, you can ensure that all CAT data is encrypted at rest and in flight as well. Correct?

Ms. BOHLIN. Yes, fully end-to-end encryption at motion and at rest, absolutely.

Senator CORTEZ MASTO. OK. Thank you.

Can I jump back to also the conversation regarding the May 6, 2010, flash crash? Let me just ask you this: If the Consolidated Audit Trail process were in place in 2010, would the exchanges themselves been able to identify the cause of that crash? My understanding is it took at least 5 years to really figure out the cause of that crash and later determine that a U.K. trader was arrested for placing fake trades that melted the market. If the CAT process were in place, would the information you have been able to uncover identified much earlier, sooner, quicker, however you want to say it, and figured out what was going on there?

Mr. SIMON. Yeah, I think it certainly would have been much easier, and we would have had a better database. And going back to what Senator Brown said in the beginning and the confidence in the market, the integrity and confidence in the market is critical. And one of the biggest issues with the flash crash was not just that it happened but how long it took to figure out what did happen.

Senator CORTEZ MASTO. Right.

Mr. SIMON. We will have much better tools that are available to identify the underlying customer. But the biggest negative and detriment that we have is it is limited to the securities and the options market. To the extent that there are futures markets and CFTC markets, regulated markets that are involved, they are not yet included in the Consolidated Audit Trail. It would be great from a customer protection and confidence and integrity standpoint to be able to integrate the U.S. futures markets into the Consolidated Audit Trail as well and potentially at some point the non-U.S. markets since we are in a global market, both with respect to products and with respect to geography. But it will be a very important first step in getting there.

Senator CORTEZ MASTO. Thank you. And thank you again for being here. I appreciate the conversation.

Chairman CRAPO. Thank you.

Senator Kennedy.

Senator KENNEDY. Mr. Simon, is this going to stop flash crashes?

Mr. SIMON. No.

Senator KENNEDY. Is this going to stop manipulation?

Mr. SIMON. No.

Senator KENNEDY. What is this going to do then?

Mr. SIMON. This is going to help the regulators police the markets after there is a flash crash and after there is manipulation, to bring the wrongdoers——

Senator KENNEDY. How often do we have a flash crash?

Mr. SIMON. I am aware of one.

Senator KENNEDY. OK. We are going to spend $4 billion to implement it? Is that the right number?

Mr. SIMON. That is a number that the SEC used early on. I do not believe that number is currently correct.

Senator KENNEDY. The SEC says it is going to cost $4 billion. Do you know how long it would take me to count to $4 billion?

Mr. SIMON. A long time.

Senator KENNEDY. A hundred-and-28 years. I would not make it. None of us would. And it is going to cost another $2.1 billion to keep it up?

Mr. SIMON. That is not my current estimate as to what the cost will be to build or to operate.

Senator KENNEDY. Do you think it can be done cheaper?

Mr. SIMON. Yes.

Senator KENNEDY. How much?

Mr. SIMON. The current operating budget for the CAT LLC, for the Operating Committee itself, just for the build and operation and the ancillary efforts, is approximately $60 to $75 million a year for the foreseeable future.

Senator KENNEDY. OK.

Mr. SIMON. That does not include, to be——

Senator KENNEDY. Well, I have got to move on. My briefing here from the SEC says $2.1 billion, you know, $75 million, and this is not going to stop flash crashes, and it is not going to stop manipulation, but you are going to have all this information.

Ms. Bohlin, what are you going to do with it? Where are you going to store it?

Ms. BOHLIN. So the data will be stored in FINRA CAT's cloud environment.

Senator KENNEDY. Who runs the cloud? Is that Amazon?

Ms. BOHLIN. AWS, Amazon Web Services.

Senator KENNEDY. OK. So how much will the contract with Amazon be? Senator Brown is very interested in this.

Ms. BOHLIN. The specifics of those contracts are confidential. I am happy to go back, just I would want to consult with counsel.

Senator KENNEDY. Well, you are going to have to tell us to appropriate the money, right?

Ms. BOHLIN. So in terms of funding perhaps, I do not think it is an appropriation that——

Mr. SIMON. No, the funding is coming—to date, the SROs have paid every penny for the CAT out of their own pocket. Eventually, we would like the——

Senator KENNEDY. Who are the SROs?

Mr. SIMON. The exchanges, 23 registered national securities exchanges——

Senator KENNEDY. And they are not going to pass that cost on? I mean, this is not free money, right? Somebody is going to pay Amazon.

Mr. SIMON. It is an operating cost that the SROs and with the industry, once we get fees in place, we will share the cost and it ultimately will be a cost center for the——

Senator KENNEDY. This is my first impression. Look, freedom is risk. You cannot regulate away every risk. It is not going to stop manipulation. It is not going to stop a flash crash. It is going to help you understand better what happened. You cannot understand what happened now? You went back and figured out what happened in the one and only flash crash we have had, haven't you, Ms. Bohlin?

Ms. BOHLIN. Eventually, after quite some time and effort.

Senator KENNEDY. That did not cost $4 billion, did it?

Ms. BOHLIN. Not that I am aware of, no.

Senator KENNEDY. OK. I mean, this sounds like something Facebook would ask for, or Google. OK? You say 3,000 people are going to have access to this information. Does that include the Chinese?

Ms. BOHLIN. No. That is just regulators——

Senator KENNEDY. Does that include the North Koreans?

Ms. BOHLIN. No.

Senator KENNEDY. Or Russia?

Ms. BOHLIN. No.

Senator KENNEDY. OK. So we do not know how many people are going to really have access to this.

Ms. BOHLIN. Well, all of the access is through private lines. You have to have a private line connection, so the interfaces are in no way exposed to the Internet.

Senator KENNEDY. I mean, I am trying—this is the way I am approaching it, and I am hurrying because I have to be on the floor. This is $4 billion, $2 billion to maintain it. Haven't you looked at the cost-benefit analysis? We are running $22 trillion in the hole and climbing. Since we have been talking, we borrow $1 million a minute to operate this place, $1.4 billion a day. I mean, why do you want to do this? I understand it will give you real-time data and you can go in there and look faster. But $4 billion, $2 billion to maintain it? We run the risk that your data could be compromised. Have you ever heard the expression, "The cure is worse than the disease"? I mean, next you are going to want our DNA. I just do not get it. And I understand you are taking out the personal information, and I am not against the good work that the SEC does. I think Jay Clayton, he is a rock-and-roll star. But I just do not get it. I just do not get it. And my time has been gotten, so I have got to go.

[Laughter.]

Chairman CRAPO. Thank you, Senator Kennedy.

Senator Van Hollen.

Senator VAN HOLLEN. Thank you, Mr. Chairman. Thank you and the Ranking Member and the witnesses here, and sorry I am running a little later, and I understand some of my questions have been covered, so I will get to the point. But I will say that, Ms. Bohlin, we are pleased to have FINRA in the State of Maryland, so thank you for what you do there on the job.

I want to pick up on a question that I think Senator Cortez Masto covered with respect to a futures contract—I think she mentioned the flash crash—and the question about whether the CAT system will be able to capture those future contracts, whether that is the intention, and if so, what the timeline is. And I am happy to take an answer from any of the witnesses here.

Mr. SIMON. Yes, I will be happy to answer on behalf of the consortium. We are building the CAT system that the SEC has mandated, and the SEC obviously has jurisdiction only over the equities and the options markets, so they have mandated that we build the CAT to cover those products.

They specifically have asked for comment and are looking at the inclusion of futures contracts, which obviously will be necessary for a comprehensive surveillance of the financial markets generally. That is a possible next step. We do not have the timeline for that. That would require obviously cooperation between the CFTC and the SEC in the development of such a project along with the oversight committees in Congress.

Senator VAN HOLLEN. Thank you. I mean, you would agree if we do not capture futures contracts, that would be a big hole in the system?

Mr. SIMON. Yes.

Senator VAN HOLLEN. So we need one way or another to make sure that is included, right?

Mr. SIMON. Yes. Right now we have our hands full through 2022 and getting the equities and the options markets in there. But that is certainly something that we would have to address thereafter.

Senator VAN HOLLEN. And with respect to the concerns some of my colleagues have raised about data security, because I understand this will contain the second largest amount of data of any system in the world, certainly in the United States, what measures are being taken now at the front end to make sure that we address the ever changing and increasing threat of cyberattacks?

Mr. SIMON. Let me address that from one angle and then have Shelly address it from another. I think the first thing we can do from an Operating Committee and consortium of the SROs is try to make the database less attractive to hackers, and that is why we have put in the exemption not to include Social Security or tax identification numbers in there, not include date of birth, and other types of similar personally identifiable information. So if that information is not there, we think it is a much less attractive target for a hacker. But notwithstanding the lack of PII in the system, we understand that there still will be a lot of data in there that may be attractive, so, therefore, we have worked with the CISO at FINRA CAT, with the industry, with the SEC to make sure that we have absolute state-of-the-art security measures in place. And, Shelly, you can quickly summarize those.

Ms. BOHLIN. Sure, absolutely. The way that we approach it, first of all, I will say that data security, cybersecurity is FINRA CAT's top priority. That is very much our focus. And at a very high level, we approach it with three very fundamental components: people, process, technology, you have to have the right people with the right experience, number one, very critical. So our CISO, over 20 years of experience. We have all of the exchanges' expertise, their CISOs, the industry's expertise, and FINRA parent's expertise. So we cannot stress enough technology is incredibly important, end-to-end encryption, private lines, the regulator can only access via a private line, MFA—multifactor authentication, the encryption. So it is really a multifaceted system that is part of everyday culture.

Senator VAN HOLLEN. Thank you. The last question I have got relates to concerns that some people have expressed about potential conflict of interest because this is—the SEC, of course, has a mandate to protect the public. This is an entity made up of, you know, members who are participating in the market, for-profit companies, some of whom I understand have been previously fined by the SEC. So what can you do to assure the public that this system will be run to protect the public interests and avoid conflict of interest which seem to be embedded in the structure in some ways?

Mr. SIMON. As you are well aware, the Nation's securities markets are based on a system of self-regulation so that the markets that are operating, the exchanges and FINRA that operate markets in one way or another also are responsible for the regulation of those markets. That will not change in CAT. All CAT will do is, very important, provide better surveillance tools for the SROs that are responsible for ensuring the integrity of their market through their self-regulatory operations. But understanding that with the greater amount of data in there and the more possibility that there is a misuse, clearly the SEC has stated in the rule and it stated

in the plan that the data in the system can be used only for regulatory and surveillance purposes, and Shelly and the FINRA CAT team are putting together surveillance of the system itself, of its use, just to see atypical patterns of use of the data, to try to identify places where regulators may be misusing the data.

So we are aware of the concerns. It is nothing new to the securities industry or to the SROs and is something we are able to and think that we will be able to police.

Senator VAN HOLLEN. I appreciate that, and there are some reports that the industry is actively trying to slow down this effort because it would result in greater transparency, even under the current system. Can you comment on that at all?

Mr. SIMON. I will start and then turn it to Judy. As Judy mentioned in her opening statement, we have an Advisory Committee, and we are working closely with SIFMA, and everybody in the industry and the SROs, at FINRA CAT, at the SEC are working in a coordinated, cooperative fashion to make the CAT successful.

Ms. MCDONALD. So the industry has had unprecedented involvement—and that goes from the participation in the Advisory Committee to the participation in the industry working group, and broker-dealers collectively have logged many hundreds of hours in the course of explaining work flows, reviewing specifications, bringing concerns to the table. We are doing this so that there is efficient and accurate collection of data. I do not know how much more the industry could actually put into this effort to make it successful, because at the end of the day we are required by the exchanges to do the reporting to CAT.

Senator VAN HOLLEN. OK.

Mr. SIMON. This is a cost and not—this is an expense and not an income center for the industry and for the SROs, but notwithstanding that, there has been really, in my experience, an unprecedented level of cooperation among everybody in the industry to make this successful.

Senator VAN HOLLEN. OK. Thank you. Thank you, Mr. Chairman.

Chairman CRAPO. Thank you, and that concludes our questions today. I want to again thank the panel for coming. As you can see, there is a strong understanding of the importance and the benefits of CAT. There is also a very high level of concern about the data collection and privacy impacts here, which I share on both sides. And so I think we are far from where I have a comfort level, and I think that is true for a number of Members of the Committee. But we understand and appreciate the efforts that are being undertaken to address these issues. I am sure you will receive some additional questions from the Members of the Committee who were not able to stay or be here, and I encourage you to respond to them quickly. For those Senators who do wish to submit questions for the record, those questions will be due by Tuesday, October 29th. And as I always do, I encourage you as the witnesses to respond as quickly as you can to those questions. With that, thank you again. This hearing is adjourned.

[Whereupon, at 11:11 a.m., the hearing was adjourned.]

[Prepared statements, responses to written questions, and additional material supplied for the record follow:]

PREPARED STATEMENT OF CHAIRMAN MIKE CRAPO

Today's hearing will focus on oversight of the status of the Consolidated Audit Trail, commonly referred to as the "CAT".

In 2010, in response to the Flash Crash and a number of other market disruption events, the SEC proposed the creation of a real-time tracking system to track securities orders across all markets throughout the life cycle of the order—from origination, to routing, cancellation, modification, or execution.

At the time, the SEC estimated the creation of the CAT would cost $4 billion to launch and have ongoing maintenance costs of $2.1 billion.

In 2012, I wrote a letter requesting that the SEC consider alternatives to establishing the CAT database, such as housing it on FINRA's existing Order Audit Trail System, or OATS.

It has been 9 years since the SEC's initial proposal for the CAT and after multiple challenges and delays it would appear that we have arrived at a version of CAT that realizes real-time, less accurate data is not necessary to the market function and that slightly delayed, more accurate information significantly reduces costs while still preserving the functional improvements CAT is intended to provide. Further, the CAT now better leverages existing resources by recently selecting a subsidiary of FINRA to be the plan processor.

I continue to have concerns about the costs associated with the build, the volume of the information collected, what information will be collected, who has access to the information collected, and how the information will be secured.

Last year, Ranking Member Brown and I wrote a letter to SEC Chairman Clayton that emphasized our bipartisan belief that protecting individuals' personally identifiable information, or PII, is paramount to the American people.

We have continued to seek a better understanding of what type of PII is being collected, how that information is being used, who can access it and how the data is secured and protected.

Chairman Clayton's September 9th statement echoed this sentiment regarding the importance of protecting information collected and stored in the CAT, particularly Social Security numbers, account numbers, and dates of birth.

Chairman Clayton stated that he believes "the regulatory objectives of the CAT can still be achieved without these most sensitive pieces of investor information."

Last week, the SROs officially requested a modification to the CAT NMS Plan to exclude the collection of dates of birth, Social Security numbers, individual taxpayer identification numbers, and account numbers.

This request is long overdue and I encourage the SEC to grant this amendment which, I agree with the SROs, will reduce the risk profile of the data collected and stored in the CAT while still preserving the CAT's intended regulatory use.

In his September 9th statement, Chairman Clayton went on to say that even if the SROs reduce the scope of the PII collected, the nature of the data to be included in the CAT "necessitates robust security protections."

I could not agree more and look forward to hearing from our witnesses on how they plan to address these important issues from each of their unique roles in the creation of the CAT.

I look forward to receiving an update from each of our witnesses on outstanding issues and challenges that remain to achieving an operational CAT.

I thank the witnesses for their willingness to appear today.

PREPARED STATEMENT OF SENATOR SHERROD BROWN

Thank you, Chairman Crapo, and welcome to our witnesses.

We are just shy of 200 days from the 10th anniversary of the 2010 flash crash. Although there hasn't been a market disruption of that magnitude since, our markets have become faster, more sophisticated, and more fragmented. In that time, industry has spent untold billions on upgrading technology and developing faster and smarter trading systems.

Yet the SEC, who we all rely on to maintain fair, orderly, and efficient markets, still lacks a comprehensive system that would allow it to effectively oversee the securities markets to protect Americans' college savings and retirement funds.

In an industry where cutting-edge technology is the name of the game and trading firms erect competing microwave towers so that computers in Chicago can communicate with computers near Wall Street in milliseconds, the SEC still cobbles together data from multiple sources in an attempt to have a complete understanding of our markets.

This is why the SEC called on FINRA and the firms that run our Nation's stock and options exchanges to build the Consolidated Audit Trail, or CAT, one system

with a beginning-to-end view of how trading happens, so we can prevent insider trading, market manipulation, and other misconduct that cheats the system.

When the effort began in 2012, it was a huge undertaking. But, 7 years later we are only at the first stage of data reporting, and many details need to be finalized. Under the current timeline, the system will not be fully operational until 2022.

Some take issue with the SEC, or any Government agency, having this much data and call the system a target for hackers.

I refuse to accept that we can't both protect people's personal information, and go after criminals who take advantage of our markets.

I know there are dozens of technology experts, data scientists, and market veterans working on this. Just last week, the CAT operating committee submitted to the SEC its proposal to exclude Social Security Numbers and other personal information from the reported data.

That is just one of many creative solutions that balance the need for oversight with protecting sensitive information.

I trust the very capable minds at the exchanges, FINRA, and the SEC can work out access to data concerns, tracking the use of the audit trail, and how to keep information secure to allow this long overdue oversight tool to be completed.

The bottom line is—if you are smart enough to have information or strategies you think someone wants to steal, then you are smart enough to help come up with ways to protect them.

And we can't afford to wait.

Just last week, the SEC filed charges against 18 people, most of them in China, who engaged in a 6-year market manipulation scheme using dozens of accounts, across many brokerage firms, that resulted in 31 million dollars of illicit profits.

While we'll never know if the new system would have made it easier to uncover those crimes, it is that kind of activity that the SEC should have the technology to uncover.

We also know that the question isn't if but when there will be another crash or major disruption. Everyone—Main Street, industry, and Congress—will look to those represented by our panelists today and the SEC to understand what happened, how it will be fixed, and who was responsible. Not having an answer, or waiting 5 months for one, will be unacceptable.

If another flash crash happens, or the delays or disagreements over what should be solvable questions continue, you can expect to be back before this Committee. We are expecting you all to cooperate and work diligently to finish the CAT project.

There are not many things that SEC Chair Clayton and I agree on, but finishing the CAT without further delay is one of them.

Every day we wait creates more risks for our markets and more opportunities for criminals to cheat our regulatory system.

Thank you, Mr. Chairman.

PREPARED STATEMENT OF SHELLY BOHLIN

PRESIDENT AND COO, FINRA CAT LLC, FINANCIAL INDUSTRY REGULATORY AUTHORITY

OCTOBER 22, 2019

Chairman Crapo, Ranking Member Brown, and Members of the Committee: On behalf of FINRA CAT, LLC, a subsidiary of the Financial Industry Regulatory Authority, or FINRA, I would like to thank you for the opportunity to testify today. I serve as the President and Chief Operating Officer of FINRA CAT, LLC, and I welcome the Committee's invitation to discuss specific details of FINRA CAT's work as the Plan Processor of the Consolidated Audit Trail, or CAT, since FINRA CAT stepped into the role 6 months ago.

The CAT is designed to be a centralized source of information on activity in the equities and listed options markets. The Securities and Exchange Commission (SEC) adopted Rule 613 in the wake of the 2010 flash crash to require the CAT to be created. The SEC explained at the time that the purpose of the CAT is to create a comprehensive consolidated audit trail that allows regulators to efficiently and accurately track all activity in these securities throughout the U.S. markets to facilitate comprehensive market reconstructions, more robust market surveillance, and better analytics to support policymaking.[1] Given the size and complexity of the fi-

[1] See Securities Exchange Act Release No. 67457 (July 18, 2012), 77 FR 45722 (August 1, 2012) (SEC adopting release for Rule 613 to require the national securities exchanges and

Continued

nancial markets, the CAT must collect, process, and store a vast amount of data to achieve this goal. This is a highly complex project that requires deep technological expertise, sophisticated and proactively evolving security, close regulatory coordination with the SEC and the consortium of self-regulatory organizations (SROs) responsible for managing the CAT (SRO consortium),[2] and full-time engagement with broker-dealers that ultimately must report data to the CAT.

The CAT NMS Plan was filed with the SEC by the SRO consortium to meet the SEC's Rule 613 requirements, and the Plan was approved by the SEC on November 15, 2016.[3] FINRA CAT began serving as the CAT Plan Processor in April of this year after being selected by the SRO consortium to build and operate the CAT system. Since our selection, FINRA CAT has been performing these functions on a contract basis for the SRO consortium, in accordance with the consortium's CAT NMS Plan.

FINRA CAT appreciates that there is interest in the CAT from multiple perspectives. The CAT is an important tool that must be built properly so that the market regulators—including the SEC, FINRA, and the national securities exchanges—can use it as intended to efficiently and accurately track all activity in the U.S. securities markets. In addition, given the importance of sensitive information to the success of the CAT in achieving its goals, its security is of paramount concern to the regulators, to industry members who will report data to the CAT, to investors, and to the public.

FINRA CAT is fully committed to serving these interests. The leadership and staff of FINRA CAT have significant experience in developing audit trail technology and utilizing it for regulatory purposes. In addition, FINRA CAT has access to the full resources of FINRA and its long, successful work in this area, expertise that has been valuable in the months since FINRA has been tasked with the development of the CAT. With this support, FINRA CAT's work to build the CAT is on schedule. FINRA CAT also is committed to receiving input from all stakeholders so that it may serve its role most effectively. Close engagement with the SROs, SEC, industry stakeholders, the public, and Congress is critical to FINRA CAT's efforts and the efforts of the SRO consortium.

Transition to FINRA CAT

After FINRA was selected by the SRO consortium to succeed the former Plan Processor, FINRA CAT, a subsidiary of FINRA, was created to focus solely on performing the functions of the Plan Processor.[4]

Importantly, FINRA CAT is a regulated entity. FINRA CAT is part of FINRA's parent SRO umbrella and accordingly an "SCI Entity."[5] This means that while FINRA CAT serves as a contractor for the SRO plan participants and is not a CAT NMS Plan participant itself, FINRA CAT nevertheless is subject directly to the SEC's jurisdiction, including Regulation Systems Compliance and Integrity (Reg SCI). FINRA CAT's status as an SCI Entity ensures direct accountability—both to the SRO plan participants and to the SEC—for important issues like system security, integrity, capacity, and business continuity.

While FINRA CAT is part of FINRA's parent SRO umbrella and supported by FINRA resources, FINRA CAT is a distinct corporate subsidiary with controls in place to create sufficient separation from FINRA operations where needed and appropriate. We have built out a dedicated FINRA CAT operations staff led by me and a Chief Technology Officer. We also hired, with the approval of the SRO consortium, a Chief Information Security Officer (CISO) and a Chief Compliance Officer (CCO). These officers are responsible, respectively, for FINRA CAT's information technology security and governance and regulatory compliance programs. These two positions also owe fiduciary duties to the SRO consortium, as specified in the CAT NMS Plan.[6]

FINRA to file a national market system (NMS) plan for the creation, implementation, and maintenance of the CAT).

[2] The 24 participants currently in the consortium are: BOX Exchange LLC; Cboe BYX Exchange, Inc., Cboe BZX Exchange, Inc., Cboe EDGA Exchange, Inc., Cboe EDGX Exchange, Inc., Cboe C2 Exchange, Inc. and Cboe Exchange, Inc.; FINRA; Investors Exchange LLC; Long-Term Stock Exchange, Inc.; 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; and New York Stock Exchange LLC, NYSE American LLC, NYSE Arca, Inc., NYSE Chicago, Inc. and NYSE National, Inc.

[3] See *https://www.sec.gov/rules/sro/nms/2016/34-79318.pdf.*

[4] While FINRA is a member of the consortium, FINRA recused itself and did not take part in the selection decision.

[5] See *https://www.sec.gov/rules/sro/finra/2019/34-85764.pdf.*

[6] See Section 4.6(a) of the CAT NMS Plan, available at *https://catnmsplan.com/wp-content/uploads/2019/09/CAT-2.0-Consolidated-Audit-Trail-LLC%20Plan-Executed-(175745081)-(1).pdf.*

Since becoming the Plan Processor in April, FINRA CAT has worked closely with the SRO consortium and SEC staff to expeditiously put in place a solution for the first scheduled phase of the CAT—specifically, the collection and processing of order and trade data from the equities and options exchanges and FINRA.[7] For equities, FINRA CAT has been able to leverage existing data feeds the exchanges currently provide to FINRA, and in June, FINRA CAT deployed a significant technology release to ingest and validate newly reported options data from the options exchanges. FINRA CAT has used scalable technology to process, on average, over 100 billion market records a day during this period with no material operational issues or delays.

This current quarter, FINRA CAT will be finishing the development of analytical tools that allow the SEC and SRO plan participants, as regulatory users of the CAT, to analyze and run complex queries on the CAT data. In addition, these tools will include functionality that allows regulatory users to see visual displays of the consolidated equity market order book for any given period of time. An example of this is the delivery of multifactor authentication, an important security enhancement, months ahead of its originally planned implementation date of May 2020.

Upcoming Milestones—Industry Member Reporting to CAT

At the same time that FINRA CAT has been working to implement the first phase of CAT data reporting from plan participants, we also have been dedicating substantial resources to preparing for the next stage-industry member reporting, which is scheduled to be phased in from April 2020 to July 2022.[8]

Looking ahead, large and small firms that currently report similar audit trail data to FINRA's existing Order Audit Trail System (OATS) will begin reporting equities data in April 2020, followed by large firm reporting of options data in May 2020. Small firms that do not currently report to OATS are scheduled to begin reporting in December 2021. Initially, industry member data will be limited to information concerning order and trade events. After a number of interim phases that will require the reporting of increasingly complex order and trade information, the final phase of industry member reporting—as currently contemplated by the SEC-approved CAT NMS Plan—calls for certain customer and account information reporting beginning in July 2022. Prior to each new reporting phase, there will be mandatory test periods to promote compliance for the broker-dealers reporting data to the CAT. FINRA CAT continually looks for opportunities to accelerate the timeline where possible.

Achieving these reporting milestones requires significant effort from all parties. FINRA CAT is involved in full-time industry engagement through a variety of channels. FINRA CAT has worked with the consortium and CAT stakeholders to publish lengthy guidance on a variety of industry reporting scenarios, a schema for industry member reporting, and final technical specifications for the initial industry reporting phases.[9] FINRA CAT and the SRO participants provide frequent presentations to the industry, which are archived on the SRO consortium's dedicated CAT NMS Plan website.[10] FINRA CAT also maintains a fully staffed Help Desk to maintain an open line of communication.

Active broker-dealer participation and feedback is a critical part of this engagement, as the success of CAT requires effective broker-dealer implementation of the CAT reporting requirements. There are a number of industry representatives involved in the governance of the CAT NMS Plan through their participation on an advisory committee established by the CAT NMS Plan.[11] A group of industry representatives join a weekly working group discussion that FINRA CAT cochairs with the consortium to identify and resolve interpretive questions. With the help of this weekly discussion forum, FINRA CAT and the SRO consortium have published answers to numerous frequently asked questions and continue to answer new questions regularly.[12]

Active SEC involvement is critical as well. Each week, FINRA CAT hosts a call with SEC staff and the SRO plan participants to provide an update on project development and progress. FINRA CAT appreciates the time, investment, and insight

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[7] For purposes of CAT reporting, FINRA data includes information about activity in the over-the-counter markets reported to FINRA's Trade Reporting Facilities, Alternative Display Facility, and Over-the-Counter Reporting Facility. More information can be found on *www.finra.org.*

[8] See *https://catnmsplan.com/timelines/.*

[9] See *https://catnmsplan.com/technical-specifications/index.html.*

[10] See *https://catnmsplan.com/news-page/index.html.*

[11] See Section 4.13 of the CAT NMS Plan, available at *https://catnmsplan.com/wp-content/uploads/2019/09/CAT-2.0-Consolidated-Audit-Trail-LLC%20Plan-Executed-(175745081)-(1).pdf.*

[12] See *https://catnmsplan.com/faq/index.html.*

provided by the SEC staff on all aspects of the CAT, and FINRA CAT has been happy to report so far that its work is on schedule.

FINRA CAT recognizes that challenges are sure to arise throughout the industry phase-in. Prior to becoming the Chief Operating Officer of FINRA CAT, I worked for 25 years with FINRA's market regulation program, including on the successful multiphase implementation of FINRA's OATS reporting requirements. Today, FINRA combines OATS data with other regulatory data to process on average more than 78 billion records a day. As I and my FINRA CAT colleagues draw on our extensive prior experience with audit trail implementation, we welcome dialogue with the industry and all CAT stakeholders, particularly as we encounter new challenges unique to CAT reporting and prepare CAT to support regulators' efforts to retire existing systems like OATS.

Security and Customer Identifying Information

Under the current CAT NMS plan approved by the SEC in 2016,[13] industry members will be required to report certain customer identifying information, including account numbers and some personally identifying information, or PII. While we recognize the ongoing policy discussions related to the necessity of specific elements of PII to the success of the CAT, those requirements are ultimately matters the SRO consortium and the SEC must determine. However, I can assure the Committee that the security of PII, and of all CAT data more broadly, is of the utmost priority to FINRA CAT, and I can address the data security program that FINRA CAT has put in place to meet the CAT NMS Plan's requirements.

In terms of FINRA CAT's overall information security program, we are led by a CISO who was approved by the SRO consortium who is also its fiduciary. Our CISO has over 20 years' experience working on information security at FINRA, including as a security architect and security engineer. The CISO is supported by a dedicated team of security analysts who ensure that security controls are effectively implemented, monitor the security of the CAT System and respond to anomalies, evaluate and approve access, enforce compliance with security policies and standards including National Institute of Standards and Technology (NIST) Special Publication (SP) 800-53, and evaluate evolving threats and security control opportunities to ensure that the CAT security posture remains strong. In addition, the FINRA CAT security team is able to leverage the security expertise and advanced technology solutions that FINRA has invested heavily in over the years, including the people, process, and technologies it has developed and deployed to operate a secure cloud environment that is comparable in scale to the fully deployed CAT solution. As the SRO consortium recently discussed in a presentation to the industry, the FINRA CAT security program includes significant layers of architectural-level security controls and program-level security controls.[14] Examples of architectural controls include secure infrastructure for connecting to the CAT system and architectural separation between transaction data and PII. Examples of program controls include a full suite of information security policies, procedures, and standards, as well as regularly scheduled independent third-party system penetration testing, code reviews, and security control validation.

The extensive FINRA CAT security policies address a range of issues required by the CAT NMS Plan, including data storage and handling, insider risk, data connectivity and transfer, incident management, security logging and monitoring, and account management. FINRA CAT's security program is based on work product developed by the FINRA CAT CISO in coordination with a security working group made up of CISOs and security experts from each of the SRO plan participants.

Each CAT System release is subject to the granting of an Authority To Operate (or ATO) by the SRO consortium. To obtain an ATO from the consortium, the CAT CISO presents a package of materials to the security working group that demonstrates the strength of the CAT System's security posture. This package includes the system security plan, internal and third-party security testing reports, and an independent validation and verification report confirming that security controls are aligned with the NIST industry standards followed by the Federal Government.[15]

FINRA CAT understands concerns that continue to be raised about the inherent risk of handling CAT data, particularly PII. Even with the enhanced architectural and program controls required by the plan for PII—such as containing PII in its own separate system with restricted access—there may be policy questions for the SEC and SRO consortium to discuss about the costs and benefits of collecting and storing sensitive personal data.

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[13] See *https://www.sec.gov/rules/sro/nms/2016/34-79318.pdf.*
[14] See *https://catnmsplan.com/news-page/cat-industry-webcast-recording-08-28-19/.*
[15] See *https://catnmsplan.com/news-page/cat-industry-webcast-recording-08-28-19/.*

FINRA CAT's job is to support the regulators' decision making on this issue. This includes making any modifications to the system design to account for current discussions between the SEC, the SRO consortium, and the industry. As SEC Chairman Clayton recently noted before the House Financial Services Committee, the SROs are refining the details of a recommendation to eliminate Social Security numbers, account numbers, and dates of birth from the CAT, filing a request last week with the SEC to formalize the modified approach.[16] FINRA CAT continues to work closely and productively with the SEC and the SROs to ensure that it has the right technological solution in place for when customer and account information reporting begins in July 2022.

Conclusion

Thank you again for the opportunity to appear today. The CAT is a major regulatory undertaking meant to help the SEC, FINRA, and the exchanges better regulate our securities markets. FINRA CAT recognizes the role it must play as the CAT Plan Processor to make the CAT fully operational and secure. We are on target to complete the build on time and in line with the strict data security protocols established in the SEC-approved CAT NMS Plan. We look forward to our continued collaboration with Congress, the SRO consortium, the SEC, market participants, stakeholders and the public as we work to achieve the project's goals.

PREPARED STATEMENT OF JUDY MCDONALD

CHAIR, CAT NMS PLAN ADVISORY COMMITTEE

OCTOBER 22, 2019

My name is Judy McDonald, I am the head of Regulatory Technology at Susquehanna International Group, LLP (SIG), a global quantitative trading firm headquartered in Bala Cynwyd, PA. In my role at SIG I have been evaluating the Consolidated Audit Trail (CAT) NMS Plan since its inception and participated in the CAT Development Advisory Group prior to the Plan Processor selection. Since February 2017, I have served along with 13 other industry participants on the Advisory Committee, and since March 2019 have served as the Chair of the Advisory Committee.

Today I can confidently state that the effort to deliver CAT is moving forward in a very positive manner. Since February 2019, when FINRA CAT became the new Plan Processor, the Self Regulatory Organizations (SROs), FINRA CAT and industry members have been in a virtuous cycle of iterative deliverables and collaboration on the Plan. FINRA CAT brings subject matter expertise, depth of resources, and leadership to the effort. These capabilities have resulted in improvements ranging from well written policies and procedures, to capable project management, to delivery on portions of a large, complex, distributed system.

The Advisory Committee is satisfied that the intermediate milestones of the past year have been met and that significant progress has been made toward processing SRO reporting and the completion of industry member technical specifications for the first equity and option reporting phases.

However, there are a few areas of concern as the implementation of CAT progresses,

1. *Data Security.* This is undoubtedly the most significant concern as the CAT will gather and store an unprecedented amount of information that previously has not been centrally located nor specifically identifiable. The concerns can be broken down into three categories: (a) Trading records for institutions, (b) Personally Identifiable Information (PII) for retail customers, and (c) the Security Policies of the regulators:

Trading Records

There is significant concern about the security of the CAT data repository and the misuse of trading records by those with "authorized" access. Trading records will be less secure than PII and accessible by a broader set of individuals. This highly proprietary information results from significant investments, and Broker-Dealers (BDs) are very concerned that trading strategies could be reverse-engineered by competitors, by academics, or by rogue actors. Further, SROs compete with each other and

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[16] See Letter from Michael Simon, CAT NMS Plan Operating Committee Chair, to Vanessa Countryman, SEC, Request for Exemptive Relief from Certain Provisions of the CAT NMS Plan related to Social Security Numbers, Dates of Birth, and Account Numbers (Oct. 16, 2019), available at *https://www.catnmsplan.com/wp-content/uploads/2019/10/CCID-and-PII-Exemptive-Request-Oct-16-2019.pdf.*

BDs; this is beneficial to investors and could be compromised with the misuse of data.

PII Data

We are encouraged by the progress to avoid the collection of Social Security numbers and other sensitive PII data. With this progress we believe some focus should be shifted to address the retirement of the legacy Electronic Blue Sheet (EBS) system, which currently collects PII data and is less secure than CAT.

Security Policies

The Advisory Committee has little insight into the security programs at the regulators and whether security policies and procedures have changed commensurate with the increased value of the CAT data and the increased threat of compromise. We cannot emphasize enough the harm that could come from an external bad actor gaining access to trade information once data is bulk downloaded from the central FINRA CAT repository.

In summary, I appreciate the critical nature of securing CAT data. Two of the best ways to achieve data security is to limit the number of people with access and to control the use of the data as tightly as possible. The Advisory Committee urges reconsideration of allowing the 22 exchanges and the SEC to bulk download CAT data.

2. *Verbal and Manual Quotes.* There is a significant open issue with respect to the capture and reporting of verbal and manual quotes. Human interaction with highly electronic markets is a deeply challenging issue that affects a small but very important part of the market and if disrupted, could dramatically reduce market liquidity particularly during periods of extraordinary volatility. The Advisory Committee recommends a stepwise approach for reporting verbal and manual quotes.

3. *Fees.* Another area of concern is the current lack of insight into fees that may be applied to BDs. The absence of a fee schedule creates uncertainty around the effort and unnecessarily challenges firms budgeting to comply with CAT. It also raises the concern of chasing more firms out of business and imposing yet another barrier to entry, all to the detriment of market liquidity and competition.

4. *The SEC Proposal for Financial Accountability Milestones.* The SEC proposal centers on the best-practice goals of increasing accountability and transparency of the CAT project. While we are supportive of these goals, legitimate unforeseen circumstances may occur where fixed deadlines work against the collective best interest of the CAT implementation. There must be some flexibility in place to address unforeseen situations.

In closing, I look forward to continuing my work on the CAT project and will be happy to address any specific questions you have.

PREPARED STATEMENT OF MICHAEL J. SIMON

CHAIRMAN, CAT NMS PLAN OPERATING COMMITTEE

OCTOBER 22, 2019

I. Introduction

Chairman Crapo, Ranking Member Brown, and Senators of the Committee, thank you for the opportunity to testify before you today about the progress made on developing the Consolidated Audit Trail system ("CAT System" or "CAT"). As you are aware, the national securities exchanges and the Financial Industry Regulatory Authority (FINRA) (as the only national securities association) are developing and operating the CAT System as Participants[1] to the National Market System (NMS) Plan Governing the CAT (the "Plan").[2] The Securities and Exchange Commission

[1] The 24 Participants are: BOX Exchange LLC; Cboe BYX Exchange, Inc., Cboe BZX Exchange, Inc., Cboe EDGA Exchange, Inc., Cboe EDGX Exchange, Inc., Cboe C2 Exchange, Inc. and Cboe Exchange, Inc.; FINRA; Investors' Exchange LLC IEX; Miami International Securities Exchange LLC, Long-Term Stock Exchange, Inc.; 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; and New York Stock Exchange LLC, NYSE American LLC, NYSE Arca, Inc., NYSE Chicago, Inc. and NYSE National, Inc.

[2] National Market System Plan Governing the Consolidated Audit Trail, Section 1.1 available at *https://www.catnmsplan.com/wp-content/uploads/2019/09/CAT-2.0-Consolidated-Audit-Trail-LLC%20Plan-Executed-(175745081)-(1).pdf* [hereinafter the "Plan"].

("SEC" or "Commission") mandated both the Plan and the CAT System through adoption of Rule 613 of Regulation NMS.[3]

Described broadly, the CAT requires Participants, and will require broker-dealers (Industry Members), to submit information to the CAT System related to the inception, routing, cancellation, modification, or execution of an order.[4] When completely implemented, the CAT System will receive, validate, and process such data to create life cycles of orders across the markets. The Participants and the SEC will use the CAT System solely for regulatory purposes, querying the CAT System to facilitate their oversight of the securities markets and to help them fulfill their obligations under the Federal securities laws. As noted in Rule 613, the Commission expects the Participants and Industry Members to share in the costs of the CAT, and the Plan includes a funding model consistent with the cost-sharing requirement of Rule 613.[5]

There has been significant interest in the CAT. Understandably, much of this interest has centered around the extent to which the system will include personally identifiable information (PII), the security of the system more generally, as well as the cost of the system. Before discussing these issues, I'd like to provide a little background on the CAT, tell you a little about the structure of the project and my role, and give you an update on the progress of the CAT System.

a. Background on CAT

By way of background, the Commission conceived of and ultimately mandated the CAT System to more effectively and efficiently conduct cross-market supervision of trading activity.[6] The Commission has explained that the regulatory data infrastructure the Commission, the exchanges and FINRA currently rely on is outdated, inconsistent, and inadequate to effectively oversee a complex, dispersed, and highly automated national market system.[7] Upon complete implementation, the CAT system will provide a number of significant benefits, including: (i) consolidated trading information across all markets and (ii) the ability to identify the trading of specific end-customers.

One practical example of limitations of current regulatory data relates to regulators' ability to reconstruct and analyze market events.[8] According to the Commission, the lack of direct access to audit trail data resulted in the Commission's inability to quickly and efficiently reconstruct market events during the financial crisis in 2008 and the "Flash Crash"[9] in 2010.[10] In proposing SEC Rule 613, the Commission noted that while the existing audit trail information assisted the staffs of the SEC and the self-regulatory organizations in their regulatory responsibility to surveil for compliance with self-regulatory organization rules and the Federal securities laws and regulations, it believed that existing audit trails were limited in their scope and effectiveness in varying ways.[11]

To address this need, in August, 2012, the Commission adopted Rule 613[12] requiring the Participants to submit an NMS plan to create, implement, and maintain a consolidated audit trail for orders in NMS Securities.[13] The Commission mandated that the Plan address activity across all markets, from the time of order inception through routing, cancellation, modification, execution, and allocation, in ac-

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[3] Consolidated Audit Trail Adopting Release, Exchange Act Release No. 67,457, 77 FR 45,722 (Aug. 1, 2012) [hereinafter "Rule 613 Adopting Release"].

[4] See generally Plan, supra note 2 (outlining the requirements of the CAT System).

[5] See Regulation NMS, 17 CFR §242.613(a)(1)(vii)(D) (2019).

[6] See Rule 613 Adopting Release, supra note 3 at 45,723.

[7] See id. at 45,723; Joint Industry Plan; Order Approving the National Market System Plan Governing the Consolidated Audit Trail, Exchange Act Release No. 79,318, 81 FR 84,696, at 84,697 (Nov. 23, 2016) [hereinafter "CAT NMS Plan Adopting Release"].

[8] See Consolidated Audit Trail Proposing Release, Exchange Act Release No. 62,174, 75 FR 32,556, at 32,557 (June 8, 2010) [hereinafter "Rule 613 Proposing Release"].

[9] On May 6, 2010, the prices of many U.S.-based equity products suddenly plummeted and recovered almost as quickly. This event is referred to as the "Flash Crash". The Commission, along with the Commodity Futures Trading Commission, undertook an analysis of the Flash Crash. The Commission has explained that the available data "hindered staff in determining what happened to liquidity before, during, and after the Flash Crash. Two major problems were the inability to identify and eliminate duplicate orders from the data and the inability to accurately sequence events across the multiple data sources." Rule 613 Adopting Release, supra note 3 at 45,732.

[10] CAT NMS Plan Adopting Release, supra note 7 at 84,834 n. 2246.

[11] See Rule 613 Proposing Release, supra note 8 at 32,563-568.

[12] See Rule 613 Adopting Release, supra note 3.

[13] For purposes of the Plan, "NMS Securities" are defined as "any security or class of securities for which transaction reports are collected, processed, and made available pursuant to an effective transaction reporting plan, or an effective national market system plan for reporting transactions in Listed Options." See Plan, supra note 2 at Section 1.1.

cordance with the requirements of Rule 613. In September, 2014, the Participants submitted an initial proposed NMS plan to the Commission.[14] Over the course of more than 2 years, the Participants filed two amendments to the initial NMS plan; upon publication, the SEC received dozens of comment letters on the proposed NMS plan from across the industry,[15] many of which focused on the security of the CAT System. In addition to NMS Securities mandated by Rule 613, the Participants also determined to include OTC Equity Securities (NMS Securities and OTC Equity Securities collectively are "Eligible Securities") within the initial scope of the CAT.[16] The Participants proposed this to allow for a more expanded audit trail and to facilitate an expedited retirement of OATS (which applies to OTC Equity Securities as well as NMS stocks) as duplicative to CAT. In November 2016, the Commission unanimously approved the amended Plan developed by the Participants in accordance with the requirements of Rule 613.[17]

When the CAT System is fully operational it will address the regulatory need the Commission identified and facilitate multiple Participants' ability to conduct their own market surveillance. In particular, the more granular order attribution information that will be available via CAT will help Participants make their surveillance programs more efficient and effective. As Participants develop regulatory systems that interact with CAT data, they may use CAT data to supplement targeted queries of their own exchange data and/or to build new exchange-specific surveillance to bolster regulation of individual markets and across markets. For example, Participants will more easily identify exchange-specific manipulative activity, such as opening and closing cross-manipulation, using CAT data because a market participant may be entering manipulative orders on one exchange that are otherwise not visible to another exchange's surveillance systems.

The CAT presents new opportunities to increase both regulatory effectiveness and efficiencies, and the Participants are committed to using the CAT System to reduce regulatory inefficiencies, including reducing regulatory duplication, in a manner that promotes the safety of the markets and the quality and effectiveness of the Participants' regulatory programs.

b. Structure of CAT Project

To understand my role on the CAT project, it may be helpful to review the various stakeholders and contributors to the project. Consolidated Audit Trail LLC (CAT LLC) is a consortium of national securities exchanges and national securities associations. The Operating Committee is comprised of representatives of each Participant, serves as the governing body for CAT LLC and provides review, guidance, oversight and decision-making authority for the overall operations of the CAT System. The Operating Committee selects the Plan Processor, which is responsible for implementing and operating the CAT System. As mandated by Rule 613 and the Plan, the Operating Committee receives industry perspective and guidance from the CAT LLC Advisory Committee, which is a diverse group of industry representatives (e.g., small, medium and large broker-dealers, floor broker-dealers, proprietary trading firms clearing firms, service bureaus, buy-side traders, academicians). There also are numerous working groups with discreet responsibilities related to the CAT project.

I have been involved with the CAT since the adoption of Rule 613, first as an employee of a future Participant and, since 2017, as Chair of the Operating Committee while also serving as an Independent Senior Advisor to Deloitte. I can represent to you that the Participants have been working, and continue to work, diligently and in good faith to comply with their regulatory obligations to build and operate the CAT in compliance with SEC Rule 613 and the Plan. In doing so, the Participants are working closely with staff of the SEC to ensure the CAT is designed and implemented in a manner consistent with regulatory expectations and with the Advisory Committee to ensure that the CAT is designed and implemented in a manner that is efficient and will benefit the industry-at-large.

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[14] See Initial National Market System Plan Governing the Consolidated Audit Trail available at *https://www.catnmsplan.com/wp-content/uploads/2018/02/p600989.pdf.* The Participants worked with the Development Advisory Group (DAG), which consisted of broker-dealer representatives, to solicit industry feedback when creating the Plan.

[15] See Securities and Exchange Commission File No. 4-698 available at *https://www.sec.gov/comments/4-698/4-698.shtml.*

[16] For purposes of the Plan, "OTC Equity Securities" are defined as "any equity security, other than an NMS Security, subject to prompt last sale reporting rules of a registered national securities association and reported to one of such association's equity trade reporting facilities." See Plan, supra note 2 at Section 1.1.

[17] See CAT NMS Plan Adopting Release, supra note 7.

Throughout the process of creating and operating the CAT, the Participants have been deliberate about ensuring that the CAT System and the data within the system are secure. The Participants are committed to developing and implementing a fully functional and secure CAT System in accordance with the timeline developed by the Participants and FINRA CAT, which was shared with the SEC.

II. Process of Developing and Implementing the CAT

In addition to developing the Plan that governs the overall operation of the CAT System, the Participants went through a rigorous process to identify a Plan Processor to develop, implement, and operate the CAT System. Understanding that this would be a challenging effort, the Participants began this undertaking well before the Commission ultimately approved the Plan. Specifically, the Participants developed a request for proposal (RFP) process and published a Proposed RFP Concept Document for public comment to get feedback on the feasibility and costs of implementing the CAT reporting requirements contemplated by the Plan. Participants also published information on the anticipated content and structure of the RFP so that interested bidders had the opportunity to review the scope of information they would have to provide in an RFP response. The Participants ultimately published an RFP in February 2013.

In September 2013, the Participants filed a separate NMS plan with the Commission, entitled the Plan Governing the Process of Selecting a Plan Processor and Developing a Plan for the Consolidated Audit Trail (Selection Plan). The Selection Plan governed how the Participants would ultimately select the Plan Processor. The Commission approved the Selection Plan in February 2014.[18] Following the process outlined in the Selection Plan, 10 entities submitted responses to the RFP. The Participants heard oral presentations from all 10 entities and identified three finalists. The majority of Participants ultimately selected Thesys Technologies LLC (Thesys) in accordance with the voting procedures for the selection of the initial Plan Processor under the Selection Plan.

The relationship with Thesys did not progress in a satisfactory manner. After working closely with Thesys in an attempt to overcome what the Participants viewed as inadequacies in Thesys' performance as Plan Processor, the Participants determined that Thesys could not remedy those inadequacies in a timely and cost-effective manner. Thereafter, the Participants determined to engage a new Plan Processor. Because the Participants understood and appreciated the urgent need to complete the CAT System, the Participants commenced an abbreviated selection process, contacting the two other finalists from the initial selection process. Earlier this year, the Participants selected FINRA, operating through a subsidiary (FINRA CAT), to serve as the successor Plan Processor. The Participants transitioned the project to FINRA CAT in order to facilitate the timely development and implementation of the CAT. Shortly thereafter, the Participants provided the Commission an updated plan outlining the phased timeline for implementing the CAT System.

III. Progress Update

Since transitioning the project to FINRA CAT, the Participants have made substantial progress toward meeting their obligations to build and operate the CAT. The Participants actually began submitting data to the CAT in November 2018, when Thesys was the Plan Processor, and have successfully submitted more than 13 trillion records to the CAT System since transitioning to FINRA CAT. Since commencing operations as Plan Processor, FINRA CAT has collected all data from the Participants, validated and linked all equity exchange data, and is on target to validate and link all options exchange data by February 2020. FINRA CAT also has completed various releases related to Participant reporting in a timely manner and has accelerated the delivery of multifactor authentication—a key aspect of the security of the CAT System—by several months from the planned date of May 2020. Since selecting FINRA CAT as Plan Processor, there have been no production outages or major operational issues with the first technical release.

The Participants also have made substantial progress with regard to Industry Member CAT reporting (i.e., CAT reporting by broker-dealers), which is scheduled to commence in April 2020. Industry Member onboarding is in progress, and the Participants have finalized the Technical Specifications for Industry Member reporting for the initial two reporting phases. Additionally, FINRA CAT has finalized Industry Member connectivity and completed Industry Member registration.

To place the progress made to date in perspective, it may be helpful to provide a sense of the scope and magnitude of the CAT project. The CAT System receives

[18] The Selection Plan was later incorporated into the Plan approved by the Commission on November 15, 2016.

over 105 billion records per day on average and has processed a peak of 182 billion records from Participants alone on one day for options, Options Price Reporting Authority, options national best bid and offer, and equities exchange data. The Participants clearly have complied with the Commission's charge to build a comprehensive system designed to be dependable, robust, and scalable.

Importantly, this progress has come about not only through the efforts of the Participants and the Plan Processor, but also due to the enhanced involvement of Advisory Committee members and Industry Members more broadly. The Participants and FINRA CAT have worked regularly and productively with the Advisory Committee and industry associations, such as the Securities Industry and Financial Markets Association (SIFMA), Financial Information Forum, and the Securities Traders Association, to gather, assess, and answer numerous interpretive questions, publish Frequently Asked Questions (FAQs), assess timelines for Industry Member technical specifications and reporting, and otherwise develop a workable CAT. The Participants also met with the Investment Company Institute on topics related to the CAT System. The Commission staff, who regularly attend nearly all CAT meetings and calls, also have played an important role in discussions related to the development of the CAT. With the help of these various contributors, the Participants have been able to make significant progress in developing the CAT System and preparing the industry for a fully functional CAT System by publishing or providing 247 pages of technical specifications, 226 of FAQs, 10 workflow documents including a 367 page Industry Member Reporting Scenarios document and a 22 page onboarding guide, and 24 webinars; and registering 1,530 Industry Members.

Beginning next month, the Participants and the Plan Processor will work together, using a phased approach, to expeditiously achieve the following milestones: (i) large Industry Member testing (December 2019), (ii) large Industry Member reporting (April 2020), (ii) small Industry Member testing (December 2019), (iii) small Industry Member reporting (December 2021), and (iv) customer account and customer identifying information reporting by all firms (July 2022).[19] The Participants are working to achieve all milestones, i.e., achieve complete implementation of the CAT System, by July 2022.[20]

IV. PII

I would like to discuss personally identifiable information. As noted earlier, the SEC has mandated that the CAT System be designed and developed to comply with the requirements of SEC Rule 613 and the Plan. Rule 613(c)(7)(i)(A) states that the Plan must require Participants and Industry Members to record and electronically report to the CAT System Customer-IDs for each order and each reportable event.[21] Rule 613(j)(5) defines Customer-ID as "a code that uniquely and consistently identifies such customer for purposes of providing data" to the CAT System.[22] Rule 613 does not define what qualifies as customer identifying information, but in proposing and adopting Rule 613, the SEC suggested that the CAT System "be responsible for assigning a unique customer identifier in response to an input by a [regulator] of a customer's Social Security number or tax identification number"[23] and noted its expectation that the Participants "establish a process by which [the Customer-IDs] are reported to the [CAT System], and how this information is linked to the name and address of customers as stored in the [CAT System]."[24] Accordingly, the Commission-approved Plan currently defines Customer Identifying Information as "information of sufficient detail to identify a Customer, including, but not limited to, (a) with respect to individuals: name, address, date of birth, individual tax payer identification number (ITIN)/Social Security number (SSN), individual's role in the account (e.g., primary holder, joint holder, guardian, trustee, person with the power of attorney) . . . "[25]

It is important to note that the inclusion of PII has been a point of contention since the inception of the CAT System. In fact, members of Congress, the SEC, Participants and others in the industry have raised security and privacy concerns related to the nature and volume of information to be included in the CAT System, with particular focus on the use and inclusion of customer identifying information.

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[19] Customer account and customer identifying information reporting may be impacted by the Participants' request for exemptive relief. See infra note 28 and accompanying text.

[20] The phased implementation involves a more detailed breakdown of the milestones, including milestones related to OATS reporting and non-OATS reporting small Industry Members.

[21] Regulation NMS, 17 CFR §242.613(c)(7)(i)(A) (2019).

[22] Regulation NMS, 17 CFR §242.613(c)(7)(i)(A) 613(j)(5) (2019).

[23] Rule 613 Proposing Release, supra note 8 at 32,573.

[24] Rule 613 Adopting Release, supra note 3 at 45,757.

[25] Plan, supra note 2 at Section 1.1.

The Commission made clear, however, that the utility of the CAT System would be significantly degraded without a means to uniquely identify underlying customers.[26]

The need to balance facilitating effective regulation using the CAT System against security concerns related to the breadth of sensitive information that will be in the CAT System remains paramount. Participants have been in discussions with the SEC and the industry on how best to balance these competing concerns. To that end, the Operating Committee formed a PII Working Group to research and recommend potential alternatives regarding the handling of PII in the CAT System.

After considering various alternatives over the course of 2018, the PII Working Group, in consultation with SIFMA, recommended an approach that would have avoided the need to have any PII in CAT. Industry Members would have retained such information as they have to date, and the SEC and Participants would have requested it from each broker-dealer firm, as necessary, through the creation of a separate PII request/response system. At the suggestion of the Commission staff—which did not favor the approach proposed by the PII Working Group—the PII Working Group had further discussions and ultimately recommended an alternative approach to the Operating Committee.

Specifically, the Participants worked together with SIFMA to develop what is now referred to as the CCID Alternative. Under this alternative, the Plan Processor would generate a unique identifier for a customer (the "CAT Customer ID" or "CCID") using a two-phase transformation process that avoids the need to collect and maintain SSNs in the CAT. In the first transformation phase, Industry Member CAT Reporters would transform an SSN to an interim value.[27] Industry Members would submit this transformed value, and not the SSN, to the CCID Subsystem operated by the CAT separate and apart from other customer and account information. The CCID Subsystem would use the transformed value to create a unique CCID for each customer. The regulatory staffs of the Participants and the SEC would then use the CCID in queries and analysis of CAT data.

The use of CCIDs would enhance the security of the CAT System while preserving the regulatory benefits of the system. The CAT would not collect or store any SSNs. Because the CAT System would only store CCIDs, rather than SSNs, this alternative would eliminate the risk of having a comprehensive aggregated source for all individual customer SSNs. Instead, only Industry Members would continue to collect individual customer SSNs, as they do currently. Moreover, the process to create CCIDs using, in part, SSNs would be secure. The Participants believe this will significantly reduce the risk that information in CAT could be used to facilitate identity theft and do so in a manner that does not compromise the regulatory benefits of the CAT.

The Participants recognize that eliminating the collection of SSNs by the CAT for initial processing by the Plan Processor would cause CAT Reporters to assume a critical role in the accurate generation of CCIDs. This creates a risk to the integrity of the CCID values ultimately assigned to customer records in the CAT that is beyond the full control of the Plan Processor. The Plan Processor will consider methods for detecting errors in the transformed values submitted by CAT Reporters, some of which may be identified by functionality supporting the error resolution for customer data requirement of the Plan. Nevertheless, the Participants and the working group of Participant and Industry Members that developed the CCID Alternative jointly believe that the value of eliminating the need for CAT Reporters to transmit SSNs to the CAT exceeds the potential increased risk to the integrity of CCID assignments.

The Participants also have developed what is now referred to as the Modified PII Approach that would eliminate dates of birth and account numbers for natural persons in the CAT System (although year of birth for customers would be collected and maintained in the CAT). Similar to SSNs, the Participants believe that dates of birth and account numbers are particularly sensitive from a security perspective and should not be included in the CAT. The Participants believe that eliminating dates of birth and account numbers from the CAT would further reduce the risk profile of data collected and stored in the CAT by eliminating the PII data elements

[26] See Rule 613 Adopting Release, supra note 3 at 45,756–758.

[27] Industry Members would continue to store individual customer SSNs outside the CAT, as they do today. If a Participant's regulatory staff or the SEC staff needs to obtain a customer SSN during an investigation, the regulator would need to request that information from the CAT Reporter. If, however, a Participant's regulatory staff or the SEC staff has an SSN through other means, the regulator will have the ability to use that SSN to query the CAT. Similar to the process just described, the SSN would be transformed into the CCID, which, in turn, may be used by the regulator in queries and analyses of CAT data. Under this alternative, Industry Members would not maintain the generated CCID.

that would support attempted identity theft without compromising the regulatory benefits of the CAT.

To implement the CCID Alternative and the Modified PII Approach, the Participants have requested exemptive relief from the Commission from relevant aspects of the Plan.[28]

V. Security

Since conceptualizing the Plan, the Participants have been mindful of security concerns related to the CAT. Excluding SSNs, dates of birth and account numbers from the CAT System will result in the CAT System being a much less attractive target for cybercriminals. Nevertheless, the security of the CAT System will remain a top priority. The Participants have taken, and will continue to take, all appropriate precautions to safeguard all data within the CAT System.

Understanding the importance of information security generally, CAT LLC itself is structured in a manner to appropriately emphasize the security of the CAT. For example, CAT LLC has both a Chief Information Security Officer (CISO) and Chief Compliance Officer, both of whom are fiduciaries of CAT LLC, and are responsible for ensuring compliance with Plan requirements.[29] Specifically, the CAT CISO is responsible for creating and enforcing appropriate policies, procedures, and control structures to monitor and address data security issues for the Plan Processor and the CAT System.[30] The CISO also is obligated to review the Participants' information security policies and procedures that are related to the CAT System to evaluate if the Participants that access CAT data have an information security program comparable to the Plan Processor's program.[31] Additionally, the Operating Committee established a Security Working Group, which is comprised of the CAT LLC CISO as well as CISOs and security experts from each Participant. Members of the working group collectively represent hundreds of years of experience in the information security space. The SEC staff also has served as an active observer to Security Working Group meetings.

In addition to structuring the oversight and responsibility of the CAT System in a manner that focuses on security, the Participants have designed the CAT System to meet stringent security standards.[32] The system is subject to the robust controls framework set forth in National Institute of Standards and Technology (NIST) Special Publication (SP) 800-53 including, among other things the establishment of a System Security Plan and annual third-party independent verification and validation.[33] This is the same standard required for Federal information systems under the Federal Information Security Management Act. The Participants designed and built the CAT System with both architectural-level and program-level controls. The SEC and Participants can only query the CAT System via dedicated private circuits between them and the CAT System, mitigating the risk of an attack via the Internet. The CAT system further requires multifactor authentication for regulatory use of the query tools, mitigating insider risk at the regulators, as well as for access to the Industry Member reporter portal.[34] Additionally, the CAT System and relevant personnel continuously monitor regulatory access and use of the system. The CAT System logs every instance of access to the CAT central repository and will maintain a full audit trail of access to customer data. Additionally, the Operating Committee, the SEC, and Participants will periodically receive and review a list of authorized users and their most recent access; each user organization will regularly verify that its list of authorized users and the roles they are assigned remain accurate.[35]

The Participants have integrated security processes into the design and development of the CAT System. Threat analysis drives security requirements and design. Continuous automated testing along with rigorous security assessment by an expert team of security engineers is brought to bear during the design and build of the system. A highly qualified third-party cybersecurity testing organization regularly per-

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[28] See Letter from Michael Simon, CAT NMS Plan Operating Committee Chair, to Vanessa Countryman, SEC, Request for Exemptive Relief from Certain Provisions of the CAT NMS Plan related to Social Security Numbers, Dates of Birth and Account Numbers (Oct. 16, 2019) available at *https://www.catnmsplan.com/wp-content/uploads/2019/10/CCID-and-PII-Exemptive-Request-Oct-16-2019.pdf.*

[29] See Plan, supra note 2 at Section 4.6.

[30] See id. at Section 6.2.

[31] See id. at Section 6.2.

[32] See id. at Appendix D Section 4.2.

[33] The application of NIST SP800-53 to the CAT is further informed by ISO 27002, NIST Cybersecurity Framework.

[34] See Plan, supra note 2 at Appendix D Section 4.1.4.

[35] See id. at Appendix D Section 4.1.4.

forms further security testing, including penetration testing and code security assessment.

The overall CAT security program also is subject to regular third-party review to verify that the program is operating in accordance with its System Security Plan and with applicable standards. The Plan Processor will continue to subject the CAT System to annual NIST SP 800-53 Independent Validation and Verification (IV&V). FINRA CAT delivered Release 1 (June) on time and with no major security defects, as confirmed by both internal and third-party security testing, as well as the third-party security controls assessment, i.e., IV&V. FINRA CAT is on schedule to deploy Release 2 in November with no major defects as well; internal security testing is complete, third-party security testing is nearly complete, and a new IV&V is in progress.

Finally, to keep Industry Members and other interested persons apprised of CAT security efforts, in August, CAT LLC and FINRA CAT hosted an industry webinar focusing on the security of CAT data. During the webinar the Participants shared information about how the data reported to the CAT System will be safeguarded to ensure the security and confidentiality of the data.

VI. Costs

Developing and operating the CAT System in accordance with SEC Rule 613 and the Plan requires a significant commitment of capital—both human and financial. In terms of human capital, all Participants have contributed the time and expertise of numerous senior-level personnel from their respective organizations.[36] These individuals provide expertise on technology and systems engineering, legal, regulatory and compliance, data, and security issues. To date, the entirety of the financial commitment to develop and operate the CAT System has been borne by the Participants, notwithstanding that Rule 613 and the Plan specifically contemplate the CAT being funded jointly by the Participants and Industry Members.

To provide context, the cost associated with the CAT System include: (i) fixed and variable costs for the Plan Processor to build and operate the CAT; (ii) legal fees; (iii) consulting fees; (iv) insurance; and (v) costs associated with engaging other vendors, like financial administrators and auditors. Going forward, we estimate the annual budget to operate the CAT System to be upwards of $75 million. Note, this figure only reflects CAT LLC's direct costs. It does not include the cost of compliance for Participants or Industry Members nor the individual costs of the Participants, and CAT LLC is not in a position to collect or estimate those costs.

Although the Participants have continued to independently fund the CAT, they have attempted to implement fees applicable to both Participants and Industry Members to fund the cost of the CAT as contemplated by Rule 613 and the Plan. In 2017, the Participants filed proposed rule changes and a Plan amendment to adopt a schedule to establish fees for Participants and Industry Members, which would have resulted in Industry Members helping fund the CAT.[37] After receiving comments to the proposed rule changes and the Participants responding to the comments and filing amendments to the proposed rule changes, the Participants withdrew their rule changes when it became clear that the SEC was going to disapprove those fees, given it summarily abrogated the Plan amendment that would have established Participant and Industry Member fees.[38]

There is still no fee structure in place and the Participants alone continue to fund the CAT. It remains of critical importance that the industry contributes to funding the development and implementation of the CAT System. Not only is this a reasonable approach to financing such a massive project, it is consistent with Rule 613 and the Plan that the Commission approved. Accordingly, the Participants are working on an amended fee proposal that they will submit to the Commission for its review and approval.

Relatedly, the Commission recently issued proposed amendments to the Plan that would add new sections to the Plan to govern the recovery of any fees, costs, and expenses incurred by CAT LLC in connection with the development, implementation and operation of the CAT System from the effective date of the amendment until

[36] See id. at Section 6.2(b)(vii).

[37] See, e.g., Notice of Filing and Immediate Effectiveness of a Proposed Rule Change Related to Fees for Use on Bats EDGX Exchange, Inc., Exchange Act Release No. 80,821, 82 FR 26,177 (June 6, 2017).

[38] See Notice of Withdrawal of Proposed Rule Changes, as Modified by Amendments, To Establish Fees for Industry Members To Fund the Consolidated Audit Trail, Exchange Act Release No. 82,505, 83 FR 3,043 (Jan. 22, 2018).

the Participants complete implementation of the Plan.[39] Specifically, Proposed Section 11.6 would require the Participants to meet four critical CAT implementation milestones by certain dates to collect the full amount of any related post amendment Industry Member fees established by the Operating Committee or implemented by the Participants. If the Participants fail to meet the target deadlines set forth in Proposed Section 11.6, they would only be entitled to collect a portion of the relevant amount, as determined by the amount of time by which the Participants have missed the target deadlines.

The Participants understand the Commission's concerns and ultimate goal of providing financial incentives to complete the CAT in a timely manner. The Participants are reviewing the details of the proposed amendment and intend to provide a comment letter with considerations for the SEC. These comments will be based on the Participants' experience in designing and building the CAT System and will be aimed at helping achieve the SEC's goals in an efficient manner.

VII. Conclusion

The Participants remain committed to meeting their obligation to build and operate the CAT System and are making significant progress in this regard. The Participants will continue to take all necessary precautions to safeguard the data within the CAT System and to promote the security of the system more generally. Thank you for the opportunity to provide testimony on this matter.

[39] See Proposed Amendments to the National Market System Plan Governing the Consolidated Audit Trail, Exchange Act Release No. 86,901, 84 FR 48,458 (Sept. 13, 2019).

RESPONSES TO WRITTEN QUESTIONS OF SENATOR BROWN FROM SHELLY BOHLIN

Q.1. Please describe the FINRA CAT breach/intrusion notification process, including the entities and organizations that would be notified and the timetable for notification. Please also describe any process for notification to investors, or the public generally.

A.1. FINRA CAT has a sophisticated information security program guided by CAT NMS Plan requirements and is working to support the efforts of the consortium of self-regulatory organizations (SRO) responsible for managing the CAT (known as CAT Plan Participants or the SRO consortium) to limit the kinds of sensitive retail investor information that would be reported to the CAT. This program includes a formal and formally tested incident response plan, consistent with guidance established by the National Institute of Standards and Technology, and which addresses notification requirements applicable to the unauthorized access to CAT Data. These notifications are driven by the facts and circumstances of any breach/intrusion. If FINRA CAT becomes aware of actual (or potential) unauthorized access to CAT Data, we, working with the SRO consortium, will take all reasonable steps to investigate the incident and mitigate any technical vulnerabilities identified from unauthorized access to protect the integrity of the CAT system. We will further work with the SRO consortium to report unauthorized access to law enforcement, the SEC and other authorities, and to notify customers or other parties as required or as the consortium deems appropriate. Also, as an "SCI Entity," FINRA CAT is subject directly to the SEC's jurisdiction, including Regulation Systems Compliance and Integrity (Reg SCI). FINRA CAT's status as an SCI Entity ensures direct accountability, including cyberincident reporting requirements.

Q.2. Please provide the available cost estimates for (i) building the CAT system and (ii) annual operation of the CAT system, specifying current cost and costs once it is fully operational.

A.2. The SRO consortium is more appropriately able to provide public information concerning costs, as specific details of the financial terms of the contract between the SRO consortium and FINRA CAT are confidential. We understand that they are addressing cost-related questions in their answers to the Committee.

Q.3. Please identify the private and Government organizations and entities that would be necessary to involve in the development and management of a CAT system that includes U.S. futures data and activity.

A.3. While FINRA CAT has the systems capability to incorporate futures data in the CAT system, any work towards that end would necessarily only follow the legal and policy decisions made by Federal regulators, including the CFTC and the SEC. There may also be questions for the Federal regulators and Congress about whether new legislative authority is needed. These regulators would likely engage futures market participants, as well as other public and private stakeholders, such as the National Futures Association. Should policy makers decide to expand the CAT to include futures

data, FINRA CAT would work expeditiously to support that regulatory objective.

RESPONSES TO WRITTEN QUESTIONS OF SENATOR SASSE FROM SHELLY BOHLIN

Q.1. Is FINRA tied in with the Financial Sector Information Sharing and Analysis Center (FSISAC)?

If not, how are you obtaining cyberthreat information?

A.1. Yes.

Q.2. Would the Commission consider setting up a test bed and proving to the Banking Committee Members that the "SSN's would be secure"?

A.2. While we are happy to provide information to and coordinate demonstrations with your office and other Committee Members, and to work with the various stakeholders to make that happen, I will defer to the SEC on this particular question.

RESPONSES TO WRITTEN QUESTIONS OF SENATOR KENNEDY FROM SHELLY BOHLIN

Q.1. I would like to better understand the relationship between FINRA and FINRA CAT.

Who will be required to conduct independent reviews of FINRA's security controls?

A.1. FINRA and FINRA CAT, LLC are separate legal entities, run independently of each other, although FINRA CAT does contract with FINRA for some services. FINRA CAT, LLC is a subsidiary of FINRA and was created to focus solely on performing the functions of the CAT Plan Processor for the consortium of self-regulatory organizations responsible for managing the CAT (known as CAT Plan Participants or the SRO consortium). FINRA CAT is part of FINRA's parent SRO umbrella and accordingly an SCI Entity. This means that while FINRA CAT serves as a contractor for the SRO consortium and is not a CAT NMS Plan participant itself, FINRA CAT nevertheless is subject directly to the SEC's jurisdiction, including compliance with Regulation Systems Compliance and Integrity (Reg SCI). FINRA CAT's status as an SCI Entity ensures direct accountability to the SEC-for important issues like system security, integrity, capacity, and business continuity. FINRA CAT's security controls are subject to the oversight of the CAT Plan Participants, independent third party assessments required pursuant to the Plan, and the SEC.

Both FINRA and FINRA CAT have implemented controls to prevent FINRA from having an advantage over other Plan Participants in accessing CAT data or receiving services from FINRA CAT.

Q.2. Who, in the public and private sector, will have access to data from the CAT? Please list those entities.

A.2. CAT Data can only be accessed for regulatory purposes and only by authorized regulatory users from the CAT Plan Participants and the SEC. FINRA CAT has worked with the SRO consortium to develop comprehensive data access controls that meet regu-

latory requirements. In addition, as currently designed, only a subset of those authorized regulatory users will have permission to access and view Customer Account Information and Customer Identifying Information, which is stored and handled separately from the order and trade data. Additional access controls are discussed below in Question seven.

The 24 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. and Cboe Exchange, Inc., Financial Industry Regulatory Authority, Inc., Investors Exchange LLC, Long-Term Stock Exchange, Inc., 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; and New York Stock Exchange LLC, NYSE American LLC, NYSE Arca, Inc., NYSE Chicago, Inc. and NYSE National, Inc. Some of these SRO Participants have the same parent company. Those companies include the following: BOX (Boston Options Exchange); Cboe; FINRA; IEX; LTSE; Nasdaq; NYSE; and, MIAX.

Q.3. What are you doing to ensure a secure mechanism is developed for the submission of data, its storage, and the destruction of such data once it is no longer necessary?

A.3. In terms of FINRA CAT's overall information security program, we are led by a CISO who was approved by the SRO consortium and also has a fiduciary duty to the SRO consortium. Our CISO has over 20 years' experience working on information security at FINRA, including as a security architect and security engineer. The CISO is supported by a dedicated team of security analysts who ensure that security controls are effectively implemented, monitor the security of the CAT System and respond to anomalies, evaluate and approve access, enforce compliance with security policies and standards including National Institute of Standards and Technology (NIST) Special Publication (SP) 800-53, and evaluate evolving threats and security control opportunities to ensure that the CAT security posture remains strong.

In addition, the FINRA CAT security team is able to leverage the security expertise and advanced technology solutions that FINRA has invested in heavily over the years, including the people, process, and technologies it has developed and deployed to operate a secure cloud environment that is comparable in scale to the fully deployed CAT solution. As the SRO consortium recently discussed in a presentation to the industry (*https://www.catnmsplan.com/wp-content/uploads/2019/08/FINRA-CAT-Security-Approach-Overview—20190828.pdf*), the FINRA CAT security program includes significant layers of architectural-level security controls and program-level security controls. Examples of architectural controls include secure infrastructure for connecting to the CAT system and architectural separation between transaction data and customer data. Examples of program controls include a full suite of information security policies, procedures, and standards, as well as regularly scheduled independent third-party system penetration testing, code reviews, and security control validation.

The extensive FINRA CAT security policies address a range of issues required by the CAT NMS Plan, including data storage and handling, insider risk, data connectivity and transfer, incident management, security logging and monitoring, account management, and data destruction. FINRA CAT's security program is based on work product developed by the FINRA CAT CISO in coordination with the SRO consortium's Security Working Group, which is comprised of CISOs and security experts from each of the CAT Plan Participants.

Each CAT System release is subject to the granting of an Authority To Operate (or ATO) by the SRO consortium. To obtain an ATO from the consortium, the CAT CISO must demonstrate the strength of the CAT System's security posture to the Security Working Group. This includes, among other things, system security, internal and third-party security testing, and independent validation confirming that security controls are aligned with the NIST industry standards followed by the Federal Government and that they have been effectively implemented.

FINRA CAT understands concerns that continue to be raised about the inherent risk of handling CAT data, particularly PII. Even with the enhanced architectural and program controls required by the plan for PII-such as containing PII in its own separate system with restricted access-there may be policy questions for the SEC and SRO consortium to discuss about the costs and benefits of collecting and storing sensitive personal data.

FINRA CAT's job is to support the regulators' decision making on this issue. This includes making any modifications to the system design to account for current discussions between the SEC, the SRO consortium, and the industry. The SROs recently requested exemptive relief to eliminate social security numbers, account numbers, and dates of birth from the CAT. You will find this request at the following link: *https://www.catnmsplan.com/wp-content/uploads/2019/10/CCID-and-PII-Exemptive-Request-Oct-16-2019.pdf*. FINRA CAT continues to work closely and productively with the SEC and the SROs to ensure that it has the right technological solution in place for when customer and account information reporting begins in July 2022.

Q.4. What security protocols are in place, or will be followed by the SROs and the SEC to mitigate the risk of a data breach?

A.4. FINRA CAT has a sophisticated information security program guided by CAT NMS Plan requirements and is working to support the consortium's efforts to limit the kinds of sensitive retail investor information that would be reported to the CAT. FINRA CAT has developed a System Security Plan (SSP), in accordance with extensive NIST 800-series Special Publication guidance on computer security, and follows this SSP to ensure that security controls, including those used to prevent, detect, and mitigate a data breach, are defined and effectively implemented. While not public for security reasons, this SSP and its effective implementation undergoes independent third-party evaluation on an annual basis. The SSP includes incident response and breach management controls. FINRA CAT is prepared for a variety of scenarios and has established and tested processes and actions in the event of unau-

thorized access to CAT data that vary depending on the facts and circumstances of any breach/intrusion. If FINRA CAT becomes aware of actual (or potential) unauthorized access to CAT Data, we, working with the SRO consortium, will take all reasonable steps to investigate the incident and mitigate any technical vulnerabilities identified from unauthorized access to protect the integrity of the CAT system. We will further work with the SRO consortium to report unauthorized access to law enforcement, the SEC and other authorities and to notify customers or other parties as required or as the consortium deems appropriate.

Q.5. Have you worked with those stakeholders supplying data to the CAT to ensure they are comfortable with the levels of security surrounding the system?

A.5. FINRA CAT has worked with the SRO consortium to conduct substantial engagement with the reporting parties regarding their reporting obligations and data security measures. With respect to data security measures, the SRO consortium and the Plan Processor have sought to provide reporting parties with assurance that strong and appropriate security measures are in place, while avoiding disclosure of sensitive information about CAT security controls and processes that could be used in an attempt to circumvent those controls if it fell into the wrong hands. This assurance includes a robust program of regular independent third-party assessments, including validation that security controls are effectively implemented in accordance with NIST SP800 series standards, as well as third-party independent penetration testing and code security assessments. Meetings are regularly held, and the CAT website (catnmsplan.com) provides detailed, up-to-date information on these and other communications, including CAT alerts, regular podcasts, and engagement with compliance professionals at firms. These relationships are important to communicating and clarifying obligations, and to understanding the questions and concerns of various stakeholders.

Q.6. Will you continue to engage with industry and stakeholders on information security once the system is up and running?

A.6. FINRA CAT will continue to engage all stakeholders on this important issue after the CAT is operational. The CAT is a highly complex project that requires deep technological expertise, proactively evolving security, close regulatory coordination with the SEC and the SRO consortium, and full-time engagement with broker-dealers that ultimately must report data to the CAT. There are a number of industry representatives involved in the governance of the CAT NMS Plan through their participation on the Advisory Committee established by the CAT NMS Plan.

The Advisory Committee established in the CAT NMS plan is charged with advising the Participants on the implementation, operation, and administration of the CAT. Under the Plan, the Advisory Committee has the right to attend Operating Committee and Subcommittee meetings generally and to submit its views prior to a decision by the Operating Committee. The composition of the Advisory Committee includes: (a) broker-dealers of varying sizes and types of business, including a clearing firm; (b) an individual who maintains a securities account; (c) an academic; and (d) institu-

tional investors. This kind of stakeholder participation and feedback is and will continue to be critical to FINRA CAT's efforts in all areas, including information security.

Q.7. What protocols will FINRA CAT have to ensure staff that have access to the CAT database, and potentially the ability to extract this data, do not misuse it? Can you elaborate on any access controls, limitations, and monitoring of the extractions that will take place?

A.7. FINRA CAT has worked with the SRO consortium to develop comprehensive data access controls that meet regulatory requirements. For example, only authorized regulatory users from the Participants and the SEC will have permission to access CAT Data via the CAT System. And, as currently designed, only a subset of those authorized regulatory users will have permission to access and view Customer Account Information and Customer Identifying Information, which is stored and handled separately from the order and trade data. Authorized regulatory users outside of the SEC must execute a Safeguard of Information Affidavit provided by the Plan Processor, which provides, among other things, that authorized regulatory users must maintain the confidentiality and security of CAT Data and to use CAT Data only for regulatory purposes. In addition, authorized regulatory users outside of the SEC are required to complete the CAT Security Awareness Training Course provided by the Plan Processor. As the Plan Processor, however, FINRA CAT does not have the authority to oversee or enforce restrictions on the appropriate regulatory use of CAT data by those who access it. The obligation to monitor and enforce restrictions on the uses of and access to CAT data falls on each SRO that is part of the CAT Plan for their respective employees and the SEC for SEC staff. Also, the SEC is responsible for any training for authorized regulatory users inside the agency. FINRA CAT has also established monitoring controls at multiple system layers (e.g., data storage, application front end) designed to detect access anomalies. This includes the use of behavioral analytics designed to recognize normal and abnormal access patterns. All access to CAT Data is logged, in accordance with the Plan and subject to this monitoring. Instances of potential abnormal access will be flagged for the respective SRO or the SEC to follow up on.

With respect to Plan Processor personnel, only those who need access to CAT Data to fulfill their responsibilities for delivery and operation of the CAT System are granted access to CAT Data. That access must be justified to the satisfaction of the CISO and CCO (who are fiduciaries to the SRO consortium) and approved by them. This access is subject to periodic review, as well as to monitoring that is attuned to the restricted use patterns expected of these personnel.

Q.8. Cybersecurity is one of the greatest risks facing the financial services industry and every sector of critical infrastructure in the U.S. Currently, the CAT plan does not require the plan processor to notify market participants of cyberincidents that compromise their data.

What procedures will be followed to notify firms in the event of a breach of CAT data?

A.8. FINRA CAT has a sophisticated information security program guided by CAT NMS Plan requirements and is working to support the consortium's efforts to limit the kinds of sensitive retail investor information that would be reported to the CAT. We also have notification processes in the event of unauthorized access to CAT Data, but those vary depending on the facts and circumstances of any breach/intrusion. If FINRA CAT becomes aware of actual (or potential) unauthorized access to CAT Data, we, working with the SRO consortium, will take all reasonable steps to investigate the incident and mitigate any technical vulnerabilities identified from unauthorized access to protect the integrity of the CAT system. We will further work with the SRO consortium to report unauthorized access to law enforcement, the SEC and other authorities and to notify customers or other parties as required or as the consortium deems appropriate.

Q.9. Do you think such a notification requirement would be in the best interests of all parties involved? SEC registrants are required to have breach notification policies and procedures, why not FINRA CAT?

A.9. While the response to any unauthorized access to CAT Data will necessarily vary depending on the facts and circumstances of the event, FINRA CAT, working with the SRO consortium, developed a coordinated incident response framework. In the event of an incident, FINRA CAT will investigate the incident. We will further work with the SRO consortium to report unauthorized access to law enforcement, the SEC and other authorities and to notify customers or other parties as required or as the consortium deems appropriate. In addition, FINRA CAT, as an SCI entity under the SEC's Regulation SCI, has an obligation to report to the SEC "any unauthorized entry into the SCI systems or indirect SCI systems of an SCI entity".

Q.10. I am concerned the CAT is a likely target for those who wish to manipulate U.S. markets—are you confident the CAT system and data included within will be adequately protected from these threats?

A.10. I have confidence in our data security program, not only in the systems we have in place, but also our team's ongoing commitment to making data security central to our function. The CAT system by its nature requires deep technological expertise, proactively evolving security, close regulatory coordination with the SEC and the SRO consortium, and full-time engagement with broker-dealers that ultimately must report data to the CAT.

FINRA CAT has policies, procedures, and a robust set of other security controls to ensure the security and confidentiality of information submitted to the CAT. Such policies and procedures require information barriers between regulatory and nonregulatory staff of the Participants with regard to access and use of CAT Data, a mechanism to confirm the identity of persons permitted to use CAT Data, and a comprehensive information security program. Participant information security policies and procedures are subject to review by the CAT Chief Compliance Officer and Chief Information Security Officer, with any deficiencies reportable to the CAT LLC Operating Committee. FINRA CAT's security program is aligned

with NIST SP800-53—the Security and Privacy Controls for Federal Information Systems and Organizations—and undergoes regular third-party audits. In addition, we are required to subject the CAT System to regular penetration testing and code reviews by a qualified third-party security assessor. This is on top of an extensive internal cybersecurity program staffed by highly qualified cybersecurity personnel that is integrated into the development and operations life cycle of FINRA CAT. Among other benefits, this internal program implements yet another layer of threat analysis, penetration testing, and code assessment. In addition, FINRA's Internal Audit Department will conduct reviews of various aspects of the CAT system, procedures, and operation.

The CAT System is designed from the ground up with structural controls that avoid exposure to certain common threats. Notably, the CAT Regulator systems are designed without Internet access. CAT Data is only accessible by Participants and the SEC via private connectivity lines, with their users subject to multifactor authentication. Monitoring augmented by behavioral analytics is used to detect and quickly respond to potential improper attempts to access CAT Data or use the CAT System in an inappropriate manner. Industry Members—which may only submit and correct data sent to the CAT—are required to submit data either via private lines, AWS PrivateLink or the CAT Secure Reporting Gateway; unlike Participants and the SEC, Industry Members are not permitted to query CAT Data. Reporting subsystems are architecturally separate from query subsystems and the underlying CAT Data repository; they are designed without the ability to read data in the CAT, and to quickly move received data into the CAT to greatly shield the reporting subsystem from being a viable target for unauthorized access to CAT Data.

FINRA CAT's multifaceted cybersecurity program, with architectural constraints such as private-line-only access, along with multiple levels of complimentary and redundant security testing by both Plan Processor security staff and independent third parties justifies strong confidence that the CAT system and included data are appropriately protected from cybersecurity threats consistent with current standards. Nevertheless, FINRA CAT is cognizant that its cybersecurity framework must not be static; it must evolve as more effective cybersecurity techniques and practices emerge.

RESPONSES TO WRITTEN QUESTIONS OF SENATOR WARNER FROM SHELLY BOHLIN

Q.1. Irrespective of how the PII issue is ultimately resolved between the SEC and the consortium, do you have confidence that the FINRA CAT's data security program and architecture has the controls in place to keep whatever data is stored safe and secure?

A.1. I have confidence in our data security program, not only in the systems we have in place, but also our team's ongoing commitment to making data security central to our function. The CAT is a highly complex project that requires deep technological expertise, proactively evolving security, close regulatory coordination with the SEC and the consortium of self-regulatory organizations responsible for managing the CAT (known as CAT Plan Participants or

the SRO consortium), and full-time engagement with broker-dealers that ultimately must report data to the CAT.

FINRA CAT has policies and procedures to ensure the security and confidentiality of information submitted to the CAT. Such policies and procedures require information barriers between regulatory and nonregulatory staff of the Participants with regard to access and use of CAT Data, a mechanism to confirm the identity of persons permitted to use CAT Data, and a comprehensive information security program. Participant information security policies and procedures are subject to review by the CAT Chief Compliance Officer and Chief Information Security Officer, with any deficiencies reportable to the CAT LLC Operating Committee. FINRA CAT's security program is aligned with NIST SP800-53—the Security and Privacy Controls for Federal Information Systems and Organizations—and undergoes regular third-party audits. In addition, we are required to subject the CAT System to regular penetration testing and code reviews by a qualified third-party security assessor. This is on top of an extensive internal cybersecurity program staffed by highly qualified cybersecurity personnel that is integrated into the development and operations life cycle of FINRA CAT. Among other benefits, this internal program implements yet another layer of threat analysis, penetration testing, and code assessment.

The CAT System is designed from the ground up with structural controls that avoid exposure to certain common threats. Notably, the CAT Regulator systems are designed without Internet access. CAT Data is only accessible by Participants and the SEC via private connectivity lines, with their users subject to multifactor authentication. Monitoring augmented by behavioral analytics is used to detect and quickly respond to attempts to access CAT Data or use the CAT System in an inappropriate manner. Industry Members—which may only submit and correct data sent to the CAT—are required to submit data either via private lines, AWS PrivateLink or the CAT Secure Reporting Gateway; unlike Participants and the SEC, Industry Members are not permitted to query CAT Data. Reporting subsystems are architecturally separate from query subsystems and the underlying CAT Data repository; they are designed without the ability to read data in the CAT, and to quickly move received data into the CAT to greatly shield the reporting subsystem as a viable target for unauthorized access to CAT Data.

FINRA CAT's multifaceted cybersecurity program, with architectural constraints such as private-line-only access, along with multiple levels of complimentary and redundant security testing by both Plan Processor security staff and independent third parties justifies strong confidence that the CAT system and included data are appropriately protected from cybersecurity threats consistent with current standards. Nevertheless, FINRA CAT is cognizant that its cybersecurity framework must not be static; it must evolve as more effective cybersecurity techniques and practices emerge.

Q.2. What, in your view, were the causes for implementation delays?

A.2. As the head of FINRA CAT, I can speak only to what has happened since we took over as plan processor in April 2019. We are currently on schedule and are confident in our ability to meet the milestones moving forward.

Q.3. Please describe how a subsidiary of FINRA was selected earlier this year to replace Thesys? Was there an open bidding process? Were there other bidders?

A.3. FINRA provided bid information to the SRO consortium at the consortium's request, and the SRO consortium's selection of FINRA was announced on February 27, 2019. As part of the SRO consortium, FINRA recused itself and did not take part in the selection decision. After the selection, FINRA created FINRA CAT as a separate and distinct subsidiary to focus solely on performing the functions of the CAT Plan Processor. FINRA CAT believes that the SRO consortium is best positioned to respond to questions about other bidders and the operation of the bidding process.

Q.4. How was the SEC engaged with CAT NMS as it began experiencing significant delays?

A.4. FINRA CAT believes the SRO consortium is best positioned to respond to questions about project development and management before FINRA CAT assumed the role of Plan Processor. FINRA CAT notes that since it became the CAT Plan Processor, it has completed all deliverables according to schedule.

Q.5. What are SEC current authorities in compelling the implementation of CAT?

A.5. The CAT NMS Plan was filed with the SEC by the SRO consortium to meet requirements the SEC established when it adopted Rule 613 of Regulation NMS. In its role as CAT Plan Processor, FINRA CAT is committed to continuing to complete work according to schedule. FINRA CAT is also a part of FINRA's parent SRO umbrella, meaning FINRA CAT, as part the FINRA self-regulatory organization, is subject directly to the SEC's jurisdiction over SROs.

RESPONSES TO WRITTEN QUESTIONS OF SENATOR WARREN FROM SHELLY BOHLIN

Q.1. The Flash Crash on May 6, 2010, briefly erased about $1 trillion from our Nation's economy. In response, more than 2 years later, the Securities and Exchange Commission (SEC) adopted a rule to create, implement, and maintain the Consolidated Audit Trail (CAT) to monitor securities trades in U.S. markets.

The CAT would be a real-time tracking system to enhance regulators' efforts to oversee U.S. markets by collecting data about securities quotes and orders and allow the SEC to understand trading practices. Without the CAT and other tools to more quickly analyze trading data, the SEC was unnecessarily delayed in reporting on what caused the brief crash to U.S. markets.[1] Federal regulators took 7 months to analyze and publicly report the causes of the Flash Crash, and it took an additional 5 years to analyze and pub-

[1] *Reuters*, "Factbox: After the Flash Crash, Changes to U.S. Markets", Jonathan Spicer, September 1, 2011, *https://www.reuters.com/article/us-financial-regulation-algos-factbox/factbox-after-the-flash-crash-changes-to-us-markets-idUSTRE7806QS20110901.*

licly report that a London-based trader played a significant role in the crash.[2]

What are the risks to the market if the SEC does not have the tools to quickly, efficiently, and accurately track information about trades in the event of another Flash Crash?

A.1. The CAT is intended to enhance the regulators' ability to perform market analyses and market reconstruction. When the SEC approved the CAT NMS Plan filed by the SRO consortium, it discussed the benefits of such audit trail enhancements including to conduct surveillance and market reconstruction. In its role as CAT Plan Processor for the SRO consortium, FINRA CAT is committed to providing a CAT solution that meets the requirements of the CAT NMS Plan and supports the CAT's intended regulatory uses.

Q.2. High-frequency trading, which allows for rapid buying and selling based on computer formulas and complex algorithms, now accounts for more than half of daily trading volume.[3]

What are the risks of not having a comprehensive regulatory system, such as the proposed CAT, to oversee these frequent and rapid securities trades?

A.2. The CAT NMS Plan includes a number of provisions designed to promote the accuracy of linked and sequenced order activity data. When the SEC approved the CAT NMS Plan filed by the SRO consortium, it discussed the benefits of these provisions and how they are designed to enhance the ability of regulators to oversee trading activity in the equities and options markets. In its role as the CAT Plan Processor for the SRO consortium, FINRA CAT is committed to providing a CAT solution that meets the requirements of the CAT NMS Plan and supports the CAT's intended regulatory uses.

Q.3. In 2012, the SEC approved a rule to establish the CAT. Nearly 10 years after the May 2010 Flash Crash, the CAT is still not in place to protect the U.S. economy and people across the country that would suffer from another major hit to the market. The continued lack of real-time trade reporting and monitoring of the securities market, however, remains a significant vulnerability in our regulatory system.

Senator Brown's opening statement stated that, " . . . the SEC called on [the Financial Industry Regulatory Authority (FINRA)] and the firms that run our Nation's stock and options exchanges to build the Consolidated Audit Trail, or CAT, one system with a beginning-to-end view of how trading happens, so we can prevent insider trading, market manipulation, and other misconduct that cheats the system."[4]

Please explain how the CAT would prevent these harmful and illegal practices in U.S. securities trades.

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[2] *Reuters*, "SEC Urges Completion of Long-Delayed Trading Database", John McCrank, August 27, 2018, *https://www.reuters.com/article/us-usa-stocks-regulation-cat/sec-urges-completion-of-long-delayed-trading-database-idUSKCNILC2FA.*

[3] CNBC, "Just 10 Percent of Trading Is Regular Stock Picking, JPMorgan Estimates", Evelyn Cheng, June 14, 2017, *https://www.cnbc.com/2017/06/13/death-of-the-human-investor-just-10-percent-of-trading-is-regular-stock-picking-jpmorgan-estimates.html.*

[4] Opening statement of Ranking Member Sherrod Brown to the U.S. Senate Committee on Banking, Housing, and Urban Affairs, October 22, 2019, *https://www.banking.senate.2.ov/imo/media/doc/Brown%20Statement%2010-22-192.pdf.*

A.3. When the SEC approved the CAT NMS Plan filed by the SRO consortium, it discussed the intended use of CAT data to enhance the ability of regulators to surveil the equities and options markets, including for market manipulation, insider trading and violations of trading rules, among other things. Enhanced surveillance with CAT data will, in part, be achieved by including more complete and aggregated information about the full life cycle of orders and customer-identifying information. The SEC noted its belief that enhanced surveillance may reduce violative behavior through potential enforcement actions and through deterrence if market participants believe violative activities are more likely to be detected. In its role as the CAT Plan Processor for the SRO consortium, FINRA CAT is committed to providing a CAT solution that meets the requirements of the CAT NMS Plan and supports the CAT's intended regulatory uses.

Q.4. Despite the many benefits of the CAT, as described in your written testimony and the testimonies of the other witnesses, the securities industry and their lobbying groups have repeatedly pushed to delay the implementation of the CAT by arguing that collecting large amounts of trading data is unsafe due to cybersecurity concerns.[5] [6]

You state in your written testimony, "Given the size and complexity of the financial markets, the CAT must collect, process, and store a vast amount of data to achieve this goal."[7]

Please explain in detail why the CAT must collect and maintain significant amounts of data on the entire life cycle of securities orders.

A.4. The SEC-approved CAT NMS Plan includes discussion of the surveillance and oversight benefits intended by Plan requirements to track the entire life cycle of orders from origination through routing, cancellation, modification, or execution. This necessarily requires that the CAT collect and maintain significant amounts of data. As the SEC noted in its order adopting Rule 613, in analyzing the events of May 6, 2010, SEC staff were only able to create a comprehensive view of the order books by acquiring, processing, and aggregating four distinct data sets that each contained a subset of order book information from each of the four exchanges that could provide such information: Nasdaq ModelView, NYSE Openbook Ultra, NYSE ARCABook, and BATS Exchange (citing to the final joint report issued by the staffs of the CFTC and the SEC on September 30, 2010). The SEC further noted that this required the processing of an enormous volume of data. Since FINRA CAT assumed the role of the CAT Plan Processor and began work on a solution for the first scheduled phase of the CAT—the collection and processing of order and trade data from the equities and options exchanges and FINRA—it has used scalable technology to process, on average, over 100 billion market records a day.

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[5] *The Hill*, Opinion, "The National Security Risk No One Is Talking About", Christopher Iacovella, July 3, 2019, *https://thehill.com/opinion/cybersecurity/451403-the-national-security-risk-no-one-is-talking-about.*

[6] SIFMA, "Beware of CAT", Randy Snook, November 30, 2017, *https://www.sifma.org/resources/news/beware-of-cat/.*

[7] Written testimony of Shelley Bohlin to the U.S. Senate Committee on Banking, Housing, and Urban Affairs, October 22, 2019, *https://www.banking.senate.gov/imo/media/doc/Bohlin%20Testimony%2010-22-192.pdf.*

Q.5. Please explain why the lack of this data would render the CAT insufficient to protect the markets from disruptions, such as the May 2010 Flash Crash.

A.5. If CAT does not contain order life cycles, the stated objectives of CAT will not be achieved—better market reconstruction, enhanced policymaking, and more robust surveillance, among other things. All of these objectives, which will be enhanced by the CAT, may contribute to better market features and rules that could further minimize the risk of another flash crash-type event, but the CAT itself will not halt or prevent market activity. The SEC-approved CAT NMS Plan includes a number of requirements to promote the complete, accurate and timely consolidation of audit trail information to serve these uses. In turn, the CAT is designed to better inform policy decisions and generally improve oversight of the securities markets. In its role as the CAT Plan Processor for the SRO consortium, FINRA CAT is committed to providing a CAT solution that meets the requirements of the CAT NMS Plan and supports the CAT's intended regulatory uses.

Q.6. A July 2019 op-ed from the head of the securities industry's lobbying organization argued that, "The SEC has been hacked before, and it knows the CAT will put the [personally identifiable information (PII)] of millions of American investors at risk."[8] The consortium in place to create and implement the CAT, however, recently published a presentation with details regarding ongoing cybersecurity protections.[9]

Please explain in detail how the CAT would protect sensitive personal data from data breaches or other cybervulnerabilities. Please also explain how the consortium creating and implementing the CAT would be held accountable for cybervulnerabilities.

A.6. The security of PII, and of all CAT data more broadly, is of the utmost priority to FINRA CAT. FINRA CAT has put in place a robust data security program to meet the CAT NMS Plan's requirements. This program is defined in an extensive System Security Plan built in accordance with the NIST SP800 series Special Publication with security controls specifically defined in accordance with NIST SP800-53. While not public for security reasons, this SSP is evaluated by an expert independent third-party as an integral part of an annual Independent Verification and Validation (IV&V) assessment that verifies that security controls are well defined and effectively implemented. The SSP includes incident response and breach management controls. As the SRO consortium recently discussed in a presentation to the industry, the FINRA CAT security program includes significant layers of architectural-level security controls and program-level security controls. Examples of architectural controls include secure private-line-only infrastructure for connecting to the CAT regulatory interfaces (designed without an Internet interface) and architectural separation between transaction data and PII. Examples of program controls in-

[8] *The Hill*, Opinion, "The National Security Risk No One Is Talking About", Christopher Iacovella, July 3, 2019, *https://thehill.com/opinion/cybersecurity/451403-the-national-security-risk-no-one-is-talking-about.*

[9] CAT NMS Plan, "CAT Security Overview: Safeguarding Data Reported to CAT", Accessed October 25, 2019, *https://www.catnmsplan.com/wp-content/uploads/2019/08/FINRA-CAT-Security-Approach-Overview20190828.pdf.*

clude a full suite of information security policies, procedures and standards, an extensive cybersecurity program staffed by highly qualified cybersecurity personnel that is integrated into the full development and operations life cycle of FINRA CAT, and regularly scheduled independent third-party system penetration testing, code reviews, and security control validation. FINRA CAT also is cognizant that its cybersecurity framework must not be static; it must evolve as more effective cybersecurity techniques and practices emerge.

FINRA CAT has notification processes in the event of unauthorized access to CAT Data, but those vary depending on the facts and circumstances of any breach/intrusion. If FINRA CAT becomes aware of actual (or potential) unauthorized access to CAT Data, we, working with the SRO consortium, will take all reasonable steps to investigate the incident, mitigate any technical vulnerabilities identified from unauthorized access to protect the integrity of the CAT system. We also will work with the SRO consortium to report unauthorized access to law enforcement, the SEC and other authorities and to notify customers as required or as the consortium deems appropriate. As an "SCI Entity," FINRA CAT is subject directly to the SEC's jurisdiction, including Regulation Systems Compliance and Integrity (Reg SCI). FINRA CAT's status as an SCI Entity ensures direct accountability, including cyber incident reporting requirements to the SEC, as well as important issues like system security, integrity, capacity, and business continuity.

Q.7. Please explain how Federal regulators will be able to quickly and effectively detect and respond to malicious cyberactivity targeting the CAT. Please also explain how Federal regulators and the consortium would test and maintain the CAT's cybersecurity mechanisms.

A.7. The FINRA CAT System Security Plan includes controls for detecting and responding to malicious activity, including monitoring controls at multiple system layers (e.g., data storage, application front end) designed to detect access and usage anomalies. This includes the use of behavioral analytics designed to recognize normal and abnormal access patterns. All access to CAT Data is logged, in accordance with the Plan and subject to this monitoring. Should any such anomalies be detected, they will be handled in accordance with the published Information Security Incident Response Plan, which includes notification of appropriate regulatory bodies, including the SEC in accordance with Reg SCI.

With respect to testing and maintaining the CAT's cybersecurity mechanisms, as required by the Plan, FINRA CAT subjects itself to the following regular independent third-party assessments:

- Third-party security penetration testing and code security assessments. These third-party assessments are performed in addition to a robust suite of internal security testing that is performed by highly qualified security staff of the Plan Processor and embedded into the system development life cycle.
- An independent validation and verification (IV&V) of the controls defined in the System Security Plan (SSP). The SSP encompasses the hundreds of security controls defined by NIST SP800-53. The design and effective implementation of these

controls is independently validated by the IV&V. This is the same set of security controls and independent validation process required for Federal Systems under the Federal Information Security Management Act.

- Material security deficiencies identified by these testing processes are presented to the consortium's Operating Committee when it considers whether to grant an Authorization To Operate (ATO) for each release. Any security deficiencies identified by these testing processes are presented to the consortium's Operating Committee as part of the package of information it considers in granting an Authorization To Operate (ATO) for each release.

RESPONSES TO WRITTEN QUESTIONS OF SENATOR CORTEZ MASTO FROM SHELLY BOHLIN

Q.1. Will the CAT help regulators, such as FINRA, SEC, FBI, and the Department of Justice, catch short selling, spoofing, fake trades, and wire fraud more quickly?

A.1. When the SEC approved the CAT NMS Plan filed by the SRO consortium, it discussed the intended use of CAT data to enhance the regulators' ability to surveil for market manipulation, such as spoofing and other violations of trading rules, which include rules concerning short sales. In its role as the CAT Plan Processor for the consortium of self-regulatory organizations responsible for managing the CAT (known as CAT Plan Participants or the SRO consortium), FINRA CAT is committed to providing a CAT solution that meets the requirements of the CAT NMS Plan and supports the CAT's intended regulatory uses.

Q.2. Could the CAT system help investigate who is making a billion-dollar profit in trades made right before the Trump administration makes a market-moving announcement?

A.2. One of the intended uses of the CAT discussed by the SEC and the SRO consortium is the enhanced ability to identify customers who originate orders. In its role as the CAT Plan Processor for the SRO consortium, FINRA CAT is committed to providing a CAT solution that meets the requirements of the CAT NMS Plan and supports the CAT's intended regulatory uses.

Q.3. Will the CAT be able to help exchanges and regulators know if brokers are being "unduly influenced by fees and rebates" rather than the best execution outcome for investors?

A.3. When the SEC approved the CAT NMS Plan, it noted its belief that the Plan would facilitate enforcement of best execution. In addition, when the SEC adopted its Transaction Fee Pilot to study the effects that exchange transaction fee-and-rebate pricing models may have on order routing behavior, execution quality and market quality, it discussed the potential for CAT data to be used to support the study. In its role as the CAT Plan Processor for the SRO consortium, FINRA CAT is committed to providing a CAT solution that meets the requirements of the CAT NMS Plan and supports the CAT's intended regulatory uses.

Q.4. Will the CAT help exchanges and regulators know if brokers are routing the trading interests of mutual funds, pensions, and endowments in a way that results in information leakage?

A.4. When the SEC approved the CAT NMS Plan, it noted its belief that the Plan would facilitate enforcement of trading rules. For example, the SEC-approved CAT NMS Plan is intended to enhance regulators' ability to track the entire life cycle of orders from origination through routing, cancellation, modification, or execution. In its role as the CAT Plan Processor for the SRO consortium, FINRA CAT is committed to providing a CAT solution that meets the requirements of the CAT NMS Plan and supports the CAT's intended regulatory uses.

Q.5. Will the CAT help exchanges and regulators identify sophisticated market participants who use multiple brokers and market centers to engage in disruptive trading?

A.5. When the SEC approved the CAT NMS Plan filed by the SRO consortium, it discussed the intended use of CAT data to enhance the regulators' ability to surveil for market manipulation, including by conducting surveillance across market centers and identifying activity originating from multiple market participants. In its role as the CAT Plan Processor for the SRO consortium, FINRA CAT is committed to providing a CAT solution that meets the requirements of the CAT NMS Plan and supports the CAT's intended regulatory uses.

Q.6. We have had a lot of discussion about how difficult it is to identify the beneficial owners of firms. This secrecy can lead to criminal activities. For example, Mr. Navinder Singh Sarao (the individual who initiated the 2010 flash crash) was not registered as a broker in the U.S. He used four firms to place his trades.

Would CAT be able to find him or just his brokers?

A.6. The SEC adopted Rule 613 in the wake of the 2010 flash crash to require the CAT to be created. The SEC explained at the time that the purpose of the CAT is to create a comprehensive consolidated audit trail that allows regulators to efficiently and accurately track all activity in listed and unlisted equity securities and listed options throughout the U.S. markets to facilitate comprehensive market reconstructions, more robust market surveillance, and better analytics to support policymaking.

Any broker-dealer that is a member of a national securities exchange or FINRA and receives and/or handles orders in NMS Securities, which includes NMS stocks and Listed Options, and/or unlisted OTC Equity Securities—regardless of whether they operate in a foreign country—must report to CAT and satisfy clock synchronization requirements. If a non-U.S. broker-dealer routes an order to a U.S. broker-dealer, the receiving U.S. broker-dealer is required to report the receipt of an order from a non-U.S. broker-dealer in the same way as it would report the receipt of an order from a Customer. Specifically, the receiving U.S. broker-dealer would report the receipt of this order as the original receipt of the order from the non-U.S. broker-dealer, and the receiving U.S. broker-dealer also would report the Firm Designated ID for the non-U.S. broker-dealer. The U.S. broker-dealer would not report the ultimate customer of the non-U.S. broker-dealer. However, CAT Plan Partici-

pants and other regulators like the SEC could request the identification of the ultimate customer at the non-U.S. broker-dealer from the U.S. broker-dealer, and if necessary may be able to request the information from foreign regulators.

Q.7. The system is only as good as the exchanges who report concerns and ownership. How will you ensure that exchanges fully comply with reporting?

A.7. FINRA CAT is required by the CAT NMS Plan to develop and implement a comprehensive compliance program to monitor CAT Reporters' adherence to SEC Rule 613. The CAT Plan Processor must produce and provide reports to the SROs and the SEC containing performance and comparison statistics, as needed, on each CAT Reporters' compliance thresholds so that the Participants or the SEC may take appropriate action if a Participant fails to comply with its CAT reporting obligations.

Q.8. What are your views on including futures data and over-the-counter equities in CAT?

A.8. While futures data could aid regulators in cross-market surveillance, the current plans for the consolidated audit trail (CAT) do not include this information. As a practical matter, while FINRA CAT has the systems capability, knowledge, and expertise to build out a system that could incorporate futures data, any work towards that end would necessarily only follow the legal and policy decisions made by Federal regulators, including the CFTC and the SEC. The current CAT NMS Plan already requires the reporting of over-the-counter equities to CAT.

Q.9. What are your views on including initial public offering data, clearing data, and other data into the CAT database?

A.9. FINRA CAT has the knowledge and expertise to build a system that can gather other forms of data, but those are policy decisions that would need to be made by others, including the SEC and the SRO consortium. Currently, clearing and IPO data is not within the scope of SEC Rule 613 or the CAT NMS Plan. However, the SRO consortium filed a public written assessment with the SEC concerning an expansion of the CAT to include certain additional data, including information on primary market transactions. You can find more information about this issue at the following link: *https://www.catnmsplan.com/wp-content/uploads/2017/06/Expansion-Report-Final-5.15.17.pdf.*

Q.10. How is CAT Advisory Committee and Operating Committee ensuring that CAT will remain technologically robust and modern?

A.10. Pursuant to the CAT NMS Plan, the CCO's annual assessment, which is provided to the SEC and the CAT NMS Plan Operating Committee, must include "an evaluation of potential technology upgrades based on a review of technological advancements over the preceding year, drawing on technological expertise whether internal or external." For example, as cloud technology evolves and advances, CAT will adapt accordingly. In addition, the Plan Participants, with their own wealth of technological expertise, are actively involved with making sure that CAT remains technologically robust and modern. In addition, unless a matter is discussed in executive session, the Advisory Committee has an oppor-

tunity to comment on or ask questions about relevant topics during Operating Committee meetings, including the technology used to support the CAT.

Q.11. Assuming CAT is implemented in the next 3 years, what are the upgrades that will need to take place to ensure CAT does not fall behind the industry best practices?

A.11. FINRA CAT will continue to work with the industry and other stakeholders to not only maintain state-of-the-art technology and data security practices, but it will strive to lead the industry and anticipate technological needs and improvements. We will evolve as technology evolves. The complexity of CAT requires deep technological expertise, sophisticated and proactively evolving security, and close coordination with all stakeholders. As an "SCI Entity," FINRA CAT is subject directly to the SEC's jurisdiction, including compliance with Regulation Systems Compliance and Integrity (Reg SCI). FINRA CAT's status as an SCI Entity ensures direct accountability to the SEC—for important issues like system security, integrity, capacity, and business continuity. We have built out a dedicated FINRA CAT operations staff led by me and a Chief Technology Officer. We also hired, with the approval of the SRO consortium, a Chief Information Security Officer (CISO) and a Chief Compliance Officer (CCO). These officers are responsible, respectively, for FINRA CAT's information technology security and governance and regulatory compliance programs.

RESPONSES TO WRITTEN QUESTIONS OF SENATOR SINEMA FROM SHELLY BOHLIN

Q.1. Upon full implementation, the Consolidated Audit Trail (CAT) system will be an unprecedented database, collecting 58 billion records and maintaining data on over 100 million institutional and retail accounts on a daily basis. The CAT, and all the unique customer data it holds, will also be accessible to thousands of users. Therefore, while the CAT has the potential to offer important oversight, it will also be a prime target for cyberhacks. Under current CAT requirements, what kind of personal information would be accessible to system users? Is this information already being collected by other audit trail systems?

A.1. Under the current CAT NMS Plan, industry members will be required to report certain customer identifying information, including account numbers and some personally identifying information, or PII. The consortium of self-regulatory organizations responsible for managing the CAT (known as CAT Plan Participants or the SRO consortium) has filed requests with the SEC to limit the Plan's PII collection requirements. Specifically, under the SRO consortium's requests, the CAT would not receive and store individuals' account numbers, social security numbers or dates of birth. FINRA CAT notes that any PII stored in the CAT is subject to heightened security controls, such as architectural separation in a separate PII subsystem with restricted user access. When the SEC approved the CAT NMS Plan, it discussed the extent to which customer-identifying information is included in existing audit trail systems such as Electronic Blue Sheets.

Q.2. The Securities and Exchange Commission has been advised that the CAT system should not collect Social Security numbers, account numbers, and full dates of birth. Can regulators properly conduct market analysis, investigations, and enforcement if these pieces of information are not collected by the CAT?

A.2. FINRA CAT recognizes the ongoing policy discussions related to the necessity of specific elements of customer-identifying information for the success of the CAT, which are ultimately matters the SRO consortium and the SEC must determine. FINRA CAT is committed to providing a CAT solution that supports the regulators' decision making on this issue.

RESPONSES TO WRITTEN QUESTIONS OF SENATOR SASSE FROM JUDY MCDONALD

Q.1. Would the Commission consider setting up a test bed and proving to the Banking Committee Members that the "SSN's would be secure"?

A.1. Provided the October 16, 2019, Request for Exemptive Relief is accepted, SSNs will not be stored in the CAT Customer and Account Information data repository.[1] The only PII which will be stored will be "phone book" type data: name, address, year of birth, masked account number, account type, and the individual's role in the account. I encourage the Banking Committee to request to review the results of the third party security reviews including the (1) Independent Verification and Validation and (2) Penetration Testing results which should provide reasonable assurances about the security of all PII data.

RESPONSES TO WRITTEN QUESTIONS OF SENATOR KENNEDY FROM JUDY MCDONALD

Q.1. I am concerned the CAT is a likely target for those who wish to manipulate U.S. markets—are you confident the CAT system and data included within will be adequately protected from these threats?

A.1. No, the AC shares your concerns with the vulnerability of CAT data. Although FINRA CAT has very good security in the FINRA CAT environment and has not only met the "gold standard" of NIST SP800-53 but has exceeded this standard by encrypting data at-rest and in-transit, establishing independent third party verification and validation, establishing independent penetration testing as well as monitoring every query and command with behavioral-based analysis for alerting. There is also considerable oversight of these security efforts.

However, some significant concerns exist, specifically:

1. The bulk downloading of CAT data by 23 different exchanges plus the SEC. Currently, each of the securities regulators has unfettered access to bulk down load CAT data. Although the SRO's have always had to satisfy security requirements, the AC has no insight into their security programs and do not know if they meet

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[1] *https://www.catnmsplan.com/wp-content/uploads/2019/10/CCID-and-PII-Exemptive-Request-Oct-16-2019.pdf*

the same standards or practices as FINRA CAT, which is especially concerning in light of the increased value of the CAT data and the increased likelihood of compromise.

2. There will be up to 3,000 CAT individual users (individual users) made up of (presumably) regulatory staff and academics, which once again multiplies the risk of compromise.[1] These users may download CAT data to their respective PCs without limitation. While oversight is required, the AC has no insight into the criteria, quality, or frequency of that oversight; nor does the AC have an understanding of the protocols that would preclude any of the individual users from misappropriating the CAT data. Likewise, the AC has no insight into any protections of these entities from computer hacks or other cyber threats, and ergo have no basis for confidence in their security protocols. Additionally the only review SRO's undergo prior to enabling their employee's access to the CAT data is a security policy review by the FINRA CAT CISO.[2] The AC is concerned that even if the security policy is well written, it does not provide assurance with respect to actual implementation.

3. Unlimited access of cross-market data. Historically, the exchanges have always had access to the data in their own markets and limited access to activities in other markets; however, CAT will supply easy and very broad access to all exchange and broker-dealer data at all times.

4. The CAT Reporter Agreement. Broker-dealers must sign the CAT Reporter Agreement in order to access the CAT to report transactions. This agreement contains provisions including limiting the financial liability of CAT to $500 and maintaining regulatory immunity for data breaches.

In light of these issues, two of the best ways to strengthen data security is to (1) control the use of the data as tightly as possible and (2) limit the number of people with access to the data. The AC has developed, and continues to refine, a number of security recommendations that have been shared with the SEC and SROs including; establishing a secure data reviewing environment, limits on bulk-downloading, and improvements to cross-market data access policies and procedures.

RESPONSES TO WRITTEN QUESTIONS OF SENATOR WARNER FROM JUDY MCDONALD

Q.1. You've raised concerns with allowing the exchanges to hold CAT data. Given that our system currently gives SROs regulatory authority, would restricting the exchanges' access to CAT data limit the overall ability to identify bad conduct and reconstruct market events?

A.1. The AC is concerned about the SROs having access to cross-market data that is beyond what they would need to meet their existing regulatory obligations. These obligations generally include monitoring their member's activities, but not for each of the 23

[1] The CAT Plan does not limit access to regulatory staff, but rather limits access to "regulatory purposes", which is an undefined term. Accordingly, it is uncertain how each exchange may interpret the scope of this limitation and therefore what personnel may have access.

[2] The individual employees must sign A "Safeguard of Information" Affidavit however, this is independent of any SRO requirement.

SROs to individually undertake cross-market surveillance, since that is already covered by FINRA. I believe the SROs can very effectively use CAT data to pursue issues and alerts that arise in the course of monitoring the activities of their members, including access to specific data of interest about a member's activities on other exchanges. Targeted access to cross-market data, instead of unrestricted access, will ensure a more secure and properly used CAT.

The SEC has the expertise and experience to undertake wholesale market reconstruction. The AC is not recommending any restrictions on access by the SEC to any of the non-PII data in CAT, with the caveat that the number of staff accessing the system should be minimized to only those who are in fact working on market reconstructions, rule proposals, or specific exam/investigations matters, and that the nature of the queries should be narrowly scoped to the set of data needed to complete the task.

Q.2. What were the causes for implementation delays?

A.2. There are many reasons for the delay in CAT implementation from the aggressive initial timeline to those enumerated in the SRO's November 13, 2017, Request for Exemptive Relief.[1]

Q.3. Please describe the background of how Thesys was selected as the Plan Processor to build the CAT?

A.3. The selection of Thesys as the Plan Processor predates the formation of the AC, so I cannot comment the background of how Thesys was selected as the Plan Processor.

Q.4. What other bidders were short-listed? Why was Thesys selected? Which exchanges voted for Thesys?

A.4. The bidding process predates the formation of the AC, so I cannot comment on how Thesys was selected.

Q.5. Would you agree that a major part of the delay in the CAT implementation occurred from the inability of Thesys to provide a viable system after working on it nearly 2 years?

A.5. Yes, there are many reasons for the delay in CAT implementation from the aggressive initial timeline to those enumerated in the SRO's November 13, 2017, Request for Exemptive Relief.[2] Additional information can be provided by other witnesses.

Q.6. What did other participants propose to replace Thesys before they were finally fired earlier this year? Why did the exchanges keep them on the contract for as long as they did?

Were the exchanges in agreement on whether Thesys should be retained?

A.6. I have no direct knowledge of these topics.

Q.7. Please describe how a subsidiary of FINRA was selected earlier this year to replace Thesys? Was there an open bidding process? Were there other bidders?

A.7. I have no direct knowledge of these topics.

Q.8. How was the SEC engaged with CAT NMS as it began experiencing significant delays?

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[1] *https://www.sec.gov/comments/4-698/4698-2681993-161486.pdf*
[2] *https://www.sec.gov/comments/4-698/4698-2681993-161486.pdf*

A.8. I have no direct knowledge of these interactions.

Q.9. What are SEC current authorities in compelling the implementation of CAT?

A.9. I am unaware of any specific authorities.

Q.10. I understand that as a member of the Advisory Committee you don't have a vote or seat at the operating committee.

Are there improvements that you would make to help the operating committee run more effectively?

A.10. The CAT NMS Plan underlines the flaws inherent with the governance model for NMS Plans. NMS Plans grant SRO's sole authority as Operating Committee members to design, implement and allocate costs without providing industry members any representation on a decision-making body. This governance structure limits transparency and creates perceived conflicts of interest. The industry is limited to the AC which participates in general Operating Committee meetings but does not meet in executive sessions nor have a vote in any forum. Additionally, the AC does not participate in all working groups. The AC is not typically included in other meetings or prior to the formation of a subcommittee working group. Providing Broker-Dealers and Asset Management firms better access to contribute their expertise and experience with voting rights would lead to better outcomes.

Q.11. Do you think investors are adequately represented as part of the governance process?

A.11. No, I think investors are under-represented in the governance of this process.

Under the approved CAT NMS Plan, the AC is comprised of 14 members including one "individual who maintains a securities account with a registered broker or dealer but who otherwise has no material business relationship with a broker or dealer or with a participant" as well as three persons selected to "represent a registered investment company." These four AC members are particularly focused on the interests of the investing public.

Members of the AC represent the industry from various perspectives; the AC is united on three common and deep concerns—that is, data security, preventing the misuse of information, and limiting costs which might be ultimately borne by the investing public. Protection of personally identifiable information (PII) and transactional data and minimizing costs are the primary goals of all members of the AC, not just those representing individual investors and investment companies.

The AC itself is restricted in its power and ability to be effective. The AC provides as much input and feedback as the current structure and practice allow; however, the AC has no voting position on the Operating Committee, is excluded from Executive Sessions, and is frequently provided information in an untimely manner. Investors would be more fully represented if the AC were permitted greater involvement in the governance process.

Q.12. Can the SEC appoint or remove members of the operating committee? Does the CAT NMS Plan or Rule 613 prohibit the SEC from appointing or removing members of the operating committee?

A.12. No, CAT NMS Plan Section 4.2 provides for the composition of the operating committee which does not include provisions for appointment or removal of members by the SEC.

Q.13. Does Rule 613 prohibit the SEC from appointing independent members to the operating committee?

A.13. The CAT NMS Plan does not have any provision that provides for the SEC to appoint an independent member of the operating committee.

Q.14. What, in your view, can independent members provide to the operating committee? Are there benefits?

A.14. The Operating Committee is currently composed solely of SRO representatives which are dominated by three large exchange "families" including ICE, Nasdaq, and CBOE. Each of these SRO's have coaligned regulatory obligations and financial interest in the operation and regulation conducted with CAT data. Absent from this committee is any insight from the thousands of broker-dealers, market makers, and asset managers whose proprietary data will be submitted to CAT, who will be subject to the reporting obligations of CAT, and who will in time significantly fund the CAT.

RESPONSES TO WRITTEN QUESTIONS OF SENATOR CORTEZ MASTO FROM JUDY MCDONALD

Q.1. Will the CAT help regulators, such as FINRA, SEC, FBI, and the Department of Justice, catch short selling, spoofing, fake trades, and wire fraud more quickly?

A.1. CAT data will be used by SEC and self-regulatory organizations (SRO's) within the definition of Section 3(a)(26) of the Exchange Act. The CAT data is intended to be used for, "surveillance and regulatory purposes," a broad term that has yet to be defined, and industry participants remained concerned that SRO's can take an expansive view and use this data for quasicommercial purposes. CAT data should enable regulatory personnel to better identify anomalous trading activities across multiple markets and accounts. Short selling, of course, is not illegal, but CAT should allow regulators to better identify manipulative strategies that involve short selling. It is unclear if CAT data would help in identifying wire fraud.

Q.2. Could the CAT system help investigate who is making a billion-dollar profit in trades made right before the Trump administration makes a market-moving announcement?

A.2. CAT data and analysis tools are intended to help regulators identify anomalous trading patterns which occur prior to an event and assist regulators more quickly to identify both the beneficial owners of those trades and persons with the authority to trade.

Q.3. Will the CAT be able to help exchanges and regulators know if brokers are being "unduly influenced by fees and rebates" rather than the best execution outcome for investors?

A.3. CAT data and analysis tools provided with CAT should, in addition to existing public disclosure of executing and routing practices reports which are already required under Rule 605 and 606

of Regulation NMS, help regulators identify patterns of order routing.

Q.4. Will the CAT help exchanges and regulators know if brokers are routing the trading interests of mutual funds, pensions, and endowments in a way that results in information leakage?

A.4. CAT data and analysis tools are intended to help regulators identify order routing patterns which could be indicative of information leakage, when combined with other information such as financial news.

Q.5. Will the CAT help exchanges and regulators identify sophisticated market participants who use multiple brokers and market centers to engage in disruptive trading?

A.5. Market participants may use multiple brokers and trade across market centers for a number of legitimate reasons, however, one of the most significant characteristics that differentiates CAT from existing regulatory systems is that CAT will enable regulators to identify an individual or entity's trading patterns across multiple broker-dealers and market centers. All trading activity will be tracked to the individual or entity with a common CAT Customer ID(s).

Q.6. We have had a lot of discussion about how difficult it is to identify the beneficial owners of firms. This secrecy can lead to criminal activities. For example, Mr. Navinder Singh Sarao (the individual who initiated the 2010 flash crash) was not registered as a broker in the U.S. He used four firms to place his trades.

Would CAT be able to find him or just his brokers?

A.6. The CAT Customer and Account Information combined with the CAT Customer ID allows for the identification of the accounts of U.S. citizens across broker-dealers and the beneficial owners of those accounts. However if the beneficial owner is not a U.S. citizen, the account can only be identified to the broker-dealer.

Q.7. The system is only as good as the exchanges who report concerns and ownership. How will you ensure that exchanges fully comply with reporting?

A.7. The SEC and SRO's are responsible for ensuring compliance with CAT reporting. The Advisory Committee (AC) has no power to enforce exchange compliance with reporting and is limited to providing comments on policies and procedures which could help motivate compliance and detect lack of compliance.

Q.8. What are your views on including futures data and over-the-counter equities in CAT?

A.8. OTC equities will be included in CAT data. Futures are (1) a different asset class, (2) traded with different participants and for different reason than equities and options, and (3) are regulated by the CFTC rather than the SEC. Including futures in CAT would require significant input from not only financial services firms with CAT obligations, but also end-users including energy producers, agricultural, and other commodities participants. While including futures data in CAT would provide a more robust picture of some cross-asset class trading such as the SPY (the S&P 500 Depository Receipt) vs. S&P 500 e-mini contract at the Chicago Mercantile Ex-

change, a significant study of the need for futures data in CAT as well as the expected outcome of including futures in CAT should commence prior to any further action.

Q.9. What are your views on including initial public offering data, clearing data, and other data into the CAT database?

A.9. IPO data would provide regulatory value, however it would be a very expensive effort in light of the current business practices related to an IPO which are extremely manual, unstructured, and highly variable with each offering. Any reporting requirements are likely to change business practices. I suggest performing a thorough analysis prior to publishing a rule proposal and then taking an iterative approach, starting with the very basic reporting requirements and gradually increasing if additional information is needed and additional value is anticipated. Many of these ideas are more fully expressed in the October 28, 2019, Financial Information Forum comment letter.[1]

Clearing data will have little regulatory value for CAT once allocation reporting into CAT is complete in April 2021 for equities and December 2021 for options. CAT data will provide regulators with access to account information including the account owner of the order when it was placed, the beneficial owner of where the equities or options are held, fill reports, and final allocation instructions.

Q.10. How is CAT Advisory Committee and Operating Committee ensuring that CAT will remain technologically robust and modern?

A.10. The AC is very active and provides extensive technical feedback at the level of standards, procedures and practices and insight based on the experiences of the relative firms; however the AC is limited in that it can only offer comments, opinions, and suggestions and thus far, has not been consulted on technology specifics such as architecture, tools, or specific technical approaches.

Q.11. Assuming CAT is implemented in the next 3 years, what are the upgrades that will need to take place to ensure CAT does not fall behind the industry best practices?

A.11. The AC anticipates working with CAT LLC and the SRO's to ensure that CAT maintains industry best practices as it relates to (1) data security including adherence to industry standards, (2) experimentation and utilization of emerging technology, and (3) capacity and performance planning.

RESPONSES TO WRITTEN QUESTIONS OF SENATOR SINEMA FROM JUDY MCDONALD

Q.1. Upon full implementation, the Consolidated Audit Trail (CAT) system will be an unprecedented database, collecting 58 billion records and maintaining data on over 100 million institutional and retail accounts on a daily basis. The CAT, and all the unique customer data it holds, will also be accessible to thousands of users. Therefore, while the CAT has the potential to offer important oversight, it will also be a prime target for cyberhacks. Under current CAT requirements, what kind of personal information would be ac-

[1] *https://fif.com/comment-letters*

cessible to system users? Is this information already being collected by other audit trail systems?

A.1. Provided the October 16, 2019, Request for Exemptive Relief is accepted, SSNs will not be stored in the CAT Customer and Account Information data repository.[1] The only PII which will be stored will be "phone book" type data: name, address, year of birth, masked account number, account type, and the individual's role in the account. Currently this information can only be obtained on an ad hoc basis through the use of the Electronic Blue Sheet System.

In addition to PII, the CAT will also expose the valuable intellectual property of individual investors and trading firms by assembling in one place the details of all trading activity which were previously stored in disparate locations; this data could be exploited by a bad actor.

Q.2. The Securities and Exchange Commission has been advised that the CAT system should not collect Social Security numbers, account numbers, and full dates of birth. Can regulators properly conduct market analysis, investigations, and enforcement if these pieces of information are not collected by the CAT?

A.2. Yes, through the use of the CAT Customer Identifier and the Customer and Account Information data repository, the regulators should be able to conduct market analysis, investigations, and enforcement. This is the primary goal of the approach which underlies the Exemptive relief request. This approach has been broadly supported in an informal nature by industry members and regulators and was a result of many months of collaboration amongst regulators and industry members.

RESPONSES TO WRITTEN QUESTIONS OF CHAIRMAN CRAPO FROM MICHAEL J. SIMON

Q.1. Early estimates for the creation of a "real-time" CAT would cost $4 billion to launch and have ongoing maintenance costs of $2.1 billion. What are the current cost estimates for initial launch costs and what are the cost estimates for ongoing maintenance for the "next-day" CAT approach?

A.1. The Consolidated Audit Trail, LLC (CAT LLC)[1] operates pursuant to a budget that the Operating Committee approves on a quarterly basis. Based on the most recent CAT LLC budget, the current annualized cost for building and operating the CAT is approximately $60 million for calendar year 2019. The budget does not distinguish between build and operating costs. While the 2020 CAT LLC budget is under development, current estimates are that the annualized costs will be between $60 and $75 million.

Under current budgetary projections, the FINRA CAT build costs will peak next year, and then decrease over the next few years as FINRA CAT finishes the build. On the other hand, the FINRA CAT costs to operate the CAT will increase substantially in the coming years, particularly beginning in 2021 as we approach full CAT functionality. We also expect legal and consulting costs to decrease

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[1] *https://www.catnmsplan.com/wp-content/uploads/2019/10/CCID-and-PII-Exemptive-Request-Oct-16-2019.pdf*

[1] Note, CAT NMS, LLC is the predecessor to CAT LLC.

as the CAT moves from development to operation. The bottom line is that the total cost to operate the CAT is uncertain, but unlikely to increase above $75 million annually in the near future.

There are a number of assumptions and qualifications to these projections. First, these are the costs solely borne by CAT LLC regarding the build and operation of the CAT. Thus, these costs do not include the costs to the Participants and the industry members to prepare for, and comply with, CAT requirements. Second, a number of FINRA CAT costs are variable. Those include the costs of cloud hosting and the customer/account database. Thus, any estimates of such costs at this time is somewhat speculative. Finally, FINRA CAT costs could change based on changes to the current design and operation of the CAT system, effectuated through the change request process. Any such change request could add additional costs both to the development of the CAT and the ongoing costs of operating the CAT.

Q.2. As the CAT is currently designed, more than 20 SROs and the SEC would be allowed to download bulk data from CAT into their systems. In such an arrangement, there is a grave increase in the likelihood that sensitive information stored in CAT will be compromised.

Can you explain why the transmission and downloading of bulk data is currently allowed under the plan? Would a limitation on downloading of bulk data affect the regulatory function of the CAT?

A.2. SEC Rule 613 requires that the Participants address data extraction in the CAT NMS Plan.[2] Pursuant to this requirement, the CAT NMS Plan filed with and approved by the Commission describes the methods by which Participants may extract data from the CAT system, including via user-defined direct queries and bulk extracts.[3] Importantly, the CAT NMS Plan permits the bulk extract of transaction data only; Customer Account Information, Customer Identifying Information and other personally identifiable information (PII) (as defined in the Plan) may not be subject to bulk extraction. In addition, Rule 613 and the CAT NMS Plan both require that Participants develop and implement surveillance systems, or enhance their existing surveillance systems, to make use of CAT Data.[4] As discussed in the Commission's order approving the CAT NMS Plan, the Participants "believe that permitting regulators to download/order transaction data from the Central Repository for regulatory use (i.e., "bulk data extracts") is important for their regulatory purposes, and that eliminating or limiting bulk data extracts of transaction data from the CAT may significantly

[2] See Regulation NMS, 17 CFR §242.613(a)(1)(i), (iii) (2019).

[3] See National Market System Plan Governing the Consolidated Audit Trail, Section 6.10(c)(i)(B) available at *https://www.catnmsplan.com/wp-content/uploads/2019/09/CAT-2.0-Consolidated-Audit-Trail-LLC%20Plan-Executed-(175745081)-(1).pdf* [hereinafter the "CAT NMS Plan"]. See also id. at Appendix D, Section 8.2.2 ("The Central Repository must provide for direct queries, bulk extraction, and download of data for all regulatory users. Both the user-defined direct queries and bulk extracts will be used by regulators to deliver large sets of data that can then be used in internal surveillance or market analysis applications.").

[4] See Regulation NMS, 17 CFR §242.613(f) (2019); and CAT NMS Plan, supra note 3 at Appendix D, Section 6.10(a).

and adversely impact the Participants' ability to effectively conduct surveillance of their markets using CAT Data."[5]

The Participants are focused on the security of CAT Data, including with respect to bulk extracts. Access to CAT Data, via bulk extract or otherwise, will be subject to the CAT security protocols. For instance, only authorized regulatory users with appropriate permissions will be able to access and extract CAT Data, and all CAT Data returned shall be encrypted.[6] Additionally, the CAT system requires multifactor authentication for regulatory use of the query tools, mitigating insider risk at the regulators, as well as for access to the Industry Member reporter portal.[7]

Access and the ability to extract PII is subject to additional safeguards. All PII collected by the CAT must be stored separately from transaction data and will not be eligible for bulk extract.[8] Regulatory users must have special entitlements (beyond entitlements to transactional CAT Data) to access PII data.[9]

Additionally, to balance security considerations and potential risks related to the bulk extraction of CAT Data, CAT LLC authorized FINRA CAT to develop and implement a secure analytics workspace (SAW), which the Participants and the SEC may use to analyze CAT Data and run their surveillance protocols. Development of the SAW is underway, and implementation is expected in the fall of 2020. Until SAW is operational, the Participants' use of CAT Data must necessarily take place outside of the SAW. Temporary and persistent copies of CAT Data may exist in an Amazon Web Services (AWS) environment protected by security controls, policies, and practices consistent with the CAT system itself. Small subsets of CAT Data may be extracted in support of regulatory and surveillance activities.

RESPONSES TO WRITTEN QUESTIONS OF SENATOR BROWN FROM MICHAEL J. SIMON

Q.1. Please describe the FINRA CAT breach/intrusion notification process, including the entities and organizations that would be notified and the timetable for notification. Please also describe any process for notification to investors, or the public generally.

A.1. As required by the Plan, the CAT has a sophisticated information security program, which includes an incident response plan consistent with National Institute of Standards and Technology guidance. The actions taken in the event of unauthorized access to CAT Data will depend on the circumstances. If FINRA CAT becomes aware of actual (or potential) unauthorized access to CAT Data, FINRA CAT will work with the Participants and will take all reasonable steps to investigate the incident and mitigate any identified technical vulnerabilities to protect the integrity of the CAT system. CAT LLC will report unauthorized access to law enforcement, the SEC, and other authorities as required or appropriate.

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[5] See Joint Industry Plan; Order approving the National Market System Plan Governing the Consolidated Audit Trail, Exchange Act Release No. 79318 (Nov. 15, 2016), 81 FR 84696, 84757 (Nov. 23, 2018) [hereinafter, "Plan Adopting Release"].

[6] CAT NMS Plan, supra note 3 at Section 6.10(c)(ii).

[7] See id. at Appendix D, Section 4.1.4.

[8] See id. at Appendix D, Section 4.1.6.

[9] See id.

This process may result in the use of, among other things, forensic services, breach notification services, and/or identity/fraud monitoring.

Q.2. Please provide the available cost estimates for (i) building the CAT system and (ii) annual operation of the CAT system, specifying current cost and costs once it is fully operational.

A.2. As noted in the answer to Chairman Crapo, CAT LLC operates pursuant to a budget that the Operating Committee approves on a quarterly basis. Based on the 2019 CAT LLC budget and actuals to date, the current annualized cost for building and operating the CAT is approximately $60 million. The budget does not distinguish between build and operating costs. While the 2020 CAT LLC budget is under development, current estimates are that the annualized costs will be between $60 and $75 million.

Under current budgetary projections, the FINRA CAT build costs will peak next year, and then decrease over the next few years as FINRA CAT finishes the build. On the other hand, the FINRA CAT costs to operate the CAT will increase substantially in the coming years, particularly beginning in 2021. We also expect legal and consulting costs to decrease as the CAT moves from development to operation. The bottom line is that the total cost to operate the CAT is uncertain, but unlikely to increase above $75 million annually in the near future.

There are a number of assumptions and qualifications to these projections. First, these are the costs solely borne by CAT LLC regarding the build and operation of the CAT. Thus, these costs do not include the costs to the Participants and the industry members to prepare for, and comply with, CAT requirements. Second, a number of FINRA CAT costs are variable. These include the costs of cloud hosting and the customer/account database. Thus, any estimates of such costs at this time is somewhat speculative. Finally, FINRA CAT costs could change based on changes to the CAT system, effectuated through the change request process. Any such change request could add additional costs both to the development of the CAT and the ongoing costs of operating the CAT.

Q.3. Please identify the private and Government organizations and entities that would be necessary to involve in the development and management of a CAT system that includes U.S. futures data and activity.

A.3. A more complete assessment would be necessary to definitively respond to this question, particularly the type and number of the products underlying the futures contracts. For futures based on single securities, or narrow-based security indices (e.g., nine or fewer securities), the Securities Exchange Commission and the Commodity Futures Trading Commission (CFTC) share jurisdiction. But for futures contracts based on broad-based security indices or commodities, the CFTC is the oversight authority. Based on the nature of the instrument, the Participants believe that if the CAT NMS Plan were amended so that the CAT system included U.S. futures data and activity, the following private and Government organizations and entities, in addition to the SEC and current Plan Participants, likely would need to be involved: (i) the CFTC, (ii) the National Futures Association, (iii) relevant des-

ignated contract markets, (iv) relevant futures commission merchants, (v) relevant broker-dealers, (vi) relevant derivatives clearing organizations, (vii) the Futures Industry Association, and (viii) relevant introducing brokers.

RESPONSES TO WRITTEN QUESTIONS OF SENATOR SASSE FROM MICHAEL J. SIMON

Q.1. In your testimony, you discuss the PII Working Group and how their initial recommendation was an approach that would have avoided the need to have any PII in the CAT.

Can you tell me why the Commission staff denied this initial approach?

How were the options presented by the working group evaluated?

A.1. The PII Working Group worked closely with SIFMA and the CISOs of each Participant to develop an approach that would have eliminated the need to maintain any PII in the CAT system. Commission staff was invited to all discussions on this topic. The approach would have involved the creation of a new request and response system that would allow regulators to request PII from Industry Member CAT Reporters rather than having such data included in the CAT. Commission staff requested that the PII Working Group develop another approach. The Participants are not in a position to know why the Commission staff preferred the development of an alternative to the initial recommendation of the PII Working Group.

RESPONSES TO WRITTEN QUESTIONS OF SENATOR WARNER FROM MICHAEL J. SIMON

Q.1. One of the concerns we've heard time and time again regarding the CAT is that it presents a privacy and cybersecurity risk. I know that the SEC has been working diligently on the PII issue and that the Exchanges have proposed "CAT Customer IDs" as an alternative approach to Social Security numbers.

Would you agree that the data security question can be a very solvable issue as long as all parties work constructively and in good faith?

A.1. The security of CAT Data is and will remain a top priority of the Participants. While all systems are subject to ongoing security risks, the Participants have taken, and will continue to take, all appropriate precautions to safeguard all data within the CAT system. The Participants believe that data security and associated risks can be managed effectively with the assistance and good faith effort of all parties.

Q.2. My goal is to have an effective CAT up and running as soon as possible. Given the long history of delays and challenges with its implementation, I wonder if there should be some reforms to the operating committee so that it runs more efficiently.

What were the causes for implementation delays?

A.2. The CAT is an extremely complex project. Rule 613 required the Participants to select a Plan Processor, contract with that enti-

ty and build, test and implement Participant reporting to the CAT within a year.

Recognizing the challenges of the timetable, the Participants proposed, and the SEC approved, a supplemental national market system plan to provide for the selection of a Plan Processor while the SEC considered adoption of the overall CAT NMS Plan. Pursuant to the Selection Plan,[1] the Participants were able to choose a Plan Processor (Thesys Technologies LLC) within approximately 2 months of SEC approval of the CAT NMS Plan, and complete the Plan Processor Agreement within another few months.[2]

Notwithstanding the relatively prompt selection of a Plan Processor, TCAT ultimately proved unable to build the system required under the CAT NMS Plan and the Plan Processor Agreement between the parties. The Participants worked in good faith with TCAT to begin operation of the CAT one year later than required under the CAT NMS Plan and Rule 613. However, TCAT proved unable to deliver a compliant system even with the additional year for development.

After TCAT failed to deliver a contract-compliant system in the timeframes required and demanded significant payments in excess of the contract requirements, among other things, the Participants decided to terminate the Plan Processor Agreement for default and change Plan Processors, selecting and contracting with FINRA CAT. While this initially added time to the development of the CAT, the Participants believe that changing processors when they did actually will result in a fully functional CAT in a shorter time frame than if they had continued the project with TCAT as processor.

Q.3. Please describe the background for how Thesys was selected as the Plan Processor to build the CAT?

A.3. As noted in response to Question 2, the Participants selected Thesys Technologies LLC, which ultimately formed TCAT, as the Plan Processor pursuant to the provisions of the CAT NMS Plan and the supplemental Selection Plan discussed above. Technical and legal/regulatory experts from the Participants, working with outside consultants and legal advisors, developed detailed requirements for the operation of the CAT. The Participants then issued a request for proposal (RFP) for the Plan Processor. Ten entities submitted responses to the RFP. The Participants provided each applicant with the opportunity to make an oral presentation to the Participants group. From those 10 applicants the Participants selected three finalists and sought additional information from each finalist. The Participants ultimately selected TCAT as the Plan Processor.

Q.4. What other bidders were short-listed? Why was Thesys selected? Which exchanges voted for Thesys?

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[1] See Plan Governing the Process of Selecting a Plan Processor and Developing a Plan for the Consolidated Audit Trail, which was incorporated as Article V of the CAT NMS Plan approved by the Commission on November 15, 2016.

[2] Thesys Technologies LLC was selected by CAT NMS LLC to be the Plan Processor for the CAT. Thesys Technologies established its subsidiary, Thesys CAT (TCAT) to serve as the Plan Processor.

A.4. The other two finalists for Plan Processor were FINRA and Sungard/Fidelity National Information Services Inc. (Sungard/FIS). Sungard/FIS withdrew from consideration before the final Participant vote for Plan Processor. The Participants then conducted a vote between FINRA and Thesys, and each Participant voted pursuant to their own selection criteria. The vote was via closed ballot and the only result announced was that Thesys won the vote; there was no announcement as to how each Participant voted.

Q.5. Would you agree that a major part of the delay in the CAT implementation occurred from the inability of Thesys to provide a viable system after working on it nearly 2 years?

A.5. Yes. Please see the response to Question 2, above.

Q.6. What did other participants propose to replace Thesys before they were finally fired earlier this year? Why did the exchanges keep them on the contract for as long as they did? Were the exchanges in agreement on whether Thesys should be retained?

A.6. When it became clear to the Participants that TCAT would be unable on its own to build the CAT system that the CAT NMS Plan requires, the Participants first considered providing supplemental support to TCAT, either from the Participants themselves or from a third party. However, it soon became clear that even with support, TCAT would not be able to build a compliant CAT system in a timely and cost-efficient manner. In light of TCAT's failure to deliver a contract-compliant system in the timeframes required (and other defaults), the Participants decided to terminate the Plan Processor Agreement for default and replace TCAT. The Participants' decision to terminate TCAT for default was unanimous.

The Participants kept TCAT on contract as long as they did because they understood that changing processors necessarily would add time to the project. Thus, the Participants worked in good faith with TCAT as long as they could to try to remedy the defects in the deliverables and to address concerns with future deliverables. It was only after receiving, testing, and attempting to remedy the defects in TCAT's system, as well as other defaults by TCAT including its extracontractual payment demands, that the Participants concluded that TCAT could not meet the requirements of its Plan Processor Agreement and was, in any event, unwilling to do so on the agreed-upon terms and conditions. Upon reaching that conclusion the Participants promptly terminated the TCAT Plan Processor agreement for default.

Q.7. Please describe how a subsidiary of FINRA was selected earlier this year to replace Thesys? Was there an open bidding process? Were there other bidders?

A.7. The Participants followed the requirements in the CAT NMS Plan in selecting a successor Plan Processor. Specifically, under Section 6.1(t) of the CAT NMS Plan, CAT NMS, LLC formed a Selection Committee and established a process to evaluate and review bids. That process, which took into account the applicable time constraints, was to contact FINRA and FIS, the two other finalists in the initial process, to gauge their interest in bidding on the CAT project. Both entities submitted proposals. FINRA proposed specifics as to how they would build a system compliant with the CAT

NMS Plan, together with a cost proposal. FIS proposed an interim step in which CAT NMS, LLC would hire them as consultants to review the system to determine how best they could provide services moving forward. Based on these proposals, the Selection Committee recommended FINRA to the Operating Committee, which voted to approve FINRA as the Plan Processor. Note, FINRA recused itself and did not take part in the selection decision.

Q.8. How was the SEC engaged with CAT NMS as it began experiencing significant delays?

A.8. The SEC and its staff have been engaged with CAT LLC [3] and the Participants throughout the entire life of the project. When the problems with TCAT became apparent, Chairman Clayton convened a meeting of the presidents or CEOs of the Participants on April 9, 2018, to express his concerns with the delays in the project. Brett Redfearn, Director of the Division of Trading and Markets also communicated the importance of getting the project back on track.

In response to the requests of Chairman Clayton and the staff, the Participants submitted a comprehensive Master Plan to the staff that included all material steps to implement all phases of the project. The Participants also created a Leadership Team of four Participant representatives to help streamline decision making on day-to-day issues that did not raise policymaking concerns.

More fundamentally, the SEC has been actively monitoring all CAT activities. The SEC staff participates in Operating Committee, Compliance Committee and most working group calls, including the Security Working Group. In January of this year Chairman Clayton hired Manisha Kimmel as Senior Policy Advisor for Regulatory Reporting to coordinate the SEC's oversight of the creation and implementation of the CAT. Ms. Kimmel previously was the Chair of the CAT Advisory Committee and, among other things, holds weekly calls with the CAT Leadership Team. The staff of the Division of Trading and Markets works closely with Ms. Kimmel in overseeing CAT matters.

Q.9. What are SEC current authorities in compelling the implementation of CAT?

A.9. The SEC compels the implementation of the CAT through Rule 613, and the CAT NMS Plan adopted under that rule, and via its oversight role over the Participants. The SEC has not amended Rule 613 since its adoption. With respect to the CAT NMS Plan, the SEC recently has proposed amendments to the CAT NMS Plan regarding transparency and cost recovery.

Q.10. What is the SEC's typical engagement with the operating committee?

A.10. As provided under Section 4.4 of the CAT NMS Plan, the SEC staff may attend, and does attend, all Operating Committee meetings, including both regular and executive sessions. In addition, as noted above, the SEC staff also participate in Compliance Committee and most working group calls. While most interaction between the SEC and the Participants is informal, the SEC con-

[3] Note, CAT NMS, LLC is the predecessor to CAT LLC.

ducts all formal communications with the Operating Committee through letters and other communications.

Q.11. Has the SEC attended any of the operating committee meetings?

Does the SEC have access to the meeting transcripts?

A.11. As noted above, the SEC staff attends Operating Committee meetings. The Operating Committee does not record or otherwise transcribe its meetings. However, the Operating Committee does draft minutes of its meetings, and the SEC staff receives those minutes.

Q.12. Does the CAT NMS Plan or Rule 613 prohibit the SEC from appointing or removing members of the operating committee?

A.12. There is no provision in either Rule 613 or the CAT NMS Plan giving the SEC the authority either to appoint or remove members of the Operating Committee. Rule 613 broadly addresses some operational and administrative requirements related to the CAT, such as requiring the CAT NMS Plan to include provisions related to the fair representation of Participants, the administration of the CAT NMS Plan and an Advisory Committee. However, Rule 613 does not otherwise dictate the specific manner in which the Participants would govern CAT LLC. In implementing Rule 613, the Participants provided in the CAT NMS Plan for the governance of CAT LLC through an Operating Committee. The CAT NMS Plan specifies that each Participant appoints one voting member, plus an alternate, to the Operating Committee. The SEC approved those provisions in approving the CAT NMS Plan.

Q.13. Does Rule 613 prohibit the SEC from appointing other independent members to the operating committee?

A.13. As noted in the answer to the previous question, Rule 613 does not grant the SEC the ability to appoint members of the Operating Committee. The CAT NMS Plan controls the composition of the Operating Committee and it does not include any provision regard the appointment of independent members to the committee.

Q.14. What, in your view, can independent members provide to the operating committee? Are there benefits?

A.14. Rule 613 specifically requires the Participants establish an Advisory Committee "to advise the plan sponsors on the implementation, operation, and administration of the central repository." The Participants implemented that provision in the CAT NMS Plan by providing for an Advisory Committee consisting of 14 representatives from the industry, academia and the public. Under Rule 613, Advisory Committee members "have the right to attend any meetings of the plan sponsors [other than in executive session], to receive information concerning the operation of the central repository, and to provide their views to the plan sponsors." The CAT NMS Plan and Commission guidance acknowledge the need for appropriate limitations on the role of the Advisory Committee. In excluding Advisory Committee members from executive session meetings, for example, the Commission explained that "meet[ing] in [E]xecutive [S]ession without members of the Advisory Committee appropriately balances the need to provide a mechanism for industry input into the operation of the central repository, against the

regulatory imperative that the operations and decisions regarding the consolidated audit trail be made by [Participant]s who have a statutory obligation to regulate the securities markets, rather than by members of the [Participant]s, who have no corresponding statutory obligation to oversee the securities markets."[4]

Thus, the Participants, which, as self-regulatory organizations, have the regulatory obligation to develop and implement the CAT, have voting membership on the Operating Committee. The independent members of the Advisory Committee have a vehicle to provide their views to the Operating Committee in a structured manner. The Participants believe that this establishes the appropriate balance in the governance and oversight of the CAT.

Q.15. As we look forward, assuming CAT is implemented in the next 3 years, what are the upgrades that will need to take place to ensure CAT does not fall behind the industry best practices?

A.15. As required by Rule 613 and the CAT NMS Plan, the CAT system is designed to be flexible, scalable, and technologically robust and modern. Rule 613(a)(1)(v) requires that the CAT be flexible and scalable, including the capacity "to efficiently incorporate, in a cost-effective manner, improvements in technology, additional capacity, additional order data, information about additional securities or transactions, changes in regulatory requirements, and other developments." The CAT NMS Plan also requires that the CAT be flexible and scalable, and that it "employ[s] optimal technology for supporting (1) scalability to increase capacity to handle a significant increase in the volume of data reported, (2) adaptability to support future technology developments and new requirements, and (3) maintenance and upgrades to ensure that technology is kept current, supported, and operational."[5] The CAT system has been designed with these requirements in mind.

The Operating Committee has the responsibility to ensure that CAT remains technologically robust and modern. In doing so, the Operating Committee works closely with the Advisory Committee, FINRA CAT, the technology staffs of the Participants, industry organizations (such as Securities Industry and Financial Markets Association (SIFMA) and Financial Information Forum (FIF)) and the SEC. To oversee these efforts, the Operating Committee has established a Technology Working Group that works closely with FINRA CAT to oversee the technological development and operation of the CAT. Furthermore, the CAT NMS Plan requires the Plan Processor to engage an Independent Auditor to conduct an annual audit of the Plan Processor's policies, procedures and control structures. Through these vehicles, the various groups can make recommendations to the Operating Committee to help ensure that CAT remains technologically robust and modern.

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[4] Plan Adopting Release, supra note 5 at 84732-3.

[5] CAT NMS Plan, supra note 3 at Appendix C-Section 5(a). The CAT NMS Plan further requires: "Participants will provide metrics and forecasted growth to facilitate Central Repository capacity planning. The Plan Processor will maintain records of usage statistics to identify trends and processing peaks. The Central Repository's capacity levels will be determined by the Operating Committee and used to monitor resources, including CPU power, memory, storage, and network capacity." Id. As a baseline, the CAT must have capacity requirements "based on twice (2X) the historical peaks for the most recent 6 years, and the Plan Processor must be prepared to handle peaks in volume that could exceed this baseline for short periods." Id. at Appendix D, Section 1.1. Note that Appendix D includes additional information on the technical architecture of the CAT.

Finally, the CCO's annual written assessment must consider, among other things, "an evaluation of potential technology upgrades based on a review of technological advancements over the preceding year, drawing on technological expertise whether internal or external."[6] Based on his review, the CCO may recommend potential technology upgrades to the Operating Committee. Thus, in addition to being designed in a manner that is intended to be flexible, scalable, and technically robust, the technology used in the CAT is separately assessed at least annually.

RESPONSES TO WRITTEN QUESTIONS OF SENATOR CORTEZ MASTO FROM MICHAEL J. SIMON

Q.1. Will the CAT help regulators, such as FINRA, SEC, FBI, and the Department of Justice, catch short selling, spoofing, fake trades, and wire fraud more quickly?

A.1. The CAT system is designed to make data available to the SEC and Participants to perform surveillance or analyses, or for other purposes as part of their regulatory or oversight responsibilities. The CAT system will facilitate the ability of regulators to surveil for suspicious activity. The data that will be available in the CAT system may assist the SEC and Participants in more quickly identifying manipulative activity, including manipulative short selling, spoofing, and fake trades, for example. Although the FBI and Department of Justice will not have access to the CAT system or the data within it, the FBI and Department of Justice may benefit from such information to the extent either body is engaged in a joint investigation with a regulator with such access, e.g., a joint investigation with the SEC.

Q.2. Could the CAT system help investigate who is making a billion-dollar profit in trades made right before the Trump administration makes a market-moving announcement?

A.2. As noted in response to Question 1, the CAT system is designed to make data available to the SEC and Participants to perform surveillance or analyses, or for other purposes as part of their regulatory or oversight responsibilities. The data that will be available in the CAT system may assist the SEC and Participants in more quickly identifying various forms of potentially suspicious trading activity.

Q.3. Will the CAT be able to help exchanges and regulators know if brokers are being "unduly influenced by fees and rebates" rather than the best execution outcome for investors?

A.3. Both SEC Rule 613 and the CAT NMS Plan expressly require that the Participants and their employees use CAT Data only for surveillance and regulatory purposes.[1] In Particular, Appendix D of the CAT NMS Plan states: "The Plan Processor must provide Participants' regulatory staff and the SEC with access to all CAT Data for regulatory purposes only. Participants' regulatory staff and the SEC will access CAT Data to perform functions, including economic analyses, market structure analyses, market surveillance,

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[6] Id. at Section 6.6(b)(ii)(B)(1).

[1] Regulation NMS, 17 CFR §242.613(e)(4)(i)(A) (2019); CAT NMS Plan, supra note 3 at Section 6.5(g), Appendix C-Section 4(b), and Appendix D-Section 8.1.

investigations, and examinations."[2] In light of this permitted use of CAT Data, the Participants believe that CAT Data can be used to conduct economic and market structure analyses that may assist regulators in studying many issues including, for example, fees and rebates.

Q.4. Will the CAT help exchanges and regulators know if brokers are routing the trading interests of mutual funds, pensions, and endowments in a way that results in information leakage?

A.4. As designed, the CAT system will include detailed information with respect to the handling of orders. For example, CAT Reporters will be required to provide information with respect to the routing of orders within an individual reporting firm as well as between reporting firms. In addition, CAT Reporters will be required to record the identification of information barriers for certain order events, including when an order is received or originated, transmitted to a department within a firm, and when it is modified. Thus, while the ability to identify information leakage will vary based on the facts and circumstances in any instance, CAT will provide regulators with the complete life cycle of an order, which will help in examinations or investigations related to the appropriate handling of orders.

Q.5. Will the CAT help exchanges and regulators identify sophisticated market participants who use multiple brokers and market centers to engage in disruptive trading?

A.5. As discussed in the response to Question 3 above, the Participants must use CAT Data only for regulatory purposes, including economic analyses, market structure analyses, market surveillance, investigations, and examinations. In practice, the CAT will allow Participants and the SEC to investigate, among other things, potentially suspicious trading activity that may be dispersed across broker-dealers and market centers.

Q.6. We have had a lot of discussion about how difficult it is to identify the beneficial owners of firms. This secrecy can lead to criminal activities. For example, Mr. Navinder Singh Sarao (the individual who initiated the 2010 flash crash) was not registered as a broker in the U.S. He used four firms to place his trades.

Would CAT be able to find him or just his brokers?

A.6. While the CAT system is designed to have information on U.S. broker-dealers and their customers, it will not have information on foreign customers in all instances. For example, a U.S. broker-dealer receiving an order is required to report the receipt of the order and the Firm Designated ID (i.e., trading account information) of the customer. Where a U.S. broker-dealer receives an order from a foreign broker-dealer, the U.S. broker-dealer reporting information to the CAT system is required to report the foreign broker-dealer involved in the trade rather than the ultimate customer of such foreign broker-dealer (whose identity may not be known to the U.S. broker-dealer).

[2] CAT NMS Plan, supra note 3 at Appendix D-Section 8.1.

Q.7. The system is only as good as the exchanges who report concerns and ownership. How will you ensure that exchanges fully comply with reporting?

A.7. Under Rule 613 and the CAT NMS Plan, the national securities and options exchanges have a regulatory obligation to report data to the CAT system and the SEC will be able to examine the exchanges' compliance with Rule 613 and the CAT NMS Plan. The SEC also is able to enforce compliance with Rule 613's and the CAT NMS Plan's reporting obligations. In addition to being subject to the SEC's examination and enforcement authority, the Plan Processor must provide the Operating Committee with reporting metrics related to Participant performance. These metrics will assist the Operating Committee in identifying and addressing potential Participant reporting issues. Note, the SEC also will receive these metrics.

Q.8. What are your views on including futures data and over-the-counter equities in CAT?

A.8. The reporting requirements of the CAT NMS Plan apply to all "Eligible Securities," which includes all NMS Securities and all OTC Equity Securities.[3] The CAT NMS Plan currently does not apply to futures or other products that are not NMS Securities or OTC Equity Securities.[4]

The Participants believe that they must gain experience with CAT reporting and CAT Data before determining to potentially expand the scope of the CAT. Note that any expansion of the CAT would be subject to public notice and comment, and Commission approval. Separately, each year the Chief Compliance Officer of CAT LLC (CCO) is required to complete a written assessment of the Plan Processor's performance, which typically includes, among other things, a consideration of whether the CCO believes that the CAT should be expanded to include additional data elements or products.[5]

Q.9. What are your views on including initial public offering data, clearing data, and other data into the CAT database?

A.9. As discussed in the response to Question 8 (including footnote 4), the Participants believe that they must gain experience with CAT reporting and CAT Data before determining to potentially expand the scope of the CAT. Note that any expansion of the CAT would be subject to public notice and comment, and Commission approval.

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[3] See id. at Section 1.1.

[4] On May 15, 2017, the Participants filed with the Commission a report discussing the potential expansion of the CAT to include primary market transactions in securities that are not NMS Securities or OTC Equity Securities, and debt securities. See Discussion of the Potential Expansion of the Consolidated Audit Trail pursuant to Section 6.11 of the CAT NMS Plan (May 15, 2017), available at *https://catnmsplan.com/wp-content/uploads/2017/06/Expansion-Report-Final-5.15.17.pdf.* At the time, the Participants declined to expand the scope of the CAT and explained:

As a result of their analysis, the Participants believe that it would be premature to expand the CAT to include such transactions at this time. The Participants believe that further consideration of whether to include such transactions should be based on data derived from Participants' and Industry Members' actual experience with CAT reporting, as well as a consideration of the costs required to build systems to enable CAT reporting.

[5] See CAT NMS Plan, supra note 3 at Section 6.6(b).

Q.10. How is CAT Advisory Committee and Operating Committee ensuring that CAT will remain technologically robust and modern?

A.10. As required by Rule 613 and the CAT NMS Plan, the CAT system is designed to be flexible, scalable, and technologically robust and modern. Rule 613(a)(1)(v) requires that the CAT be flexible and scalable, including the capacity "to efficiently incorporate, in a cost-effective manner, improvements in technology, additional capacity, additional order data, information about additional securities or transactions, changes in regulatory requirements, and other developments." The CAT NMS Plan also requires that the CAT be flexible and scalable, and that it "employ[s] optimal technology for supporting (1) scalability to increase capacity to handle a significant increase in the volume of data reported, (2) adaptability to support future technology developments and new requirements and (3) maintenance and upgrades to ensure that technology is kept current, supported and operational."[6] The CAT system has been designed with these requirements in mind.

The Operating Committee has the responsibility to ensure that CAT remains technologically robust and modern. In doing so, the Operating Committee works closely with the Advisory Committee, FINRA CAT, the technology staffs of the Participants, industry organizations (such as Securities Industry and Financial Markets Association (SIFMA) and Financial Information Forum (FIF)) and the SEC. To oversee these efforts, the Operating Committee has established a Technology Working Group that works closely with FINRA CAT to oversee the technological development and operation of the CAT. Furthermore, the CAT NMS Plan requires the Plan Processor to engage an Independent Auditor to conduct an annual audit of the Plan Processor's policies, procedures and control structures. Through these vehicles, the various groups can make recommendations to the Operating Committee to help ensure that CAT remains technologically robust and modern.

Finally, the CCO's annual written assessment, discussed in the response to Question 8, must consider, among other things, "an evaluation of potential technology upgrades based on a review of technological advancements over the preceding year, drawing on technological expertise whether internal or external."[7] Based on his review, the CCO may recommend potential technology upgrades to the Operating Committee. Thus, in addition to being designed in a manner that is intended to be flexible, scalable, and technically robust, the technology used in the CAT is separately assessed at least annually.

Q.11. Assuming CAT is implemented in the next 3 years, what are the upgrades that will need to take place to ensure CAT does not fall behind the industry best practices?

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[6] Id. at Appendix C-Section 5(a). The CAT NMS Plan further requires: "Participants will provide metrics and forecasted growth to facilitate Central Repository capacity planning. The Plan Processor will maintain records of usage statistics to identify trends and processing peaks. The Central Repository's capacity levels will be determined by the Operating Committee and used to monitor resources, including CPU power, memory, storage, and network capacity." Id. As a baseline, the CAT must have capacity requirements "based on twice (2X) the historical peaks for the most recent 6 years, and the Plan Processor must be prepared to handle peaks in volume that could exceed this baseline for short periods." Id. at Appendix D, Section 1.1. Note that Appendix D includes additional information on the technical architecture of the CAT.

[7] Id. at Section 6.6(b)(ii)(B)(1).

A.11. Please see the response to Question 10 above, which discusses measures designed to ensure that the CAT remains flexible, scalable, and technically robust and modern going forward.

RESPONSES TO WRITTEN QUESTIONS OF SENATOR SINEMA FROM MICHAEL J. SIMON

Q.1. Upon full implementation, the Consolidated Audit Trail (CAT) system will be an unprecedented database, collecting 58 billion records and maintaining data on over 100 million institutional and retail accounts on a daily basis. The CAT, and all the unique customer data it holds, will also be accessible to thousands of users. Therefore, while the CAT has the potential to offer important oversight, it will also be a prime target for cyberhacks. Under current CAT requirements, what kind of personal information would be accessible to system users? Is this information already being collected by other audit trail systems?

A.1. Under Rule 613, and in addition to certain transaction data, Participants and broker-dealers must record and electronically report Customer Identifying Information and Customer Account Information to the CAT system.[1] Currently, the Commission-approved CAT NMS Plan defines Customer Identifying Information as "information of sufficient detail to identify a Customer, including, but not limited to, (a) with respect to individuals: name, address, date of birth, individual tax payer identification number (ITIN)/social security number (SSN), individual's role in the account (e.g., primary holder, joint holder, guardian, trustee, person with the power of attorney)."[2] Rule 613(j)(4) and the CAT NMS Plan generally define Customer Account Information as "account number, account type, customer type, date account opened, and large trader identifier (if applicable)."[3] Pursuant to the CAT NMS Plan, Customer Identifying Information and Customer Account Information are segregated from other general transaction data.[4] Additionally, the SEC and the Participants cannot bulk extract such information and regulatory users must have special entitlements to access such data.[5] As mentioned during testimony, the Participants have requested exemptive relief from the Commission from relevant aspects of the CAT NMS Plan to eliminate the requirement that CAT LLC collect and retain SSNs, dates of birth, and account numbers.

Currently, broker-dealers are required to provide this type of information, except for date of birth, to the SEC or a Participant in response to an electronic blue sheet (EBS) request from the requesting regulator.

Q.2. The Securities and Exchange Commission has been advised that the CAT system should not collect Social Security numbers, account numbers, and full dates of birth. Can regulators properly conduct market analysis, investigations, and enforcement if these pieces of information are not collected by the CAT?

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[1] Regulation NMS, 17 CFR §242.613(c)(7)(i)(A) (2019).
[2] CAT NMS Plan, supra note 3 at Section 1.1.
[3] Regulation NMS, 17 CFR §242.613(j)(5) (2019); CAT NMS Plan, supra note 3 at Section 1.1.
[4] CAT NMS Plan, supra note 3 at Appendix D-Section 4.1.6.
[5] Id.

A.2. Yes. The Participants believe that the proposed alternative to collecting SSNs, account numbers, and full dates of birth will enhance the security of the CAT system while preserving the regulatory benefits of the CAT. Under the proposed alternative, regulators would continue to have the capability to create a reliable and accurate CAT Customer ID (CCID) that is unique for each customer, and to use the unique CCID to track orders from any customer throughout the order's life cycle, regardless of what brokerage account was used to enter the order. This approach would eliminate the risk of having a comprehensive aggregated source for all individual customer SSNs without having an adverse impact on the effective use of the CAT by regulators, including the ability of regulators to identify customers and their related trading activity.

ADDITIONAL MATERIAL SUPPLIED FOR THE RECORD

October 21, 2018

The Honorable Mike Crapo
Chairman

The Honorable Sherrod Brown
Ranking Member

U.S. Senate Committee on Banking, Housing, and Urban Affairs
534 Dirksen Senate Office Building
Washington, DC 20510

Re: **Oversight of the Status of the Consolidated Audit Trail**

Dear Chairman Crapo and Ranking Member Brown:

Thank you for holding this important hearing to examine the SEC's implementation of the Consolidated Audit Trail (CAT). Better Markets has advocated for an effective CAT for many years and appreciates this opportunity to share its views with the Committee.

As is well known, the CAT has the potential to be a game-changer for the SEC and revolutionize the Commission's capabilities to protect investors, facilitate capital formation and promote fair and orderly capital markets – on which job creators and savers, and indeed all Americans, depend. When completed, the CAT will serve two critical and long-overdue functions: enable the SEC to reduce, manage, and better understand market disruptions and crashes as well as identify, deter, and punish illegal manipulations and other predatory and trading abuses – all for the benefit investors and our markets.

Those functions are vital because investor confidence and trust are the foundations upon which our markets are build and grow. Yet, today, almost ten years after the "Flash Crash," we remain at grave risk of another one, which will crush confidence of investors and damage our capital formation capability for years to come.

Our markets are moving at the 21st Century speed of milliseconds, but our regulators are too often hopelessly stuck with technology better suited to the horse and buggy era of the 19th Century. The CAT could change all that and catapult investor protection into the 21st Century. However, the CAT is currently bogged down in conflicts, regulatory weakness and legislative neglect and it is likely not to live up to its potential. Getting the CAT up and running as a powerful investor protection system will require this Committee's foresight, leadership, support and oversight.

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History

As this Committee is aware, the SEC first proposed to create the CAT immediately after the "Flash Crash" in May 2010. At a hearing on May 20, 2010, before this very Committee, then SEC Chairman Mary Shapiro discussed how a consolidated audit trial that would track orders could help regulators better understand flash crashes and other market abnormalities.[1] During the "Flash Crash" nearly one trillion dollars of stock market value was temporarily wiped out from investors' accounts. This confidence-shattering event took just 18 minutes to unfold and saw some stocks inexplicably plummet to $1 per share while others skyrocketed to more than $100,000 per share.

Adding insult to injury, it took the SEC and the Commodity Futures Trading Commission (CFTC) more than four months and thousands of staff hours to reconstruct the events that spanned those 18 minutes, largely because regulators had neither the tools nor the data to understand how and why the stock market experienced its steepest intraday drop ever.[2] The Flash Crash vividly illustrated the need for a much more comprehensive, coherent, and accessible data trail.[3]

At the end of May 2010, the SEC released a proposal of SEC Rule 613 which would eventually create the CAT. The proposal envisions the CAT to enable the SEC to monitor and react to market events and manipulations in real time. Approximately two years passed before the SEC unanimously approved on July 18, 2012 SEC Rule 613, which creates a National Market System Plan (NMS Plan) called the CAT NMS.[4]

Rule 613 of Regulation NMS under the Securities Exchange Act of 1934 required national securities exchanges and national securities associations (also known as self-regulatory organizations (SROs)) to jointly submit a national market system ("NMS") plan—

> "to create, implement, and maintain a consolidated order tracking system, or consolidated audit trail, with respect to the trading of orders in NMS securities, that would capture customer and order event information for orders in NMS securities, across all markets, from the time of order inception through routing, cancellation, modification, or execution."

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1 *See* "Examining the Causes and Lessons of the May 6th Market Plunge," U.S. Senate Banking Committee, May 20, 2010, S. Hrg. 111-774.

2 Making matters worse, it is now apparent that even that four months of intensive work failed to uncover the reasons for the crash, as made painfully clear when a trader in London was arrested five years later, in April 2015, for his then-previously undisclosed and unknown role in causing the Flash Crash. See, "Trader Arrested in Manipulation That Contributed to 2010 'Flash Crash'," Nathaniel Popper and Jenny Anderson, April 21, 2015, The New York Times, available at https://www.nytimes.com/2015/04/22/business/dealbook/trader-in-britain-arrested-on-charges-of-manipulation-that-led-to-2010-flash-crash.html

3 Since 2010, we have witnessed other sudden and major trading upheavals that have indeed shaken the confidence of investors and markets. Markets were again thrown into uncertainty on August 24th, 2015 when 40% of NASDAQ-100 companies hit daily lows that were more than 10% below previous day closing price and over 19% of Exchange Traded Funds (ETFs) experienced price swings large enough to trigger limit up-limit down trading pauses.

4 *See* "Rule 613 (Consolidated Audit Trail)." Available at https://www.sec.gov/divisions/marketreg/rule613-info.htm.

In adopting Rule 613, the Commission reflected on the difficulties of performing its oversight responsibilities in today's complex, dispersed, and highly automated national market system, especially when it needs to piece together "disparate data from a variety of existing information systems lacking in completeness, accuracy, accessibility, and or timeliness."

CAT NMS was mandated by the SEC to propose a Joint Industry Plan called the CAT Plan which would see the creation and implementation of the CAT system. An additional four years passed before the SEC released for public comment, in April 2016, a 1,090-page Joint Industry Plan developed by the CAT NMS consortium which proposed to create the CAT system.[5] Some of the members of this consortium have a long rap-sheet for having violated SEC's own rules and securities laws,[6] which are precisely the type of misconduct the CAT would enable the SEC to detect and punish more quickly, more often and more effectively.

The CAT system as envisioned by the Joint Industry Plan was flawed in several respects that were inherent in the very nature of the industry-led effort. The overriding and, indeed, likely fatal flaw was embedding industry influence if not control over a system that was for monitoring and policing the industry. Frankly, it was like asking bank-robbers to provide the police with the getaway routes for their future crimes.

As a result, Better Markets concluded that the Joint Industry Plan for CAT will not protect investors or rid our capital markets of disruptive and manipulative practices because it was designed by the very industry it is meant to oversee, and consequently it reflects the conflicted influence of the industry in nearly every respect.[7] For example, the SEC's oversight role in the Joint Industry Plan was weak, and enhancements to the system to ensure that it remains up-to-date and modernized were not built into the implementation plans, making improvements to the system haphazard and ad hoc. This means that regulators – and the American public – would have no real assurance that the system will keep pace with our rapidly evolving equity markets.

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5 As of this writing, the Plan Participants are: BATS Exchange, Inc.; BATS-Y Exchange, Inc.; BOX Options Exchange LLC; C2 Options Exchange, Incorporated; Chicago Board Options Exchange, Incorporated; Chicago Stock Exchange, Inc.; EDGA Exchange, Inc.; EDGX Exchange, Inc.; Financial Industry Regulatory Authority, Inc.; International Securities Exchange, LLC; ISE Gemini, LLC; Miami International Securities Exchange LLC; NASDAQ OMX BX, Inc.; NASDAQ OMX PHLX LLC; The NASDAQ Stock Market LLC; National Stock Exchange, Inc.; New York Stock Exchange LLC; NYSE MKT LLC; and NYSE Arca, Inc.

6 See "SEC Charges Direct Edge Exchanges [owned by BATS Exchange] With Failing to Properly Describe Order Types." Penalty: at least $14 million. See, also, "SEC Charges NYSE, NYSE ARCA, and NYSE MKT for Repeated Failures to Operate in Accordance With Exchange Rules." Penalty: at least $4.5 million. See, also, "SEC Charges NASDAQ for Failures During Facebook IPO." Penalty: at least $10 million. See, also, "SEC Charges New York Stock Exchange for Improper Distribution of Market Data." Penalty: at least $5 million.

7 *See* Better Markets' comment letter in response to the CAT NMS Plan (Release No. 34-77734; File No. 4-698). (July 18, 2016). Available at https://www.sec.gov/comments/4-698/4698-17.pdf

The (Non)Implementation of CAT

In January 2017, Thesys Technologies LLC was hired to build and operate the CAT (becoming the so-called "Plan Processor"). Problems with Thesys's implementation of the CAT surfaced early in the process. For nearly a year, Thesys was not able to retain a Chief Information Security Officer, which meant Thesys could not receive the co-operation of the SROs in agreeing to the specification and other technical matters. There were other delays and challenges but because of the secrecy surrounding the entirety of the CAT implementation, the public, and this Committee, to this day, cannot clearly ascertain the definitive causes for those delays. The challenges and lack of progress became so problematic, that CAT NMS decided to fire Thesys as the Plan Processor, and hired a subsidiary of FINRA, FINRA CAT LLC, as the new Plan Processor.

As of this writing, CAT NMS has missed the following deadlines:

- The November 15, 2017 milestone completion date for the Plan Processor publishing final technical specifications for the submission of order data for Industry Members;
- The May 15, 2018 milestone completion date for the Plan Processor publishing technical specifications for Industry Member submission of customer data;
- The May 15, 2018 milestone completion date for the Plan Processor making the testing environment available on a voluntary basis and beginning connectivity testing and accepting order data from Industry Members for testing purposes;
- The August 15, 2018 milestone completion date for Industry Member order submission testing;
- The October 15, 2018 milestone completion date for Industry Member reporting of customer information to the Central Repository;
- The November 15, 2018 deadline for full Industry Member reporting.

When CAT NMS requested that the SEC extend the November 15, 2017 deadline for CAT system to come online and receive data from exchanges and FINRA, the SEC – correctly, in our view – declined to provide the CAT NMS such a "no action" letter which would have essentially excused their non-compliance with the SEC Rule 613. The public understood from this action that the SEC is signaling that the agency reserved the right to bring enforcement proceedings against the CAT NMS consortium for non-compliance.

However, after those initially promising steps to ensure that the SEC would hold the CAT NMS consortium accountable for their non-compliance with the SEC Rule 613 deadline, the SEC's oversight of this important issue has lapsed.

SEC Fails to Enforce the Law

Despite repeatedly violating SEC rules without any valid or compelling reasons (which should not matter anyway), the CAT NMS consortium has never been held accountable. As we had detailed in a letter to the SEC Chairman in September 2018,[8] the SEC had ample authority to compel compliance of Rule 613. In addition to the SEC's general authority to enforce compliances of the securities laws and rules, the specific SEC rule that gave birth to CAT NMS (SEC Rule 613) itself includes a provision mandating compliance by the industry-members that comprise the CAT NMS and specifies that non-compliance could result in fines. Rule 613 states clearly:

> *(h) Compliance by national securities exchanges and national securities associations.*
>
> *(1) Each national securities exchange and national securities association shall comply with the provisions of the national market system plan approved by the Commission.*
>
> *(2) Any failure by a national securities exchange or national securities association to comply with the provisions of the national market system plan approved by the Commission shall be considered a violation of this section.*
>
> *(3) The national market system plan submitted pursuant to this section shall include a mechanism to ensure compliance by the sponsors of the plan with the requirements of any approved plan. Such enforcement mechanism may include penalties where appropriate.*[9]

Such a requirement was fundamental to the SEC's decision to outsource this mission-critical system to the private sector in the first place. After all, it has been obvious since the decision was made to outsource the CAT to the private sector that there were going to be serious conflicts of interest and enormous incentives for at least some industry members to delay, weaken or kill the CAT before it ever came on line (as previously detailed by Better Markets[10]).

The Commission knew that as well when it was making the decision to outsource CAT to the industry and specifically armed itself with appropriate and effective regulatory tools to encourage and, if need be, compel the implementation of CAT according to the approved timelines and standards. In particular, the phrase "may include penalties where appropriate" was a considered decision by the Commission. This phrase was absent in the 2010 Proposed Rule 613 but was specifically included in the 2012 Final Rule 613. In the Adopting Release for the Final Rule 613, the Commission argued —rightly so—

> "…that a penalty provision could provide an incentive for each SRO [self-regulatory organization, *i.e.,* stock exchanges that comprise the CAT NMS consortium] to comply with all the provisions of the NMS plan because each SRO will seek to avoid incurring any

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8 *See* Better Markets Letter to Chairman Jay Clayton calling on the SEC to enforce its rules, (September 24, 2018), *available* at https://bettermarkets.com/sites/default/files/BM%20Ltr%20to%20SEC%20Chair%20Clayton%20On%20CAT.pdf.

9 *See* 17 C.F.R. § 242.613(h).

10 *See* fn. 7 *ibid.*

> penalty under the Rule. The incentive to avoid a penalty could also reduce the risk of non-compliance with the Rule."[11]

Thus, the SEC was forearmed, and the industry was specifically forewarned.

It was, however, all for naught. As was predictable and foreseen, the industry-dominated and conflicted consortium failed repeatedly to meet its legal obligations, indefensibly putting investors and markets at risk -- although simultaneously making sure that SEC cops on the beat remained unequipped to monitor and police their activities. Nevertheless, the SEC has repeatedly failed to use its authority, enforce the law or hold the lawbreakers accountable.

Given the critical nature of CAT, the specific statutory authorization, and the consortium's inexcusable conduct, the SEC should have levied substantial daily fines for every day of non-compliance. After all, the industry was on notice and the SEC had already been more than accommodating, but its rule was and remained nonetheless unjustifiably violated. Moreover, every day of delay was another day investors were at risk. This is the precise circumstance anticipated by the SEC and provided for in its rule. The failure of the SEC to act has gutted the rule, nullified the purpose for the provision, removed the risk of a penalty and, therefore, any incentive for compliance.

Recommendations to Fix CAT

CAT is owned, controlled, and operated by the for-profit industry, which is riddled with conflicts of interest, rather than the SEC which is statutorily required to prioritize the public interest. Under the SEC's approved plan, CAT is funded by industry. Its data will be accessible to the "Plan Participants" that manage the private corporation that will have formal ownership of CAT. Some of these Plan Participants are affiliated with broker-dealers. The SEC will have access to this data for regulatory purposes only. As a philosophical matter, for-profit businesses should not be put in charge of and in control of CAT and its data, which will contain information that would have commercial value for any for-profit company seeking to maximize profits (as opposed to the SEC with its mission of upholding the public interest).

To avoid more years of disappointment, failure and non-compliance, the SEC must promptly reform the Plan's organizational and governance structure. The SEC may choose to retain the building of the CAT system by an outside entity, as it currently does with its other IT systems, but it must host the system in-house, under its direct and sole control, retaining the prerogative to grant (or deny) access of the data to non-broker-dealer affiliated SROs. If the Commission believes it is necessary and appropriate, the Commission may enlist the already formed Development Advisory Group (DAG) to support and advise the Commission, as it selects the contractor or a consortium of contractors that will build the CAT according to the specifications in Rule 613.

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[11] *See* Adopting Release (Release No. 34-67457; File No. S7-11-10), p.235. Available at https://www.sec.gov/rules/final/2012/34-67457.pdf.

In the alternative, the industry's conflicts of interest must be eliminated or mitigated, or failure will be the inevitable outcome. To that end, the SEC must reconstitute the governance structure to reduce the industry's and SROs' dominance and increase the SEC's and public's representation in the governance of CAT NMS, LLC, specifically—

- The Commission must alter the charter and corporate identity of the CAT NMS, turning it into a not-for-profit organization, and align its mission to that of the SEC;
- The not-for-profit then must be led by a Board, the majority of which will be strictly independent directors with impeccable reputations and integrity;
- The chair of the Board must be a person without past, present or future conflicts who is appointed by the SEC in an open, public process;
- The Director of the Division of Trading and Markets must serve on the Board as the permanent sole vice-Chair;
- The newly formed not-for-profit organization can decide to maintain the Development Advisory Committee to advise and support CAT;
- The SEC should then solely control access and usage of the CAT system.

An additional overriding flaw in the CAT system is that the performance specifications of the current CAT Plan indefensibly fall well short of what is necessary and technologically possible. It is as if the SEC wants to get out of 19th Century, but only to the 20th Century and not to the markets and private sector of the 21st Century. Building such a disadvantage into the CAT Plan at the beginning means that the SEC simply will never catch up with the industry and likely never be in a position to fully and properly protect investors and markets.

For example, the CAT Plan currently requires that Participants report data to the Central Repository by 8 a.m. on *the next trading day*. For example, a trade (or any other reportable event) completed at 9:30 a.m. on a Friday on an exchange would not have to be reported into the CAT system until the following Monday at 8 a.m. – 70.5 hours after the trade has occurred. And delays for hours or close to a full day would presumably be commonplace.

In stark contrast, FINRA's TRACE and other systems already require much faster reporting, ranging from 10 seconds to 15 minutes on trade transactions. The CAT Plan offers no convincing justification – because, we submit, there is none – for the extraordinarily lax reporting time frame, particularly given that market participants have real time access to the information and electronic transmission of it would likely only take microseconds if not nanoseconds.

Real-time, or near real-time would allow for much more robust surveillance and quicker reaction time. As suggested by experts at Lawrence Berkeley National Laboratory, there are reliable measurement methods that can be devised with the help of a high-performance computer system that would provide regulators with early warnings of an impending Flash Crash-like

event.[12] These methods might provide as much as an hour of lead time, enabling regulators to intervene to pre-empt or mitigate such crashes (i.e., trading halts, circuit breakers, etc.). However, these would only be possible if the CAT receives real-time or near real-time reporting, and is able to consolidate such data for monitoring and surveillance.

Without using the readily available real-time reporting functionality used today by other regulators and the industry itself, the CAT will serve at best as a data archive, not a meaningful surveillance system that could help the SEC detect unstable trading patterns, avert flash crashes, and halt abusive trading practices while they are in progress.

Finally, the CAT will also not include futures data, which is a glaring omission. The SEC and other regulators concluded that the Flash Crash itself was caused by a futures contracts trade. In other words, even if we had a fully operational CAT at the time of the 2010 Flash Crash, CAT's database would not have included the necessary dataset to enable the SEC and the CFTC to conduct an audit to learn the identity of the trader or the type, timing, and size of the order – basically, what was then thought to be the causes of the crash.[13]

SEC Has Opportunity to Fix CAT

On September 9, 2019, the SEC proposed amendments to Rule 613, ostensibly to increase transparency of and accountability at CAT NMS. The proposal would amend the CAT NMS Plan to require the consortium to:

> develop a complete implementation plan containing a detailed timeline with objective milestones to achieve full CAT implementation (the ''Implementation Plan''). This Implementation Plan would be filed with the Commission and made publicly available after approval by a Supermajority Vote of the Operating Committee. The Implementation Plan must be submitted by the Operating Committee to the Chief Executive Officer (''CEO''), President, or an equivalently situated senior officer of each Participant, prior to being voted on by the Operating Committee. Additionally, to further improve implementation transparency, the Commission proposes requiring the Participants to provide the Commission and the public with quarterly progress reports approved by at least a Supermajority Vote of the Operating Committee. The Quarterly Progress Reports must also be submitted by the Operating Committee to the CEO, President, or an equivalently situated senior officer of each Participant, prior to being voted on by the Operating Committee. The proposed amendments also include provisions regarding financial accountability to facilitate implementation of the CAT in an expeditious and efficient manner.[14]

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12 *See* "Federal Market Information Technology in the Post Flash Crash Era: Roles for Supercomputing." Bethel, E. Wes; David Leinweber; Oliver Rubel; and Keshenq Wu. Lawrence Berkeley National Laboratory. (2011).

13 But see supra. n. [-].

14 *See* Proposed Amendments to the National Market System Plan Governing the Consolidated Audit Trail. File No. S7–13–19, 84 Fed. Reg. 48458 (September 13, 2019) *available* at https://www.federalregister.gov/documents/2019/09/13/2019-19852/proposed-amendments-to-the-national-market-system-plan-governing-the-consolidated-audit-trail.

While some of these reforms are laudable (and long-overdue), they do nothing to address the foundational flaw that embeds the industry's conflicts of interest throughout the consortium and governance of the CAT. Moreover, they may actually incentivize inappropriate strategic behavior by some members of the consortium to cause future delays because the penalties would fall on others. This misalignment of incentives only exacerbates the already grossly indefensible lack of accountability.

This Committee should demand more from the SEC in holding CAT NMS accountable for its repeated failures, particularly in light of the SEC's record of failing to do so itself. This Committee should also press for other reforms outlined above that would fix some of the underlying structural defects of CAT NMS. At a bare minimum, the governance and control of CAT NMS must be fixed to remove the unresolved conflicts of interests that have caused the delays of the implementation thus far and will continue posing a serious risk and hamper SEC and FINRA's mission of investor protection and the promotion of market integrity.

Conclusion

It is long past time that the SEC had readily at its disposal a state-of-the-art system for monitoring and tracking trading activities across all of the venues that comprise our national market system. As has been well known – and evidenced – for far too long, the SEC simply cannot fulfill its core missions of protecting investors, maintaining the integrity of our markets, and facilitating capital formation without such a system.

The Consolidated Audit Trail system should be a core regulatory tool, owned and controlled by the SEC and used to protect investors, make the capital markets fairer, and facilitate investments in companies. The CAT should not be a privately-held system in the hands of a deeply conflicted private corporation, which is supposed to not only build it but then use it to self-police. Moreover, the CAT's technological capabilities simply must be first rate, not a distant second to private industry standards, and capable of adapting to the ever-evolving markets.

The SEC has all the power, authority and incentives to fix these structural problems. It needs the will and the vigorous support of this Committee, which must hold them accountable and ensure that, after all these years, investors are protected from another Flash Crash and other confidence-killing and costly market practices.

Thank you for considering these issues.

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