FIRM'S GUIDE TO THE CONSOLIDATED AUDIT TRAIL (CAT)

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Deloitte.

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Preface: How to use this Guide

This Guide provides an overview of the Consolidated Audit Trail (CAT) and a summary of considerations for Industry Members (Firms) as they prepare to report to the CAT. For purposes of this document, Firms are specifically those who are Industry Members of the Securities Industry and Financial Markets Association (SIFMA). This document has been divided into multiple sections to assist Firms in understanding the various CAT topics and its potential impacts. It starts with an overview of the scope, products, transaction types, types of Firms, reporting and error correction requirements under Rule 613, followed by implementation timelines for Firms. It also describes the technical specifications for reportable events and fields and provides an awareness of the guidance that is publicly available to Firms on CATNMSplan.com, which includes reporting scenarios and Frequently Asked Questions (FAQs).

The later chapters of the Guide elaborate on potential impacts that Rule 613 has on Firms, and considerations in their implementation, including sourcing data, various reporting models, the use of vendors in the reporting process, technology architecture, and additional considerations such as registration and testing. The Guide describes considerations for control frameworks and governance models that may assist in the enhancement of data quality by enabling the monitoring of end-to-end processes, exception management, and data sources. The Guide provides an overview of testing considerations and industry testing requirements by Firms before receiving clearance to report to the CAT. A checklist of readiness considerations is also provided in both list and free form formats. Potential challenges associated with readiness and reporting are described, including data, regulatory, operational and technology challenges as well as disaster recovery and contingency plans the Firms should consider. The Guide closes with details about the path forward, the focus areas and next steps with respect to the CAT reporting timeline.

This Guide is intended to help Firms understand CAT reporting requirements as they work to comply with the *Consolidated Audit Trail* (CAT) regulations. For Introducing Firms that may ***not*** have reported to the Order Audit Trail System (OATS), shaded boxes have been highlighted to reiterate Introducing Firm considerations.

Client and account information considerations are not included as part of this Guide due to the fact that these terms have not yet been defined by CAT NMS LLC and plans for their inclusion in CAT reporting have not yet been finalized or approved.

This Guide provides an overview of the CAT regulation and provides considerations for implementation; however, **it is not a replacement for the regulatory requirements as communicated on CATNMSplan.com and as defined within the technical specifications, reporting scenarios, and FAQs.** *Additionally, the Plan Processor, has published guidance related to CAT Reporting, including an onboarding guide and connectivity supplement. Firms should monitor CATNMSplan.com for further details regarding these and future document releases.*

Firms should monitor CATNMSplan.com for further updates and announcements.

1.0 Executive Summary

I. Background on Rule 613, Plan Processor and CAT NMS LLC

The United States (US) Securities and Exchange Commission (SEC) adopted SEC Rule 613 (Rule 613) in 2012 to create the Consolidated Audit Trail (CAT) intended to allow regulators to monitor activity in National Market System (NMS) securities throughout the US markets. In November 2016, the SEC approved the CAT NMS Plan, which was submitted by the Self-Regulatory Organizations (SROs). The CAT NMS Plan outlines a broad framework for the creation, implementation, and maintenance of the CAT.

Jointly formed by the SROs, CAT NMS LLC was jointly formed by the SROs to coordinate and collectively select a Plan Processor, thus making the CAT a "facility" of each SRO. The selected Plan Processor is responsible for performing the processing functions required under Rule 613 and the CAT NMS Plan. The Operating Committee of CAT NMS LLC, a governing body composed of representatives of the SROs, oversees the operation of the CAT. On a functional level, CAT will collect information on quotes, orders, routes, and trade execution for exchange-listed equities and options throughout the US NMS, including related events such as cancellations, modifications and acceptances of an order or route.

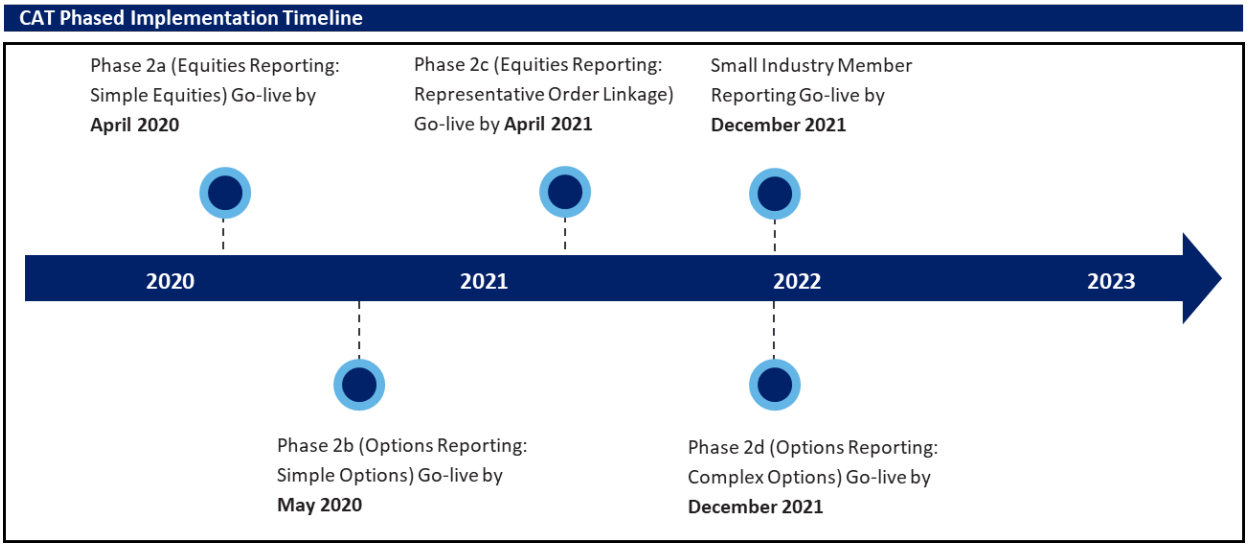
II. Impact to Firms, Product Scope and Timelines

The CAT applies to all US exchanges and Firms, including Alternative Trading Systems (ATSs), registered with an SRO and unlike the Order Audit Trail System (OATS), **there are no broker-dealer exemptions** from reporting requirements. Any broker-dealer that is a member of a national securities exchange or Financial Industry Regulatory Authority (FINRA) and handles orders **must report to CAT**. Eligible securities include NMS stocks, listed options, and over-the-counter (OTC) equity securities.

Firms need to report market transaction data (Reportable Events) to the CAT in a format(s) specified by the Plan Processor, approved by the Operating Committee and compliant with Rule 613. Scope and timelines are further discussed in section 3 of this Guide.

These events cover the end-to-end lifecycle of a trade, including but not limited to, quotes, original receipts or originations of an order, modifications, cancellations, routing, receipts of a routed order execution (in whole or in part), and ultimately order allocations. As indicated in this Guide and elaborated on CATNMSplan.com, these events will be reportable in different phases in the CAT implementation timeline, starting in April 2020, as shown in Figure 1.0.1.

Figure 1.0.1: Phased Implementation Timeline



Additionally, CAT has different timelines for the implementation of the phases indicated in Figure 1.0.1 for large Firms and small Firms. Specific implementation dates and definitions of Firm size will be discussed in detail in section 4 of this Guide. Later scheduled phases include allocations and customer information, but details regarding implementation have not been finalized and published at the time of writing of this Guide.

III. Reportable events, scenarios & fields (in excess of OATS), Error corrections and FAQs

The **Industry Member Technical Specifications** for equities and simple option (Phases 2a and 2b), provides an overview to the requirements of reporting to CAT by Firms. It provides detailed information about data elements, data types, order events and file formats for the in-scope products that are required to be reported. It also describes how Firms must submit files to CAT, including access instructions, network and transport options, error corrections and testing requirements.

A separate companion document to the Industry Member Technical Specifications is also available on CATNMSplan.com, titled **CAT Industry Member Reporting Scenarios,** which contains reporting scenario examples and can be used to determine how event types and field values should be applied while reporting various order handling and execution scenarios for equities and simple options.

Section 5 of this Guide provides an overview of the Industry Members Technical Specifications and the CAT Industry Member Reporting Scenarios documents. Firms should refer to these documents, as well as the FAQs, published on CATNMSplan.com, to gain an understanding of the approved and up-to-date reporting requirements for CAT.

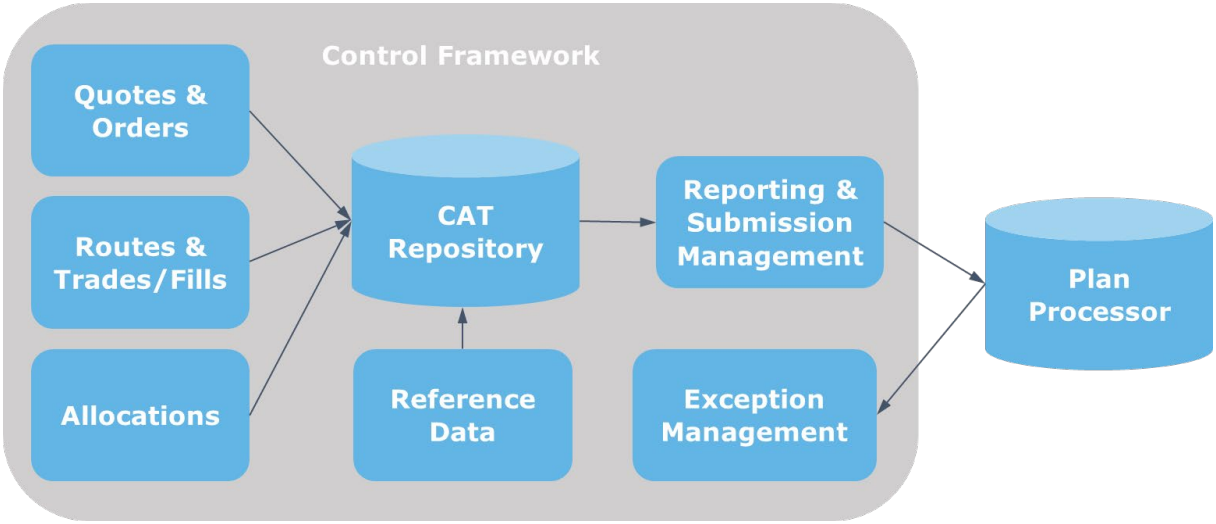
Firms should understand that **CAT is more than an evolution of FINRA's OATS.** CAT will include a substantial number of additional requirements, such as options data, allocations, and customer data that are not considered within the current OATS requirements. CAT has a shorter error correction window than OATS. Errors must be corrected within three trading days (T+3) of the Reportable Event. Introducing

Firms will also have greater reporting obligations under CAT as compared to OATS. A summarized comparison between CAT and OATS reporting requirements is presented in section 5.9 of this Guide.

IV. Operational considerations including architecture, vendors, controls and governance, connectivity and testing

The CAT reporting requirements may necessitate Firms to evaluate their current policies and procedures, reporting architecture, controls framework and/or governance models to confirm timely and correct data reporting. Firms should consider assessing data sources, mapping their data to the technical specifications of CAT, identifying and addressing potential gaps and remediating any observed data anomalies. Source data would flow through several steps, including enrichment, validation controls, and submission formatting for CAT reporting. There are several considerations such as using a centralized or federated model, buying or building in-house solutions, utilizing the services of a vendor or any combination of these factors. Data and technical architecture considerations are discussed in section 6 of this Guide.

Figure 1.0.2: Components of a Conceptual Architecture



Operational processes including CAT submission management and exception management, will also be important components of a sustainable solution. The aggregation and transmission of CAT data also introduces several security considerations since CAT requires that data be protected at rest and in transit. Firms that are making changes to their systems and operations for CAT, will need to plan ahead to meet the industry timelines. Connectivity over private lines will be available in October 2019 and CAT Secure Reporting Gateway in November 2019. Industry testing of CAT submissions begins in **December 2019**. Firms should consider performing internal testing of their systems and processes for CAT Reporting in preparation for the industry go-live timelines.

To maintain CAT compliance over time, an effective control framework and governance model that can monitor the timeliness, accuracy and completeness of CAT submissions and error corrections, as well as manage changes to the business, products, systems and regulations that may impact a Firm's CAT reporting solution(s) should be considered. Service providers within a Firm's CAT solution may also

introduce some risks to be managed. Governance models and controls frameworks are discussed in section 7 of this Guide.

V. Other considerations

In addition to the CAT reporting requirements and considerations for implementing CAT reporting solutions, Firms should consider technological, regulatory and operational challenges that may arise in the preparation and data reporting stages of CAT reporting. New data types such as the Firm Designated ID (FDID) and products such as options may require greater attention as they are not currently reported to OATS. Firms who are also OATS Reporters, should also consider the challenges in parallel reporting to OATS and CAT, as the retirement plan for OATS is not yet final.

From an operational perspective, registration for CAT will require Firms to identify Principal, Primary, and Secondary contact individuals as well as the CAT Reporter (Firm or CAT Reporting Agent if applicable). These terms will be defined and expanded upon later in this Guide. Firms should consider whether their business continuity, disaster recovery and contingency plans need to be (re)assessed and adjusted to perform in conjunction with CAT requirements and in accordance to Firm specific capabilities. Additionally, Firms may want to consider the potential advantages and disadvantages of client account holder notifications indicating that. Firms should assess if there are any incremental responsibilities, in relation to applicable laws and regulations, beyond those included in current client account agreements which would extend to CAT. It should be noted that at the time of writing this Guide, CAT does not have an additional regulatory requirement for client communications.

Technology challenges include integrity and consistency of the data as it flows through internal systems as well as vendor platforms. Regulatory challenges include supporting parallel reporting regimes (e.g. OATS, Blue Sheets) alongside CAT, as well as being prepared for regulators to have an increased understanding of Firms' markets activities and responding to regulator inquiries about their CAT submissions.

Firms should consider their current capabilities in relation to CAT readiness and in light of operational, technological and regulatory challenges, including but not limited to those identified in this Guide. Section 8.10 includes a checklist that Firms could leverage to perform an assessment to understand their CAT readiness status.

Finally, Firms should make sure that they comply with immediate requirements for CAT, including registration with the Plan Processor, meeting clock synchronization requirements, and preparing for connectivity testing in Q3 2019.

2.0 Introduction

2.1 Background on the CAT (SEC Rule 613)

Rule 613 was established by the SEC on July 11, 2012 after the 2010 "Flash Crash," which saw the Dow Jones Industrial Average Index (DJIA) reduce in value by approximately 9% in a matter of minutes. In response to the high market volatility, and the difficulty in determining the cause of the Flash Crash, the SEC adopted Rule 613 in 2012 to create the CAT, intended to allow regulators to monitor activity in NMS securities throughout the US markets. Rule 613 outlines a broad framework for the creation, implementation, and maintenance of the CAT, including minimum standards for adherence to the framework, as established by the SEC.

The CAT collects information on a variety of market events, including but not limited to, quotes, orders, routes, and trade executions for all exchange-listed equities and options throughout the NMS. Additionally, the CAT will track related events such as cancellations, modifications and order or route acceptances. The development and implementation of the CAT on an industry-wide basis, represents an evolution in maintaining the integrity of the financial and capital markets.

2.2 What is the NMS Plan?

In September 2014, the SROs submitted the CAT NMS Plan to the SEC, describing how the SROs would implement and maintain the CAT. The SROs created and jointly own CAT NMS LLC, which was formed by the SROs to arrange for and oversee the creation, implementation and maintenance of the CAT as required under Rule 613. The SEC published the amended CAT NMS Plan in May 2016 and requested public comments; later approving the CAT NMS Plan on November 15, 2016.

2.3 Role of CAT NMS, LLC

Under Rule 613, each member of a national securities exchange or national securities association is required to comply with all the provisions of the CAT NMS Plan. The CAT NMS Plan requires each SRO to adopt rules requiring its members to comply with Rule 613 and the CAT NMS Plan, and to enforce compliance by its members in accordance with these governing regulations. Accordingly, each SRO has adopted rules requiring its members to comply with Rule 613 and the CAT NMS Plan.

With respect to governance of the CAT, each SRO is permitted to appoint one member of the Operating Committee and each SRO appointee is entitled to one vote. The CAT NMS Plan sets forth certain provisions relating to the Operating Committee, including identification of those actions requiring a majority vote, a supermajority vote or a unanimous vote, and the management of conflicts of interest. Additionally, the Operating Committee oversees the operation of the CAT and has the responsibility of oversight the Plan Processor, an entity that performs the processing functions required by Rule 613 and the Plan.

3.0 Overview of CAT Scope and Requirements

3.1 Introduction

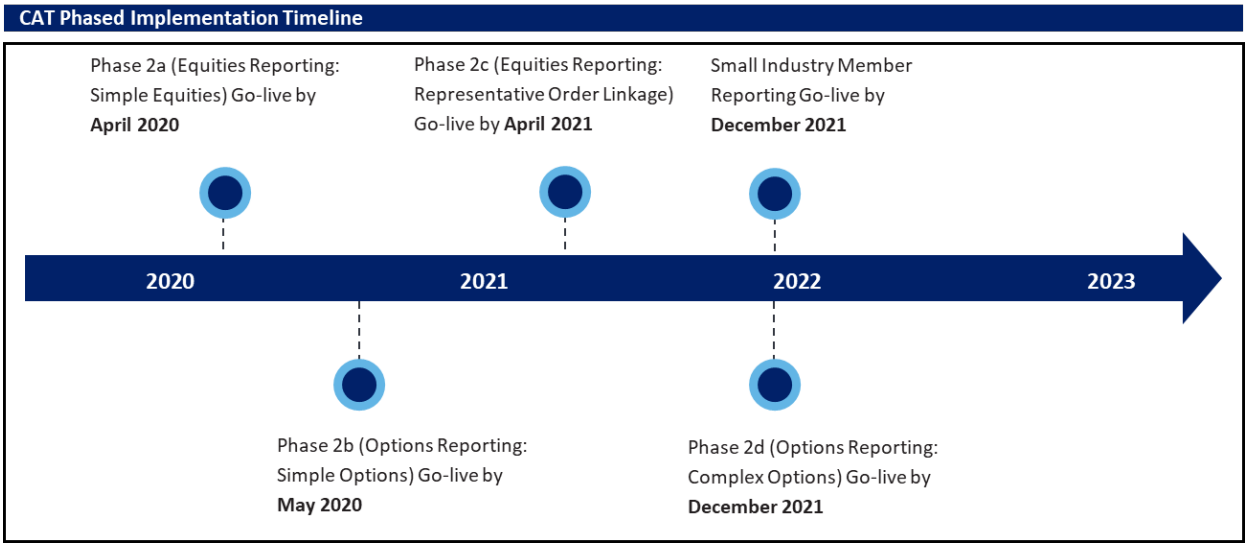
The provisions set forth in Rule 613 apply to all US equities and options exchanges and broker-dealers (including ATSs) registered with an SRO. **Under CAT, there are no exceptions from Rule 613 reporting requirements.** Any broker-dealer that is a member of a national securities exchange or FINRA and receives, originates and/or handles orders in NMS Securities, which includes NMS stocks and Listed Options, and/or OTC Equity Securities must report to CAT.

Firms are required to report market transaction data to the CAT in a format or formats specified by the Plan Processor. Formats for reporting are defined in the technical specifications, scenarios and FAQs that are published on CATNMSplan.com.

Reportable Events cover the end-to-end lifecycle of a trade, including but not limited to, quotes, the original receipt or origination of an order, modification, cancellation, routing, receipt of a routed order execution (in whole or in part). The allocation of an order will be reportable in a later phase in the CAT implementation timeline.

CAT Reporting will be implemented in a phased-manner for Firms.

Figure 3.1.1: CAT Implementation Timeline



Additional phases, that increase the scope of CAT reportable data and events, are currently under consideration by the Operating Committee. At the time of writing this Guide, client allocations and customer information have not yet been defined and have not been included in this Guide. Regardless, CAT implementation is scheduled in different phases for large and small Firms. Specific implementation dates and definitions of Firm size will be discussed in detail in the following sections.

3.2 Type and Size of Member Firms

Firms **will be** impacted differently by the CAT reporting requirements, based upon their business type and the type(s) of reportable activity they conduct.

Types of Firms

An Industry Member (also defined as Firm or Firms in this document) is a member of a national securities exchange or a member of a national securities association. Any broker-dealer that is a member of a national securities exchange or FINRA and handles orders in NMS Securities, which includes NMS stocks and listed Options, and OTC equity securities must report to CAT.

Firms can be:

1. **Executing Firm:** Broker or dealer that processes a buy or sell order on behalf of a client or another Firm. Executing Firms have a clear reporting responsibility for the orders they handle, routing of the orders and ultimate execution.

2. **Introducing Firm:** Broker or dealer that interacts with customers but may not execute trades on behalf of customers. Introducing Firms will have a regulatory obligation to report any quotes, new orders, routes and any cancels or amendments to those events.

3. **Clearing Firm:** Broker or dealer that not only handles orders to buy/sell securities, but also maintains custody of securities and other assets. The act of clearing (including step-ins and step-outs) is not reportable, however, if handling orders or providing execution services, a clearing member will have an obligation to report those events. If the clearing member provides reporting services to their correspondent or Introducing Firms, then the roles and responsibilities should be clearly defined for that operating model. If the Clearing Firm is reporting on behalf of another Firm, that the outsourcing Firm may designate the Clearing Firm as the CAT reporting source on their registration.

Size of Firms

For CAT reporting, there are different timelines for **small and large Firms**. The SEC defines a **small Firm** as a broker or dealer that (a) had total capital (net worth plus subordinated liabilities) of less than $500,000 on the date in the prior fiscal year as of which its audited financial statements were prepared pursuant to SEC Act of 1934 article 240.17a-5(d) or, if not required to file such statements, a broker or dealer that had total capital (net worth plus subordinated liabilities) of less than $500,000 on the last business day of the preceding fiscal year (or in the time that it has been in business, if shorter); and (b) is not affiliated with any person (other than a natural person) that is not a small business or small organization as defined in SEC Rule 0-10.

Firms that do not fall into the above category are considered ***large Firms according to the regulation****.* **Unless otherwise noted, the timelines described in this Guide apply to large Firms.**

3.3 Products in Scope

Eligible Securities

Firms will be required to report to the CAT reportable events involving an eligible security. Under the CAT NMS Plan, "eligible security" includes equities and options with the following definitions[1]:

> (1) all **NMS Securities**, meaning "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"; and
>
> (2) all **OTC Equity Securities**, meaning "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."

For eligible securities, the types of events that will need to be reported will include:

- All **proprietary orders,** including market maker orders
- All **street side representative orders** (both agency and proprietary)
- **Electronic listed quotes** (NMS stocks) sent to an exchange or the Alternative Display Facility (ADF) (assumes exempted relief request for verbal quotes)
- **Unlisted quotes** (OTC Equity Securities) received by a broker-dealer operating an inter-dealer quotation system (e.g., Global OTC, OTC Link)
- **Unlisted quotes that meet the definition of bid or offer** under the Plan sent by a broker-dealer to a quotation venue not operated by an SRO or broker-dealer
- **"Simple Electronic Option Orders:"** orders to buy or sell a single option that are not related to or dependent on any other transaction for pricing or timing of execution that are either received or routed electronically by an Industry Member CAT Reporter
- **"Electronic Paired Option Orders:"** electronic option orders that contain both the buy and sell side that is routed to another Industry Member or exchange for crossing and/or price improvement as a single transaction on an exchange. Further, the events related to Simple Electronic Option Orders subject to reporting in Phase 2b are limited to those events which involve electronic receipt of an order, or electronic routing of an order
- **Electronic receipt of an order:** the initial receipt of an order by an Industry Member in electronic

[1] DEFINITIONS, LIMITED LIABILITY COMPANY AGREEMENT OF CAT NMS, LLC. https://www.catnmsplan.com/wp-content/uploads/2018/01/CAT-NMS-Plan-Current-as-of-1.10.18.pdf

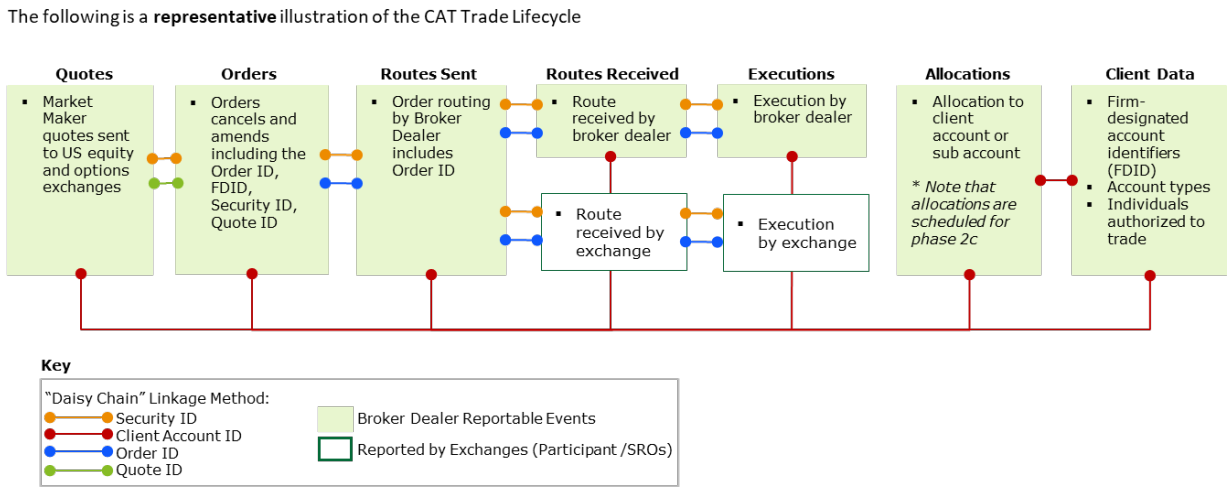
form in standard format directly into an order handling or execution system

- **Electronic routing of an order:** the routing of an order via electronic medium in standard format from one Industry Member's order handling or execution system to an exchange or another Industry Member

3.4 Trade Lifecycle Events and Linkage

The Plan Processor will use the "daisy chain approach" to link and create the order lifecycle. A series of unique identifiers, assigned to each event handled by CAT Reporters, are linked together by the central repository and assigned a single CAT-generated CAT-Order-ID that is associated with each individual order event and used to link the order lifecycle events.

Figure 3.4.1: CAT Trade Life Cycle Event and Linkage



Within the trade lifecycle, a reportable event includes, but is not limited to, a quote, order, modification, cancellation, route, and acceptance of a routed order, execution (in whole or in part) and allocation of an order.

There are certain reportable data elements which are used to link related events. These data elements include:

1. Event IDs (including quote ID and order ID)
2. Account Firm Designated ID (FDID); and
3. Trade specific information (including security and time stamp)

Details on reportable events and data elements for equities and single leg options transactions will be further described in Section 5 of this Guide.

3.5 Data Process and Timing

The CAT NMS Plan requires Firms to record order, quote, fulfillment and trade events. Real-time reporting to CAT is not required. Data may be bulk uploaded all at once prior to the reporting deadlines or may be submitted in batches with associated uploads throughout the day.

The CAT NMS Plan requires certain reportable events, outlined later in this Guide and in the Industry Member Technical Specification document, to have timestamps in milliseconds. To the extent that a CAT Reporter's order handling or execution systems utilize timestamps in increments finer than milliseconds (e.g. microseconds), such a CAT Reporter is required to utilize such finer increments when reporting CAT data to the CAT.

Reportable Events for a Trading Day are required to be reported to CAT by 8:00 AM Eastern Standard Time (EST) on the next Trading Day (T+1)[2]. Error corrections are due by T+3, which is a substantial change from current OATS requirements of T+5.

Figure 3.5.1: Data Reporting and Submission

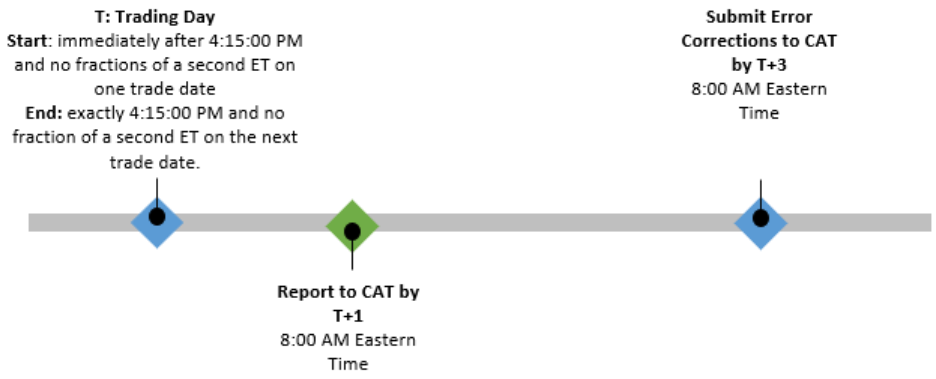


Table 3.5.1: Examples for Error Correction Timelines

No.	T (Reportable Event is Executed on):	T+1	T+3
1	Monday, 4:00 PM EST	Tuesday, 8:00 AM EST	Thursday, 8:00 AM EST

[2] Trading day is defined per section 6.4.1 in the Technical Specifications on CATNMSplan.com as: "Trading Day for Industry Members is defined as: Start: immediately after 4:15:00 PM and no fractions of a second Eastern Time on one trade date End: exactly 4:15:00 PM and no fraction of a second Eastern Time on the next trade date (T=Trading Day, a defined term).

No.	T (Reportable Event is Executed on):	T+1	T+3
2	Monday, 4:20 PM EST	Wednesday, 8:00 AM EST	Friday, 8:00 AM EST

Trading Day (T) for Industry Members is defined as[3]

- **Start**: immediately after 4:15:00 PM EST and no fractions of a second on one trade date
- **End:** exactly 4:15:00 PM EST and no fraction of a second on the next trade date

The Trading Day is used to determine the reporting deadline of CAT events, including when error repairs and Firm-initiated corrections are due. Weekends or any day that all equities or options national securities exchanges are closed are not considered a Trading Day. CAT accepts submissions 24 hours per day, 7 days per week, other than during announced scheduled maintenance. Reports received after the deadline **will be considered late.**

Introducing Firm Consideration:
Firms will need to report events that occurred during a particular Trading Day anytime between the time the event occurred and the reporting deadline, which is 8:00 AM EST on the next Trading Day. Any report that is received after the deadline will be considered late.

Error Corrections

Errors under CAT, as defined for the purposes of this Guide, include, but are not limited to, file integrity errors, mandatory data element errors, syntax errors and linkage errors communicated to Firms through the CAT Reporter Portal and the Secure File Transfer Protocol (SFTP), which the Plan Processor has referred to as CAT File Transfer.

Errors must be repaired prior to 8:00 AM EST on T+3 (CAT Trading Day of event + three Trading Days). Repairs received after the repair deadline will be considered late. Firms must correct errors regardless of when they occur (i.e. Firms must still correct errors even after the correction deadline). Additional details as well as the latest version of Error Correction timelines can be found in the Industry Member Technical Specifications at CATNMSplan.com. The staged implementation of CAT may impact the timing of error correction as additional error type validations by the Plan Processor are performed. For further considerations on Error correction processes and implementation impact, refer to Guide section 5.4.

[3] Appendix D: CAT Date Definitions and Reporting Guidelines, Industry Member Technical Specifications. https://www.CATNMSplan.com/technical-specifications/index.html

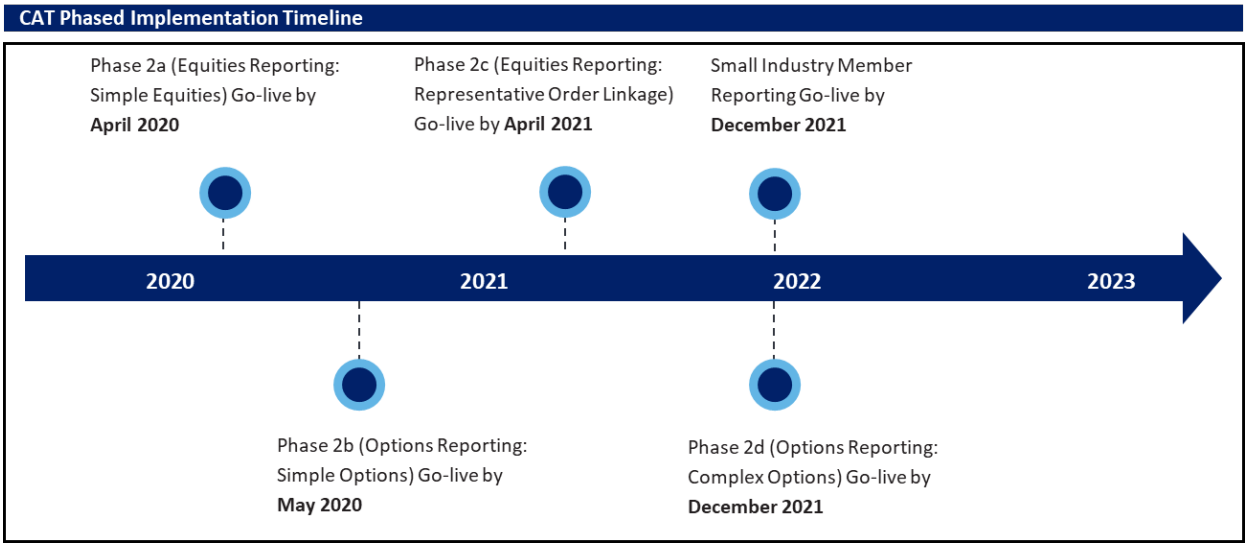
4.0 CAT Industry Member Implementation Timelines

4.1 Introduction

The reporting of order and trade data to the CAT will be carried out in a **phased manner**. At the time of writing this Guide, the SROs have defined the first four phases of Industry Member reporting. Industry testing begins in December 2019, with simple equity reporting (Phase 2a), commencing in **April 2020 for large Firms**, followed by simple options (Phase 2b), representative orders (Phase 2c), and finally complex options (Phase 2d). **Small Firm** reporting will commence in **December 2021**. It is noted that small Firms have the option to ***voluntarily*** begin reporting prior to the scheduled December 2021 go-live date.

Refer to the CAT NMS Timeline for the latest version of the Implementation Timeline.

Figure 4.1.1: CAT Phased Implementation Timeline



Technical Specifications Publication Timeline

The technical specifications for Phases 2a and 2b were published on April 29, 2019 with the latest version available on CATNMSplan.com.

The dates for the release of the technical specifications for Phases 2c, 2d, and Customer & Account were released in April 2019. The dates are specified in Table 4.1.1.

Table 4.1.1: Date of Release for Technical Specifications

Date		
Phase 2c	Phase 2c: Representative Order Linkages	**January 2020**
Phase 2d	Phase 2d: Manual Options Order, Complex Orders and Options Allocations	**January 2020**
Customer and Account Information	Customer & Account	**January 2021**

4.2 CAT Implementation Phases and Stages

CAT Implementation is going to occur in a phased manner. As defined in the Industry Member Technical Specifications on CATNMSplan.com, the currently published phases will consist of the following:

Table 4.2.1: CAT Implementation Phases[4]

Phase 2a ***Equities Part 1*** ***4/20/2020***	• All events and scenarios covered by OATS • All proprietary orders including market maker orders • Firm Designated IDs • All street side representative orders (both agency and proprietary) • Linkage is required between the representative street side order and the order being represented when the representative order was originated specifically to represent a single order (received either from a customer or another broker-dealer) and there is: 1) an existing direct electronic link in the Firm's system between the order being represented and the representative order, and 2) any resulting executions are immediately and automatically applied to the represented order in the Firm's system • Quotes in NMS stocks sent to a national securities exchange or facility of a national securities association *assumes exemptive relief request or Plan amendment for verbal quotes • Unlisted quotes (OTC Equity Securities) received by a broker-dealer operating an inter-dealer quotation system (e.g., Global OTC, OTC Link) *see above comment on verbal quotes • Unlisted quotes that meet the definition of bid or offer under the Plan sent by a broker-dealer to a quotation venue not operated by an SRO or broker-dealer *see above comment on verbal quotes • Electronic capture time for manual orders • OATS guidance regarding Firm modifications to previously routed orders (as outlined in OATS FAQ C35[5]) applies to CAT

[4] Table 1: Industry Specifications Phased Approach: Industry Member Technical Specifications. https://www.CATNMSplan.com/technical-specifications/index.html

[5] C35. Many of our customer orders are routed to an ECN. Although the orders are market orders, they are required to contain a limit price. Our trader modifies the limit price on the orders, as market conditions require, to obtain the best price for the customer. In a fast-moving market, the trader may modify the order many times over a short period. Are we required to submit an OATS report for each of these modifications? OATS Compliance FAQs. https://www.finra.org/industry/faq-oats-compliance-faq

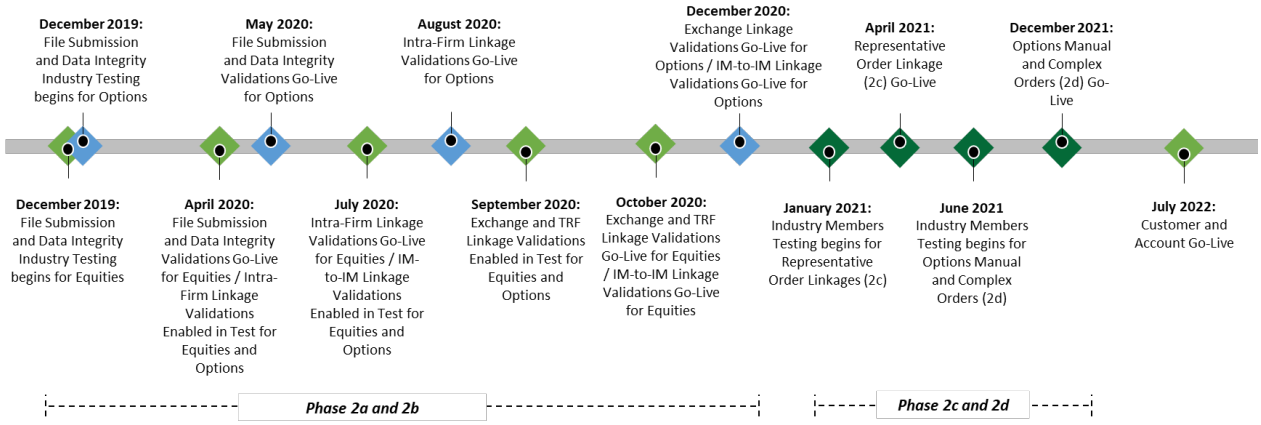
Phase 2b ***Options Part 1*** ***5/18/2020***	• Simple options electronic orders, excluding electronic paired orders
Phase 2c ***Equities Part 2*** ***4/2021***	• Linkages to the customer order(s) being represented for all representative order scenarios, including agency average price, net trading, aggregated orders, OMSEMS scenarios • Sub-account allocations • Rejected External Routes with flag indicating route was not accepted by receiving destination • Internal Route modifications and cancels • Unlisted quotes sent to an inter-dealer quotation system operated by a CAT Reporter • Revisit application of OATS guidance to CAT for Firm modifications to previously routed orders (as outlined in OATS FAQ C35) • Special Handling instructions on Route Reports (limited to a defined set of values) • Quote ID on Trade Events • Order Effective Time for orders that are received by an Industry Member and do not become effective until a later time
Phase 2d ***Options Part 2*** ***12/2021***	• Simple options manual orders • Electronic and manual paired orders • All complex orders with linkage to all CAT-reportable legs

The timelines for these phases are described in the following sections.

4.3 Large Firm Implementation Timelines

Large Firm industry testing for Phase 2a is anticipated to commence in December 2019, with the first go-live date planned for April 2020. To gain access to the production environment, Firms are required to successfully submit a file for testing. Summary of the timeline for each phase for large Firms is shown in Figure 4.3.1.

Figure 4.3.1: Timeline for Large Firms



The implementation plan for large Firms includes submission of all data, including all linkage keys, beginning in April 2020 with data integrity and linkage validation introduced incrementally, beginning with basic data integrity checks and then enabling the various linkage validations in stages. Timelines for both testing and production in each Phase for large Firms are as follows:

Table 4.3.1: Phase 2a – Equities

	Date	
Phase 2a: Equity	***1. File Submission & Data Integrity checks***	
	Industry Testing: Start submission of data into test environment and gather feedback on data integrity checks. *There is no requirement for mandated participation; However, Firms will be required to submit a file successfully to test prior to being given access to Production*	**December 2019**
	Mandatory production submission*:* Perform all data integrity checks *Firms will be required to submit all Phase 2a data everyday by 8 am EST T+1 and correct all rejected data by 8 am on T+3*	**April 2020**
	2. Intra-Firm Linkage	
	Industry Testing: Gather feedback on Intra-Firm linkage *Test requirements are still under discussion*	**April 2020**
	Mandatory production submission: Add Intra-Firm linkage *Firms will be required to correct all Intra-Firm linkage errors by 8 am EST on T+3*	**July 2020**
	3. Industry Member-to-Industry Member Linkage (Inter-Firm Linkage)	
	Industry Testing: Gather feedback on Industry Member-to-Industry Member linkage *Coordinated industry testing – specific plans are in development*	**July 2020**
	Mandatory production submission: Add Industry Member-to-Industry Member linkage checks *Firms will be required to correct all Firm to Firm linkage errors by 8 am EST on T+3*	**October 2020**
	4. Exchange and TRF Linkage	
	Industry Testing: Gather feedback on exchange and Trade Reporting Facility (TRF) linkage *Coordinated industry testing – specific plans are in development*	**September 2020**
	Mandatory production submission: Add Exchange and TRF linkage checks *Firms will be required to correct all exchange linkage errors by 8 am EST on T+3*	**October 2020**

Table 4.3.2: Phase 2b – Options

		Date
Phase 2b: Options	***1. File Submission & Data Integrity checks***	
	Industry Testing: Start submission of data into test environment and gather feedback on data integrity checks *There is no requirement for mandated participation; However, Firms will be required to submit a file successfully to test prior to being given access to Prod*	**December 2019**
	Mandatory production submission*:* Perform all data integrity checks *Firms will be required to submit all Phase 2b data everyday by 8 am EST T+1 and correct all rejected data by 8 am on T+3*	**May 2020**
	2. Intra-Firm Linkage	
	Industry Testing: Gather feedback on Intra-Firm linkage *Test requirements are still under discussion*	**April 2020**
	Mandatory production submission: Add Intra-Firm linkage checks *Firms will be required to correct all Intra-Firm linkage errors by 8 am EST on T+3*	**August 2020**
	3. Industry Member-to-Industry Member Linkage (Inter-Firm Linkage)	
	Industry Testing: Gather feedback on Industry Member-to-Industry Member linkage *Coordinated industry testing – specific plans are in development*	**July 2020**
	Mandatory production submission: Add Industry Member-to-Industry Member linkage checks *Firms will be required to correct all Firm to Firm linkage errors by 8 am EST on T+3*	**December 2020**
	4. Exchange and TRF Linkage	
	Industry Testing: Gather feedback on exchange and TRF linkage *Coordinated industry testing – specific plans are in development*	**September 2020**
	Mandatory production submission: Add Exchange linkage checks for go-live of all 2b functionality *Firms will be required to correct all exchange linkage errors by 8 am EST on T+3*	**December 2020**

For the following phases, additional milestones have not been published:

Table 4.3.3: Phase 2c - Representative Order Linkages

Date		
Phase 2c: Representative Order Linkages	***Representative Order Linkages***	
	Industry Testing: Start submission of data into test environment and gather feedback on data integrity checks	**January 2021**
	Mandatory production submission for representative order linkages	**April 2021**

Table 4.3.4: Phase 2d - Manual Options Orders, Complex Orders and Options Allocations

Date		
Phase 2d: Manual Options Orders, Complex Orders and Options Allocations	***Manual Options Orders, Complex Orders and Options Allocations***	
	Industry Testing: Start submission of data into test environment and gather feedback on data integrity checks	**June 2021**
	Mandatory production submission for Manual Options Orders, Complex Orders and Options Allocations	**December 2021**

The CAT NMS Plan defines a Manual Order Event as a "non-electronic communication of order-related information for which CAT Reporters must record and report the time of the event." Complex Options may include an equity component and multiple options components (e.g., buy-write, straddle, strangle, ratio spread, butterfly and qualified contingent transactions).

Table 4.3.5: Reporting of Customer and Account Information

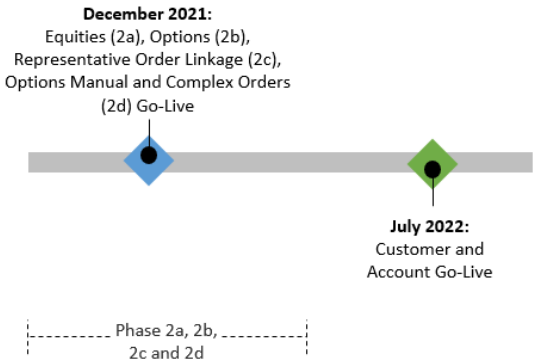
Date		
Customer and Account Information	***Customer and Account Information***	
	Industry Testing: Start submission of data into test environment and gather feedback on data integrity checks	**January 2022**
	Mandatory production submission for Customer and Account information	**July 2022**

4.4 Small Firm Implementation Timelines

For small Firms, each phase will go live into production approximately one year after the go-live dates for large Firms. A Small Firm is a Firm that qualifies as a small broker-dealer as defined in SEC Rule 613 and which satisfies the criteria listed above.

All phases - simple equity reporting (Phase 2a), simple options (Phase 2b), representative order linkages (Phase 2c), and finally complex options (Phase 2d) - are expected to commence in December 2021, while Customer and Account Information should be live by July 2022.

Figure 4.4.1: Timeline for Small Firms



Per ***CAT FAQ A22***[6]***,*** small Firms may voluntarily choose to begin reporting prior to December 2021. However, if a small Firm begins reporting at such earlier date, (1) it must report all CAT Data required to be reported by Firms in accordance with the CAT Compliance Rules, the CAT NMS Plan and the Industry Member Technical Specifications, as if it were required to report such CAT Data; and (2) it may not cease reporting to the CAT once it begins.

The details of the timeline for Small Firms are shown in the table below:

Table 4.4.1: Small Firm Timeline

Date		
Phase 2a: Equities	All 2a functionality for File Submission, Data Integrity, and Linkages must be live in production one year after the reporting goes give for large Firms	**December 2021**
Phase 2b: Options	All 2b functionality for File Submission, Data Integrity, and Linkages must be live in production approximately one year after the reporting goes live for large Firms	**December 2021**

[6] A22 Can Small Industry Members that are not OATS Reporting Members (Small Industry Non-OATs Reporters) voluntarily report to the CAT prior to December 2021? CAT General FAQs. https://www.catnmsplan.com/faq/index.html#faqGen

Date		
Phase 2c: Representative Order Linkages	All 2c functionality for Representative Orders Linkages must be live in production	**December 2021**
Phase 2d: Manual Options Orders, Complex Orders and Options Allocations	All 2d functionality for Manual Options Orders, Complex Orders and Options Allocations must be live in production approximately one year after the reporting goes live for large Firms	**December 2021**
Customer and Account Information	All functionality for Customer and Account Information must be live in production at the same time as reporting goes live for large Firms	**July 2022**

5.0 Understanding the Technical Specifications for Equities and Options

5.1 Introduction

For the purposes of this Guide, this section is intended to provide an overview of the Industry Member Technical Specifications for reporting of equities and options, as per the provisions of Rule 613. As outlined in Rule 613, Firms will have to report market transaction data in accordance to the format(s) specified by the Plan Processor and approved by the Operating Committee and as indicated in the Industry Member Technical Specifications available on CATNMSplan.com. At the time of writing this Guide, only Phase 2a and Phase 2b Technical Specifications have been approved and provided to Firms.

The published technical specifications document presents data elements, data types and order events for the in-scope products that are required to be reported by Firms. The Technical Specifications are essential for a Firm to build its reporting infrastructure to prepare for go-live.

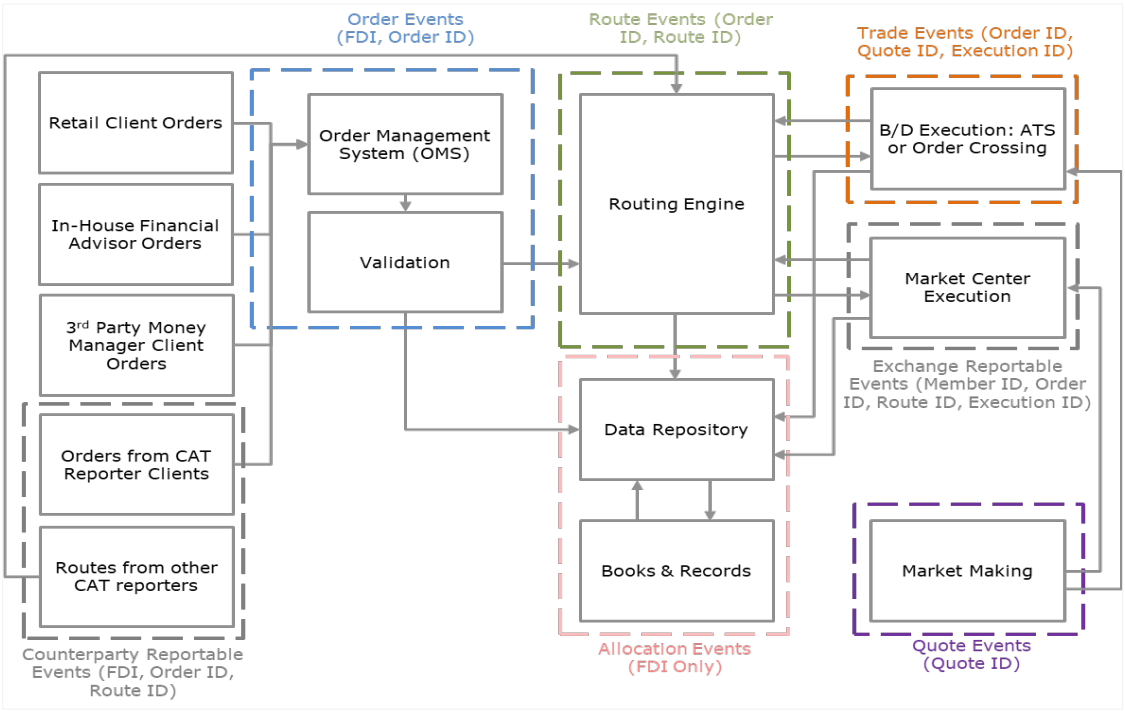
A separate companion document containing detailed reporting scenario examples and titled **CAT Industry Member Reporting Scenarios** is available on CATNMSplan.com and should be used as a guide for determining how the event types and field values laid out in this document must be applied when reporting various order handling and execution scenarios for both equities and options.

5.2 Reportable Events and Fields

Reportable Events

Reportable Events include, but are not limited to, the original receipt or origination, modification, cancellation, routing, execution (in whole or in part) and allocation of an order, quotations, and receipt of a routed order. The below figure illustrates the CAT Reportable Events that constitute a trade lifecycle order flow. The reportable events for equities are described in Table 5.2.1 and the reportable events for single leg option transactions are described in Table 5.2.2.

Figure 5.2.1: CAT Reportable events that constitute a trade lifecycle order flow



The reportable events for eligible securities in equities are listed in the Table 5.2.1. This includes events related to manual equity orders, which are reportable in Phase 2a.

Table 5.2.1: Equity Events[7]

No.	Event	Description
1	New Order Event	Reported when an Industry Member originates an order, receives a customer order, originates a bunched, representative or proprietary order, or receives an order from a non-reporting foreign entity
2	New Order Supplement Event	Supplement to the New Order event, used when the New Order event exceeds the maximum length allowed, or when the orders being represented are not captured in the New Order Event
3	Order Route Event	Reported when an Industry Member routes an order to another broker dealer, exchange or Alternative Trading System (ATS)
4	Order Modify Route	Deferred – event not required for Phase 2a. SROs will evaluate need for a modified route event after reviewing Phase 2a data and include event in Phase 2c, if necessary

[7] Table 8: Equity Events: Industry Member Technical Specifications. https://www.CATNMSplan.com/technical-specifications/index.html

No.	Event	Description
5	Order Cancel Route	Deferred – event not required for Phase 2a. SROs will evaluate need for a cancelled route event after reviewing Phase 2a data and include event in Phase 2c, if necessary
6	Order Accepted	Reported when an Industry Member, including an Alternative Trading System, accepts a routed order that originated at another broker dealer
7	Order Internal Route Accepted	Reported when an order moves within an Industry Member to another desk or other department
8	Order Internal Route Modified	Reported when an Order Internal Route Accepted was modified (*Deferred – event not required for Phase 2a*)
9	Order Internal Route Cancelled	Reported when an Order Internal Route Accepted was cancelled (*Deferred – event not required for Phase 2a*)
10	Child Order	Reported when an order is sliced within the desk or department it is being worked, and is assigned a new order identifier
11	Child Order Modified	Reported when a Child Order is modified
12	Child Order Cancelled	Reported when a Child Order is cancelled
13	Order Modified	Reported when changes to the Material Terms of an order are made, or an order is cancel/replaced
14	Order Modified Supplement Event	Supplement to the Order Modified event, used when the Order Modified event exceeds the maximum length allowed, or when the orders being represented are not captured in the Order Modified Event
15	Order Adjusted	Used to report simple order modifications, including changes to the price or quantity of the order
16	Order Cancelled	Reported when an Industry Member fully or partially cancels an order
17	New Quote	Reported when quotations on equity Eligible Securities sent to a quote display facility or quote driven Alternative Trading System, or a quote sent to a customer or broker dealer that resulted in a trade
18	Quote Received	Reported when a quote is received by an Industry Member
19	Quote Cancelled	Reported when a quote is cancelled
20	Trade Event	Reported by the executing venue where the trade occurred, with details associated with each side of the trade
21	Trade Supplement Event	Reported when there is more than one order associated with one side of a trade
22	Order Fulfillment	Reported when the execution of a customer/client order is not required to be reported for public dissemination. The event includes details associated with the client/customer side and Firm side
23	Order Fulfillment Amendment	Reports the amendment of a previously reported fulfilment, including the full restatement of the event with applicable changes represented

No.	Event	Description
24	Post Trade Allocation	Reported when executed shares are allocated to end customer accounts during post-trade processing (*Deferred – event not required for Phase 2a*)
25	Amended Allocation	Reported when an amendment occurs to a previously reported post trade allocation (*Deferred – event not required for Phase 2a*)

For purposes of clarity, the Order Route event, Trade event, Order Fulfillment event, and Quote event are elaborated below.

a) Order Route Events

The Order Route event is required to be reported by a Firm to CAT when an order is routed in full or in part, to another Firm, to foreign Firms and to exchanges. The Order Route event is also required when an order is routed between two Industry Member Identifier (IMIDs) that are attributed to the same legal entity. Order handling instructions that are sent by the routing Firm to the receiving destination, are to be reported in the *handlingInstructions* CAT field using a standardized list of handling instructions and codes.

These handling instructions are not required to be reported on the Order Route event until Phase 2c. For additional details on Order Route event, refer to **Order Route** in the latest version of the **Industry Member Technical Specifications** document.

Introducing Firm Consideration:

- ***Introducing Firms will need to report Order Route events (quote, order, route) when it enters orders into its Clearing Firm's systems for order execution from a proprietary account, or for routing orders via algorithms provided by the Clearing Firm's systems***
- ***Order Route events will need to be reported even when orders are directed to an exchange for execution using Clearing Firm's systems***
- ***When accessing a Clearing Firm system for direct market access reporting responsibilities lies with the Introducing Firm (including execution event)***

b) Trade events

These events include the Trade Event (MEOT) and the Trade Supplement Event (MEOTS). Trade events are reported when an Industry Member is the executing venue for a trade and is required to report the trade for public dissemination purposes. Trade events are two-sided, and contain information on both sides of the trade, with the exception of negotiated trades and internalized trades.

Details of each side of a trade are reported using a list of fields that are collectively named as Trade Side Details. For additional details on Trade events, refer to **Trade** in the latest version of the **Industry Member Technical Specifications** document.

c) Order Fulfillment events

These events include the Order Fulfillment Events (MEOF) and the Order Fulfillment Amendments Event (MEFA). Order Fulfillment Event is used to report the execution of a customer/client orders that are not required to be reported for public dissemination purposes. The customer/client details and the Firm side details will be captured in an Order Fulfillment Event. Order Fulfillment Amendment Event is used to report an amendment to a previously reported fulfillment. In an amendment scenario, even though some of the data elements may remain unchanged, a Firm would need to capture the entire state of the amended fulfillment in an Order Fulfillment Amendment Event.

The Order Fulfillment event is used to report the execution of a customer/client order that is not required to be reported for public dissemination purposes. They are required in scenarios where a representative order is used to facilitate the execution of the customer or client order and/or when an order is routed to a foreign market and the resulting foreign execution is not captured by CAT.

For additional details on Order Fulfillment Events, refer to **Section 4.13 Order Fulfillment** in the latest version of the **Industry Member Technical Specifications** document.

d) Quote events

This includes New Quotes (MENQ), Quote Received (MEQR) and Quote Cancelled (MEQC) events. In Phase 2a, the following quotations must be reported:

1. Quotes in NMS Securities sent to an exchange or the ADF. Quotes in NMS Securities sent to an exchange must be reported using the New Order and Route Events.

2. Quotes in OTC Equity Securities received by an Industry Member CAT Reporter operating an inter-dealer quotation system.

3. Quotes in OTC Equity Securities that meet the definition of bid or offer under the CAT NMS Plan sent by a broker-dealer to a quotation venue not operated by a CAT Reporter.

Quotes are reported when received by a Firm. Quotes cancelled are reported when as cancelled. If a quote is cancelled that was sent by an ATS or a Firm, then both the sender of the quote and the entity that accepted the quote must report Quote Cancelled events.

For additional details on the events related to equities, refer to **Equity Events** in the latest version of **Industry Member Technical Specifications** on CATNMSplan.com.

This section lists the Reportable Events for single leg option transactions. This includes events related to Simple Electronic Option Orders (excluding Electronic Paired Option Orders), which are reportable in Phase 2b.

Table 5.2.2: Single Leg Option Events[8]

No.	Event	Description
1	New Option Order	Event used to report new option orders to CAT
2	Option Order Supplement	Supplement to the New Option Order event, used when the New Option Order event exceeds the maximum length allowed, or when the orders being combined are not captured in the New Order Event. Also used for instances when the *priorUnlinked* or *nextUnlinked* flags are unknown at the time of order receipt
3	Paired Option Order	Event used to report a cross of an agency/initiating order and contra side order(s) for single-leg option orders (*Deferred – event not required for Phase 2b*)
4	Option Order Route	Reported to CAT by an Industry Member that has routed an option order to another Industry Member or an exchange
5	Option Order Modify Route	Deferred – event not required for Phase 2b. SROs will evaluate need for a modified route event after reviewing Phase 2b data and include event in Phase 2d, if necessary
6	Option Order Cancel Route	Deferred – event not required for Phase 2b. SROs will evaluate need for a cancelled route event after reviewing Phase 2b data and include event in Phase 2d, if necessary
7	Option Order Accepted	Reported when an Industry Member accepts a single-leg option order routed from another Industry Member or an exchange
8	Option Order Internal Route Accepted	Reported when an order is internally routed from where it was accepted or originated to another desk or other internal destination
9	Option Order Internal Route Modified	Reported when an Industry Member modifies an internal route (*Deferred – event not required for Phase 2b*)
10	Option Order Internal Route Cancelled	Reported when an Industry Member cancels an internal route. (*Deferred – event not required for Phase 2b*)
11	Child Option Order	Reported to represent instances when an order is sliced within the desk or department it is being worked and is assigned a new order identifier
12	Child Option Order Modified	Reported when a Child Option Order is modified
13	Child Option Order Cancelled	Reported when a Child Option Order is cancelled
14	Option Order Modified	Reported when changes to the Material Terms of an order are made, or an order is cancel/replaced
15	Option Order Modified Supplement	Used for certain aggregated orders in addition to the Option Order Modified event (*Deferred – event not required for Phase 2b*)

[8] Table 32: Summary of Option Event: Industry Member Technical Specifications. https://www.catnmsplan.com/technical-specifications/index.html

No.	Event	Description
16	Option Order Adjusted	Used to report simple order modifications, including changes to the price or quantity of the order
17	Option Order Cancelled	Reported when an order is fully or partially cancelled
18	Option Order Fulfilment	Reports the fill of a customer order in a combined option order scenario
19	Option Order Fulfilment Amendment	Reports how an order fulfillment was amended
20	Option Post-Trade Allocation	Reports how option positions (executed contracts) are allocated to end customer accounts and sub-accounts by Clearing Firms during post-trade processing (*Deferred – event not required for Phase 2b*)
21	Option Post-Trade Amended Allocation	Reports an amendment to a previously reported allocation (*Deferred – event not required for Phase 2b*)

For additional details on the events related to options, refer to **Single Leg Option Events** in the latest version of **Industry Member Technical Specifications** on CATNMSplan.com.

Reportable Data Elements

Firms are required to use specific data elements while reporting order events to the CAT system. These data elements are included in CAT events and/or metadata files and they facilitate data management functions within the CAT system. In the Technical Specifications, Data elements will be notated with the abbreviation R, C, O or A to represent whether it is required, conditional, optional or applicable for ATSs only. This codification will appear in the last column of each table describing an event in the technical specifications and serve as input for CAT data validations for the identification of errors from required data elements that are missing.

Data elements that are reportable to CAT are outlined below.

a) **Identifiers Data** – Data elements which capture identifiers (IDs); (Table 5.2.3)

b) **Trade Specific Data** – Data elements that capture data about the trade; (Table 5.2.4)

c) **Customer Specific Data** – Data elements that capture data about the customer or client *(Customer specific identifiers are still under discussion and only the customer account FDID is clearly defined as described in chapter 5.6 of this Guide)*

Table 5.2.3: Identifiers

No.	Data Element	Data Element Description
1	CAT Reporter IMID	An SRO assigned identifier that is used to identify an Industry Member whose data is submitted to CAT

No.	Data Element	Data Element Description
2	CAT Submitter ID	A unique identifier that is used to identify an entity that is authorized to submit data to CAT on behalf of an Industry Member
3	Order ID	A unique identifier that is assigned by the Firm and is used to represent an order in CAT Reportable Events
4	Firm ROE ID	An internal identifier that is assigned by the Industry Member to uniquely represent a record in CAT
5	Error ROE ID	An identifier assigned by the CAT system to uniquely identify an error record. This identifier will be provided to Firms as a part of error feedback from CAT
6	Industry Member Identifier (IMID)	An identifier which is assigned by an SRO to any of its members and that is used in scenarios where an Industry Member must refer to themselves or another Industry Member in an event. IMIDs include FINRA MPIDs, Nasdaq MPIDs, NYSE Mnemonics, CBOE User Acronyms, and CHX Acronyms
7	Firm Designated ID (FDID)	An identifier assigned by the Industry Member to uniquely represent trading accounts. FDID is designated only for the purpose of CAT reporting and must be unique across time and must be common across all vendors an Industry Member uses to report new orders to CAT for the same trading account

Table 5.2.4: Trade Specific Data Elements

No.	Data Element	Data Element Description
1	Timestamps	Order handling data must be recorded and reported with timestamps of milliseconds or finer granularity
2	Order Types	A standardized list of order types is defined for the purposes of CAT reporting
3	Order Handling Instructions	Special handling instructions are reported using a standardized list based on common exchange order types and codes. Order handling instructions qualify the pricing, quantity, execution timing, or execution method of an order
4	Equity Symbols	Firms must use the symbology of the primary listing exchange for reporting events related to listed equity eligible securities and must use FINRA OTC symbology for reporting events related to OTC Equity Securities. This symbology information is provided in the 'CAT Reportable Equity Securities Symbol Master', which is a list of all NMS stocks and CAT-reportable OTC equity securities representing the current trading day. This equity symbol master list will be published on CATNMSplan.com
5	Option Symbols	Standard option symbols established across exchanges as the result of the Option Symbology Initiative (OSI) must be used for reporting any single-leg listed options to CAT. The options symbol master list will be published on CATNMSplan.com

No.	Data Element	Data Element Description
6	Flex Percent Option Symbols	FLEX Percent options can only be uniquely identified using the OSI once their deterministic prices are known. When reporting the *optionID*[9] for a FLEX Percent option, Firms must append "%" to the beginning of the standard OSI symbol
7	Corporate Actions	CAT will receive information daily about corporate actions and symbol updates from various sources equity and options listing exchanges and, publish daily symbol master files to the Firms. These symbol master files will be available on CATNMSplan.com
8	Options Intraday Listing and Delisting	CAT accommodates intraday listing of options by exchanges, for which Firms must report the OSI (Option Symbology Initiative) symbol as the *optionID* field

Clock Synchronization Requirement[10]

Timestamping is one of the required data elements for each order event and must be correctly reported by Firms at predefined levels of granularity. To comply with Clock Synchronization requirements and correctly record the Timestamp fields for order events, Firms are required to synchronize Business Clocks, at a minimum, to within 50 milliseconds of the time maintained by the National Institute of Standards and Technology (NIST) and to maintain such synchronization. Business clocks that are solely used for manual CAT events or for the time of allocation on Allocation Reports must be synchronized, at a minimum, to within a one second tolerance.

The tolerance includes:

- The difference between the NIST standard and a time provider's clock;
- Transmission delay from the source; and
- The amount of drift in the Participant's clock

To confirm the accuracy of timestamps for Reportable Events, Firms should document and maintain their synchronization procedures for Business Clocks and keep a log of the time when they synchronize their Business Clocks as well as the results of the synchronization process. This log must include notice of any time a Business Clock drifts more than the applicable tolerances specified above.

The log must include results for a period of not less than five years ending on the then current date, or for the entire period for which the Industry Member has been required to comply with this Rule if less than five years. Firms also have to certify their compliance with these clock synchronization requirements and report violations according to the requirements that will be established by the Operating Committee. Firm

[9] *optionID* is a CAT reportable text field on option events and represents the 21-character OSI Symbol of an option.
[10] See FINRA Regulatory Notice 1709 dated March 15, 2017

may use any time provider and technology for clock synchronization as long as the Business Clocks are in compliance with the accuracy requirement.

Introducing Firm Consideration:

- ***Firms will need to report all orders captured in an electronic system with timestamps of milliseconds or finer granularity***
- ***For an order that is received manually and then later entered into an electronic system for further handling and execution, Firms will need to report both the manual receipt time and the Electronic Capture Time[11]***

Data Formats for File Submissions

Firms can submit Industry Member Data to the CAT system using either the JavaScript Object Notation (JSON) or the Comma Separated Values (CSV) file formats. It is to be noted that no JSON-CSV conversion is expected from Firms. Firms can either submit records in JSON format or in CSV format.

A JSON schema file is made available to Firms to support their submission of data files to the CAT system. The file describes each JSON data type with their required representation formats and contains a mapping that defines the JSON positions in a CSV representation. The latest version of the JSON schema file is available on CATNMSplan.com.

File submissions to the CAT system have specific sets of requirements with respect to uniqueness of file names, file size and file compression. For guidance on these requirements, refer to **Submission Process** in the latest version of the Industry Member Technical Specifications document.

5.3 Industry Member Reporting Scenarios

The Industry Member Technical Specifications document is accompanied by a separate companion document that provides examples of specific reporting scenarios, intended to practically illustrate CAT reporting. It is titled 'CAT Industry Member Reporting Scenarios' and is published on CATNMSplan.com. This document can be used as a guide for determining how the event types and field values can be applied when reporting various order handling and execution scenarios for both equities and options.

The Industry Member Reporting Scenarios document is periodically updated to provide additional clarification and to address Firms' questions on the Technical Specifications.

Some examples from the Industry Member Reporting Scenarios document are presented here. Examples include scenarios for Introducing Firms to illustrate the reportable events they will need to report to the

[11] CAT FAQ G.1: Is a CAT Reporter required to report two separate timestamps for Manual Order Events? https://www.CATNMSplan.com/faq/index.html#faqManOrd

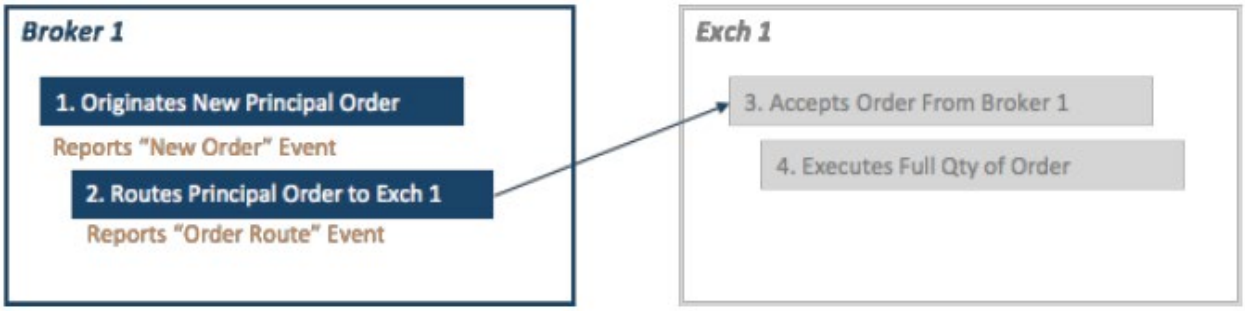
CAT, as well as the interaction with the Clearing Firm and what events they report. These scenarios are based on version 2.1 of the scenarios document — Firms should refer to the source document before relying on these scenarios to ensure there have been no changes.

Example 1: New Principal Order Routed to an Exchange and Executed

This scenario is scenario 2.1.1 in the Industry Member Routing Scenarios version 2.1 document.

It illustrates the CAT reporting requirements when an Industry Member originates a new principal order, routes the order to an exchange, and the order is executed on the exchange.

Figure 5.3.1: Example 1 Scenario



Industry Member Broker 1 is required to report:

- The origination of a principal order (New Order event)
- The route to an exchange (Order Route event)

The execution will be reported by the exchange.

Table 5.3.1: Example 1 Scenario

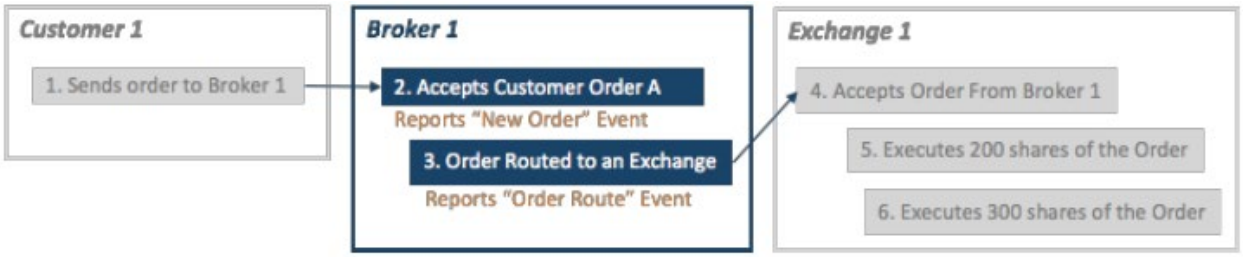
#	Step	Reported Event
1	Broker 1 originates a New Order	Broker 1 reports a **New Order event.** Type = MENO
2	Broker 1 routes the order to Exchange 1 (Exch 1)	Broker 1 reports an **Order Route event.** Type = MEOR
3	Exch 1 accepts the order from Broker 1	Exch 1 reports a **Participant Order Accepted event** (refer to the Participant Technical Specifications for further information on SRO reporting obligations).
4	Exch 1 executes the full quantity of the order	Exch 1 reports a **Participant Trade event.**

Example 2: Customer Order Routed to an Exchange as Agent

This scenario is scenario 2.1.2 in the Industry Member Routing Scenarios version 2.1 document.

This scenario illustrates the CAT reporting requirements when an Industry Member routes a customer order to an exchange on an agency basis.

Figure 5.3.2: Example 2 Scenario



Industry Member Broker 1 is required to report:

- The receipt of the customer order (New Order event)
- The route of the customer order to the exchange (Order Route event)

In this scenario, since the execution is passed back directly to the customer, **no Order Fulfillment event is required to be reported.**

Table 5.3.2: Example 2 Scenario

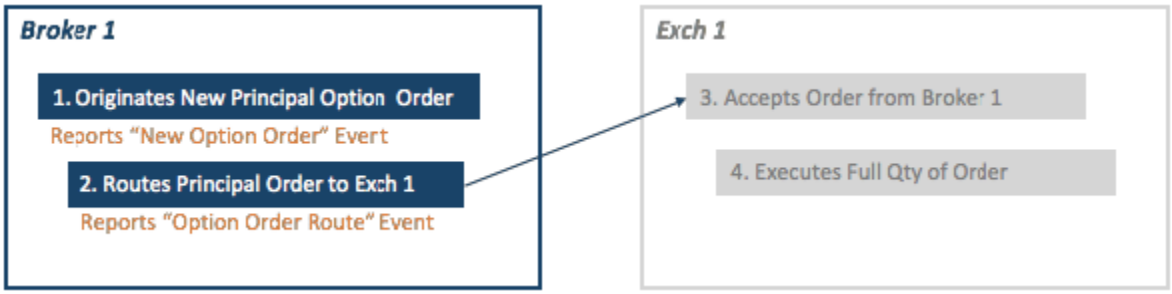
#	Step	Reported Event
1	Customer sends a Buy order to Broker 1	NA
2	Broker 1 accepts the customer order	Broker 1 reports a **New Order event.** Type = MENO
3	Broker 1 routes the order to exchange EXCH1	Broker 1 (IMID = FRMA) reports an **Order Route event.** Type = MEOR
4	The Exchange accepts the order from Broker 1	EXCH1 reports a **Participant Order Accepted event.**
5	The Exchange executes a partial quantity (200) of the order	EXCH1 reports a **Participant Trade Event.**
6	The Exchange executes a partial quantity (300) of the order	EXCH1 reports a **Participant Trade Event.**

Example 3: New Principal Option Order Routed to Exchange and Executed

This scenario is scenario 3.1.1 in the Industry Member Routing Scenarios version 2.1 document.

This scenario illustrates the CAT reporting requirements when an Industry Member originates a new principal option order electronically, and electronically routes the order to an exchange where it is executed.

Figure 5.3.3: Example 3 Scenario



Industry Member Broker 1 is required to report:

- The origination of a principal option order (New Option Order event)
- The route to an exchange (Option Order Route event)

Table 5.3.3: Example 3 Scenario

#	Step	Reported Event
1	Broker 1 originates an order from its proprietary account	Broker 1 reports a **New Option Order event.** Type = MONO
2	Broker 1 routes the option order to Exchange 1 (Exch 1)	Broker 1 reports an **Option Order Route event.** Type = MOOR
3	Exch 1 accepts the option order from Broker 1	Exchange reports a Participant **Simple Option Order Accepted event.**
4	Exch 1 executes the full quantity of the option order	Exchange reports a Participant **Simple Option Trade event.**

Example 4: Order Routed and Executed via a Clearing Firm

This scenario is scenario 2.12.1 in the Industry Member Routing Scenarios version 2.1 document.

This example illustrates the CAT reporting requirements when an Introducing Firm enters a customer order into a Clearing Firm's system, and the Clearing Firm executes the order from a proprietary account. Both the Introducing Firm and Clearing Firm are Firms.

Figure 5.3.4: Example 4 Scenario

Introducing Firm Broker 1 is required to report:

- The receipt of the customer order (New Order event)
- The route of the order to the Clearing Firm (Order Route event)

The Clearing Firm is required to report:

- The receipt of the order from Broker 1 (Order Accepted event)
- The execution of the order (Trade event)

Table 5.3.4: Example 4 Scenario

#	Step	Reported Event
1	Customer sends the order to Broker 1	NA
2	Broker 1 accepts the customer order	Broker 1 reports a **New Order event.** Type = MENO
3	Broker 1 routes the order to the Clearing Firm	Broker 1 reports an **Order Route event**. Type = MEOR
4	The Clearing Firm accepts the order from Broker 1	Clearing Firm reports an **Order Accepted event.** Type = MEOA
5	The Clearing Firm executes the order	Clearing Firm reports a **Trade event.** Type = MEOT

Example 5: Direct Order Routing via a Clearing Firm's System

This scenario is scenario 2.12.2 in the Industry Member Routing Scenarios version 2.1 document.

This scenario illustrates the CAT reporting requirement when an Introducing Firm receives a customer order and, using its Clearing Firm's system, directs the order to an exchange for execution. The Clearing Firm does not participate in any order routing or handling instructions, but only provides the technology to the Introducing Firm to route the order.

Figure 5.3.5: Example 5 Scenario

Introducing Firm Broker 1 is required to report:

- The receipt of the customer order (New Order event)
- The route of the order to Exchange 1 (Order Route event)

The Clearing Firm does not have CAT reporting obligations in this scenario. The exchange follows CAT reporting guidelines as outlined in the CAT Reporting Technical Specifications for Plan Participants, which is published on CATNMSplan.com.

Table 5.3.5: Example 5 Scenario

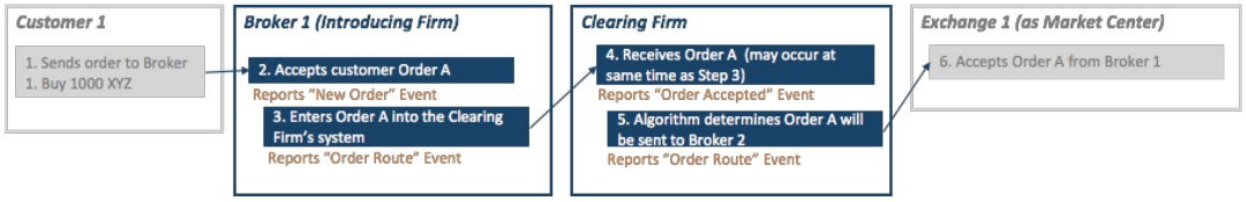
#	Step	Reported Event
1	Customer sends an order to Broker 1	NA
2	Broker 1 accepts the order from the customer	Broker 1 (IMID = FRMA) reports a **New Order event.** Type = MENO
3	Through the Clearing Firm's system, Broker 1 enters and directs the order to Exchange 1	Broker 1 reports an **Order Route event.** Type = MEOR
4	Exchange 1 accepts the order from Broker 1	Exchange 1 (EXCH1) reports a **Participant Order Accepted event.**

Example 6: Order Routing via an Algorithm Provided by the Clearing Firm

This scenario is scenario 2.12.3 in the Industry Member Routing Scenarios version 2.1 document.

This scenario illustrates the CAT reporting requirements when an Introducing Firm receives a customer order and enters it into a Clearing Firm's system. The Clearing Firm's system automatically determines the routing destination based on pre-defined criteria developed by the Clearing Firm. The Clearing Firm makes the determination as to where the order is routed. The Introducing Firm does not direct the order. Both the Introducing Firm and the Clearing Firm are Firms.

Figure 5.3.6: Example 6 Scenario



Introducing Firm Broker 1 is required to report:

- The receipt of the customer order (New Order event)
- The route of the order to the Clearing Firm (Order Route event)

The Clearing Firm is required to report:

- The receipt for the order from the Introducing Firm (Order Accepted event)
- The route of the order to Exchange 1 (Order Route event)

The exchange follows CAT reporting guidelines as outlined in the CAT Reporting Technical Specifications for Plan Participants, which can be found at this CATNMSplan.com.

Table 5.3.6: Example 6 Scenario

#	Step	Reported Event
1	Customer sends an order to Broker 1	NA
2	Broker 1, as the Introducing Firm, accepts the order from the customer	Broker 1 (IMID = FRMA) reports a **New Order event.** Type = MENO
3	Broker 1 enters the order into the Clearing Firm's system	Broker 1 reports an **Order Route event.** Type = MEOR
4	The Clearing Firm accepts the order routed from Broker 1	Clearing Firm (FRMB) reports an **Order Accepted event.** Type = MEOA
5	The Clearing Firm's system algorithm determines to route the order out to Exchange 1	Clearing Firm (FRMB) reports an **Order Route event.** Type = MEOR
6	Exchange 1 receives the order from Clearing Firm	Exchange 1 (EXCH1) reports the **Participant Order Accepted event.**

5.4 Summary of Error Correction

SEC Rule 613(e)(6) requires prompt correction of data reported to the CAT system. The Plan Processor is required to identify errors on CAT file submissions that do not pass the defined validation checks and conformance to the Data Quality Governance requirements. "Errors" are defined as CAT reporting errors identified by the Plan Processor and which have been communicated back to a CAT Reporter and/or Data Submitter, in the case that the data has been submitted to the Central Repository on behalf of a CAT Reporter. Errors must be correctly re-reported within the specified T+3 timeframe.

Firm submissions to the CAT system will be processed in four steps and different validation errors are identified by the CAT system in each of these steps. These error types are summarized in table 5.4.1.

Table 5.4.1: Types of Errors

Processing Sequence	Processing Step	Errors / Feedback
1	File Acknowledgement	File Submission Error
2	File Integrity	File Integrity Error
3	Data Ingestion	Data Errors including syntax and semantic errors
		Corrections Feedback for Ingestion Errors
4	Linkage Discovery	Linkage errors including duplicates, out of sequence and linkage errors
		Corrections Feedback for Linkage Errors

Any rejections of submitted records or errors identified on accepted submissions would be communicated to reporting Firms using five types of feedback. These feedbacks will be transmitted to Firms using an SFTP server and/or be displayed on the CAT Reporter Portal. Functionality of Reporter Portal is not yet finalized.

The five types of feedback are tabulated in Table 5.4.2.

Table 5.4.2: Types of Feedback

Feedback	Feedback Source	Description
File Status	SFTP and the CAT Reporter Portal	Indicates the acceptance or associated errors with a Metadata and/or Data files
Reporting Statistics	CAT Reporter Portal	Provides the daily summary statistics representing reporting activity and errors for prior submission and CAT Trading days. Error Rate is also included
Error Feedback	SFTP and the CAT Reporter Portal	Indicates errors found during Processing, including Rejections, Out of Sequence, and Unlinked events

Corrections Feedback	CAT Reporter Portal	Provides information for the repair status of all Corrections. When an error has been corrected, the updated status will be reflected
System Status and Announcements	CAT Reporter Portal	Provides the status of CAT Processing, with a distinction for instances when a processing delay or issue is occurring. Additionally, announcements related to system maintenance and upcoming changes will be presented

For detailed guidance on validation errors and feedback, refer to **Section 7 – Feedback and Corrections** in the latest version of Industry Member Technical Specifications document.

Types of Error Corrections

All CAT submissions that fail validation checks and receive Error feedback, are required to be repaired and resubmitted by the reporting Firm. A Firm can also submit corrections on its previously submitted records if it determines that errors were contained in the reportable events.

The types of correction scenarios that will be supported by the CAT system are summarized in Table 5.4.3:

Table 5.4.3: Types of Error Corrections

Type of Error Correction	Description
Repair CAT Errors	Supports the repair of events for which a CAT Error was provided to CAT Reporter/Submitter in feedback
Firm Initiated Corrections	Supports the correction of events for which there is no associated CAT error feedback. This correction also applies when a Firm repairs an error without submitting an *errorROEID*
Record Deletions	Supports the deletion of a single event to remove erroneous events which did or did not result in a CAT Error
File Deletion	Supports the deletion of all events within a single file, including all respective CAT errors for those events
Same Day Corrections	Supports the reporting of corrections that may occur on the same CAT processing date as the original submission

Feedback, including acknowledgements and rejections, will be generated from each step of the CAT processing by the Plan Processor. Order Events feedback will be provided as soon as the processing of

each step is completed. All feedback, including rejections, for files submitted by 8:00 AM EST T+1 will be available no later than noon on T+1, where T is the CAT Trading Day. From a timing perspective, intra-Firm processing occurs prior to inter-Firm processing (refer to section 5.4.1 of this Guide for a summary of error correction.

It should be noted that there is no audit trail or ability to download data after submission.

For detailed guidance on reporting of error corrections, refer to **Section 7 – Feedback and Corrections** in the latest version of Industry Member Technical Specifications on CATNMSplan.com.

Introducing Firm Consideration:

- ***Error Correction reporting process will need daily operational monitoring of all feedback from CAT either through SFTP transmissions or through the web interfaces of the CAT Reporter Portal***
- ***Introducing Firms will need to plan for the capability to access the CAT Reporter Portal to process corrections***

5.5 Interpretive FAQs

FAQs have been published on CATNMSplan.com in order to help Firms in developing their CAT reporting systems in accordance with the Technical Specifications. Within the FAQs, there are some which are considered "interpretive" and thus answers have been provided to reduce ambiguity from the point of view of CAT NMS LLC. **It is strongly recommended that Firms read the FAQs to understand the interpretations and implications of the CAT requirements.**

The general topic areas that are outlined within the FAQs are as follows:

A. General

B. Reporting Requirements

C. Definitions

D. Order Receipt

E. Order Routing & Execution

F. Representative Orders

G. Manual Orders

H. ATS

I. Foreign Securities

J. OTC Equity Securities

K. Options

L. Equity Floor Brokers

M. **Firm Designated ID**

N. **Third Party Reporting**

O. **Technical Requirements**

P. **Feedback & Error Correcting**

Q. **Customer & Account Information**

R. **Clock Synchronization**

S. **Security**

5.6 Account Information

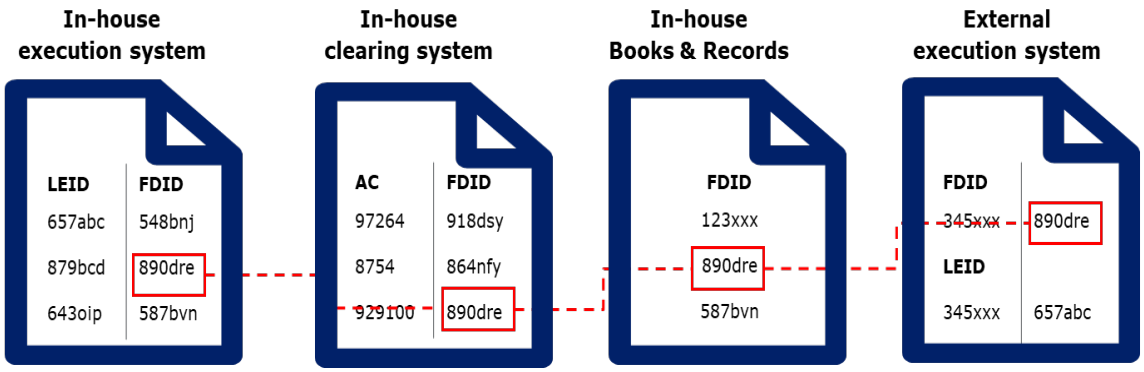
Firm Designated IDs (FDIDs)

FDID is defined in Section 1.1 of the CAT NMS Plan as "a unique identifier for each trading account designated by Firms for purposes of providing data to the Central Repository, where each such identifier is unique among all identifiers from any given Industry Member for each business date."

Trading accounts are represented by the Firm Designated ID (FDID) in the CAT. Firms must assign a single FDID to each trading account that is unique across all vendors that the Industry Member may use to report new orders to CAT. Under the CAT NMS Plan Firms are required to report the FDID on each new order submitted to the central repository. Given the purpose of the FDID under the CAT NMS Plan, it is important that this identifier be consistent across each business day of a broker-dealer.

Thus, Firms are required to assign a single FDID to each trading account and it must be unique across all vendors a Firm may use to report data to CAT. For example, if a Firm uses multiple vendors for reporting to CAT, each vendor must report any activity from the same trading account using the same FDID. FDIDs are also required to remain unique across time. Consistency is needed in the application of FDIDs across all of Firm's systems. Figure 5.6.1 illustrates an example for the application of FDIDs across systems.

Figure 5.6.1: Application of FDIDs



The reporting obligations associated with FDIDs can present a set of complexities for Firms. Some of these potential challenges that are involved with FDIDs are listed below.

- *Implementation:* The generation of a unique identifier for each trading account used to place an order is required. The usage of an actual account number as FDID is prohibited per ***CAT FAQ M2***[12] in the FAQ on CATNMSplan.com, unless the account is an internal firm account and not a client account, in which case the account number is permissible. New data fields may possibly be required to facilitate the reporting of FDIDs by Firms
- *Coordination*: Introducing Firms that use multiple Clearing Firms may need to ensure the consistency of FDID across the order/trade lifecycle. This may pose a challenge since coordination amongst Introducing and Clearing Firms is essential to ensure the desired consistency
- *Maintenance:* FDIDs must remain unique across time. If a Firm recycles account numbers, they cannot recycle the FDID for a different customer. Appropriate governance and controls are necessary to ensure that the master data for FDID is protected, including controls covering data integrity, access and change management, data transmission and security over the mapping to customer accounts
- *Impact to Vendor Systems:* Vendors could add the FDID to the CAT report, or Vendors could increase the data fields of their system to incorporate FDID. This consideration may be dependent on the type of vendor and services they provide

Introducing Firm Consideration:
Introducing Firms will need to assign a unique identifier as the FDID for each trading account and ensure its uniqueness across vendors and systems (including Order Management Systems and Execution Management Systems), to fulfill CAT reporting. Firms may not use the actual account number of a customer account as the FDID.

Account Classification

Reporting of order transactions in CAT will require Firms to populate the *accountHolderType* field under Reportable Events. The reporting specifications for this field will require a Firm to identify the beneficial owner of each account in which an order was received or originated. This may require Firms to classify all trading accounts into CAT reportable institutional customer accounts, employee accounts, foreign accounts, market making accounts and other CAT specified account types. Firm account maintenance may need to be revisited in preparation of Phase 2a in CAT reporting.

[12] Can actual account numbers be used as the FDID when submitting data to CAT? CAT Firm Designated ID FAQs . https://www.catnmsplan.com/faq/index.html#faqFDID

Trader Identifier

The identification of authorized traders on an account is required per the CAT NMS Plan; however, it is not currently in the technical specifications of reportable events. It may be implemented as an attribute of an account as part of customer reference data. Firms should monitor CATNMSplan.com for further updates on this requirement.

5.7 Trade Linkages

Reportable Events in CAT will be linked together by the Plan Processor using a "daisy chain" approach. In order for the Plan Processor to be able to link these records, Firms must provide certain linkage keys in their reporting. Critically, these linkage keys will need to be consistent from record to record so that each step in the daisy chain can be linked. The following is the set of linkage keys, as identified in Industry Member Technical Specifications, that connects CAT events within a Firm and across Firms.

Table 5.7.1: Linkage Keys[13]

Linkage Key	Description	Fields
Order Keys		
Order Key	Links together the events of the same order, within an Industry Member. For example, Order Key links an Order Accepted event to a subsequent Order Route event.	• *orderKeyDate* • *CATReporterIMID* • *symbol (or optionID)* • *orderID*
Prior Order Key	Links modifications to the original order. For example, Prior Order Key links an Order Modified event to the previous Order Accepted event.	• *priorOrderKeyDate* • *CATReporterIMID* • *symbol (or optionID)* • *priorOrderID*
Parent Order Key	Links Child (Option) Order events and (Option) Order Internal Route Accepted events to the related parent order event. For example, links an Order Internal Route Accepted event to a parent New Order event.	• *parentOrderKeyDate* • *CATReporterIMID* • *symbol (or optionID)* • *parentOrderID*
Manual Order Key	Links an order event representing a duplicative electronic message to the previously reported order event representing the original manual order. Optional in Phase 2a.	• *manualOrderKeyDate* • *CATReporterIMID* • *symbol (or optionID)* • *manualOrderID*

[13] Table 5: Linkage Keys: Industry Member Technical Specifications. https://www.CATNMSplan.com/technical-specifications/index.html

Linkage Key	Description	Fields
Trade and Fulfillment Keys		
Trade Key	Links Trade events to related Trade Supplement events.	• *tradeKeyDate* • *CATReporterIMID* • *symbol* • *tradeID*
Fulfillment Key	Links CAT Order Fulfillment events to a related Fulfillment Amendment event if the *fulfillmentID* remains the same.	• *fillKeyDate* • *CATReporterIMID* • *symbol (or optionID)* • *fulfillmentID*
Prior Fulfillment Key	Links an Order Fulfillment event to a related Order Fulfillment Amendment event if a new *fulfillmentID* is assigned.	• *priorFillKeyDate* • *CATReporterIMID* • *symbol (or optionID)* • *priorFulfillmentID*
TRF Linkage Key	Links the Trade event reported by the Industry Member to the related tape report in the Trade Reporting Facility (TRF)/ Alternative Display Facility (ADF)/ OTC Reporting Facility (ORF).	• *eventTimestamp* • *CATReporterIMID* • *symbol* • *tapeTradeID*
Quote Keys		
Quote Key	Links New Quote events reported by the Industry Member to related order or quote events. For example, links a New Quote event to a related Trade event. In Phase 2a, Quote Key is not applicable to New Order events, Order Modified events, and Trade events. In Phase 2a, Quote Key is only applicable on New Quote events and Quote Cancelled events in scenarios where an Industry Member is required to report the related events to CAT.	• *quoteKeyDate* • *CATReporterIMID* • *symbol* • *quoteID*
Prior Quote Key	Links a quote event being modified to the previous quote event if a new Quote ID is assigned. In Phase 2a, Quote Key is only applicable on New Quote and Quote Cancelled events in scenarios where an Industry Member is required to report the related events to CAT.	• *priorQuoteKeyDate* • *CATReporterIMID* • *symbol* • *priorQuoteID*
Options Keys		
Complex Order Key	Complex Order key is not applicable until Phase 2d and will be defined in subsequent publications of the Industry Member Technical Specifications document.	

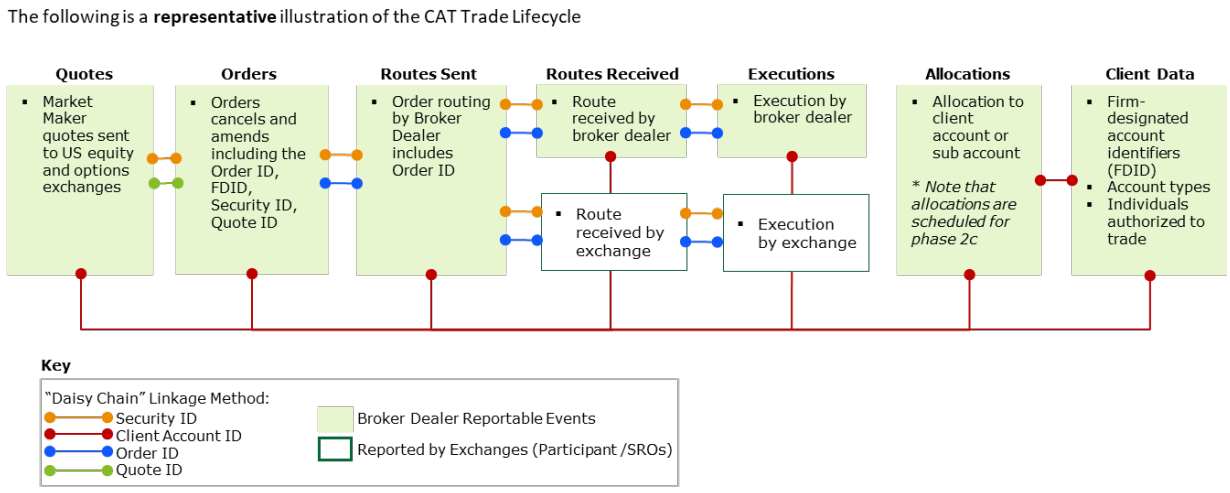
Linkage Key	Description	Fields
Route Linkage Keys		
Route Linkage Key	Links the CAT events reported by the Industry Member routing an order away and the Industry Member accepting the order.	*Refer to **Summary of Route and TRF Linkage Keys** in the latest version of Industry Member Technical Specifications on CATNMSplan.com, for detailed descriptions.*
Quote Route Key	Links quote events reported by an Industry Member routing a quote to an Interdealer Quotation System (IDQS) and the IDQS receiving the quote. Not applicable in Phase 2a.	*Refer to **Summary of Route and TRF Linkage Keys** in the latest version of Industry Member Technical Specifications on CATNMSplan.com, for detailed descriptions.*

Firms may need to assess and adjust their order management and execution management systems to incorporate the requirements for trade data linkages:

- *External Linkages:* CAT specifications will require Firms to link all reportable events with the usage of certain linkage keys that will connect order events within an Industry Member and across Firms and Exchanges. Capabilities may need to be developed to ensure that the data elements for linkage fields between Route and Order accepted events are consistent
- *Internal Linkages*: Developing the ability to internally link trade data, across technology systems and processes, from order through to allocation is a fundamental capability for CAT readiness. Developing this solution can have long term strategic benefits as it can reduce the eventual burden on CAT specific reporting processes

The following diagram illustrates the linkage between trade lifecycle events.

Figure 5.7.1: Linkage between Trade Lifecycle Events



5.8 Security Requirements for Encryption and Authentication

The CAT NMS Plan requires CAT data to be encrypted at rest and in-transit with industry standard practices such as Secure Sockets Layer (SSL) or Transport Layer Security (TLS) encryption methods, including data archives.

a) *Encryption (In-transit data)*: Firms may send and obtain data to/from the CAT system using SFTP or the CAT Reporter Portal. Firms are required to use TLS-based encryption method with minimum version 1.2, for any connection to the CAT Reporter Portal. Intrinsic encryption capabilities of SFTP are to be leveraged for SFTP transmissions of Industry Member Data. AES256 encryption protocol will be supported by the CAT system and support for other encryption protocols is under evaluation.

b) *Encryption (At-rest data)*: The CAT system will be built on Amazon Web Services (AWS) and all data will be encrypted at rest using the AWS Key Management Service (KMS). Native AWS encryption features will be used to encrypt data upon receipt by the CAT system and no action is required by an Industry Member.

In accordance with the CAT NMS Plan, multi-factor authentication is required for any access or login to the CAT Reporter Portal and the SFTP services provided by CAT.

a) *Authentication for CAT Reporter Portal*: Two-factor authentication is specified for access to the CAT Reporter Portal. The first factor comprises of the usage of username and password. The second factor is expected to be via push notification to an app installed on the user's mobile device. Periodic rotation of passwords would be required

b) *Authentication for SFTP service:* Two-factor authentication is also specified for the SFTP service. The first authentication factor will be username and password. The second factor is yet to be specified in the Industry Member Technical Specifications

Additional details on multi-factor authentication are expected to be provided in the Industry Member Onboarding User Guide or in the latest version of the Industry Member Technical Specifications document.

It can also be noted that there are security benefits tied to FINRA CAT, LLC being the Plan Processor. FINRA CAT, LLC is an SCI entity[14] and will be required to comply with Regulation SCI obligations such as annual Business Continuity and Disaster Recovery (BC/DR) plan testing, monitoring and reporting of SCI events, annual review of compliance with Regulation SCI and ensuring adequate levels of capacity, integrity, resiliency, availability, security, internal controls and testing, that are consistent with industry standards.

[14] The U.S. Securities and Exchange Commission's Regulation Systems Compliance and Integrity or Regulation SCI, applies to "SCI entities," a term which includes self-regulatory organizations (SROs), including stock and options exchanges, registered clearing agencies, FINRA and the MSRB, alternative trading systems (ATSs), that trade NMS and non-NMS stocks exceeding specified volume thresholds, disseminators of consolidated market data (plan processors"), and certain exempt clearing agencies. See *Regulation Systems Compliance and Integrity,* https://www.sec.gov/rules/final/2014/34-73639.pdf

For additional considerations related to security, refer to section 6.6 of this Guide.

5.9 Comparison Between OATS and CAT

The Consolidated Audit Trail is more than an evolution of FINRA's Order Audit Trail System (OATS). CAT includes substantial additional requirements, including new events, options data, allocations, linkage. Options reporting is a significant change for Firms as they implement solutions to generate the reports for the options quotes, orders, and executions. Under Rule 613, market makers will be required to submit quotation activity in addition to execution information. This may be substantial for options markets, where quote activity away from the national best can be measured in millions for some Firms. The shorter error correction window under CAT is also a significant change for Firms that may require additional operational and technical capabilities to meet the T+3 due date for error corrections.

There will be a period of parallel reporting to both OATS and CAT. CAT will need to accumulate information before a retirement of OATS can be initiated as described in section 10.1 of this Guide on the Path Forward. Firm's should also consider the accuracy and integrity of data across duplicative reporting requirements.

To assist Firms with the implementation of the Consolidated Audit Trail (CAT), FINRA and the Exchange SROs have prepared a mapping table to demonstrate how current FINRA OATS FAQs map to CAT requirements. Detailed mapping is provided for each set of OATS FAQs on CATNMSplan.com.

Table 5.9.1[15] captures select differences in the scope of OATS and the requirements as per Rule 613:

Table 5.9.1: Difference between OATS and CAT

No.	Item	OATS	CAT
1	Options	Not Required	Required
2	OTC equities	Required	Required
3	Link the audit trail execution reports for buy and sell orders to the public trade report	Required	Not required

[15] Gap Analysis: https://CATNMSplan.com/wp-content/uploads/2018/02/updated_oats_cat_gap_analysis.pdf

No.	Item	OATS	CAT
4	Timestamp granularity	At least to seconds	At least to milliseconds
5	Market maker proprietary order submission	Not Required	Required
6	Customer information	Not Required	Required
7	Error correction timeline	Reject repair window is within 5 business days of final rejection delivery (R+5)	3 business days from the date the trade was executed (T+3)**
8	Exemptions for manual orders of certain broker-dealers/Firms	In scope	Not in scope
9	Exclusions from definition of Reporting Member Firms	In scope	Not in scope
10	Sub-account allocations	Not in scope	Required (Phase 2c)

** Per CAT FAQ P16[16] all errors must be corrected by T+3 which is a substantial change relative to OATS

Introducing Firm Consideration:
In Phase 2a, Introducing Firms will be responsible for reporting routes, modifications, and cancellations in line with OATS guidance[17].

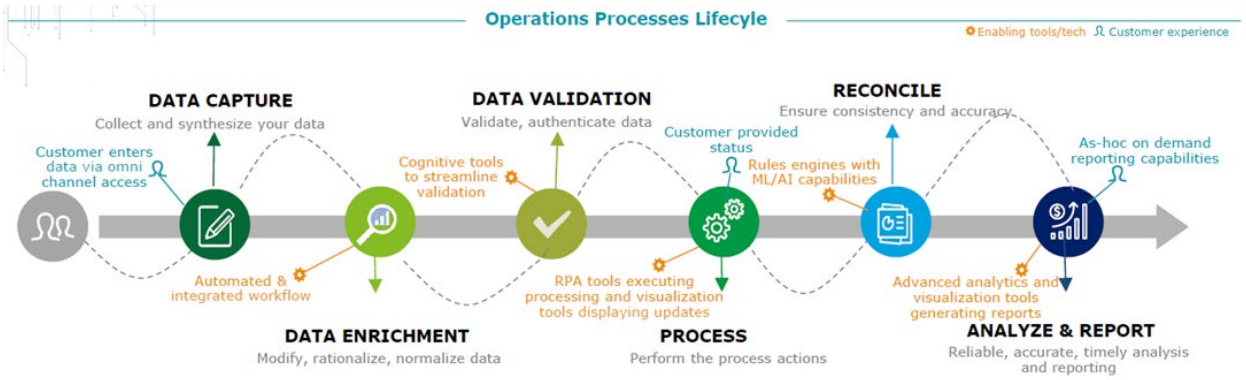
[16] P16 What is the T+3 error correction timeframe based on (e.g., submission date, original error date, etc.)? Example: if an order event is submitted on T and is rejected on that day, then corrected on T+1 but the correction on T+1 fails, is the event on T considered "corrected" or does the T+1 rejection need to be addressed and, if so, when? CAT Feedback and Error Corrections FAQs.
https://www.catnmsplan.com/faq/index.html#faqFBErrCorr
[17] Section 2.5.2. Reporting Responsibilities of Sender/Receiver: Industry Member Technical Specifications.
https://www.CATNMSplan.com/technical-specifications/index.html

6.0 Data and Tech Architecture

6.1 Introduction

This section provides considerations for Firms, related to the conceptual technology architecture. Specific technologies will not be addressed in detail, but conceptual considerations for reporting Firms will be discussed. This section will also introduce the various reporting models and conceptual components of an architecture that Firms may implement and the considerations for each type of model. Each step in the Operations Process Lifecycle should be covered in the CAT solution architecture.

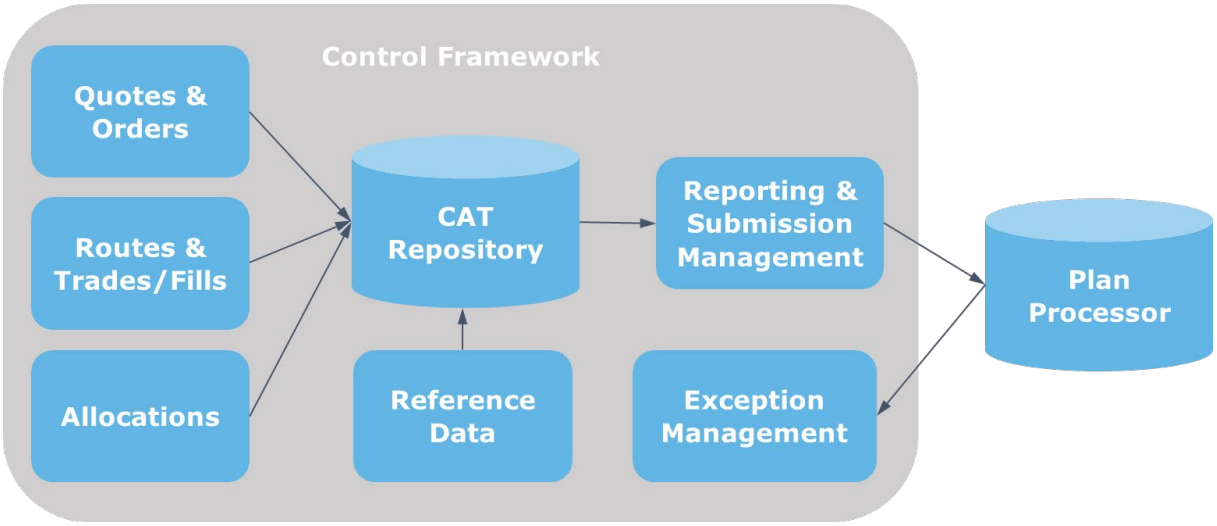
Figure 6.1.1: Steps in the Operations Lifecyle



Goals of the architecture should be made clear from project inception. For example, some questions that Firms should consider are whether the architecture should include data management, data quality, as well as CAT reporting models; and whether automated workflow should be considered for report submission and error handling. Additional questions to address in the design phase include the potential for additional users and consumers of the data, including the Firm's Supervision, and ability for a Firm to respond to ad-hoc regulatory requests once Regulators begin their supervisory functions using CAT data.

A conceptual architecture may form the basis for a specific implementation by Firms depending on the variety of data sources given a Firm's order management, routing and execution platforms, reference data sources, and the Firm's approach to centralized or decentralized reporting. The following diagram depicts the components that should be considered in the conceptual architecture.

Figure 6.1.2: Components of a Conceptual Architecture



6.2 Architecture

As Firms consider their architecture for CAT, they should consider whether CAT could be a catalyst to review their system portfolio. Firms should assess their data sources, map the Firm's data to the technical specifications for CAT reporting, identify and address potential data inconsistencies, and seek to remediate any observed data anomalies across trade and customer data.

Firms may consider utilizing a centralized data warehouse or data lake as a repository for CAT data and a reporting engine to generate the CAT formatted reports for submission. This engine could reduce the need to manage disparate systems for reporting, reduce the footprint of the error handling component, and provide an ability to provide data in a standardized format for other uses. From an error handling perspective, the architecture should also consider the need to link errors to relevant order and client ID information and maintain correction details for audit/traceability. Considerations should be given to support an operational need in responding to regulator inquiries about the reported CAT data, including clarifications or customer identification.

The following diagram is a representation of a potential Firm's architecture to identify types of data and subcomponents with a table of descriptions for each of the components.

Figure 6.2.1: Subcomponents of a Conceptual Architecture

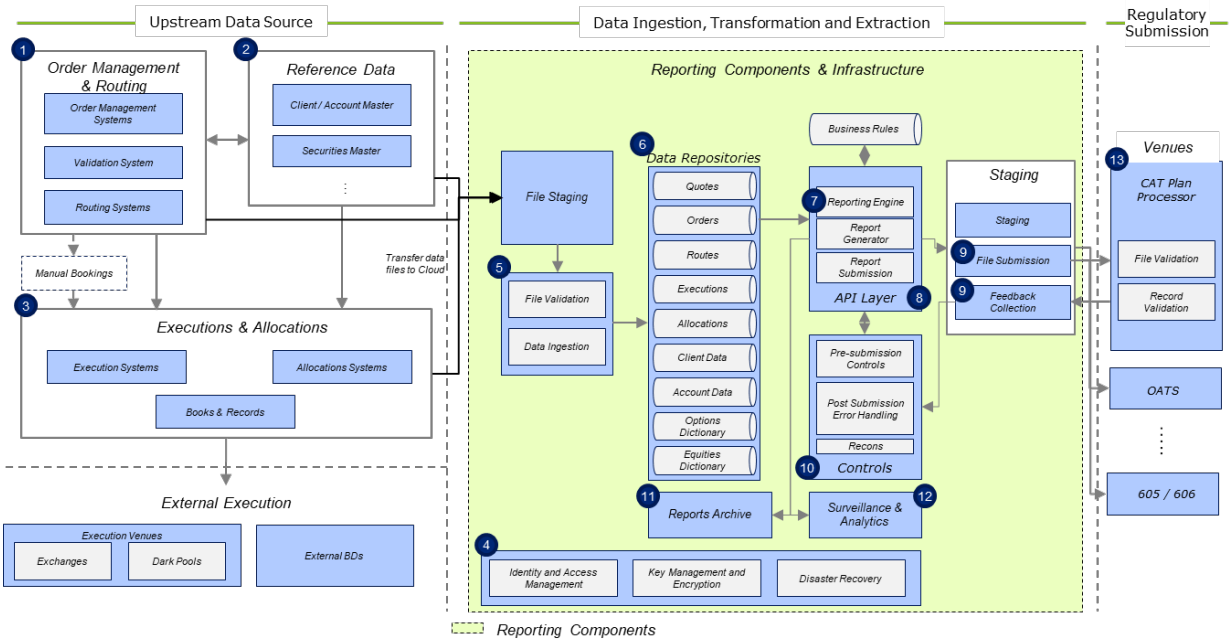


Figure 6.2.1 – Component Description	
1	**Order Management & Routing:** Capture and compare material order & originating customer information, including those from external order entry systems, capture Account IDs, and adhere to Clock synchronization/ timestamp requirements for reportable events
2	**Reference Data:** Address client data quality issues/challenges, and build mechanisms to source Client and Securities (Equities & Options) data to be used for reporting
3	**Execution & Allocation:** Link both sides of internal executions (both Firm side and counterparty side), initiate version control for trade correction & modification, link original orders to executions
4	**Reporting components & Infrastructure:** Create re-usable reporting components which can be used by multiple regulatory reporting applications and provision appropriate infrastructure (storage, compute & network) to manage necessary environments like Dev, Test, UAT and PROD
5	**File Validation and Ingestion:** Perform validation on files received from on-premise and ingest validated records into data warehouse

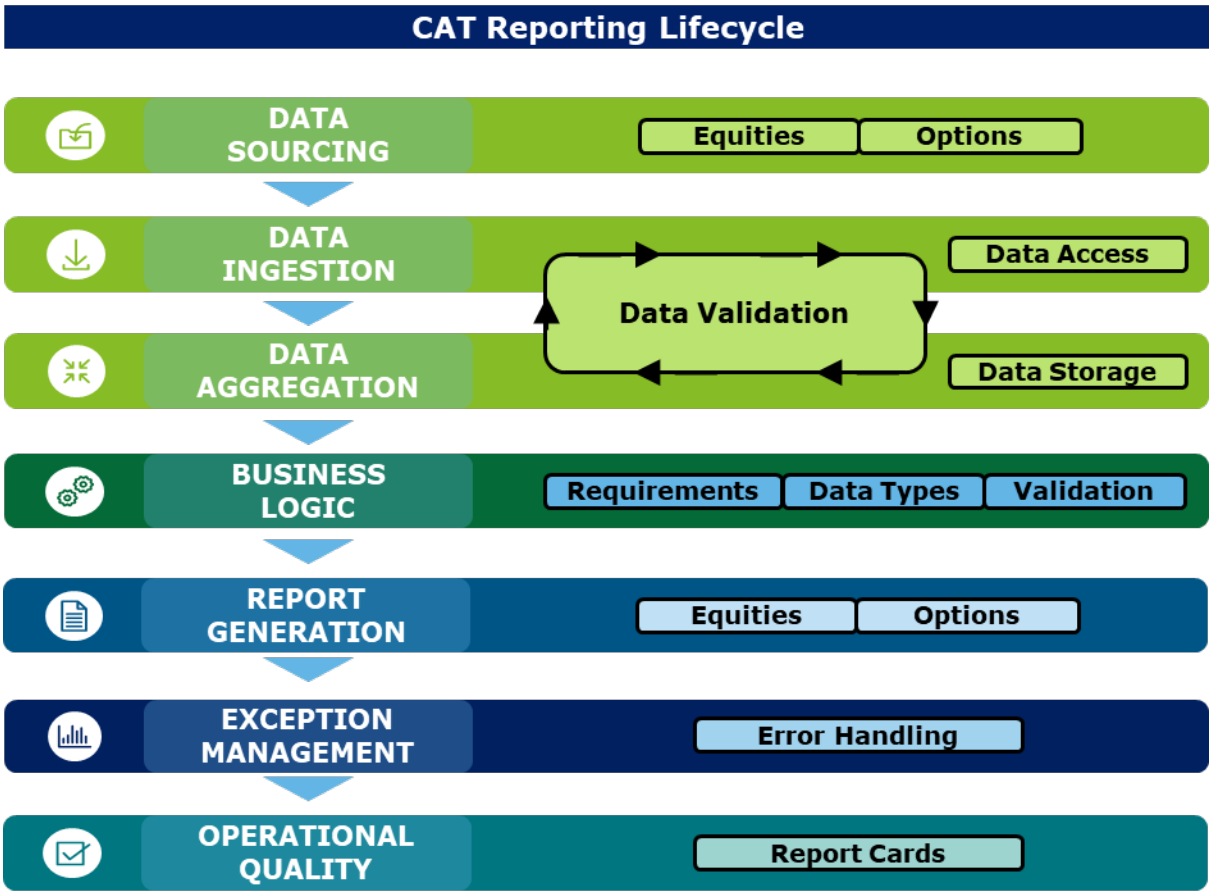
	Figure 6.2.1 – Component Description
6	**Data Repositories:** Provision data stores for reportable events, customer and reference data, build relationships between data attributes such as customer and accounts, and provide ability to integrate with other components such as Rules Engine
7	**Reporting Engine:** Source required transactions, customer and reference data and generate reports, including capabilities to cleanse, profile, enrich and govern data to be used for CAT reporting
8	**API Layer:** Provision APIs to integrate with data stores, reporting engine, reporting operations and CAT Plan Processor functions
9	**File Submission and Feedback Collection:** Create a framework to submit files to Plan Processor and collect feedback files from Plan Processor
10	**Controls & Error Handling:** Provision reporting operations tools to reconcile and validate reports pre-submission, as well as handle exceptions and error rejects, assess root cause, generate business reports, and build mechanisms to reconcile and address gaps
11	**Reports Archive:** Build archives and audit logs to retain reports in a standard format for a period of not less than five years, and build audit logs of authorized user, process & system activities, access of customer information, and submission of reports
12	**Surveillance and Analytics:** Provision capabilities to enable internal surveillance and analytics capabilities that utilize data from CAT Client and Transactions Repositories
13	**Regulatory Submission:** Post extraction, submit the generated reports in standard file formats (JSON and/or CSV) via SFTP or the CAT Reporter Portal, to the CAT Plan Processor. Functionality of Reporter Portal is not yet finalized.

6.3 Data Sourcing

A foundational element of preparing for CAT readiness is sourcing and standardizing data that will be required to create CAT submissions, including understanding the products, booking models of the data sources and enrichment of source data. Once the data has been inventoried, an assessment of the standardization of the data and measure of data quality can be made. Firms may then look to proactively remediate any potential data issues ahead of CAT reporting.

As an initial step, Firms should consider the relevant systems within their organization which will be used to source the data required for CAT Reporting. Data will have to be aggregated and validated to generate reports for transactions that are in scope for CAT Reporting, while ensuring correctness of the data submitted. If errors are identified by CAT, these would need to be corrected and resubmitted in the given timeframe. The following diagram shows an illustrative CAT Reporting Lifecycle that Firms may follow.

Figure 6.3.1: CAT Reporting Lifecycle



Identification of Data Sources – Determining the relevant sources for data origination for each of the lines of business, booking models and in-scope products is likely to be a large part of any CAT program. This would also include the schedule to source the data in time for the T+1 reporting. It is noted that sourcing of data will impact the completeness and accuracy of CAT reporting, including the basis for any control framework, such as source reconciliations.

Normalization and Enrichment of Data – Source data may be in different formats and levels of enrichment depending on a Firm's trading platform(s). Once data has been extracted from the source systems, it may need to be standardized and enriched with reference data to have normalized data that is ready to be formatted and submitted to CAT.

Formatting Data for CAT Submission – CAT will accept two kinds of text-based files: JSON and CSV. To support JSON and CSV submissions, CAT has published a JSON schema file on the CAT public website that describes each data type with required representation formats and a mapping that defines the position in a CSV representation. All data submitted to CAT will be validated based on the defined data type of each item, including proper formatting and range checking. Firms will have to develop processes to pull

and convert data from normalized sources into the final format for CAT, and to develop controls to ensure the completeness and accuracy of the data in the submission files.

6.4 Reporting Models

Firms will need to design and implement a reporting model for CAT Reporting whether in-house or outsourced or a combination thereof. A reporting model could have a centralized data repository to source data, such centralization would provide a single point of organization and accountability for CAT reporting. Reporting model could also be decentralized due to individual business units with disparate systems/vendors for reporting to CAT. Firms may buy or build the technological systems required for CAT reporting. Firms could also choose to outsource reporting to a Submitter or use any combination of these models.

There are several combinations of functionality to consider when designing the CAT reporting model. How a Firm will choose one or more of the solutions will impact the operations and controls they will need to implement as well as the timing of report submission and error corrections. The conceptual architecture components may be a combination of vendor supported or in-house solutions. The following aspects will impact a Firm's CAT solution.

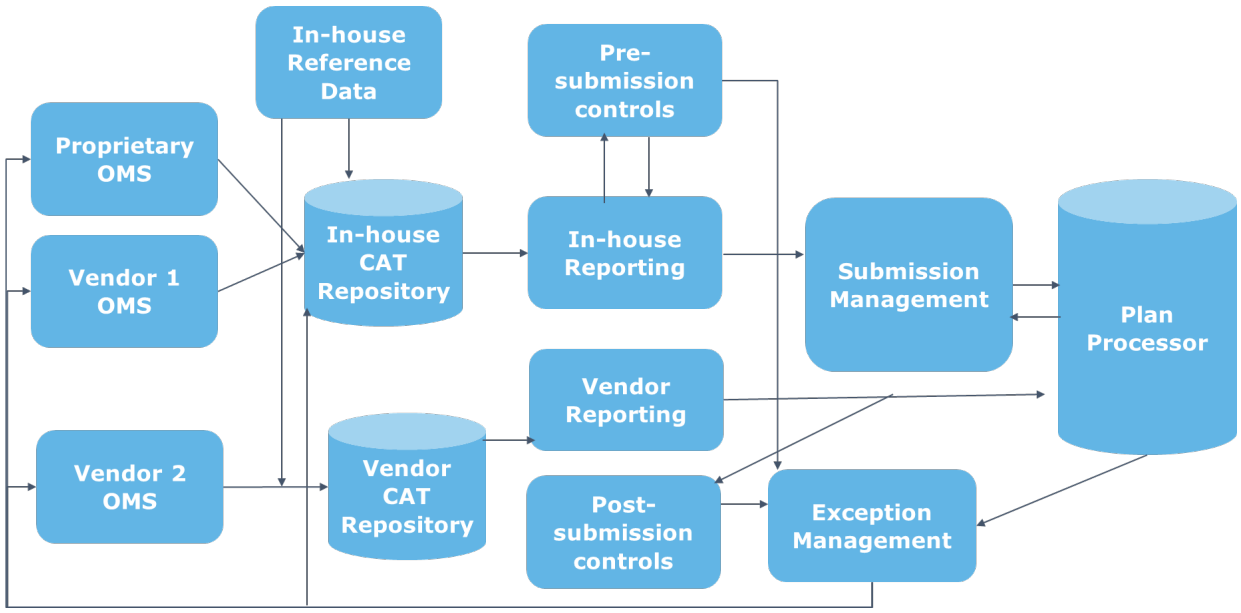
1. **Centralized vs. Decentralized:** Firms may choose to centralize the aggregation of source data for translation, enrichment or to have decentralized reporting. There are many benefits to aggregation of data, including enhanced controls and ability to serve additional consumers; however, Firms will need to weigh that in comparison to their vendor strategy and the cost of building, maintaining and securing the data as well as the time to process and report.

2. **Buy or Build:** Firms may consider a self-reporting approach, including a data-lake approach. The benefits of additional controls and other non-CAT uses of the data may lead Firms to invest in their own technologies. Smaller Firms that are already reliant on vendor solutions may choose not to undertake a large-scale implementation.

3. **Insource or Outsource:** Firms may choose to report on their own by implementing an in-house reporting solution(s), or to outsource the report submission to a CAT Reporter. A Firm may also enter into an agreement with a CAT Reporting Agent (Submitter or CRA) pursuant to which the CAT Reporting Agent agrees to fulfill the obligations of such a Firm under the CAT Compliance Rules. Any such agreement is required to be evidenced in writing and the agreement must specify the respective functions and responsibilities of each party to the agreement that are required to effect full compliance with the requirements of the CAT Rules. Such agreement should include the date on which the Submitter should commence reporting to the CAT on behalf of the Industry Member. In addition, to begin reporting to the CAT, the Firm and the Submitter must complete the onboarding process with the Plan Processor. The Firm is responsible for compliance with the CAT reporting requirements regardless of the existence of an agreement with a Submitter. Firms may also choose to use a combination of Firm reporting and vendor reporting for certain trade flows, though this will present its own complexities and risks associated with reconciling two different reporting models.

The following figure illustrates a reporting model that has a combination of in-house and vendor reporting. It also includes integration of the various reporting models with a Firm's exception management and reference data. Additional complexities to the following reporting model would include the potential for multiple parties to be involved in the reporting of events across the trade lifecycle. For example, the trade order may be originated by one Firm, routed by another Firm/vendor and executed by a third Firm, each Firm with separate reporting obligations.

Figure 6.4.1: Illustrative Complex Reporting Model



There are several considerations when using vendors to support CAT reporting since the Firms will retain the regulatory reporting obligation, even if the vendor is reporting on a Firm's behalf. Potential issues with data quality, timeliness, and error corrections should be considered when determining the roles and responsibilities for CAT reporting operations. Some considerations include:

- To the extent that Order Management Systems (OMS) vendors or Clearing Firms are reporting on behalf of introducing or executing brokers, they should clearly define the responsibilities for regulatory reporting since the introducing and executing brokers will retain the regulatory obligation for CAT reporting. Updates to each of the customer clearing agreements should be completed in advance of CAT reporting to provide clarity on roles and responsibilities
- Roles and responsibilities for exception management and error corrections should be clearly defined given the operating model that is implemented. Factors such as pre-submission validations, triage of exceptions and any attempt to repair errors from FINRA CAT by a vendor will be necessary to determine the exception management processes
- Clearing Firms or other CAT reporting vendors that will be reporting on behalf of a correspondent Firm should determine the requirements for data that should be provided by the correspondent Firm to effectively meet the CAT reporting requirements. These data requirements may be in

excess of the information that is currently provided

- Clearing Firms or other CAT reporting vendors that are reporting on behalf of a Firm should also determine the extent of validations that will be performed over the Firms trade data and any notification and error correction protocols necessary. For example, if a trade event would knowingly fail CAT validations, should it be submitted or held in a queue until it can be repaired?
- Firms that are using vendors for reporting should also be aware of the vendors data requirements, validation rules, and controls to monitor the submitted data that did not get reported to CAT due to any failed validations, business rules or incomplete submissions
- Clearing Firms that are not reporting on a Firm's behalf will need to consider the Service Level Agreements (SLAs) and processing times to provide the Firms the data they will need to report timely to the CAT. Formatting and enrichment of the data should also be determined to ensure the information is provided in an agreed-upon state

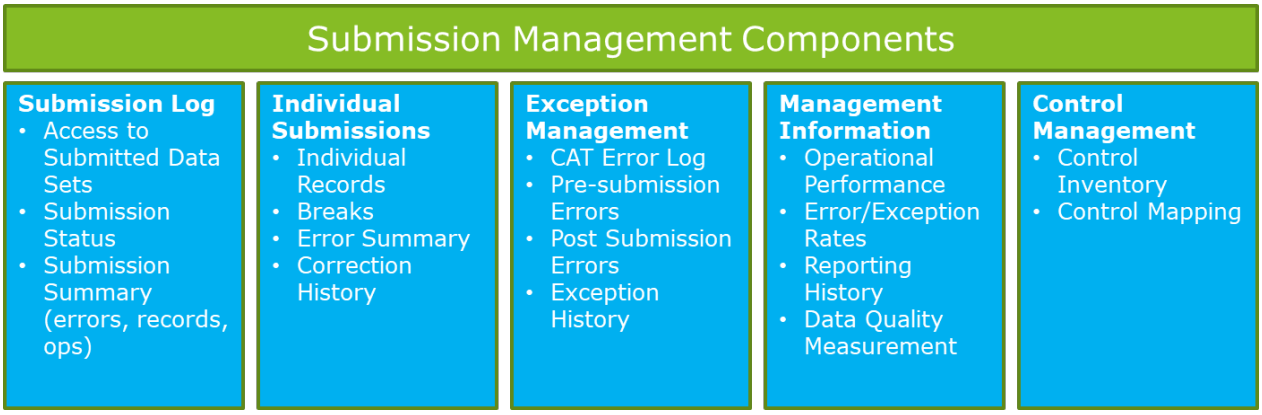
Types of Vendor solutions that may impact a Firm's CAT reporting model may include:

- Vendors platforms in order management, trading and execution, clearing and settlement, and reference data may offer various reporting solutions for CAT
- Data aggregators that offer to collect data from various sources and aggregate for CAT reporting. Vendor trading platforms may also provide aggregation services to report their platform data as well as offer sourcing and normalization for other external data to consolidate for CAT reporting
- Data and report validation solutions that may be rules-based or embedded in other vendor platforms offer a control function over the data.
- Specific technology solutions for formatting and submission of CAT Reports or other supportive technologies such as workflow tools for exception management

Submission Management is another important operational component of the Firms reporting model/architecture. Firms should consider the capabilities to track submission and generate metrics of CAT reporting.

Submission management components are illustrated in the diagram below.

Figure 6.4.2: CAT Submission Management



Supporting Technologies

Some fundamental technologies can be considered by Firms to build the data framework for CAT reporting.

a) *Databases*: A master or reference database should be considered for Firms that implement a centralized model for reportable events and elements such as Firm Designated Identifier (FDID) for trading accounts, CAT Submitter ID for reporting agents and Order Identifiers. As the CAT system will be a native cloud architecture solution, Firms may consider the benefits of adopting cloud-based database solutions.

b) *Workflow Systems*: Workflow systems could be leveraged for automating operational processes, including submission, exception, and change management as well as control framework to assist Firms in executing these operational requirements.

c) *Security and Controls*: In preparation for CAT reporting, Firms will possibly be making changes to their data and technical infrastructure to capture and report CAT required data. Account related information such as FDID will be transmitted through different Firm's workflow systems and possibly through vendor systems. Appropriate encryption technology will need to be implemented to ensure that all client and account data is protected. Risk platform strategies and cybersecurity controls should be considered by Firms.

d) *Data Visualization tools*: Data visualization tools may support the reporting of performance and data quality metrics to the control group and the Governance function to effectively support their decisions.

e) *Cloud Model:* A cloud solution is an option for Firms in their data aggregation and reporting strategy. This solution may be an accelerator for Firms who need to achieve CAT compliance and should be considered as part of their conceptual architecture and overall technology and cloud strategy.

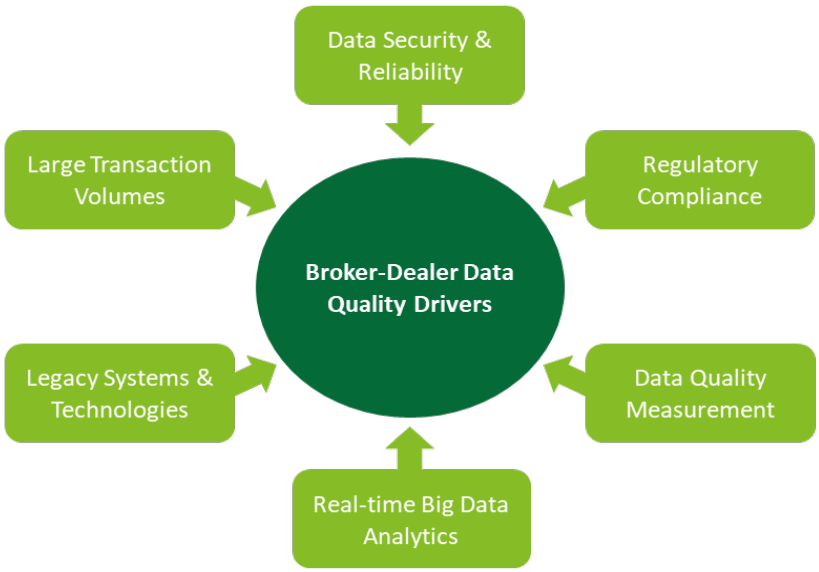
f) *Forward-Looking Technology:* Technology processes and digital enablers should be forward looking to increase efficiency and capacity and to reduce risk of errors from manual procedures.

Such technologies may include Robotic Process Automation (RPA) and Machine Learning. The processing of data could potentially allow for technology-enabled, straight-through processing to source the data for CAT reporting. Intelligent monitoring of data processing using technologies such as machine learning can provide early warnings into issues with accuracy, completeness and timeliness of the data.

6.5 Data Management

Data Quality: Data quality and management are the foundation capabilities for any regulatory reporting model, and Firms will have to focus on building out a sustainable and effective control model to ensure the quality of the data contained in their CAT reports. There are several validation points in the trade data flow, including source systems, normalized repositories, pre-submission reports and post submission reports. Data mining solutions may also be run to find anomalies that may indicate other issues exist in the source data, enrichment or normalization processes.

Figure 6.5.1: CAT Data Quality Drivers



Record Retention: According to each of the Participant's CAT compliance rules, information required to be reported to the CAT must be maintained in accordance with SEC Rule 17a-4(b). This rule states that these records must be preserved for at least three years, the first two years in an accessible place. Records are not required to be retained in an electronic format; they may be retained in a paper format. However, with respect to Business Clock synchronization, logs must include synchronization results for a period of not less than five years ending on the then current date, or for the entire period for which the Industry Member has been required to comply with this requirement if less than five years. SEC Rule 17a-4 also allows for a Firm to have a lesser retention period for reported information if the Firm has the ability to reproduce the submission upon request from the regulator. Firms may face technical challenges in

implementing such a capability in the need to retain the data in historical format with the values as of the point in time of the order or trade. Firms will also need to consider the availability of prior submissions to support Exception Management and Error correction as well as being able to respond to regulatory inquiries about prior submitted data. Another consideration for Firms will be the need to keep any error corrections on the CAT Reporter Portal consistent with a Firm's book and records and their archives.

Scalability and Sustainability: The CAT technical infrastructure will need to be scalable and sustainable, with the ability to adapt to new requirements and operate within a rigorous processing and controlled environment. This is of particular importance given that the most complicated reporting for many Firms—allocations, complex options, and customer data—will be reported in later stages. Firms must design with the end in mind so that they are not stuck with a solution that works now but cannot support the later stages.

6.6 Data Security

As Firms build CAT reporting systems, they should develop an understanding of how information flows across CAT architecture. Such an understanding allows the determination of how in-transit data is protected through the data transmission process as well as amongst and between systems and repositories. Once an understanding has been established, Firms should amend and/or adapt data controls policies and policies, as necessary, in alignment with industry best-practices as well as regulatory requirements.

The following factors should be considered when developing an understanding of data security as it pertains to CAT reporting:

- **Internal Data:** Appropriate policy access controls, and/or data encryption mechanisms to ensure internal data transmission, including to a central data repository/data lake or other repository, is protected and only available on a need to know basis. This should incorporate accesses to data for report production, error handling and corrections processes, which may include data remediation
- **External Data:** Controls should be established to ensure only required and appropriate data is reported to the Plan Processor or service providers, including methods for identifying breaches of data and defining required procedures if data leakages do occur. Lists of required and non-required data fields should be maintained and segregated
- **Error Handling:** Specific consideration should be given in relation to the error handling and corrections processes, where certain staff may be required to access information to address remediation. In this case, sufficient auditability, such as "break glass" access and monitoring should be applied to ensure that data access is both appropriate and justified
- **Central Data Repository:** The establishment of a central data repository creates a new centralized risk for Firms. Considerations should be given towards the control environment around such a repository
- **Data Breaches:** As part of the Control Framework implementation for CAT, Firms should ensure that controls are setup to detect and monitor any data breaches, including both internal and external data incidents. Such controls may include firewall scanning, but should also include

additional controls, such as whether any non-required data has been provided to service providers or the Plan Processor. Additionally, defined procedures should be incorporated that are aligned to existing policies and standards to ensure that incidents are reported and actioned in a proportionate and risk-based manner, and any external declarations are made where required

- **Determining Access to Data:** Definitions should be required for which roles (e.g. Regulatory Operations reporting team(s)) will require access to data for critical path reporting, and which users may require access for the error handling and corrections process. Additionally, appropriate detective controls should be put in place to monitor when users have accessed any data, including required justification for such access, and spot check reviews should be made to review the appropriateness of these justifications
- **Security and Data Handling Training:** Sufficient training and awareness should be required across all staff that are part of the CAT submission processes to ensure awareness of security procedures and data handling. Proactive implementation of training, prior to users access to data, should be aligned with, and may be accompanied by existing security awareness training. Staff members should receive periodic reminders and training to reiterate associated risks of breaches and material changes to procedures
- **Legacy Systems:** Systems that are being used or repurposed for CAT reporting should undergo testing and assurance that process integrity, protection of data transmission and storage meets and/or exceeds required levels of protection. This applies to both internally and externally sourced data
- **Data Transmission**: For details on secure connection and transmission of data into the Central Repository, refer to section 8.3 for further details
- **Vendor Security**: Consideration should be given to how information is transmitted and stored by vendors, refer to section 8.7 for further details
- **Record Retention**: Firms must make sure they meet the preservation and maintenance of electronic communication records, as per the integrity/availability requirements of SEC Rule 17a-4(f) and FINRA Rule 6890. Firms also must make sure that proper security controls are in place to protect such records. refer to section 6.5 for further details

7.0 Governance and Controls

7.1 Introduction

New reporting requirements as part of CAT implementation are likely to require Firms to evaluate their current governance models to determine that reported data is complete and accurate. As part of this evaluation, Firms should consider both the governance model and the controls framework to determine the level of oversight of data reporting. An effective governance model would consist of the primary stakeholders in the CAT reporting process within a respective Firm's management. The control framework would generate information, such as metrics and performance data which can help to inform and improve the governance model.

Working together, the governance model and controls framework, could balance business, technology and regulatory changes while monitoring the data quality for complete and accurate reporting. It also provides support for a Firm's technology solution to maintain the data repository for reporting solutions with reporting performance indicators and an application of an end-to-end control framework covering the multiple CAT reporting requirements. Business changes may include trading flexibility and expansion of trading products.

7.2 Governance Model

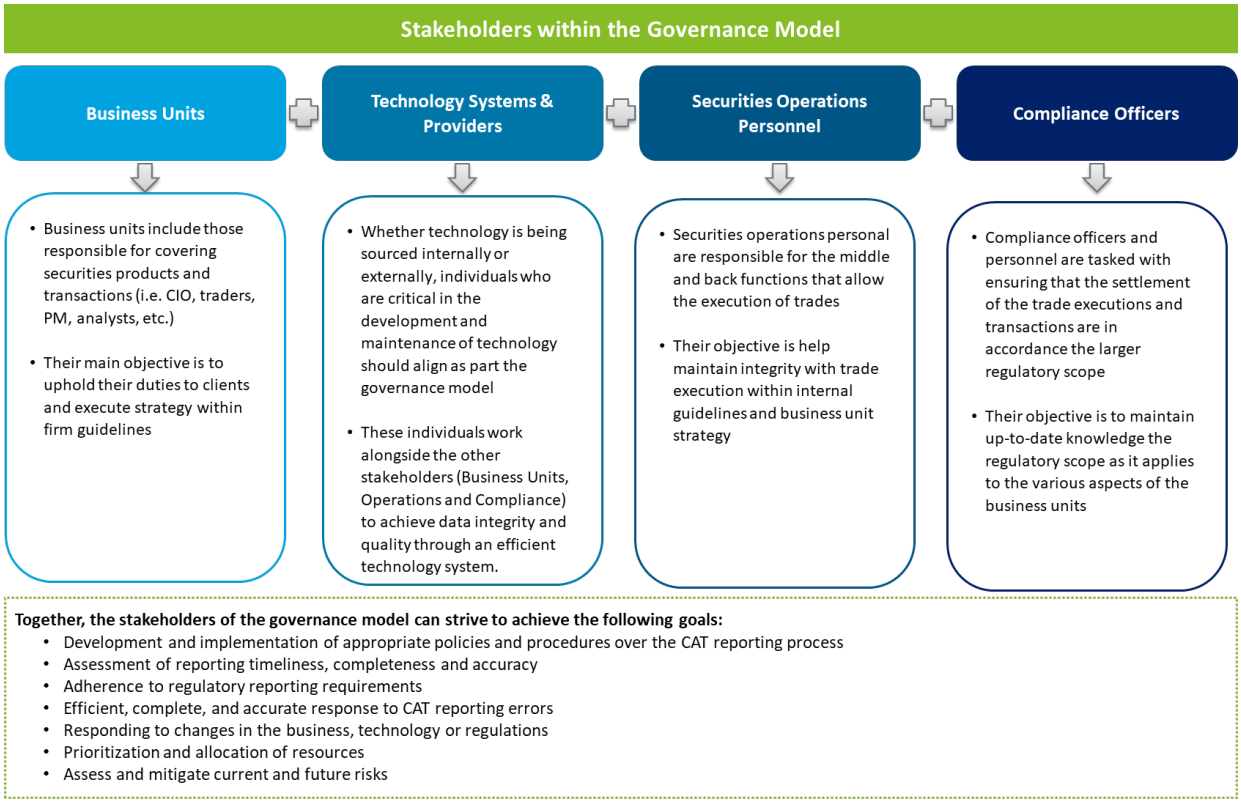
The governance model with respect to the CAT Reporting Lifecycle does not differ significantly from those which applies to other aspects of the Firm. The model should consist of strong policies and procedures, stakeholder management, and should be targeted at achieving the model's end-goal of reporting complete and accurate information to the CAT.

The governance model should consider a variety of source data to effectively evaluate and potentially enhance CAT reporting. Additionally, the governance model should be both forward looking and past-reflecting, as it considers how to adapt and address complexities due to regulatory changes, technological developments, and general evolution within the securities industry.

The governance body for CAT should include representation from each of the stakeholder groups. The main stakeholders include:

- Business Units covering the in-scope products such as Equity and Option trading
- Operations
- Technology
- Compliance

Figure 7.2.1: CAT Governance Model Stakeholders



The goals for the governance function may include:

- Development and implementation of appropriate policies and procedures over the CAT reporting process
- Assessment of reporting timeliness, completeness and accuracy
- Adherence to regulatory reporting requirements
- Efficient, complete, and accurate response to CAT reporting errors
- Responding to changes in the business, technology or regulations
- Prioritization and allocation of resources
- Assess and mitigate current and future risks

Metrics and Information for Governance

The inputs that can be used by the governance function to effectively achieve their goals can be sourced from a variety of parties. Of these include the stakeholders listed in Figure 7.2.1, as well as the monitoring metrics from the Control Framework. Other sources include regulatory and governmental bodies,

employees and staff, as well as technology providers. Metrics and information may include but is not limited to the following:

- CAT Reporting Submission metrics (timeliness and volume)
    - Volume of records submitted by CAT Event type
    - Volume trends and comparisons to average
    - Trending of timeliness statistics
- Control Framework/Monitoring Metrics (e.g. exceptions, level of data quality, error data)
    - Volume and historical trending of the number of CAT errors
    - Pre and post CAT error correction acceptance % rates
    - Exceptions by business product / source system
    - Exceptions by validation point (see 7.4.1 for the various points at which exceptions can be generated)
- Change management metrics (business, product, and system changes)
- Regulatory changes as approved by the authorized regulatory body
- Developments in technology both directly and indirectly related to CAT reporting processes
- Industry and competitor trends and benchmarks in developing CAT reporting systems

While these are examples of sources for input data for the governance framework, there are many other that can be considered, and Firms should work to establish responsible parties for reporting and monitoring the data that is received from these sources.

Policies and Procedures

Firms will likely require changes and enhancements to existing policies and procedures to meet the CAT reporting regulatory requirements and to mitigate some of the operational, compliance, legal, and reputational risks associated with the implementation of the CAT. Updates to the procedures should include CAT reporting processes, exception management, and control processes. Additional controls may be required for customer account maintenance and data transmission. Firms could prepare their systems and inventory their controls to ensure that they can provide accurate and complete data to the CAT.

A review of the Firm's current policy controls, procedures, and system limitations would be beneficial to determine how much additional work and funding is necessary to meet the demands of the CAT and manage associated risks. Firms may assess their current policies, procedures and controls and define new ones necessary in connection with anticipated processes, systems, and infrastructure that may be deployed. An overarching control framework formalizing the existing and new controls across the dimensions of system, product, technology, process and people would be beneficial.

Implementation of strong data security and privacy policies and procedures, covering internal data processing and external data transmissions, may be of particular importance from a legal and reputational risk perspective. Firms may consider setting up controls to detect and monitor data breaches, including both internal and external data incidents.

Consideration for Governance Model

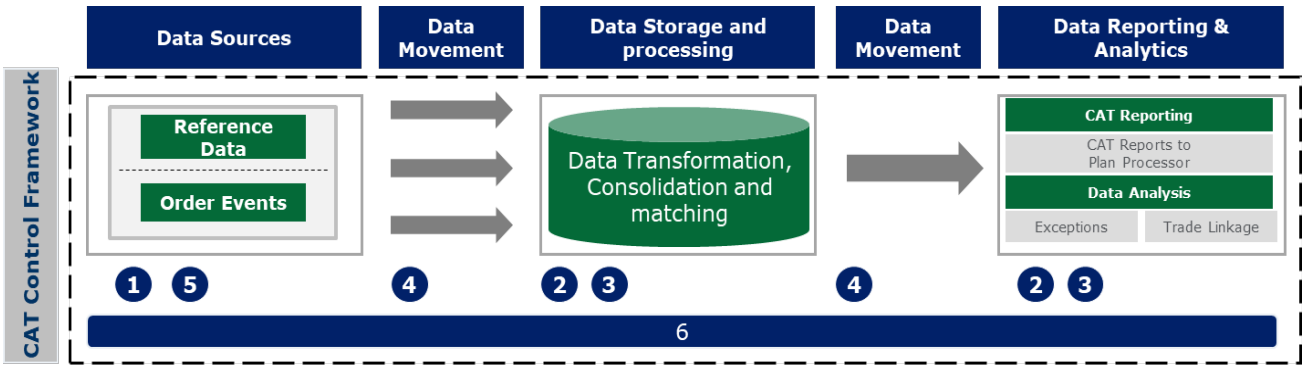
The governance model could include the following components:

- Monitoring of daily synchronization of all business clocks
- Monitoring of information provided in the CAT Reporting Statistics from the CAT Reporter Portal)
    - Files have been accepted by the CAT
    - Rejected files and repairs to rejected files
    - Late reports
    - Error rates
- Monitoring of communication from the Plan Processor on system maintenance and upcoming changes
- Periodic review of control framework information for:
    - All reportable events are submitted to CAT
    - Data fields contain accurate information
    - Data is properly reported against the Firm's IMID
- Oversight of business and technology changes such as:
    - New products added
    - New systems added
    - Changes to upstream systems
    - Business and regulatory changes
- Oversight of service providers (if applicable):
    - CAT Reporting Agent and Third-Party Reporting Agent effectiveness
    - Adherence to Service Level Agreements (SLAs)
    - Control assessment results (e.g. SSAE16)

7.3 Control Framework

The objective of the Control Framework is to enable oversight over the CAT reporting completeness and accuracy supported by metrics. The following landscape outlines the various control domains that should be considered for CAT reporting.

Figure 7.3.1: CAT Control Domains Landscape

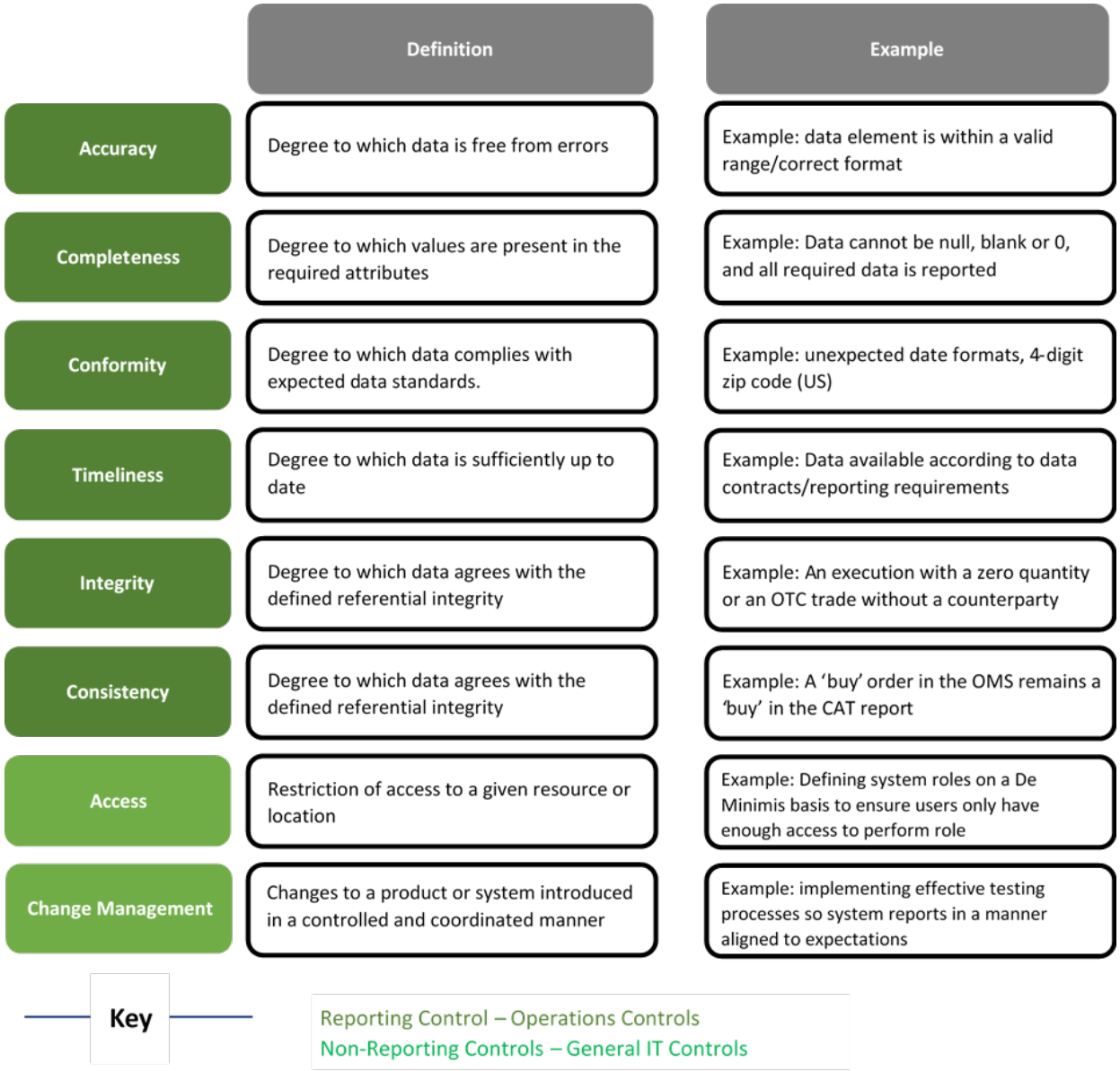


#	Control Type	Example
1	**Front End**	Automated configurable logic to limit user input values, or procedures governing user inputs
2	**Business Rules**	Logical conditions on data quality defined by business knowledge/rule requirements to identify data anomalies
3	**Reconciliation**	Data reconciliation from source to interim repository and cross system comparison for completeness and consistency
4	**Batch Monitoring**	Automated controls to monitor the completeness and accuracy of data movements during transfer
5	**Substantive Volume**	Retrospective comparison for expected total value and volume of trading for given a period
6	**General IT**	Access Control: restricting the users with access to confidential data to only those who require access for reporting or analysis Change Control: Integrating CAT reporting impact analysis to all system development and changes for trade cycle process

Considerations for Monitoring Activities as Part of The Controls Framework

Monitoring of the CAT Reporting process by Firms will help to ensure that correct and timely data is being submitted at all stages to CAT. CAT Reporting may be monitored to measure the effectiveness of policies and procedures adopted by the Firm. A control framework may be applied at each stage of the CAT Reporting Lifecycle such as sourcing of data, report validation, data quality and submission. An effective control framework will be able to detect and prevent errors in CAT Reporting. The following diagram outlines considerations that should be taken into effect when implementing the CAT control framework.

Figure 7.3.2: CAT Control Framework Considerations



- ***Source Data Validation***
    - Controls to check whether eligible securities trades are included in trade reporting
    - Controls to check trade data is pulled only once from source to aggregation point
    - Controls to catch any data anomalies to investigate root causes
    - Controls to check whether Submitter data to be reported has consistent FDID applied
    - Data Validation Errors: The rate and type of data validation errors at each point in the process may be an indicator of effectiveness of the processing or potentially upstream

issues. For example, accounts that are invalid or Security identifiers that cannot be populated may fail validations, but may be an indicator to another root issue either in source data or enrichment processes

- ***Report Validation***
    - Controls to ensure all expected data is included
    - Controls to check report format is aligned to the technical specifications
    - Monitoring controls to ensure non-reportable data is not included the final submitted report
- ***Data Quality Control***
    - Preventative controls such as policies, procedures and standards for data governance and management to enable high quality data
    - Data dictionaries in place for all in-house and vendor systems
    - Accepted Records: Pure volumes and comparison to historical average may be an indicator to the completeness and capacity. Firms may also calculate a percentage of submitted records that were accepted for each trade date or daily average for dates included in the requested range (such as 180 days), and the percentage after all corrections and replacements have been processed. This may be calculated in a ratio such as Accepted Records / Original Submitted Records x 100. This ratio may be a relevant measure to the Industry success rates and 95% target threshold for initial acceptance and 98% post error correction.
- ***Completeness Validation***
    - Reconciliation of CAT submissions to source data
- ***Accuracy and Performance Metrics***
    - Reported element values are consistent with source data
    - Reported element values are valid business rules for reported data
- ***Pre-submission controls***
    - Firms could consider development of pre-submission controls, where CAT submissions are validated prior to delivery to the Plan Processor, including linkage and customer data. Such validations can provide for the earliest possible identification of linkage errors and may minimize unexpected errors further down the line. This can have additional benefits as well, such as enabling Firms to use the data for internal surveillance and visibility into how orders are moving between systems and desks for specific customers which could help Firms in better surveying trading activity.
- ***Post-submission controls***
    - Firms could consider developing post-submission controls and have procedure in place to handle errors that have been reported. Errors that are identified and sent to Firms by the

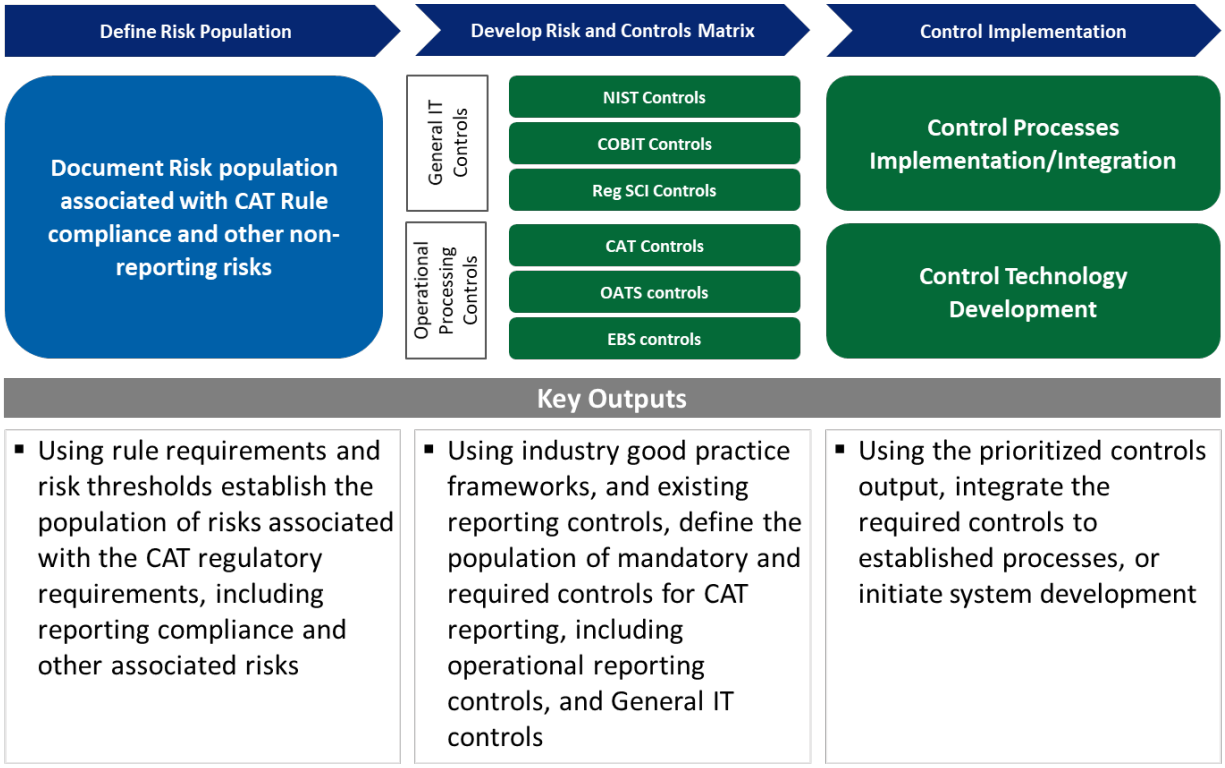
CAT, must be repaired prior to 8:00 AM EST on T+3 (CAT Trading Day of event + three Trading Days). With such aggressive timelines for error corrections, Firms should consider having procedures in place to repair all errors within this timeframe. Firms should also consider the process for submission of self-identified corrections to CAT.

- Corrections: The rate of corrections is also a meaningful metric for governance functions and one of the target metrics for the industry. The percentage of the corrections performed against the total records submitted may be calculated as (Corrected Records / Original Submitted Records) x 100
- Accepted Linkage Records: The percentage of ingested order event records, that were accepted during the linkage stage for each trade date or daily average for dates included in the requested range (such as 180 days), after all corrections and replacements have been processed (i.e. Linked Records / Ingested Records) x 100
- Timeliness: The percentage of number of files submitted on time and the extent of lateness in hours may be an important metric particularly with respect to the SLAs established within a Firm, with Vendors, and ultimately for CAT compliance

Prioritization and Phasing to Implement Controls Framework

In developing the CAT control framework, consideration should be made to prioritizing controls implementation that are mandatory for regulatory compliance and those controls related to high levels of risk in processing (e.g. transformational data controls/ data privacy).

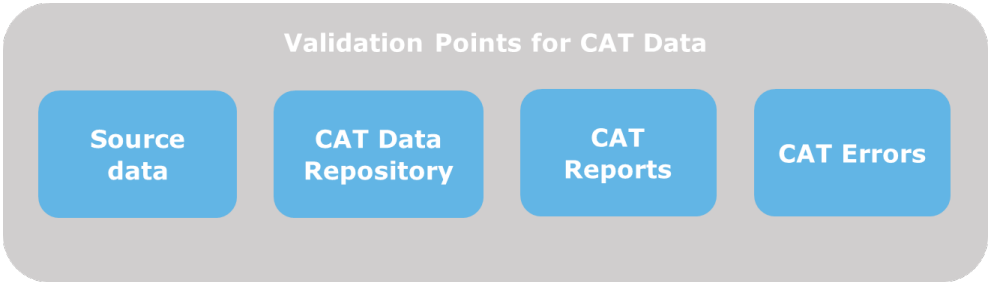
Figure 7.3.3: Control Framework Implementation Prioritization



7.4 Exceptions Management

Exception identification and correction management processes may be essential for an effective and timely management of CAT. The definition of a CAT Error and the error correction timelines are described in Section 5.4 of this Guide. Firms should consider that error corrections and resubmissions should reconcile with their books and records. Exceptions may be identified at several points in the data sourcing and reporting lifecycle from source system validations, CAT data repository validations, pre-submission validations, and post-validations by the Firm or Plan Processor that are reported back to the Firm. Early identification of exceptions from the validation points illustrated below may assist Firms to meet the CAT Error correction timelines.

Figure 7.4.1: Sources of Exceptions and Validations



An Exception Management program should be supported by appropriate workflow and case management systems that allows categorization of correction types (e.g., invalid FDID/ Customer IDs, linkage breaks, and format/ syntax issues), tracking of corrections through responsible parties, and requisite sign-offs. Furthermore, a detailed tracking of error types and root causes may be maintained to help flag trouble spots and remediate errors. Firms will also need to consider how they will maintain log of errors and corrections.

To meet the error correction timeline, Firms should consider establishing an error-handling process in place to ensure the data quality is validated through the various systems within the Firm and repairs are applied to the CAT data and source data for consistency with books and records.

- Capabilities may include upgrading and/or developing an operational and technology processes for efficient exception handling, communications and escalation mechanisms for errors in CAT reporting. Error correction events may be captured and linked in front-, middle, and back-office processes and systems for accurate re-reporting to the CAT by the T+3 deadline. An appropriate workflow would assist in streamlining the error handling process

- As part of the readiness work, Firms should identify risks in current processes and assess the need for controls for error detections and reconciliations. Projections of the volume and type of corrections may inform estimate efforts and resources needed to comply with data submission timeframe and proposed error correction timeline. Following this analysis stage, Firms may develop and implement new processes and operationalize the front-, middle-, and back-office changes to minimize the data errors and corrections

- For Firms that are leveraging a vendor reporting solutions, consideration should be given to the regulatory requirements to be able to access and repair their data. As detailed in the Reporting model section of this Guide, the agreement with the reporting vendors should clearly define roles and responsibilities about validating the data and responding to errors. Firms will retain the regulatory obligation for CAT reporting and error correction even if a vendor solution is implemented, so access to the CAT systems will be necessary for Firms to view their report cards and exceptions to allow for timely repairs and resolution

Firms should consider the capabilities within Exception Management for correcting data in upstream systems and data repositories. When Vendor systems are used in order management, routing and execution, Firms will need to consider how to manage those exceptions and make corrections in vendor systems. Firms should also consider how to keep the Firms' book and records in line with CAT data. Refer to Figure 6.4.1 for Exception Management processes within the reporting model.

8.0 Reporter Readiness

8.1 Introduction

CAT represents a shift in how regulators will oversee the securities markets and trading activities. Timely planning can help Firms seize broader strategic opportunities presented by CAT. Firms may need to build a detailed roadmap to implement the various changes required to comply with the new CAT regulations, including organizational and infrastructural changes.

This upcoming chapter aims to provide practical next steps for Firms to prepare to report for CAT. These sections will focus on areas such as:

- *Registration:* Firms will be required to be registered with the Plan Processor, FINRA CAT, LLC. The registration is applicable for all CAT Reporters, the scope of which is much wider than that of OATS
- *Internal Testing*: Firms need to perform internal testing to ensure they are prepared for reporting. Firms would need to consider various dimensions in developing the test plans. Internal testing would be followed by Industry Testing
- *Industry Testing:* The first Industry Member testing window opens in December 2019, prior to the production environment go-live in April 2020. Phase 2a/2b testing timelines are distributed from December 2019 to September 2020. Firms would be required to plan their development builds to meet industry test dates
- *Vendor Risk Management:* Firms leveraging a vendor should apply enhanced oversight including due-diligence, to ensure that the vendor can comply with the CAT requirements
- *Business Continuity:* Firms may need to update their Business Continuity Plans and Disaster Recovery (BCP/DR) policies due to CAT Reporting

8.2 Registration

CAT reporters must register with FINRA CAT, LLC, the Plan Processor. The type of Firms that must register include:

1) any member of a national securities exchange or national securities association that handles orders or quotes in NMS equity securities, OTC equity securities, or listed options; and
2) any CAT Reporting Agent (Submitter) that is or will be authorized to submit data to the CAT on behalf of an Industry Member
3) as defined in the FINRA CAT Member Onboarding Guide, Third-Party Reporting Agents (TPRA) will be those entities that are authorized "to view data submitted on behalf of a CAT Reporting IMID by another Submitter"

As previously noted, **CAT does not provide for any Firm to be excluded or exempted from the CAT reporting obligation**.

Introducing Firm Consideration:
Introducing Firms will need to register to begin reporting to CAT. If a Firm is authorizing a Third Party Reporting Agent to report on its behalf, it will need to name that vendor on the CAT Registration Form.

CAT registration opened on **March 18, 2019** and were **due by June 27, 2019,** but the registration remains open for any Firms that have not yet registered, including new Firms.

The official CAT registration form can be referred to at www.CATNMSplan.com/registration/index.html. The form is intended to be submitted online via the aforementioned link.

The registration form will capture information such as:

- Company information
- CAT registered principal
- CAT report source (self-reporting or vendor)
- Preferred connectivity type for self-reporting Firms
- Types of securities traded
- Reporting phase
- Type of Firms (small or large)
- CAT reporting default IMID

CAT registration involves the designation of a Registered Principal who should be an individual who is aware of the Firm's overall business and the regulatory obligations of the business units. The Registered Principal will be responsible and accountable for the Firm's CAT reporting obligations. An employed FINRA Series 24 person is required to be named as the CAT Registered Principal. However, if a Firm does not employ a Series 24 Registered Principal and instead employs one or more Limited Principals (e.g., Series 26), then the Firm should name a Limited Principal on the CAT Registration form (CAT FAQ A28[18]).

[18] A28 The CAT Registration form requires that a Registered Principal be named. Must that Registered Principal have a Series 24 license? CAT General FAQ. https://www.catnmsplan.com/faq/index.html#faqGen

It should be noted that CAT User account administration is the responsibility of the Firm. As such, the Firm will need to designate a Super Account Administrator that will be responsible for creating users for the CAT Reporting Portal or SFTP.

Submitters may be part of a Firm's CAT Reporting model as described in Chapter 6 of this Guide. CAT Technical Specifications define the identification of the "Submitter" in the metadata on the files reported to CAT. If a Firm is authorizing a Submitter, both the Firm and the Submitter are required to complete CAT registration. Firms will need to enter Relationships into the CAT Reporter Portal for any submitters for TPRAs. Self-reporting Firms are required to mention their preferred connectivity type (SFTP or CAT Reporter Portal) on the CAT Registration form. Firms that are using Submitters, will need to access CAT feedback via the CAT Reporter Portal and select this option as their preferred connectivity type. Up-to-date connectivity requirements are defined by the Plan Processor in the FINRA CAT Connectivity Supplement available on CATNMSplan.com.

Once the CAT registration form is submitted, Firms will be required to complete additional steps in order to gain access to the CAT. Firms should defer to the FINRA CAT Member Onboarding Guide for these steps as well as additional information regarding access to the CAT. Additionally, Firms are encouraged to reach out to the FINRA CAT Helpdesk at help@finracat.com for any questions on CAT registrations or the FINRA CAT Member Onboarding Guide.

Firm's should also consider any changes to their registration information, including any changes to the business for in-scope products, legal entity changes, personnel changes impacting the CAT designate, and the plans to use a vendor for CAT submissions.

Comparison Between OATS and CAT Registration

Firms that are also OATS reporters, may be familiar with the basics of CAT registration. That said, there are some differences between OATS and CAT registration requirements. These can be noted in Table 8.2.1.

Table 8.2.1: Difference between OATS and CAT Registration

Area of Difference	OATS	CAT
Who Should Register?	OATS registration is limited to only FINRA, NASDAQ, and NASDAQ BX members that receive and/or handle orders for OATS reportable securities	CAT registration applies to **all members** of a national securities exchange or national securities association that handle orders or quotes in NMS equity securities, OTC equity securities, or listed options.
Exemptive Relief	OATS rules contain provisions that allow Firms to request an exemption from OATS reporting obligations for manual orders, in certain circumstances.	CAT Rules **do not have** provisions that **relieve** any Firm from its CAT reporting obligations.

Registration Process	A defined set of steps is required for a Firm to complete its OATS registration. Creation of a reporting mechanism is a pre-requisite step to OATS registration. An initial step of OATS registration is the submission of a request to designate the Super Account Administrator (SAA) by completing the 'Designating/Updating a Super Account Administrator (SAA)' form.	The first step of CAT registration involves the completion and online submission of the one-page registration form on the CAT NMS website. Additional steps for CAT registration will be communicated in the near future, on CATNMSplan.com.

8.3 Connectivity

Firms and CAT Reporting Agents (Submitters or CRAs as defined by the Plan Processor) will be required to use a secured connection. Firms and Submitters will be able to interface with the CAT system using SFTP or the CAT Reporter Portal. SFTP will require a secure connection through private lines provided by a managed network service provider (MNSP) or Amazon Web Services (AWS) PrivateLink. CAT Reporter Portal connectivity will require the CAT Secure Reporting Gateway (SRG), private lines or AWS PrivateLink. The CAT Reporter Portal will be limited to the 100,000 records and provides reporting statistics, including account statistics and other features. Firms will have the ability to designate a primary and/or back up connection for their file transfer.

a) ***Private Lines***: Private line connectivity must be provided by a managed network service provider (MNSP), such as CenturyLink, to establish redundant private lines into the CAT system. Depending on the MNSP and services selected, a range of bandwidths may be available. Connectivity for private lines will be available **October 2019.**

b) ***AWS PrivateLink:*** Cloud-to-cloud connection may be established using AWS PrivateLink. This enables communication from a Firm's AWS VPC to the Plan Processor's VPC without pass through a public network.

c) ***CAT SRG***: The CAT SRG allows end users to access the CAT Reporter Portal via a web browser, using a secured multi-factor authentication (MFA) to establish an encrypted session. Firms and Submitters that use public lines will have to meet data connectivity and encryption specifications outlined in the CAT NMS Plan for accessing the CAT Reporter Portal via the CAT SRG. Firms should note that the CAT SRG does not limit the choice of Internet Service Providers. Access to the CAT SRG will begin in November 2019.

Introducing Firm Consideration:
Introducing Firms will need to select a connectivity option(s) and quickly implement solutions, once the vendor details are released to be ready for Industry Testing in December 2019.

Connectivity specifications have been provided by the Plan Processor in the CAT NMS Plan and in the FINRA CAT Connectivity Supplement that is available on CATNMSplan.com. Firms should refer to these

documents as well as reach out to the FINRA CAT Helpdesk regarding questions on the connectivity specifications and regarding the Connectivity Supplement.

8.4 Internal Testing

To support effective and efficient industry testing, Firms should consider completing **internal testing** of their CAT reporting solution(s) **prior to the start of industry testing**.

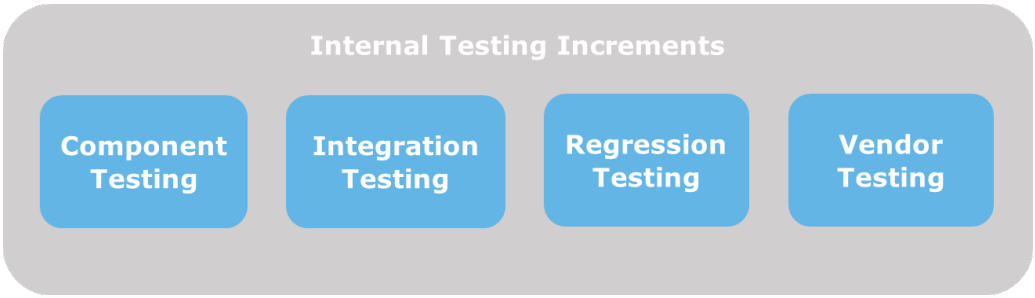
Timelines for testing should consider the dates for Industry testing and stage the internal testing to meet those targets. Industry testing will occur in stages to allow for incremental testing of Plan Processor functionality. For large Firms, Industry testing begins in December 2019. The following lists milestones for the CAT industry testing environment:

- Phase 2a and 2b: File Submission and Data Integrity – December 2019
- Phase 2a and 2b: Intra-Firm Linkage – April 2020
- Phase 2a and 2b: Inter-Firm Linkage – July 2020
- Phase 2a and 2b: Exchange Linkage – September 2020
- Phase 2c: Representative Order Linkages – January 2021
- Phase 2d: Options Manual and Complex Orders – June 2021

Depending on a Firm's CAT solution, internal testing may plan to cover each of the functions of the system across the conceptual architecture and each aspect of the technology solution such as source data changes, data transmission, scheduling, and validations. Firms should consider testing of the process components such as submission management, exception management, and governance. Compliance testing of the solution may also be considered for Firms to understand their regulatory compliance with CAT.

Testing may be performed in incremental waves to allow for focused testing as components are implemented, then to integrate those components into an end-to end test that will determine if there are any other impacts to existing systems through regression testing, and ultimately to include vendor integration, if applicable. The appropriate test environments should also be considered as Firms plan for the waves of incremental testing. The figure below outlines proposed internal testing increments.

Figure 8.4.1: Internal Testing Increments



While developing internal test plans, Firms should also consider whether creation of any representative test data is required, as well as test data volumes for capacity and performance testing. The dimensions that Firms may consider for developing test plans are in Table 8.4.1.

Table 8.4.1: Dimensions for Internal Plans and Test Data

Dimension	Summary of Dimension
Business Model	The various data sources and booking models that generate the reportable events under a variety of scenarios, trade venues, counterparties, corrections, revisions and other factors should be considered for sufficient coverage of the variety of data, events and sources. As business models might be supported by vendor systems considerations should be given to testing of such systems
Product Type	Trade records of various securities across product types, including equities and options, could provide sufficient coverage to determine whether there are any issues with product specific data elements. Considerations should be given to testing product reference data, including corporate actions
Volumes	Sufficient volumes of test data may support a Firm's readiness for production-level performance and considerations for peak periods or peak event types may be included in the test data plans
Positive and negative testing	Firms may consider including exceptions in their test data to trigger validations and exception management solutions
Test period	Firms should consider the testing duration and sequential periods of testing to cover the Trade lifecycle that spans trade dates in whole or in part

Firms levering Reporting Vendors should develop a strategy for conducing internal testing with those vendors, including obtaining confirmation that those vendors have gone through sufficient internal and industry testing.

Another dimension to consider for internal testing is alignment with Business Continuity Planning (BCP) scenarios such as delay in processing data/files and different outage scenarios such as upstream system or connectivity outages.

8.5 Industry Testing

The testing timelines are different for Large and Small Firms. Timelines for Small Firms have not yet been published.

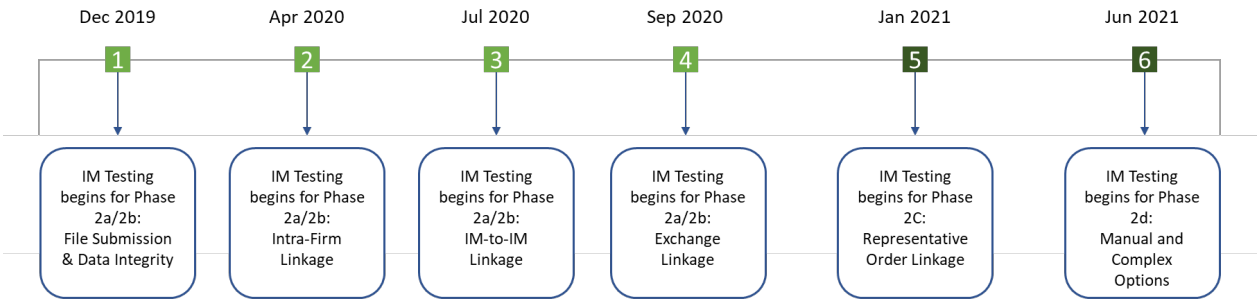
Timelines for Large Firms

Functionality for testing of Phases 2a and 2b will be made available in four sub-phases, starting with simple file submission and data integrity checks in December 2019 and ending with coordinated-industry testing for exchange and TRF linkage, in September 2020.

It is expected that Firms will be required to perform a minimum level of testing prior to being allowed to submit data into production (i.e. a certification), though details of this process have not been published by the Plan Processor.

Industry testing will be conducted in increments as new functionality is released to the testing environment. Firms can expect that the Plan Processor will publish more details and test plans for test phases as the test phases get closer. Incremental functionality within testing will be conducted by the Plan Processor while Firms are required to submit data, assess feedback from the Plan Processor and validate reported CAT Errors. Test phases for Phases 2a and 2b are shown in Figure 8.5.1.

Figure 8.5.1: Test Phases for 2a and 2b



1. **File Submission and Data Integrity:** Firms will need to successfully submit data to the test environment to obtain access to the production environment. This test environment would incorporate basic data integrity validations such as the rejection of a record (e.g., invalid format, invalid symbol, invalid IMID, etc.)

2. **Intra-Firm Linkage:** These validations will be enabled in the test environment in April 2020. Intra-Firm linkage validations will include only those validations that are within a single Firm or IMID. The final test requirements for this reporting event are still under SRO discussion

3. **Industry Member-to-Industry Member Linkage (Inter-Firm Linkage):** This will test linkage between multiple Firms. These validations will be enabled in the test environment in July 2020. Specific testing plans and requirements for coordinated industry testing are still under SRO discussion

4. **Exchange and TRF Linkage:** This will test linkage of reported activity back to exchange or TRF activity. These validations will be enabled in the test environment in September 2020. Specific testing plans and requirements for coordinated industry testing are still under SRO discussion

5. **Representative Order Linkages for Equities:** Details are still pending

6. **Options Manual and Complex Orders:** Details are still pending

8.6 Client Account Holder Notification

Firms may want to consider potential client account holder notifications, to inform clients that their information will be submitted to CAT. Firms should assess if there is any incremental responsibility beyond the current statements in client account agreement in relation to compliance with laws and regulations which would extend to CAT. CAT does not have an additional regulatory requirement for client communications at this time, so Firm's will need to consider the pros and cons of such communications. Firms should consider whether they should disclose to their clients the additional data that they will be disclosing to CAT and the regulators. The decisions on what and when to communicate to clients may have implications for the communication policies and procedures and privacy notification requirements

Due to the increased amount of client data reporting into CAT, clients may have concerns regarding the dissemination of personal account and transaction data, *despite* being a regulatory requirement. Firms may deploy different approaches for notifying customers and include:

1) **Choosing to incrementally update and/or revise their internal policies in alignment with CAT reporting requirements; or**

2) **Choosing to delay modifications to client account holder notifications until full implementation of CAT reporting has been achieved through both equities and options**

Irrespective of the approach taken Firms should consider the impact to Financial Advisor call centers and customer service centers with questions regarding adjustments. Regardless of the timeline, Firms should communicate these regulatory requirements to existing and prospective clients as well as provide assurances of client information communication security.

Throughout the CAT implementation timeline, Firms should review their front office policies and amend them to incorporate new requirements under CAT. Below are some of the considerations associated with and potential methods to enhance client account holder notifications as it pertains to CAT reporting implementation.

Considerations:

- **Revisiting frequency of notifications**: Firms will need to determine the frequency of CAT notifications. Choosing to notify client early may result in multiple updates and /or notifications to customers

- **Implementation of piecemeal vs. wholesale changes:** For those Firms who already notified clients about reporting into OATS or Blue Sheets, changes to notifications, with respect to CAT reporting, may not require significant time, resources or modifications to existing systems, depending on the Firms' internal processes. However, Firms who provide less or minimal notification to clients regarding regulatory reporting requirements may need to develop systems and/or policies and procedures to notify clients about these new reporting systems. In this case, some Firms may opt to implement these systems or changes over the course of the 3-4 year timeline in which both equity and options are phased into CAT reporting, rather than continuously adjusting notifications as phases progress

- **Preparedness for client questions to call center:** Firms should plan for an increase in questions and inquiries around CAT customer notification and a process for responding should be established. This can include coming up with a list of types of questions expected and pre-determined answers, or creating a list of FAQs and responses for clients

- **Confidential information concerns:** Firms should consider types of communication and assurance around information security that will be shared with the clients

8.7 Vendor Risk Management

When leveraging CAT reporting vendors, vendor risk management should be considered, especially since Firms will retain the regulatory obligation and the fact that CAT will contain confidential customer information along with detailed transaction data. Firms are responsible for the timeliness, accuracy and completeness of the data that they report to CAT regardless of who transmits the data to the CAT. Therefore, even if a Firm uses another CAT Reporter to report data on its behalf, the Firm remains fully responsible for the timeliness, accuracy and completeness of the data. Hence, Firms should develop relationships with their vendors to proactively gain assurances regarding the level of control over their CAT reportable information.

While considering the potential outsourcing of any CAT-related functions to vendors, Firms may want to outweigh the pros and cons surrounding this decision. It may be advisable to have a comprehensive plan for identifying uncertainties and legal liabilities regarding the hiring of vendors for CAT reporting, and measures in place for consistent monitoring of vendor performance.

Challenges:

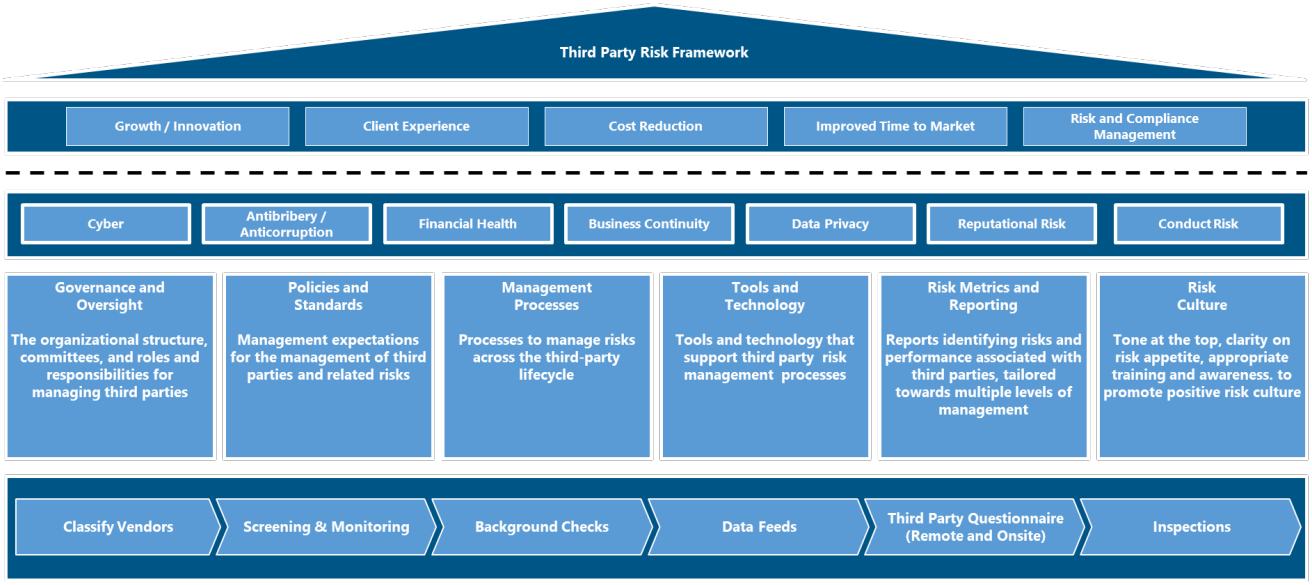
- **Confidential information concerns:** where information is stored in vendor systems and concerns confidential information, Firms should proactively gain assurances regarding the level of control around such information, including access, and cyber security controls and notification requirements of any data breach, including but not limited to confidential customer information

- **Firm Designated IDs presents complexities:** CAT specifications require Firms to generate a unique identifier (FDID) for each trading account. Firms must assign a single FDID to each trading account. This FDID also must be unique across all vendors that the Industry Member may use to report to CAT. This adds complexity when Firms have multiple systems or vendor platforms as each would be required to report the same unique FDID for the trading account

Potential Methods to Manage Vendor Risks:

- Establish or leverage a vendor risk framework on which the program will be designed and built. Such framework will assist in understanding the inherent risks stemming from the CAT vendors such as cyber risks, resiliency, performance, and data integrity. Figure 8.7.1 provides a broad view of such construct and operating model components

Figure 8.7.1: Foundational Third-Party Risk Framework



Additional considerations in managing vendors should include:

- Establish vendor inventory management which links into each CAT vendor risk log, governance, policies, and procedures. This should also include oversight into vendor resiliency and continuous monitoring of vendors with respect to confidential data
- Perform scheduled and spot-check reviews that include a structured agenda covering policies, procedures, leakage escalation processes, relevant mitigating controls, on-going operational issues, open items, security, access, performance reports and SLA metrics
- Seek assurance reports related to specific high-risk data
- Develop controls to check consistency of FDID application for data to be reported

- Assess benefits, risks, and downstream affects to other systems necessary to integrate a vendor reporting solution
- Consider maintaining data dictionaries for in-house and vendor systems
- Update and/or establish vendor agreements which include established service level agreements (SLAs) and clear roles and responsibilities over CAT reporting and handling
- Where applicable, review vendor selection which include pre-contract checks and adequate contractual language
- Validate that vendors are integrated into broader business continuity plans and tests are conducted on a periodic basis

8.8 Vendor's Considerations in Providing CAT Reporting Services

A Vendor may act as a CAT submitter on behalf of any Firm. Vendors will need to consider the requirements they will have of their customers to provide timely and accurate data, the validations that they will perform, the communication of status. Clear roles and responsibilities should be documented, and operations and systems tested.

Such agreement between Vendor and Firm is required to be evidenced in writing and the agreement must specify the respective functions and responsibilities of each party to the agreement that are required to effect full compliance with the requirements of the CAT Compliance Rules. Such agreement should include the date on which the Submitter should commence reporting to the CAT on behalf of the Industry Member. In addition, to begin reporting to the CAT, the Industry Member and the Submitter must complete the onboarding process with the Plan Processor. Notwithstanding the existence of an agreement with a Submitter, an Industry Member maintains primary responsibility for compliance with the CAT reporting requirements.

Clearing Firms as CAT submitters

If clearing Firms are reporting on behalf of introducing and executing brokers, they should contractually define their responsibilities for regulatory reporting since the introducing and executing brokers will retain the regulatory obligation for CAT reporting. As noted above roles and responsibilities for exception management and error corrections will need to be clearly defined. Updates to the customer Clearing Agreements should be completed in advance of CAT reporting.

Clearing Firms that are reporting on behalf of a correspondent Firm will need to determine data requirements which are in excess of the information needs for clearing services, to effectively meet the CAT reporting requirements. Further, they should also determine the extent of validations that will be performed over the Firms trade data and any notification and error correction protocols necessary.

Clearing Firms that are not reporting on behalf of a Firm will need to consider the SLAs and processing times to provide the Firms the data they will need to report timely to the CAT. Formatting and enrichment of the data should also be determined to ensure the information is provided in an agreed-upon state.

8.9 Business Continuity Plans, Disaster Recovery and Contingency Planning

Firms will need to consider whether their Business Continuity Plans and Disaster Recovery (BCP/DR) have been appropriately updated and tested to include CAT reporting. This will include making sure that Firms are able to submit and correct records to the CAT despite system interruptions they may face. CAT reporting and correction timelines will remain in effect regardless of whether a Firm is having technical issues. Firms should also conduct regular testing of their CAT BCP/DR plans.

Potential Considerations when developing or updating the BCP/DR Plans:

- The Business Continuity Plan (BCP) should be aligned with applicable industry standards (e.g. NIST 800-34)
- Individual system level BCP/DR guides should be developed for each CAT reporting component in scope
- A Disaster Recovery Guide should be maintained by the Business Continuity Management function to define the set of activities intended to ensure that critical business functions will continue to operate despite serious incidents or disasters, or will be recovered to an operational state within a reasonable period of time
- Training, awareness and communication related to CAT BCP should be developed and executed or built into the existing BCP training, awareness and communication programs
- Firms should test their ability to operate their backup and recovery facilities by performing functional and performance testing of its BCP/DR periodically. This will assist Firms to test and update their plans and also check if the recovery teams are aware of their roles and responsibilities. Validation of the various types of plans can be performed by either conducting: (i) plan walkthroughs, (ii) tabletop exercises, (iii) integrated tests with both business and technology involved, of a single element or component, or (iv) war gaming exercises or mock disasters to simulate an actual disruption
- Firms should assess where their current BCP/DR and emergency response plans address geospatial information about facilities, business partners, service providers and vendors

In addition to business connectivity and disaster recovery, Firms should develop contingency plans for technological and vendor outages to ensure continuation of CAT reporting. Potential outages with respect to technology and vendors may include, but are not limited to:

- Connectivity outage
- Vendor outage
- Plan Processor outage
- Trading platform outage

- Reporting platform outage

8.10 BAU/CAT Readiness Checklist

The following checklist provides a list of questions in a survey format to allow Firms to measure their CAT readiness. Responses may be "yes", "no", "in progress" or "not applicable" to the survey format. An additional checklist that allows for free-form responses to the questions as a way for Firms to document how they are preparing for CAT is available in Appendix 1 of this document.

1. **Scope and Registration**

   - ☐ Have you determined whether you are a large or small Industry Member? (refer to definition in Section 3.2)
   - ☐ Do you understand the obligations for using a vendor as a CAT Reporter?
   - ☐ Have you registered with FINRA CAT LLC?
   - ☐ Have you established a program for CAT reporting?
   - ☐ For non-OATS reporters – have you considered the impact of CAT on your people, process and technology?

2. **Data and Events**

   - ☐ Have you identified your quote, order, routing, and execution data sources?
   - ☐ Have you identified your reference data sources?
   - ☐ Have you mapped your events to the CAT reportable event types?
   - ☐ Have you mapped your source data fields to the CAT reporting requirements?
   - ☐ Have you identified your data remediation work, internally or with vendors?
   - ☐ Have you completed any data remediation work?
   - ☐ Have you defined the method for generating the FDID?
   - ☐ Have you established a plan to build linkages between reporting events?

3. **Operations**

   - ☐ Have you defined a schedule to meet submission deadlines for CAT reportable events?
   - ☐ Have you defined a schedule to meet the CAT error correction deadline?

- ☐ Have you built operating procedures for Submission Management?
- ☐ Have you built operating procedures for Exception Management (error handling)?
- ☐ Are you going to notify your customers that their data will be reported to the CAT?

4. Technology

- ☐ Have you documented your CAT technology architecture?
- ☐ Have you documented your CAT reporting model(s)?
- ☐ Have you documented your CAT Test plans?
- ☐ Have you identified a connectivity solution for data submission?
- ☐ Have you identified the connectivity requirements for the CAT Reporter Portal (authentication certificates)?
- ☐ Have you determined the data retention requirements?

5. Governance

- ☐ Have you identified all internal functions impacted by CAT?
- ☐ Have you established a governance structure and identified accountable management for CAT reporting?
- ☐ Do you have defined metrics for governance reporting and management reports?
- ☐ Have you designed a control framework?
- ☐ Have you established pre-submission validation controls?
- ☐ Have you updated Compliance Policies and Supervisory Procedures for CAT?

6. Vendors

- ☐ Have you selected one or more vendors for CAT Reporting?
- ☐ Have you notified the Vendor of your intention to have them report on your behalf?
- ☐ Have you identified all the Vendor data validations and client control considerations?
- ☐ Have you confirmed the Vendor's readiness for Industry testing participation?
- ☐ Have you established a vendor oversight program?

7. Security and Business Continuity

- ☐ Have you developed a Cyber Security Plan?
- ☐ Have you developed Business Continuity and Disaster Recovery plans?

- ☐ Have you developed a plan to address data security and encryption if CAT data at rest and in transit?

9.0 Summary of Challenges, Risks, and Other Considerations

9.1 Introduction

CAT reporting will have multiple implications for Firms. Firms would need to assess the impact the CAT will have on their operations, technology, staff, governance and regulatory compliance. The CAT may provide potential opportunities to Firms to enhance their broader business operations in surveillance, data analytics, and client-relationship management. It is anticipated that innovations in technology would be a disruptor in the way data and reporting is going to be managed in future for the CAT.

Some of the potential challenges faced by the Firms would be in the areas of data readiness, regulatory compliance, operations, and technology capabilities. This section will explain these challenges and some potential solutions which the Firms may consider for overcoming these issues. Timely consideration of these challenges and actions may help Firms prepare for compliance with CAT.

9.2 Data Readiness Challenges

In preparation for the daily reporting of large volumes of data to CAT, Firms should assess their current data readiness capabilities such as data sourcing, data quality, data validation and overall data governance to identify gaps and take remedial actions for enhancement. There are several challenges which the Firms should consider.

Some potential challenges include:

- **Data management constraints:** Trade data submissions need to comply with a specific reporting format. Part of the challenge is an absence of adequate data governance—in terms of effective governance structure, standard policies and procedures, clear business management ownership, assigned data stewards, quality monitoring, and data lineage tools. Silo-ed systems and technology shortcomings also make the task of integrating and reconciling data between the various systems feeding trade data more problematic. In addition, the change in timestamp requirement for orders and events to milliseconds, calls for a reassessment of systems, that can only report in seconds
- **Firm Designated IDs (FDIDs) present complexities:** CAT require Firms to generate a unique identifier for each trading account used to place the order, notably restricting the use of an actual account number or any other identifier that could be used to influence a transaction in the account. Additionally, the FDID is required to be unique across the Firm, adding further complexity where Firms have multiple systems or vendor platforms
- **Trade data linkage challenges:** CAT specifications will require Firms to link all reportable events with the usage of linkage keys that will connect order events within an Industry Member and across Firms and Exchanges. This will essentially mean Firms have to develop capabilities to ensure data elements

for linkage fields between Route and Order accepted events are the same

- **Firms leveraging vendor systems**: Firms using Vendor OMS systems and/or CAT reporting vendor solutions may face situations where vendors may provide CAT records/files different formats. Self-reporting Firms that use multiple OMS/EMS may need a process to convert between formats to normalize the data

Potential solutions for consideration:

- Firms should assess data management and reporting capabilities and implement enhanced data architecture to meet CAT reporting requirements
- Firms should plan and invest in enhancing their legacy systems
- Firms should consider enhanced data governance capabilities
- Key performance indicators (KPIs)/key risk indicators (KRIs) should be defined to track data improvements (quality improvements, issue reductions) and to improve integrity across systems
- Firms should improve data sourcing processes with enhanced data security, data archival, and data recovery capabilities to drive compliance efficiently
- Firms should create uniform data with common references that can be easily linked across the trade lifecycle
- RPA, cognitive technologies, and big data analytics solutions should be considered for automating routine data processes. This would help in efficiently addressing the challenges around data quality and reduce the likelihood of regulatory scrutiny and fines

9.3 Regulatory Compliance Challenges

As discussed in this document, CAT presents regulatory compliance challenges in two dimensions: not only must Firms report to and comply with CAT, but Firms must also continue to comply with a number of regulatory reports such as OATS, EBS, MiFID. While it is expected that some of these reporting obligations may change or reduce due to CAT, there will be overlap for some period of time that Firms must contend with.

Some potential challenges for Firms include:

- Understanding the scope and potential impact of CAT Reporting
- Establishing consistency of reporting across the different regulatory reporting regimes (i.e. ensuring a consistent view of a Firm's activity across reporting regimes)
- Understanding the potential implications of CAT non-compliance, including possible inspections and fines
- Developing the capabilities to timely response to regulatory inquires

- Enhancing internal surveillances—given that regulators will now have a much broader picture of Firm activity, Firms may wish to proactively improve their internal surveillances to ensure their picture of their activity is at least as good as their regulator's

Potential solutions for consideration:

- Enhanced training procedures and communication protocols to educate personnel on the CAT requirements and the individual's responsibility in meeting those requirements
- Implement updated controls, reporting tools, and supervisory procedures for the ongoing monitoring of the accuracy, timeliness, completeness and consistency of data submission to the CAT and other regulatory reports
- Incorporating the impact of CAT to the monitoring and oversight responsibilities of the Chief Compliance Officer, Chief Risk Officer, and internal audit functions
- Developing capabilities to timely source prior submissions

9.4 Operational Challenges

CAT reporting may lead to changes in business processes, such as customer onboarding procedures and customer data maintenance. At a minimum, Firms may have to develop new procedures, define new processes, identify resources, and expand their infrastructure to process and retain data for CAT compliance. As CAT introduces new reporting products and operational processes Firms should begin to identify impact to their current operations.

The level of staff resourcing requirements for Firms in readiness for CAT is likely to be dependent on the portfolio of traded products for each Firm. Considerations may include:

- Volume and Complexity of Trading Activity and Firm services, including:
    - If a Firm's business includes Listed Options or Complex Orders
    - Prime Brokerage or Market Making functions
    - If the Firm is also service provider for other Firms such as clearing and reporting
- Which regulatory reporting requirements are in scope for the Firm and the use of vendors
- Functionality of current reporting technology, including the utilization of automated workflows and emerging technology in report production, controls and error handling process
- Establishment of an integrated and risk-based control framework, including proactive controls ahead of report submission

Some potential challenges include:

- Limited reporting experience with certain activities and events, especially options

- Ability to handle ad hoc regulator inquiries about past data submissions
- Ability to establish supervisory procedures to monitor CAT Reporting
- Ability to implement operational processes for submission and exception management
- Training and awareness of operational personnel on CAT requirements
- Ability to respond to error correction accurately and timely

Firms should begin to identify how their current operations will be impacted by the CAT requirements, including technology platforms and reporting procedures.

Potential solutions for consideration:

- Identify the business units or specific stakeholder subgroups that are responsible for CAT reporting tasks
- Assess the current staffing of these business units and specific stakeholder subgroups in relation to the entire body of work necessary to successfully meet CAT reporting requirements
- Document potential weaknesses in the current staffing infrastructure that may need to be updated to comply with new regulatory requirements and enhance efficiency, capacity and reduce errors. This may include converting human resources to technological capabilities, staffing alternatives, and outsource/vendor solutions
- Compare the alternatives and develop an actionable plan to build capabilities to execute according to regulatory requirements, respond to regulator inquiries post go-live, and build research capabilities for past submissions and to handle ad-hoc requests

Below is an ***illustrative*** example of a matrix that a Firm may develop in order to assess their current staffing in comparison to the projected staffing necessary for CAT, as well as the potential cost estimates. Information and estimates are for illustration purposes only and **do not reflect any particular firm or CAT requirements.**

Figure 9.4.1: Full-Time Equivalent Matrix

	Business (i.e. Wealth Management; Investment Bank)			Technology
	Governance	Business Unit(s)	Operations	In-house & Vendor Solutions
Current (FTE)[1]	5.6	4.2	2.7	7
Current ($)[2]	2.04M	1.53M	0.985M	3.55M[3]
Target (FTE)	6.1	3.9	2.8	9
Target ($)	2.23M	1.42M	0.985M	4.79M[4]
Difference (FTE)	+0.5	-0.3	+0.1	+2
Difference ($)	0.19M	-0.11M	-	1.24M

Target Total	**FTE**	**$**
Business	12.8	4.64M
Technology	9	1.24M

1. This matrix assumes rates for FTEs are $1000 per day across both business and technology.
2. Amounts are annualized on a 365 day year (i.e. FTE * 1000 * 365)
3. This amount includes a $1M technology infrastructure amount
4. This amount includes a $1.5M technology infrastructure amount

9.5 Technology Challenges

CAT implementation is likely to have a substantial impact on Firms' technology infrastructure. The requirements will also likely necessitate changes to systems and data processing, transmission, and reporting tools.

For day-to-day operations of CAT reporting, control framework, and exception management, Firms should consider the use of technologies and digital enablers to increase efficiency, capacity, and reduce risk of errors from manual procedures.

Some potential challenges include:

- The time stamp requirement for orders and other relevant reportable events, which is defined to at least milliseconds
- Understanding the dependencies on source systems, external systems or vendors and confirm gaps in reporting procedures or issues of data integrity
- Ability to generate and manage FDID
- Scalability and flexibility of the current system architecture
- Ability to generate reports for option quotes, orders, and execution
- Ability to submit quotation informational in addition to execution data timely and accurately

Potential solutions for consideration:

- Review dependencies on external systems or vendors and confirm gaps in reporting procedures or issues of data integrity
- Consider the scalability and flexibility of the current system architecture
- Enhance or build systems to store CAT data and generate the reports including options quotes, orders, executions and error corrections
- Leverage Robotic Process Automation (RPA) to capture and interpret existing information to automate transaction processing, data manipulation, and communication
- Explore using Machine Learning, to intelligently facilitate linkages and match trades throughout their lifecycle to proactively identify data breaks, errors and unallocated trades
- Assist in the execution of controls, as well as provide the necessary data for workflow management, and visualization for effective governance, through advanced analytics
- Integrate advanced data visualization tools and dashboards into technology infrastructure to enable easy processing, analyzing, and communication of data

9.6 Post Go-Live Considerations

Periodic technology enhancements will need to support established processes, data submission standards and other industry dependencies. The systems and data architecture must meet the processing, retention and access requirements as well as expand to meet future capacity and functional capabilities.

Some potential challenges include:

- Maintaining system and data integrity over time
- Periodic review and update to CAT reporting governance and policies

Potential solutions for consideration:

- Develop governance to respond to future reporting changes

10.0 Path Forward, Focus Areas and Next Steps

CAT reporting requirements are much more comprehensive and detailed than OATS. The CAT reporting system, the day-to-day operations of the CAT reporting, control framework, and exception management should be strategically designed and implemented. Firms should consider a future state of operations that can leverage technologies and digital enablers to increase efficiency, capacity and reduce risk of errors.

The next steps that Firms may focus on, are outlined in table 10.0.1.

Table 10.0.1 Focus Areas and Next Steps

Focus Areas	Next Steps
People	• Identify the stakeholders for CAT implementation • Define internal organization's roles and responsibilities for CAT reporting • Identify additional staffing needs
Process	• Design the control framework for CAT internal systems • Build operational capabilities to meeting CAT requirements • Update policies and procedures for CAT compliance
Technology infrastructure	• Build technology architecture using proprietary in-house systems and/or vendor solutions • Adopt forward looking technology solutions
Data infrastructure	• Assess existing data management and reporting capabilities • Revise data management policies and data governance procedures
Regulatory updates	• Monitor the continually changing regulatory reporting requirements • Consolidate the efforts for multiple reporting regulations and overlapping data reporting requirements

Retirement of OATS

CAT Reporters who are also OATS Reporters should be cognizant of the fact that OATS will eventually be retired. However, prior to sunsetting OATS, the CAT would need sufficient data to ensure that regulators can adequately conduct surveillance and investigations of Firms. Hence, it is anticipated that CAT reporters who are also OATS reporters would have to report both OATS and the CAT for a period of time. OATS will be retired after the error rates reach an acceptable level.

According to a proposed rule change[10] filed by FINRA with the SEC, to eliminate OATS, "*To ensure the CAT's accuracy and reliability, FINRA is proposing that, before OATS could be retired, the CAT would generally need to achieve a sustained error rate for Industry Member reporting in each of the categories below for a period of at least 180 days of 5% or lower, measured on a pre-correction or as-submitted basis and 2% or lower on a post-correction basis (measured at T+5). FINRA is proposing to measure the 5% pre-correction and 2% post-correction thresholds by averaging the error rate across the period, not require a 5% pre-correction and 2% post-correction maximum each day for 180 consecutive days. FINRA believes that measuring each of the thresholds over the course of 180 days will ensure that the CAT consistently meets minimum accuracy and reliability thresholds for Industry Member reporting while also ensuring that single-day measurements do not unduly affect the overall measurements".*

The retirement plan for OATS is not final and details are subject to change once a final plan is approved and published.

Certain considerations for CAT reporters who are also OATS reporters:

- Probable parallel reporting to OATS and CAT until all Firms reporting to OATS are successfully reporting to the CAT
- Consider sunsetting OATS and OATS Vendors, if any, while maintaining books and record
- If OATS reporting is currently handled by a clearing Firm or OMS/EMS vendor, understand how their new service, if they plan to expand, affects the Firm. If the Firm uses an OATS reporting vendor, assess if they will provide a CAT service.
- Apply consistent account identifiers across applications as this is necessary for accurate CAT reporting
- Assess CAT processing alternatives including whether CAT reporting can be consolidated with other services

Considerations for the retirement of OATS include:

- **Covered Securities**: The CAT NMS Plan includes OTC Equity Securities in the securities that must initially be reported to CAT in order to include these securities that are currently reported to OATS
- **Dual Reporting**: CAT Reporters that are also OATS Reporters will have to report to both CAT and OATS until FINRA can integrate CAT data with OATS data in such a manner that allows it to meet its regulatory obligations
- **Three-Year CAT Implementation Schedule**: OATS can be eliminated only after all Firms currently reporting to OATS are successfully reporting information to CAT

[10] Self-Regulatory Organizations; Financial Industry Regulatory Authority, Inc.; Notice of Filing of Proposed Rule Change To Eliminate Requirements That Will Be Duplicative of CAT. https://www.federalregister.gov/documents/2017/06/01/2017-11359/self-regulatory-organizations-financial-industry-regulatory-authority-inc-notice-of-filing-of

For those Firms that have never reported to OATS and are subject to CAT, the immediate task is to understand impending compliance dates and reporting alternatives. CAT provides a number of opportunities to centrally manage the Firm's data, perform more-focused internal surveillance, and may reduce the burden of response to regulatory inquiries which collectively can serve to potentially reduce the Firm's cost associated with regulatory reporting and data management.

Appendix

Below is a version of the BAU/CAT Readiness checklist provided in section 8.10 to assist Firms in understanding their level of CAT readiness and potential steps or actions that are necessary to achieve successful CAT reporting.

1	Scope and Registration	Answer	Date of Response	Description	Reference
1a	Have you determined whether you are a large or small Industry Member?	Yes, No, In-progress, not applicable	mm/dd/yyyy	ex. We have calculated our total capital as $nnn which is in excess of the $500,000 threshold for a Small Industry Member	w.p. n.n.n
1b	Do you understand the obligations for using a vendor as a CAT reporter?				
1c	Have you registered with FINRA CAT LLC?				
1d	Have you established a program for CAT reporting?				
1e	What preparations have you made for implementation of a program for CAT reporting?				
1f	For non-OATS reporters – have you considered the impact of CAT on your people, process and technology?				
2	**Data and Events**	**Answer**	**Date of Response**	**Description**	**Reference**
2a	Have you identified your quote, order, routing, and execution data sources?				
2b	Have you identified your reference data sources?				
2c	Have you mapped your events to the CAT reportable event types?				
2d	Have you mapped your source data fields to the CAT reporting requirements?				
2e	Have you identified your data remediation work, internally or with vendors?				
2f	Have you completed any data remediation work?				
2g	Have you defined the method for generating the FDID?				
2h	Have you established a plan to build linkages between reporting events?				

3	Operations	Answer	Date of Response	Description	Reference
3a	Have you defined a schedule to meet submission deadlines for CAT reportable events?				
3b	Have you defined a schedule to meet the CAT error correction deadline?				
3c	Have you built operating procedures for Submission Management?				
3d	Have you built operating procedures for Exception Management (error handling)?				
3e	Are you going to notify your customers that their data will be reported to the CAT?				
4	**Technology**	**Answer**	**Date of Response**	**Description**	**Reference**
4a	Have you documented your CAT technology architecture?				
4b	Have you documented your CAT reporting model(s)?				
4c	Have you documented your CAT Test plans?				
4d	Have you identified a connectivity solution for data submission?				
4e	Have you identified the connectivity requirements for the CAT Reporter Portal (authentication certificates)?				
4f	Have you determined the data retention requirements?				
5	**Governance**	**Answer**	**Date of Response**	**Description**	**Reference**
5a	Have you identified all internal functions impacted by CAT?				
5b	Have you established a governance structure and identified accountable management for CAT reporting?				
5c	Do you have defined metrics for governance reporting and management reports?				
5d	Have you designed a control framework?				
5e	Have you established pre-submission validation controls?				
5f	Have you updated Compliance Policies and Supervisory Procedures for CAT?				

6	Vendors	Answer	Date of Response	Description	Reference
6a	Have you selected one or more vendors for CAT Reporting?				
6b	Have you notified the Vendor of your intention to have them report on your behalf?				
6c	Have you identified all the Vendor data validations and client control considerations?				
6d	Have you confirmed the Vendor's readiness for Industry testing participation?				
6e	Have you established a vendor oversight program?				
7	**Security and Business Continuity**	**Answer**	**Date of Response**	**Description**	**Reference**
7a	Have you developed a Cyber Security Plan?				
7b	Have you developed Business Continuity and Disaster Recovery plans?				
7c	Have you developed a plan to address data security and encryption if CAT data at rest and in transit?				

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