

Consolidated Audit Trail

Exchange Linkage Overview 9/16/20

Agenda

- ▶ Exchange Matching Timeline
- ▶ Linkage Keys and Errors
- ▶ Exchange Route Matching Processing
- ▶ Early Observations on Exchange Linkage Errors
- ▶ Feedback and Corrections

2a/2b Timelines

- ▶ The CAT Industry Member Test and Production Environments for Phases 2a and 2b are being rolled out in a series of releases which implement different validation types at different times. These releases include:

Release	Test Environment Deployment Date	Production Environment Deployment Date	Compliance Go-Live Date
1- File Submission and Data Integrity	December 16, 2019 (multiple releases)	April 13, 2020 (multiple releases)	June 22, 2020 (Phase 2a)
			July 20, 2020 (Phase 2b)
2- Intrafirm Linkage	April 20, 2020 (multiple releases)	May 4, 2020 (multiple releases)	July 27, 2020 (Phase 2a)
			August 24, 2020 (Phase 2b)
3- Interfirm Linkage	July 27, 2020	August 10, 2020	October 26, 2020 (Phase 2a)
			January 4, 2021 (Phase 2b)
4- Exchange/ TRF Linkage	September 9, 2020	September 28, 2020	October 26, 2020 (Phase 2a)
			January 4, 2021 (Phase 2b)

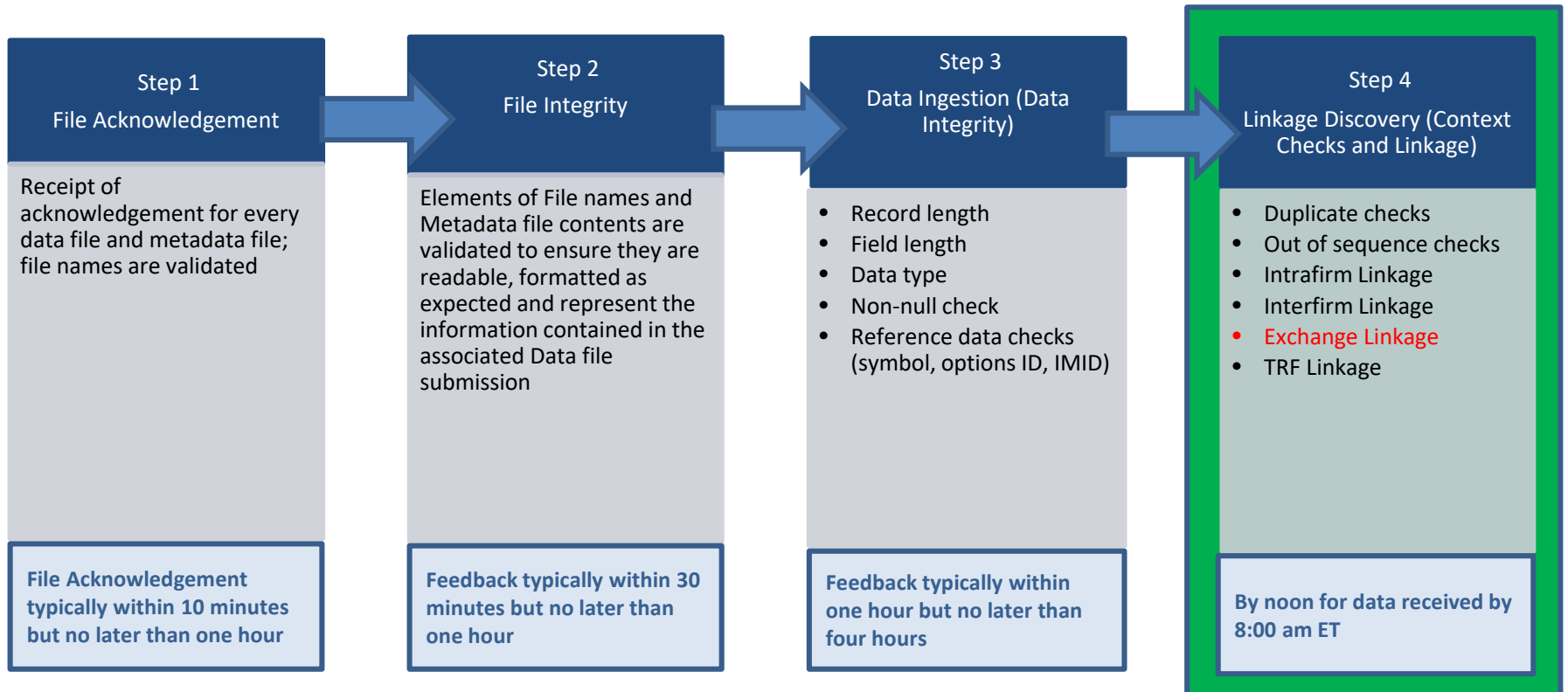
- ▶ Refer to CAT Alert 2020-01 for additional information.

Industry Member 2a/2b – Release 3 & 4 (Interfirm, Exchange & TRF) Release Rollout

Interfirm Release 3.1 Industry Test – 7/27/2020 Production – 8/10/2020	Interfirm Release 3.2 Industry Test – 8/10/2020 Production – 8/10/2020	Exchange/TRF Release 4.1 Industry Test – 9/9/2020 Production – 9/28/2020	Interfirm Release 3.3 Exchange/TRF Release 4.2 Industry Test – 9/21/2020 Production – 9/28/2020
<ul style="list-style-type: none"> Machine-to-Machine Interfirm Validations & Feedback including Named Errors. <p>CAT Reporter Portal</p> <ul style="list-style-type: none"> Download Interfirm Feedback including Named Errors. Set preference for Named Feedback (JSON vs CSV). 	<p>CAT Reporter Portal</p> <ul style="list-style-type: none"> Reporting Summary (Interfirm Link Eligible, Errors, Warnings and Adjusted Error Rate). Counterparty statistics downloadable for Interfirm Unlinked and Unlinked Named Errors. Error Code Count screen to include Interfirm Errors and Warning including Named Errors. Error Search screen ability to view and correct Interfirm Linkage Errors (No Named Errors). 	<ul style="list-style-type: none"> Machine-to-Machine Exchange/TRF Validations & Feedback including Named Errors. <p>CAT Reporter Portal</p> <ul style="list-style-type: none"> Download Exchange/TRF Feedback including Named Errors. 	<p>CAT Reporter Portal</p> <ul style="list-style-type: none"> Reporting Summary (Exchange/TRF Link Eligible, Errors and Adjusted Error Rate). Error Code Count screen to include Exchange/TRF Errors including Named Errors. New Screen including Export for Interfirm, Exchange & TRF statistics by counterparty. Error Search screen <ul style="list-style-type: none"> View and correct Exchange & TRF Linkage Errors. View Interfirm Named Errors (not repairable via the Portal).

Phase 2a Interfirm/Exchange/TRF Compliance Date – 10/26/2020
Phase 2b Interfirm/Exchange Compliance Date – 1/4/2021

CAT Processing



Linkage Keys and Errors

Exchange Route Linkage Key

Industry Member Routes to an Exchange:

Sender (Industry Member)	Receiver (Exchange)
senderIMID	routingParty
destination (Exchange ID)	Exchange (Exchange ID)
Event Date portion of eventTimestamp	Event Date
symbol (or optionID)	symbol (or optionID)
routedOrderID	routedOrderID
session	session

- ▶ Guidance for populating linkage keys for each exchange is found in the [Order Routing Field Mapping between CAT and Exchanges](#), published on the Technical Specifications page of CATNMSPlan.com.
- ▶ Route Linkage Key must be unique and must be equal between the firm and the exchange.
- ▶ *Routed Order ID* must be unique except when an exchange requires the use of the original *routedOrderID* when reporting a modification and route for a previously routed order or in certain Cross Order scenarios. In such cases, *dupROIDCond* must be set to true.
- ▶ During Linkage Processing, leading spaces and leading zeroes will be removed from the *routedOrderID* and *session* fields (planned for implementation in Test and Prod on 9/28/2020).

Refer to **Section 2.6.3.2 and 2.6.3.3** of the IM Tech Spec for additional information/examples.

Exchange Matching Approach

- ▶ CAT Equity Exchange Linkages – using the same exchange dataset as what is used for OATS matching
- ▶ Linkage Key Construction
 - Effective September 28, 2020 in Test and Production, FINRA CAT will remove leading zeros from the *routedOrderID* and *session* field for linkage purposes only in both CSV and JSON format
 - Unlike OATS, leading zeros in the *routedOrderID* field are not rejected in CAT
- ▶ Note: Unlinked Feedback will include the event as it was populated on submission which will reflect any leading spaces or leading zeroes

Order Routing Field Mapping between CAT and Exchanges

- ▶ Provides guidance outlining how Industry Members must populate each field required for Exchange Route Matching for each Exchange
- ▶ Found on Technical Specifications page of CATNMSPlan.com
- ▶ Example:

senderIMID in CAT events is formatted with <CRD>:<senderIMID>

CAT Report Field	BOX-related field
senderIMID	Market Participant Identifier (MPID)
routedOrderID	CIOrdID (Tag 11) for FIX Users ClientOrderId (Tag 191) for SAIL Users
Symbol	Symbol
eventTimestamp	Trade Date
session ¹	FIX: • SenderCompID (Tag 49) SAIL: • "User Id" tag from the "TC-User Connection" Message sent by the Participant at the beginning of the day

Populating IMID Fields on Exchange Routes

- ▶ CAT reporters must populate the *senderIMID* with both the CRD and IMID, formatted as <CRD>:<IMID>
- ▶ The IMID portion of *senderIMID* must include the exchange assigned identifier that is used in the order route message to the exchange
- ▶ Example:

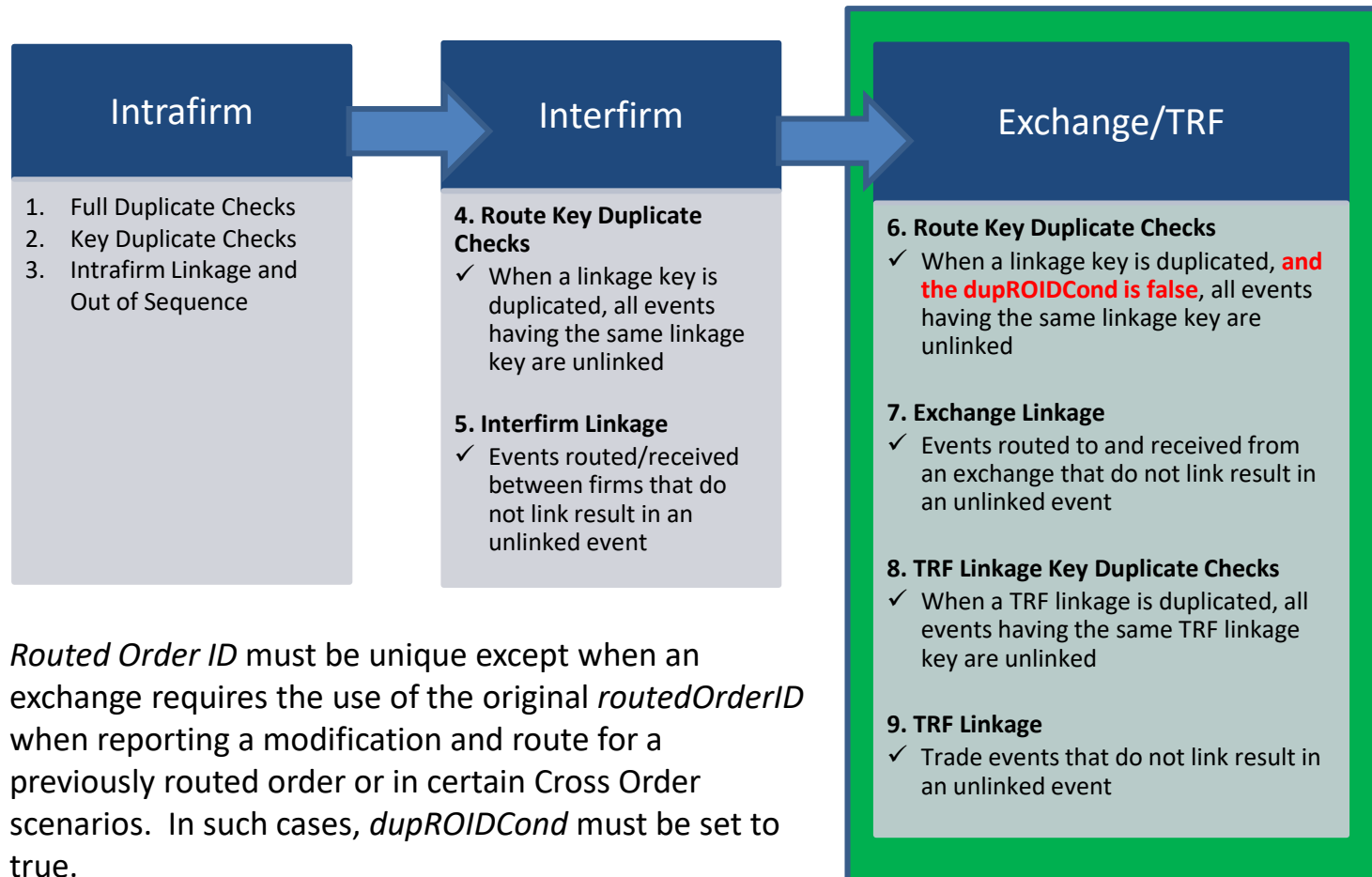
Sender - MEOR		Receiver – EOA	
CATReporterIMID ABCD		Exchange EXCH	
senderIMID	123:ABC	routingParty	123:ABC
destination	EXCH	exchange (Exchange ID)	EXCH
Event Date (portion of eventTimestamp)	05012018	Event Date (portion of eventTimestamp)	05012018
session	sess01	session	sess01
symbol	XYZ	symbol	XYZ
routedOrderID	ROID1234	routedOrderID	ROID1234

Equal Linkage Keys

Sender - MEOR		Receiver - EOA	
CATReporterIMID ABCD		Exchange EXCH	
senderIMID	123:ABC	routingParty	123:ABC
destination	EXCH	exchange (Exchange ID)	EXCH
Event Date (portion of eventTimestamp)	05012018	Event Date (portion of eventTimestamp)	05012018
session	0001ABCD	session	01ABCD
symbol	XYZ	symbol	XYZ
routedOrderID	ROID1234	routedOrderID	ROID1234

Sender - MEOR		Receiver - EOA	
CATReporterIMID ABCD		Exchange EXCH	
senderIMID	123:ABC	routingParty	123:ABC
destination	EXCH	exchange (Exchange ID)	EXCH
Event Date (portion of eventTimestamp)	05012018	Event Date (portion of eventTimestamp)	05012018
session	0001ABCD	session	01ABCD
symbol	XYZ	symbol	XYZ
routedOrderID	00ROID1234	routedOrderID	ROID1234

Linkage Discovery Steps



Routed Order ID must be unique except when an exchange requires the use of the original *routedOrderID* when reporting a modification and route for a previously routed order or in certain Cross Order scenarios. In such cases, *dupROIDCond* must be set to true.

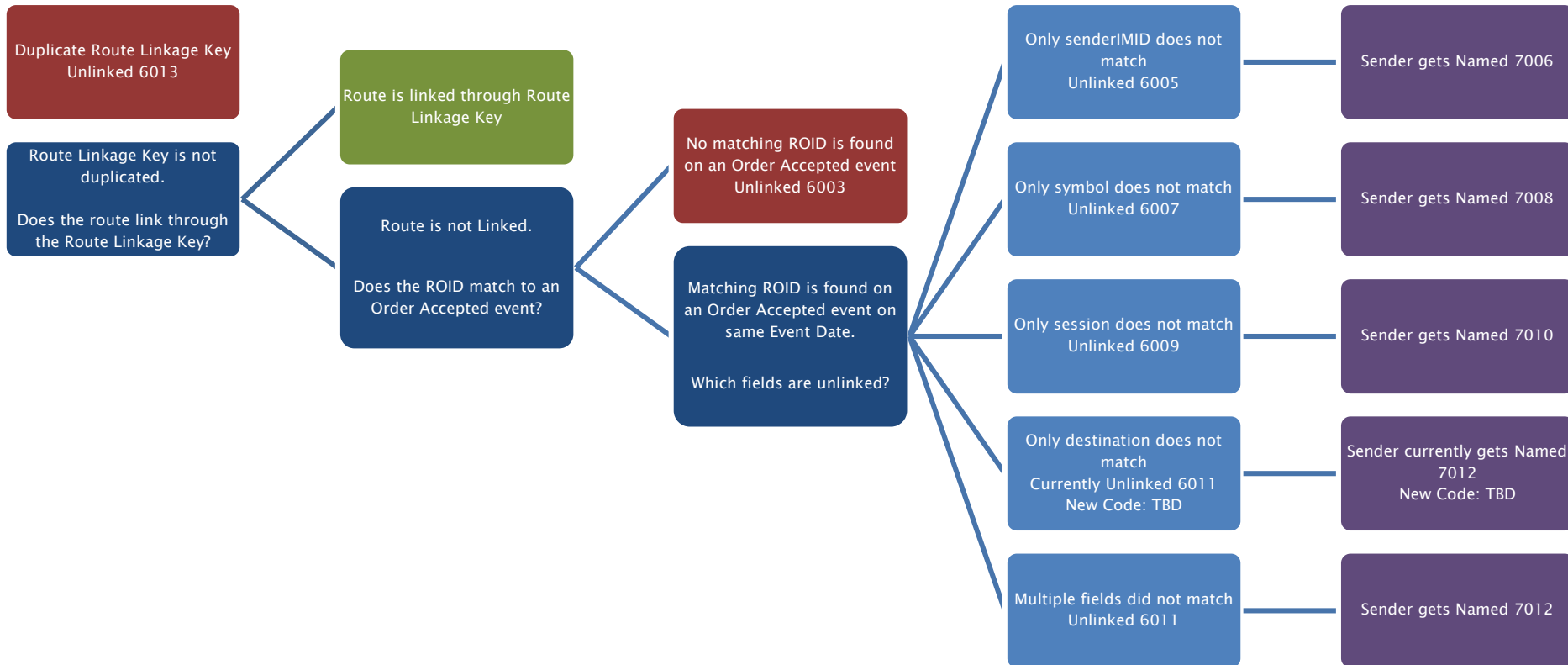
Exchange Route Key Linkage Errors

Error Type	Assigned Series
Exchange Linkage Errors	6000 and 7000

Error Type	Description
Unlinked Route to Exchange	Error codes assigned to the CAT Reporter who submitted the route event that is unlinked. Specific codes delivered to distinguish which part of the linkage key failed to match.
Named Errors	Error codes assigned when the CAT Reporter was named in a record submitted by an Exchange that is unlinked.
Route Key Duplicates	Error codes assigned when an Industry Member reports a duplicated Exchange Route Linkage key. Duplication of Exchange Route Linkage Keys will result in unlinked errors for all records having the same key.

Order Route to Exchange – Linkage Order of Operations

Is the Route Linkage Key Duplicated?



Early Observations with Differences in Exchange Linkages Key

The following scenarios are generating unlinked events and have been observed across many firms:

1. Industry Member and Exchange populating different IMIDs.
2. Firm populating incorrect Exchange ID in destination field.
3. Session IDs incorrectly populated.
4. Firms improperly marking an Exchange Route as an Interfirm Route.
5. Duplicated Route Linkage Key.

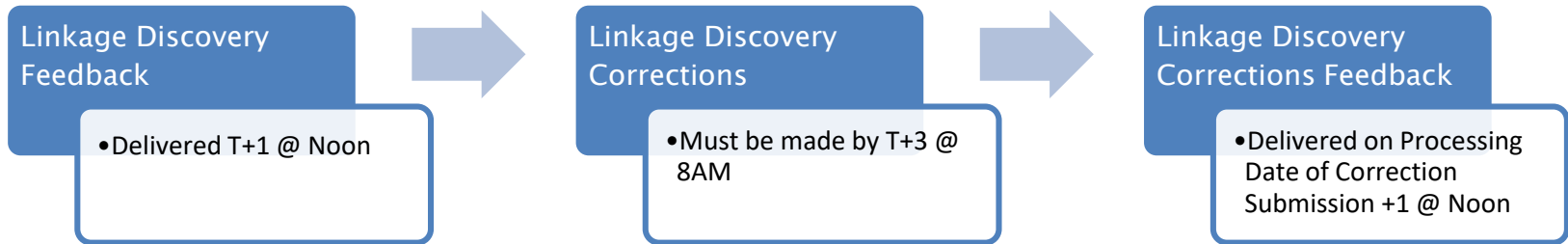
session Differences:

1. NYSE – For Options Exchange, NYSE will eliminate prefix.
2. Cboe – 8 characters expected as per CAT guidance; Note this is different than OATS for Cboe equities where only 4 characters are required; FINRA CAT is aware that Cboe equities named feedback reflects only 4 characters. *This issue is under review.*

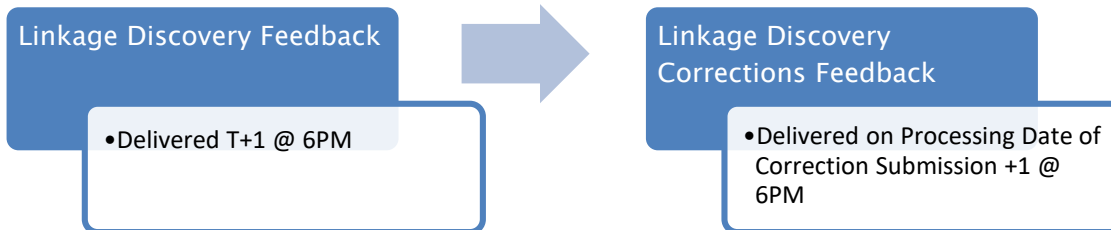
Linkage Feedback and Corrections

Linkage Discovery Feedback and Corrections

Production Environment



Industry Test Environment



Linkage Feedback Delivered via SFTP

- ▶ Feedback files will be accessible in the Submitter's feedback directories.
- ▶ Feedback for data submitted by a CAT Reporting Agent on behalf of a CAT Reporter will be accessible under the CAT Reporter's feedback directories if the CAT Reporter has an SFTP account.
- ▶ Named Errors will be accessible **only** in the CAT Reporter's feedback directory.
 - The feedback format will match the format of the original submission unless the CAT Reporter specifies a preference for Named Unlinked Errors that is different than the Unlinked Errors.
- ▶ Feedback will remain available for 10 calendar days.

Linkage Feedback Available on the Reporter Portal

- ▶ Machine formatted feedback files for all submission types will be accessible for download by the CAT Reporter, Submitter and Third-Party Reporting agent (if applicable).
- ▶ Machine formatted feedback files for Named errors will be accessible for download **only** by the CAT Reporter.
- ▶ Machine formatted feedback files will remain available for 10 days.

Correcting Exchange Unlinked Errors

- ▶ Feedback and Correction approach is the same as what is occurring with IM to IM

Example 1 – Routed Order ID is not equal, IM Firm corrects

	Error Code	actionType	CATReporterIMID	Type	destination/ exchange	senderIMID/routingParty	routedOrderID
Unlinked and Unlinked Named	6003, 7004	NEW	ZZZT1	MEOR	NYSE	99999999:ZZZT1	XX113854ZZZ
Exchange Order				EOA	NYSE	99999999:ZZZT1	XX113854
Resolves both errors		RPR	ZZZT1	MEOR	NYSE	99999999:ZZZT1	XX113854

How to Ask a Question during Today's Call

- ▶ **For participants using computer audio:**
 - Click the “Raise Hand” button at the bottom of the participants window.
 - A visual prompt will indicate that your line has been unmuted.

- ▶ **For participants using phone audio:**
 - Enter *9 on your phone keypad.
 - An audio prompt will indicate that your line has been unmuted.