



Disaster Recovery Test Plan

October 2018

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1. trueEX DR Test

The trueEX DR test will focus on demonstrating a complete workflow of trading on the trueEX platform - including FCMs setting credit limits and managing their client's access to trueEX, Participants submitting orders, executing and clearing trades on the trueEX (both the Exchange and SEF) platforms, and all parties verifying that the trades are correctly reflected at the clearinghouse. The FIX gateway and /or the Drop Copy gateway must be verified following trade execution. When testing has been completed, it must be verified that all test trades have been deleted from production systems.

Please note: trueEX will act as the FCM for all participants in the DR tests.

1.1 DR Test Scope

The scope of this document is to describe:

- The required configuration and setup required prior to starting the DR test
- DR Operation (timing, coordination, etc)
- The test cases the Participants will perform on the trueEX platform and the anticipated results of these tests.

This document is to be used in conjunction with the latest version of the CLOB & RFQ FIX Specifications. Reach out to onboarding@trueex.com for more information.

The document is organized based on upon the message flows for each of the pre-trade credit, trade and post-trade phases of the trade life cycle. These test cases will support both Participants and FCMs. The Participant test cases describe the FIX messaging dialog between a market maker and their counterparty. If the Participant is not using FIX, the test cases will support order entry and execution via the trueEX UI. FCM test cases will be performed by trueEX using the trueEX UI.

Trader Test Overview

- CLOB (FIX & UI)
 - Post resting orders for outrights & switches
 - Execute outrights & switches
 - View order and trade history in the trueEX UI Blotter (UI trades only)
- RFQ (FIX & UI)
 - Originate and execute a butterfly trade
- PTC (FIX & UI)
 - Cleared Termination
 - Allocation
 - CME/LCH Query
- RFQ Streaming (FIX)

FCM Test Overview (Performed by trueEX)

- Using the trueEX UI & Traiana FIX interface:
 - Set push credit limits for a Participant firm
 - Suspend a Participant's clearing route
 - Adjust push credit limits and receive notification if a Participant firm breaches a limit.
 - Update a participant firm to have a Plus one credit limit

1.2 Connectivity

Trading Participants in the DR test may connect to the trueEX platform via FIX or our web-based user interface (UI).

- **FIX Clients**
FIX clients are assumed to have an existing application that is able to connect to the trueEX FIX Gateway.
- **UI Clients**
UI clients will connect to the trueEX platform by using one of the following supported web browsers:
 - Internet Explorer 11
 - Google Chrome

1.3 Test Accounts

Participants will use their current trueEX production accounts for testing.

trueEX will allow clients to perform DR Connectivity (ping) tests on:

- Saturday, September 15th
- Saturday, September 29th

Please contact trueEX directly for IP address information @ 646-786-8526 or support@trueex.com.

1.4 Test Schedule

The FIA DR Test is scheduled for Saturday, October 13, 2018. The following schedule will apply to the test:

- Pre-open @ 8:30 AM EST
- Open @ 9:00 AM EST
- Close @ 1:00 PM EST

All participants are expected to have conducted basic login and connectivity checks. The test times are subject to change, pending confirmation by all parties.

When the market closes at 1:00 PM EST, users will be informed of the close and the platform will no longer accept orders. They will be able to access their blotters. Participant and FCM Admins will have full access as well.

2. DR Test Steps

This test plan assumes one FCM Admin (if participating), one UI trader, and one FIX trader to verify that the full trading life cycle is supported by all parties.

2.1 CLOB

Step	Scenario	Steps & Expected Results
1	FCM Admin sets a Push credit limit for Trader 1's firm.	<ol style="list-style-type: none"> 1. FCM Admin clicks on Firm Name for Trader 1. 2. FCM Clicks on the Edit button. 3. FCM Admin enters 10M in the push limit field 4. FCM Admin enters 25K in the clip size field 5. FCM Admin clicks Save. <p>Expected Results:</p> <ul style="list-style-type: none"> • FCM Admin verifies that the credit limit is displayed as 0/10M. • Trader 1 is able to post orders. (See next steps)
2	Trader 1 & Trader 2 post an outright and a switch order.	<ol style="list-style-type: none"> 1. Trader 1 submits a bid and an offer on 3yr SB outright for 75M. 2. Trader 2 submits a bid and an offer on 2 x 5yr SB switch for 50M. <p>Expected Results:</p> <ul style="list-style-type: none"> • Trader 1 sees the 3yr outright orders in orange and the 2 x 5yr switch orders in blue. • Trader 2 sees all four orders in own internal interface
3	Trader 1 & Trader 2 aggress each other's orders to execute trades.	<ol style="list-style-type: none"> 1. Trader 1 aggresses the 2 x 5yr switch bid that Trader 2 posted. 2. Trader 2 aggresses the 3yr outright offer that Trader 1 posted. <p>Expected Results:</p> <ul style="list-style-type: none"> • Trader 1 sees an orange trade notification and tradeON window for both the 3yr and 2 x 5yr trades. • Trader 1 can click the Blotters link to view the trade history details. • Trader 2 sees both trades in own internal interface. • DropCopy account associated with Trader 2 receives an Execution Report for both trades.

4	FCM Admin views the limits for Trader 1 and sees the usage amount	1. FCM Admin views updated credit limit usage for Trader 1's firm.
5	Trades are verified at CME	1. Trade details can be viewed for both parties at CME immediately.
6	Trader 1 posts an outright order	1. Trader 1 posts a bid and offer on the 25yr SB outright. Expected Results: <ul style="list-style-type: none"> • Trader 1 sees the 25yr order in orange. • Trader 2 sees the 25yr order in own internal interface.
7	FCM Admin suspends the clearing route for Trader 1's firm	1. FCM Admin clicks the Suspend button for Trader 1's firm. Expected Results: <ul style="list-style-type: none"> • FCM Admin sees that the clearing route for Trader 1's firm is suspended. • Trader 1 sees that all own orders are cancelled and a notification stating that the clearing route has been suspended. • Trader 2 sees that all Trader 1's open orders are cancelled in the Market Data updates. <p>NOTE: FCM Admin will not change status at the desk or the trader level, rather the admin suspends the clearing route at the Participant level.</p>
8	Trader 1 submits an order that is rejected due to insufficient credit, since the clearing route has been suspended.	1. Trader 1 attempts to post orders or bids on any order book. Expected Results: <ul style="list-style-type: none"> • Orders are rejected with a message "You have insufficient credit for this transaction". • Trader 1 can still view market updates and access order and trade history in the Blotter.
9	FCM Admin activates the clearing route for Trader 1's firm and sets a Push credit limit.	1. FCM Admin clicks on the Firm Name for trader 1's firm. 2. FCM Admin clicks on the Activate button. Expected Results: <ul style="list-style-type: none"> • Trader 1 sees a notification that the clearing route has been activated. 3. FCM Admin clicks the Edit button. 4. FCM Admin enters 40K in the Push limit field 5. FCM Admin and clicks on the Save button. Expected Results: <ul style="list-style-type: none"> • FCM Admin verifies that the total credit limit is updated to 0/40K. • Trader 1 is able to post orders that are under

		40K DV01.
10	Trader 1 posts an order	<p>1. Trader 1 submits an offer on the 25yr outright for 10M and a bid the 10 x 12yr switch for 25M.</p> <p>Expected Results:</p> <ul style="list-style-type: none"> • Trader 1 sees the 25yr & 10 x 12yr orders in orange. • Trader 2 sees the 25yr & 10 x 12yr orders in own internal interface.
11	FCM Admin sets credit limits to Plus 1	<p>1. FCM Admin clicks the Edit button.</p> <p>2. FCM Admin selects the Plus 1 option and clicks the Save button.</p> <p>Expected Results:</p> <ul style="list-style-type: none"> • FCM Admin verifies that the total credit limit is updated to Plus 1. • Trader 1 is able to continue posting orders

2.2 RFQ

Step	Scenario	Steps & Expected Results
1	Trader 1 and Trader 2 execute a butterfly on RFQ.	<p>1. Trader 1 originates a 5 x 7 x 10yr SB fly and selects Trader 2 as a respondent.</p> <p>2. Trader 2 quotes.</p> <p>3. Trader 1 accepts the quote</p> <p>4. Trader 2 executes the trade</p> <p>Expected Results:</p> <ul style="list-style-type: none"> • Trader 1 can click on the Blotters link to view trade history details. • Trader 2 sees trade in own internal interface.
2	Trades are verified at CME	<p>1. Trade details can be viewed for both parties at CME immediately.</p>

2.3 PTC (Clearing Terminations)

Step	Scenario	Steps & Expected Results
1	Trader 1 (Originator) creates a package and sends to Trader 2 (Respondent)	<p>1. Trader 1 uploads positions from either trade ID query, trueEX CSV template or CME trade register file and creates a package for sending.</p> <ul style="list-style-type: none"> • Trader 1 can either set himself or the Counterparty to breakdown the package (see Step 4 below) <p>2. Trader 1 selects Trader 2 as a respondent and sends package.</p>

		<p>3. Trader 1's FCM approves the credit limit for the package:</p> <ul style="list-style-type: none"> • If Trader 1's firm is set to "auto-approve," then the package will be sent to the Respondent immediately • If Trader 1's firm is set to "manual approval," then the FCM will login to the trueEX UI, click the PTC link, and approve the package • If Trader 1's firm is set to use Traiana for credit limit management, then the platform will send a credit limit ping to the Traiana FIX interface <p>Expected Results:</p> <ul style="list-style-type: none"> • Trader 1 sees package in the outbox quadrant of the PTC Dashboard • Trader 2 sees the package in the inbox quadrant of the PTC Dashboard
2	Trader 2 prices the package	<p>1. Trader 2 clicks on review package, inputs an NPV package fee and clicks on Send Quote.</p> <p>2. Trader 2's FCM approves the credit limit for the Quote:</p> <ul style="list-style-type: none"> • If Trader 2's firm is set to "auto-approve," then the package will be sent to the Respondent immediately • If Trader 2's firm is set to "manual approval," then the FCM will login to the trueEX UI, click the PTC link, and approve the package • If Trader 2's firm is set to use Traiana for credit limit management, then the platform will send a credit limit ping to the Traiana FIX interface <p>Expected Results:</p> <ul style="list-style-type: none"> • Trader 2 sees the package in the outbox quadrant of the PTC Dashboard. • Trader 1 sees the package in the inbox quadrant of the PTC Dashboard.
3	Trader 1 accepts price	<p>1. Trader 1 clicks on review package and selects Trader 2's price</p> <p>Expected Results:</p> <ul style="list-style-type: none"> • Trader 1 sees the accepted price flash • Trader 2 sees that the price has been accepted and is prompted to Execute.
4	One Trader executes on the price & breaks down the package	<p>1. Trader 2 clicks on Execute</p> <p>2. Both traders see the package in the executed quadrant of the PTC Dashboard and that it is Pending Breakdown.</p> <p>3. Whichever trader wants to do the Breakdown</p>

		(see Step 1 above) clicks on Breakdown Package 4. The same Breakdown Trader applies trade event fees and clicks on Breakdown. Expected Results: <ul style="list-style-type: none"> The other trader sees the package and is prompted to Review Breakdown Fee.
5	Second trader approves Breakdown Fee	1. Second Trader clicks on Review Fee Breakdown 2. Second Trader clicks on Approve Expected Results: <ul style="list-style-type: none"> Both Trader 1 and 2 see package in the executed quadrant - Breakdown Accepted. Trader 1 can click in Blotter link to view trade history details. Trader 2 sees all trades in own internal interface. Drop Copy account associated with Trader 2 receives an Execution Report for the trades.
6	Trades are verified at CME	1. Trade details can be viewed for both parties at CME immediately.

2.4 PTC (Allocations)

Step	Scenario	Steps & Expected Results
1	FCM uploads bunched order positions	1. FCM uploads swaps from trueEX CSV template. 2. FCM selects trades to allocate and creates a package. 3. FCM clicks on the Send button. Expected Results: <ul style="list-style-type: none"> Allocated trades are sent directly to clearing houses and new clearing accounts.

3. DR Verification

We will use the following tools to verify the results of the testing:

3.1 Market Data Updates

FIX Traders - Market Data Gateway

FIX Traders will see Market Data updates in the trueEX Market Data Gateway as CLOB orders are posted, updated, canceled, and executed. Additional details are documented in our FIX specification.

UI Traders -Market View

UI Traders will see Market Data updates in the associated CLOB views as order prices change. New or updated CLOB prices will flash in white before turning to blue (for other trader's orders) or flash in orange (for own orders) as they are posted.

3.2 Trade Confirmations (STP)

FIX Traders – Drop Copy Execution Reports

FIX Traders will see an execution report on the trueEX Drop Copy Gateway when a trade occurs. Additional details are documented in our FIX specification.

UI Traders - Blotter

UI Traders will see updates in their blotter as soon as their orders are posted and trades are executed.

3.3 Trades for Clearing

Testers will need valid credentials at CME. When trueEX trades are sent to CCP for clearing they will have a (Alpha) USI that is prefixed with 1010000241 (DCM, CLOB) or 1010000272 (RFQ, PTC). CCPs will generate Beta & Gamma USIs for the resulting cleared trades.