

Turquoise

TQ603 – Guide to Testing Services

Issue 1.0

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Stock Exchange Group

Contents

1.0	Introduction	4
1.1	Purpose	4
1.2	Readership	4
1.3	Document Series	4

2.0	Document History	5
2.1	Contacts	5

3.0	Service Overview	5
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4.0	Customer Development Service	6
4.1	CDS Environment	6
4.2	Production-Like CDS Environment	6
4.3	Access to the Customer Development Service	6
4.4	Market Hours	7
	*All times listed are in UK Time	7
4.5	Reference Data	7
4.6	Instrument Synchronisation with the Live Service	7
4.7	End to End Testing	7

5.0	Conformance Testing	7
5.1	Application Conformance Testing	7
5.2	Algorithm Conformance Testing	8

6.0	Sponsored Access Test Service	8
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7.0	Group Ticker Plant Testing Service	9
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8.0	Live Connectivity Testing Services	9
8.1	Production Heartbeat Generator	9
8.2	Production TCP Responder	9

1.0 Introduction

Turquoise provides a range of testing services to customers developing and testing software applications for use on its Millennium Exchange Live Service (Live Service).

1.1 Purpose

The purpose of this document is to provide an overview of the Customer Testing Services available on Millennium Exchange and how to access them.

When read in conjunction with the Millennium Technical Specifications¹ and the other available testing documentation, it is intended that these documents provide all of the necessary information customers require to develop, test and trial their software before connecting to the Live Service.

1.2 Readership

This document is relevant to software developers, system testers and other technical staff who are involved in testing and developing applications for use in the Live Service. It is also relevant to customers who want to use the Customer Development Service (CDS) for testing trading strategies or for training purposes.

1.3 Document Series

This document is part of a series of Customer Testing documents that are available to customers. The other documents are:

- TQ601 - Guide to Application Certification
- TQ602 - Certification Report
- GTP005 - Testing Services Guide

These documents form part of a series of technical documentation available to customers who are developing software to connect to the Live Services. For reference, the full range of documents available at the following locations:

<http://www.lseg.com/markets-products-and-services/our-markets/turquoise/information-centre/document-library>

<http://www.lseg.com/areas-expertise/technology/group-technology/group-ticker-plant>

¹ The Millennium Technical Specifications includes all protocols including Group Ticker Plant.

2.0 Document History

This document has been through the following iterations:

Issue	Date	Description
1.0	Xx August 2017	Initial Version

In subsequent issues, where amendments have been made to the previous version, these changes will be identified using a series of side bars as illustrated opposite.

2.1 Contacts

Please contact your Technical Account Manager or the Technical Account Management Team if you have any questions about the Testing services outlined in this document

- Telephone: +44 (0)20 7797 3939
- Email: londontam@lseg.com

3.0 Service Overview

Turquoise offers a wide range of testing services. Customers can use the testing services to:

- Test the functional interface between their software applications and the Turquoise Millennium Gateways.
- Certify their software applications for use on the Live Service
- Test trading strategies against a simulation of the Live Service
- Provide market participants with a safe training environment away from the Live Service
- Test their market data applications

All of the above service offerings are available on CDS which is described in the next section.

4.0 Customer Development Service

4.1 CDS Environment

The CDS provides a fully functioning live simulation of the Live Service against which our customers can develop, test, and run their Trading and Information applications.

CDS also provides model based testing scenarios to help customers with their development efforts.

All Trading Services available on the Live Service are replicated on the CDS. The full range of Trading Services is detailed on the Turquoise Website at:

<http://www.lseg.com/markets-products-and-services/our-markets/turquoise/information-centre/document-library>

Customers should note that reference data (instruments, participants, etc.) on the CDS environment are updated on an ad hoc basis only which means that both environments may not be fully synchronised. Additionally, during exchange upgrade readiness periods, the software version may be different from that of the live service version.

4.2 Production-Like CDS Environment

Turquoise plans to introduce a production-like CDS environment in Q1 2018. The production-like CDS environment will be continuously aligned with the live service in terms of software version and reference data (instrument, participants, etc.). Instrument reference data will be updated on a daily basis.

All Trading Services available on the Live Service are replicated on the production-like CDS environment.

The full range of Trading Services is detailed on the Turquoise Website at:

<http://www.lseg.com/markets-products-and-services/our-markets/turquoise/information-centre/document-library>

4.3 Access to the Customer Development Service

To access the Turquoise CDS environment, please contact your Technical Account Manager. Full IP address information can be found in the TQ102 – Connectivity Guide.

4.4 Market Hours

Event	Time*
Market Start	05:00:00
Start of Continuous Trading	08:00:00
End of Continuous Trading	19:59:00
Market End	19:59:20

*All times listed are in UK Time

4.5 Reference Data

An FTP & SFTP flat-file based Reference Data download service has been introduced as part of Millennium Exchange. All customers are required to test that their systems can process the Reference Data files prior to go-live. Reference Data files in the CDS environment will reflect the file structure for future state reference data files. Reference Data files in the production-like CDS environment will reflect the current production file structure. Further information is available in TQ501 – Guide to Reference Data Services.

4.6 Instrument Synchronisation with the Live Service

Customers should note that instruments on the CDS environment are updated on an ad hoc basis only which means that both environments might not be fully synchronised.

4.7 End to End Testing

The CDS environment sends trades to a clearing house during normal operation. Please liaise with your clearing house for more information.

5.0 Conformance Testing

5.1 Application Conformance Testing

Before connecting to the Live Service, customers are required to certify that their software applications fully conform to the Turquoise Millennium Technical Specifications in conjunction with the Turquoise Certification Policy. Customers should use the CDS to complete the certification test.

Customers are required to recertify their software in accordance with the Turquoise Certification policy:

- whenever the customer modifies the software in anyway that directly impact a Turquoise interface;
- the exchange venue upgrades its production environment to a later version of software;
- the customer is requested to re-certify their application by the relevant venue.

Full details of the Turquoise certification policy and process are available in the following documents:

- **TQ601** - Guide to Application Certification
- **TQ602** - Certification Report

5.2 Algorithm Conformance Testing

From 3 January 2018, Turquoise will require firms to self certify that all algorithms used on Turquoise have been tested. In accordance with the revised MiFID II release of the Turquoise rulebook, any Order message specifying the use of an algorithm as the decision maker for that order by way of a short code will be taken as confirmation from a Member that the algorithm has been adequately tested. Member Firms will be required to populate the long code associated with the short code, complete with a description of the testing undertaken, in the Member Portal by the end of the next trading day. Firms may, but are not required to, use the Turquoise CDS environment to self certify their algorithms. Turquoise will not perform conformance testing of client algorithms.

6.0 Sponsored Access Test Service

Sponsored Access Customers have additional mandatory testing requirements for Sponsored Users (Native Gateway) and Sponsoring Firms (Drop Copy Gateway).

Sponsored Users and Sponsoring Firms will need to ensure they are using certified software on the Native Gateway for Order Entry (Sponsored User) and the Drop Copy Gateway (Sponsoring Firm). Both User and Firm will need to demonstrate they tested the functions associated with a Daily Life Cycle (DLC) of the service on the CDS environment prior to go-live on production. The DLC test is conducted with the Sponsoring Firm, the Sponsored User and a member of the Market Access team.

Full details of the testing services and requirements can be found in the Sponsored Access Service Description. The document can be found at the following link:

<http://www.lseg.com/markets-products-and-services/our-markets/turquoise/information-centre/document-library>

7.0 Group Ticker Plant Testing Service

Group Ticker Plant, testing service allows customers the ability to interact with the GTP multicast data prior to accessing the Live Service environment. Further information on the GTP testing services can be found in the GTP005 – Testing Services Guide found at the below link.

<http://www.lseg.com/areas-expertise/technology/group-technology/group-ticker-plant>

8.0 Live Connectivity Testing Services

8.1 Production Heartbeat Generator

A Market Data Heartbeat Generator is activated from 18.30-23.00 from Monday to Thursday following the Production service shutdown and will use the existing Production IP addresses. The Heartbeat Generator will also be activated every weekend from Saturday 22:00 to Sunday 22:00.

A Market Data Heartbeat Generator generates Heartbeat Poll messages every 2 seconds on both the Primary and Backup feeds for MITCH and GTP.

8.2 Production TCP Responder

The TCP Responder is activated from 18.30-23.00 from Monday to Thursday following the Production service shutdown at 18.25 and will use the existing Production IP addresses. The TCP Responder will also be activated every weekend from Saturday 22:00 to Sunday 22:00.

The TCP Responder responds to customer TCP messages such as Telnet to all Primary and Backup Trading Gateways in addition to MITCH and GTP.

The Production IP addresses referenced above can be found on the website at the link below:

<http://www.lseg.com/markets-products-and-services/our-markets/turquoise/information-centre/document-library>

Please note that the Production TCP Responder for RNS is activated during weekends only.

Customers are reminded that the Turquoise may broadcast test data from its Production environment at the weekends which should be discarded and not processed.

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