Agenda

• Introduction
• London Stock Exchange Group – Member Portal
• London Stock Exchange Group - MiFID II - Business Update (Equities)
• London Stock Exchange Group - MiFID II - Technical Update
• London Stock Exchange – TRADEcho
• Turquoise Lit Auctions™
• Q & A Session
Member Portal

Don Mucha
Manager, Technical Account Management and Market Access
Client Technology Services - UK
London Stock Exchange Group
The Member Portal is a secure online interface providing firms with access to manage multiple LSEG memberships via a single login.

The Member Portal for London Stock Exchange and Turquoise will be available in October (date tbc), with support for the LSE Derivatives Market trading access to be added shortly thereafter.

Additional functionality for MiFID II will be available from end of November:

- Short/long code mapping (LSE/ LSEDM/ Turquoise)
- Algorithmic market making agreement and security registration (LSE/ Turquoise)
- MiFID II trading declarations re algorithmic trading & DEA (LSE/ LSEDM/ Turquoise)

Upon launch, Super Users will be provided with login credentials and can register and assign access permissions to other company users.

Users of existing member portal for Borsa Italiana (BItClub) can use same login credentials to access LSE and Turquoise once they have been assigned user permissions for the markets.
How to Register

Member firms should download the [LSE](#) and/or [Turquoise](#) Member Portal Order Form together with the [Member Portal Terms & Conditions](#) from the LSEG website. To register, please complete the following steps:

1) **Enter your company information**

In addition to your company name and address, the Order Form requests your company’s Legal Entity Identifier (LEI code) – all member firms will need to provide an LEI code ahead of January 2018. If your firm doesn’t already have an LEI code, these can be requested from the [London Stock Exchange LEI service](#) or from another authorised Local Operating Unit.

2) **Nominate your company Super User**

Within the Order Form, you’ll be asked to nominate one or more company Super Users – a Super User will be able to access all functionality within the Member Portal and set-up and control access rights for other users within your company.

3) **Sign and return the completed Order Form**

Completed Order Forms can be scanned and emailed to [membership@lseg.com](mailto:membership@lseg.com) or returned via post to Membership Team, London Stock Exchange, 10 Paternoster Square, London EC4M 7LS.
Member Portal Exchanges

Choose site:

- London Stock Exchange
- Turquoise
Phase 1 – Technical Configuration
Phase 1 Technical Configuration
Overview

• Manage / View Technical Configurations:
  • Trading ComplID / UserIDs
  • Self Execution Prevention

• Manage / View Sponsored Access Configurations
  • Sponsored Access User IDs
  • Sponsored Access Portal Access
  • Sponsored Access Restricted Instrument Lists

• Manage / View Network Enablements
  • Internet Enablements (Sponsored Access Portal / TRADEcho Portal)
  • Trading Service Enablements
  • Multicast Channel Enablements (GTP, MITCH)

• Manage / View Software Conformance
Technical requirements and data

- MIT Configuration
  - Comp Id Management
    - TESTMEM1
    - TESTMEM2
  - Sponsored Access - Portal Access
  - Sponsored Access - RIL
  - Self Execution Prevention

- Connectivity

- Market Data Feed
CompID Management

• Request New CompIDs / UserID

• Request Modification of existing ID’s
  • Change message per second
  • Cancel on Disconnect / Cancel on Logout settings
  • Change Self Execution Prevention instructions

• Request Deletion of existing ID’s

• View and Download technical configuration
CompID Management

Member firms can request new and manage existing CompIDs in this area for Millennium Trading System. In the MIT configuration navigation pane you will see a list of your member ID’s, select a member ID to see the technical configuration associated to it. You can find the technical specifications for the Millennium Trading System here.

Current CompID configuration:

- Test Company Limited
  - Native
  - TEST0001
  - ION TRADING
  - Active
  - 250
  - false
# CompID Management

## ComplId Detail

<table>
<thead>
<tr>
<th>Field</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Member ID</td>
<td>TESTMEM1</td>
</tr>
<tr>
<td>Sponsor Access</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Username (*)</td>
<td>Test Company Limited</td>
</tr>
<tr>
<td>Protocol (*)</td>
<td>NATIVE</td>
</tr>
<tr>
<td>Software (*)</td>
<td>ION TRADING</td>
</tr>
<tr>
<td>Session ID (*)</td>
<td>TEST0000</td>
</tr>
<tr>
<td>Status (*)</td>
<td>Active</td>
</tr>
<tr>
<td>TPS (*)</td>
<td></td>
</tr>
<tr>
<td>Disconnect Delay (milliseconds)</td>
<td>0</td>
</tr>
<tr>
<td>Self Execution Prevention</td>
<td>None</td>
</tr>
<tr>
<td>Cancel or Disconnect</td>
<td>C Yes</td>
</tr>
<tr>
<td>Cancel on Logout</td>
<td>C Yes</td>
</tr>
</tbody>
</table>
Sponsored Access

• Request new Sponsored Access Trading ID’s
• Modify Sponsored Access Trading ID’s Technical Configurations
  • Change messages per second
  • Change cancel on disconnect / cancel on logout
  • Sponsored Access Restricted Instrument Lists
• Request Deletion of Sponsored Access Trading ID’s
• Manage Sponsored Access Portal Access
• Request New Sponsored Access Restricted Lists
New Portal Access

Contact (*)
Test Super User

Email
superuser@bitclub2.com

Production Source IP
1.1.1.1

Node: cw-stms-btc02.lseg.stockex.local
## Sponsored Access

### New RIL

- **Member ID (‘)***
  - TESTMEM1

- **PROD Firm Name***
  - TESTMEM1

- **PROD FTP Login***
  - LSE_TEST

- **PROD FTP Password***

- **PROD RL Name (Exch Mgr)***
  - LSE_TEST_RL04

- **Sponsored User***
  - No Sponsored User

- **SAPIID***
  - internet

- **Source IP(s) Permissoined***
  - 1.1.1.1
Network Enablements

- View all Unicast and Multicast network enablements per SAP
- Request new Unicast and Multicast enablements
- Download a Report of network enablements
- Request Modification and Removal
Network Enablements

SAPs

Below are your active SAP ID connections to the Millennium Trading System. You can view details of the SAPs and make firewall enablement requests for TCP services here. The policy groups consist of:

<table>
<thead>
<tr>
<th>Group Name</th>
<th>TCP Services Associated</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trading</td>
<td>Native</td>
</tr>
<tr>
<td></td>
<td>FIX Trading</td>
</tr>
<tr>
<td></td>
<td>Post Trade</td>
</tr>
<tr>
<td></td>
<td>Drop Copy Gateway</td>
</tr>
<tr>
<td>Info [GTP-MITCH]</td>
<td>MITCH Replay Recovery</td>
</tr>
<tr>
<td></td>
<td>GTP Replay Recovery</td>
</tr>
<tr>
<td>ftp/ftp</td>
<td>reference-data</td>
</tr>
<tr>
<td>sponsored Access Portal</td>
<td>Sponsored Access Portal</td>
</tr>
<tr>
<td>Tradecho FIX GW</td>
<td>Tradecho FIX Gateway</td>
</tr>
</tbody>
</table>

**SAPED**
- **Primary Address**: Datacenter, XXX XXX Angola - United States
- **IP Address Range**: 1.1.1.1
- **Bandwidth**: 1 GB

- Dummy SAP
- Dummy SAP 2

Download Report
Network Enablements

![Edit SAP Form]

- **Address**
  - City: SLOUGH
  - Post code: XXX XXX

- **SAP ID**: DummySAP

- **IP Address Range**: 1.1.1.1

- **Bandwidth**: 1 GB

- **Services**:
  - Trading
  - Info [FTP-MITCH]
  - ftp/ftp
  - Sponsored Access Portal
  - Tradecho FIX Gateway
  - HSVF
  - BTS
  - BCS

- **Save**
Network Enablements

GTP Multicast Channel Details

SAPID (*)

DummySAP 2
DummySAP

Select
Software Certification

- View list of all proprietary software certified by the firm.
- View certification details
  - Software Name
  - Software Certification Date
  - Date when next certification is due
  - Protocols supported
- Download report of all certified software.
# Software Certification

## Member Portal

![Member Portal Image](image)

### Software Providers

<table>
<thead>
<tr>
<th>Software vendor</th>
<th>Software name</th>
<th>Vendor Type</th>
<th>Create Date</th>
<th>Last Certification Date</th>
<th>Next due Certification Date</th>
<th>Last Certificate Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABN AMRO CLEARING BANK N.V.</td>
<td>Test Software</td>
<td>Proprietary</td>
<td>20/09/2017</td>
<td>20/09/2017</td>
<td>20/09/2017</td>
<td>Full certification</td>
</tr>
<tr>
<td>ABN AMRO CLEARING BANK N.V.</td>
<td>ABN - AMRO LISE UFG (UNIVERSAL FIX GATEWAY)</td>
<td>Proprietary</td>
<td>28/08/2017</td>
<td>17/03/2016</td>
<td>17/03/2016</td>
<td>Full certification</td>
</tr>
</tbody>
</table>
Short / Long Code Mapping
Timeline

• MiFID II changes intended to go-live end of November 2017.

• Customers will be able to test loading short codes and long codes from end of November.

• LSEG will look to run the short code reconciliation process to allow customers to test their end to end process.

• Short codes loaded during testing period will be removed from the Member Portal database.

• Short codes will be subject to formal validation checks from 3 January 2018
Member Portal – MiFID II Menu

Member Portal

Home - Member Requests - Membership Management - Company User Management - MiFID II Services

Member Requests
In the Profile Changes area, members can review requests to change their membership profile and technical configuration. Members wishing to set-up trading access for the first time or remove this, should use the Add & Remove Market Access links.

- Profile Changes
- Application Request
- Add New Market Access
- Remove Market Access
- Amend Derivatives Market Access

Member Management
In this area, users can view and request changes to their company’s membership profile, including company details, trading set-up, contacts and technical configuration.

- Member Data
- Software

Company User Management
In this area, Super Users can add and remove Company Users and manage their access permissions.

Enter

MiFID II Services
MiFID II services description

- Short-Long Codes
- Positions Report
Member Portal – Data Management

- View and search short codes assigned to the firm
- View details of the short codes
- Add a new short code
- Make a short code inactive
- Change the long code associated to a short code
- Download a report of short codes
# Data Management

<table>
<thead>
<tr>
<th>Short Code</th>
<th>Long Code</th>
<th>Identifier Code Type</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>L485</td>
<td>Andrea</td>
<td>Client LEI</td>
<td></td>
</tr>
<tr>
<td>L486</td>
<td>Andrea</td>
<td>Client LEI</td>
<td></td>
</tr>
<tr>
<td>L487</td>
<td>Andrea</td>
<td>Client LEI</td>
<td></td>
</tr>
<tr>
<td>L488</td>
<td>Andrea</td>
<td>Client LEI</td>
<td></td>
</tr>
<tr>
<td>L489</td>
<td>Andrea</td>
<td>Client LEI</td>
<td></td>
</tr>
</tbody>
</table>

---

**Add Short-Long Code**

**Search**

**Download Report**
Member Portal – Short – Long Code Details
Member Portal – Add Short-Long Code

Add Short-Long Code

Short Code

Long Code

Identifier Code Type

Client LEI
Natural Person Algorithm

Send
Member Portal – Bulk Upload

- Manage (upload, modify, inactivate) short codes via a CSV upload
- View CSV upload file from past 5 days
- View results and error files from the upload
- Download the CSV template file
## Member Portal – Bulk Upload

### Upload History

<table>
<thead>
<tr>
<th>upload id</th>
<th>upload date</th>
<th>status</th>
<th>user file</th>
<th>result file</th>
<th>error file</th>
</tr>
</thead>
<tbody>
<tr>
<td>2205</td>
<td>2017-09-21 11:54</td>
<td>Published</td>
<td>Download</td>
<td>Download</td>
<td>---</td>
</tr>
<tr>
<td>2204</td>
<td>2017-09-21 11:51</td>
<td>Published with errors</td>
<td>Download</td>
<td>Download</td>
<td>Download</td>
</tr>
<tr>
<td>2203</td>
<td>2017-09-21 11:48</td>
<td>Published</td>
<td>download</td>
<td>download</td>
<td>---</td>
</tr>
<tr>
<td>2202</td>
<td>2017-09-21 10:35</td>
<td>Published</td>
<td>Download</td>
<td>Download</td>
<td>---</td>
</tr>
<tr>
<td>2201</td>
<td>2017-09-21 10:34</td>
<td>Published</td>
<td>Download</td>
<td>Download</td>
<td>---</td>
</tr>
</tbody>
</table>
# Member Portal – Bulk Upload File

![Excel Sheet](image)

### Excel Sheet Description:

The image shows an Excel spreadsheet titled "RTS24-BulkUpload". The spreadsheet contains data in the following columns:

- **Short Code**
- **Long Code**
- **Identifier**
- **Notes**
- **Operation Type**

The data includes:

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
<th>I</th>
<th>J</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>4485</td>
<td>andrea</td>
<td>L</td>
<td>Note23</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>4486</td>
<td>andrea</td>
<td>L</td>
<td>Note23</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>4487</td>
<td>andrea</td>
<td>L</td>
<td>Note23</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>4488</td>
<td>andrea</td>
<td>L</td>
<td>Note23</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>4489</td>
<td>andrea</td>
<td>L</td>
<td>Note23</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>4490</td>
<td>andrea</td>
<td>L</td>
<td>Note23</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Member Portal – Bulk Upload Menu

![Image of Member Portal interface]

- **File CSV**
  - Browse...
  - Replace the whole list of existing short-long codes
  - Upload CSV

- **Upload History**

<table>
<thead>
<tr>
<th>upload id</th>
<th>upload date</th>
<th>status</th>
<th>user file</th>
<th>result file</th>
<th>error file</th>
</tr>
</thead>
<tbody>
<tr>
<td>2205</td>
<td>2017-09-21 11:54</td>
<td>Published</td>
<td>Download</td>
<td>Download</td>
<td></td>
</tr>
<tr>
<td>2204</td>
<td>2017-09-21 11:51</td>
<td>Published with errors</td>
<td>Download</td>
<td>Download</td>
<td>Download</td>
</tr>
<tr>
<td>2203</td>
<td>2017-09-21 11:48</td>
<td>Published</td>
<td>download</td>
<td>download</td>
<td></td>
</tr>
<tr>
<td>2202</td>
<td>2017-09-21 10:35</td>
<td>Published</td>
<td>Download</td>
<td>Download</td>
<td></td>
</tr>
<tr>
<td>2201</td>
<td>2017-09-21 10:34</td>
<td>Published</td>
<td>Download</td>
<td>Download</td>
<td></td>
</tr>
</tbody>
</table>
Member Portal – Bulk Upload

Results File
### Member Portal – Bulk Upload Error File

#### Excel Sheet Snippet:

<table>
<thead>
<tr>
<th>Line Number</th>
<th>Error Description</th>
<th>Short Code</th>
<th>Long Code</th>
<th>Identifier Code Type</th>
<th>Notes</th>
<th>Operation</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-3</td>
<td>A record with the same Short Code and Identifier Code Type doesn't exist</td>
<td>4482</td>
<td>lindsay2</td>
<td>L</td>
<td>Note23</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>A record with the same Short Code and Identifier Code Type doesn't exist</td>
<td>4483</td>
<td>lindsay3</td>
<td>L</td>
<td>Note23</td>
<td>2</td>
</tr>
</tbody>
</table>
Member Portal – Reports Window

- View reports of short code reconciliation errors
Bulk Upload via sFTP

- Same file prepared for the CSV upload can be used for sFTP upload

- File naming convention should be: Venue_ShortLongCodes_YYYYMMDD_NN.csv (ex: LSE_ShortLongCodes_20171002_01.csv)

- Firms can be set up to send files either “by difference” or “from scratch”
Bulk Upload via sFTP
Short – Long Code Constraints

• Two different records can not have the same pair Short Code – Identifier type for the same venue

• Local Person Identifier and Legal Entity Identifiers (LEI) must not be used to identify an algorithm.

• Short Code can be used only once during the system lifetime. If a short code is made inactive it can not be reused.

• When doing a bulk upload a file replacing the whole list of existing short-long codes with the ones included in the file any short-long code not in the file will be made inactive and will not be usable again.

• Short code values 0, 1, 2 and 3 are reserved and can not be used.
MiFID II Business Update

Tom Stenhouse
Head of Product
LSE Cash Secondary Markets and Turquoise
London Stock Exchange Group
MiFID II deployment approach (1/2)

- MiFID II regulation comes into force on Wednesday 3 January 2018, whilst Tuesday 2 January 2018 is a normal working day

- Therefore, London Stock Exchange and Turquoise intends to implement MiFID II related instrument configuration changes on 2 January 2018 to reduce implementation risk

- London Stock Exchange config changes on 2 January 2018 include:
  - Update of ‘liquid’ vs. ‘not liquid’, ADT and pre-trade LIS according to ESMA’s MiFID II classifications for 2018
  - Introduction of MiFID II tick tables
  - Introduction of maximum order value validation on order entry/modification
MiFID II deployment approach (2/2)

- Turquoise config changes on 2 January 2018 include update of ‘liquid’ vs. ‘not liquid’, ADT and pre-trade LIS according to ESMA’s MiFID II classifications for 2018

- Turquoise intends to adjust to MiFID II tick sizes on dates which align with the relevant primary market, and on 2 January 2018 for securities for which the primary market is outside Europe (e.g. Swiss) using the ADNT of the ‘most relevant market by liquidity’ as published by ESMA

- From 3 January 2018, rules and policy changes across LSE and Turquoise include:
  - Changes to the definition of Trading Capacities (DEAL, MTCH, AOTC)
  - Post-trade validation of short codes for order record keeping requirements
LSEG delivering value in MiFID II

LSE and Turquoise have developed a number of key initiatives which will offer significant value following the introduction of MiFID II, including:

- LSE block strategy
  - Large In Scale integrated non-displayed orders, including midpoint pegged
  - Intraday auctions
  - Closing Price Crossing (CPX) session
  - Iceberg enhancements, including random refresh size
- TRADEcho
- Turquoise Plato Block Discovery™
- Turquoise Lit Auctions™
MiFID II Technical Update

Paul Kennedy
Technical Account Manager
Client Technology Services - UK
London Stock Exchange Group
Specifications for MIT 9.2, SOLA 11 and GTP 1.4.1 have been published in March 2017.

MiFID II Deployment Guides have been issued for London Stock Exchange, Group Ticker Plant, London Stock Exchange Derivatives and TRADEcho.
## Deployment Schedule

<table>
<thead>
<tr>
<th></th>
<th>London Stock Exchange</th>
<th>Turquoise</th>
<th>London Stock Exchange Equity Derivatives</th>
<th>London Stock Exchange Interest Rate Derivatives</th>
</tr>
</thead>
<tbody>
<tr>
<td>CDS Go-Live</td>
<td>3 August 2017</td>
<td>31 July 2017</td>
<td>21 July 2017</td>
<td>7 September 2017</td>
</tr>
<tr>
<td>CDR 1</td>
<td>7 October 2017</td>
<td>30 September 2017</td>
<td>7 October 2017</td>
<td>7 October 2017</td>
</tr>
<tr>
<td>CDR 2</td>
<td>28 October 2017</td>
<td>21 October 2017</td>
<td>21 October 2017</td>
<td>21 October 2017</td>
</tr>
</tbody>
</table>

*Go-Live Dates are subject to customer readiness and internal testing*
Conformance Test

— Conformance Test is mandatory for all applications connecting to SOLA, MIT and GTP platforms.

— All applications must be certified in order to be allowed to take part in the Dress Rehearsals.

— Customers should contact the Market Access Team to schedule the Conformance Test as soon as possible.

— Derivatives customers will only be required to perform a conformance test on one LSEG venue (IDEM, LSEDM Equity Derivatives or LSEDM Interest Rate Derivatives) and can passport their application to the other markets.
The new protocol changes will be deployed for Trading and Market Data. Changes are not backwards compatible so firms must ensure they upgrade their software to be aligned with the new exchange version on the go-live date.

- New timestamps granularity and alignment to UTC.

- Reference Data files will be enhanced with MiFID II relevant information.

- Legacy Turquoise reference data files will be decommissioned and will no longer be available on the website.

- Deployment of Group Ticker Plant (GTP) MiFID II feed.
• On the release go-live date, a set of new fields will be required in the new order and quote messages:
  – Client ID
  – Investment ID
  – Execution ID
  – Algo Flag
  – DEA Flag

• Although present in the protocol, the content of the above fields will not be subject to any formal validation or cross check, only basic technical validations outlined in platform specs will be applied.
Release Go-Live (All Markets)

• On the release go-live date, a set of new fields will be added to Execution Reports and Trade Capture Reports:
  – Client ID
  – Investment ID
  – Execution ID
  – Algo Flag
  – DEA Flag
  – Waiver Indicators
  – Post Trade Flags
LSEDM Deployment Approach

At SOLA 11 Go-Live

• Deployment of new version of trading protocols, including new timestamps granularity and alignment to UTC

• Deployment of new version of market data protocols (HSVF)

• Introduction of new pre-trade controls on maximum order notional value

• Iceberg orders: Introduction of new check on minimum notional value of iceberg orders at order entry/modification

• Classification of ‘liquid’ vs. ‘not liquid’ instruments included in reference data, according to ESMA’s MiFID II classification

• Deployment of new version of market data protocols (HSVF)
LSEDM Deployment Approach

After Go-Live but before 2 January 2018

• Adjustment to existing TraderID configurations for market makers / liquidity providers.

On 2 January 2018

• Bilaterally Negotiated Trades: Update to minimum thresholds for negotiated transactions, according to MiFID II pre-trade LIS thresholds

• Bilaterally Negotiated Trades will be disabled for size below pre-trade LIS for liquid derivatives

• Bilaterally Negotiated Trades (cross orders, where still available) will no longer contribute to the last trade price and other price statistics
3 January 2018

- Introduction of ‘matched principal’ trading capacity
- Communication of ‘stressed market conditions via market data Bulletin messages.'
GTP Go-Live Plan

November 13 2017

GTP London upgraded to 1.4.1.x
- Turquoise Exchange 1.9.2.x MiFID II Go Live
- Core level changes applied applicable to London Turquoise and TRADEcho markets
- Turquoise MiFID II Post Trade Channels available

November 20 2017

London Stock Exchange and TRADEcho exchange upgraded to MiFID II code set
- GTP London and TRADEcho MiFID II Post Trade channels available
- Existing OOF Book Trade message disseminated and replaced by the new GTP MiFID II Trade Report message disseminated via the new MiFID II channels only

November 27 2017

London Stock Exchange, Turquoise, TRADEcho Exchange and GTP instances fully migrated to MiFID II code set
- No changes this weekend

1) GTP Milan Remains on 1.4.0.7
- Core level changes not yet applicable
- BT Post Trade Channels not available

GTP instance upgraded to MiFID II code set

GTP instance not yet upgraded to MiFID II code set
GTP Go-Live Plan – 13 November

- Group Ticker Plant MiFID II code set will be deployed to the GTP London Instance
- From this date Turquoise Post Trade MiFID II channels will be available
- Post Trade London and TRADEEcho channels will not become available until the week following
- The following protocol changes will be made on this date and applicable to all markets disseminated via GTP London:
  - Statistics Snapshot: static and Dynamic reference price field added
  - Instrument Directory – Equities: Static and Dynamic reference price fields converted to reserved fields
  - Instrument Directory – Fixed Income: Static and Dynamic reference price fields converted to reserved fields
  - Instrument Directory: Static and Dynamic reference price fields converted to reserved fields
  - Add Order Incremental: RFQ ID field added
  - Trade: On-Book Trade Cancellation, Correction and Pending Price Flag added to the message
  - Trade Cross: Flags added to support the changes to the cancellation logic of Cross Trades
  - Statistics Update: Static and Dynamic Reference price values added to the message
  - Indicative Quote Message added

- For Turquoise market only, the new GTP Post Trade MiFID II channels will be available for subscription. The MiFID II messages added for dissemination via Post Trade channels are: MiFID II Trade (0x51), MiFID II Trade Report (0x54) and MiFID II Trade Cross (0x56). Only the MiFID II Trade (0x51) is applicable to Turquoise market.
GTP Go-Live Plan – 20 November

• Group Ticker Plant MiFID II code set (1.4.1.x) will already be deployed on the GTP London Instance.

• From this date London Stock Exchange and TRADEcho Post Trade MiFID II channels will be available.

• All protocol changes mentioned on the prior slide will already be live.

• The Phase 1 GTP TRADEcho Off Book Trade channels will be decommissioned and replaced by the new GTP MiFID II Post Trade channels.

• All MiFID II changes to GTP London Instance are complete.
In order to facilitate the testing of software applications and customer algorithms, a new test environment will be provided in parallel to the existing one starting from Q1 2018:

- a Legacy CDS will be provided for all the Trading and Market Data services of the Group’s Trading Venues
- the new environment will be continuously aligned with production in terms of Software Version of Trading and Market Data Systems and Reference Data
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• Technical Account Management

+44 (0) 20 7797 3939

londontam@lseg.com

• Market Access (conformance testing)

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marketaccess@lseg.com
TRADEcho Overview

- Partnership between BOAT Services and London Stock Exchange

- Regulatory approval has been received from the UK’s Financial Conduct Authority (FCA) to operate the TRADEcho platform as an Approved Publication Arrangement (APA)

- TRADEcho Phase 1 went live in June 2017

- Phase 2 is scheduled to go-live on Monday 20 November 2017
  - Mandatory dress rehearsal 28 October 2017
  - Mandatory migration for Phase 1 clients. PTGW logic no longer supported.

- TRADEcho MiFID II will go-live on 3 January 2018
## TRADEcho migration 1/4

### Migration plan to MiFID II go-live

<table>
<thead>
<tr>
<th>Date</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>17 November 2017</td>
<td>Last Trading day of TRADEcho Phase 1</td>
</tr>
<tr>
<td>20 November 2017</td>
<td>TRADEcho Phase 2 technical go-live*</td>
</tr>
<tr>
<td>2 January 2018</td>
<td>MiFID II technical configuration</td>
</tr>
<tr>
<td>3 January 2018</td>
<td>MiFID II go-live</td>
</tr>
</tbody>
</table>

*Mandatory upgrade for all Phase 1 clients*
On last trading day of TRADEcho Phase 1 (Friday before Technical Go-live)

- Customers who wish to carry forward deferred publication trade reports from Phase 1 to Phase 2 are required to cancel the relevant trade report themselves from Phase 1 prior to 17:15

- All remaining deferred publication trades will be published from 17:15 onwards

- Customers are advised to archive any required information from Phase 1 TRADEcho Portal
TRADEcho migration 3/4

Technical Go-live date of TRADEcho Phase 2

- Deployment of new version of TRADEcho message protocols
- PTGW logic no longer supported. All phase 1 customers’ must use MMT logic.
- Deployment of new version of market data protocols (GTP)
- Introduction of revised segment MIC codes for on Exchange business
- Introduction of interim deferred publication regime
- Relevant MiFID II flag to be used to meet existing Rule 3040 requirement instead of the Reporting Condition where required for on Exchange trades
- Customers that carried forward deferred trades from Phase 1 must re-enter them into Phase 2 from 6:15 onwards, any remaining delay will be based on ruling Phase 2 delay regime
2 January 2018 (MiFID II technical configuration)

- Update of ‘liquid’ vs. ‘not liquid’, ADT, ADNT and pre-trade LIS according to ESMA’s MiFID II classifications for 2018
- Full MiFID II deferred publication regime replaces interim configuration
- OTC & SI trade report submission extended until 19:15 each trading day

3 January 2018

- MiFIR / MiFID II enters into force
- Revised Rules of the London Stock Exchange enter force
- Existing Rule 3040 requirement to use Reporting condition revoked. MiFID II flags only to be used as required by MiFID II
Borsa Italiana PTTS

Borsa Italiana Post Trade Transparency Service (PTTS)

- PTTS will be decommissioned, effective Monday 27 November 2017
- TRADEcho will include the same universe of instruments
  - Borsa Equity instruments - already part of the LSE universe and included in the XLON Instrument file
  - Borsa non-equities + MTS instruments - Provision of reference data will be confirmed in due course
TRADEcho website - www.tradecho.com
TRADEcho Client Hub - www.tradecho.com/client-hub


GTP technical documents - https://www.lseg.com/areas-expertise/technology/group-technology/group-ticker-plant
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"Turquoise Plato Block Discovery" Global Trading Magazine, Issue #63
Q3 2017, pages 58-61 http://e.issuu.com/embrd.html#12494135-53088037
Turquoise – partnership and innovation
An idea 10 years ago, now trading €1 trillion per year and delivering award winning innovation that works, designed in partnership with our customers

- Turquoise share of European trading 11.7% (2015: 8.3%)
- Turquoise value traded on order book Turquoise Integrated Lit €1.2tn, up 26% (2015: €973bn) Turquoise Plato™ (non display) €159bn, up 32% (2015: €121bn)
- Turquoise Plato partnership formed September 2016 – bringing together for the first time buy-side, sell-side and trading venue

- Award winning innovation designed in partnership
- €43.6bn matched since 2014 launch to end September 2017 of which €39.5bn or 91% traded since September 2016

Turquoise Plato Block Discovery™

2015 Financial News Award for Excellence in Trading and Technology Most Innovative Trading Product / Service

UK Referendum partnership announced September 2016
Turquoise Overview

Innovative Approach to Trading European Equities

Turquoise Lit
TRQX

Broad stock universe for trading listed securities, DRs and ETFs from core Developed plus Emerging countries

Combines simple limit and iceberg orders with Large In Scale hidden orders

Turquoise Plato™
TRQM

Matches orders pegged to the midpoint Primary Market Best Bid and Offer of the respective European Exchange

Size priority and user-defined Minimum Execution Size (MES) are key features
Size priority in the matching logic is different to traditional time priority of other public order books.

Continuous Trading

Turquoise Plato Uncross™

- The buy-side friendly randomised midpoint uncrossing for larger and less time sensitive passive orders
- Is an innovation that differentiates Turquoise among European markets
- Allows only passive orders from buyers and sellers

Turquoise Plato Block Discovery™

- Facilitates trading in larger block orders by matching Block Indications
- Maximises opportunity allowing interaction with existing liquidity in Turquoise Plato Uncross™
- Robust reputational scoring and surveillance

Discrete functionalities for complimentary liquidity
1 connection, 19 countries and growing…

Turquoise, with regulatory approval, can admit for trading instruments listed on primary exchanges denominated in various currencies

1. Austria  8. Hungary  15. Portugal
3. Czech Republic  10. Italy  17. Sweden
5. Finland  12. Netherlands  19. UK
6. France  13. Norway
7. Germany  14. Poland

- **One connection**, one rulebook
  - Blue chips, mid and small caps
  - Plus
    - Global Depository Receipts
    - ETFs – including multiple listings
    - USA shares, ADRs and ETFs

- **Open Access** choice of interoperable CCPs
  - EuroCCP NV
  - LCH.Clearnet Ltd
  - SIX x-clear

- **Settle in respective country's CSD**
  Central Securities Depository or ICSD
Growth of Turquoise Plato Block Discovery™
New Records in H2 2016 and January – September 2017 surpass extraordinary June 2016

Turquoise Plato Block Discovery™
Award winning innovation designed in partnership

Turquoise Plato Block Discovery™
• September 2017 monthly value traded via Turquoise Plato Block Discovery™ = € 6.05 billions
  10% more than prior record July 2017 = € 5.49 billions
  More than 8x September 2016 = € 0.70 billions

• € 43.6 billion matched since 2014 launch, of which € 39.5 billion or 91% matched since September 2016

• Record Weekly Value 11-15 Sep 2017 = € 1,677 millions
  +5% above prior record 24-28 July 2017 = € 1,601 millions

• Record Daily Value 27 July 2017 = € 435.1 millions
  +20% more than prior record 8 June 2017 = € 362.8 millions
  prior record 07 June 2017 = € 274.6 millions
  prior record 24 May 2017 = € 209.0 millions

Source: Turquoise analysis

2015 Financial News Award for Excellence in Trading and Technology
Most Innovative Trading Product / Service

London Stock Exchange Group
## Turquoise Plato Block Discovery™

### High Trade Size

**For trades in ESMA Band 5 blue chips above LIS**

**Average Trade Sizes consistently are above €1 million**

---

**Sep 2016 to Sep 2017: Average Trade Sizes consistently are above €1 million for ESMA Band 5 blue chips for trades above Large In Scale**

<table>
<thead>
<tr>
<th>ESMA Bands by ADT = Average Daily Turnover</th>
<th>ESMA Bands (€ LIS)</th>
<th>Value Traded (€), where trades &gt; LIS</th>
<th>Trade Count, where trades &gt; LIS</th>
<th>Average Trade Size (€)</th>
<th>Average Trade Size Multiple of LIS</th>
<th>Max Trade Size (€)</th>
<th>Country</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADT &lt; €500k</td>
<td>Band 1 (€ 50k)</td>
<td>334,380,731</td>
<td>2,534</td>
<td>131,958</td>
<td>2.6x</td>
<td>2,830,085</td>
<td>Germany</td>
</tr>
<tr>
<td>€0.5m &lt; ADT &lt; €1m</td>
<td>Band 2 (€ 100k)</td>
<td>202,106,270</td>
<td>947</td>
<td>213,417</td>
<td>2.1x</td>
<td>2,518,091</td>
<td>UK</td>
</tr>
<tr>
<td>€1m &lt; ADT &lt; €25m</td>
<td>Band 3 (€ 250k)</td>
<td>4,548,066,600</td>
<td>9,277</td>
<td>490,252</td>
<td>2.0x</td>
<td>6,852,667</td>
<td>Germany</td>
</tr>
<tr>
<td>€25m &lt; ADT &lt; €50m</td>
<td>Band 4 (€ 400k)</td>
<td>3,370,716,341</td>
<td>4,453</td>
<td>756,954</td>
<td>1.9x</td>
<td>5,663,713</td>
<td>Germany</td>
</tr>
<tr>
<td>ADT &gt; €50m</td>
<td>Band 5 (€ 500k)</td>
<td>14,057,990,455</td>
<td>13,309</td>
<td>1,056,277</td>
<td>2.1x</td>
<td>13,109,835</td>
<td>Italy</td>
</tr>
<tr>
<td><strong>Grand Total</strong></td>
<td></td>
<td><strong>22,513,260,397</strong></td>
<td><strong>30,520</strong></td>
<td><strong>737,656</strong></td>
<td>n/a</td>
<td><strong>13,109,835</strong></td>
<td></td>
</tr>
</tbody>
</table>

Turquoise Plato Block Discovery™ trades for ESMA Band 5 blue chips above LIS average more than €1 million per trade and are more than 100x larger than the €10k average trade sizes for the same ESMA Band 5 blue chips matching using continuous midpoint mechanisms.

---

![Average Trade Size Chart](chart.png)

Source: Turquoise analysis
Turquoise Plato Block Discovery™
Trade in size, save half PBBO bid offer spread

Imperial Tobacco (GBX), 4 Dec 2014 excluding auctions. LIS = ESMA’s Large In Scale.

Turquoise Plato Block Discovery™ facilitates trades in Turquoise Plato Uncross™ that trade inside minimum tick and in significantly larger size.

Midpoint dark trades enable price improvement by matching inside the lit orderbook minimum tick size price levels.

Turquoise trades at €1m+ will save 100x+ post trade clearing costs compared with average dark pool trade size of €10k where clearing costs relate to number of trades.

Sources: Bloomberg, Turquoise analysis.
Venues include: Aquis, BATS Europe, BlockMatch, Chi-X Europe, Equiduct Trading, Liquidnet, LSE, Sigma-X MTF, Turquoise, UBS MTF.
Search for Yield, Search for Liquidity

Turquoise LSEG members are trading an increasing number of Mid + Small caps

300 names ~ 80% value traded in Europe

Turquoise trades many more symbols including blue chips, mid and small caps

• Turquoise now matches trades in significantly more stock symbols each month as investors continue to search for liquidity to match trades in mid and small caps

Source: Turquoise Analysis
Turquoise Lit Auctions™
A MiFID II solution for matching in frequent lit auctions at mid-price of PBBO or limit prices

**Turquoise Lit Auction™ - Summary of Key Features**

<table>
<thead>
<tr>
<th>Market Identifier Code (MIC) – TRQA</th>
<th>Order Types – Limit** and Pegged (with/without Limit Price** which acts as a cap)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Auction Transparency (Real Time) – Aggregated Auction Quantity and Price (No Imbalance)</td>
<td>Time in Force (TIF) – DAY and GFA, Good for a single Turquoise Lit Auction™</td>
</tr>
<tr>
<td>Auction Duration – A random period between 50 and 100 milliseconds</td>
<td>Reference Price Collar – Yes, all trades must be equal to or within PBBO</td>
</tr>
<tr>
<td>Auction Trigger – A potential match within PBBO or receipt of a GFA Order</td>
<td>Well Formed Market Checks (WFMC) – Turquoise Lit Auction™ will only occur when PBBO is well formed</td>
</tr>
<tr>
<td>Auction Matching Logic &amp; Priority – Price to Maximise Quantity matched; then Member*/Time priority</td>
<td></td>
</tr>
</tbody>
</table>

**Turquoise Lit Auction™ start on identification of a crossed book, within Reference Price Collar (PBBO)**

1. **Member A:** Sends **Buy** DAY Order
2. **Member B:** Sends **Sell** DAY Order
3. IAQ/P published
4. Order Submission Interval
5. **Turquoise Lit Auction™** uncross occurs

**Time**

1. **Turquoise Lit Auction™** immediately checks for a match once the Buy DAY Order is received (no auction event triggered). ¹
2. **Turquoise Lit Auction™** immediately checks for a match once the Sell DAY is received (auction event triggered).
3. **Turquoise Lit Auction™** starts.² Indicative Auction Quantity and Price (IAQ/P) published via Market Data (GTP/MITCH).
4. 50 millisecond window for Members to submit Orders to **Turquoise Lit Auction™**.
5. **Turquoise Lit Auction™** random uncross within the next 50 millisecond period.

**Fixed**

Trade and 0 IAQ/P published via Market Data (GTP/MITCH).

¹ Note: If a **Turquoise Lit Auction™** cycle is already under way and the auction has started, the Order will be added to the Order Book and if there is a change from the previously published IAQ/P, an updated IAQ/P will be published.

² Note: Receipt of a GFA Order will also start a **Turquoise Lit Auction™** if an auction is not in progress.
Best Execution via Single Connection

Extensive Choice of Trading Channels, more efficient by design with Open Access & choice of CCP

Global Investors

LSE choice of trading mechanisms

Turquoise choice of trading mechanisms

LSEG Data Centre

LSEG Order Book
Execution Channels
Single MIT Platform

1. SETS II orderbook

2. Opening Auction

3. Intra-day Auction

4. Closing Auction

5. Turquoise Lit Book™

6. Turquoise Plato™

7. Turquoise Plato Dark-Lit Sweep™

8. Turquoise Plato Uncross™

9. Turquoise Plato Block Discovery™

10. Turquoise Lit Auctions™

ONE International Settlement Message

* Newly introduced price forming liquidity event, timed to coincide with the traditional low point in daily volatility, and exempt from the MiFID II double volume caps in dark trading enabling mid-day price formation.
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