



London
Stock Exchange Group

Technical User Group

London, 2 October 2017

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



London
Stock Exchange Group

Member Portal

Don Mucha
Manager, Technical Account Management and Market Access
Client Technology Services - UK
London Stock Exchange Group

Member Portal Introduction

- 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 (BlitClub) 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.

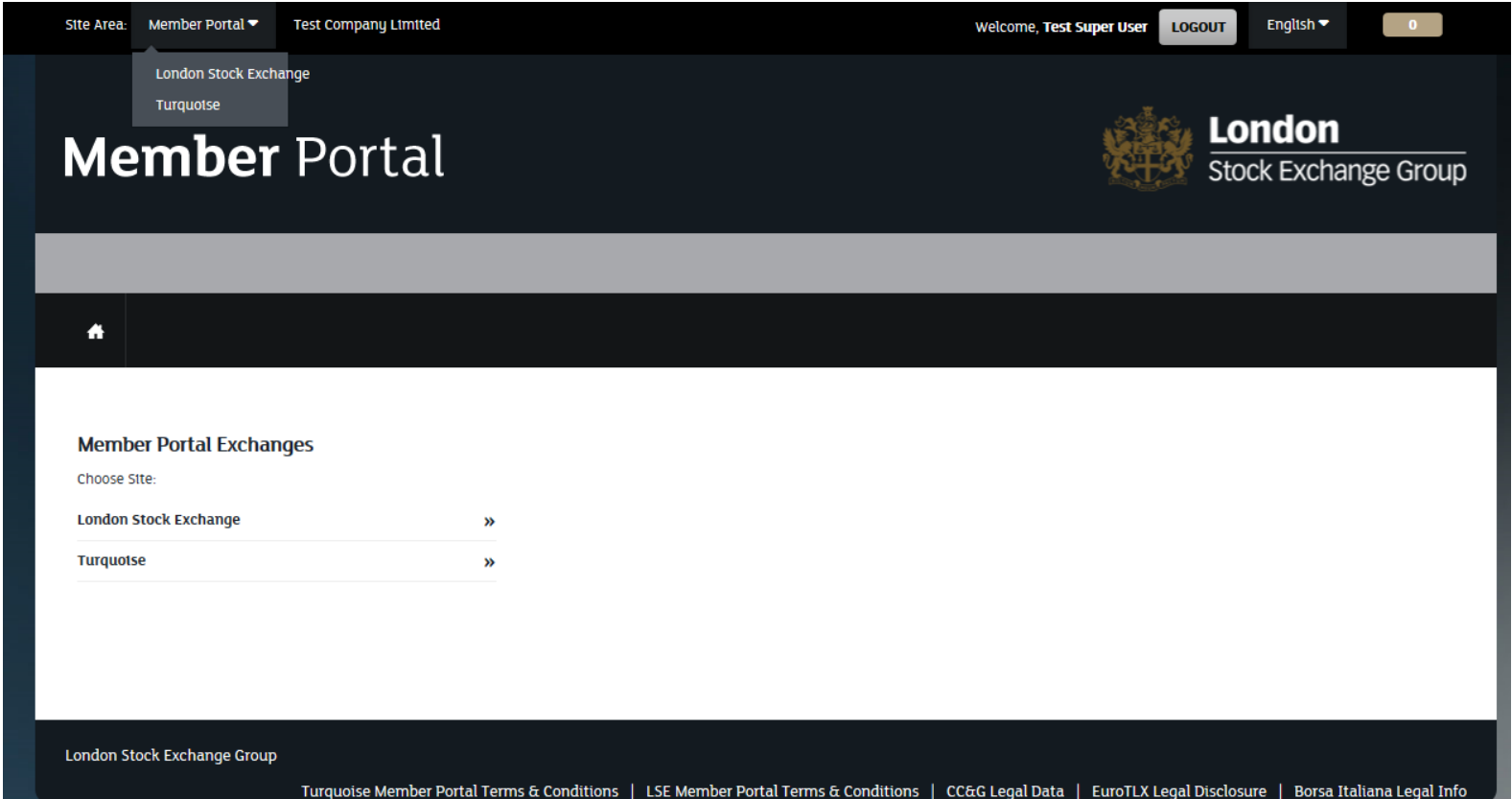
2) Nominate your company Super User

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 or returned via post to Membership Team, London Stock Exchange, 10 Paternoster Square, London EC4M 7LS

Member Portal Exchanges



The screenshot shows the 'Member Portal Exchanges' page of the London Stock Exchange Group. The top navigation bar includes 'Site Area: Member Portal', 'Test Company Limited', 'Welcome, Test Super User', a 'LOGOUT' button, 'English', and a balance of '0'. A dropdown menu for 'Member Portal' is open, showing 'London Stock Exchange' and 'Turquoise'. The main header features the 'Member Portal' title and the LSEG logo. Below the header is a horizontal bar with a home icon. The main content area is titled 'Member Portal Exchanges' and contains a 'Choose Site:' section with two links: 'London Stock Exchange' and 'Turquoise', each with a right-pointing arrow. The footer includes the 'London Stock Exchange Group' name and a row of links: 'Turquoise Member Portal Terms & Conditions', 'LSE Member Portal Terms & Conditions', 'CC&G Legal Data', 'EuroTLX Legal Disclosure', and 'Borsa Italiana Legal Info'.

Site Area: Member Portal ▼ Test Company Limited Welcome, Test Super User LOGOUT English 0

London Stock Exchange
Turquoise

Member Portal

Member Portal Exchanges

Choose Site:

London Stock Exchange »

Turquoise »

London Stock Exchange Group

[Turquoise Member Portal Terms & Conditions](#) | [LSE Member Portal Terms & Conditions](#) | [CC&G Legal Data](#) | [EuroTLX Legal Disclosure](#) | [Borsa Italiana Legal Info](#)

Member Portal Main Menu

Site Area: **London Stock Exchange** Test Company Limited

Welcome, **Test Super User** **LOGOUT** **English** **0**

Member Portal

**London**
Stock Exchange Group

Home

Member Requests

Membership Management

Company User Management

 → London Stock Exchange → Home

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»

Add New Market Access»

Remove Market Access»

Membership 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»

Company User management

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

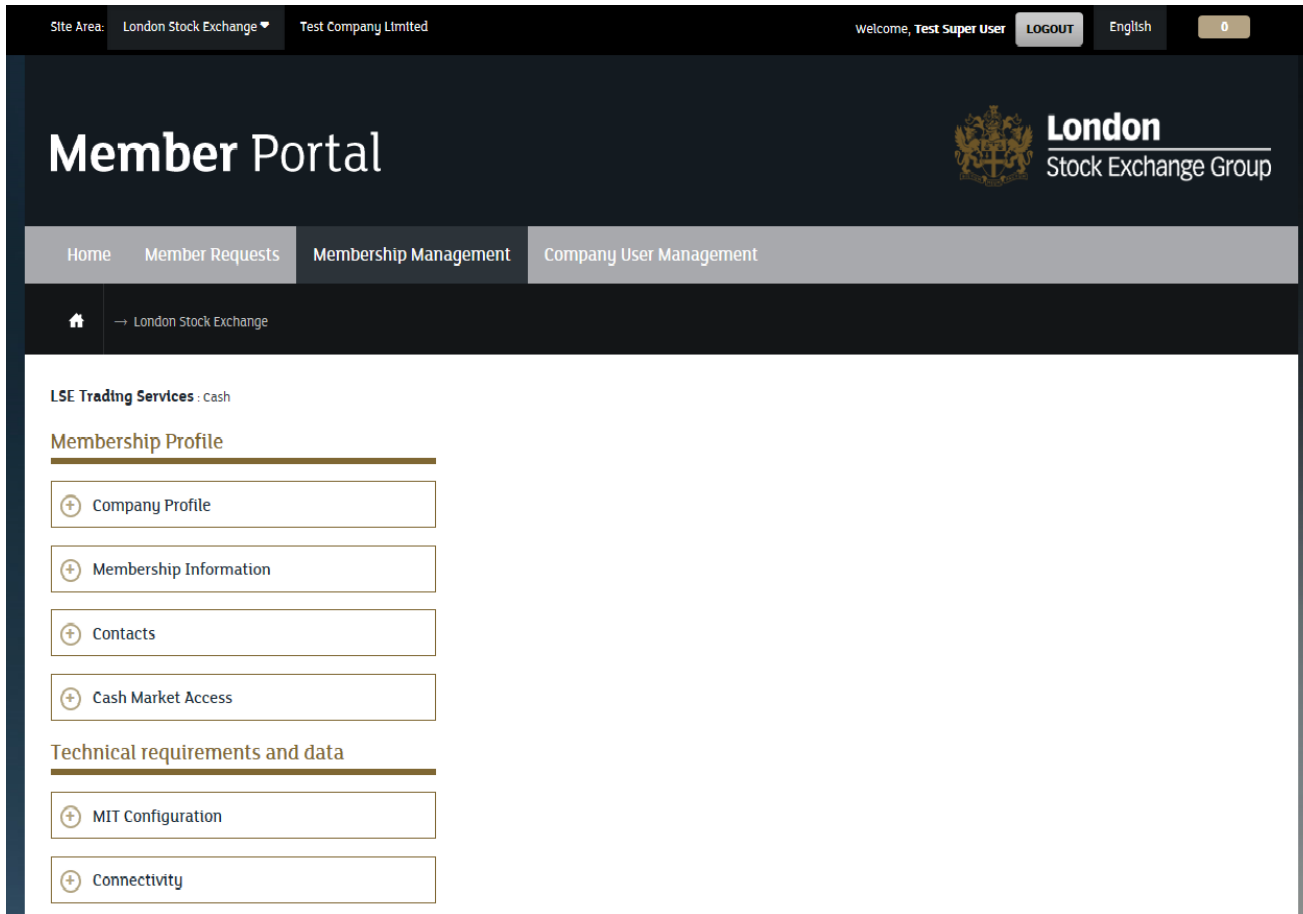
Enter»

Turquoise Member Portal Terms & Conditions | LSE Member Portal Terms & Conditions | CC&G Legal Data | EuroTLX Legal Disclosure | Borsa Italiana Legal Info

London Stock Exchange Group 2 October 2017

Page 7

Member Data Area



The screenshot displays the Member Portal interface. At the top, a dark navigation bar includes the site area (London Stock Exchange), user information (Test Company Limited), a welcome message (Welcome, Test Super User), a LOGOUT button, language selection (English), and a balance indicator (0). Below this, the main header features the 'Member Portal' title and the London Stock Exchange Group logo. A secondary navigation bar contains links for Home, Member Requests, Membership Management (which is highlighted), and Company User Management. A breadcrumb trail shows the path from Home to London Stock Exchange. The main content area is titled 'LSE Trading Services : Cash' and is divided into two sections. The 'Membership Profile' section, underlined, contains four expandable items: Company Profile, Membership Information, Contacts, and Cash Market Access. The 'Technical requirements and data' section, also underlined, contains two expandable items: MIT Configuration and Connectivity. Each item is represented by a button with a plus icon and the item name.

Site Area: London Stock Exchange ▼ Test Company Limited

Welcome, Test Super User LOGOUT English 0

Member Portal

Home Member Requests **Membership Management** Company User Management

→ London Stock Exchange

LSE Trading Services : Cash

Membership Profile

- + Company Profile
- + Membership Information
- + Contacts
- + Cash Market Access

Technical requirements and data

- + MIT Configuration
- + Connectivity



Phase 1 – Technical Configuration

Phase 1 Technical Configuration Overview

- Manage / View Technical Configurations:
 - Trading CompID / 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 Configuration Area

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

- Request New CompIDs / UserIDs
- 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

Comp Id Management

Member firms can request new and manage existing compID's 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](#).

Add new CompId

Username	Protocol	Session ID
	v	v
Software	Status	
v	v	Search

Current compID configuration:

		Session		Sponsor			
☐	Username	Protocol	ID	Software	Status	TPS	Access
☒	Test Company Limited	Native	TEST000N	ION TRADING	Active	250	false

CompID Management

CompId Detail

✕

Modification request

Member ID

TESTMEM1

Sponsor Access

☐ Yes ☒ No

Username (*)

Test Company Limited

Protocol (*)

Native

Software (*)

ION TRADING

Session ID (*)

TEST000N

Status (*)

Active

TPS (*)

250

Disconnect Delay (milliseconds)

0

Self Execution Prevention

None

Cancel or Disconnect

☒ Yes ☐ No

Cancel on Logout

☒ Yes ☐ No

- 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

Sponsored Access

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



London
Stock Exchange Group

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

SAPID

internet



Source IP(s) Permitted

1.1.1.1



- 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

SAPs

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

Group Name	TCP Services Associated
Trading	Native
	FIX Trading
	Post Trade
	Drop Copy Gateway
Info [GTP-MITCH]	MITCH Replay Recovery
	GTP Replay Recovery
ftp/sftp	reference-data
Sponsored Access Portal	Sponsored Access Portal
Tradecho FIX GW	Tradecho FIX Gateway

[Add SAP](#)

SAPID	Primary Address	IP Address Range	bandwidth	
 DummySAP	Datacenter, XXX XXX Angola - United States	1.1.1.1	1 Gb	 
 DummySAP 2	Datacenter, XXX XXX Angola - United States	1.1.1.1	10 Gb	 

[Download Report](#) 

Network Enablements



London
Stock Exchange Group

Edit SAP

Address

City (*)

SLOUGH

County/State/Province

Post code (*)

XXX XXX

Country (*)

SAPID (*)

DummySAP

IP Address Range

1.1.1.1

Bandwidth

1 Gb

☐ Trading

☐ Info [GTP-MITCH]

☐ ftp/sftp

☐ Sponsored Access Portal

☐ Tradecho FIX Gateway

☐ HSVF

☐ BTS

☐ BCS

Save

GTP Multicast Channel Details



SAPID (*)

DummySAP 2
DummySAP

Select

Network Enablements

GTP Multicast Channel Details

SAPID (*)

DummySAP 2

☐ Indexes

Notes

Notes for Back office user for this request

☐ FTSE 100 - Group A

☐ FTSE 100 - Group B

☐ FTSE 250

☐ Structured Products

☐ Miscellaneous

☐ European (EQS)

☐ International (IOB & ITR)

☐ FTSE Indices

Send



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


London
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[Home](#)
[Member Requests](#)
[Membership Management](#)
[Company User Management](#)

[→ London Stock Exchange → Software](#)

Software Providers

Software vendor

Software name

Last Certificate Type

Version

Create Date Start

Create Date Stop

Next due Certificate Date Start

Next due Certificate Date Stop

Last Certificate Date Start

Last Certificate Date Stop

Search

Software vendor	Software name	Software type	N. version	Create Date	Last Certification Date	Next due Certification Date	Last Certificate Type
ABN AMRO CLEARING BANK N.V.	Test Software	Proprietary	1	29/09/2017	03/09/2017	03/09/2018	Full certification
ABN AMRO CLEARING BANK N.V.	ABN - AMRO LSE UFG (UNIVERSAL FIX GATEWAY)	Proprietary	1,0	28/08/2017	17/05/2016	17/05/2016	Full certification

[xims-software](#)



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

**London**
Stock Exchange Group

[Home](#) [Member Requests](#) [Membership Management](#) [Company User management](#) [MIFID II Services](#)

 → [London Stock Exchange](#) → [Home](#)

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](#) »

MIFID II Services

MIFID II Services description

- [Short-Long Codes](#) »
- [Positions Report](#) »

Membership 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](#) »

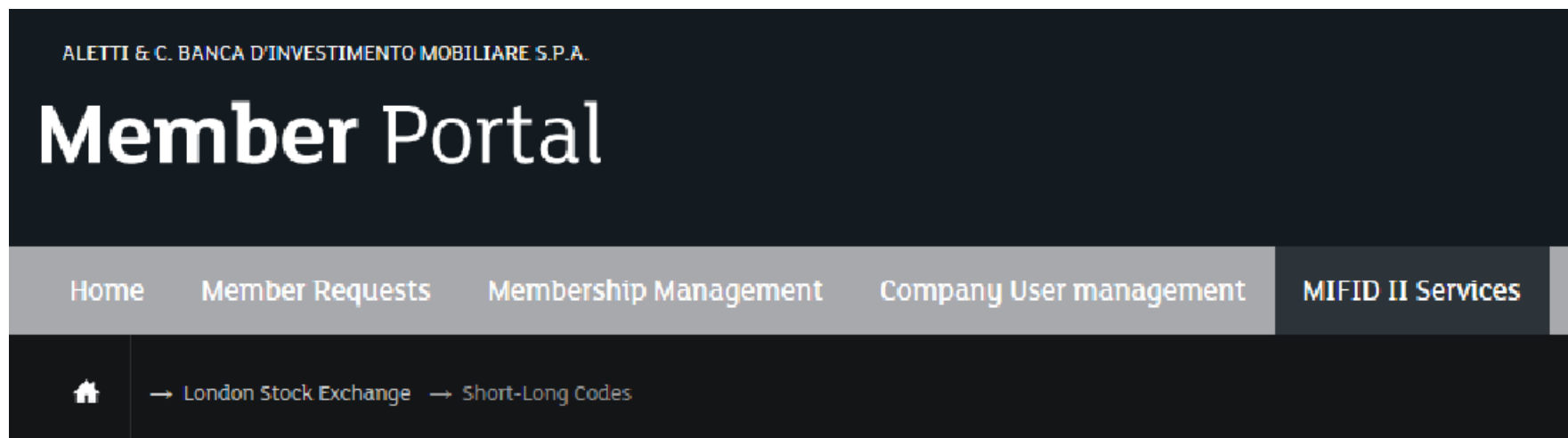
Company User management

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

- [Enter](#) »



Member Portal – Short Code Menu



Short-Long Codes

Data Management »

Bulk Upload »

Reports »



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



Member Portal – Data Management

Data Management

Add Short-Long Code

Short Code

Long Code

Identifier Code Type

All

Status

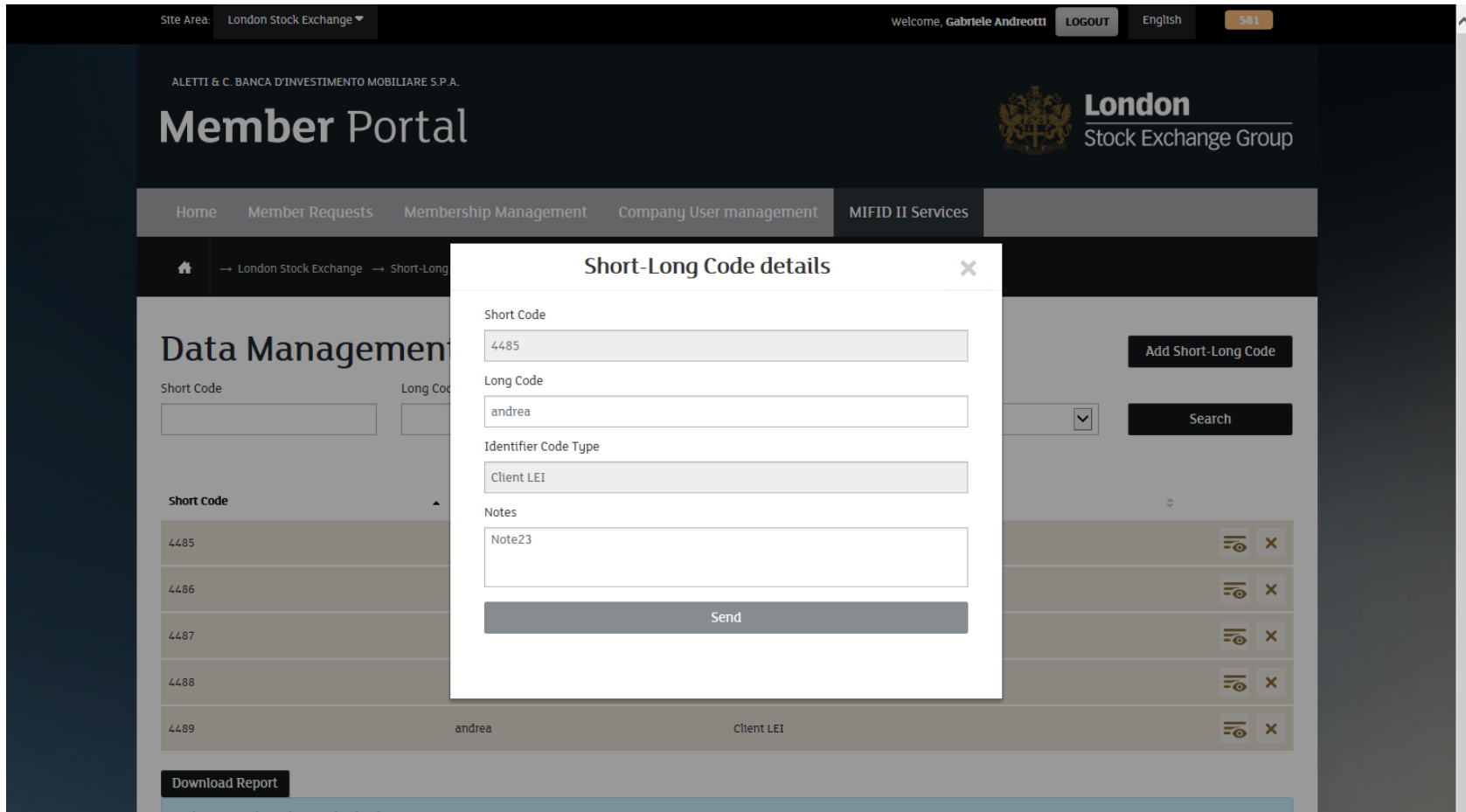
Active

Search

Short Code	Long Code	Identifier Code Type	
4485	andrea	Client LEI	
4486	andrea	Client LEI	
4487	andrea	Client LEI	
4488	andrea	Client LEI	
4489	andrea	Client LEI	

Download Report

Member Portal – Short – Long Code Details



The screenshot displays the Member Portal interface for ALETTI & C. BANCA D'INVESTIMENTO MOBILIARE S.P.A. The user is logged in as Gabriele Andreotti. The main navigation bar includes links for Home, Member Requests, Membership Management, Company User management, and MIFID II Services. The 'Data Management' section is active, showing a table of Short and Long Codes. A modal window titled 'Short-Long Code details' is open, allowing the user to edit or add a code. The modal contains fields for Short Code (4485), Long Code (andrea), Identifier Code Type (Client LEI), and Notes (Note23). A 'Send' button is at the bottom of the modal. The background table lists several codes, with the last one (4489) matching the details in the modal.

Short Code	Long Code	Identifier Code Type	Notes
4485			
4486			
4487			
4488			
4489	andrea	Client LEI	Note23



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

Site Area: London Stock Exchange

Welcome, **Gabriele Andreotti**
[LOGOUT](#)
[English](#)
581

ALETTI & C. BANCA D'INVESTIMENTO MOBILIARE S.P.A.


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[Home](#)
[Member Requests](#)
[Membership Management](#)
[Company User management](#)
[MIFID II Services](#)

[→ London Stock Exchange](#)
[→ Short-Long Codes](#)
[→ Bulk Upload](#)

File CSV

[Browse...](#)

☐ Replace the whole list of existing short-long codes

[Upload CSV](#)
[Download CSV Template](#)

Upload History

Upload Id	Upload Date	Status	User File	Result File	Error File
2205	2017-09-21 11:54	Published	Download	Download	---
2204	2017-09-21 11:51	Published with errors	Download	Download	Download
2203	2017-09-21 11:48	Published	Download	Download	---
2202	2017-09-21 10:35	Published	Download	Download	---
2201	2017-09-21 10:34	Published	Download	Download	---

Member Portal – Bulk Upload File

RTS24-BulkUpload - Microsoft Excel

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T
1	Short Code	Long Code	Identifier	Notes	Operation Type															
2	4485	andrea	L	Note23	0															
3	4486	andrea	L	Note23	0															
4	4487	andrea	L	Note23	0															
5	4488	andrea	L	Note23	0															
6	4489	andrea	L	Note23	0															
7																				
8																				
9																				
10																				
11																				
12																				
13																				
14																				
15																				
16																				
17																				
18																				
19																				
20																				

Member Portal – Bulk Upload Menu

Site Area: London Stock Exchange ▼
Welcome, **Gabriele Andreotti**
LOGOUT
English
581

ALETTI & C. BANCA D'INVESTIMENTO MOBILIARE S.P.A.

London
Stock Exchange Group

Home
Member Requests
Membership Management
Company User management
MIFID II Services

→ London Stock Exchange → Short-Long Codes → Bulk Upload

File CSV

 Browse...

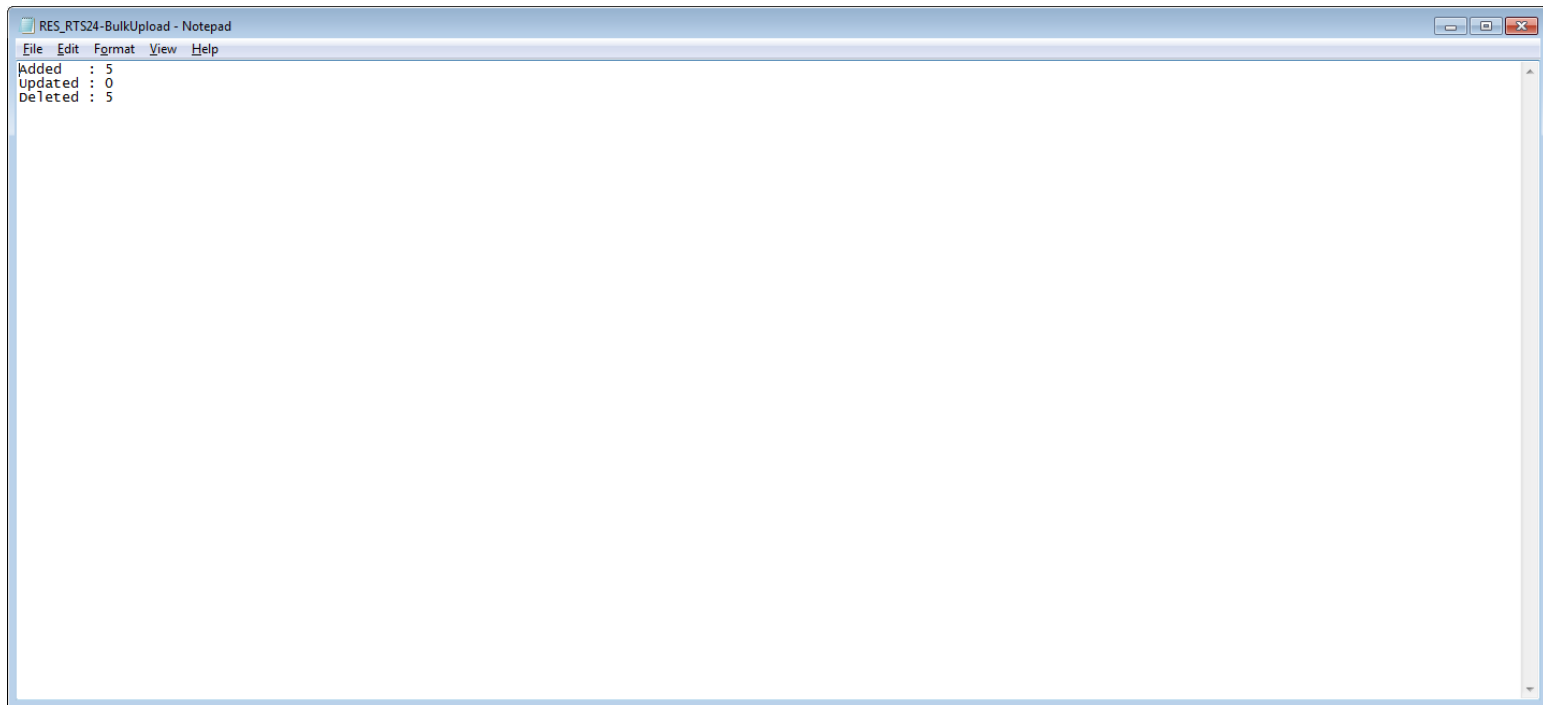
☐ Replace the whole list of existing short-long codes

Upload CSV **Download CSV Template**

Upload History

Upload Id	Upload Date	Status	User File	Result File	Error File
2205	2017-09-21 11:54	Published	Download	Download	---
2204	2017-09-21 11:51	Published with errors	Download	Download	Download
2203	2017-09-21 11:48	Published	Download	Download	---
2202	2017-09-21 10:35	Published	Download	Download	---
2201	2017-09-21 10:34	Published	Download	Download	---

Member Portal – Bulk Upload Results File



London
Stock Exchange Group

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Member Portal – Reports Window

- View reports of short code reconciliation errors

ALETTI & C. BANCA D'INVESTIMENTO MOBILIARE S.P.A.

Member Portal



London
Stock Exchange Group

Home Member Requests Membership Management Company User management **MIFID II Services**

→ London Stock Exchange → Short-Long Codes → Reports

Sorry, No missing shortcode file is founded

Node: cw-stms-btc01.lseg.stockex.local

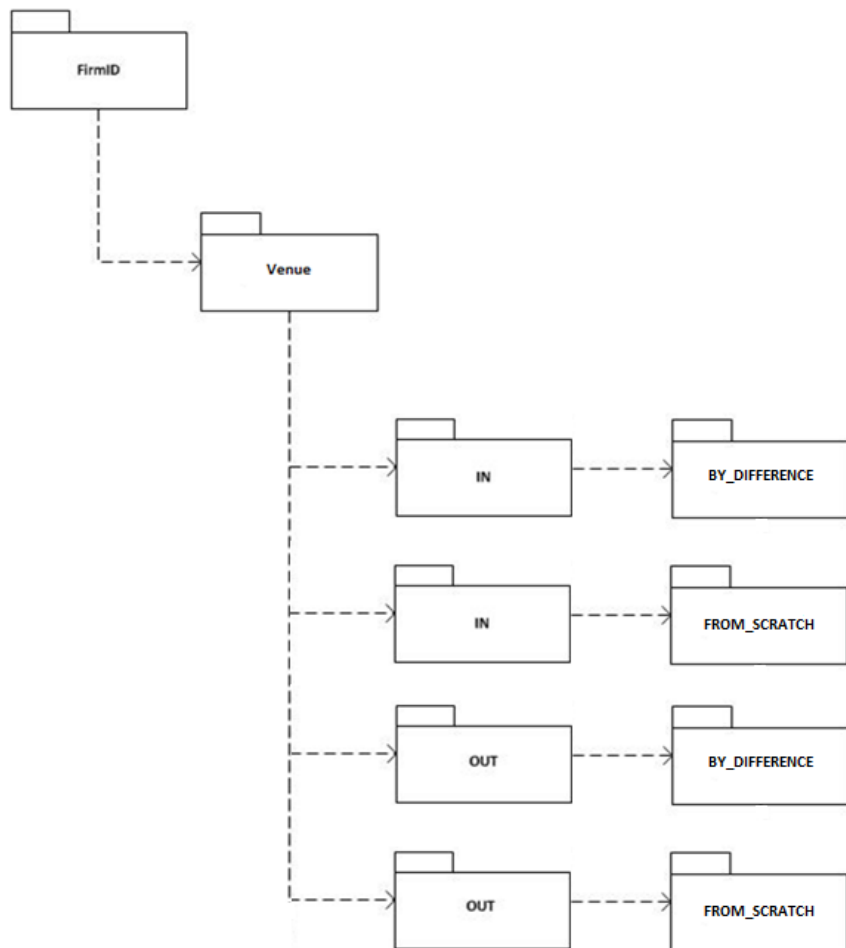


Bulk Upload via sFTP

- 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.



London
Stock Exchange Group

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™



London
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MiFID II Technical Update

Paul Kennedy
Technical Account Manager
Client Technology Services - UK
London Stock Exchange Group



MiFID II Customer Documentation

- 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

	London Stock Exchange	Turquoise	London Stock Exchange Equity Derivatives	London Stock Exchange Interest Rate Derivatives
CDS Go-Live	3 August 2017	31 July 2017	21 July 2017	7 September 2017
CDR 1	7 October 2017	30 September 2017	7 October 2017	7 October 2017
CDR 2	28 October 2017	21 October 2017	21 October 2017	21 October 2017
Production Go-live*	20 November 2017	13 November 2017	13 November 2017	13 November 2017

***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.

Release Go-Live (All 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.

Release Go-Live (All Markets)

- 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



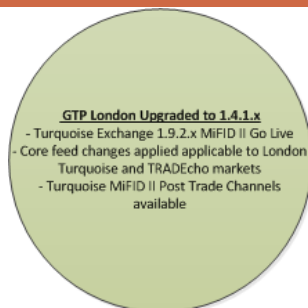
LSEDM Deployment Approach

3 January 2018

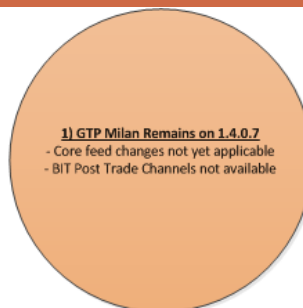
- Introduction of 'matched principal' trading capacity
- Communication of 'stressed market conditions via market data Bulletin messages.



GTP Go-Live Plan



November 13 2017

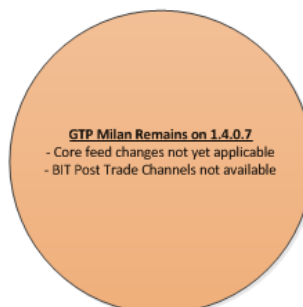


GTP Instance upgraded to MiFID II code set

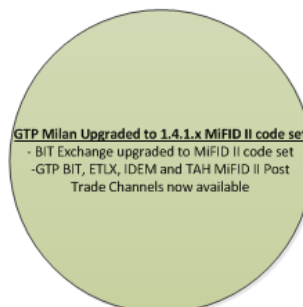
GTP Instance not yet upgraded to MiFID II code set



November 20 2017



November 27 2017



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 TRADEcho 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.

Legacy CDS

- 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



Contacts

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TRADEcho

Philippe Teillet
Technical Account Manager
Client Technology Services – UK
London Stock Exchange Group

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

17 November 2017 Last Trading day of TRADEcho Phase 1

20 November 2017	TRADEcho Phase 2 technical go-live*
2 January 2018	MIFID II technical configuration
3 January 2018	MiFID II go-live

*Mandatory upgrade for all Phase 1 clients

TRADEcho migration 2/4

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

TRADEcho migration 4/4

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



Documentation

TRADEcho website - www.tradecho.com

TRADEcho Client Hub - www.tradecho.com/client-hub

TRADEcho APA technical documents / TRADEcho MiFID II Deployment Guide Document - <http://www.londonstockexchange.com/products-and-services/technical-library/millennium-exchange-technical-specifications/millennium-exchange-technical-specifications.htm>

GTP technical documents - <https://www.lseg.com/areas-expertise/technology/group-technology/group-ticker-plant>



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LSE

Technical Account Manager: londonTAM@lseg.com / +44 207 797 3939

Turquoise

Integrity Innovation Partnership Excellence
European single market trading venue of choice

Turquoise Plato™

Collaboration. Innovation. Execution.
Large in Scale electronic execution channel that works

One Group. One Vision.
Open Access

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"The Future of Trading is Now" in **Best Execution Magazine**, 10 October 2016
<http://www.bestexecution.net/industry-viewpoint-turquoise-dr-robert-barnes/>

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<http://www.thetradenews.com/Trading-Venues/The-Big-Interview-Robert-Barnes/>

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Q3 2017, pages 58-61 <http://e.issuu.com/embed.html#12494135/53088037>



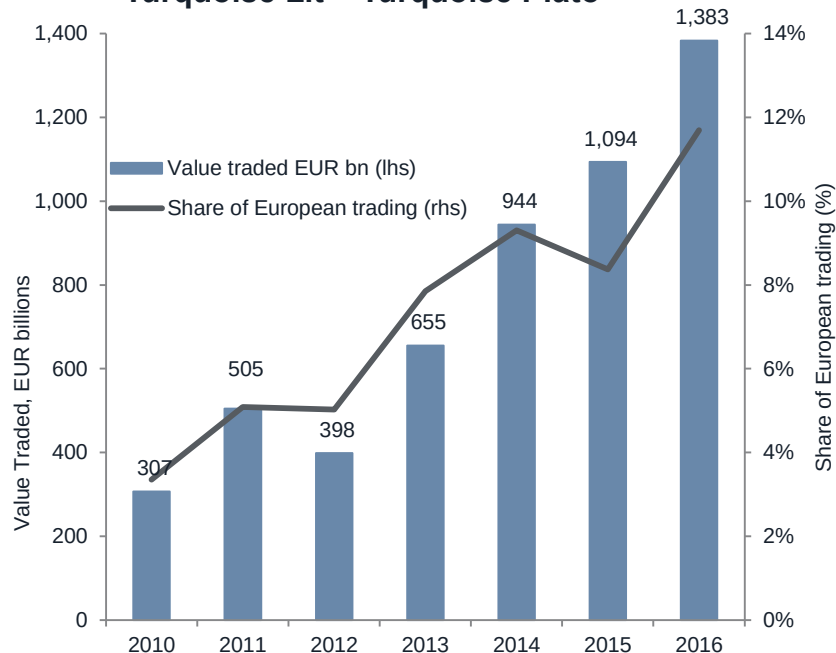
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Turquoise – partnership and innovation



An idea 10 years ago, now trading €1 trillion per year and delivering award winning innovation that works, designed in partnership with our customers

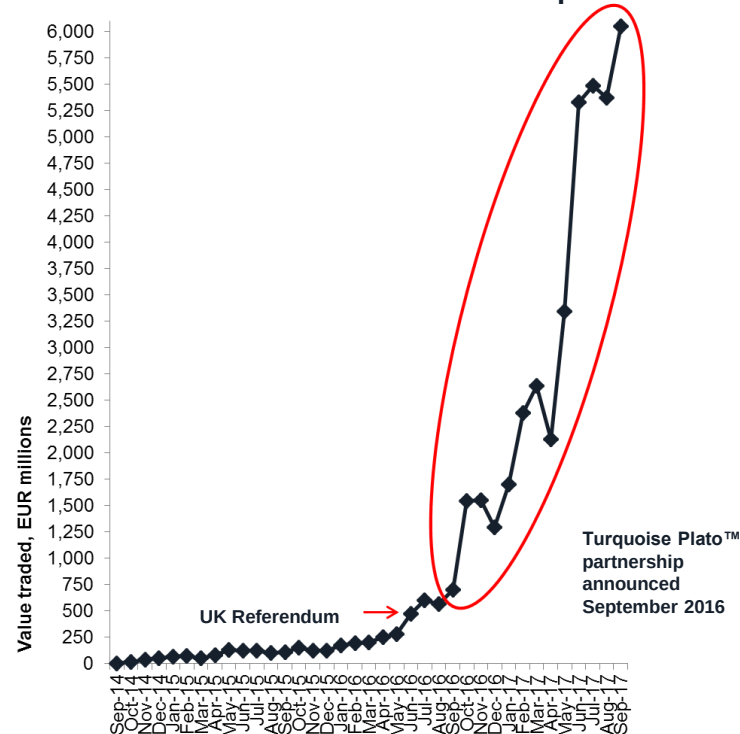
Turquoise Lit + Turquoise Plato™



- **Turquoise share of European trading 11.7%** (2015: 8.3%)
- Turquoise value traded on order book
Turquoise Integrated Lit €1.2trn, **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

Turquoise Plato Block Discovery™

- 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**



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



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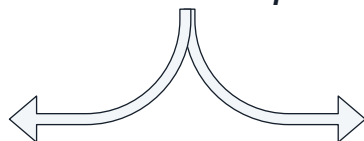
Turquoise Overview

Innovative Approach to Trading European Equities



Discrete functionalities for complimentary liquidity

**Turquoise Lit
TRQX**



Turquoise Plato™

TRQM

- 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

- 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™

Turquoise Plato Block Discovery™

- ✓ 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

- ✓ 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



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1 connection, 19 countries and growing...



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



Trade European Securities of

- | | | |
|--------------------------|-------------------|-----------------|
| 1. Austria | 8. <u>Hungary</u> | 15. Portugal |
| 2. Belgium | 9. Ireland | 16. Spain |
| 3. <u>Czech Republic</u> | 10. Italy | 17. Sweden |
| 4. Denmark | 11. Luxembourg | 18. Switzerland |
| 5. Finland | 12. Netherlands | 19. UK |
| 6. France | 13. Norway | |
| 7. Germany | 14. <u>Poland</u> | |

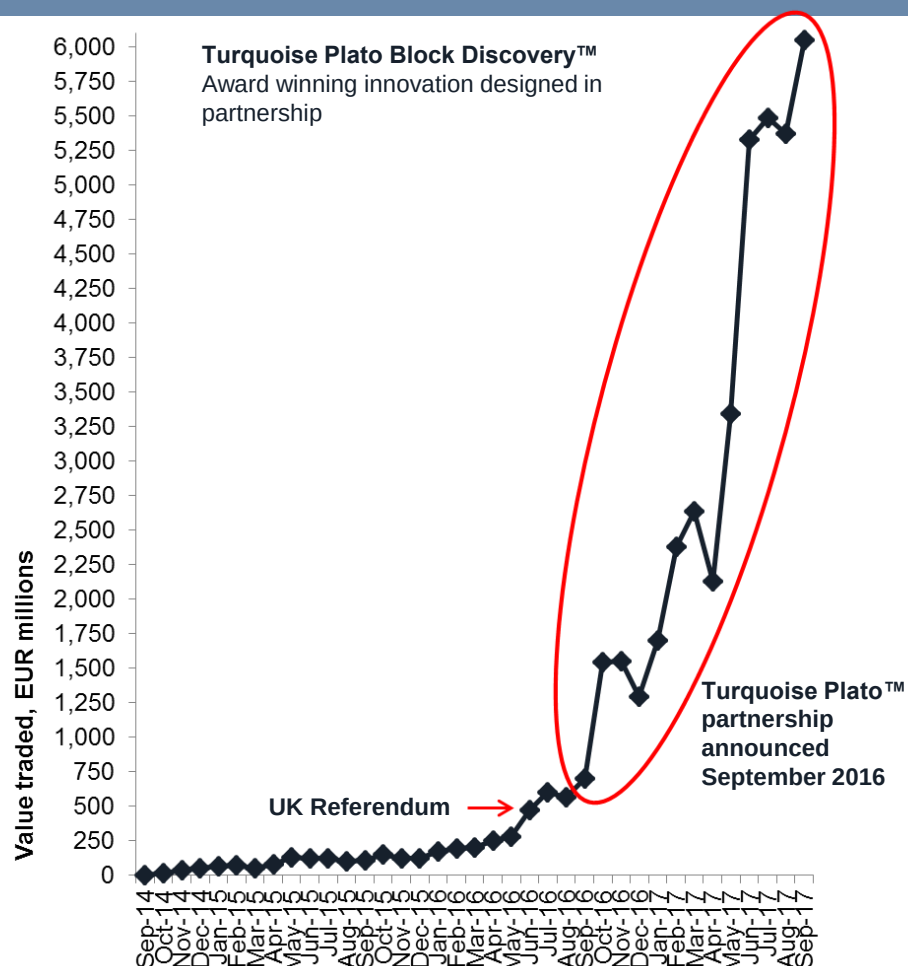
- **One connection, one rulebook**
 - Blue chips, mid and small caps
 - Plus
 - Global Depository Receipts
 - ETFs – including multiple listings
 - USA shares, ADRs and ETFs
- **Open Access** choice of interoperable CCPs
 - EuroCCP NV
 - LCH.Clearnet Ltd
 - SIX x-clear
- **Settle in respective country's CSD**
Central Securities Depository or ICSD



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Growth of Turquoise Plato Block Discovery™

New Records in H2 2016 and January – September 2017 surpass extraordinary June 2016



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

Turquoise Plato Block Discovery™

High Trade Size

For trades in ESMA Band 5 blue chips above LIS

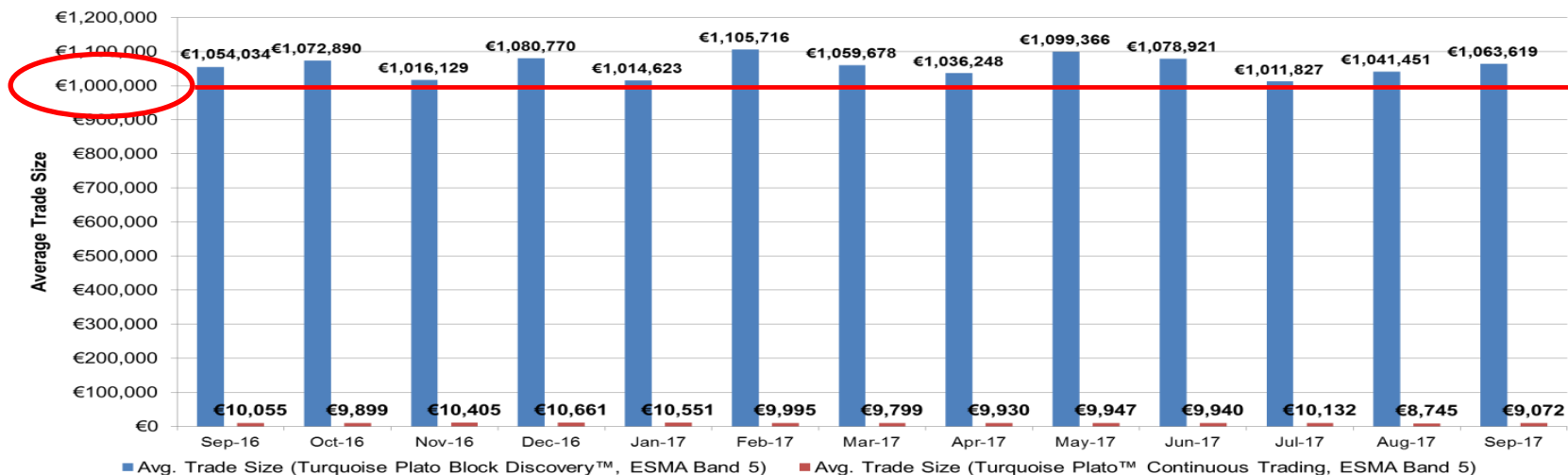
Average Trade Sizes consistently are above €1 million



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

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

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.



Source: Turquoise analysis

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

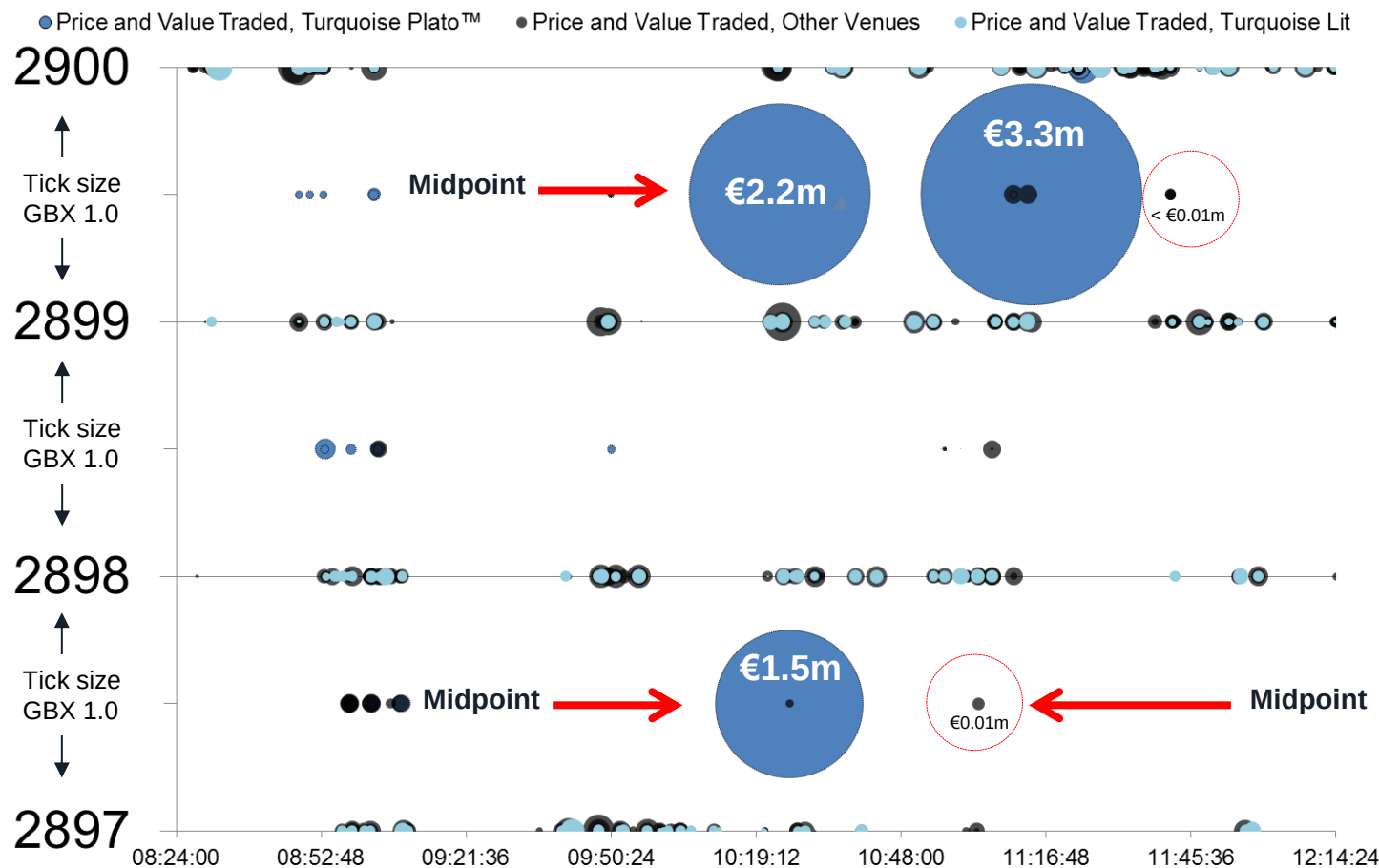


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Turquoise Plato Block Discovery™

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

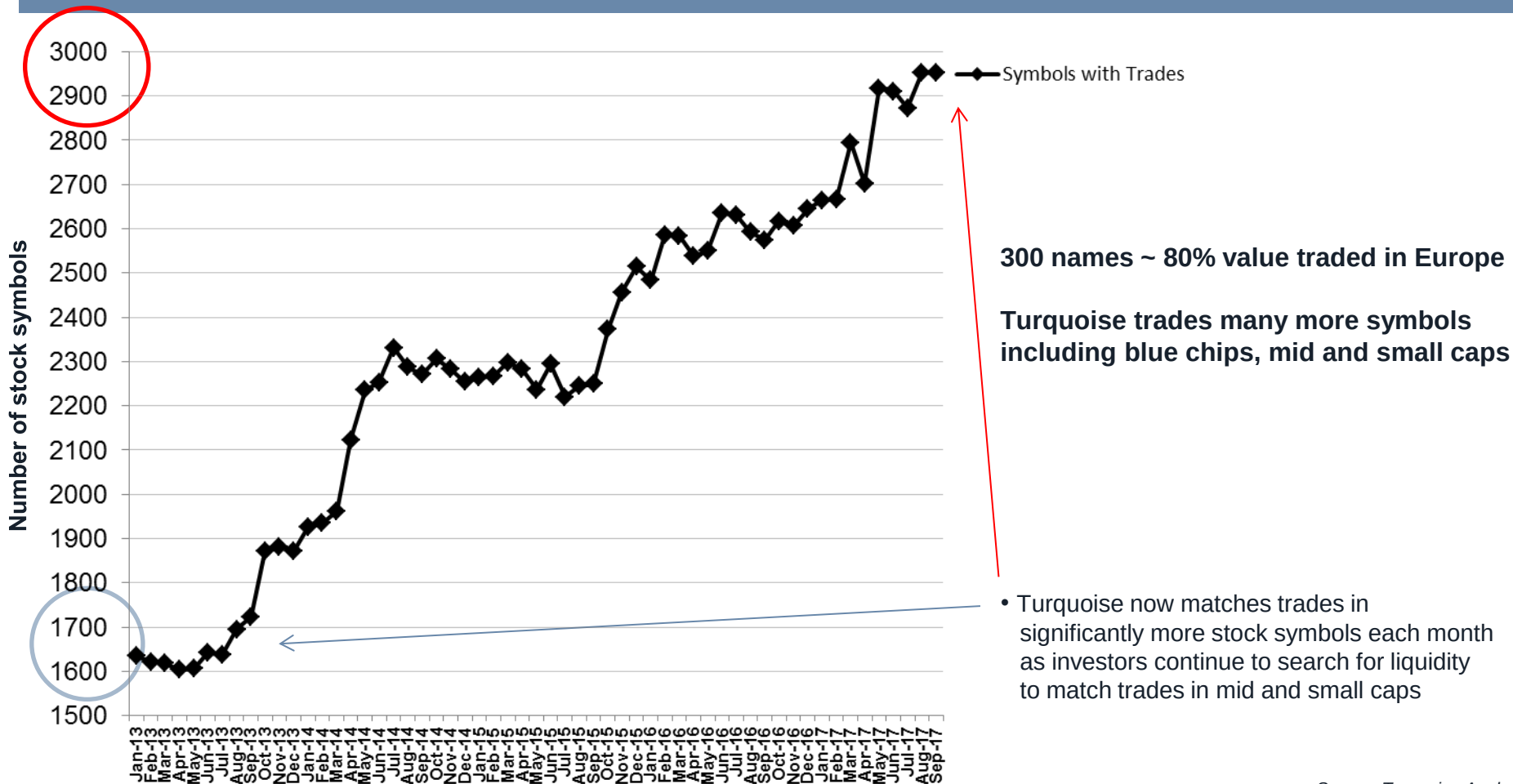
Midpoint dark trades enable price improvement by matching **inside the lit** orderbook **minimum tick size** price levels.

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



Source: Turquoise Analysis



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Turquoise Lit Auctions™

A MiFID II solution for matching in frequent lit auctions at mid-price of PBBO or limit prices

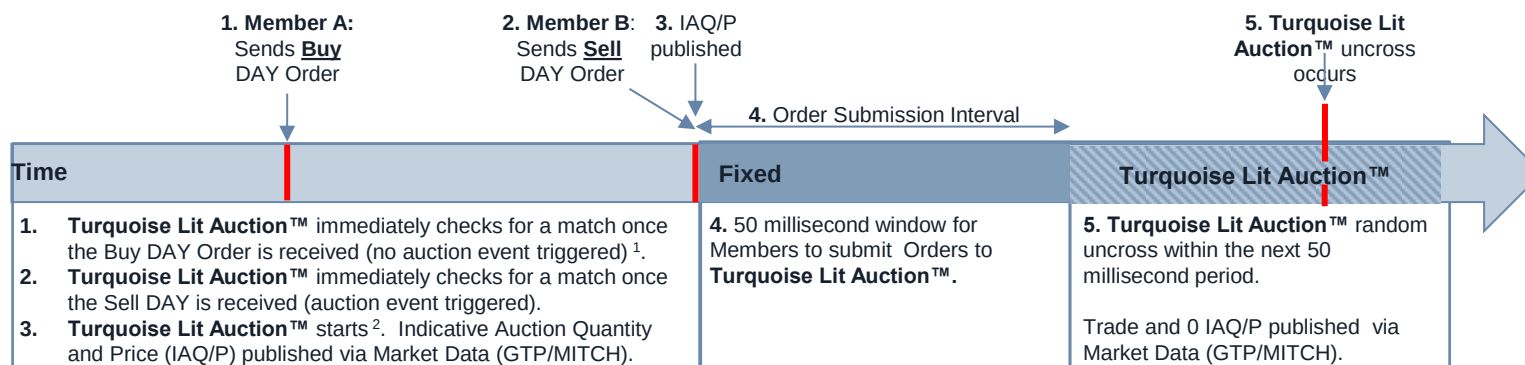
Turquoise Lit Auction™ - Summary of Key Features

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

*Member's can 'opt-in' to Member Priority matching. When a Member 'opts-in', once the **Turquoise Lit Auction™** price is determined, their orders will first match against their own contra orders, before attempting to match against other counterparties.

**All Limit Prices submitted (including Pegged orders) must follow ESMA tick size regime of RTS11

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



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.

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more efficient by design with Open Access & choice of CCP*

Global Investors

LSEG Data Centre



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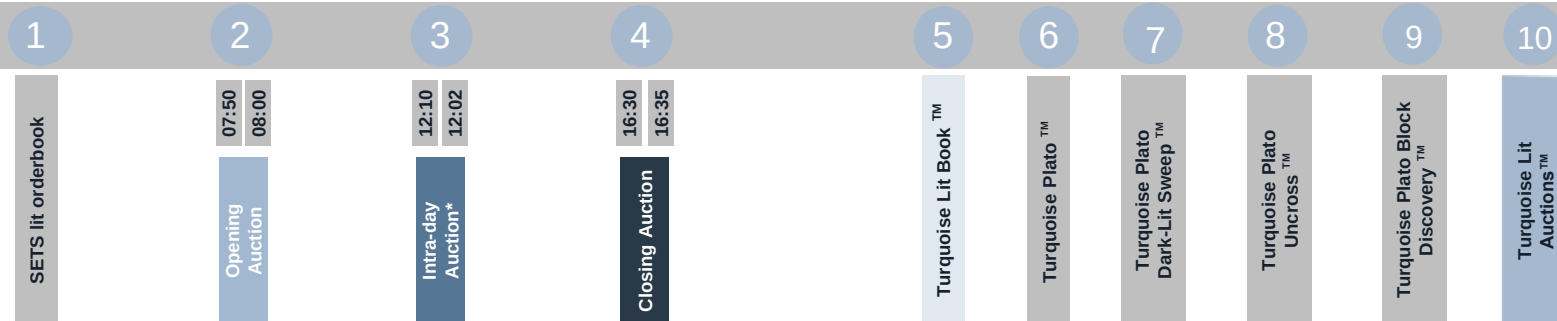


Turquoise

LSE choice of trading mechanisms

Turquoise choice of trading mechanisms

LSEG Order Book
Execution Channels
Single MIT Platform



EuroCCP LCH SIX

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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Q & A