Technical User Group

London

22 April 2020
Agenda

• Introduction

• London Stock Exchange Member Portal Enhancements

• London Stock Exchange - Release 9.5.3

• Group Ticker Plant - Release 1.4.4.9

• Turquoise - Release 9.5.3

• Other Project Updates and 2020 Roadmap

• IDEM – SOLA Release 15

• Borsa Italiana - Release 9.5 & EuroTLX consolidation

• Q&A – https://app.sli.do/event/6tueovrw
London Stock Exchange Member Portal Enhancements

Don Mucha
Manager, Technical Client Relationship Management & Global Market Access
Client Technology Services UK
Instrument Registration Process - Current

- Firm registers as a Market Maker with Membership Team

- Firm fills out a spreadsheet called the Registration Information Form (RIF) manually inputting into the spreadsheet the instruments in which they want to be a registered market maker.

- Firms prints out the RIF spreadsheet form and sign it.

- Firms scans the signed RIF form and emails to CMS Market Management team.
Instrument Registration Process - New

- Firm registers as a Market Maker with Membership Team.
- Firm enters registrations into Member Portal either via a bulk upload or web form.
- Member Portal performs validity and consistency checks before accepting and processing any applications.
- 17:30 UK time daily cut off time for requests to go-live the next day.
- Instrument will be loaded into Millennium system at the end of the day.
Customers can view instruments they are registered for along with the status. They can also add, reinstate and withdrawal registrations directly via Member Portal.

LSE Market Making - Registration Information

For queries relating to market making registrations, including registering in an instrument currently in a non-market making segment / sector.

Please email marketmanagement@lseg.com.

Any request for a withdrawal must be made to the Market Supervision department on +44 (0)20 7797 3666. An example where permission may be granted includes where a member firm is acting both as broker and market maker to an issuer that is subject to a bid situation or where the member firm has system problems in accordance with rules 1050 and 1500 in core rules.

<table>
<thead>
<tr>
<th>Member ID</th>
<th>Trader Group ID</th>
<th>ISIN</th>
<th>Status</th>
<th>Valid From</th>
<th>Valid To</th>
</tr>
</thead>
<tbody>
<tr>
<td>MEMBERID01 TRGROUP01</td>
<td>BMCS IE00B88FY913 BOOSTFTSE150YXS</td>
<td>ENIL ETCS</td>
<td>Withdrawn</td>
<td>09/03/2017</td>
<td></td>
</tr>
<tr>
<td>MEMBERID01 TRGROUP01</td>
<td>ZAAP IE00B88FY913 2X APPLE ETP</td>
<td>ETCM ETCD</td>
<td>Withdrawn</td>
<td>23/01/2018</td>
<td></td>
</tr>
<tr>
<td>MEMBERID01 TRGROUP02</td>
<td>ZAMZ IE00B88FY913 2X AMAZON ETP</td>
<td>ETCM ETCD</td>
<td>Withdrawn</td>
<td>23/01/2018</td>
<td></td>
</tr>
<tr>
<td>MEMBERID01 TRGROUP01</td>
<td>ZAPIT IE00B88FY913 2X CITI ETP</td>
<td>ETCM ETCD</td>
<td>Active</td>
<td>23/01/2018</td>
<td></td>
</tr>
<tr>
<td>MEMBERID01 TRGROUP02</td>
<td>ZCARM IE00B88FY913 2X SALESFOR ETP</td>
<td>ETCM ETCD</td>
<td>Active</td>
<td>23/01/2018</td>
<td></td>
</tr>
</tbody>
</table>
Customers can add instrument registrations by selecting the instrument from a list of active instruments. A list of active instruments is provided to Member Portal at the end of each day.
Firms can bulk upload Instrument Registrations by loading a CSV file into Member Portal. A result file will be produced for successful uploads and an error file will be produced with any errors.
London Stock Exchange – Release 9.5.3

Ethem Arabaci
Technical Client Relationship Management
Client Technology Services UK
Release 9.5.3 – Summary of changes

• Introduction of the new field “Offset” in FIX and Native New Order message
• Reserved field added to Native New Order Message
• Native New Order message length increase
• Data type change to the Exchange Market Size field in the XLON Instrument file
• RFQ enhancements and go-live of the Auto-Complete “Anonymous to All” Auction RFQ with Order Book Sweep model (available for ETPs in sizes below ESMA Large In Scale (LIS) thresholds only)
New Offset order type

- New “Offset” field valid with the At The Close (ATC) time in force only

- The order will be priced based on the user defined offset (in basis points) from the Dynamic Reference Price (DRP) when elected to the order book, at the beginning of the Closing Auction. The DRP at the start of the closing auction will usually be the last orderbook execution.

- Clients can also specify a limit price (“hard limit price”) and an offset. If both are specified, the more conservative of the hard limit price and the calculated price (DRP + offset) will be used

- If the calculated price (DRP + offset) results in a price which does not conform to the minimum price increment for that instrument, the price will be rounded conservatively to a valid tick
# Offset order – Interface changes

## FIX 5.0 trading

<table>
<thead>
<tr>
<th>Message</th>
<th>Tag</th>
</tr>
</thead>
<tbody>
<tr>
<td>New Order</td>
<td>OrdType(40) – new value ‘F’ (Offset)</td>
</tr>
<tr>
<td>New Order</td>
<td>Offset(27018) – new tag</td>
</tr>
<tr>
<td>Order Cancel/Request</td>
<td>Offset(27018) – new tag</td>
</tr>
<tr>
<td>Execution Report</td>
<td>Offset(27018) – new tag</td>
</tr>
</tbody>
</table>

## Native

<table>
<thead>
<tr>
<th>Message</th>
<th>Field</th>
</tr>
</thead>
<tbody>
<tr>
<td>New Order</td>
<td>Order Sub Type – new value ‘55’ (Offset)</td>
</tr>
<tr>
<td>New Order (message length increased)</td>
<td>Offset – new field</td>
</tr>
<tr>
<td>New Order (message length increased)</td>
<td>Reserved field – new field</td>
</tr>
<tr>
<td>Order Cancel/Request</td>
<td>Offset – new field (amended existing Reserved field)</td>
</tr>
</tbody>
</table>

## Drop Copy

<table>
<thead>
<tr>
<th>Message</th>
<th>Tag</th>
</tr>
</thead>
<tbody>
<tr>
<td>Execution Report</td>
<td>Offset(27018) – new tag</td>
</tr>
</tbody>
</table>
RFQ enhancements

- Ability for the requestor to make all quotes public at any time within the Request For Quote (RFQ) session

- Notification to Market Makers that their RFQ quotes become executable, and therefore published to the market, if below the ESMA Large In Scale (LIS) threshold for the instrument

- RFQ Quotes will also be published for RFQ cancellation and expiry if below the ESMA LIS threshold for the instrument

- Go-live of the Auto-Complete “Anonymous to All” Auction RFQ with Order Book Sweep model (available for ETPs in sizes below ESMA Large In Scale (LIS) thresholds only)
## RFQ models summary

<table>
<thead>
<tr>
<th>Model</th>
<th>Manual Winner Takes All</th>
<th>Auto-Complete Winner Takes All</th>
<th>Auto-Complete with Order Book Sweep</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Instrument type</strong></td>
<td>Equities, DRs &amp; ETPs</td>
<td>Equities, DRs &amp; ETPs (above LIS RFQs)</td>
<td>ETPs (below LIS RFQs)</td>
</tr>
<tr>
<td><strong>Anonymity</strong></td>
<td>Anonymous or named</td>
<td>Equities, DRs: Anonymous or named ETPs: Named</td>
<td>Anonymous</td>
</tr>
<tr>
<td><strong>Market Maker Quotes</strong></td>
<td>RFQ Quotes are sent to the Requester: Best Execution or Select and Match models</td>
<td>RFQ quotes are NOT sent to the requester: execution against the best quote</td>
<td>RFQ quotes are NOT sent to the requester: execution against the best quote(s) and/or order(s)</td>
</tr>
<tr>
<td><strong>Post Trade – Trade Type</strong></td>
<td>RFQ Trade</td>
<td>RFQ Trade</td>
<td>RFQ Trade if the RFQ executed against a Quote, and Regular Trade if executed against an order</td>
</tr>
<tr>
<td><strong>Post Trade – Quote publication</strong></td>
<td>Opened Quotes published if trade is below LIS</td>
<td>Equities, DRs: Opened Quotes published if trade is below LIS ETPs: Opened Quotes not published as trade above LIS</td>
<td>Opened Quotes published as trade is below LIS</td>
</tr>
</tbody>
</table>
Release 9.5.3 Go-Live Readiness

• Certification is mandatory for all Native software

• Certification test is required for any other software which is modified in order to support the release.

• All application certifications must be completed prior to production go-live.

• Sign-off that all trading and market data software has been tested is required before production go-live.
# Release 9.5.3 Timeline

<table>
<thead>
<tr>
<th>Date</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>31 March 2020</td>
<td>Technical Specifications released</td>
</tr>
<tr>
<td>22 April 2020</td>
<td>CDS go-live</td>
</tr>
<tr>
<td>6 July 2020</td>
<td>Production go-live*</td>
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* Dates are subject to internal testing and customer readiness. Final dates will be confirmed in due course.
Group Ticker Plant – Release 1.4.4.9

Ethem Arabaci
Technical Client Relationship Management
Client Technology Services UK
Release 1.4.4.9 – Summary of changes

1. New field ‘Side’ added to Trade Summary Message

2. New mechanism of Order Book Recovery
Trade Summary Message – ‘Side’ Field

Purpose
Provides an indication of whether the original visible passive side trade was a Buy or a Sell on a multi or single trade event.

Change / Impact
➢ New field ‘Side’ added to Trade Summary Message
➢ Message Length increased
➢ Requires CDS testing and customer sign off with your TAM

<table>
<thead>
<tr>
<th>Side</th>
<th>61</th>
<th>1</th>
<th>Byte</th>
</tr>
</thead>
<tbody>
<tr>
<td>The side of the visible passive order(s) that triggered the trade summary.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Value</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Space</td>
<td>No Side (only Hidden quantity executed)</td>
</tr>
<tr>
<td>B</td>
<td>Buy Side</td>
</tr>
<tr>
<td>S</td>
<td>Sell Side</td>
</tr>
</tbody>
</table>

GTP 002 – Technical Guide Issue 19.11.1
New Mechanism of Order Book Recovery

**Purpose**
Allows customers to obtain the current Trading Status from the Replay and Recovery Complete (0x83) message for every instrument, including the ones that have no active orders on the order book at the time of the Recovery Request.

**Change / Impact**
- Impacts recovery of Order Book messages (Recovery Type = 1) for the Level 1 and Level 2 Order Book services
- Order Book Clear (0x79) message returned for every instrument requested regardless if displayable active orders exist on the Instrument Order Book
- Order Book Clear message will be published before publishing the Orders to serve a Recovery request for Order Books initiated, regardless of whether the request is at the Instrument Level, Segment Level, or Channel Level.
New GTP Documents and Release Notes are available on the GTP website.

https://www.lseg.com/areas-expertise/technology/group-technology/group-ticker-plant
# GTP Release 1.4.4.9 Timeline

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Release 9.5.3 – Summary of changes

Turquoise Plato Lit Auctions™ Order Book

• Re-introduction of Time in Force (TIF) Good for Auction (GFA)
• New pegged order matching logic

Turquoise Plato™ (inc. Turquoise Plato Block Discovery™) Order Book

• Introduction of a new matching phase Trading At Last (TAL)

Turquoise Lit™, Turquoise Plato Lit Auctions™ and Turquoise NYLON™ Cash Order Book

• Amendment to order expiry timing
• Orders with a TIF of GFA will be reintroduced for the Turquoise Plato Lit Auctions™ Order Book.

• GFA Orders will only be accepted if upon entry the auction generates an Indicative Auction Price and Quantity is greater than 0 (zero), else the order will be expired immediately.

• A new matching logic will allow Pegged Orders to be considered at their Limit Price, when they are not marketable at the midpoint of the Primary Market Best Bid and Offer.
Turquoise Plato™ - Trade at Last (TAL)

- Post-close matching phase using fixed Primary Market Closing Price with no pre-trade transparency
- Easy adoption through simple extension of Turquoise Plato™ and Turquoise Plato Block Discovery™
- Firm orders and ‘conditional’ order functionality offered

Existing functionality:

Turquoise Plato™ and Turquoise Plato Block Discovery™

Combination of Reference Price Waiver (RPW) and Large In Scale (LIS) Waiver

PBBO Midpoint used for matching up to 16:30

Time: 8:00

16:30 16:35+
Primary Auction End Time

TAL Phase:
RPW and LIS matching resumes after Primary closing auction using Primary Market Closing Price

Extended session:
Execution Reports sent to
advise of firm-up request or to
confirm trade at the Primary
Market Closing Price

Execution Reports sent to confirm expiry / cancellation of all unexecuted Orders & Block Indications

Key attributes
- Trade At Last (TAL) phase leverages existing functionality and attributes of Turquoise Plato™ and Turquoise Plato Block Discovery™
- ‘Fixed price’ matching phase using Primary Market Closing Price
- Firm Orders and Block Indications (‘conditionals’) permitted as per conventional model
- Existing Reputational Scoring methodology utilised
- Same instrument universe as the Turquoise Plato™ Order Book

Note: This proposal is subject to regulatory ‘non-objection’
Events are based on timings for LSE (as a Primary Market) and UK time
• Following the introduction of the new TAL phase within the Turquoise Plato™ Order Book, all Orders will now expire at the close of the trading session.

• For Example: Unexecuted Orders will now expire from the Turquoise Lit™ and Turquoise Plato Lit Auctions™ Order Books and Turquoise NYLON™ Cash Order Book at 16:30:01, instead of 16:30:02 (UK Time).
## Release 9.5.3 timelines

<table>
<thead>
<tr>
<th>Release 9.5.3</th>
<th>Dates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Updated Technical Specifications</td>
<td>Available now</td>
</tr>
<tr>
<td>CDS deployment</td>
<td>22 April 2020 *</td>
</tr>
<tr>
<td>Production go-live</td>
<td>13 July 2020 *</td>
</tr>
</tbody>
</table>

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Other Projects Updates and 2020 Roadmap

Don Mucha
Manager, Technical Client Relationship Management & Global Market Access
Client Technology Services UK
TRADEcho – 3.5

- This release will be made available in CDS in Q2 2020 with production expected in early Q3 2020.

- No mandatory customer changes for this release

- Bug fixes and changes include:
  - Inactive Instruments excluded from Instrument Mapping Logic
  - CountryOfIssue is now optional on quotes
  - Restoring the EOD Summary trade files – this can be requested in the Portal
No protocol changes being introduced as part of this release.

**Implied-in prices for butterfly spreads** – The deployment of SOLA14B will allow the enablement of implied-in prices in butterfly spreads. Implied-in prices are implicit orders calculated based on the explicit orders available in the book of the legs composing the butterfly spread. Implied-out orders will remain disabled on butterfly spreads. There will be no impacts on implied-in and implied-out prices for calendar spreads, condor spreads and packs.

<table>
<thead>
<tr>
<th>Date</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>21 May 2020</td>
<td>CurveGlobal Markets SOLA 14B CDS Go-Live</td>
</tr>
<tr>
<td>15 June 2020</td>
<td>CurveGlobal Markets SOLA 14B Production Go-Live*</td>
</tr>
</tbody>
</table>

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## 2020 Roadmap

<table>
<thead>
<tr>
<th>Date</th>
<th>Market / Product</th>
<th>Release / Environment</th>
</tr>
</thead>
<tbody>
<tr>
<td>22 April 2020</td>
<td>London Stock Exchange</td>
<td>9.5.3 CDS</td>
</tr>
<tr>
<td></td>
<td>Turquoise</td>
<td>9.5.3 CDS</td>
</tr>
<tr>
<td></td>
<td>Group Ticker Plant</td>
<td>1.4.4.9 CDS</td>
</tr>
<tr>
<td>Q2 2020</td>
<td>TRADEcho</td>
<td>3.5 CDS</td>
</tr>
<tr>
<td>21 May 2020</td>
<td>CurveGlobal Markets</td>
<td>14B CDS</td>
</tr>
<tr>
<td>15 June 2020</td>
<td>CurveGlobal Markets</td>
<td>14B Production*</td>
</tr>
<tr>
<td>6 July 2020</td>
<td>London Stock Exchange</td>
<td>9.5.3 Production*</td>
</tr>
<tr>
<td></td>
<td>Group Ticker Plant</td>
<td>1.4.4.9 Production*</td>
</tr>
<tr>
<td>13 July 2020</td>
<td>Turquoise</td>
<td>9.5.3 Production*</td>
</tr>
<tr>
<td>Early Q3 2020</td>
<td>TRADEcho</td>
<td>3.5 Production*</td>
</tr>
</tbody>
</table>

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SOLA Platform Update

Flavio Ravotto
Manager, Customer Relationship Management Technology
Client Technology Services Italy
IDEM – SOLA 15

- Technical Specifications: June 2020

- CDS availability: end of Q2/beginning of Q3 2020

- **Mandatory Conformance Test before the go-live**

- **Go-Live (dates TBC) by the end of September 2020** (2 CDRs, one out of the 2 mandatory, before the go-live)

- Introduction of **CPI (Client Price Improvement)** facility to enter client orders either closed internally (vs. order on own account) or on the public orderbook (according to price priority)
IDE M – SOLA Hardware Refresh

— In Q4 2020, the Hardware on which the SOLA platform runs (for IDEM) will be replaced

— No changes to SAIL and FIX Trading/Drop Copy Protocols will happen together with the Hardware Refresh

— No changes to SAIL/FIX Trading/Drop Copy Gateways IP and ports will happen together with the Hardware Refresh

— One of the key objectives of the project is to provide customers with a significant improvement of performances and to support new services

— Go-Live by the end of November 2020

— 2 Customer Dress Rehearsals will be held before the go-live
  – Participation to at least 1 CDR is to be considered mandatory
Millennium IT – Release 9.5 & EuroTLX

Consolidation

Flavio Ravotto
Manager, Customer Relationship Management Technology
Client Technology Services Italy
Timeline

• The new **MIT Release 9.5** is planned to **Go-Live on Saturday 20 June 2020** (1st Trading Day, **Monday 22 June 2020**)

• Documentation has been published on the Borsa Italiana website since 9 March 2020

• CDS available since 25 March 2020

• **Customer Dress Rehearsal:**
  — 1st CDR planned for 30 May 2020
  — 2nd CDR planned for 13 June 2020
  — Participation to at least 1 CDR is to be considered mandatory
EuroTLX Consolidation (1)

- Together with MIT Release 9.5, **EuroTLX will be moved to the MIT instance currently in use for Borsa Italiana**, this implies:
  - the same Native/FIX trading Gateways and Drop Copy/Post Trade Gateways currently in use for Borsa Italiana will also be used for EuroTLX
  - **Comp IDs will not change**, just GW IP address and port will change
  - Connections to the current dedicated EuroTLX gateways will become unavailable
  - the default password of all EuroTLX Comp IDs will be reset to the default one, **bit_1234**
  - the Instrument ID for all EuroTLX instruments will change
EuroTLX Consolidation (2)

- EuroTLX Consolidation has been applied in CDS since 8 April 2020

- No Changes will be applied to GTP configuration

- No Changes will be applied to Reference Data Files (that will be updated with new Instrument ID)
  
  — ISINs will not change

- Mapping between current Instrument IDs and new Instrument IDs will be provided prior the go-live (as done for CDS)
Functional Changes

• Changes to RFQ mechanism will be introduced, in particular
  — Deferred publication of RFQ trades
  — Auction RFQ

  **Note:** both changes will not be activated at the go-live but at a later stage, confirmation will be provided in due course

• Changes to GTP and GTP Lite
  — Trade Summary Message (indication of passive order side, plus – for multiple execution – cumulative quantity and “far” executed price) on MIT markets
  — Activation of Hidden Execution Indicator for MIT markets
  — Dissemination of end of previous trading day Open Interest in the morning at Market Open for IDEM Market
Client Technology Services Italy

— **Customer Relationship Management Technology**
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  [Clients-Services@borsaitaliana.it](mailto:Clients-Services@borsaitaliana.it)

— **Service-Desk** (customer support desk)
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  [service-desk@borsaitaliana.it](mailto:service-desk@borsaitaliana.it)

— **Market Access** (configurations, enablements, conformance tests, etc.)
  +39 02 72 42 6 668
  [market-access@borsaitaliana.it](mailto:market-access@borsaitaliana.it)
Please submit any questions via the SLIDO link provided in your invitation

https://app.sli.do/event/6tueovrw/live/questions