



Technical User Group

Paris

6 March 2019

Turquoise “Hard” Brexit Contingency Plans

Turquoise

Turquoise has established a Dutch entity to operate a MTF, Turquoise Global Holdings Europe B.V. (“TGHE”). This will operate in addition to Turquoise Global Holdings Limited (“TGHL”).

TGHE is pending authorisation from the Autoriteit Financiële Markten (AFM) to operate a multilateral trading facility (MTF) in the Netherlands. This will allow us to offer further choice to investors and members seeking our MTF services throughout the EU and from relevant overseas jurisdictions.

TGHE Production Checklist



Prior to production, customers must complete all appropriate steps where necessary:

- Complete and submit TGHE membership applications
- Complete software certification or self-certification confirmation
- Request TGHE production technical configuration via Member Portal
- Complete clearing set up by contacting the relevant CCP or GCM
- Attend at least 1 mandatory customer dress rehearsal
- Load relevant short/long code mapping to TGHE on Member Portal



Timeline

- Customer Dress Rehearsal 1 – 16 February 2019 (Complete)
- Customer Dress Rehearsal 2 – 2 March 2019 (Complete)
- Customer Dress Rehearsal 3 – 16 March 2019
- Production Go-Live – 1 April 2019*

***The commencement of TGHE's operations is subject to a final decision of both TGHE and Turquoise Global Holdings Limited ("TGHL"). The timing and outcome of that decision will depend on considerations related to the various implementations of Brexit. This could include a 'no deal Brexit' as well as other scenarios that may arise such as a change to the date that the UK is due to leave the EU, other transitional arrangements that may be agreed, or equivalence decisions that may be granted by authorities.**



TRADEcho Brexit Plans

TRADEcho Future State

- TRADEcho will continue to operate a UK trade reporting service for the combined EU27 & UK instrument universe.
- In addition, TRADEcho established a EU APA service in based Amsterdam; TRADEcho applied for approval for the service by the Autoriteit Financiële Markten (AFM).
- Customers will be granted access to the EU APA service in addition to the UK APA service under their current agreements.
- Customers will indicate which APA they are reporting to via the incoming message or within the APA preference section in the TRADEcho Portal.
- SRR will remain as a single entity supporting both APAs but will introduce new rules to distinguish reporting obligations in the relevant jurisdiction of the submitter and its counterparty.
- London Stock Exchange will remain a UK Regulated Market, on Exchange trade reports will carry the relevant Regulated Market MIC (XLON) or MTF (XLOM or AIMX) as both venue or execution and venue of publication. They may only be submitted to the UK service.

APA Changes

- New FIX tag “Target APA” will be introduced in the FIX trade report and SI Quote messages so customers can indicate the APA they want to report:
 - ECHO – TRADEcho UK APA (default)
 - ECEU – TRADEcho EU APA
- TargetAPA will no longer support ‘XLON’. Any Off-Book On-Exchange trade reports can only be made to ‘ECHO’ and will be published with the relevant On-Exchange MIC.
- ECEU MIC code should not be used until EU APA goes live.
- Venue of Publication field being added to Group Ticker Plant (GTP) to indicated the APA published through:
 - ECHO – For UK APA
 - ECEU – For EU APA
 - The MIC corresponding to the relevant venue where the trade report is On Exchange / other MTF or OTF

SRR Changes

- The SRR has been enhanced to distinguish between UK and EU27 investment firms and systematic internalisers.
- These values will be available in the revised rules table as part of the assessment of reporting obligation
- New SRR rules logic being introduced to derive a firms' status
- New FIX tag "Target APA" will be introduced in the FIX trade report and SI Quote messages so customers can indicate the APA they want to report:
 - ECHO – TRADEcho UK APA
 - ECEU – TRADEcho EU APA
 - BOTC (Bats (CBOE) UK)
 - TREA (Tradeweb UK)
 - TWEA (Tradeweb EU)



SRR Changes – External APA Routing

- Customers should contact CBOE to be set up with necessary CompIDs for access to CBOE European and UK based APA.
- Customers will no longer be able to submit trade reports to the CBOE UK and EU APA using the same TRADEcho user. Separate users will need to be enabled to access each APA.
- Any new User configuration should be completed in the TRADEcho Portal prior to TRADEcho Brexit production go-live.

SRR Rule Migration

- TRADEcho will be migrating existing ruleset to the new ruleset.
- We do not require firms to accept the new rules within the portal. They will be automatically active on go-live.
- Firms should ensure they thoroughly understand and test the new rules in the CDS environment from 11 March 2019.
- Changes to the SRR rules can be made from 06:00 on go-live.

SI Quoting Changes

- New FIX tag “Target APA” will be introduced in the FIX trade report and SI Quote messages so customers can indicate the APA they want to report:
 - ECHO – TRADEcho UK APA (default)
 - ECEU – TRADEcho EU APA
- New Gateways being introduced for SI Quoting.
 - **Customers will no longer be able to use the same CompID for trade reporting and SI Quoting.**
 - SI Quotes sent via the Trade Reporting gateways will be rejected.
- TargetAPA will be added to the quoting website.

SI Registry Changes

- SmartStream Reference Data Utility (RDU) file formats are being updated with two new fields to account for Brexit to distinguish between the UK SI Regime and EU SI Regime.
- All SIs are required to resubmit their SI status for all entries prior to Brexit.
- Timeline:
 - 16 March – new file format goes live in production
 - 30 March – Deadline for submitting SI status with new fields.
- Changes are due to be implemented regardless of any Brexit delay and firms must comply by **30 March 2019**.

TRADEcho Checklist

- Complete testing of new functionality in the TRADEcho CDS environment
- Complete mandatory software certification testing for any directly connected software
- Attend mandatory Customer Dress Rehearsal on 16 March 2019
- Ensure new CompIDs created for SI Quoting (SI Only)
- Submit SI Status with new fields before 30 March 2019 (SI Only)



Timeline – Hard Brexit Contingency Plan

The timeline below sets out the expected timeframes to support a ‘no deal’ Brexit scenario (effective 29 March 2019).

Dates below are subject to regulatory approval and dependent on the outcome of Brexit negotiations and any agreed transitional agreements.

- 3 December 2018 – TRADEcho Brexit Phase 1 release (APA changes)
- 11 March 2019 - TRADEcho Brexit Phase 2 release (SRR changes)
- 16 March 2019 – Mandatory Customer Dress Rehearsal
- 1 April 2019 – Go-live (tbc)



Post-Brexit Transaction Reporting for Third Country Member Firms

Transaction Reporting Overview

- Third Country Member Firms should submit transaction reports for all on-book and off-book trade executed on trading venue for submission to the relevant National Competent Authority (NCA).
- UK Trading venues (London Stock Exchange, Turquoise and London Stock Exchange Derivatives) have partnered with UnaVista's ARM.
- Third Country Members currently using UnaVista for their EU MiFIR transaction reporting should engage with their Unavista contact to discuss additional details around Venue Reporting including connections and any other details.
- Third Country Members that do not use UnaVista will be required to submit their transaction reports to the Trading Venues via sFTP.
- Third Country Member Firms' transaction reporting files will be collected by UnaVista ARM and validated against ESMA Transaction Reporting Validation Rules before submission to the relevant NCA.

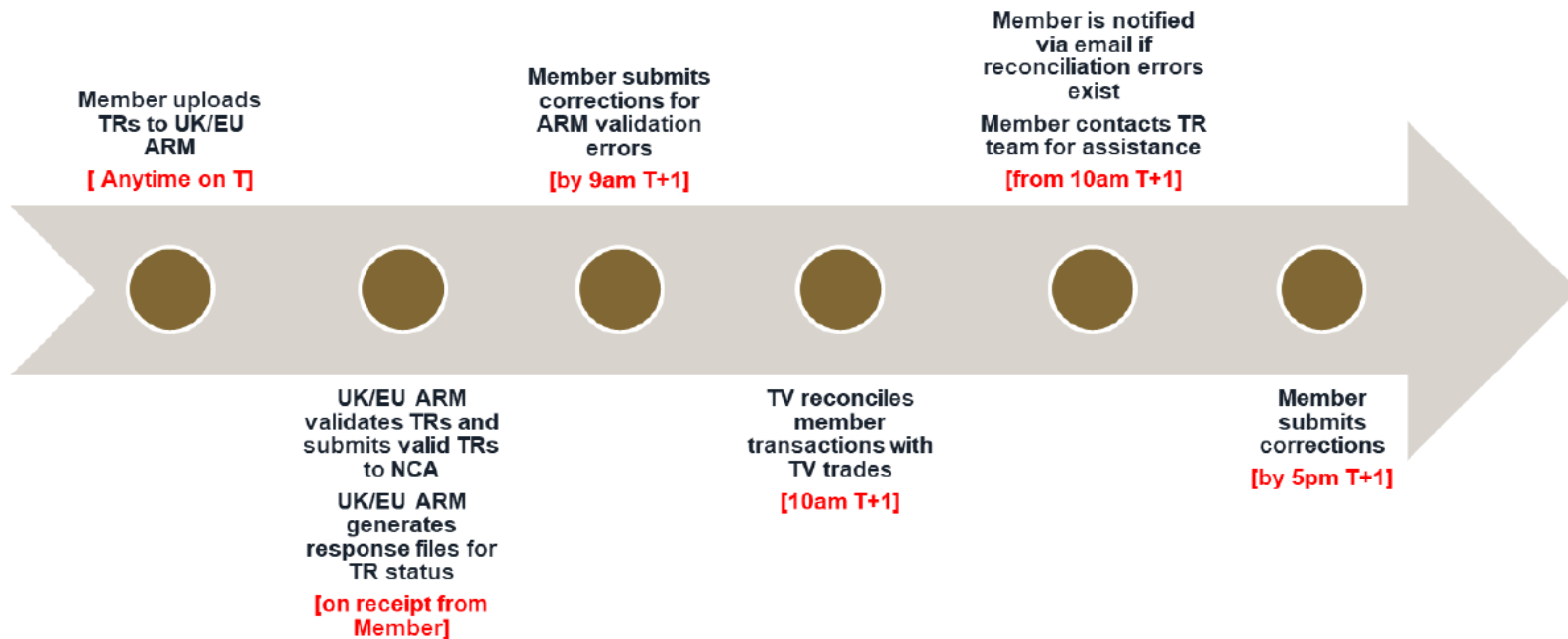
Transaction Reporting Process

- ESMA validation errors and NCA rejection errors will be generated by the ARM.
- Third Country Member Firms are expected to submit transaction reports for all trades executed on T and resolve any ARM validation errors by 9am London local time, on T + 1
- Trading Venues will in addition reconcile report submissions in the ARM against its own internal records.
- Any discrepancies against the trading venue's own records must be corrected by 5pm London local time on T+ 1



Transaction Reporting Process

London time specified





London Stock Exchange - ETF & ETC/ETN Market Structure Changes

ETF & ETC/ETN Market Structure Changes

- Opening auction price monitoring extension changes
 - Additional Price Monitoring Extensions (PME) introduced with staggered Price Monitoring Percentage to offer more time for investors to react to the potential significant price change and reduce the chance of trades occurring significantly far away from the fair value
 - CDS since 22 February 2019 / Production go-live Monday 8 April 2019
- Introduction of ETCs/ETNs - Euroclear Bank Settlement Trading Service
 - This is an extension of our ETF Euroclear Bank Settlement Trading Service. Addition of ETCs/ETNs
 - CDS go-live 8 March 2019 / Production go-live Monday 15 April 2019

Opening Auction Price Monitoring Extension – Current Configuration

- A price monitoring extension (PME) is triggered when at the end of the call period the indicative auction match price is greater than a configured tolerance away from the reference price
- Currently up to a maximum of 2 PMEs for all ETPs
- Same price monitoring percentage triggering each PME



Opening Auction Price Monitoring Extension – New Configuration

New production configuration for the opening auction

- Up to a maximum of 4 to 5 PMEs depending on the sector
- Different price monitoring percentage to trigger each extension
- For example, sector ETFL will have a maximum of 5 opening auction PMEs – initial PME 2%, 2nd PME 5%, 3rd PME 10%, 4th PME 20%, 5th PME 50%
- Change applicable to all ETF & ETC/ETN trading segments on SETS and ETFS - Euroclear Bank settlement trading services

Opening Auction Price Monitoring Extension – Functionality Changes

- No additional market data message introduced
- No change in message structure
- Session transition for the additional PMEs will be advertised as per today:
 - GTP Instrument Status
 - MITCH Symbol Status

Introduction of ETCs/ETNs - Euroclear Bank Settlement Trading Service

- Addition of ETCs/ETNs to current ETFs - Euroclear Bank settlement trading service
- Trading service renamed to ETPs - Euroclear Bank settlement
- Clients currently enabled to trade on ETFs - Euroclear Bank settlement trading service will have access to the new products
- 3 new segments
- 21 new sectors

Turquoise Next Release

Turquoise Next Release

- Introduction of the GTP Trade Summary Message – A GTP Trade Summary message (0x57) will be disseminated before any individual Turquoise Lit™ order book updates are published
- Preferred clearing model introducing LCH SA as a non-interoperable CCP to clear Euronext Securities (excluding Ireland) traded in the Turquoise Lit™, Turquoise Plato Lit Auctions™, Turquoise Plato™ order books (including Turquoise Plato Block Discovery™)
- Both changes available on CDS
- GTP Trade Summary will be introduced in production on Monday 11 March 2019
- Preferred clearing will be introduced in production on Monday 25 March 2019



2019 Timeline

2019 Timeline

Monday 11 March	Introduction of the GTP Trade Summary Message on Turquoise
Monday 25 March	Introduction of preferred clearing on Turquoise
Monday 1 April	Turquoise Europe production go-live (TBC)
Monday 1 April	TRADEcho Brexit release go-live (TBC)
Monday 8 April	Opening auction price monitoring extension changes
Monday 15 April	Introduction of ETCs/ETNs - Euroclear Bank Settlement Trading Service
21 June	LSEDM withdraw of Equity Derivatives contracts, trading in CurveGlobal contracts is unaffected
June	SOLA 13 go-live
Q4	Introduction of HSVF multicast on SOLA



SOLA Platform Update

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Throttling mechanism

- Trading users on SOLA platform are configured with a maximum number of tps (transactions per second) allowed, with the previous versions of SOLA platform transactions which exceeded the maximum number of tps allowed were queued and processed the following second available (“park & queue”)
- With SOLA 12 (live in June 2018) supports a new throttling mechanism which implies the rejection of messages which exceed the maximum number of tps allowed
- **From 1 July 2019, the “park & queue” mode will no longer be available on SOLA platform, starting from that date all IDEM users must be configured according to the “reject” mode**
- All trading applications (proprietary or provided by a Vendor) must be compliant with the new mechanism by that date.
- The migration is in progress, all customers not migrated to the new throttling mechanism yet should contact the **Client Technology Services Italy** Team (clients-services@borsaitaliana.it) to schedule the change of the configuration as soon as possible

New HSVF Multicast Service (1)

- Market Data Feed for IDEM market is currently available:
 - via HSVF (native feed of SOLA platform)
 - GTP/GTP Lite service (service provided by LSEG)
- Currently, HSVF service is provided via TCP protocol only
- In order to improve performances, we are introducing a new HSVF service based on UDP protocol that will be provided in parallel to the services already available (that will not be decommissioned)
- Technical specifications and dates of availability of the new HSVF UDP service will be provided in due course



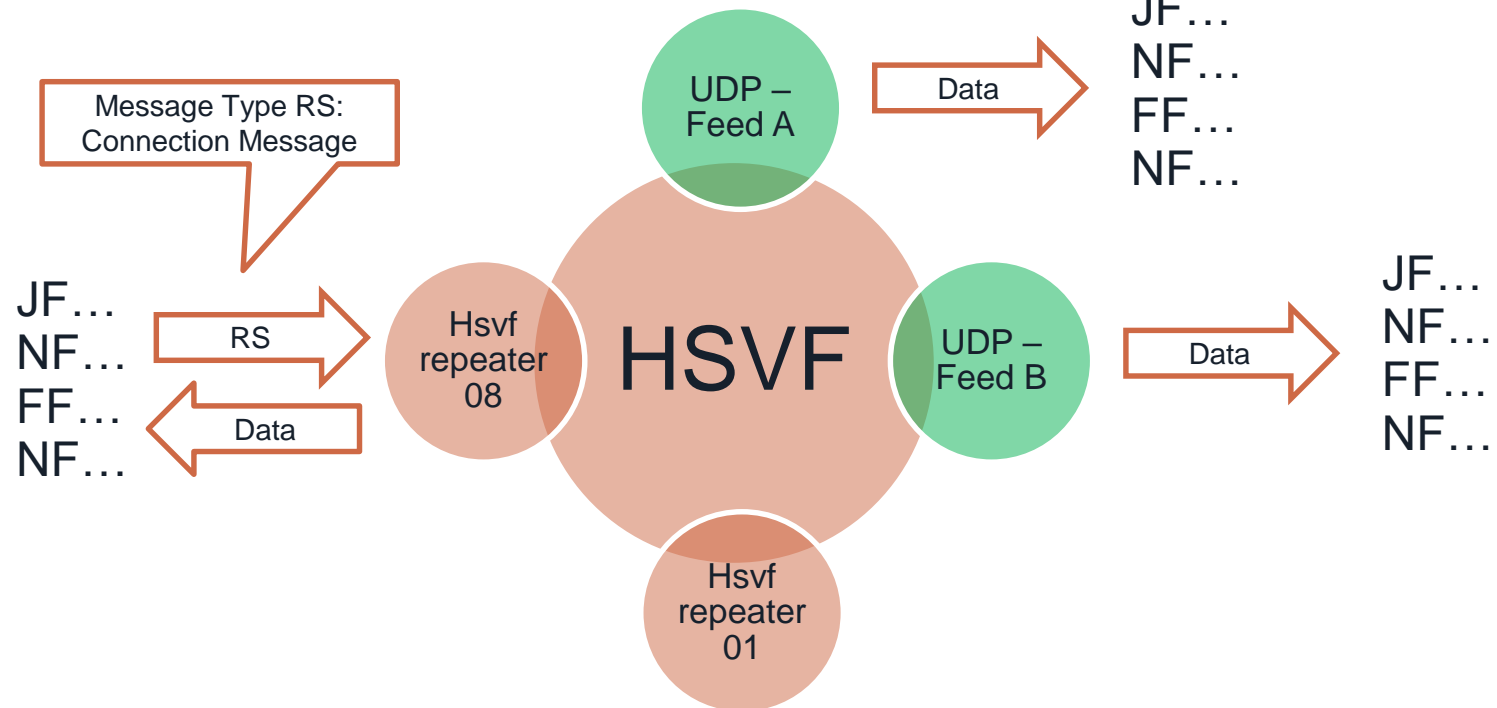
New HSVF Multicast Service (2)

- HSVF UDP service will disseminate all the existing HSVF messages on UDP protocol (with no possibility to subscribe a subset of messages), and will have a recovery mechanism (TCP based). Such recovery mechanism will be implemented using the existing HSVF (TCP) feed
- The new service will have two different UDP Feeds (A and B feed) for resiliency purposes. The recovery mechanism will give customers the possibility to retrieve missed message from the real time channel
- Customers will subscribe to a new Multicast group dedicated to the service to receive the feed
- The existing HSVF (TCP) service will remain unchanged, customers not interested in the UDP service are not supposed to implement any change to the existing set up

New HSVF Multicast Service (3)

HSVF TCP Recovery Service

HSVF UDP Real Time Feed





Sponsored Access

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Sponsored Access

Sponsored User

a non-Member Firm that
trades on our markets
through a Member Firm
(its *Broker*)

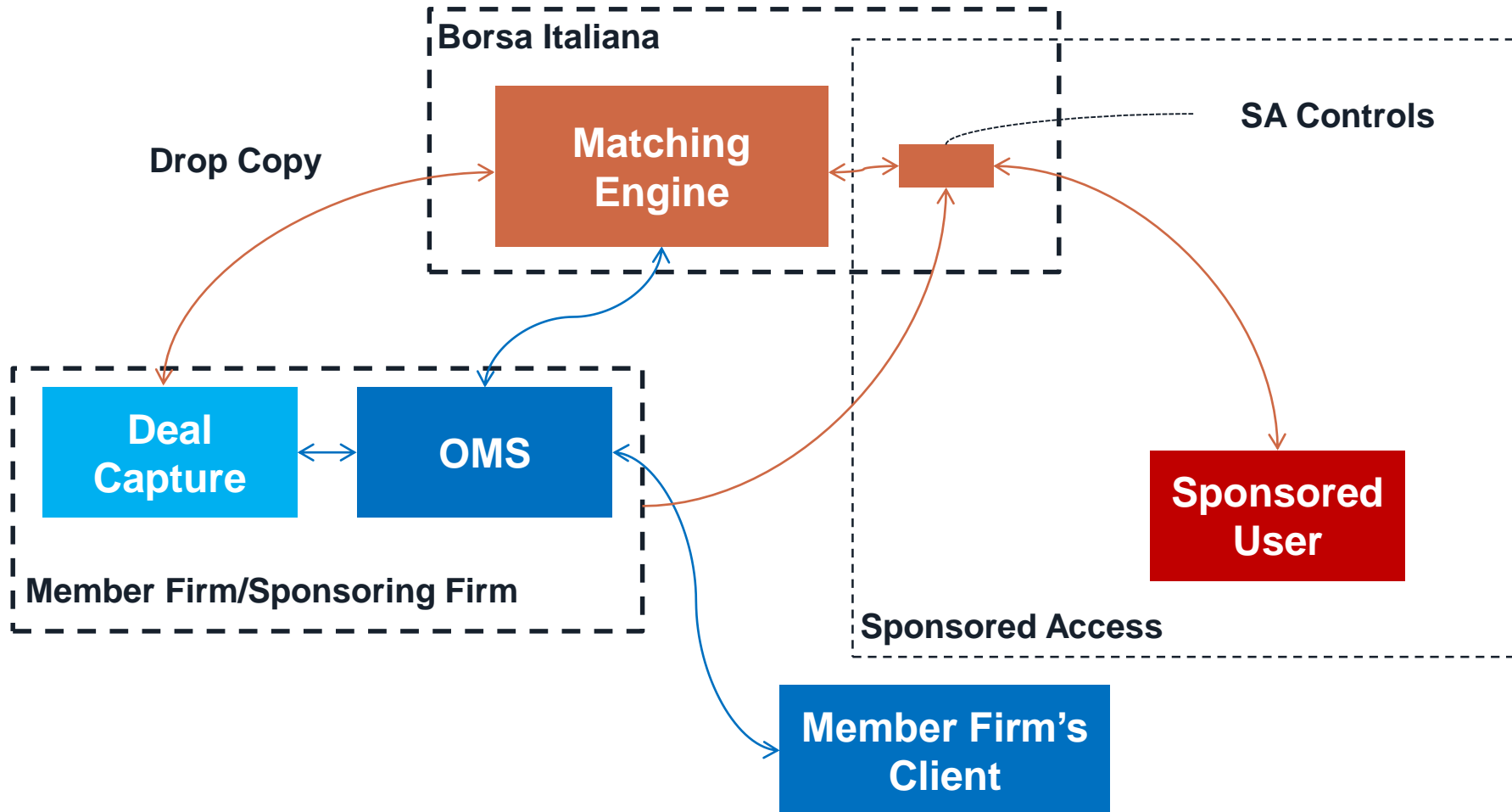
Sponsoring Firm

a Member Firm through
which a Sponsored User
trades
(the *Broker*)

The Sponsored Access allows **Sponsored Users** to trade under **Sponsoring Firm's *Trading Code(s)*** without passing through the Sponsoring Firm's Order Management Systems

Available on Borsa Italiana **MIT** markets by the end of Q2, 2019 (regulatory approval to be assessed)

Overview



Sponsor: Requirements & Responsibility (1)

The Sponsoring Firm is required to:

- Submit the Sponsored Access Request
- Submit a request for Authorization for each of its Sponsored Users
- Self-declare it is aware of its responsibility in relation to the Sponsored Users activities

The Sponsoring Firm is responsible for:

- The entire trading activity carried out by the Sponsored Users
- Carrying out due diligence on the Sponsored Users to ensure they are fit and proper
- Real Time Monitoring Activity & Risk Control Management
- Sending the list of the SU contacts authorized to get in touch with Borsa Italiana

Sponsor: Requirements & Responsibility (2)

Technical Requirements

- Sponsored User **Comp ID** (one for each SU) to be requested via Member Portal
Dedicated Naming convention:
[Market] + [Member Code] + "NTY" + [Sequential Number]
- Sponsored Access (SA) FIX **Drop Copy** session
Each SU Comp ID must be associated to one SA Drop Copy session
Each SA Drop Copy session can be configured with one *or* more SU Comp IDs
- **Certification** of the SA Drop Copy functionalities (SU Comp ID Status Retrieval, Suspension and Reactivation)



Sponsored User: Requirements

- The SU can *only* use the Native Trading Protocol
- Unpriced (e.g. *Market*) orders will not be enabled for SU
- SU can get in touch with Borsa Italiana for
 - the physical connectivity provision
 - technology services (IT live support , CDS access, development support, etc.)

Sponsored Access – Risk Controls

- Orders submitted by the **Sponsored Users (SU)** are subject to the same rules and supervision applied to the Member Firms' orders.
- **Sponsoring Firms (Sponsors)** have a second layer of control on *each* SU:

Sponsored Access Controls	Configurable
Max Order Value	Upon request**
Max Gross Consideration*	Autonomously
Cancel On Disconnect	Mandatory
Kill Functionality	Autonomously
Restricted Instrument List	Autonomously

* Σ Value of trades executed during the day + Σ Value of open orders

**Set at CompID level entered/modified via Member Portal

- Sponsors will be given a **Sponsor Portal** to manage the **SU's Operational Limits**. The access to the Sponsor Portal will require a 2 factors Authentication Process:
RSA Token & Password

Sponsor's Control Tools (1)

Sponsor Portal

- Max Gross Consideration set up
- Max Gross Consideration Alerts
- SU connection monitoring
- Kill switch
- Reactivation

FIX Drop Copy Session

- SU transactions Drop Copy
- SU connection monitoring
- Kill switch
- Reactivation

If disconnected, the SU will be suspended

Sponsor's Control Tools (2)

Restricted Instrument List (RIL)

The RIL prevents the SU from performing its trading activity on specific instruments (up to 100 instruments).

How to create a RIL:

- 1) Request the RIL's name via Member Portal
- 2) Associate the RIL to the SU Comp ID via Member Portal
- 3) Handle the RIL's content uploading csv. files via SFTP
(the uploading can be done and processed intraday)

A single RIL can be associated to one or more SU Comp IDs.

An SU Comp ID can be associated to zero or one RIL.



MIT Hardware Refresh & MITCH Decommission

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MIT Hardware Refresh (1)

- In **Q4 2019**, the Hardware on which the MIT platform runs (for **Borsa Italiana** and **EuroTLX**) will be replaced
- **No changes to Native and FIX Trading Protocols** will happen together with the Hardware Refresh
- **No changes to Native/FIX gateways IP and ports** will happen together with the Hardware Refresh

MIT Hardware Refresh (2)

- **Together with the go-live of the Hardware Refresh, the MITCH service will be decommissioned**
 - Market Data for markets running on the MIT platform will be disseminated by the GTP and GTP Lite services only
- Customer Dress Rehearsals will be organized prior the go-live
- One of the key objectives of the project is to provide customers with a **significant improvement of performances** and to support new services



Datacenter Policy (1)

- **The Primary Datacenter (PDC) will remain the same currently in use** (BT Inet, Settimo Milanese – Milan, Italy), this will avoid impacts to:
 - Customers connecting via the Milan co-location
 - Blt Networks' and Milan CMC's primary lines
- **The Secondary Datacenter (SDC) will move to a new location** (Aruba, Ponte San Pietro – BG, Italy), therefore:
 - Borsa Italiana will migrate Blt Networks' secondary lines
 - Milan CMC's secondary lines will have to be migrated by customers
 - this change will be independent from the HW refresh and will be done in parallel to other activities (for a interim period it will be possible to keep connecting to the new SDC via the current secondary connection without service interruption until line migration will be completed)

Datacenter Policy (2)

No impacts for Clients connecting:

- via Service Providers (any change will be up to the Service Providers if it uses BIt Network and/or Milan CMC)
- from London (via connections provided by the LSE)

Platform Failover (1)

- Currently, the MIT platform runs in *Active-Active* mode (warm back-up)
 - the Secondary (Disaster Recovery) Instance of the Matching Engine is always active and is aligned in real-time with the Primary one
 - In case of Failover/Disaster Recovery the Secondary Instance does not need to be re-started (warm back-up)
- **After the HW refresh, the MIT platform will run in *Active-Passive* mode (cold back-up)**
 - the Secondary Instance of the Matching Engine is not active and needs to be re-started in case of Failover/Disaster Recovery

Platform Failover (2)

- System will be back available within 30 minutes since the failover invocation
 - *Markets will be restarted after all the internal checks will be completed*
- Rationale:
 - *Active-Passive* mode is the standard functioning for all other LSEG Trading Venues (including IDEM)
 - The alignment of the Secondary Instance in real-time affects performances which can be improved having a cold back-up failover



GTP update (Introduction of FPGA etc.)

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Introduction of FPGA Technology

- **Together with the MIT HW refresh, FPGA (*Gen3*) technology will be introduced for GTP FDI Multicast Channels** for
 - Borsa Italiana channels disseminating data for markets running on the MIT platform (channels H, I, J, K and Z)
 - EuroTLX (channels Q, R and S)
- **No protocol changes** are planned will happen together with the FPGA introduction
- **No changes to Multicast Groups, TCP and UDP IP and ports** will happen together with the FPGA introduction
- One of the key objectives of the project is to provide customers with a **significant improvement of performances**
- Bandwidth requirement for FDI Multicast Channels \geq 1 Gbps

Feed C

- Together with the MIT HW refresh, as the Matching Engine will not run in *Active-Active* mode anymore, **the Feed C will no longer be available**
- In case of Failover, **only the B feed will be available from the Secondary Datacentre**
 - This functioning is the same currently in place for IDEM market



Key Dates for 2019

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Key Dates for 2019

- On 4 March 2019 the Opening Auction has been introduced on ETFP market
- RFQ Minimum Increment on Fixed Income will go-live by the end of Q2
- Millennium IT – Release 9.4 planned for Q4 (after HW refresh) with introduction of Deferral of RFQ trades (and other evolution to RFQ mechanism)
- New SOLA release to go-live in Q4 (content under definition)



Q & A