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## London Stock Exchange Group response to ESMA discussion paper on “The Distributed Ledger Technology Applied to Securities Markets”

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### Introduction

London Stock Exchange Group (LSEG) is exploring potential use cases for distributed ledger technology (“DLT”) and is participating in the Hyperledger Project (also referred to as Hyperledger fabric) sponsored by the Linux Foundation. LSEG is also a founding member of the Post Trade Distributed Ledger Group (PTDL), an industry-wide consortium that supports the evolution of the post trade industry by leveraging DLT. LSEG continues to play a leading role in PTDL as part of its Organising Committee.

In this context, we respond to ESMA’s discussion paper “*The Distributed Ledger Technology Applied to Securities Markets*” (ESMA/2016/773) and offer the following general comments and observations:

- We welcome ESMA’s approach of separating DLT from virtual currencies. This approach contributes to the development of a common understanding of DLT capabilities among the financial community and fosters a constructive debate regarding the possible applications of DTL to financial markets.
- DLT services must comply with the financial services regulatory framework. ESMA’s statement that “*entities or groups of entities willing to use the DLT should be mindful of the existing regulatory framework*” reinforces the principle that if a DLT provider is in effect performing a regulated activity, then the provider must be authorised and the service must comply with relevant regulation, according to a functional approach.
- Regulatory requirements should not be introduced until the technology and use cases are more developed. We agree with the conclusion of the European Parliament that to introduce rules at this early stage could stifle technology innovation. We would support the creation of a cross-industry initiative to develop high-level DLT technical standards, such as common DLT features and technical protocols (e.g. cyber security).
- Financial Market Infrastructure (FMI) will remain a point of trust in financial markets. DLT does not change the requirement for entities to become authorised and regulated to carry out regulated FMI activities. FMIs will look to utilise DLT to achieve greater efficiency in performing regulated activities and operational processes (e.g. record keeping and reconciliation processes) and to create new value added services. FMIs are well placed to provide DLT enabled value added services – they are already highly regulated, designed to service large scale operational activities, maintain infrastructure rules, manage member disputes and perform monitoring. In a nut shell, FMIs would manage DLT services in accordance with well-established governance and operational controls.
- Full change or replacement of most FMI post-trading services with DLT seems unlikely, given the complexity of automating many FMI services and essential functions. Hybrid DLT/other process models are likely to be implemented first for products and services for which some processes can be automated to increase efficiency.



- Industry-wide DLT adoption will likely take longer than anticipated. We agree with the Oliver Wyman/JP Morgan estimate stated in “*Unlocking Economic Advantage with Blockchain, A Guide for Asset Managers*” that full utilisation in capital markets infrastructure is unlikely to take place until 2020-2030, we believe likely by 2025. Barriers to adoption include industry-wide cost of conversion, the development of interoperability between multiple DLT infrastructure providers, data and systems, fragmentation of jurisdictional legal and regulatory policies, political timetables and competing non-DLT technology. To facilitate development, we endorse initiatives to harmonise standards between DLT providers.
- We agree with ESMA’s list of key benefits, challenges, shortcomings and risks, although it is difficult at this early stage to prioritise challenges and shortcomings. As with any technical innovation, DLT is neither good nor bad per se – the challenges, shortcomings and risks depend on specific applications. The challenges and shortcomings identified by ESMA, such as scalability and ease of interoperability, will become more apparent or discarded as use cases are fully explored.
- DLT used in clearing services. We welcome in section 6.1, Clearing Activities, ESMA’s confirmation that clearing activities regulated under Regulation (EU) No 648/2012 (EMIR) can be provided only by EMIR authorised entities. We recognise the benefits that DTL may bring to some CCP operations (e.g., reducing reconciliation process and costs) but note that DLT cannot replace core CCP functions, such as risk and default management. Further, DLT must be implemented in a way that preserves other CCP benefits, such as multilateral netting of positions. We suggest that if a DLT provider offers clearing services for non-derivative assets (eg spot market), that the provider should be authorised and subject to the same or similar requirements as EMIR authorised CCPs.
- DLT used in record-keeping services. Recording securities holdings on a distributed ledger is not the same service as Central Securities Depository (CSD) notary and registration functions, which are essential to maintain the integrity of securities issues. When assets are recorded only in a public distributed ledgers, there is no entity or service that reconciles individual holdings with the number of total assets issued or manages any potential discrepancies, which undermines investor protection. Permissioned ledgers, to the extent that they operate with admission requirements and conduct rules, are complementary to the central governance and monitoring performed by FMI.
- DLT used in settlement services. The key regulatory consideration is the enforceability of the transfer of assets (and transactions) which are performed on a DLT system. In particular, the industry will be looking for legal certainty relating to the status of transactions on a DLT before they are recorded on a Securities Settlement System recognised under the Settlement Finality Directive (for transactions settled in the EU). DLT record keeping and validation methods should be assessed against the acquisition and disposition rules applicable in the jurisdiction in which the DLT service chooses to be located. DLT system and operational rules should not conflict with issuance and account maintenance rules and technicalities where securities are issued or recorded. Further, DLT system capabilities (eg the ability to process high volumes of transactions) will need to be confirmed as this use case develops.



## About us

LSEG (EU Transparency Register: 550494915045-08) is a diversified international market infrastructure and capital markets business sitting at the heart of the world's financial community. The Group can trace its history back to 1698.

The Group operates a broad range of international equity, bond and derivatives markets, including London Stock Exchange; Borsa Italiana; MTS, Europe's leading fixed income market; and Turquoise, a pan-European equities MTF.

Post trade and risk management services are a significant part of the Group's business operations. In addition to majority ownership of multi-asset global CCP operator, LCH Group, LSEG operates CC&G, providing clearing services for a range of European securities as well as exchange traded equity and commodities derivatives; Monte Titoli, a CSD successfully migrated in Target2–Securities settlement platform; and globeSettle, the Group's newly established CSD based in Luxembourg.

## LSEG contacts

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## Part B. Responses to Questions

**Q 1: Do you agree with the list of possible benefits of the DLT for securities markets? Please explain, e.g., are these benefits unique to the DLT, are some more important than others, are some irrelevant?**

1. We broadly agree with the benefits cited by ESMA. In our view, the most important DLT benefits relate to the enhancement of operational processes and cyber security:
  - Enhanced resiliency. DLT could upgrade current processes and create distributed (hence non-fragmented) data-base and transaction management solutions. The distributed nature of the data-base means that the risk of losing transactions will be drastically reduced.
  - Increased efficiency and cost reduction. Further automation of processes and less reconciliation of records among different databases will streamline the processing of undisputed records and substantially reduce manual processes required to reconcile disputed records. These enhancements are expected to reduce operational costs, mainly through the reduction of messages between databases. Standardised DLT data definitions and securities recordkeeping protocols will need to be agreed and widely implemented to reduce the redundancy of 'data translation'.
  - Enhanced cyber security. DLT has no single point of failure and uses cryptography to ensure that records are kept private and immutable (as required on a use case-by-use case basis). Additionally, ledger state changes cannot be altered. Systems employed for financial services and other industries will require full validation at on-boarding. Architecture enabling observer roles will allow regulators and others who are permissioned clearer disclosure of



terms/documentation and for monitoring of transactions. But choices made in the deployment of DLT-enabled services will be critical to reinforcing these benefits. We believe that an industry level of DLT cyber security standards should be agreed.

- Improved data reporting. DLT could help firms to consistently implement reporting requirements throughout divisions and to reduce technical reporting errors. Use of DLT could overall improve data quality and reporting compliance.
2. In relation to the potential benefits discussed in “Clearing and Settlements” (par. 3.1) and “Counterparty risk (par. 3.4) we note the following:
- Enhanced reconciliation. We agree that DLT could make some reconciliation processes faster and more efficient, but this will depend also on the volume of data to be reconciled and on the degree of interoperability between the data sources. Further standardisation of data structure and more harmonization of data reporting fields will be required to fully utilize DLT for reconciliation mechanisms.
  - Role of the CCP and intermediaries involved in clearing activities. A CCP performs several highly specialised and regulated functions, such as risk management, which at their heart cannot be fully automated or replicated by technology. CCPs also perform critical processes related to regulated activities, including exposure netting and preparing transactions for settlement. As for clearing of certain types of transactions (eg cash equities and spot transactions) DLT could lead to a reduction of counterparty risk in terms of the time and size of exposure to such risk, as long as a DLT can support settlement on a pre-funded basis. However the use of DLT in clearing activities should seek to preserve the benefits of multilateral netting (reducing both counterparty and operational risk) especially in spot markets where volumes of transactions are high. It is unlikely that DLT will disintermediate the role of CCPs or reduce the number of intermediaries involved in clearing activities in the near to medium term: only EMIR authorised CCP can perform clearing functions and clearing intermediaries will remain necessary to act as guarantors for the executing counterparties.
  - Reduced settlement time. DLT could support reduced settlement cycles and asset transfer (i.e. moving from T+2 to T+0), however this capability is not unique to distributed databases, as it can already be performed by other systems (e.g. T2S) and we note that compression of a settlement cycle mainly depends on factors other than technology. Real-time settlement assumes that market participants are able to, and willing to, transition to a real-time inventory and transaction environment. Such transition would require large scale changes to the internal operations of all market players and is unlikely to occur for a significant time. As noted above, compression of settlement cycle reduces counterparty exposure risk but it would only work on a pre-funded basis because counterparty risk remains until settlement is actually effected (i.e. DLT does not guarantee settlement).
3. In relation to potential benefits for “Record of ownership and safekeeping of assets” (par. 3.2 of the DP) we note that the notary function and reconciliation processes – which are essential to investor protection – are provided by authorized CSDs and cannot be replaced by DLT. A central securities depository (CSD) could employ a DLT technology to make its operations more efficient (ease of messaging and transmissions) and provide easier access for clients. But in the absence of an entity performing notary and central reconciliation processes, a number of questions are raised in terms of legal enforceability of records stored on the ledger and investor protection.



4. In relation to “Availability” under paragraph 3.6, it should be noted that this benefit is not unique to DLT and that other systems could operate on a real-time and continuous basis (e.g. T2S). The practice of operating on business days is driven by organisational and commercial considerations, for instance market hours for the underlying assets and internationally observed conventions to operate on business days.

**Q 2: Do you see any other potential benefits of the DLT for securities markets? If yes, please explain.**

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**Q 3: How would the benefits of the technology be affected, in the case where the DLT is not applied across the entire lifecycle of securities (i.e., issuance, trading, clearing and settlement, safekeeping of assets and record of ownership) but rather to some activities only?**

We believe that the most realistic scenario for DLT implementation is described by ESMA in par. 30, whereby FMIs and other market players will first use this technology to make some internal process safer, more efficient and cost-effective. Therefore, the benefits of DLT could be obtained even if it is not rolled out across the entire lifecycle of securities. Greater efficiencies in trading and post-trading operational systems will depend on the ability of this technology to interact with legacy and new systems. We endorse the development timeframe estimated by Oliver Wyman and JP Morgan in “*Unlocking Economic Advantage with Blockchain, A Guide for Asset Managers*”. Joint industry working groups will be essential to agree on technological standardisation required for interoperability of the technology between post-trade functions, as well as between market participants.

**Q 4: Which activities (e.g., post-trading, other activities), market segments and types of assets in the securities markets are likely to be impacted the most by the DLT in your opinion? How is the DLT likely to modify the way securities markets operate? Please explain.**

First applications of DLT to post-trade are likely to be related to internal functions where the technology can be quickly and easily implemented to reduce aspects of operational complexity and cost. These applications are likely to exploit the core DLT function of record keeping – such as providing post-trade systems for trade allocation, confirmation, matching, reconciliation and record keeping. It is too early in the development of and commercial response to such technology to put forward detailed views on operational impacts, other than our general view that DLT should lead to reduced messaging throughout the financial infrastructure system.

**Q 5: According to which timeframe is the DLT likely to be applied to securities markets in your view? Please distinguish by type of activities, market segments and assets if relevant.**

As noted in Q3, we generally agree with the development timelines presented by Oliver Wyman and J.P. Morgan. In our view, the initial development work is being led by FinTech companies and external technologies providers, but we expect that most FMIs will then quickly upskill their capabilities to manage these technologies. As for the core services provided by FMIs, we believe DLT is unlikely to change or replace the current financial services industry architecture in the short and mid-term.

**Q 6: How might your organisation benefit from the introduction of the DLT?**

[field intentionally left blank]



**Q 7: If you are working on a concrete application of the DLT to securities markets please describe it (i.e., which activities, which market segments, which type of assets and for which expected benefits) and explain where you stand in terms of practical achievements in relation to your objectives.**

[field intentionally blank]

**Q 8: Do you agree with the analysis of the potential challenges? Please explain, e.g., are some more important than others, are some irrelevant in your view.**

Yes, we agree with the challenges identified by ESMA but with the following priority:

- Technology issues: DLT scalability and interoperability must be further developed and thoroughly tested to ensure that new systems meet the processing capabilities and standards of current financial services technology. The challenge ESMA raises regarding settlement in central bank money is also key to future development and integration of DLT into the financial system. There are several ways of performing DvP however one of the most efficient ways is via central bank money. This step, i.e. issuing central bank cash in secure and protected DLT environment, would solve several current issues surrounding DvP on DLTs. But implementation will be subject to complex risk, regulatory and legal considerations. We note the Bank of England's recently published Staff Working Paper No. 605, "*The macroeconomics of central bank issued digital currencies*". The paper finds that there are clear macroeconomic advantages of using central bank digital currencies and recommends further research.
- Governance and privacy issues: On one hand, a DLT-based solution cannot replace FMI governance and conduct rules pertaining to core FMI regulated functions. But DLT could become a tool for executing, monitoring and enforcing some of an FMI's service and member requirements. On the other hand, FMI are well placed to provide governance for DLT-based services, FMI are experienced in creating bespoke system rules and technology controls and are already subject to direct regulatory oversight. Governance of a DLT can be achieved through technology controls; permissioned ledgers allow for many controls to be implemented, such as white-listing (approved participant addresses), verification of smart contract performance and secure key management systems. But DLT governance must also be established through robust DLT system rules: detailed and effective user rules, resolution processes and monitoring mechanisms.

**Q 9: Do you see any other potential challenges? If yes, please explain.**

[Intentionally left blank]

**Q 10: Which solutions do you envisage for these challenges and where do the current initiatives stand in terms of practical achievements to overcome them?**

Please refer to our answers for Q8.

We further note that technical and business solutions to the risks mentioned in the paper mainly depend on the specific deployment plan and the market infrastructure design that one wants to achieve.

**Q 11: Do you agree with the analysis of the key risks? Please explain, e.g., are some risks more important than others, are some irrelevant in your view.**



Yes, we agree with the analysis of key risk and believe that the most critical are:

- Operational risk (para 49): in particular we note implementation risk which could arise from errors in coding systems or smart contracts. DLT would need to interoperate with internal legacy and external infrastructure systems and this type of interoperability may increase risks. Early stage integration will be particularly important for DLTs to test and establish performance, and early stage testing may also create risks until DLT system capabilities and risks of interoperability are better understood. We believe that authorised FMI are best placed to deliver successful implementation for use of DLTs in financial markets. FMI are already highly regulated, large-scale services providers and would manage implementation subject to existing strong governance and operational standards including real-time monitoring of operational functions.
- Cyber risk (section 5.1): in permissioned ledgers cyber security risk is reduced, however not completely removed and decisions made in deployment for various use cases will affect cyber controls and risks. The highest levels of cybersecurity should be pursued when deploying distributed networks infrastructures, especially when sensitive data is transmitted through these networks. LSEG would be happy to discuss cyber security technical recommendations.

**Q 12: Do you see any other potential risks? Please explain.**

We see the following additional risks:

- Implementation risk: See answer to Q11 above;
- Scalability risk: DLT providers must ensure adequate enhancements and testing technology as they scale operations to process greater volumes. The development of adequate data storage capabilities will also be critical. Further, the volume and nature of DLT traffic could also require dedicated networks;
- Legal risk: e.g. uncertainty about the enforceability of transactions performed through a DLT may raise legal risks.

**Q 13: How could these risks be addressed? Please explain by providing concrete examples, especially for the risks potentially affecting your organisation.**

See answers to Q11-12.

**Q 14: Do you think that the DLT will be used for one of the scenarios above? If yes, which one(s)? If no, please explain?**

1. We believe that DLT could be used for each of the three clearing scenarios the ESMA has described, either wholly or partially. We do not believe that the use of DLT in any of these scenarios will come to market fully enterprise ready, but will go through incremental implementation phases: initially employed in test cases within CCPs or CSDs, then deployed as live solutions to market participants.
2. We note ESMA's confirmation that activities performed by the DLT must comply with the EU regulatory requirements cited in the scenarios. In every situation it must be the service provider, not the DLT, which is authorised to perform regulated activities on a DLT.
3. We note that, in Scenario 3, ESMA states that clearing activities for non derivative assets (eg spot) could be provided by entities other than EMIR authorised CCPs. We believe that clearing functions should be regulated when performed for non-derivative assets. Otherwise, the risk is to create unregulated areas where critical financial market



infrastructure services are being provided outside of regulated financial markets and potentially subject to lower governance, monitoring and other standards.

**Q 15: If the DLT is used for one of these [CCP] scenarios, how could compliance with the regulatory requirements attached to each scenario be ensured?**

Regulated CCPs would monitor the DLT technological performance and member compliance as part of their normal compliance monitoring plans.

**Q 16: Do you think that the DLT will be used for one of the scenarios above? If yes, which one(s)? If no, please explain?**

[Intentionally left blank]

**Q 17: If the DLT is used for one of these scenarios, how could compliance with the regulatory requirements attached to each scenario be ensured?**

Please refer to our response under Q15.

**Q 18: Do you think that the DLT will be used for safekeeping and record-keeping purposes? Please explain, with concrete examples where appropriate.**

[Intentionally left blank]

**Q 19: If the DLT is used for the safekeeping and record-keeping of ownership, how could compliance with the regulatory requirements be ensured?**

As mentioned in our response to Q1, recordkeeping of ownership on a DLT raises a number of questions, in particular the legal enforceability and status of records on the ledger before or instead of settlement with a Securities Settlement System (as required under the Central Securities Depository Regulation). In most common public ledgers, nodes are collectively responsible for validating transaction data. This means that there is no legal entity bearing responsibility for reconciling individual holdings with the number of total amount of the issue and for managing any potential discrepancies. In this context the notary and registration functions performed by CSDs are essential to maintain the integrity of the issue and they could not be directly replaced by DLTs. Further, DLT record keeping and validation methods should be assessed against the acquisition and disposition rules applicable in the relevant jurisdiction in which the DLT chooses to locate itself. Where relevant, a DLT set up should not interfere with applicable issuance, account maintenance and recordkeeping rules.

**Q 20: Do you think that the DLT will be used for regulatory reporting purposes? Please explain, with concrete examples where appropriate.**

Yes, a DLT based solution could be used to assist a regulated reporting entity (eg trade repository) in providing regulatory reporting functions. Benefits could arise for further automation of reporting mechanisms, consolidation of data systems and reduction of the messages currently exchanged between a high number of intermediaries, key financial market infrastructure and regulatory stakeholders.

**Q 21: If the DLT is used for regulatory reporting purposes, how could compliance with the applicable regulatory requirements be ensured?**





Regulated reporting entities would monitor the technological performance and any DLT member compliance as part of their normal compliance monitoring plans.

**Q 22: Do you think that the DLT could be used for other securities-related services than those already discussed, in particular trading and issuance?**

Outside of post-trade, we are aware that applications are being developed for trading and record-keeping of assets in private markets and to execute some shareholder servicing functions. Private markets have less complex regulatory (no prospectus or listing requirements) and data related requirements (pre- and post-trade publication requirements).

**Q 23: Do you see potential regulatory impediments to the deployment of the DLT in securities markets?**

DLT-based solutions are merely ways of automating and performing regulated and other activities. As long as entities seeking to utilise DLT remain subject to existing financial services regulation, and not the technology itself when deployed for a particular purpose, we do not see any particular regulatory impediments.

**Q 24: Should regulators react to the deployment of the DLT in securities markets and if yes how? If you think they should not do so please justify your answer.**

We endorse the European Parliament's approach adopted in the Motion on Virtual Currencies, adopted on 26 May, that regulators should take a proportionate regulatory approach as to not stifle innovation and to carefully monitor DLT developments at this time. Consistent with the view in our response to Q23, we believe that regulatory focus should be on monitoring how regulated financial services entities are developing DLT solutions.