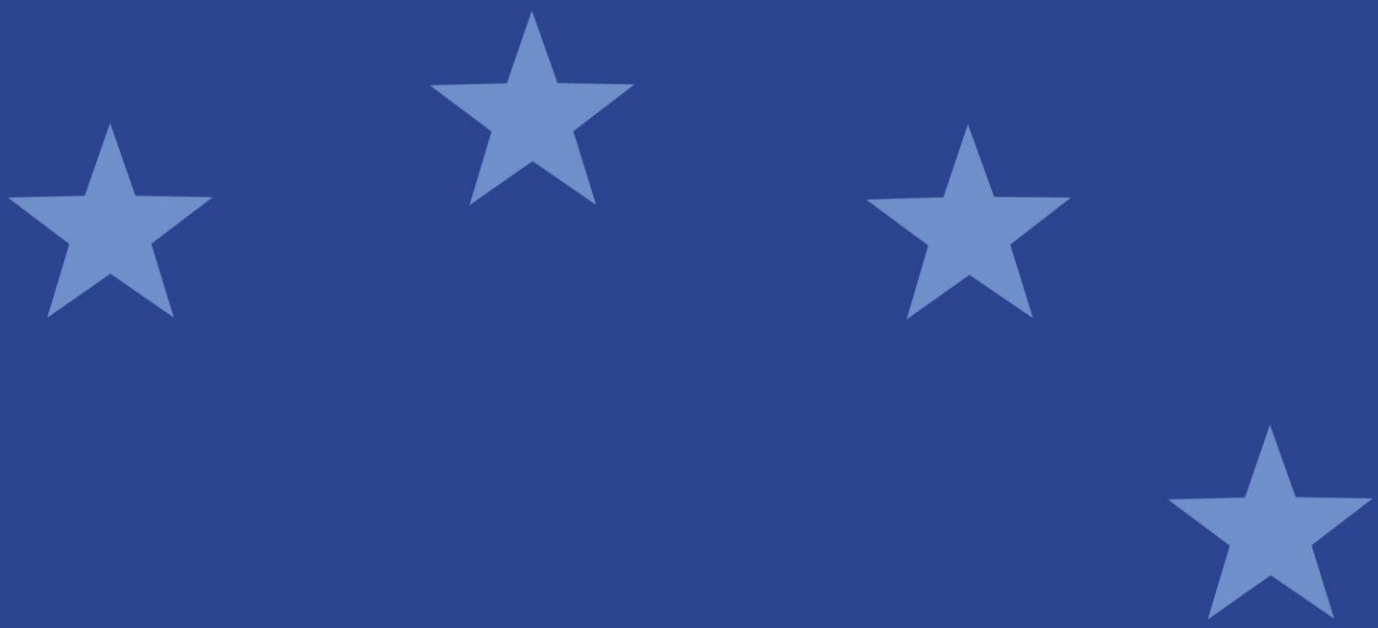
esma European Securities and Markets Authority

Discussion Paper

The Distributed Ledger Technology Applied to Securities Markets



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Responding to this paper

ESMA invites comments on all matters in this paper and in particular on the specific questions summarised in Annex 1. Comments are most helpful if they:

- respond to the question stated;
- indicate the specific question to which the comment relates;
- contain a clear rationale; and
- describe any alternatives ESMA should consider.

ESMA will consider all comments received by **2 September 2016.**

All contributions should be submitted online at www.esma.europa.eu under the heading 'Your input - Consultations'.

Publication of responses

All contributions received will be published following the close of the consultation, unless you request otherwise. Please clearly and prominently indicate in your submission any part you do not wish to be publically disclosed. A standard confidentiality statement in an email message will not be treated as a request for non-disclosure. A confidential response may be requested from us in accordance with ESMA's rules on access to documents. We may consult you if we receive such a request. Any decision we make not to disclose the response is reviewable by ESMA's Board of Appeal and the European Ombudsman.

Data protection

Information on data protection can be found at www.esma.europa.eu under the heading Legal Notice.

Who should read this paper?

This discussion paper is meant to be read by technologists such as Fintech companies and any financial institutions interested in the use of the Distributed Ledger Technology (DLT) in securities markets such as banks, central counterparties, central securities depositaries, custodians, asset managers, investors, etc. ESMA expects that persons who read this paper have already a good understanding of the mechanics of the DLT. Indeed, this paper is not meant to explain in detail how the DLT works but rather how it could be applied to securities

markets and what would be the possible benefits, risks and challenges of such an application. [1]

[1] For more information on the DLT and its functioning, please see ECB Occasional Paper 'DLTs in securities post-trading: revolution or evolution?' available at http://www.ecb.europa.eu/pub/pdf/scpops/ecbop172.en.pdf. Also, while ESMA realises that several variations of the DLT may exist, ESMA uses the term Distributed Ledger Technology in singular in the rest of the document for ease of reference.

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1 Executive Summary

Reasons for publication

ESMA began analysing virtual currencies in 2013. It was public knowledge that a number of investment products using virtual currencies as underlying assets were launched into the market. The phenomenon was marginal at that time but ESMA believed it should be monitored as it had the potential to become more widespread and to create new risks to investors. ESMA was also aware that attention was shifting from virtual currencies to the technology underpinning them.

In April 2015, ESMA published a call for evidence on investments using virtual currencies or the distributed ledger technology ('DLT'). The results of the call for evidence showed that investments using virtual currencies as underlying remained marginal. However, the underlying technology had the potential to be used by financial markets outside the space of virtual currencies with possible disruptive effects. Hence, ESMA decided to analyse the possible impact of the application of the DLT to securities markets.

In particular, ESMA looked at the potential benefits and risks that the DLT could bring when applied to securities markets, from a public policy perspective. ESMA examines this new technology in light of the regulatory framework developed over the past years to provide important safeguards for well-functioning securities markets, and in particular the post trading functions, which appear as the primary scope of application of the DLT.

In order to progress with its analysis, ESMA has decided to publish a Discussion Paper (DP) to seek stakeholders' views on the results of its preliminary assessment. Importantly, ESMA does not express at this stage any opinion on the DLT but rather presents in a factual and objective manner the results of its preliminary analysis on the possible impacts of the DLT on securities markets. ESMA appreciates that the DLT may have different applications and impacts on financial activities, market participants and market infrastructures, depending on a variety of elements, including its capacity to address a number of technical, governance, legal and regulatory issues. It is too early at this stage to form a definite opinion on whether the DLT will be able to address these issues in an efficient way.

Contents

This DP is organised as follows: section 2 provides background information on the DLT and ESMA's approach to the technology; section 3 sets out the possible benefits

of the DLT applied to securities markets; section 4 discusses the possible shortcomings/challenges to those benefits; section 5 focuses on the risks that the deployment of the DLT may introduce and finally section 6 analyses the relevant regulatory framework, with a focus on the main EU legislation relevant for potential applications of the DLT in securities markets.

Next Steps

ESMA will use the feedback to this discussion paper to develop a position on the use of the DLT in securities markets and in particular to assess whether a regulatory response may be needed.

2 Background

2.1 Introduction to the DLT

1. Distributed ledgers - sometimes known as 'Blockchains' in the case of virtual currencies - are essentially records, or ledgers, of electronic transactions, very similar to accounting ledgers. Their uniqueness lies in the fact that they are maintained by a shared or 'distributed' network of participants (so-called 'nodes') and not by a centralized entity, meaning that there is no central validation system. Another important feature of distributed ledgers is the extensive use of cryptography, i.e. computer-based encryption techniques such as public/private keys and hash functions, to store assets and validate transactions.

2. Until today the most widely known application of the DLT is the public ledger of transactions for virtual currencies, such as Bitcoins. More recently, the idea has spread that the use of distributed ledgers could be extended to traditional financial services. Some market participants and market infrastructures have publicly commenced working on initiatives to leverage this technology.

3. Importantly, ESMA understands that the DLT that would be used for financial services would differ from the Blockchain designed for Bitcoins in a number of ways. In particular, while the Bitcoin Blockchain is an open system where all can contribute to the validation process ('permissionless' system), the DLT that is likely to be used in financial markets would be a permissioned-based system with authorised participants only. This difference is important to keep in mind because it has a number of consequences in terms of potential benefits and risks.

4. 'Distributed ledgers' and 'Blockchain' are often used interchangeably when discussing the technology. However, the Blockchain is a particular type of distributed ledger originally designed and used for Bitcoins. ESMA therefore uses the term 'distributed ledger technology' (DLT) when referring to distributed ledgers in general in the rest of the document.

2.2 ESMA's approach vis-a-vis the DLT

5. ESMA is mindful of the issues raised by virtual currencies such as Bitcoin. However, it is important to stress that ESMA's work on the DLT is limited to the application of this technology to securities[2] markets. Indeed, issues related to the payments aspect of virtual currencies are outside the scope of ESMA and are treated by other institutions such as the European Central Bank or the European Banking Authority.

6. When looking at financial innovation, ESMA has a balanced approach, meaning that ESMA is interested in understanding both the benefits and the risks that the DLT may

[2] The term 'securities' is used in this paper as a synonymous for financial instruments.

bring and ways to address those risks. Sections 3, 4 and 5 of the DP set out the possible benefits, their limitations and the risks that the DLT may bring. ESMA does not express any view on the likelihood that these benefits and risks materialise in the future.

7. Also, ESMA examines the DLT in light of the existing regulatory framework, which provides important safeguards for well-functioning securities markets, and in particular the post trading functions. ESMA stresses that entities or groups of entities willing to use the DLT should be mindful of the existing regulatory framework. In addition, they should be mindful of a number of principles, which underpin the current market infrastructures, in particular the CPMI-IOSCO Principles for Financial Market Infrastructures (PFMIs). Section 6 of the Discussion Paper discusses in greater detail the key applicable EU legislation.

8. ESMA realises that the possible benefits and risks that the DLT may bring depend on how it may be applied to securities markets. Also, the more changes the DLT would bring to the functioning of securities markets, the more likely it would raise regulatory challenges. The following situations may be considered:

    a) The DLT is used by existing market participants/infrastructures to improve their internal processes, i.e., the DLT is a mere internal technological improvement. ESMA sees limited regulatory challenges in situation a), as long as market participants/infrastructures continue to comply with the relevant requirements, since the EU regulatory framework does not prescribe the type of technology that market participants/infrastructures have to use to perform their activities or fulfil their obligations.

    b) The DLT is aimed at changing/replacing the current set up of market participants and market infrastructures. ESMA believes that this could create a number of challenges with respect to the safeguards brought by recent securities markets regulations, e.g., if new risks are left unaddressed by the existing regulatory framework.

    c) Median situations, which would fall somewhere in-between situation a) and b)

    d) A status quo situation where the existing set up of the securities markets would prevail.

9. ESMA does not express at this stage any opinion on the likelihood of the situations above. The DLT is still in its early days and its potential impact on securities markets remains unclear, also considering the potential challenges/shortcomings that it will need to overcome to be deployed effectively.

3 Possible benefits of the DLT applied to securities markets

10. ESMA sets out, hereafter, its analysis of the possible benefits of the DLT in securities markets. This list is not meant to be exhaustive because the technology is quickly evolving and new benefits may emerge. Importantly, ESMA does not express a view at this stage

on the likelihood that these benefits may unfold. The possible challenges and limitations to the applications of the DLT are discussed later on in the DP.

3.1 Clearing and settlement

11. The DLT could speed the clearing and settlement of certain financial transactions, by reducing the number of intermediaries involved and by making the reconciliation process more efficient. Indeed, the DLT could make it easier for parties to transact with one another across countries, thereby reducing the need for multiple intermediaries. Because of the shared nature of the ledgers, which means that all the participants to the DLT network would hold their own copies of the ledger with no conflicting information, and the use of algorithms to agree on a consensus, the DLT could also make the reconciliation process faster and more efficient.

12. Certain proponents of the DLT believe that the clearing and settlement of transactions could effectively combine into a single step, which would be (almost) instantaneous. This could create a number of additional benefits, including reduced counterparty risk and less need to post collateral, as we discuss below.

3.2 Record of ownership and safekeeping of assets

13. The DLT could facilitate the recording of ownership of a variety of securities and the safekeeping of assets (depositary/registrar, custody and notary functions), by promoting a unique reference database, by reducing the possible ambiguity of contract terms, by increasing the automation of the processing of corporate actions and, again, by making reconciliations more efficient.

14. The DLT could facilitate the implementation of a unique reference system across securities markets, e.g. through the use of a unique security identifier, which would be embedded in the system. This identifier could then be shared and used unequivocally by all participants in the network. It is to be noted however that various standard identifiers, such as the ISIN, already exist for different asset classes and are in use in the markets. This concept would therefore not be new but the DLT could bring new solutions to make these unique reference systems an integrated part of the trade lifecycle process.

15. Smart contracts, which would sit on top of the ledgers, may help reduce the uncertainty attached to contract terms and increase the automation of the processing of corporate actions, even if their use may be limited to certain types of instruments or contracts for complexity reasons, at least in the short term. The concept of smart contract had emerged before the development of the DLT but the technology could accelerate its development. Smart contracts are self-executing codes meant to replicate the terms of a given contract. They effectively translate contractual terms (e.g., payment terms and conditions, confidentiality agreements) into computational material.

16. In addition and as already discussed, because of its shared nature and the use of algorithms to agree on a consensus, the DLT could make reconciliations more efficient.

17. The DLT could also be used to directly issue digital securities and track their ownership and help supporting issuance related services.

18. The proponents of the technology believe that it could ultimately become the trusted source for the record of ownership of securities and safekeeping of assets, with a number of potential consequences on the current market infrastructure, e.g., some systems could become redundant or custodians could see their role evolving.

3.3 Reporting and oversight

19. The DLT could potentially facilitate the collection, consolidation and sharing of data for reporting, risk management and supervisory purposes, by enlarging the scope of information available from a single source and making access to this information easier and faster. With the DLT, every record could in theory be retraceable across its history. This could be beneficial to reporting officers, risk managers and regulators, provided the necessary safeguards are in place. Also, the DLT could increase the speed of access to this information, e.g., supervisory authorities could have direct access to the information stored on the ledgers.

3.4 Counterparty risk

20. The DLT could reduce the counterparty risk of certain securities transactions. As explained above (see paragraph 12), the DLT could shorten the settlement cycle of the transactions, which means that each party would be exposed for a shorter period of time to the risk of default of the other party. It is even argued that the DLT may eliminate the counterparty risk of certain transactions and remove the need for Central Counterparty (CCP) clearing because the settlement could be almost instantaneous.

21. However, it is important to make the distinction between cash ‘spot’ transactions and transactions with a maturity like derivative transactions. While for ‘spot’ transactions, a single settlement extinguishes the obligations of the respective parties at once, in the case of derivatives transactions, obligations remain through the entire life of the contract. Therefore, there is the need to mitigate the counterparty risk throughout the life of the instrument. For this reason, ESMA believes that the DLT is unlikely to eliminate the counterparty risk from derivatives transactions and hence the benefits of CCP clearing for derivative instruments are likely to remain unchanged. Also, there would still be a need for exchange of collateral between the counterparties during the life of the transaction to mitigate counterparty risk. CCP clearing may also provide a number of additional benefits for derivatives, like netting, which might be lost with the DLT in its current form as we explain below (see paragraph 34).

3.5 Efficient collateral management

22. As already stated above**,** the DLT could help reduce or even remove counterparty risk for cash 'spot' transactions. Market participants may therefore post collateral for shorter periods of time, less collateral or even no collateral for certain transactions. However, spot transactions are already in a large part uncollateralised, therefore it remains to be seen how much of a benefit the DLT would bring on this aspect.

23. The DLT might also be used to improve the processing of collateral movements across market participants.

24. The reduced need of collateral and the capacity to speed collateral movements would increase market collateral availability. Also, market participants may reuse collateral more frequently.

3.6 Availability

25. The DLT could in theory operate on a continuous basis. This high level of availability is seen as a potential benefit for financial services where processes are usually organised in batches. Although the additional operational complexities of a system running on a continuous basis should not be underestimated.

3.7 Security and resilience

26. The DLT is presented as a potentially very secure technology, some argue more secure than current systems. The perceived high security of the DLT, which remains to be tested, is grounded on the distributed nature of the ledger, i.e., there is no single point of attack, and the use of cryptography and consensus to secure and validate transactions. These features could help mitigate the risk of a cyber-attack. They could also reduce the need for recovery plans, since the records would be kept in several places at the same time.

3.8 Costs

27. A general reduction of costs is one of the main suggested benefits of the DLT. For example, in post-trading activities, the DLT may streamline middle and back offices processes with the automation of some tasks which are currently performed manually. The same may be true for reporting and monitoring functions. Also, the use of distributed ledgers could reduce or even eliminate maintenance costs of individual ledgers at company level and reduce the need for costly business continuity plans. In addition, by reducing the need for multiple intermediaries, the DLT could also reduce transactions costs.[3]

[3] See http://santanderinnoventures.com/wp-content/uploads/2015/06/The-Fintech-2-0-Paper.pdf

3.9 Other possible benefits

28. The DLT might be used to enhance pre-trade information and the matching of buyers and sellers, e.g., by advertising widely potential buy and sell interests or by making it possible for counterparties to perform a verification of ownerships (i.e. the buyer could be ascertained that the seller has the securities and the seller that the buyer owns the corresponding amount of cash) before the trade. However, it seems that this part of the trade lifecycle is not the main focus of the current market initiatives around the DLT.

Questions to stakeholders:

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?

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

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?

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.

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.

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

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.

4 Key challenges and possible shortcomings

29. ESMA believes that the DLT will need to overcome a number of possible challenges and shortcomings before its benefits can be reaped. Some of these challenges are related to the technology itself. Others are mainly related to possible governance, privacy and regulatory issues. These issues are discussed in greater detail below.

4.1 Technological issues

Scalability issues

30. It seems that the technology is developing rapidly and that some firms have begun using DLT for targeted financial activities. However, ESMA is not presently aware of a securities market DLT system operable on a large scale. What has been achieved for targeted activities might be difficult to replicate on a wider scale, with a broad range of instruments and participants. Some of the benefits attached to the technology, e.g., low latency, may also become less relevant if the technology is deployed extensively.

Interoperability with the existing systems and between the different networks

31. It seems unlikely that the DLT would be deployed across all market segments and activities simultaneously. In a step-wise scenario, the DLT would need to interoperate with existing market infrastructures and the attendant systems, at least in the short to medium term. In addition, separate ledgers might be used for different asset types and these ledgers will need to interact with one another. This raises a number of technical challenges. Not all market participants may choose to build interfaces to the new technology and existing market infrastructures might have no immediate benefit in starting interoperating with different ledgers. Also, many of the benefits of the DLT could be reduced, unless it is widely adopted by market participants and market infrastructures.

Need to settle in central bank money

32. In order to achieve full Delivery versus Payment for settlement, both the asset and cash ‘legs’ of the transactions need to be processed simultaneously. Unless fiat currency is recorded on the DLT, a ‘bridge’ between the DLT and the fiat currency ledgers would be needed. Again this raises a number of technical and legal issues.

Recourse mechanism

33. In its current design, the DLT creates immutable shared ledgers. Once validated, the transactions are considered immutable and the system does not allow for a transaction to

be modified, cancelled or revoked. On the one hand, this could be considered as a potential benefit. But on the other hand the question arises as to how possible mistakes would be handled from a technological and also governance perspective, e.g., who would be entitled to flag errors, which correction mechanism would then apply and according to which timeframe. Importantly, because the DLT could potentially increase the speed of clearing and settlement, there is heightened need to quickly correct mistakes. ESMA understands that some firms may be working on possible recourse mechanisms but is not aware of the details of those mechanisms.

Position netting

34. In its current design, the DLT records each transaction in a sequential order and on a 'gross' basis. While this method of accounting is well suited for cash 'spot' transactions, it may raise issues for derivative transactions, e.g. cleared derivatives for which position margins and collateral requirements are computed on a net basis. Unless changes are brought to the way the technology currently operates, the absence of netting could effectively increase the need for collateral and capital for cleared financial derivative transactions.

Margin finance and short selling

35. Margin finance currently allows market participants to transact with assets financed externally. With the DLT, and because the possession of assets is a pre-requisite for transacting, such transactions may no longer be possible. The same question may be valid for short-selling.

4.2 Governance and privacy issues

Governance framework

36. We understand that the DLT that is likely to be applied to securities markets would be 'permission-based' in contrast to the 'permissionless' system that was originally designed for virtual currencies, e.g., Bitcoins, for a number of reasons, including efficiency, security and privacy purposes. In a permission-based system, only 'permissioned' participants can act as a node, i.e., validate transactions. Their identity is typically known to the rest of the network.

37. A permission-based framework requires rules to approve/reject authorised participants. Factors that may be worth considering when designing those rules may include minimum capital requirements, conduct of business rules and risk management processes. Also, there may be a trade-off between accepting many participants at the risk of making the system unduly complex and being excessively selective at the risk of limiting the scope of the network.

38. In addition, rules to govern the interactions between participants, both 'permissioned' and 'non-permissioned' will be necessary. These rules would need to address many and

potentially complex issues. Examples include the liabilities of the respective participants, including in case of fraud or error, correction mechanisms and penalties in case of infringement to the rules, the intellectual property attached to the technology or the territoriality of the law likely to apply to the network. An agreement between the participants on their remuneration model would also be needed.

39. Furthermore, the governance framework should provide clarity on the entity or group of entities that would be held liable for the activities of the network vis-à-vis third parties, in particular local regulators and customers.

Privacy issues

40. By design, in a DLT environment, the information recorded on the ledgers is made public to the participants of the network, or at least to 'permissioned' participants. This information typically comprises the history of the transactions and the balance of cash and assets held on accounts. In addition, it seems that the DLT could be used to store and share private information on clients, e.g., for Know Your Customer procedure purposes. The question then arises as to how the public nature of the ledger, which is embedded in the technology, might combine with the need to preserve the anonymity and privacy of some of the information recorded in the ledger.

41. It seems that the use of encryption identifiers (i.e. private keys) instead of names could provide some level of privacy, e.g., the exact identity of a party to a transaction or the name of an account holder could remain unknown to most participants. Yet, the operation of those private keys would need to be carefully designed and controlled. Different levels of access to the network, depending on the exact nature and scope of the participant might also be needed.

4.3 Regulatory and legal issues

42. The capacity of the DLT to fit into the existing regulatory framework may limit its deployment. The key EU regulations likely to apply and how they would reflect in terms of requirements for the participants to the DLT network are discussed in greater detail in section 6.

43. Legal issues, such as the legality and enforceability of the records kept on the DLT, also need to be carefully considered. Differences in securities and company laws across the EU may also interfere with a wide deployment of the DLT in securities markets in the EU. Again, these issues are discussed in greater detail in section 6.

44. Finally, supervising a DLT 'network' might be more complex than supervising central market infrastructures, in particular considering that the different nodes might be established in different jurisdictions and subject to different privacy, insolvency and other requirements.

Questions to stakeholders:

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.

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

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?

5 Key risks

45. ESMA realises that the DLT could bring some potential benefits to securities markets, provided that a number of challenges are addressed as discussed above. Meanwhile, ESMA sees potential risks in the technology, which are discussed in greater detail below. Some of these risks are specific to the DLT. Others, which may exist in the current market infrastructure already, could potentially be heightened if the DLT was to be deployed widely.

5.1 Cyber risk, fraud and money laundering

46. As highlighted in the section on benefits, the shared nature of the ledgers may mitigate the risk that a cyber-attack directed to a single point brings down the entire network as might be the case with the current systems. Meanwhile, a flaw in the system could have wider consequences. Indeed, if someone was to break into the system, he/she might have access not only to the information stored at the point of attack but to the full breadth of information recorded on the ledgers. This could have extensive negative consequences on the confidentiality of information and the integrity of data. Furthermore, if the technology itself (e.g., the encryption techniques) was hacked, the risk of contagion could extend beyond the single DLT network under attack, as the protocols used by different DLT networks tend to be similar.

47. Private/public keys might be lost or stolen and used fraudulently to record fictitious transactions. In the absence of a sufficiently robust governance framework, dishonest nodes might also take control of the network, even temporarily, and alter the consensus process.

48. Similarly, in the absence of adequate controls, the DLT could be exposed to the risk of money laundering and terrorist financing activities, notably because the use of public/private keys could make it easier to conceal identities and to hide the history of transactions.

5.2 Operational risks

49. The proponents of the DLT believe that it could help mitigate operational risks, by increasing the automation of back office processes and reducing the potential for human errors. However, a glitch or a failure in the system could have far-reaching consequences. Indeed, because market participants would rely on the same system and the same processes, which would be largely automated, the need for checks and balances would be reduced. While this would be largely beneficial, it could leave the system unduly exposed in case of anomaly.

50. Similarly, the use of smart contracts should in principle reduce the likelihood of errors, e.g., by automating the processing of corporate actions, but could also create additional risks in the absence of adequate controls, e.g., if the coding is erroneous. In other words the occurrence of errors might be lower but their impact could be higher.

5.3 Market volatility, interconnectedness and new pockets of risks

51. Through a unique reference system and more automated and harmonised processes across participants, asset classes, the DLT could contribute to herding behaviour and increase market volatility in times of stress. It could also increase the interconnectedness between market participants, by making it easier for them to interact with one another, which could increase the spreading of shocks.

52. Depending on how and by whom it would be used, the DLT could also lead to risk accumulating in less regulated segments of the markets. Finally, it could boost certain market segments where the activity is currently hindered by cumbersome post-trading processes and create new pockets of risks in financial markets.

5.4 Fair competition and orderly markets

53. The deployment of the DLT could raise fair competition issues. As an example, the supporters of a DLT network could prevent new participants to join or impose such conditions that it becomes economically unviable for new members to join the network. A monopoly-like situation could emerge, with possible negative consequences on the cost and the quality of the services.

54. It might be difficult to establish competitive ledgers or ensure the interoperability between ledgers, thus negatively impacting the competitive nature of securities markets.

55. Unless adequate controls are in place, some participants to the network could also unduly exploit the information recorded on the network, e.g., recent trades made by competitors or the level of their inventories, to front-run them or manipulate the market. The lower the privacy level of the network or the lower the safeguards attached to it, the higher the risks would be.

5.5 Other risks

56. The DLT could add another layer of complexity to securities markets because of the use of complex encryption techniques, which could have negative implications from a risk management or oversight perspective. Indeed, while the DLT should in principle enhance the traceability of transactions and transparency in securities markets, the encryption of the information could make it harder to disentangle it and to process it, at least in the short term. This could effectively render supervisory work more challenging.

57. Another risk is related to the uncertainty attached to the migration to a new environment. Risks, e.g., operational risks, could be heightened during the transition phase to the DLT. Furthermore, the running of two parallel systems could impose additional costs on providers and users of financial services in the short to medium term.

Questions to stakeholders:

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.

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

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

6 Analysis of the applicable EU regulatory framework

58. In this section of the DP, ESMA sets out its analysis of how the DLT, when applied to securities markets, would map to the existing EU regulatory framework. Importantly, this analysis does not pretend to be exhaustive, considering that the technology is still at an early stage of development and that its applications may evolve through time. Equally important, ESMA's purpose is not to make any recommendations on possible ways to address the regulatory challenges that the DLT could raise at this stage. Rather, this section of the DP aims to draw stakeholders' attention on the key requirements likely to apply to the entities or group of entities willing to use the DLT (referred collectively as the DLT network in the rest of the document), depending on the type of securities and related activities that they envisage to undertake. Entities and groups of entities willing to use the DLT should be mindful of the existing regulatory framework.

59. Based on its analysis and consistent with current market developments, ESMA is of the view that initially the DLT will primarily be explored for post-trading activities, i.e., clearing, settlement, and securities servicing. Therefore, this section of the DP focuses on the main EU pieces of legislation on post-trading activities, namely the European Market Infrastructure Regulation (EMIR), the Settlement Finality Directive (SFD), the Central Securities Depositories Regulation (CSDR). Other pieces of legislation such as the Markets in Financial Instruments Directive (MiFID), the UCITS Directive and the Alternative

Investment Fund Managers Directive (AIFMD) for the record-keeping of ownership are also discussed. Other pieces of legislation such as the Securities Financing Transaction Regulation (SFTR), the Directive on Financial Collateral Arrangements, the Market Abuse Regulation, the Anti-Money Laundering Directive or the Short Selling Regulation could be relevant as well but are not discussed in this paper. Notwithstanding the binding regulatory requirements likely to apply, some principles, like the CPMI-IOSCO Principles for Financial Market Infrastructures[4], may also provide useful guidance on the requirements that would need to be applied to the DLT if it were to replace the existing market infrastructures.

60. This section of the DP is organised according to the following activities:

- Clearing;
- Settlement;
- Safekeeping and record-keeping of securities and rights attached to securities (including asset servicing);
- Reporting; and
- Other activities.

6.1 Clearing activities

61. In the EU, clearing activities are governed by EMIR and MiFIR. EMIR provides that certain classes of over-the-counter (OTC) derivative transactions have to be cleared through Central Counterparties (CCPs) and that risk mitigation techniques need to be applied for other types of OTC transactions. MiFIR extends the clearing obligation by CCPs to regulated markets for exchanged-traded derivatives. In addition, clearing may apply to other types of transactions (e.g., transactions of shares or bonds), depending on market practice. In the latter case, clearing may be done through CCPs or other entities.

Key requirements provided by EMIR and MiFIR

62. Pursuant to Article 5 of EMIR, certain types of standardised OTC derivative transactions are subject to the clearing obligation by CCPs. For other OTC transactions not subject to the clearing obligations by CCPs and not voluntarily cleared by authorised or recognised CCPs, Article 11 of EMIR provides that these assets shall be subject to risk-mitigation techniques to measure, monitor and mitigate operational risk and counterparty credit risk. In particular, Article 11 includes requirements related to bilateral margining.

[4] See http://www.bis.org/cpmi/publ/d101a.pdf

63. According to Article 2(3) of EMIR, clearing means the process of establishing positions, including the calculation of net obligations, and ensuring that financial instruments, cash, or both, are available to secure the exposures arising from those positions.

64. Article 2(1) of EMIR defines a CCP as a legal person that interposes itself between the counterparties to the contracts traded on one or more financial markets, becoming the buyer to every seller and the seller to every buyer. CCPs are legal entities subject to authorisation. They have to comply with a wide set of obligations such as capital requirements, open-access rules, rules of conduct, reporting to trade repositories, etc. Notably, CCPs have to comply with the segregation and portability obligations set out in Article 39 of EMIR.

65. Article 29 of MiFIR extends the clearing obligation by CCPs to regulated markets for exchanged-traded derivatives.

Possible scenarios

66. Based on the above, market participants willing to set up a DLT network in order to provide clearing services would need to comply with different requirements, depending on the type of instrument involved. ESMA considers below the different possible scenarios and what they would imply in terms of legal requirements for the DLT network. As highlighted in section 3, the DLT might provide limited benefits for the clearing of derivatives instruments.

67. For each of the scenarios below, if the DLT network is designated as a securities settlement system under the SFD, it would need to comply with SFD as discussed in section 6.2. An overview of the scenarios is provided in Annex 2, Table 1.

Scenario 1: Clearing of OTC derivative transactions in a DLT environment

Scenario 1.1: OTC derivative transactions subject to the clearing obligation by CCPs[5] as defined by EMIR

68. If market participants were to set up a DLT network to clear OTC transactions subject to the central clearing obligation by CCPs, this DLT network would need to comply with the requirements set by EMIR. In particular, this means that a CCP would still be needed.[6]

69. Different solutions could be envisaged in order to comply with this requirement (e.g., agreement with an existing CCP, set up of a new legal entity that would apply for an authorisation as a CCP), which could bear different levels of costs, benefits and risks.

70. The same would apply for OTC derivatives transactions that are not subject to the clearing obligation by CCPs but that are cleared by CCPs on a voluntary basis.

[5] https://www.esma.europa.eu/sites/default/files/library/public_register_for_the_clearing_obligation_under_emir.pdf
[6] According to Article 17 of EMIR, Member States shall grant authorisation only to CCPs that comply with all the requirements of EMIR and that have been designated as a securities settlement system under the SFD.

Scenario 1.2: OTC derivative transactions not subject to the clearing obligation by CCPs

71. Article 11 of EMIR imposes certain obligations on financial counterparties and non-financial counterparties that enter into an OTC derivative contract not cleared by a CCP. In particular, financial and non-financial counterparties shall ensure that appropriate procedures and arrangements are in place to measure, monitor and mitigate operational risk and counterparty credit risk including at least:

    - The timely confirmation, where available, by electronic means, of the terms of the relevant OTC derivative contract;

    - Formalised processes which are robust, resilient and auditable in order to reconcile portfolios, to manage the associated risk and to identify disputes between parties early and resolve them, and to monitor the value of outstanding contracts.

72. These procedures and arrangements are further specified in Articles 12 to 15 of Regulation 149/2013 and the future Regulatory Technical Standards on bilateral margining.

73. Furthermore, Article 11 of EMIR also contains the requirements on the exchange of collateral between certain counterparties. Bilateral margining would be an important factor to take into account in considering how the DLT could potentially be implemented for OTC derivatives transactions not cleared by a CCP.

74. As a result, if the DLT was to be used for the clearing of OTC derivative transactions not subject to the clearing obligation or not cleared by CCPs, it would have to be developed in such a way that it would allow counterparties and non-financial counterparties to comply with the obligations of risk mitigations techniques of Article 11 of EMIR.

Scenario 2: Clearing of exchange-traded derivatives in a DLT environment

75. According to article 29 of MiFIR, transactions of exchange-traded derivatives have to be cleared through CCPs as defined by EMIR. Like under scenario 1.1, if market participants were to use the DLT to clear transactions of exchange-traded derivatives, there would still be a need to have a CCP that would have to comply with EMIR.

Scenario 3: Clearing of transactions of other types of assets (i.e. MiFID securities, securities lending, repurchase agreements, collateral deposits, derivatives non-MiFID instruments and non-MiFID financial instruments) in a DLT environment[7]

76. Some CCPs and other types of market infrastructure such as clearing-houses clear non-derivative assets. If these assets are cleared by a CCP, the CCP must comply with EMIR rules (e.g. authorisation, capital requirements).

[7] https://www.esma.europa.eu/sites/default/files/library/ccps_authorised_under_emir.pdf

77. If the assets are cleared by entities other than CCPs there is no rule at EU level on the form that these entities must take and on their governance.[8] However, national laws may apply.

Questions to stakeholders:

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?

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

6.2 Settlement activities

78. Settlement activities are governed mainly by CSDR and SFD.

79. The aim of CSDR is to harmonise certain aspects of the settlement cycle and settlement discipline and to provide a set of common requirements for Central Securities Depositories (CSDs) operating securities settlement systems across the EU. CSDR plays a pivotal role for post-trade harmonisation efforts in Europe, as it will enhance the regulatory and operational conditions for cross-border settlement in the EU. It applies to the activities of CSDs and to the settlement of transactions in all financial instruments as defined by MiFID, unless specified otherwise in a given provision of CSDR.

80. SFD aims at reducing the systemic risk associated with participation in payment and securities settlement systems, and in particular the risk linked to the insolvency of a participant in such a system. SFD applies to payment and securities settlement systems duly notified as well as any participant in such a system, and to collateral security provided in connection with the participation in a system, or operations of the central banks of the Member States in their functions as central banks. In line with ESMA's remit, the rest of the document focuses on the SFD applied to securities settlement systems, and not payment systems, which fall under the scope of the EBA.

Key requirements provided by CSDR

81. According to Article 3(1) of CSDR, an issuer established in the Union that issues or has issued transferable securities which are admitted to trading or traded on trading venues shall arrange for such securities to be represented in book-entry form. This requirement shall apply from 1 January 2023 to transferable securities issued after that date and from 1 January 2025 to all transferable securities. Recital 11 of the CSDR provides that the Regulation should not impose one particular method for the initial book-entry form

[8] For the time being, this type of entity is not very common and so far the most important regulated securities markets have chosen to use CCPs.

recording which should be able to take the form of immobilisation or of immediate dematerialisation.

82. According to Article 3(2) of CSDR, where a transaction in transferable securities takes place on a trading venue the relevant securities shall be recorded in book-entry form in a CSD. Where transferable securities are transferred following a financial collateral arrangement as defined in point (a) of Article 2(1) of Directive 2002/47/EC, those securities shall be recorded in book-entry form in a CSD on or before the intended settlement date, unless they have already been so recorded.

83. Article 5 of CSDR provides that any participant in a securities settlement system shall settle such transactions on the intended settlement date. As regards transactions in transferable securities which are executed on trading venues, the intended settlement date shall be no later than on the second business day after the trading takes place.

84. According to Article 6 of CSDR, for each securities settlement system that it operates, a CSD shall establish procedures that facilitate the settlement of transactions on the intended settlement date with a minimum exposure of its participants to counterparty and liquidity risks and a low rate of settlement fails. Article 7 further provides that a CSD should establish a system to monitor settlement fails and procedures to resolve those settlement fails, including through buy-ins.

85. According to article 9 of CSDR, settlement internalisers shall report to the competent authorities on a quarterly basis the aggregated volume and value of all securities transactions that they settle outside securities settlement systems.

86. Article 2 of CSDR defines a CSD as a legal person that operates a securities settlement system as defined by SFD (see below) that is not operated by a central counterparty whose activity consists of the execution of transfer orders and provides at least one of the following services: (i) initial recording of securities in a book-entry system ('notary service') or (ii) providing and maintaining securities accounts at the top tier level ('central maintenance service').

87. According to Article 18(2) of CSDR, securities settlement systems may be operated only by authorised CSDs, including central banks acting as CSDs.

88. A CSD must be authorised and supervised by the competent authority of its home member state. It has to comply with a wide set of requirements, including capital and organisational requirements set out in Title III of CSDR.

89. Article 2 of CSDR defines a settlement internaliser as any institution which executes transfer orders other than through a securities settlement system.

Key requirements provided by SFD

90. Article 3 of SFD provides that transfer orders and netting shall be legally enforceable and shall be binding on third parties.

91. Article 9 of SFD provides that the rights of holders of collateral security should be insulated from the effects of the insolvency of the provider.

92. Article 2(a) specifies that a 'system' shall mean a formal arrangement between three or more participants, with common rules and standardised arrangements for the clearing or execution of transfer orders designated as a system by the Member State whose law is applicable.

93. According to Article 2(f), participants to a securities settlement system shall mean an institution, a CCP, a settlement agent or a clearing house. Article 2(d) of the Directive clarifies the functions of a settlement agent but does not specify the type of entity that can fulfil the functions of a settlement agent.

Possible scenarios

94. Based on the above, and as far as settlement activities are concerned, different requirements may apply to the DLT network, depending on the applicability of SFD and CSDR. If the DLT network is not designated as a securities settlement system, it will not fall under the scope of SFD. This will in turn affect its capacity to act as a CSD. Criteria considered by Member States to designate a securities settlement system under SFD may include the volume and value of all securities transactions that are settled through the system and its systemic importance. If, on the contrary, the DLT network is designated as a securities settlement system, SFD and CSDR will apply. We discuss the various scenarios and their consequences in terms of requirements for the DLT network in greater detail below. An overview of the scenarios is provided in Annex 2, Tables 2, 3.

<u>Scenario 1: Settlement of securities transactions by a DLT network that is not designated as a securities settlement system by its home Member State</u>

95. Because the DLT network is not designated as a securities settlement system, SFD would not apply (SFD, article 2). This also means that the DLT network would not be able to qualify as a CSD (CSDR, article 2).

<u>Scenario 1.1: The DLT network does not act as a settlement internaliser under CSDR</u>

96. The DLT network may settle securities transactions that do not fall in the scope of CSDR and that would not be potentially settled in a securities settlement system operated by a CSD or by a central bank acting as a CSD. In such a case, the DLT network would not act

as a settlement internaliser under CSDR and would not be subject to the reporting requirements under CSDR.

Scenario 1.2: The DLT network acts as a settlement internaliser under CSDR

97. If the DLT network qualifies as a settlement internaliser, it will have to comply with the relevant reporting requirements. In the case of internalised settlement (when settlement takes place outside a securities settlement system), CSDR specifies reporting requirements for the settlement internalisers. Therefore, if the DLT network is used for internalised settlement, it will need to comply with the reporting obligations laid down in Article 9 of CSDR, provided that the securities covered fall in the scope of Article 9 of CSDR.

98. This scenario would also imply the need for the DLT network to have a connection with the relevant CSD, depending on the securities it covers (through accounts opened with the CSD) either directly (the DLT network would be a participant in the securities settlement system operated by the CSD) or indirectly via a participant in the securities settlement system operated by the CSD.

99. If the DLT network were a participant in the securities settlement system operated by the CSD, it would need to comply with the participation requirements, as well as with the reconciliation requirements in accordance with Article 37 of CSDR.

Scenario 2: The DLT network is designated as a securities settlement system

100. In this case, the SFD requirements would apply. According to article 2 of SFD, a formal arrangement would be needed between the participants to the system and a system operator would have to be identified. According to CSDR, this operator would need to be a CSD (CSDR article 18.2) and the CSDR requirements would apply.[9] This CSD would need to comply with CSDR requirements, including minimum capital requirements, conduct of business rules, prudential rules, etc.

Questions to stakeholders:

[9] In addition to payment systems, which fall outside of ESMA's scope, SFD applies to securities settlement systems operated by CCPs or CSDs. Because we discuss settlement activities in this section, our focus is on securities settlement systems operated by CSDs. For more details on the securities settlement systems operated by CCPs, please refer to the section on clearing.

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?

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?

6.3 Safekeeping and record-keeping of ownership of securities and rights attached to securities (including asset servicing)

101. There is no harmonised definition of safekeeping and record-keeping of ownership of securities at EU-level and this task is performed by a wide range of entities in practice such as custodian banks, registrars, notaries, depositaries or CSDs. The rules might also depend on whether the record-keeping applies at the issuer or investor level.

102. One important aspect to consider is the legislation applicable to securities and the rights attached to securities, which is not harmonised at EU level. Aspects linked to the issuance of securities as well as to the rights attached to securities are defined by national rules, including Civil Law and Corporate Law.

103. Also, the national law may provide that a security is governed by the law of the place where the security is located/registered or where the records of the security are kept. In a DLT environment, it might be less clear where the securities and their records are located.

104. In addition, it is equally important to look at how settlement finality is ensured in relation to operations involving transfer of ownership of securities.

Scenario 1: record-keeping at issuer level:

105. For record-keeping of ownership at issuer level, the rules will depend on each national Corporate Law.[10] Therefore, in order to determine whether the DLT can be used in that context there is a need to assess each relevant national Corporate Law. For example, in Germany, the issuer has to create a physical certificate for the establishment of securities in accordance with civil law requirements. This means that this national provision would prevent the full digitalisation of securities with the DLT in Germany.

106. In this context, it is also important to highlight the need to ensure the integrity of the issue. Under Article 37 of CSDR, a CSD shall take appropriate reconciliation measures to verify that the number of securities making up a securities issue or part of a securities issue submitted to the CSD is equal to the sum of securities recorded on the securities accounts

[10] Pursuant to Article 49(1) of CSDR, Member States shall communicate to ESMA a list of the key relevant provisions of their laws and ESMA shall publish this list. The list is available here.

of the participants of the securities settlement system operated by the CSD and, where relevant, on owner accounts maintained by the CSD.

Scenario 2: record-keeping at investor level:

107. The rules governing the recording-keeping of ownership at the investor level will vary across several sectorial legislations such as MiFID, the UCITS Directive or the Alternative Investment Fund Managers Directive (AIFMD). In particular, in the context of the UCITS Directive and the AIFMD, depositaries are responsible for the safe-keeping of assets of the funds (UCITS and alternative investment funds) for which they are the depositaries.

108. Therefore, if there is an attempt to use the DLT under the UCITS Directive or the AIFMD, a depositary would still be required to comply with the UCITS Directive and the AIFMD.

109. The record-keeping of ownership at investor level may also depend on the Civil Law.

Questions to stakeholders:

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

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

6.4 Regulatory reporting activities

110. Several pieces of legislation such as MiFID, EMIR and the SFTR have introduced reporting obligations from market participants to national competent authorities or third-parties such as trade repositories. For example, under EMIR, information on CCP-cleared and non-CCP cleared derivative contracts must be reported to trade repositories. Under the SFTR there will be similar reporting obligations for securities financing transactions.

111. Trade repositories are registered legal entities supervised by ESMA and they have to comply with a wide set of rules. In particular, EMIR imposes strict operational, record-keeping and data-managements requirements to trade repositories. If market participants would like to set up a DLT network to provide the same exact functions as trade repositories, there would still be a need to have a trade repository that would have to comply with EMIR.

Questions to stakeholders:

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

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

6.5 Other activities

112. The DLT could potentially be used for other activities in the area of securities markets, such as securities trading, and other types of issuance related services than those already discussed above. One example may be in the area of crowdfunding.

Questions to stakeholders:

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?

Other questions to stakeholders:

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

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.

7 Annexes

7.1 Annex 1

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?

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

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?

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.

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.

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

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.

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.

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

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?

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.

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

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

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?

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

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?

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?

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

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

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

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

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?

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

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.

7.2 Annex 2

Table 1: Clearing - Overview of the scenarios

	OTC derivatives		Exchange-Traded Derivatives	Other assets**
	OTC derivatives transactions subject to the clearing obligations*	**OTC derivatives that are not subject to the clearing obligation**		
	scenario 1.1	**scenario 1.2**	**scenario 2**	**scenario 3**
MiFIR (art. 29)	N/A	N/A	Need to clear through a CCP	N/A
EMIR	Need to clear through a CCP	Need to implement risk mitigation techniques ; clearing through CCP possible but not mandatory	N/A	N/A except if voluntary clearing through a CCP
Impact on the DLT	Need to have/be a CCP, hence need to be designated as a settlement system	Not mandatory to have/be a CCP*** but need to implement risk mitigation techniques	Need to have/be a CCP, hence need to be designated as a settlement system	Not mandatory to have/be a CCP***, no specific requirements

* or cleared by CCPs on a voluntary basis

** MiFID securities, securities lending, repurchase agreements, collateral deposits, derivatives non-MiFID instruments and non-MiFID financial instruments

*** but if clearing happens through a CCP, CCP needs to comply with EMIR

	Elevated requirements
	Average requirements
	Low requirements

Table 2: Settlement - Overview of the scenarios

	The DLT is NOT designated as a settlement system		The DLT is designated as a settlement system
	NO settlement internaliser	**Settlement internaliser**	
	Scenario 1.1	**Scenario 1.2**	**Scenario 2**
SFD	N/A	N/A	Need to comply with SFD
CSDR	N/A	Reporting requirements under Article 9 of CSDR	Need to comply with CSDR
Impact on the DLT	No requirements	Reporting requirements under Article 9 of CSDR; Potential reconciliation requirements under Article 37 of CSDR	Need to ensure finality of settlement, need to have/be a CSD
Impact on the scope of activities that the DLT may undertake	Cannot be a CSD, which bears some limits for settlement activities (see below)	Cannot be a CSD, which bears some limits for settlement activities (see below)	Has to be a CSD

Elevated requirements
Average requirements
Low requirements

Table 3: Settlement - CSD related requirements by type of instruments

	Financial instruments as defined by MiFID (e.g. transferable securities (TS), money market instruments, UCITS, emission allowances)			**Non-financial instruments**
	TS, issued by issuers established in the Union, admitted to trading BUT not traded on trading venues	**TS, issued by issuers established in the Union, traded on trading venues, or transferred following a financial collateral arrangement**	**Other financial instruments**	

CSDR	Need to record in book-entry form but not necessarily with a CSD	Need to record in book-entry form with a CSD	No need to record in book-entry form but CSDR requirements may apply if the securities are recorded in a CSD and/or maintained in securities accounts with a CSD	N/A
Impact on the DLT	Not mandatory to have/be a CSD but need to record in book-entry form	Need to have/be a CSD	Not mandatory to have/be a CSD	Not mandatory to have/be a CSD