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| 4 January 2022 |

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| Reply form for the Call for Evidence (CfE) on the DLT Pilot Regime |
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| Date: 4 January 2022 |

Responding to this paper

The European Securities and Markets Authority (ESMA) invites responses to the specific questions listed in the Call for Evidence (CfE) on the DLT Pilot Regime for published on the ESMA website.

*Instructions*

Please note that, in order to facilitate the analysis of the large number of responses expected, you are requested to use this file to send your response to ESMA so as to allow us to process it properly. Therefore, ESMA will only be able to consider responses which follow the instructions described below:

* use this form and send your responses in Word format (pdf documents will not be considered except for annexes);
* do not remove the tags of type <ESMA\_QUESTION\_DLTP\_1> - i.e. the response to one question has to be framed by the 2 tags corresponding to the question; and
* if you do not have a response to a question, do not delete it and leave the text “TYPE YOUR TEXT HERE” between the tags.

Responses 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.

**Naming protocol**

In order to facilitate the handling of stakeholders’ responses please save your document using the following format:

ESMA\_DLTP\_NAMEOFCOMPANY\_NAMEOFDOCUMENT.

e.g. if the respondent were ESMA, the name of the reply form would be:

ESMA\_DLTP\_ESMA\_REPLYFORM or

ESMA\_DLTP\_ANNEX1

***Deadline***

Responses must reach us by **4 March 2022.**

All contributions should be submitted online at [www.esma.europa.eu](http://www.esma.europa.eu) under the heading ‘Your input - Consultations’.

***Publication of responses***

All contributions received will be published following the end of the consultation period, unless otherwise requested. **Please clearly indicate by ticking the appropriate checkbox in the website submission form if you do not wish your contribution to be publicly disclosed. A standard confidentiality statement in an email message will not be treated as a request for non-disclosure.** Note also that 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 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](http://www.esma.europa.eu) under the headings ‘Legal notice’ and ‘Data protection’.

# General information about respondent

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| --- | --- |
| Name of the company / organisation | Avanade BV |
| Activity | Other Financial service providers |
| Are you representing an association? |  |
| Country/Region | International |

1. Please provide any general observations or comments that you would like to make on this call for evidence, including any relevant information on you/your organisation and why the topics covered by this call for evidence are relevant for you/your organisation.

<ESMA\_QUESTION\_DLTP\_1>

Thank you for inviting us to submit a response to your Call for Evidence. Please find below the responses to this CfE provided by an international team of Avanade Subject Matter Experts.

About Avanade: Avanade was founded in 2000 by Accenture LLP and Microsoft Corporation, and globally employs 50,000+ professionals with a revenue of US$ 4.0+ billion (2021 fiscal). We are a global professional services company providing IT advisory, innovative digital and cloud services as well as technology, business & industry solutions, and managed services.

In our function as end-to-end capability provider in the financial industry (working with 7 out of top 10 global banks and 300 financial services clients) we have witnessed the rapid advancement and adoption of DLT in recent years in the financial industry and beyond.

Our work with the “crypto economy” around the world: Catalysed by the increased emergence of DLT as infrastructure and Fintech start-ups called “Crypto Assets Firms”, the challenge for governments and regulators to protect consumers and investment firms alike has increased exponentially in the last months. To put it in perspective, the market value for (public) DLTs increased from $400 billion to $3 trillion last year.

The technological possibilities and business models (a global, 24x7 and online market) outpaced the regulatory side on local and international level. To protect governments, institutions, and consumers alike, it is crucial to shine more light onto those matters.

Being at the forefront of innovation and technology, Avanade has taken an active role in shaping the future of this market. We actively help regulators around the world and traditional market participants (banks, exchanges, infrastructure providers etc.) to understand the new challenges and explore and make the best of these new possibilities.

Despite our capabilities and experience, Avanade does not currently plan to operate a distributed ledger.

Some of our active projects/direct involvement includes:

* The open SEC consultation (USA)
* The MICA and MIFID regulation (EEUU) and this RFI
* The AMBIMA, CVM, Central Bank and Congress self-regulation (Brazil)

With a long and extensive background in DLT Technologies, standards formulation (ISO, ITU, IEEE, etc.) Avanade regularly partners with Microsoft for client work. Microsoft is well-positioned to help with research insights and directions in recent technology advances.

In this CfE, our approach to answering the questions is to explain key technical characteristics of DLTs and embed those into a holistic picture from a regulatory perspective required by ESMA to make informed decisions about the future of DLTs in the EU.

We have answered under the philosophy that technology should serve society. The current regulations issued by ESMA are the result of the cumulative effort of the trading “community” over the past decade. They should therefore be respected and preserved as much as possible. The onus will therefore be on DLT technologies to follow the regulations as closely as possible, not to amend the regulation to accommodate DLT trading.

<ESMA\_QUESTION\_DLTP\_1>

1. Please indicate whether you/your organisation is planning to operate a DLT MI under the DLT Pilot and provide some high-level explanation of the business model

<ESMA\_QUESTION\_DLTP\_2>

Avanade is a Global System Integrator and Consultancy business with significant expertise in Blockchain and DLT. Our services using DLT extend way beyond Financial Services and into Blockchain Identity, Blockchain design/cryptography, Blockchain-based security logging/monitoring and others. We have been involved in DLTs since their inception and understand both the technologies as well as the crypto trading community.

In Financial Services, we are positioned to advise regulators and participants on the use of DLT and possibly assist with the design, implementation, governance, or other aspect of DLT technologies. We do expect some of our customers to ask us to provide DLT-related services, but we do not anticipate running a trading business in a DLT-based financial market on our own.

<ESMA\_QUESTION\_DLTP\_2>

1. What are the key elements supporting the increased use of DLT in the field of financial services? What are the main obstacles, including in the technical standards, for the development and up-take of DLT-based solutions (listing, trading and settlement)? Do you plan to operate a restricted (permissioned) or unrestricted (permissionless) distributed ledger?

<ESMA\_QUESTION\_DLTP\_3>

There are several key elements around the use DLT’s in financial services. The discussion of these follows below, including main obstacles from a technical perspective.

*DLTs are global in nature and allow for continuous trading -* DLT-based financial services operate globally - one market for the whole world and this market is open to trading 24/7. Anyone can trade anything from anywhere at any time. This is unlike regulated markets, which are local, follow certain trading times and are generally limited to a certain geographic area (local legislation).

*Trust in the rules -* When using DLT, all operations are governed by rules. These rules are inherent to the system and underpinned by cryptography. Everyone must follow the same rules, which cannot be broken. Traditional systems do of course have rules. However, it is **not** mathematically impossible to abuse them.

*Private DLTs are not transparent and hence less/not trustworthy* – Private DLTs refer to some trading systems that use a DLT internally in a way which is not transparent to all/other participants. Such systems are effectively a better kind of traditional centralized databases, with encryption-backed integrity. They offer no “community” advantage to DLT trading and should at best be treated in exactly the same manner as traditional trading. We also caution for the possibility of fraud disguised as “DLT trading” to attract innocent retail traders.

*Semi-public DLTs are also known as permissioned DLTs or proof-of-stake DLTs* - They work with a pool of controlling nodes (voting pool) which decide what transactions are valid and should be accepted in the immutable ledger. In a trading scenario, the validation nodes would be run by many (e.g., 20-50 nodes) assorted market players who have a “stake” in making sure the market runs fairly. The ledger relies on core data for the fabric of its operation. It protects payload data for the application(s) it supports (i.e., the regulated trading application). The validating nodes need access (need to “see”) all the data, both core and payload. The payload can be anything the application(s) need(s) and can implement all the fields required by regulation e.g., transaction fields, reporting fields. In addition, semi-public DLTs must grant ESMA or the NCAs read-only access to all the voting pool data for market monitoring. This way, regulators will see all the payload data, e.g., transaction and reporting data, used for validation and the resulting validated transactions.

*Public ledgers are also known as permission-less or proof-of-work DLTs* - These are already popular trading venues such as Bitcoin, which cannot have their own payload but still can have additional “transaction data” or “meta-data”. It may be possible to add the regulatory data, or a hash of it, in the meta-data to enable regulation, even in established DLT protocols that a regulator cannot change. Although such an action would invalidate key benefits like anonymity, it will enable exchanging assets between regulated and non-regulated DLT markets. For example, an asset traded in a MiFIR venue would contain the regulatory meta-data but if it was exchanged “outside” of the MiFIR venue, the meta-data would be either stripped or ignored by the non-regulated market. If the asset was taken back “inside” an MiFIR venue, the meta-data would be re-created (if previously stripped) or re-instated (if previously ignored). This would allow trading across DLT-based venues, whether MiFIR or other non-regulated venues, which would enhance the possibilities for traders and thus make it more attractive.

*Timing constraints* – We would like to point out that despite the above, no popular and acceptereportsd DLT can currently meet all the latency requirements described in the RTS. We have expanded this in Q18.

*Certain DLTs, like Bitcoin, are pseudonymous* – This means that instead of names, IDs are used. In this case, some reporting details may not be known and thus cannot be reported. As we explain in Q23, this can be partially mitigated by assigning useful values to the missing details. However, they will never be perfectly equivalent to systems which use names. For example, the buyer of an asset might be known, but not its seller. This issue depends on the DLT and should be approached on a case-by-case basis.

*Security requirements* - Each DLT is designed to operate under well-defined security requirements within a security framework while adhering to financial regulations. The emergence of new technologies such as DLTs and their specific application in the financial sector brings never seen, unique challenges in terms of security risks which should be addressed by a regulatory framework.

Avanade does currently not plan to operate a distributed ledger.

<ESMA\_QUESTION\_DLTP\_3>

1. Would you consider operating a DLT MTF Would you consider operating a DLT SS without operating at the same time a DLT MTF? If yes, under which conditions?

<ESMA\_QUESTION\_DLTP\_4>

Avanade does not consider operating neither a DLT MFT or a DLT SS at the present time.

ESMA\_QUESTION\_DLTP\_4>

1. Please provide an overview of how DLT securities trade in the current market structure (incl. what types of trading system are used, the relevance of secondary market trading)? Do you see any challenges with the current market structure following the application of the DLT Pilot?

<ESMA\_QUESTION\_DLTP\_5>

Currently, in the non-regulated space, we have DLT-based markets trading continuously on a 24/7 basis. Unlike regulated markets, there is no pre-market, market and post-market trading. In addition, participants can trade anything from anywhere in the world. These characteristics are, of course, strikingly different from regulated markets and make regulated markets seem too constrained. However, there is one challenge faced by DLT markets, and that is latency.

Both *proof-of-stake* or *proof-of-work* ledger technologies introduce a degree of latency until transactions can be validated and inserted in the ledger. By design, this delay is in the order of minutes and is therefore significant because it prevents high-frequency transactions and thus certain types of trading. Protocols like Sidetree (https://identity.foundation/sidetree/spec) propose mechanisms to minimize latency and enable scaling. But Sidetree is a compromise as it exchanges speed for reduced trust/security – it allows a “window of opportunity” in which new transactions may not be fully committed and thus vulnerable to attacks of system abuses.

There is no doubt that latency will play a major role in the adoption of DLTs. It seems highly improbable that a ledger could avoid higher latency while remaining fully secure. This has been extensively researched, and no widely accepted solution has been found so far. Some organisations might claim otherwise, but the veracity of their claims remains doubtful.

Next to latency, a major challenge (for public DLTs) is their increased energy/electricity consumption required for the (from the outside) “simple action” of exchanging data between computers. Although this may not be a scientifically accurate perception, there may be a certain level of public disapproval of the high energy consumption of certain DLTs.

<ESMA\_QUESTION\_DLTP\_5>

1. Instrument status: Do DLT financial instruments have different characteristics than ‘standard’ shares, UCITS-ETFs and bonds? If yes, please elaborate and explain whether these different characteristics call for a different approach for the application of the transparency requirements?

<ESMA\_QUESTION\_DLTP\_6>

Most DLT financial instruments will probably have their own data schema and thus their own characteristics. Only a few of the regulatory attributes would exist in DLT financial instruments. The missing attributes should be added, either as part of the data payload or as meta-data (as explained in Q3). Since the missing characteristics can be added, a different approach to regulation will not be required to accommodate the difference in DLT characteristics. Instead, we propose the careful addition of the missing characteristics into meta-data or payload.

However, the regulation needs to consider that DLTs take longer to synchronise and validate transactions. Amendments in the timing requirements of regulations will be needed. For more detail, please see Q18.

<ESMA\_QUESTION\_DLTP\_6>

1. Transactions: Where are DLT financial instruments traded? Could there be OTC trading in those instruments?

<ESMA\_QUESTION\_DLTP\_7>

Current DLT trading cannot be considered on-venue because it would not be following rules placing it in a RM, OTF or MTF venue. All DLT trading at the moment should be considered OTC, which of course means that, yes, there can be OTC trading of DLT instruments (see Q6).

However, there is no reason why DLT-based trading venues (RM, OTF and MTF) cannot be created. By doing so, they would benefit from toughness against abusing the rules, and they would be able to attract traders willing to participate in regulated markets. It would be even more beneficial if the DLT-based venue can exchange assets with OTC system, so that traders not willing to participate in regulated markets can still trade with traders who do.

<ESMA\_QUESTION\_DLTP\_7>

1. Transactions: Do the lists of transactions in Article 13 of RTS 1 and Article 12 of RTS 2 reflect relevant transaction types for DLT financial instruments? If not, please explain which types of transactions are missing and why they should be added to the lists of transactions.

<ESMA\_QUESTION\_DLTP\_8>

Article 13 of RTS 1 and Article 12 of RTS 2 refer to transparency of transactions and define some types of transactions that do not have to be reported. However, the nature of DLT trading mandates that all transactions are public or semi-public and thus the exceptions do not matter – everything will be public and thus “reported”. Should a DLT-based regulated trading venue be created, it will also have to hold public or semi-public list of transactions. A DLT that attempts to hold transactions private would not offer any advantage, would not be trusted by DLT traders will not attract legitimate traders and would more or less be no different than a centralized database (with cryptographically-assured integrity). Regulation should mandate that semi-public DLTs can grant read access to country regulators for market monitoring.

<ESMA\_QUESTION\_DLTP\_8>

1. Can the current transparency requirements in RTS 1 and 2 be applied for DLT financial instruments (e.g. liquidity assessment, thresholds, flags, reporting fields) or would they need to be adjusted? If not, what should be the appropriate approach?

<ESMA\_QUESTION\_DLTP\_9>

The nature of DLT trading mandates that all transactions are public or semi-public, and thus they can be processed by anyone for any purpose, including to derive data from the transactions. This needs to be combined with including all relevant data in payload or meta-data, as explained in Q3.

This approach would retain compatibility with the current DLT and will also enable exchanging assets between MiFIR and non-regulated DLT markets. I.e., an asset is traded in a MiFIR venue would have the meta-data but if it was exchanged out of the MiFIR  venue, the meta-data would be either stripped or ignored by the non-regulated market. If the asset was taken back into an MiFIR venue the meta-data would be re-created or re-instated. The issue with this approach is that it may increase latency.

However, it would allow trading across DLT-based venues, whether MiFIR or OTC, which would enhance the options for traders. On the other hand, holding more meta-data about transactions may invalidate key benefits of the DLT instrument, for example it may cancel anonymity.

<ESMA\_QUESTION\_DLTP\_9>

1. Are there any standards (e.g. messaging, identification of accounts/users, product identifiers, reporting, etc.) in a DLT environment that should be taken into account when revising the RTS 1 and 2?

<ESMA\_QUESTION\_DLTP\_10>

A large number of standards around DLTs are either published or under development. These come from multiple bodies, including ISO, IEEE, IEF and W3C. The following non-conclusive list is an extract of some standards applicable to financial services, and so relevant to RTS 1 and RTS 2.

IEEE 2140.1-2020: General Requirements For Cryptocurrency Exchanges; ISO/TR 23244:2020 – Blockchain And Distributed Ledger Technologies – Privacy And Personally Identifiable Information Protection Considerations; ISO/TR 23455:2019 – Blockchain And Distributed Ledger Technologies – Overview Of And Interactions Between Smart Contracts In Blockchain And Distributed Ledger Technology Systems; ISO/WD TR 23642 – Blockchain and distributed ledger technologies - Overview of smart contract security good practice and issues; ISO/WD TS 23259 – Blockchain and distributed ledger technologies — Legally binding smart contracts; ISO/AWI TS 23516 – Blockchain and Distributed Ledger Technology — Interoperability Framework.

Although we do recommend ensuring that RTS 1 and RTS 2 are not a barrier in complying with the above standards, we must be pragmatic on both the length of that work and, most crucially, the possibility for those standards to be entirely incompatible with the philosophy of the regulations (e.g. transparency vs privacy).

Standardization is a driver for business and so it is very likely that DLTs will follow the standards as good as they can. The same approach is recommended for RTS 1 and 2, unless there is a risk of the regulated markets falling behind and in the long term being unable to compete with DLT-based markets, even if those are not regulated but standardized.

<ESMA\_QUESTION\_DLTP\_10>

1. Do you anticipate any problems that may emerge from the current liquidity concepts in Delegated Regulation (EU) 2017/567 and RTS 2 for the application of related transparency requirements for DLT financial instruments? Please explain and make proposals on how such problems could be solved.

<ESMA\_QUESTION\_DLTP\_11>

The liquidity concepts set out in Delegated Regulation (EU) 2017/567 and RTS 2 define to thresholds for liquidity and methodology for assessing such. Given that DLT keeps a public or semi-public record of transaction, the process of assessing an organisation’s liquidity becomes even easier. In fact, it can even be automated with a piece of software which can get its required data from the ledger itself – not the participants or the liquidity providers. Although there may be some aspect of liquidity not recorded in the ledger, this will depend on the case, and it may be able to be included as data payload or meta-data (see Q3). Overall, we anticipate no issue in the principle of assessing liquidity in DLT-based markets. Regulation should mandate that semi-public DLTs can grant read access to country regulators for market monitoring.

<ESMA\_QUESTION\_DLTP\_11>

1. Are DLT securities traded on different trading systems as ‘standard’ shares and UCITS-ETFs (mostly continuous trading and periodic auctions) or bonds (RFQ, voice trading)? Please explain.

<ESMA\_QUESTION\_DLTP\_12>

The current public DLT-based trading (e.g., crypto assets) use different systems for different types of assets. However, there can be DLTs which support multiple types of assets including shares, bonds and securities. This will most likely be semi-public DLTs and run by investment networks (banks, investment companies etc.). Therefore, the response depends on the objectives and requirements governing a DLT-based trading network.

Please note that although open DLT trades tokens, these are not shares, ETFs or bonds, meaning they are not DLT securities. Also, they have different ways of trading and venues which are global and 24/7. There may be some closed DLT venues which do trade standard regulated instruments with the support of a DLT. We consider those as private DLTs, and we have discussed this topic in Q3.

<ESMA\_QUESTION\_DLTP\_12>

1. To what extent would the choice of trading protocols and applications have an impact on the trading of instruments and on the requirements to publish information according to RTS 1 and 2?

<ESMA\_QUESTION\_DLTP\_13>

DLT technologies are not directly compatible with the instruments as they are defined in RTS 1 and 2. Although there cannot be an instrument design compatible with all DLTs, meta-data or payload can be added to the DLT data to make them compatible with (likely) any instrument and its regulatory context (please see more details and warnings in Q3). This new semi-public DLT could be designed such that its trading protocols and applications would be compatible. Alternatively, the trading protocols and applications can be made compatible with the DLT (see Q 47).

We should also point out that an exchange would be required if the intention was to move asset in or out of the regulated environment. The DLT protocol and implementation is a choice which will affect the approach to the above issue.

In addition to the above, the choice of DLT protocol affects latency and energy consumption (see Q5 and Q18 for more detail)

<ESMA\_QUESTION\_DLTP\_13>

1. Do the systems on which DLT financial instruments trade require tailored pre-trade transparency requirements as those per Table 1 Annex I of RTS 1 and Annex I of RTS 2?

<ESMA\_QUESTION\_DLTP\_14>

 It is unlikely that any DLT will directly support the transparency requirements listed. For example, DLTs do record trading time at the required granularity, and they do record a price (value). But they miss out on a lot of the remaining requirements, like the instrument identification code or a currency. The missing requirements could be included in the payload or meta-data, as detailed in Q3. This addition would meet the requirements in full, without any changes. Note: the wording of the question referred to different tables, we have answered by the requirements listed on Table 3 Annex I of RTS 1 and Table 2 Annex I of RTS 2.

<ESMA\_QUESTION\_DLTP\_14>

1. Would the use of restricted (permissioned) vs unrestricted (permissionless) DLT represent any difference in how the pre-trade transparency requirements should be applied?

<ESMA\_QUESTION\_DLTP\_15>

It is unlikely that the type of ledger and permission philosophy would affect any of the transparency requirements set out in RTS 1 and 2, and that includes pre-trade requirements. As explained in Q3, the primary mechanism to support regulation requirements is by including the information in additional data payload or meta-data. This approach shifts the issue to the implementation of the specific DLT instance, rather than the approach of the underlying DLT technology.

<ESMA\_QUESTION\_DLTP\_15>

1. Is it in your view necessary to make changes to the calibration of waivers for DLT shares and UCITS-ETFs in RTS 1? Do you expect any implementation issues in the application of waivers also taking into account the above considerations?

<ESMA\_QUESTION\_DLTP\_16>

The assumptions made in this question and the context given in the CfE document may not be true in all cases. The CfE document states “*It is ESMA’s understanding that a specific DLT financial instrument is unlikely to be traded on different venues*.”, to which we do not fully agree. It is likely that a technical exchange can be built to allow trading on a different venue, even a non-regulated market, and still retain a reference price from the regulated market. This can happen with direct exchange or even with NFTs, which can float independently and do not require a direct technical connection. ESMA should consider whether it wishes to support this innovation as an in-scope possibility.

Further, the context states “*ESMA is seeking feedback whether DLT shares and UCITS-ETFs trade differently in terms of sizes with respect to “standard” instruments*”. This is challenging to quantify as the popularity of DLT markets among institutional and retail traders in the future is unknown. Past and present experience with Bitcoin and NFTs shows that the public is likely to embrace certain types of DLT (or crypto) trading, and thus what could start as a very small market grow to a very large one very quickly.

We believe that the best approach is to not amend the calibration of waivers yet, as there is no firm evidence on which any changes could be based, yet. It may be beneficial to introduce a flexible method to calibrate the waivers in the future.

<ESMA\_QUESTION\_DLTP\_16>

1. Is it in your view necessary to make changes to the calibration of waivers for DLT bonds in RTS 2? Do you expect any implementation issues in the application of wavers also taking into account the above considerations?

<ESMA\_QUESTION\_DLTP\_17>

DLTs can be deployed in a public, semi-public or private manner. Transparency waivers are not useful in a case of a public or semi-public DLT, as all information would have to be available, and the market is open 24/7. Even in semi-public DLTs, the information is known to far too many participants and so it cannot be hidden from the competition. It is true that these facts will expose liquidity providers to the risks that waivers aim to control, but it is an inevitable consequence of DLTs and the nature of such markets.

Of course, a private DLT could be implemented. This would enable the selective publication of information, but such an endeavour effectively negates the advantages of DLTs. A DLT that attempts to hold transactions private would not offer any advantage, would not be trusted by DLT traders, will not attract legitimate traders and would more or less be equivalent to a centralised database.

Given the above, we do not see any need for amending the waivers of RTS 2. Regulation should mandate that semi-public DLTs can grant read access to country regulators for market monitoring.

<ESMA\_QUESTION\_DLTP\_17>

1. What can be considered as close to real-time as possible for the publication of post-trade reports in the context of DLT-securities on DLT MIs?

<ESMA\_QUESTION\_DLTP\_18>

DLTs have two performance indicators, throughput and transaction time. Throughput refers to how many transactions can be accepted per second. This is beyond the scope of this question. Transaction time is the time for the network to come to an agreement, that is to validate a transaction, specifically: to apply the governance rules (e.g., validate permissions), to execute the proof-of-work or proof-of-stake algorithm and to save the result in its state. Bitcoin takes up to 60 minutes to validate a transaction while Ethereum takes on average 6 minutes. These times are indicative and may change in the future.

An array of other DLTs exist with transaction times varying from about 2 seconds to several minutes. It is paramount to note that DLTs achieve high speeds by trading off security for speed. They either allow a window of opportunity to attack the system or offer weak transaction validation. The issue of validation time has been the subject of scientific research for many years and there is no universally accepted solution that offers equal levels of security as Bitcoin and Ethereum but at higher transaction speeds. There are, however, some solutions that offer levels of security that can be considered good enough and indeed operate at higher transaction speeds.

Ultimately, no DLT will ever be able to achieve the transaction times of a centralized database. The distributed nature of DLTS involve communications across *multiple* computers, which will always take more time than a communication between one computer and a single central database. Both the one-minute for equity and five-minute for non-equity instruments is not likely to be realistic for DLTs - despite the existence of 2-second DLTs as these are not yet established, proven, and accepted. On the other hand, when a DLT is used, all participants are bound to the same transaction delay and all the transaction details become available immediately after the cycle has finished (i.e., after the block has advanced). With that in mind, there is no need to regulate the acceptable delay for public and semi-public DLTs, because everyone will operate under the same delay.

However, there is a need to select DLTs that fit ESMA’s objectives. For example, ESMA may regulate that a DLT taking, on average, longer than *x* to complete transactions is not suited for regulated market trading. Independent reviewers should be used to determine the average transaction time and to monitor that it remains the case continuously and all the time. Monitoring is passive and helps to not only know the average at any time, but to also to detect technical issues, whether accidental or intentional – e.g., a cyberattack or other attempt to abuse the system.

<ESMA\_QUESTION\_DLTP\_18>

1. Are the current deferral periods for equity and non-equity instruments appropriate for DLT securities? Please, distinguish between DLT shares, ETFs and bonds.

<ESMA\_QUESTION\_DLTP\_19>

DLTs publish the information immediately after a block has completed its validation, and the transactions have been inserted in the blockchain. On that basis, there is no need to allow for any deferral periods, and in fact there cannot be any deferral periods. Every participant will see all the information at the same time, if the ledger is public or semi-public. This applies to all types of trading assets including shares, ETFs and bonds. Regulation should mandate that semi-public DLTs can grant read access to country regulators for market monitoring.

<ESMA\_QUESTION\_DLTP\_19>

1. Is it necessary to amend the current fields and flags for post-trade transparency (modifications/cancellations/additions) for their application to DLT shares, ETFs (Tables 2, 3 and 4 of Annex I of RTS 1) and bonds (Annex 2 of RTS 2)? Do you expect any implementation issues on basis of the current fields and flags?

<ESMA\_QUESTION\_DLTP\_20>

As detailed in Q3, it is unlikely that *any* DLT will be directly compatible with the regulated instruments. ESMA is rightfully concerned about the field “currency”, and we are also concerned about many other fields which are not part of the operational fabric of DLTs. As suggested elsewhere, compatibility should not arise from amendments to regulation, but from adding additional payload or meta-data to the DLT transactions. This solution will enable DLT-based trading while retaining all the required post-trade transparency fields without amendments.

<ESMA\_QUESTION\_DLTP\_20>

1. Is it necessary to amend RTS 3 for the purpose of the DLT Pilot? Do you anticipate any problems with the application of RTS 3 under the DLT Pilot?

<ESMA\_QUESTION\_DLTP\_21>

Our answer assumes that the providers relevant to RTS 3 will also use a DLT to store their reporting output. If that is the case, then the data sourced for RTS 3 will be drawn from DLT data payload or meta-data as described in Q3. The reports themselves will also go in the payload or meta-data of a DLT transaction, as it is unlikely any DLT would directly support the fields required by RTS 3. ESMA is correct to be worried about currency field, but we are in practice concerned that almost none of the fields will be directly compatible with DLTs. The requirement to submit data each day can be met by DLT. If the payload and meta-data is indeed used, then there will be no need to amend RTS 3 in any way.

<ESMA\_QUESTION\_DLTP\_21>

1. Do you agree with the approach indicated in the above paragraph? Please justify your answer.

<ESMA\_QUESTION\_DLTP\_22>

It is our understanding that ESMA is willing to enable exceptions to RTS 22 when DLTs are used for trading. In our opinion this approach would have its own merits in other cases but not for (public or private) DLTs. Rather than ESMA adapting the regulations, DLT MI Operators ought to deploy and implement compliant DLTs.

We have detailed in Q3, how DLTs can use payload or meta-data to include all flags and fields required for compliance. There should be no need for exemptions in terms of what data is reported.

On the other hand, flexibility (possibly in the form of exceptions) should be afforded around timings of reporting – as explained in Q18, it is unlikely that DLTs will be able to meet the timings currently possible by centralized databases.

We should also appreciate that DLTs are likely to be public or semi-public, therefore the term “reporting” is arguably inaccurate, if the information is public, then there is little further to “report.”

<ESMA\_QUESTION\_DLTP\_22>

1. Private individuals: Do you agree that DLT MTFs could report transactions on behalf of the private individual as part of the compensatory measure foreseen by Article 4(1)(c) of the pilot regime? Please explain your statement. What other solutions can be explored to address this data gap?

<ESMA\_QUESTION\_DLTP\_23>

Considering that they are likely to be public or semi-public, there is no need to give additional reporting responsibility to DLT MFTs. All transactions will be visible. Regulation should mandate that semi-public DLTs can grant read access to country regulators for market monitoring. This would satisfy the first part of the question.

For any missing data, the correct approach would be to define a mechanism to complete them with reasonable and useful values, and then to *register* those values in the main or an auxiliary ledger.

<ESMA\_QUESTION\_DLTP\_23>

1. Reporting status and transaction reference numbers (Fields 1 and 2): How will DLT MTF treat cancellations to correct previously submitted information as per Section 5.18 of ESMA Guidelines on transaction reporting being the information stored on DLTs immutable? Is it necessary to amend the current fields 1 and 2 for their application in the context of a DLT environment? Do you foresee any other reporting status other than New and Cancellation in the context of a DLT environment?

<ESMA\_QUESTION\_DLTP\_24>

It is correct that data inserted in DLTs is immutable. This is true for all DLT MIs including DLT MTF. The only mechanism to delete data in DLTs is to make a new entry that marks a previous entry as deleted. This is achieved in various ways, for example some DLTs keep deletions in a chain separate than the main chain, while others store deletion entries in the main chain.

The approach enabled by RTS 22 can be followed accurately with a DLT. Records can be marked as “NEW” or “CANC” in the way RTS 22 currently allows. We do not expect the need to introduce any other state. The rules around reuse of TRNs can also be adhered to by DLTs. It is not necessary to amend the current fields 1 and 2 for their application in the context of a DLT environment.

Some DLTs project a “state” of final/effective data after deletion/cancellation. RTS 22 should be slightly amended to designate that reading from a final state projection is acceptable for DLT-based reporting, as long as this state is provided by the DLT nodes themselves and is secure.

<ESMA\_QUESTION\_DLTP\_24>

1. Trading Venue Transaction Identification, TVTIC (Field 3): Is it necessary to amend the current field for its application in the context of a DLT environment? Do you expect any implementation issues on basis of the current fields? Should new fields be added in the context of a DLT environment?

<ESMA\_QUESTION\_DLTP\_25>

As detailed in Q3, DLT-based trading should use data in payload or meta-data to support all the fields of ESMA regulations. Thus, no DLT would be directly compatible with ESMA regulations. If this approach is adhered to, then the TVTIC field can follow the regulation As-Is. It can be used in exactly the same way as if it was not a DLT but a centralised database. It is not necessary to amend the current field. We do not expect any implementation issues on the basis of the current fields and no new fields should be added.

<ESMA\_QUESTION\_DLTP\_25>

1. Executing entity and submission entity identification codes; MiFID II Investment Firm indicator (Fields 4-6); Buyer details and decision maker (Fields 7-15); Seller details and decision maker (Fields 16-24): Is it necessary to amend the current fields for their application in the context of a DLT environment? Do you expect any implementation issues on basis of the current fields? Should new fields be added in the context of a DLT environment?

<ESMA\_QUESTION\_DLTP\_26>

We have looked at the referred fields [MiFID II Investment Firm indicator (Fields 4-6); Buyer details and decision maker (Fields 7-15); Seller details and decision maker (Fields 16-24)]. Although it refers to different fields, the explanation for the answer is the same as for Q25: It is not necessary to amend the current fields. We do not expect any implementation issues on the basis of the current fields and no new fields should be added.

<ESMA\_QUESTION\_DLTP\_26>

1. Transmission of an order (Fields 25-27): Is it necessary to amend the current fields for the application in the context of a DLT environment? Do you expect any implementation issues on basis of the current fields? Should new fields be added in the context of a DLT environment?

<ESMA\_QUESTION\_DLTP\_27>

Regarding the context of this question, as described in the CfE document: we have detailed in Q8 and elsewhere that reporting exceptions are not applicable in a DLT, because all information is either public or semi-public, and that in semi-public cases the country regulator should be granted read access to the ledger data for market monitoring.

Regarding the question: we have looked at the referred *Transmission of an order (Fields 25-27).* Although it refers to different fields, the explanation for the answer is the same as for Q25: It is not necessary to amend the current fields. We do not expect any implementation issues on the basis of the current fields and no new fields should be added.

<ESMA\_QUESTION\_DLTP\_27>

1. Trader, algorithms, waivers and indicators (Fields 57-65): Is it necessary to amend the current fields for the application in the context of a DLT environment? Do you expect any implementation issues on basis of the current fields? Should new fields be added in the context of a DLT environment?

<ESMA\_QUESTION\_DLTP\_28>

Regarding the context of this question, as described in the CfE document: As explained in Q8, reporting exceptions are not applicable in a DLT, because all information is either public or semi-public. In semi-public cases the country regulator should be granted read access to the ledger data for market monitoring. Given that DLT markets are usually open 24/7, the concept of pre-trading does not currently co-exist with DLT trading.

Regarding the pharasing of the question: we have looked at the referred *Trader, algorithms, waivers and indicators (Fields 57-65).* Although it refers to different fields, the explanation for the answer is identical to the one for Q25: It is not necessary to amend the current fields. We do not expect any implementation issues on the basis of the current fields and no new fields should be added.

<ESMA\_QUESTION\_DLTP\_28>

1. Short selling field (Field 62): Is short selling possible? Does it depend whether it is a DLT MTF or a DLT MTF+DLT SSS? Is it necessary to amend the current field for the application in the context of a DLT environment? Do you expect any implementation issues on basis of the current fields?

<ESMA\_QUESTION\_DLTP\_29>

We have looked at the referred *Short selling field (Field 62).* Although it refers to different fields, the explanation for the answer is the same as for Q25: It is not necessary to amend the current fields. We do not expect any implementation issues on the basis of the current fields and no new fields should be added. This applies to DLT MTFs as well as DLT MTF + DLT SS.

In addition, we think that short selling will also be possible based on the discussion in Q3. Any field or function can be implemented in the same way as it is currently done in systems using centralized databases.

<ESMA\_QUESTION\_DLTP\_29>

1. Transaction details (Fields 28-40): Is it necessary to amend the current fields for their application in the context of a DLT environment? Do you expect any implementation issues on basis of the current fields? Should new fields be added in the context of a DLT environment?

<ESMA\_QUESTION\_DLTP\_30>

We have looked at the referred *Transaction details (Fields 28-40).* Although it refers to different fields, the explanation for the answer is the same as for Q25: It is not necessary to amend the current fields. We do not expect any implementation issues on the basis of the current fields and no new fields should be added.

<ESMA\_QUESTION\_DLTP\_30>

1. What are your views on the arrangements that DLT MTFs would need to establish to ensure the provision of complete and accurate reference data to ESMA? Do you think that the current arrangements described in RTS 23 should be amended to ensure its application in the DLT environment? Do you expect any implementation issues on basis of the current RTS 23?

<ESMA\_QUESTION\_DLTP\_31>

We believe RTS 23 should not be amended to ensure its application in the DLT and we do not expect any implementation issues. This answer is based on our position that DLT trading will never be directly compatible with financial instruments unless payload data or meta-data are included, as we have explained in Q3.

We would, however, like to note that there can be changes to RTS 23 to simplify the processes described therein. For example, we have stated that where ledgers are public, there is no need for “reference data” to be reported, as the country regulator would be able to see the public transaction data. In the case of semi-public ledgers, we have suggested a small amendment to mandate that the local regulator shall have read access to ledger data for the purpose of market monitoring.

We would like to note that the provisions around timing of reporting in RTS 23 are unnecessarily generous for DLT trading. The transactions in a DLT are publicised immediately after the block has finished, which may take up to a maximum of (only) 60 minutes – as explained in Q18.

Finally, the provisions for local regulators to transmit data to ESMA using a special secure channel by midnight can be improved. We suggest the regulators to use their own DLT for the purpose of communicating data including reporting. Please see Q46 for details.

<ESMA\_QUESTION\_DLTP\_31>

1. Issuer related fields (Field 5): Is it necessary to amend the current field for the application in the context of a DLT environment? Do you expect any implementation issues on basis of the current fields? Should new fields be added in the context of a DLT environment?

<ESMA\_QUESTION\_DLTP\_32>

As explained in Q3, DLT-based trading should use data in payload or meta-data to support all the fields according to ESMA regulations. If this approach is followed, then the *Issuer related fields (Field 5)* can follow the regulation As-Is and can be used in exactly the same way as if it was not a DLT but a centralised database. It is not necessary to amend the current field. We do not expect any implementation issues on the basis of the current fields and no new fields should be added.

<ESMA\_QUESTION\_DLTP\_32>

1. Venue related fields (Fields 6-12): Is it necessary to amend the current field for the application in the context of a DLT environment? Do you expect any implementation issues on basis of the current fields? Should new fields be added in the context of a DLT environment?

<ESMA\_QUESTION\_DLTP\_33>

We have looked at the referred *Venue related fields (Fields 6-12).* Although it refers to different fields, the explanation for the answer is the same as for Q25: It is not necessary to amend the current fields. We do not expect any implementation issues on the basis of the current fields and no new fields should be added.

<ESMA\_QUESTION\_DLTP\_33>

1. Notional (Field 13): Is it necessary to amend the current field for the application in the context of a DLT environment? Do you expect any implementation issues on basis of the current fields? Should new fields be added in the context of a DLT environment?

<ESMA\_QUESTION\_DLTP\_34>

We have looked at the referred *Notional currency 1 (Field 13).* Although it refers to different fields, the explanation for the answer is the same as for Q25: It is not necessary to amend the current fields. We do not expect any implementation issues on the basis of the current fields and no new fields should be added.

<ESMA\_QUESTION\_DLTP\_34>

1. Bonds or other forms of securitised debt related fields (Fields 14 – 23): Is it necessary to amend the current field for the application in the context of a DLT environment? Do you expect any implementation issues on basis of the current fields? Should new fields be added in the context of a DLT environment?

<ESMA\_QUESTION\_DLTP\_35>

We have looked at the referred *Bonds or other forms of securitised debt related fields (Fields 14 – 23).* Although it refers to different fields, the explanation for the answer is the same as for Q25: It is not necessary to amend the current fields. We do not expect any implementation issues on the basis of the current fields and no new fields should be added.

<ESMA\_QUESTION\_DLTP\_35>

1. Do you agree with ESMA’s assessment that no major amendments to RTS 25 appear necessary for the implementation of the DLT Pilot?

<ESMA\_QUESTION\_DLTP\_36>

As reflected throughout our answers, we think that ESMA’s regulations in terms of transaction data and reporting data do not need to be amended. However, regulation regarding timing needs to be relaxed to accommodate the longer time DLTs take to settle. Please see Q3, Q5, Q18 and Q31 for more detail.

<ESMA\_QUESTION\_DLTP\_36>

1. Do you think the definition of “order” is still applicable to the DLT context? Are the order record keeping requirements in Article 25 and related RTS 25 applicable in the DLT context? If yes, how do you envisage to comply with such requirements? If no, please justify your answer.

<ESMA\_QUESTION\_DLTP\_37>

Yes, we agree that the definition of “*order*” is still applicable in the DLT context. As explained in Q3, the data defined in RTS 24 (not RTS 25) can be included in the payload of semi-public DLTs. In case of public DLTs, meta-data (in the form of a hash) deriving from the full data can also be included.

These data will originate from the order execution application of the investment firm. This implies that any order processing must be handled by the investment firm system before they reach the DLT. Some of the order execution conditions could be processed in a customised semi-public DLT as part of the validation rules. ESMA might wish to mandate this process to increase transparency, visibility and thus fairness.

<ESMA\_QUESTION\_DLTP\_37>

1. Can chains of transmission on DLT financial instruments occur?

<ESMA\_QUESTION\_DLTP\_38>

Yes, chains of transmission can occur in some types of DLT, specifically in semi-public DLTs that operate with the order data in the payload. In this case, the DLT implementation can choose to enable and allow chains of transmission.

Chains of transmission cannot occur in public DLTs, although there may be a possibility to establish smart contracts to emulate chains of transmission.

<ESMA\_QUESTION\_DLTP\_38>

1. Is it possible to split or aggregate orders? In or out the DLT? Or both?

<ESMA\_QUESTION\_DLTP\_39>

Yes, orders can be split in some types of DLT, specifically in semi-public DLTs that operate with the order data in the payload. In this case, the DLT implementation can choose to enable and allow split or aggregate orders.

Orders cannot be split in public DLTs, although there may be a possibility to establish smart contracts to emulate split or aggregate orders.

<ESMA\_QUESTION\_DLTP\_39>

1. Does the concept of “Transmission of an order” defined in Article 4 of RTS 22 make sense in the context of DLT? If so, when would you consider an order to be transmitted?

<ESMA\_QUESTION\_DLTP\_40>

One way of approaching the answer is to explore the concept of trust. In a DLT trust is anchored into the validation process and the proof-of-stake or proof-of-work executed by the network of DLT nodes.

An order is transmitted to one single node which passes the order to the other nodes for validation, i.e., to start the process of completing a new block. If that single node can be trusted, we could call the order as “transmitted” once an acknowledgment of reception of the order has been received from this node.

This, however, is contrary to the foundational principle of DLTs; no single node should be trusted. Trust and security derive from all the nodes.

An order placed in a DLT should be deemed “transmitted” when in DLT terms it has been validated and inserted into the ledger. The order has gone through the validation steps (which are different depending on the DLT) and secure, trustworthy immutability has been applied. The block has been completed.

An alternative approach would be to consider the order as “transmitted” if it has been submitted to a DLT validation node for inclusion in the ledger (that would be Step (4) in Q41). This would mean that the order has left the “hands” of the Investment Firm, but it does not ensure that the order will pass validation by the DLT. As mentioned above, this would be contradictory to the foundational principle of DLTs.

RTS 22 was not written for DLTs and follows a different trust model. It can be amended for DLT-supported trading without losing sight of its underlying principles. Specifically, Article 4 (1a) and (1b) need to be reworded to firmly refer to the insertion of an order to the DLT. Article 4 (1c) and Article 4 (2) can remain the same. These order details can be accommodated as payload or meta-data as explained in Q3.

<ESMA\_QUESTION\_DLTP\_40>

1. What do you consider are the phases of a DLT transaction? At what point in time can such a transaction in DLT securities be considered executed? How do you think “broadcast the transaction to the network” should be defined?

<ESMA\_QUESTION\_DLTP\_41>

These are the phases of a DLT transaction:

1. A Client gives an order to an Investment Firm.
2. The investment firm receives the order and processes it in its own system, completes the reporting properties and executes any other local task about this order – as they do in non-DLT systems.
3. The investment Firm sends the order to a validation node which is part of the voting pool of the DLT
4. The validation node receives the order and triggers the validation process for this order by sending to every other node in the network (broadcasting).
5. Validation checks to be conducted by each node: whether the digital signature is correct, whether the traded instruments exist and owned by the participants, whether the investment firm has right to execute orders, whether the reporting requirements for the order at this stage are met, whether other governance rules are applied correctly etc. At the end of this phase, each validating node is either ready to vote on the results of the checks or ready to start a *proof-of-work* (public DLT).
6. Final Validation: In a *proof-of-stake (semi-public) DLT* the nodes now vote on whether the order is valid or not. Each node sends its vote to every other node in the network. If all nodes agree, the order is ready to be included into the immutable ledger, i.e., a new block is completed. The agreement is a hard requirement.

In a *proof-of-work (public) DLT*, the nodes do not vote but compete to find the solution for a difficult cryptographic puzzle.

1. The order is now inserted into the immutable ledger and becomes a solid part of it. That is a new block is completed. A “current state” projection may also be updated, if it exists (e.g. some ledgers keep track of their state to accommodate deletions, see Q24).

At this point we can say that the order has been transmitted and executed. A possible amendment to RTS 22 Article 3 is to add Paragraph 3, worded along the lines “An investment firm shall be deemed to have executed a transaction if any of the cases described in Paragraph 1 have been taken in DLT-based trading and have resulted in successful inclusion of the transaction record in the ledger”

The “broadcast the transaction to the network” is our Step 7 above. This step could more accurately be described as “a transaction has been inserted into the immutable ledger.”

Note: The digital signature is not the only validation that happens, and it is not the same in all DLTs, other identity mechanisms can also be used. It is likely that the confusion has risen from the use of digital signatures in Bitcoin, in which case it is indeed the only validation needed. Also note that “digital signature” or “digitally signed” refers to the cryptographical signature created with a Private Key under public-key-cryptography algorithms. This signature is not to be confused with simple digital signatures offered by services like DocuSign which are less secure.

<ESMA\_QUESTION\_DLTP\_41>

1. Do you think the definition of “transaction” is still applicable to the DLT context?

<ESMA\_QUESTION\_DLTP\_42>

Yes. Transactions, as defined in RTS 22 Article 2, can be accommodated in DLT. A minor amendment may be considerd to specifically include that these transactions on DLTs (see Q41).

<ESMA\_QUESTION\_DLTP\_42>

1. General fields (Fields 1 - 3), ISIN for RTS 1-3: Is it necessary to amend the current fields for the application in the context of a DLT environment? Do you expect any implementation issues on basis of the current fields? Should new fields be added in the context of a DLT environment?

<ESMA\_QUESTION\_DLTP\_43>

Yes, it will be necessary to allow a combination of ISIN+DTI to support all aspects of the security as ESMA describes in the context. We do not expect implementation issues. As explained in Q3, these fields can be added in payload or meta-data of DLTs. Please read Q44 as well.

<ESMA\_QUESTION\_DLTP\_43>

1. Should a new field indicating the DTI be added to RTS 23 and RTS 1-3? What kind of analysis could be performed on a tokenised security by coupling ISIN and DTI information?

<ESMA\_QUESTION\_DLTP\_44>

Regarding a new field, and in conjunction with the answer to Q43, we suggest adding a new field to keep the DTI separate from the ISIN. We have considered the case of only amending the allowed values of Field 1 to allow for a combination of ISIN+DTI. However, that is not the best future-proof option.

Regarding analysis, we must understand that once a token has been identified with a DTI, it then becomes open to analysis from where a competent analyser can infer an array of conclusions, even in pseudonymous ledgers: the trading profile of the participant, trading patterns, sources and destinations of assets, ethically dubious activity and so on. There are numerous companies that specialise in AI-based analysis of public ledgers. This type of analysis could be conducted for legitimate reasons by regulators, monitors of the market etc. but also for malicious reasons with criminal intent.

<ESMA\_QUESTION\_DLTP\_44>

1. Is the ISIN sufficient to ensure uniqueness of a given tokenised financial instrument? Is there any element of the DTI standard that you consider should be added as a separate field in RTS 23 and RTS 1-3?

<ESMA\_QUESTION\_DLTP\_45>

For existing financial instruments, the current process of creating an ISIN code is sufficient and adheres to the strict rules of the traditional market i.e., not fractionizing.

For DLT trading, we must embrace new formal standards. The ISIN is not sufficient since it neither covers types and instances of crypto assets, nor new tools like DTI and ISO (ISO 24165-1:2021). The ISIN itself cannot express new financial instruments which are not of financial nature but operated as such, and because it cannot express new types of products, e.g., NFTs, which can be traded as if they were financial instruments.

The DTI itself is sufficient to express all instruments discussed above. A field should be added for the DTI in the RTS (see also Q44). There is no need to store any element of the DTI separately because the DTI will be processed by standard software tools which should be designed such that a breakdown of the information stored in the DTI is fit-for-purpose.

<ESMA\_QUESTION\_DLTP\_45>

1. Traditional reporting systems - RTS 22/23: Does the setting up of the traditional reporting systems as illustrated in Annex 1 of the ESMA Guidelines on transaction reporting make sense in the context of the pilot regime?

<ESMA\_QUESTION\_DLTP\_46>

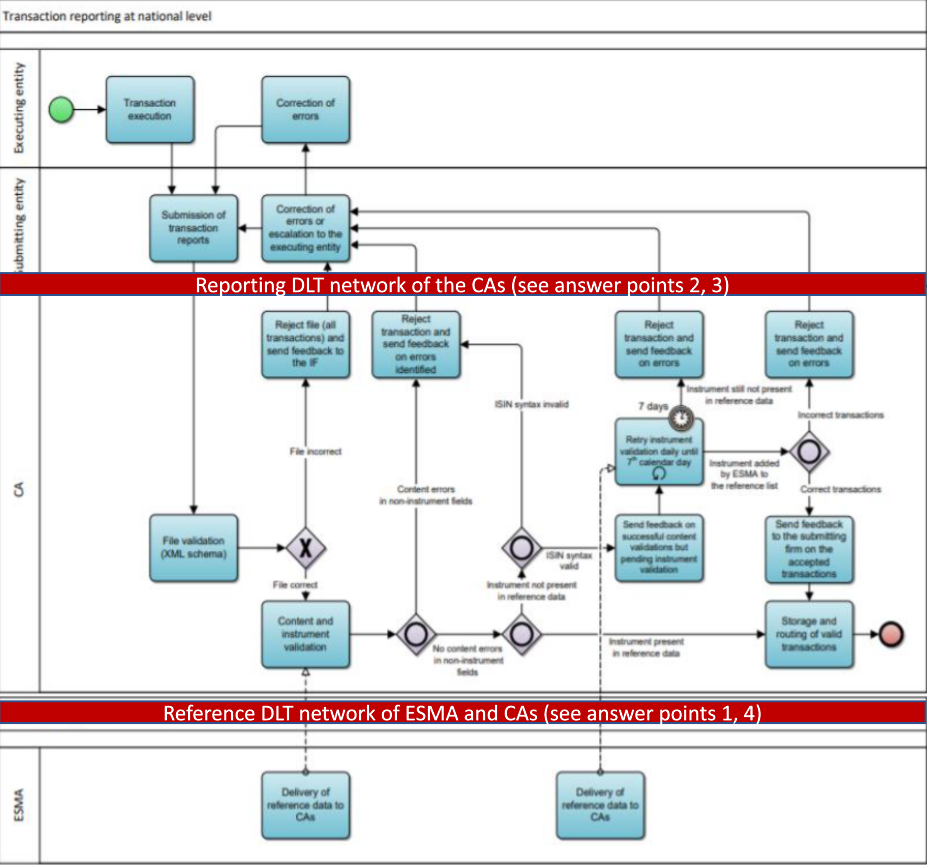
As outlined before, particularly in Q3, we think that the traditional transaction reporting system will work “As-Is” under a DLT environment.

However, there are multiple advantages if reporting as well as trading were supported by DLT. In fact, we would strongly encourage ESMA to pilot a DLT-based reporting infrastructure (labelled as “Reporting DLT network” in diagram). There are multiple high-level benefits to be gained by DLT, including higher levels of trust/security in the system, higher resilience, quicker publication of results, higher inclusion etc. We have listed only a few of the possible changes to the reporting system, if DLTs were used:

1. ESMA and the NCAs could set up their own DLT to exchange reference data via the immutable blockchain (labelled as “Reference DLT network” in diagram). This would replace the traditional “instrument reference data delivery.”

1. Transaction execution backed by a DLT is automatically public or semi-public. Thus, it can be immediately monitored and validated by the CA and the Submitting Entity (labelled as “Reporting DLT network” in diagram).
2. Any errors can be caught at DLT validation stage. The validating nodes could reject the three possible errors (Incorrect files, content errors and invalid ISIN syntax) in real-time. This would create a more efficient and effective system which would benefit all participants.
3. If there was a DLT to share refence data (labelled as “Reference DLT network” in diagram), then even reference errors would be immediately detected. If all data were public or semi-public and immediately available, there may not be the need for a (max) 7 day waiting period to deliver reference data. This may or may not be possible depending on other factors.

The points above would most likely imply an additional layer of complexity to the DLT Pilot. However, we think this complexity is worth the effort in order to deploy the full DLT-based trading and regulation, and to understand the benefits from a holistic point of view.



<ESMA\_QUESTION\_DLTP\_46>

1. Execution and IT infrastructure - RTS 22/23: Does the fact that execution takes place on a DLT has an impact on the investment firm’s reporting system and requires setting up of separate/new IT infrastructures?

<ESMA\_QUESTION\_DLTP\_47>

Yes, there will be an impact on the IT infrastructure on both hardware and software level. Details will depend on how the DLT Pilot will run and what it will stipulate. We can safely assume the following non-conclusive list of IT requirements:

1. At a minimum new software will need to be written to connect existing trading systems with DLT. That includes transmission of requests to the DLT as well as any reporting changes.
2. Investment firms, NCAs, ESMA or any other participant who will operate or monitor the DLT will have to deploy hardware to support it as well as the DLT software itself.
3. There will have to be at least a supplier of the DLT software, responsible for developing it in a way customised for trading under ESMA regulations. That supplier will not necessarily be instructed by ESMA, but it will have to exist in some form.
4. ESMA will need to obtain (or hire) the expertise to review the DLT software made by the supplier above, to ensure the requirements are met. It operates securely and is generally fit-for-purpose of regulated trading

Avanade has expertise and global resources to advise, implement or otherwise support all the IT changes mentioned above (see Q1 and 2).

<ESMA\_QUESTION\_DLTP\_47>

1. ISO standards 20022 and RTS 22/23: Can ISO 20022 be implemented and used by DLT MTFs or DLT TSS and/or their members/participants to comply with the reporting required under Article 26 and 27 of MiFIR. Do you think ISO 20022 would represent an opportunity or an issue for DLT MTF? Please explain your statement.

<ESMA\_QUESTION\_DLTP\_48>

Yes, ISO 20022 can be implemented and used by any mentioned participant and will not represent an issue. The standard refers to a data structure and is therefore only relevant to software development, rather than the regulation side. As we have explained in Q3, if the transaction (and reporting) data is included in DLT data payload or meta-data, then it can be implemented to support XML or JSON or any other format defined in ISO 20022 or anywhere else.

<ESMA\_QUESTION\_DLTP\_48>

1. XML template of RTS 22/23: do you think that different formats might be more suitable to the DLT while keeping the common ISO 20022 methodology? If yes, please explain what the most appropriate format would be and for which reasons.

<ESMA\_QUESTION\_DLTP\_49>

We recommend taking the opportunity to use JSON format, which has the following advantages with respect to XML:

1. It is simpler for software developers to work with, debug, review and understand. This leads to higher quality and less cost.
2. It is the de facto modern standard for exchanging structured data. XML used to take this role in the past, but technology has now clearly moved to JSON.
3. JSON is simpler and lighter from a computational perspective. It takes up fewer bytes to communicate the same information because it is less verbose. This leads to quicker and cheaper communications, less cost of storage and faster processing. The differences are not significant but they do exist and are measurable.

<ESMA\_QUESTION\_DLTP\_49>

1. Do you/your organisation plan to offer settlement of DLT securities in e-money tokens? If yes, what would be the most appropriate way for reporting these transactions? Do you agree with ESMA’s proposal on how to populate the currency fields when the financial instrument is priced in e-money tokens?

<ESMA\_QUESTION\_DLTP\_50>

As explained in Q2, Avanade is a Global System Integrator and Advisor and does not plan to participate in any DLT-based trading.

Storing the value in Euros would work well for e-money tokens. However, considering already existing crypto currencies such as Bitcoin, this approach would be too narrow, and we suggest ESMA to consider the following solutions to be prepared for future developments:

1. Convert to Euro using FIAT price online services report as the value of the crypto currency. Specifics will need to be defined, i.e., which services to use? How to average it out? How often to update the conversion rate? etc. This option is likely to be inaccurate and there may be a cost to purchase up to date conversion rates from the online services.
2. Amend RTS 22 and 23 to allow codes for the e-money itself, even though they are not included in ISO 4217 yet. Codes for supported currencies must be defined. This is likely the most accurate option as it avoids conversion inaccuracies.
3. Amend RTS 22 and 23 to accommodate both options (1) and (2) in separate fields. This is likely the best option as it gives the actual value in e-money or other crypto currencies as well as an estimate of its value in Euros.

<ESMA\_QUESTION\_DLTP\_50>

1. Do you consider it possible that transactions in DLT securities could be settled in different currencies and/or different e-money tokens? If yes, please explain what would be the most appropriate way for converting such transactions in EUR.

<ESMA\_QUESTION\_DLTP\_51>

It is certainly possible to settle transactions in different currencies and can be a feature of a DLT implementation. It works by executing two transactions as the result of one instruction: (1) the exchange of the crypto currency and (2) the exchange of FIAT currency. This way DLTs can support cross-currency and cross-border transactions. Each transaction would be reported separately under ESMA rules. It would be up to the DLT operators to choose how currencies will be converted, the rates, and the rest of the details and implement those in the DLT features. It would be up to the traders to accept the conversion rules. ESMA will probably need to regulate that such transactions do indeed count as two transactions and must be reported as such.

<ESMA\_QUESTION\_DLTP\_51>

1. What are your views on the arrangements that DLT MTFs and DLT TSSs would need to establish to grant direct and immediate access to transaction data to regulators by admitting them as regulatory observer participants? Do you expect any implementation issues in relation to the obligation to make MiFIR transaction data available to the NCAs and MiFIR transparency/ reference data to ESMA?

<ESMA\_QUESTION\_DLTP\_52>

We strongly agree with the view that all DLT-based trading should grant NCAs or even ESMA itself direct read access to the data used for validation and voting in the DLT. This will enable the monitoring as well as the efficiencies discussed in Q46. This question suggested a DLT to be setup between NCAs and ESMA. In addition, we have discussed that an independent third-party appointed by the regulator should monitor the operation of the DLT to ensure adherence to timing and latency requirements. These apply to semi-public DLTs where participants need access to monitor the ledger. Public DLTs can be monitored without permission, and this should be established as well. We do not expect any implementation issues in any of the above cases.

<ESMA\_QUESTION\_DLTP\_52>

1. Is it technically feasible to store on the DLT the details of the transaction according to ISO 20022 methodology in order to enable regulators to pull that data directly into a readable format without any transformation of the data? Do you believe that the use of ISO 20022 could have a significant negative impact in terms of scalability of the system and the related congestion risk? If yes, please justify your answer and specify if the impact is dependent on the type of governance model and technology that the DLT is using.

<ESMA\_QUESTION\_DLTP\_53>

Yes, it is technically feasible to store transaction details in accordance with ISO 20022 so that regulators can pull data directly from the DLT and without the need of transformation. We have explained in Q3 that is data is included in payload or meta-data, then any amount of data in any format can be processed with a performance impact proportional to the increase of data.

For completeness, we would like to note that a potential bottleneck to latency is the speed of internet connectivity amongst participants, but that would only be an issue if the DLT is not implemented correctly i.e. it is not designed to be able to scale and it would not be due to the use of ISO 20022 itself. Regardless of the reason, and as we have mentioned before, DLTs that fail to scale should simply not be a suitable choice for DLT trading. It should not be the concern of ESMA to adapt the rules to allow poor DLT implementations, when there can be good implementations that scale.

<ESMA\_QUESTION\_DLTP\_53>

1. Can all information to be reported under MiFIR Article 27 pursuant to Table III of the Annex to RTS 23 be recorded on the DLT according to the ISO 20022 methodology? Please explain your answer also in relation to scalability impact at DLT level.

<ESMA\_QUESTION\_DLTP\_54>

Yes, all information to be reported under MiFIR Article 27 pursuant to Table III of the Annex to RTS 23 can be recorded on the DLT according to the ISO 20022 methodology.

In Q3 and Q53 we explained that if payload or meta-data is used to store transaction data, then any amount of data in any format can be processed. The impact on performance is proportional to the increase of data. Whether data is in accordance with ISO 20022 has a negligible effect on scalability.

<ESMA\_QUESTION\_DLTP\_54>

1. Can all data necessary to perform the transparency (Article 2 of RTS 3) and DVC (Article 6 of RTS 3) calculations be recorded on the DLT according to the ISO 20022 methodology? Please explain your answer also in relation to scalability impact at DLT level.

<ESMA\_QUESTION\_DLTP\_55>

Yes, all data necessary to perform the transparency (Article 2 of RTS 3) and DVC (Article 6 of RTS 3) calculations can be recorded on the DLT according to the ISO 20022 methodology.

In Q3 and Q53 we explained that if payload or meta-data is used to store transaction data, then any amount of data in any format can be processed. The impact on performance is proportional to the increase of data. Whether data is in accordance with ISO 20022 has a negligible effect on scalability.

<ESMA\_QUESTION\_DLTP\_55>

1. Do you see any issue with obtaining the data elements required by RTS 22 and 23 from external databases like GLEIF, ISO 4217 list (currencies), ISO 10383 (MIC) or ANNA-DSB (ISIN) before the data is permanently stored into the distributed ledger? Please explain your answer.

<ESMA\_QUESTION\_DLTP\_56>

No, we do not see any issue. Assuming the data elements are obtained by the investment firms when an order is processed (see Q41, Step 2), and that the transaction data is included in payload or meta-data of the DLT (see Q3), then the DLT is agnostic with respect to the source of the data elements. It is not relevant whether the system is DLT-based or a traditional centralized database.

<ESMA\_QUESTION\_DLTP\_56>

1. Do you see any major impediments for the regulator as a regulatory observer participant to pull large size of encrypted data from the distributed ledger? Please explain your answer in the context of encryption of data and key management, and in relation to any scalability impact at DLT level.

<ESMA\_QUESTION\_DLTP\_57>

This is already supported by most DLTs and known as “observer nodes” which are designed to primarily be hot-swappable backups in case of voting node malfunction. This functionality can be modified slightly and then leveraged for the purpose of monitoring.

In fact, if the nodes were run by regulators as fully participating (voting) nodes, it would benefit the ledger in terms of security and fairness. We appreciate, however, that this might pose a regulatory/legal hurdle.

As correctly stated, complex cryptographic techniques are used at various stages of DLT processing and should not be confused with hashing. It is noteworthy that these encryption mechanisms do not hinder the ability of legitimate participants to read existing immutable data. If the latter were true, then the DLT would be inoperable. Participants must exist, and they must be able to read the data before they can validate it (see Q41).

Key management would also not be an issue. Ledgers are already designed to manage their keys and that may include rotation and other functions. Various DLTs employ different techniques to achieve that, including the use of PKI or internal Certificate Authorities or even DLT-based key management systems.

<ESMA\_QUESTION\_DLTP\_57>

1. Taking into consideration the variety of technologies available in the DLT world, what is, in your opinion, the most efficient way to admit regulators as regulatory observer participants? Please explain your answer.

<ESMA\_QUESTION\_DLTP\_58>

In semi-public DLTs, which are usually based in *proof-of-stake*, we believe that ESMA and NCAs have a “stake”. It would therefore be very sensible to allow ESMA and/or NCAs as full voting nodes to the DLT. However, the current legislation/political agreement does not allow this.

Therefore, the regulators should be granted at least read access to all the data input and output to the DLT either as an observer node (see Q57) or in another way (details are beyond the scope of this question). For clarity, we would like to emphasize that disagreement/non-compliance to the above should be reason for serious concerns/suspicions about a DLT network’s activities.

For public DLTs, the data is already available to the public and the regulators can simply read it.

<ESMA\_QUESTION\_DLTP\_58>

1. Do you have any suggestion to ensure interoperability among DLT MTFs, DLT TSS and the regulators as described in Paragraph 126? Please explain your answer.

<ESMA\_QUESTION\_DLTP\_59>

ESMA has two technical options to ensure interoperability with reasonable efficiency.

The first is to develop in-house software with modules or agents to read from various DLTs. For each “ESMA-compliant” DLT, a customised software module would be required to fulfil this function. The second option would be for ESMA to enter a partnership with a supplier and purchase their existing software which is already compatible to multiple DLTs.

We are happy to discuss both options upon request.

As discussed in Q57, ESMA or the NCAs should act as “observer nodes” in the DLT. This requires two elements: (1) the DLT must be modified to allow observer nodes without voting rights (if that is not possible already) and (2) the regulator must run and maintain the (virtual) hardware and network of the node at their own cost. We do not expect significant costs.

In fact, one idea would be to cover the cost through fees charged to DLT operators. We must point out that DLT network would enjoy savings by not having to maintain IT infrastructure to support reporting since the regulators would have direct access to the DLT and handle the reporting requirements themselves. These savings would justify the fees.

<ESMA\_QUESTION\_DLTP\_59>

1. Do you have any suggestion to ensure interoperability among different DLT MTFs and/or DLT TSS as described in Paragraph 127? Please explain your answer.

<ESMA\_QUESTION\_DLTP\_60>

Currently, different DLTs are not designed to be compatible. In fact, even two DLTs of the same type would produce a data output stream which would not be directly compatible with each-other. The reason is because immutability of blocks provides an unbroken chain of data produced by one DLT and cannot have arbitrary data added to it by another DLT.

Work done towards compatibility is still at early stages and should not be trusted unless it is understood and peer-reviewed by the community.

The only mechanism to correctly transfer data from one DLT to another is to follow the normal input process – i.e., take the data from one DLT must go through the validation process on another DLT before it can be inserted into a new block. In this case it would not be the same kind of validation as a new financial transaction. Instead, it would be a simple validation to suit the needs of copying data:

1. Data may need to be flagged as archived, so that they are only copied and not actioned

1. Checks should be done to determine whether the process of copying the data is legitimate and trustworthy. This can be achieved with standard security techniques including TLS, identity, and access management etc

It will then be up to the copying process to ensure its own security and integrity when copying data – just the current processes that transfer reporting data as shown in the diagram of Page 30 of the CfE do.

The issue with this approach is that validation takes additional time, and thus data will take some time (in the order of minutes) to be immutably written in their new ledger.

<ESMA\_QUESTION\_DLTP\_60>