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PROJECT GARUDA

Wholesale Digital Rupiah Cash Ledger

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CONTENTS

PREFACE

Bank Indonesia publishes this Consultative Paper (CP) regarding the Digital Rupiah development plan as a follow-up to the publication of the Garuda Project **White Paper: Navigating the Digital Rupiah Architecture**. The issuance of this CP is an endeavor to begin public discussions on the design of the Digital Rupiah.

This CP provides an overview of the Digital Rupiah design for the first stage of its development (immediate stage), namely the wholesale Digital Rupiah cash ledger which includes the introduction of the technology and basic functionalities constituting the issuance, redemption, and transference of funds. The design of the Digital Rupiah development has taken into consideration benchmarks against best practices from several countries that have conducted studies and experiments on wholesale central bank digital currency.

In this regard, Bank Indonesia invites the inputs or views from all relevant stakeholders based on this CP to improve the design of the Digital Rupiah development. All inputs or views submitted should be accompanied by a detailed explanation and/or supporting information.

Feedback can be submitted through the following methods:

- Email to: Payment System Policy Department (proyekgaruda@bi.go.id)
- Letter to: Payment System Policy Department – Bank Indonesia D Building 5th Floor, Jl. MH Thamrin No.2, Jakarta 10350

1 BACKGROUND

On November 30, 2022, Bank Indonesia published a white paper titled "Project Garuda: Navigating the Digital Rupiah Architecture". The white paper served as a form of public communication. The publication also detailed the end-to-end integrated high-level design configuration of Digital Rupiah, its design features to enable the development of new business models, its technology architecture, and regulatory and policy support for the implementation of the design.

Bank Indonesia will develop Digital Rupiah design in stages within an iterative process enabling broader exploration of design alternatives and ensuring optimal benefit. The development of the Digital Rupiah is divided into three stages. On the first stage (immediate state), Bank Indonesia develops wholesale Digital Rupiah (w-Digital Rupiah) cash ledger (issuance, redemption, and transference of funds use cases). On the next stage (intermediate state), Bank Indonesia will expand the w-Digital Rupiah use cases to include broader types of financial market transactions. Lastly, on the final stage (end state), Bank Indonesia will pilot the integrated end-to-end design of w-Digital Rupiah and retail Digital Rupiah (r-Digital Rupiah).

The development of the Digital Rupiah at each of the stages would be pursued in sequences (Figure 1). Each sequence comprises public consultation in the form of Consultative Paper (CP), proof of concept, prototyping, piloting/sandboxing, and review of the policy stance. Bank Indonesia takes this approach to ensure the proper design of Digital Rupiah. Bank Indonesia publishes this CP as the implementation of the sequence. Presently, for this CP, Bank Indonesia places a focus on the first stage of Digital Rupiah development (immediate state).

This CP is part of Bank Indonesia's efforts to initiate public engagement on the Digital Rupiah design. Stakeholder inputs and views are expected, as they would become crucial elements for reinforcing the design of Digital Rupiah in the next sequence of its development.

Testing the applicability of the prototype with a sandbox mechanism (using dummy data). Option for piloting is open.

PoC: Concept validation before the development stage.

Prototyping: Development of prototypes with a specific scope.

1 CONSULTATIVE PAPER

CP publication and FGDs to establish ownership and stakeholders' engagement

4 POLICY STANCE REVIEW

Policy stance review on Digital Rupiah development based on sandboxing evaluation results

Figure 1 Digital Rupiah Sequences

2 THE W-DIGITAL RUPIAH DESIGN: IMMEDIATE STATE

2.1 Overview of W-Digital Rupiah Design

Digital Rupiah is a liability of Bank Indonesia to its users issued in digital format. It is denominated in Rupiah, that functions as a medium of exchange, unit of account, and store of value. Digital Rupiah is the realization of the mandate from the Currency Act as amended by the Development and Strengthening of Financial Sector Act (P2SK Act) which states that the kind of Rupiah consists of rupiah banknotes, rupiah coins, and digital rupiah.

It will be issued in two types, wholesale Digital Rupiah (w-Digital Rupiah) and retail Digital Rupiah (r-Digital Rupiah). Both would be developed in an integrated manner from wholesale to retail. W-Digital Rupiah is the foundation for the entire Digital Rupiah architecture.

W-Digital Rupiah would act as a risk-free settlement asset in the wholesale market and become the complement of the central bank reserve accounts. Additionally, w-Digital Rupiah would bear no interest to its holder.

Users would access w-Digital Rupiah through token-based verification. Tokens are perceived as a suitable choice for w-Digital Rupiah as they are considered more capable of facilitating transactions between actors in financial markets that tend to be more complex.

W-Digital Rupiah would use Distributed Ledger Technology (DLT) as technology platform. Bank Indonesia views DLT as a potential solution to tackle single point of failure problem and improve financial integrity as well as promote higher efficiency.

The DLT platform in w-Digital Rupiah will be permissioned-based. It is seen as more secure and compatible for the character of large value-small volume type of transactions commonly found in financial markets.

2.2 W-Digital Rupiah Design for the Immediate State

This CP places a focus on the first stage of Digital Rupiah development (immediate state), which is w-Digital Rupiah cash ledger. It consists of three use cases namely the issuance, redemption, and transference of funds among participants (Figure 2) with the following key attributes:

Accessability

W-Digital Rupiah is accessed and used on a limited basis by particular parties (commercial banks and non-banks) who meet certain criteria set by Bank Indonesia. These parties are then referred to as wholesalers and non-wholesalers. Bank Indonesia could also serve as a wholesaler.

Role

Bank Indonesia would take roles as:

a. *genesis developer*, the sole party that develops and modifies the source code within the platform.
b. *validating node*, which validates transactions.
c. *regulatory node*, which holds the right to regulate and supervise the network, including the right to collect and analyse data in real time.
d. *operator node*, which serves as a proxy that provides access to the ledger for participants who do not possess their own node (no node).
e. *administrative node*, which manages participation arrangements within the network.

Commercial banks and non-banks who would own a status as wholesaler or non-wholesaler could act as either a validating node, non-validating node, or no node with arrangements that would be explained in the following section.

2 THE W-DIGITAL RUPIAH DESIGN: IMMEDIATE STATE

Issuance

W-Digital Rupiah is issued through the transfer of funds from participant's reserve account to the Digital Rupiah technical account at Bank Indonesia Real Time Gross Settlement (BI-RTGS) System.

Usage

W-Digital Rupiah is used as the settlement asset for financial transactions, inter-participants, or between participants and Bank Indonesia. Participants transfer w-Digital Rupiah within the DLT network in accord with best practices that are settlement finality, queue management supported by gridlock resolution, and privacy.

Redemption

The w-Digital Rupiah cycle ends with redemption. In case participants wish to reduce their Digital Rupiah holding, they could convert w-Digital Rupiah into their reserve account at Bank Indonesia.

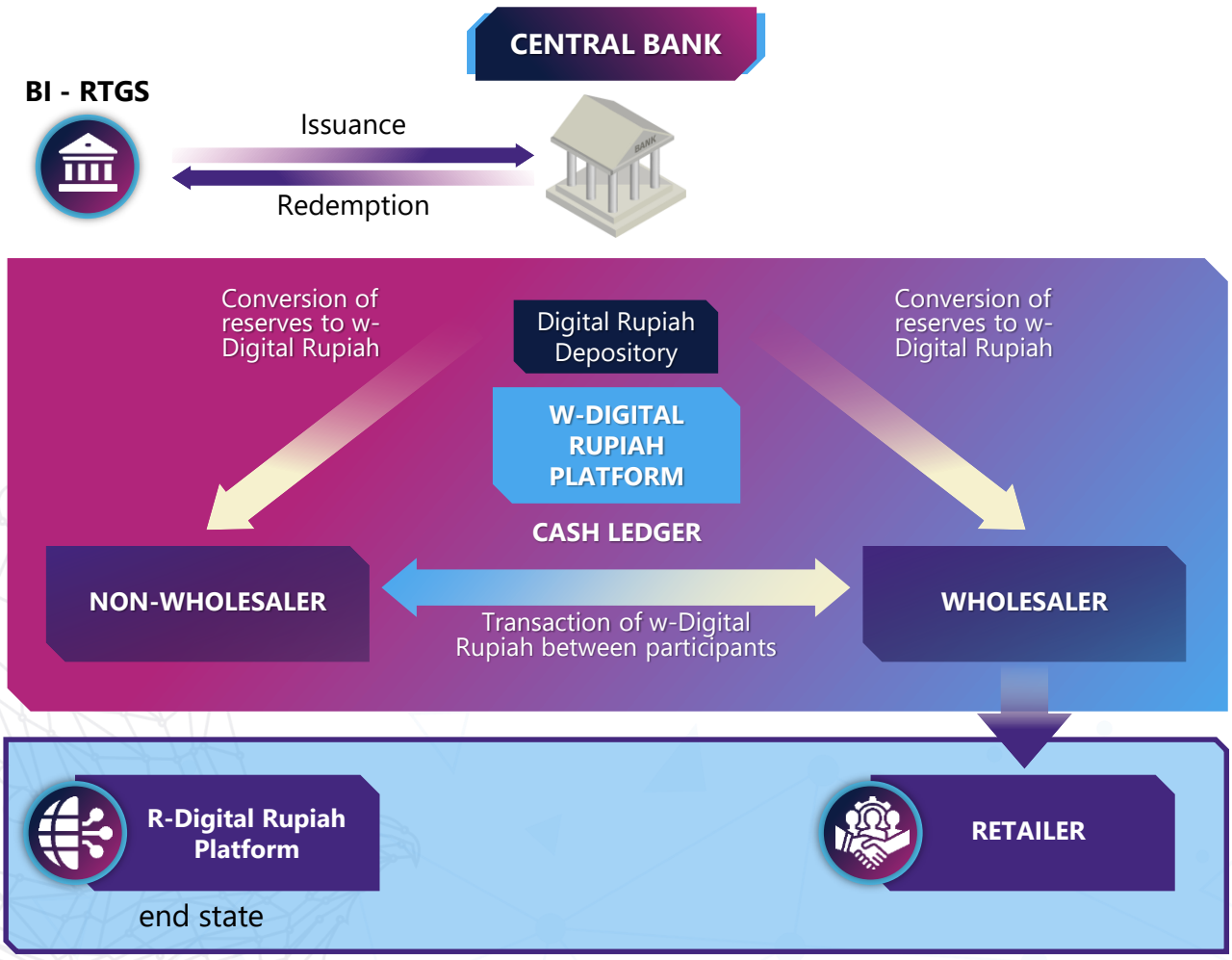


Figure 2 Wholesale Digital Rupiah Design

3 THE SCOPE OF PUBLIC CONSULTATION

As described in the previous section, this CP is designed as the initial sequence of the w-Digital Rupiah cash ledger development. W-Digital Rupiah cash ledger is the transference of funds among participants in the financial market in a decentralized environment.

This CP will discuss two issues, they are functionality and general considerations. Bank Indonesia welcomes all inputs from various parties on several issues and concerns presented in the questions below.

3.1 Functionality

In this section, various functional aspects within w-Digital Rupiah cash ledger (w-Digital Rupiah) will be explored including the functional links between the DLT platform and BI-RTGS. These aspects comprise access, issuance/redemption, transference of funds, as well as technical and 3i[1] capabilities (Figure 3).

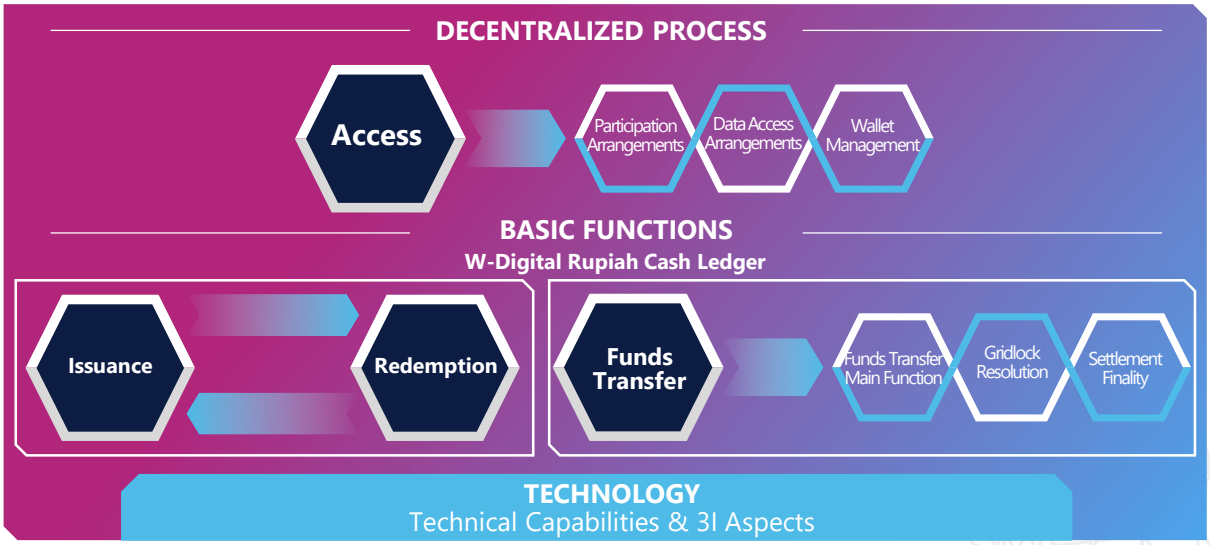


Figure 3 The Scope of Functionality Aspects of w-Digital Rupiah Cash Ledger

3.1.1 Access

This section covers three issues on access, consisting of the participation arrangements, data access arrangements, and wallet management.

A Participation Arrangements

As discussed in the previous section, access to w-Digital Rupiah is restricted only to wholesalers and non-wholesalers. Bank Indonesia will designate parties who would be appointed as wholesalers based on certain additional criteria set by Bank Indonesia.

W-Digital Rupiah distribution scheme would be one-tier. Both wholesaler and non-wholesaler could obtain w-Digital Rupiah directly from Bank Indonesia (one-tier). In contrast to non-wholesalers, at the last stage of Digital Rupiah development (end state), wholesalers would have a function in distributing Digital Rupiah to retailers and end users.

[1] Integration, interoperability, dan interconnection.

Wholesalers dan non-wholesalers will take a certain role in the w-Digital Rupiah platform. The configuration of roles and access rights is arranged into 3 (three) classifications:

Validating node: this classification grants rights to participant to perform as validator of transactions and control the management/custody of their w-Digital Rupiah tokens.

Non-validating node: this classification grants rights to participant to control the management/custody of their w-Digital Rupiah tokens without a right to perform as validator.

No node: this option enables a participant to hold w-Digital Rupiah without any rights to manage and hold tokens as well as perform as validator. Tokens will be custodied in Bank Indonesia as the ledger operator (operator node).

Each option has different implications on investment and operations. In validating node, participants would need to provide and operate infrastructures with high computation capacity, the computing capacity required for non-validating nodes tends to be lower than for validating nodes. This will leave no node at the lowest, as participants in this option would only need to provide a network connection with ledger operator.

Participants could operate nodes independently with DLT infrastructure provided by Bank Indonesia. Wholesalers, as suggested by their function, would be required to take a role as validating node. Whilst non-wholesaler would have an option to select either as non-validating node, or no node. These arrangements are needed to warrant scalability and proper incentive in the w-Digital Rupiah platform.

B Data Access Arrangements

Privacy is an important element of transactions in the wholesale ecosystem. In a centralized system, transactions between parties are only known by the transacting parties and the central authority. Similar condition may not be found in the decentralized system.

As explained in the previous section, the engagement of multi-parties in validating transaction in this system will simultaneously expose them to other participants' data.

W-Digital Rupiah platform must be designed based on the need-to-know principle. This principle restricts access to data and information only to relevant parties. On this matter, w-Digital Rupiah platform would need to be equipped with query and capturing[2] features to ensure that any bilateral or multilateral transaction data would only be accessible to relevant parties in the network based on their access right with different visibility levels.

Those relevant parties consist of transacting parties, Bank Indonesia and other parties acting as validators. Only regulator, in this respect, Bank Indonesia, has direct access to all transaction data for supervisory and oversight purposes. In this regard, Bank Indonesia would assume full control over the Digital Rupiah network.

Therefore, the w-Digital Rupiah DLT platform would be equipped with cryptographic mechanism which enables access rights segregation and restriction to data propagated to all participants in the network. This also applies for user interface. Challenge remains in determining the degree of visibility that could be granted to each party, the selection of optimal privacy-enhancing technology and cryptographic technique, and the balance between confidentiality and auditability.

[2] Query is a mechanism to access data and information stored in each participant's ledger in the form of granular or aggregate data in real-time or within a certain time period. Meanwhile, capturing is a mechanism for recording all transactions that have been validated in real-time where the validating node that validates the transactions sends every copy to the regulatory node.

C Wallet Management

Wallet management issues comprises the types of wallets which will be developed in the w-Digital Rupiah platform. The w-Digital Rupiah token is stored in a digital wallet, which could be a hot or cold wallet[3]. Hot wallets would be mandatory as it is used for transactional purposes. Conversely, cold wallets would be optional. Participants could leverage cold wallets for cyber risk mitigation.

Questions

1. In your view, what are the implications of segregating participation into wholesaler and non-wholesaler? Would this segregation adequate to mitigate risk?
2. In your view, does the number of validators for w-Digital Rupiah platform need to be large to ensure its operational efficiency and effectiveness? What would be your considerations?
3. In your view, how should incentives/rewards be designed in order to encourage participants to take a role as a validating node?
4. In your view, what would be the risk if wholesalers have options to select non-validating node?
5. In your view, what would be the risk of non-wholesalers who act as a validating node?
6. Has it been possible to expose data content partially in DLT, e.g., only transaction value, to allow for the implementation of gridlock resolution without violating privacy? To what extent could data visibility be set?
7. What are the arrangements/standards for identity management in the w-Digital Rupiah platform (identity service) that could protect user privacy and enable traceability, including monitoring of illegal transactions?
8. What are the factors that need to be taken into consideration in selecting the privacy-enhancing technology?
9. How can confidentiality and auditability be balanced in a decentralized system?
10. In your view, should the issuance and management of w-Digital Rupiah wallet be directly performed by Bank Indonesia, or should it be handed over to the industry?
11. Should cold wallets be mandatory for the w-Digital Rupiah design?

[3] Hot wallets are online token storage, while cold wallets are offline. Cold wallet could take the form of the hardware or other physical forms.

3.1.2 Issuance/Redemption

As explained in the previous section, the issuance of w-Digital Rupiah is conducted through the transfer of funds from participant's reserve account to the technical account of Digital Rupiah at BI-RTGS System. This simultaneously triggers an instruction to issue w-Digital Rupiah tokens in KDR on the w-Digital Rupiah platform which is immediately forwarded to the requesting participant (on demand). In this process, tokens issued would be checked for its validity[4] by participants that act as validating nodes before being updated into the ledger.

KDR plays an instrumental role in the w-Digital Rupiah configuration. KDR will act as the single-entry point in ensuring security, completeness, validity, and accuracy of Digital Rupiah supply. Bank Indonesia will develop and operate the KDR.

In the event the wholesaler wishes to reduce the stock of Digital Rupiah, the tokens will be converted back into current account balance at Bank Indonesia. The issuance, transference, and redemption processes occur in real-time on the w-Digital Rupiah platform. Conversion from a participant's current account balance to Digital Rupiah could occur 24/7 or during designated operating hours.

Questions

1. What is your view on KDR role?
2. In your view, should the role of validating the authenticity of Digital Rupiah be delegated to participants other than Bank Indonesia?
3. What would be the risk embodied in the withdrawals and redemption process of w-Digital Rupiah that need to be taken into consideration?

[4] Validity in this case includes the authenticity of the token and ensures that the token has never been spent.

3.1.3 Funds Transfer

This section discusses on how w-Digital Rupiah platform implements funds transfer functions, gridlock resolution, and settlement finality, including their challenges.

A Funds Transfer Main Functions

The funds transfer process on the w-Digital Rupiah platform refers to the best practices applied in wholesale payment system. In this regard, transaction settlement has two main functions, namely (i) real-time and gross transaction processing (including submission, validation, conditionality, and settlement functions) and (ii) liquidity saving mechanisms which includes queue mechanism (queue arrangement, queue reordering, queue cancellation) and gridlock resolution. Payments in w-Digital Rupiah will be settled in real-time if the sender has sufficient funds/liquidity.

The implementation of the above functions will be facilitated by smart contract. This feature allows various activities in the network to be carried out automatically without human intervention. It is used to determine the business logic of a transaction. For example, the transaction processing flow in a traditional system can be moved into a smart contract so that it could be executed by each participating node (decentralized).

Smart contracts could also be used for liquidity management, including queuing and gridlock resolution mechanisms. Implementation of both mechanisms on the w-Digital Rupiah platform can function just as it would in the real-time gross settlement system. Liquidity needs can be met through Bank Indonesia (e.g., through intraday liquidity facilities) or other participants (lending of w-Digital Rupiah tokens).

B Gridlock Resolution

Gridlock resolution is a mechanism to resolve transaction deadlocks that often occur in large-value transactions settlements. This mechanism is executed through netting and reordering of transaction priorities.

The implementation of gridlock resolution in decentralized system will potentially be more complex than centralized system. In a centralized system, algorithms or criteria set by a central authority triggers the resolution whereby gridlock could be resolved accordingly based on priority.

Similar condition may not occur in decentralized systems. In a decentralized system, each party can initiate simulation of reprioritization. This may potentially disadvantage some parties. Gridlock may be unfairly settled, as resolution may not be conducted according to order.

C Settlement Finality

The main principle of settlements is settlement finality. This principle determines the point when transactions are recognized as final or irrevocable.

Within a decentralized system, the compliance of this principle will be determined by the chosen consensus mechanism. Consensus, in this respect, will be achieved after certain conditionalities are met (probabilistic). Consequently, settlement process would take time and the timing of settlement finality could be hard to define.

W-Digital Rupiah will use proof of authority as its consensus mechanism. This choice is better in terms of speed and security. In this respect, consensus is achieved by authorized parties without demanding complex computation.

In addition, the use of permissioned DLT in w-Digital Rupiah platform will allow an easier determination of settlement finality compared to the use of permissionless DLT (e.g., finality occurs when a transaction on the ledger is validated).

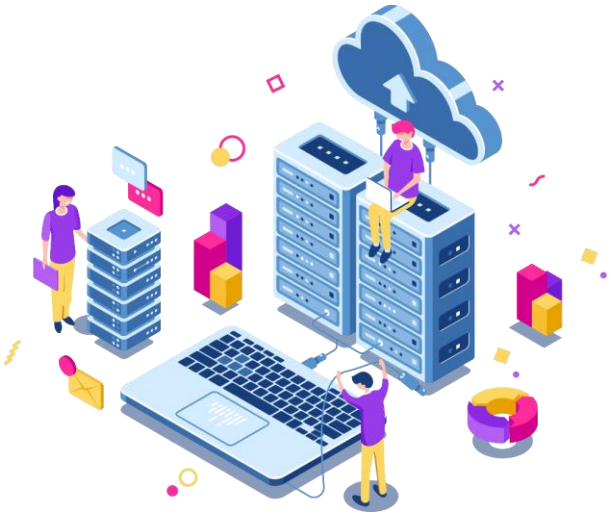
Questions

1. In your view, does w-Digital Rupiah require the role of liquidity providers? If required, who should take the role?
2. In your view, is the risk of gridlock relevant in a DLT system as is in a centralized system? If so, how could gridlock resolution be implemented fairly in a DLT system?
3. Is proof of authority sufficient to ensure settlement finality?
4. Are the current legal provisions sufficient to ensure settlement finality in a decentralized system?

3.1.4 Technical Capabilities and 3I Aspects

The Digital Rupiah platform is designed with the capability to integrate with existing financial market infrastructures, including payment systems. This connectivity accommodates seamless conversion, transference of funds, and exchange of assets, and alignment of different participation rules among infrastructures.

To achieve this, the Digital Rupiah platform must comply with the 3i principles when connecting to the financial market infrastructures. The fulfillment of 3i principles in the development of Digital Rupiah could be achieved through two prerequisites. Firstly, the capability for Digital Rupiah to exchange information and conduct transactions, either directly or indirectly, with traditional, both existing and future, financial market infrastructures. Secondly, the standardization of technical, semantic, and business/legal aspects with respect to technological advancements and policy requirements. This will also apply in terms of cross-border interoperability.



W-Digital Rupiah will act as a complement to the account-based BI-RTGS System. As described in the previous sections, interoperability between w-Digital Rupiah platform and BI-RTGS system will occur on the issuance and redemption cycle of w-Digital Rupiah token. In this respect, challenges in harmonizing both systems remain, among others related to the difference on technical capabilities, participation arrangements, and operational model, e.g., difference in operational hours.

In addition, a challenge may occur through the differences in the use of cloud services. Each DLT participant may use different cloud infrastructures thus potentially limiting interoperability.

Questions

1. In your view, what would be the conditions for a DLT system to coexist with existing centralized systems like BI-RTGS? What are the potential use cases that could stimulate systems' coexistency other than issuance and redemption?
2. What risks might arise from the coexistence between w-Digital Rupiah DLT platform and the current financial market infrastructures, including in the event that effective coexistence fails to occur?
3. How could Digital Rupiah be designed to achieve transferability across multiple payment platforms (cross-chain platforms)? Are new technologies or technical standards required?

3.2 General Considerations

3.2.1 Technology: Scalability and Resilience

As explained in the previous section, the technology platform used for w-Digital Rupiah would be based on permissioned DLT with proof of authority consensus considering its ability to ensure greater security.

First, DLT is seen as an innovative solution to overcome the classic problem of single point of failure embedded in every centralized system such as RTGS. RTGS systems, including the BI-RTGS system, are classified as systemically important financial market infrastructure (SIPS). This system is a payment system used to settle large-value, critical, and immediate transactions such as monetary operations and interbank money market. However, given its crucial role and status, the RTGS system tends to be vulnerable to the single point of failure risk.

DLT provides an innovative solution to overcome such risk. The use of DLT enables higher resilience as it allows the system to recover quickly in the event of operational disruption, including from cyber-attacks. This is possible as data and processing are distributed to several nodes, whereby other nodes could back up the failure of one node.

Second, the use of permissioned DLT provides better scalability compared to permissionless DLT. One of the emerging issues in DLT infrastructure is the technical ability/capability to process transactions with high volumes rapidly. This can be accommodated through permissioned DLT which is considered to be the middle ground for the needs of resilience and scalability, given the issue of better scalability compared to permissionless DLT. In this model, access to the platform would be given only to the selected parties that meet certain criteria as such scalability would be easier to reach and thus considered more capable to handle large value-small volume characteristics of wholesale transactions.

Third, DLT is regarded as capable of increasing traceability while encouraging efficiency with atomic settlements, which enables seamless transaction processing.

Fourth, the chosen consensus mechanism is viewed to provide better cyber-resilience. Most of the DLT consensus mechanisms are prone to cyber-attacks such as the "51% attack" posing double spending risk, and finality disruption. In this respect, the use of proof of authority consensus mechanism is perceived to have better ability to mitigate such risk.

However, challenges remain.

First, like any other payment system, Digital Rupiah platform is prone to operational disruptions and cyber-attacks.

Second, issue on the provision of efficient recovery mechanism. As described in the previous section, the use of DLT may incure privacy issues. On the contrary, if privacy compliance is met (e.g., data is held exclusively by transacting parties and parties acting as a regulatory node), a new problem occurs. In this condition, recovery process in DLT may not be performed as efficiently as in centralized systems, especially when the party suffering from disruptions does not maintain active backups. Furthermore, data recovery through the regulatory node is likely time-consuming.

Third, scalability issue. Despite being superior in terms of scalability compared to permissionless DLT, a permissioned DLT is still untested in sustaining the stability of its performance in the event of a surge in transaction volume above its normal capacity. In this respect, a trade off occurs between resiliency and speed. A system that does not duplicate the ledger, such as centralized systems, will have low resilience. On the contrary, a highly decentralized system will tend to be slow, inefficient, and low in its scalability.

Questions

1. Would a decentralized system provide better operational resilience than a centralized system? Would proof of authority be adequate in mitigating cyber-attack?
2. To what extent does DLT risk management differ from centralized systems? What capabilities must be built by each party involved?
3. What aspects must be considered and ensured in designing backups and Business Continuity Plan (BCP) for decentralized systems? Must each node in DLT maintain an active backup to ensure resilience of each node within the DLT?
4. Does the use of cloud in DLT networks require standardization? If so, to what degree should cloud standardization be implemented within a resilient DLT ecosystem?
5. In your view, is a permissioned DLT comparable to centralized systems in handling low-volume and high-value transactions, including its capacity to tackle the surge in transaction volume?
6. What is the optimal level of distribution/decentralization in the Digital Rupiah ledger to achieve the optimal combination of resilience, speed, efficiency, and scalability?
7. Would there be other operational risks that have not been clearly mapped in the use of DLT, especially those affecting system resilience, reliability and security and how could they be addressed? What operational or cyber risks may be unavoidable?

3.2.2 Implications towards the Payment System and Financial and Monetary Systems

The issuance of the Digital Rupiah could open wider economic opportunities. On the wholesale side, the use of w-Digital Rupiah as a settlement asset for transactions in monetary operations and financial transactions is expected to strengthen monetary policy transmission. Additionally, the use of smart contract features in Digital Rupiah is expected to deepen the financial market through the emergence of more efficient and diverse business model, shorter intermediation chains, and more integrated technology platforms between Digital Rupiah and digital securities [5].

From the financial system stability perspective, the risks of using Digital Rupiah for wholesale transactions are less sophisticated than its use for retail transactions. In this regard, concerns regarding disintermediation risk and procyclicality generally arise with r-Digital Rupiah.

However, this does not mean that w-Digital Rupiah is immune to risks. In addition to the operational risks, as described in the previous section, the risk of using w-Digital Rupiah towards financial system stability may occur from higher interdependency. This level of risk is perceived to be greater in w-Digital Rupiah given the higher intensity of interconnectedness both across infrastructures within the Digital Rupiah platform and between Digital Rupiah infrastructures and traditional infrastructures. In addition, the scope of wholesaler participation, which includes non-bank institutions, will increase risk exposure.

Achieving high-level of adoption is also not an easy task. The design of w-Digital Rupiah needs to identify the right use cases to ensure effective adoption, in this context, for the wholesale financial market ecosystem.

[5] This CP prioritizes the development of w-Digital Rupiah at the immediate stage. The integration of w-Digital Rupiah with monetary operation and digital securities will be elaborated at the next stage of development (intermediate stage).

THE SCOPE OF PUBLIC CONSULTATION

Questions

1	How would the use of w-Digital Rupiah change the financial structure, particularly the interbank money market structure, including its implications for the asset pricing? Does the classification of participation into wholesalers, non-wholesalers, and retailers affect the market structure and resilience of the financial industry and payment systems?
2	Should the quantity of w-Digital Rupiah in circulation be capped? If so, what factors should be considered for such policy?
3	What implications would arise due to the 24/7 operation of interbank money market, enabled by the use of w-Digital Rupiah?
4	What are the minimum requirements that must be met by each participant to manage risk arising from interdependencies?
5	In your view, what opportunities and challenges could arise from active involvement of non-bank entities in financial markets? Is it necessary to have specific criteria regarding the participation of non-bank financial institutions in the w-Digital Rupiah platform? Are capital requirements considered sufficient to mitigate risks?
6	Which features should be adopted by Digital Rupiah to optimize its potential added value to financial market deepening (i.e., potential smart contracts that could be leaveraged to overcome classic problems related to financial market deepening)?
7	What factors must be considered to ensure effective adoption of Digital Rupiah in the wholesale market? What use cases are needed to ensure effective adoption of w-Digital Rupiah?

GLOSSARY

BI Real Time Gross Settlement (BI-RTGS) System	Financial infrastructure used for electronic funds transfer where the settlement is instantaneous on a gross basis.
Business Continuity Plan (BCP)	Strategies to overcome certain circumstances where business must continue after a disaster
Distributed Ledger Technology (DLT)	An approach that records and shares data across multiple data storage locations (journals). This technology enables transactions and data to be recorded, shared and synchronized across distributed networks with different network participants.
Integration, interoperability, interconnection (3i)	Types of interlinkages among financial market infrastructures
Integration	The unification of post trade infrastructure in the same institution for the transaction service value chain
Interoperability	The ability for two or more systems to exchange information or transact without middleware
Interconnection	The ability between systems to exchange information or transact requires an intermediary, or in other words the interconnection between systems occurs indirectly
Digital Rupiah Depository (KDR)	Digital Rupiah Depository, is one of the nodes in the w-Digital Rupiah platform involved in the issuance and redemption of w-Digital Rupiah tokens
Node	An integral piece of distributed ledger technology that store ledgers
No node	A type of participation where the participant does not have a node and only needs to provide a network to connect to the operator's ledger service
Non-wholesaler	Parties that have access to Digital Rupiah directly from Bank Indonesia and can transact on the w-Digital Rupiah platform

GLOSSARY

Permissioned DLT	A closed-source distributed ledger technology variant where the participants are known, and authorization is required before usage or activity validation on the network
Permissionless DLT	An open source distributed ledger technology variant where any party can participate in usage and activity validation on the network
Proof of authority	A consensus mechanism where validation is only performed by authorized parties
Single point of failure	Any point in a system, whether a service, activity, or process, that, if it fails to work correctly, leads to the failure of the entire system
Systemically Important Payment System (SIPS)	A payment system that can potentially trigger systemic risks in the event of a disruption or if proper risk management is not implemented, as it is processing large-value transactions or settling transactions from other financial market infrastructures
Wholesale	In the context of this CP, the definition of wholesale falls within the scope of financial markets, hereafter known as wholesale markets, where financial instruments such as stocks, bonds, currencies, and derivatives are traded
Wholesaler	A party who obtains the right to access Digital Rupiah directly from Bank Indonesia and distributes it to retailers and end users

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If there are still views and inputs that have not been included in the presentation and questions of this CP, you may submit them to Bank Indonesia.

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