November 29, 2024
Bank of Japan

Third General Meeting of the CBDC Forum

The CBDC Forum held its third general meeting on October 17, 2024. The Bank of Japan explained about the system under development for the pilot program and provided updates on progress made by different working groups (see attached slides).

Third General Meeting of the CBDC Forum

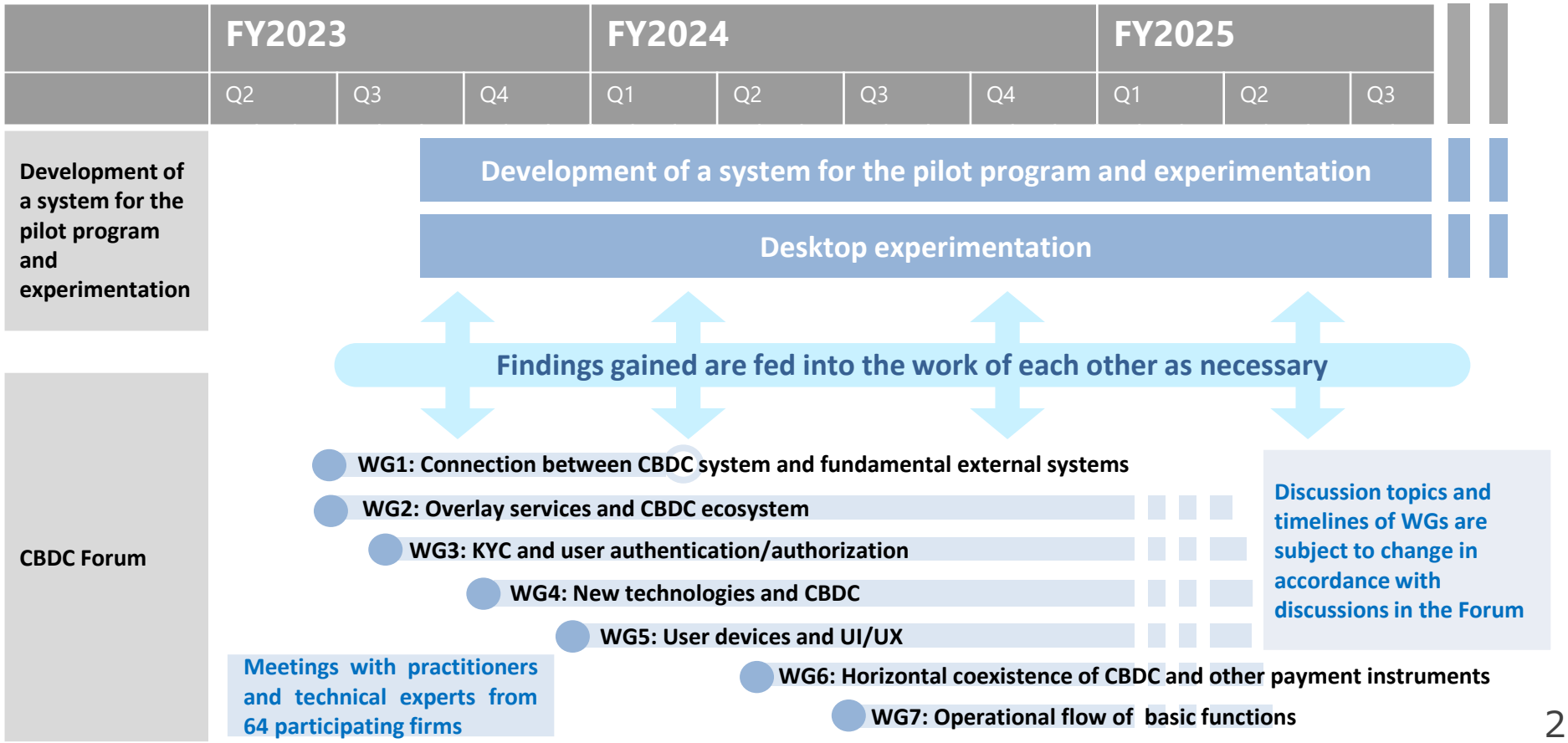
October 2024
Bank of Japan

Ⅰ. CBDC Forum

Overview of the pilot program

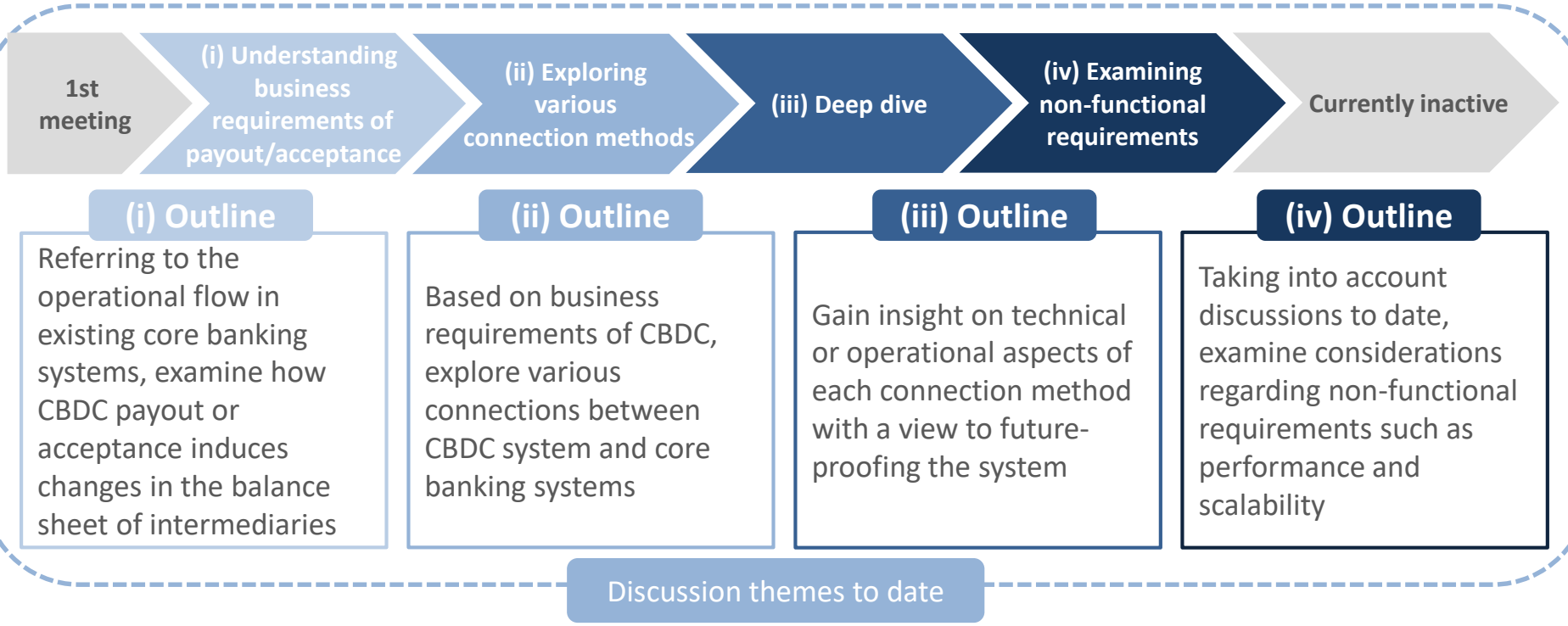
- Regarding the development of a system for the pilot program and experimentation, system development work is in progress. Concurrently, desktop experimentation is being carried out, with a focus mainly on functions that are not implemented in the system.
- Under the CBDC Forum, discussions are ongoing for working groups (WGs) 2 through 6, while WG7 has been newly established (WG1: currently inactive).

▽ **Overall timeline of the pilot program**



WG1: Connection between CBDC system and fundamental external systems

- **WG1**, during the 11 meetings it has held to date, has discussed issues including (i) business requirements of payout and acceptance of CBDC and (ii) connection methods between a CBDC system and core banking systems.
- Having carried out all of its intended discussions, WG1 is currently inactive. Meanwhile, findings gained through the WG's efforts are being utilized for the development of a system for the pilot program.



WG2: Overlay services and CBDC ecosystem

- **WG2** continues to engage in discussions particularly on the overall concept of a CBDC ecosystem and on surveys on precedents in the payment landscape.
- Going forward, by gaining insights on technologies supporting overlay services from the private sector, the WG will continue to deepen its understanding of, for example, the implications of such insights on CBDC. WG members will also consider overlay CBDC services and their use cases through the API sandbox project.

(i) Overall concept and case studies

(ii) Discussion on technologies

(iii) Gaining insight into CBDC

(iv) API sandbox project

(i) Agenda

- Concept of CBDC ecosystem
- Survey on precedents in the payment landscape
  - ✓ Overseas CBDC ecosystems
  - ✓ Overseas FPS ecosystem design
  - ✓ Embedded finance, banking APIs
  - ✓ Other payment services
  - ✓ Regional digital currencies

(ii) Agenda

- External coordination of a CBDC system regarding overlay services
  - ✓ Open APIs, SDKs
  - ✓ Sandboxes
  - ✓ Update and maintenance of supporting functions
  - ✓ Developer community
- Overseas experiments exploring API for CBDC
  - ✓ Project Rosalind (BOE, BISIH)
  - ✓ Digital Shekel Challenge (BOI)

(iii) Agenda

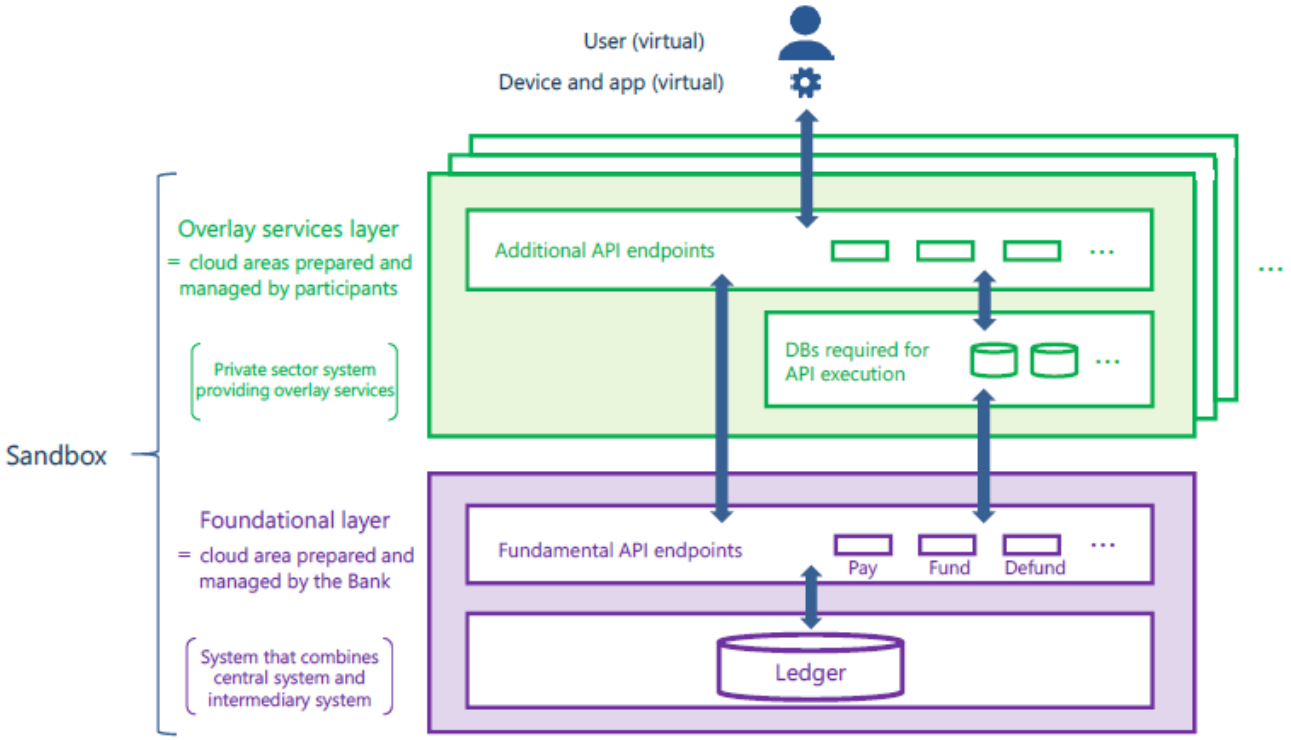
- Potential of overlay CBDC services
  - ✓ Classification of use cases
  - ✓ Utilization of data
  - ✓ So-called programmability
- CBDC as an enabler for services
  - ✓ Anticipated features

Discussion themes to date

Key themes for future discussions

API sandbox project: (i) Overview

- As part of WG2's efforts, the Bank of Japan and volunteer members of WG2 have been proceeding with the API sandbox project since April 2024.
  - 18 companies, comprising a part of WG2, are participating in the project. Several related initiatives have also been launched in this regard, and are currently under consideration.
- An experimental environment has been prepared in the cloud so that various API functions, such as credit transfer, payout, and acceptance, as well as use cases could be developed by the Bank and the private-sector participants.



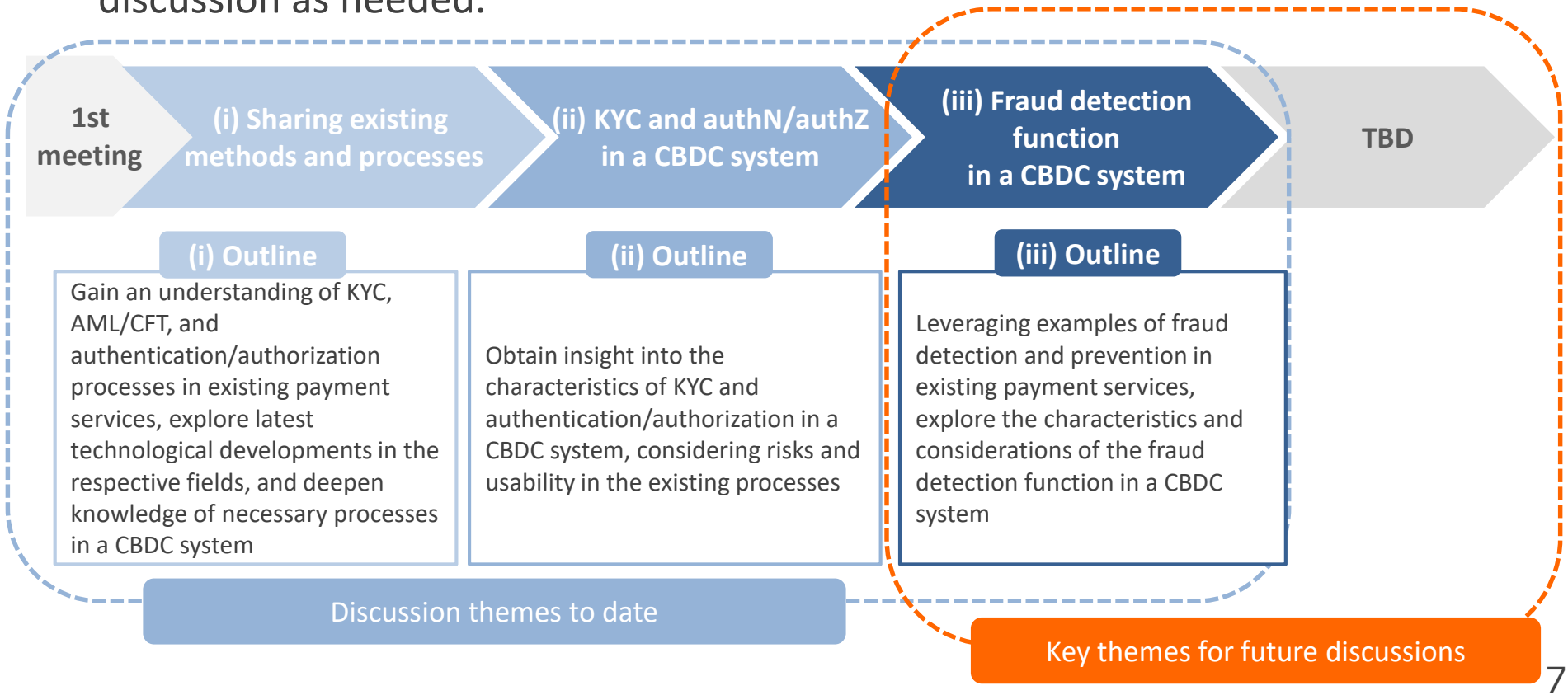
API sandbox project: (ii) Fundamental APIs

- Fundamental APIs prepared by the Bank are listed below.

API endpoints	Description
/account	Refers to the information of a specified CBDC user account
/balances	Refers to the balance linked to a specified CBDC user account
/transactions	Refers to the transaction history of a specified CBDC user account
/fundings	Pays out CBDCs to a specified CBDC user account
/defundings	Accepts CBDCs from a specified CBDC user account
/payments	Transfers CBDCs from one account to another
/hashed-timelocks	A specified amount of CBDC is locked under the following conditions: • The payee's account can unlock the funds and receive the amount by submitting the pre-image (original hash value) before the timeout. • The payer's account can request the cancellation of the lock after the timeout, allowing the payer to reclaim the amount.
/internal/accounts	Manages a CBDC user account (creates, modifies and deletes, and refers to the list)
/internal/balances	Manages the balance of a CBDC user account (creates, modifies and deletes, and refers to the list)
/internal/balance-connectors	Manages the link between a CBDC user account and its balance (links, removes the link, and refers to the link status)
/internal/transactions	Increases or reduces a specified amount of CBDC for several accounts at once

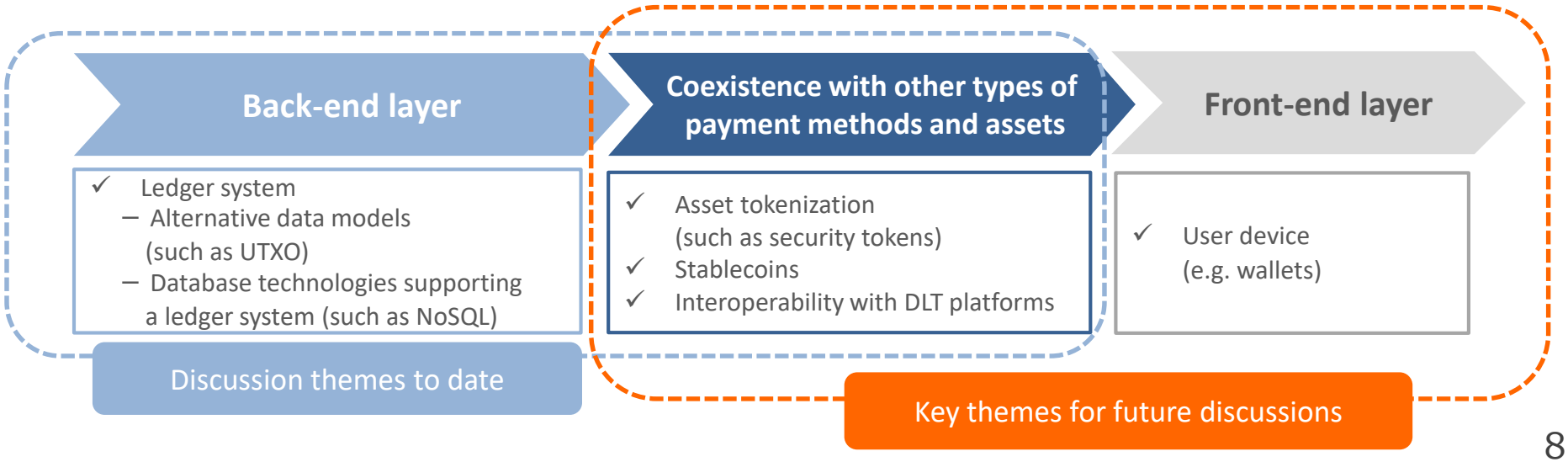
WG3: KYC and user authentication/authorization

- **WG3** has gained technical and procedural insight into KYC and authentication/authorization for a potential CBDC system, based on the KYC, AML/CFT, and user authentication/authorization processes in existing payment services.
- As next steps, WG3 will explore the characteristics of the fraud detection function in a potential CBDC system, with additional themes taken up for discussion as needed.



WG4: New technologies and CBDC

- **WG4** delves into new technologies related to a CBDC ecosystem and explores their potential usage.
- The focal points of the WG's discussions have thus far included technologies related to the back-end layer of the CBDC system (e.g. ledger system), more specifically, alternative data models, such as UTXO, and new database technologies.
- Going forward, WG4 will discuss: the coexistence of the CBDC system with other types of payment methods and assets, focusing on asset tokenization and interoperability with DLT platforms, and the front-end layer of the CBDC system with a focus on such devices as wallets.



WG5: User devices and UI/UX

- **WG5** has explored areas including devices for consumers and retailers as well as offline payments, while considering universal access and UI/UX in the context of CBDC.
- WG5 will continue with discussions on how to make CBDC available for anyone to use, wherever necessary and under various circumstances.

Discussion themes to date

[Theme 1] Existing payment channels

[Theme 2]
"Available for anyone to use"

・For example, what kind of overall design (devices, apps, networks, etc.) could be used regardless of factors such as IT literacy, age, disability, and access to a smartphone?

・UI/UX will also be considered based on the above.

Devices primarily for individual users

[Theme 3]
"Available whenever necessary"

・For example, what kind of overall design would be suitable for CBDC to be acceptable even in stores without over-the-counter terminals?

・Specifically, the combination of store and user devices will be discussed.

Devices, networks, and gateways primarily in the store

[Theme 4]
"Available under various circumstances"

・For example, what kind of overall design could be used even in times of disaster, poor mobile reception, and system or network failure?

・Specifically, offline payments will be discussed.

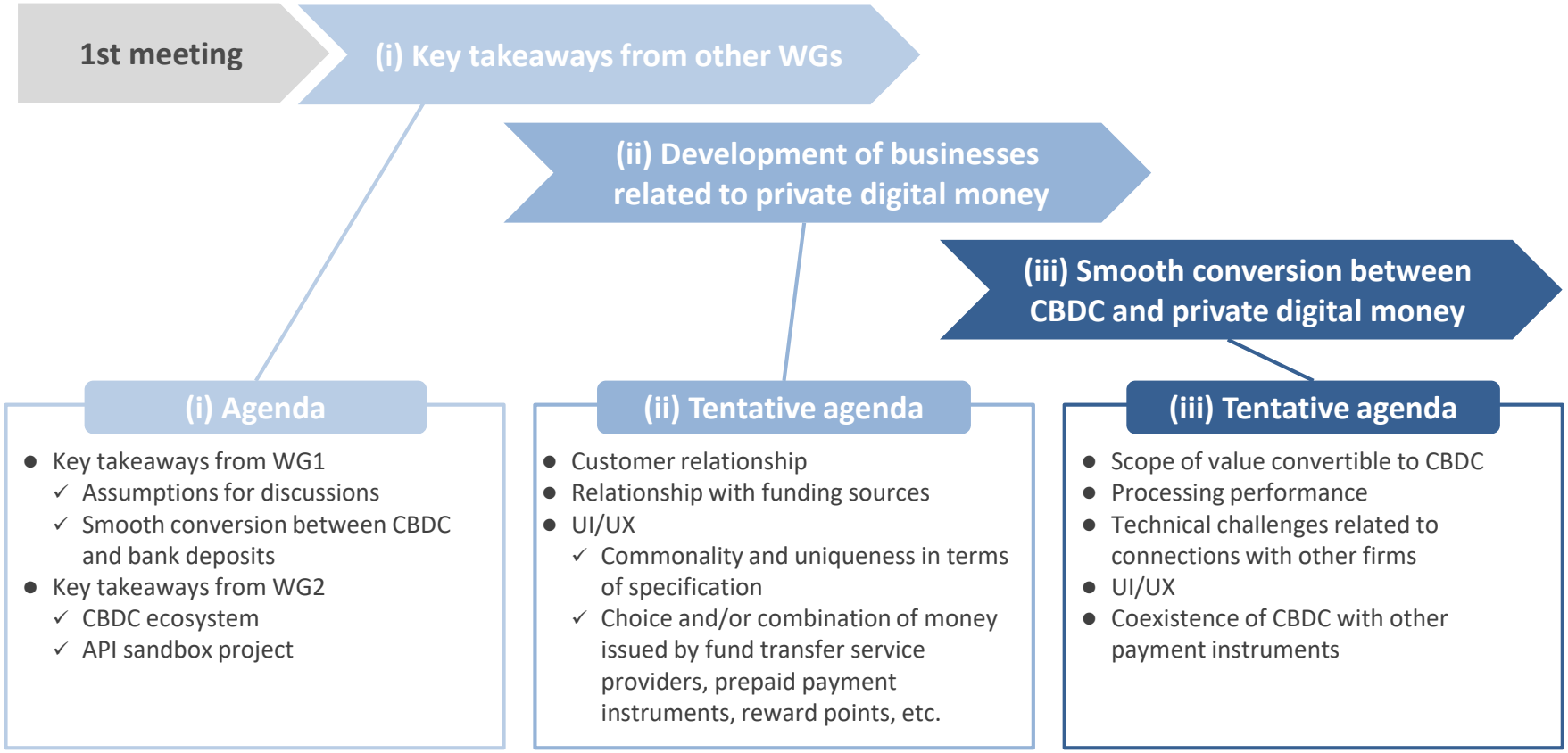
[Theme 5] Other issues

・Topics such as e-commerce and P2P transfer will be discussed accordingly.

Key themes for future discussions

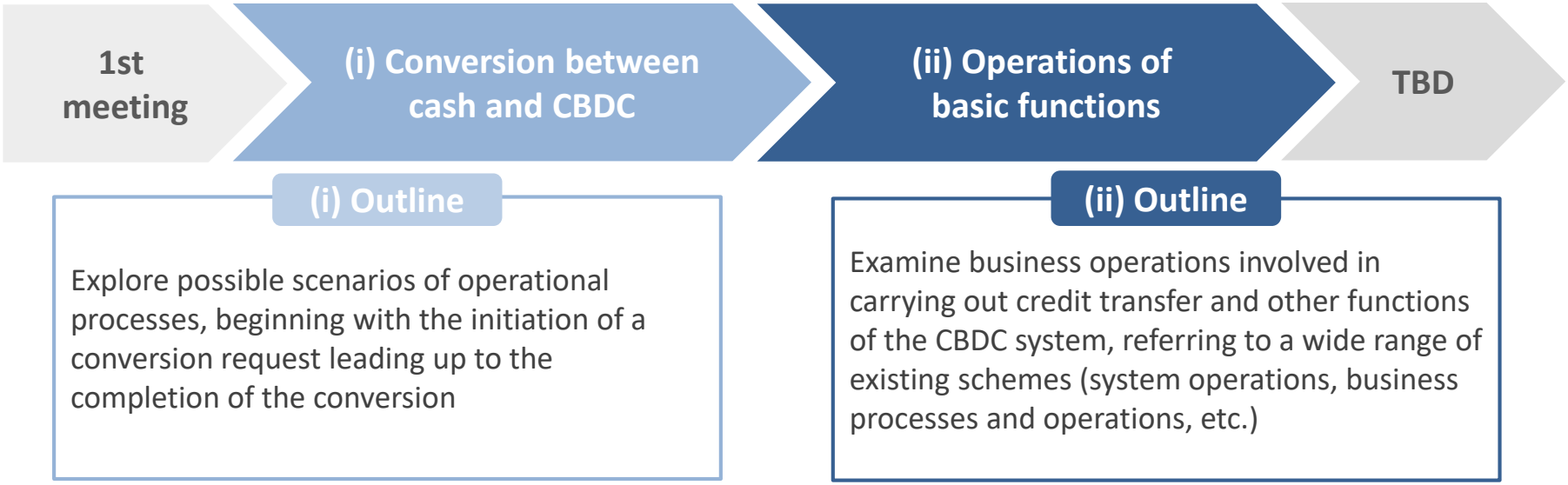
WG6: Horizontal coexistence of CBDC and other payment instruments

- **WG6** explores the development of businesses related to private digital money and, based on the insights gained, takes a deep dive into issues, particularly the smooth conversion between CBDC and private digital money and the coexistence of CBDC with other payment instruments (first few meetings devoted to sharing key takeaways from other WGs).



WG7: Operational flow of basic functions

- **WG7** discusses possible operational processes involved in the conversion between cash and CBDC as well as in the basic functions of the CBDC system, addressing issues including challenges associated with these operational flows.
- In exploring the above, the WG will refer to existing schemes for fund transactions at financial institutions while taking into account discussions related to the ongoing development of a system for the pilot program and experimentation.
- WG7 held its first meeting in September 2024.

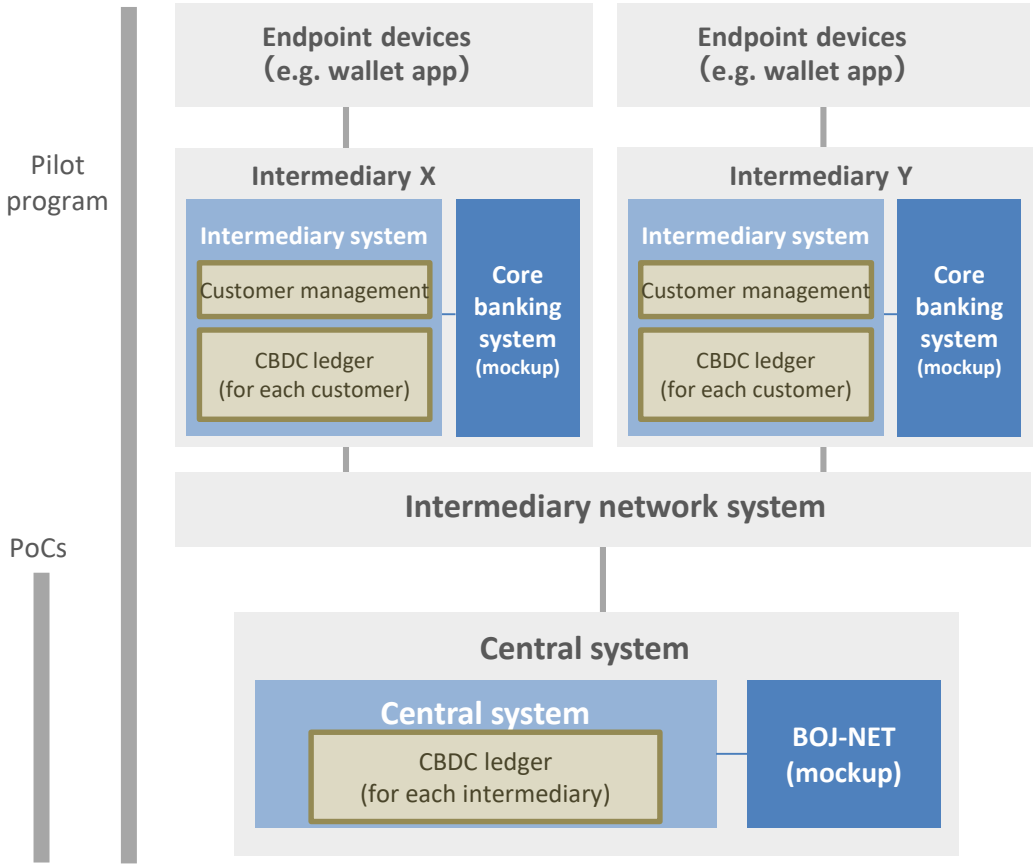


Ⅱ. Development of a System for the Pilot Program

Development of a system for the pilot program and experimentation

System overview

Scope



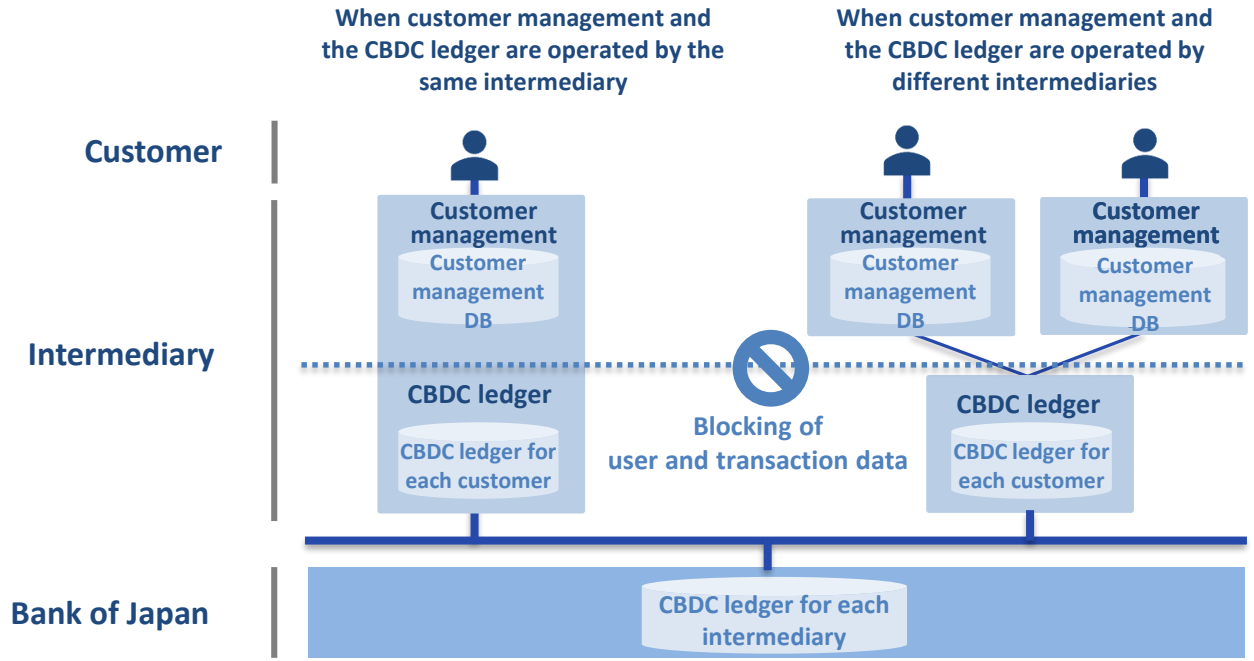
Main considerations

- **Performance**
  - Identify technical issues and solutions for higher system performance by pursuing a pilot system that can handle high load processes
- **Scalability**
  - Identify technical issues and solutions for scalability by incorporating features that support functional and performance scalability in the pilot system design phase
- **End-to-end set-up**
- **Privacy**

Features of the system: (1) Privacy

- In consideration of privacy, it is important to note that the system is designed not to handle user and transaction data on the CBDC ledger.
  - Even in the case where the intermediary conducts both customer and ledger management, blocking of user and transaction data from the CBDC ledger is necessary.
- In developing the system, the customer management component and the ledger management component are separated, with the ledger management component designed in such a way that user and transaction data cannot be handled in the area.

Overview of intermediaries



Features of the system: (2) Record splitting and parallel processing

- To improve processing performance, record splitting can be enabled, where necessary, to enhance parallel processing.

Mechanism of record splitting
(e.g. User A, with a 100-yen deposit, withdraws 30 yen)

No record splitting

User	Balance
A	100 yen

Record splitting
(e.g. splitting into two records)

User	Balance
A	50 yen
	50 yen

Withdrawal of 30 yen

User	Balance
A	70 ~~100~~ yen

locked

During the withdrawal, A's record is locked and no transactions can be processed on A's account.

User	Balance
A	20 ~~50~~ yen
	50 yen

locked

During the withdrawal, A's second record remains unlocked, with which other transactions can be processed on A's account simultaneously.