EUROPEAN CENTRAL BANK
EUROSYSTEM

Workshop on the future of B2B payments

09 October 2024

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Digital Euro

Retail Central Bank Digital Currency

Where does a digital euro fit as money?

 **Liability of central bank**	 **Liability of a private entity**	 **Not a liability**
i. **Cash:** physical form, general public ii. **Central bank deposits** (“ntwCeBM”)**:** digital form, limited access iii. **Digital Euro** (“rCBDC”): Complement to cash and Central Bank deposits	i. Commercial bank money ii. E-money, including DLT-based e-money tokens (regulated under the EU Markets in Crypto-Assets Regulation)	i. Crypto-assets

A unique payment option for 349 million citizens in the euro area

Current payment options that will continue to exist

Cash

Card

Bank account

Other digital payments

+

Digital euro: an additional way to pay across Europe

Bringing cash-like features to the digital world

Pan-European

Free for euro area citizens

High privacy

Available **offline**

Your euro, your choice: diverse use cases, devices and technology

Use cases	Connectivity	Consumer devices	Consumer interfaces	Technologies
Person-to-person payment	Online	Smartphone	Digital Euro App	Internet
Point-of-sale payment	Offline	Physical card	PSP app	NFC
E-commerce		Web interface		QR codes

A scheme to ensure usability across the euro area

Rulebook Development Group (RDG)

A **digital euro rulebook** would establish **common standards** to:

Ensure **pan-European reach** and a **harmonised payment** experience

Give **market participants** the **freedom** to develop innovative solutions

Enable domestic instant payments solutions to also achieve **euro area reach**

A digital euro scheme is being defined with **broad market involvement** in order to represent society at large:

Intermediaries

Retailers

Consumers

Detailed overview of digital euro services within the rulebook

Access management

- **Onboarding digital euro end-users**
- **Offboarding digital euro end-users**
- **Payment instrument management** (provision and maintenance)
- **Linking digital euro holdings to commercial bank money account**
- **User lifecycle management processes** (identification, data update, information display on balance and transactions, account portability and end user support)
- **Account information service**

Liquidity management

- **Funding** (manual and automated)
- **Reverse waterfall**
- **Defunding** (manual and automated)
- **Waterfall**

Transaction management

- **Transaction initiation** (one-off transactions)
- **Authentication**
- **Payment confirmation/ rejection notification**
- **Refunds**
- **Dispute/exception management**
- **Recurring payments**
- **Pay-per-use enabled via pre-authorisation service**
- **Payment initiation service**

Core services

Optional services

An example of a digital euro user journey similar to a conditional payment

TM 5.C – Reservation/pre-authorisation service on e-com

Transfer mechanism		User device/ hardware				User interface				Data exchange technology				Authentication	
							Mobile app								
Online	Offline	Mobile device	Card	Wearable	Computer	Physical card	D€ App	PSP App	Online interface	Chip	NFC	QR-code	Internet (incl. alias & pay-by-link)	PIN	Biometrics
✓	✗	✓	✗	✗	✓	✗	✓	✓	✓	✗	✗	✗	✓	✓	✓

User Journey Description

Pre-authorisation setup on e-commerce platform via web browser and mobile phone

The individual wishes to rent an apartment. On the business website she selects the service, provides her alias[1] and confirms the pre-authorisation of the payment. She receives a push notification on her mobile phone with a request to consent the pre-authorisation[2]. She clicks on it and the request to pre-authorise the transaction opens in her mobile app. She authenticates the payment and receives a confirmation of pre-authorised transaction. After the stay the business initiates the payment based on her consumption. She receives a push notification with payment confirmation.

[1] If she is registered as customer with the e-commerce platform and stored her alias in her customer profile, her alias may automatically be prefilled at the check-out page.

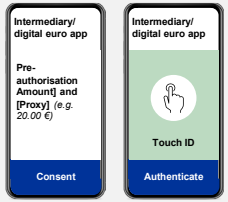
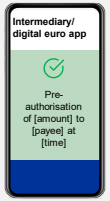
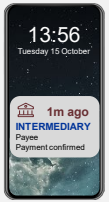
[2] She could also choose to stay on her computer and be redirected to her PSP's online interface to consent and authenticate the transaction. In this scenario, she would receive payment confirmation in the online interface

TM 5.C – Reservation/pre-authorisation service on e-com

Online

Use Case: Payer completes reservation/pre-authorisation payment on e-com by using Alias

Payee Payer

# of actions *(estimated)*	1	3	~3	1	1
	1	2	3	4	5
Prerequisites		**Checkout** Payer selects digital euro as payment method, selects Alias and inserts the Alias 	**Authentication & Consent** Payer opens the app, authenticates and consents the transaction 	**Pre-authorisation** Confirmation of pre-authorisation transaction is displayed 	**Payment confirmation (later)** Later, when transaction initiated, payer receives payment confirmation when is completed 
Requirements	• Payer should be able to select digital euro payment • Payer enters an Alias if it is not already stored by Payee • Payee should be able to store Alias associated to Payer • Interface should securely process the payment to route it to the financial institution for authorisation while protecting Payer's sensitive payment details • Payee's app should be able to redirect Payer to digital euro/Intermediary app using Alias reference	• App should display pre-authorisation amount and Payee of the transaction and confirm consent of Payer • Payer should be able to consent to the transaction through one of the accepted authentication mechanisms • If amount exceeds available balance, reverse waterfall should be triggered for Payer, provided that the user has configured reverse waterfall; reverse waterfall does not work for offline transactions; User might be notified[1] • The payer's intermediary checks that the transaction amount respects any rule as defined in the legislative proposal and/or Rulebook	• Confirmation of transaction validation should be displayed on device • Funds should be blocked until post-transaction is closed • A validity timeframe could be enforced as described in the Rulebook • An amount lower than the originally reserved amount could be debited, but not higher.	• Payer's account/wallet should be debited, and Payee's account/wallet should be credited • Payer receives a push notification, including amount, date and time, location and merchant name • Transaction data may be recorded in Payer's and Payee's transaction log subject to the political decision on whether transaction data is recorded.

Prerequisites

- Payer and Payee have a digital euro account/wallet
- Payee must accept digital euro as a payment method
- Digital euro or intermediary app supports pre-authorisation
- Payer has registered and activated Alias
- Payer has selected items

1. Notification of an insufficient digital euro balance and the amount to be taken from the linked account

Additional supporting materials:

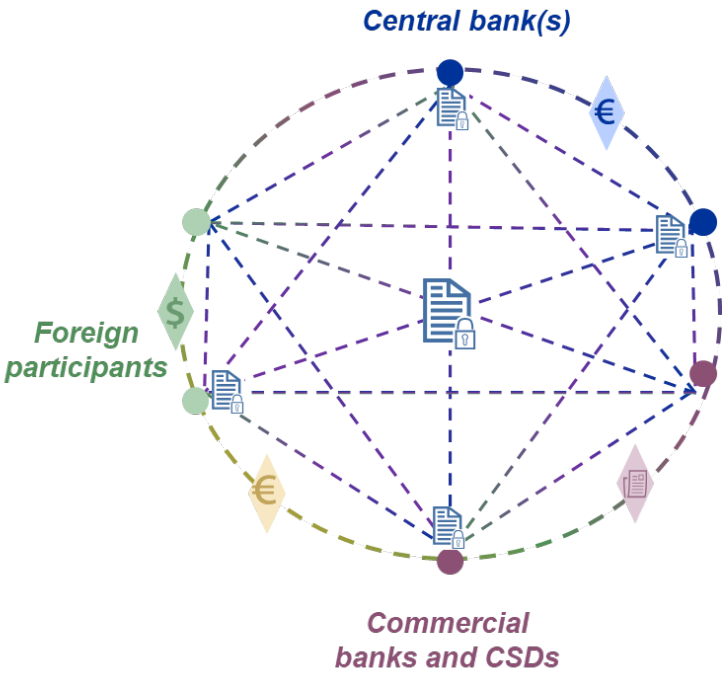
- Updated digital euro FAQ
- Report: A stocktake on the digital euro
- ECB Opinion on the European Commission's legislative proposal on digital euro
- Digital euro two-pager
- Digital euro booklet
- Digital euro LinkedIn page

Thank you

2

New technologies for wholesale central bank money settlement

DLT: implications for central bank money settlement



1. Money, securities or other digital assets recorded as tokens on a shared network
2. Benefits expected by market: atomicity, decentralised programmability, ease of reconciliation (and disintermediation)
3. Central bank money settlement needed to reduce risks and as enabler; attractive business and use cases / efficiency gains to be created by the market
4. Absent full migration to DLT by all, coexistence with and settlement also for existing technologies

Multiple options for central bank money settlement

Trigger/bridge approaches

Central bank money settlement in non-DLT infrastructures; interoperable with market DLTs

Full DLT approaches

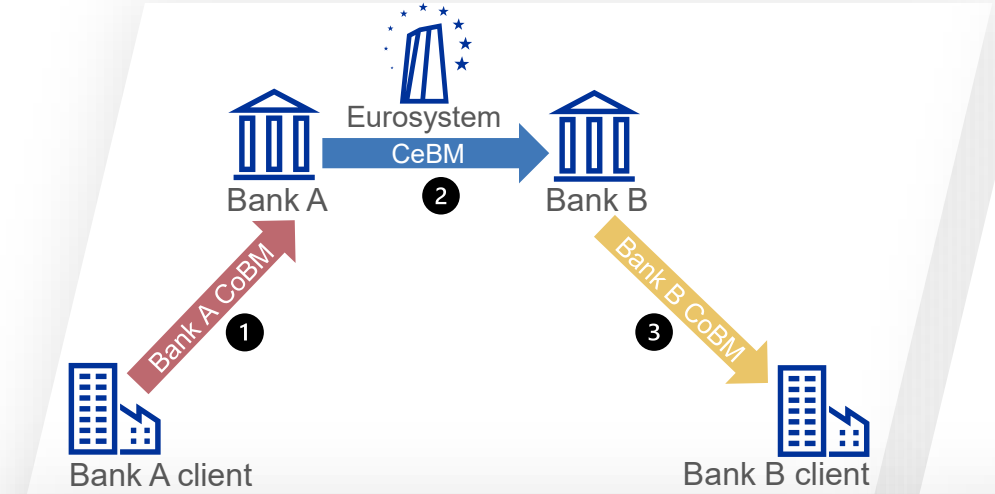
Central bank money settlement on DLT platforms

Interoperability solutions

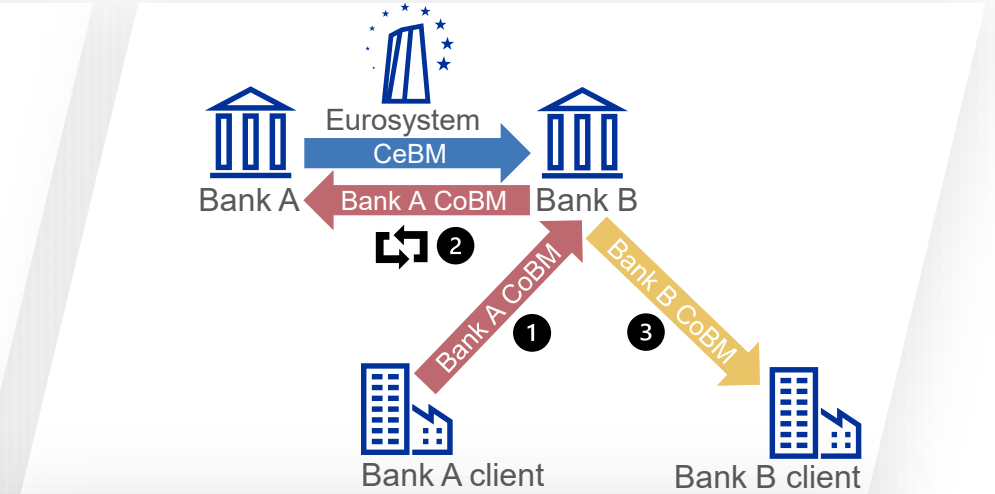
	€ central bank money	Other assets
Trigger solution	On T2 (RTGS)	On external DLT
TIPS Hash-link	On TIPS-like platform	On external DLT

	€ central bank money	Other assets
Interoperability	On Eurosystem DLT	On external DLT
Integration	On Eurosystem DLT	On Eurosystem DLT
Distribution	On external/shared DLT	On external/shared DLT

Interlinking central bank money (CeBM) and commercial bank money (CoBM) – stylised settlement models



Example 1



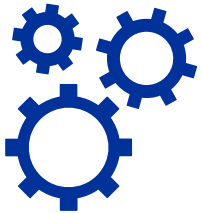
Example 2

Note A: These examples are non-exhaustive; other models could be considered
Note B: These models could in principle be implemented with cross-platform and single-platform solutions

Eurosystem exploratory work

Practical work together with **market stakeholders**, planned from **May to November 2024**, focused on the **interoperability solutions**:

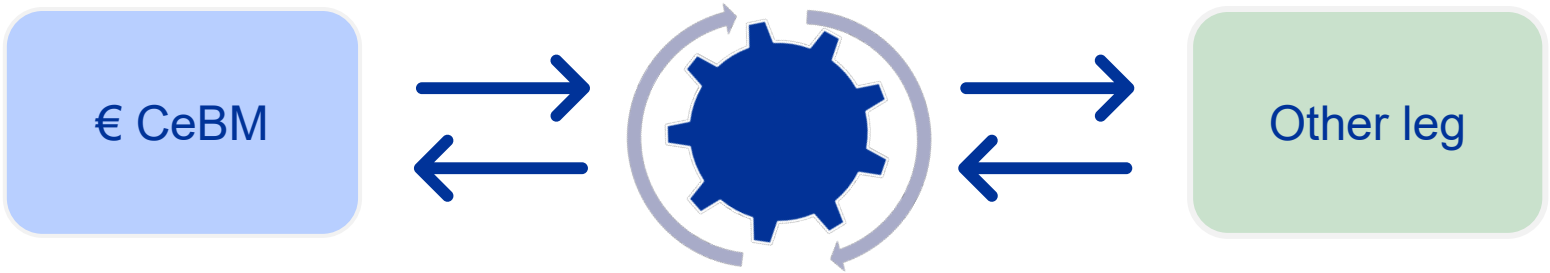
Provided by Deutsche Bundesbank, Banque de France and Banca d'Italia



- **Experiments**: mock settlement of the cash and asset legs in test environments
- **Trials:** actual settlement of transactions in central bank money in a limited setting for a limited period of time

N.B. the Eurosystem's exploratory work does not constitute a commitment by the Eurosystem to provide any steady-state solution(s) in the future or to make any changes to its current infrastructure.

Settlement in Eurosystem exploratory work (1/2)



3 solutions and different Interoperability mechanisms to synchronise settlement

- Trigger Solution (HTLC, basic approach without HTLC)
- TIPS Hash Link (API Gateway)
- DL3S – DLT Interoperability (HTLC, Swift connector)

3 types of use cases

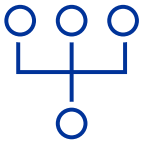
- DvP: other leg is a digital asset
- PvP FX: other leg is CeBM denominated in another currency
- Automated payments: single payment (no other leg) or interlinked payments (other leg are EUR CoBM payments)

Settlement in Eurosystem exploratory work (2/2)

Across the solutions and the different use cases, common features explored:

(near) instant settlement in central bank money on a gross basis

- Benefit: safe settlement with no counterparty risk



Atomic and synchronised settlement of two (DvP, PvP) or more legs (FX PvPvP, DvPvP and interlinked EUR CeBM / CoBM payments)

- Benefit: complex transactions and processes are settled as one conditional transaction, reducing risks

Implications of these features compared to today's settlement process and market practices (e.g. for liquidity management)?

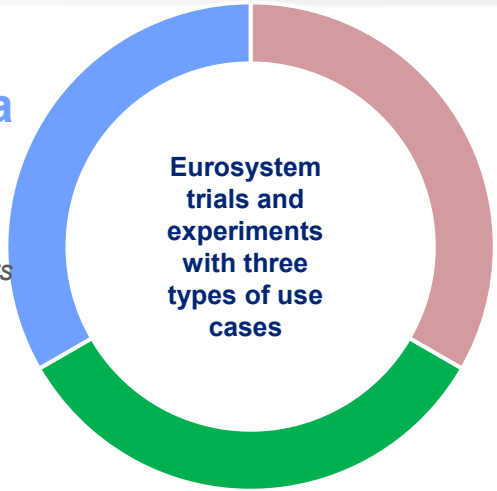
Trials and experiments at a glance

Domestic payments use cases within the euro area

(experiments = mock settlement)

- ✓ *Automation of margin calls*
- ✓ *Tokenised deposits / deposit tokens transfers*
- ✓ *Automation of interbank settlement and reconciliation*

***Who**: commercial banks, CCPs*



Securities related use cases

(trials = real settlement ; experiments = mock settlement)

- ✓ *Issuance and distribution of securities natively on DLT (e.g. Commercial paper, bonds, tokenised funds)*
- ✓ *Secondary market transactions*
- ✓ *Securities lifecycle management: coupon payment, asset servicing, redemption*
- ✓ *Repo*

***Who:** commercial banks, CSDs, CCPs, investors, issuers, trading venues*

International use cases with other central banks

(experiments = mock settlement)

- ✓ PvP FX settlement
- ✓ Meridian FX using the three solutions of the Eurosystem

.. And in parallel with trials and experiments

Continued research into DLT and new technologies

- ✓ Policy analysis on impact of DLT and implications
- ✓ Further in-depth analysis of other solutions for CeBM settlement (DLT-Integration and DLT-Distribution)

Monitoring of ongoing initiatives and stakeholder engagement

- ✓ Dedicated Eurosystem Market Contact Group for new technologies and wholesale settlement: 60+ European and international market stakeholders
- ✓ Monitoring of other central bank / BIS initiatives: e.g. Singapore, Switzerland

Eurosystem participation in other BIS-IH initiatives

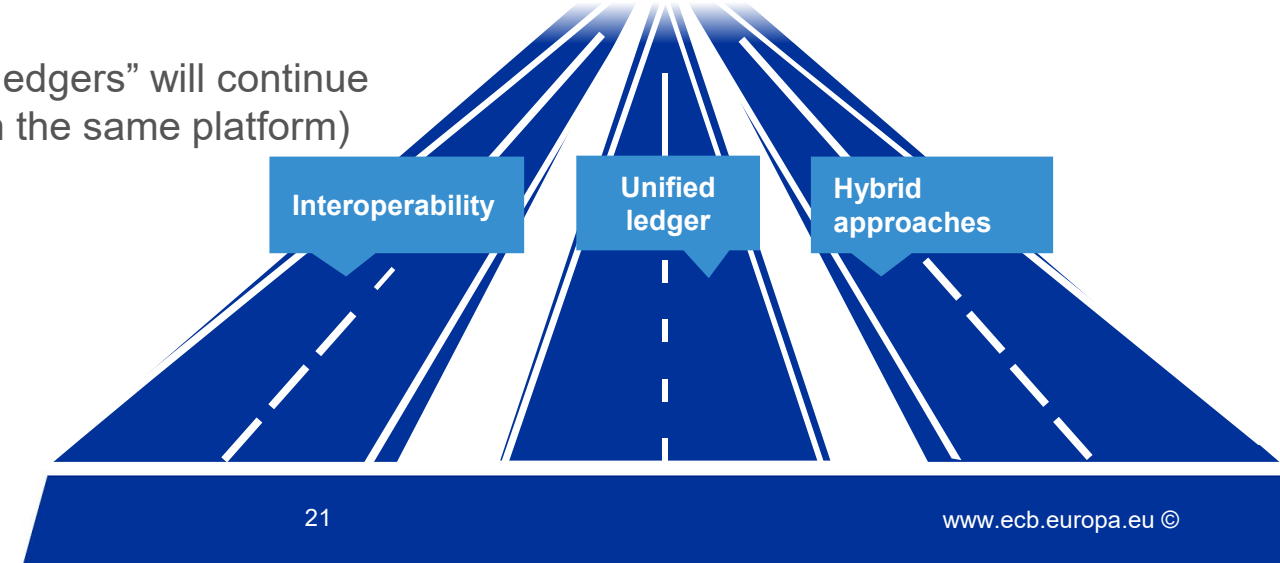
- ✓ Meridian FX
- ✓ Agorá
- ✓ Rialto (via Eurosystem centre)

Work on a longer-term vision

Key objectives:

- ✓ Preserve the stabilising role of central bank money
- ✓ Strengthen the efficiency of European financial markets
- ✓ Avoid re-fragmentation

Analysis of “unified ledgers” will continue (cash and assets on the same platform)



Further information

ECB webpage on exploratory work and ntw-Contact Group documents:

https://www.ecb.europa.eu/paym/integration/distributed/exploratory/html/index.en.html

7 October 2024 speech by Piero Cipollone:

https://www.ecb.europa.eu/press/key/date/2024/html/ecb.sp241007~cc903db51d.en.html