EUROPEAN CENTRAL BANK

EUROSYSTEM

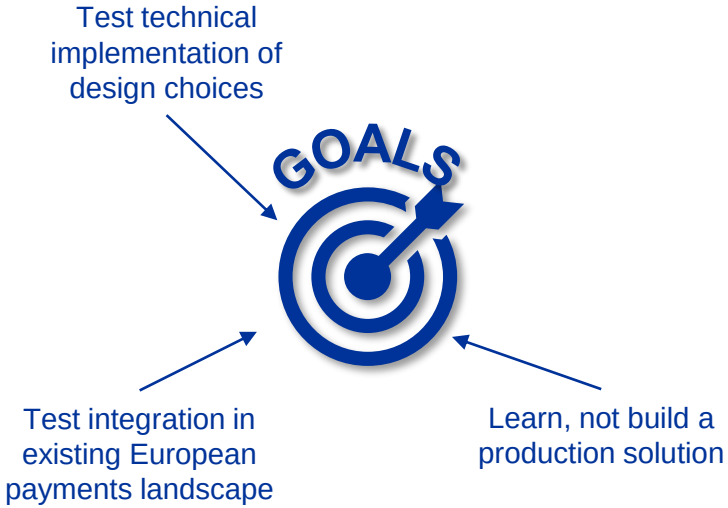
Digital euro prototype

Summary and lessons learned

3 July 2023

Digital euro project team

Prototype background, set-up and goals



1 **Back-end prototype**
Developed by the Eurosystem

5 **Front-end prototypes**
Developed by selected participants

Jul 2022 - Feb 2023

Use cases

Point of sale (PoS): payer & payee-initiated

Person to person: online & offline

E-commerce

No personal data were processed in the prototyping exercise either by the ECB or by the front-end prototype participants.

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Prototype exercise results

Possible to smoothly integrate digital euro into the existing European payments landscape, while leaving ample room for innovative features and technologies.

A digital euro could in principle **work both online and offline**, using independent designs.

Important: the specific choices made for the prototypes do not affect any decision relating to a specific technology or functionality for the final digital euro design. The API specifications do not prejudge possible alternative designs. The actual prototypes presented will be discarded and not used further.

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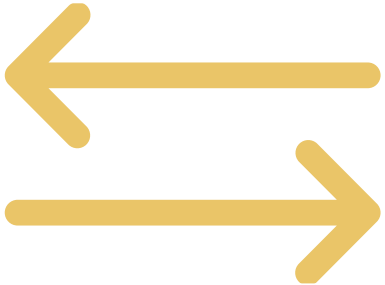
Back-end prototype

What we developed

- N€XT, a **bespoke centralized settlement system** developed from scratch by the Eurosystem
- **Not a DLT**, but based on a **UTXO data model** (greatest potential for learning)

What we learned

UTXO model allows for fast and efficient validation of transactions



Transaction model based on UTXO can support different types of transactions (future proof)…

… while protecting user privacy by not revealing payment patterns or account balance to the Eurosystem

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Front-end prototypes

What was developed

P2P online Caixa Bank	P2P offline Worldline	E-commerce Amazon	POS payer EPI	POS payee Nexi
Mobile app Alias	Mobile app Secure Element, NFC	Online shopping Wallet webapp	Customer app + Merchant app QR codes	Customer app + Smart POS NFC + QR codes

What we learned

- **Smooth interaction** between front-end and back-end with room for **innovative approaches;** adaptation effort for existing PSP systems remains to be evaluated
- **Offline and online can have different data models and be interoperable:** offline data model can be also balance based. **Maturity still a challenge.**