

# How to integrate CBDC with DLTs?

Strategies and Solutions

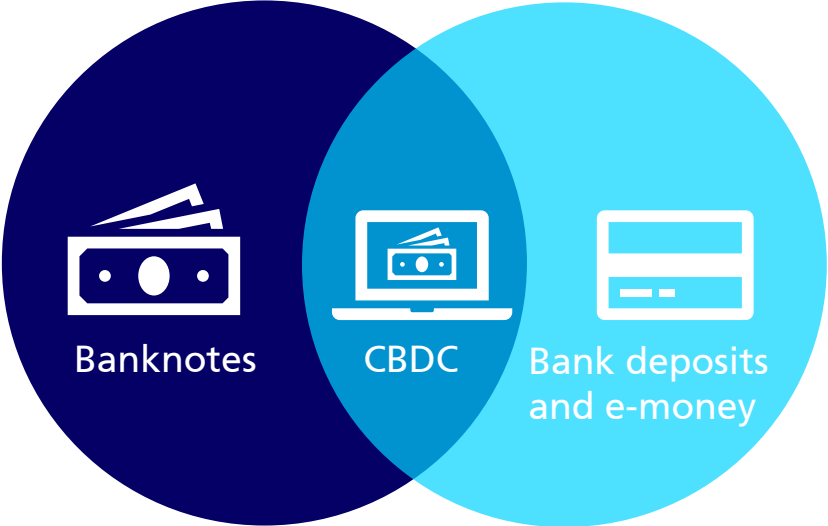
Lars Hupel  
TUM Blockchain Salon  
2023-05-12

**Central  
Bank  
Digital  
Currency**

**Distributed  
Ledger  
Technology**

# Central Bank Digital Currency

Issued by the central bank



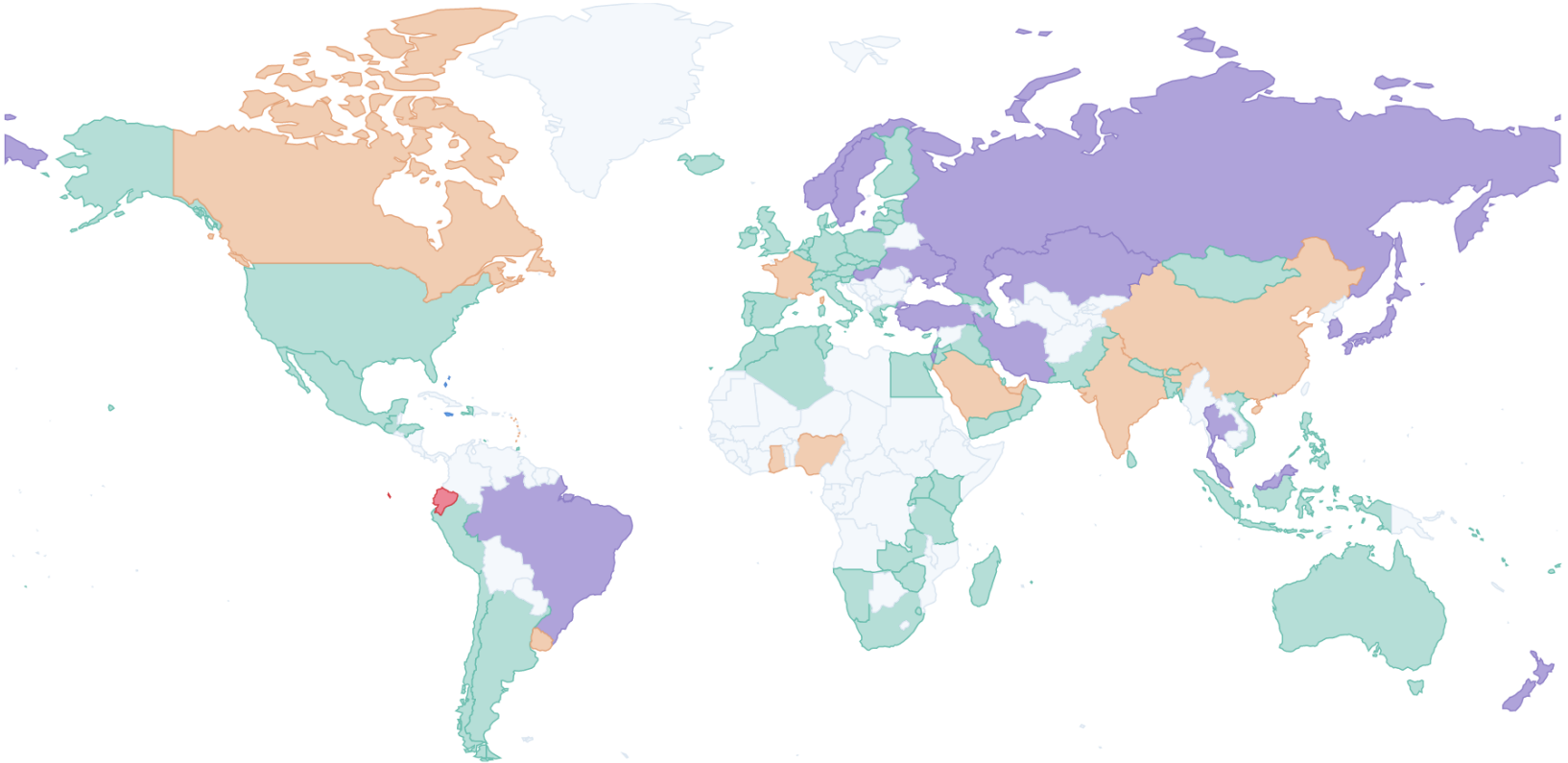
Banknotes

CBDC

Bank deposits  
and e-money

Digital money

# CBDC worldwide



**In 2023, over 20 countries will take significant steps towards piloting a CBDC.**



**distributed ledger:**

**append-only store of transactions which is distributed across many machines**

The background is a collage of Botswana banknotes. A magnifying glass is positioned over a central image of a doctor in a white coat examining two young children. The text 'Will CBDC run on DLT?' is overlaid on a dark blue banner at the top.

**Will CBDC run on DLT?**

**Does it matter?**



# Roles & Responsibilities in CBDC



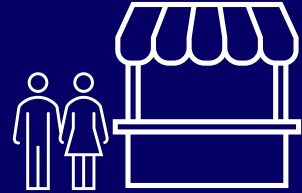
Central Bank



Intermediaries




Users



# Validation & Integrity

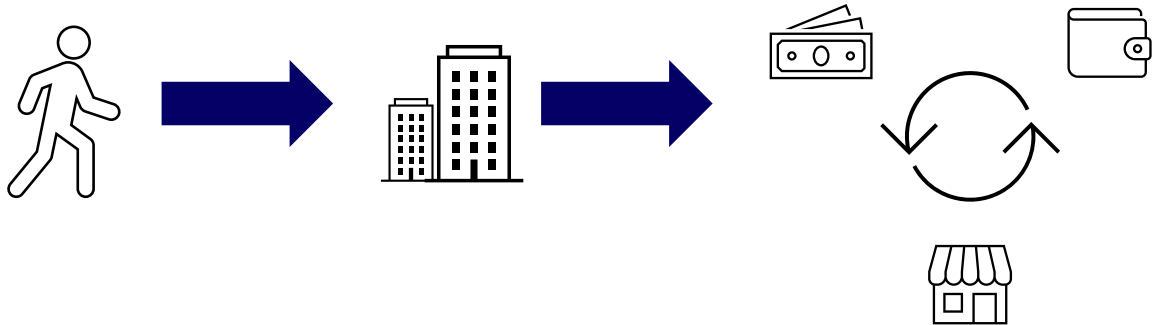
Alice - 10 €  
Bob + 10 €



Central Bank



# Distribution & Custody



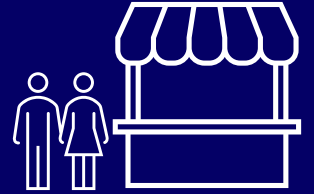
Intermediaries



# Payments & more ...



Users





# Programmability in CBDC

# Programmable Money

(e.g. HTLC)

# Programmable Payments

(e.g. ERC-20)

**Programmable  
Money**

**Programmable  
Payments**



Digital pound CBDC won't be programmable to avoid government control perceptions

**ECB Says Yes to Programmable Payments, No to Programmable Money**


CBDC – How Dangerous is Programmability?

September 21, 2021

**Policy**

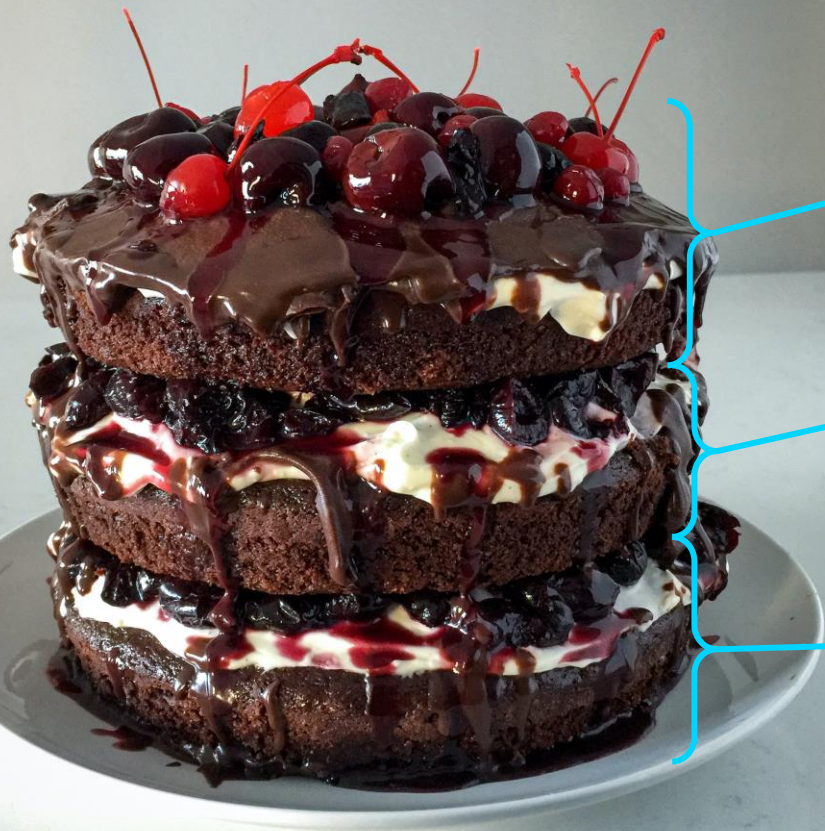
**Digital Euro Will Never Be Programmable, ECB's Panetta Says**

Some observers have touted restrictions on how people can spend their money as an advantage of a central bank digital currency.

By Jack Schickler  Jan 23, 2023 at 4:28 p.m. Updated Jan 23, 2023 at 6:10 p.m.







Private Sector  
Innovation

FSP Integration

Central Bank  
Infrastructure



# CBDC & Smart Contracts

# Assumptions

1 Central Banks do not care about specific DLT implementations.

Central Banks do not care about end-user operations.

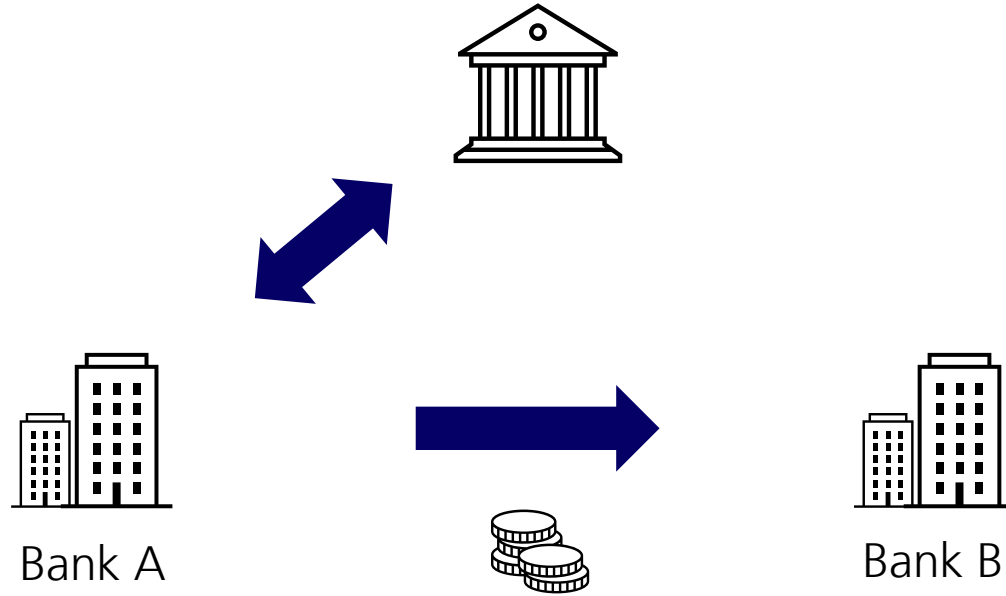
2

3 Commercial players know better about customer needs.

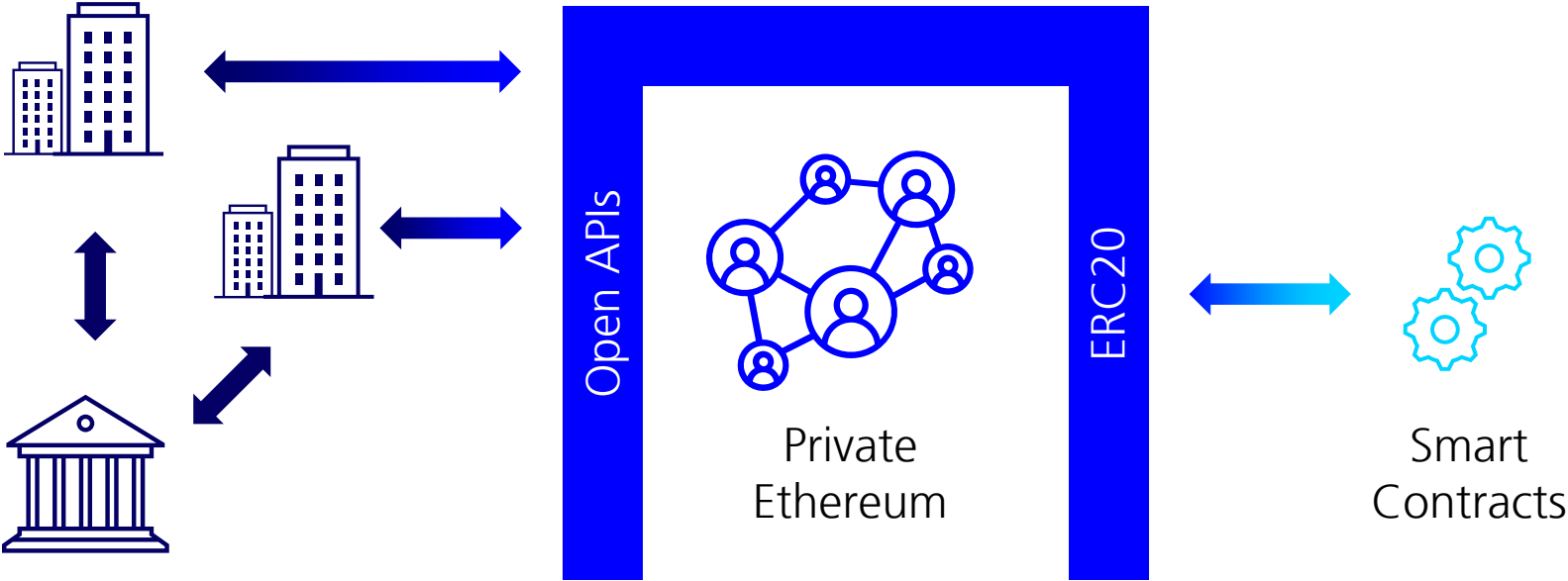
DLTs evolve much faster than currency does.

4

# Transacting CBDC directly



# Transacting CBDC in a Smart Contract





Decentralized  
Identifiers

ERC20  
(or similar)

Liquidity  
management

Open APIs

# What do we gain?



Ability to experiment



Flexibility for new use cases

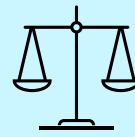


Separation of concerns

# What do we need?



Stable currency



Regulatory control



Standardization







Giesecke+Devrient  
Creating Confidence

# Questions? Answers!

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