ADHARA

Wholesale CBDCs: towards a new, just in time operating model for treasuries

ITU Seminar, November 23, 2021

4 types of money

~3% of the world's money
AML / CTF issues

Type of issuer

	Central bank	Commercial bank	E-money institution
Bearer instrument	Physical cash		
Regulated liabilities	Central bank deposits (RTGS)	Bank accounts	E-money accounts, incl. prepaid cards

- **Wholesale use only** (interbank settlement)
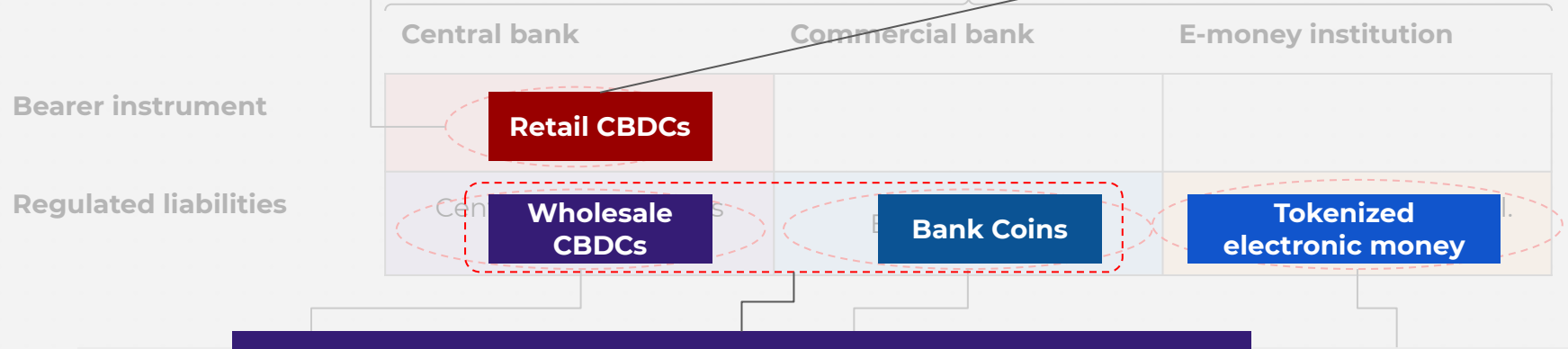- **Created against other assets** (repos, securities, credit)

- **~95 of the world's money**
- **Largely created against credit**
- **Already digital**
- **... but not programmable / difficult to access and use programmatically**

- **Light regulation (petty cash uses)**
- **Backed by bank cash (not created against credit)**

The transition to digital money

- ~3% of the world's money
- AML / CTF issues

- **Research only at this point**
- **Important implications on monetary policy - to be explored**
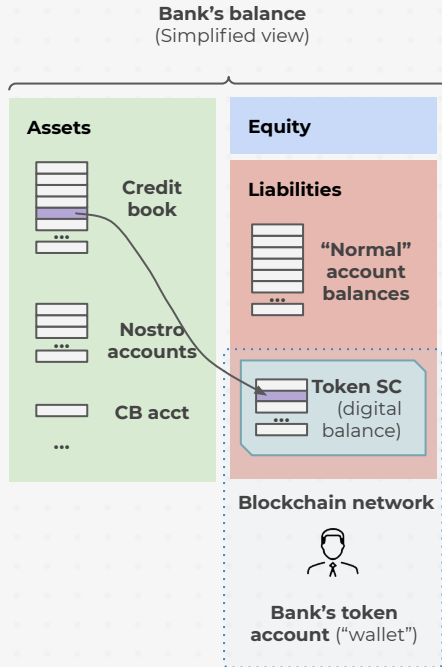- **Not clear the implications for commercial banks**

	Central bank	Commercial bank	E-money institution
Bearer instrument	**Retail CBDCs**		
Regulated liabilities	**Wholesale CBDCs**	**Bank Coins**	**Tokenized electronic money**

- **Wholesa**... settleme...
- **Created**... (repos, se...

- **Main field of work today, quickly advancing towards production**
- **Digital means "programmable": functionality coupled with money**
- **Optimal implementation through smart contracts on blockchain**
- **Available in two forms / constructs:**
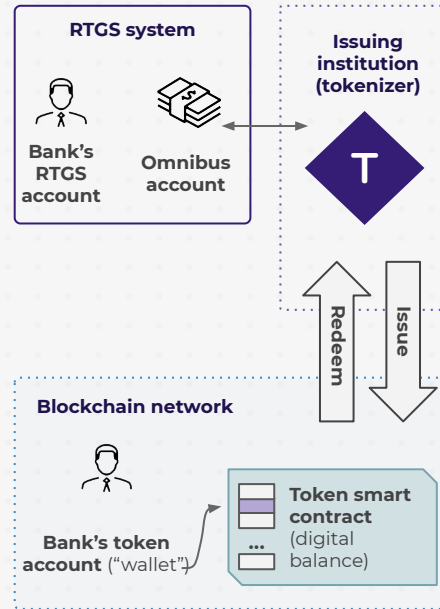 - **Native**
  - **Tokenized (backed)**

...nt regulation (petty cash ...s)

...ked by bank cash (not ...ated against credit)

Regulated digital liabilities: "Native" vs "Tokenized" constructs
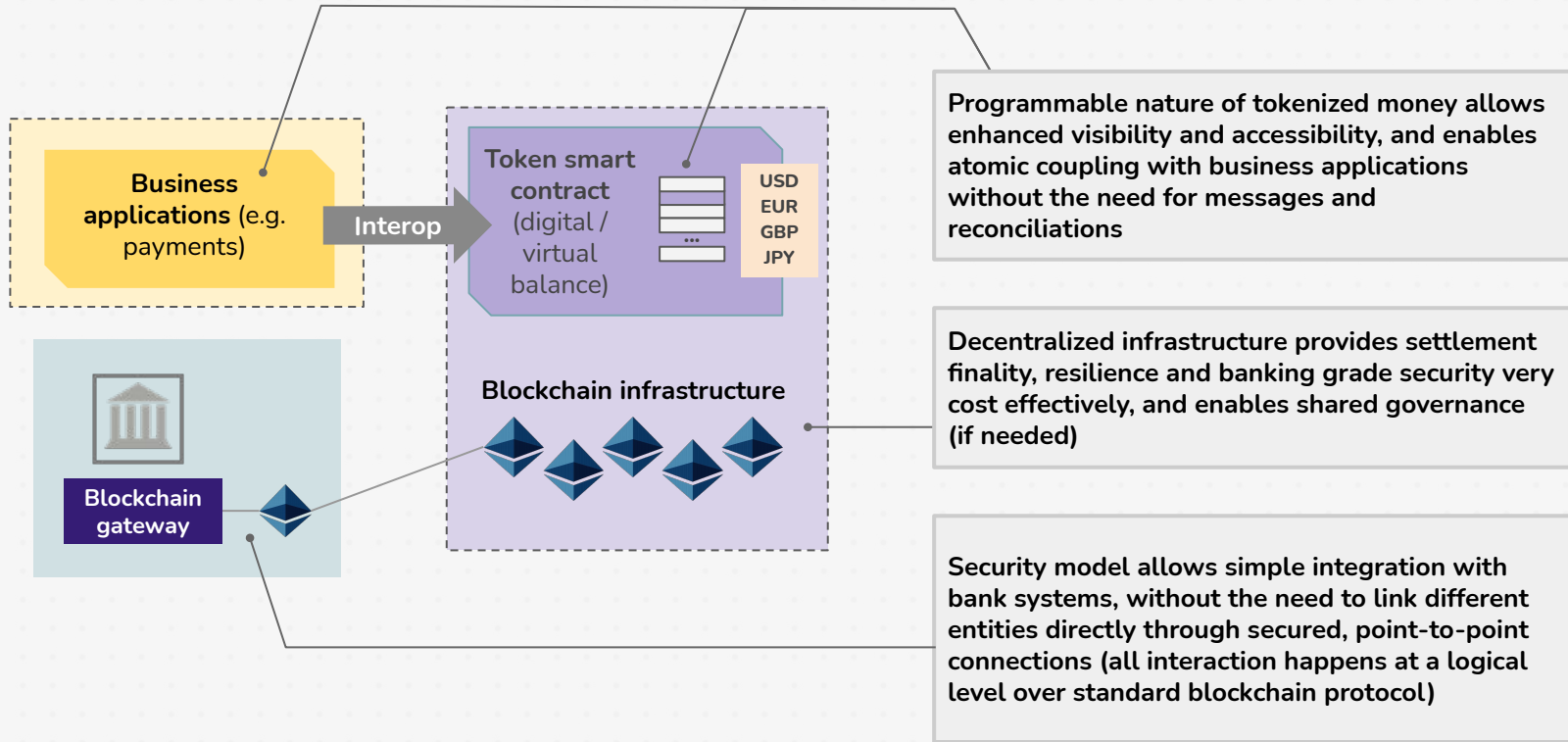

The "native" construct

Bank's balance
(Simplified view)

Assets

- Credit book
- Nostro accounts
- CB acct
- ...

Equity

Liabilities

- "Normal" account balances
- Token SC (digital balance)

Blockchain network

Bank's token account ("wallet")

The "tokenized" construct

RTGS system

Bank's RTGS account

Omnibus account

Issuing institution (tokenizer)

T

Redeem / Issue

Blockchain network

Bank's token account ("wallet")

Token smart contract (digital balance)

In both cases:

- Accessible
- Programmable
- Real time

Wholesale CBDCs: why blockchain?

Business applications (e.g. payments)

Interop

Token smart contract (digital / virtual balance)

USD
EUR
GBP
JPY

Blockchain infrastructure

Blockchain gateway

Programmable nature of tokenized money allows enhanced visibility and accessibility, and enables atomic coupling with business applications without the need for messages and reconciliations

Decentralized infrastructure provides settlement finality, resilience and banking grade security very cost effectively, and enables shared governance (if needed)

Security model allows simple integration with bank systems, without the need to link different entities directly through secured, point-to-point connections (all interaction happens at a logical level over standard blockchain protocol)
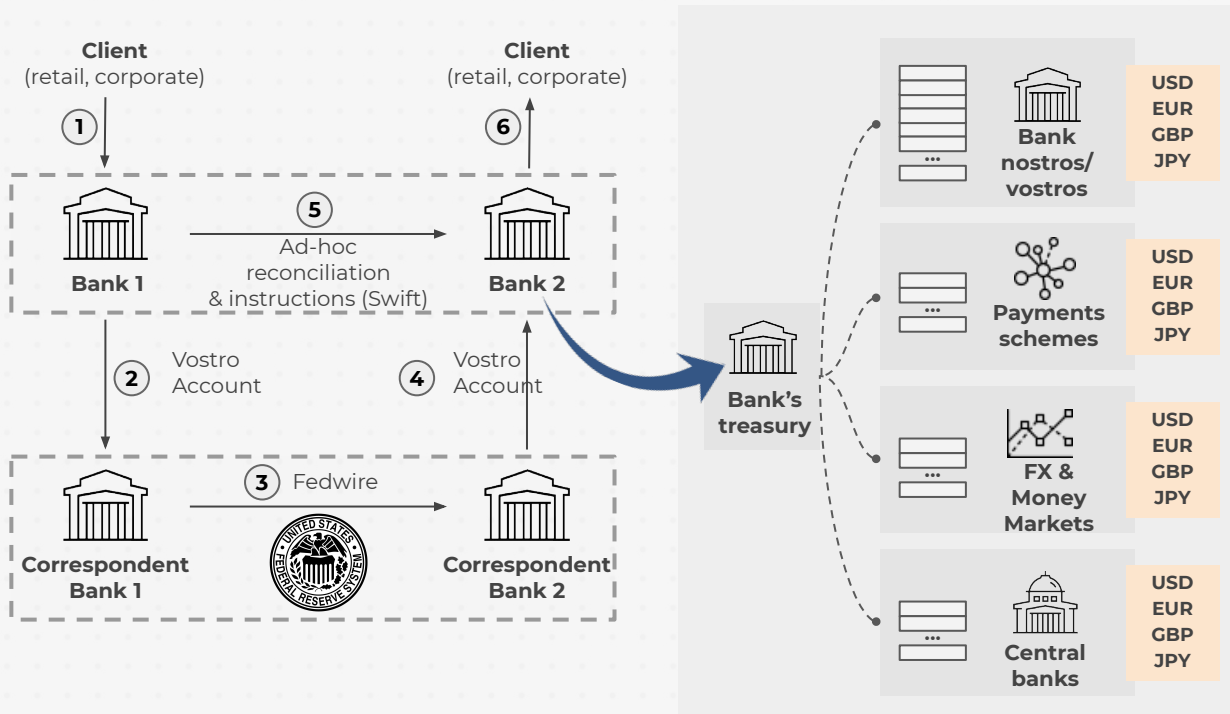
The need for wholesale money - example payments
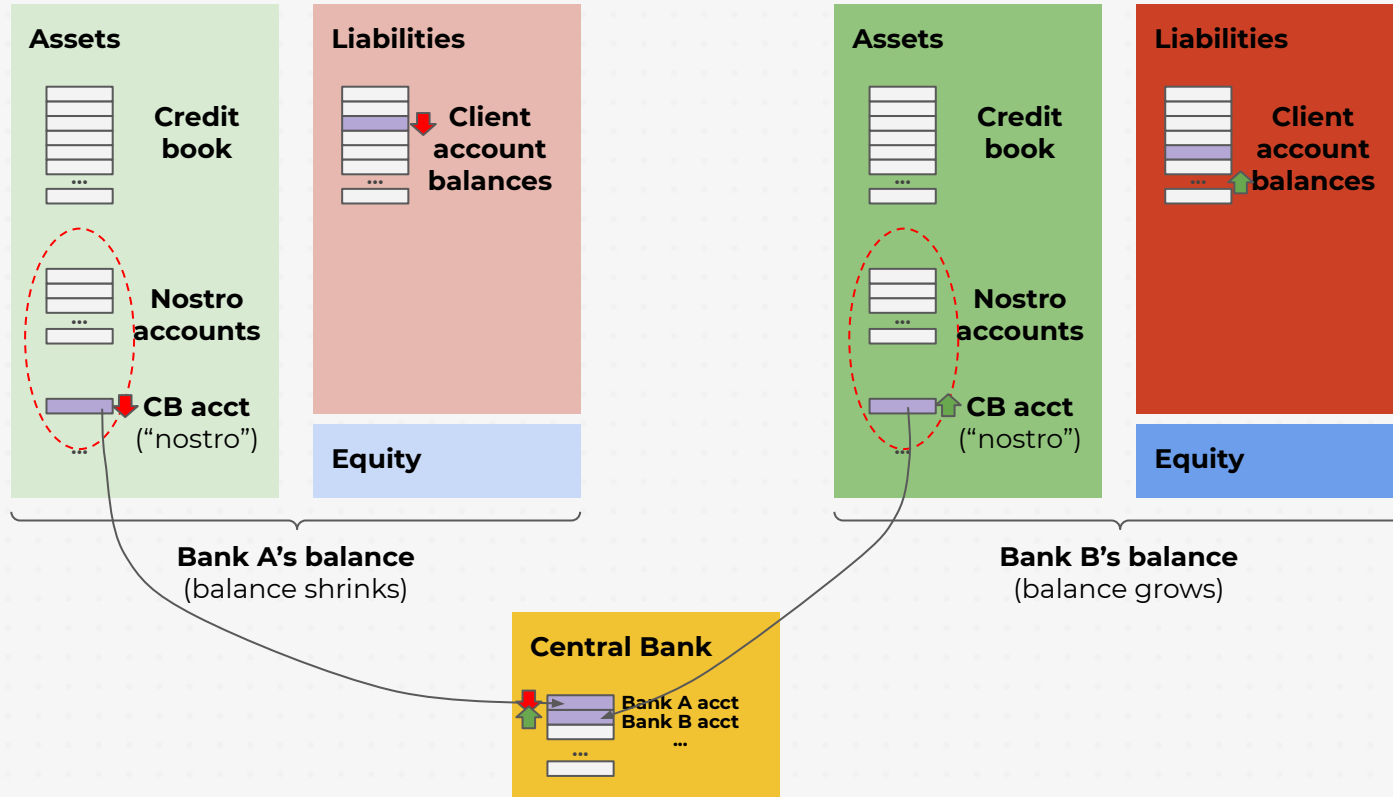
Current issues in treasuries today - example x-border payments

- No digital orchestration of payments (based on messages)
- Separate Fx process
- Pre-trade and post-trade: decoupling of payments and settlement
- Fragmentation of liquidity and credit counterparty risk

=> Financial and capital costs from excess prefunded liquidity needs

=> Reconciliations, operational costs, operational risk

=> Lack of visibility of liquidity and payments commitments - difficult Fx risk management

Towards a new, just in time operating model for treasuries
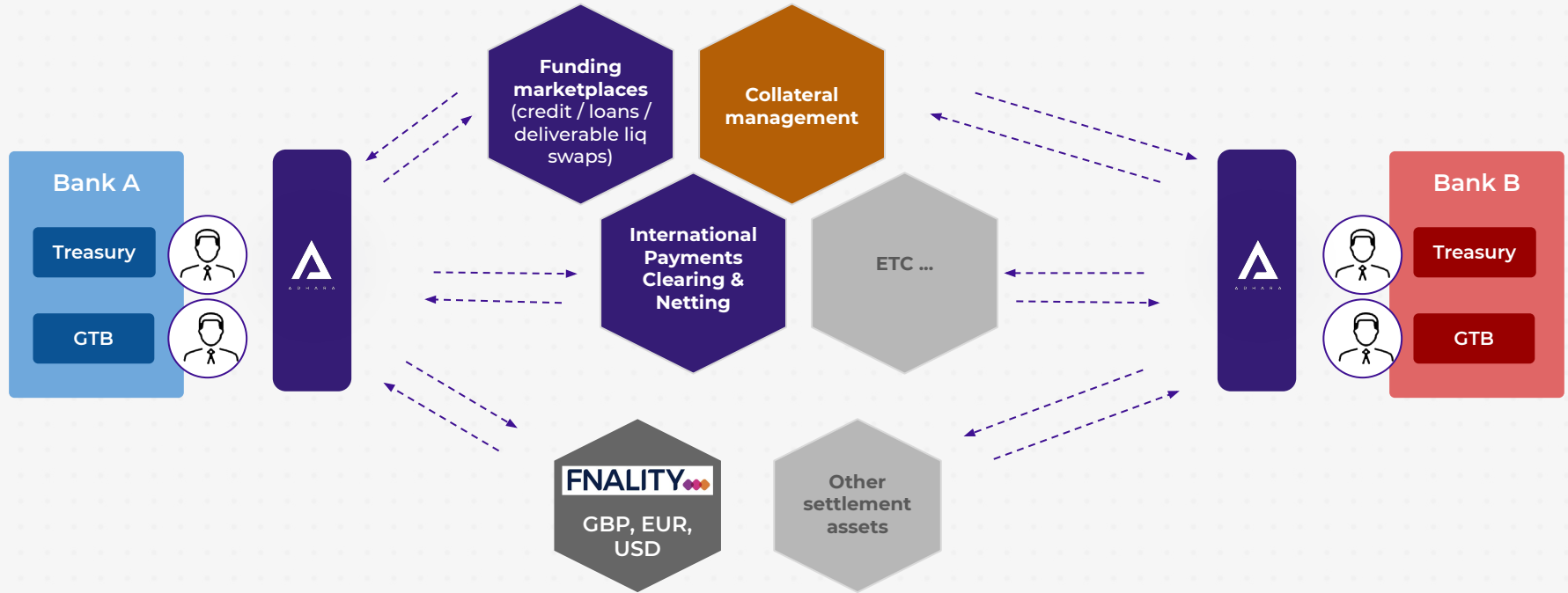
Application to cross currency payments

Real time funding

Client banks and subsidiaries can dynamically fund their (tokenized) liquidity pools as needed, as well as invest their excess liquidity on the hub

Consolidated liquidity pools

The hub provides banks with a single liquidity pool for all their settlement needs, both with internal counterparties (i.e. with other subs) and external ones (through the hub)

Settlement obligations

Banks and subsidiaries have a consolidated view of their settlement obligations, of different types and with different priorities. Obligations are settled through the consolidated liquidity pool (their tokenized liquidity account)

Network / scheme operation

The underlying (permissioned) blockchain network as well as the scheme / rulebook is centrally managed - or a decentralized governance model is also possible
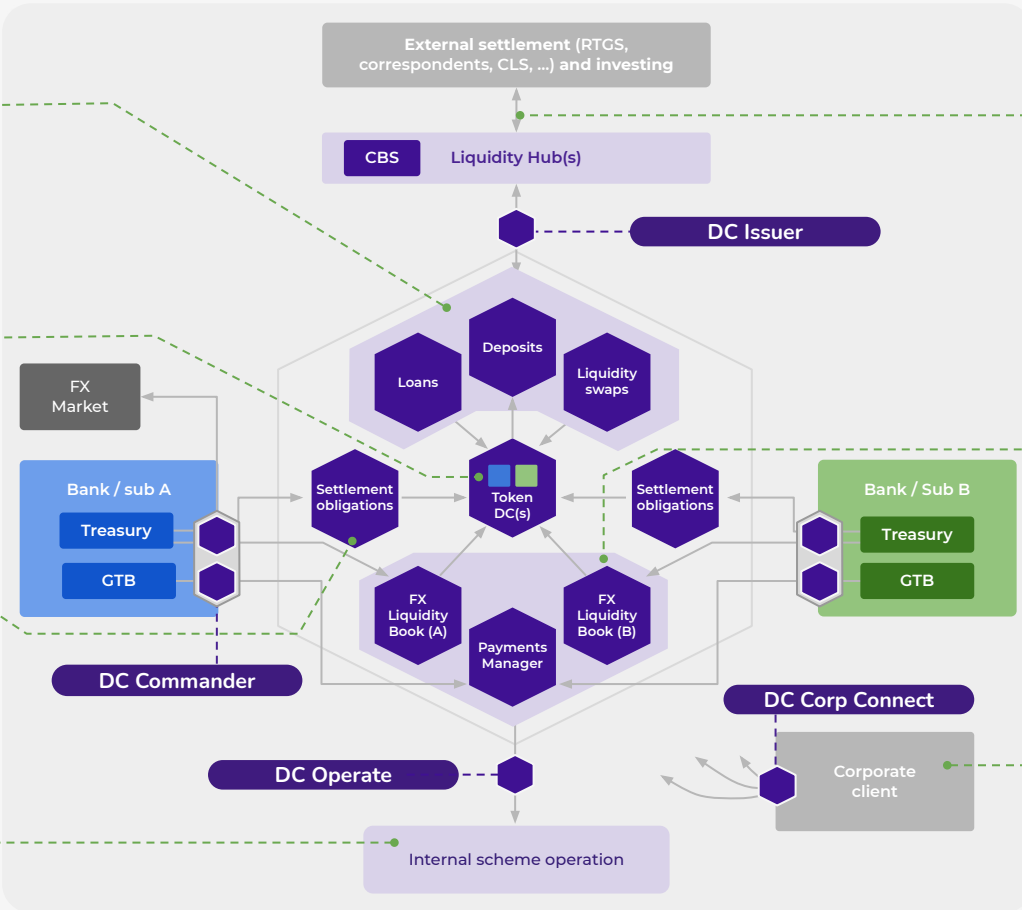
External settlement thru hub

Hub centralizes external settlement (and investment) activities, thus leveraging domestic presence and achieving economies of scale (e.g. consolidating correspondent relationships)

Cross currency payments orchestration

Payments are digitally orchestrated and created as single digital objects, providing a single version of truth regarding their status at all times. Treasuries offer marked up Fx rates for payments, thus dynamically setting Fx prices for cross currency payments. Submission of payments atomically create their corresponding settlement obligations

End client access

End clients (e.g. corporates) can be given selective access to the network, e.g. to submit payments directly, look up payments status, visualize treasury balances, etc.

External settlement (RTGS, correspondents, CLS, …) and investing

CBS   Liquidity Hub(s)

DC Issuer

Deposits

Loans   Liquidity swaps

FX Market

Settlement obligations   Token DC(s)   Settlement obligations

Bank / sub A
Treasury
GTB

Bank / Sub B
Treasury
GTB

FX Liquidity Book (A)   FX Liquidity Book (B)

Payments Manager

DC Commander

DC Corp Connect

Corporate client

DC Operate

Internal scheme operation

Wholesale CBDCs: benefits

✓ Optimization of intraday liquidity peaks

✓ Reduction / elimination of credit counterparty risk => reduced capital consumption

✓ Elimination of reconciliations and errors => reduction of operational cost and risk

✓ Real time visibility of liquidity and settlement commitments => better risk management

✓ Benefits for end clients: real time payments, better (dynamic) fx prices, real time visibility of payments and risk, new innovative payments services
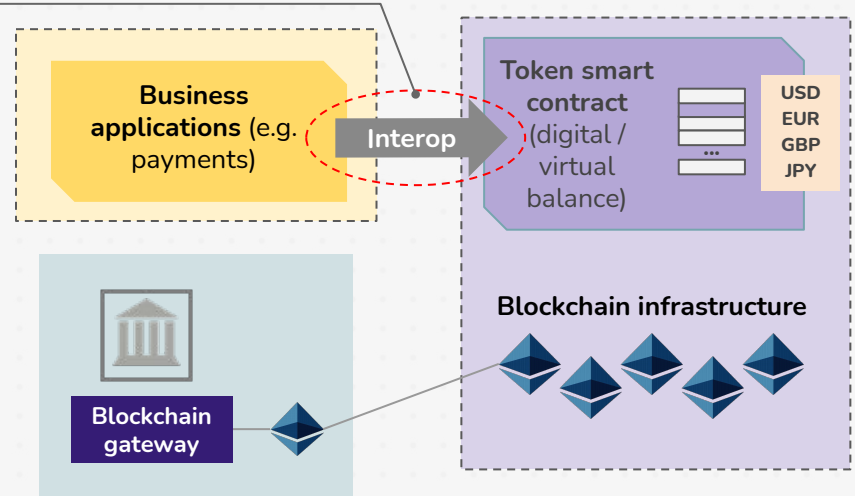
Potential areas for standardization

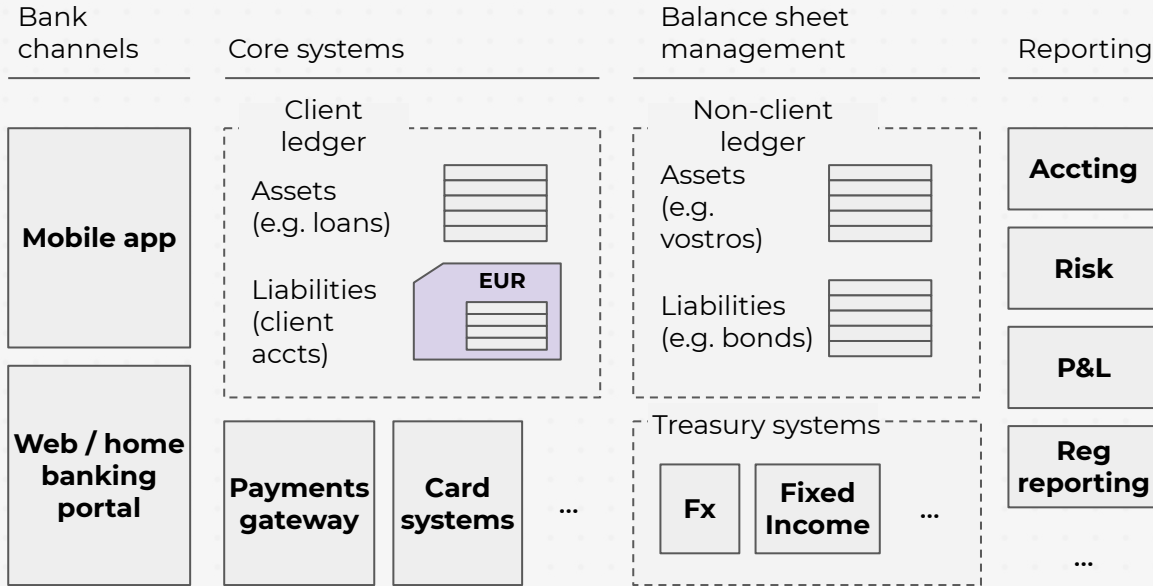**Standardization** needed in the **interfaces** to the **digital settlement assets**

- Visualization / reading **balances**
- Triggering irrevocable **transfers**
- **Holding** / encumbrances / pledging

... as well as at the **business orchestration** level

- **Atomic execution** of transactions in different settlement asset platforms

Business applications (e.g. payments)

Interop

Token smart contract (digital / virtual balance)

USD
EUR
GBP
JPY

Blockchain gateway

Blockchain infrastructure

Next frontier: natively digital bank coins - starting w wholesale use (e.g. multi-geographical banking groups)

Bank channels

Core systems

Client ledger

Assets (e.g. loans)

Liabilities (client accts)

EUR

Mobile app

Web / home banking portal

Payments gateway

Card systems

...

Balance sheet management

Non-client ledger

Assets (e.g. vostros)

Liabilities (e.g. bonds)

Treasury systems

Fx

Fixed Income

...

Reporting

Accting

Risk

P&L

Reg reporting

...

- Ledger database = token smart contract

- ... but complying with token standards

  => bank money is programmable / operable from blockchain

- All (classic) systems stay the same

  => client can still operate the account through existing channels

  => Reporting etc. stay the same

✓ Wholesale CBDCs an important efficiency opportunity for banks

✓ ... and an important element to drive innovation

✓ Key benefit is reduction of intraday liquidity needs, credit counterparty risk, and operational cost and risk

✓ Retail CBDCs unlikely to be an alternative in wholesale (many questions pending)

✓ Bank coins potentially useful for multi-geographical banking groups and institutional banking