

WHICH PART OF TRADITIONAL **FINANCE'S LUNCH ARE** BLOCKCHAINS EATING?

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CRYPTO FINANCE

DEUTSCHE BÖRSE
GROUP

SECURING TRUST IN DIGITAL ASSETS

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- **Covering the entire value chain:** full suite of professional digital asset services, including trading and post-trade services, custody and staking
- **Partnering with financial institutions:** B2B business model, enabling financial institutions to access digital assets securely with a single onboarding for all services
- **Strong parent company:** Crypto Finance is part of Deutsche Börse Group, leading market infrastructure provider worldwide and amongst the largest stock exchange operators
- **Prudentially regulated:** FINMA licensed Securities Firm in Switzerland, MiCAR licensed CASP under Bafin



ALL IT TAKES IS A SINGLE NUMBER

Private key

E.g. p2wpkh:Kyy
Necessary for spending

Address `bc1phuptypne8u2afyr5wx0wj3r8h3e4e2zlxvry3sfzvs6ma5zdh0usl3fy4d`  

Confirmed balance	0.00042000 BTC \$48.35	Pending	+0.00000000 BTC \$0.00
Confirmed UTXOs	1	Pending UTXOs	0
Total received	0.00042000 BTC	Type	P2TR

Public key

Address¹: `bc1phuptypne8u2afyr5wx0wj3r8h3e4e2zlxvry3sfzvs6ma5zdh0usl3fy4d`
Necessary for deposits
Necessary for watching²



¹A few steps were skipped

²Details depend on asset

EXTENSIVE INSTITUTIONAL CUSTODY SERVICES

Dive into a thriving ecosystem of digital assets with unmatched security and compliance standards

Protocols



Token Standards

ERC-20 ERC-223 ERC-721 SPL CMTA 20

Services

- Secure custody
- Whitelisting of client accounts
- Deposits and withdrawals
- Transaction monitoring
- Crypto compliance checks
- Reporting services
- Administration services
- Staking of assets

Security & Governance





- Audited, secure HSM-based solution
 - SOC-2 / ISAE 3000 report**
 - FIPS 140-2 Level 3 certified
 - PEN tested (InfoGuard, Riscure, RedGuard, Certitude and Un1quely)
- Access controlled user interface
- Best practice transaction approval and monitoring
- Technologically and operationally enforced withdrawals only to whitelisted client wallets

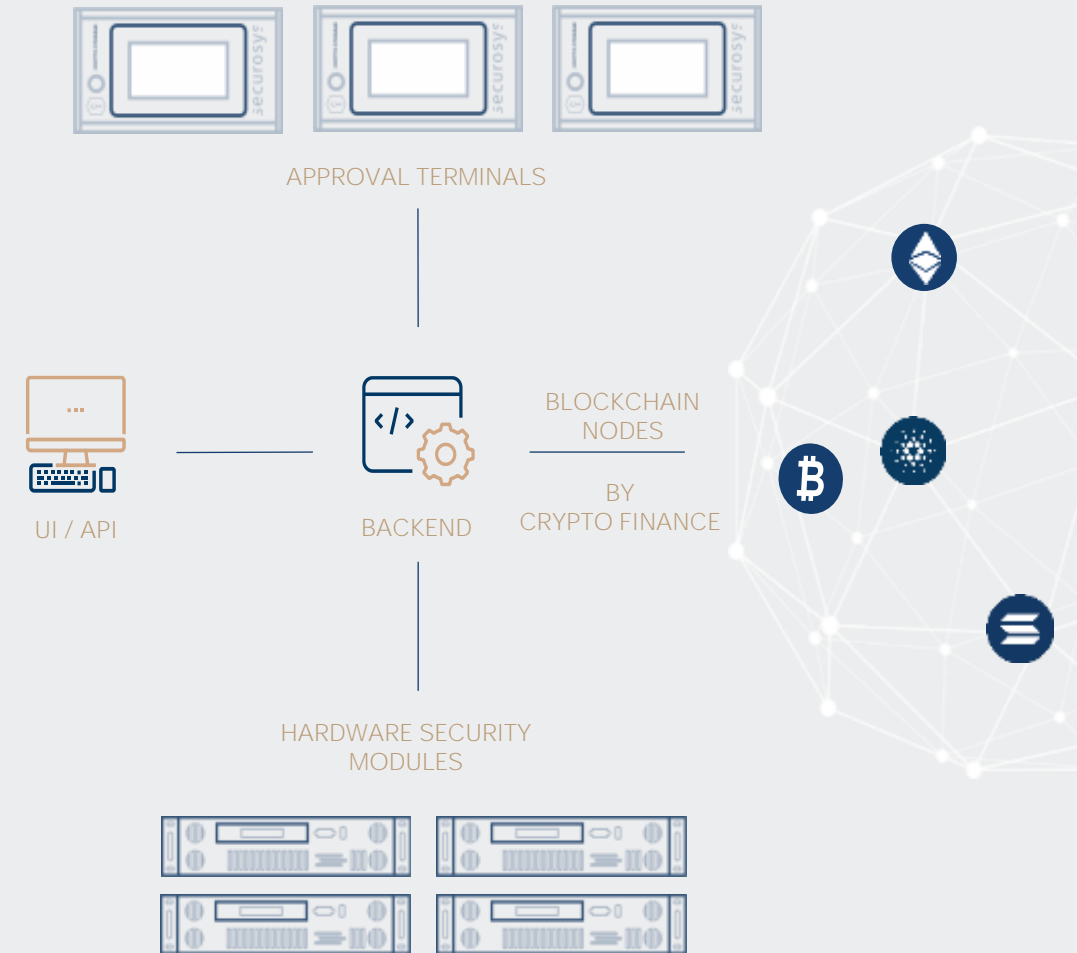
*The above list is not exhaustive and is periodically updated. Development can be tailored to clients' requests

**We have initiated the necessary procedures to obtain the SOC-1 / ISAE 3402 Type I report in 2024

OUR INSTITUTIONAL-GRADE INFRASTRUCTURE

Market-leading, banking level security for all use cases

-  Private keys are created on FIPS-certified **Hardware Security Modules (HSMs)** subject to strict governance and proprietary architecture.
-  Private keys are stored in the HSMs, which are located georedundant, highly guarded locations in **Switzerland and Germany**.
-  After a transaction request, approvals are required, with an approval framework that is stored with and bound to each private key.
-  Approvals are given on the **Approval Terminals (ATs)** after manual verification, but the private key signature for a transaction is applied on the HSM exclusively.



BLOCKS

Each block contains **transactions**

- Consistent with network rules
- Consistent with current state

Is identified through its **hash**

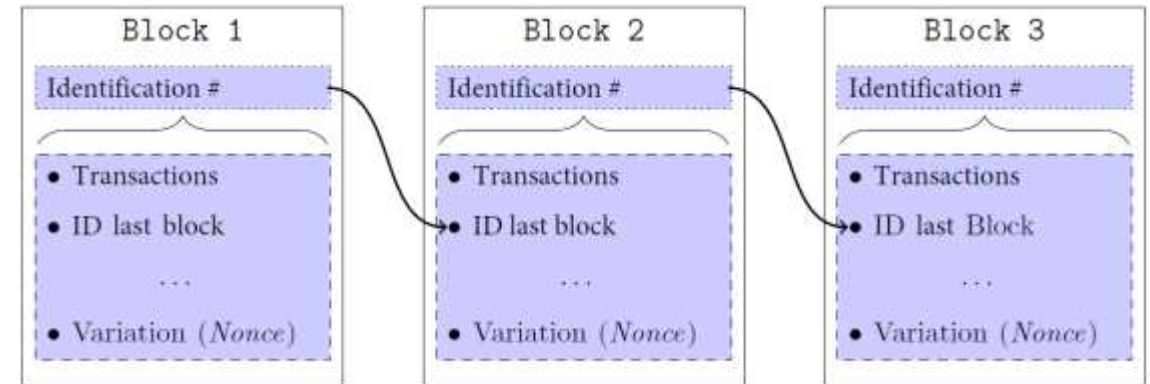
- Any change changes the block hash

References previous block through **parent hash**

- Any change in the past devalidates the chain

Allows for **variation**

- Proof of Work challenge



WHAT DOES A BLOCKCHAIN DO?

Time-orders transactions
Without a central party

Prevents double-spends
Enables digital scarcity
Allows shared state
Protected by global consensus
Enables sovereign monetary system
Enable right transfers
Enables digital asset provenance
Bootstraps real asset provenance
Records undeniable history
Eliminates the need for trust
Facilitates instant transactions
Across border
And jurisdictions

WHAT DOES ABLOCKCHAIN *NOT* DO?

- Know the truth (sad I have to say this)
- Know what happens outside of the chain
- Know what happens on other chains (exceptions apply)
- Enforce the truth in the real world



TOKENS – WHAT DO YOU BUY?

The token IS the value

Native assets:

- BTC
- LTC
- ...

Use enforced on the platform:

- ETH
- SOL
- ...

Utility or governance tokens:

- UNI
- MKR
- ...

The token REPRESENTS the value

“Backed” by real-world items or laws:

- Stablecoins (USDC)
- “Wrapped” tokens (WBTC)
- Bonds
- Stallions
- Cars
- Structured Products

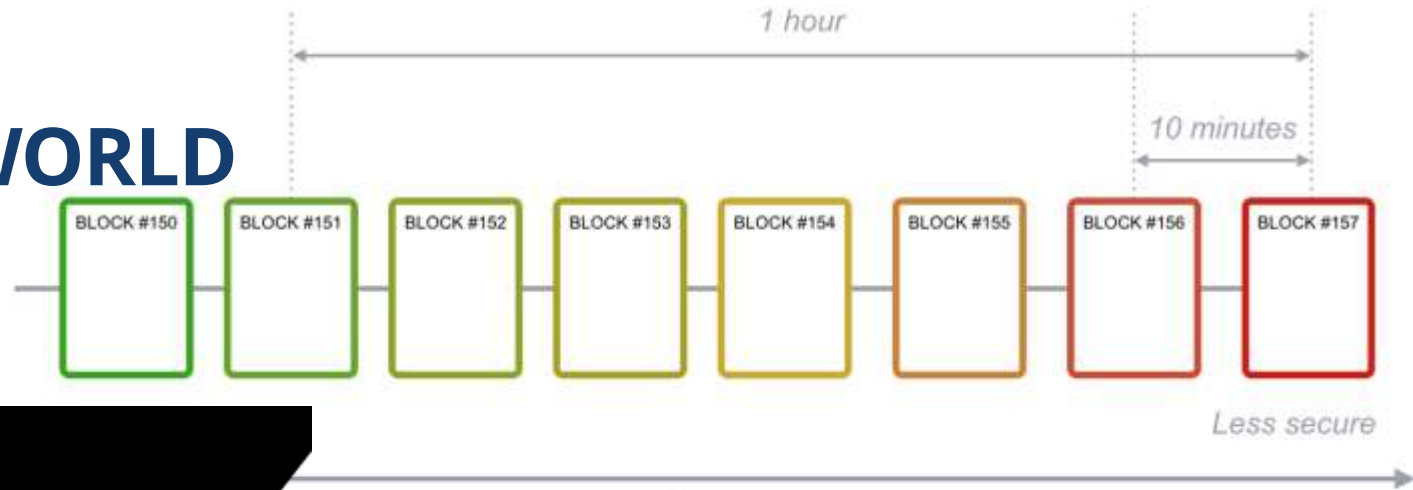
“Backed” by collateralization:

- Stablecoins (DAI)

Collectibles:

- In-game items

BLOCKCHAIN AND REAL WORLD



Oracle

Get real-world information into the blockchain

Enforcement

Get results of on-chain events enforced in the real world



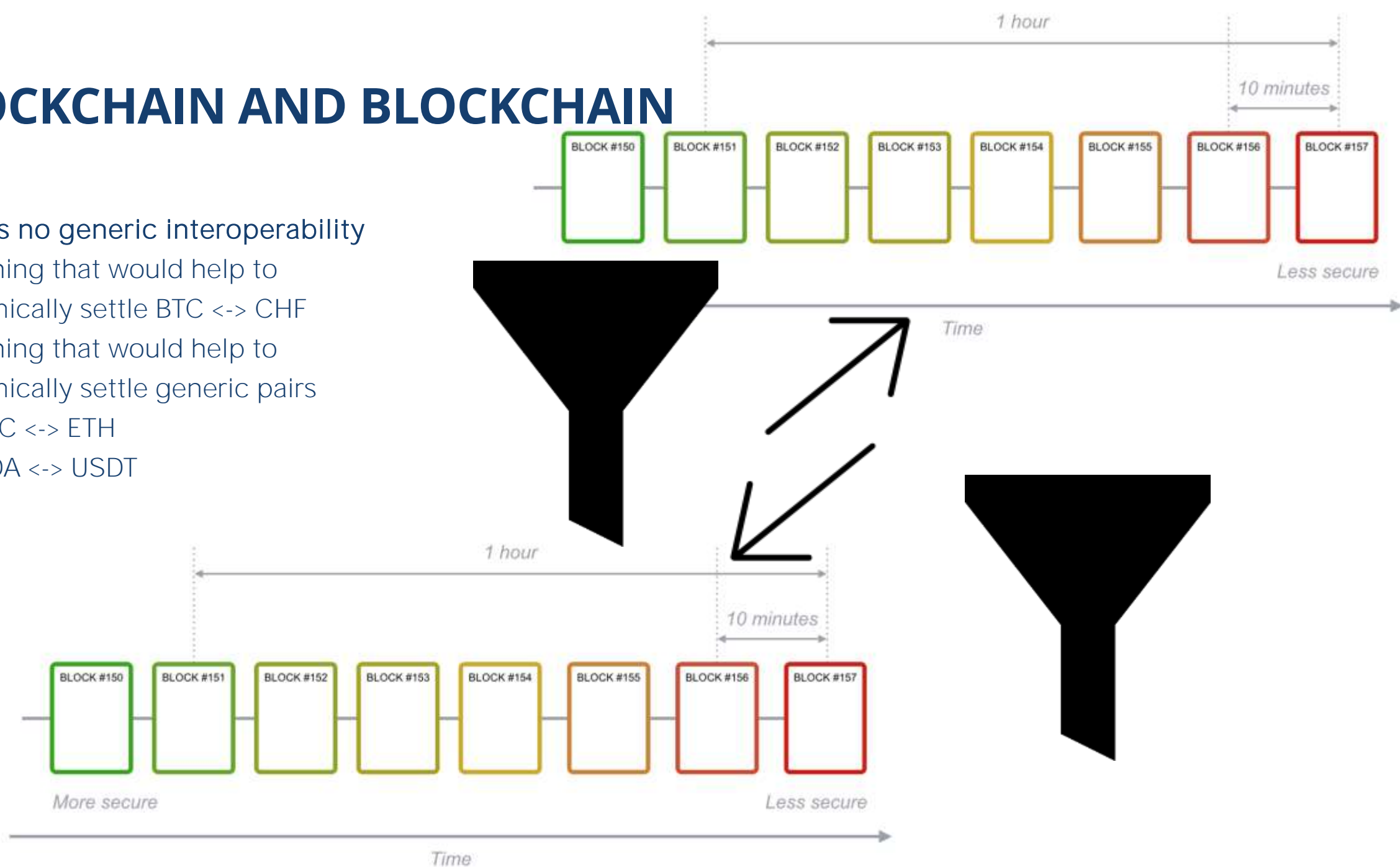
Time



BLOCKCHAIN AND BLOCKCHAIN

There is no generic interoperability

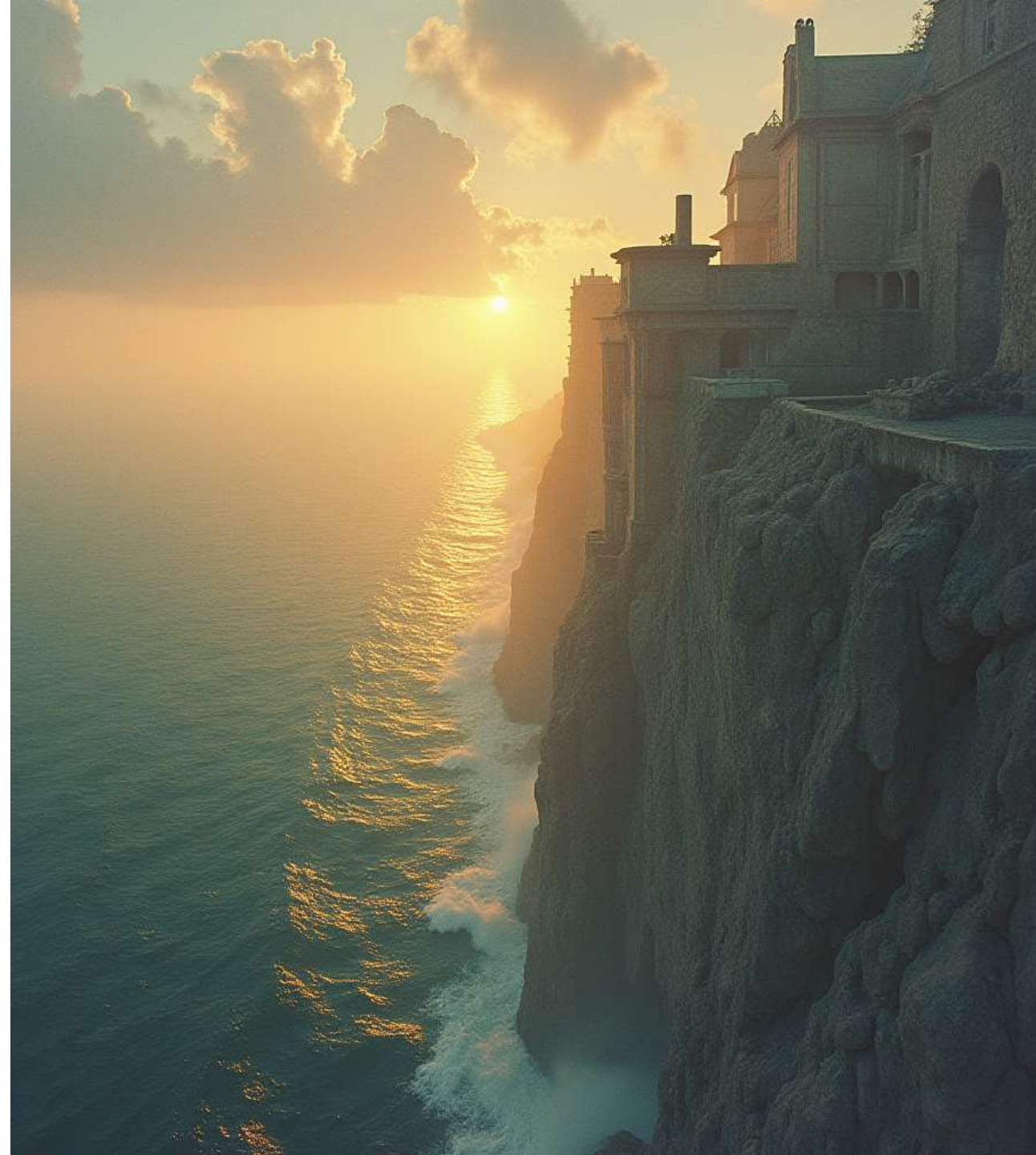
- Nothing that would help to atomically settle BTC <-> CHF
- Nothing that would help to atomically settle generic pairs
 - BTC <-> ETH
 - ADA <-> USDT



THE EDGE OF GENERICNESS

Things that DO have advantages when settling on chain

- DvP within one blockchain, using escrow smart contracts
 - ETH <-> USDT
 - MKR <-> DAI
- Settling in “atomic swaps”
 - BTC <-> LTC



SETTLING GENERIC CRYPTO ASSETS

Approach 1: Focus on one ecosystem only. E.g., only Ethereum

→ Based on CFAG trading data, that's <1% of trades

Approach 2: Bridge the missing assets into one central chain

→ Custodial risk to the issuer of the wrapped asset

Approach 3: Do the traditional thing

→ Introduces a central party that gets heavily regulated



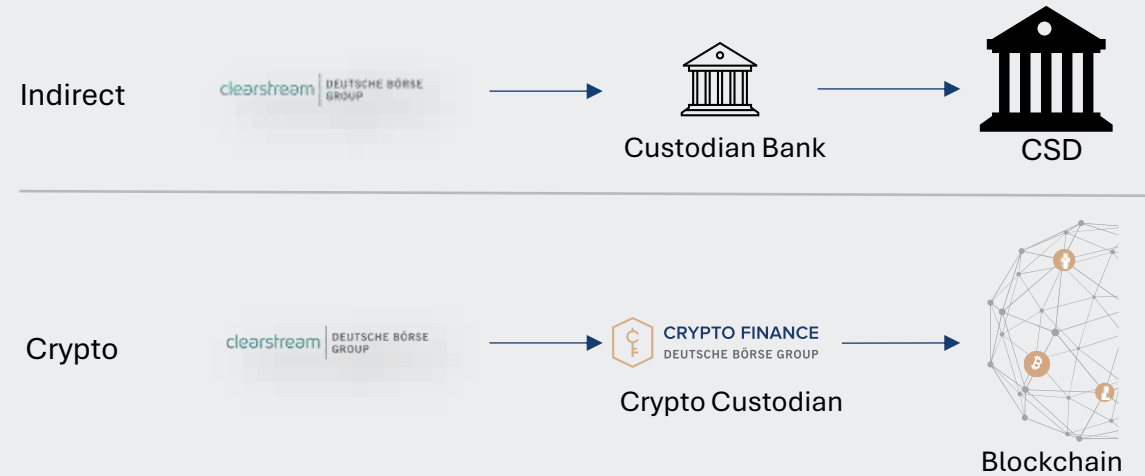
The existing rails help

DBG has strong rails existing rails

Representation as an **ISIN** with no further integration at clients

MiCA is live since beginning of the year

Crypto custodian and CSD in the same group is **globally unique**



CRYPTO ASSETS ARE NOT SPECIAL!

- We expect Custody of Crypto Assets will become a highly specialized business
- Similar to how it is today for traditional asset
- Crypto offers the option for anyone to hold their own assets

That's good!

- Analogy to precious metals holds very well
- ➔ We expect 50-100 crypto custodians globally



Problem: Trading parties don't trust each other to «send first»

Objective: Mitigate notional risk when trading

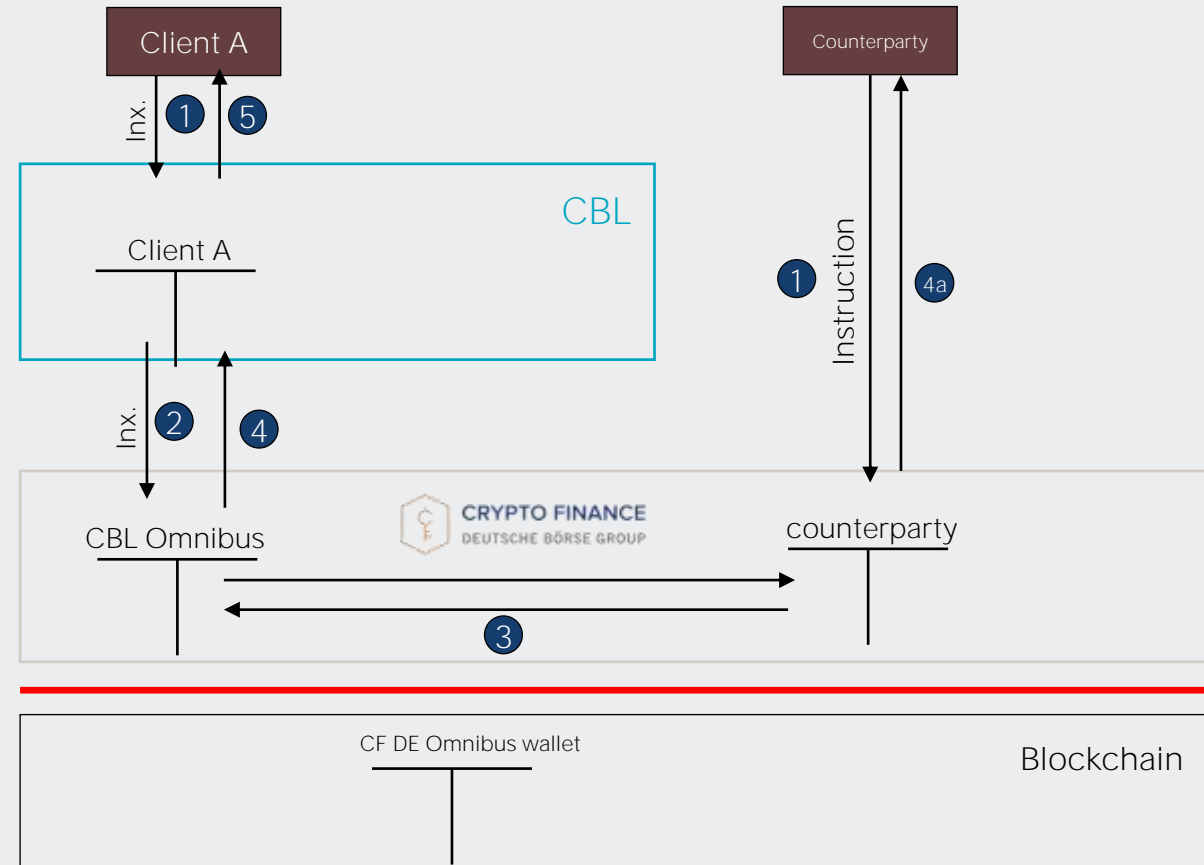
Approach: DvP settlement at a regulated custodian

No funding prior to trade

Funding prior to settlement date at a regulated custodian

Can be CFD or CBL

Parties have notional risk only against CFD
replacement risk against counterparty



Capture the relevant parts of the ecosystem

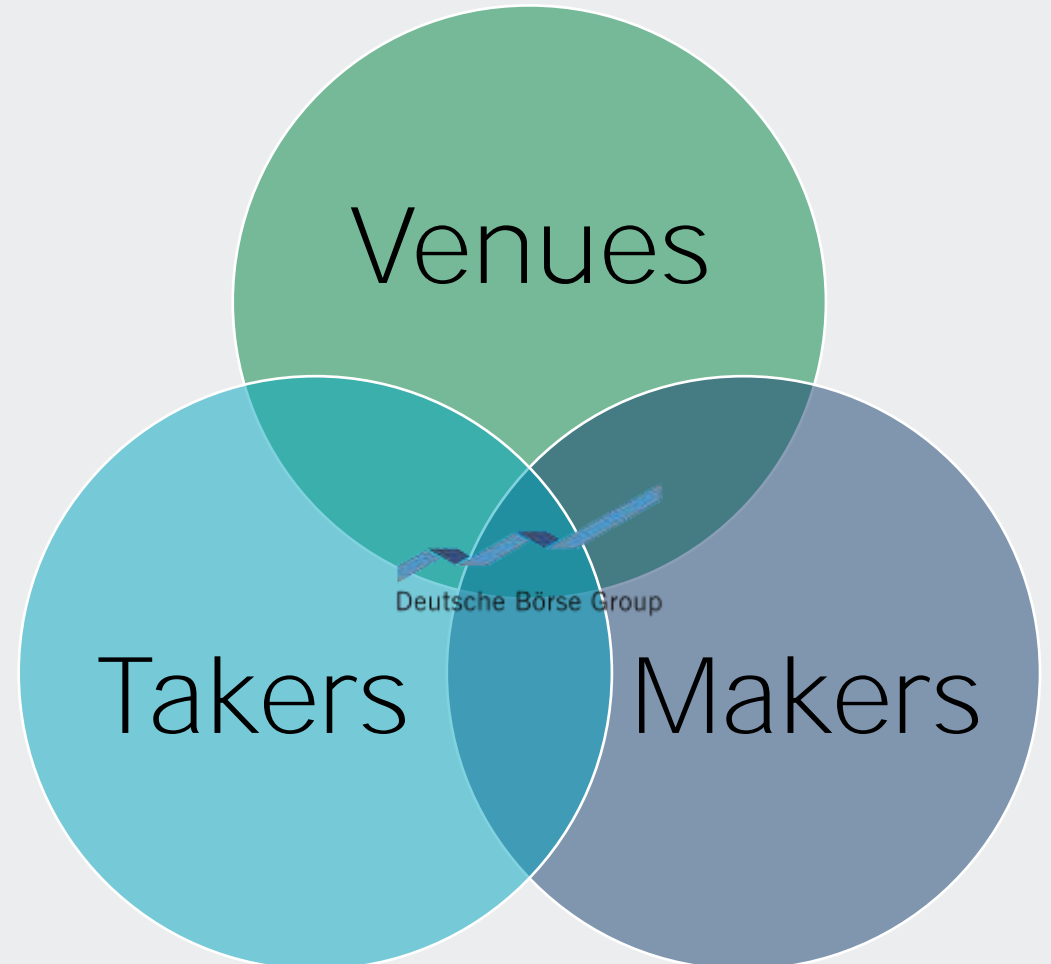
Approach: Capture the relevant parts of the ecosystem

Kick-starting a settlement ecosystem with DBG advantages

DBG has an unfair advantage with the **takers**, getting ~2700 banks through CBL subcustody

DBG has a good start with the **venues**, through 3DX integration

Crypto Finance brings its own **market maker**, onboarding others



CONCLUSION

- Blockchains are amazing!
- Not every problem has a blockchain solution
- Custody and settlements of blockchain assets do not have a blockchain solution

- We do the traditional thing
- Rolling it out on traditional rails



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