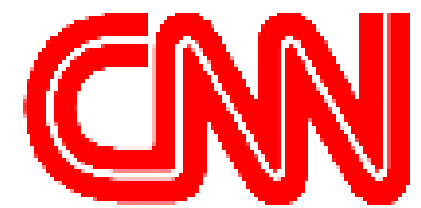


Decentralized Digital Depository

Presented by Artem Duvanov
Head of Innovation
NSD

Fully compliant & decentralized solution for cryptoassets

Cryptocurrencies and Blockchain



Crypto Exchange Binance is More Profitable than Germany's Biggest Bank Deutsche

This year, in the first quarter of 2018, Deutsche Bank, Germany's biggest bank and one of Europe's leading financial institutions, recorded a profit of \$146 million. Binance, the world's biggest cryptocurrency exchange, recorded a profit of \$200 million.



just 1 in 3 Millennials have money in the stock market.

 Bitcoin.com

17.21% of millennials own cryptocurrency



The global blockchain technology market was 0.67 billion USD in 2017 and will reach 10.58 billion USD with a CAGR of 58.39% during the forecast period 2017-2023.

\$34 billion traditional database market
open source database market at \$2.6 billion



The problem



Crypto investors
need a safekeeping
service that
**minimizes risk and
cost**

Clients need full
regulatory
compliance

Crypto infrastructure
allows asset owners
to be anonymous

The vast majority of
existing services are
heavily centralized

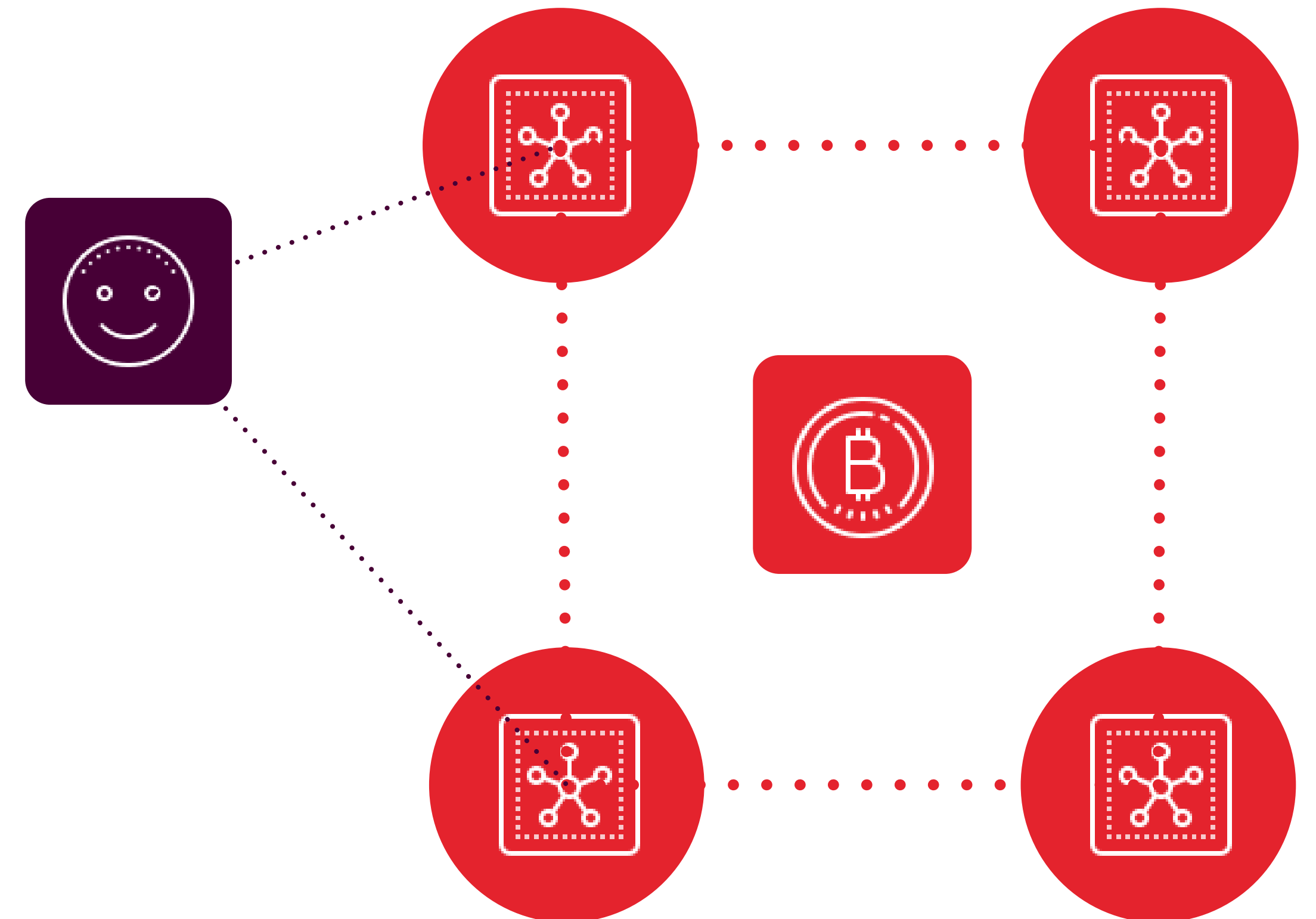
What do market players need?

- The new market of crypto currencies, utility tokens and tokenized assets is here to stay, but operational, compliance, and other related costs and risks are prohibitive for most market players
- As for traditional assets on blockchain, numerous PoCs done by financial organizations have demonstrated that a new level of efficiency can be achieved, but scale is necessary
- Market players need further reduction of fees and more value-added services to cut the back office costs, but transformation potential of mature technologies has exhausted

Opportunity for financial infrastructure to rebuild their services
on crypto foundation to meet needs of market players

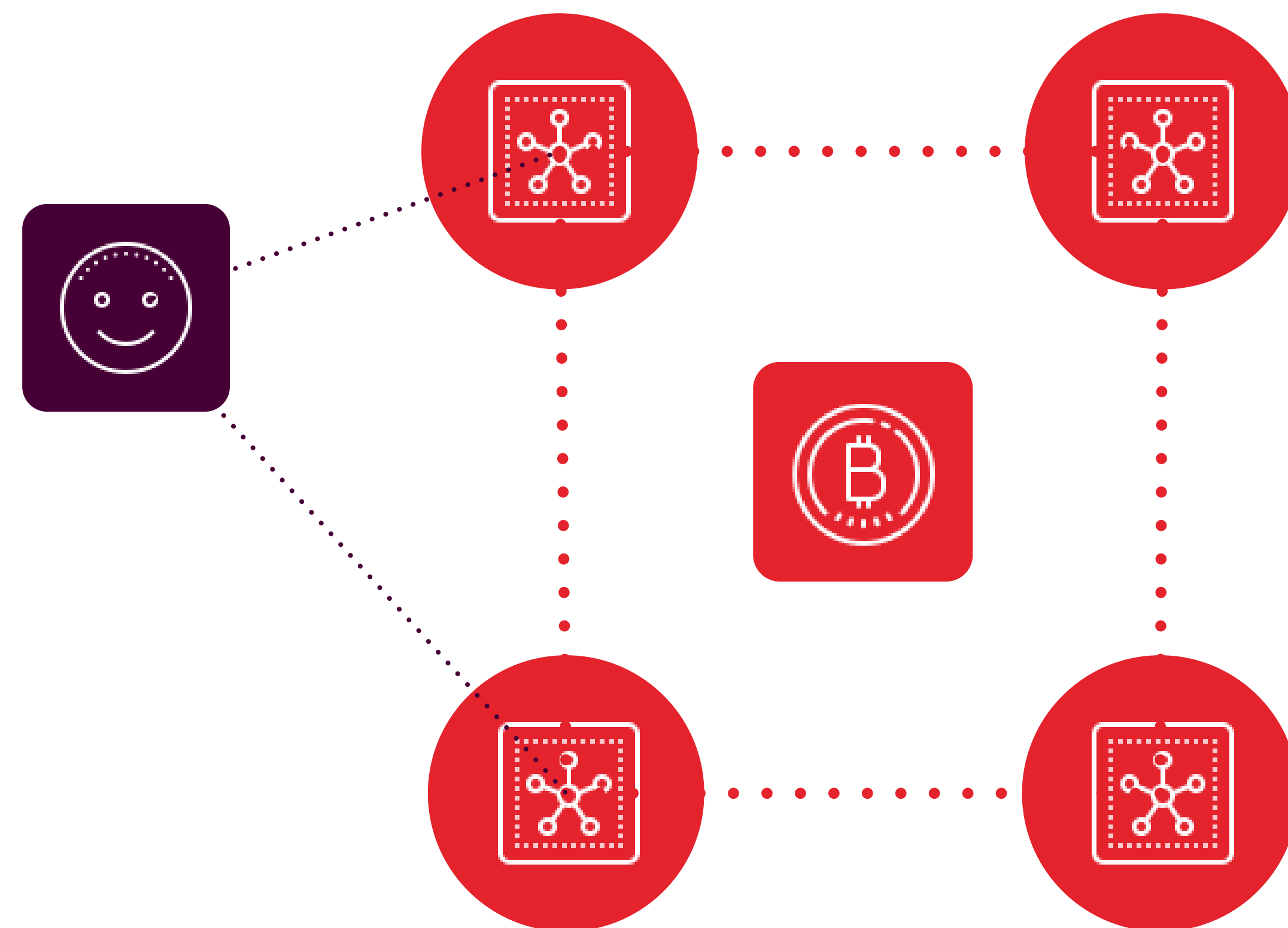
Our solution: **Decentralized Digital Depository**

- Decentralized platform to host existing and new crypto assets
- Consortium to control the platform that provides:
 - Well-founded and enforceable legal basis for all relevant jurisdictions
 - Clear and transparent governance arrangements
 - Comprehensive framework for legal, operational, and other risk management
 - Policies, procedures, and system settings to ensure regulatory compliance

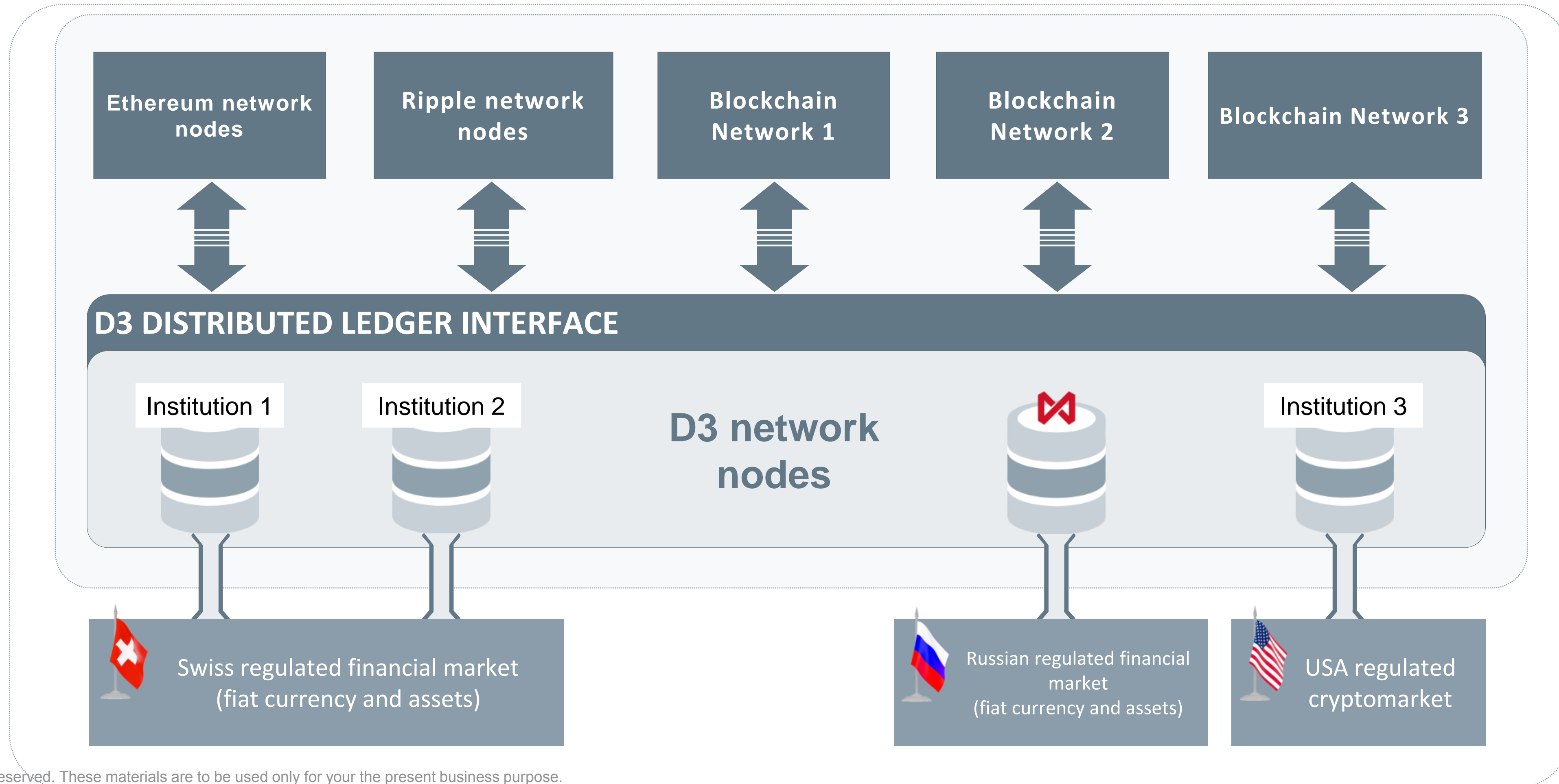


Our solution: **Decentralized Digital Depository**

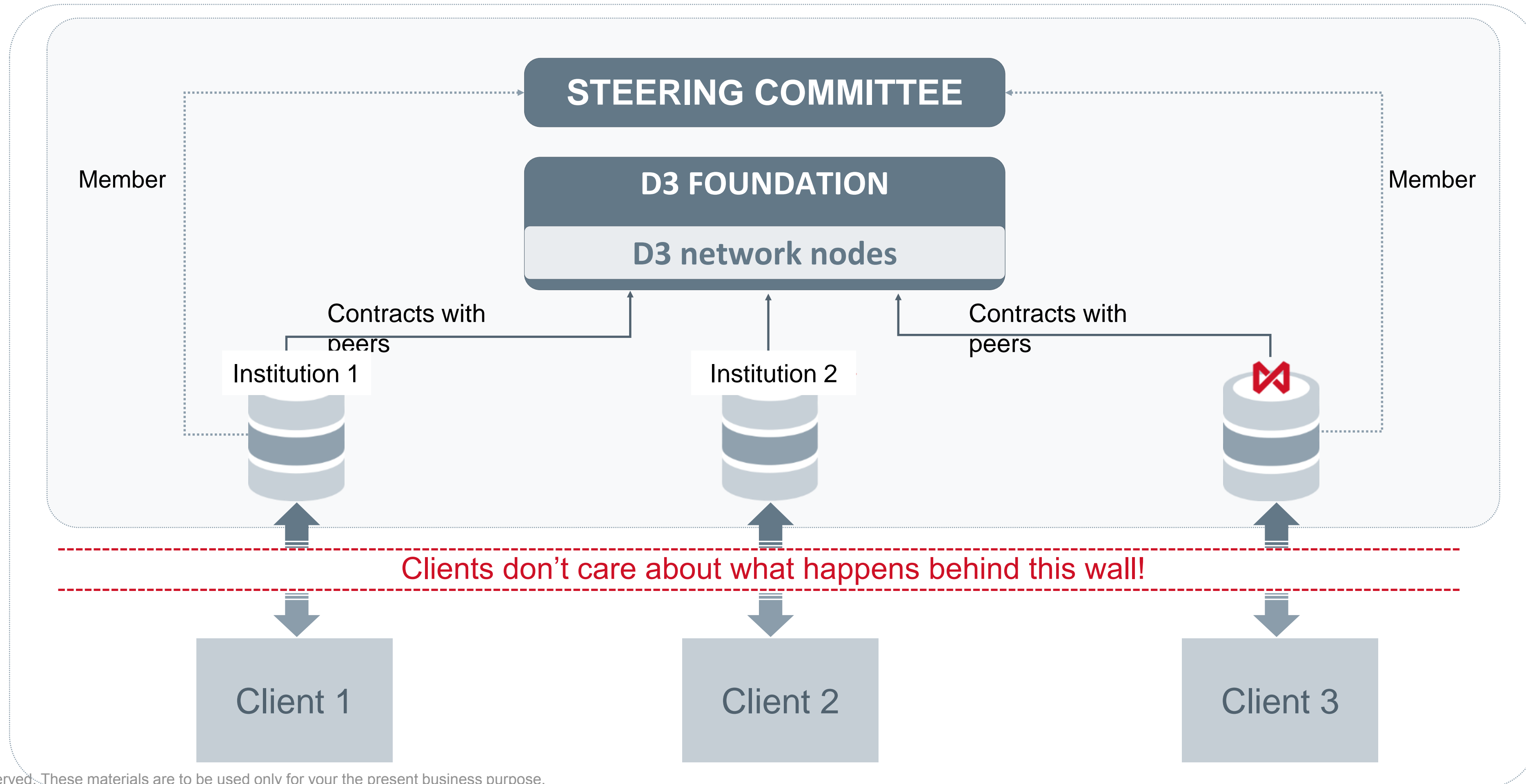
- D3 is a next generation post-trade infrastructure:
 - ✓ designed as a decentralized system
 - ✓ built specifically for crypto assets
 - ✓ used by market players without intermediaries
 - ✓ owned and governed by financial infrastructure organizations
- D3 supports the full range of crypto assets – from tokenized securities to cryptocurrencies
- D3 offers safekeeping, settlement and asset servicing, with extended services available through smart contracts.



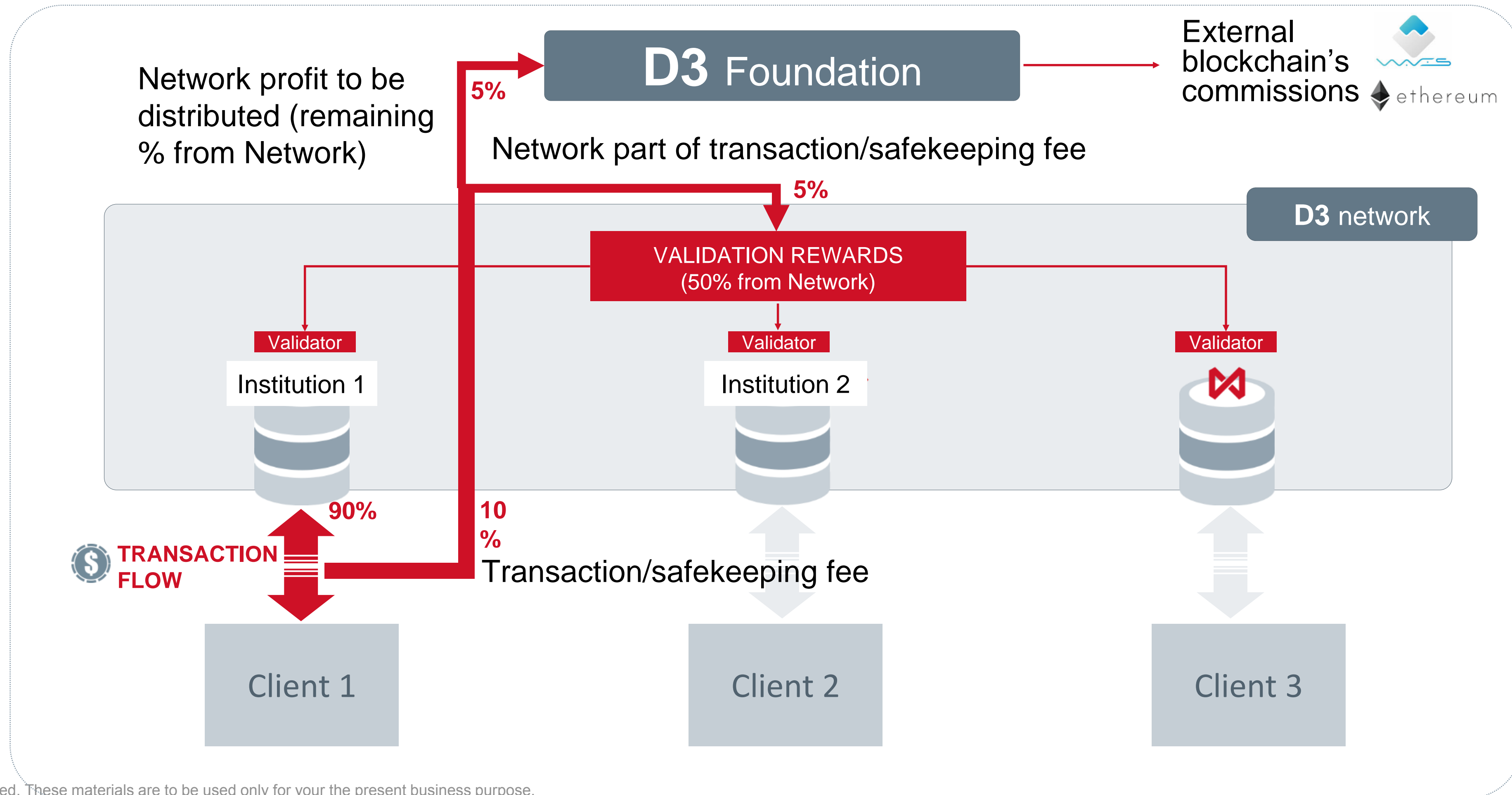
D3 Ecosystem



D3 Foundation



Business Model



Market Size

Start with cryptocurrencies, continue with digital assets:

- Daily trading volume for cryptocurrencies - >\$1 billion USD
- Volume of holding cryptocurrencies by @fatcats ->\$100 billion USD
- Potential volume of digital assets (new edge) ->\$1 trillion USD (25% of current market)

Commissions:

- 10% of holding of crypto with 0,1%/year fee – USD10million during 3 years
- 10% of holding of digital assets with 0,1%/year fee – USD100million during 3 years

Core algorithm of the solution

- Multisignature federation of notaries¹ (two-way peg)
 - Notaries own shared wallets in Ethereum and Bitcoin and in D3 ledger (Hyperledger Iroha)
 - Deposits are done via tokenisation and distributed voting
 - Withdrawals are done via cryptographic proofs at the level of Smart Contracts

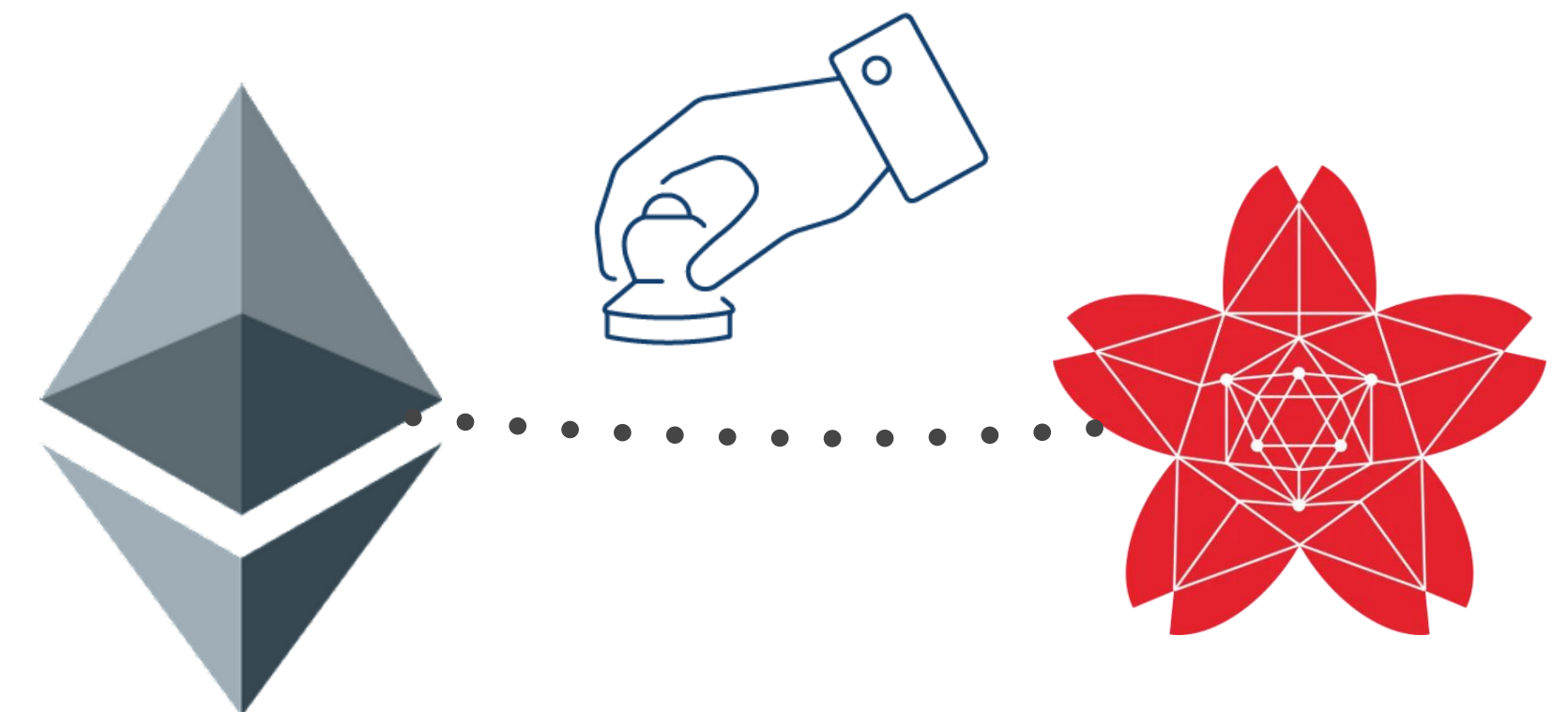
¹ <https://www.rsk.co/blog/sidechains-drivechains-and-rsk-2-way-peg-design>

Key features of technology used

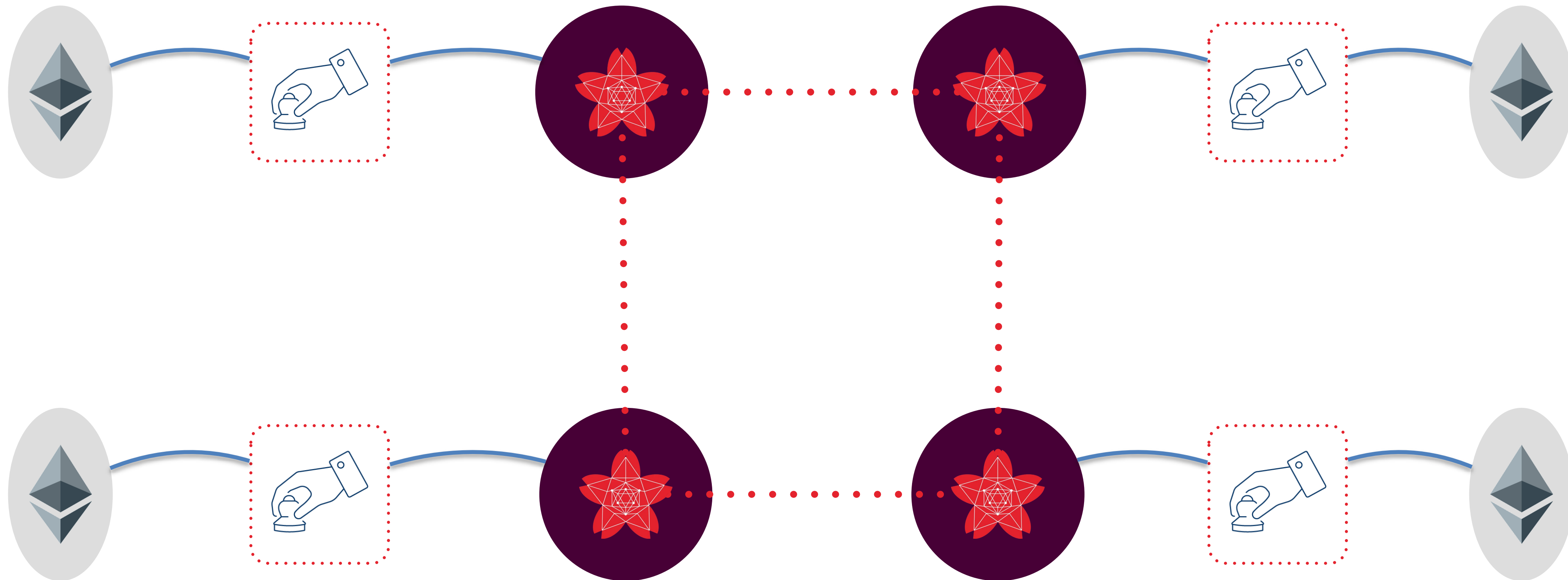
- 2-way peg network for each sidechain (Ethereum, Bitcoin, etc.)
- Core ledger is Hyperledger Iroha
 - Deterministic and BFT consensus
 - Has multisignature transactions in its core
- We provide same user experience as centralized platforms:
D3 client can use D3 as easy as if it was a centralized crypto exchange service

D3 node

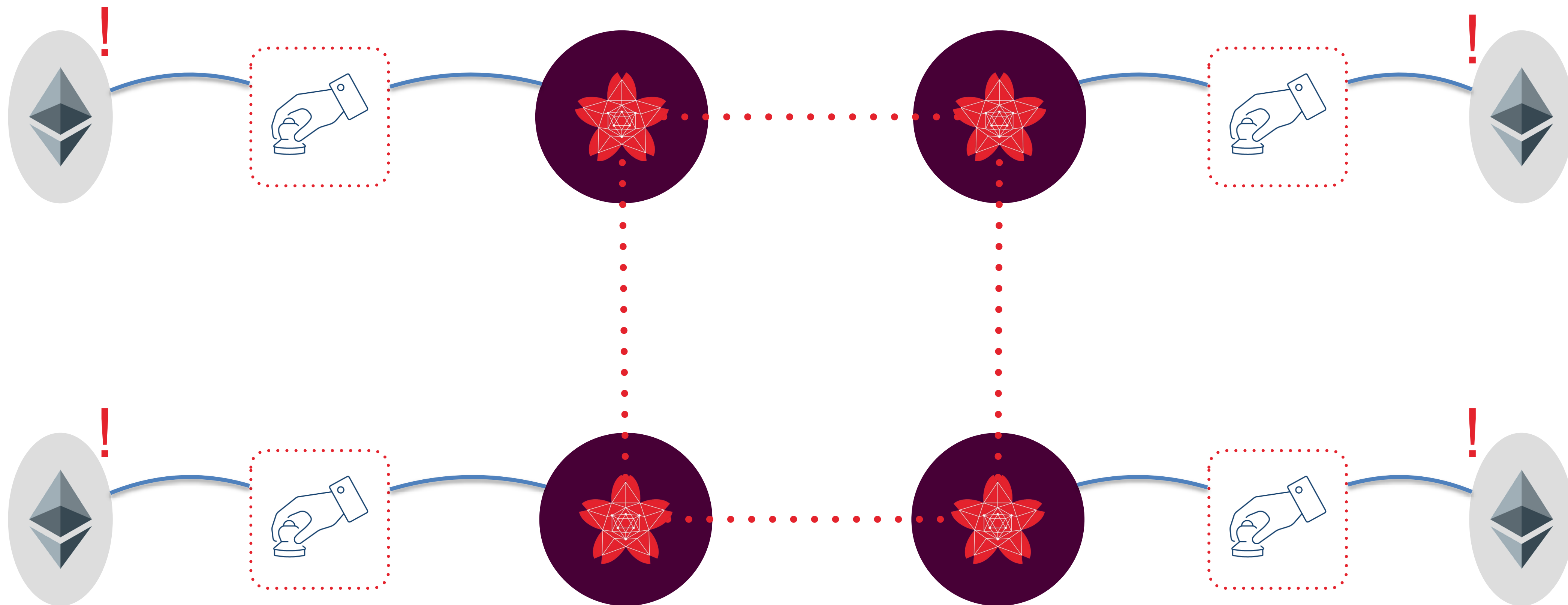
- Is a part of solution infrastructure and incorporates logic for two-way peg
- The key components of D3 node are:
 - Hyperledger Iroha peer
 - Ethereum peer
 - Notary service and private keys that are used for certification



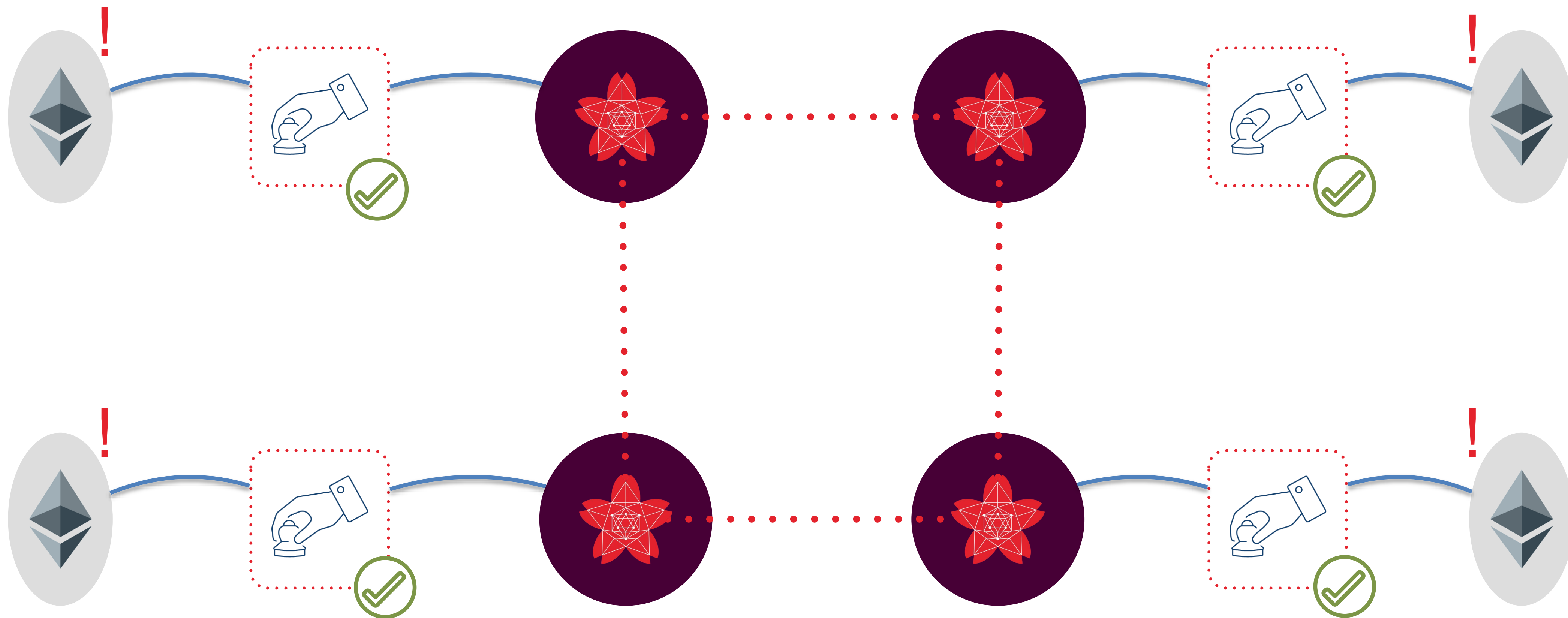
How does two-way peg work for deposits?



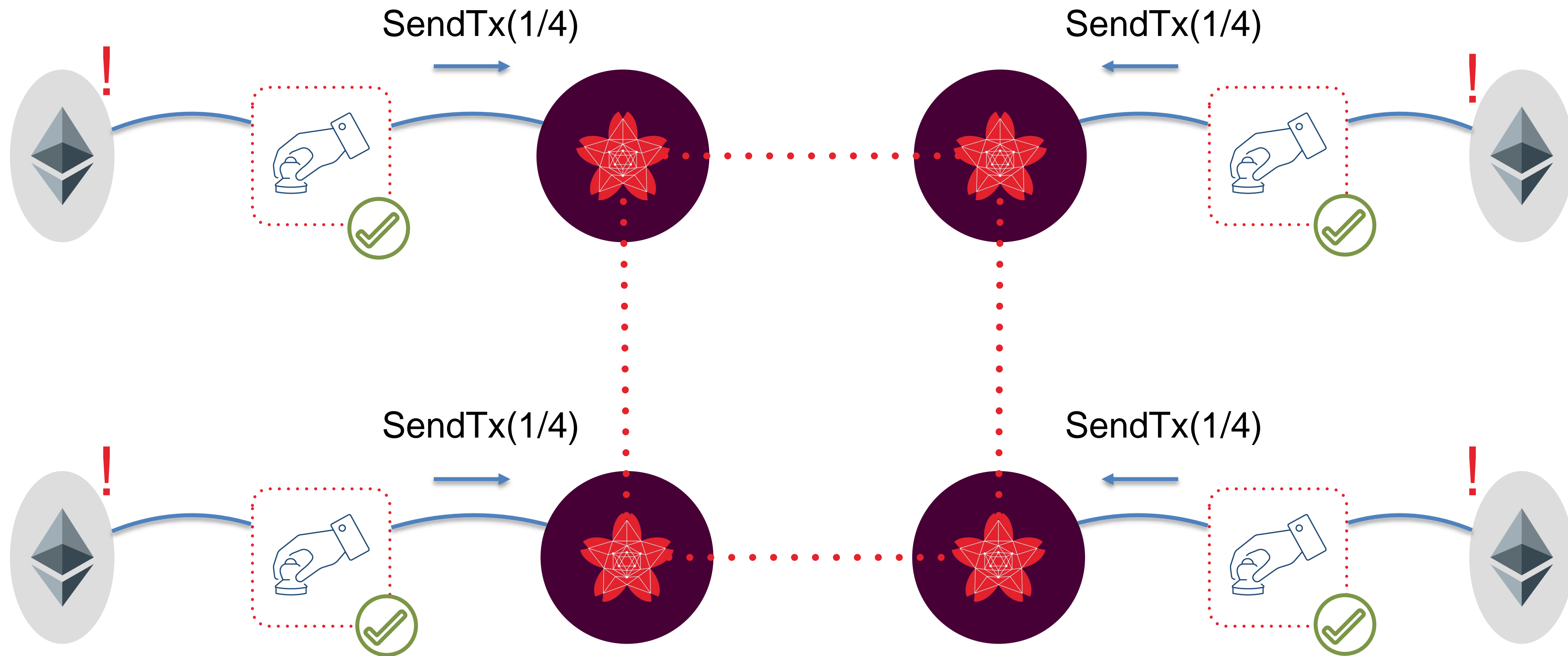
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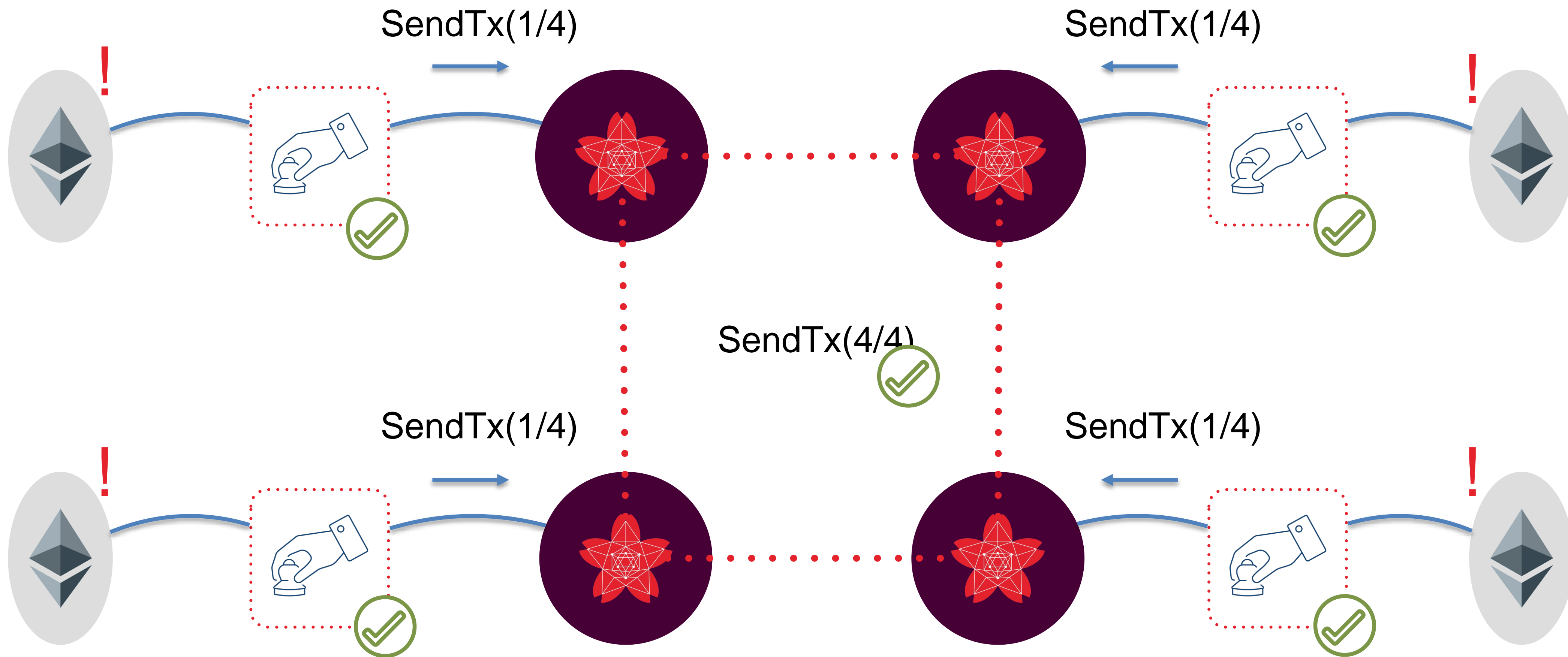
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How does two-way peg work for deposits?



Use case scenario for deposit

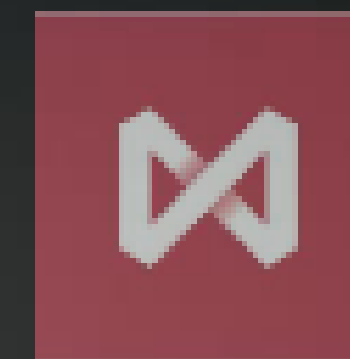
1. Create new user in D3 system by generating keys (Registration service)
2. There will be an empty account — so we need to deposit assets
3. D3 client (me) deposits ETH to a specified address in Ethereum, using any wallet (I use myetherwallet)
4. We need to wait until this transaction is “finalized” — written in chain with additional blocks over
5. Each D3 notary certifies the fact of transfer by multi signature transaction
6. When everyone certified — the tokens are created in Iroha and user can check the balance in web app

Use case scenario for withdrawal

1. D3 client now wants to get money back to Ethereum from Iroha. He/she creates a withdrawal request in D3.
 2. This request is noticed by Withdrawal service.
 3. This service goes over each notary and asks them to present a proof (signed approval of withdrawal).
 4. When all proofs are collected — Withdrawal service asks Ethereum smart contract to
 5. Smart contract sends ETH to a specified ethereum address in request
- check proofs and send money back.

Source code

- Hyperledger Iroha (C++)— <https://github.com/hyperledger/iroha>
- Notary application (Ethereum & Bitcoin) and other services (Kotlin, Spring) — <https://github.com/d3ledger/notary> (please use master branch)
- Web application for D3 (VueJS)— <https://github.com/d3ledger/back-office> (please use development branch)



Questions?

<https://d3ledger.com>

<https://nsd.ru>

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