Who is in Charge: Centralised and decentralised infrastructures

dr ir Leonard Franken (AFM)

Who regulates Bitcoin?

- Who is who in supervision/regulation
- Traditional banking/payment run through in 15 slides
- Who actually is in charge of decentralized infrastructures?
- DAO, Digital “Euro” and other DAO’s

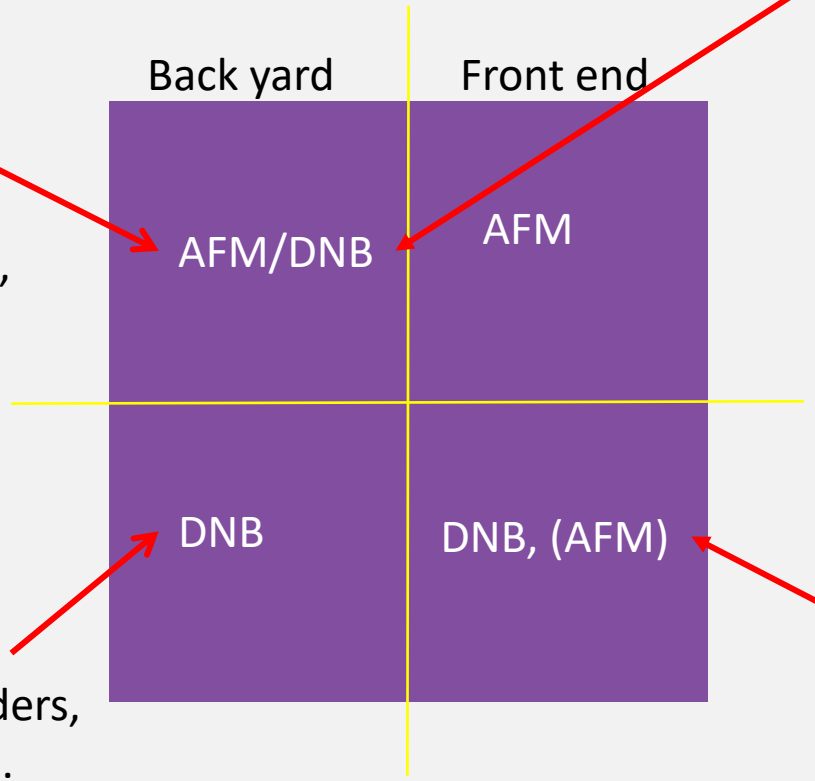
POSITION OF THE AFM IN THE SUPERVISORY ARENA

<table>
<tr><th></th><th colspan="3">Financial sector</th><th colspan="4">Other sectors</th></tr>
<tr><td>Stable, solid, prudential</td><td colspan="3">DNB</td><td colspan="4" rowspan="2"><table><tr><td></td><td>RDW</td><td>ILT</td><td rowspan="2">IGZ</td><td rowspan="2">NVWA</td></tr><tr><td colspan="3">ACM (consumer)</td></tr></table></td></tr>
<tr><td>Fair (not misleading)</td><td colspan="3">AFM</td></tr>
<tr><td>Fair competition</td><td colspan="6">ACM</td></tr>
<tr><td>Careful with personal data</td><td colspan="6">Dutch Data Protection Authority (AP)</td></tr>
<tr><td>Prevent laundering / financing terrorism</td><td colspan="2">DNB</td><td>AFM</td><td colspan="3">Miscellaneous</td></tr>
<tr><td>Not criminal</td><td colspan="6">FIOD / OM / Police</td></tr>
</table>

AFM/DNB playing field

Exchanges, Brokers,
Crowdfunders,
Custodians,
Asset managers,
Investment funds
Financial intermediairs,
Accountants….

When it is about **financial stability** DNB has a role to play.
Concerning infrastructure



Banks,
Clearing&settlement,
Pensionfunds,
Payment service providers,
Insurance companies….

When it is about **conduct** AFM has a role to play.
Concerning products and services-> Robo advise, digital marketing, chat bot's

AFM Strategic Objectives

- The AFM promotes the fair and conscientious provision of financial services
- The AFM promotes the fair and efficient operation of the capital markets
- The AFM contributes to the stability of the financial system


FAIR

Tokens

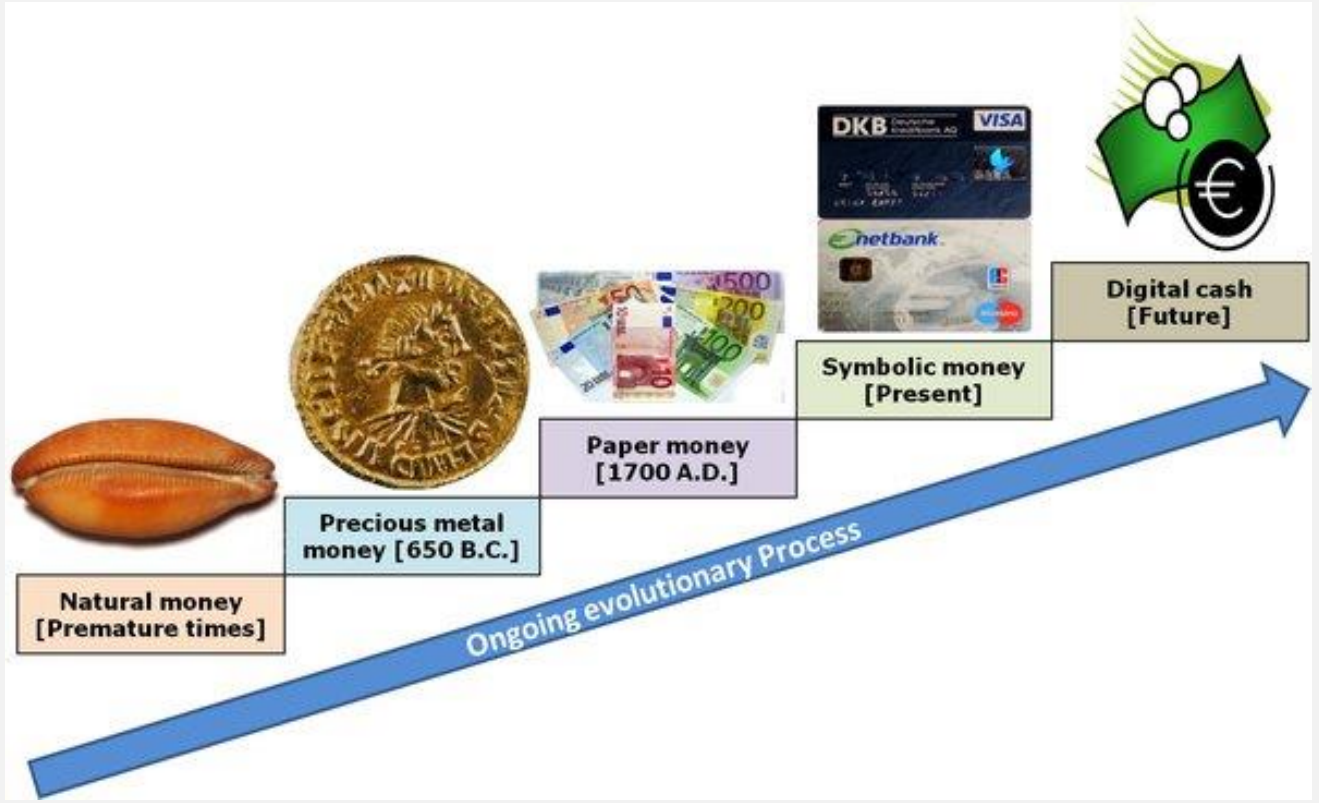
ECB concerned e-money, stablecoins become attractive when interest rates negative
21 hours ago
by Ledger Insights

Fintech

Central bank experiments with CBDC will drive securities onto blockchain
November 09, 2020
Fear of Chinese advances with programmable money and Facebook's Libra are pushing central banks to digital currencies, which may transform financial markets.

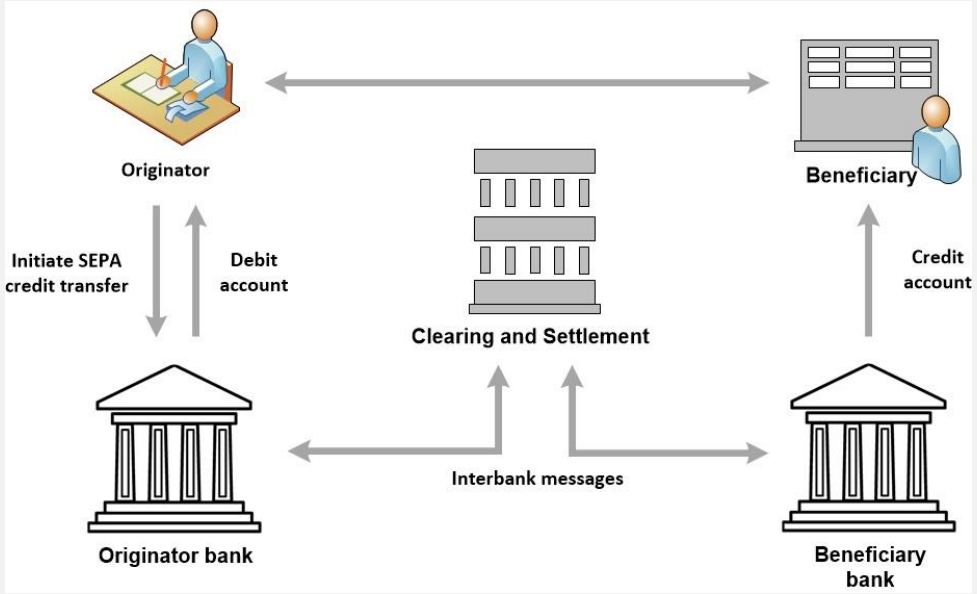
Payments

- Instruments
- Products/scheme's
- Clearing & Settlement
- Stakeholders…….infra/service providers…..banks



Two categories of payments

- **Non cash**/Account based
  - Possible intermediates, Trust
  - Cheques, debit, credit
  - Settlement cycle



- **Cash**/Token based

Payments or money

- Cash: distributed by the central bank through the commercial banks. (balance sheet central bank)

- Non Cash
  - Central bank money
    - Banks
    - (Wholesale)
  - Commercial bank money
    - Consumers (retail)
    - SME
    - wholesale

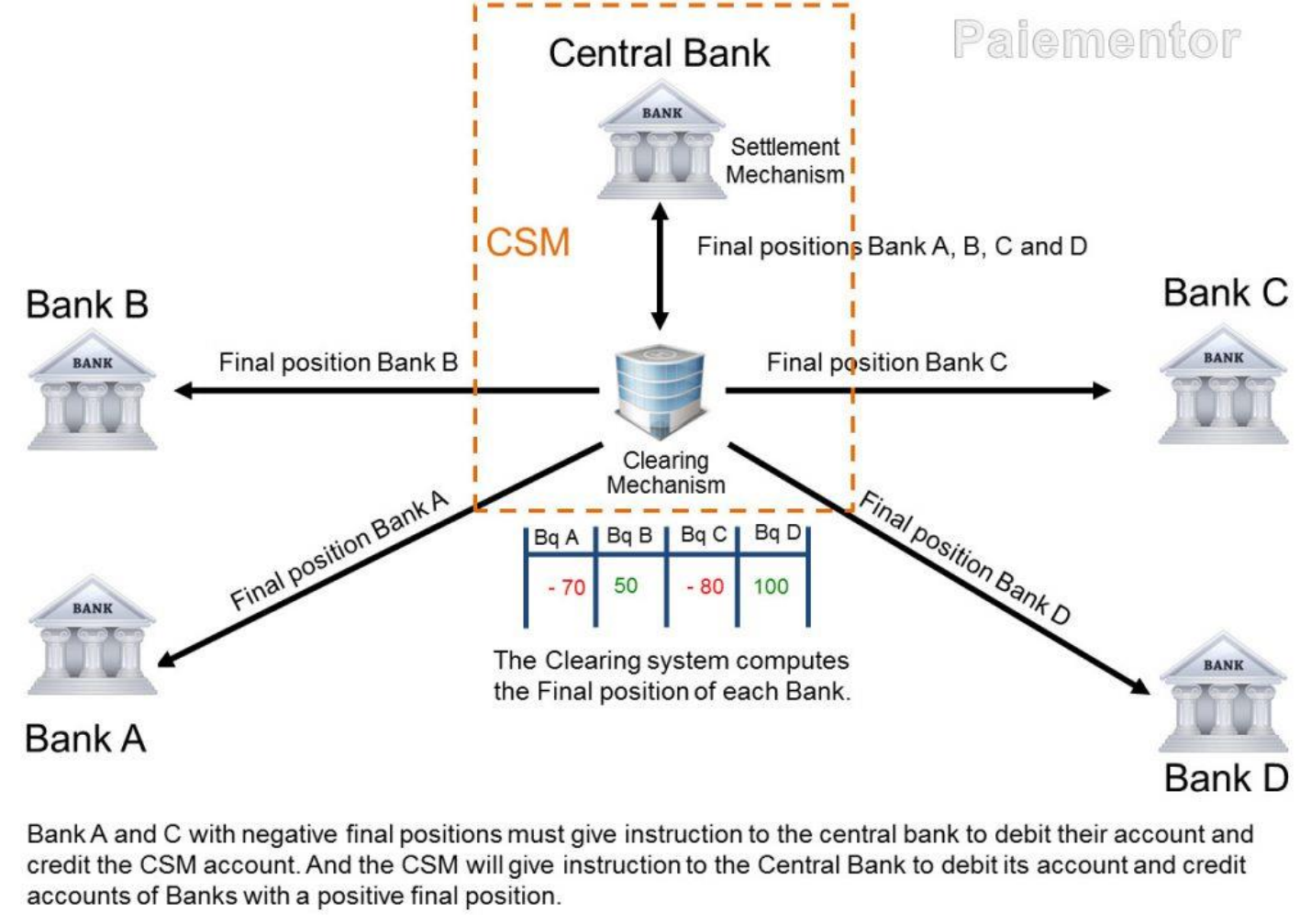
What is a payment

- Getting money from one location to the other
  - Retail/“small value”
    - Efficiency
  - Large value payments
    - Managing risk

Alike the transport system
- It needs to be reliable
- Bringing goods and people from one location to the other
- Use: foot, steps, bikes, cars, trains, buses, plains, boots etc
- We got: roads, highways, dirt roads, side walks
- Provided by a public authority or private firm; it matters
- Who gets what and who carries the cost
- And once its there it changes slowly it doesn’t dissappear easily
- Technology often the driver

National: Clearing & Settlement mechanism

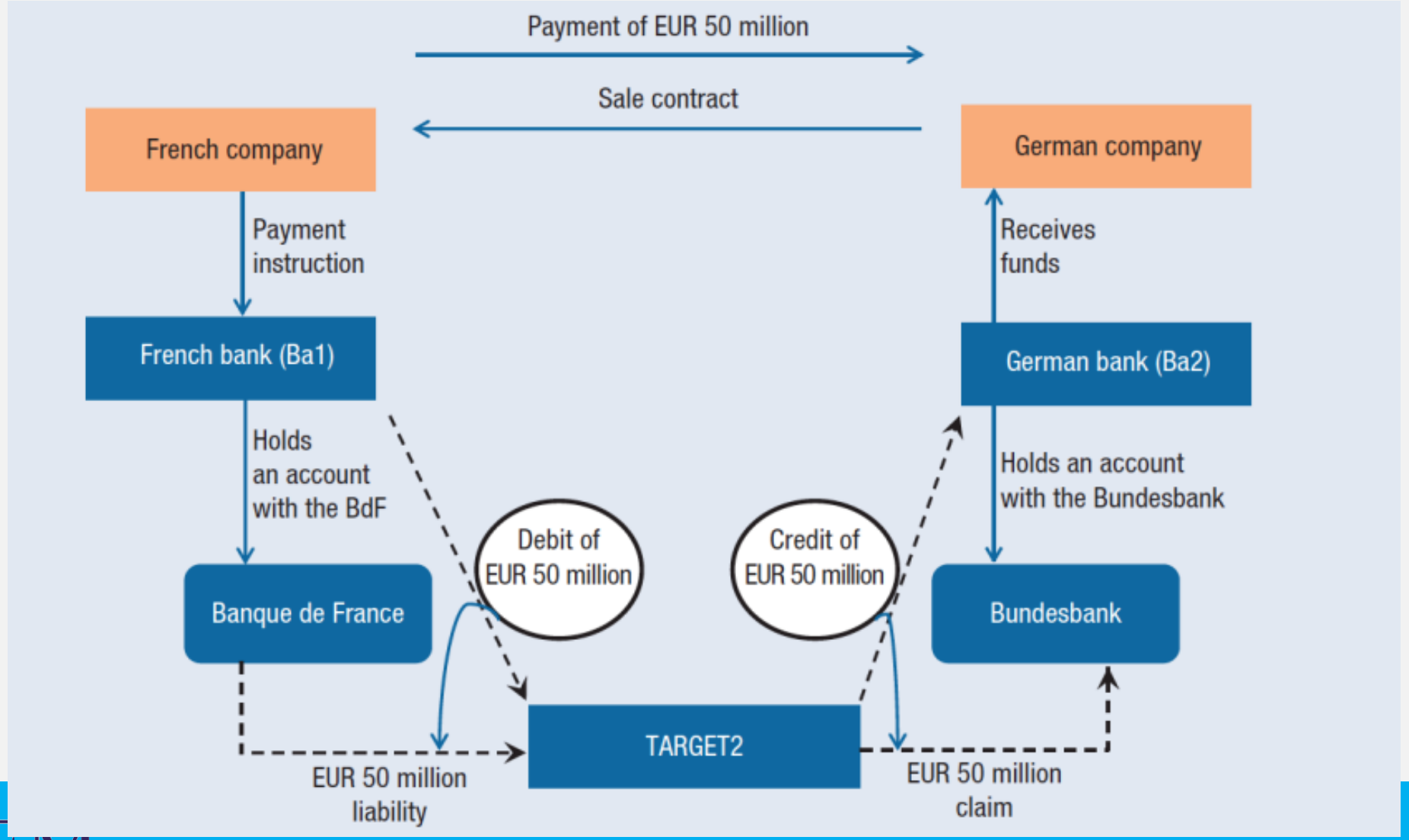
- Within bank it is simple
- Between banks
  - Central bank to provide credit lines



Bank A and C with negative final positions must give instruction to the central bank to debit their account and credit the CSM account. And the CSM will give instruction to the Central Bank to debit its account and credit accounts of Banks with a positive final position.

https://www.youtube.com/watch?v=fstoINqXJK8

International→ Target2



Target2 in Numbers

- Target2
  - Daily 345,006 payments €1,812 billion Euro (1.812.000.000.000 Euro)
  - Approx. 1600 participants
  - 90% in terms of value 66% in terms of volume of total

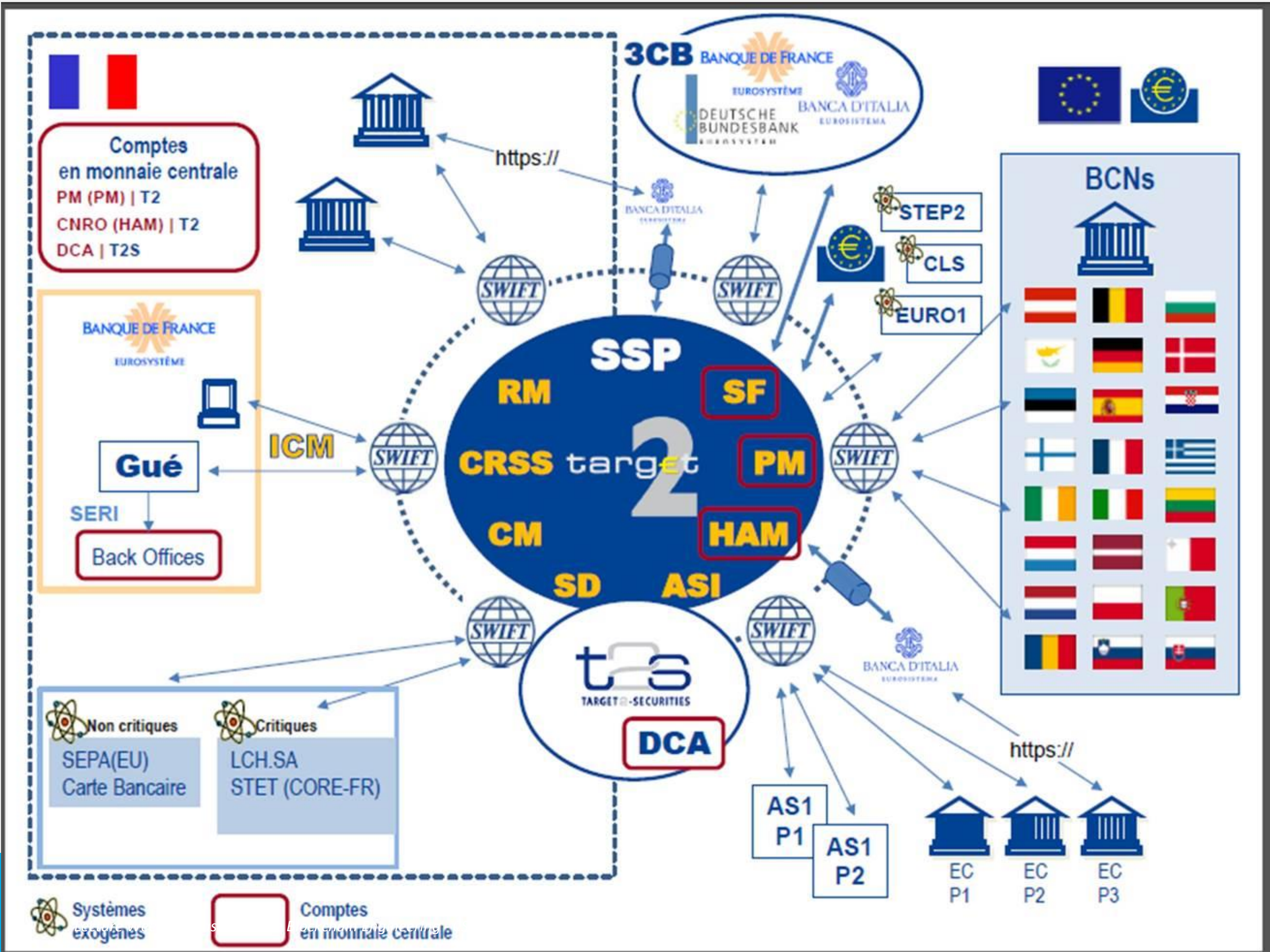
  - (TARGET2 is open: 7:00 – 18:00, with the exception of: Saturdays; Sundays; New Year's Day; Good Friday and Easter Monday; 1 May (Labour Day); Christmas Day; and 26 December.)

https://www.youtube.com/watch?v=7_mAOt-V4C4

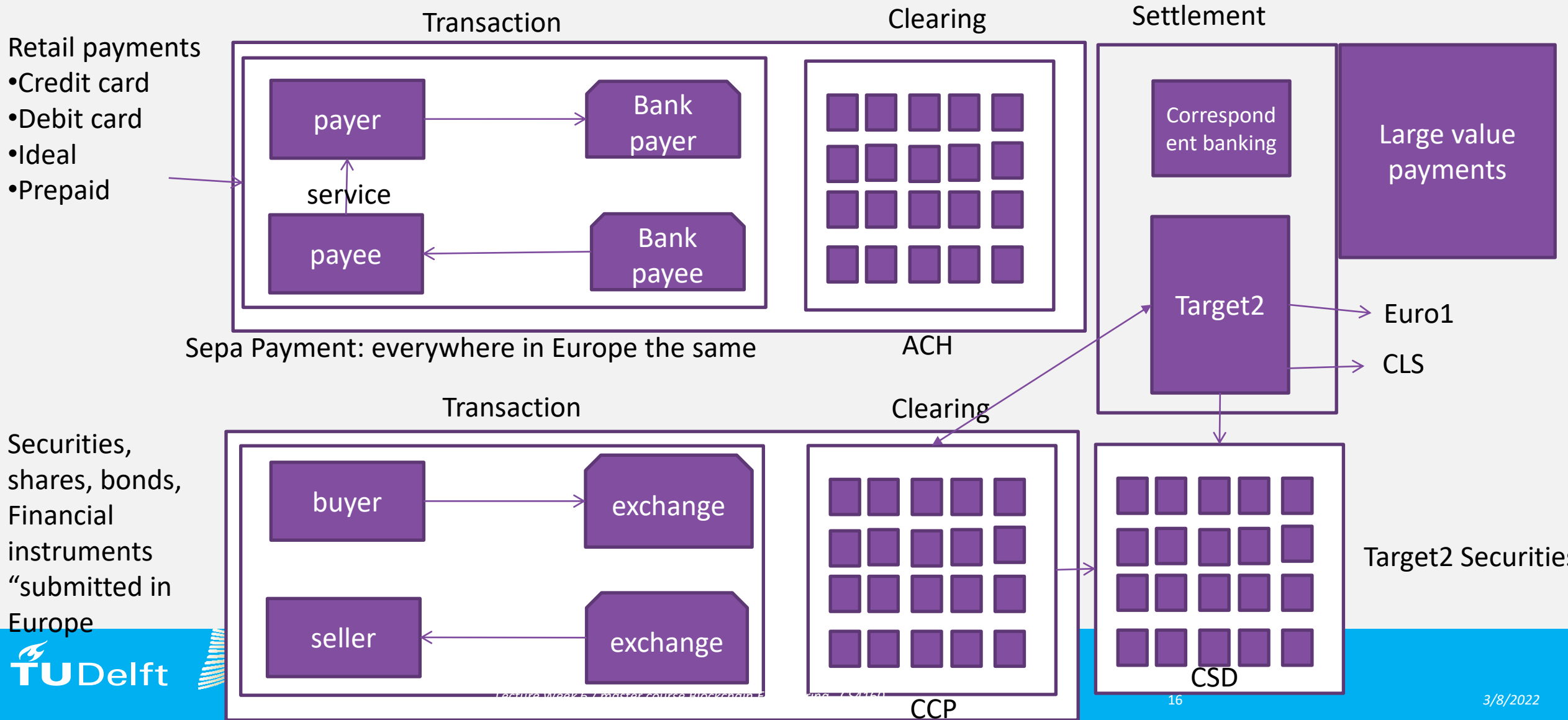
Role of Swift

SWIFT →internationally,
SEPA →SEPA area.

SWIFT →various currencies,
SEPA →Euro only.



Payment Infrastructure (Europe)



Card based payments

- Account based
- From Cardboard to Plastic to Magnetic stripe to Chip

History of Credit Cards

- First credit card (1920" in US)
- Diners Club (1950)
  First modern credit card company
- American Express (1958)
- BankAmericard (1958)
  later Visa
- Everything Card (1967)
  later Master Charge (1969)
  later Master Card (1979)

Belang

- groot: je kunt niet betalen als 'het betalingsverkeer eruit ligt', behalve als je cash hebt. Een deel van de bevolking maakt echter juist bewust geen gebruik van cash. Een paar uur is vervelend (november 2010: probleem met kabel van Telfort zorgt ervoor dat iDEAL enkele uren niet werkt), een paar dagen is problematisch, langer wordt ontwrichtend.
- stijgend: cyberwarfare wordt als serieuze bedreiging gerapporteerd in de pers.

Samenwerking, standaardisatie

CURRENCE, Chipknip, acceptgiro, SEPA

Bestuur: inrichting, toezicht

Wet- en regelgeving: EC, Ministerie van Financien

Toezicht: AFM (Regulering marktwerking), ECB, DNB (Bankvergunning, Vergunning electronische geldinstelling)

Fraudebestrijding: Ministerie van Justitie (Meldpunt Ongebruikelijke Transacties, Vervolging)

Functie

- betalingsverkeer in Nederland. Mijn betaalg
'transient', opgeslagen is alleen mijn betaalre
creditcardrekeningen bij creditcardmaatschap
Uitzonderingen: geldopname info op bankpas
of staat dat bij de betaalrekening?), vingerafc

Betaler

QPARK, ov-chipkaart, Electronische specials

(Eenmalige) machtigingen

acceptgiro, Overschrijving, acceptgiro

On-line authenticatie

PAY, Maestro, PIN, Bankpas, Debit card

Betaler

Maestro

Credit Card

Chipknip, Chipper/Chipknip

Contant geld

"Electronic money"

1,2 mrd transacties/jaar
14,4 mrd euro/jaar

0,16 mrd transacties/jaar
56,7 mrd euro/jaar

1,9 mrd transacties/jaar
76 mrd euro/jaar

eBay, MARKTPLAATS, PayPal, Google checkout, Credit card processing

iDEAL, 0,005 mrd transacties/jaar

Internet Bankieren (per bank)

244.000 terminals

Betaalterminal

Chipknip Oplader
5.000 (2003)

ATM
7.600 (2003)

CONNECT

Contantgeldnetwerk

Overige - Volkskrant (24-9-2010)
7% van de omzet
6% van de transacties

PAY SQUARE, ICS, Credit Card Serving

Credit Card Companies, Cardaccount

Volkskrant (24-9-2010)
60% van de omzet
38% van de transacties

EQUENS

ING, Bank, Bankrekening

Rabobank, Bank, Bankrekening

TEMENOS, Banking software provider

DNB, TARGET 2, Clearing/Settlement

ING, Rabobank

Internationaal Betaalnetwerk (210 landen)

Internationale overboekingen

Ontvanger

Volkskrant (24-9-2010)
33% van de omzet
56% van de transacties

ING, Bankkantoor (Schatting: 1.000 tot 10.000 bankkantoren)

Uitgever fysieke special

Koninklijke Joh. Enschedé

First European E-money Trust (Feed)

Historie/Toekomst

- betaalrekening sinds vijftiger jaren, overschrijvingskaarten, bankafschriften, postbezorging dominant tot negentiger jaren (?), internet bankieren dominant daarna (?). Toekomst: internationalisering lijkt de trend, de vraag is welke invloed Nederland kan hebben op Nederlands betalingsverkeer: uitvoering beleid uit EU, enige invloed op beleid EU (??)

Legenda

Overzicht Betalingsverkeer Nederland

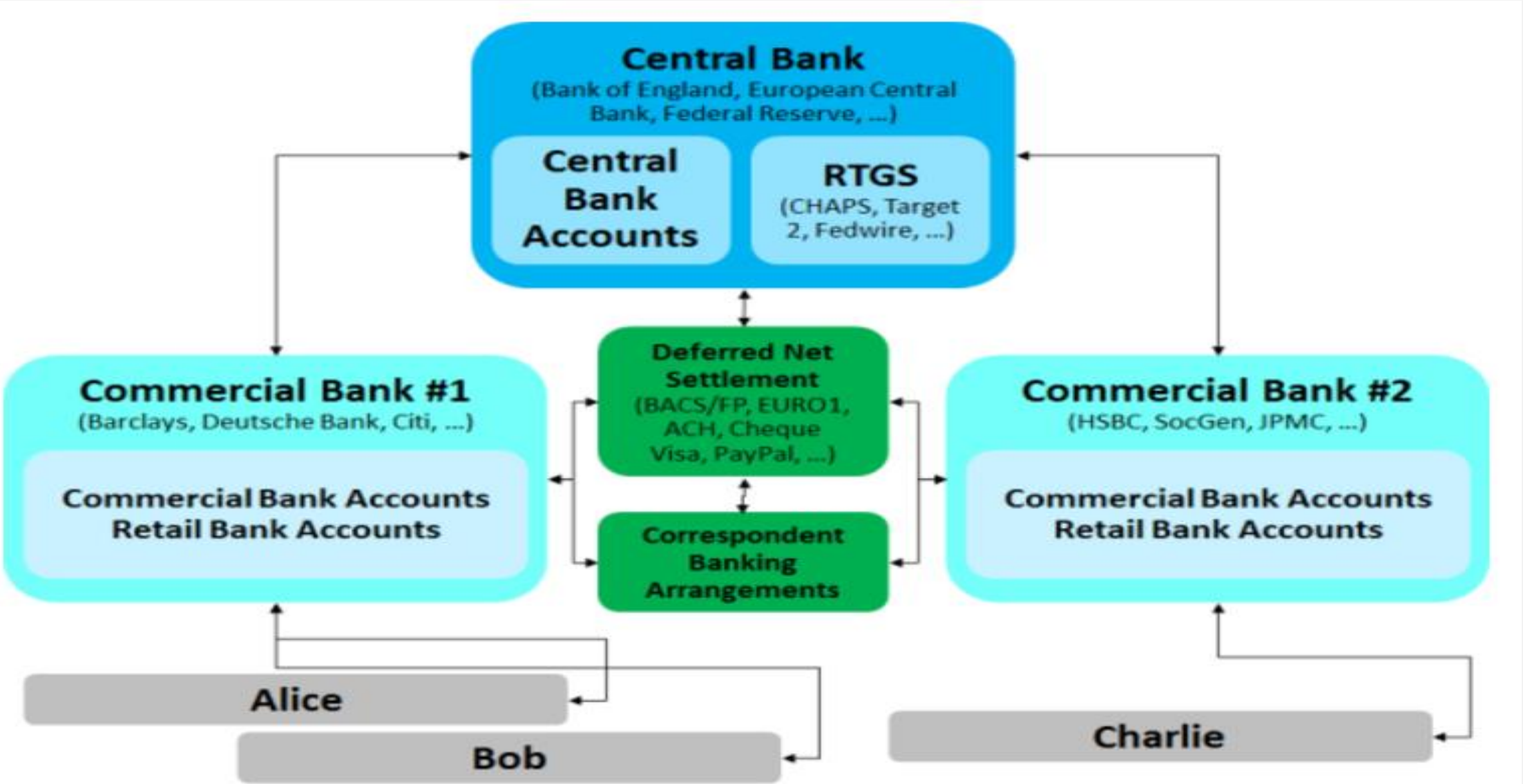
Contant geld
Geld opnemen
Betalen
Afschriften
Machtiging

Aantallen

EIM onderzoek in opdracht van Currence c
- Omvang electronisch betalingsverkeer: 1
- Kosten betalingsverkeer: 788 mln euro

Currenceonderzoek over aantallen transac
(FD 8 januari 2011)
- 57% contant
- 39% PIN
- 6% overig, waarvan:
  * 54% iDEAL,
  * 22% acceptgiro,
  * 8% overschrijving,
  * 5% PayPal
  * 2% machtiging
  * 4% rest

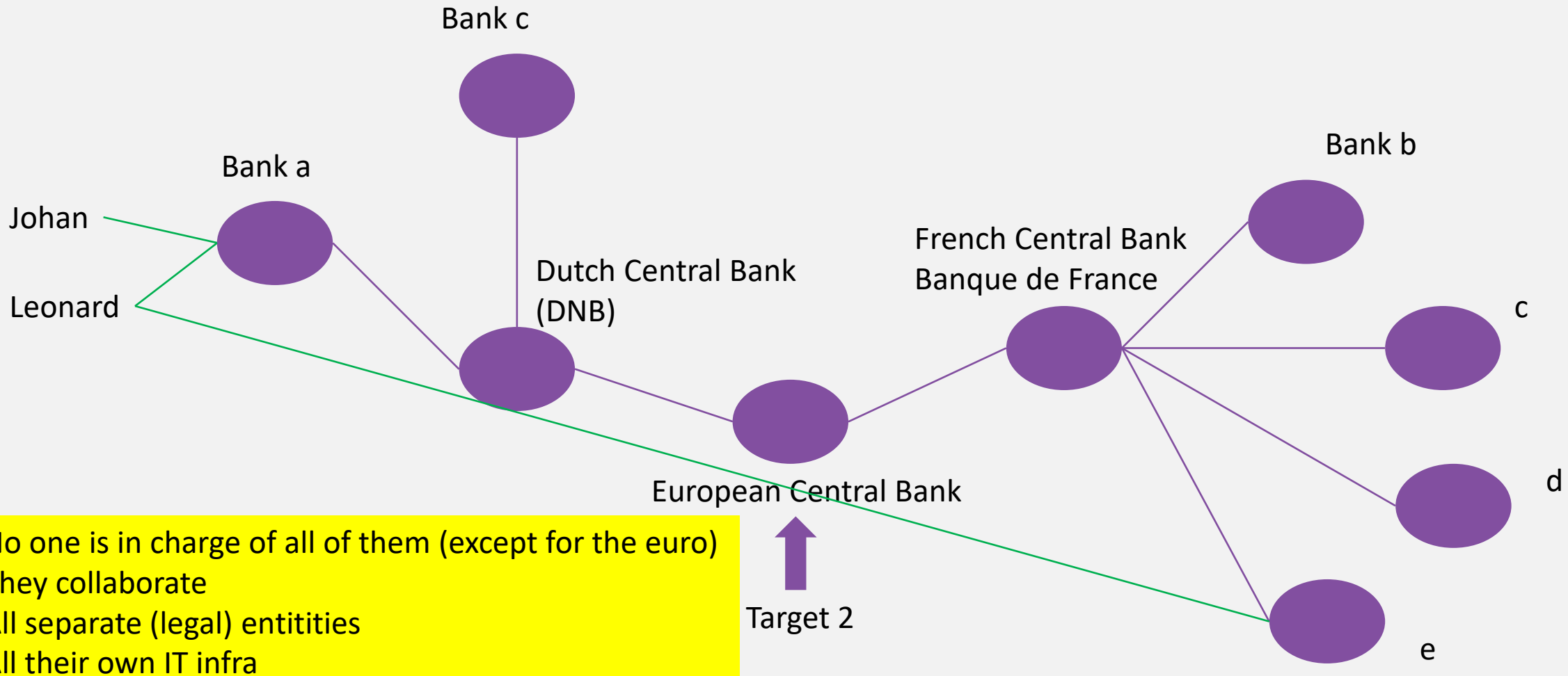
Betalingsverkeer Nederland


Central Bank
(Bank of England, European Central Bank, Federal Reserve, ...)
Central Bank Accounts
RTGS
(CHAPS, Target 2, Fedwire, ...)
Deferred Net Settlement
(BACS/FP, EURO1, ACH, Cheque Visa, PayPal, ...)
Correspondent Banking Arrangements
Commercial Bank #1
(Barclays, Deutsche Bank, Citi, ...)
Commercial Bank Accounts
Retail Bank Accounts
Commercial Bank #2
(HSBC, SocGen, JPMC, ...)
Commercial Bank Accounts
Retail Bank Accounts
Alice
Bob
Charlie

Payment infrastructure

- Eco systems of individual firms/banks
  - None controls everything (e2e)
  - Each bank is a separate legal entity
- The magic landscape glue
  - Central banks
  - API's and
  - Supervision/regulation (DNB & AFM supervision)
- AFM & DNB complementary tasks
  - Central bank and supervisor; these are not the same people

Institutes in a Payment Infrastructure



- No one is in charge of all of them (except for the euro)
- They collaborate
- All separate (legal) entitities
- All their own IT infra
- All do more or less the same job: transactions

- Only supervision has “control “ over all of them

How about unsupervised decentralised permissionless infrastructures: will they fit in?

- Who is in charge
  - how decentralised is the governance of the infra and it's services
- Look at Bitcoin blockchain and others
- DAO, "Digital Euro's" and others

Who is in charge

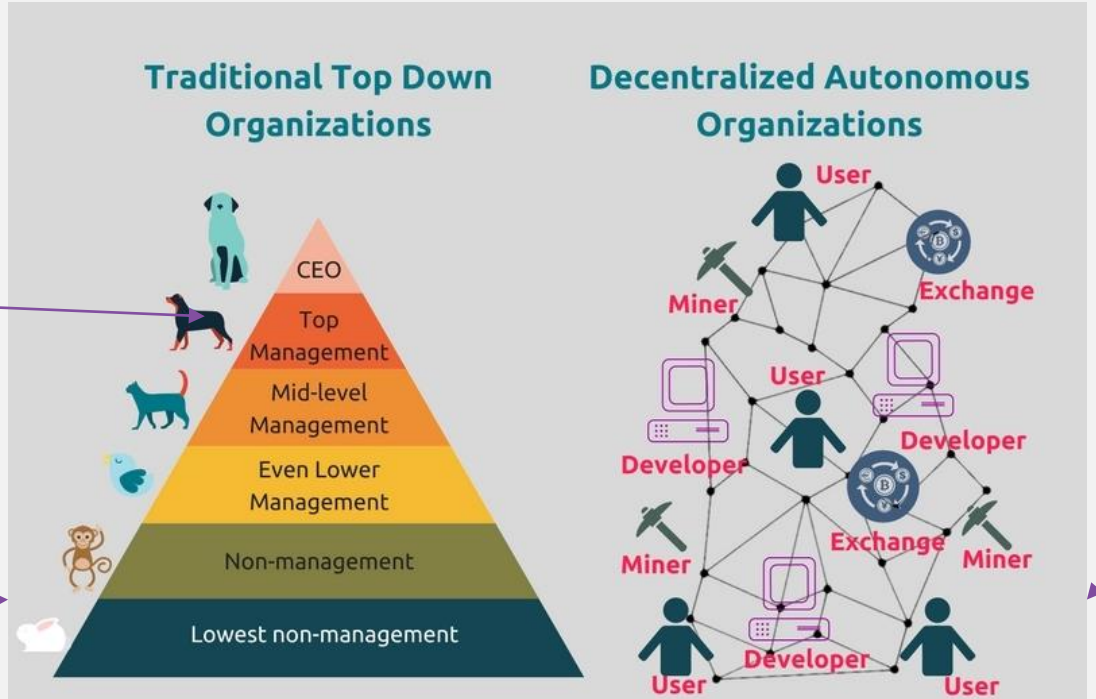
- An Institute (firm) :
  - **Vertical governance**
    - Top down, Top is responsible
      - Management board, Supervisory board, Shareholders, Several committees
    - Each firm creates its own infrastructure
    - Agreements/contracts with other firms
    - Laws, norms, “force” or language

- Decentralised approach: DLT/Blockchain
  - No central party
  - Often no legal entity
  - It’s decentralised
  - **Social and algoritmic** administration of governance
  - → **Horizontal governance**

Traditional vs Decentral

Potential:
Shareholders,
Supervisors,
Regulation

Centralised or
Vertical governance



DeCentralised or
Horizontal governance

(Decentral) Governance Formats

Horizontal governance

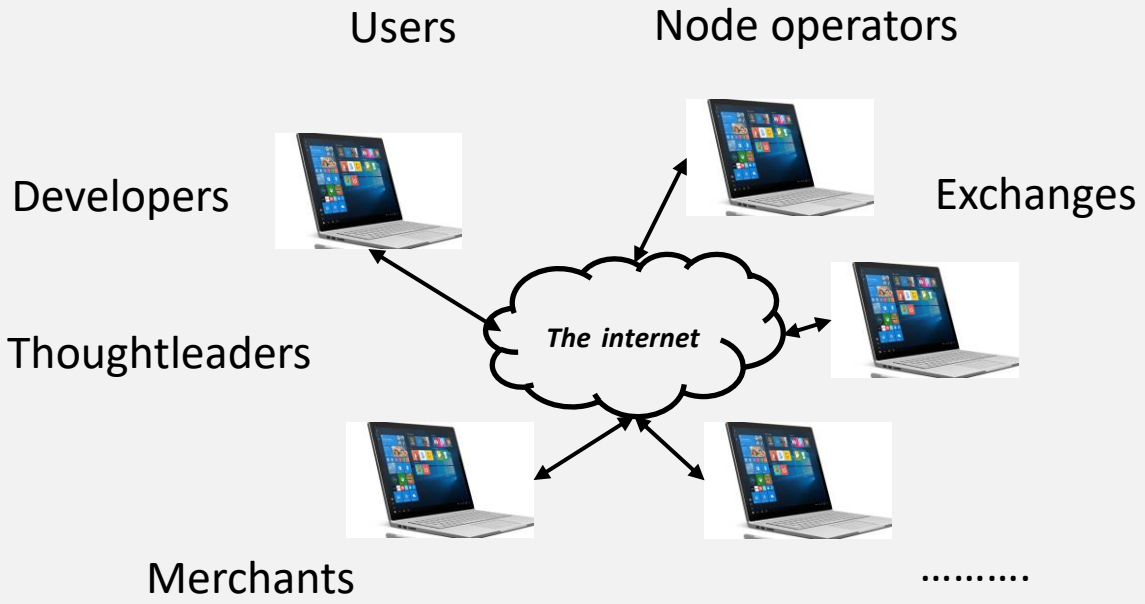
Decentralised

Leaderless

Public

Permissionless.

- Direct governance
  - Everybody vote, public debate
  - Collective action of all involved
  - Hard to reach consensus
- Representative governance
  - Efficient
  - Majority



2 Strategies

challenge of technology enabled social organisms

- On chain
  - Proposing & **Voting** using the blockchain
  - From completely software coded rules (consensus algorithms)
  - To support in the voting process, but all can vote
  - **Governance tokens**
- Off chain
  - Traditional
  - Meetings

- Advantages of on chain governance
  - It is a decentralized form of governance
  - Quicker turnaround times for changes
  - Through built in voting mechanisms
  - Token holders (algorithms)
  - Voting registered on the blockchain
  - Exampes: Tezos, EOS, bisq
- Disadvantages of On-Chain Governance
  - Low-voter turnout
  - Information position
  - Users with greater “stakes” can manipulate votes (sibbel attack)
  - Collusion
  - (cost)

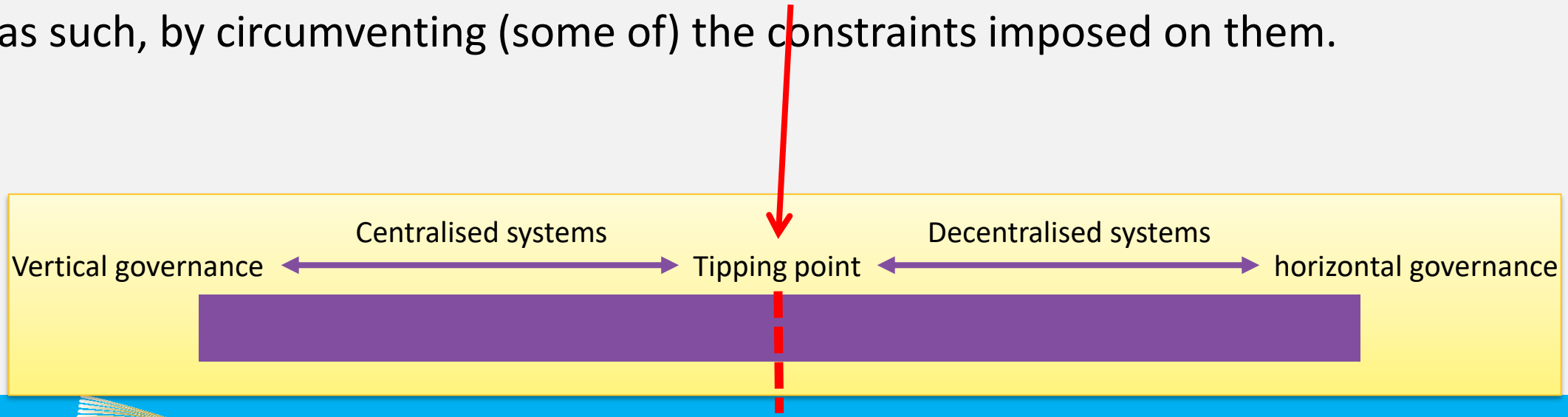
Immutable:
1, 2 8 or x miners
Ex: bitcoin classic bitcoin, cash
Ethereum dao

About horizontal governance

With a pure form of horizontal governance no one controls any one

In absence of any control, the existence is random and cannot be ensured or maximized.

That being said, even with horizontal and decentralized governance, a group of participants may achieve a form of direct **control** over the blockchain by collaborating, and as such, by circumventing (some of) the constraints imposed on them.



Split the governance question

- The development of a blockchain
  - New functionality (change of consensus, lightni
  - About features
  - New releases
  - Is not about the “smart contracts”
  - ***Future development of the blockchain*** → **Social or managerial governance**

Open source

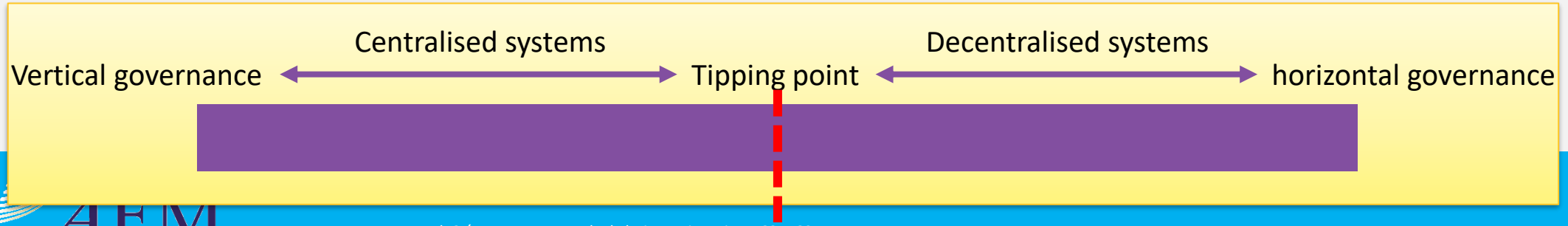
- The operation of a blockchain
  - Acceptance of transactions
  - Consensus on transactions
  - ***Day to day operations*** → **Operational governance)**

Development of the blockchain (managerial governance):

Open source

Creation of the DLT software

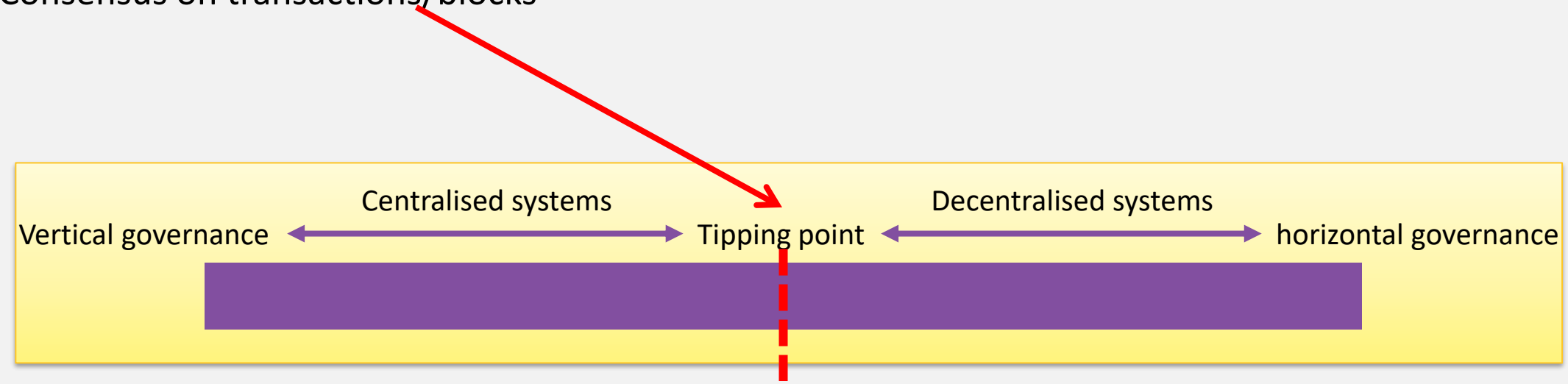
- Contribution
  - Cathedral model and
  - Bazaar model
- Acceptance
  - Horizontal model
  - High priest model (a group with “some” decision-making powers)
  - Vertical model



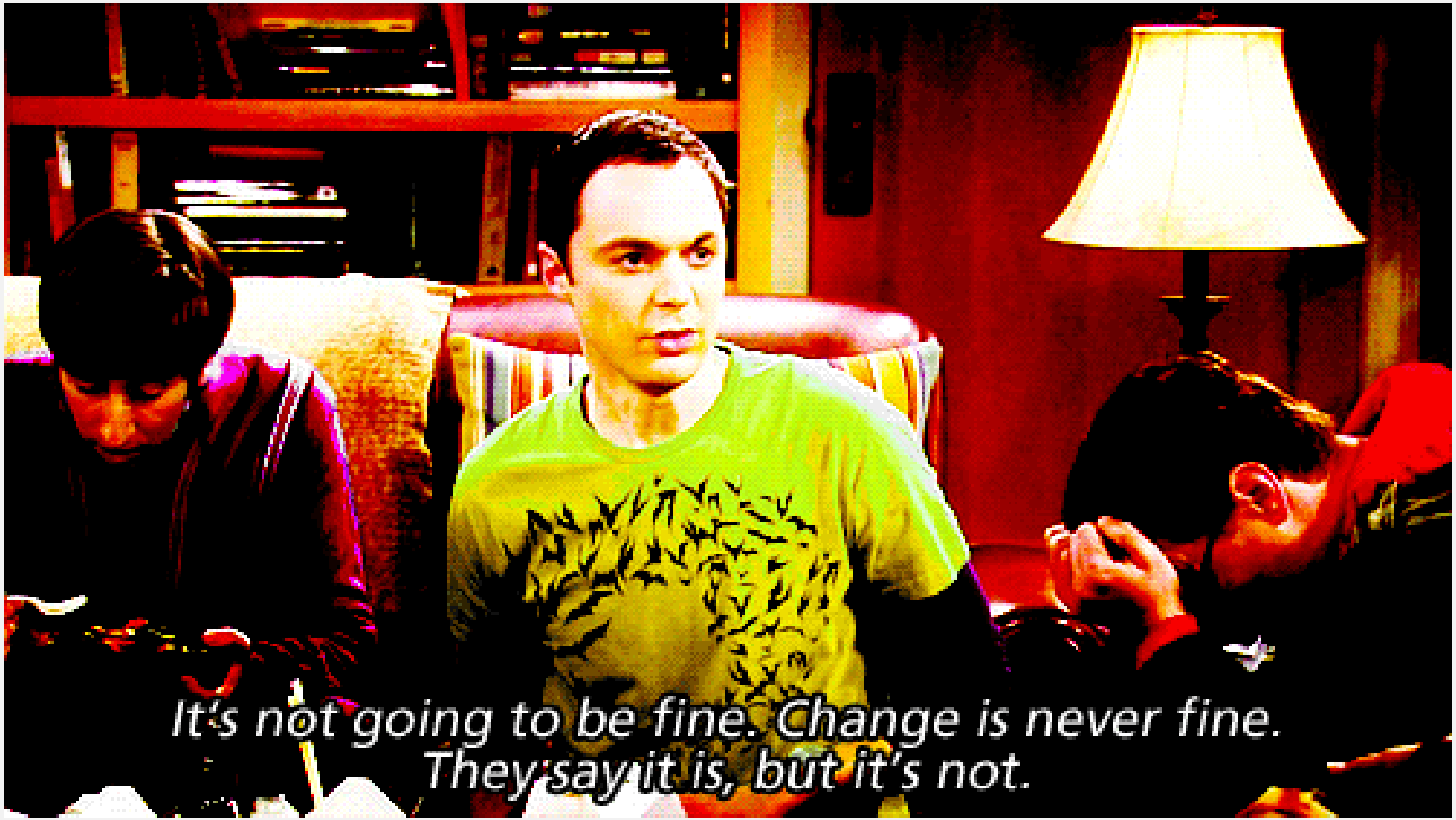
Operational governance of a blockchain

→ who decides what is stored on the blockchain, what is a valid transaction

- The operation of a blockchain
  - Check validity of transactions
  - Consensus on transactions/blocks



Break…….


It's not going to be fine. Change is never fine.
They say it is, but it's not.

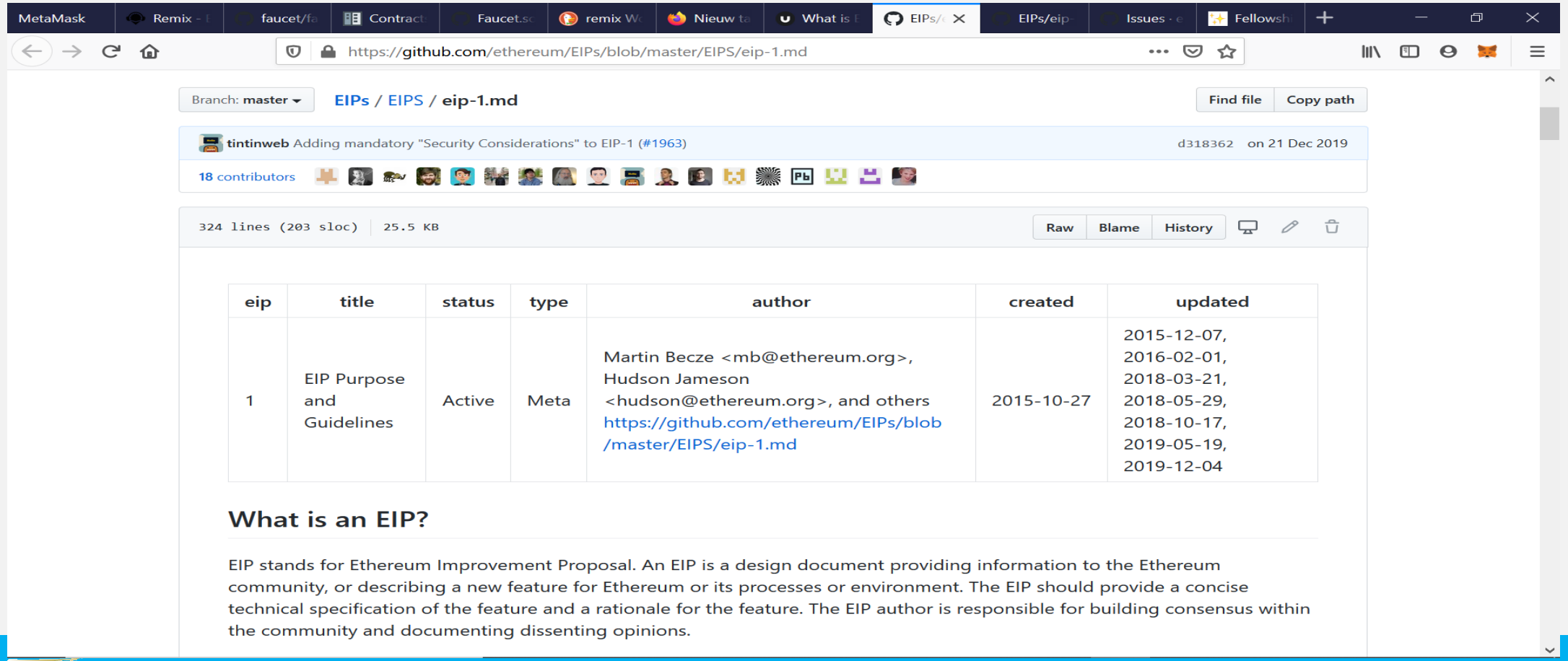
Look at Ethereum managerial and operational →about the DLT, not the smart contacts

- Managerial ()
  - Open source proces
  - EIP, ERC, core development team
  - High priest model

- Operational governance
  - Consensus algorithm driven (PoW, PoS/Beacon)

Who decides on the next version of Ethereum
- Fixing bugs
- New consensus algorithm
- Larger blocks
- Hard Forks
- etc

EIP 1….if you want to contribute



https://github.com/ethereum/EIPs/blob/master/EIPS/eip-1.md

Branch: master ▾ EIPs / EIPS / eip-1.md Find file Copy path

tintinweb Adding mandatory "Security Considerations" to EIP-1 (#1963) d318362 on 21 Dec 2019

18 contributors

324 lines (203 sloc) 25.5 KB Raw Blame History

eip	title	status	type	author	created	updated
1	EIP Purpose and Guidelines	Active	Meta	Martin Becze <mb@ethereum.org>, Hudson Jameson <hudson@ethereum.org>, and others https://github.com/ethereum/EIPs/blob/master/EIPS/eip-1.md	2015-10-27	2015-12-07, 2016-02-01, 2018-03-21, 2018-05-29, 2018-10-17, 2019-05-19, 2019-12-04

What is an EIP?

EIP stands for Ethereum Improvement Proposal. An EIP is a design document providing information to the Ethereum community, or describing a new feature for Ethereum or its processes or environment. The EIP should provide a concise technical specification of the feature and a rationale for the feature. The EIP author is responsible for building consensus within the community and documenting dissenting opinions.

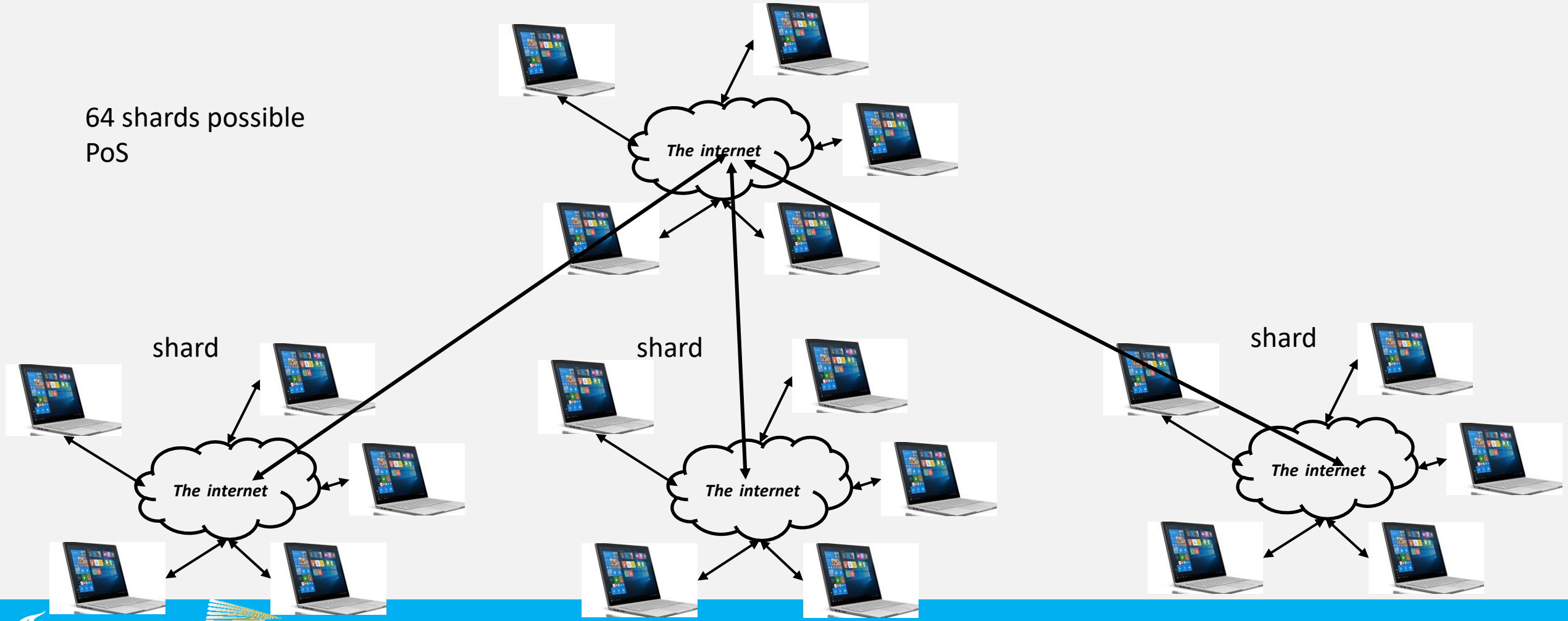
This one: how to gain acceptance by the “miners”

https://ethereum.org/en/eth2/beacon-chain/
https://decrypt.co/resources/what-is-ethereum-2-0
EIP 2982
Ethereum Foundation

Staking process: stakers needed 16324, 32Ether → 19K$

Ethereum 2.0 : Beacon

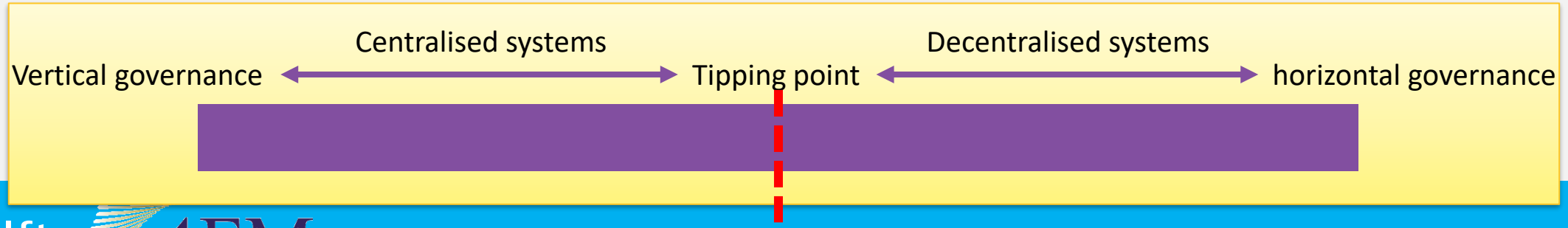
64 shards possible
PoS



Ethereum

- Managerial governance
  - Open source (bazaar model)
  - Core development team (role of Vitalin Butalik?) High priest model

- Operational governance
  - Every one can join as a node
  - Consensus algorithm (PoW and to be PoS)



Bitcoin managerial and operational →about the DLT

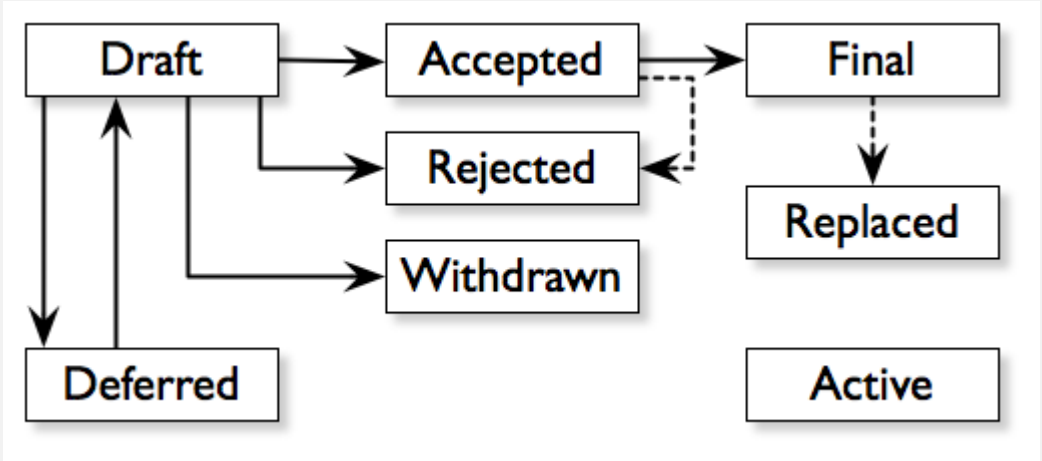
- Managerial
  - Open source proces
  - BIP, core development team
  - High priest model

Who decides on the next version of bitcoin
- Fixing bugs
- New consensus algorithm
- Larger blocks
- Hard Forks
- etc

- Operational governance
  - Consensus algorithm driven (PoS)

BIP 0001

Describe the Bip proces, see github



These two?

Recent

2017

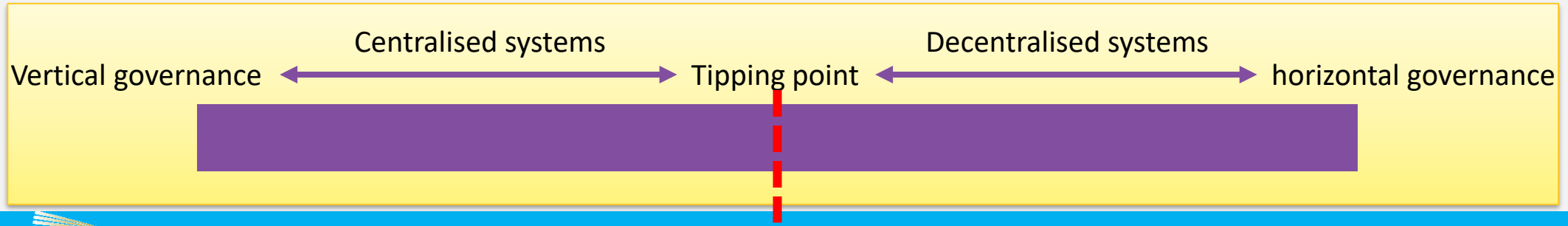
https://decrypt.co/resources/what-is-taproot-proposed-bitcoin-upgrade
Voting through block bits

Bitcoin

https://blog.lopp.net/who-controls-bitcoin-core-/

- Managerial governance
  - Open source (bazaar model)
  - Core development team (role of Wladimir vd Laan) High priest model

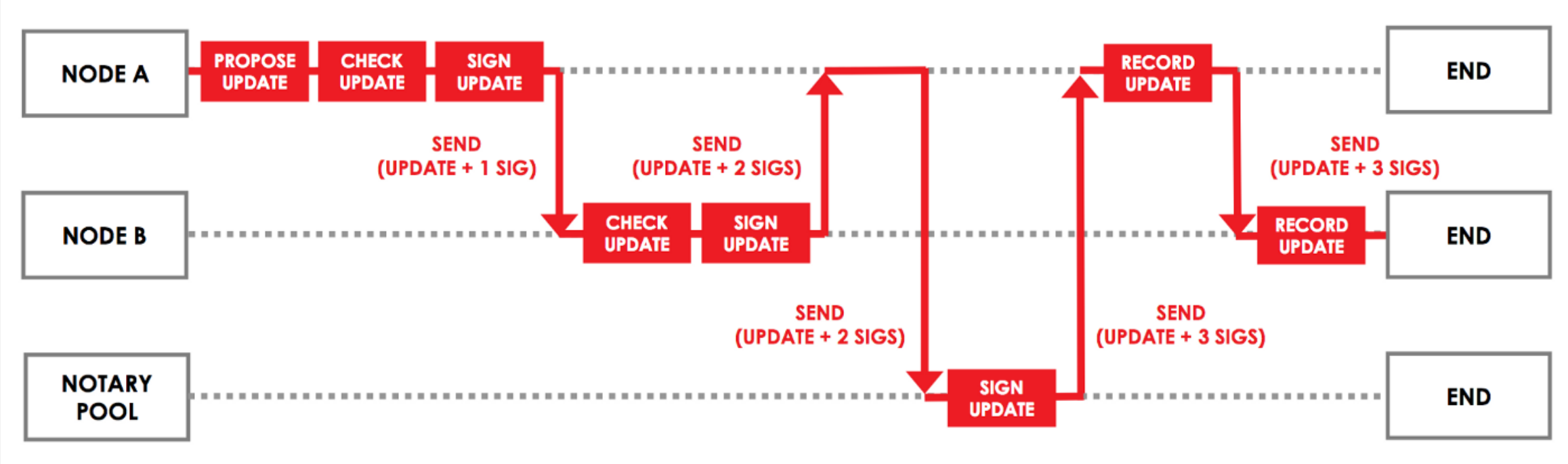
- Operational governance
  - Every one can join as a node
  - **Consensus** algorithm (PoW)



Corda

- R3 consortium
  - Created corda
- Corda Business networks
  - https://corda.network/about/business-networks/
- Corda software open source available

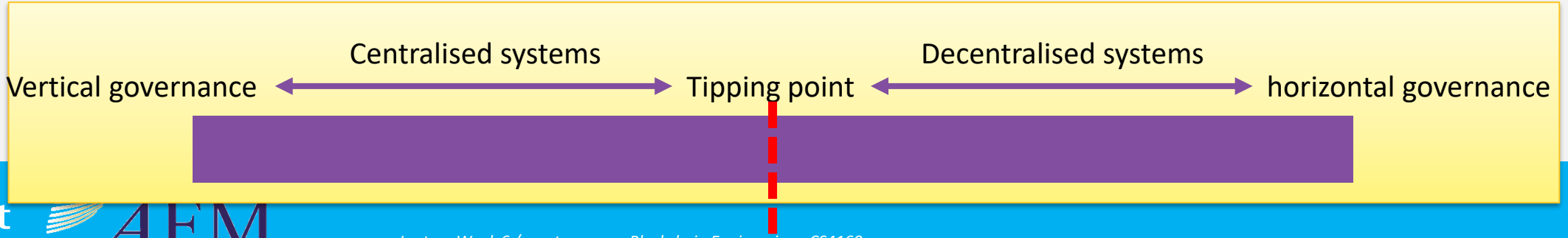
Corda operational model (Trustchain???)



Corda (Private Chain)

- Managerial governance
  - Open source (bazaar model)
  - Core development team with a designated R3 project manager

- Operational governance
  - Need to join the Corda Network Association
    - Pay fee's and contribution
  - Consensus algorithm (**notary nodes**)

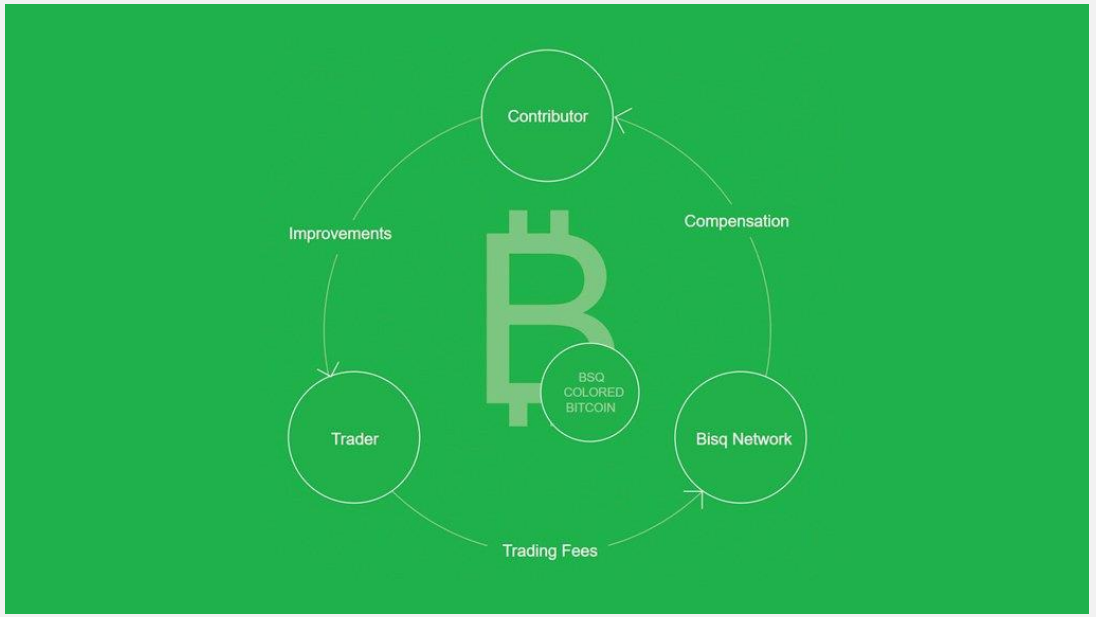


Governance

Social/managerial governance

Operational governance

Bisq DAO

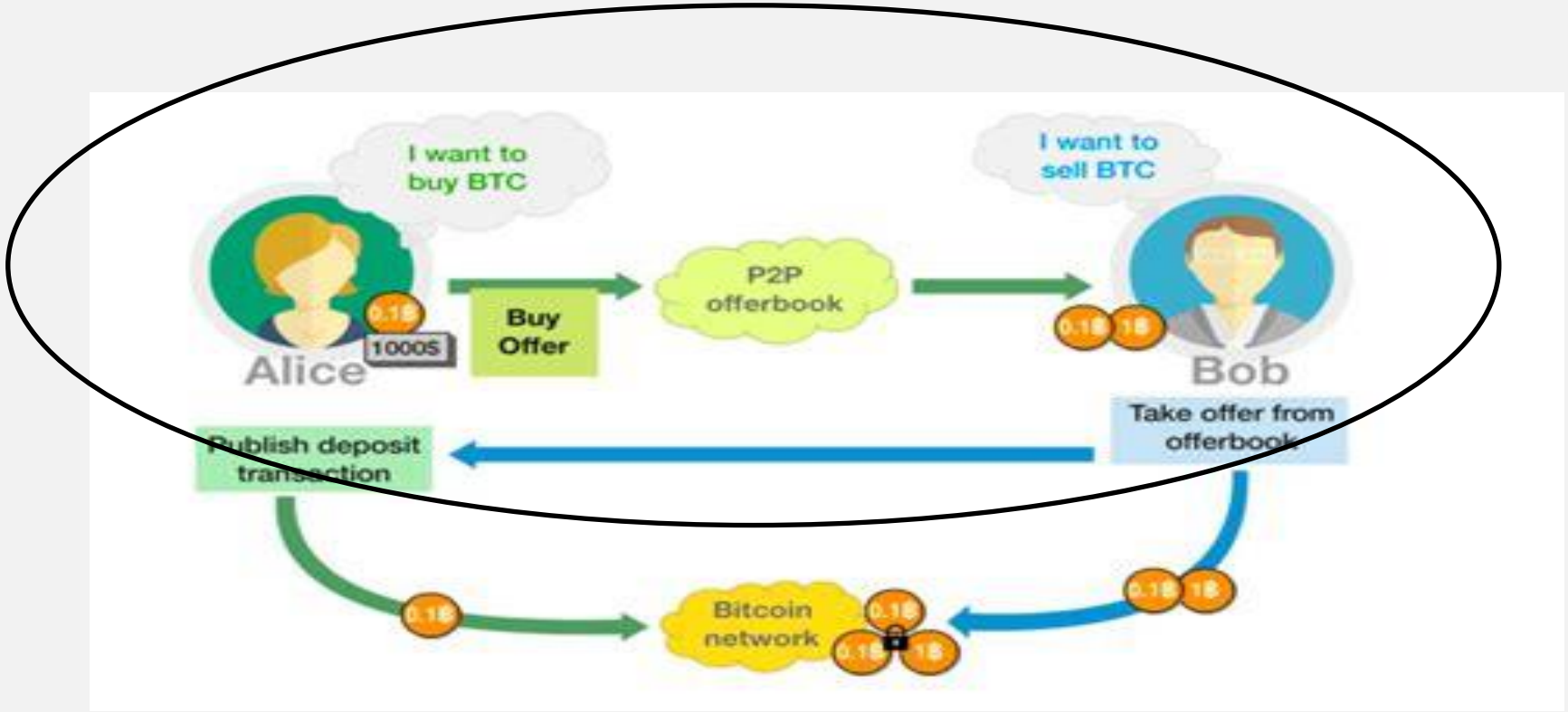


- Traders buy BSQ tokens to pay for trades
  - Trading fees
  - Colored coins on the bitcoin blockchain

- BSQ tokens are being used to
  - compensate **Bisq DAO (software/app)** developers
  - Also dispute resolution
- Usage of a voting mechanism

Bisq DAO

Distributed app, not on blockchain

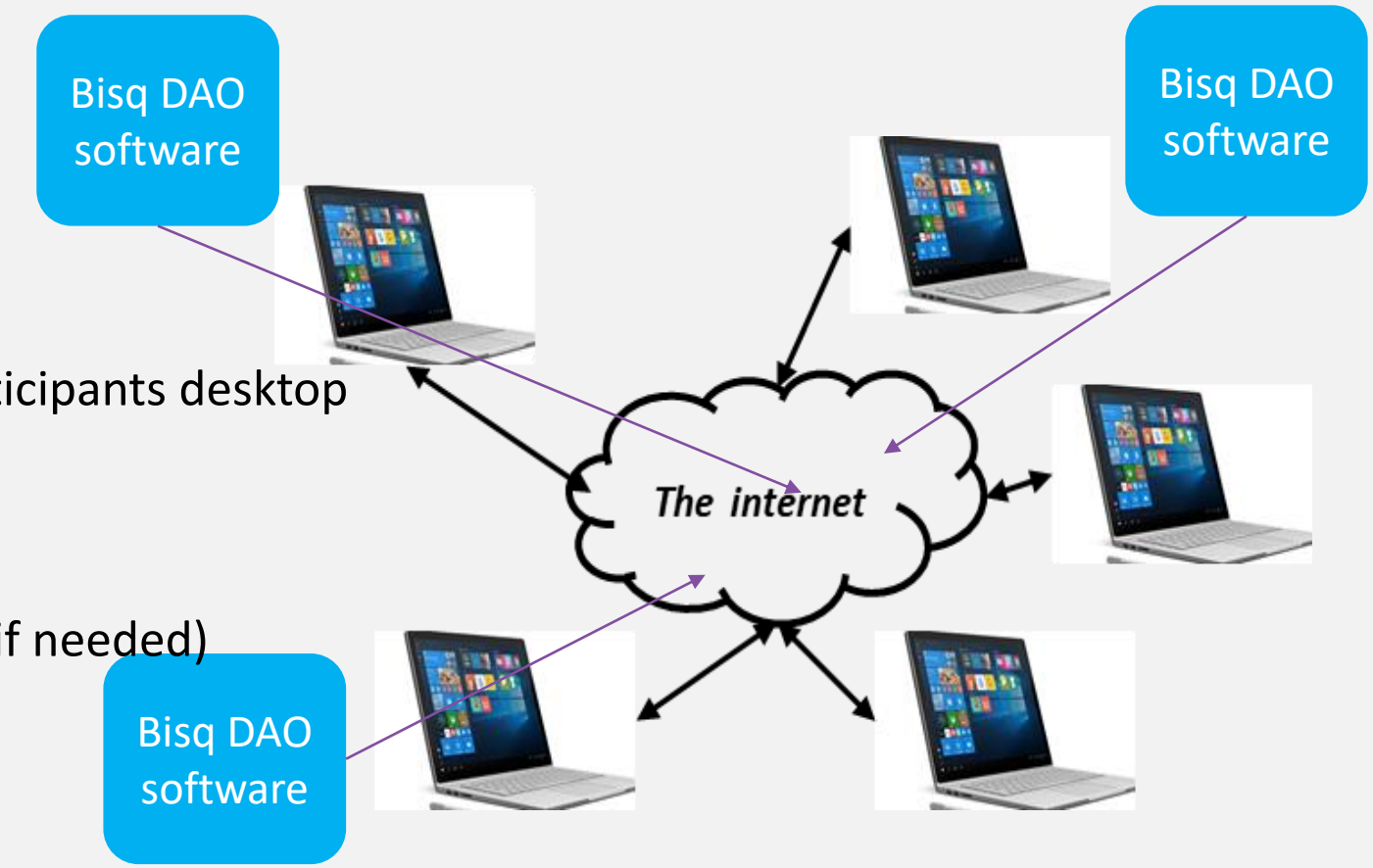


https://bisq.network/dao/

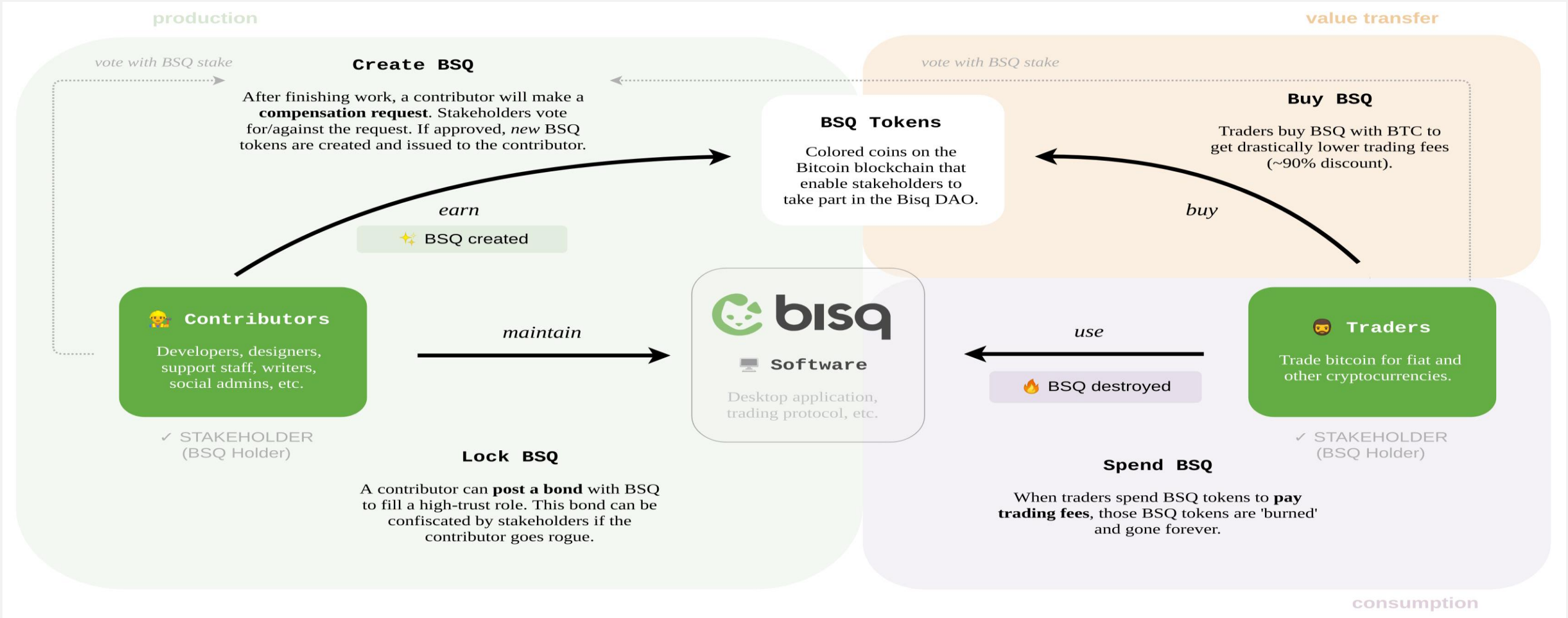
Bisq DAO: bitcoin trading

- Bisq application
  - Is not a smart contract
  - Is a stand alone application on the participants desktop
  - Uses the bitcoin blockchain
    - Transactions (multi sig escrow)
    - **Governance/voting**
  - Use the conventional banking system (if needed)

- **“On chain governance”**

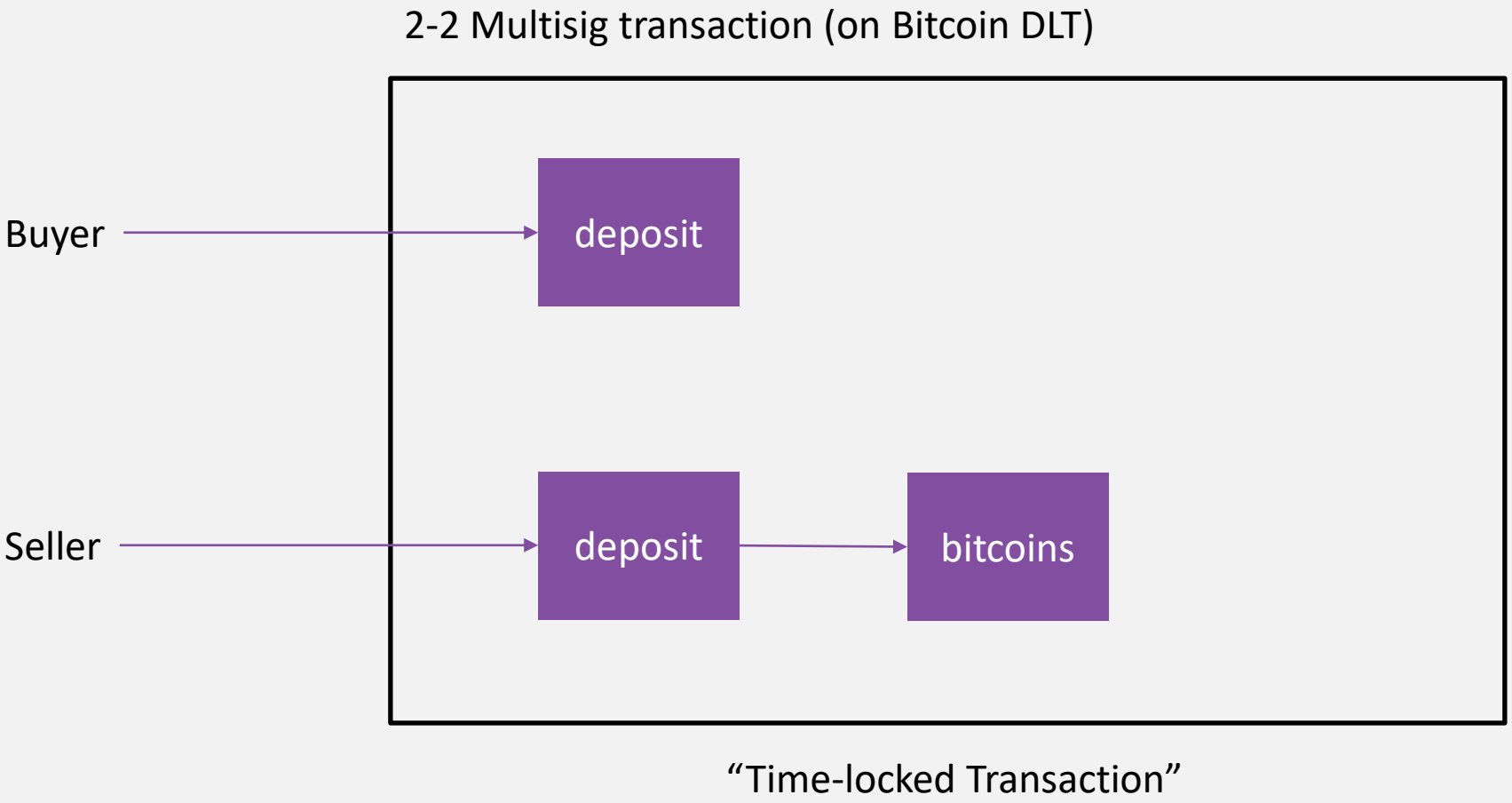


Bisq DAO


production
value transfer
vote with BSQ stake
Create BSQ
After finishing work, a contributor will make a compensation request. Stakeholders vote for/against the request. If approved, new BSQ tokens are created and issued to the contributor.
vote with BSQ stake
BSQ Tokens
Colored coins on the Bitcoin blockchain that enable stakeholders to take part in the Bisq DAO.
Buy BSQ
Traders buy BSQ with BTC to get drastically lower trading fees (~90% discount).
earn
BSQ created
buy
Contributors
Developers, designers, support staff, writers, social admins, etc.
maintain
bisq
Software
Desktop application, trading protocol, etc.
use
BSQ destroyed
Traders
Trade bitcoin for fiat and other cryptocurrencies.
✓ STAKEHOLDER (BSQ Holder)
✓ STAKEHOLDER (BSQ Holder)
Lock BSQ
A contributor can post a bond with BSQ to fill a high-trust role. This bond can be confiscated by stakeholders if the contributor goes rogue.
Spend BSQ
When traders spend BSQ tokens to pay trading fees, those BSQ tokens are 'burned' and gone forever.
consumption

https://bisq.wiki/Security_deposit

Multisig deposits



Dispute

- Time constrained
- First →Trader chat
- Second → Mediator
- Third → Arbitrator
- Final: funds released to the “donation address”

Bisq DAO

- Open trading community
- Have a kind of profit model (BSQ tokens)
- Dispute resolution mechanism (trade disputes)
- Incentives for contributors
  - Developers
  - Mediators
  - Arbitrators
  - …..(node operators…not discussed)
- On-chain voting
  - https://docs.bisq.network/compensation.html#submit-your-compensation-request
  - https://docs.bisq.network/compensation.html#background

- …still improving

Tokenised Euro

ECB concerned e-money, stablecoins become attractive when interest rates negative

21 hours ago

by Ledger Insights

Fintech

Central bank experiments with CBDC will drive securities onto blockchain

November 09, 2020

Fear of Chinese advances with programmable money and Facebook's Libra are pushing central banks to digital currencies, which may transform financial markets.

https://www.investopedia.com/terms/c/central-bank-digital-currency-cbdc.asp

Two types of tokenised Euro's

- (Central) bank Euro, Cash and digital
  - There is only the Euro-token
  - Central bank guarantees this Euro (Central Bank Digital Curreny)

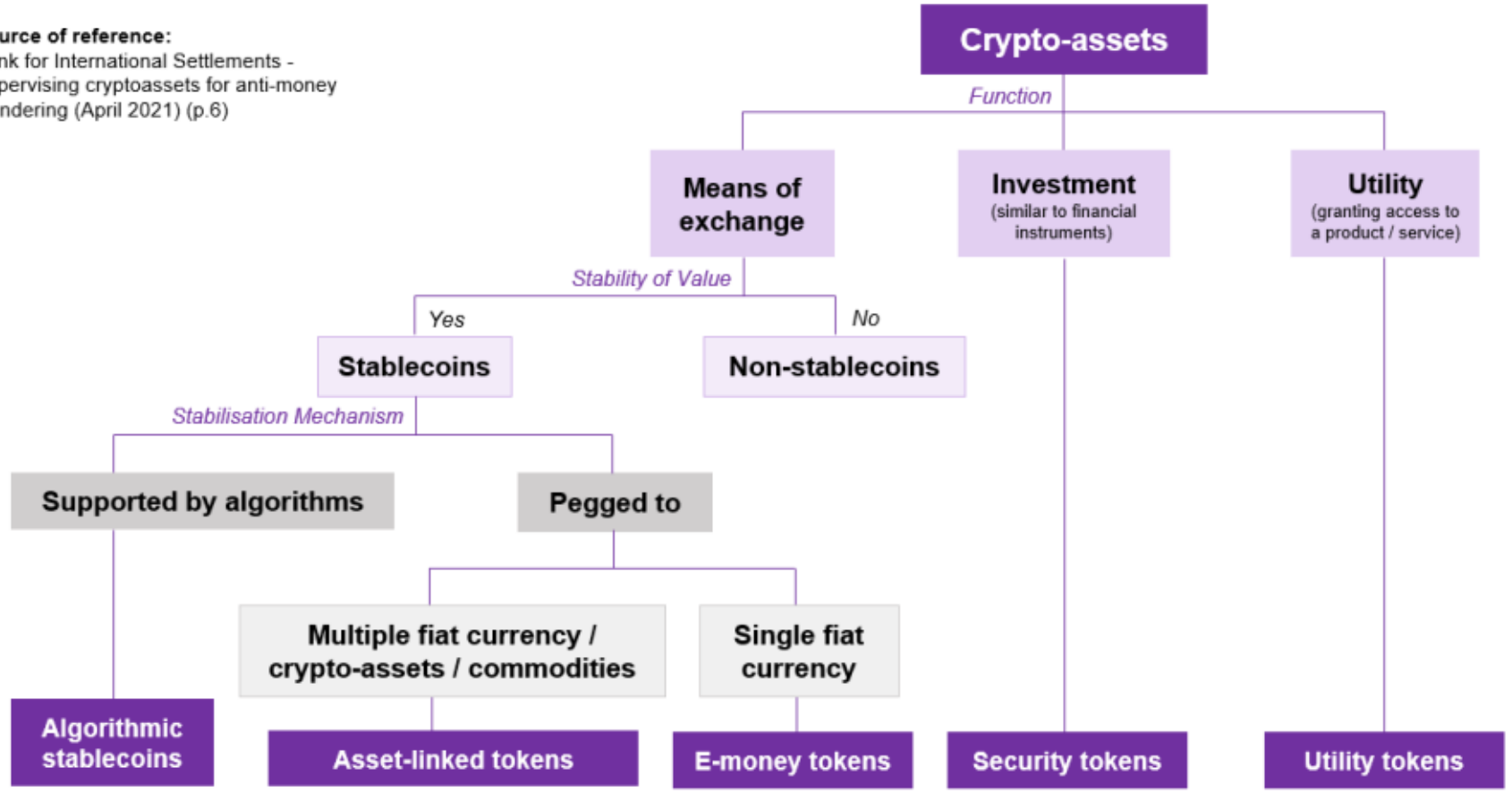
- E money
  - Euro deposit for each Euro-Token
  - You get it back when you hand in your Euro-token

- Technology wise both are/could be the same…

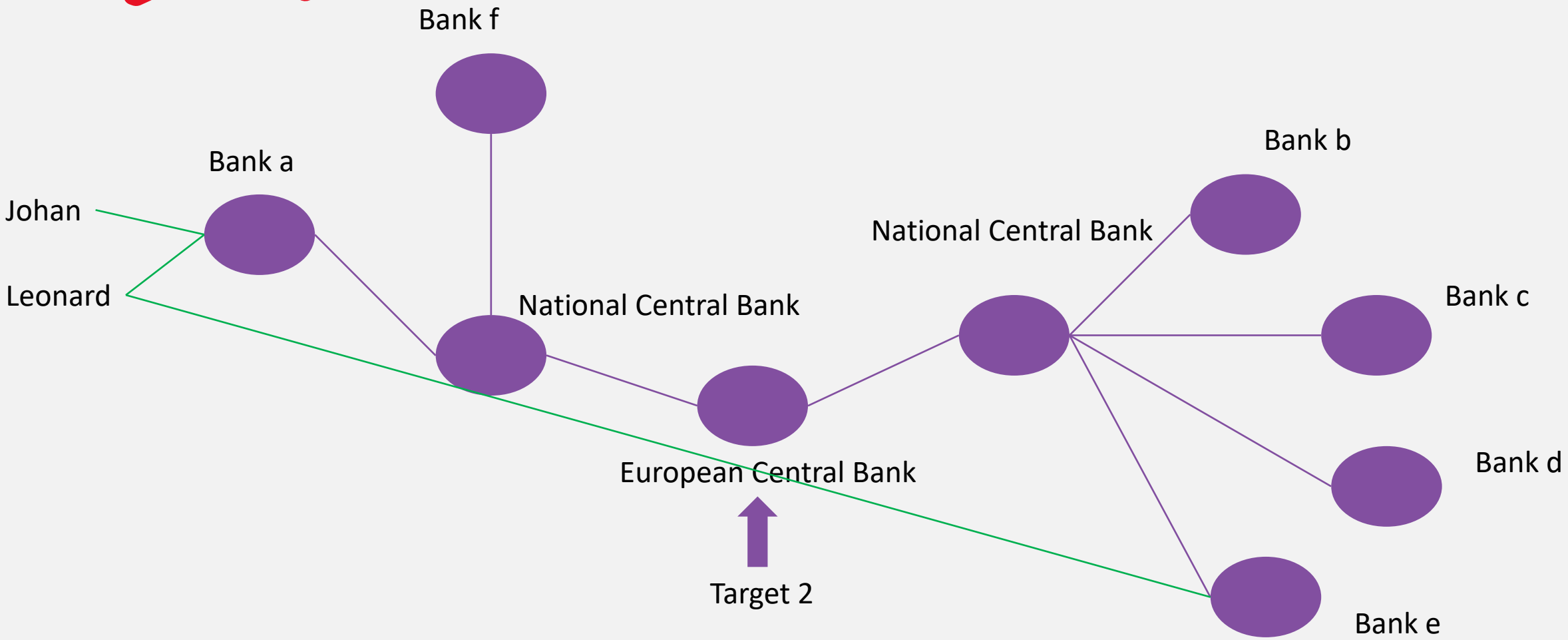
Who is in charge….

Classification of crypto-assets

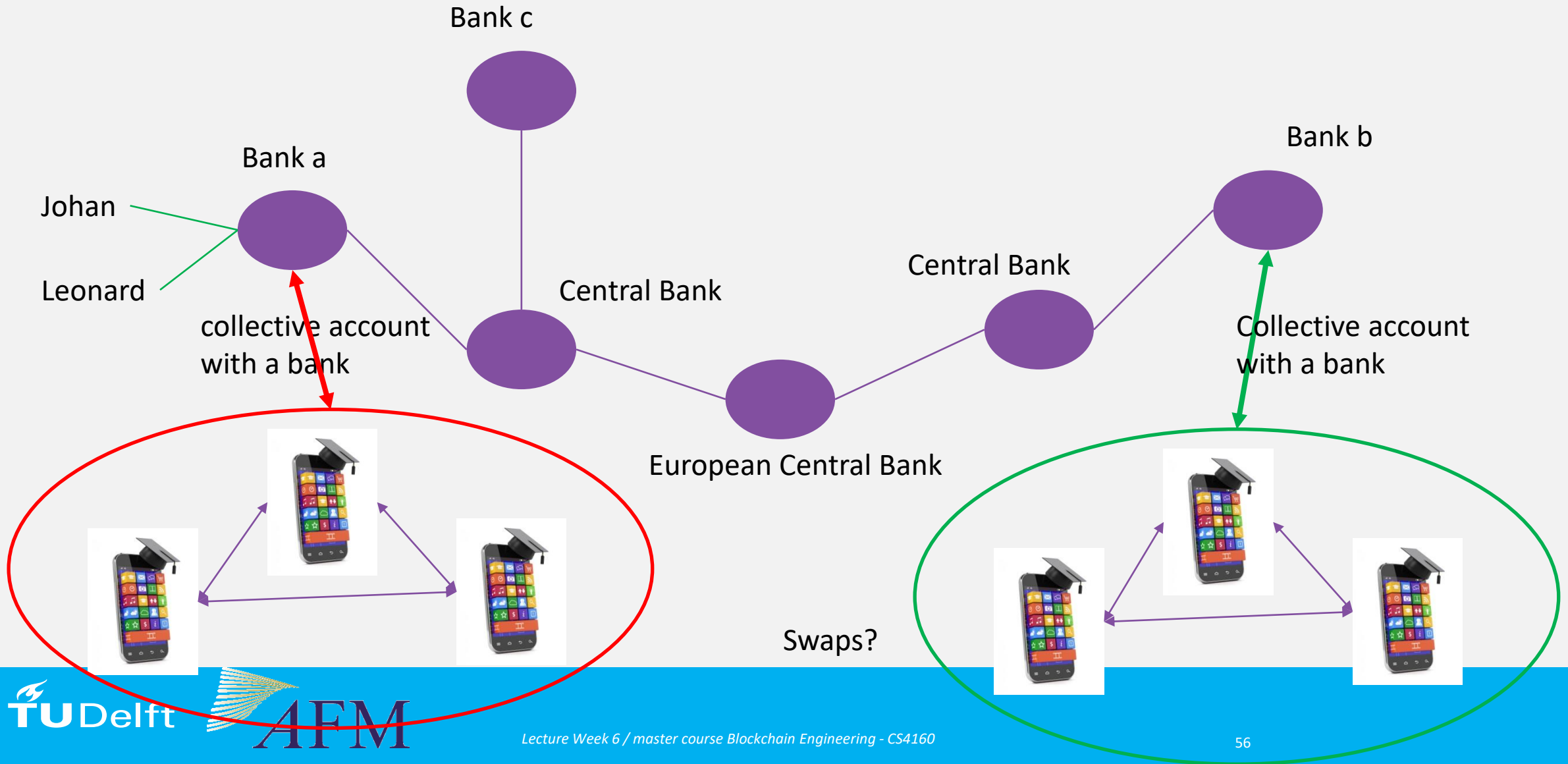
Source of reference:
Bank for International Settlements - Supervising cryptoassets for anti-money laundering (April 2021) (p.6)



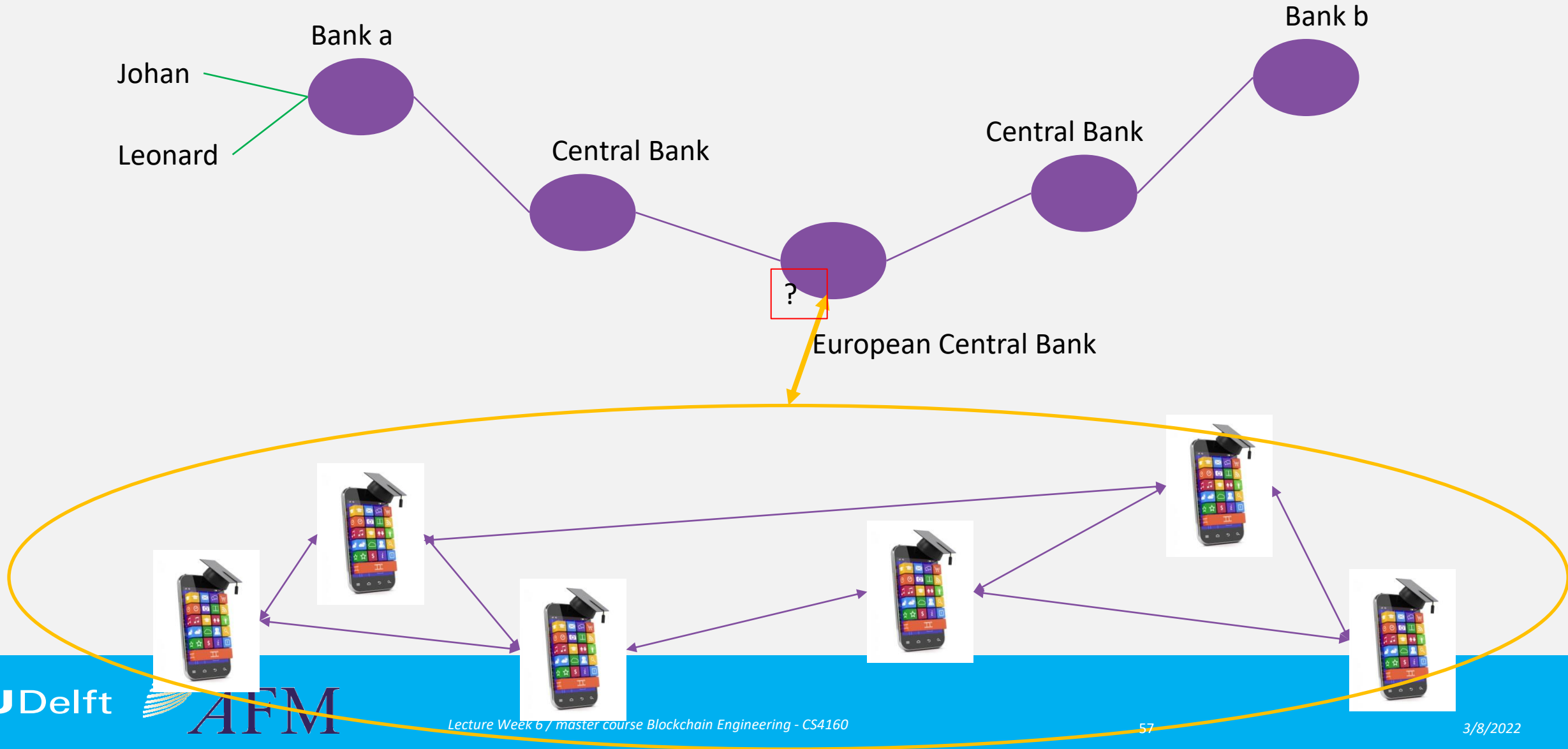
~~Institutes~~ Nodes in a Payment Infrastructure



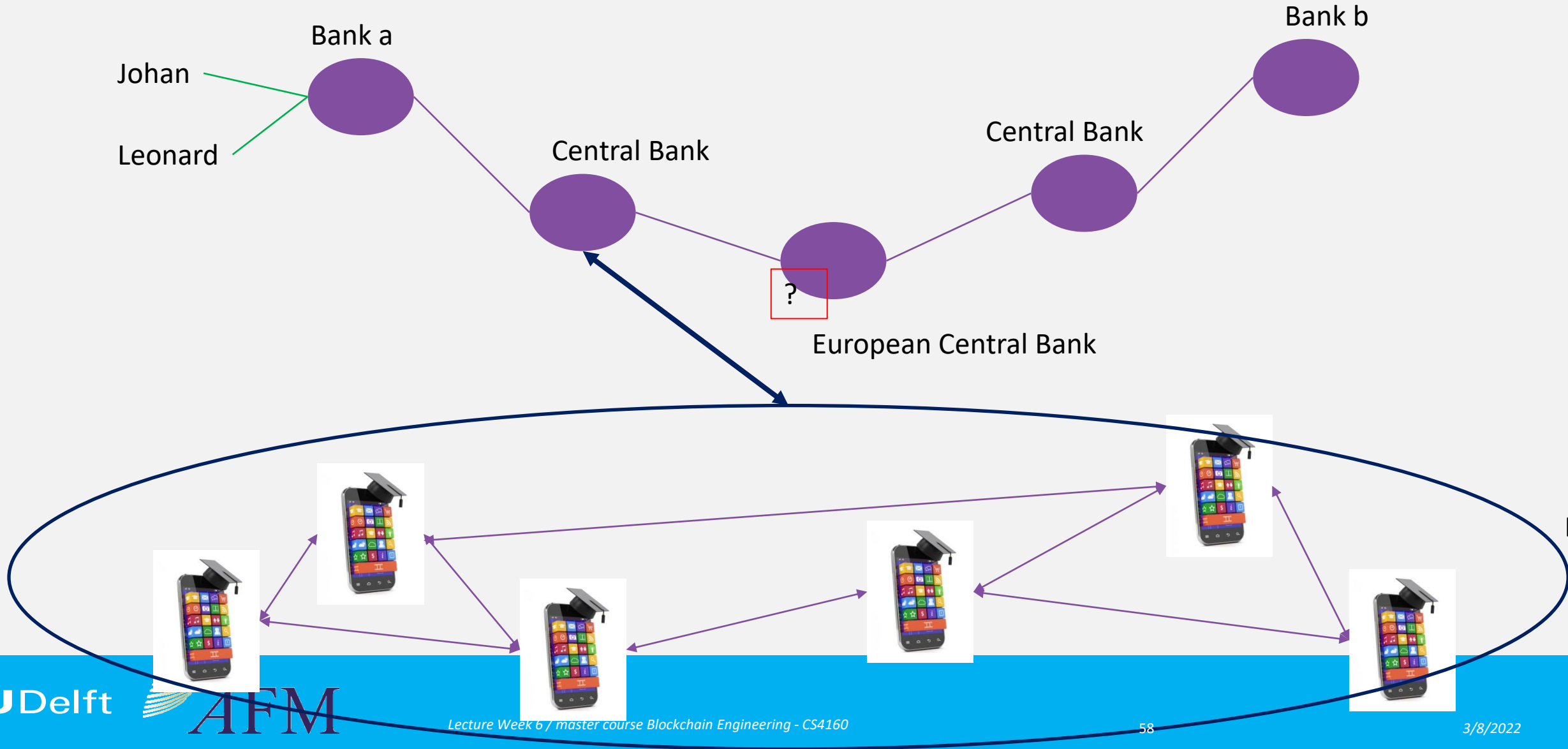
Electronic Money Tokens



Cash equivalent or DLT based/digital euro?



Cash equivalent or DLT based/digital euro?



Trust chain/Super app Euro Token
→ need to code some rules: compliance by design

- Double spending
- Consensus/Finality
- (or alternative risk mitigation)

- On line → off line (digital cash?)
  - What if no internet
  - Again
    - Double spending/finality
  - Or alternative mitigation of the risks.

Other DLT applications:

- DAO as an investment fund
- DAO as crowdfunding platform
- DLT as a shared truth

What is an investment fund?

equity fund

Developping countries fund

Orange juice fund

Index fund

Innovative projects fund

High tech shares fund

Crypto fund

Real estate fund

Porkbelly fund

Fund manager

Euro's / participations

Investors (you, me, anybody)

A crypto investment fund

Crypto fund

Wallet with crypto's
Btc, xlm, ltc

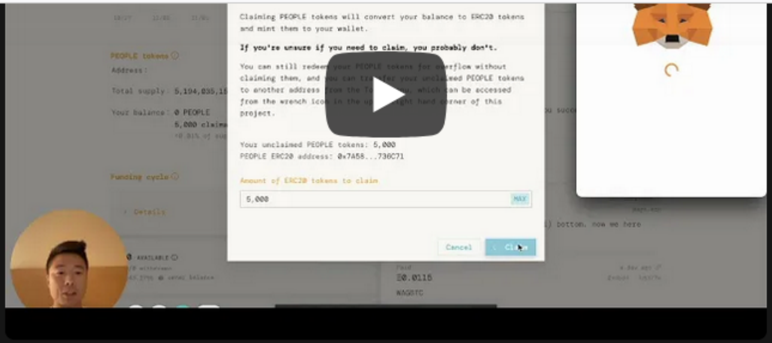
DAO:
Investment rules

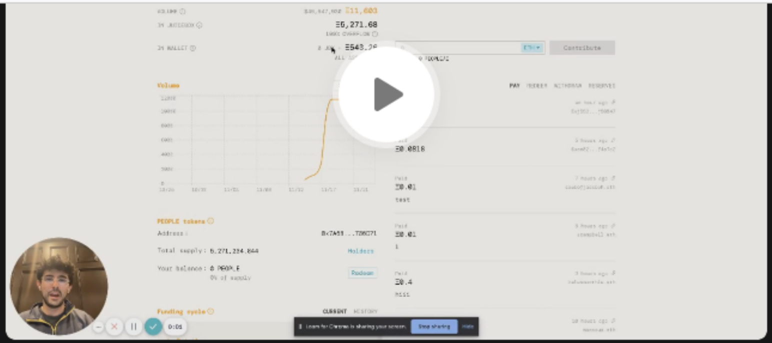
"Euro's" / Tokens

Investors (you, me, anybody)

ConstitutionDAO

https://www.constitutiondao.com





ConstitutionDAO (2021-2021) was a beautiful experiment in a single-purpose DAO. We now believe this project has run its course.

The community has taken all actions that it was organized to accomplish: we raised capital, we bid at Sotheby's, and upon losing, we made full refunds available to the community as promised.

Having lost the auction and following the core team's choice to wind down, we would like to remind you that the tokens possess no rights, governance, or utility other than redeeming them for ethereum from the smart contract held in Juicebox at a ratio of 1,000,000:1—the same ratio at which contributions were made to the initial crowdfund to buy the Constitution.

It is also an option to keep your $PEOPLE tokens and do with them as you please—it is clear that there are parts of the community who wish to incorporate them into future projects. **ConstitutionDAO cannot and will not endorse any future plans for the token. Nothing in here is financial advice. Do your own**

What is a Crowd funder?

Project Loans

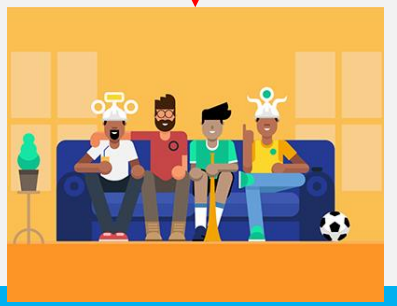
Start up Loan or Equity

Creating a new product

Crowfund manager

Platform: Euro's / Participations

Investors | borrowers



(you, me, anybody)

A Crowd funder using b…/DLT

E.g. loan of 10.000 euro in 100 tokens
- Tokenised euros
- Tokenised participations

Wallet with euro & loan tokens

Wallet with euro & loan tokens

Smart contract/ Dapp: Loan

Wallet with euro & loan tokens

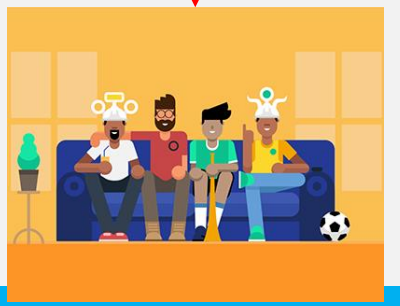
Wallet with euro & loan tokens

DAO: Investment rules

Euro's / Participations

Investors | borrowers

(you, me, anybody)



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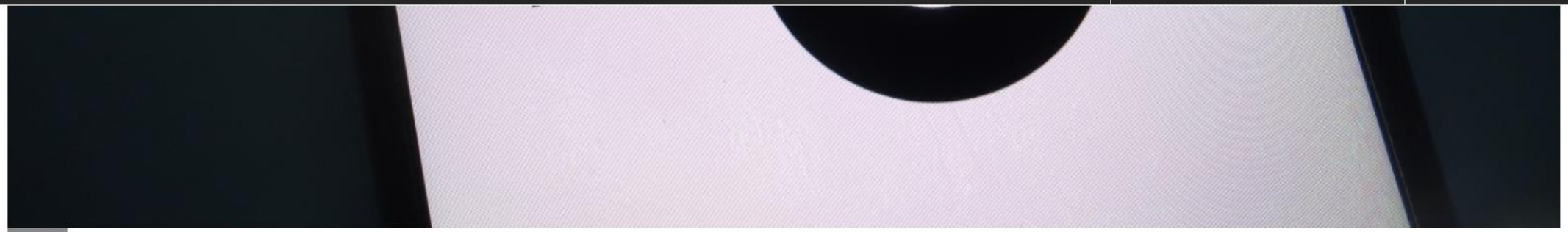
4 Banks Complete €100K Comm

https://www.coindesk.com/markets/2018/12/06/4-banks-complete-100k-commercial-paper-transacti

Layer 2 CoinDesk Newsletters

Bitcoin $37,312.99 -1.25% Ethereum $2,562.04 -1.31% XRP $0.591511 -3.77% Sola Crypto Prices → Top Assets →



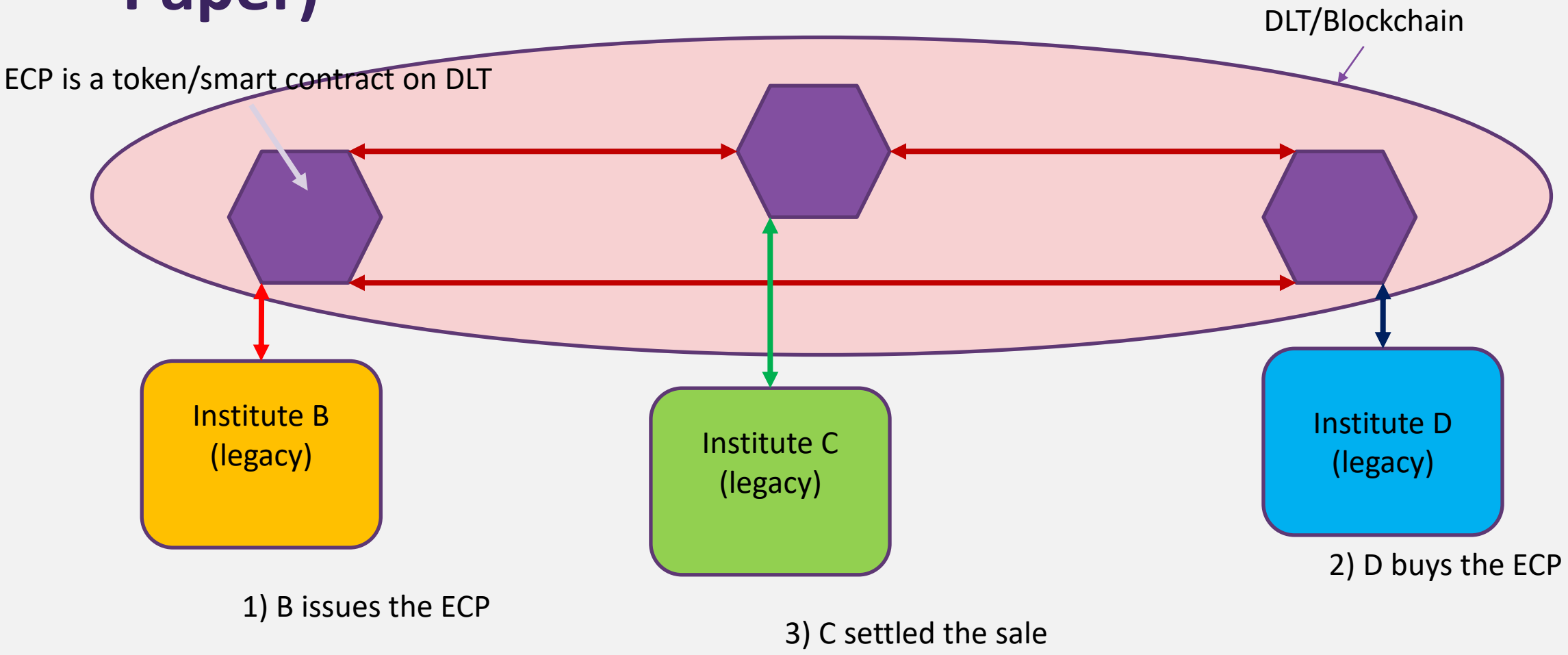
R3

Four European banks – Commerzbank, ING, Natixis and Rabobank – have settled a live transaction for a short-term debt instrument on the Corda platform developed by blockchain consortium startup R3.

According to a report from FinTech Futures on Thursday, the transaction involved an issuance of a one-day maturity euro commercial paper (ECP) worth €100,000 (or $1,13,432) at a notional value.

Natixis reportedly acted as the issuer of the instrument, Rabobank as the investor and ING as both the dealer and escrow agent. Commerzbank provided tech support and regulatory

Issuance & trade of ECP (Euro Commercial Paper)



The end