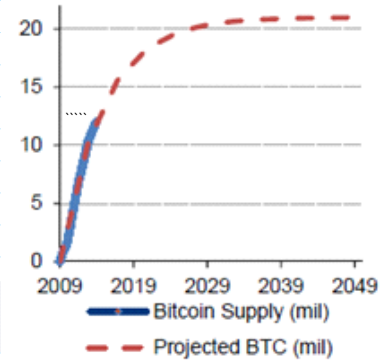
2 Dalis. Reikia žodžiu atsakyti dėstytojui į vieną iš sekančių teorinių klausimų, remiantis paskaitų medžiaga:
2.1. Apklasis e-parašas ir jo panaudojimas.
2.2. Aklojo e-parašo demaskavimas ir jo panaudojimas.
2.3. Cut-and-Choose paradigma.
2.4. Atsitiktinė Identifikacijos Eilutė - Random Identification String (RIS).
2.5. Sukčiavimo nustatymas panaudojant RIS.
2.6. Pagrinddinės tranzakcijų sudėtinės dalys UTxO blokų grandinėje ir kriptografinių metodų panaudojimas .
2.7. Pagrindinės blokų sudėtinės dalys, kaip gaunama blokų grandinė, kuo paremtas jos saugumas ir blokų kasyba.
Atsakymas vertinamas maksimaliu balu 2.

https://coinmarketcap.com/

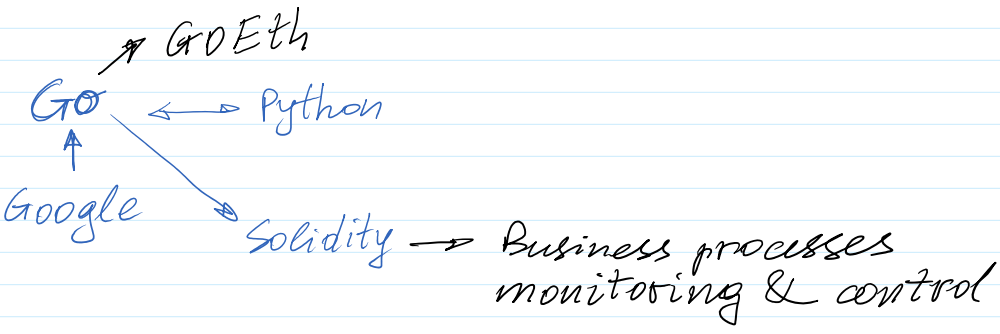
Bitcoin - BTC https://bitcoin.org/en/

Ethereum - ETH https://ethereum.org/

Monero https://www.getmonero.org/

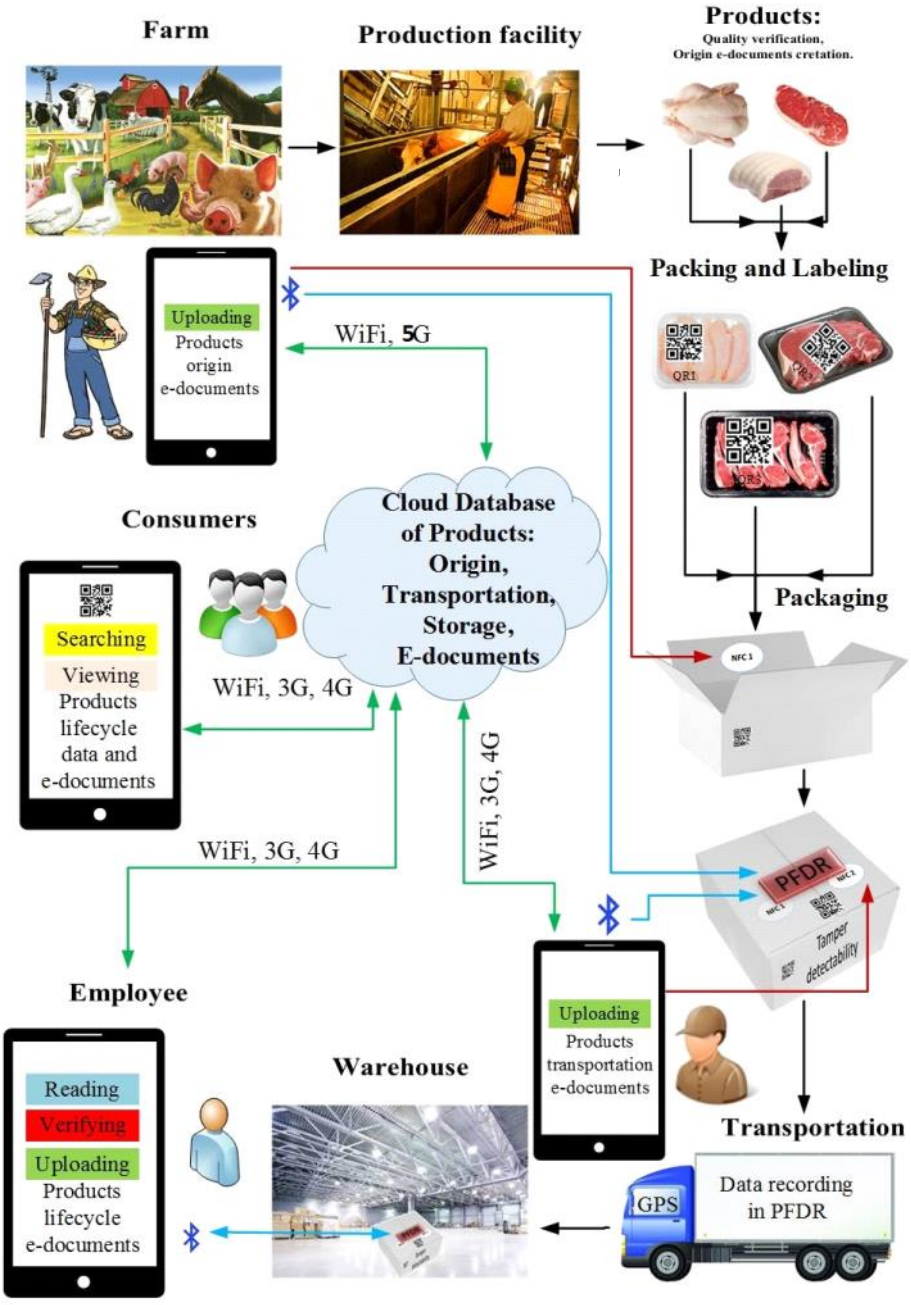


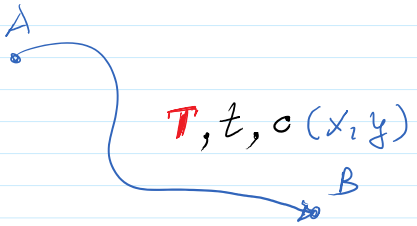
Total number of Bitcoins over time.

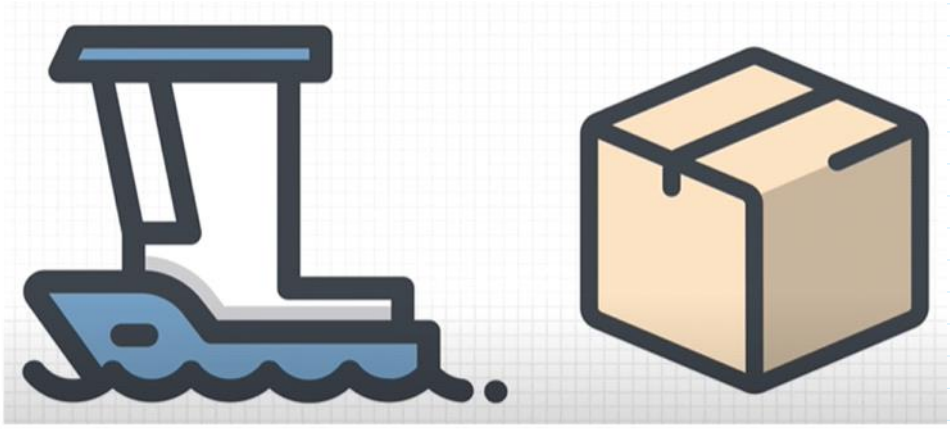


Fabric
↓
IBM Food Trust

Community
MIT







Containers: **IBM** and containers shipping giant **Maersk Group**.
Maersk Group is No 1 in the top 10 transport companies.

IBM Hyperledger
Fabric
Distributed Ledger
Technology
Permissioned Blockchain

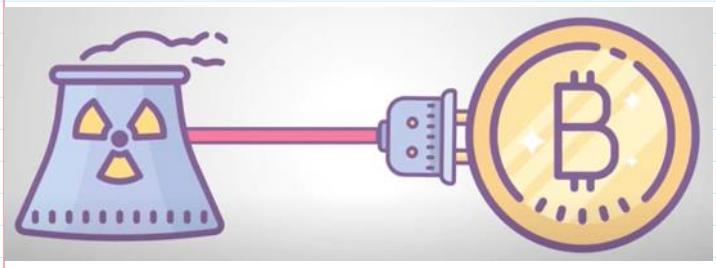
Food Trust.

Ethereum blockchain
Permissionless Permissioned

Open Ethereum

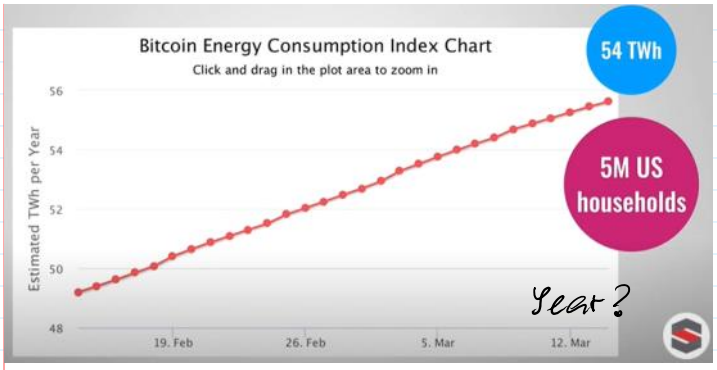
ICO - initial coin offer
STO - secure token offer
NFT - non-fungible token
offer

Federal Burou of Reserve
Fed



PoW - Proof of Work

1 BTC ~> 30 000 $
64 000 $



Electric energy consumption kWh

1 kWh ~ 0.193 Eur

54 TWh = $54 \cdot 10^9$ kWh

1 TWh = 10^{12} Wh

Application Specific Intrgrated Circuits - ASIC --> mining

Farm is using a huge el. (EP) power

[W] - watt

In 1 household EP ~ 5 kW

During 1 hour Energy = 5 kWh

↓

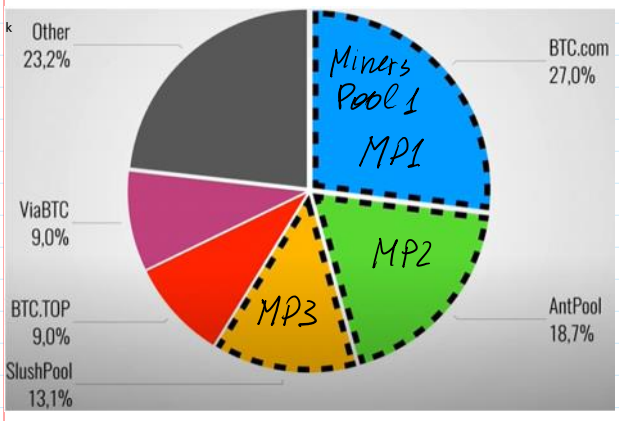
~ 1 Eur

To charge e-vechile 20 - 50 kW

Farm can consume ~ 500 kW - 1 MW

During 1 hour you'll consume Energy = 1 MWh = 1000 kWh

1000 kWh * 0,2 € = 2000 €

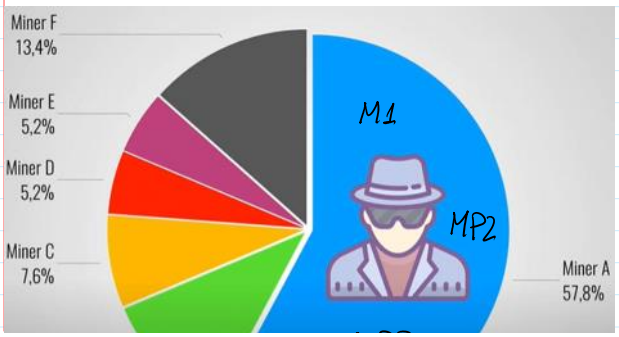


51% Attack

Computation power of mining is related to the speed of h-values computation V_h ~ THash/sec

E.g. V_h = 1000 THash/sec

Total network has V_h = 1900 TH/s



> 51% Network power

1000 TH/s is more then 51% 1900 TH/s

51% Attack

Forking

Ethereum 1 Eth ~ 2300 $

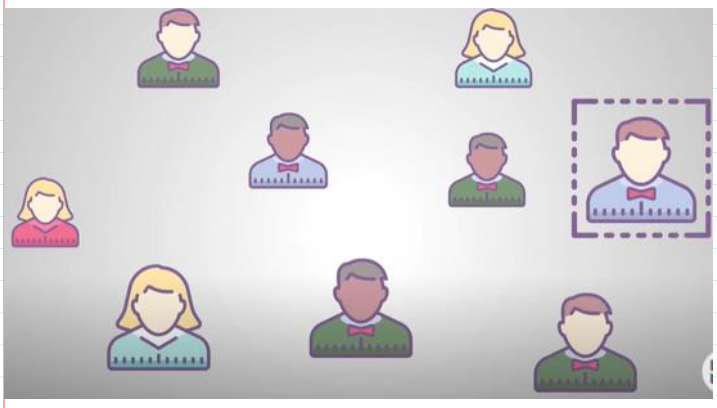
↓

The name of cryptocurrency in Ethereum blockchain is named as Ether – Eth

1) Cryptocurrency Ether penetration to busines
2) Potential investors attraction

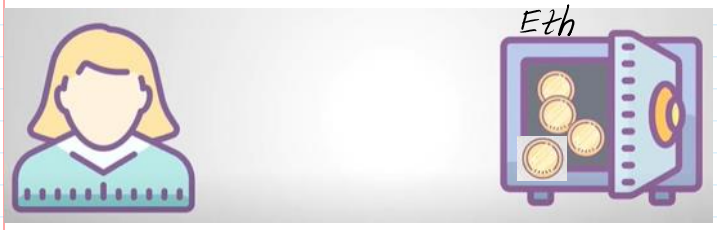
↓

Can buy Tokens related to Ether.



Vitalik Buterin

Eth → 32 Eth put into the „shell" to make a right to mine a block



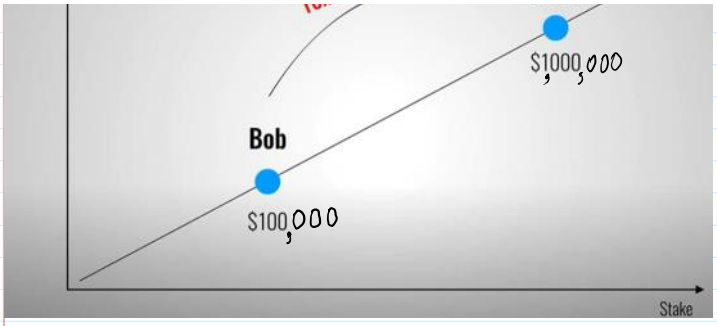
The difficulty of validat. is low →

→ the speed of validation is increased.

$1\ Wei = 10^{-18}\ Eth$

$1\ Eth = 1000000000000000000\ Wei$

To mine a block consisting of

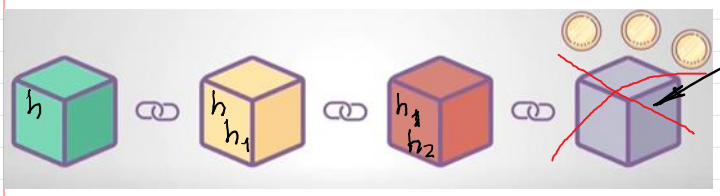


1 Eth = 1 000 000 000 000 000 000 Wei

To mine a block consisting of a lot of transactions →

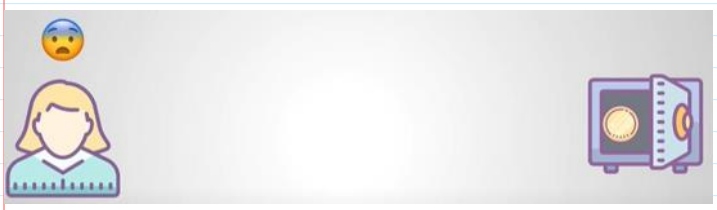
→ every transaction has declared a reward in Gas for its validat.

↳ Gas price : 1 Gas = 2000 Wei



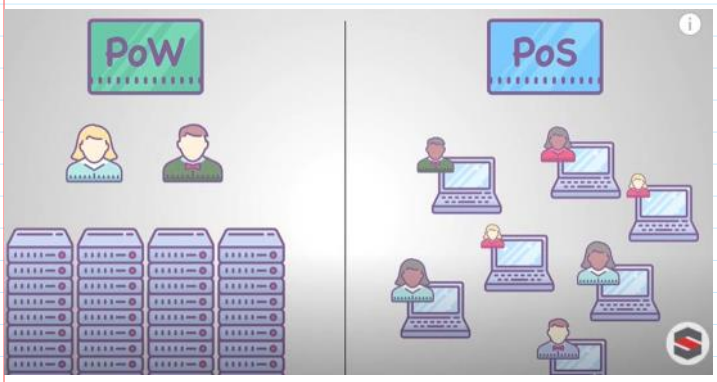
Mistaken validated block

Intentionally Non-Intentionally



To empty your deposit after some time.

TSMC



Ethereum 2.0

32 Eth ; 1 Eth ~ 140 $

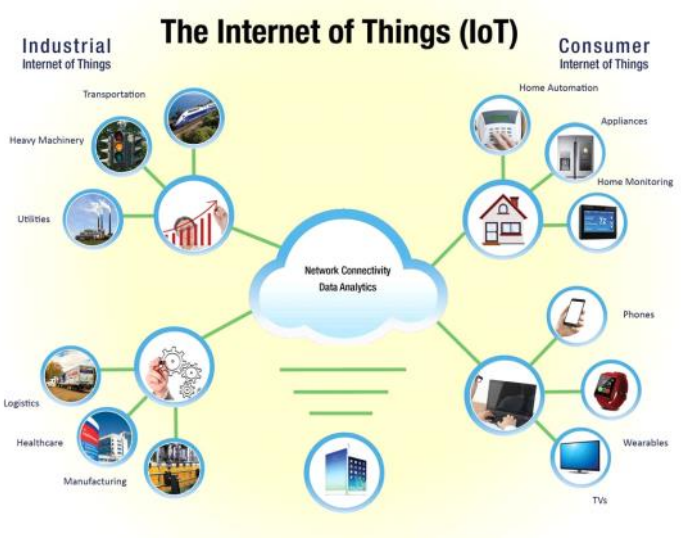
Ethereum, Libra, ... etc.

Fiat currency → crypto curr. →

→ Financial transact. →

→ Smart contracts

→ Investment mech. → tokens



< 1000 Tx/s

→ 15000 Tx/s

ECDSA 512 bits

G5 → G6

G0 → Generate PrK, PuK → Ethereum Account

Signature creation

Signature verification

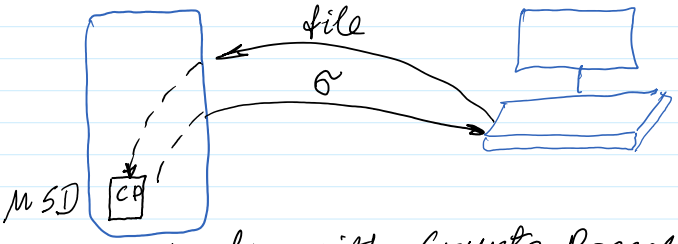
PrK generation:

1. Generate with independent software and together with PuK save it in separate token. Device for PrK generation must be disconnected from internet.

   1.1. Flash stick (Go Trust, Taiwan)

   1.2. In mobile phone:

2. Signing must be performed using separete token or mobile phone.



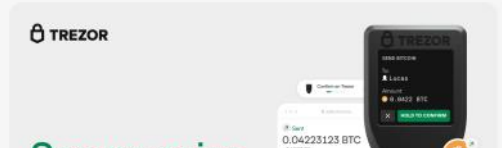
Flash stick with Crypto Processor: having PrK, PuK, cryptographic functions

1) $h = H(file)$

2) $Sign(PrK, h) = \sigma = (r, s)$

https://www.ledger.com

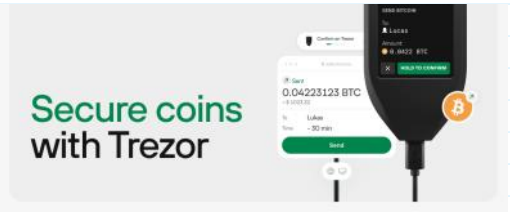
https://trezor.io



Trezor Hardware Wallet (Official) | Bitcoin & Crypto Security

The safest cold storage wallets for crypt security and

https://trezor.io



Book-keeping --> accounting --> balance --> state

Bookkeeping is the recording of financial transactions, and is part of the process of accounting in business.[1] Transactions include purchases, sales, receipts and payments by an individual person or an organization/corporation. There are several standard methods of bookkeeping, including the single-entry and double-entry bookkeeping systems.

From <https://en.wikipedia.org/wiki/Bookkeeping>
https://www.dreamstime.com/stock-image-d-life-cycle-accounting-process-illustration-circular-flow-chart-image30625511

Authorized capital
Credit
Fixed Assets
Costs
Incomes

Op.No.	Input	Output	RemainingAmount
1	123	0	123
2	5	11	117

Compare with UTxO system
https://medium.com/@olxc/ethereum-and-smart-contracts-basics-e5c84838b19

State 0

Authorized Capital	Credit	Fixed Asset				**Balance 0**
12 000	9 000	-12 000				**9 000**

State 1

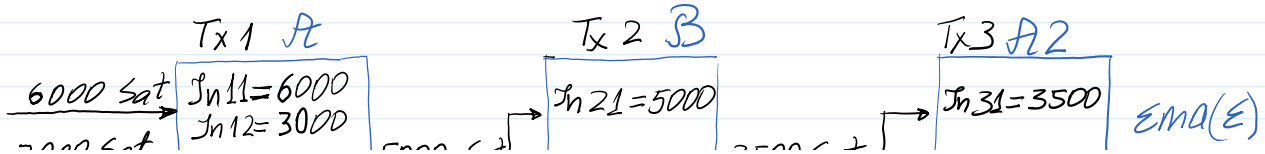
Authorized Capital	Credit		Electricity Cost 1	Mining 1	Percent for Credit	**Balance 1**
	9 000		-3 000	+31 000	-1 000	**36 000**

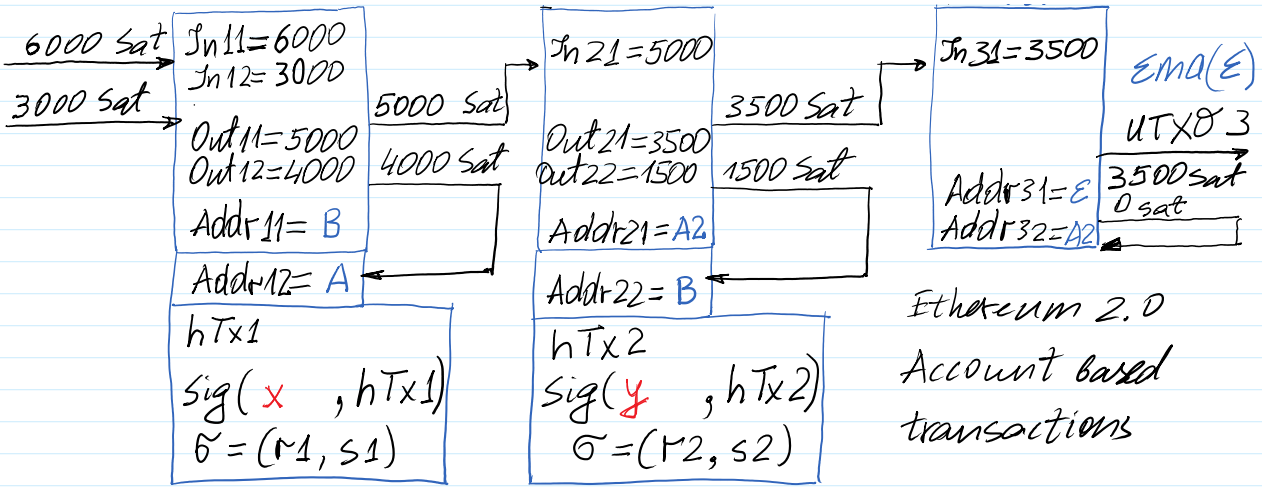
State 2

Authorized Capital	Credit		Electricity Cost 2	Mining 2	Percent for Credit	**Balance 2**
	8 000		-15 000	-	-1 000	**20 000**

Book-keeping --> Accounting --> Balance --> State

Block structure - Unspent Transactio Output (UTxO) model





$Tx1 = '1 : In11 = 6000 \,||\, In12 = 3000 \,||\, Out11 = 5000 \,||\, Out12 = 4000 \,||\, Rec1 = B \,||\, Rec2 = A'$

$Tx2 = '2 : In21 = 5000 \,||\, Out21 = 3500 \,||\, Out22 = 1500 \,||\, Rec1 = A2 \,||\, Rec2 = B'$

$Tx3 = '3 : In31 = 3500 \,||\, Out31 = 3500 \,||\, Out32 = 0 \,||\, Rec1 = E \,||\, Rec2 = A2'$

$h_1 = H(Tx1) = h28(Tx1)$

$h_2 = H(Tx2) = h28(Tx2)$

$h_3 = H(Tx3) = h28(Tx3)$