Proof of Stake 1

Murat Osmanoglu

Designing a Security Protocol

- Objective
- Resources
- Threat Model
- Algorithm
- Assumption

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  - to have a good threat model, think exactly what will happen when the algorithm are being executed in the real world (it should reflect the real-time scenario)

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  - Liveness : new transactions are added to the ledger at regular frequency. There is an upper bound at which the transactions send to the nodes will be included in the log.

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  - when a party sends a message, it will be going to reach to other parties

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    In PoW setting, the adversary is allowed to control the minority of the total hash power which is available to network

    In PoS setting, the adversary is allowed to control the minority of the total stake that is recorded in the ledger

Bitcoin

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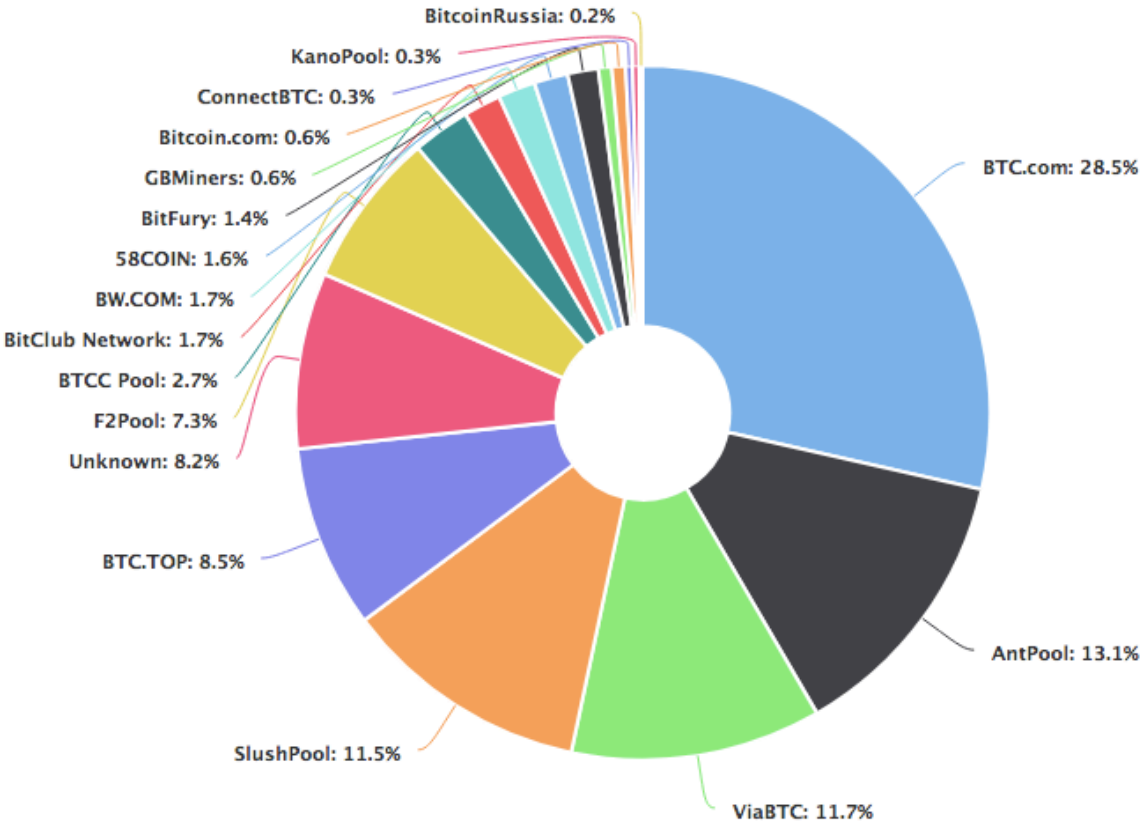
- the difficulty level of the puzzle is adjusted continually according to the current computation power of the network

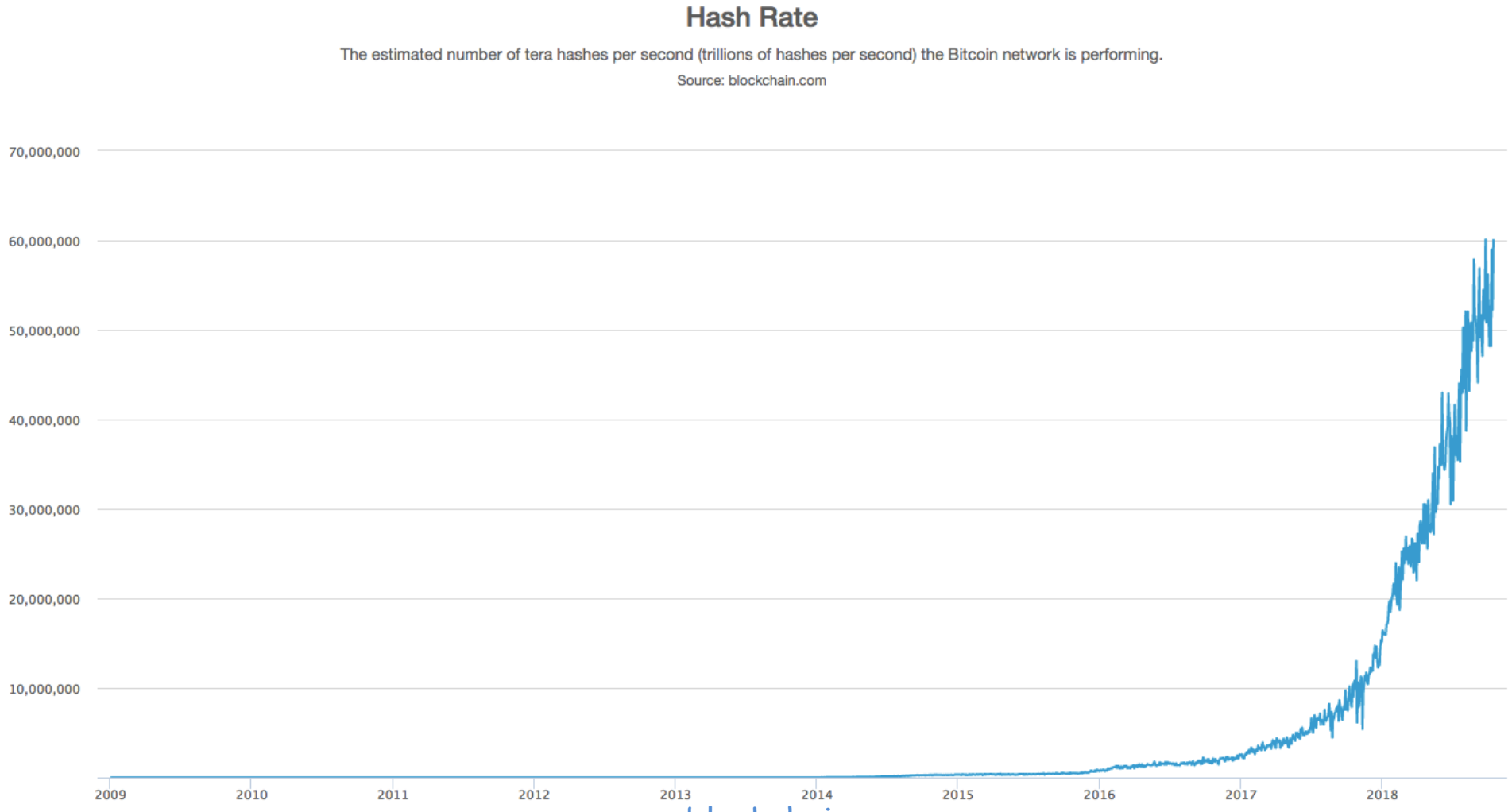
Disadvantages of Bitcoin



www.blockchain.com

Hashrate distribution
among the largest pools

Disadvantages of Bitcoin



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The estimated number of tera hashes per second
(trillions of hashes per second) the Bitcoin network is performing

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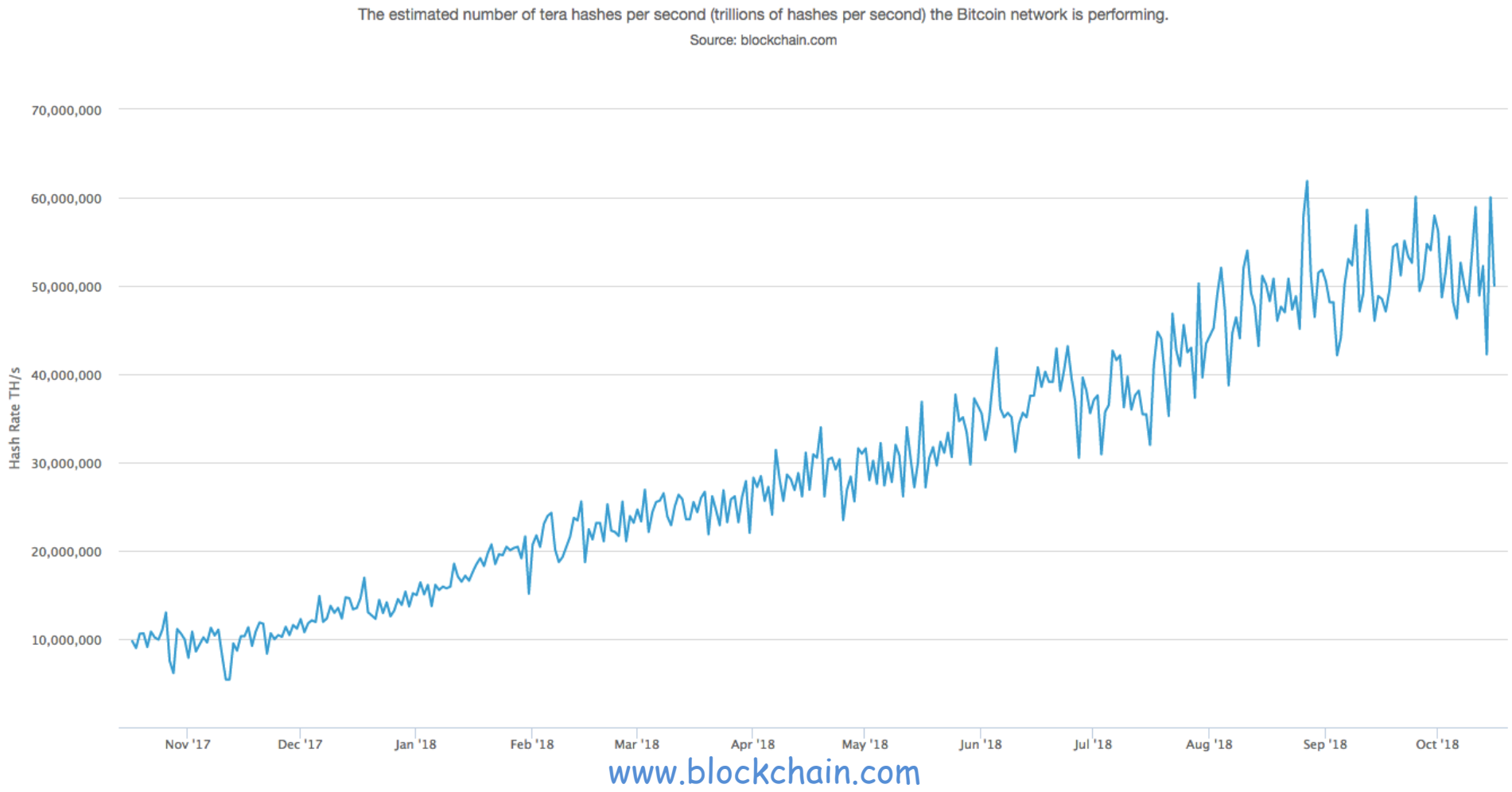

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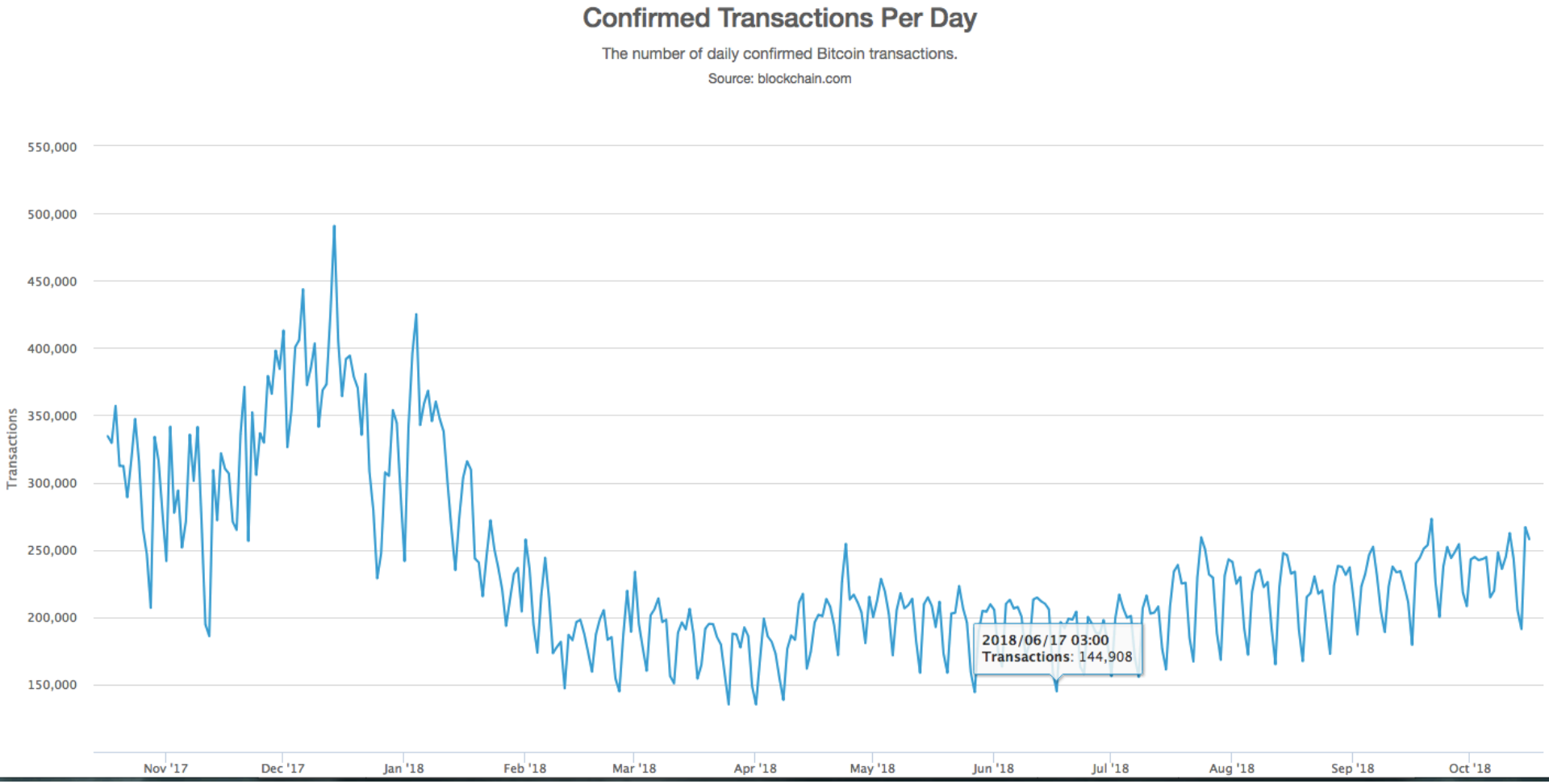

www.blockchain.com

Last recorded one (daily) : 266.308

≈ 1850 per block

Disadvantages of Bitcoin

- ≈ 1850 transactions per block
  ≈ 3 transactions per second
- 25 transactions per second for Ethereum
- 61 transactions per second for BitcoinCash
- 193 transactions per second for PayPal
- 1500 transactions per second for Ripple
- 1667 transactions per second for Visa

Disadvantages of Bitcoin

24.10.2017 – 16.10.2018

www.blockchain.com

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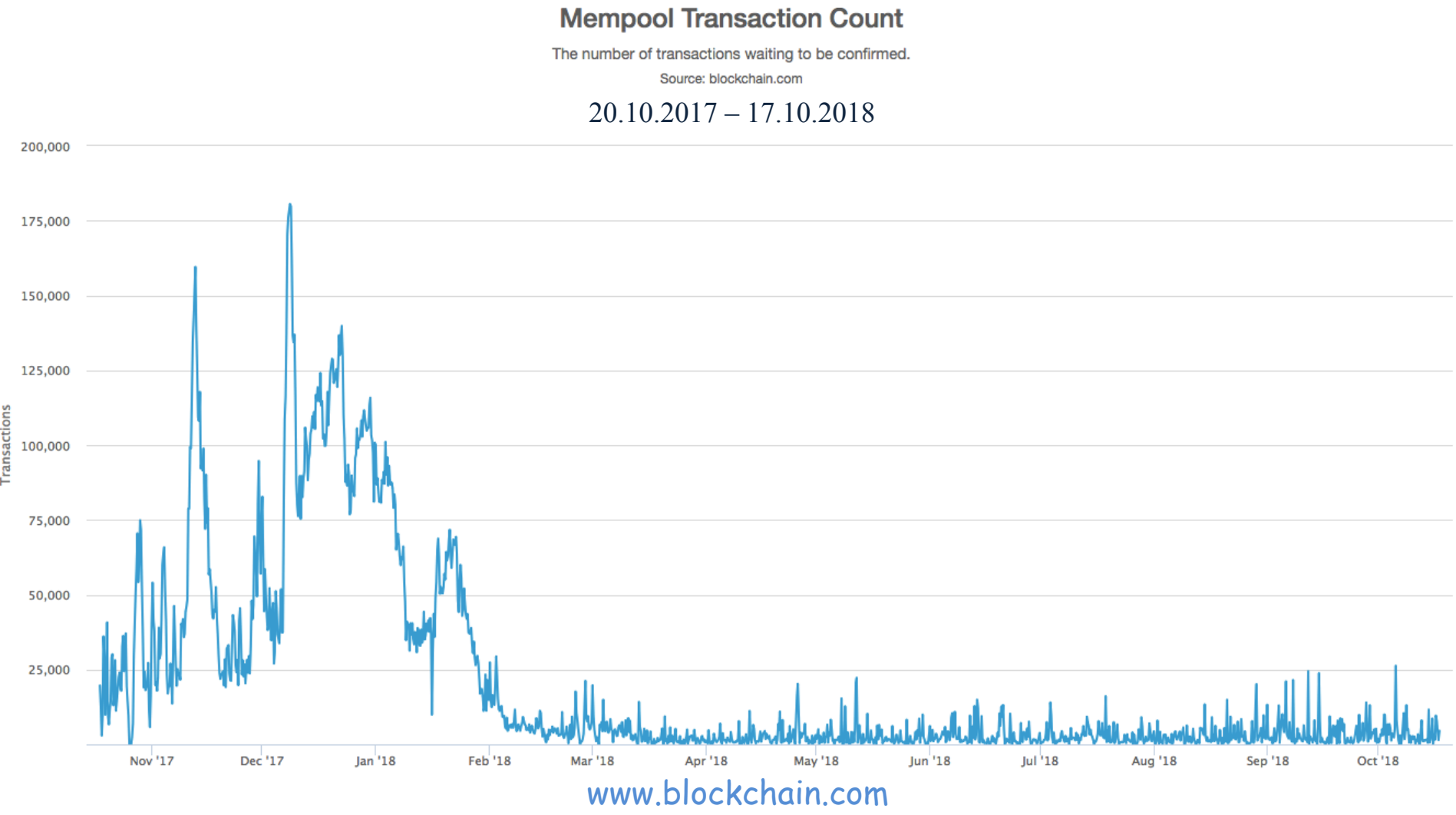

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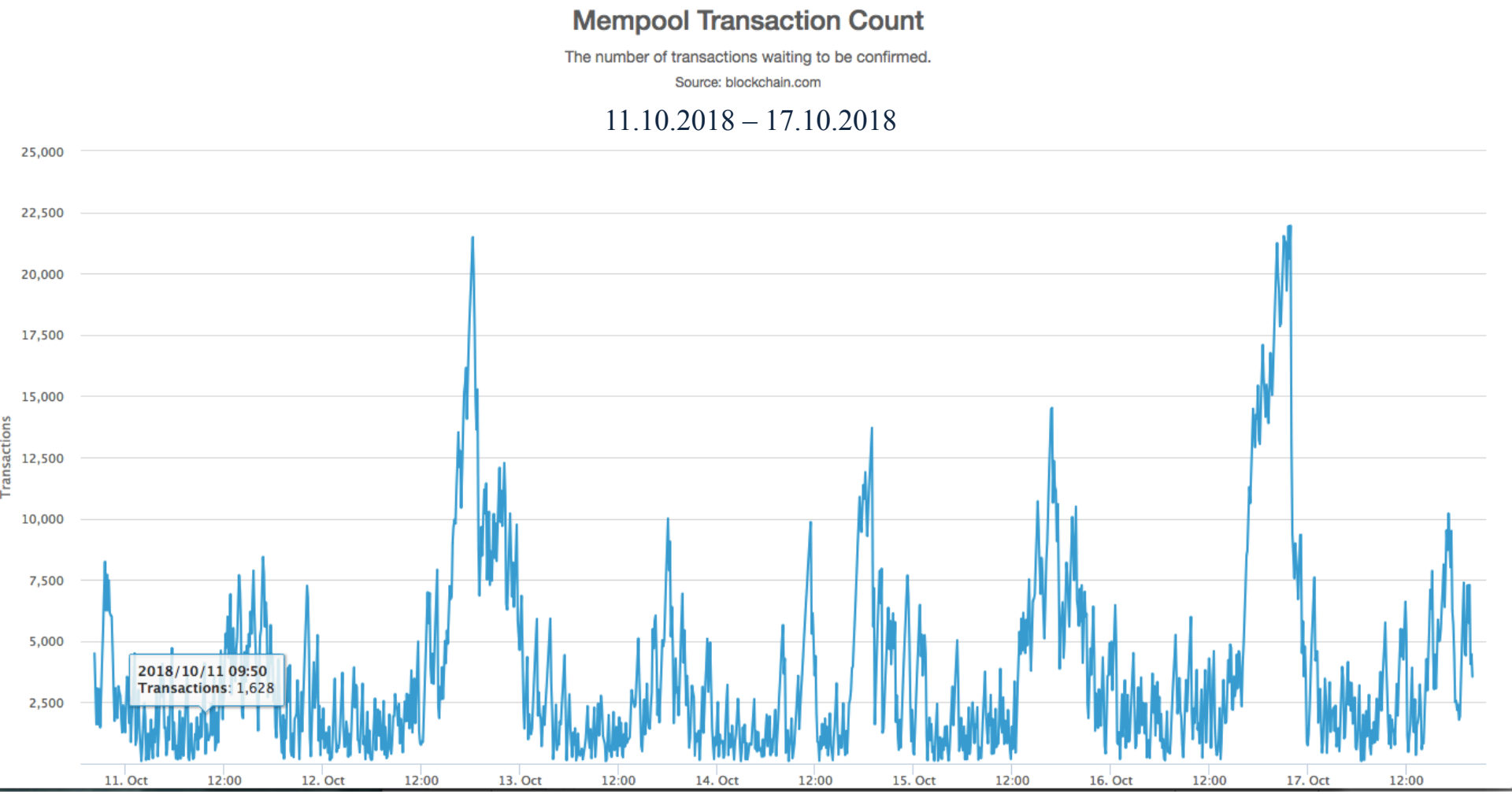

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  - random sampling by those trying to create the block

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Tendermint

peercoin

CARDANO

NXT

NeuCoin

Peercoin

PPCoin: Peer-to-Peer Crypto-Currency with Proof-of-Stake

Sunny King, Scott Nadal
(sunnyking9999@gmail.com, scott.nadal@gmail.com)

August 19th, 2012

Abstract

A peer-to-peer crypto-currency design derived from Satoshi Nakamoto's Bitcoin. Proof-of-stake replaces proof-of-work to provide most of the network security. Under this hybrid design proof-of-work mainly provides initial minting and is largely non-essential in the long run. Security level of the network is not dependent on energy consumption in the long term thus providing an energy-efficient and more cost-competitive peer-to-peer crypto-currency. Proof-of-stake is based on coin age and generated by each node via a hashing scheme bearing similarity to Bitcoin's but over limited search space. Block chain history and transaction settlement are further protected by a centrally broadcasted checkpoint mechanism.

Introduction

Since the creation of Bitcoin (Nakamoto 2008), proof-of-work has been the predominant design of peer-to-peer crypto currency. The concept of proof-of-work has been the backbone of minting and security model of Nakamoto's design.

Peercoin

" . . . the crypto-currency is dependent on energy consumption, thus introducing significant cost overhead in the operation of such networks, which is borne by users wia a combination of inflation and transaction fees. As the mint slows in Bitcoin network, eventually it could put pressure on raising transaction fees to sustain a preferred level of security."

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  They changed the rule with *PPCoin v0.3* as timeweight stops growing after 90 days