decentralized transactional data

NGI Forum

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transactional data
information that documents an exchange, agreement or transfer between parties

any agreement or exchange of commercial or legal significance

describing an event

time dimension/numerical value

related to personal data
decentralization
types

architectural

political

logical
reasons

fault tolerance

attack resistance

collusion resistance
blockchains

architecturally decentralized: no SPF

politically decentralized: no one controls them

logically centralized: state system behaves like single computers
measures
Public Blockchains have Subsystems
If an essential subsystem is centralized, the system is centralized.

- **Mining** (by reward)
- **Exchanges** (by volume)
- **Client** (by codebase)
- **Nodes** (by country)
- **Developers** (by commits)
- **Ownership** (by addresses)
Minimum number of entities in a given subsystem required to get to 51% of the total capacity

<table>
<thead>
<tr>
<th>Subsystem</th>
<th>Measure</th>
<th>Bitcoin (Gini)</th>
<th>Bitcoin (Nakamoto)</th>
<th>Ethereum (Gini)</th>
<th>Ethereum (Nakamoto)</th>
<th>Bitcoin (Data Source)</th>
<th>Ethereum (Data Source)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mining</td>
<td>Block reward</td>
<td>0.4</td>
<td>5</td>
<td>0.82</td>
<td>3</td>
<td>blockchain.info/pools</td>
<td>etherscan.io/stat/miner?range=1&amp;blocktype=</td>
</tr>
<tr>
<td>Client</td>
<td>Unique codebases</td>
<td>0.915</td>
<td>1</td>
<td>0.92</td>
<td>1</td>
<td>bitnodes.21.co/api/#list-nodes</td>
<td>ethernodes.org/network/1/nodes</td>
</tr>
<tr>
<td>Developer</td>
<td>Commits to main client</td>
<td>0.79</td>
<td>5</td>
<td>0.91</td>
<td>2</td>
<td>github.com/bitcoin/bitcoin</td>
<td>github.com/ethereum/go-ethereum</td>
</tr>
<tr>
<td>Exchange</td>
<td>24 hour volume</td>
<td>0.83</td>
<td>5</td>
<td>0.85</td>
<td>5</td>
<td>coinmarketcap.com/currencies/bitcoin/#markets</td>
<td>coinmarketcap.com/currencies/ethereum/#markets</td>
</tr>
<tr>
<td>Node</td>
<td>Distribution across countries</td>
<td>0.84</td>
<td>3</td>
<td>0.85</td>
<td>4</td>
<td>bitnodes.21.co/api/#list-nodes</td>
<td>ethernodes.org/network/1/nodes</td>
</tr>
<tr>
<td>Owner</td>
<td>Distribution across addresses with &gt;$500k [Jul 2017]</td>
<td>0.65</td>
<td>456</td>
<td>0.76</td>
<td>72</td>
<td>bitinfocharts.com/top-100-richest-bitcoin-accounts</td>
<td>etherscan.io/accounts</td>
</tr>
</tbody>
</table>

Maximum Gini / Min Nakamoto

|                          |                                           | 0.915          | 1                  | 0.92            | 1                   |                                           |                                           |

Ministerstwo Cyfryzacji
governance
the more decentralized, the harder to govern

efficiency vs. fairness

data privacy
where we are?
risk management
research projects
regtech