

A SYSTEMATIC REVIEW ON ONLINE *bitcoin* VISUALIZATIONS



Natkamon Tovanich^{1,2,3}, Nicolas Heulot¹, Jean-Daniel Fekete², and Petra Isenberg²

¹ IRT SystemX, ² AVIZ Research Team, Inria, ³ Université Paris-Saclay, France

Coding tables & screenshots
of tools: <https://osf.io/w5b3p/>


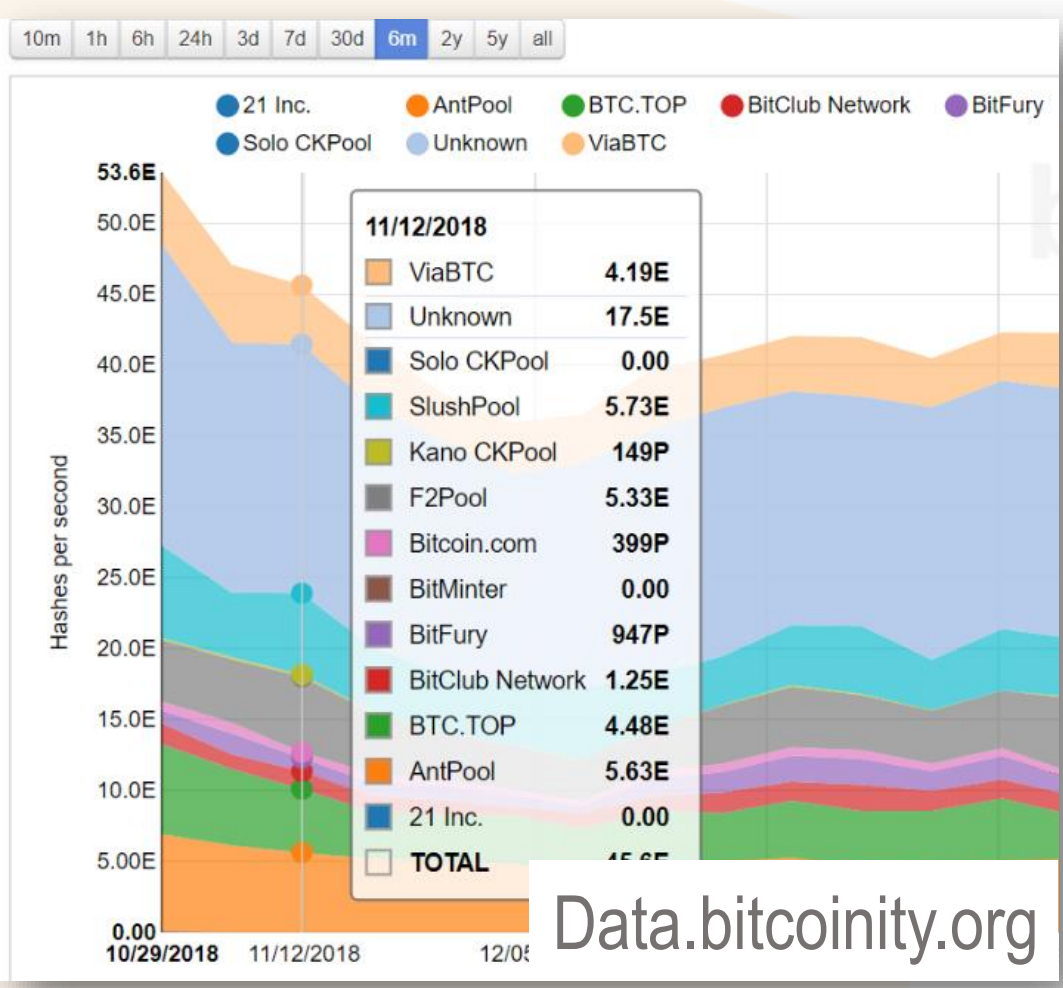
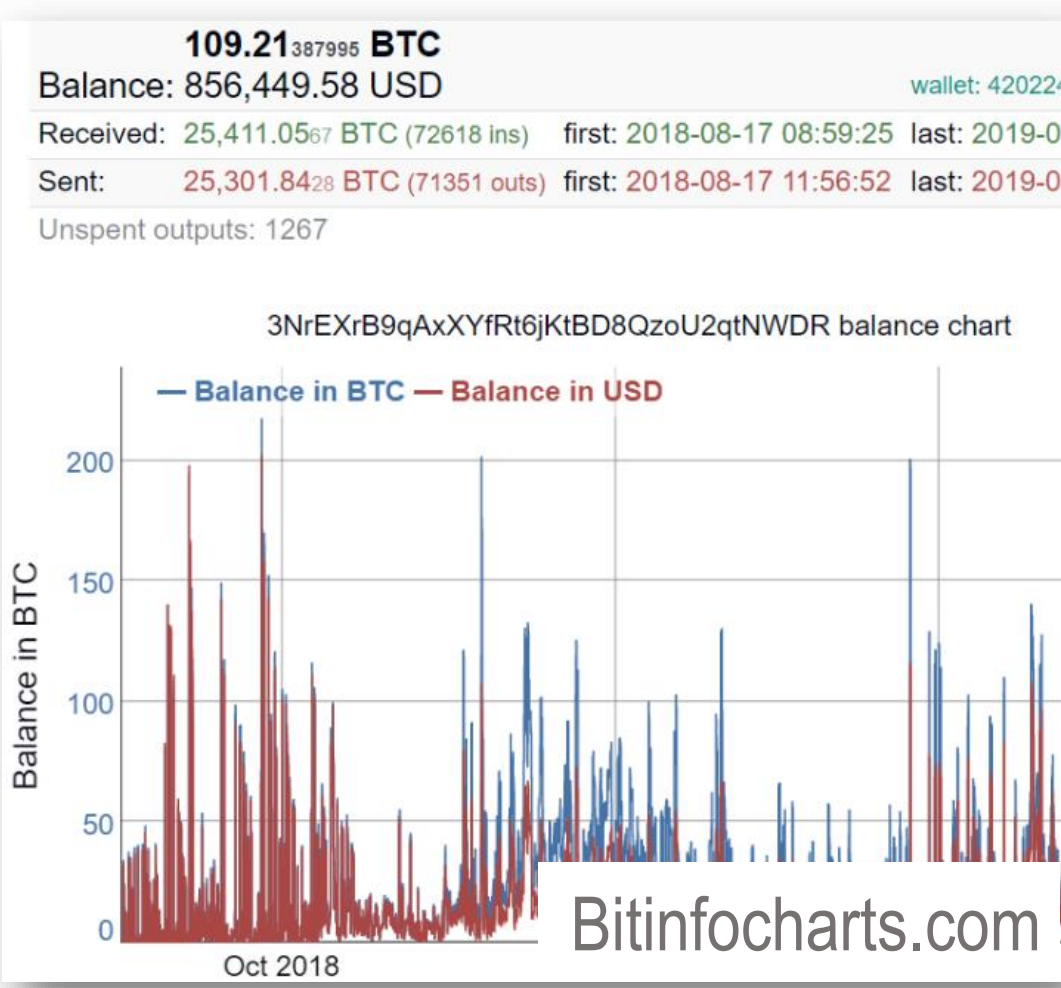
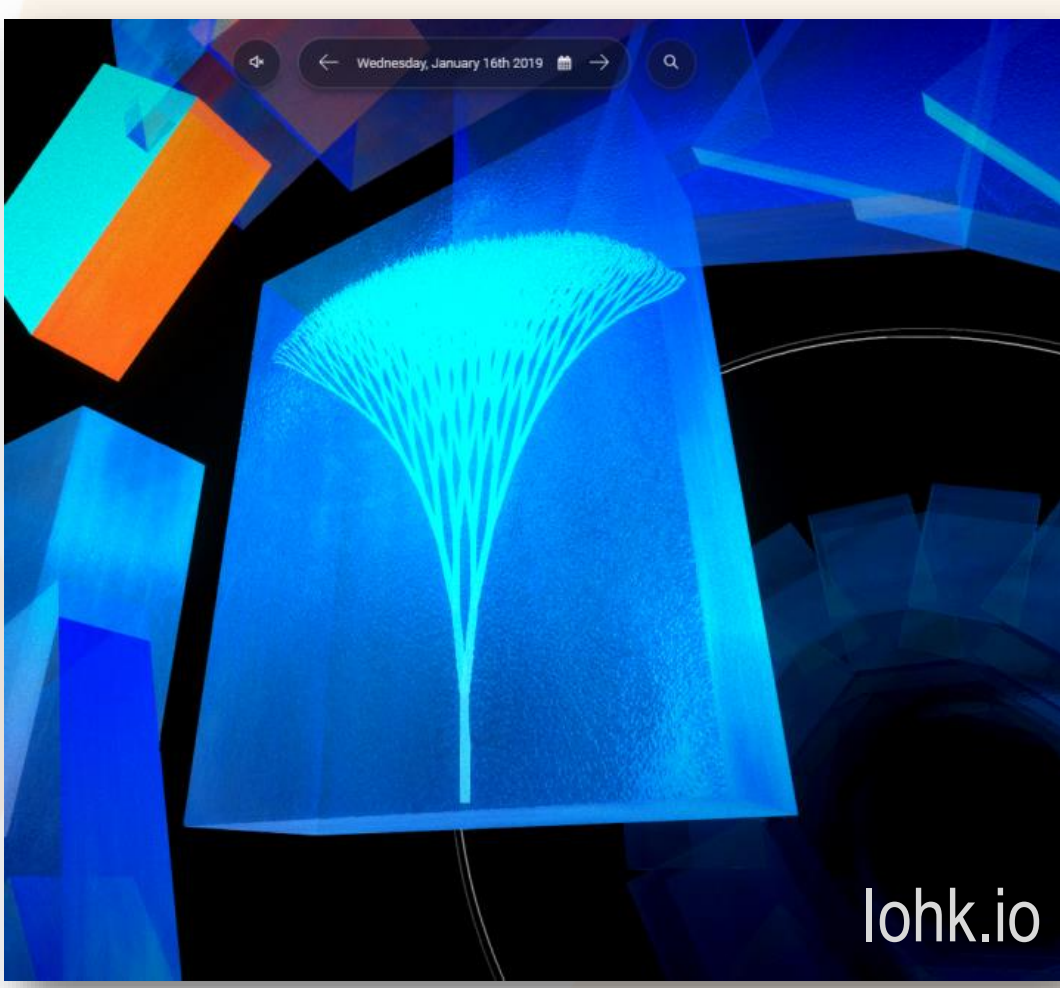
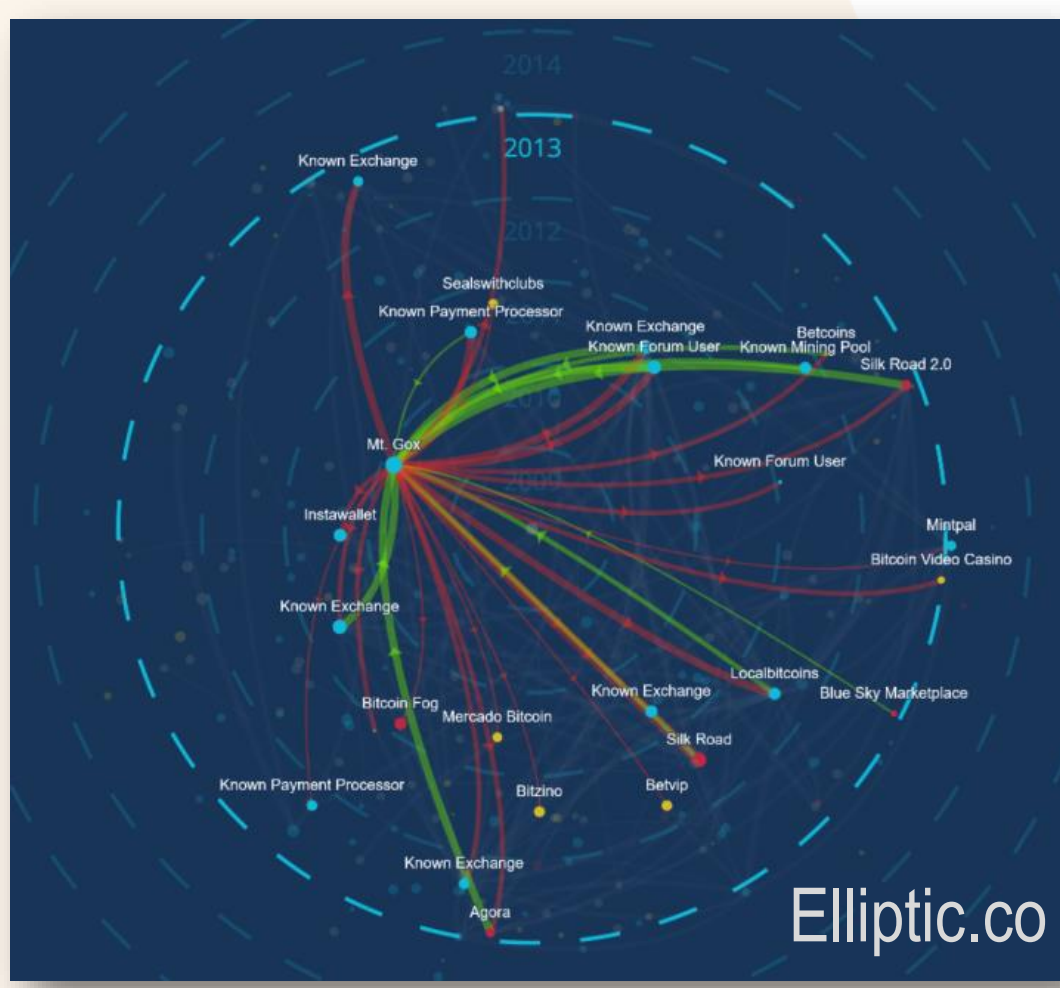
WHAT IS BITCOIN?

- Bitcoin is a **cryptocurrency** that allows users to exchange digital currency without centralized control.
- Transactions are permanently stored in a public dataset called the **blockchain**.
- Bitcoin **miners** verify transactions, group them, and append new blocks to the end of the blockchain.

SYSTEMATIC REVIEW

- **Keywords:** *Bitcoin* x {*analysis, analytics, visualization, visual analytics, dashboard, graph, chart*}
- **Data collection:** We used Google Search to retrieve the first 100 results for each keyword.
- **Result:** 46 online Bitcoin visualizations, categorized based on *analysis tasks* and *visual representations*.

ONLINE BITCOIN VISUALIZATIONS

Cryptocurrency Exchange	P2P Network Activity	Financial Transaction	Enjoyment / Casual Use	Transaction Network
				
Bitcoin exchange rate in USD	Hash rate of mining pools	Bitcoin balance of an address	Symphony of Blockchain	Network of Bitcoin entities
Total: 17 tools	Total: 14 tools	Total: 13 tools	Total: 9 tools	Total: 4 tools
Basic charts7	Basic charts8	Basic charts3	Basic charts0	Basic charts0
Time series17	Time series11	Time series5	Time series0	Time series0
Node-link diagram0	Node-link diagram0	Node-link diagram2	Node-link diagram0	Node-link diagram4
Map1	Map4	Map0	Map0	Map0
Others*3	Others0	Others**11	Others***9	Others0

* Spider chart, tree map and Sankey diagram. ** 9 of them show transaction details in the form of text tables. *** representation of Bitcoin data as 2D and 3D objects.

Definitions of Analysis Tasks

- **Cryptocurrency exchange:** analyze market statistics, such as exchange rate, volume, and market capitalization.
- **P2P network activity:** gain an overview of activities in the peer-to-peer network such as mining and transaction rate.
- **Financial transaction:** see details and basic statistics of individual transactions, blocks, and Bitcoin users.
- **Enjoyment/casual uses:** attract public attention to Bitcoin.
- **Transaction network:** understand connections between addresses via transactions.

DISCUSSION

- The online tools we saw are meant to show an overview of Bitcoin data or attract public attention.
- Time series are the most common visualization type, mostly used to present aggregated statistics.
- We still miss visual analytics tools for experts to explore Bitcoin data based on entities (people, enterprises), historic events (halving days, attacks), or group activities (such as miners).