Neo cryptocurrency by Onyishi Odinaka Vitus

Interesting, NEO is a blockchain “platform” that rents out its underlying tech stack, enabling the development of digital assets and smart contracts on top of its own infrastructure. Generally speaking, NEO’s value proposition is similar to that of Ethereum’s. While the latter markets itself as a more abstract tool with which to build arbitrarily complex decentralized applications (“apps”), the former is more focused on digital asset recordkeeping with e-contracts, including for currently “fiat” or “real-world” assets.
Why NEO: However, according to its whitepaper, NEO offers a “decentralized and distributed ledger protocol that digitalizes real-world assets into digital ones, enabling registration, depository, transfer, trading, clearing and settlement via a peer-to-peer network.” Relative to Ethereum, the NEO platform is in even earlier innings of development, but there appears to be sizeable support from its community. Further, the platform has gained a noteworthy following in certain regions in Asia, and has been labeled as “China’s Ethereum”.

The principle of neo cryptocurrency

However, in its current state, the NEO blockchain appends a new block every 15-20 seconds, with demonstrated transaction throughput of ~1,000 transactions per second (“tips”) and a theoretical transaction throughput of 7,500-10,000 tsp (per their Reddit AMA and other sources). 1,000 tips put NEO among the fastest across its peer group and an optimized 10,000 tsp makes a case to support commercial applications of scale, pitting it against incumbent centralized solutions. These throughput levels substantially dwarf Ethereum’s current ~15 tps (~30 tps theoretical), though Ethereum’s near-term pipeline of scaling solutions (which we plan to cover ina future blog post) should bridge a meaningful portion of this current gap. The relative efficiency of NEO’s blockchain is further detailed in several points below (e.g. consensus mechanism, Virtual Machine build).

Consensus MechanismIn addition, NEO utilizes a Delegated Byzantine Fault Tolerance (“dBFT”) consensus mechanism, which is a large driver of its elevated network throughput. dBFT is closer to a Proof of Stake (“PoS”) system than a Proof of Work (“PoW”) system and shares several of its benefits. While a detailed discussion of PoS vs. PoW is beyond the scope of this article, PoS has several advantages over PoW (e.g. electricity/hardware scalability, faster/greater transaction finality and higher network throughput, etc.). However, PoS involves numerous validators perpetually connected to the internet staking coins, increasing the attack surface for potential hacks. Additionally, like PoW, PoS is still prone to forks if consensus were to break. While in reality, most blockchains (PoW and PoS) fork fairly frequently before

converging back to a single chain shortly thereafter (i.e. uncle and orphan blocks), this poses a conflict for NEO's vision of widespread digitization of real-world assets. A blockchain securing traditionally fiat securities cannot afford to diverge into two versions and wait out inconsistencies until one is declared a winner (i.e. delayed finality on a regular basis).

Lastly, while an order of magnitude more scalable than PoW systems, current PoS research has only demonstrated network throughput in the several hundreds of tps (compared to Visa's 50,000+ tps capacity). Taking a step back, "Byzantine Fault Tolerance" is a classic computer science problem that is especially fundamental to any distributed system. In essence, it poses the question: How does a system of anonymous, distributed actors who receive data at different times and in a different order, converge to consensus? A system that addresses this issue can guarantee that digital assets are moved in the correct order and recognized consistently by every node in the system. In the NEO network, there are several types of actors, spanning several distinct categories: 1) Ordinary Nodes – function as both as a client interface and server; store complete historical data as well as detect and relay transactions, but do not participate in block validation 2) Bookkeeping Nodes – trusted nodes that must reach consensus to confirm every block; receive GAS transaction fees for validating blocks 3) Users – clients via web browser or dApps, who not required to download the blockchain's complete history. In NEO's dBFT construct, the network enables large-scale participation in consensus through proxy voting.

This process is simplified as follows:

1) Ordinary nodes vote for a bookkeeping node (a delegate) it supports a. Note that there are certain requirements (e.g. minimum RAM/internet speed, the minimum stake of ~1,000 GAS) that must be met in order to be granted bookkeeping responsibilities b. Bookkeeping nodes can redeem their staked GAS at any time, but lose status as a bookkeeper upon withdrawal c. Bookkeeping nodes are not anonymous as they are required to get consensus authority certificates, potentially even revealing their real-world names

2) The selected group of bookkeepers, through a BFT algorithm, reach consensus and generate new blocks a. A bookkeeping node (randomly assigned from the pool of bookkeepers) broadcasts its version of the blockchain to the networks. If 2/3 of the other bookkeeping nodes agree with the information, the consensus is achieved i. If less than 2/3 of these bookkeeping nodes approve this, a different bookkeeping node is appointed to broadcast its blockchain version, with this cycle repeating until 2/3 consensus is achieved 3) Voting in NEO continues in real time, rather than in accordance with a fixed term (e.g. Ethereum's CASPER PoS system has a "bonding period", which appears to have a minimum of several months)

Advantages and summary

Compared to Ethereum, NEO is in the early stages of its development and is therefore significantly behind on developer adoption, public mindshare, “battle tests” (practical load/exceptions testing), and overall network effects. However, NEO’s ecosystem could be positioned to grow as a result of:High levels of network throughput as a result of innovations such as its dBFT consensus mechanism and JIT-VM Relative resistance against hard forks Development environment compatibility with existing infrastructure and solutions Significant support and focus on Asian / Chinese markets Potential pipeline of storied ICOs launching on its platform.