



Blockchain Performance Study: Ethereum Vs. Ubiq



Partner with



Ubiq (UBQ) is an early Ethereum fork, winner of 2017's Blockchain Company of the Year by the Digital Finance Institute, and currently ranked at 193 on Coin Market Cap. The Ubiq platform was developed in order to address what the core team identified as essential shortcomings of the Ethereum platform. Specifically, these shortcomings were cited as inconsistencies in block time resulting from its difficulty algorithm. **Ubiq engaged Whiteblock's BTaaS (Blockchain Testing-as-a-Service) team** to test their platform and benchmark their custom difficulty algorithm against Ethereum's.

“We’re really happy with the test results. We now know our scalability changes will work in practice and not just in theory. **These results are going to shape our future development efforts** and make it easier to demonstrate these changes to the community.”

Alex Sterk, CEO of Ubiq Technologies.

The key difference between Ubiq and Ethereum is the implementation of Flux, Ubiq's custom difficulty algorithm. Flux enforces an 88-second block time which is considerably longer than Ethereum's 12-17 second block time.

Block Time	
 ETHEREUM	 UBIQ
12-17 sec	88 sec

Since their launch, Ubiq's difficulty algorithm has undergone several changes. Flux refers to the current iteration and the development team wanted to benchmark its performance and validate further improvement proposals, such as increasing the default gas limit to 30 million. Before proposing these changes to the community **they needed to prove their hypothesis and test these potential implementations** to ensure they wouldn't negatively impact performance.



At A Glance



Context: Ubiq targets 88 second block time versus Ethereum's 12 - 17 in the hopes of achieving greater stability without sacrificing overall transactional throughput.



Hypothesis: A higher block time like that of Ubiq's would result in a far lower uncle rate without transactional throughput, even with block gas limits far exceeding default values



Problem: Ubiq's objective performance, can't be practically or objectively determined due to the difference in size and capacity of the Ubiq network versus that of Ethereum



Goal: Validate Ubiq's hypothesis with a series of performance tests that are conducted using the Whiteblock platform

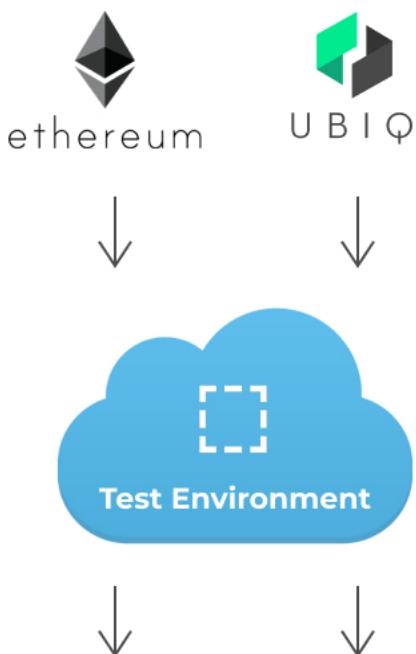
To quickly run their test series and accelerate their time to market, Ubiq engaged Whiteblock's Blockchain Testing-as-a-Service (BTaaS) offering to drive insight into how the Ubiq network performs under a variety of scenarios. Using the Whiteblock testing framework, the Btaas team helped validate the performance of Ubiq's custom difficulty algorithm and other key performance metrics.

The subject of block time, especially within the Ethereum network, is highly

debated. Put simply, block time refers to the amount of time it takes for the network to add the next block to the chain. **Block times are different for every blockchain and are usually enforced by a difficulty algorithm which dictates how easy or hard it is to mine a block.** Some argue that shorter block times can result in higher levels of transactional throughput while others claim that longer block times help reduce uncle rate and consecutively increases transactional throughput.



The Whiteblock team used their testing platform to provision a test network consisting of **30 nodes**, each with a starting wallet balance of **100 UBQ tokens**.



TEST ENVIRONMENT

30 Nodes

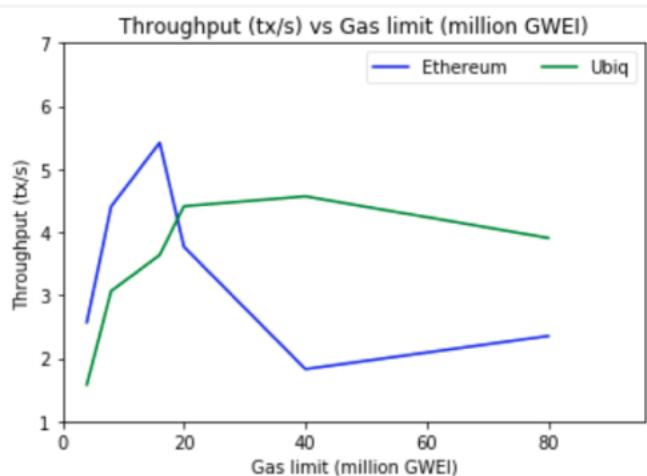
(10 Transaction, 20 Miners)

100 UBQ Tokens

Metrics:

- Total transactions
- Mining difficulty
- Block time
- Gas consumption
- Block gas limits.

*Tests performed for Ubiq and Ethereum under identical conditions



20 of those nodes were configured to mine blocks and the other **10** continually sent transactions. Each test series enforced a different gas limit, starting at 4 million and incrementally increasing up to 80 million, while tracking four primary metrics: *total transactions, mining difficulty, block time, and gas consumption*. The resulting data was plotted to observe the correlations between each metric. **In order to benchmark Ubiq's performance, an identical Ethereum test network was deployed with the same tests run in parallel.**

Although the relationship between gas limit and transactional throughput is not a linear one, a positive trend was observed. The higher gas limits allowed more transactions to fit within a single block, but resulted in an increased block time. In the case of Ubiq, throughput continued to increase up to the 40 million gas limit and began to drop at 80 million. Notably, even though transactional throughput began to decline at the 80 million gas limit, **the uncle rate of the network never rose to significant levels but remained significantly lower than that of Ethereum.**

At the 80 million gas limit, Ubiq presented an average uncle rate of 2.7% – quite low in comparison to Ethereum's 27.6%. The Whiteblock team determined that if the Ubiq network decided to increase its default block gas limit to 40 million, it should be safe to do so without negatively impacting its transactional throughput. This was good news for the Ubiq team, however, more granular network tests indicated their difficulty algorithm was less stable than Ethereum's under the presence of high degrees of network latency, an issue the development team will address in the next version of their client.

Takeaways:

With increased gas limits (20M <), Ubiq network demonstrates higher transactional throughput

The Flux difficulty algorithm provides more stability than that of Ethereum

The Ubiq network bottleneck is unable to tolerate higher degrees of network latency, a previously unknown issue that was brought to light through this testing series

Overall Results:

With block gas limits set at 40 million, Ubiq's transactional throughput was around 2 times higher than Ethereum's. At an 80 million gas limit, Ubiq's uncle rate was also 90% lower than that of Ethereum's. The lower uncle rate also implies more robust security under these conditions since more of the network's computing power is being put to use mining new transactions, which also allows for higher transactional throughput.

Test Driven Insights

2X (tx/s)

Ubiq's transaction throughput per second was 2x that of Ethereum's at 40 million block gas limit

90% More Secure

Ubiq's uncle rate is 90% lower than that of Ethereum's at 80 million block gas limit



The results of Whiteblock's testing efforts validated the Ubiq team's hypothesis and provided an educated framework to drive action for their future development efforts.

Ubiq measures its own success based on the value their blockchain provides its users. **Ubiq trusted the Whiteblock testing methodology to objectively evaluate performance and drive actionable insight** to shape their future development efforts. For blockchain and distributed ledger technologies, the Whiteblock testing platform can quickly and easily simulate the strengths and weaknesses of a real-world network, an immensely valuable tool for development teams and users.

Existing blockchain networks are far from perfect. In a market dominated by marketing lingo and flashy white papers, there is a need for performance testing to ensure that blockchain technology differentiates itself as real-world solution.

The Need for Testing

As the world focuses on evaluating the long-term feasibility of blockchain solutions, it's apparent that certain scalability issues are preventing mainstream adoption. For example, **the CryptoKitties incident of 2017** brought these issues to light when the Ethereum network saw a massive increase in users and transactions. This spike of activity resulted from the growing popularity of a decentralized application that allows users to collect and breed virtual pets on the Ethereum blockchain. The goal of CryptoKitties was to provide a unique and fun way to introduce new users to blockchain, which **they succeeded in, however, no one was prepared for its popularity as these digital kittens overwhelmed the network.**

A situation like this could have been anticipated before it happened and even avoided had the blockchain developers run an adequate series of pre-deployment tests to help them predict performance under periods of high stress.

Inefficiencies of the blockchain

Cryptokitties incident- December 5th, 2017

6X increase

in pending transactions
on Ethereum network.

CryptoKitties
accounted for

20% of ETH transactions



Network congestion leads to increased processing fees "Due to network congestion, we are increasing the birthing fee from 0.001 ETH to 0.002 ETH. This will ensure your kittens are born on time!"

Learn more

www.whiteblock.io

Whiteblock is a Los Angeles based blockchain testing company. Learn more about how Whiteblock can help you develop a high performing blockchain system or decentralized application.