How the Lightning Network Makes Bitcoin Payments Cheaper and Faster

Original: https://www.btcc.com/en-US/academy/research-analysis/how-the-lightning-network-makes-bitcoin-payments-cheaper-and-faster

Lightning Network that supports small and instant bitcoin payments are becoming bigger and more useful.

In the fall of 2008, the white paper "Bitcoin: A Peer-to-Peer Electronic Cash System," written by Satoshi Nakamoto, was circulated on a cryptography mailing list. As the title suggests, it proposed a protocol for creating an electronic cash system without the need for intermediaries or trust. A few months later, in January 2009, the first Bitcoin block was mined.

There was no block size limit on the Bitcoin network in the very beginning. To prevent network spamming and the blockchain size increasing exponentially, a block size limit of 1MB was introduced. The Bitcoin Network has maintained its small block size and long blocktime to keep the network decentralized through tumultuous times with considerable disagreements.

The Limited Throughput Capacity of the Bitcoin Blockchain Makes Small Payments Costly

The Bitcoin Network's decentralized and secure design, with a small block-size and relatively long blocktime, does not come without drawbacks. The transaction capacity of the Bitcoin blockchain is far too low for using bitcoin payments on a large scale. The Bitcoin blockchain's practical throughput is seven transactions a second on average. In comparison, the Visa payment network processed 5,200 transactions on average per second in 2021.

Also, payment confirmation on the Bitcoin Network takes time. A new block is mined, on average, every 10 minutes, and it's standard to require a transaction to be included in several mined blocks for a transaction to be considered confirmed.

The limited space on the blockchain means that transactions compete to be included in a block. Miners will want to maximize their income and pick the transactions that give them the highest fees. With the current demand for transactions, transaction fees become disproportionally high for smaller payments.

The Lightning Network Supports a Large Number of Small And Instant Bitcoin Payments

The Lightning Network solves the limited throughput capacity of bitcoin payments on the Bitcoin blockchain and dramatically decreases the transaction fees on smaller payments. Utilizing the Lightning Network, millions of people can send fractions of a bitcoin at instant speed – at the same time.

The Lightning Network is a network of payment channels; each channel is opened with one transaction on the Bitcoin blockchain. Once a channel is opened, the two counterparties in a channel can sign updated bitcoin transactions redistributing the value of the opening blockchain transaction.

The beauty of the Lightning Network is that these updated bitcoin transactions don’t have to be broadcasted to the blockchain and hence do not take blockspace or require miner fees. But the updated transactions still have value because they could be broadcasted to the Bitcoin blockchain as a valid Bitcoin transaction.

The network component enters through how payments are relayed between people not having a direct connection through a payment channel. As long as you are connected to a person who is connected to the recipient (you can add more jumps here), your payment can be performed off-chain through all channels along the route, signing updated and valid Bitcoin transactions.

Use of the Lightning Network Is Growing Rapidly

The use of the Lightning Network is somewhat of a blackbox due to the protocol design. Therefore, most are left to look at imperfect public metrics to gauge the growth in Lightning Network usage. In our newly published report, The State of Lightning Volume 2, we estimate how much the Lightning Network is used for payments.

The number of payments on the Lightning Network has roughly doubled, compared to a year ago, while the value of the payments has increased by more than 400%, measured in U.S. dollars.

Stripping away trading-related payments, which vary significantly in volume with market sentiment, we see that the increase in commerce payments and personal transfers has been even higher. And significantly, they are on a continuous upwards slope.

Several other factors point to great potential for further increased adoption of the Lightning Network. We estimated that just over 100,000 users had access to Lightning payments globally last summer. In March 2022, we estimate more than 80 million people had access to Lightning payments on an installed application.

Users with access to Lightning payments are not the same as active users. It's, for instance, reasonable to believe, and the numbers back it up, that most of the users of popular payment apps that recently implemented Lightning payments still don't use Lightning. However, more user access increases the likelihood of more widespread use. And the possibilities of using bitcoin payments over Lightning are growing, as highlighted by a flurry of Lightning integration announcements at Bitcoin 2022.

The Numbers Show that Only a Very Small Percentage of

Bitcoin Holders Use It for Payments

BitPay, likely one of the most used payment processors for non-trading-related bitcoin payments, reported it processed close to 40,000 bitcoin transactions in February. Our data shows more than 700,000 non-trading-related payments on the Lightning Network in the same month. Therefore, in terms of numbers of transactions, it's not too far-fetched to think that the Lightning Network is close to rivaling or surpassing the Bitcoin Network in non-trading related payments.

Despite rising quickly, comparing these transaction numbers to the number of bitcoin holders, most bitcoin holders still use it solely as an investment vehicle. Crypto.com estimates that there are close to 180 million bitcoin owners globally. Comparing this number with the number of non-trading-related bitcoin payments indicates that a minuscule share of bitcoin holders use bitcoin as a medium of exchange.

The Lightning Network Is Critical to Realizing Satoshi Nakamoto's Original Vision

The Bitcoin white paper presents a solution for creating a payment network not reliant on trust or an intermediary. Nowhere in the white paper is it stated that Bitcoin is designed to be an investment vehicle with enormous returns that eventually will outcompete all other money and swallow the value of other investment vehicles. The numbers, however, clearly indicate that a version of the latter is the motivation for most bitcoin "users."

The current investment-driven demand for Bitcoin transactions is high enough to make fees unreasonably high also for many commerce payments that wouldn't need instant confirmation. Therefore, the Lightning Network is not only about allowing a greater number of transactions and transaction speed but also making bitcoin payments cheap enough to be used.

In order to maintain small blocks and long block times, solutions like the Lightning Network are essential if Bitcoin is to be a payment option in line with Satoshi Nakamoto's original vision.