

Lightning Network, “ the silver age ” of Bitcoin ?

“A system (...) which would allow direct online payments from one party to another without going through a financial institution¹ ”: these are the first words published by the mysterious Satoshi Nakamoto, on 31 October 2008, in the white paper announcing the creation of Bitcoin.



Bitcoin (the digital currency) may be transferred securely using cryptography, without having recourse to an intermediary and independently from the traditional financial system; the issuer and the receiver just need to hold a bitcoin wallet with a public key which allows them to be identified.

In redefining the interaction between payments and data, their storage and their sending, Bitcoin (the concept or network) has opened up new possibilities and has made instant transfers easy, even across national borders, in a way which was once deemed impossible.

Launched in 2009, its number of users continues to grow, going from just over 3 million in 2015 to more than 80 million in the first quarter of 2022². Some economists and analysts predict that this exponential adoption curve should reach the 100 million milestone in 2023 and almost one billion by the end of 2029³.

In reality, it must be noted that in spite of this enormous take-up and a capitalisation of close to 600 billion dollars, bitcoin is struggling to impose itself as a foreign exchange currency; it has instead emerged as a new speculative asset, increasingly

correlated to the fluctuations of the NASDAQ index, or as a safe haven for some. We are far from the concept of new “payment system” extolled at the start of its creation, and so as to better understand the limits currently faced by Bitcoin, we need to call to mind some of its operating principles.

Bitcoin transactions are grouped into blocks. Those which are referred to as “miners”, challenging the computing power of their IT equipment and guaranteeing, using cryptographic means, the checking and the implementation of the transaction blocks as well as their addition onto a public register, simultaneously shared with all users (blockchain). These miners are remunerated by the “transaction costs” (fees), which are paid by the issuer and calculated based not on the amount transferred, but on the “weight” in bytes of IT data of the transaction. As a result, it would cost the same price to send 10 million euros or 10 euros. These fees have varied over time; they fluctuate between a few dollars and almost 60 dollars, with its peak being reached in 2017.

Beyond the transaction costs which can prove high and disproportionate for the sending of small amounts, the Bitcoin network is facing a scalability issue. In actual fact, in order to maintain the proper running of the network, the volume of transactions per block is limited. As a result, the wait time for the approval of a transaction varies depending on the increase in demand. Currently, the network processes approximately 7 transactions per second and the confirmation of the transaction can take hours. By way of comparison, the Visa network prides itself on guaranteeing 24,000 transactions per second.⁴ This limit on the volume of transactions creates, in addition to a reduction in transactions, an auction-like effect, since those who are ready



to pay more will see their transactions completed more quickly.

The roll-out of Bitcoin as a large-scale payment method therefore finds itself compromised. Nevertheless, the digital and programmable nature of Bitcoin make its capacities evolving and, for several years, the proposals and initiatives of developers in order to achieve Satoshi Nakamoto’s vision by solving the abovementioned issues relating to scalability and costs are numerous.

¹ Satoshi Nakamoto, 31.20.2008 – “ Bitcoin: a peer-to-peer electronic payment system ”. https://bitcoin.org/files/bitcoin-paper/bitcoin_fr.pdf

² Statista, 01.2022 – “ Number of Bitcoin wallet users on Blockchain in the world from the first quarter of 2015 to 1st quarter 2022 ”. <https://fr.statista.com/statistiques/665756/nombre-detenteurs-portefeuille-bitcoin-sur-blockchain-monde/>

³ SSRN, 14.07.2021 – “ Bitcoin Price Forecast Using Quantitative Models ”. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3879700

⁴ Visa, consulté le 18.05.2022 – “ Visa acceptance for retailers ”. <https://usa.visa.com/run-your-business/small-business-tools/retail.html>



The Lightning Network is one of these initiatives and without doubt the one with the greatest impact.

Founded in 2015, the Lightning Network (LN) adds a layer of programming (Layer 2) to the blockchain with the aim of optimising the functioning thereof. Tested for the first time in 2017 on the blockchain of the digital currency Litecoin⁵, the use of the Lightning Network then moved to the Bitcoin network.

With this protocol, the transactions are performed on a parallel payment network which is tied to the blockchain (off-chain) in order to benefit from the security and trust features which are specific to the blockchain all the while reducing its use. To simplify matters, the two users which are parties to the transaction open and register a “payment channel” on the blockchain and each files an amount there in bitcoins. Moreover, they can carry out, between then, as many transactions as they wish, without any time limit. It will only be at the closure of the channel that the final balance of transactions

performed will be checked and published on the blockchain and divided between the users.

By reducing the number of transactions to two, at the opening and closure of the payment channel, the costs and the network congestion problems linked to the use of the Bitcoin blockchain are therefore drastically reduced.

Another fundamental advantage is that these payment channels can be linked together. Thus, with the exponential adoption of the Lightning Network network, a user will be able to pay any other user via three or four channels.

Apart from allowing Bitcoin to change scale, with extremely low transaction costs and allowing for micro-transactions which could reach the smallest bitcoin unit (the Satoshi: 0.00000001 BTC or that

is approximately €0.003) the Lightning Network opens the door to new business models. In his article⁶ on potential uses, the financial analyst Lukas Tatge describes how several online newspapers could bill the reader per number of views of articles or visits, thereby reaching consumers who are less likely to pay for subscriptions. This payment method could also be used by cash dispensers which do not offer payment by card, in order to send money - easily and almost free of charge - to close friends and relatives or even to send tips on social networks akin to Twitter's *Tip* system.

Lastly, as with other banking or payment applications, IT solutions are available to simplify the use of the Lightning Network for the end user as much as possible.

With the Lightning Network, Bitcoin therefore uses all of its protocol scope for the transfer of values and not only for the transfer of its own digital currency. Indeed, the Strike⁷ application, which already uses this technology, offers the possibility of easily making transfers and instant payments across the entire world, in bitcoins but also in fiat money (EUR, USD, etc.); payments in currencies, almost instantaneously, converted into bitcoins, processed via the Lightning Network and reconverted at the best rate in the end currency desired by the recipient. It is no longer necessary to hold bitcoins to take advantage of the power of the Bitcoin network

Jack Mallers, the founder of the Strike application, recently announced⁸ partnerships with the e-commerce giant Shopify and the global leader of NCR payment systems. He therefore opens access to the Lightning Network and to his system of



interoperable payment channels to millions of businesses and users of which an increasing number are joining every day. The number of payments made during the year gone by has doubled whilst the total value of these payments has quadrupled⁹. The various electronic wallets available, such as, inter alia, Chivo¹⁰, Strike or Cashapp currently allow close to 80 million persons to gain access to the Lightning Network.

It is difficult not to see the emergence of formidable disruptive innovation coming to compete with the international fund transfer companies (Money Gram, Western Union, etc.) and with the digital payments companies (Visa, MasterCard, etc.).

⁵ Electronic currency under free licence (MIT License) technically similar to Bitcoin.

⁶ Lukas Tatge, 20.03.2020 – " Analysis of use cases for the Lightning Network ". <https://medium.com/coinmonks/analysis-of-use-cases-for-the-lightning-network-bitcoin-2-0-cc8b7ac9ee5e>

⁷ Strike - <https://strike.me>

⁸ Danny Nelson, Coindesk, 08.04.2022 – " Jack Mallers' Strike Announces Shopify Integration for Bitcoin Lightning Payments ". <https://www.coindesk.com/business/2022/04/07/jack-mallers-strike-announces-shopify-integration-for-bitcoin-lightning-payments/>

⁹ Arcane Research, 04.2022 – " The State of the Lightning ". https://assets.ctfassets.net/4rilomtvaee4/3wrBvznCykPAohtwhCGmfE/9ab5a76cce470cc65a656b896d2300fb/The_State_of_Lightning_Vol_2.pdf

¹⁰ Electronic wallet created by the government of El Salvador in order to make payments in dollars or in bitcoin since the adoption by the country of bitcoin as a currency with legal tender

Furthermore, in a recent report¹¹, the Morgan Stanley analysts are predicting an increasing use of the *Lightning Network* as a payment solution and think that Strike can compete with, and even surpass, the giant of digital payments Visa.

David Marcus, former president of Paypal, member of the management team at Coinbase and leader of the cancelled project to create the digital currency Diem de Meta (ex Facebook) was fully aware of this. In April last he announced¹² the creation of the Lightspark business with the aim of “*exploring, building and extending the capacities and use of Bitcoin*” by helping businesses to implement the Lightning Network.



Between critics and “hyperbitcoinization”

There are several within the bitcoin community, in particular the “bitcoin maximalists¹³”, who forecast that bitcoin will be the sole digital asset required in the future and that the world is heading towards a “hyperbitcoinization”. According to this theory, more and more individuals and groups across the world will realise the benefits of a borderless digital value transaction system which is resistant to censure thus bringing our societies to a turning point where Bitcoin will become the default system.

As noted by the Economist André Orléan, “*Currencies like languages only exist embedded within the groups which have chosen them. They are born from interactions which take place within the groups and which they help to create.*” In his analysis¹⁴ of the Bitcoin community, he notes that at the time of each socio-political rupture, the reconfiguration of the currency rules plays a structuring role. In other words, the political change and the currency change go hand in hand.

The disruptive nature of the crypto-currency and notably of the Bitcoin illustrates this change. This is not without its criticisms however. Whether real or unfounded, these criticisms share nevertheless in the evolution, improvement and efficiency of this free project upon which thousands of developers are working.

It has, for example, been said, that bitcoin is used mainly for criminal activities. However, this

¹¹ Joel Frank, Yahoo Finance, 22.04.2022 – “Bitcoin Lightning Network-Based Strike Can Rival Visa – MS” <https://finance.yahoo.com/news/bitcoin-lightning-network-based-strike-112519630.html>

¹² David Marcus, Twitter, 12.05.2022 - https://twitter.com/davidmarcus/status/1524826813096112128?ref_src=twsrc%5Egoogle%7Ctwcamp%5Eserp%7Ctwgr%5Etweet

¹³ Jake Frankenfield, Investopedia, mis à jour le 26.07.2021 – “Bitcoin Maximalism” <https://www.investopedia.com/terms/b/bitcoin-maximalism.asp>

¹⁴ André Orléan, Revue Esprit, 08.2019 – “The Bitcoin community”. <https://esprit.presse.fr/article/andre-orlean/la-communaute-bitcoin-42200>



statement was undermined in the report¹⁵ from the former director of the CIA, Michael Joseph Morell. The latter believes that in reality its use for unlawful activities is very limited, notably owing to the fact that the register on which the transactions are recorded in an unchangeable manner may be used by the forces of law and order and the intelligence community in order to identify them. The unlawful transactions carried out using bitcoins transactions (less 1% of the total transactions between 2017 and 2020¹⁶) are probably well below those carried out via the traditional banking system.

Furthermore, owing to the secure operation of the blockchain requiring a lot of computer calculations (proof of work) the bitcoin transactions have been accused of being energy-intensive and this is undeniable.

Nevertheless, this can be nuanced by the results of the Bitcoin Mining Council (BMC) survey which were made public last January¹⁷. The survey, which was carried out on 46% of mining companies of Bitcoin and relating to the consumption of electricity, technological efficacy and sustainable development, revealed that the mining activity of these companies is performed with a sustainable energy mix of 66.1 %. Based on these data, the body believes that the share of the sustainable electric mix of the global mining industry was approximately 58.5 % during the course of the fourth quarter 2021, up 1% in relation to the third quarter 2021, which makes it, by comparison, one of the most sustainable industries in the world.

Furthermore, the miners are aware of the ecological stakes linked to their activities and to the optimisation of their costs. An increasing number

¹⁵ Michael J. Morell, thecipherbrief.com, 13.04.2021 – “ Report: An Analysis of Bitcoin’s Use in Illicit Finance ”. <https://www.thecipherbrief.com/report-an-analysis-of-bitcoins-use-in-illicit-finance>

¹⁶ Ciphertrace, 02.2021 – “ Cryptocurrency Crime and Anti-Money Laundering Report, February 2021 ”. <https://ciphertrace.com/2020-year-end-cryptocurrency-crime-and-anti-money-laundering-report/>

¹⁷ Bitcoin Mining Council, 18.01.2022 – “ Q4 Bitcoin Mining Council Survey Confirms Improvements in Sustainable Power Mix and Technological Efficiency ”. <https://bitcoinminingcouncil.com/q4-bitcoin-mining-council-survey-confirms-sustainable-power-mix-and-technological-efficiency/>



are using renewable energy and, thanks to a less voluminous mining material which is easy to transport, they settle near sustainable energy sources or use energy surpluses and losses. For example, the multinational ConocoPhillips, specialising in extraction, transport and oil processing, sells - to mining companies - natural gas surpluses from its business activities which are destined to be burned.

Progress is also being made with regard to micro-processor manufacturers; for example we refer to Intel and its computer chip for mining, a lot less energy intensive and a lot more efficient than previous models.

Some also relativize the electric consumption of the mining industry of the Bitcoin (220 Twh) by comparing it with that required for the extraction of gold (571 Twh) or with the current energy cost which is a lot higher and required for the operating of the global banking system.



Fix the Money, Fix the World

To attempt to understand the Bitcoin by reducing it to its current price and its fluctuations, or by comparing it to stock market capitalisations of technology companies would be a mistake. To decipher it with more success one must take its intrinsically evolving potential into account and its prospects for disruptive innovations.

The momentum and dynamism of its ecosystem are promising. The adoption of the Bitcoin as a currency and value transfer system will result from the convergence of appropriate responses regarding its benefits compared to other payment and transfer methods, its simplicity of use and its energetic efficiency. The different international rules which are put in place will also bring the legal framework which is required for its deployment.

By introducing concrete solutions to the issues of the cost and speed of carrying out the transactions, the Lightning Network contributes to the progress of the success of Bitcoin and its adoption on a larger scale as currency network and payment system.

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