Formal Verification.

In The Network: Bitcoin

Q2 2020 Report

July 2020

Powered by glassnode

Preface

As we enter the second half of 2020, Bitcoin continues to maintain its properties as a immutable, seizure and censorship resistant, decentralised value storage and transfer system.

In collaboration with Glassnode, 'In The Network' provides a succinct on-chain analysis of the current state of the network and its surrounding ecosystem through a non-exhaustive use of both established and more exotic metrics.

Formal Verification.

Contents

Bitcoin As A Value-Transfer System

Over time, it has become increasingly popular to frame Bitcoin as a value-transfer system. Therefore, a key measure is the financial bandwidth of the network per unit of time. The results will be able to evaluate what *type* of value-transfer system the Bitcoin network currently is and how it may be evolving over its lifespan.

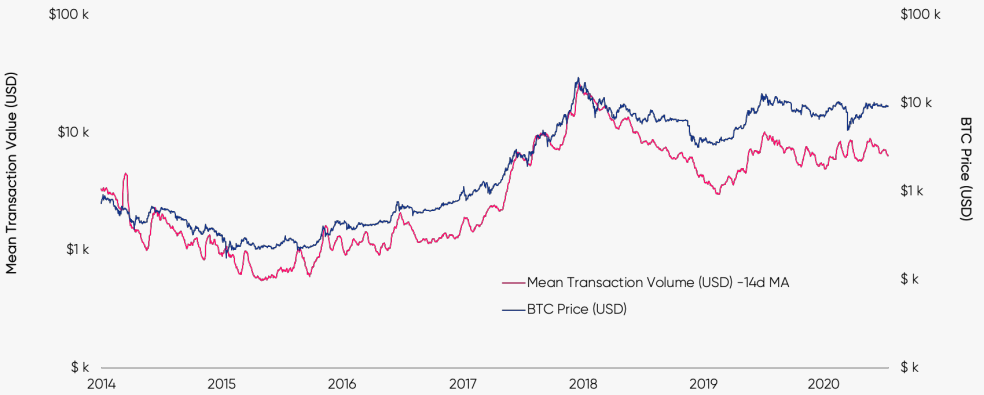
By utilising both transaction count and average transaction size (USD), we can create composite metrics, such as Economic Throughout (Nic Carter, 2018) that is useful for evaluating value-transfer systems.

Economic throughput is equal to:
Mean transaction value (USD) x transaction count

In this sense, economic throughput is the measure of financial bandwidth of a network. The strong assurances that Bitcoin provides are arguably not optimal for low-value transactions and this is being reflected in the general increase in mean transaction value over the years.

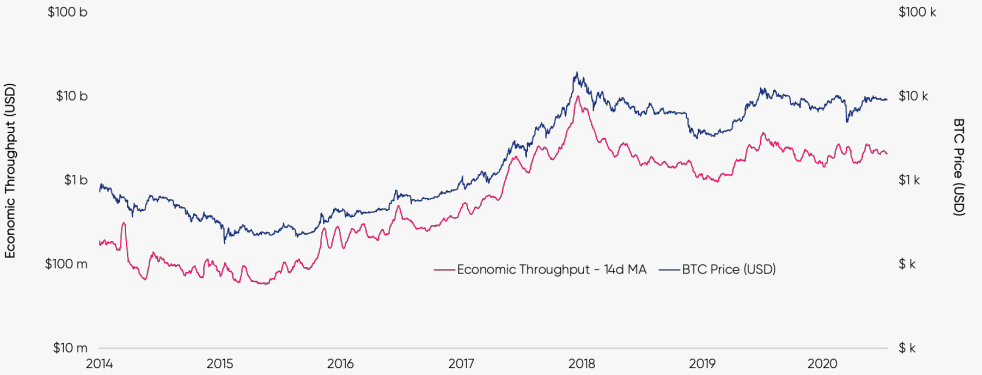
The network currently sees **approximately $2.1 billion in economic throughput daily.**

Mean Transaction Value (USD)
Smoothed using a 14d MA



Source: Glassnode

Economic Throughput (USD)
Smoothed using a 14d MA



Source: Glassnode

Bitcoin As A Value-Transfer System

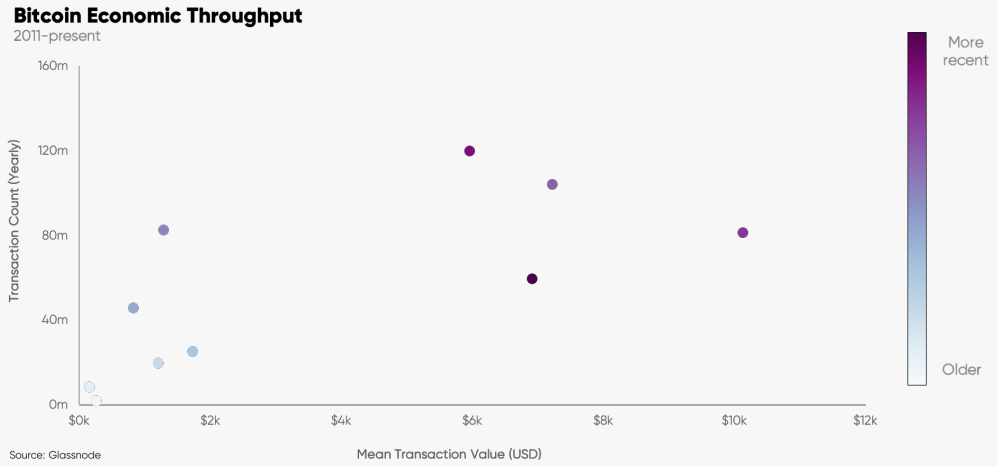
We can also explore what is driving the increase in economic throughput on the network. For example. whether the growth was due to a low number of very high value transactions (characteristics of a settlement network).

The scatter plot on the right is yearly transaction count plotted against the mean transaction value for each year starting from 2011. Each dot represents a year which get darker over time.

What is clear is how Bitcoin's economic throughput has been throttled over the years by growth in *both* transaction count as well as mean transaction value. Higher average transaction value is not associated with lower transaction count.

In general, networks tend to move towards one corner over time. It is reasonable to expect a more negative association between transaction count and average transaction value due to its settlement assurance profile as a global network, increased usage of batched transactions, as well as its fee dynamics.

Of course, the usage of off-chain transactions, through the use of second layers like Lightning, impact values here but still periodically settle at the base layer.



	Transaction Count (yearly)	Average Transaction Size (USD)	Annual Economic Throughput (USD)
2011	1,842,138	$262	$482,996,444
2012	8,398,524	$160	$1,342,411,466
2013	19,579,808	$1,209	$23,674,354,554
2014	25,204,855	$1,731	$43,635,905,600
2015	45,619,702	$833	$38,015,830,411
2016	82,571,772	$1,293	$106,770,536,613
2017	104,007,301	$7,223	$751,260,349,934
2018	81,341,138	$10,128	$823,828,717,808
2019	119,729,415	$5,965	$714,176,543,412
YTD	59,530,551	$6,915	$411,643,163,000

Dynamic Range NVTS

The NVTS (Dimitry Kalichkin, 2018) calculates the ratio of Bitcoin's market cap and the 90d average on-chain transaction value in order to identify periods of overvaluation and undervaluation relative to value being transmitted on the network.

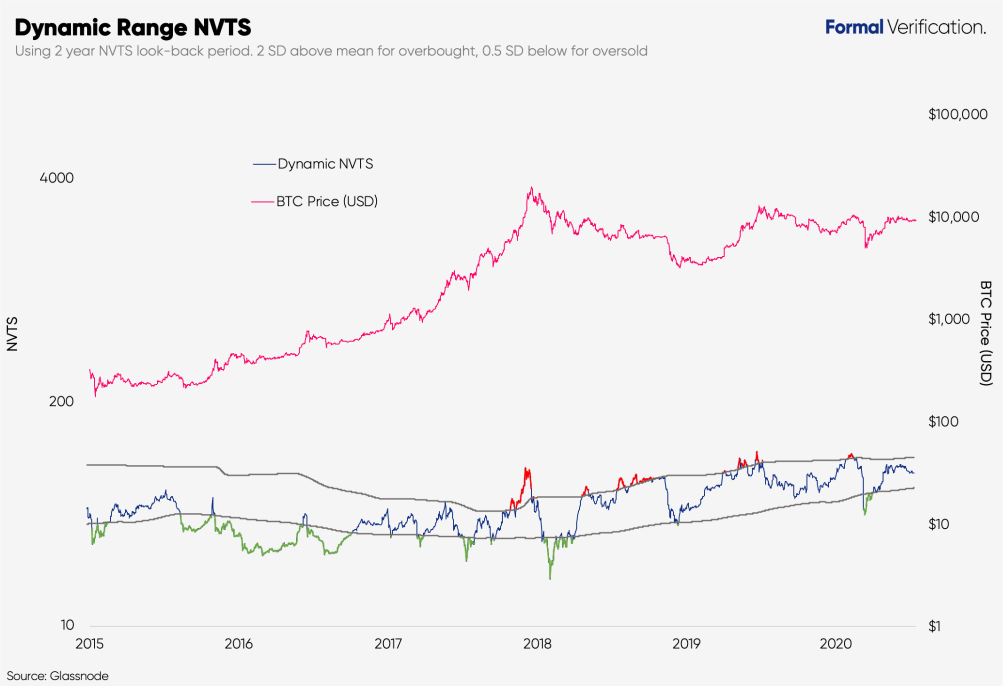
The standard NVTS is often analysed with thresholds in mind: 150 for overbought and 45 for oversold (Willy Woo).

However if we consider how the the use of off-chain transactions (e.g. Liquid) can impact the denominator, a fixed thresholds approach for NVTS might not longer be appropriate. The Dynamic Range NVTS (Charles Edwards) is an alternative measure that applies thresholds using standard deviations above and below a long-term mean of the NVTS.

We can define a long-term mean as being 2 years (although a longer time frame might be appropriate as Bitcoin ages. Furthermore, using 2 SDs above the mean (for overbought) and 0.5 SDs below the mean (for oversold) is necessary given the NVTS skewness historically.

Based on these parameters, the Dynamic Range NVTS is currently indicating that BTC is neither overbought or oversold.

Different parameters for the dynamic NVTS should be explored and monitored for future research as Bitcoin matures as a network.



ThermoCap

ThermoCap (Nic Carter, 2019) measures the total economic work contributed by miners. ThermoCap is defined as the cumulative revenue paid to miners (i.e. the sum of block rewards and transaction fees).

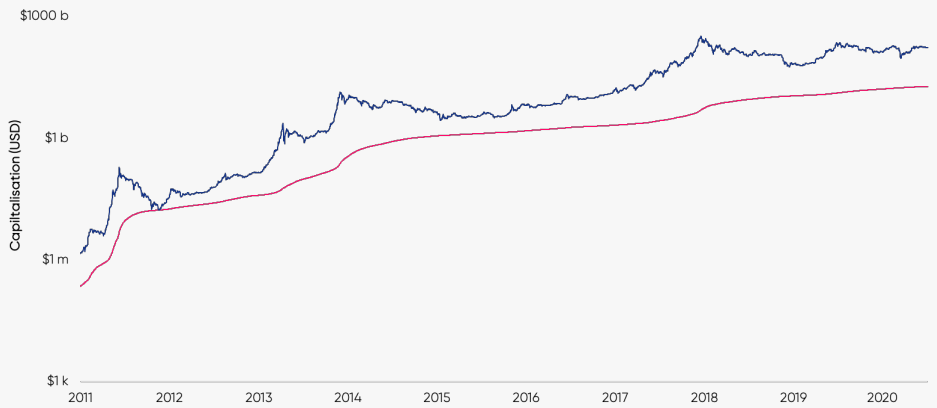
Given miners have to operate with a degree of profitability, we can assume cumulative expenditure by miners should not exceed total rewards provided by the protocol. ThermoCap therefore effectively tracks the upper bound of investment from miners.

BTC continues to be trading at a premium to total security spend by miners. **At the end of Q2. ThermoCap totalled $18.6bn representing 11% of the total BTC market capitalisation**.

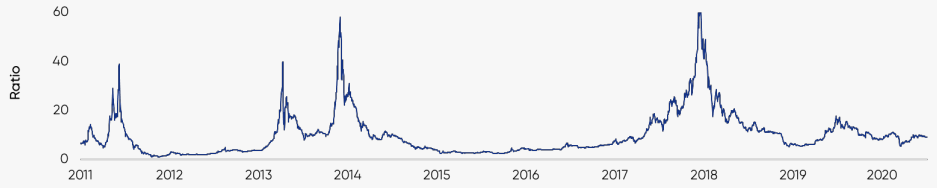
This premium has also been increasing in Q2. **The market cap to ThermoCap ratio has climbed 12% since the start of the year and 35% in the second quarter**.

ThermoCap (USD)

Incl. block rewards and trasnsaction fees



Market Cap to ThermoCap Ratio



Source: Glassnode

Difficulty Ribbons

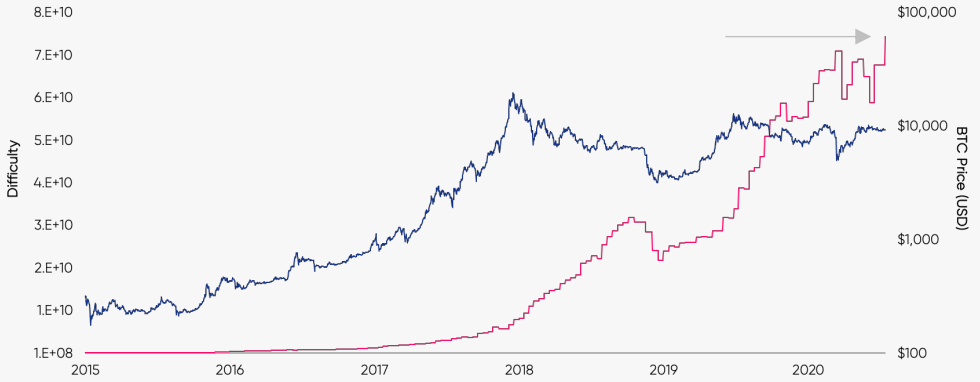
Studying the difficulty adjustments for Bitcoin can be a useful exercise to visualise the relationship between price and mining operations. Bitcoin's difficulty was relatively turbulent in Q1 and Q2 with certain events, such as the March 12th crash and the 3rd halvening, playing a significant role. With the halvening specifically, there were two reductions in difficulty as a result in hash rate. This however was quickly reversed in June when the network saw its biggest difficulty increase in nearly 2 years (+15%).

Difficulty Ribbons (Willy Woo, 2019) enables us to visualise periods of sustained miner capitulation (when ribbons compress). **What is noticeable is how the difficulty ribbons have compressed and even inverted twice in the first two quarters of this year.**

The recent inversions are likely the result of the ever stronger commitment of resources provided by miners in the lead up to March 12th and the halvening both of which put significant pressure on unprofitable miners to remain operational.

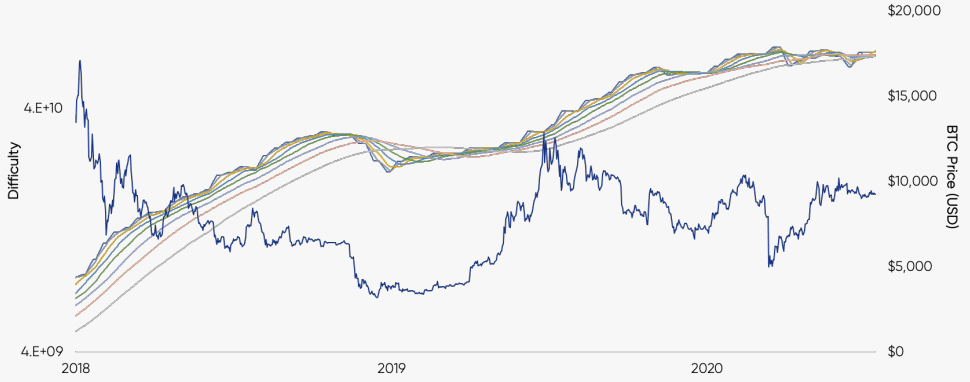
Perhaps what's most interesting in light of this is that, as of July 13th, **BTC has the highest difficulty adjustment ever seen**. This may potentially signal that mining capitulation has stabilised, allowing for only the strong holders to be sellers. On the other hand, the higher difficulty may also mean that certain miners are yet to be shaken out given the increased competitive environment.

Difficulty Adjustments
2015-present



Source: Glassnode

Difficulty Ribbons
2018-present

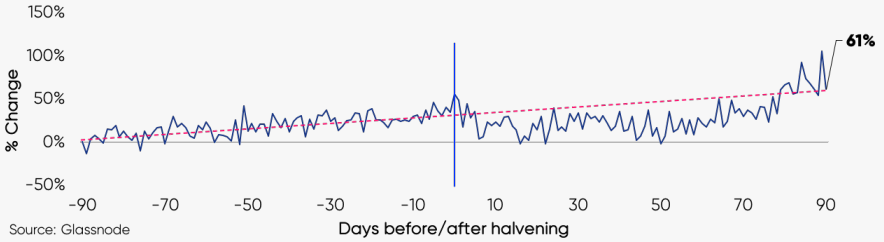


Source: Glassnode

Hash rate

1st Halvening

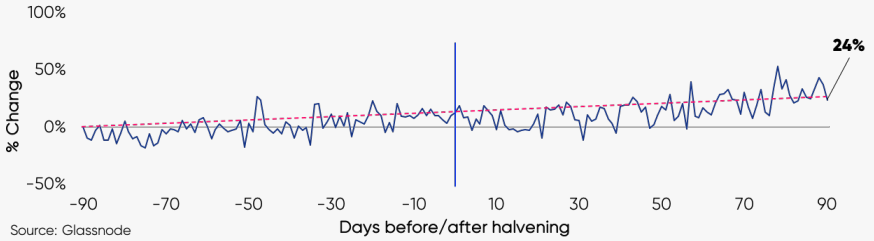
Hash rate 90 days before and after halvening



Source: Glassnode

2nd Halvening

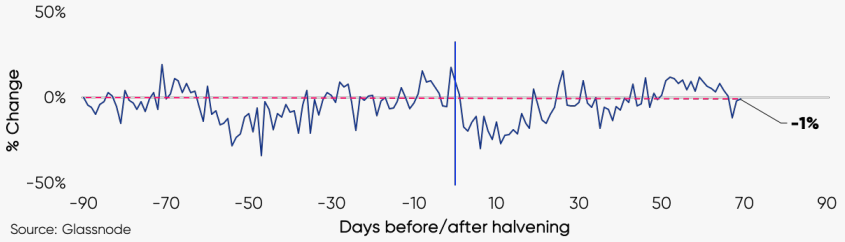
Hash rate 90 days before and after halvening



Source: Glassnode

3rd Halvening

Hash rate 90 days before and after halvening



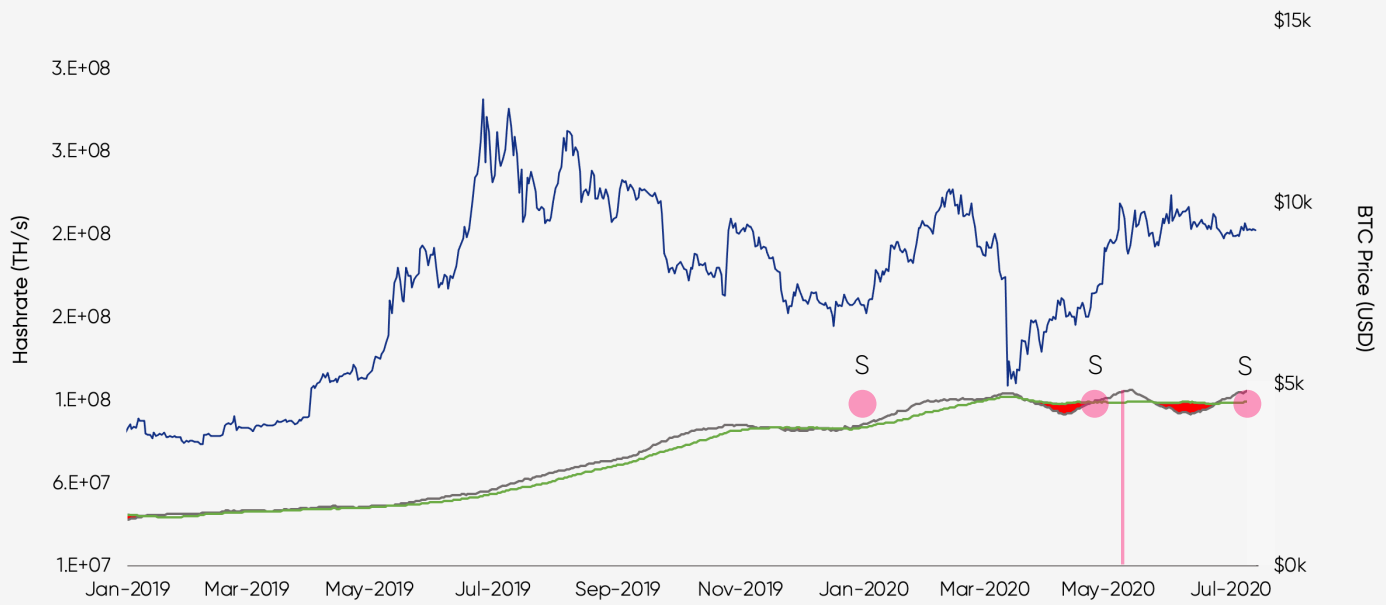
Source: Glassnode

Comparing the hash rate of the network before and after each halvening show that their trends are not completely uniform. While hash rate has generally dipped in the days after each halvening (naturally due to the reduction of rewards paid to miners), **we can clearly see the importance of context surrounding each event**. One example, is the negative impact from the March 12th volatility leading up to the 3rd halvening that occurred two months later. Both events have meant hash rate has been suppressed but had been showing signs of recovery until recently – hash rate is slightly lower than levels 90 days prior to the event.

As mentioned earlier, given a new ATH in difficulty recently, it remains to be seen whether an increase in hash rate will occur coming weeks or if the increased adjustment is enough to force inefficient miners to leave the network.

Days Before/After	1st Halvening	2nd Halvening	3rd Halvening
-60	23%	0.20%	7.00%
-30	24%	11.00%	1.00%
0	55%	12.00%	10.00%
+30	33%	5.00%	-3.00%
+60	21%	17.00%	10.00%
+90	61%	24.00%	N/A
Max Drawdown 10 Days Post Halvening	-23%	-11%	-21%

Hash Ribbons



Source: Glassnode

Hash Ribbons (Charles Edwards) identifies times when miner capitulation has peaked by looking at when the 1 month and 2 month SMA of Bitcoin's hash rate cross each other. These hash ribbons can also be combined with a BTC price momentum indicator (e.g. a 10-20 SMA crossover) in order to limit any drawdowns. Critically, one of the advantages of using hash ribbons over difficulty ribbons is the natural reduction in lag by not having to wait on adjustments occurring every 2016 blocks (~2 weeks) to produce signals.

Pink dots represent periods when hash rates and BTC price both start to recover. Looking back over Bitcoin's history, miner capitulation occurs nearly every year but for each halvening, signals have also typically been formed. One signal was confirmed in **April 2020** heading into the halvening with another signal occurring very recently on July 13th. Historically, after signals form post-halvenings, there have been multi-year periods until the next signal is formed.

See here for more details regarding hash ribbons and its methodology.

Fee Ratio and FRM

Bitcoin miners that secure the network expend energy in return for rewards which come in the form of block rewards and transaction fees.

The Fee Ratio (FR) is a measure of the percentage of the economic volume that would be have to be paid in fees in order to maintain an equivalent level of security. Under certain assumptions we might conclude that a low FR is *desirable* because it means that a smaller portion of transactions value is paid as fees in order to maintain network security.

The fee ratio assumes that the combination of miner rewards is under a state of 'equilibrium'. In other words, the total 'security budget' rewarded to miners has been sufficient relative to the levels of transaction volume the network settles at any given time.

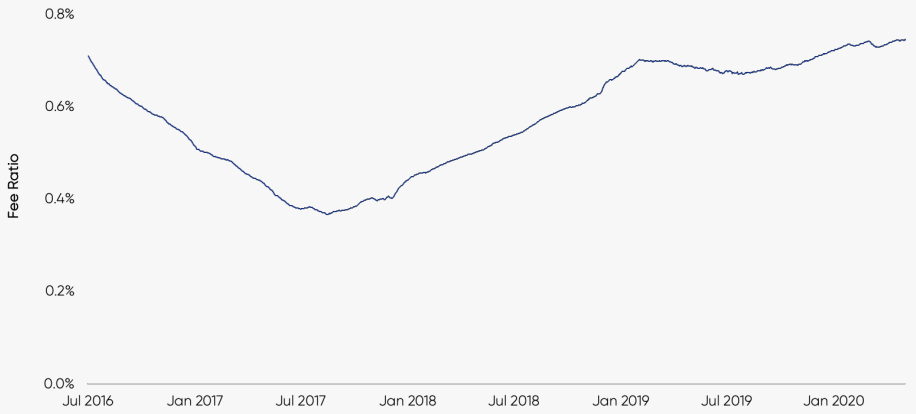
We can then estimate the multiple of current fees on the network that is required to achieve the FR. The Fee Ratio Multiple (FRM) (Matteo Leibowitz, 2018) is equal to:

Miner Revenue (block rewards + transaction fees)/ transaction fees

FRM can be a measure of a networks security - a low FRM means a network relies less on block reward subsidy to maintain total security budget and vice versa. Over the last halvening cycle (2016-2020), the FRM increased slightly from 2020 at the end of 2016 to 33 in May 2020.

Fee Ratio

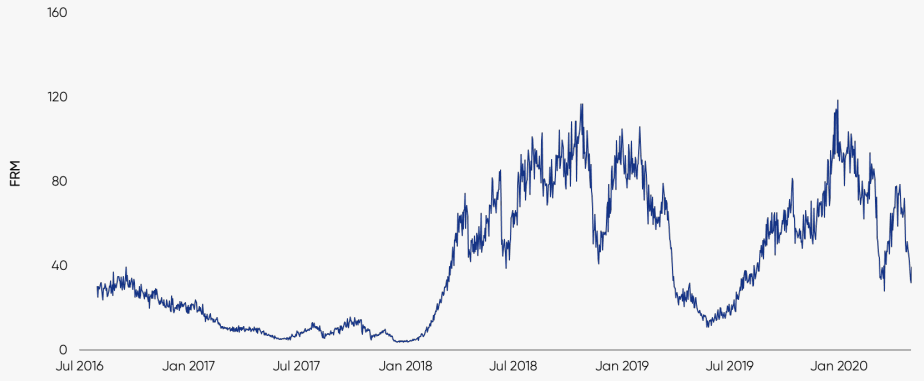
Calculated using 1 year miner revenue and transaction volume



Source: Glassnode

Fee Ratio Multiple (FRM)

Smoothed using 30d EMA for fee revenue



Source: Glassnode

HODL Waves

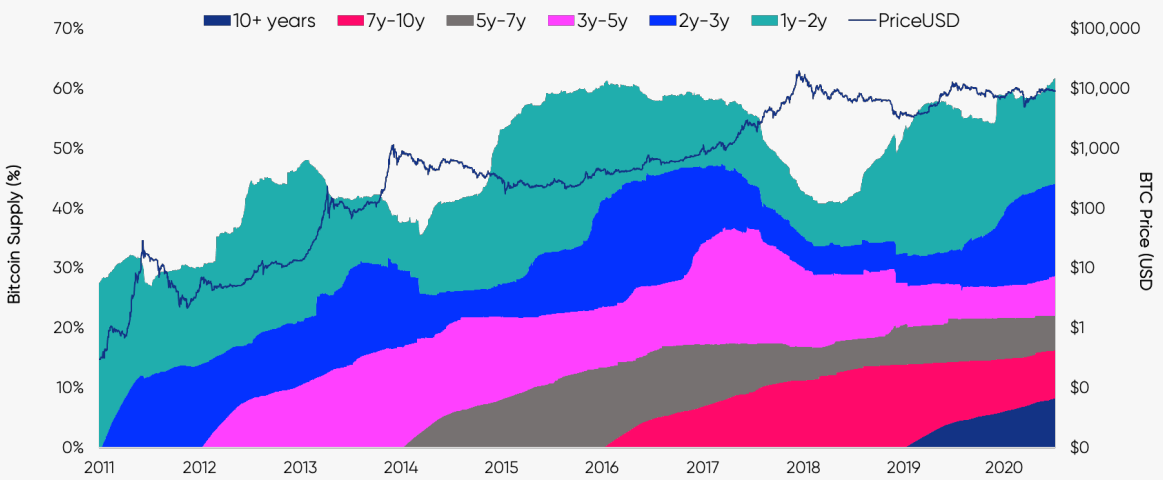
HODL Waves (Unchained Capital, 2018) is a UTXO-based metric that indicates the portion Bitcoin's supply that was last moved within a particular window of time. In other words, it allows us to analyse the composition of the BTC holder base at a more macro level. Active supply is calculated by:

$$\text{Active Supply} = \text{value (of all UTXOs where } t - t_{created} \text{ is in selected age band)}$$

In Q2 2020, the percentage of Bitcoin supply that had not moved in at least 1+ years reached a new ATH (61.6%), beating the previous high of 61.3% back in January 2016. Additionally, supply that had not moved in more than 5 years has also reached ATH of 22.1%. Collectively, this signifies a steady growth in its long-term investor base.

HODL Waves

Percentage of Bitcoin in existence last moved within time period



Source: Glassnode

UTXO Distribution	*Supply not moved in* 1+ years	3+ years	5+ years
Q1 2018	41.1%	28.9%	17.0%
Q2 2018	42.1%	29.0%	18.1%
Q3 2018	48.2%	29.4%	18.5%
Q4 2018	52.7%	27.6%	20.5%
Q1 2019	57.6%	27.3%	20.4%
Q2 2019	56.5%	27.2%	21.5%
Q3 2019	55.0%	26.9%	21.6%
Q4 2019	58.9%	27.0%	21.6%
Q1 2020	58.4%	27.4%	21.6%
Q2 2020	61.6%	28.6%	22.1%

Change Since	1+ years	3+ years	5+ years
2017	44%	-5%	31%
12 Months	9%	5%	2%
YTD	5%	6%	2%

Binary CDD and VOCD

An alternative way we can study the behaviour of long-term holders is to assign higher values to supply that has been idle in addresses. Bitcoin Days Destroyed is defined as the number of BTC multiplied by the number of days since those coins were last moved.

Binary Coin Days Destroyed (Hans Hauge, 2019) analyses long-term holders by taking the mean days destroyed over time and identifies days where CDD was higher or lower than the average. One of the benefits of this approach is reducing the impact of exchange flows which can naturally impact the values of days destroyed.

The Binary CDD graph on the right plots days where answer is "no". CDD visualised has been adjusted for circulating supply as well as change transactions.

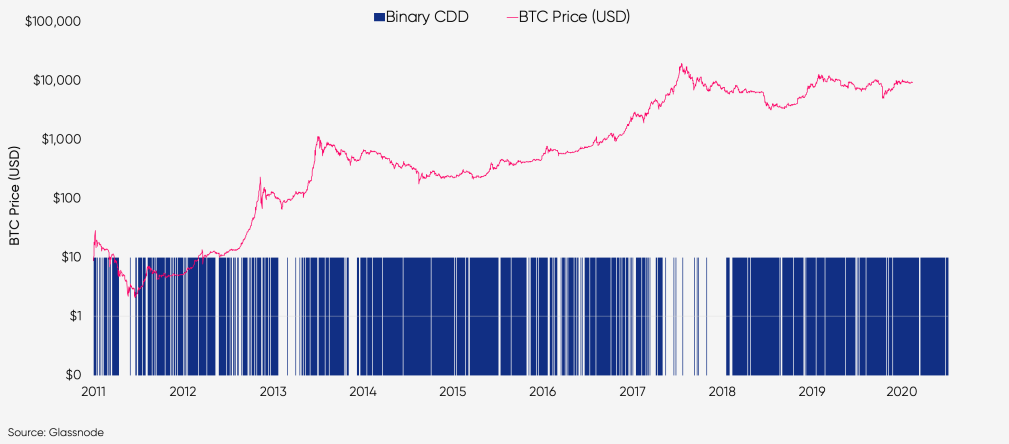
As we can see, **the vast majority of 2020 so far has been a period of accumulation by long-term holders**.

Taking this further, we can frame long-term holder activity in terms of *opportunity costs*. When the Value of Coins Destroyed (CDD times BTC price) is higher than the market price of BTC, we can determine more Bitcoin days are being destroyed rather than being created.

To smooth out the exchange flows, a 30d MA is applied to the VOCD in order to create the MVOCD. **Every period where the MVOCD is below the BTC price, the cumulative opportunity cost to hold rather than sell increases which continued to be the case throughout Q2.**

Binary CDD

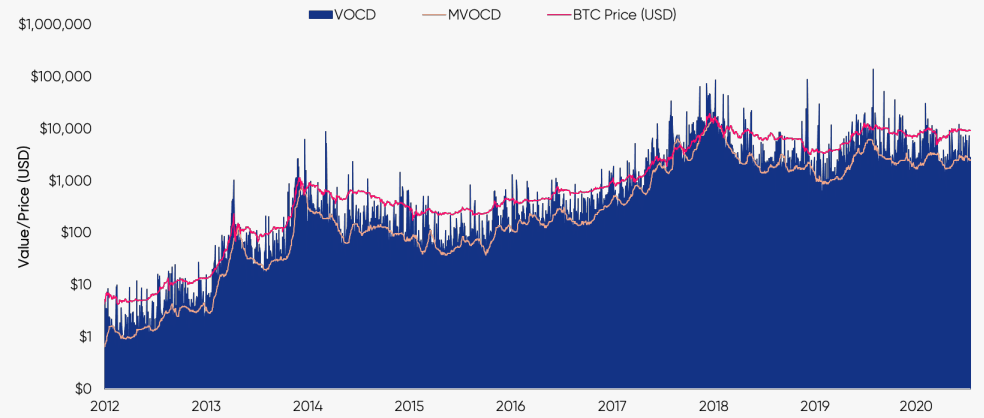
Adjusted for circulating supply and change transactions



Source: Glassnode

MVOCD

2012-pesent



Source: Glassnode

Liveliness

While Hodl Waves are useful for discerning market behaviour of Bitcoin investors on a macro scale, Liveness (Tamas Blummer, 2018) provides a *single* quantitative measure for saving behaviour. It is simply defined as the ratio of Bitcoin Days Destroyed and the sum of all historical Bitcoin Days Destroyed. Liveness trends downwards as BTC units become dormant and increases as long-term positions are moved (and potentially liquidated) on the network by BTC holders.

At the end of 2018, liveliness increased when BTC headed towards $3k. During the crash in March this year, Liveliness initially increased very slightly before reversing once again to continue its trend downwards as long-term holders remained largely unshaken. In Q2 2020, liveliness continued to decrease.

By subtracting liveliness from one and multiplying this value with the circulating supply at the time, we can estimate the total number of BTC in long-term held positions (as well as lost).

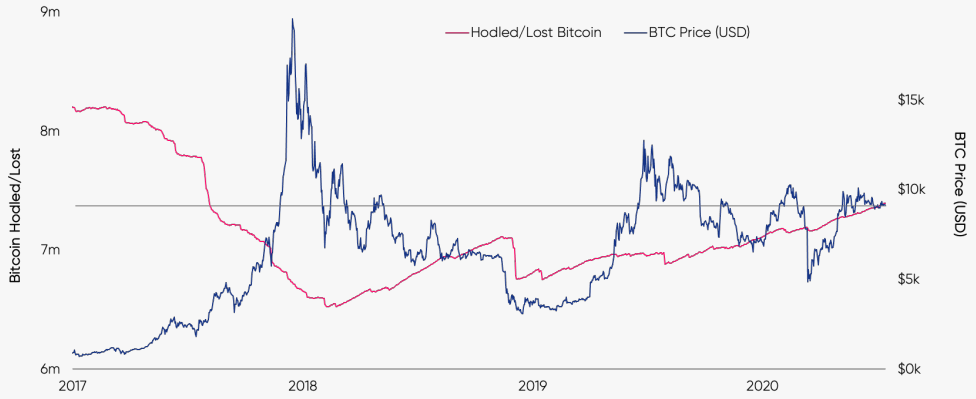
There are ~7.4m BTC that are either HODLed or lost – the highest number seen since August 2017.

What's particularly interesting once we incorporate supply into the equation is how the number of HODLed/lost units is higher today than it was at the end of 2019, despite liveliness being lower at that time.

Liveliness
2011-present

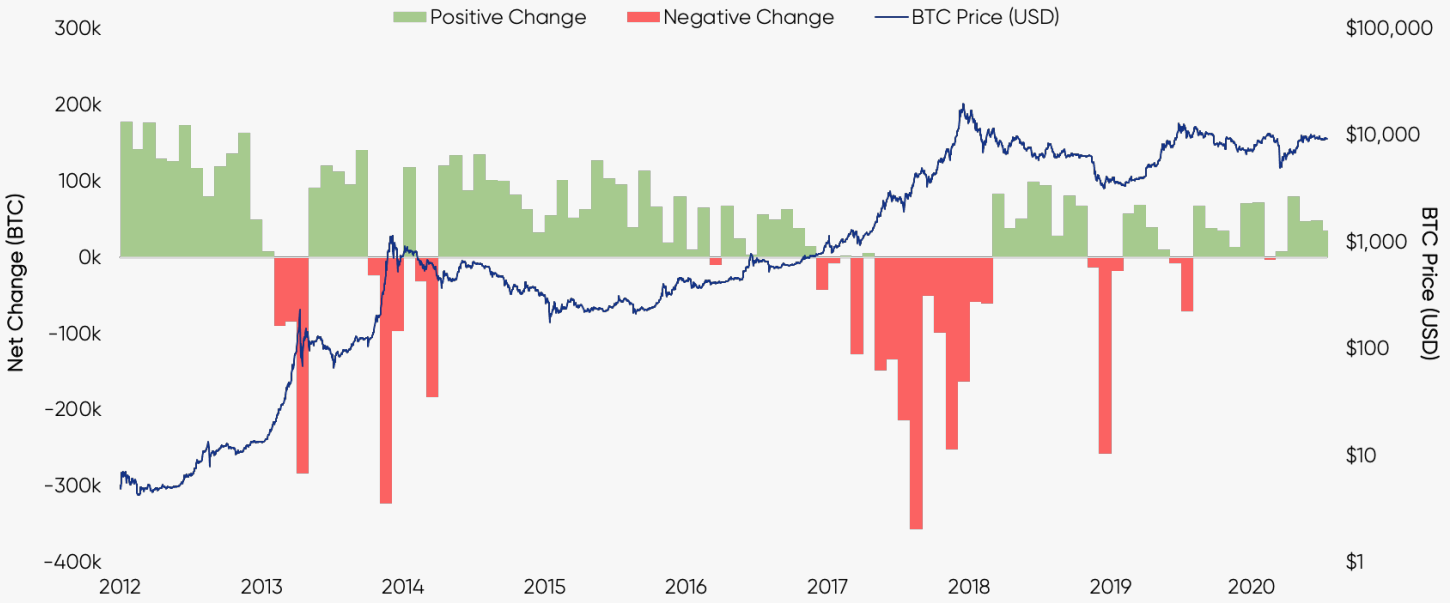
Source: Glassnode

HODLed/Lost Bitcoin
2017-present



Source: Glassnode

Hodler Net Position Change



Source: Glassnode

As first introduced by Adamant Capital (2019), Hodler Net Position analyses the accumulation behaviour of investors by simply comparing the monthly change in Hodled BTC over time. By only looking at the change by period, Hodler Net Position Change naturally excludes lost BTC from the analysis.

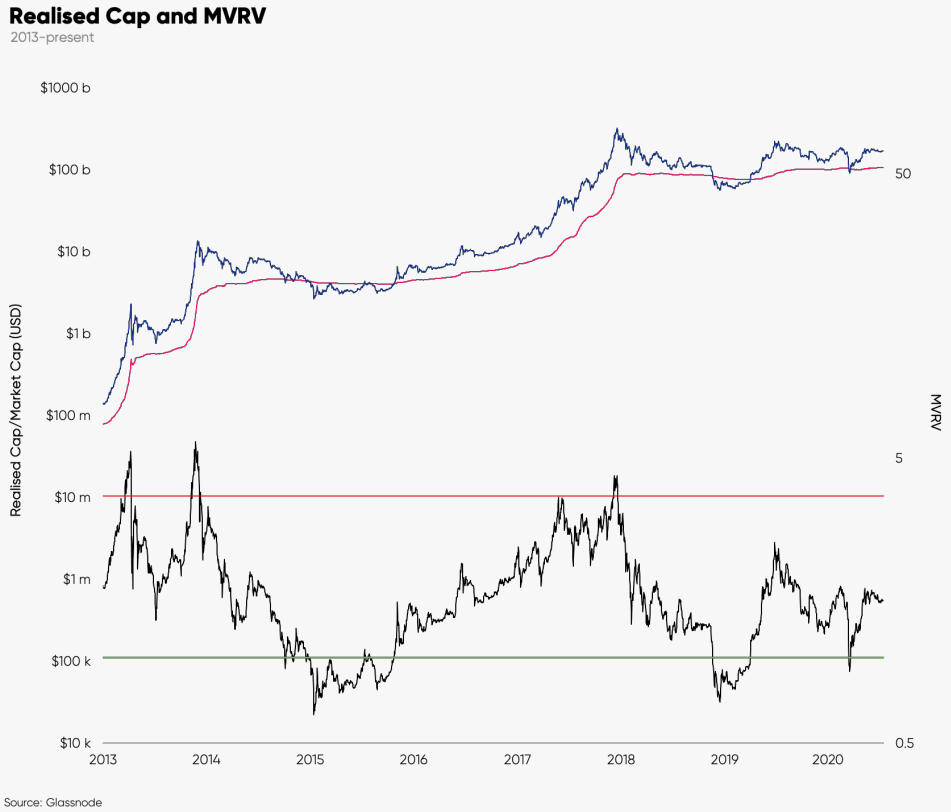
Looking back over the years, we can see that, up until the end of 2018, net buying positions changed into net selling once the previous market top was reached. Since August 2019, net new positions have been largely accumulated by investors with the exception of March 2020 where a small 3.6k negative change was observed. **Q2 saw a 2.3x increase in positive position change (+176k BTC) than observed in Q1 (+76k BTC)**. Note, that administrative transactions from exchanges may impact this measure.

Market Value to Realised Value (MVRV)

Realised Cap (Coin Metrics, 2018) is an alternative metric to market capitalisation that values different portions of the supply depending on when that supply last moved. For UTXO-based networks, this means valuing outputs by the price in which they were created, producing an aggregate cost basis for BTC holders.

Dividing the market cap by the realised cap gives us the MVRV ratio. Large increases to market cap relative to realised cap has usually indicated market tops - Historically, an MVRV above 3.7 has signalled potential overvaluation. Conversely, large decreases (MVRV less than 1) in the ratio has typically provided a strong indicator for market bottoms.

The MVRV ratio briefly dipped below 1 around March 12th this year. **In Q2, the MVRV continued to trend higher moving from 1.1 to 1.8. The current MVRV is 1.6 signalling neither overvalued or undervalued based on the upper and lower thresholds.**



Source: Glassnode

LTH-MVRV

Building on the standard MVRV ratio, we can use certain coin age information for Bitcoin's supply to distinguish between different types of market players. Analysing UTXO probability curves allows us to define l**ong term holders (LTH) as holders controlling UTXOs that have a minimum age of 155 days**. By segregating groups by short and long-term holders, we can create more experimental revisions on more established metrics, such as the MVRV to create the LTH-MVRV ratio (Glassnode, 2020).

Like the MVRV, the LTH-MVRV can be used as a long-term indicator. A critical difference is that the LTH-MVRV only considers UTXOs that have a lifespan longer than 155 days. By only incorporating older UTXOs into the calculation, the LTH-MVRV removes short-term trends from the original MVRV ratio.

By factoring in UTXO age, LTH-MVRV produces potentially stronger, and more distinct signals than the standard MVRV particularly for market tops. **Historically, market tops have coincided with an LTH-MVRV above 20. The LTH-MVRV is currently stands at 1.65.**

Realised Cap and LTH-MVRV

2013-present

Source: Glassnode

Exchange Net Flows

Net BTC flows moving in and out of centralised exchange addresses continued to be net negative throughout the whole of Q2.

There are now approximately 2.64m BTC held across exchange wallets.

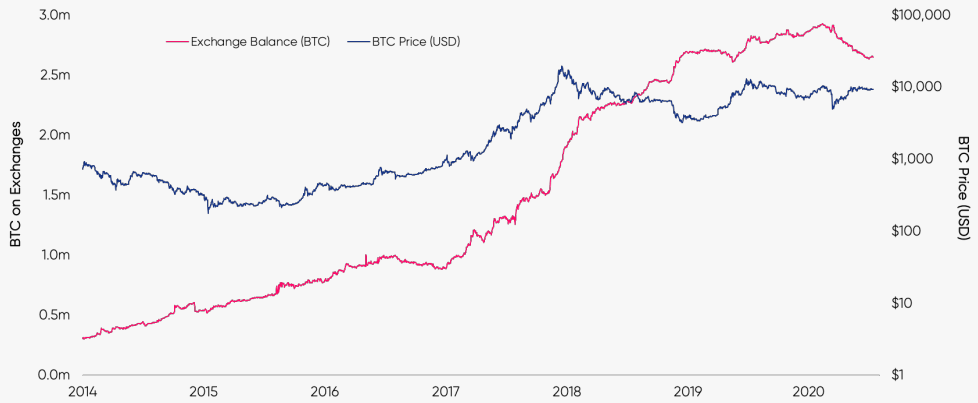
While the month of March saw the largest net outflow for a single month period (-90.2k BTC), **the aggregated net outflows for Q2 was more than 3x than flows seen in Q1 this year.** Although only using partial for the month, the net flows for July has been slightly net positive so far potentially ending the 5 month net negative flows from exchanges this year.*

Note, developing statistical techniques used to label exchange addresses means that these metrics are subject to slight changes over time, particularly for the most recent data points.

Net Flow From Exchanges

Q1 2020	Q2 2020
-55.4k BTC	-174k BTC

BTC on Exchanges
2014-present



Source: Glassnode

Net Flows From Exchanges
2019-present

Source: Glassnode

*Data as of 19th July 2020.

Exchange Flow Composition

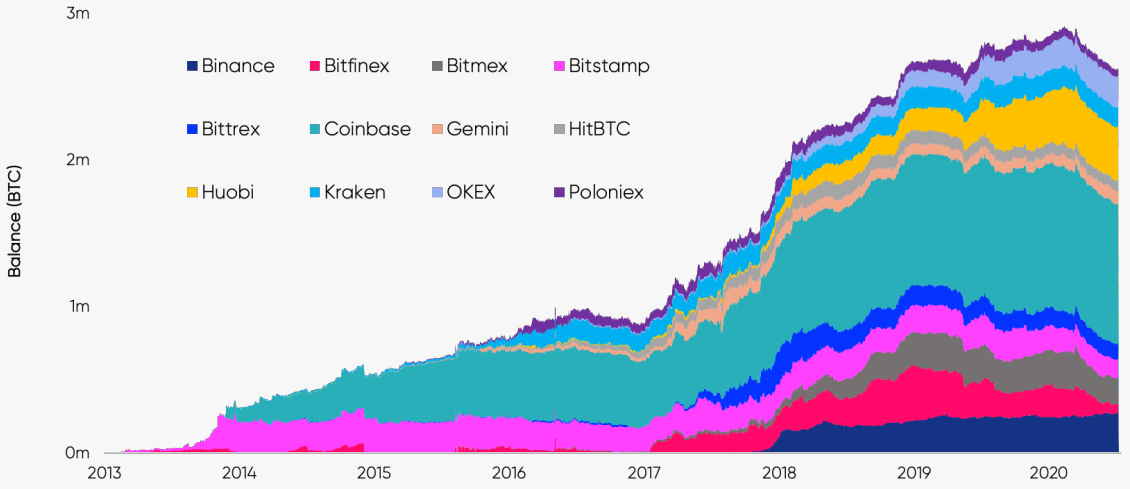
Analysing the BTC distribution by exchanges shows that the **net flows of BTC supply is not uniform across venues** for both the direction of the net flows as well as the rate of change in BTC balance.

Bitfinex had the largest decline in supply YTD (-71%) and in Q2 (-66%), followed by Bitmex and Bitstamp which both showed similar rates of decline.

Binance, Gemini, and OKEX are the only exchanges that have shown a positive change in supply in 2020 so far, with Gemini wallets seeing the highest growth in supply for both YTD (43%) and for Q2 (28%).

Exchange Balance Composition

Total amount of BTC held on exchange addresses



Source: Glassnode

BTC Supply Distribution	Binance	Bitfinex	Bitmex	Bitstamp	Bittrex	Coinbase	Gemini	HitBTC	Huobi	Kraken	OKEX	Poloniex
Sep-19	8.6%	6.1%	8.0%	7.5%	4.3%	34.3%	2.6%	2.7%	11.7%	5.5%	5.9%	2.7%
Oct-19	9.0%	6.0%	8.2%	7.5%	3.9%	34.0%	2.4%	2.7%	11.8%	5.4%	6.5%	2.5%
Nov-19	9.1%	6.5%	8.5%	5.9%	4.5%	34.8%	2.2%	2.7%	12.1%	5.3%	6.0%	2.3%
Dec-19	8.5%	7.8%	8.3%	5.9%	4.3%	34.6%	2.2%	2.7%	12.3%	5.1%	6.0%	2.2%
Jan-20	8.3%	6.9%	8.6%	5.7%	4.1%	34.2%	2.6%	2.6%	13.0%	5.0%	7.1%	2.0%
Feb-20	8.8%	6.3%	8.9%	5.2%	3.9%	34.0%	2.6%	2.6%	14.0%	4.9%	6.8%	2.0%
Mar-20	8.8%	6.8%	7.6%	5.2%	4.2%	34.9%	2.5%	2.7%	13.7%	5.0%	6.8%	1.9%
Apr-20	9.4%	4.4%	6.7%	5.5%	4.2%	35.8%	2.7%	2.7%	13.9%	5.1%	7.8%	1.9%
May-20	10.1%	2.7%	6.8%	5.2%	4.2%	36.3%	3.4%	2.8%	13.7%	5.2%	7.9%	1.9%
Jun-20	10.2%	2.4%	6.8%	4.8%	4.1%	36.5%	3.5%	2.7%	13.9%	5.1%	8.0%	1.9%

Distribution Change	Binance	Bitfinex	Bitmex	Bitstamp	Bittrex	Coinbase	Gemini	HitBTC	Huobi	Kraken	OKEX	Poloniex
YTD	11%	-71%	-24%	-25%	-14%	-3%	43%	-8%	4%	-7%	22%	-22%
Q2 2020	9%	-66%	-15%	-14%	-8%	-2%	28%	-4%	-5%	-4%	11%	-8%

P2P Marketplaces

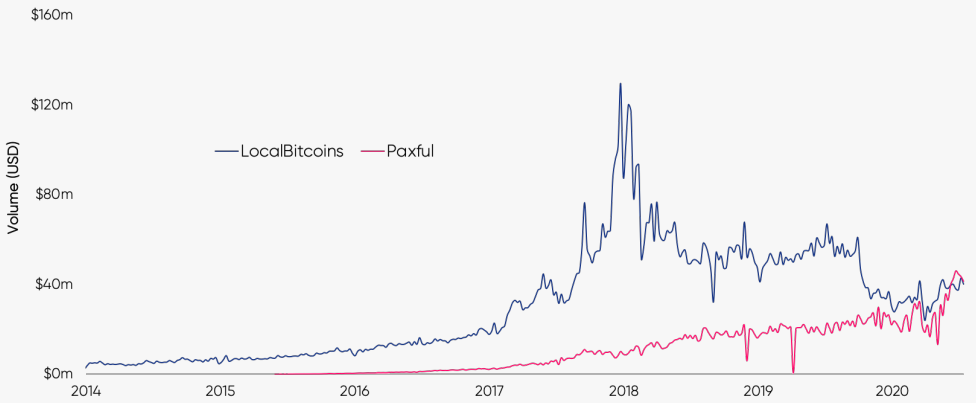
Peer-to-peer (P2P) marketplaces are venues that allow users to to buy and sell digital assets to one another using a variety of payment methods. Two of the most popular marketplaces used globally are Paxful and LocalBitcoins. Since the birth of Paxful, LocalBitcoins has continued to lose market share. In June 2020, Paxful overtook LocalBitcoins in weekly USD-equivalent trading volume for the first time.

There are several factors that may have collectively led to LocalBitcoin's decline in the last year. In June 2019, LocalBitcoins removed the option for users to pay with cash in-person as well as implemented a new identity verification system a few months later, severely affected the unbanked users in the 242 countries it serviced.

Volume Change (%)	LocalBitcoins	Paxful
Q1 2019	-8%	15%
Q2 2019	11%	-8%
Q3 2019	3%	21%
Q4 2019	-35%	11%
Q1 2020	-13%	-2%
Q2 2020	12%	28%

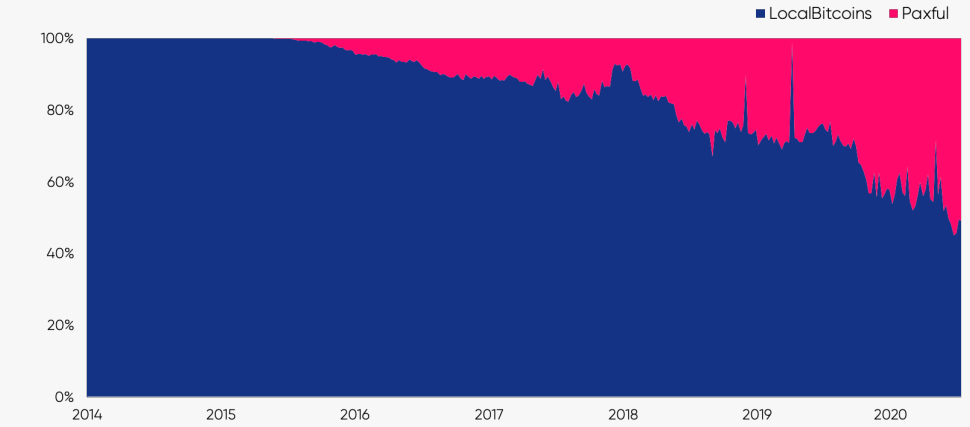
LocalBitcoins and Paxful Bitcoin Trading Volume (USD)

Total USD equivalent of BTC traded per week



Source: Coin Dance

LocalBitcoins and Paxful Market Share

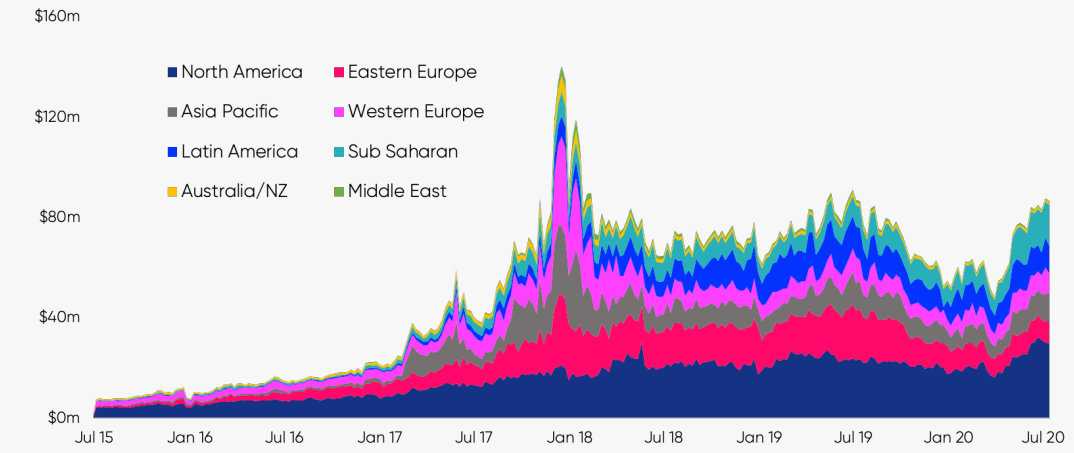


Source: Coin Dance

P2P Exchanges By Region

Combined OTC Volume (Per Region)

Volume aggregated across Paxful and LocalBitcoins



Source: Usefultulips

Volume Share (%)	Middle East	Australia/NZ	Sub Saharan	Latin America	Western Europe	Asia Pacific	Eastern Europe	North America
2016	1%	4%	4%	2%	17%	6%	19%	47%
2017	1%	4%	8%	5%	17%	19%	20%	26%
2018	2%	2%	10%	11%	13%	14%	20%	28%
2019	1%	1%	10%	15%	9%	12%	21%	31%
2020	1%	1%	14%	15%	10%	12%	13%	34%

Volume Change (%)	Middle East	Australia/NZ	Sub Saharan	Latin America	Western Europe	Asia Pacific	Eastern Europe	North America
Q3 2019	-15%	0%	15%	-15%	-3%	-1%	-3%	-7%
Q4 2019	-51%	-13%	-10%	-22%	-21%	-26%	-39%	-9%
Q1 2020	1%	-8%	-9%	4%	5%	-12%	-21%	-6%
Q2 2020	23%	2%	69%	17%	21%	29%	-2%	29%

The distribution of the aggregated P2P volume per region has changed over the years. In 2016/2017, the majority of the combined trading volume occurred in North America and the European regions.

However, in the last 2 years, there has been notable increased interest in **Latin America** with the region now having a 15% share in volume. This increase comes at a time when countries such as Venezuela continued to experience hyperinflation which shed 99% of its value against the dollar in 2019. This trend supports recent research that has found evidence that Bitcoin is being used as a vehicle currency across Latin America.

Africa is another region of notable growth in 2020 having the largest volume change in Q2 2020 (+70%). Africa's blockchain ecosystem is expanding with leading markets being found in Nigeria, Ghana, South Africa, and Kenya.

Address Balance Distribution

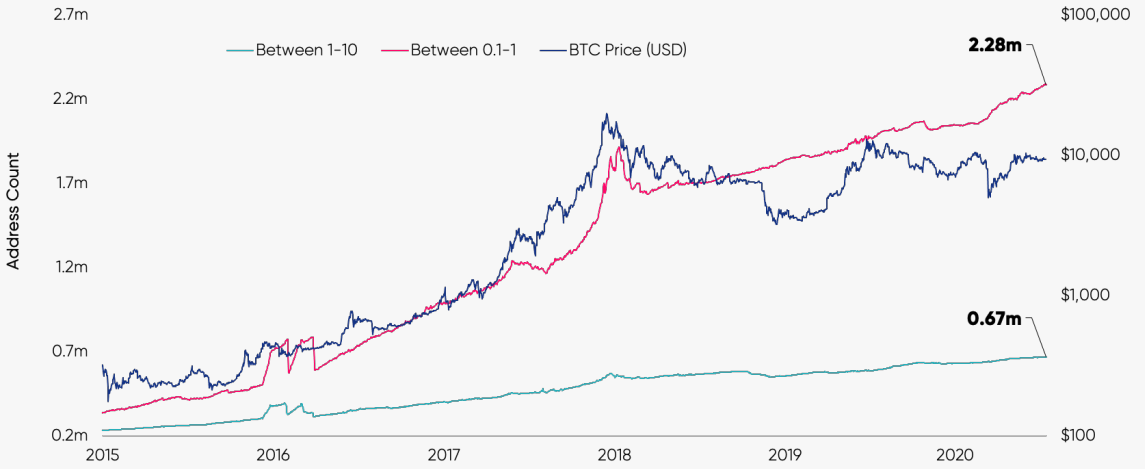
The distribution of addresses by balance can serve as a proxy for potential network growth. The most notable growth in the last year has come from retail-type addresses that have a balance of between 0.1-10 BTC.

What's particularly interesting is that the growth of addresses in the 0.1-1 bracket started accelerating since the sharp decline in BTC price in March suggesting opportunistic buying from retail investors. **The number of addresses in the 0.1-1 bracket increased at at an even faster rate in Q2 (+7%), building off on the 4% growth seen in the previous quarter.**

The other area of growth that occurred over the same period was **addresses holding between 1-10 BTC. This bracket also continued to reach new ATHs in Q2 which now stands at 667k addresses.**

Addresses with Balance 0.1-1BTC and ≥1 BTC

2015-present



Source: Glassnode

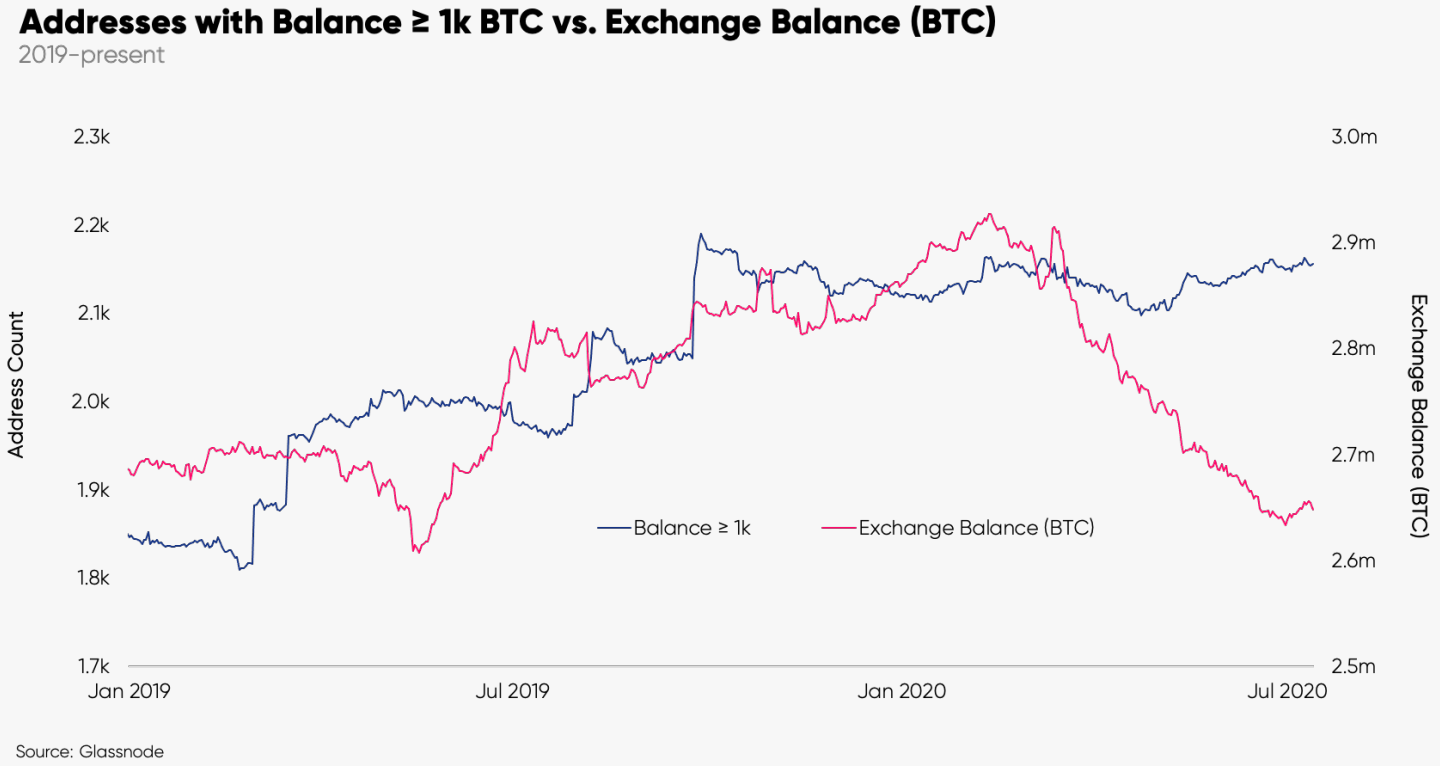
Number of Addresses by BTC Balance

Wallet Size Bands (BTC)	0.01-0.1	0.1-1	1-10	10-100	100-1k	1k-10k	>10k
2015	1,166,486	704,703	375,474	123,255	14,904	1,630	103
2016	2,219,348	987,373	400,250	129,770	16,496	1,626	112
2017	4,360,481	1,792,228	554,995	133,448	15,883	1,517	117
2018	3,920,188	1,834,967	552,697	132,588	14,761	1,752	99
2019	5,001,586	2,043,058	628,769	136,651	14,119	2,010	109
Q1 2020	5,199,556	2,153,213	645,181	137,359	13,913	2,022	110
Q2 2020	5,371,167	2,263,853	665,296	138,957	13,933	2,043	106
July 2020	5,382,777	2,280,591	666,732	138,182	13,914	2,052	104

Change (%)	0.01-0.1	0.1-1	1-10	10-100	100-1k	1k-10k	>10k
12M	15.0%	15.6%	13.4%	1.8%	-1.7%	10.86%	-11.11%
YTD	7.6%	11.6%	6.0%	1.1%	-1.5%	2.09%	-4.59%

Data 14th July 2020.

Whale Addresses



Source: Glassnode

Growth has not been limited to smaller balance addresses. **The number of addresses that hold more than 1k BTC has grown 3% since the end of April.** A marked increase for these addresses is particularly interesting because it coincides with a reduction of BTC supply in exchange wallets which, as highlighted previously, has continued to decrease during the same period.

While it is possible that exchanges dispersing BTC supply across new wallets might effect this total wallet count, it might also be that an increase in the number of addresses holding >1k BTC balances is simply reflective of increased accumulation by whale investors.

Multisig Addresses

Tracking the adoption of multisig address provides a proxy as to what portion of the supply is held by secure custodians and thus as a SoV. Building on Delphi Digital's analysis on P2SH addresses in May, the total BTC supply held in multisig addresses has fallen slightly from its peak by 3%. But while this might seem like the adoption across multisig addresses is declining overall, there are certain nuances at play.

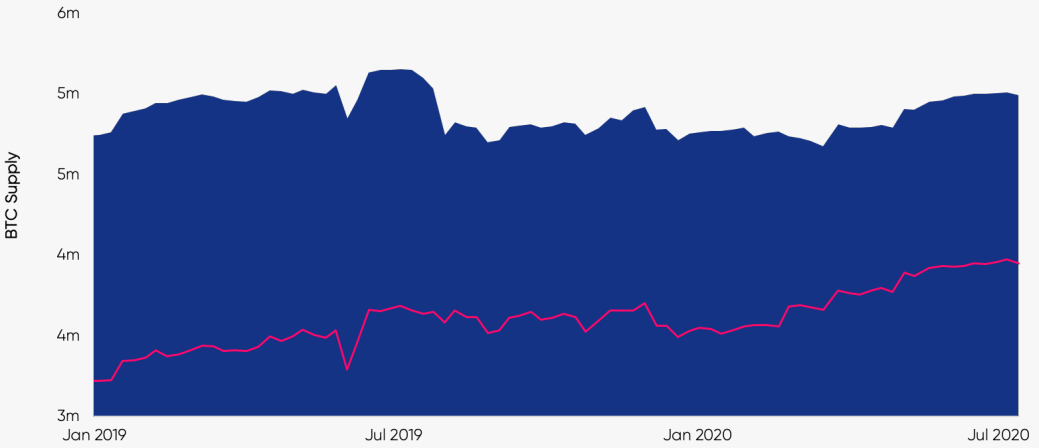
If we look at UNSPENT (hashed script only public once output has been executed), the number of BTC supply held in this category has continued to increase in 2020 – it may just be that the visibility of multisig arguments (e.g. 2 of 3) are becoming ever more opaque if we assume that BTC within this UNSPENT band are indeed held in multisigs.

With this in mind, we can contrast the growth of this category with the total supply in multisig by a simple ratio. At the start of 2019, **68% of the potential total supply of BTC was in the UNSEPNT band. Fast forward to today, that ratio now stands at 79%.**

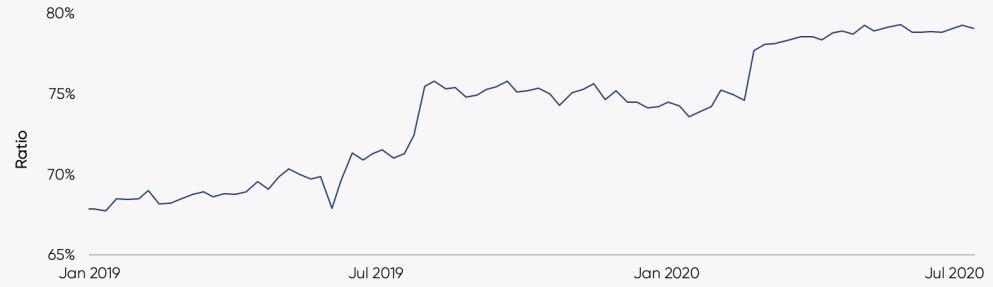
BTC Supply in Multisigs	Total	UNSPENT	Ratio
2016	1,744,990	33,021	2%
2017	2,537,741	490,738	19%
2018	4,740,590	3,217,406	68%
2019	4,751,374	3,527,483	74%
Q1 2020	4,809,895	3,778,787	79%
Q2 2020	5,002,509	3,956,083	79%

BTC Supply In Multisig Addresses vs. UNSPENT

2019-present



UNSPENT Supply Ratio To Total



Source: P2SH Address Type by Antoine Le Calvez

Note, P2PKH addresses have been excluded from the above analysis.

Lightning and Liquid Network

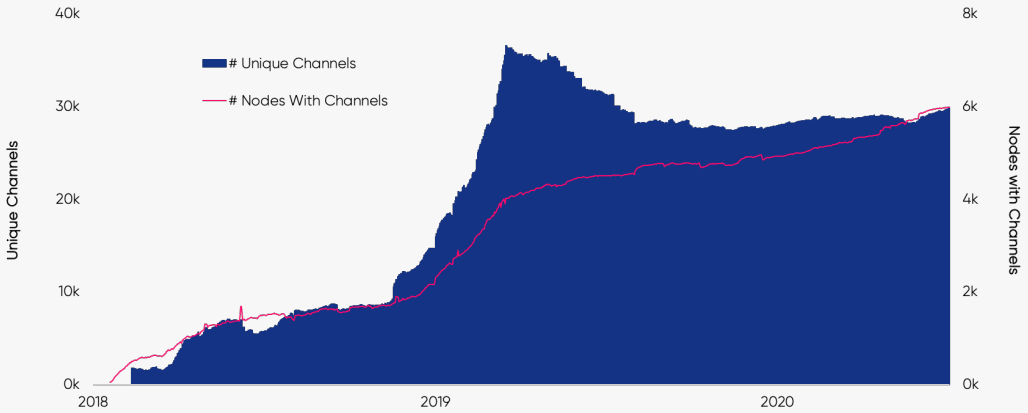
Shifting the analysis over to the lightning network, the number of nodes joining the lighting network **has continued to grow since 2018, increasing 21% since the start of the year and 12% in Q2**.

Conversely, the number of unique (public) channels has declined 18% since its peak from 36.5k in March 2019. However, the number of channels has increased 7% in 2020 (29.7k channels).

BTC capacity for Lightning increased 5% in Q2 and 13% YTD and looks set to break the 1k barrier in the coming days. **In comparison, Liquid, a Bitcoin sidechain-based settlement network, has grown throughout 2020. The sidechain now has a capacity of 2.5k marking a 2200% growth in 2020 alone**.

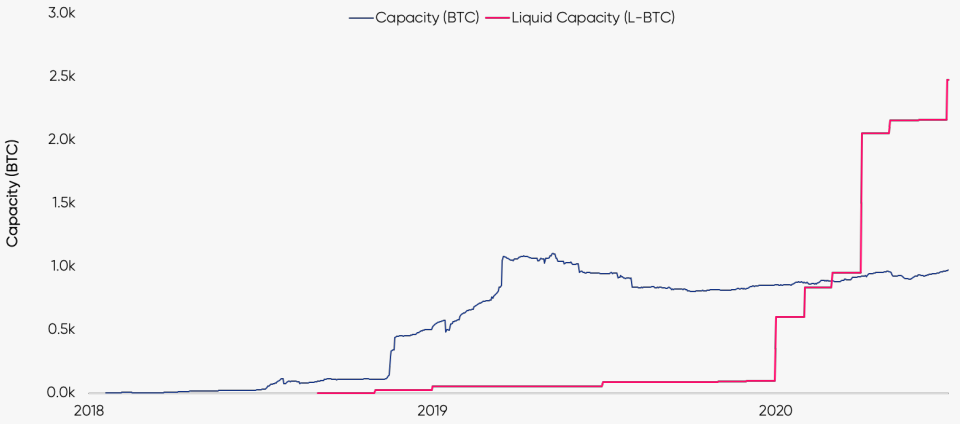
Note, that this analysis does not include private channels that have been created.

Liquid Nodes and Unique Channels



Source: Bitcoinvisuals

Lightning and Liquid Capacity



Source: Bitcoinvisuals, Liquid

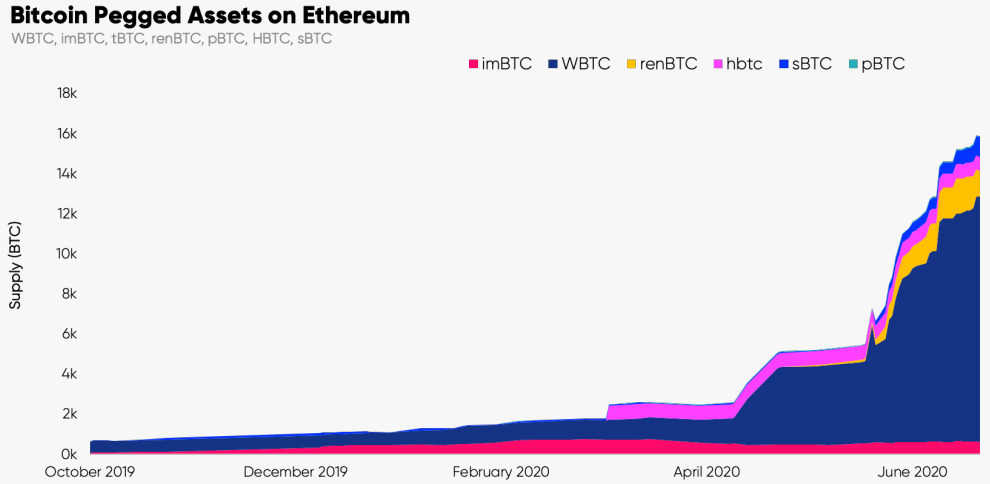
BTC on Ethereum

The industry has seen significant efforts in bridging BTC to the world of decentralised finance (DeFi), most notably on Ethereum.

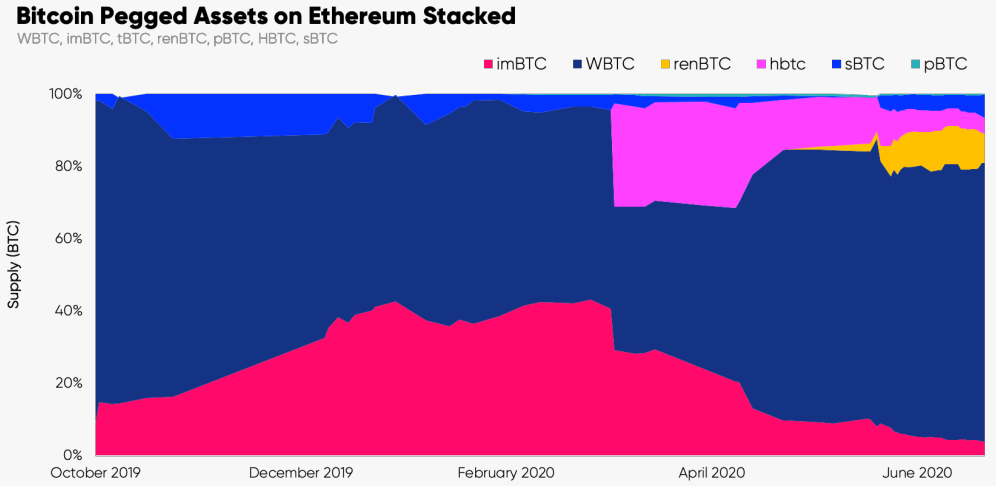
In most cases, this involves creating a BTC-collateralised ERC-20 token pegged to the market value of Bitcoin but each variant can differ drastically in their trust models. In the last few weeks alone, a wide range of BTC-pegged assets have been integrated with several dApps predominantly in the credit markets, where Bitcoin's volatility profile has been sought after.

One of the initial demand drivers was the inclusion of WBTC as a collateral asset on MakerDAO in May 2020 which is now backing 10% of the DAI supply. More recently, liquidity incentive mechanisms have been catalytic in driving up the supply of other variants, such as **RenBTC where the total value minted by the Ren protocol is now over $11 million.**

As of 20th July, there are 15.8k BTC (0.1% of the circulating supply) is represented on Ethereum.



Source: Dune Analytics, Elias Simos



Source: Dune Analytics, Elias Simos

Formal Verification.

www.formalverification.io