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Overview of Crypto Payment

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Research and Insights

Marco Report



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Executive Summary

Welcome to our crypto payment series. This article will give you an overview of the crypto payment market.

Key Takeaways

- Cryptocurrencies have experienced tremendous growth. The transaction value of BTC surpassed Paypal in 2020, and ETH also experienced a rapid increase.
- In general, there are three types of crypto payment gateways: Off-Chain payment, On-Chain (Layer 1) payment, and On-Chain (Layer 2) payment.
- Crypto.com, BitPay, and Coinbase Commerce offer two kinds of crypto payment products: payment gateway and prepaid card. Besides fintech players, traditional financial institutions have also started to build crypto payment networks, such as JPMorgan.
- Prepaid/gift cards and VPN/hosting industries accept the most cryptocurrency.
- The number of crypto users surged from **106 million** in January to **125 million** in February this year, signalling a new era for crypto adoption.
- Both BTC and ETH transaction values have reached ATH this year and surpassed the peak of the 2017 bull market significantly. In 2020, Bitcoin transaction volume reached **\$1 trillion** and surpassed PayPal's 936 billion.
- Crypto payment volume ranged from **\$15.66 billion** to **\$16.52 billion** by rough estimation. Crypto payment adoption still has a long way to go.

Introduction

The motivation of Bitcoin is to create a “peer-to-peer electronic cash system” as indicated in the Bitcoin whitepaper. Twelve years have passed since the first Bitcoin was mined, and the crypto space continues to become more prosperous with thousands of cryptocurrencies existing today and is supported by more than [106 million](#) people worldwide. In this tremendous adoption process, many ask, “how is the development of crypto payment which is the first incentive of cryptocurrencies growing?” As the pandemic changed our payment preferences, we expect further growth in crypto payment.

The rough estimate of crypto payments volume in 2020 ranges from **\$15.66 billion** to **\$16.52 billion**. Even though crypto adoption has accelerated this year, payment volume does not look big, especially when we compare it with payment giants like Visa and Paypal, which has \$8.8 trillion and \$936 billion payment volume for 2020 respectively.

As a payment method, crypto hasn't been mainstream. However, we should also note that cryptocurrencies' transaction value has already reached a relatively high level. According to [Coin Metrics](#), in 2020, the on-chain transaction volumes of BTC and ETH were **\$1 trillion** and **\$402 billion** respectively. BTC transaction values already surpassed PayPal. Statista shows that [digital payments](#) transaction value (including payments for products and services which are made over the internet as well as mobile payments at point-of-sale (POS) via smartphone applications) for 2020 was **\$5.5 trillion¹**, and BTC and ETH transaction volumes added up to more than ¼ that of the digital payments. Crypto transactions are becoming more and more important nowadays.

¹ The followings are not included: transactions between businesses (Business-to-Business payments), bank transfers initiated online (that are not in connection with products and services purchased online), and payment transactions at the point-of-sale where mobile card readers (terminals) are used

Brief History

You may hear of the Bitcoin Pizza Day, when a Florida man paid 10 thousand Bitcoins for two pizzas on 22nd May 2010. This may be the most famous and widespread Bitcoin transaction in Bitcoin's early period. The man surely never expected that the 10k Bitcoin then would be worth more than \$500 million now.

In 2011, the major cryptocurrency payment service provider BitPay was founded to provide mobile checkout services to merchants that wanted to accept Bitcoins. It also reported [\\$1 billion](#) worth of transaction processing in 2018.

bitpay

From 2013 to 2014, the crypto payment industry developed gradually. In February 2013, the famous social media platform Reddit began to [accept](#) Bitcoin as a payment option. 2014 indicated the rapidly growing popularity of Bitcoin as numerous companies established to foster crypto payment: [Dell](#) and [Time Inc.](#) partnered with Coinbase to accept Bitcoin payment; Coinbase also added payment processing capabilities to [PayPal](#); Partnered with BitPay, [Microsoft](#) followed to embrace Bitcoin payment.



Time Inc.



In 2015, [Stripe](#) initiated Bitcoin payment integration for merchants, making e-payments even more accessible. In the same year, Japanese e-commerce giant [Rakuten](#) added its name to the list of retailers that accept Bitcoin in the US.



In February 2018, Coinbase joined the crypto payment industry by announcing the [launch](#) of Coinbase Commerce, which is a tool to let merchants accept

multiple cryptocurrencies. In March 2018, the Lightning Network (LN) beta version was launched, and in 2019, the network was used for transactions. In October 2018, Crypto.com Visa Card started to ship in Asia and in March 2019, Crypto.com Pay checkout solution was launched.



After 2019, more and more companies were involved in this payment evolution supported by the payment platforms, including Whole Food, Shopify, etc. Coming into 2021, crypto adoption has been further accelerated, driven by the bull crypto market. What's more, Crypto.org Chain – the payment-centric blockchain network will be launched in March 2021. This will further empower Crypto.com Pay to a widely payment usage.

Crypto Payment Gateways

Usually, merchants need to integrate payment gateway to accept consumers' cryptocurrencies, and generally, there are three types of crypto payment gateways:

- Off-Chain
- On-Chain (Layer 1)
- On-Chain (Layer 2)

Off-Chain Payment

Off-chain payments are facilitated by custodial services just like traditional mobile/online payments. Those custodial services normally provide a list of accepted cryptocurrencies and act as the settlement agent who bears price volatility risks.

Those payment solutions are usually very convenient and provide a great user experience. However, unlike the Bitcoin network, off-chain payments are not fully trustless. In other words, users need to trust the custodian agency in order to use their services.

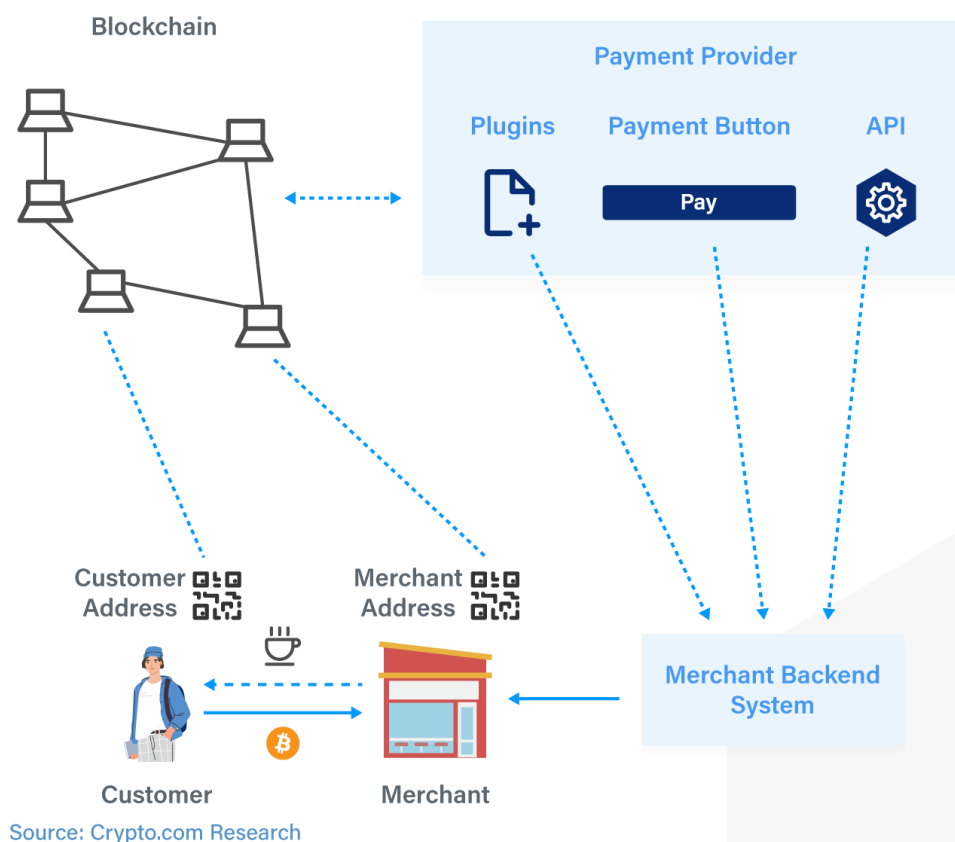
On-Chain (Layer1) Payment

The payments facilitated by this kind of gateway are on-chain (e.g., the Bitcoin blockchain). You pay your crypto directly from your wallet to the merchant's wallet. The blockchain network will validate the transaction.

Typically, such payment platforms work like non-custodial crypto wallets. The merchant is assigned an address to receive payment. Therefore, the payment platform's role is to provide integration tools like API or UI plugins for those merchants who wish to integrate it.

Typically, merchants accepting crypto will charge a higher fee (>0.5% of transaction volume) to compensate for their operational costs, in addition to the liquidity and volatility risks that come with handling cryptocurrencies. For retail users, the user experience of making crypto payments should be similar to making a transfer over the blockchain network, such as withdrawing money from an exchange to a wallet.

On-chain Payment Demonstration:



Here we use Crypto.com as an example to illustrate. The [Crypto.org Chain](#) is a highly performant native blockchain solution, which will make transactions between crypto users and merchants seamless, cost-efficient and secure. In addition to decentralized features, Crypto.org Chain can also integrate with current fiat payment gateways, which reduces the public's efforts to access cryptocurrencies. Our mobile payment product Crypto.com Pay is powered by Crypto.org Chain. Crypto.org Chain will be [launched](#) on 25th Mar 2021.

We summarize the key value propositions of the Crypto.org Chain as below:

- Secure: Fault-tolerant design making the Chain resilient and safe;
- Instant & Low-Cost: Chain delivers Instant transaction confirmation coupled with minimal fees;
- Permissionless: Chain is an open-sourced project that welcomes any

party to join the network and/ or contribute to the code development.

What's more, Crypto.org Chain not only caters to retail users who want to spend crypto anywhere for free but also speaks to fiat institutions who face cryptocurrency-related challenges. For instance, Crypto.org Chain will help fiat institutions in areas such as:

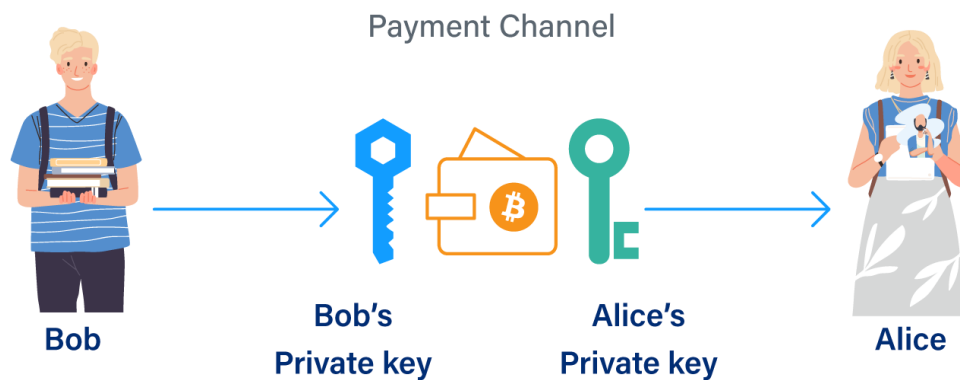
- Safe custody of cryptocurrencies;
- Control of price volatilities of cryptocurrencies;
- Timely and cost-efficient on-chain / off-chain settlement;
- Management & support of multiple cryptocurrencies.

On-Chain (Layer 2) Payment

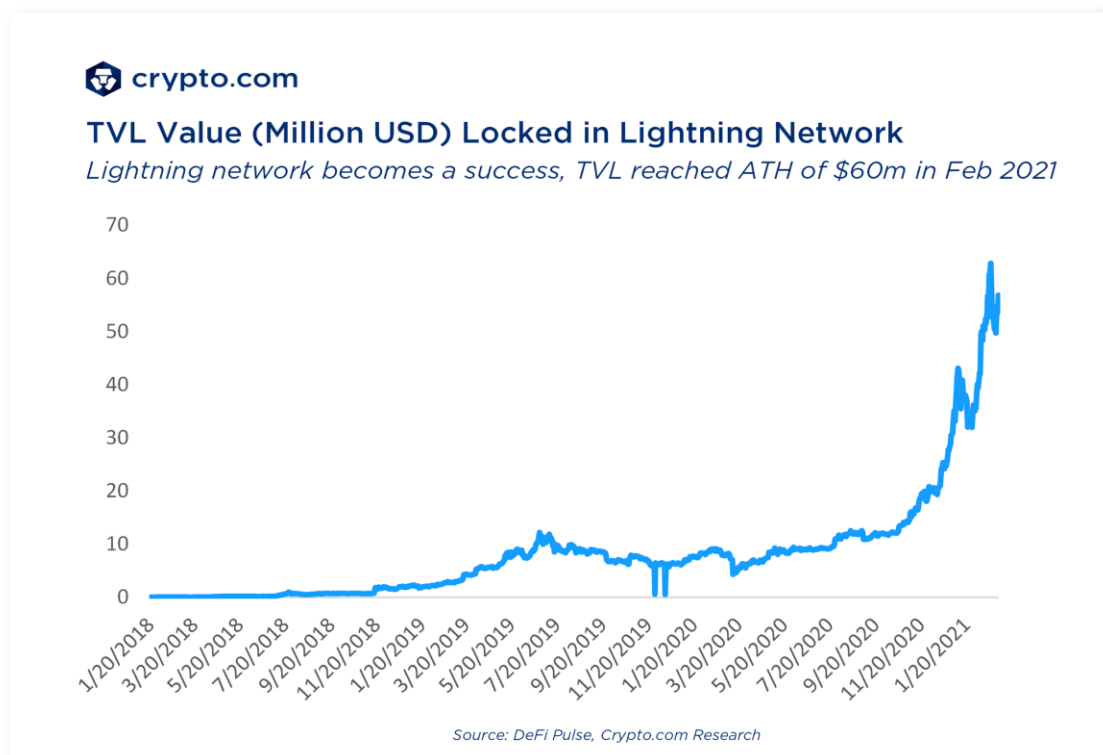
This kind of payment temporarily moves some transactions off-chain so that they can be settled much faster. Only when transactions in off-chain channels are finished will they be broadcast to the whole on-chain network. One famous method for off-chain payment that you may have heard of is the *Lightning Network*.

The Lightning Network is a layer 2 [payment channel](#) designed as a scaling solution to tackle the [blockchain scalability trilemma](#). The main idea is to establish a channel between two parties who want to transact. All transactions taking place within the channel are off-chain, and global network consensus is not required. As a result, these transactions execute quickly via a smart contract, with much lower fees and almost instantaneously. A typical payment channel has three phases:

1. Establish a channel by signing and funding it;
2. Peer-to-peer transactions on a payment channel;
3. Close the channel and broadcast the final state to the main blockchain.



In March 2018, Lightning Labs released the beta version of the Lightning Network and in 2019, the network was used for transactions. Today, **\$54.6 million** was locked in the Lightning Network based on data from [DeFi Pulse](#).



Payment Companies

Crypto.com

Crypto.com builds an ecosystem to buy, sell, and pay with crypto to accelerate the world's transition to cryptocurrency, and we serve 10 million users today. Our strategy is to leverage payment solutions as the primary tool for driving adoption and user acquisition, while building trading and financial services solutions as the major sources of revenue. We provide two payment products: **Visa card** and **Crypto.com Pay**.

Visa card is a prepaid card that users can top up using bank account transfer, other credit/debit cards or cryptocurrencies. It's the most accessible crypto card in the world as it has already shipped to the US, Europe, the UK, Singapore and Canada. This Visa card enables users to:

- Spend & withdraw the fiat equivalent of their cryptocurrency online or offline at **50+ million** VISA-approved merchants worldwide;
- Enjoy instant top-up and payment completion without waiting time;
- Spend overseas at interbank exchange rates without markups;
- Benefit from amazing perks associated with the card.



Crypto.com Pay enables customers to pay in crypto. It also allows merchants to accept cryptocurrency and get paid in their preferred crypto or fiat

currency to adjust their risk level. Supported by the Crypto.org Chain, Crypto.com Pay can reduce the confirmation time less than 1 second and can process up to 50,000 transactions per seconds (tps).

Crypto.com Pay has four offerings:

- **Pay Checkout:** Customers check out and pay in crypto or merchants to receive crypto as an additional payment option. Selected partners: **Woo Commerce, Ecwid, OpenCart, Oveit, Ledger, BC Vault, Travala.com**, etc. Two outstanding benefits: A. Reduced transaction costs (**0% fees**) for merchants, enabling consumers to spend crypto online for free with additional 20% cash back (up to \$50 per customer); B. Enable users to shop with 15+ DeFi tokens, including CRO, USDC, BTC, ETH, and LTC.
- **Pay Gift Cards:** Users can shop at worldwide prominent brands (such as iTunes, Google Play, Amazon, Starbucks, Nike etc.) with crypto, and get cashback in CRO with each purchase.
- **Pay Airtime Top-Up:** Pay for mobile airtime top-up via Crypto.com Pay in cryptocurrencies such as BTC, ETH, LTC, and CRO. Users can top up airtime for mobile numbers offered by over 340 prepaid mobile network operators, including **T-Mobile, Vodafone, Airtel, Orange, Verizon**, and others, in over 100 countries.
- **Pay Your Friends:** Pay back your friends in crypto instantaneously for free, and earn rewards by doing so.

BitPay

[BitPay](#) gateway focuses on settling payments by invoices that are issued by online-shops. It charges a 1% processing fee from merchants except for the miner fees. BitPay can help merchants convert cryptocurrency into fiat. After that, merchants can withdraw fiat currency from BitPay to their bank account. One useful feature BitPay [offers](#) is to set withdrawal transaction speeds to whatever time frame is required. [BitPay](#) is the largest bitcoin payment processor in the industry. However, it suffered opposition as it [forces](#) users to pay via a non-standard version of the BIP70 – a deprecated Bitcoin payment standard that relies on a centralized digital certificate issuance and may open up the risk of AML/KYC surveillance and monitoring of on-chain transactions.

BitPay supports eight cryptos in total. They are BTC, BCH, ETH, XRP, USDC, BUSD, PAX, and GUSD. In December 2020, Bitcoin [accounted](#) for 81% of BitPay's total transactions processed.

Coinbase Commerce

Coinbase Commerce is a crypto payment solution provided by Coinbase, the biggest crypto exchange in the US. Coinbase Commerce focuses on the e-commerce sector and allows merchants to convert crypto to fiat money. Unlike BitPay, which charges 1% processing fees, Coinbase claims they do not charge a commission for withdrawing funds. Only network fees from miners are charged. However, some people have [concerns](#) there might be hidden charges as the network fees are so high recently.

Coinbase supports six cryptocurrencies: BTC, BCH, DAI, ETH, USDC, and LTC.

Traditional Financial Institutions

Besides those Fintech companies mentioned above, traditional financial institutions continue to join providing crypto payments services. One example is JPMorgan that created JPM Coin for institutional payments. JPMorgan, the largest bank in the US, has been very active in crypto payments. In 2016, JPMorgan built Quorum blockchain, which can be used for crypto transactions. Although Quorum was sold to a crypto firm later, it is not the end of the story. In 2019, JPMorgan created a proprietary cryptocurrency: JPM Coin, to improve institutional clients' payment settlements. JPM Coin is a stablecoin in nature and works as the intermediary for institutional payments.

Clients can redeem JPM Coin for USD after the transaction is settled.

In 2020, JPMorgan's global head of wholesale payments [mentioned](#) that a large tech client was using JPM Coin commercially for the first time. JPMorgan also launched a separate business named Onyx, which expands JPMorgan's wholesale payment platform. Onyx has been growing rapidly. Its blockchain network, Liink, has [enlisted](#) more than 400 financial institutions around the world in 78 countries, including 25 of the world's top 50 banks.

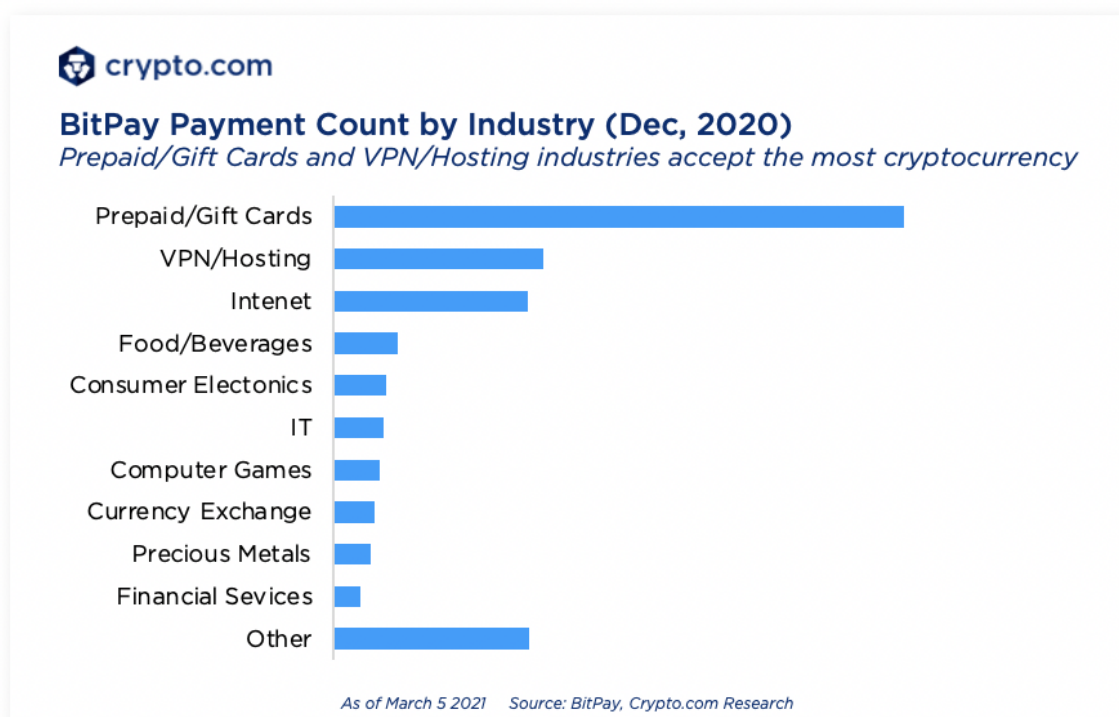
Additionally, more than 100 banks have [tested](#) instant payments with the use of Ripple.

On 4th Jan 2021, OCC announced a ground-breaking [crypto policy](#) for banks: It allows US banks to participate in Independent Node Verification Network (INVN) and use stablecoins for payment activities. The [interpretive letter](#) further explains that "a bank may use stablecoins to facilitate payment transactions for customers. In doing so, a bank may issue stablecoins, exchange stablecoins for fiat currency, as well as validate, store, and record payments transactions by serving as a node on a blockchain (INVN)." This might further provide them incentives to join crypto payments and even to build their payment networks.

Merchants

Accepting cryptocurrency is becoming the trend for merchants in many industries. You can find a company list that accepts cryptocurrencies [here](#), and this list is expected to be much longer in the future as more corporations are trying to join. For instance, [Tesla](#) is pending to accept Bitcoin.

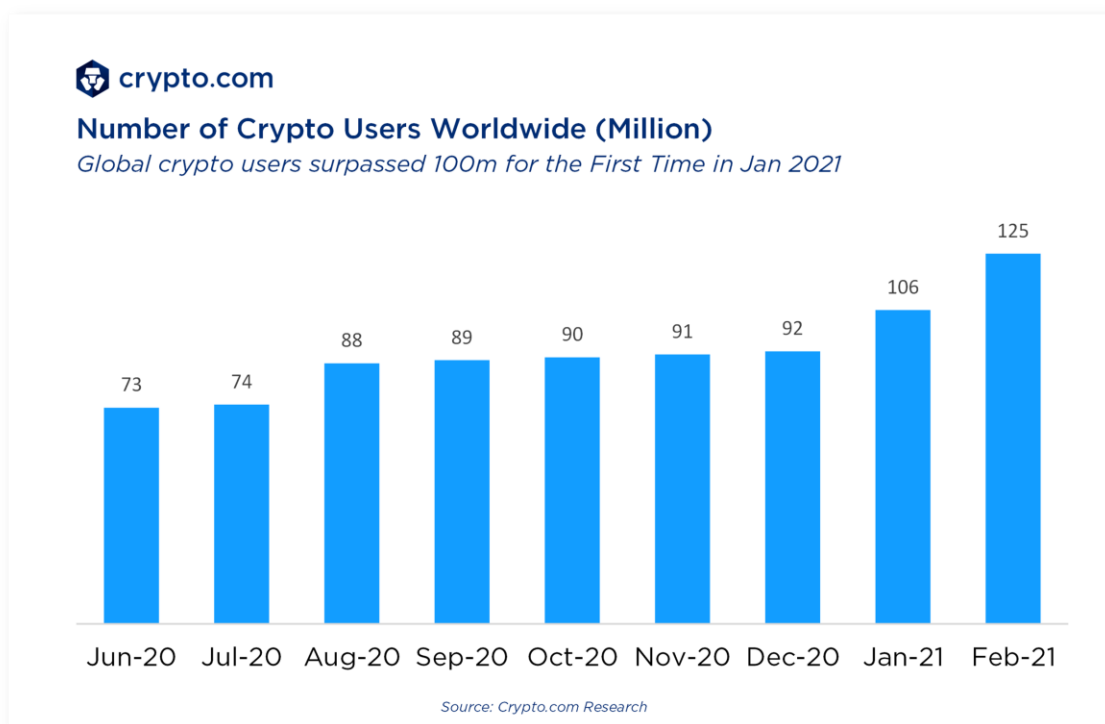
According to [data](#) from BitPay, we can see that prepaid/gift cards and VPN/hosting industries accept the most cryptocurrency.



General Users

We can't leave out users when we talk about crypto payment. As the end-users of crypto payment, crypto users also determine the development of this industry, just like the adoption of the internet.

We have adjusted our [methodologies](#) to calculate crypto market sizing worldwide. The number of crypto users first passed 100 million in January 2021, and the latest number is 125 million in February 2021.



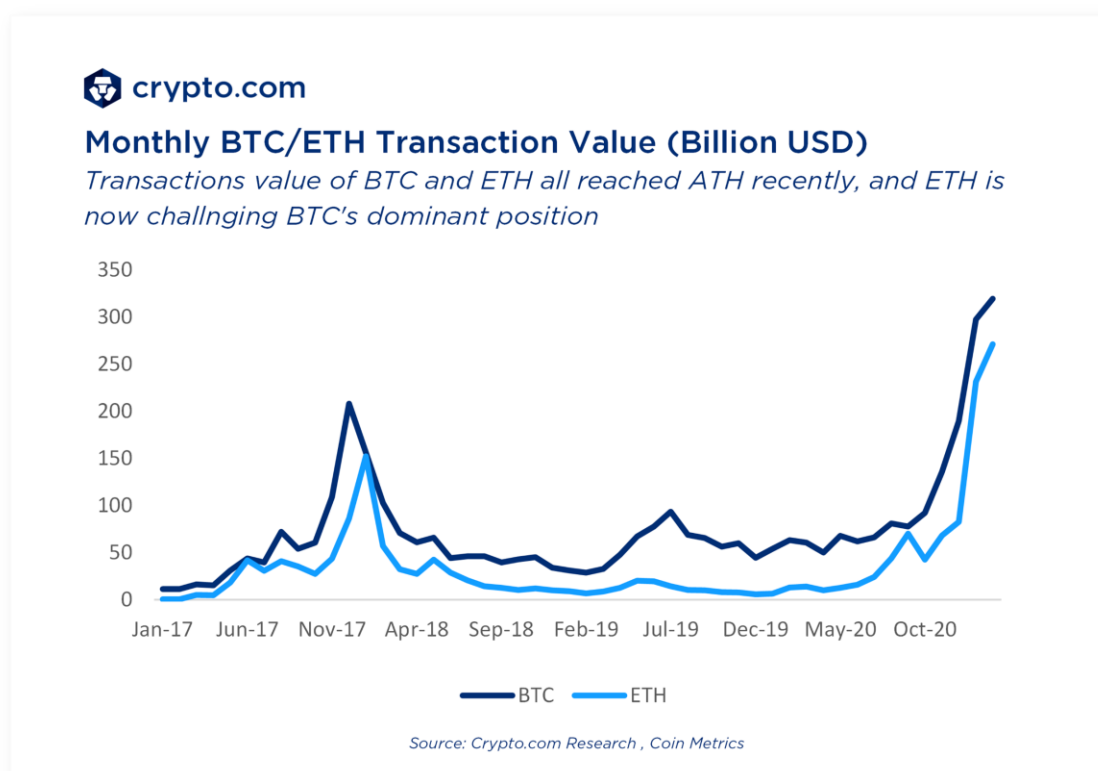
Analysis

Transaction & Payment Volume

In this section, we will compare crypto transaction volume with digital payment volume and PayPal payment volume. After that, we will have a rough estimate for the crypto payment volume.

BTC and ETH Transaction Value

Our transaction value indicator is the USD value of all the transfers that happened each month between different addresses. The data is adjusted to remove noise and certain artifacts.



In 2020, the on-chain transaction volumes of BTC and ETH were **\$1 trillion** and **\$402 billion** respectively. Both BTC and ETH transaction values have reached ATH this year and surpassed the peak of the 2017 bull round quite a lot. In February, the monthly transaction value of BTC and ETH are **319.3 billion** and **271.1 billion** USD respectively. And we can also see that ETH is gradually becoming a real challenger for BTC.

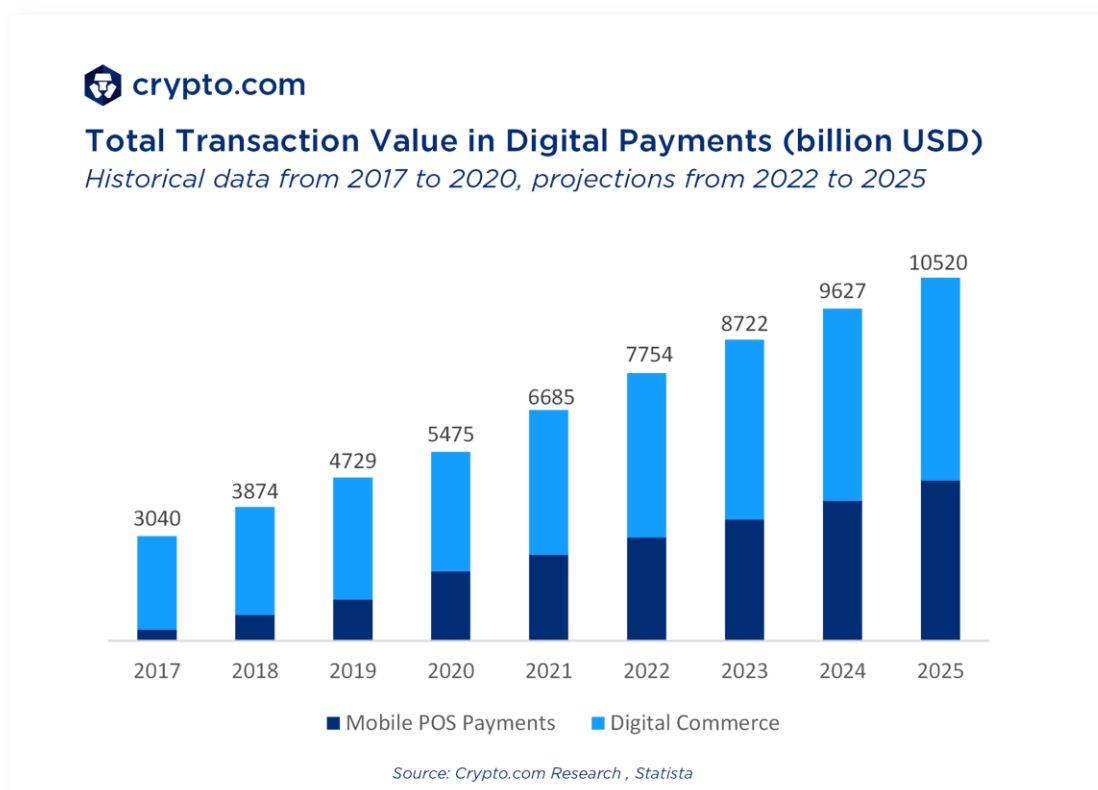
Digital Payment Volume

Statista [categorizes](#) digital payments into Digital Commerce and Mobile POS Payments²:

Digital Commerce: Consumer transactions made via the internet which are directly related to online shopping for products and services. Examples include credit cards, direct debit, invoice, or online payment providers, such as PayPal and AliPay.

Mobile POS Payments: Transactions at Point-of-Sale that are processed via smartphone applications (so-called “mobile wallets”). Examples include ApplePay and Samsung Pay.

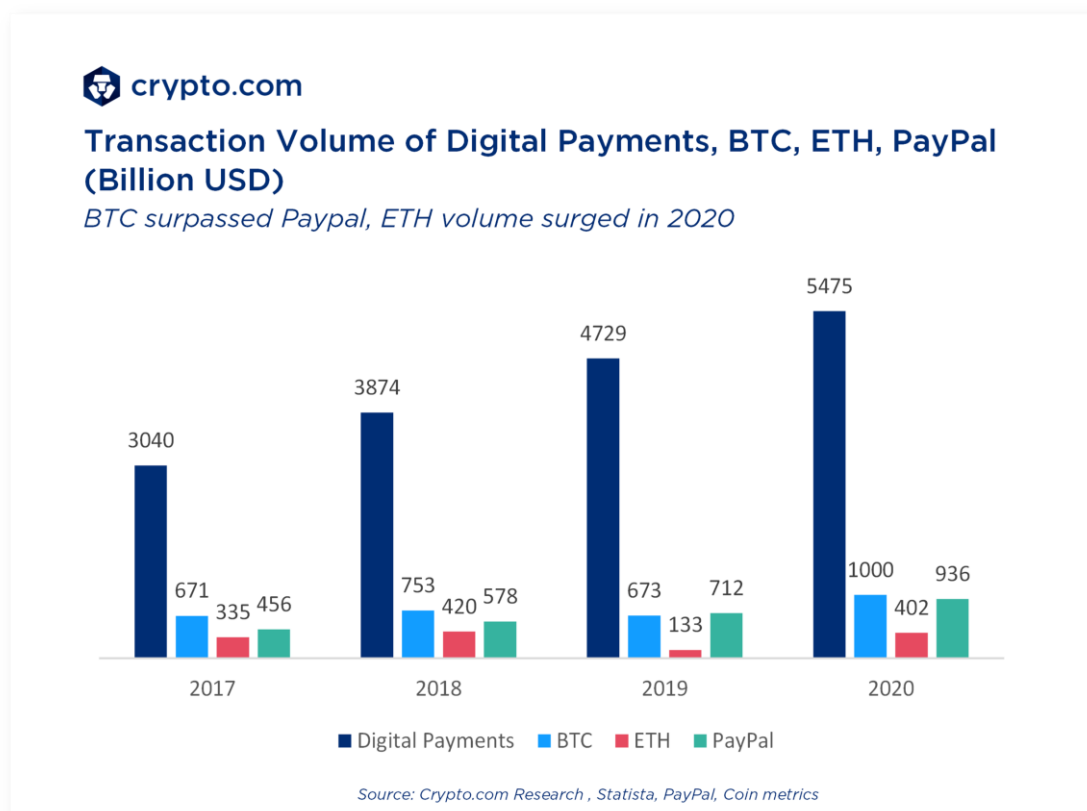
It [shows](#) that global digital payments transaction value reached \$5.5 trillion in 2020.



² The followings are not included: transactions between businesses (Business-to-Business payments), bank transfers initiated online (that are not in connection with products and services purchased online), and payment transactions at the point-of-sale where mobile card readers (terminals) are used

Transaction Volume Comparison

The following chart compares the transaction volumes of BTC, ETH with digital payments and PayPal to give you a more intuitive understanding of how large crypto transaction volume is.



The BTC transaction values already surpassed PayPal, and BTC and ETH transaction volume is $\frac{1}{4}$ that of digital payments. Crypto transactions have become increasingly important.

Although the transaction volume of crypto is huge, we should also note that only a proportion of it is used for payments. Currently, there are no authoritative data for crypto payment volume. Here we do some simple calculations to give you a rough idea of crypto payment volume.

[FIS](#) suggests that only 0.4% of global e-commerce are attributed to crypto payments. The estimation of global e-commerce sales ranges from [\\$3.914 trillion](#) to [\\$4.13 trillion](#). We estimate that crypto payments volume ranges from **\$15.66 billion** to **\$16.52 billion** by a simple calculation. Compared to payment giants like Visa and PayPal, which have \$8.8 trillion and \$936 billion payment

volume for 2020 respectively, crypto payment still has a long way to go.

Advantages

Crypto payment has great potential to be the next evolution in the payment industry, supported by the following superior features:

User Autonomy And Disintermediation

Instead of relying on banks to keep your money in the traditional fiat payment, you can control your own money as long as you keep your private key. Users are able to control how they spend their money without the need to trust any intermediaries.

Privacy

Users will not unveil their personal information, and the transactions take place anonymously. The only disclosure is the wallet address, which is not likely to reveal any personal information.

Low Transaction Fee For Remittances

Usually, the traditional wire transfer is both time-consuming and expensive. The fees for cross-border payment can be 5% to 10% for each transfer, and it might take up to 2 working days to finish. By applying Blockchain technology, users can make a faster and cost-efficient transfer.

High Default Tolerance

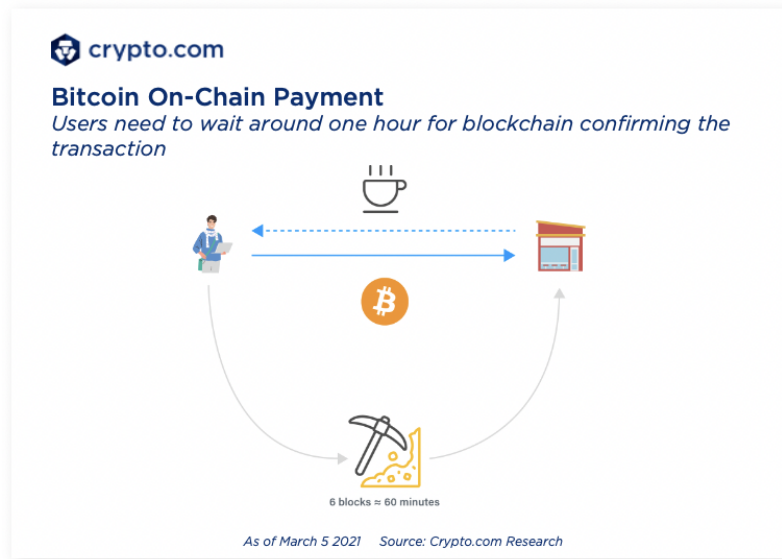
Supported by a large number of nodes in the blockchain system, payments are broadcasted to the entire network when they are successfully settled. No one can change the records as long as the network itself is secure, so the hacking risk is largely reduced.

Roadblocks & Solutions

However, like other emerging technologies that encountered resistance before becoming mature, we also would like to talk about the main barriers to crypto payment.

Fees / Speed

For Bitcoin, one may need to wait for 60 minutes (6 blocks deep) until a transaction can be settled. Even one block confirmation can take up to 10 minutes. For small transactions, such as buying a cup of coffee, this kind of delay is unacceptable.



The high transaction fee is another problem. Bitcoin's transaction fee is independent of transaction volume, making it attractive for high-value payments. However, paying \$1 as a transaction fee is simply too expensive for small daily transactions.

While other cryptocurrencies, like Ethereum, generally have lower fees and are faster, they are still subject to the [blockchain scalability](#) problem. When there is a surge on network usage, network congestion can make transactions slow and expensive. Many crypto projects are trying to solve the scalability trilemma. For more details, please check our university article [here](#).

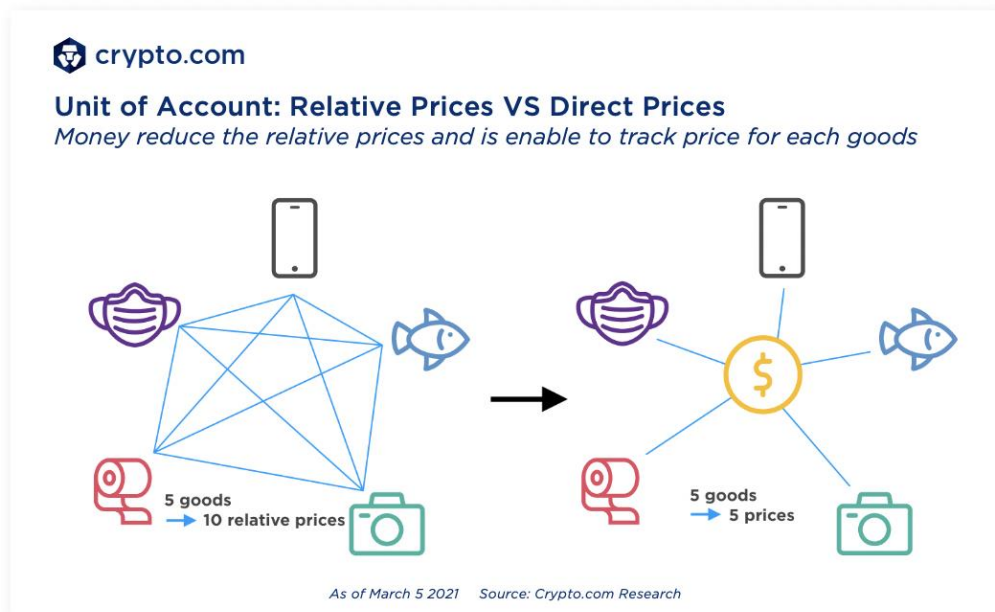
Crypto.org Chain was born for crypto payment, and we do bear the scalability problem in mind. We used the consensus algorithm to have confirmation time less than 1 second and process up to 50,000 transactions per second (tps).

Volatility

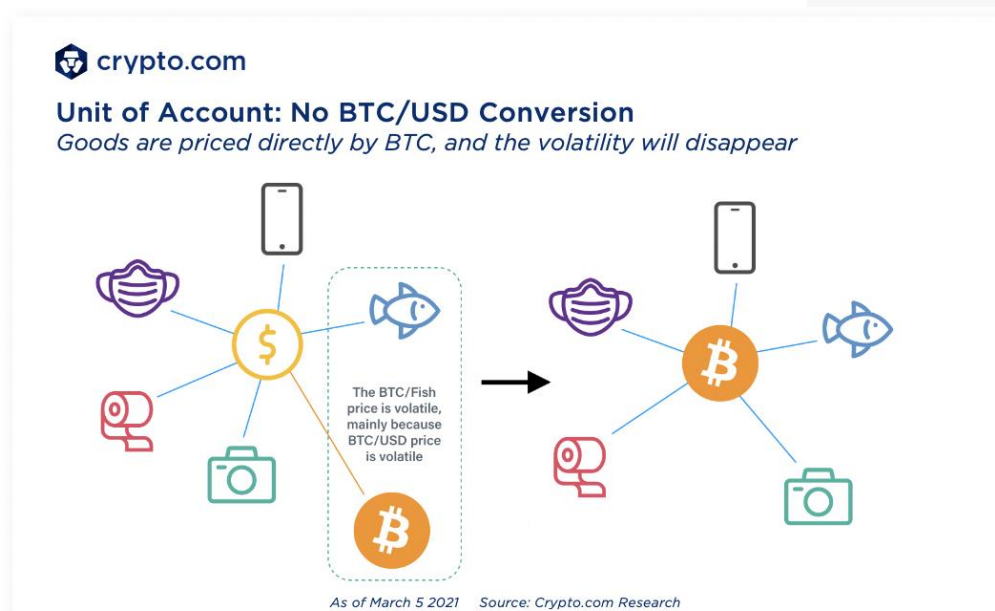
Traditionally, money can be used as a unit of account, a store of value, and a medium of exchange. Each of these three roles emerged in order to overcome different economic needs. Money as a unit of account is perhaps the most important.

With money that serves as a unit of account, only n prices need to be tracked:

the price of each good in units of money. The unit of account allows agents to communicate value in an easily understandable and universally accepted way. It is, in a sense, like a common language.



Sadly, cryptocurrencies still have a long way to go before becoming a unit of account. When purchasing goods, users are still converting BTC into its USD equivalent value to determine the price of goods, e.g., 0.1 BTC = \$900 = an iPhone. In this sense, Bitcoin is indifferent to other consumer goods, and its relative price to other goods will always be changing.



In light of this, many have suggested the use of stablecoins during this

transition phase. As Sir Jon Cunliffe, the deputy governor of Bank of England, [suggests](#), “it could become mainstream for people to move from holding all or much of the money now in ‘current accounts’ at banks to holding it in ‘stablecoin’ in virtual ‘wallets’ provided by non-banks.” Once people are more willing to adopt stablecoins, they will also integrate other cryptocurrencies, which may eventually bring crypto payment into the mainstream.

Regulation

Compliance risk (e.g., AML, KYC) is another concern for the crypto space. The decentralized nature of blockchain makes it hard to be controlled by the government. As a result, it increases the difficulty of using centralized ways to supervise the whole system and conduct fiscal policy. [FinCEN](#) has specified many regulations to control this risk. However, the regulations seem to be too strict, and it's still controversial.

Summary

Key Takeaways

- Cryptocurrencies have experienced tremendous growth. The transaction value of BTC surpassed Paypal in 2020, and ETH also experienced a rapid increase.
- In general, there are three types of crypto payment gateways: Off-Chain payment, On-Chain (Layer 1) payment, and On-Chain (Layer 2) payment.
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