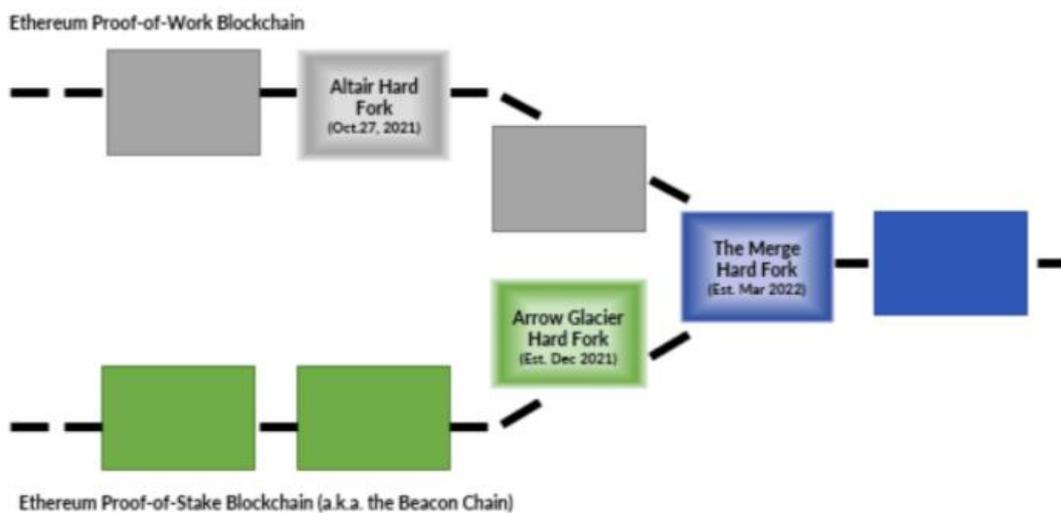


# Technological Trends & Developments

## The latest updates from the ETH2 roadmap

Ethereum Foundation is preparing for the Kintsugi long-running testnet, a step up in production readiness for the clients, which aims to implement a near-final Merge spec candidate. The name is inspired by the Japanese art of repairing broken pottery by mending the areas of breakage with lacquer dusted or mixed with powdered gold, silver, or platinum. For analytical Merge specifications that are considered to be implemented for Kintsugi, [please refer here](#). Earlier during November, the Altair upgrade has been successful as a warm-up upgrade in anticipation of the merge event. Among the highlights of the Altair upgrade is the support for “sync committees” to the beacon chain, which are enabling light clients to easily sync up without high requirements related to processing power or data usage. Similarly, the update introduces updated penalty parameters known as slashing penalties. This update is “punishing” inactive validators of the network who are not proposing new blocks or processing transactions to lose their staked ETH faster. Additionally, the minimum slashing penalty for those validators with fraudulent actions has been increased from 0.25ETH to 0.5 ETH. An annotated version of the [Altair beacon chain spec is available here](#). Since Altair is reducing the hardware requirements, it is anticipated that will improve the decentralization of the network, and support the adoption of the Ethereum blockchain long-term.



Ethereum Hard Fork Schedule Source: [Galaxy Digital Research](#)

It is currently expected that the Merge Hard fork will be implemented on March 2022, when the Beacon Chain will merge with the Ethereum Proof-of-work chain. Currently there are approximately 8.42 Million in staked ETH. This update will end the mining activity in Ethereum and will replace with the Proof-of-stake. According to [Josh Stark](#), an employee at the Ethereum Foundation the transition from Proof of Work to Proof of Stake will contribute to reducing the energy use of the network by about -99.95%. In "Proof of Work" cryptocurrencies, the high energy use is a proxy for a financial cost.

If it is expensive to mine, then it is expensive to gain majority control of the network. In PoW, that expense comes in the form of energy. By switching to Proof of Stake, we substitute the role of the energy in the protocol and put in a stake a financial cost. From then, the main energy cost is just running client software which is equal to approximately 2.6 MWh per year. A simple comparison with the US gaming industry will showcase that gaming is 1,300 times as energy-consuming than powering Ethereum.

## Open Zeppelin incubates Forta - the first decentralized runtime security protocol for smart contracts

Forta is a decentralized runtime security protocol for smart contracts, which monitors transaction activity and receive alerts on security, financial, operational, and governance-related events. Forta has two components- agents and nodes. Agents are scripts that look for certain characteristics or state changes. Nodes run agents against each block of transactions.

## Vitalik Buterin suggests a step-by-step roadmap for scaling rollups with calldata expansion and sharding

Ethereum co-founder Vitalik Buterin [has published a step-by-step roadmap](#) for how data space available to rollups can be greatly expanded, and hence rollup fees greatly reduced) progressively. The roadmap is starting from calldata gas cost reduction and continuing with a step-by-step rollout of sharding.

Rollups are in the short and medium-term as argued by the author is the only trustless scaling solution for Ethereum. Transaction fees on L1 blockchains have been exploding for an extensive timeline and is now really important to help mitigate such costs by advancing the technology of rollups.

Name	Current cost to transfer ETH
 Polygon Hermez	\$0.25 ▾
 Loopring	\$0.34 ▾
 ZKSync	\$0.41 ▾
 Optimism (2)	\$2.72 ▾
 Arbitrum One (2)	\$2.92 ▾
 Ethereum	\$8.60 ▾

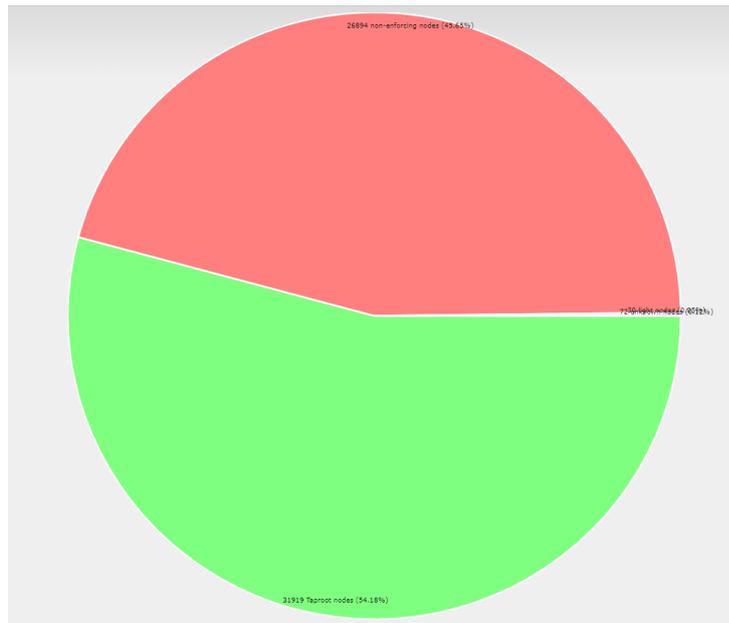
Gas cost comparison of Ethereum Rollups/ Real-time comparison is [available here](#).

Rollups are already significantly reducing fees for many Ethereum users up to 8x, and ZK rollups, which have better data compression and can avoid including signatures, have fees ~40-100x lower than the base gas fee of Ethereum. A long-term solution to respond to the inadequacy of rollups in their present form is data sharding, which would add ~1-2 MB/sec of dedicated data space for rollups to the chain. As the first step is by adopting the EIP 4448, which is expected to increase data space available to rollups to a theoretical max of ~1 MB per slot and decrease costs for rollups by ~5x. It could be implemented faster than the remaining steps suggested in the roadmap. Other milestones include incubating the business logic” of the sharding spec but avoiding most of the difficulties around networking by keeping the initial number of shards very low (e.g. 4). The third step is to increase the number of active shards from 4 to 64. Shard data would now go into subnets, and so by this point, the P2P layer must have been hardened enough to make splitting into a much larger number of subnets viable. Finally, the fourth step of the roadmap suggests the addition of data availability sampling to ensure a higher level of security, protecting users even in the event of a dishonest majority attack. Once data availability sampling is fully introduced, the sharding rollout is complete.

## Taproot, Bitcoin’s Long-Anticipated Upgrade has activated

Taproot, Bitcoin's long-anticipated code upgrade with a focus on enhancing the network’s privacy and security, has been activated. This is the first major upgrade for the network since the introduction of Segregated Witness in 2017. It was [proposed by Greg Maxwell](#) in 2018. It has been followed by three Bitcoin Improvement Proposals initiated by Pieter Wuille, Tim Ruffing, A.J. Townes and Jonas Nick, and merged into Bitcoin Core in October 2020. The upgrade went live when the Bitcoin blockchain reached block 709,632 at 5:15 UTC time on Sunday, Nov. 14, which was mined by F2Pool.

Taproot introduces Schnorr signatures that enable more complex transactions on Bitcoin – such as those from multi-signature wallets – while improving the privacy and security of the transactions. The switch to Schnorr signatures also has implications for network scaling, as the Taproot upgrade swaps out the cryptographic framework ECDSA.



Bitcoin nodes supporting the Taproot upgrade [Source](#)

Currently 31919 nodes signaling the Taproot upgrade (54.18% out of total) The rest are running old software, which means they will not yet be able to enforce the new rules of Taproot – and they to upgrade to Bitcoin Core 21.1. Miners who have not upgraded their software will be unable to successfully mine on the network and will not earn block rewards. In terms of users, they will not be able to send or receive Taproot transactions until their particular Bitcoin wallet supports it –currently the majority of wallets hasn't extended support for it.

## Regulatory Updates

### EUROPE

The Central Banks of **Italy** and **Germany** (Banca d'Italia and Deutsche Bundesbank, respectively) are working together on new Central Bank money settlement practices which involve programmable trigger mechanisms that connect DLT-based assets, like a tokenized securities, and cash. In the context of this collaboration, a pilot test has already been conducted by Deutsche Boerse, Deutsche Bundesbank and Germany's Finance Agency with the participation of Citibank, Barclays, Goldman Sachs, Commerzbank, DZ Bank and Societe Generale ([source](#)).

The Finance Ministry of **Slovenia** has requested public opinion and consultation regarding crypto tax laws and taxing cryptocurrency investments. This development takes place one month after the Financial Administration of the Republic of Slovenia proposed a 10% tax on cryptocurrency activities. Should the proposal be signed, fiat to crypto conversions, and payments in cryptocurrency will be subject to a **10% tax**, up to a threshold for of €15,000 for the calendar year ([source](#)).

In the effort to improve trust in digital assets and promote equality among investors, **Austria** aims to implement a new taxation scheme for cryptocurrencies. Specifically, capital gains from cryptocurrencies will be subject to 27.5% tax, equating them to other financial instruments such as stocks. This tax does not apply to when

changing one cryptocurrency for another. Finally, in case an investor incurs a loss in the selling process, they will be eligible for compensation ([source](#)).

## USA

President Biden signs a \$1 trillion bipartisan infrastructure bill subjecting crypto brokers to specific reporting rules. The bill requires that all brokers report any transaction under the current tax code. At the same time, recipients of transactions over \$10,000 ought to verify the sender's personal information and record their Social Security number, the nature of the transaction and other information, and report the transaction to the government within 15 days ([source](#)).

Furthermore, the Biden administration has requested from the Congress to establish new regulations regarding stablecoins, stating that companies responsible for such currencies should register with a state or a federal banking regulator, stressing that stablecoin holder should enjoy deposit insurances ([source](#)).

According to the FDIC (Federal Deposit Insurance Corporation) agent, a group of regulators is currently creating a system for banks to adopt and use cryptocurrencies. This proposal includes the conditions, regarding the cryptos management, under which the national bank could use them for loans or other operations ([source](#)).

## UK

The UK follows the European Union's example for the potential rollout of a CBDC. The UK Treasury and the UK Central Bank are planning to launch a consultation starting in 2022. More specifically, the Bank of England has suggested that the digital pound consultation with HM Treasury should consider factors, such as design features, benefits and implications for users and business, as well as other relevant issues. The results of the 2022 consultation will ultimately determine whether U.K. authorities should move forward with a CBDC. As the Central Bank quoted:

*"If the results of this 'development' phase conclude that the case for CBDC is made, and that it is operationally and technologically robust, then the earliest date for launch of a U.K. CBDC would be in the second half of the decade".* ([source](#)).

In an attempt to limit illicit activity, Sian Berry, former co-leader of the Green Party of England and Wales and current member of the London Assembly submitted a proposal for a crackdown on crypto advertisements on public transport. According to Berry:

*"The ads should be banned because digital assets are still not regulated across the United Kingdom"* ([source](#)).

## REST OF THE WORLD

The government of **Israel** has approved new regulations regarding the cryptocurrency industry, aiming to combat illegal activities such as money laundering and terrorism financing. More specifically, Israel enforced new Anti-Money Laundering (AML) regulations that require local fintech companies and virtual currency service providers (VASP) to obtain an operating license. Shlomit Wagman, director of the Israel Money Laundering and Terror Financing Prohibition Authority, said that:

*"the new AML rules would help the country curb criminal usage of digital assets while also providing the industry with more support and legitimacy"* ([source](#)).

Since the recent cryptocurrency mining prohibition in China, Kazakhstan is emerging as a new mining hub in Asia. In response, the senate is moving forward with regulations intended to monitor the financial and crypto sector within the country.

According to Olga Prepichina, the Senate Deputy, many illegal activities, like black-market participants find digital assets convenient due to their anonymous nature and the decentralization of crypto platforms, are causing trouble in tracking down finances, prompting the need for regulations that would ensure the progression of the industry with safety ([source](#)).

China's NDRC (National Development and Reform Commission) considers imposing "punitive electricity prices" as a means of further penalizing electricity prices for crypto mines. Specifically, the NDRC's center of attention will be the industrial scale mines and state-owned entities that mine crypto. At the same time, NDRC's spokesperson, Meng Wei encouraged local governments to "take care of mining within their jurisdictions". On the same note, the NDRC and other top government agencies have added Crypto mining to a list of industries to be eliminated, in early October ([source](#)).

## Market Updates

Blockchain market continues to evolve with a significant tempo. More and more governmental structures around the world practically try blockchain technologies in order to gain additional value:

- [The Korean Teachers' Credit Union \(KTCU\)](#), South Korea's state pension fund, is apparently trying to obtain exposure to Bitcoin (BTC) through a crypto exchange-traded fund (ETF). In the first half of 2022, KTCU, one of South Korea's major institutional investors, is considering investing in a pure Bitcoin ETF or Bitcoin-linked ETFs. According to the article, KTCU is contemplating investing in multiple Bitcoin ETF products, including those offered by Mirae Asset Global Investments, a South Korean asset management business. Horizons ETFs, the company's Canadian division, introduced two ETFs that follow the value of Bitcoin futures.
- The [Dubai Financial Services Authority](#) has granted regulatory permission to the Bitcoin Fund (QBTCu.TO), a closed-end investment entity located in Canada. On June 23, 2021, the fund made its Nasdaq debut, becoming the Middle East's first listed digital asset fund. The fund's purpose is to give investors exposure to Bitcoin and daily price swings in US dollars, as well as long-term capital appreciation. The fund is a diversified portfolio of digital assets that invests in Bitcoin and money market instruments denominated in US dollars. Following the DFSA's permission, the Bitcoin Fund will be able to offer up to \$200 million in units on Nasdaq Dubai. This enables the region's first crypto-based product, which is listed on a regulated exchange, to meet rising institutional demand. From large institutions to individual traders, the Bitcoin Fund will be open to all types of investors.
- Metro Mayor of [Liverpool City Region](#), announced a 700,000 pound (\$955,957) investment in meal delivery business PeepI. Local establishments will be able to use the software as a cost-effective alternative to meal delivery companies. PeepI is built on the Fuse blockchain, which offers quick transaction speeds and minimal transaction costs. It's the first time Fuse's open-source money toolbox has been used to help local communities.
- Starting in 2022, [MintGreen](#), a cleantech cryptocurrency miner located in Canada, will join with the Lonsdale Energy Corporation to provide heat to inhabitants of North Vancouver, British Columbia. During the agreement with North Vancouver, MintGreen says that its "digital boilers," which it claims

can recover more than 96 percent of the power needed for Bitcoin mining, would save 20,000 metric tons of greenhouse emissions from entering the atmosphere. In the Canadian metropolis of 155,000 people, the recovered energy will be utilized to heat 100 residential and commercial buildings.

Traditional businesses continue to expand their influence by implementing blockchain technologies and by cooperating with crypto companies:

- [The CME Group](#) announced a \$1 billion investment from Alphabet as well as a 10-year strategic partnership with Google Cloud, with the objective of speeding up the exchange's shift to the Cloud and altering the way global derivatives markets operate. The investment was made with nonvoting convertible preference shares. The CME Group launched the first Bitcoin (BTC) futures contract in December 2017. Since then, the exchange has added micro BTC futures, BTC options, and micro Ether (ETH) futures to its crypto derivatives offering.
- Burger King has teamed up with Robinhood to give out free cryptocurrencies to its customers, indicating that demand for digital assets is expanding. Customers who spend \$5 or more at Burger King in the United States will receive free crypto, largely in the form of Dogecoin, from November 1 to November 21. (DOGE). A few lucky customers will get the chance to win a full Bitcoin (BTC) or Ether (ETH).
- [Twitter](#) will add crypto payment options to its tipping jar, allowing any user to pay through the network. The crypto tips feature will be available to all iOS users worldwide, according to Twitter staff product manager Esther Crawford, and the site hopes to roll out choices for Android users in the following weeks. Users will be able to accept payments by linking third-party applications like Cash App, Patreon, Venmo, Chipper, Bandcamp, Razorpay, GoFundMe, PicPay, and Wealthsimple Cash to their Twitter biographies and individual Tweets, depending on their location.
- Eduardo Abreu, vice president of new business at payments giant Visa, announced the company's aspirations to incorporate crypto assets onto its platform for both payments and as a store of value in a recent interview with local Brazilian news site [Seu Dinheiro](#).
- [PayPal](#) has announced the launch of a new app that will serve as a one-stop shop for all of the company's customers' digital payment demands. Users will be able to access all of the company's digital financial products using the new PayPal app. With a wallet tab to manage bitcoin payments and high return savings, the new software caters to both crypto and non-crypto use cases.
- [Amazon](#) Web Services' New York office is looking for a Financial Services Specialist who "understands the whole cryptocurrency and digital asset ecosystem" and has familiarity with blockchain and distributed ledger technology, according to a job offering. According to the organization, the job would collaborate with regulators, financial institutions, and capital market operators to investigate how they may profit from digital asset adoption.
- [Central Retail Corp](#), a Thai retail sector leader, is experimenting with a digital currency among its employees. After the sandbox phase is over, the retail giant intends to make the service available to consumers and the wider public. The "C-Coin," a blockchain-powered cryptocurrency, is being provided to 80,000 Central Retail Corp employees worldwide as a bonus to their regular income as a reward for great performance.
- After conducting a test, [United Wholesale Mortgage \(UWM\)](#), one of the major wholesale and buy lenders in the United States, has decided to abandon Bitcoin payment arrangements. UWM has

officially confirmed that its first-ever cryptocurrency mortgage pilot was a success, with the company collecting five crypto payments in October and one in September.

- Tierra Viva ("Alive Earth"), a Tunja-based Colombian exporter of long-horned beetles, has been creating its own cryptocurrency in order to avoid hefty commission expenses on foreign sales. Tierra Viva's Hercules, Neptunus, and elephant beetle species sell for \$300 a pair in Tokyo, according to the outlet. The beetle species are well-liked by Japanese students and collectors. Carmelo Campos, Tierra Viva's principal programmer, stated in an interview, "It's an option to be able to export the beetles to Japan or any other area of the world and use it as a way of payment."

Meanwhile, El Salvador continues to develop bitcoin-friendly infrastructure across the country:

- Following its cooperation with digital payments gateway [Flexa](#), El Salvador's main banking institution, Bancoagrícola, plans to increase the country's Bitcoin adoption policy. Flexa released a statement on. Bancoagrícola has signed a contract with the cryptocurrency payment network to facilitate Bitcoin transactions for the bank's retail and merchant customers.
- [McDonald's](#) is apparently accepting bitcoin payments via Lightning Network. Journalist Aaron van Wirdum broke the story on Tuesday after visiting a McDonald's shop in El Salvador and being given a printed QR code that directed him to a Lightning Network billing page. As of 2019, McDonald's had 19 outlets in the Latin American country.