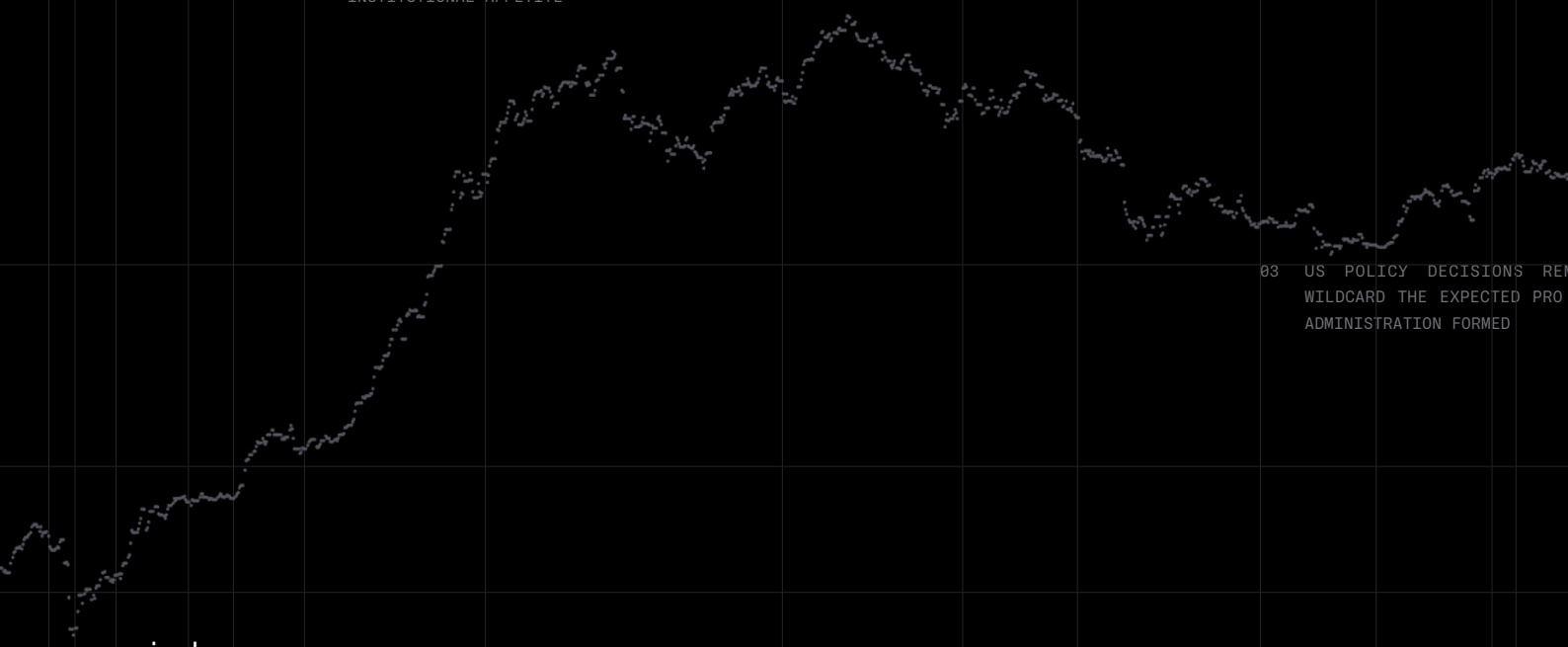
CoinShares

10 12 2024

01 EXPLORING TOMORROWS TRENDS AND INSIGHTS TO GUIDE THE NEXT CHAPTER

Outlook —2025

02 RECORD BREAKING INFLOWS INTO BITCOIN ETFS IN 2024 SIGNAL INSTITUTIONAL APPETITE



03 US POLICY DECISIONS RE WILDCARD THE EXPECTED PRO ADMINISTRATION FORMED

coinshares.com

04 INNOVATIONS SUCH AS SOLANAS FIREDANCER AND ETHEREUMS LAYER 2 UPGRADES AIM TO UNLOCK NEW TRANSACTION EFFICIENCIES POTENTIALLY SETTING THE STAGE FOR

Table of contents

JEAN-MARIE MOGNETTI
CHIEF EXECUTIVE OFFICER

2025: The year crypto breaks boundaries

2024 has undoubtedly been a turning point for the cryptocurrency industry. The sector has experienced swift expansion, building on the robust foundations laid during the previous market downturn. At CoinShares, we've witnessed this growth directly, as our assets under management (AUM) approach the significant £10 billion mark.

We believe this is just the start. Recent developments prompt us to consider the market's future carefully. The approval of Bitcoin spot ETFs in the U.S in January, followed by Ether products, was a key driver of this momentum. We expect additional altcoin ETFs to receive SEC approval, albeit likely at a slower pace than the market anticipates. Solana appears to be a strong candidate. However, well-established cryptocurrencies such as Ripple's XRP and Charlie Lee's Litecoin are also potential contenders.

Regarding Solana, it has been a crucial year for this blockchain. After FTX's downfall, it bounced back strongly, gaining retail favor for its user-friendly software, making it a popular choice for memecoins launch. To compete with Ethereum, it won't be all about throughput. Solana must attract institutional investors and develop a clear strategy to address decentralisation and repeated network downtime.

Solana's case highlights the significant impact of memecoins this year. Though some view them as trivial, memecoins are an integral part of crypto culture. Similar to NFTs collection in 2020, certain memecoins might achieve collectible or even cult status in the future.

Bitcoin remains our primary focus though, with analyst projections indicating significant growth. Adoption strategies, pioneered by Michael Saylor's MicroStrategy, are now embraced by miners. Many public companies are diversifying their treasuries with Bitcoin purchases, often at the behest of their boards and shareholders who view it as an optimal hedge. Governments are also moving to establish Bitcoin reserves, led by U.S. initiatives under Senator Cynthia Lummis and President-elect Trump. BRICS nations propose similar moves, signalling Bitcoin's growing influence at the highest levels of government.

The transformation in the industry is further highlighted by major traditional finance companies entering the market. A prime example is Robinhood's recent purchase of Bitstamp or BONY, at last, going live with their custody offering. With U.S. regulatory clarity, we expect increased M&A activity, as valuation gaps and capital availability enable U.S. legacy players to reenter the crypto race. To that extent Europe is going to be the usual shopping destination.

On the technology front, the advancement of AI agents is set to redefine the industry. These agents, operating autonomously on blockchains, are beginning to trade between themselves effectively bypassing human intervention. Coinbase has already deployed its AI-powered solution for on-chain transactions, a move likely to be emulated.

CoinShares' Research Team has long anticipated this evolving landscape. Their thorough global industry monitoring has earned them recognition among professionals and media outlets alike. The team's insightful reports have always played a fundamental role in our distribution strategy and achievements.

We hope this 2025 outlook proves valuable for your endeavours and motivates your personal crypto journey.

Enjoy the read and don't hesitate to reach out to our team.

Executive summary

As cryptocurrency continues to mature, major financial institutions, corporations, and regulatory bodies are poised to play a more active role, potentially pushing Bitcoin and blockchain technologies into wider, mainstream applications.

Looking ahead, the cryptocurrency landscape shows several forward-looking trends that are likely to shape 2025 and beyond.

Growing Bitcoin adoption through ETFs and institutional investment

Record-breaking inflows into Bitcoin ETFs in 2024 signal institutional appetite that could surge further as more platforms integrate access and regulatory clarity emerges. If Bitcoin gains broader portfolio acceptance, inflows could continue growing, potentially pushing Bitcoin closer to mainstream financial markets as a strategic asset.

Policy shifts could shape market dynamics

US policy decisions remain a wildcard. The expected pro-crypto administration formed by the Republicans could prioritise supportive regulation, boosting both Bitcoin mining and broader market confidence.

Debt and clean energy to drive mining expansion

Bitcoin miners are increasingly utilising debt markets and clean energy sources to scale operations, positioning them for strategic growth as costs decrease and environmental pressures mount. The trend toward clean energy mining is likely to attract further AI and tech sector partnerships, which could reshape mining as a cornerstone of green energy use cases.

Blockchain scaling technologies to enhance adoption

Innovations such as Solana's Firedancer and Ethereum's Layer 2 upgrades aim to unlock new transaction efficiencies, potentially setting the stage for mass adoption in enterprise and financial services. With institutional players launching their own Layer 2 solutions, the coming year could see broader blockchain integration across industries, leveraging improved transaction speed and cost-efficiency.

Corporate treasury integration and yielding strategies on the rise

Companies are increasingly using Bitcoin as a treasury asset with yield-generating strategies, a trend likely to accelerate in 2025 as regulatory frameworks stabilise. This shift could see traditional firms not only hold Bitcoin but also leverage it to enhance liquidity and shareholder value, with Bitcoin yielding strategies becoming a new corporate finance norm.

The Bitcoin triumvirate - balancing economic uncertainty, geopolitics, and tech evolution

JAMES BUTTERFILL
HEAD OF RESEARCH

In recent years at CoinShares, we have focused extensively on monetary policy, particularly its role in shaping Bitcoin's value as an emerging store of value and its historically inverse relationship with the US dollar. However, focusing solely on these aspects would overlook Bitcoin's broader potential. We believe Bitcoin will ultimately play a significant role in global trade, driven by its connection to the growth of the internet and digital infrastructure. Viewing it purely as a store of value underestimates its potential.

Economics matter though and the Federal Reserve's recent 50 basis point rate cut, despite steady jobless claims and high market valuations, reflects a pivot toward a supportive monetary stance that has buoyed investor confidence in Bitcoin. This move suggests that the Fed, having cut rates in stable times, is prepared to sustain markets through downturns, creating a "Goldilocks" scenario. However, this optimism has led to a crowded market, with 80% of investors expecting a "soft landing". Such consensus, however, may overlook potential risks.

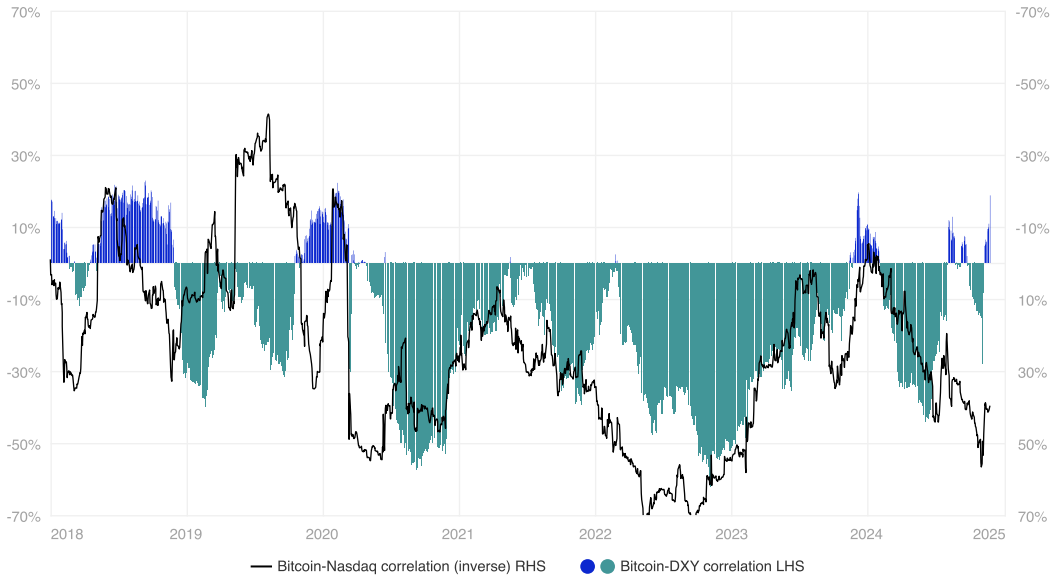
Several economic directions lie ahead. In an optimistic scenario, continued government spending could stimulate growth and potentially increase inflation, especially if import tariffs are raised, though specific policies remain uncertain. Conversely, President-Elect Donald Trump has proposed involving Elon Musk in efforts to curb government spending and address the national debt. During his campaign, Trump suggested appointing Musk to lead a new "Department of Government Efficiency", aiming to cut federal expenditures by approximately US$2tr. Musk has acknowledged that such measures could bring "temporary hardship" but sees them as essential for "long-term prosperity", This partnership highlights Trump's commitment to significant fiscal reforms, drawing on Musk's reputation for efficiency and cost reduction. In this new political landscape, the delicate balance between economic growth and low inflation remains crucial, but fiscal conservatism, if enacted would likely lead to looser monetary policy.

The Fed's approach might involve gradual rate cuts—potentially to around 2.6%—to stimulate demand as inflation remains low. However, lagging monetary policy effects mean that such easing may only slowly impact the real economy. Households, especially those in lower income brackets, face liquidity constraints, limiting potential spending boosts, while housing remains sluggish despite rate adjustments.

Trade and labour supply constraints, as well as tightening lending standards, continue to pose challenges. Business capital expenditures have slowed, suggesting cautious corporate spending, especially among smaller firms still feeling financial pressures. Despite productivity gains, weak capital expenditure is seen as a potential future threat to economic growth.

While the Fed has room to manoeuvre with low inflation, sluggish job growth and conservative spending suggest that any economic recovery may be drawn out, necessitating patience and a potentially larger than expected easing response from the Fed. Historically, Bitcoin and the dollar exhibit a strong inverse relationship, averaging around -20% since 2018 based on daily data and 070 based on weekly data, though this correlation periodically breaks down, as shown in the chart below.

Bitcoin vs the US Dollar vs Nasdaq



Source: Bloomberg, CoinShares, data available as of close 23 November 2024

This inverse relationship makes sense: Bitcoin is a finite-supply asset, best categorised as an emerging store of value competing with traditional assets like gold and US Treasuries. Additionally, the correlation between Bitcoin and the Nasdaq indicates an interplay between Bitcoin's store-of-value properties and its connection to risk assets.

This multifaceted nature of Bitcoin is due to its unique role as a hedge against both the dollar and broader economic uncertainties, coupled with its growth potential as a technology asset. As a result, we believe Bitcoin is likely to end up reacting differently to shifts in monetary policy than equities in 2025, which are more immediately impacted by corporate earnings and broader economic trends. When the dollar strengthens, both equities and Bitcoin can experience varying degrees of outflow, depending on the context and prevailing economic conditions.

— Key factors influencing Bitcoin, dollar, and equities interactions

Dollar strength vs. risk appetite

- When the dollar strengthens, often due to economic uncertainty or a "flight to safety," demand for riskier assets like Bitcoin and equities tends to decline. This may explain why Bitcoin and equities correlations often rise during such times.

- Conversely, a weakening dollar generally signals higher risk tolerance and potentially lower interest rates, attracting investors to growth-oriented or alternative assets, including both stocks and Bitcoin.

Bitcoin's role as a hedge:

- We view Bitcoin as a hedge against inflation and currency devaluation, similar to gold. When the dollar loses value, demand for alternative stores of value, like Bitcoin and gold, tends to rise. However, an overreliance on the USD as a reserve currency and safe haven (from "USD Maximalists") could be just as risky as the Bitcoin-Maximalist view point.

- Unlike Bitcoin, equities are tied more closely to economic performance and corporate earnings. When the dollar weakens, multinational companies' profits often improve (in dollar terms), boosting stock performance. However, when the dollar strengthens, equities may suffer from shrinking foreign earnings, while Bitcoin has typically seen outflows due to the dollar's attractiveness.

Liquidity and macro trends:

- Both Bitcoin and equities perform well in environments with loose monetary policy and high liquidity. However, during times of inflation or rate hikes, liquidity constraints can negatively impact stocks and also put pressure on Bitcoin as was witnessed in 2022/23.

- Equities respond more directly to changes in interest rates and economic policy, while Bitcoin's relationship to these factors is indirect but still relevant. During market sell-offs due to liquidity constraints or economic concerns, Bitcoin has occasionally diverged, especially when seen as a hedge against traditional markets.

Geopolitical impact on Bitcoin:

- Case of Middle Eastern tensions escalating, such as those between Israel and Iran, could disrupt Middle Eastern oil production, causing a spike in global energy prices. Bitcoin, as a form of "digital stored energy," could appreciate in response to inflationary pressures from rising energy prices.

- Historical precedents, like the 1973 oil embargo, show that hard assets like gold—and potentially Bitcoin—retain value during energy crises. Additionally, US financial support for Israel may lead to increased debt and monetary expansion, potentially boosting Bitcoin's value against fiat currencies. Bitcoin's decentralised nature also enables resilience against disruptions in specific mining regions.

In today's economic climate, weaker growth is likely to lead Bitcoin to gradually de-correlate from equities, but potentially also from the US dollar in 2025.

— Will the US Dollar lose its reserve currency status in 2025?

The short answer is not in 2025, but the US dollar's dominance as the world's primary reserve currency is facing increasing challenges due to economic, geopolitical, and technological factors. Central banks are diversifying reserves, with the dollar's share declining from 71% in 2000 to 59% in 2022 (according to data from the IMF), as they hedge against US policy impacts and dollar volatility. Countries like China and Russia are bypassing the dollar in trade to avoid US sanctions, and the BRICS nations are exploring a new currency for their intra-group trade, and there are suggestions this could be Bitcoin. China's Cross-Border Interbank Payment System (CIPS) provides an alternative to the SWIFT system, while digital currencies and blockchain technology offer further ways to reduce dollar dependency.

Additionally, the US faces mounting fiscal pressures, with the federal budget deficit reaching $1.833 trillion in 2024. Concerns over a potential post-election debt-ceiling crisis have led credit agencies to issue warnings about the US's fiscal stability. This situation, coupled with waning foreign demand for US Treasuries, could weaken global confidence in the dollar. As the US struggles to address its debt, emerging financial infrastructures such as China's CIPS, Russia's SPFS and Bitcoin provide alternatives that reduce reliance on dollar-centric systems, suggesting a gradual shift away from dollar dominance.

— It isn't just about being a store of value

We talk about US monetary policy a great deal, but it isn't the be all and end all, as Bitcoins growth merits are often overshadowed by its store of value features. Bitcoin's success story is more than a cyclical buy-and-sell game; it's an evolution in finance that has attracted individuals, corporations, and even governments for its decentralised, verifiable nature. Far from being a "fragile illusion," its resilience through numerous economic cycles and continued interest from high-profile firms and investors reflects the inherent value many see in it as a hedge against traditional financial risks.

Bitcoin's utility extends beyond speculation; it offers a globally verifiable and secure network that needs no central authority. This is not just code, but a network governed by consensus, ensuring transparency and security in transactions. This decentralised model is invaluable for individuals and countries seeking financial autonomy, particularly in regions with economic volatility.

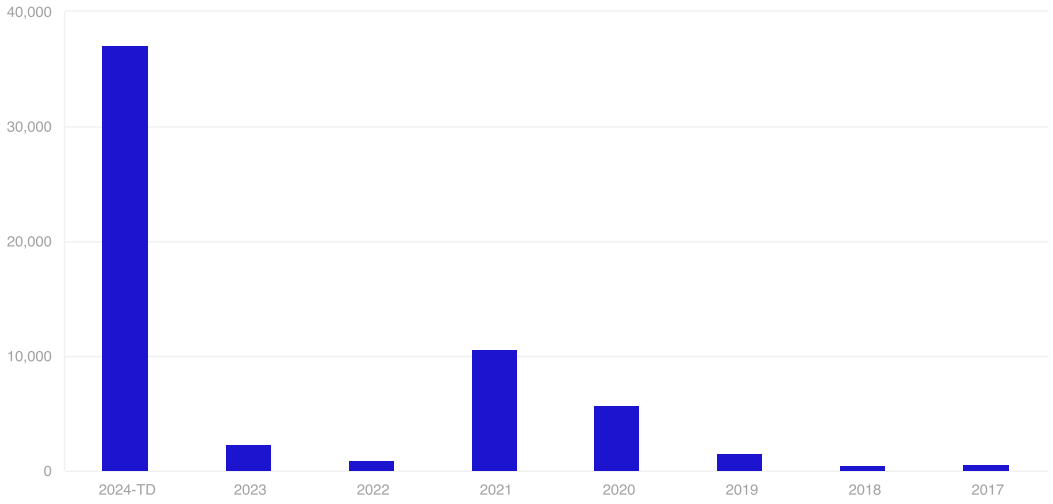
While Bitcoin may not yet match traditional assets in economic productivity, its ongoing adoption and development, such as the implementation of the Lightning Network, are beginning to show real-world utility in remittances, microtransactions, and financial inclusion. Viewing it solely as a speculative asset ignores this potential for future applications in digital finance and technology.

JAMES BUTTERFILL
HEAD OF RESEARCH

Bitcoin's record-breaking inflows signal shift, but price surges remain elusive amid policy and political headwinds

As of the end of November, inflows this year have reached US$37bn. Provided there is no significant downturn in December the flows would almost triple the previous record of US$10bn set in 2021. This surge is primarily attributed to the launch of the US spot-based bitcoin ETF, which has drawn US$32.6bn in inflows. When adjusted for outflows from Grayscale, newly issued ETFs have achieved a record inflow of US$50.6bn to date.

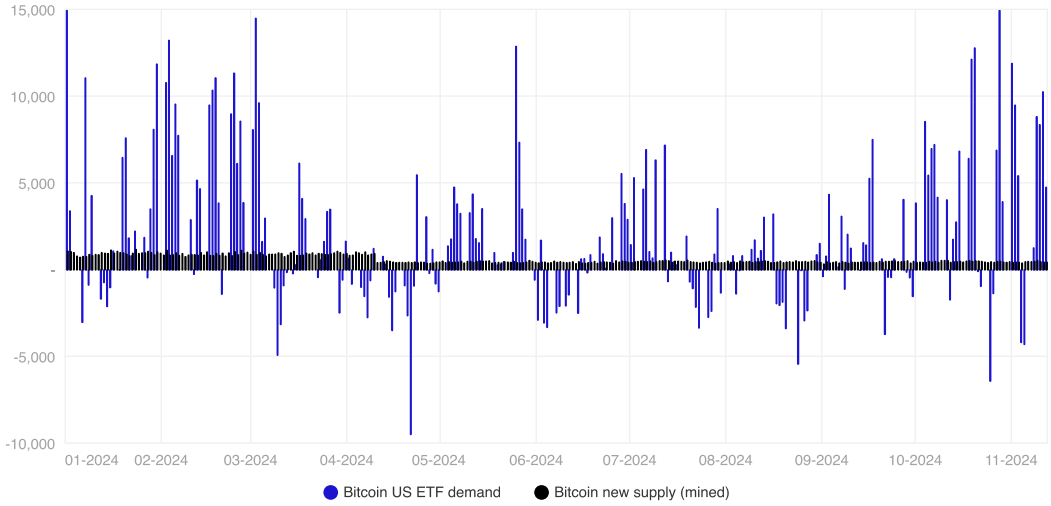
Total global digital asset fund flows (US$m)



Source: Bloomberg, CoinShares, data available as of close 23 November 2024

Assuming a US$14.4tr pool of addressable assets in the United States, if 10% of investors decided to allocate to Bitcoin the US$37bn in inflows would reflect an average portfolio allocation of 2.6%. This is over double our 1% estimate from this time last year, which projected US$14.4bn in inflows. ETF providers in the U.S. have now become the second-largest holders of Bitcoin globally, with BTC 1.08m—a demand level more than twice the BTC 191k newly minted by mining. Globally, ETP holders now custody 1.3m Bitcoin.

Bitcoin ETF demand vs supply



Source: Bloomberg, CoinShares, data available as of close 23 November 2024

This marks a highly positive event in Bitcoin's history, though we haven't seen the corresponding price surge many, including ourselves, had expected. Based on the relationship between inflows and prices (detailed here), our models indicated Bitcoin should have surpassed the US$100k mark with this level of inflows; however, prices remain near the all-time high of US$70k. We attribute this to several factors, particularly monetary policy and political climate, which we believe have recently been the main drivers of Bitcoin prices.

The U.S. Federal Reserve's pivot in monetary policy took longer than anticipated, arriving in September despite December 2023 polling expecting the shift in March this year. This delay was likely due to a combination of excess household savings, higher than expected growth and persistent elevated inflation. Political developments have also created headwinds, with polls indicating a potential Democratic win for much of the year, dampening prospects for a more relaxed regulatory stance on digital assets. Additionally, investment platforms have taken time to enable Bitcoin ETF trading, while Grayscale's closed-end Bitcoin fund has exerted significant selling pressure, with formerly locked-up holders offloading US$18.3bn this year.

Ethereum funds have not performed as well as Bitcoin this year. Before Ethereum's launch, total ETP assets under management (AuM) for Ethereum represented 20% of Bitcoin's AuM. By this ratio, inflows of US$3.2bn would have been expected. However, only US$1.11bn in inflows have materialised, factoring in the US$3.3bn in outflows from Grayscale's existing holdings. This shortfall likely stems from concerns about Ethereum's Layer 1 revenues following its June Dencun upgrade, which we discuss in further detail here.

The outlook for inflows in 2025 is optimistic. With increased political clarity, particularly regarding the potential impact of a Trump administration, Bitcoin could potentially be treated as a strategic reserve asset and see prices rise, as they did post 2020 election. Monetary policy also seems positioned for continued easing, not just in the US but many key central banks globally. If the US Government were to acquire 5% of Bitcoin's total supply, it would represent inflows of ~US$67bn. This, along with an explicit endorsement from the US government, could encourage hesitant investors to increase their positions.

U.S. poised for major crypto overhaul under Trump

MAX SHANNON
RESEARCH ANALYST

With Donald Trump securing the 2024 presidential election, the U.S. is poised to undergo significant changes in crypto regulation, positioning itself as a global leader in digital assets. Alongside Vice President-elect J.D. Vance, Trump has committed to fostering a pro-crypto environment, focusing on innovation, investment, and financial sovereignty.

— Regulatory overhaul

Trump's stance on the SEC and its chairman, Gary Gensler, has been openly critical, particularly concerning the agency's regulatory approach to digital assets. Gensler has announced he'd step down on the day of Trump's inauguration, January 20th. More pro-crypto SEC commissioners could usher in more crypto-friendly regulations and lay the foundations for a crypto renaissance.

Fortunately for the crypto industry, Trump's Vice President, Vance, has previously had a hand in working towards regulatory clarity. Vance has previously drafted proposals that would overhaul how Washington's top two regulators oversee crypto.

Coinbase, A16Z, Ripple are all 9/10/11th largest contributors to the election: less than Citadel or Susquehanna but more than Bloomberg and Blackstone, for example. Fairshake, Defend American Jobs, Protect Progress - all crypto only superPACs - are 8/13/17th largest SuperPACs by total raised. This should make it easier to push through pro-crypto legislation in a majority Red House and Senate.

Both Trump and Vance have been seen to support FIT21 to reform market structure and are willing to end Operation Chokepoint 2.0, embracing stablecoins to strengthen the U.S. Dollar's international dominance. This should be positive for Altcoins and M&A activity as TradFi firms get more clarity and confidence in the digital asset space.

— Bitcoin mining support

Trump's administration plans to make the U.S. a global hub for Bitcoin mining. Throughout his campaign, Trump met with miners and vowed to protect their operations, emphasising that Bitcoin mining is vital for financial independence and national security. He sees Bitcoin miners as defenders against Central Bank Digital Currencies (CBDCs), which his administration opposes. At Bitcoin 2024, Trump promised "to keep 100% of all the Bitcoin the U.S. government currently holds or acquires into the future... This will serve in effect as the core of the strategic national Bitcoin stockpile". Scott Bessent, Trump's newly appointed pro-crypto Treasury Secretary and a successful hedge fund manager, along with Howard Lutnick, the pro-crypto CEO of the successful financial services firm Cantor Fitzgerald, has been nominated to lead the administration's

trade and tariff strategy as the head of the Commerce Department. Both of these appointees could be on board with Trump's Bitcoin Treasury reserve asset ambitions. While it is important to take everything Trump says with a grain of salt, it is a positive remark, nonetheless. In the immediate term, bitcoin miners focused solely on mining bitcoin will likely outperform those who have diversified into other revenue streams such as AI or machine manufacturing.

— Self-custody and financial sovereignty

Trump is also a strong advocate for self-custody. During the same conference, Trump noted that he believes individuals should control their own digital assets without government interference. However, Trump's stance on issues like sanctions and the Bank Secrecy Act tends to be more neutral or reserved. Therefore, his ambitions towards self-custody may face challenges due to issues such as funding illicit activities or money laundering. This policy will not have a direct effect on the price of Bitcoin or individuals, but is a positive step for the U.S. regarding private property.

— Economic outlook for crypto

Trump's economic policies are fiscally and monetarily expansive as he favours further tax cuts and a dovish Federal Reserve Chair that should lower interest rates, increase the debt burden and drive cheap capital into risk-on assets such as crypto.

In summary, Trump's victory promises a pro-crypto administration that will support Bitcoin mining, self-custody, banking and market structure regulation and stablecoin legalisation, creating a favourable environment for digital asset innovation and growth. As the U.S. shifts towards these policies, Altcoins are likely to outperform Bitcoin, despite the latter still potentially being one of the best performing assets in 2025.

MAX SHANNON
RESEARCH ANALYST

Bitcoin mining and AI booms with debt, M&A, and clean energy

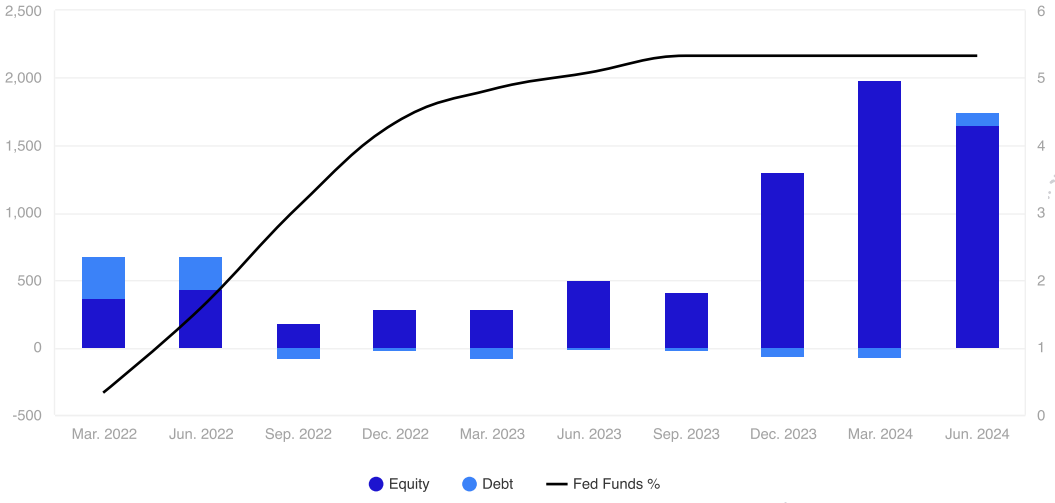
— Miners increase use of debt markets as rates decrease

As interest rates begin to return to normalised levels, the use of debt markets by Bitcoin miners is expected to return. Companies like TeraWulf, Core Scientific, Marathon Digital, and Bitdeer Technologies have already raised over US$2.5 billion through convertible note offerings. Moving forward, this trend is likely to continue, with miners leveraging these instruments to lower their cost of capital, fund strategic growth, and manage existing debt more effectively. This is particularly attractive given the constraints in traditional debt markets due to high volatility in the sector.

Given the challenges of accessing traditional debt markets due to high interest rates and industry volatility, these convertible notes provide a more balanced approach to capital structure management, providing a lesser degree of dilution. By relying less on equity financing, these companies can pursue diverse strategies, as reflected in the varied pricing of their convertible notes.

Another type of debt financing has shown some green shoots as well. Bitcoin-backed financing among miners is likely to grow as they accumulate more Bitcoin on their balance sheets. We have already seen this with Marathon's US$200 million line of credit, which followed Canaan's US$22.3 million loan secured by 530 BTC. This trend aligns with Bitcoin's rising value, making it a more valuable form of collateral. Consequently, miners can issue more depreciating fiat debt against their increasing Bitcoin holdings, enhancing their financial leverage.

Miner financing ($m)

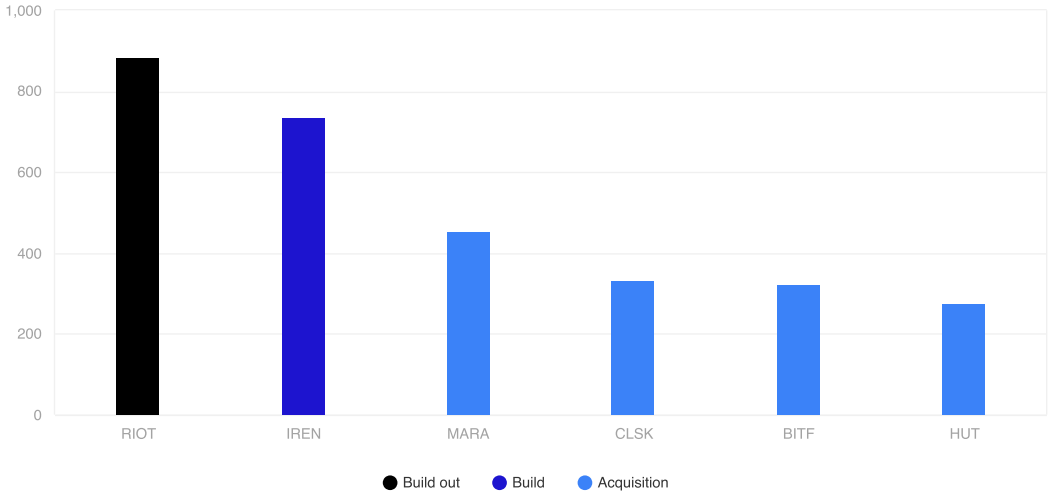


Source: Bloomberg, CoinShares, data available as of close 01 October 2024

— Further M&A occurs amongst miners

The acquisition of existing mining sites as illustrated by Cleanspark's purchase of Griid, Riot's deal with Block Mining, and Bitfarms' takeover of Stronghold - all with focus on operating facilities - is likely to increase. Procuring distressed or turnkey sites proves more cost-effective than developing facilities from scratch. The timeline for developing greenfield sites can take years, while acquiring and upgrading existing infrastructure can be achieved in a matter of months. This reduces time-to-market and accelerates returns, making it a strategic focus for players.

Weighted average cost per MW ($m)



Source: Industry Sources, CoinShares, data available as of close 17 October 2024

— AI hyperscalers focus on clean energy tier 3 redundancy

Miners are likely to continue to sign option agreements for land acquisitions to expand their energy portfolio for incoming hashrate and/or GPU compute power. We believe the most coveted characteristics of a site are tier 3 clean energy redundancy and gigawatt pipelines. For example, TeraWulf's Lake Mariner site draws all its electricity from hydro sources, and according to management, has a power usage effectiveness (PUE) of 1.2. Located in New York, the site benefits from a cooler climate compared to Texas, and the PUE can be further reduced with their rights to draw water directly from the lake.

Once these premium clean energy sites are fully leveraged, attention will likely shift to regions with a strong renewable energy mix, such as the PJM Interconnection market (c.60-65% renewable). On that basis, Bitdeer's Ohio sites (791MW by FY'27) and TeraWulf's Nautilus sites (2.5GW) may gain a competitive edge.

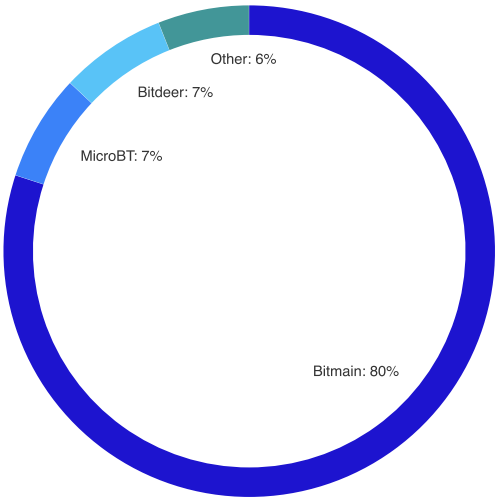
As a result, we expect companies with clean energy capabilities or sites in attractive regions have a higher likelihood of attracting AI partnerships than those heavily reliant on less ideal locations like Texas.

ALEXANDRE SCHMIDT
CFA-INDEX FUND MANAGER

The end of the bitcoin mining ASIC triopoly

Since the launch of the first Canaan Avalon chip in 2013, the ASIC manufacturing industry has been dominated by a few key players. China has been historically at its core, with the majority of ASIC designers and manufacturers based out of the country, even after the 2021 mining ban imposed by the government. Today, the market functions as a de facto triopoly, with an outsized dominance by Bitmain, followed by Canaan and MicroBT (the "Big 3"), all of them headquartered in China, but with manufacturing facilities also abroad.

Estimated Bitcoin ASIC market share



Source: Estimated by CoinShares

With the growth of bitcoin adoption, and price, mining has evolved into a more professionalised business. Since the launch of the first ASIC, the bitcoin network has grown from around 1 petahash per second (PH/s), to over 600 exahash per second (EH/s) today - an increase of 600,000 times against 2013 levels. Following Moore's law, each new generation of mining chips has become more powerful and more efficient, driving down manufacturing costs and price per hash.

The bitcoin ASIC market has become significant. A 2019 IPO filing by Canaan suggested that the total bitcoin mining equipment market had grown from US$166m in 2014 to US$3.2bn in 2018. Over the last three years, the bitcoin network hashrate has been growing between 100 EH/s and 200 EH/s annually. While not all of this growth is from newly purchased machines, at current average mining economic conditions, only newer, state of the art machines are profitable and, hence, we believe it is safe to assume that almost all of this growth does come from newly acquired machines. At current average machine prices of around US$15 per TH/s, we estimate the bitcoin ASIC market to be worth somewhere between US$15bn and US$30bn in 2024, a figure corroborated by industry insiders.

— New entrants take on established payers

As the market regained momentum in the second half of 2023, new projects began to emerge, notably those from Auradine, Bitdeer and Block Inc. For the first time since ASICs were introduced, several contenders are simultaneously racing to launch new, highly efficient mining machines that could finally challenge the established names, especially Bitmain.

MANUFACTURER	LATEST MODEL	EFFICIENCY	RELEASE DATE
Bitmain	S21 XP Hyd	12	Q4 24
Bitdeer	Sealminer A3	12	Q2 25
Auradine	AI3680	16	Q3 24
MicroBT	MM60S+	17	Q3 24
Canaan	A1566	18	Q2 24

Source: CoinShares, ASIM Miner Value, company data (as of 16 October 2024)

The big question is whether these ventures will succeed this time or whether we'll see yet another fleeting generation of mining rig startups. Auradine, a US-based bitcoin ASIC designer is backed by a US$49m investment from Marathon, whose CEO Fred Thiel sits on the company's board of directors. Auradine's first Teraflux miner launched in Q4 2023 and the its latest models boast efficiency ratios of 15 to 16 joules per terahash (J/TH), nearly matching Bitmain's latest model, the Antminer S21 XP Pro, with an efficiency of 13.5 J/TH. According to CEO Sanjay Gupta, the company already has more than 30 customers, although Marathon appears to be the largest, having placed US$44.1 million in advance prepayments over the past year.

Bitdeer, a publicly listed company spun off Bitmain in April 2023, initially operated solely as a bitcoin mining business. In March 2024, the company announced the launch of its own bitcoin mining machine featuring the SEAL01 chip. By September 2024, Bitdeer had completed testing its SEAL02 chip, capable of achieving 13.5 J/TH in underclocked settings. These have been integrated into Bitdeer's SEALMINER A2 machines, which began mass production in October 2024. Bitdeer's competitive edge lies in employing former Bitmain engineers, who have a successful track record in launching bitcoin miners at scale as well as industry connections to lock in supply chain deals.

The final entrant is Block Inc., who has been developing a bitcoin mining chip using a 3-nanometer process. Led by Twitter founder and bitcoin advocate Jack Dorsey, Block aims to 'democratise bitcoin mining'. While perceived mainly as a fintech business, Block has extensive experience with ASICs through its development of chips for Square point-of-sale systems. In July 2024, Block and Core Scientific announced a partnership to develop and deploy 15 EH/s of miners using Block's new chips. The project involves Block's Proto team, ePIC Blockchain Technologies and input from Core Scientific. However, unlike Auradine and Bitdeer, the Block and Core Scientific partnership is yet to reveal a working prototype, and whether Block's chips or the jointly developed machine will be broadly commercialised is yet to be announced.

— New competitors' success hinges on reliability and scaling

The ability of these newcomers to challenge the dominance of the "Big 3" depends largely on their success in bringing working products to market and rapidly scaling up production, which, in turn, hinges on securing capacity at semiconductor foundries. Mining operators' scepticism about new products - especially concerning reliability - also poses a challenge. However, the arrival of fresh competitors is welcome, as it could reduce the pricing power of the Big 3 and lead to more efficient and ultimately more profitable mining machines.

Bitcoin's stampede into the US financial sector

MATTHEW KIMMELL
DIGITAL ASSET ANALYST

Since their launch in February, the US Bitcoin ETFs have been nothing short of a major success. Of the 575 total ETFs launched in the US in 2024, all of the top four in terms of inflows are spot bitcoin products: IBIT, FBTC, ARKB, and BITB. Nine out of ten months since their launch have seen positive inflows. In less than a year, these spot bitcoin products collectively hold almost as many coins as any known entity, at over 1m coins—that's huge, though still slightly less than the estimated 1.1 million coins held by Satoshi Nakamoto.

For comparison, the level of inflow that bitcoin ETFs have seen in their first year took five years to reach for gold ETFs, which first launched in 2004. Such strong demand raises an important question: who is buying these ETFs, and can their inflows be sustained?

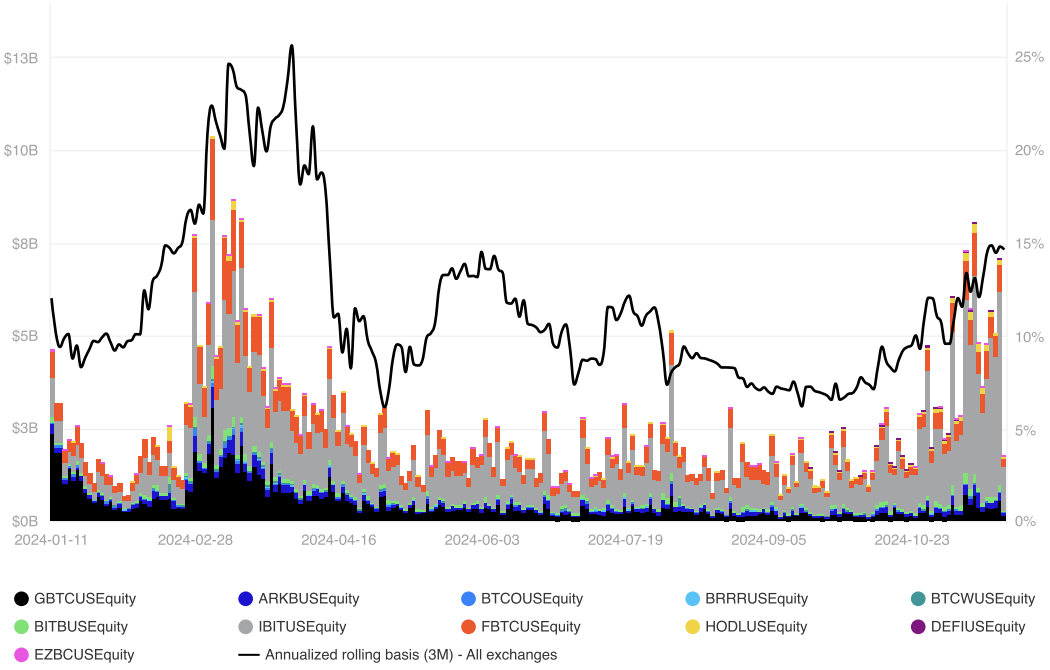
— Professional investors drive 20% of US Bitcoin ETF holdings

One source of insight into who is buying these ETFs comes from 13-F filings, which are required by investment managers with over US$100m in assets under management (AUM). These filings indicate that approximately 20% of the AUM in US spot bitcoin ETFs is held by professional firms and money managers, implying also that the remaining 80% is driven by retail or smaller financial professionals.

There are over 1,200 distinct holders of these ETFs based on 13-F forms. At 984 holders, the majority are investment advisors, which represent about 78% of the total filers, but account for only 41% of the AUM. Context of who these advisors are helps paint a fuller picture, as some notable names like Goldman Sachs with US$741m are likely more of a general liquidity provider, and others like Ark Investment Management and VanEck, which hold US$206m and US$80m, respectively, hold their own spot bitcoin products.

Hedge funds also represent a hefty portion of ownership, and with a much larger average holding size and portfolio weighting. There are 138 hedge fund holders, collectively accounting for about 38% of the total AUM among 13-F filers. Prominent holders include Millennium Management, Schonfeld Strategic Advisors, and Aristeia Capital. Here, we suspect these flows are less sticky, given that hedge funds are often more opportunistic in their allocations. Additionally, the basis trade has been appealing for much of this year, which may be a significant source of hedge-fund demand.

U.S. spot bitcoin ETFs daily volume (US$, Billions) vs. future annualized rolling basis (3M) - all exchanges



Source: Bloomberg, Glassnode, CoinShares, data available as of 22 November 2024

— Continued success of Bitcoin ETFs is very possible

The future trajectory of bitcoin ETFs hinges on several factors. Encouragingly, the number of 13-F filers increased by 20% from the March to September filing dates in 2024. This is a positive sign of growing adoption, particularly as much of that increase came from those classified as investment advisors. However, hedge funds, which still represent a substantial portion of the AUM, are more likely to trade these ETFs rather than holding them long-term. If market sentiment shifts or if certain trades unwind, these funds could quickly exit their positions, leading to outflows.

Another consideration is the relatively small allocation sizes in portfolios. Bitcoin is still largely viewed as a risk-on asset and may find itself falling within the “alternatives” bucket — and we do call it digital gold — for many managers. The size of alternatives is typically much smaller compared to equity and bond allocations limiting allocation potentials under that classification. That said, bitcoin ETFs have been available for less than a year, and many professional investors are likely still in the process of getting internal approvals or conducting due diligence across their investment committees and final decision makers.

Given the sheer size of the total addressable market of US financial professionals, even small portfolio allocations could lead to significant inflows if bitcoin becomes a standard part of modern portfolios. Inclusion is far from normal, however bitcoin has shown clear advantages as a diversifier, and there are several encouraging instances of bitcoin inclusion by discretional institutional allocators. Fidelity has incorporated their FBTC product into its All-In-One Conservative ETF; Michigan and Wisconsin have added bitcoin ETF exposure into their state pension funds; and most recently, Emory University has reported a modest holding of bitcoin ETFs in its endowment portfolio.

From a retail perspective, which seemingly remains the dominant source of demand for these ETFs, there is still room for growth. Certain brokerages, such as Vanguard, have yet to activate access to these bitcoin ETFs. Once they do, and as firms like Fidelity, Robinhood, and Interactive Brokers continue to provide access, retail participation could grow even further.

— The road ahead for US Bitcoin ETFs looks promising

The launch of bitcoin ETFs has clearly demonstrated an appetite for gaining exposure to bitcoin through familiar financial products in the US. These ETFs have not necessarily prompted a rush of professional financial managers to evaluate bitcoin's investment potential, but given the appetite for exposure, the likely progress of internal approvals deeming these products safe, and the possibility of pressure from their peers increasingly acknowledging bitcoin as a viable asset, we expect more evaluations to follow.

Access was the first step, and evaluation is the next — a process that may unfold slowly over time. Bitcoin enthusiasts should be cautious about proclaiming that "institutional money is here", given the relatively small portfolio weightings and the fact that 13-F filers account for only 20% of the AUM. Nonetheless, there is still much to be excited about.

The rapid success of these products speaks volumes about the demand for bitcoin, and the potential for even greater adoption if professional investors begin to see it as a standard portfolio component. The journey is just beginning, and the future of bitcoin ETFs looks bright.

SATISH PATEL
CFA-INVESTMENT ANALYST

The rise of Bitcoin yielding companies

The emergence of Bitcoin yielding companies is reshaping the landscape of corporate finance as businesses increasingly adopt Bitcoin as a treasury asset. This trend reflects a broader recognition of Bitcoin's potential to serve not only as a store of value but also as a means to generate yields. Yield in this context refers to 1) The growth of Bitcoin holdings relative to the company's shares 2) Yield farming, involving the generation of returns by lending Bitcoin 3) Alternative strategies for leveraging derivatives to generate income from a Bitcoin reserve.

MicroStrategy has become synonymous with corporate Bitcoin investment, holding 402,100 BTC, valued at approximately $39.8 billion as of 5th December 2024. The company introduced its own version of the

"BTC Yield" metric to measure the effectiveness of its strategy, allowing investors to gauge how Bitcoin acquisitions contribute to shareholder value. For a more detailed look at MicroStrategy's investment case, see our in-depth analysis here.

Similarly, Block has committed to using 10% of its Bitcoin product profits to acquire Bitcoin on its balance sheet, effectively employing a dollar-cost averaging strategy that enhances its treasury reserves. Marathon Digital, a Bitcoin mining company, has also taken a MicroStrategy-esque approach by leveraging low-interest debt to acquire Bitcoin. In August 2024, the company issued $300 million in convertible notes at a 2.125% coupon rate, followed by additional capital raises of $1 billion in November 2024 and $850 million in December 2024, both at a 0% coupon. This approach enables Marathon to capitalise on favorable borrowing conditions to bolster its Bitcoin holdings.

CORPORATE BITCOIN BALANCES (EX BITCOIN MINERS)	BITCOINS HELD TOTAL	TOTAL BITCOIN/MARKET CAP
MicroStrategy	402,100.0	43.46%
Tesla	9,720.0	0.08%
CoinBase	9,480.0	1.12%
Block Inc	8,363.0	1.35%
Galaxy Digital	4000.0	5.44%
Bitcoin Group	3,589.0	124.06%
Semler Scientific	1,873.0	41.94%
Nexon	1,717.0	1.44%
Metaplanet	1,142.0	15.84%
MercadoLibre	412.7	0.04%
Remixpoint	215.8	0.04%

Source: BitcoinTreasuries.net, Bloomberg, CoinShares, data as of 5th December 2024

A notable development this year was the SEC's decision to allow BNY Mellon to classify Bitcoin and other crypto securities as assets rather than liabilities, enabling the bank to offer custody services for cryptocurrency exchange-traded products. This classification aligns with MicroStrategy's ongoing efforts to improve the accounting treatment of its Bitcoin holdings, which have previously been subject to impairment losses under current GAAP standards. By recognising Bitcoin as an asset, MicroStrategy and others may be able to present a more favourable financial position, potentially mitigating the negative effects of price fluctuations on its reported earnings. Additionally, this change could enhance MicroStrategy's ability to leverage its Bitcoin holdings for lending opportunities at typical market rates of 4-6%, allowing the company to offset its interest payments.

Semler Scientific, a MedTech firm, has adopted Bitcoin as its primary treasury reserve, securing 1,873 BTC valued at around $185 million as of 5th December 2024. In addition, Metaplanet, a legacy hotel business in Japan, has also begun accumulating Bitcoin while implementing MicroStrategy's BTC Yield metric. The company holds a total of 1,142 BTC as of 5th December 2024 and is actively pursuing income generation strategies using options with Bitcoin to turn over a profit for the year. These moves underscore a growing trend among traditional and tech-oriented firms alike pivoting to Bitcoin yielding strategies and is expected to accelerate into 2025.

Throughout 2024, several major companies have begun accepting cryptocurrency as payment, suggesting a potential trend toward adopting Bitcoin in their treasury reserves in 2025. For example, luxury automaker Ferrari now accepts cryptocurrency payments in the U.S., with plans to expand into Europe. Additionally, Microsoft is evaluating a shareholder proposal to add Bitcoin to its investment strategy, with a decision anticipated at an upcoming meeting on 10 December 2024. High street retailers such as AT&T, Whole Foods, Home Depot, and AMC Theatres also accept Bitcoin through platforms like BitPay, Flexa, and Spedn, highlighting cross-industry adoption. Whilst E-commerce giants such as Amazon, Shopify, Nike, Expedia, and PayPal are already involved in cryptocurrency, either through payments or investments, and may consider incorporating Bitcoin into their treasuries in 2025.

As of 5th December 2024, corporate Bitcoin holdings reached approximately 939,190 BTC, a significant increase from 80,000 BTC in December 2020, according to BitcoinTreasuries.net. Public corporations alone account for 528,772 BTC, representing about 2.5% of Bitcoin's total supply. This robust accumulation is expected to persist and potentially intensify in 2025, especially as regulatory clarity and political developments create a more stable framework for corporate investment into digital assets.

CHRIS BENDIKSEN
BITCOIN RESEARCH LEAD

Checking in on the Lightning Network

Due to its focus on security and simplicity, at its base layer, Bitcoin trades off scalability in order to maximise decentralisation and censorship resistance. As a consequence, its data processing capacity is strictly limited, resulting in slow processing times and high transaction fees during times of high demand.

In order to alleviate these issues, various second layer (L2) solutions have been proposed to offload small-value transactions from the L1– creating a dedicated space to unlock greater capacity and speedy processing. The most successful of these solutions is the Lightning Network (LN). Built to complement Bitcoin's base layer, the Lightning Network enables cheap and instant payments in pre-funded channels that operate outside the base network, while still leveraging the security of the main chain upon request.

Over the course of 2024, the Lightning Network has solidified its role in Bitcoin's broader ecosystem, seeing rising adoption and development. Below, we briefly explore the current state of the Lightning Network, focusing on adoption, challenges, and its future trajectory.

— Most publicly visible network measures have remained flat across 2024

Looking at some standard network measures, the size and capacity of the Lightning Network remained more or less flat in 2024. In fact, many of these measures have been flat or even in decline since around 2022. According to Bitcoinvisuals, the number of nodes are about the same now as in late 2021, and the total capacity of the network, hovering around 5,300 btc, is around the same as at the start of 2023. The total number of channels peaked at c.84,000 in early 2022 and have since reduced by about 35% to 55,000 today.

That doesn't look very good at all. So what's going on here? In their annual flagship report on Lightning last year, River Financial make several arguments for why using and tracking the growth of simple public data points when analysing the Lightning Network can be problematic:

1. Unlike Bitcoin's L1, transaction information on Lightning is not public—the only people who can know anything about LN transactions are parties that are directly involved, either as senders, routers, or receivers

2. More nodes does not equal more usage—many LN users prefer Lightning Service Providers (LSPs) over managing their own channels, and LSPs can technically service an unlimited amount of users with a single node

3. Because of its privacy features, growth in Lightning usage cannot be accurately assessed using simple network measures, and is better evaluated with traditional metrics such as funds raised across the sector

We should briefly cover why LSPs have become so prevalent recently.

Lightning Service Providers (LSP) offer several advantages both for people running their own nodes, and people wanting simply to access Lightning via a fully custodial service provider.

For example, those running their own nodes can use an LSP to access inbound liquidity for their channels in return for a fee. In this way, users tap into the LSP's balance sheet, using their relationships and capital to give users more options and more efficient payment paths. But still, running a dedicated Lightning node comes at a cost, and requires running a Bitcoin node, managing liquidity (even if it is alleviated by connecting to LSPs), uptime monitoring, software updates, and node security, all of which can be time-consuming and require specialised knowledge.

For those wanting the convenience of having everything outsourced, using a fully managed service offers several benefits over running your own Lightning node, such as lower costs, and reduced technical complexity. Wallet providers and LSPs can work together to handle all technical and liquidity-related tasks for the user, providing an easy, time-efficient way to access the Lightning Network without needing the hardware or ongoing maintenance. For casual users, the fees may be more cost-effective than managing a node, and they completely rid the concepts of channel management and liquidity.

Outsourcing in either respect also typically makes for faster onboarding, reliable uptime, and better routing efficiency, making them appealing for users who prioritise convenience and speed. For the casual node runners and users, LSPs remove the need for extensive setup and basically cater to those who prefer simplicity. This is likely to be the majority of people looking to use bitcoin for small day-to-day payments where censorship or confiscation resistance is not very relevant or important to them.

— VC funding in the lightning space is healthy, but concentrated

Since 2021 several Lightning companies have secured sizable VC funding for business expansion, but the space is largely dominated by two players, Strike and River. Strike secured U$80m in a Series B round, led by Ten31 in September 2022, to enhance its retail and global payment solutions. After raising US$12m in their 2021 Series A, River Financial raised another US$35m in Series B funding in January 2022, positioning itself as the other major LSP.

Smaller companies such as Amboss Technologies, which focuses on data analytics for Lightning payments, raised U$4m for AI research and routing optimization. These funding rounds reflect growing investor confidence in the Lightning Network's potential.

— Lightning user growth comes from a diverse set of user groups

The River Lightning Report 2023 provides a detailed overview of user growth, noting that the 1,212% increase in payment volume they observed over the previous two years reflects both individual and business adoption. Key drivers include low fees, fast settlement, and the ability to handle microtransactions, especially useful in industries like gaming and cross-border payments. The report also highlights increased node participation (not mere existence), improving the network's overall efficiency and liquidity. Additionally, the development of more user-friendly wallets and platforms has made Lightning more accessible, further fueling adoption, particularly in regions with limited traditional banking infrastructure.

Businesses, especially in industries like gaming and cross-border remittances, are utilising Lightning for its low transaction fees and fast payment capabilities. Individuals are also adopting it for everyday transactions and microtransactions due to its ease of use and scalability. Additionally, users in regions with limited banking infrastructure find Lightning particularly valuable as it provides a quick, cost-effective alternative to traditional financial systems, allowing for greater financial inclusion.

The report suggests that the integration of Lightning into platforms like social media (such as Nostr) has further spurred growth, making it easier for users to send and receive Bitcoin globally. This combination of business use cases and individual accessibility has positioned Lightning as a practical solution for a growing number of people seeking more efficient, low-cost digital payments.

— We would argue that lightning is in a process of "finding itself"

The current state of the Lightning Network is not quite what many enthusiasts were envisioning when the original paper first appeared back in 2016. Over the 8 years that have passed since then, it has become clear that most users — and we see this across the wider crypto space as well — don't currently value properties such as censorship and confiscation resistance very highly for smaller amounts of money. A much stronger driver of adoption seems to be the unmatched *availability* of payment apps riding on crypto rails that have clear advantages above the banking system— not only Lightning, but above all else stablecoins.

This puts us in an interesting situation in terms of the future of the Lightning Network. At this point, it is entirely possible that Lightning adapts into a predominantly B2B network, where large LSPs act as custodians for clients using payment apps and use Lightning to instantly settle between each other.

Meanwhile, the permissionless nature of Lightning at the very least makes it *possible* for anyone to participate

in the network should any of the custodians restrict access to their apps. We believe that this in itself is an important safeguard against bad behaviour. If there is no way to *fully prevent* users from using a payment system, censorship at the business level is, at the end of the day, pointless.

Finally, we should consider the fact that a lot of bitcoin owners don't want to spend their bitcoin. Why spend your hardest asset when there is no lack of opportunity to earn and spend fiat money. The ability to make small casual payments is not lacking anywhere in the world, but the ability to protect your savings from inflationary erosion is. It may be the case that small casual bitcoin payments will not become popular until bitcoin reaches some level of adoption plateau, meaning that the Lightning Network might still simply be way ahead of its time.

MATTHEW KIMMELL
DIGITAL ASSET ANALYST

Why Bitcoin needs covenants for scalable, independent custody and transactions

Bitcoin was created for individuals to hold and transfer value independently, without third parties. Unlike previous digital cash projects, Bitcoin succeeded, solving issues like double-spending without a centralised coordinator. However, as adoption has grown, maintaining these core principles has become challenging, particularly in terms of cost-effectiveness, user-friendliness and system scaling.

We believe the next step lies in introducing covenants — changes to Bitcoin's scripting language that set rules on how coins can be spent. Specifically, covenants allow bitcoin owners to restrict a recipient from spending to certain destinations.

While it may seem small, activating covenants could be transformative for Bitcoin, especially when combined with existing Bitcoin script functions. It could enable new incentive schemes, enhance higher-layer technologies, and expand the possibilities in how coins are managed.

In our view, covenants allow a step toward scalable, peer-to-peer electronic cash by reducing the cost of independent custody and transactions. Without this change, Bitcoin risks drifting away from this goal.

— Lightning solves some problems, but covenants take scaling further

Bitcoin's scalability issues are well-documented. More users interacting within the confines of limited block space lead to longer waiting times and impractical costs for casual everyday use.

The Lightning Network (LN) helps alleviate this problem by allowing users to open off-chain payment channels to make fast, low-cost transfers, needing to settle on-chain only when channels open and close. However, Lightning has limits. Some on-chain operations are still required, which can be costly, particularly as transaction fees rise.

Lightning has improved transaction speed but hasn't fully realized Bitcoin's goal of independent value transfer without third parties. Due to costs and inconvenience, holding and transferring BTC often involve third parties, such as exchanges, wallet providers, and financial products.

Covenants could change this. They could allow multiple users to share coins (specifically, a single UTXO) without losing unilateral control, enabling new forms of custodianship, cost sharing, and reducing issues that arise in high-fee environments.

In the broader sense, covenants are another step toward making bitcoin accessible for everyday use while preserving individual freedoms.

— Covenants unlock new possibilities for Bitcoin Layer 2s

Many of the benefits of covenants are unlocked on higher layer technologies like Lightning. Although Lightning has improved transfer speed and reduced costs, it still requires transacting on-chain, mainly for channel opens/closes and liquidity purposes.

Covenants could extend Lightning's benefits to more users by splitting the cost of those on-chain operations. For example, a channel factory could allow multiple users to open Lightning channels from a single UTXO, reducing the transaction load and cost per user.

Beyond channel factories, virtual UTXO (V-UTXO) schemes, like those in proposed projects like Ark, could also benefit from covenants. While in theory possible without them, these protocols become much less interactive with certain covenants, and are likely essential for these systems to operate practically.

— Covenants are key to preserving Bitcoin's self-sovereign adoption

"Not your keys, not your coins" in common Bitcoin parlance is a mantra spreading the importance of self-custody, where users control their funds without intermediaries. Yet, complexity and increasing costs have pushed users toward custodial solutions.

For Bitcoin to achieve global adoption with self-sovereignty as an option, change is necessary. Lightning helps, but, it's almost certainly not enough as it currently exists. Without change, Bitcoin will eventually become too expensive for ordinary users.

Covenants address scalability issues by introducing more advanced transaction functions, allowing fund management in tighter ways. Which covenant and how to activate is important, but the need is quite clear, in our opinion.

Each covenant proposal is relatively small and backward-compatible but powerful in terms of what Bitcoin transactions could actually achieve. Some are simple reactivations of opcodes that were originally in Bitcoin, but have since deactivated. Others introduce a new opcode or more flexible ways to construct transactions. It is a fitting follow-on from the much larger Taproot and SegWit changes in 2021 and 2017, and the research behind them is many years deep already.

Embracing covenants could help individuals custody and transact bitcoin affordably and securely, on their own terms. Without them, adoption will continue along custodial lanes. We see the covenants discussions heating up in 2025, with a potential activation in 2026.

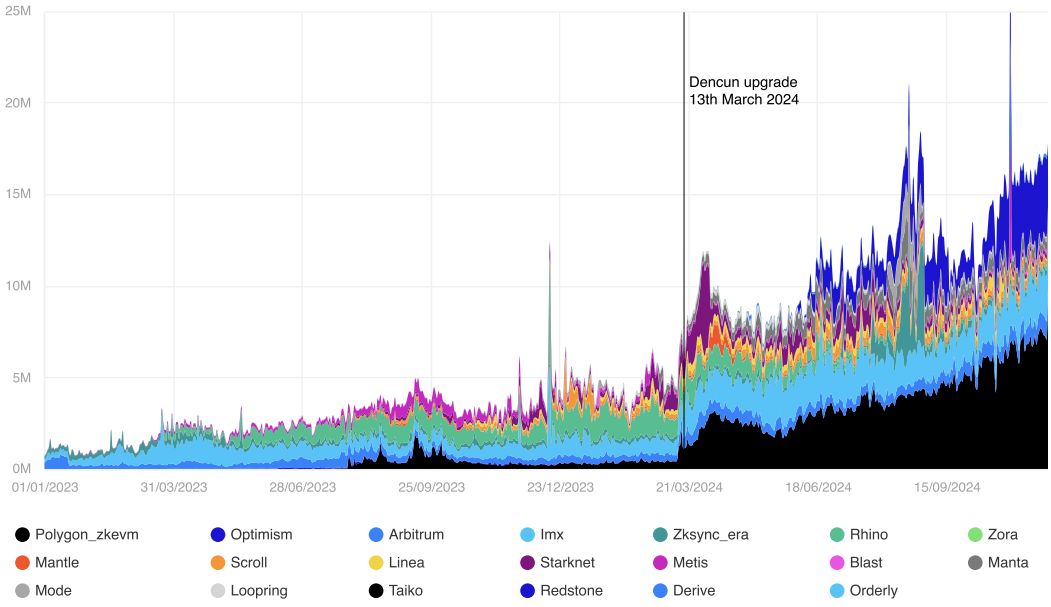
Ethereum Layer 2 usage will continue up and to the right

LUKE NOLAN
ETHEREUM RESEARCH ASSOCIATE

In March, Ethereum implemented the Dencun Upgrade, which drastically reduced transaction costs on Layer 2's, as well as increasing the Transactions Per Second (TPS) they could post back to Layer 1. The details are complicated, and we won't cover them in this piece, but you can find an extensive overview here.

The upgrade has had a noticeable impact on usage of Layer 2's. On one hand, we could call it a tremendous success, as we will explore in this short piece. On the other hand, there have been some second order consequences affecting the value of the Ether token as we view it. So what's the outlook for Layer 2's within the Ethereum ecosystem over the next year?

Number of daily transactions on Ethereum Layer 2's (excluding ethereum)



Source: GrowThePie, CoinShares, data available as of close 17 September 2024

At a glimpse, adoption of Layer 2's has shifted noticeably over the last year, especially post-Dencun as seen on l2beat:

ATTRIBUTE	1 YEAR AGO	CURRENT	% CHANGE
Daily Active Addresses	830,000	2,700,000	+225%
Daily Transactions	3,000,000	19,200,000	+540%
Total Value Bridged	6.7M ETH	13.8M ETH	+101%
Transactions Per Second (On L2)	63	370	+487%

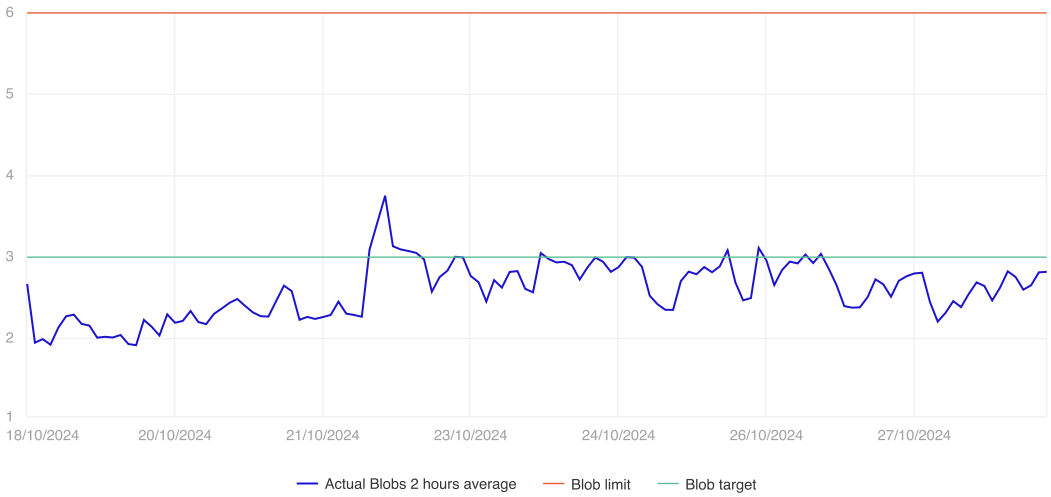
Even looking further out than the current increase in adoption for existing Layer 2's is the development of new Layer 2s by large institutions. Sony announced their Layer 2 "Soneium" earlier this year, and more recently, so did Kraken with their "Ink" blockchain. The institutionalisation of Layer 2s will drive adoption further over the next year, onboarding users who are already customers of these businesses.

— Blob market dynamics

Even given the vast increase in usage, the blob market, which is the independent fee market that Layer 2's use to post transactions to Ethereum, has been largely "free". The actual cost to post blobs, separate from the transaction data itself, is subject to a similar mechanism as introduced in EIP-1559. In a simple way, a maximum of 6 blobs can be posted to each Ethereum block; when there are more than 3 blobs posted, the price to post these blobs increases, and when there is less than 3, the price decreases until it reaches its lowest possible amount.

Recently, in late October, we saw a period in which there was consistently (albeit for a short period of time) more than 3 blobs being posted consecutively, sending the blob market into price discovery.

Average blob count per Block 10 days



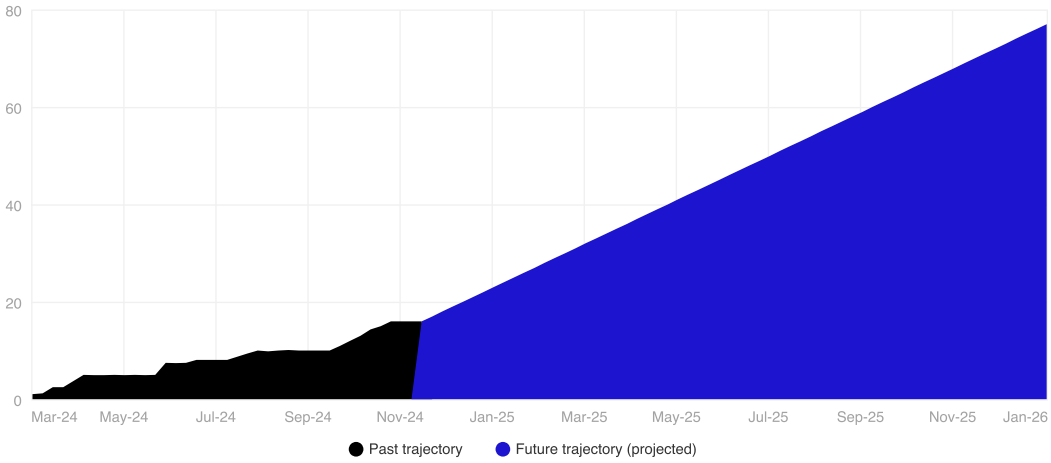
Source: Dune Analysis, data as of 25th November 2024

This stemmed from an increase in the amount of transaction demand due to users claiming the scroll airdrop. In our view, a competitive blob market brings value accrual to the ETH token due to increasing the amount of ETH supply burned. Greater competition among L2s in the blob market is the basis of our 2025 outlook: Usage on Layer 2's will continue to increase over the next year driven by even higher activity and we will start to see extended periods of price discovery for blobs. This would be the start of a healthy coexistence between what many view as a current parasitic L2-L1 relationship (at least comparatively healthier).

— Layer 2s set to grow over the next year

Apart from the aforementioned institutionalisation of Layer 2's by large players, there are other reasons to believe that our prediction is likely to come true. Base, the Layer 2 backed by crypto giant Coinbase, has transparently outlined their plans to continuously raise their gas target by 1 Mgas/sec each week on their journey to 1 Ggas/s. In simple terms, the plan here is to continuously increase the amount of transactions that can fit in each block on Base, and consequently on Ethereum itself (as batched transactions).

Base Target Mgas/sec



Source: Base, CoinShares, data available as of close 23 October 2024

Now, while there is not currently excess demand to transact on Base, there is not necessarily a requirement to raise this gas limit. But one may wonder why exactly Base developers have chosen to keep increasing capacity. For reference, at 80 Mgas/sec, Base could in theory support ~3,800 TPS worth of simple transfers. At that level of demand, the amount of blobs posted per block would almost certainly increase and we would see a continuous increase in the price to post blobs, and therefore a corresponding rise in the ETH supply burn.

It's not in vain that Base will continue to scale to host more transactions. Coinbase is planning to increase Base integration with the Coinbase consumer application (i.e. payment rails, which is already happening), tapping further into their c.100m user base and offering an easy path for greater Base adoption.

In our view, L2 adoption will continue to rise, which will increase demand for blobs, and Ethereum transaction fee spend. This outcome would be supportive for ETH's value per our model, and make L2s, once again, a relevant source of Ethereum demand.

Ethereum set for Pectra Upgrade in 2025

LUKE NOLAN
ETHEREUM RESEARCH ASSOCIATE

The Pectra upgrade is set to modify some key characteristics of the inner workings of the Ethereum blockchain as we know it. Originally planned as one hard fork (Pectra), the number of Ethereum Improvement Proposals (EIPs) in the original scope made developers split the proposals into two distinct upgrades. Pectra is likely to come sometime in Q1 2025 and the newly proposed Fusaka upgrade sometime in 2026.

— What's in the Pectra Upgrade?

The Pectra upgrade was going to be the largest in Ethereum history, at 20 included EIPs. After the split into two with Fusaka, there are 10 EIPs likely to be included in the first hard fork. We won't go into technical detail for all 10, but rather zoom in on the most important one and why it is being implemented. The full list, as seen here:

EIP #	TITLE AND EXPLANATION
7685	**General purpose execution layer requests:** A framework for handling execution layer (EL) requests triggered by smart contracts, facilitating communication between the EL and the consensus layer (CL).
2935	**Serve historical block hashes from state:** Introduces a way to access past Ethereum blocks and state through a special "blockhash" opcode, enhancing smart contract capabilities for historical data retrieval.
2537	**Precompile for BLS12-381 curve operations:** enables efficient verification of BLS signatures, which are essential for scalability and privacy in applications and ZK rollups.
7702	**Set EOA account code:** Allows Externally Owned Accounts (EOAs) to run custom code, enabling features like transaction batching.
6110	**Supply validator deposits on chain:** Integrates validator deposits directly into Execution Layer block, reducing processing delays for incoming validators.
7002	**Execution layer triggerable withdrawals:** Enables validators to manually trigger partial and full withdrawals via their `0x01` credentials.
7251	**Increase the MAX_EFFECTIVE_Balance:** Increases the amount of ETH a validator can hold from 32 to 2048 ETH.
7549	**Move committee index outside Attestation:** Makes vote aggregation easier and more efficient.
7742	**Uncouple blob count between Consensus Layer and Execution Layer:** Lets the Consensus Layer set the blob count per block, making adjustments easier and improving coordination with the Execution Layer.
TBD	**Increase blob target and max limit:** Possibly increasing the amount of blobs per block (currently at 6 maximum and a target of 3).

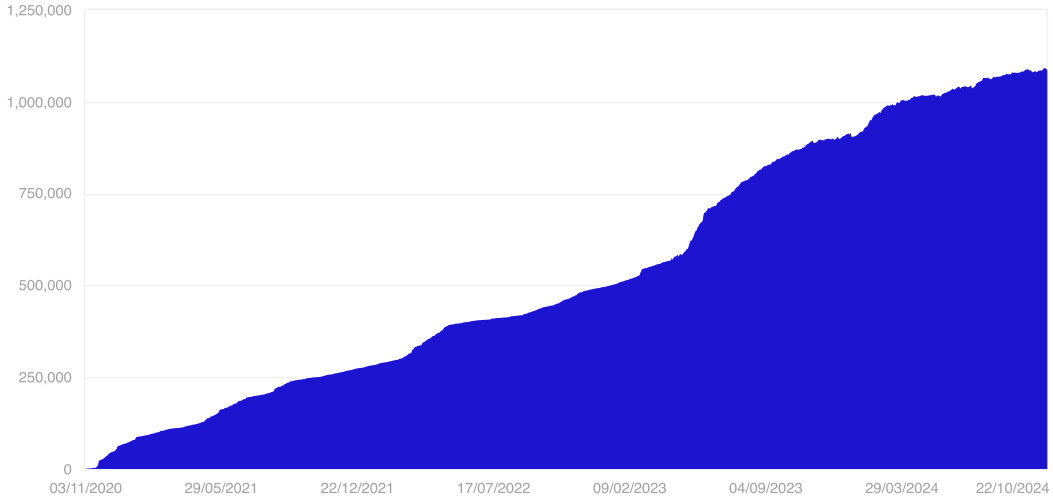
— EIP-7251: Max effective balance adjustment

EIP-7251 is the proposal with the largest implications for Ethereum. Currently, validators on Ethereum are capped at 32 ETH, which was initially set to encourage decentralisation and broaden participation. The amount of validators on Ethereum has grown quite dramatically over the last 2 years, and now sits at nearly 1.1 million as of the date of writing this, as per Dune.

The unwanted consequence of this is that as the validator set grows, the number of P2P messages over the network also increases. This has implications on how fast transactions can be finalised.

EIP-7251 increases the amount of ETH a single validator can hold to 2048, allowing large entities to consolidate to run fewer validators (i.e. Coinbase currently has 122,000 validators and could run as few as 2,000 after the upgrade).

Number of Ethereum validators



Source: Bloomberg, CoinShares, data available as of close 03 November 2024

— How does EIP-7251 improve Ethereum?

1. **Reduced computational load:** By increasing the max effective balance, validators can handle more responsibilities without needing to split their stakes across multiple validator nodes. This also means that large validating entities can reduce their overhead costs slightly (and simplify logistics).

2. **Pathway to single slot finality:** Reducing computational load is a crucial step towards achieving single slot finality - a state where blocks are finalised in just one slot (12s). Single slot finality significantly cuts down transaction confirmation times, which enhances the performance of DeFi protocols due to more immediate (irreversible) confirmation. This will very likely also mean end users benefit from better pricing on decentralised exchanges due to lower slippage and lower risk of front-running attacks.

It should be noted that rewards are not affected by EIP-7251. An entity with 10 validators with 32 ETH each will earn the same on a yearly basis than a single validator with 320 ETH.

The proposal to increase the blob target (No EIP # as of yet as seen in the table above) is aimed at improving Ethereum's scalability as a data availability layer within the rollup-centric roadmap. The proposal comes from Base developer Francis Li. As described in the other Ethereum piece in this outlook, Base is set to keep expanding transaction capacity, envisioning that demand will accompany it. Currently there is a maximum of 6 blobs per block, and the proposal would be to change this to 8, also modifying the target from 3 to 5. In our view, this may be negative for ETH in the short term as fees decrease for end users and ultimately the value accrued to the Ether token is adversely affected. However, this is part of planning for an end state that handles multiple million Layer 2 transactions per day, and therefore should only be viewed as a short term pain point.

Overall, Ethereum continues to change, and the execution of the scaling roadmap brings about new efficiencies but also challenges for the Ether token as it finds a balance between usability and value accrual. What is clear is that these changes are not suitable for those taking a short term view - developers are heavily focused on making programmatic modifications to the network that will make it suitable for an end state that hosts a variety of use cases and millions of daily users.

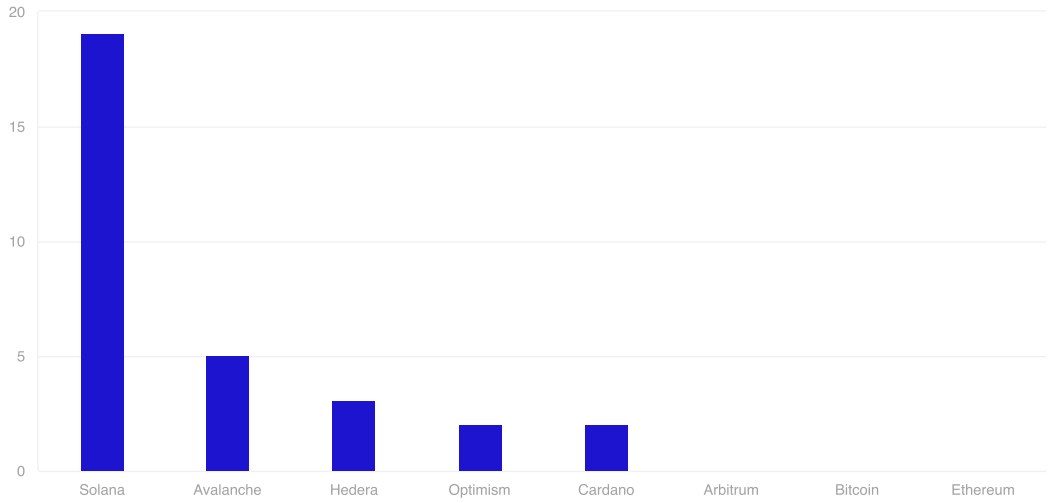
Speed unleashed: The parallel revolution

MAX SHANNON
RESEARCH ANALYST

As blockchain networks continue to grow, the need to process more transactions faster is driving a shift towards parallelisation—where multiple transactions are handled simultaneously to increase speed and efficiency. This innovation is essential for making blockchain a viable backbone for global financial systems, enabling thousands of transactions per second.

Solana was the first to adopt parallelisation, however, the approach wasn't without challenges. Solana encountered issues with congestion control, resulting in notable network outages in September 2021 and April 2022. These disruptions highlighted a fundamental obstacle: balancing speed with reliability remains difficult, especially under high transaction loads.

Frequency of network downtime periods since January 2021



Source: Network status pages, CoinShares, data available as of close 29 October 2024

This performance gap has opened the door for new competitors exploring alternative methods to improve parallel transaction processing. Two primary strategies have emerged—optimistic and pessimistic parallelisation.

In simple terms, pessimistic parallelisation is more cautious, enforcing stricter controls to avoid errors but at the cost of some speed. Optimistic parallelisation, on the other hand, focuses on speed by assuming transactions will process smoothly, though it risks reliability in more complex scenarios. Each approach has pros and cons, with pessimistic models offering more stability and optimistic ones excelling in ideal conditions.

Looking ahead, several strategies could further enhance blockchain scalability. Reducing the number of computational steps required for transaction proof generation, for instance, could significantly speed up processes. Additionally, specialised hardware like GPUs and ASICs, which are designed to handle intense computational tasks, may help push the boundaries of transaction throughput.

	OPTIMISTIC PARALLELISATION	PESSIMISTIC PARALLELISATION	ASYNCHRONOUS PARALLELISATION
Examples	Aptos, SEI v2, Monad.	Yes.	Crystality (PREDA Model).
Execution model	Execute first, validate later.	Pruned after ~2 weeks.	Decompose and execute asynchronously with non-overlapping state dependencies.
Conflict handling	Detects conflicts after execution and rolls back conflicting transactions.	Prevents conflicts by locking resources before execution.	Nearly no rollbacks; No static analysis; Avoids nearly all conflicts by breaking transactions into independent, asynchronous steps.
Throughput	High, if conflicts are rare.	Lower, due to locking and reduced parallelism.	High concurrency by design, with nearly no rollbacks needed.
Concurrency	High concurrency with potential rollback costs.	Limited concurrency due to locks.	Excellent, with a much higher level of resource utilization.
Resource utilization	Good, but can suffer due to rollback overhead.	Poor, due to waiting for locks.	High, requires breaking down transactions and understanding async programming.
Implementation complexity	Moderate, requires conflict detection and rollback mechanisms.	Simple, but may suffer from high contention management.	High, requires breaking down transactions and understanding async programming.
Rollback overhead	High in high-conflict scenarios.	None, conflicts are prevented before execution.	Nearly none, conflicts are mostly avoided by decomposing transactions.
Pros	High throughput in low-conflict environments; Reduced contention and waiting.	Ensures data integrity; Simple to understand and implement.	High concurrency and scalability; Nearly no rollbacks or complex conflict resolution needed.
Cons	High cost of rollbacks in high-conflict environments; Complexity in conflict detection and resolution.	Reduced parallelism and throughput; High contention and waiting time.	Requires significant transaction redesign; Steeper learning curve for developers as it has to redesign the programming language.

Source: Preda

There are obvious challenges related to parallelism. A major challenge for distributed networks is arriving at exact consensus on the time-ordering of the transaction history. Simultaneous processing of transactions may introduce dependencies at the transaction, block and smart contract level, requiring careful management to maintain data order and consensus.

Parallelising a network might require even more powerful and expensive nodes, which hinders decentralisation since the network will only be able to run on a smaller set of more deeply interconnected nodes. New and 'novel' consensus mechanisms will also likely have to be invented to keep everything in sync. This all has its own dangers and trade-offs.

In short, achieving high performance and stability in blockchain networks is no small task, but teams are paving the way forward with further parallelisation of networks despite the inherent trade-offs at hand. If successful, these efforts could make blockchain a scalable and reliable technology, ready to support the demands of tomorrow's digital economy.

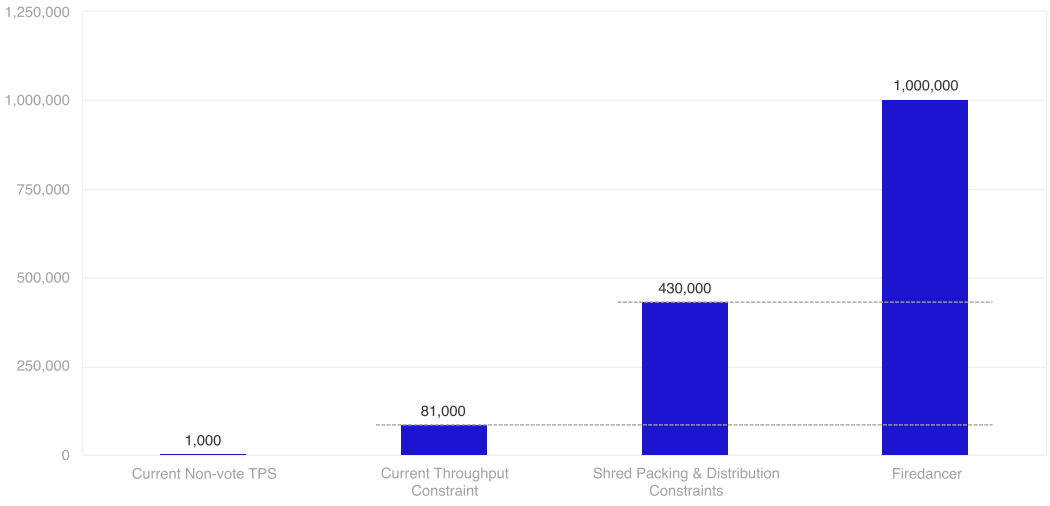
Firedancer unleashed: The route to Solana's supremacy?

MAX SHANNON
RESEARCH ANALYST

Solana's future is set to be transformed by Frankendancer and Firedancer. Together, three things should occur once implemented: documentation and standardisation of the code, diversification of the validator client pool, and improvements in ecosystem performance. Overall, it aims to revolutionise the user and developer experience:

- First, it will document and standardise the Solana protocol. This enables greater accessibility and simplicity for future clients.
- Second, it will diversify the validator client pool, reducing reliance on Solana Labs and Jito Labs, the only two clients currently validating the blockchain. In the ideal scenario, Solana could see up to four independent validator clients, with none holding more than 33% of the total stake, thus improving network uptime, as one client can go down while the others continue operating the chain.
- Third, and perhaps the most exciting aspect of Firedancer is its potential to massively boost Solana's performance. With a superior architecture, leveraging FPGAs for microsecond-level latency and the capability to handle up to 8 million signatures per second, Firedancer promises unmatched throughput and efficiency. However, this potential is currently capped by Solana's protocol, which limits throughput 81,000 TPS and faces further constraints at 430,000 TPS due to shred packing limitations.

TPS limitations



Source: Bloomberg, CoinShares, data available as of 29 October 2024

Firedancer, a full validator client built from scratch in C, aims to overhaul Solana's networking, runtime, and consensus layers for improved performance and scalability.

Frankendancer, a hybrid client currently active on the testnet, integrates Firedancer's components into Solana's existing system, allowing for incremental testing without disrupting the network. The goal is to gradually evolve Frankendancer into Firedancer, ensuring stability while unlocking significant performance gains.

This upgrade has already gone live on mainnet but will not have immediate effects on developer and user experience because of the lowest-–performance clients acting as a bottleneck to protocol performance. These lower-performance clients now have a higher open-source standard to work towards, therefore, accelerating protocol performance prior to the Firedancer development.

Looking ahead, the constraints to protocol performance, as demonstrated by TPS limitations, will need to be addressed through ongoing governance decisions and protocol updates. Firedancer's success is not just a matter of technical achievement but also of community consensus and adoption. As Firedancer progresses, updates to the protocol will be necessary to fully exploit its capabilities, potentially requiring shifts in how the blockchain handles transactions and data.

Acknowledgements

JAMES BUTTERFILL
HEAD OF RESEARCH

A finance veteran with roots in equity, fund management, and securities, this former Head of Research at ETF Securities has led CoinShares' renowned Research department with mastery.

MAX SHANNON
RESEARCH ANALYST

Max, a CFA Level 2 candidate, offers deep expertise in Bitcoin mining and equity markets, with hands-on experience in CoinShares' Long-Short Multi-Asset fund.

ALEXANDRE SCHMIDT
INDEX FUND MANAGER

Alexandre's expertise in qualitative and quantitative research has helped him lead the first and largest fund offering exposure to listed companies in the blockchain ecosystem.

CHRIS BENDIKSEN
BITCOIN RESEARCH LEAD

Guest lecturer for London Blockchain Business School's Blockchain Series, this biochemistry expert is a former global energy market analyst. Early adopter, he has led Bitcoin Research since 2017.

MATTHEW KIMMELL
DIGITAL ASSET ANALYST

A University of Texas graduate, where he pioneered the university's first intro to Cryptocurrencies Technologies course, Matthew offers a deep understanding of the digital assets industry

SATISH PATEL
INVESTMENT ANALYST

As co-manager of the Invesco CoinShares Global Blockchain ETF, Satish has extensive experience as an equity and financial analyst with notable coverage in the payments and technology sectors.

LUKE NOLAN
ETHEREUM ASSOCIATE

Although a former equity analyst, Luke also worked in software development. In this context, his passion for Ethereum makes sense, as he understands its many intricate layers.

DISCLOSURES

THE INFORMATION CONTAINED IN THIS DOCUMENT IS FOR GENERAL INFORMATION ONLY. NOTHING IN THIS DOCUMENT SHOULD BE INTERPRETED AS CONSTITUTING AN OFFER OF (OR ANY SOLICITATION IN CONNECTION WITH) ANY INVESTMENT PRODUCTS OR SERVICES BY ANY MEMBER OF THE COINSHARES GROUP WHERE IT MAY BE ILLEGAL TO DO SO. ACCESS TO ANY INVESTMENT PRODUCTS OR SERVICES OF THE COINSHARES GROUP IS IN ALL CASES SUBJECT TO THE APPLICABLE LAWS AND REGULATIONS RELATING THERETO.

ALTHOUGH PRODUCED WITH REASONABLE CARE AND SKILL, NO REPRESENTATION SHOULD BE TAKEN AS HAVING BEEN GIVEN THAT THIS DOCUMENT IS AN EXHAUSTIVE ANALYSIS OF ALL OF THE CONSIDERATIONS WHICH ITS SUBJECT-MATTER MAY GIVE RISE TO. THIS DOCUMENT FAIRLY REPRESENTS THE OPINIONS AND SENTIMENTS OF COINSHARES, AS AT THE DATE OF ITS ISSUANCE BUT IT SHOULD BE NOTED THAT SUCH OPINIONS AND SENTIMENTS MAY BE REVISED FROM TIME TO TIME, FOR EXAMPLE IN LIGHT OF EXPERIENCE AND FURTHER DEVELOPMENTS, AND THIS DOCUMENT MAY NOT NECESSARILY BE UPDATED TO REFLECT THE SAME.

THE INFORMATION PRESENTED IN THIS DOCUMENT HAS BEEN DEVELOPED INTERNALLY AND / OR OBTAINED FROM SOURCES BELIEVED TO BE RELIABLE; HOWEVER, COINSHARES DOES NOT GUARANTEE THE ACCURACY, ADEQUACY OR COMPLETENESS OF SUCH INFORMATION. PREDICTIONS, OPINIONS AND OTHER INFORMATION CONTAINED IN THIS DOCUMENT ARE SUBJECT TO CHANGE CONTINUALLY AND WITHOUT NOTICE OF ANY KIND AND MAY NO LONGER BE TRUE AFTER THE DATE INDICATED. THIRD PARTY DATA PROVIDERS MAKE NO WARRANTIES OR REPRESENTATION OF ANY KIND IN RELATION TO THE USE OF ANY OF THEIR DATA IN THIS DOCUMENT. COINSHARES DOES NOT ACCEPT ANY LIABILITY WHATSOEVER FOR ANY DIRECT, INDIRECT OR CONSEQUENTIAL LOSS ARISING FROM ANY USE OF THIS DOCUMENT OR ITS CONTENTS.

ANY FORWARD-LOOKING STATEMENTS SPEAK ONLY AS OF THE DATE THEY ARE MADE, AND COINSHARES ASSUMES NO DUTY TO, AND DOES NOT UNDERTAKE, TO UPDATE FORWARD-LOOKING STATEMENTS. FORWARD-LOOKING STATEMENTS ARE SUBJECT TO NUMEROUS ASSUMPTIONS, RISKS AND UNCERTAINTIES, WHICH CHANGE OVER TIME. NOTHING WITHIN THIS DOCUMENT CONSTITUTES (OR SHOULD BE CONSTRUED AS BEING) INVESTMENT, LEGAL, TAX OR OTHER ADVICE. THIS DOCUMENT SHOULD NOT BE USED AS THE BASIS FOR ANY INVESTMENT DECISION(S) WHICH A READER THEREOF MAY BE CONSIDERING. ANY POTENTIAL INVESTOR IN DIGITAL ASSETS, EVEN IF EXPERIENCED AND AFFLUENT, IS STRONGLY RECOMMENDED TO SEEK INDEPENDENT FINANCIAL ADVICE UPON THE MERITS OF THE SAME IN THE CONTEXT OF THEIR OWN UNIQUE CIRCUMSTANCES.

THIS DOCUMENT IS DIRECTED AT, AND ONLY MADE AVAILABLE TO, PROFESSIONAL CLIENTS AND ELIGIBLE COUNTERPARTIES. FOR UK INVESTORS: COINSHARES CAPITAL MARKETS (UK) LIMITED IS AN APPOINTED REPRESENTATIVE OF STRATA GLOBAL LIMITED WHICH IS AUTHORISED AND REGULATED BY THE FINANCIAL CONDUCT AUTHORITY (FRN 563834). THE ADDRESS OF COINSHARES CAPITAL MARKETS (UK) LIMITED IS 1ST FLOOR, 3 LOMBARD STREET, LONDON, EC3V 9AQ. FOR EU INVESTORS: COINSHARES ASSET MANAGEMENT SASU IS AUTHORISED BY THE AUTORITÉ DES MARCHÉS FINANCIERS (AMF) AS AN ALTERNATIVE INVESTMENT FUND MANAGER (AIFM) UNDER N°GP19000015. ITS OFFICE IS LOCATED AT 17 RUE DE LA BANQUE, 75002 PARIS, FRANCE.