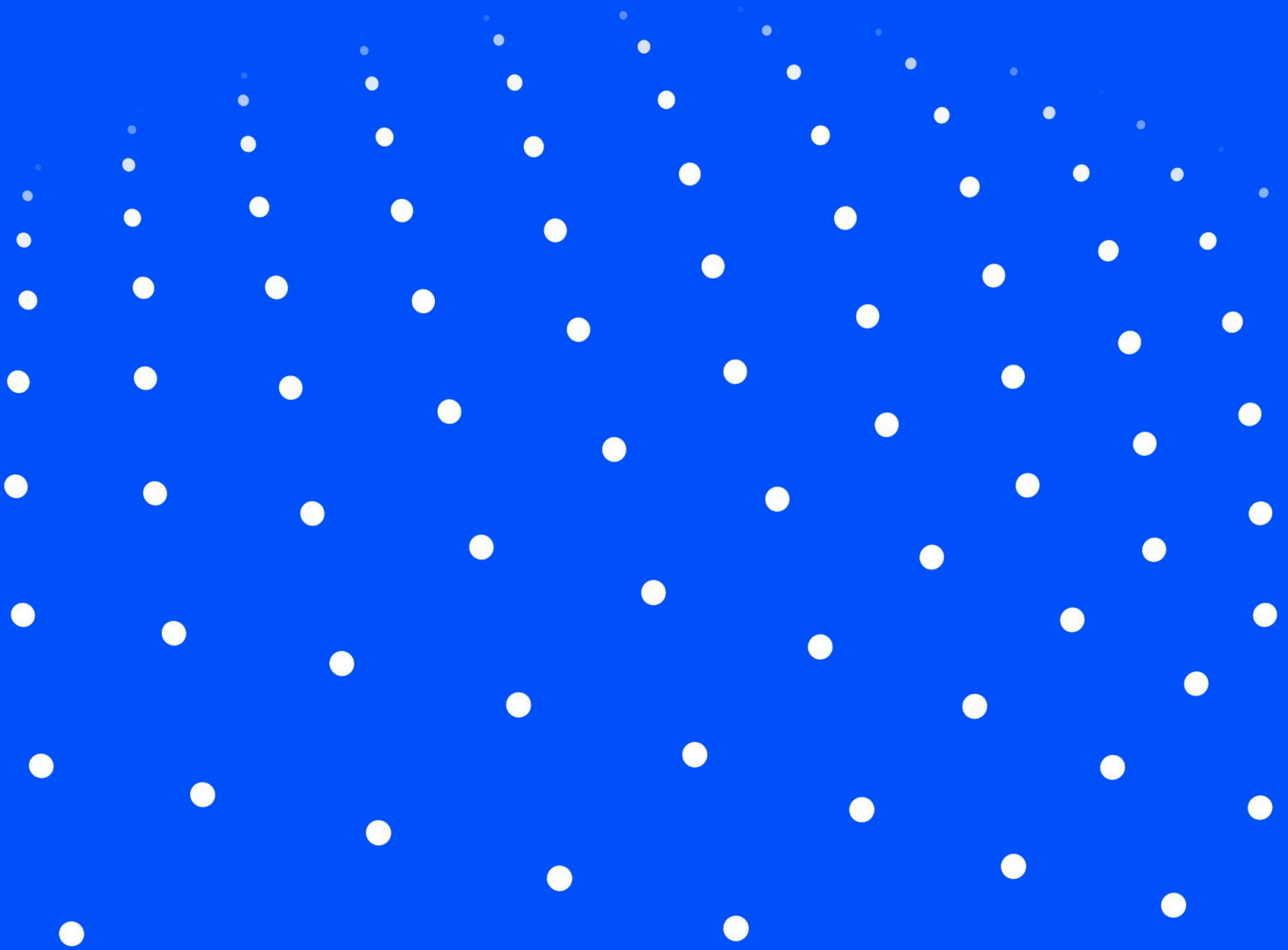


coinbase INSTITUTIONAL

# 2025 Crypto Market Outlook



# Executive Summary



**DAVID DUONG**  
COINBASE INSTITUTIONAL  
HEAD OF RESEARCH

As we look forward into 2025, the cryptocurrency market is poised for transformative growth. The maturation of the asset class continues to gain momentum, with increasing institutional adoption and expanding use cases across its various sectors. In just the past year, spot ETFs were approved in the US, tokenization of financial products increased dramatically, and stablecoins saw massive growth and greater integration into the global payments framework.

Getting here has been no easy task. But while it'd be easy to think of these successes as the *culmination* of years of work, increasingly it looks like they're actually just the *beginning* of something much bigger.

Crypto's strides are all the more impressive when we consider that, only a year ago, the asset class was reeling from interest rate hikes, regulatory crackdowns, and an uncertain path forward. It's a testament to crypto's resilience that despite all of those challenges, it has become a firmly established alternative asset class with real staying power.

From a markets perspective though, the uptrend in 2024 does belie some stark differences with previous bull cycles. Some of them are cosmetic: the term "web3" was replaced with the more fitting "onchain." Others are more profound: a demand for fundamentals has started to replace the waning influence of narrative-driven investment strategies, partly due to wider institutional participation.

Moreover, not only did bitcoin dominance surge, but the innovations in decentralized finance pushed the boundaries of what's possible with blockchain – putting the foundations of a new financial ecosystem within reach. Central banks and major financial institutions around the world are discussing how crypto can potentially make things like asset-issuance, trading, and record-keeping more efficient.

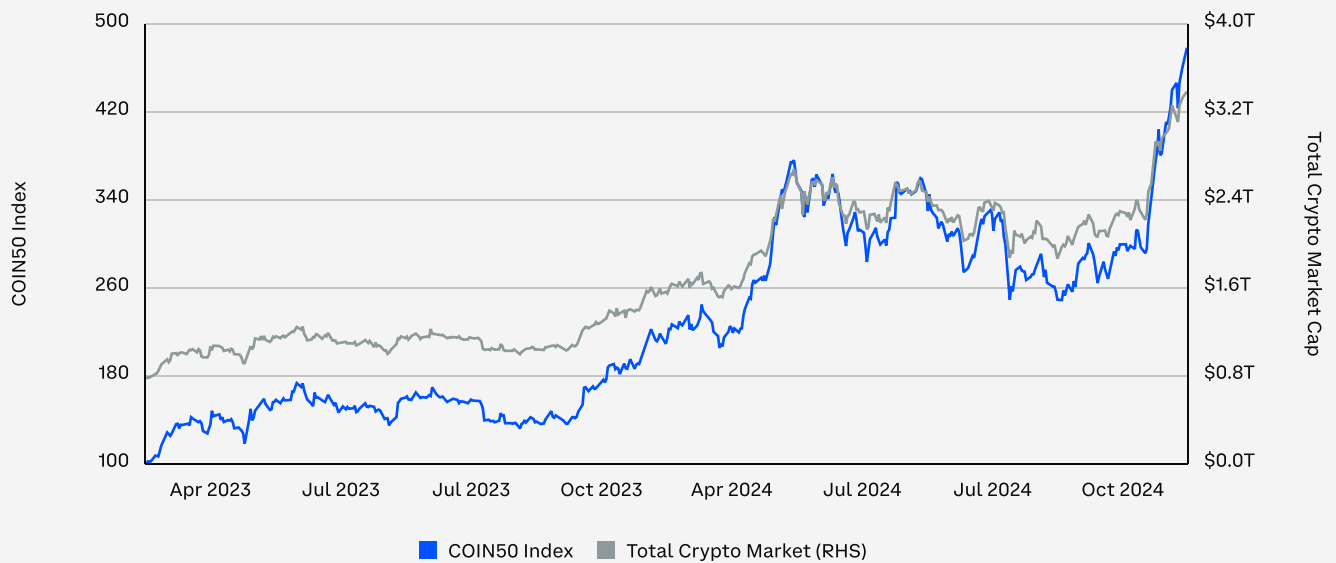
Going forward, the current crypto landscape presents a multitude of promising developments. At the bleeding edge of disruption, we're looking at decentralized peer-to-peer exchanges, decentralized prediction markets, and artificial intelligence (AI) agents equipped with crypto wallets. Closer to the institutional front, we see significant potential in stablecoins and payments (bringing crypto and fiat banking solutions closer together), undercollateralized onchain lending (facilitated by onchain credit scores), and compliant onchain capital formation.

Despite widespread crypto awareness, the technology remains largely obscure to many due to its novel technical structure. But technological innovations are also poised to change this, as more projects focus on improving the user experience by abstracting away blockchain complexities and enhancing smart contract functionality. Success here may broaden crypto’s accessibility for a new class of users.

Meanwhile, the foundations for greater regulatory clarity in the US were laid in 2024, long before November’s elections. This has set the stage for greater advancements in 2025, potentially solidifying the role of digital assets in mainstream finance.

As the regulatory and technological landscapes evolve, we expect to see substantial growth in the crypto ecosystem as wider adoption drives the industry closer to achieving its full potential. This will be a pivotal year. The breakthroughs and advancements of 2025 may very well help shape the long-term trajectory of the crypto industry for decades to come.

Chart 1. **Crypto has gained 96% year to date bringing the market cap up to \$3.4T**



Sources: Bloomberg and MarketVector Indexes.

# Additional Resources

This report is part of our efforts to provide applicable market intelligence to our institutional clients, highlighting updates on our institutional practice in long-form format. We encourage readers to visit and subscribe to our team's other publications to stay up to date:

- [Coinbase Institutional Research website](#)
- [Coinbase blog](#)
- [Coinbase Markets Podcast \(with Trading Desk\)](#)

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## Note:

*All data included in this report is as of December 1, 2024 unless otherwise noted.*

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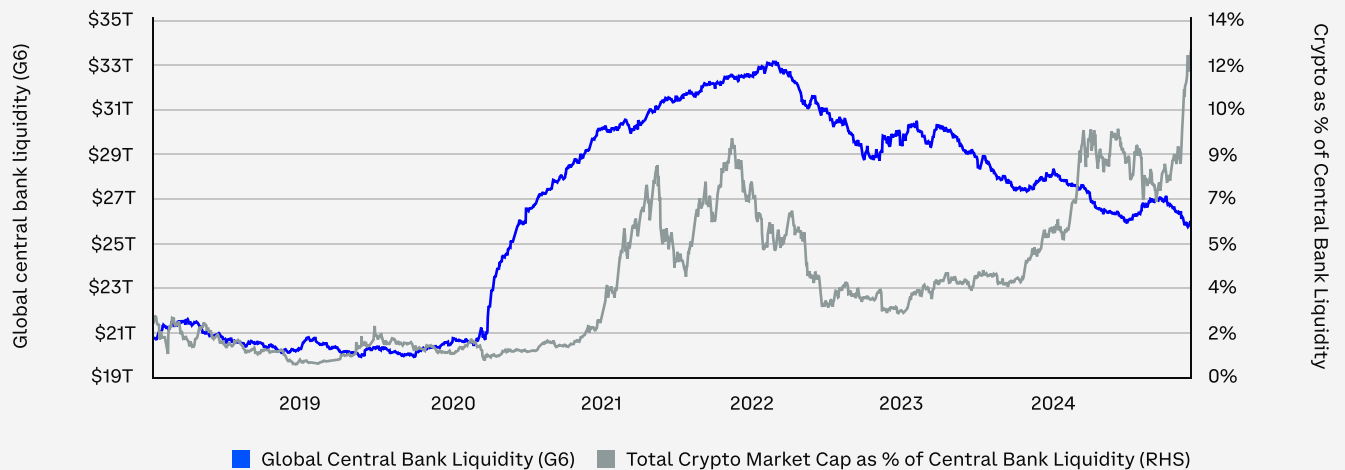
# 1 Key Themes for 2025

## 1 The 2025 Macro Roadmap

### What the Fed Wants, What the Fed Needs

President Donald Trump’s victory in the 2024 US presidential election was the most significant crypto market catalyst for 4Q24, driving bitcoin prices 4-5 standard deviations higher (compared to the three month average). But looking ahead, we think the short-term fiscal policy reaction will not be as meaningful as the long-term direction for monetary policy, particularly as we’re coming to a crucial moment for the Federal Reserve. Separating the two may not be so easy, however. We expect the Fed to continue easing in 2025, but the pace may depend on how expansionary the next set of fiscal policies will be. That’s because tax cuts and tariffs could contribute to higher inflation, and while headline CPI has fallen to 2.7% YoY, core CPI still lingers near 3.3%, above the Fed’s target.

Chart 2. **Crypto market cap as % of global central bank liquidity**



Global central bank liquidity represented by the G6: US, ECB, BoJ, BoC, BoE, PBoC  
Sources: Bloomberg, CoinMetrics and Coinbase.



For what it's worth, the Fed wants *disinflation* from current levels, meaning prices need to rise but more slowly from here to help attain its other mandate – maximum employment. They simply want the tempo of price rises to be controlled. Households, on the other hand, have been demanding *deflation*, or a decrease in prices, after dealing with the pain of higher expenses for the last two years. But while falling prices might be politically expedient, they risk spiraling into vicious cycles that can end in recession.

Still, a soft landing seems to be the base case for now, enabled by lower long-term interest rates and American exceptionalism 2.0. The Fed's rate cuts are simply a formality at this point, as credit conditions are already easing, which is a supportive backdrop for crypto performance over the next 1-2 quarters. Meanwhile, the next administration's projected deficit spending (if it materializes) should translate into greater risk taking (crypto buying) as more dollars circulate in the economy.

Chart 3. Correlation matrix based on 2024 data YTD

BTC/USD	1.00	0.04	0.07	-0.06	0.80	-0.05	-0.13	0.33	-0.07	0	-0.03	-0.28
Copper	0.04	1.00	0.43	-0.4	0.07	0.38	0.01	0.18	0.12	0.08	0.15	-0.14
CRY	0.07	0.43	1.00	-0.34	0.11	0.30	-0.04	0.16	0.18	0.14	0.21	-0.10
DXY	-0.06	-0.40	-0.34	1.00	-0.08	-0.05	0.07	-0.07	-0.59	-0.49	-0.62	0.01
ETH/USD	0.80	0.07	0.11	-0.08	1.00	-0.03	-0.16	0.36	-0.02	0.03	0.01	-0.32
Gold	-0.05	0.38	0.30	-0.05	-0.03	1.00	-0.02	0.10	-0.12	-0.06	-0.11	-0.10
MOVE	-0.13	0.01	-0.04	0.07	-0.16	-0.02	1.00	-0.32	-0.08	-0.11	-0.14	0.45
S&P 500	0.33	0.18	0.16	-0.07	0.36	0.10	-0.32	1.00	0.04	0.02	0.14	-0.77
US 10Y	-0.07	0.12	0.18	-0.59	-0.02	-0.12	-0.08	0.04	1.00	0.75	0.98	0.02
US 2Y	0	0.08	0.14	-0.49	0.03	-0.06	-0.11	0.02	0.75	1.00	0.76	-0.02
US Bond	-0.03	0.15	0.21	-0.62	0.01	-0.11	-0.14	0.14	0.98	0.76	1.00	-0.07
VIX	-0.28	-0.14	-0.10	0.01	-0.32	-0.10	0.45	-0.77	0.02	-0.02	-0.07	1.00
	BTC/USD	Copper	CRY	DXY	ETH/USD	Gold	MOVE	S&P 500	US 10Y	US 2Y	US Bond	VIX

The correlation window is from January 1, 2024 to November 30, 2024.  
Sources: Bloomberg and Coinbase.

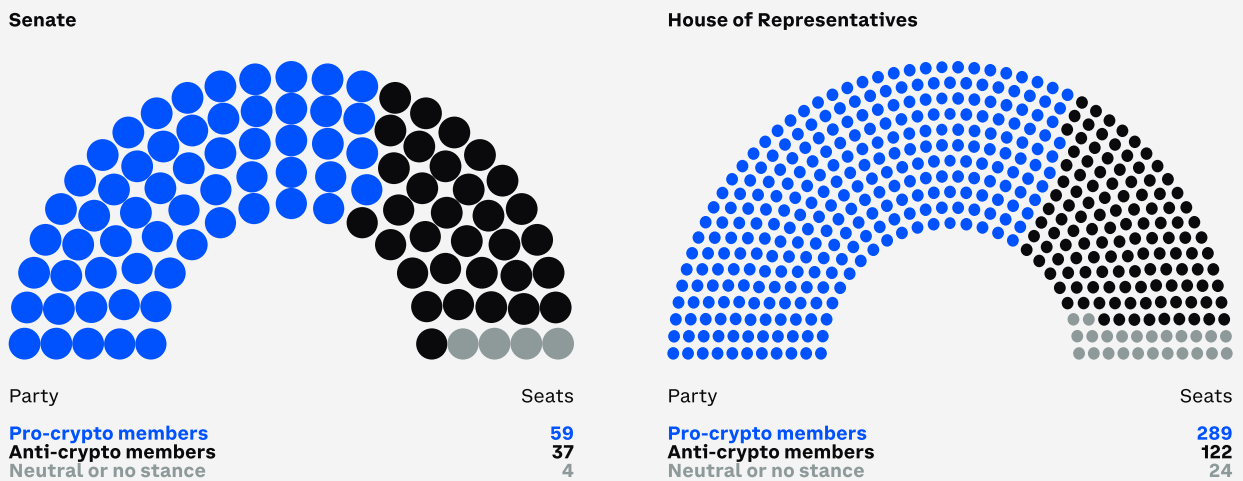
## The Most Pro-Crypto US Congress ... Ever

After struggling with political ambiguity for many years, we think the next legislative session could be the United States' chance to finally establish some regulatory clarity for the crypto industry. This election sent a strong message to Washington D.C. that the public is disaffected by the current financial system and wants change. From a markets perspective, a bipartisan pro-crypto majority in both the House and the Senate means that US regulation will likely flip from a headwind to a tailwind for crypto performance in 2025.

A new element of the conversation is the [possibility](#) of a Strategic Bitcoin Reserve. Not only did Senator Cynthia Lummis (WY) propose [The Bitcoin Act](#) in July 2024 following the Bitcoin Nashville Conference, but the Pennsylvania General Assembly also [introduced](#) the PA Bitcoin Strategic Reserve Act. The latter would allow the State Treasurer to invest up to 10% of the PA General Fund into bitcoin or other crypto-based instruments, if passed. Already [Michigan](#) and [Wisconsin](#) hold crypto or crypto ETFs in their pension funds, with [Florida](#) not far behind. That said, there could be some challenges to creating a Strategic Bitcoin Reserve such as legal constraints on what the Fed can hold on its balance sheet.

Meanwhile, the US isn't the only jurisdiction poised to make regulatory progress. The increase in global crypto demand is also shifting the competitive dynamics for thoughtful regulation internationally as well. Looking abroad, the Markets in Crypto-Assets regulation in the European Union (or MiCA) is being implemented in phases, providing a clear framework for the industry. Many G20 countries and major financial hubs such as the United Kingdom (UK), United Arab Emirates (UAE), Hong Kong, and Singapore are also actively writing rules to accommodate digital assets, creating more conducive environments for innovation and growth.

Chart 4. **Pro-crypto seats in incoming US Senate and House of Representatives**



Sources: Stand With Crypto and Coinbase.

## Crypto ETFs 2.0

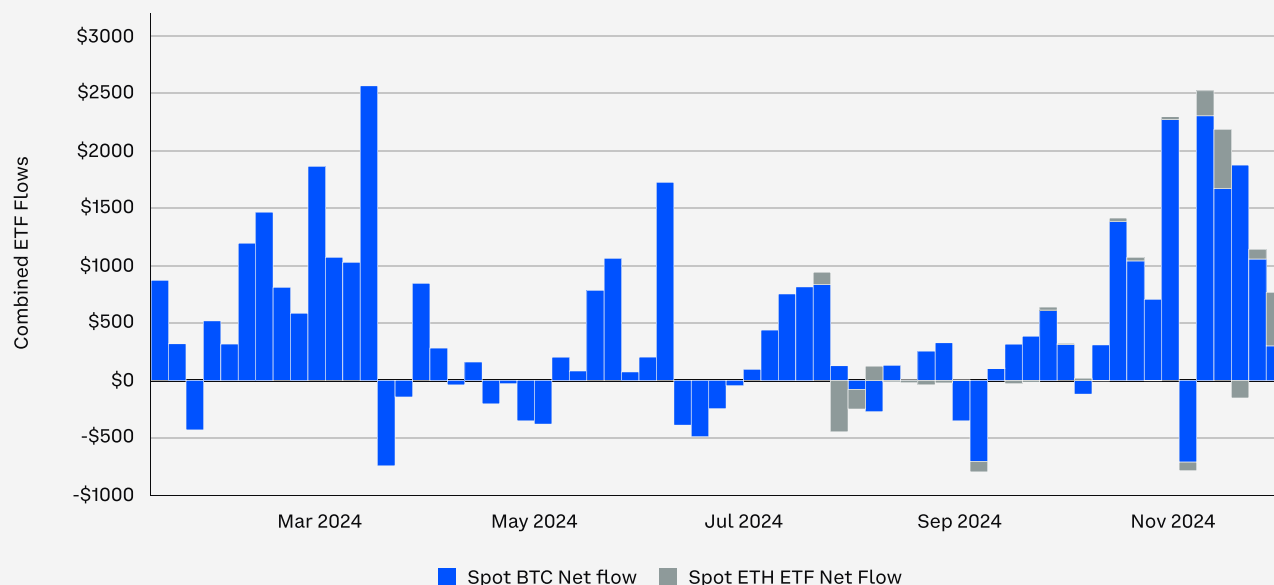
The approvals of spot bitcoin and ether exchange-traded products and funds (ETPs and ETFs) in the US were watershed moments for the cryptoeconomy, punctuated by a net inflow of \$30.7B since inception (about 11 months). That far exceeds the inflation-adjusted \$4.8B that the SPDR Gold Shares ETF (GLD) attracted in its first year after launching in October 2004. According to [Bloomberg](#), this puts these vehicles "among the top 0.1% when it comes to new ETF launches out of the about 5,500 that took place over the past 30 years."

ETFs have reshaped the market dynamics for BTC and ETH by establishing a new anchor for demand, driving bitcoin dominance up from 52% at the start of the year to a high of 62% in November 2024. According to the latest 13-F filings, almost every institutional type is now represented as holders of these products, including endowments, pension funds, hedge funds, investment advisors and family offices. Meanwhile, the introduction of US-regulated [options](#) on these products (in November 2024) will likely enable enhanced risk management and more cost-effective exposure to these assets.

Looking ahead, the industry is focused on issuers potentially expanding the set of exchange-traded products to include additional tokens like [XRP, SOL, LTC, and HBAR](#), though we think potential approvals may only be constructive for a limited cohort of assets in the near term. Instead, we are more interested in what could happen if the Securities and Exchange Commission (SEC) allowed staking in ETFs or lifted its mandate on cash rather than in-kind creations and redemptions of ETF shares. The latter mandate introduced settlement latency between when authorized participants (APs) receive buy or sell orders and when issuers can create or redeem the corresponding shares. That time lag has in turn created misalignments between onscreen ETF share prices and the actual net asset value (NAV).

The introduction of in-kind creations and redemptions could not only improve price alignment between share prices and NAV, but it could also help narrow the spreads for ETF shares. That is, APs wouldn't need to quote cash prices above bitcoin's trading price, thus lowering costs and improving efficiency. The current cash-based model also carries other implications involved with the continuous buying and selling of BTC and ETH such as increased price volatility and the triggering of taxable outcomes, which wouldn't be applicable to in-kind transactions.

Chart 5. Weekly US spot crypto ETF net flows (US\$ M)

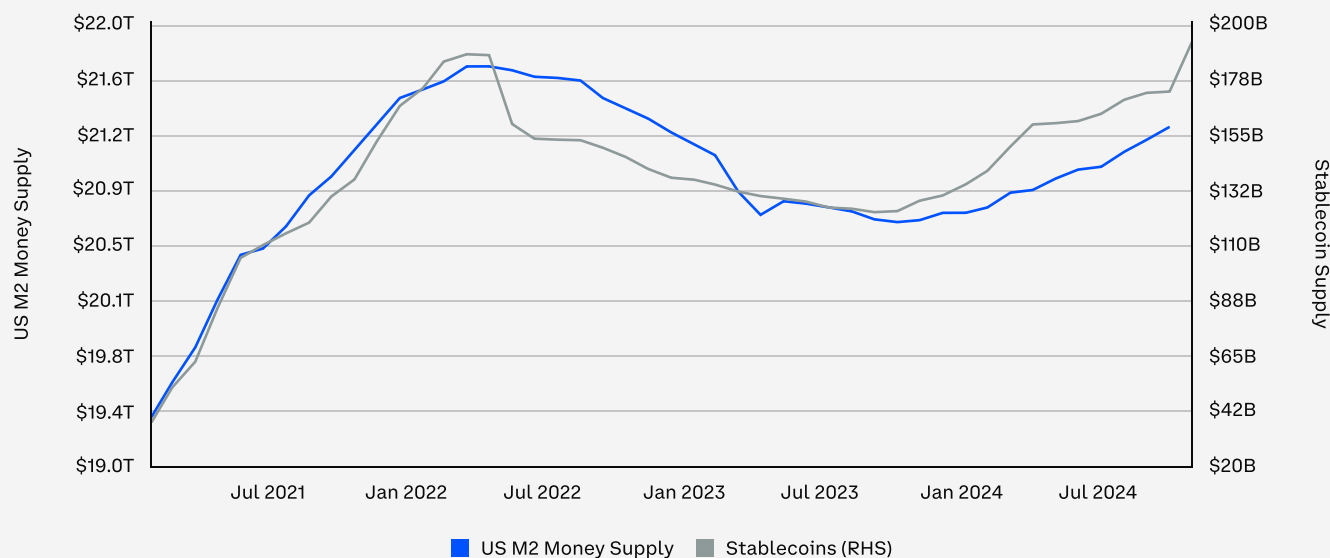


US-based spot BTC ETFs launched on January 11, 2024, and spot ETH ETFs launched on July 23, 2024. Sources: Bloomberg and Coinbase.

## Stablecoins, Crypto’s “Killer-App”

In 2024, stablecoins saw massive growth, bringing the total market capitalization up by 48% to \$193B (as of December 1). Some [market analysts](#) believe that this sector can grow to almost \$3T over the next five years based on its current trajectory. While that may seem high, given that this estimate rivals the size of the entire crypto complex today, this estimate would only comprise around 14% of the total [US M2 money supply](#) of \$21T, indicating substantial room for growth from the current level of around 0.9%.

Chart 6. US M2 money supply versus stablecoin market cap



Sources: Bloomberg, DeFiLlama and Coinbase.

Increasingly, we think the next wave of real adoption in crypto could come from stablecoins and payments, which helps explain the surge of interest in this sector over the last 18 months. Their ability to facilitate faster and cheaper transactions compared to traditional methods have led to increased utilization for digital payments and remittances with more payment firms looking to expand their stablecoin infrastructure. Indeed, we may very well be getting closer to the day when the first and primary use cases for stablecoins won’t just be trading but rather global capital flows and commerce. Beyond their broader financial applications, however, there is also [political interest](#) in stablecoins’ ability to potentially address the US debt burden issue.

The stablecoin market has settled nearly \$27.1T in transactions through November 30, 2024, almost tripling the \$9.3T observed over the same 11-month period in 2023. This includes significant volumes of peer-to-peer (P2P) transfers and cross-border business-to-business (B2B) payments. Indeed, businesses and individuals increasingly leverage stablecoins like USDC for their regulatory compliance and widespread integrations with payment platforms such as Visa and Stripe. Indeed, Stripe’s acquisition of stablecoin infrastructure company Bridge for \$1.1B in October 2024 was the largest deal in the crypto industry to date.

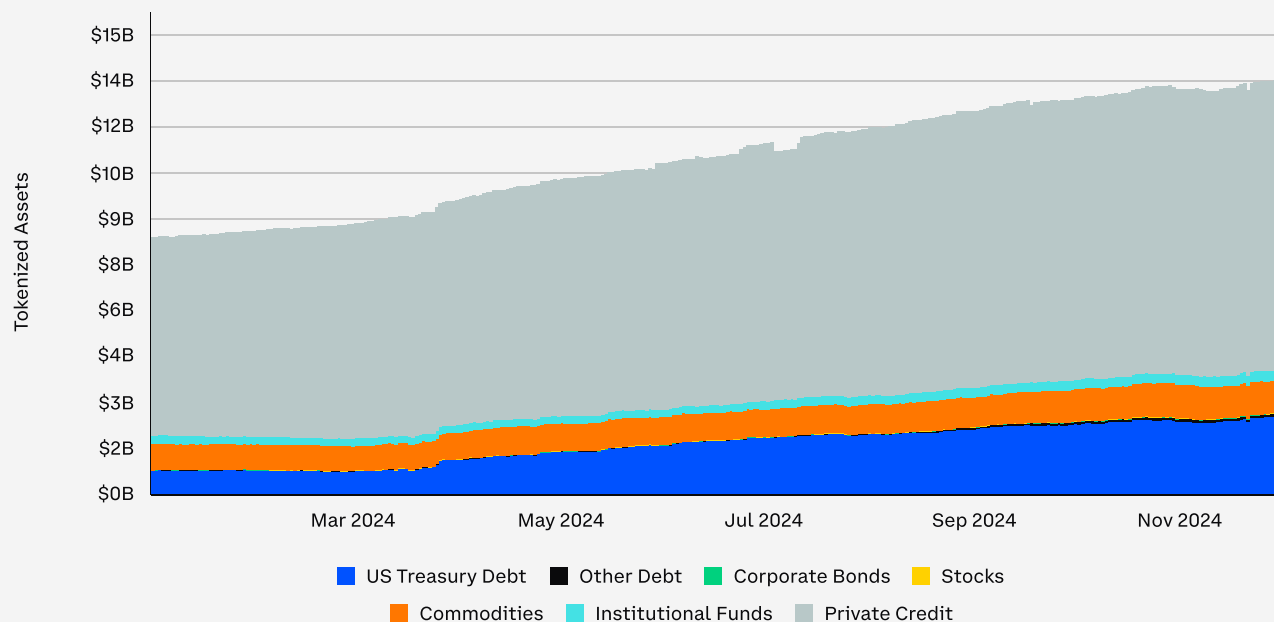
## The Tokenization Revolution

Tokenization continued to make significant progress in 2024, as tokenized real world assets (RWA) grew over 60% from \$8.4B at the end of 2023 to \$13.5B as of December 1, 2024 (excluding stablecoins), according to rwa.xyz. Projections from [various analysts](#) suggest this sector can grow to a minimum of \$2T and a maximum of \$30T over the next five years – potentially a nearly 50x increase. Asset managers and traditional financial institutions like [BlackRock](#) and [Franklin Templeton](#) have increasingly embraced the tokenization of government securities and other traditional assets on both permissioned and public blockchains, enabling near-instant cross-border settlements and 24/7 trading hours.

Firms are experimenting with using such tokenized assets as [collateral](#) for other financial transactions like those involving derivatives, which could streamline operations (with margin calls, for example) and mitigate risk. Moreover, the RWA trend is expanding beyond assets like US Treasuries and money market funds – finding traction with private credit, commodities, corporate bonds, real estate, and insurance as well. Eventually, we think tokenization can streamline the entire portfolio construction and investing process by bringing it onchain, although this may yet be a few years away.

Of course, these efforts face their own set of unique challenges, including liquidity fragmentation across multiple chains and persistent [regulatory hurdles](#) – though there have been notable advancements on both fronts. Ultimately, we anticipate tokenization to be a gradual and continuous process; however, the acknowledgment of its advantages is unequivocal. This period represents a prime opportunity for experimentation, ensuring firms remain at the forefront of technological advancements.

Chart 7. **Tokenized asset market cap by asset class (ex-stablecoins)**



Source: rwa.xyz.

## The DeFi Resurgence

DeFi is dead. Long live DeFi. Decentralized finance took a significant hit in the previous cycle, as it became clear that some applications were offering unsustainable yields using token incentives to bootstrap liquidity. In response, a more sustainable financial system has since emerged, incorporating real-world use cases and transparent governance structures.

But it's the shift in the US regulatory landscape that may yet reinvigorate DeFi's prospects, in our view. That may include the establishment of a framework for governing stablecoins and a path for traditional institutional investors to participate in DeFi, particularly as we're seeing the increasing synergies between offchain and onchain capital markets. Indeed, decentralized exchanges now represent around 14% of centralized exchange trading volumes, up from 8% back in January 2023. Even the possibility of decentralized applications (dApps) sharing protocol revenue with token holders is becoming increasingly more likely in the face of a more friendly regulatory environment.

Moreover, crypto's role in disrupting financial services is being recognized by key figures as well. In October 2024, Federal Reserve Governor Christopher Waller [prepared remarks](#) about how DeFi can largely complement centralized finance (CeFi), arguing that distributed ledger technology (DLT) can make CeFi's record-keeping faster and more efficient, while smart contracts can boost CeFi's capabilities. He also argued that stablecoins can be potentially beneficial for payments and as "safe assets" on trading platforms, albeit they require provisions to mitigate risks like runs and illicit finance. All of this suggests that DeFi could soon extend its reach beyond its primarily crypto-oriented user base and start engaging more with traditional finance (TradFi).

## 2 Disrupting Paradigms

### Telegram Trading Bots: Crypto's Hidden Profit Center

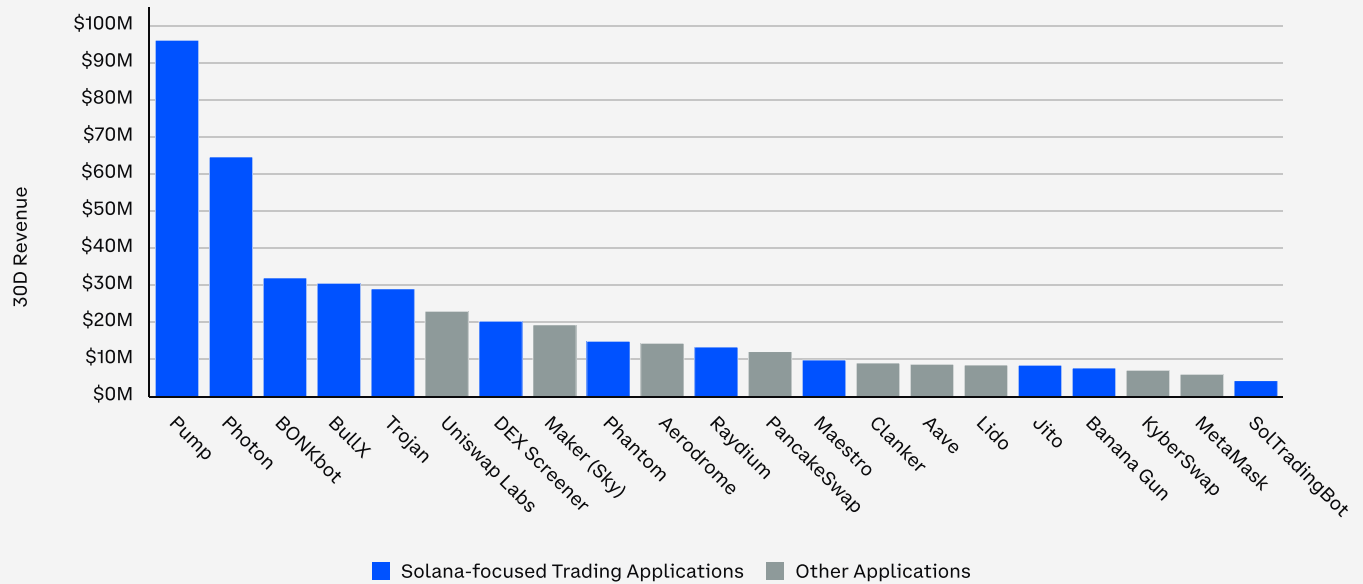
Behind stablecoins and native L1 transaction fees, Telegram trading bots have been the most profitable sector in crypto in 2024, eclipsing even major DeFi protocols like Aave and MakerDAO (now Sky) in net protocol revenue. Much of this has been the result of elevated trading and memecoin activity. Indeed, meme tokens have been the best [performing](#) crypto sector by a wide margin in 2024 (as measured by total market cap growth), and memecoin trading activity (on [Solana DEXs](#)) has surged throughout 4Q24.

Telegram bots are a chat-based interface for trading these tokens. Custodial wallets are created directly in a chat window, which can then be funded and managed via buttons and text commands. As of December 1, 2024, bot users were [primarily](#) focused on Solana tokens (87%), followed by Ethereum (8%), and then Base (4%). (Note: Most Telegram trading bots are separate from The Open Network, or TON, that is integrated into Telegram's native wallet.) This reflects the focus of the highest revenue bots like Photon, Trojan, and BONKbot, which integrate primarily with Solana.

Like most trading interfaces, Telegram bots earn a proportion of each swap as fees, which can be as high as 1% of the transactions. However, we think their users may be undeterred by the high fees due to the volatile nature of the underlying assets they trade. Through December 1, cumulative YTD fees for the highest revenue bot, [Photon](#), reached \$210M, nearing the \$227M collected by Solana’s largest memecoin launcher, [Pump](#). Other major bots like [Trojan](#) and [BONKbot](#) have also earned impressive profits of \$105M and \$99M respectively. In comparison, [Aave](#) earned \$74M in protocol revenue throughout 2024 after accounting for expenses.

We think the allure of these apps stems from their ease of use in DEX trading, particularly for tokens not yet listed on exchanges. Many bots also provide additional functionalities such as “sniping” tokens instantly on launch as well as integrated price alerting. The Telegram trading experience appears fairly attractive to users, with nearly 50% of [Trojan](#) users returning over four or more days (only 29% of users stopped after one day of use), which has contributed to a high average revenue per user of \$188. Although the growing competition between Telegram trading bots may eventually lower trading fees, we think Telegram bots (and other core interfaces discussed below) will remain a leading profit center throughout 2025.

Chart 8. Telegram bots have been some of the most profitable apps in 2024



Protocol revenues are taken net of operating fees. Data from November 2024. Sources: DefiLlama and Coinbase.

## Prediction Markets: Table Stakes

Prediction markets may have been one of the biggest winners of the 2024 US election cycle, as platforms like Polymarket outperformed polling data that had forecast a much closer race than what ultimately transpired. We view that as a win for crypto more broadly, as prediction markets utilizing blockchain rails revealed significant advantages over traditional polling data and showcased a potential differentiated use case for the technology. Prediction markets not only demonstrated the transparency, speed, and global access that crypto rails provide, but their blockchain foundations also allowed for decentralized dispute resolution and automatic payment settlements based on outcomes, setting them apart from non-blockchain variants.

While many believe the relevance of such dApps could fade post-election, we're already seeing their utility expand into other areas like sports and entertainment. In finance, they have proven to be more accurate sentiment indicators than traditional surveys for economic data releases like inflation and nonfarm payrolls, which could sustain their use and relevance post-election.

## Games: If It Bleeds, It Leads

Games have long been a core theme within crypto due to the potentially transformative impact of onchain assets and marketplaces. However, garnering loyal userbases for crypto games – a hallmark of most traditionally successful games – has been challenging so far due to the comparatively profit-driven motives of many crypto gaming users, who may not play for fun. Furthermore, web-browser-based distributions for many crypto games (and their self-custodial wallet requirements) tend to restrict the audience to crypto enthusiasts rather than gamers at large.

However, crypto-integrated games have improved massively compared to the last cycle. Central to this trend has been a shift away from the early cypherpunk ethos of “own your game fully onchain” and towards selectively placing assets onchain in a way that unlocks new capabilities without detracting from the gameplay itself. Indeed, we think many prominent game developers now view blockchain technology more as a facilitation tool rather than a core marketing feature.

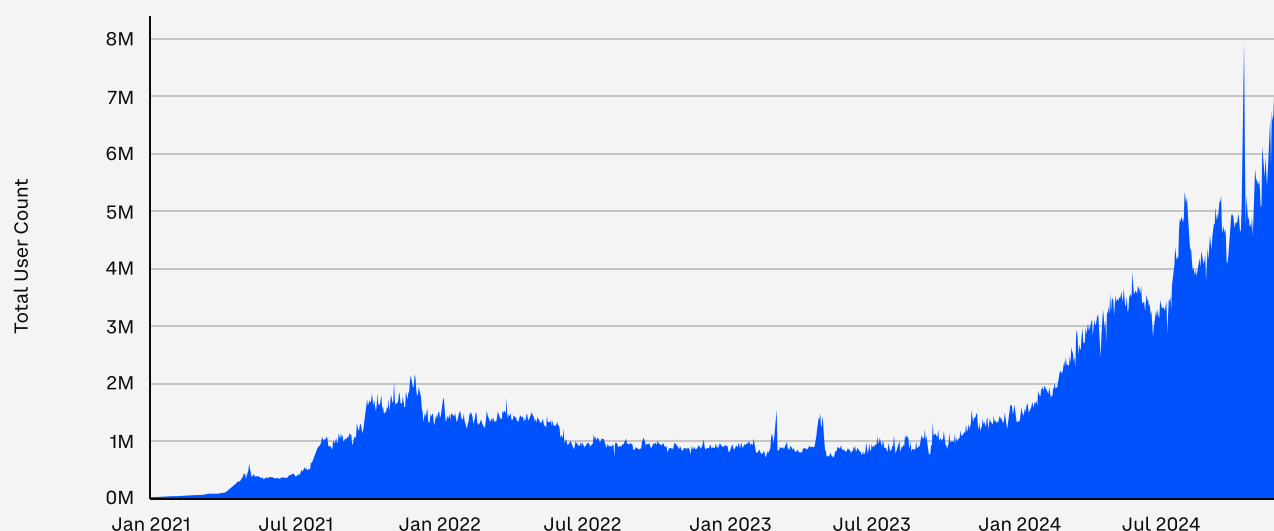
*Off the Grid*, a first person shooter and battle royale game, was a prime example of this trend. On launch, the game's core blockchain component – an Avalanche subnet – remained on testnet even as it [became](#) the #1 free-to-play game on Epic Games. Its core appeal centered on its unique gameplay mechanics rather than its blockchain token or item-trading marketplace. Critically, we think this game is also paving the way for crypto-integrated games to expand their distribution channels for more broad market appeal, and is available on Xbox, Playstation, and PC (via the Epic Games store).



Mobile has also been an important distribution channel for crypto-integrated games, via both native applications and embedded apps (like Telegram minigames). Many mobile games similarly incorporate blockchain components selectively, with the majority of activity actually running on centralized servers. Generally, these games can be played without any external wallet setup, reducing onboarding friction and making the games accessible to those unfamiliar with crypto.

In our view, the line between crypto and traditional games may continue to blur. Upcoming major “crypto games” are likely to be crypto-integrated rather than crypto-focused, with an emphasis on polished gameplay and distribution rather than play-to-earn mechanics, in our view. That said, while this may lead to a broader adoption of crypto as a technology, it’s less clear to us how this would directly translate to demand for liquid tokens. In-game currencies are likely to remain segregated across games, and we think gamers who are not crypto enthusiasts are unlikely to appreciate external investors impacting the in-game economy.

Chart 9. **Crypto-integrated games have surpassed previous cycle highs by user count**



Source: Footprint Analytics.

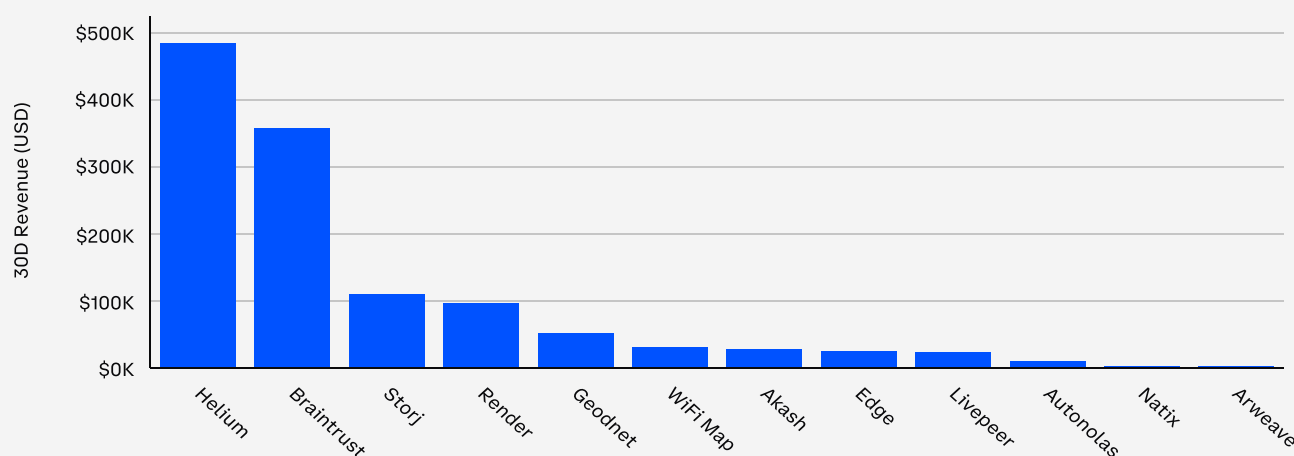
## Decentralizing the Real World

Decentralized physical infrastructure networks (DePIN) can potentially transform “real world” distribution problems by bootstrapping the creation of resource networks. That is, DePIN can theoretically overcome the initial economies of scale commonly associated with these types of projects. The scope of DePIN projects range from computational power to cellular towers to energy and is creating a more resilient and cost effective means to aggregate these resources.

The foremost example of this is Helium, which distributes tokens to individuals providing local cellular hotspots. By issuing tokens to hotspot providers, Helium was able to bootstrap a coverage [map](#) spanning most metropolitan areas in the US, Europe, and Asia without the overhead of constructing and distributing cell towers and spending large amounts of upfront capital. Instead, early adopters were motivated by gaining early exposure and equity in the network itself via tokens.

That said, we think the long-term revenue and sustainability of these networks should be evaluated on a case-by-case basis. That is, we do not think DePIN is a blanket panacea for resource allocation as industry pain points can vary significantly. Pursuing a decentralization strategy may not be applicable to an industry, for example, or it may only solve a niche subset of problems within that industry. In our view, this space is likely to have a wide dispersion between network adoption, token utility, and revenues generated – all of which are likely linked to the underlying industry they target more than the underlying technology network they utilize.

Chart 10. **Monthly revenue for leading DePIN projects.**



Protocol revenues are from November 2024.  
Source: DePIN Ninja.

## Artificial Intelligence, Authentic Value

Artificial intelligence (AI) has continued to be a key investor focus in traditional and crypto markets. However, the impact of AI in crypto has been multifaceted, with its narrative regularly shifting, in our view. In the [earliest](#) stages, blockchain technology was purported to resolve questions around data provenance for AI-generated content and users (i.e. tracking the veracity of data). AI-powered intent-driven architecture was also floated as a potential improvement to crypto’s user experience. Later, the [focus](#) moved toward decentralized training and compute networks for AI models as well as crypto-powered data generation and collection. Most [recently](#), attention has centered on autonomous AI agents with the ability to both control crypto wallets and communicate via social media.

In our view, the full impact of AI on crypto is not yet clear as evidenced by the quick cycling of narratives. We don't think this uncertainty diminishes the potential transformations that AI could bring to crypto, however, as AI technologies are constantly seeing new breakthroughs. AI applications are also becoming increasingly accessible to non-technical users, which we think will further accelerate creative use cases.

We believe that the largest question is determining how these transformations manifest into durable value accrual for liquid tokens versus company equity. Many AI agents, for example, run on traditional technology rails with the near-term "value accrual" (i.e. market attention) flowing to memecoins rather than any underlying infrastructure. While liquid tokens linked to the infrastructure layer have seen price appreciation too, their usage growth has generally lagged behind their price increases over the same period. We think this outpacing of price relative to network metrics – in conjunction with the rotational focus to AI memecoins – reflects a lack of strong consensus on how investors can capture AI growth in crypto.

## 3 The Blockchain Metagame

### Multichain Future or Zero Sum Game?

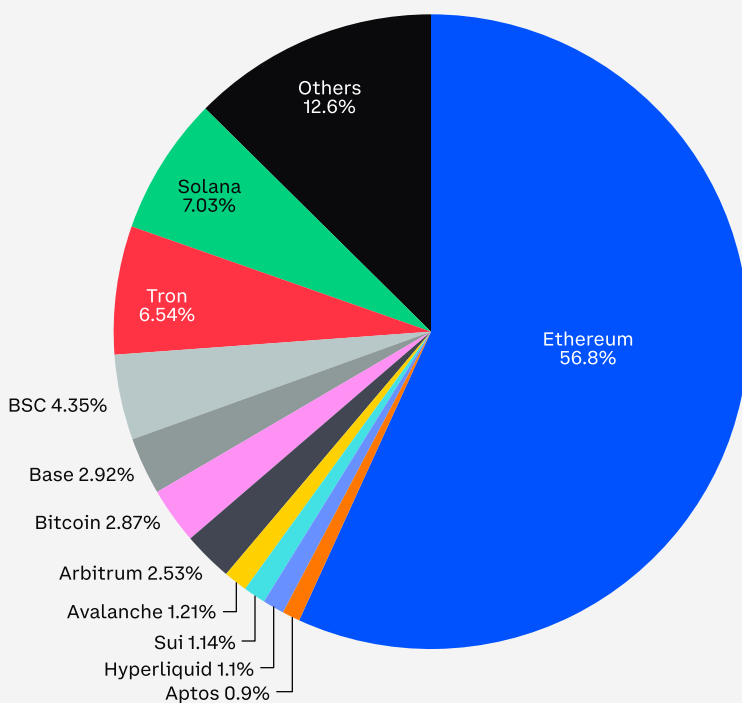
One of the big themes that has come back from the last bull cycle is the prevalence of alternative layer-1 (L1) networks. Newer networks are increasingly competing on lower transaction costs, redesigned execution environments, and minimized latency. That said, we think the L1 space has expanded to the point where there is now an excess of *generic* blockspace, even if *premium* blockspace still remains scarce.

That is, additional blockspace is not inherently more valuable in and of itself. However, a vibrant protocol ecosystem coupled with an active community and dynamic crypto asset can still enable certain blockchains to command a fee premium. Ethereum, for example, remains the center of high-value DeFi activity despite not improving its mainnet execution capacity since 2021.

Still, we think investors are attracted to the potentially differentiated ecosystems that can develop on these new networks, even if the bar for differentiation is rising. High performance chains like Sui, Aptos, and Sei are competing against Solana for mindshare, and Monad's forthcoming launch is seen as a strong contender for builders.

Historically, trading on DEXs has been the largest driver of onchain fees, which requires robust user onboarding, wallets, interfaces, and capital – creating a cycle of increasing activity and liquidity. This concentration of activity often leads to a winner-takes-most scenario across different chains. However, we think the future could still be multichain because different blockchain architectures offer unique advantages that cater to various needs. Although appchains and layer-2 solutions can offer tailored optimizations and lower costs for specific use cases, a multichain ecosystem allows for specialization while still benefiting from the broader network effects and innovations across the blockchain space.

Chart 11. Total value locked onchain is concentrated in only a few chains



Source: DefiLlama.

## Leveling Up Layer-2s

Despite the exponential scaling capacity of layer-2s (L2s), the [debate](#) around Ethereum’s rollup-centric roadmap continues. Criticisms include the “extractiveness” of L2s on L1 activity as well as their fragmented liquidity and user experience. In particular, L2s have been [perceived](#) to be the root of Ethereum’s declining network fees and the demise of the “ultrasound money” narrative. Newer axes of the L2 debate have also come to light, including decentralization tradeoffs, differing virtual machine environments (potential fragmentation of the EVM), and “based” versus “native” rollups.

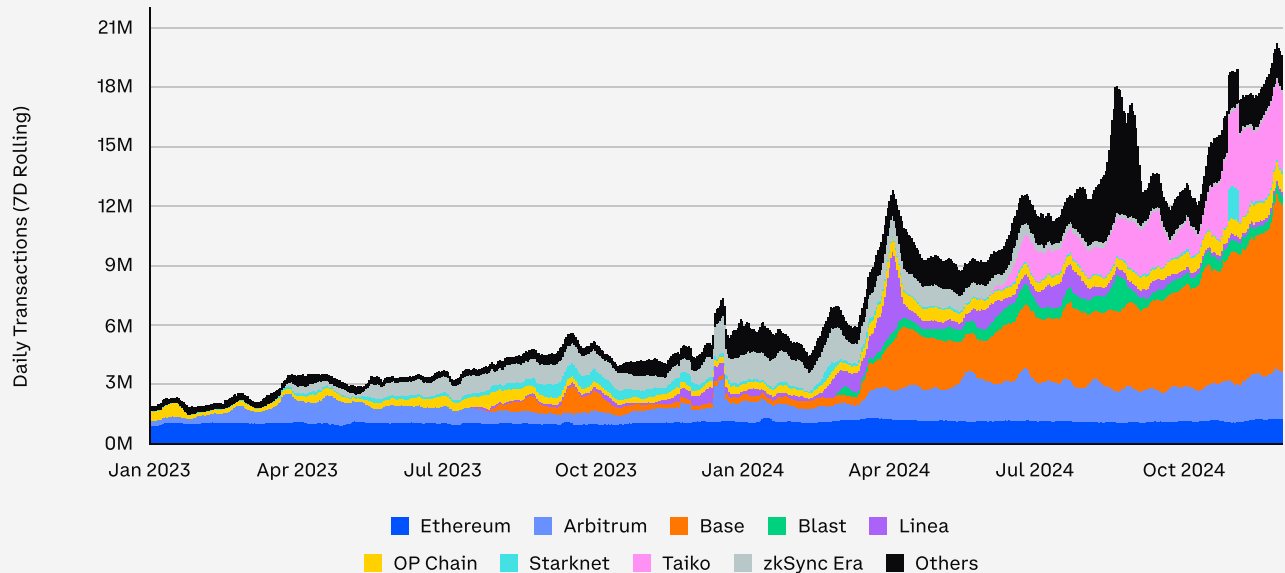
Still, we think that L2s have been an incredible success from the perspective of increasing blockspace and reducing costs. The introduction of binary large objects (blob) transactions in Ethereum’s Dencun (Deneb+ Cancun) upgrade in March 2024 lowered average L2 costs by more than 90% and contributed to a 10x increase in activity across Ethereum L2s. Furthermore, we think the ability for multiple execution environments and architectures to experiment on an ETH-based environment is a long-term [advantage](#) of the L2-centric approach.

This roadmap has come with near-term tradeoffs, however. Cross-rollup interoperability and the general user experience have become more difficult to navigate, particularly for newcomers who may not fully understand how ETH differs from one L2 to another, or how to bridge between them. Indeed, while bridging speeds and costs have improved, we think the need for users to interact with bridges in the first place degrades the overall onchain experience.

Although this is a real problem today, the community is pursuing many different solutions to address this user experience issue, such as (1) Superchain interoperability in the Optimism ecosystem, (2) real-time proving and super transactions for zkRollups, (3) based sequencing, (4) resource locks, (5) sequencer networks, and others. That said, many of these challenges are being tackled on the infrastructure and network layer and it may take time for these improvements to be reflected at the user interface level.

Meanwhile, the growing Bitcoin L2 ecosystem is harder to navigate, in our view, as there is no unifying standard for rollup security and roadmaps. In contrast, Solana’s “network extensions” tend to be more application-specific and potentially less disruptive to current user workflows. Overall, L2s are materializing across most major crypto ecosystems, though their forms vary significantly.

Chart 12. A growing proportion of ETH-based activity is occurring on L2s



Metrics are taken on a 7 day rolling average. Sources: growthpie.xyz and Coinbase.

## Everyone Gets a Chain

The increased ease of customized network deployment is driving an increasing number of applications and corporations to build chains that they have more control over. Major DeFi protocols like Aave and Sky (formerly MakerDAO) have explicit goals to launch chains as part of their long-term roadmaps, and the Uniswap team has also announced [plans](#) for their own DeFi- focused L2 chain. Even more traditional corporations are involved. Sony has [announced](#) plans for a new chain, Soneium.

As the blockchain infrastructure stack matures and becomes increasingly commoditized, we think that owning blockspace is perceived to be increasingly attractive – particularly for regulated entities or applications with specific use cases. The technology stack for doing this is also changing. In previous cycles, application-centric chains primarily leveraged the Cosmos or Polkadot Substrate SDKs. Moreover, the growing rollup-as-a-service (RaaS) industry, exemplified by firms like Caldera and Conduit, is enabling more project-owned L2 launches. These platforms facilitate easy integration with other services via their marketplaces. Similarly, Avalanche subnets may see an adoption boost due to their managed blockchain service, AvaCloud, which simplifies the launch of customized subnets.

The growth of modular chains may have a corresponding impact on the demand for Ethereum blob space as well as other data availability solutions like Celestia, EigenDA, or Avail. Ethereum blob usage has reached saturation (3 blobs per block) since early November, rising more than 50% since mid-September. Demand doesn't seem to be slowing down as existing L2s like Base continue to scale throughput and new L2s launch on mainnet, though the upcoming Pectra upgrade in 1Q25 may double the target blob count from three to six.

# 4 User Experience

## User Experience (UX) Improvements

A simple user experience is one of the most important drivers for mass adoption, in our view. While crypto has historically focused on deep technological onboarding due to its cypherpunk roots, we believe the focus is now rapidly shifting towards a simplified user experience. In particular, there is a sector-wide push to abstract the technology aspects of crypto into the background of applications. A number of recent technological breakthroughs are making this transition possible, such as the adoption of account abstraction to streamline onboarding and the use of session keys that reduce signing friction.

The adoption of these technologies will enable the security components of crypto wallets (such as seed phrases and recovery keys) to become invisible to most end users – similar to the seamless security experience of the internet today (e.g. https, OAuth, and passkeys). Indeed, passkey onboarding and in-app wallet integrations are trends that we expect to see more of in 2025. Early signs of this include passkey onboarding to Coinbase Smart Wallet and Google-integrated logins to Tiplink and Sui Wallet.

That said, we think the abstraction of cross-chain architecture may continue posing the largest challenge to the crypto experience in the near term. Cross-chain abstractions, while still a focal point in the research community at the network and infrastructure level (e.g. ERC-7683), still remain far removed from frontend applications, in our view. Improvements in this domain require enhancements at both the smart contract application level and the wallet level. Protocol upgrades are necessary to unify liquidity, while wallet improvements are necessary to present a cleaner experience to the user. We think the latter will ultimately be of greater importance for expanding adoption, though research efforts and industry debates currently center on the former.

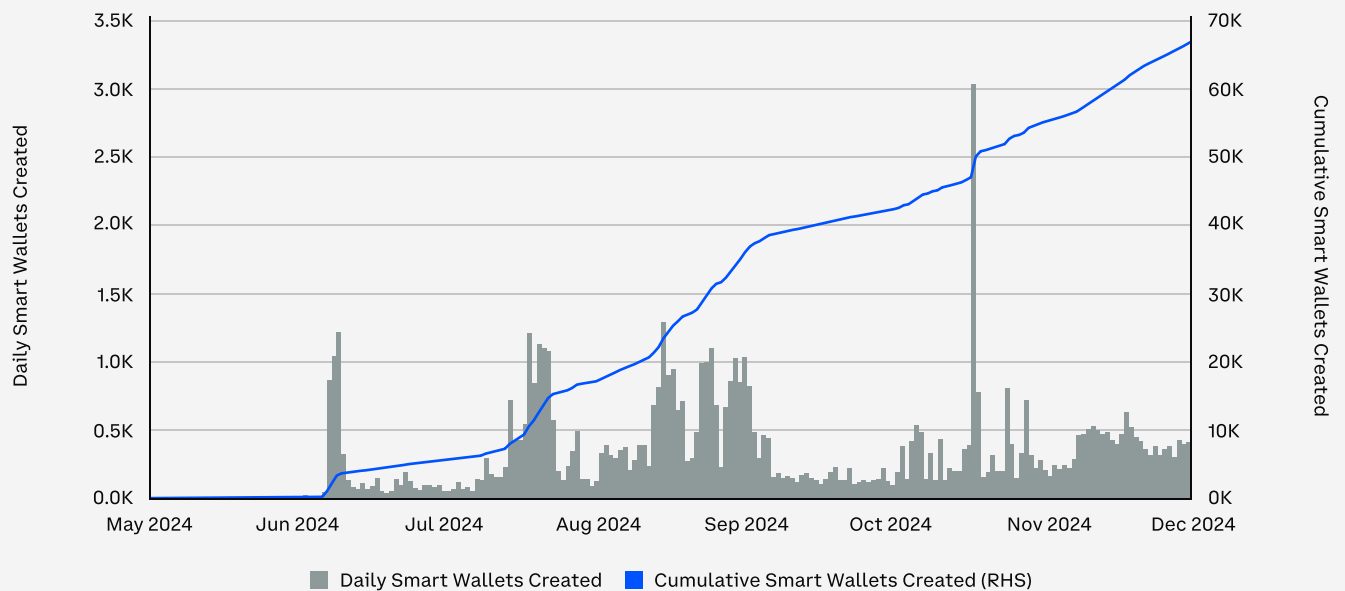
## Owning the Interface

In our view, the most critical transformation to the crypto user experience will come from striving to “own” the user relationships through better interfaces. We think this will happen in two ways. First is improvements to the standalone wallet experience as mentioned above. Onboarding processes are becoming increasingly streamlined to meet users where they are. Application integrations directly within wallets (such as swaps and lending) may also keep users locked into a familiar ecosystem.

At the same time, applications are also increasingly competing to own the user relationships by abstracting blockchain technology components into the background via integrated wallets. This includes trading tools, games, onchain social, and membership apps where wallets are automatically provisioned for users who register via familiar methods like Google or Apple OAuth. After onboarding, onchain transactions are funded via paymasters, whose costs are ultimately borne by the application owners. This brings about a unique dynamic where the revenues per user need to be aligned with the cost of paying for their onchain actions. Although the latter cost is constantly decreasing as blockchains scale, it also forces crypto applications to consider what components of data to commit onchain.

In general, there will be intense competition to attract and retain users in the crypto space. As evidenced by the aforementioned average revenue per user (ARPU) for Telegram trading bots, many retail crypto traders tend to be relatively price insensitive compared to existing TradFi entities. In the coming year, we expect the push to own user relationships to be a larger focus of protocols beyond the trading sector too.

Chart 13. Cumulative number of Coinbase Smart Wallets on Base



Sources: Dune and Coinbase.



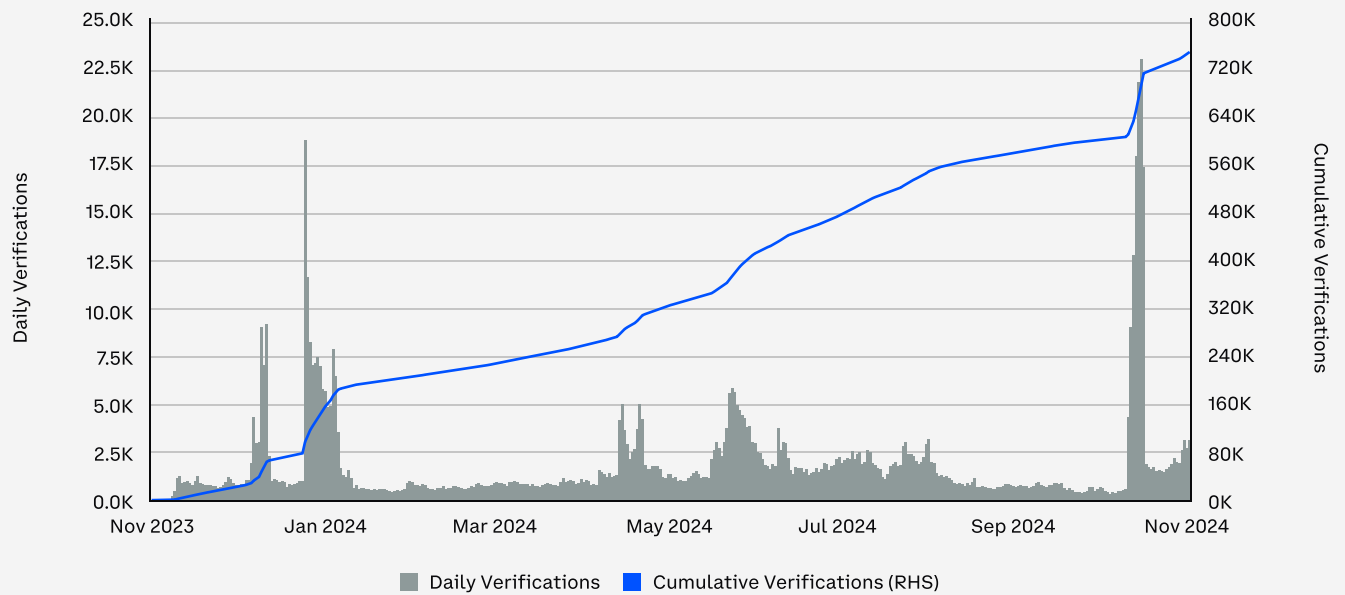
## Decentralized Identity

As regulatory clarity continues to improve and more assets are tokenized offchain, streamlining the know-your-customer (KYC) and anti-money laundering (AML) processes are also becoming increasingly important. For example, some assets are only available to accredited investors located in certain regions, making identification and credentialing core pillars of the onchain experience in the long term.

In our view, there are two key components to this. First is creating an onchain identity itself. Ethereum Name Service (ENS) provides a standard for resolving human readable “.eth” names to one or more wallets across chains. Variations of this now exist across networks like Basenames and Solana Name Service. Adoption of these core onchain identity services has accelerated with major traditional payment providers like PayPal and Venmo now [supporting](#) ENS address resolution.

The second core component is building attributes for onchain identity. This includes confirming KYC verification and jurisdiction data that other protocols can subsequently view to ensure regulatory compliance. The heart of this technology is the Ethereum Attestation Service, which is a flexible service for entities to give attributions to other wallets. These attributions are not limited to KYC – they are freely expandable to suit the needs of the attester. [Onchain verifications](#) by Coinbase, for example, leverage this service to confirm that wallets are linked to users with Coinbase trading accounts and are in certain jurisdictions. Some new permissioned lending [markets](#) on Base for real world assets will gatekeep usage via these verifications.

Chart 14. **Cumulative wallets on Base that have been verified by Coinbase**



Sources: Dune and Coinbase.

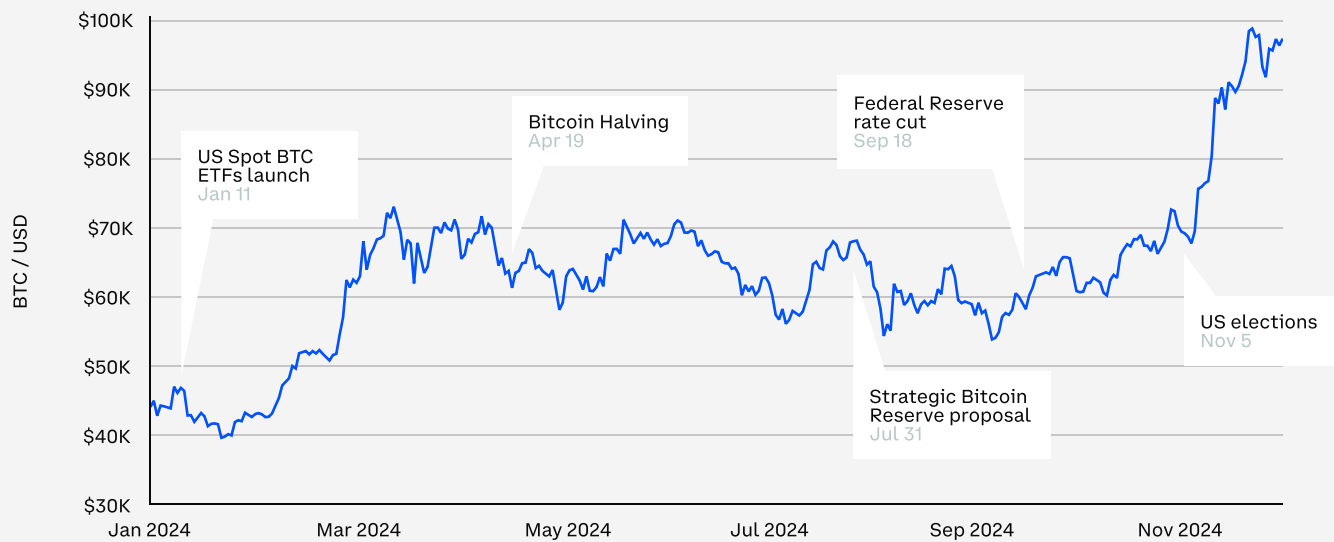
# 2 Bitcoin

## Market Outlook

Higher-quality digital assets like bitcoin (BTC) have commanded more attention in the current crypto market cycle than in any other, as bitcoin dominance rose to over 60% (as of December 1) for the first time since April 2021. While April’s Bitcoin Halving contributed to this support, the increase was primarily driven by the entry of large, established asset managers like BlackRock, Fidelity, and Franklin Templeton, which all launched spot bitcoin ETFs in the US on January 11, 2024 to resounding success. (Note that Coinbase is the custodian for 10 out of the 12 approved ETFs.)

Indeed, the Halving reduced the amount of mined bitcoin by around 13,500 BTC per month or 101k BTC (\$7.5B) since April 20 (approximately 7-8 months). That represents about a third of the total bitcoin that went into the US spot bitcoin ETFs over the same period (296k BTC). Since inception, these vehicles have attracted \$30.4B in net inflows (up to December 1, 2024) and \$104.4B in total fund assets (approximately 1.1M BTC or 5.5% of the current BTC circulating supply).

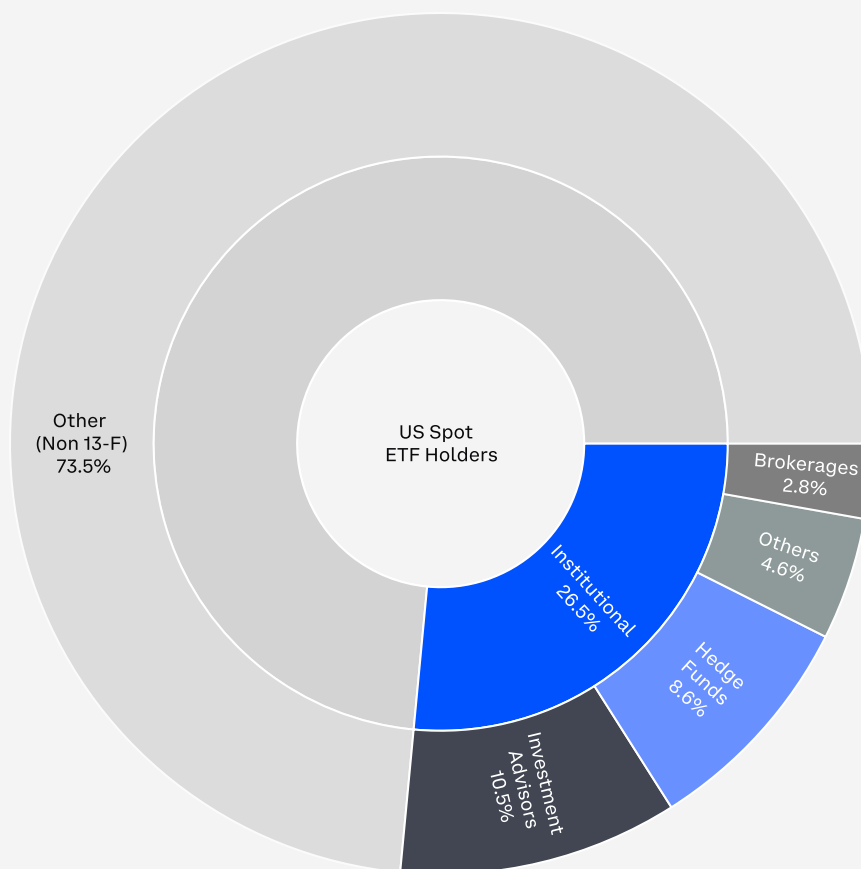
Chart 15. Bitcoin (BTC) 2024 events/milestones



Sources: CoinMetrics and Coinbase.

The most recent 13-F filings for these US spot bitcoin ETFs also indicate that institutional ownership represented around 25% of all shares as of September 30, 2024. (Note that only institutional investment managers who handle accounts of \$100M or more are required to file 13-F reports with the SEC, so the majority of ETF holders may not be captured by our analysis.) These institutional shares are almost evenly divided across investment advisors, hedge funds, and other investors comprising 1349 distinct entities. Looking ahead, we anticipate institutional investment flows will remain anchored on bitcoin through 1Q25 before we see some capital rotation into riskier assets as the market matures.

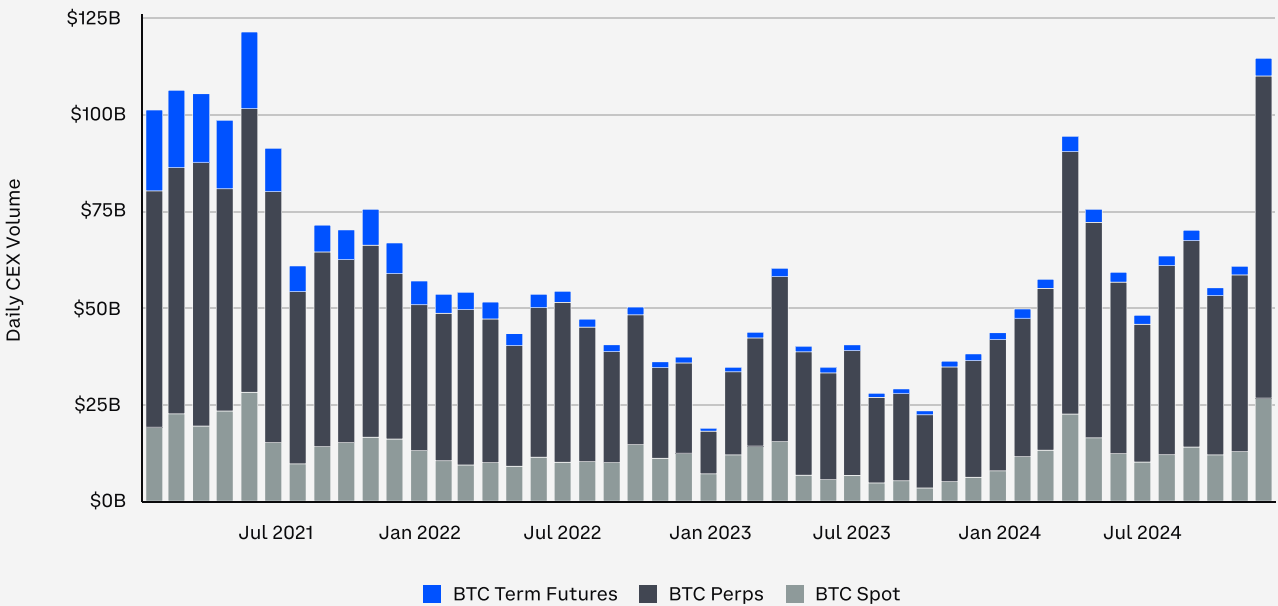
Chart 16. US spot bitcoin ETF holders



Sources: 13-F filings and Coinbase.

We also expect spot volumes to pick up now that spot bitcoin ETF options have begun trading on November 19, 2024. Options represent a further maturation of the bitcoin ETF market that could facilitate new investment strategies for traders. Moreover, this sector has room to grow given that there is currently a [25,000 position limit](#) on bitcoin ETF options (restricting how many contracts a trader can hold) which is the lowest position limit available in the industry. Indeed, many ETFs in the US have option position limits of 200,000 or more. Nevertheless, bitcoin spot volumes more than doubled from a daily average of \$12.7B in 3Q24 to \$26.7B in November 2024 across global centralized exchanges, according to CoinMetrics data. Futures volumes grew by around 76% in the same period, to an average of \$88.0B per day in November.

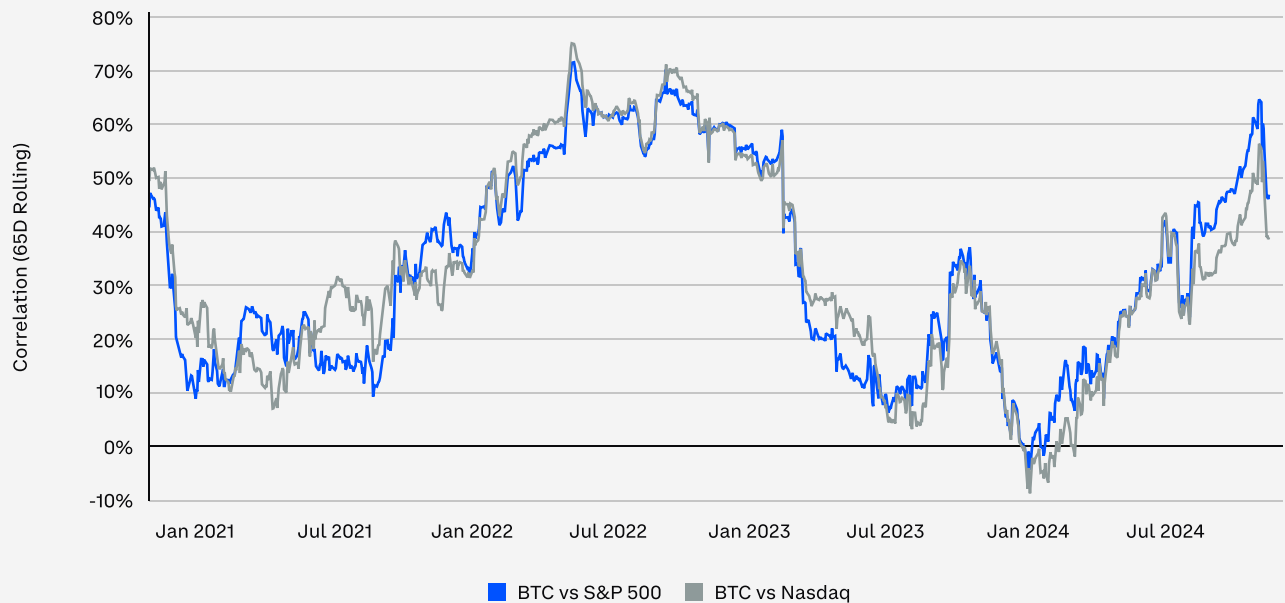
Chart 17. Bitcoin CEX average daily trading volumes by product type



Measures 17 global centralized exchanges.  
Sources: CoinMetrics and Coinbase.

Note that there are some sources of forced bitcoin selling pressure to be aware of in 2025. For example, the Mt. Gox Rehabilitation Trust has delayed its distribution deadline for the payment of its remaining bitcoin until October 31, 2025. That said, more than two-thirds of the Mt. Gox bitcoin supply (101k BTC) was already distributed in 2024, leaving less than 40k BTC (\$3.8B) left to pay, according to onchain wallet tracking by [Arkham Intelligence](#). How much of the US government stockpile of [208k BTC](#) could be sold next year is meanwhile up for debate, as most market players are narrowly focused on the potential of a [US Strategic Bitcoin Reserve](#). Other countries have started to follow suit with their own [proposals](#).

Chart 18. **Rolling correlation of daily bitcoin versus US equity returns**



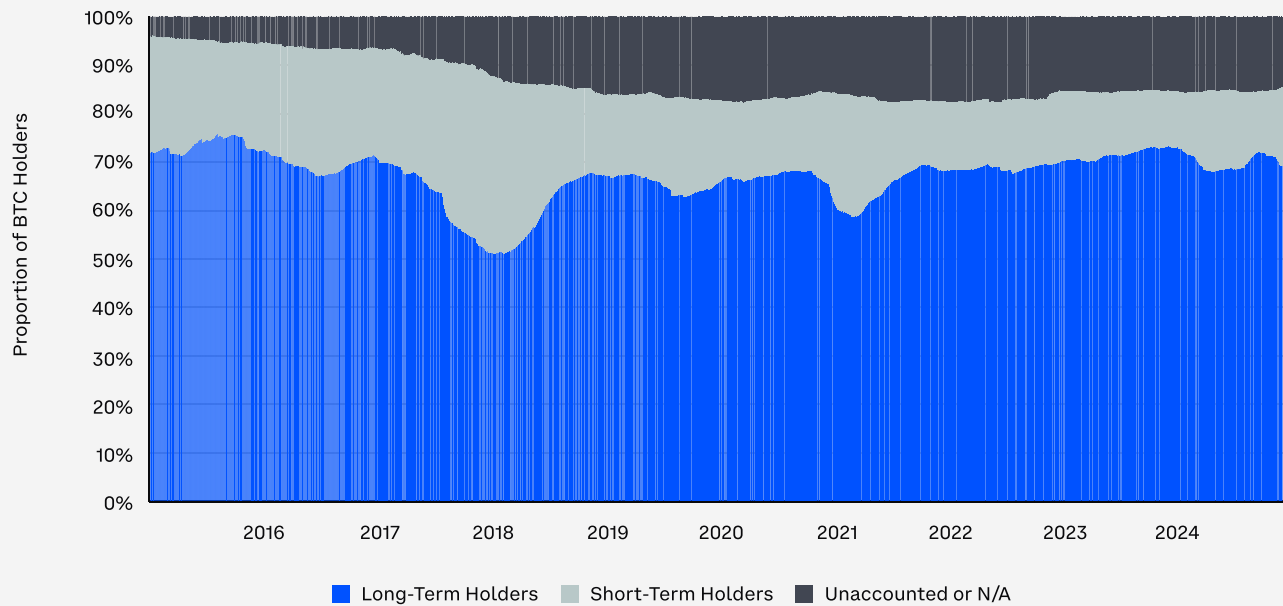
Based on a rolling 65-day window.  
Sources: Bloomberg, CoinMetrics and Coinbase.

# The Bitcoin Ecosystem

Historically, the primary use case for bitcoin has been as a store-of-value, due to its unique role in the crypto asset class as well as its limitations – both programmatically and functionally. Indeed, smart contract platforms like Ethereum and Solana stepped in primarily to enable the more complex computations on blockchains that Bitcoin couldn't. But a host of new Bitcoin infrastructure, including layer-2s, bridges, virtual machines (VM), wallets, and staking protocols, is forming a new Bitcoin ecosystem.

The value proposition is simple – the Bitcoin blockchain is one of the most valuable databases ever created, so that space is valuable. Consequently, there's plenty of appetite from BTC owners looking to do more with their BTC other than just holding it. Indeed, bitcoin liquidity tends to lay mostly dormant due to its role as a store-of-value in the crypto space, particularly compared to ether's widespread use as collateral in the DeFi sector. Around 69% of the total bitcoin supply is potentially sitting idle among long-term holders (defined as anything greater than 155 days), according to Glassnode.

Chart 19. **Around 69% of total BTC supply is held by long-term holders**



Sources: Glassnode and Coinbase.

<sup>1</sup> Note: we use bitcoin with a lowercase b to represent the token and Bitcoin with an uppercase B to represent the network.

To unlock that liquidity, a lot of work is currently going into how to overcome Bitcoin's functional limitations and extend the network's capabilities – potentially creating new sectors in the Bitcoin ecosystem such as BTCFi (or Bitcoin DeFi). These innovations were first enabled by Bitcoin's Segregated Witness (SegWit, 2017) and Taproot (2021) software upgrades, but the momentum didn't pick up until the creation of [Ordinals](#) in early 2023 and later the release of the [BitVM white paper](#) in October 2023. As a follow up, a [BitVM2 white paper](#) was recently published in August 2024, which advances the original BitVM design and helps bring the concept of a programmable Bitcoin network closer to reality – without altering the core Bitcoin code.

Many of the projects forming the new Bitcoin infrastructure (propagated by these ideas) are represented as [Bitcoin layer-2s](#) (L2s), with around [80-90](#) different rollups, sidechains, and state channels either already on mainnet or under development. (We cover this further in the section "The Layer-2 Landscape.") That said, the broader ecosystem comprises a wide range of other components including wallets, staking protocols, and bridges. The breadth of this sector has made investing here particularly challenging for the uninitiated, but more recently, the market has started to narrow in on around 10-20 different protocols.

That said, in the short term, we do not expect these developments to become idiosyncratic drivers of BTC performance. This distinguishes BTC somewhat from ETH, where the advent of L2s has led many market players to treat (some) L2 tokens as higher-beta proxies for ETH. Comparatively, we think the work happening on Bitcoin L2s will be captured as its own (independent) trading narrative for the time being, while BTC value will be anchored to the fundamental activity happening on the base layer.

## Technical Upgrades

Although these exogenous Bitcoin ecosystem developments are important, there is a proposal named [Bitcoin Improvement Proposal 347](#) (or BIP-347) that may also be worth paying attention to. This BIP was introduced in late 2023, but it wasn't formalized in late 2023, it wasn't formalized until April 2024, coinciding with the appointment of five new BIP editors from Bitcoin's Core developers. BIP-347 can enable more complex smart contract functionality on Bitcoin via covenants, by changing the underlying Bitcoin code to reintroduce the script operation code "OP\_CAT" (which stands for Operation Concatenate).

OP\_CAT effectively allows users to concatenate data on the stack – or in layman's terms, to combine two pieces of data during a transaction. That may sound simple, but it has the potential to unlock significant smart contract capabilities for the network. Use cases would include non-custodial vaults that enable reversible and recurring transactions or the ability to schedule bitcoin transfers.

Interest in Bitcoin programmability gained traction after the [BRC-20 standard](#) was introduced in 2023. BRC-20 involves inscribing text in JavaScript Object Notation (JSON) format, representing the parameters of the token itself (i.e. ticker, max supply, limit per mint) in the witness field of a transaction.

However, even though OP\_CAT was originally part of Bitcoin's codebase, it was disabled by founder Satoshi Nakamoto in 2010 because of memory usage issues and concerns about exposing the network to security vulnerabilities. On the other hand, akin to Taproot, enabling OP\_CAT would likely only require a soft fork of the network, rather than a potentially more disruptive hard fork.

But there is currently no consensus on its approval from Bitcoin's developers, miners, and node operators, making its timeline uncertain. Indeed, the Bitcoin community is notoriously conservative about making changes – the Taproot upgrade, for example, required three years of review before activation. Meanwhile, several opcodes are competing for developers' attention at the moment, such as OP\_VAULT (BIP-345) and OP\_TXHASH (BIP-346). The concern is that such changes may radically alter the complexion of the network by adding complexity and risk to the ecosystem, while potentially contravening Bitcoin's core ethos.

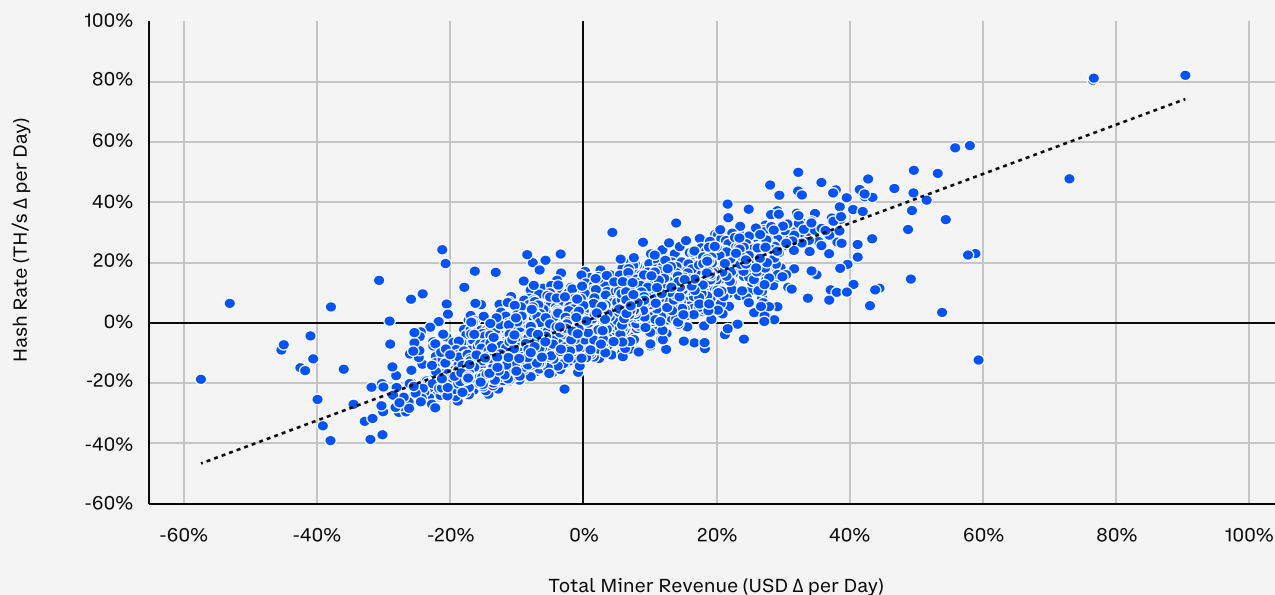
## State Of Miners

Over the long run, the growth of the Bitcoin ecosystem described above may be necessary to generate the fees that help incentivize bitcoin miners to secure the network, as their rewards continue to be [halved](#) every 210k blocks. [Some](#) have argued that it may eventually be necessary to implement "tail emissions" consisting of small, continuous rewards once the entire 21M BTC supply has been mined. Yet, despite the latest Bitcoin Halving in April, which reduced miner rewards to 3.125 BTC per block, the Bitcoin network hash rate – a measure of the combined computational power used to mine bitcoin – has continued to climb to an average of 730 exahashes per second (EH/s) in November. That's above the pre-Halving highs and once again trending up.

Indeed, TheMinerMag [reported](#) that public bitcoin miners had actually committed \$2B between 3Q23 to 1Q24 to buy hardware that was delivered through the end of 3Q24. In fact, 3Q24 represents the highest property, plant, and equipment (PP&E) spending by this cohort since 1Q22. Currently, transaction fees make up only a [de minimis portion](#) of revenues (less than 2%) in BTC terms. Miner balances have fallen from 1.82M BTC at the start of 2024 to 1.79M BTC as of December 1, 2024. Of course, BTC's appreciation during this cycle has materially affected their bottom lines.



Chart 20. Bitcoin hash rate's sensitivity to changes in miner revenue denominated in USD



Data from January 1, 2011 to December 1, 2024.  
Sources: Glassnode and Coinbase.

REGRESSION EQUATION  
 $y = 0.82x + 0.31$   
 $R^2 = 0.78$

Nevertheless, to boost revenues, some bitcoin miners have diversified their operations by incorporating support for artificial intelligence (AI) and high-performance computing (HPC), leveraging both their access to energy capacity and their expertise in running large-scale operations. To be clear, bitcoin miners are not repurposing their ASICs (application-specific integrated circuits or custom-built bitcoin mining computers) for AI, which is unfeasible because the circuitry is hardwired for only one task (mining bitcoin).

Rather, bitcoin miners are able to arbitrage their ability to tap into supplies of cheap energy and resell that power to AI firms at more competitive rates, which may be fetching higher prices at the moment due to demand. Indeed, many bitcoin miners in Texas already practice curtailing their energy consumption during periods of peak energy demand, priming them to accommodate the systems involved in AI and HPC.

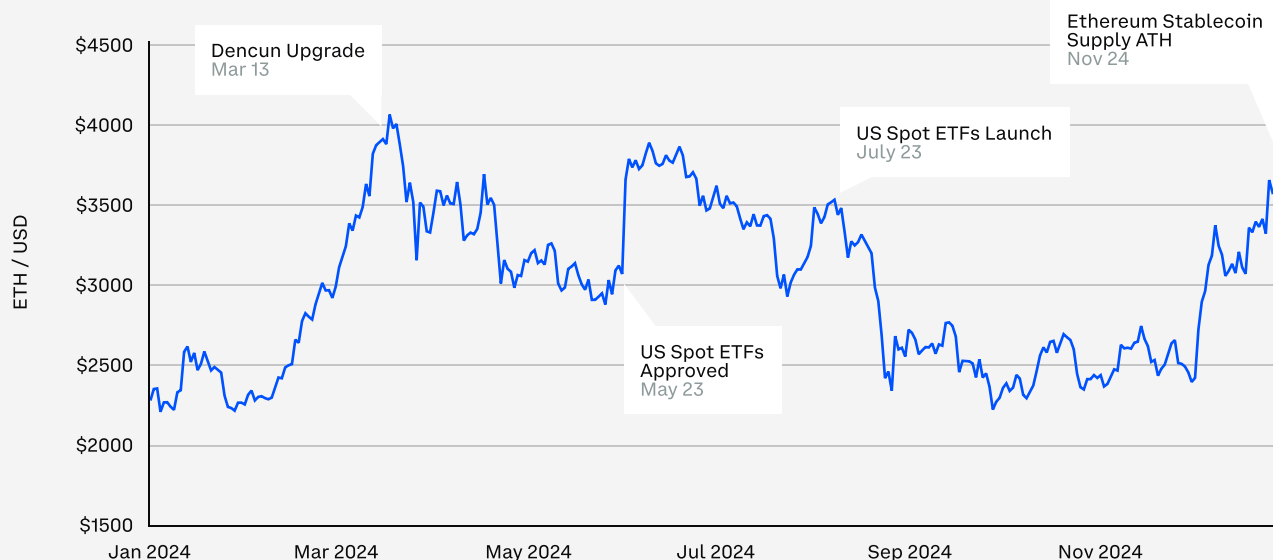
Mining companies may also be able to lease their data centers and facilities to AI companies that need such specialized real estate. That said, miners often tend to align themselves with tier-1 data centers (basic facilities) to minimize costs, whereas AI workloads typically require the greater reliability of higher-tier data centers (tier-3 or 4). Some miners may also be able to use their financial resources to buy GPUs to deliver the general-purpose compute needed by AI that miners can't offer with ASICs.

# 3 Ethereum

## Market Outlook

Ether (ETH) meaningfully underperformed BTC throughout 2024, with the ETH/BTC ratio falling from 0.054 in January to 0.037 as of December 1, 2024. Even as BTC set new all-time highs, ETH remained well below its all-time high of \$4,900. This relative underperformance has been top of mind for many crypto investors (particularly throughout 2H24) amid underwhelming ETF inflows relative to BTC, shifting investment narratives, and criticisms against Ethereum’s rollup-centric scaling roadmap.

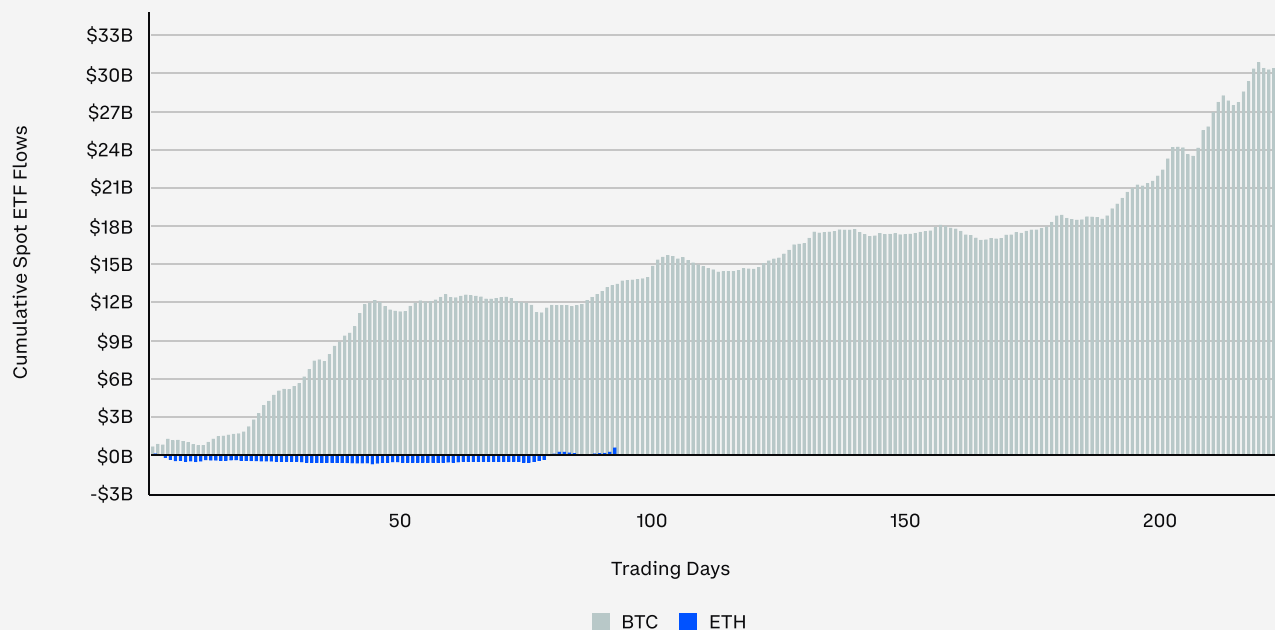
Chart 21. **Ethereum (ETH) 2024 events/milestones**



Sources: CoinMetrics and Coinbase.

US spot ETH ETFs received a cumulative \$577M in net inflows since their July 2024 launch, an overall success among the broad ETF universe. However, spot BTC ETFs attracted more than 50x that figure. Furthermore, cumulative inflows to the ETH ETF complex remained negative for much of the year as a result of outflows from the Grayscale Ethereum Trust (ETHE). This only reversed with the broader post-election rally.

Chart 22. Cumulative ETH vs BTC spot ETF inflows



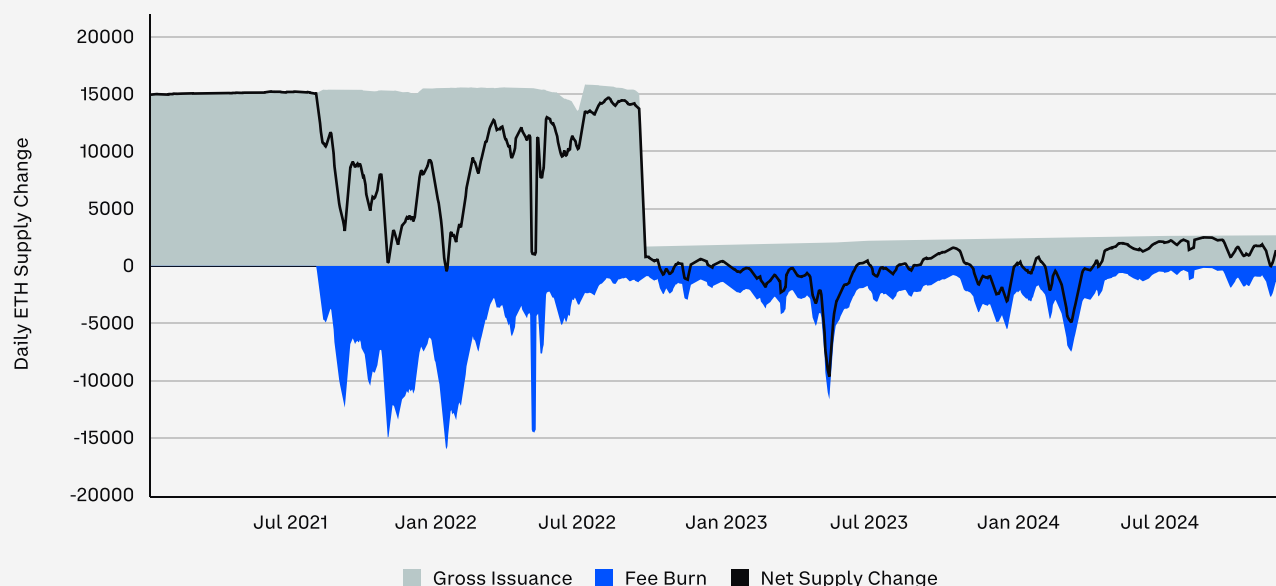
Sources: CoinMetrics and Coinbase.

This difference likely stems from the type of capital unlocked by ETFs, primarily from traditional investors. Given the high historical correlation between bitcoin and ether returns, this cohort may not find that ETH offers much enhanced diversification beyond what they already want or get from bitcoin. This makes ETH less appealing to those portfolios already diversified with BTC, which tends to be the gateway to the asset class for many. New crypto investors typically prefer starting with bitcoin due to its greater recognition and simple investment proposition. As evidence, out of the 354 ETH ETF 13-F filers as of September 30, 2024, only 43 did not have exposure to BTC ETFs.

More importantly, the investment narratives for ETH have materially shifted since the last bull cycle. Between 2022 and early 2024, ETH boasted an “ultrasound money” narrative that was meant to compete against BTC. During this period, ETH was net deflationary as a result of transaction fee burns from EIP-1559 and reduced issuance from the shift to a proof-of-stake (PoS) consensus mechanism. This ultrasound money narrative compared favorably to bitcoin’s relatively simpler “sound money” value proposition of a 21M supply cap. At the time, Justin Drake, a researcher at the Ethereum Foundation, [projected](#) in 2022 that Ethereum’s supply could fall by approximately 2M ETH per year.

However, following Ethereum's Dencun upgrade in March 2024, the supply of ETH has increased by 375k, or 0.4% annualized, through December 1, 2024. While still lower than BTC's 0.8% current annualized inflation, the inflection itself adds uncertainty to projections around ETH's long-term supply. It also nearly reverses the 460k ETH burned over the 19 months between The Merge and Dencun. Currently, nothing in the near-term Ethereum roadmap will remedy this, though there are ongoing discussions around changing the long-term issuance curve, which we discuss in the "Proposals on the Frontier" section below.

Chart 23. ETH net issuance breakdown



Data is taken on a 7 day rolling average.  
Sources: Dune (@21co) and Coinbase.

In part, the rollup-centric roadmap has been [blamed](#) for the end of this narrative - whether fairly or not - as fees paid to L2 sequencers are not burned like mainnet fees are. Furthermore, activity and users are migrating to these cheaper chains, leading to more fragmented liquidity and less congestion fees on mainnet. That said, Ethereum still benefits from early mover advantages, and its focus on decentralization may have strong appeal for certain use cases like large scale financial operations and tokenized assets.

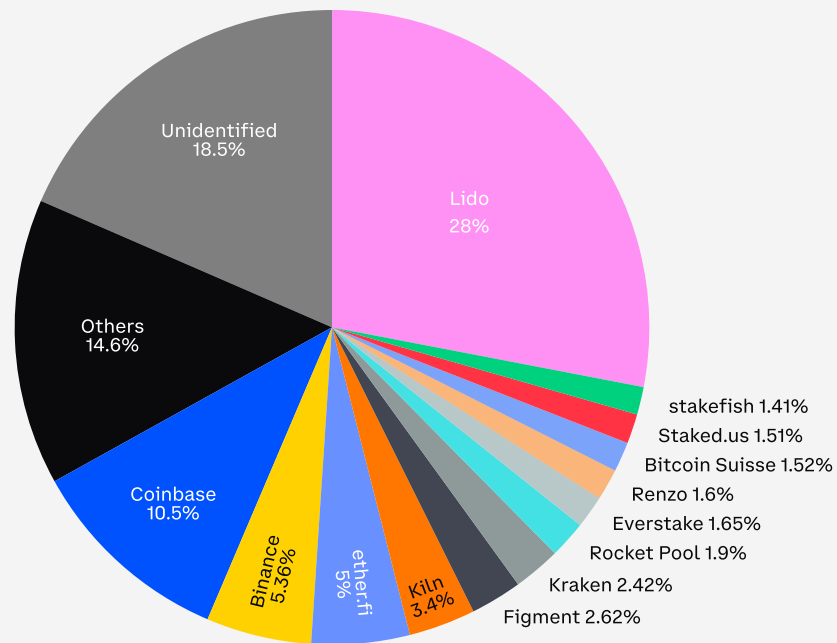
Indeed, stablecoin issuance is still heavily concentrated on Ethereum. Total stablecoin supply grew by \$63B throughout 2024, of which \$36B (57%) was on Ethereum mainnet and \$8B (13%) was on Ethereum L2s. Furthermore, Ethereum – and the Ethereum Virtual Machine (EVM) more broadly – is the most actively utilized technology for tokenization. The EVM and many open source contracts running on it have been battle tested over time, forks of Ethereum have been created for enterprise projects, and Solidity developers remain the most hireable smart contract engineers at present.

We think it's also possible that the growth of Ethereum's L2 ecosystem may be a boon for the asset in the long term, despite near-term disruptions to the user experience. It allows for more experimentation of execution environments and architectural tradeoffs, all of which are based on ETH the asset and leverage the underlying security of the mainnet. In our view, decentralized networks all trend towards gradual ossification as the number of stakeholders increases, technological complexity builds up, and migration risks become less tolerable. Despite this, improvements still occur on Ethereum with regular mainnet upgrades, with L2s only accelerating more innovative forms of architectural improvements. We discuss these tradeoffs in more detail in the below section dedicated to L2s.

# Stake And Sizzle

In light of its dedication to decentralization, Ethereum staking providers remain extremely diverse, even as staked supply has grown to a new high of 33.5M ETH. In fact, the distribution of Ethereum stakers is even more decentralized than that of bitcoin mining pools. While Lido does remain an area of concern, representing 28% of total staked ETH, it also leverages more than 200 separate node [operators](#) and regularly [benchmarks](#) itself to maximize decentralization and trustlessness in its underlying operations.

Chart 24. Breakdown of ETH stakers

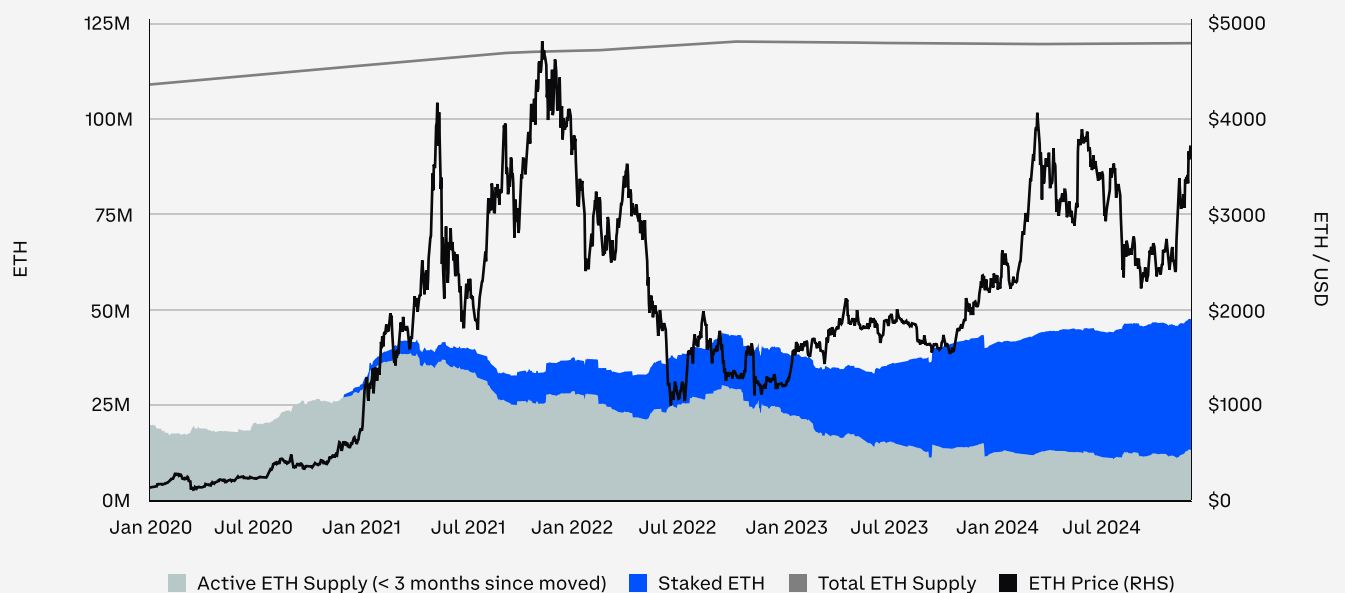


Sources: Dune (@hildobby) and Coinbase.

The growth in ETH staked supply has driven down staking yields, however. At the start of 2024, the ETH staking yield was 3.6%, but it is down to 3.1% as of December 1. This drop in yield is driven by Ethereum’s mechanism for determining staking yield, as the base reward is inversely proportional to the square root of the total balance of all validators. That is, as more ETH gets staked, block issuance yields decrease.

Importantly, neither the total supply nor the inflation rate is fixed. As more ETH gets staked, issuance – and overall asset inflation – also increases. This, however, may create a perverse cycle where inflation drives more stakers looking to avoid dilution, which in turn drives more inflation. With the existing supply curve, inflation caps out at 1.5% annualized, assuming the full 120M supply were to be staked.

Chart 25. **Staking has been a major liquidity sink for ETH**

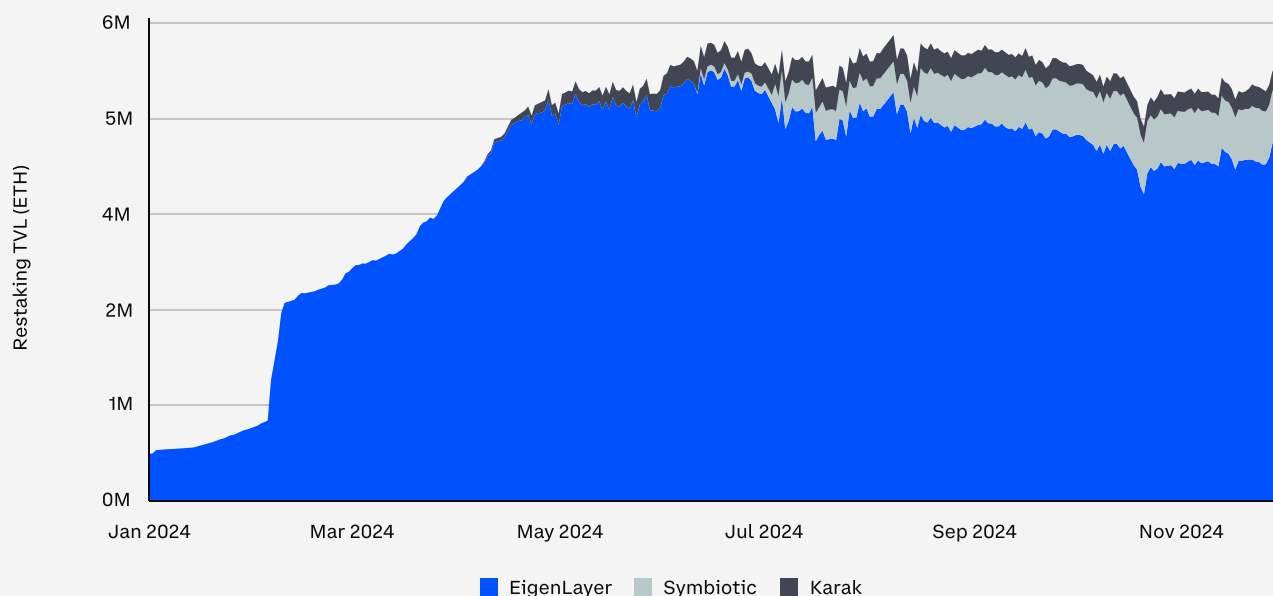


Active ETH supply is measured as the total amount of unstaked ETH held by accounts that were active in the previous 3 months. Sources: Glassnode and Coinbase.

Falling ETH yields may be one driver for the mass interest around *restaking* – a means of utilizing staked ETH to secure other services which would pay for that security. EigenLayer, the leading restaking protocol, has \$16.6B in TVL. Competing restaking protocols like Symbiotic and Karak also have sizable TVLs of \$2.4B and \$901M respectively. These competitors have a broader focus across assets and networks, though the end goal of providing “economic security” to new types of services is broadly shared among the three.

A total of 7.2% of all staked ETH has been restaked, though we think that ETH deposits to these spaces are unlikely to see additional inflows in the near term. The services secured by restaking are still mostly undergoing development and not generating meaningful yield at the moment. Early supporters looking for airdropped rewards and those further out on the risk curve have likely already allocated their capital, in our view. Meanwhile, we think other market participants may be waiting to determine the extent of additional real yield that these services will generate and whether that would be worth their associated risks.

Chart 26. TVL of restaking protocols denominated in ETH

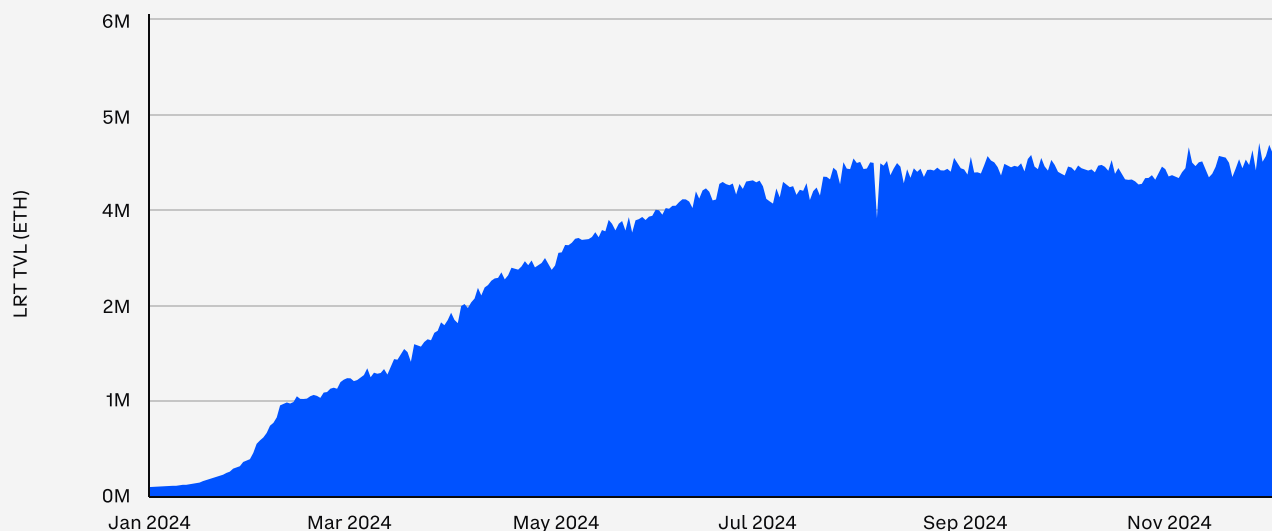


Sources: DefiLlama and Coinbase.

Restaking protocols have created a new competitive space for liquid restaking tokens. Similar to liquid staked tokens like cbETH or stETH, which represent ownership of a staked ETH position, liquid restaked tokens represent ownership of a restaked ETH position. Of the 5.5M ETH locked in restaking protocols, 4.2M ETH (76%) is locked via liquid restaking protocols. This is meaningfully higher than the 31% of ETH staked through liquid staking methods (approximately 10.4M ETH).

In our view, the higher utilization of liquid restaking tokens reflects the fact that their user base may be more yield-seeking. Indeed, the primary utility of liquid restaking (and liquid staking tokens) is to unlock liquidity from these positions by borrowing against them or by depositing them to a liquidity pool. Etherfi is currently the most utilized restaking protocol at 59% of total market share, up from a low of 34% in June.

Chart 27. TVL of liquid restaking protocols



Sources: DefiLlama, CoinMetrics and Coinbase.

Note that the current absence of yield from restaking protocols does not discount the potential importance of the actively validated services (AVSs) they secure, in our view. In particular, EigenDA, a data availability layer, is competing directly with Celestia for scalability. It has a current throughput of 15MB/s and a long-term roadmap targeting 1GB/s. In comparison, Ethereum’s maximum blob capacity is 64KB/s or 0.03125 MB/s (at its current specifications of 125KB per blob, 6 blobs per block, and a block time of 12 seconds).

EigenDA is only one of dozens of AVSs currently building on EigenLayer, with others ranging from oracles to interoperability to AI. Still, it remains to be seen whether the suite of AVSs will generate enough yield to support this magnitude of restaking capital in the long term, which we think may resurface as a key area of focus in the coming year as more AVSs launch.

## Forging The Future

A common criticism against Ethereum compared to newer L1 networks is that the pace of innovation and change on Ethereum is slowing down. Indeed, Ethereum has seen one hard fork per year over the last three years – a pace several times slower than some newer competitors and also much slower than its own early years. We don’t think this is a bad thing, however, and believe that all decentralized networks eventually follow a pattern of gradual ossification. That said, Ethereum still has a considerable roadmap ahead, with another major upgrade slated for early 2025.



## Pectra Upgrade

The planned Pectra (Prague + Electra) upgrade is targeting a release in 1Q25 and is currently undergoing tests in developer networks. It is one of the largest hard forks ever in terms of the Ethereum Improvement Proposal (EIP) count, even though its final scope was reduced in order to meet timelines. Most of the EIPs planned for inclusion are technical in nature and are unlikely to directly impact ETH value, though we call out a few changes we think are most critical below:

**EIP-7788: Dynamic Target Blob Count.** EIP-7788 introduces a mechanism to dynamically adjust the target number of blobs on Ethereum. This proposal seeks to prevent scenarios where blob space is undervalued, helping to manage blob costs more effectively and ensure stable transaction fees for layer-2 (L2) networks. Together with this proposal we are also likely to see an increase to the target and maximum blob counts on mainnet, which will help keep L2 costs low.

**EIP-7251: Max Effective Balance Changes.** This update increases the maximum validator ETH balance from 32 to 2048, enabling larger staking entities to consolidate their number of validators and reduce load on the network. At the same time, it also benefits solo stakers by enabling them to earn yield on more flexible increments. (Currently, yield can only be earned on staked increments of exactly 32 ETH.)

**EIP-7702: Set Externally-Owned Accounts (EOA) Account Code.** This EIP is a step forward for transitioning existing wallets into smart wallets. While smart accounts have existed for some time as a result of EIP-4337, adoption has been slow since many existing wallets and users have already onboarded via traditional public/private key generation. EIP-7702 adds a new transaction type that temporarily converts the user wallet into a smart contract wallet for the duration of a transaction to unlock smart account functionality for existing wallets. This lays the groundwork for a more complete migration to smart contract wallets in the long term. In the near term, for example, it can enable the unification of the “approve” and “send” transactions for ERC-20 tokens.

**EIP-7594: PeerDAS.** Data availability sampling (DAS) enables long-term scaling of blob space by removing the requirement that all nodes need to download all data while at the same time ensuring all data has been posted and is available. This is the core change behind reducing bandwidth requirements as blob space scales in the future.

Separately, a series of EIPs is also encapsulated in the **EVM Object Format (EOF)** that introduces a structured and versioned format for EVM bytecode. These changes aim to enhance the EVM by making it more modular, which enables easier upgrades and optimizations without breaking existing contracts. The EOF provides a standardized framework for defining contract code, enabling Ethereum to better support future innovations, reduce deployment risks, and streamline developer workflows.

## Proposals on the Frontier

Beyond Pectra, the longer-term vision for Ethereum has not changed considerably over the past year. It largely still follows the [roadmap](#) initially proposed by Ethereum's co-founder, Vitalik Buterin, in 2022. This consists of several core areas in the Merge, Surge, Scourge, Verge, Purge, and Splurge that respectively focus on (1) improving consensus, (2) increasing rollup throughput, (3) minimizing MEV and resisting censorship, (4) streamlining block verification, (5) eliminating technical debt, and (6) fixing "everything else." This roadmap is extremely expansive, though a few core areas are top of mind.

**Issuance Changes.** The existing ETH issuance mechanism increases ETH holder dilution as the proportion of staked ETH rises, up to a current limit of 1.5%. Some circulating proposals aim to prevent excessive staking participation, which could lead to centralization risks if liquid staking and restaking tokens gain a large boost in marketshare. Plans here vary from setting a staking cap to reducing issuance rewards. However, balancing these changes with solo staker feasibility remains a challenge. It's also not clear what an "optimal" staking ratio would be, and the final form of any issuance changes remains unknown at this time.

**Fork-Choice Enforced Inclusion Lists (FOCIL).** FOCIL is a mechanism aimed at enhancing Ethereum's censorship resistance by ensuring the timely inclusion of transactions in blocks. In this system, a committee of validators compiles local inclusion lists of pending transactions, which are then aggregated and enforced through the fork-choice rule, compelling block proposers to incorporate these transactions.

**Decentralized Block Building.** Decentralized block building refers to the process of distributing the responsibilities of block construction among multiple participants, rather than centralizing this function within a few entities. This separation aims to mitigate censorship and centralization risks by diversifying the entities involved in block production, which is currently dominated by two to three large players.

**Single Slot Finality (SSF).** Dencun introduced EIP-7514, which limited the rate at which validators could be added to the network. Pectra also plans to introduce EIP-7251 which enables consolidation of existing validators. Together, these have been in preparation for SSF, which may require a reduced consensus overhead that is important for enabling faster finalization of Ethereum's block state.

**Cryptographic Overhauls.** Ethereum is pursuing cryptographic enhancements in two main focus areas: quantum resistance and zero-knowledge proofs. The former is necessary to maintain the security of the network in the long term to protect against quantum computing attacks. The latter enables efficient transaction verification, which allows for continued scaling without compromising decentralization.

**Beam Chain.** Beam Chain is a proposed redesign of Ethereum's consensus layer and the existing Beacon Chain that was [introduced](#) by Justin Drake at DevCon 7. While it doesn't change the scope of Ethereum's roadmap, it does provide a memetic wrapper around a number of key changes, such as shorter block times (potentially four seconds), faster finality, and cryptographic improvements that would be prioritized for inclusion in a single large upgrade slated for 2029.

## Network Effects and the EVM

At the developer level, Ethereum remains extremely active. According to Electric Capital's [Developer Report](#), it has the largest number of existing developers and also continues to draw in the largest number of new developers. In our view, this is driven by two main factors – liquidity and the EVM. Ethereum remains the smart contract platform with the largest TVL, the most stablecoins, and the highest level of institutional integration. Building on Ethereum enables direct and interoperable access to the existing pool of users and capital on the platform.

Meanwhile, the EVM is also the most well-tested smart contract environment in existence. There are a large number of open source contracts and coding tutorials that enable smooth onboarding into the Solidity environment. Many alt L1s and L2s – including those burgeoning in the Bitcoin ecosystem – are also based on the EVM. This means that developers building on any EVM layer can seamlessly transport code across these platforms. Importantly, changes to the EVM currently initiate from Ethereum mainnet and are subsequently adopted by other networks, cementing Ethereum's role as the leader of EVM development.

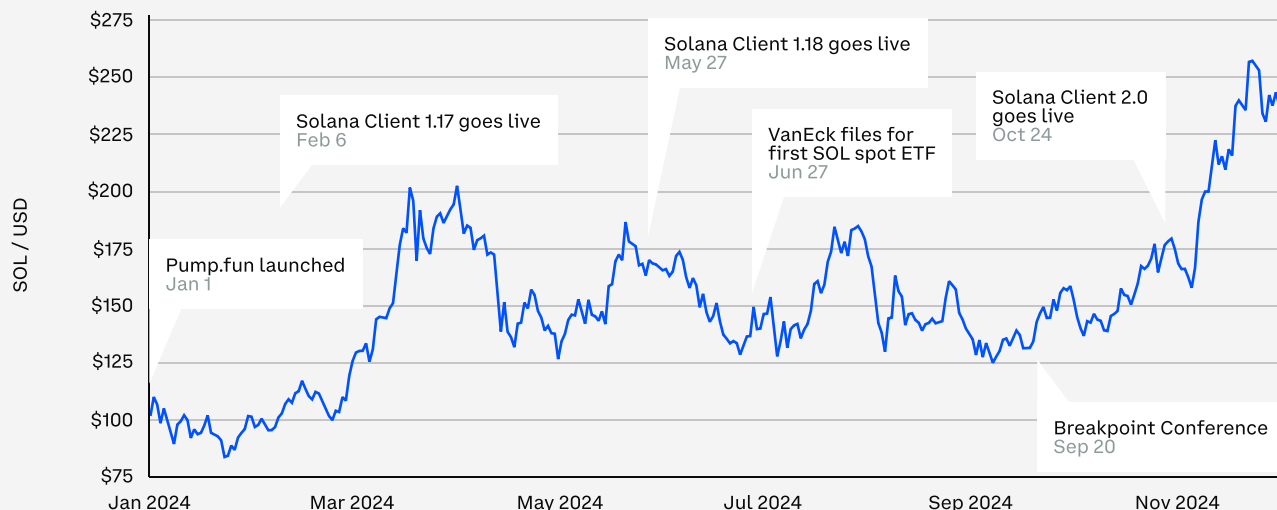
# 4 Solana

## Market Outlook

Beyond bitcoin, Solana (SOL) has been one of this bull cycle’s favorite trades. In particular, Solana’s straightforward focus on increasing throughput directly at the L1 level presents a heavily differentiated future from Ethereum’s rollup-centric roadmap. The implementation of the Solana Virtual Machine (SVM) in Rust has led to an entirely new suite of applications built from the ground up as existing protocols and code are not transferable from the EVM. Solana also benefits from an early framework of localized fee markets, which enables median transaction fees to remain low even as there is competition (and high fees) over certain portions of blockchain state. This fee differentiation enables overall blockchain fees to remain high even as the majority of transaction fees remain low, greatly improving the onchain experience.

Throughout 2024, SOL largely replaced ETH as the high beta play relative to BTC. Solana reached new all-time highs by market cap in March and new all-time highs by token price in November 2024. Indeed, SOL dominance rose from 2.8% to 3.3% YTD even as ETH dominance fell from 17.0% to 13.2%. SOL is now the second largest smart contract L1 native token by market cap, behind only ETH.

Chart 28. Solana (SOL) 2024 events/milestones



Source: Coinbase.

In our view, Solana's rise to prominence has centered on its application-focused ecosystem, which in turn has been supported by the coordination abilities of the Solana Foundation and Labs at the infrastructure level. For example, the Solana Program Library (SPL) creates a baseline implementation for tokens and governance that developers can directly use. In contrast, Ethereum has more than a dozen variations of token standards based on ERC-20 and ERC-721 for fungible and non-fungible tokens, respectively, that can be challenging to navigate.

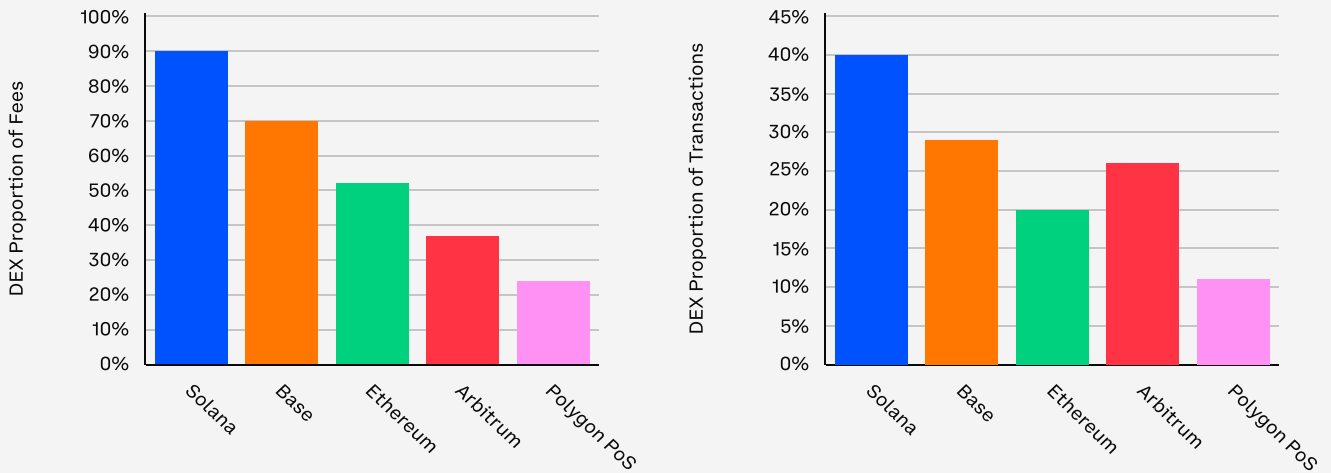
Furthermore, the existence of a single SVM development layer also eliminates questions around supporting multi-chain deployments, governance, and interoperability. This simplification greatly frees up developer bandwidth to focus on challenges more closely linked to the end users. Innovations around improved user interfaces, streamlined experiences, and onboarding processes have all seen rapid innovation on Solana.

The relative importance of the Solana Foundation can also be seen in its coordination role for shared specifications and standards. Blockchain links (Blinks), developed by Dialect and Helius for example, received endorsement from official Solana communication channels. Blinks also launched on Day 1 with integrated support from leading wallets like Phantom and Backpack. Meanwhile, the more research-focused Ethereum Foundation has historically remained a neutral entity without endorsing private entities in the space. This difference likewise pushes developer attention closer to the application layer, in our view, as there is less space for competition around shared infrastructure.

## Memecoin Mania

As a result, Solana's application layer accommodates sectors ranging from DePIN to payments. However, the largest contributor to the growth in Solana's metrics has been memecoin trading. In fact, Solana has emerged as a leading hub for DEX activity, with onchain volumes beginning to eclipse Ethereum's in 4Q24. The importance of Solana's trading sector to its network metrics is best exemplified in its fees. Transactions linked to DEX trades accounted for 90% of total fees in November 2024, higher than the 70% and 52% on Base or Ethereum respectively, and substantially higher than Arbitrum and Polygon PoS.

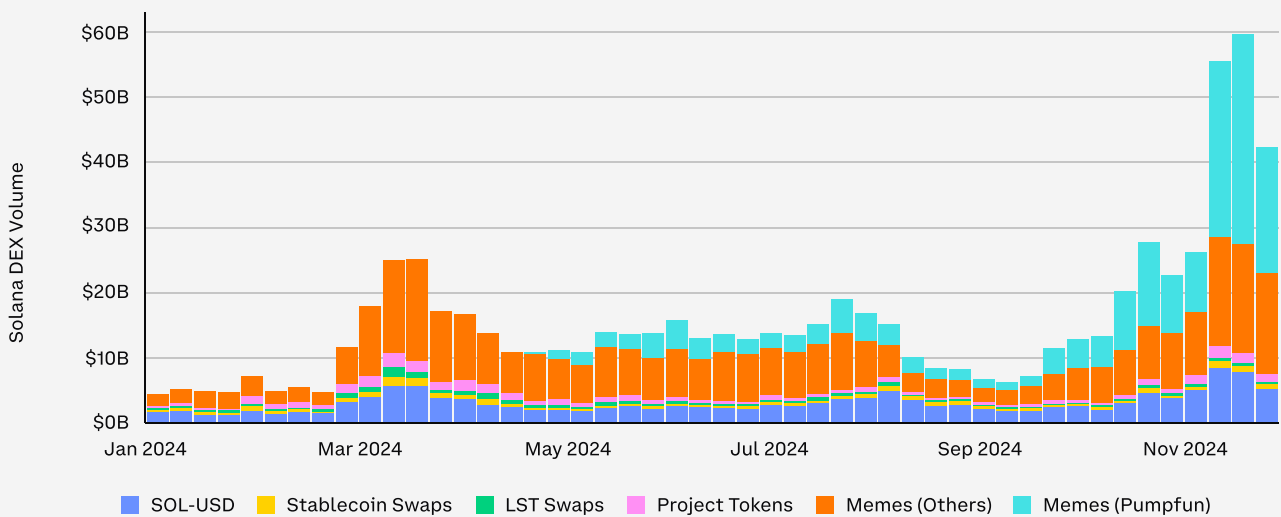
Chart 29. Solana’s percentage of both transaction counts and fees spent on DEX trades is higher than that of other chains



Data aggregated over November 2024. Sources: Dune and Coinbase.

A growing majority of this trading activity is being driven by new coins launching on Solana. In November 2024, more than 85% of all DEX volumes on Solana were memecoins, up from 40% at the the start of 2024. More than four million coins have been created on Pump.fun, Solana’s leading token launcher, with more than 20,000 tokens launched each day. The exuberance around this sector of the crypto industry has led to it being one of the most profitable – Pump, Raydium, Jito, and Telegram trading bots are among the highest revenue applications in crypto.

Chart 30. Memecoins have played a major role in Solana’s rising DEX volumes

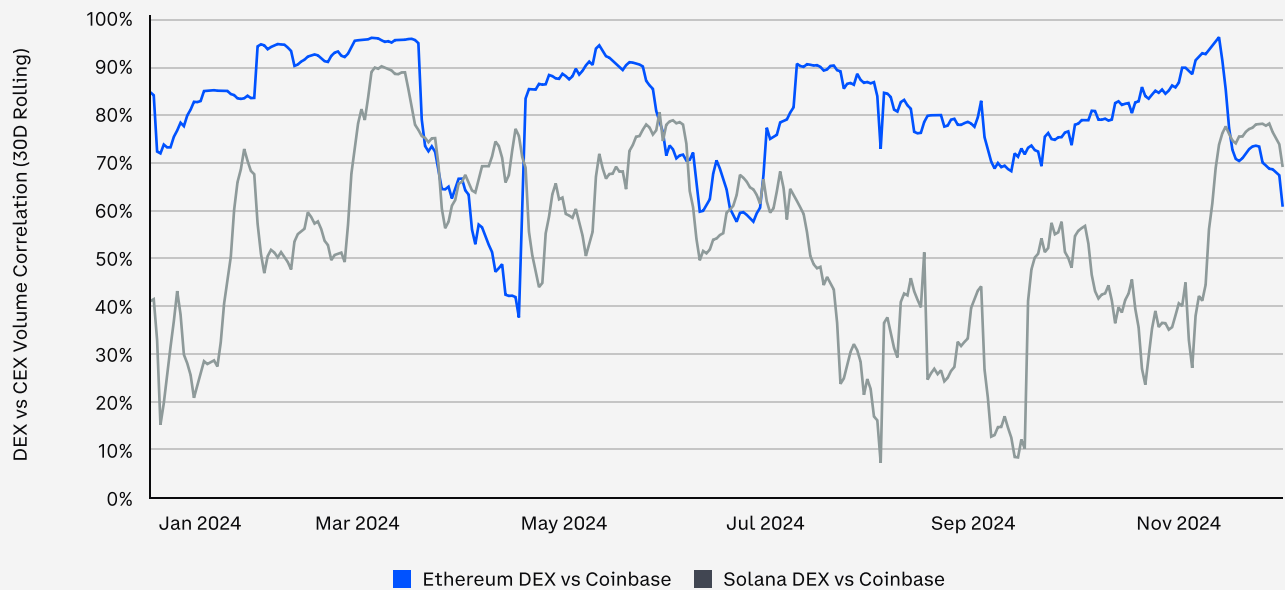


Source: Blockworks Research.

Part of this profitability is the result of Solana memecoin traders being less sensitive to fees, which is reflected in the fee-to-volume ratios paid at the DEX pool level. In November 2024, Uniswap did \$95.9B in volume across all its EVM chains, and users paid a total of \$99.8M in fees at an average rate of 0.1%. Meanwhile, Solana’s leading decentralized exchange (DEX), Raydium, did \$85.1B in volume (11% less than Uniswap), but collected \$213.3M in fees (114% more than Uniswap) at an average rate of 0.25%. That is, users paid fees that were on average 2.5x higher on Raydium pools than the fees they paid on Uniswap pools.

The trading activity on Solana appears to differ from that of more institutionalized markets, as evidenced by the decoupling of Solana DEX volumes from Coinbase CEX volumes, contrary to Ethereum DEX volumes that have remained highly correlated. Chart 31 illustrates that Solana’s DEX volumes began deviating in July, while Ethereum’s continued to track upwards. However, correlations realigned around November 12 due to the significant post-election crypto rally. The initial decoupling is likely due to Solana’s DEX activity primarily involving memecoins that are rarely listed on CEXs and are driven by unique factors. This suggests that Solana’s trading activity may be developing its own distinct ecosystem.

Chart 31. **Ethereum DEX volumes were more correlated with Coinbase spot exchange volumes than that of Solana during between July and November**



Volumes are log transformed then min-max normalized. Correlations are calculated against total Coinbase spot exchange volumes. Sources: DefiLlama, CoinMetrics and Coinbase.

# Increase Bandwidth, Reduce Latency

Looking forward, Solana's core vision is simple – to increase bandwidth and reduce latency of the network. In our view, this guiding principle enables app developers on Solana to focus less on changes to the network infrastructure and consensus layer and more on user facing products. In contrast, EVM developers may eventually need to consider interoperability and cross-chain mechanics as well as determine which EVM layer would best suit their application requirements.

Behind this vision is the belief that validators can continue to scale their hardware as global technology standards improve. Indeed, the network's reliance on performant technology and high-bandwidth connections remains central to its design. Further bandwidth scalability is being tackled through compression techniques and more efficient data propagation protocols. Other optimizations at the hardware level – such as those utilized in the Firedancer client – are also promising for future performance gains. In general, Solana's ethos is to align software advancements with improvements in global hardware and bandwidth capabilities to remain at the forefront of scalability and performance.

Beyond pure performance improvements, Solana is also exploring several new research directions to increase decentralization and reduce maximum extractable value (MEV). One of its most promising research directions, in our view, is the push for multiple concurrent leader (MCL) architecture. Right now, existing blockbuilding processes are managed by single rotating slot leaders, who have an information and timing edge. MCL architecture would make the blockbuilding process more equitable by having multiple distributed slot leaders share that process. This would reduce the ability for a single entity to control the blockbuilding process and in turn reduce MEV and other timing games.

In the near term, we expect Solana's rapid progress to continue, driven by its relatively centralized development structure and swift release cycle, especially compared to Ethereum. Solana core developers currently aim for [major releases](#) every few months (versus a year or more for Ethereum) with minor version updates for small improvements and fixes implemented regularly. Additional features "locked" behind feature gates are also enabled between major versions. For example, confidential transfers introduced in client version 1.16 were gradually rolled out in the following months via feature gates. In our view, this makes individual client upgrades less relevant for SOL performance compared to ETH, due to the relative frequency of updates.

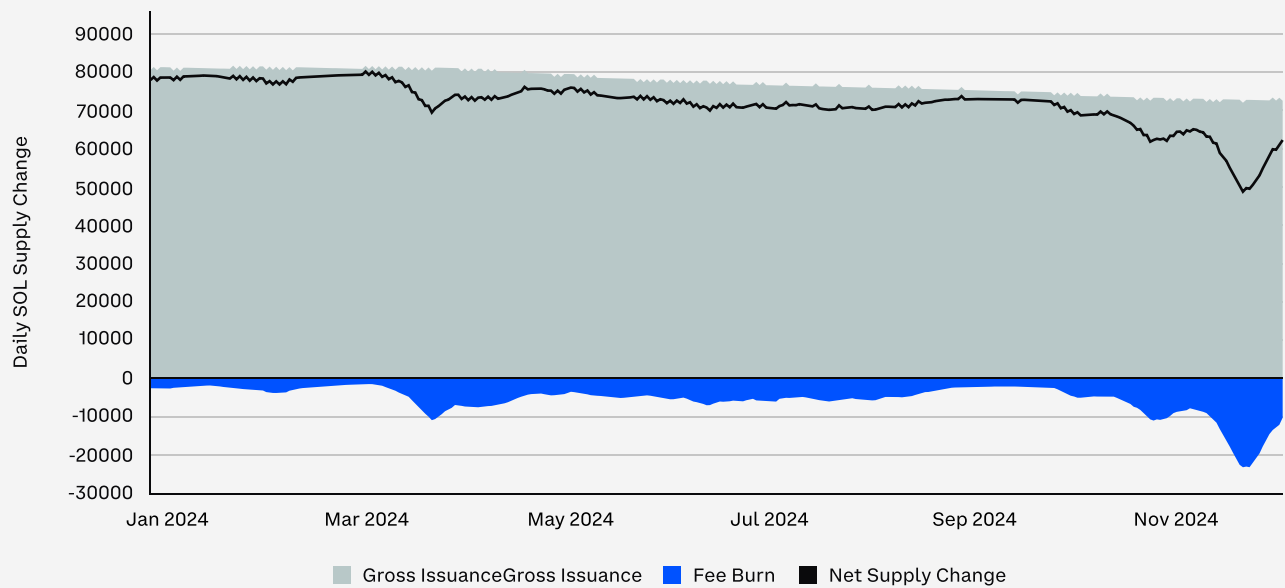
That is not to undermine their progress, however. Enabling stake-weighted quality of service (SWQoS) and introducing scheduler fixes and improved priority fees led to improved network performance. Client version 2.0 has also further lowered network latency following its full mainnet adoption in early November 2024. Each client upgrade iteratively improves the overall network infrastructure of Solana.



# Inflation Versus Adoption

Despite the strong tailwinds for Solana from a technological and scaling perspective, questions remain around SOL's inflationary pressure in the near to medium term. Solana's annual inflation currently hovers around 5.2% (December 1, 2024). In contrast, BTC and ETH annualized inflation rates are 0.8% and 0.4% respectively. In the long term, Solana's inflation rate will programmatically decrease by 15% each year until it reaches a long-term tail emission of 1.5%, although this schedule can also be modified via a Solana SPL vote. But until then, inflationary pressures are likely to remain top of mind, despite a large pick up in transaction fees and burns.

Chart 32. SOL net issuance breakdown

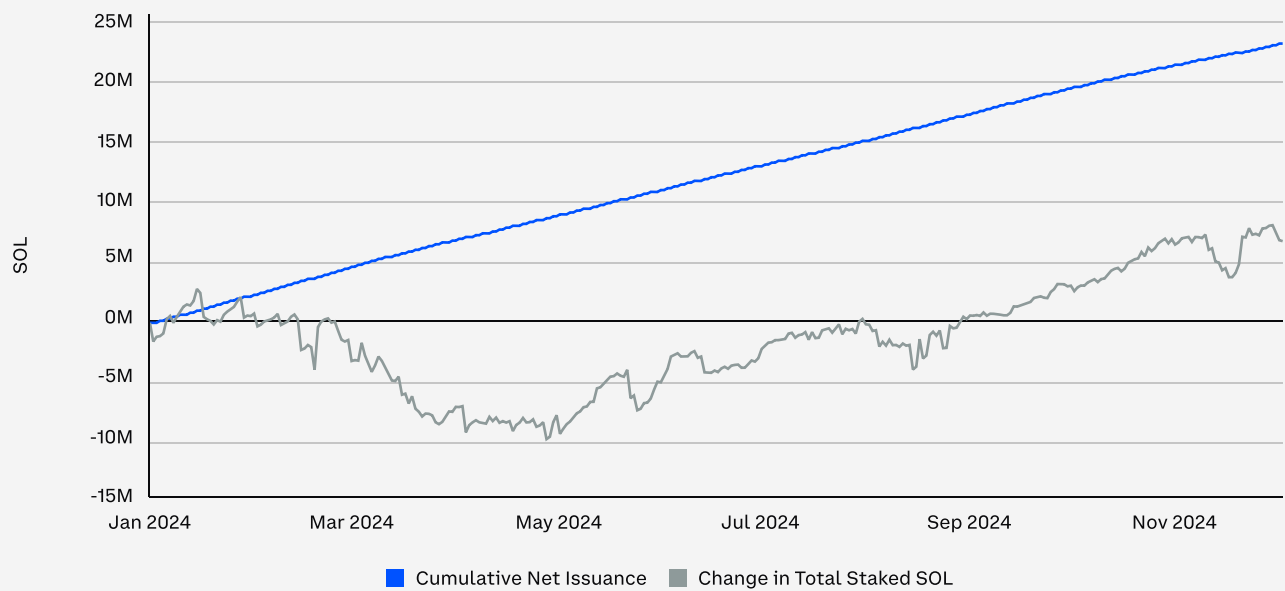


Burn is taken on a 7-day rolling average. Gross issuance is taken on a 210-day rolling average to smooth issuance spikes, which occur at the end of each epoch.  
Sources: Dune (@21co) and Coinbase.

In May 2024, Solana validators voted to pass Solana Improvement & Maintenance Document (SIMD) 96, which will eliminate burns from priority fees and redistribute those earnings to validators. Currently, 50% of both base and priority fees are burned, though priority fees currently account for more than 90% of the network's total fee burn. The implementation of this SIMD could increase the circulating SOL supply by an additional 5,000 SOL each day at current transaction fee rates. Note that SIMD-96 will only be activated after the release of client version 1.20 via a feature gate, which will likely be in 2025.

Beyond the perceived potential inflation increase from SIMD-96, other supply overhangs such as a series of unlocks clustered in the tail end of 1Q25 could also add pressure on the asset. For example, 7.5M SOL (\$1.7B) linked to Alameda Research will fully [unlock](#) on March 1, 2025. In 2025 it will also be important to keep an eye on the amount of SOL that validators are holding, as Solana stakers tend to represent long-term holders due to their illiquid positioning. (It takes two to three days to unstake SOL.) From this segment of users, we saw a gradual selloff into the 1Q24 rally and another into the 4Q24 all-time high. Over the course of 2024, this represented more than 16.3M (\$3.7B) of SOL unstaked – and potentially sold – which is a significant source of flows.

Chart 33. Net SOL issuance has mostly been unstaked throughout 2024



Sources: Dune (@ilemi, @21co) and Coinbase.

## Crossing The Chasm

While Solana has many tailwinds behind it, we think it still has a number of hurdles to overcome as it competes with Ethereum. In particular, the importance of memecoin activity to its broad network metrics (fees, users, DEX volumes, etc.) remains an area of concern for us as it's unclear how durable such activity will be in the long term. In contrast to its DEX volumes, Solana's stablecoin market cap (a metric of sustainable onchain liquidity) of \$4.7B remains below its 2022 highs and is far below that of Ethereum (\$103.7B). While a stronger SOL price has enabled more purchasing power on many of its DEX pairs – which are primarily denominated against SOL – it may have an adverse effect in the reverse scenario, in our view.

Separately, validator decentralization on Solana continues to improve, and the network now has over [1,400 validators](#) distributed across the globe. (That said, 72% of Solana validators still [benefit](#) from the Solana Foundation Delegation Program, with those validators collectively representing 19% of the total stake.) However, the lack of client diversity remains a primary concern for network resilience, though that will soon change. Firedancer is live in mainnet in non-voting mode, and a number of other full node and light clients are in development, such as Sig and Tinydancer.

Beyond the technology itself, we think that building trust in decentralized systems takes time. Although the Solana network has been stable for nearly a year, its outage in February 2024 and continued plans for rapid release cycles in the near term do increase its technological risk compared to a network like Ethereum, in our view. This partly stems from a difference in design philosophy between Solana and Ethereum, as Solana emphasizes high performance and scalability while Ethereum prioritizes liveness and fault tolerance. While we think improvements could eventually narrow the gap in technological risk profiles, we may still see more risk-averse entities prefer to build sensitive products (like tokenized assets) on the EVM in the near term.

Lastly, we think that data transparency on Solana still lags behind Ethereum. This is due partly to its relatively recent rise and the smaller talent pool of analysts capable of understanding the SVM. But it is also because the sheer size of the network history (300TB and growing) makes historical queries more computationally intensive. We think this too will improve with time, however, as the ecosystem draws more talent and historical datasets become better indexed.

# 5 The Layer-2 Landscape

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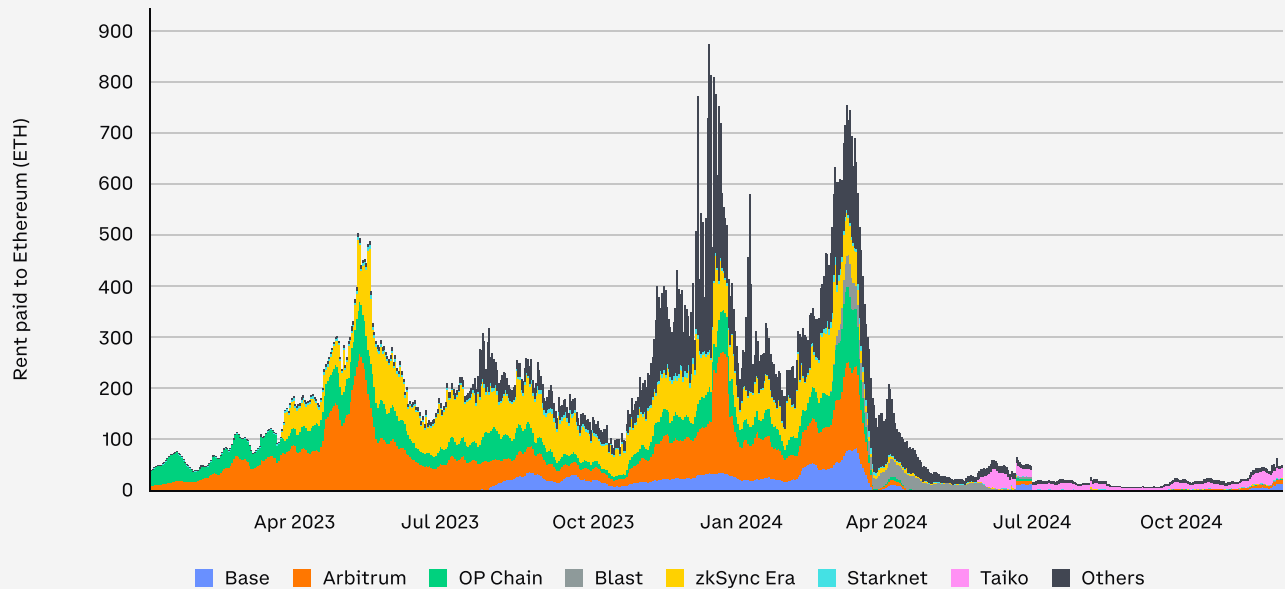
One of the largest growth stories in 2024 has been the adoption of layer-2 (L2) networks. This has occurred principally on Ethereum, where much of the core research and discussion around this approach has taken place. But it is also true for networks like Bitcoin (and even Solana to an extent), which have not historically been known for scaling solutions. In our view, L2s are likely to continue to proliferate as they allow significantly faster and cheaper transactions, and rapid technological innovation while retaining key trust properties of the underlying L1. Importantly, L2s also benefit from simplified access to L1 liquidity. The prevalence of rollup-as-a-service (RaaS) providers may further accelerate this trend as they simplify the process for entities to create and operate their own L2s.

## Accelerating Ethereum

Ethereum has made considerable progress in its rollup-centric roadmap, with the majority of its activity now occurring on L2s. Since the start of 2024, daily transaction counts on L2s have increased 289%, from 4.7M to 18.3M. This has been accompanied by a 108% increase in daily active addresses, from 947k to 1.97M. We think it's promising that the faster and lower-fee L2 environment has been gaining adoption at an accelerating pace.

In particular, we think the largest driver of increased L2 activity has been the significant fee reduction resulting from the Dencun upgrade in March 2024. Dencun introduced a new blob transaction type to Ethereum that is focused on supporting the increasing data needs of L2s. This dropped the operational costs of rollups significantly, lowering average transaction costs by more than 90%. Aggregate L2 transaction counts doubled from 5M to 10M in less than two months following the release. This rapid growth has resulted in Ethereum's blob capacity consistently reaching its maximum target utilization just seven months after its launch.

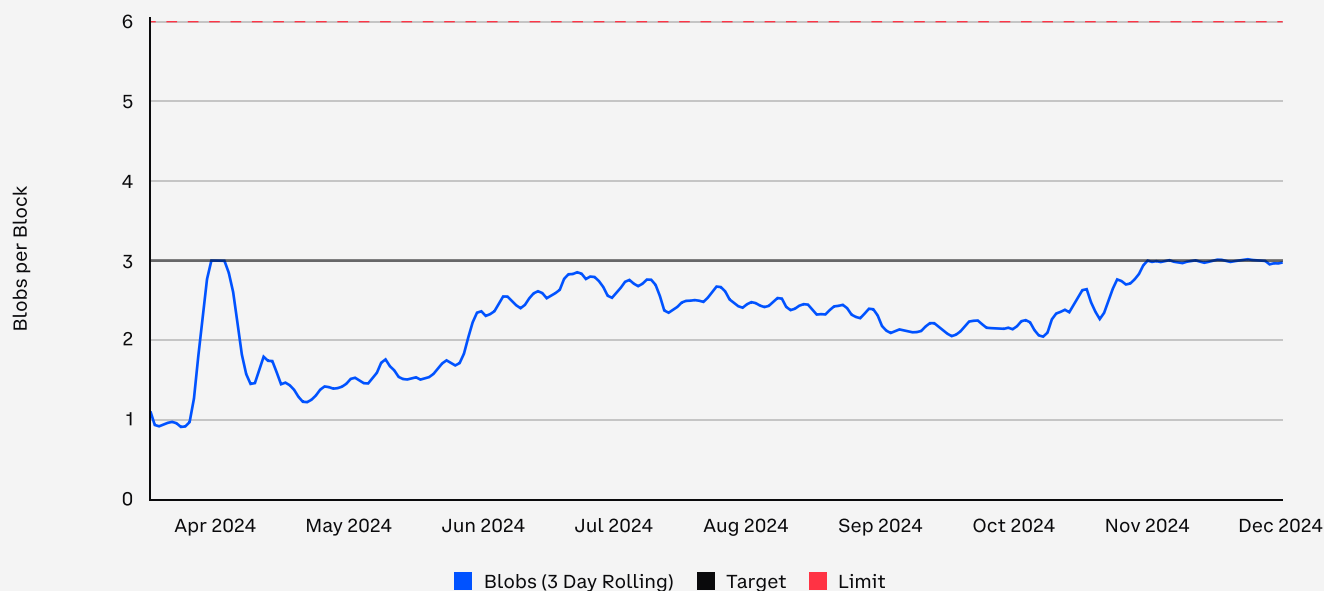
Chart 34. L2 fees paid to post data to Ethereum have dropped significantly post-Dencun



Source: growthpie.xyz.

Broadly speaking, L2s need to write data to two locations. Underlying transaction data needs to be posted to a data-availability layer like Celestia, EigenDA, or Ethereum blobs. Meanwhile, proofs of state changes need to be updated on the L1, which involves submitting a transaction to the mainnet execution layer. (These two operations can both occur on the execution layer as they were for many rollups prior to Dencun, but it's more expensive.) Since Dencun, many of the leading L2s switched to posting data to Ethereum blobs.

Chart 35. **Ethereum blobs reached target capacity in early November**

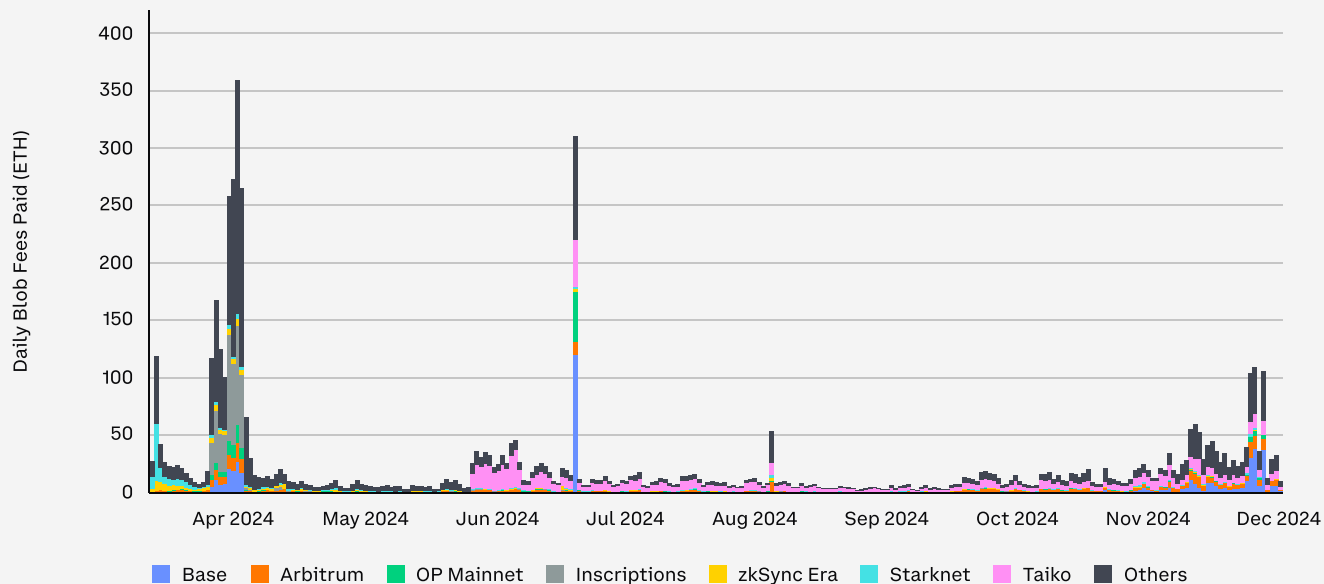


Source: Dune (@hildobby).

Ethereum has a target of three blobs per block, beyond which blob fees begin to scale exponentially. However, the fee market for blobs is separate from traditional execution transactions. That is, congestion at the execution layer from trading or NFT activity would not similarly increase the cost to post blobs. While this has helped keep L2 costs low, it has also led to criticisms that blobs have been detrimental to ETH tokenomics. Indeed, the Dencun upgrade and the adoption of L2s have resulted in total ETH transaction fees dropping to three-year lows. Furthermore, transaction fees spent on L2s do not undergo EIP-1559 style burn. Together, these have led to ETH becoming inflationary following the Dencun upgrade.

Since early November, however, blob utilization has reached its target capacity because rollups like Base have expanded their capabilities while new rollups like Taiko have launched. Although this has led to a recent increase in blob fees, we think high blob fees are unlikely to persist in the long term. Target blob capacity is likely to increase from three to six with the Pectra upgrade in 1Q25, and long-term scaling roadmaps for PeerDAS anticipate blob capacities of 16 or more in subsequent upgrades (with higher dimensionality of subnet sampling). This will likely keep blob fees – and L2 fees in turn – low for end users.

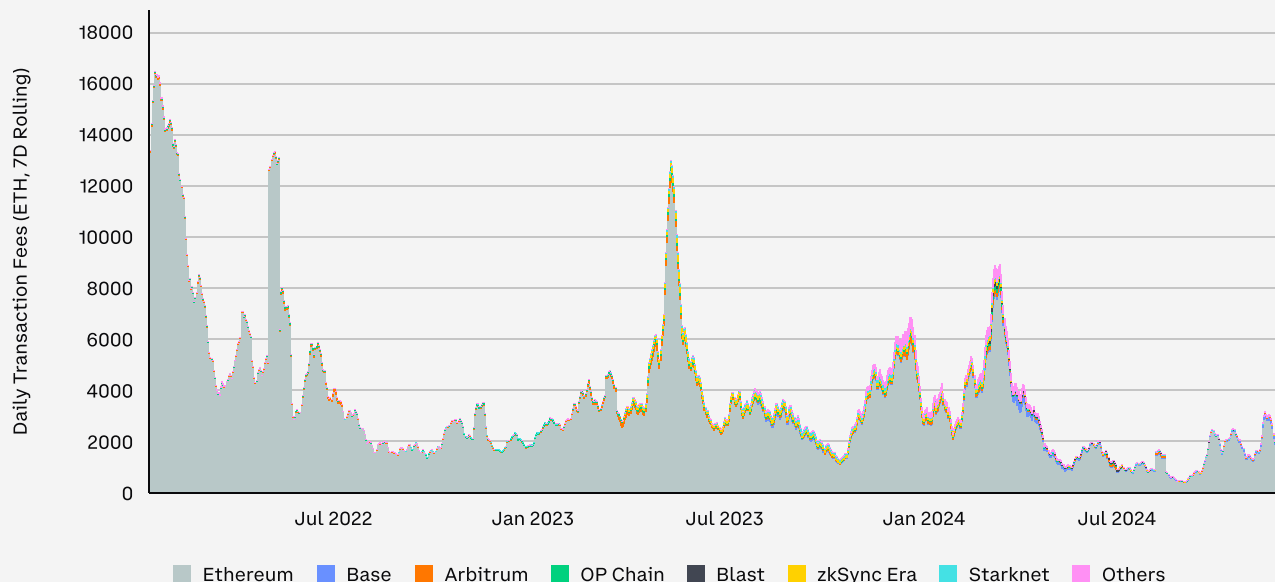
Chart 36. **Blob fees typically only rise with peak demand for blob space**



Source: Dune (@hildobby).

While we don't think that blobs will be a significant source of long-term ETH fee burn (barring a change to the blob fee structure), we also don't think that blobs have been the sole cause of inflationary ETH. In fact, we think that a reduction in ETH fee burns is a byproduct of successful blockchain scaling. That is, blockspace capacity has accelerated faster than overall corresponding demand. Indeed, the total fees spent on L2s are currently insignificant to ETH inflation – even if 100% of L2 fees were burned, ETH would remain inflationary. Instead, we think the change in inflation rate seems to be driven by lower mainnet fees more broadly (a scaling challenge not [limited](#) to L2 architecture) as well as a rise in the ETH staking ratio, which has increased gross ETH issuance.

Chart 37. Total ETH spent on transactions has reached multiyear lows



Sources: growthepie.xyz and Coinbase.

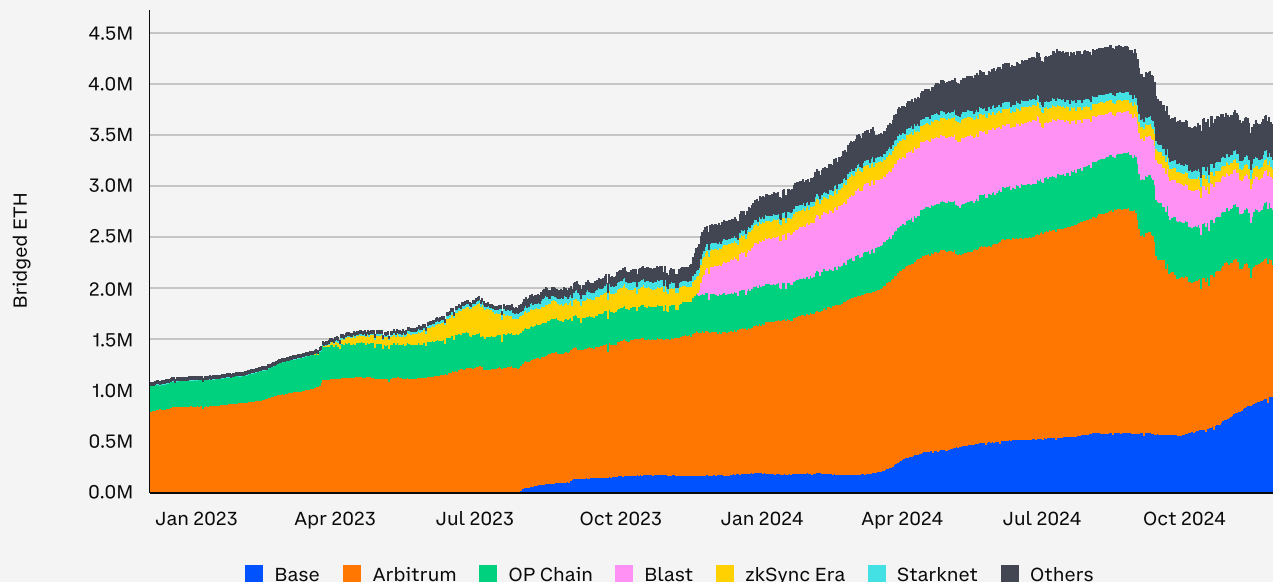
In our view, the long-term utility of ETH arises from its usage across both its mainnet and L2 ecosystem. This is not only from transaction fees, but also from (1) its use as lending collateral, (2) its role as a liquidity generator in DEX pairs, and (3) its status as the only counterparty-risk-free asset on Ethereum. Furthermore, we think that the high throughput, low-fee L2 environment may enable new forms of applications and utility for the asset that were not previously feasible on the L1 alone.

Early signs suggest that this shift could already be happening. As L2 security has improved, the amount of ether bridged to L2s has grown to over 3.5M ETH. DeFi applications serve as the largest liquidity sinks for this ETH. For example, Aave on Arbitrum currently holds over 270k ETH. Future technological primitives, such as preconfirmations which enable L2 transactions to have inclusion guarantees on the L1 block, could accelerate this trend by improving both the L2 security and user experience.

The importance of rollup security improvements is highlighted by the volume of ETH bridged to Base, a leading L2 incubated by Coinbase. ETH bridged to Base plateaued at 500-550k ETH through much of 3Q24. But following the announcement of fraud proofs on Base in October 2024 – possibly coupled with favorable expectations surrounding the US elections – the amount of bridged ETH increased by more than 80% to 900k ETH in the following two months.



Chart 38. More than 3.5M ETH has been bridged to L2s



Sources: L2beat and Coinbase.

A majority of L2 activity (measured by both TVL and transaction count) is currently centered on Base and Arbitrum, though there is a long tail of L2s that is constantly growing. Ethereum L2s are competing for users and liquidity by offering unique tradeoffs, which range from innovative block creation mechanisms and execution environments to enhanced yield on bridged assets. For example, Starknet offers a new execution environment, the CairoVM, while other rollups like Eclipse and Atlas enable the SVM. Uniswap’s recently announced Unichain also presents a new block-building process powered by trusted execution environments (TEEs) to reduce MEV. Meanwhile, the Blast rollup stakes bridged ETH to enable outsized ETH yield to users of their network.

In the long term, we think that the median transaction fee on L2s is likely to continue trending towards zero regardless of their underlying architecture. This will likely be supported by competition between L2s to attract both users and applications to their environments. Many L2s are also exploring alliance-like structures where they share a similar underlying technology stack to support better cross-chain experiences and technological improvements. The Optimism Superchain leads this approach, counting L2s such as Base, OP Chain, Mantle, Worldcoin, Unichain, and Zora among its ranks. Meanwhile, Arbitrum Orbit chains and zkSync’s Hyperchain vision are also growing the number of L2s utilizing their technologies. We think these partnerships will continue to accelerate throughout 2025 as more custom L2s launch.

# Building Up Bitcoin

Bitcoin has incorporated a number of lessons from Ethereum's L2 roadmap, with dozens of teams building Bitcoin L2s based on the Ethereum Virtual Machine (EVM). New breakthroughs in onchain Bitcoin proofs (via the BitVM) now enable L2 code executions to be proved on the more logically limited Bitcoin L1.

However, challenges such as liquidity and user fragmentation faced by Ethereum L2s may repeat to a larger extent in the Bitcoin ecosystem, as Bitcoin lacks a coherent scaling vision and a central research entity like the Ethereum Foundation. This has led to difficulties in evaluating the security tradeoffs for Bitcoin L2s, with some networks better categorized as sidechains, rather than true L2s, since they don't meet the same definition of "rollups" in the Ethereum ecosystem from a trust-assumption perspective.

Despite these challenges, the development of Bitcoin infrastructure, including L2 solutions, is expected to be a significant trend in 2025 as frontrunners emerge. These enhancements aim to generate transaction fees to support miner incentives as [block rewards decrease](#), even if the enhancements do not immediately affect the performance of BTC itself.

New transactions take around 10 minutes on average to be confirmed and added to the Bitcoin blockchain (though processing times vary in practice). But finalization can often take longer because many recipients generally require several blocks to be added to that preceding block before a transaction can be considered "settled" or immutable. Tackling the issue of speed is one of the primary reasons why L2s like the [Lightning Network](#) (launched in 2018) were created and one of the reasons why having a mainstream Bitcoin L2 could be useful, if not essential, in the long run.

Bitcoin L2s could generate the transaction fees necessary for future block production, transforming the space into a competitive race for unlocking economic value. However, technological limitations persist. By design, Bitcoin's Unspent Transaction Output (UTXO) architecture doesn't accommodate L2s well, particularly when compared to Ethereum's accounts-based model. Moreover, Bitcoin's scripting language is intentionally sparse to ensure simplicity and security, making it difficult to handle the complex state transitions of more expressive smart contracts – even though Taproot has improved the network's scripting capabilities. Finally, Bitcoin's block size limit (expanded to 4MB with SegWit) restricts how much data can be stored onchain, making it expensive for rollups to use Bitcoin for data availability.

In effect, many of these L2s represent workarounds for Bitcoin's existing infrastructure rather than complementary technologies that enhance the network's inherent functionality, unlike Ethereum or other smart contract platforms. Moreover, the idea of altering the underlying Bitcoin code is anathema to many in the community, which makes adjusting the base layer to accommodate these L2s very challenging. Indeed, many community members admire Bitcoin's minimalism and prefer that bitcoin simply remains a decentralized store of value. They believe that building complex L2 solutions could contravene Bitcoin's core ethos and potentially increase its attack surface. That said, we think L2s are poised to enable a number of key functionalities to the Bitcoin network:

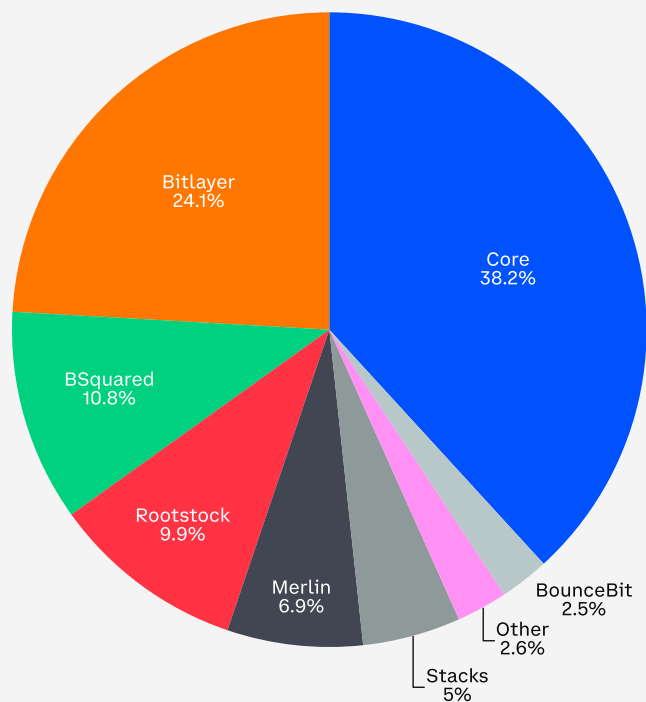
**Payments and Scaling.** The [Lightning Network](#) (LN) is one of the oldest and most well-known of the Bitcoin L2s, implemented as a network of state channels that enable cheap, instantaneous offchain transactions that periodically get committed to the base layer (when these channels are closed). The LN was designed primarily to handle payments and reduce congestion on the base layer, and, in theory, it is capable of processing millions of transactions per second (vs Bitcoin's average of five transactions per second). More recently however, a number of [other use cases](#) have been built to unlock a variety of new economic activities supported by the base layer.

**Staking.** One of the most anticipated use cases for bitcoin is self-custodial [staking](#), led by protocols like Core DAO and Babylon Chain, which form a big part of the emerging BTCFi sector. In principle, these staking protocols permit bitcoin holders to earn a yield for securing other networks – specifically networks that rely on the proof-of-stake (PoS) consensus mechanism. The idea is that this could potentially allow users to tap into one of the largest economic security funds in crypto, akin to the [restaking model](#) pioneered by EigenLayer on Ethereum.

**Smart Contracts.** Some L2s like Stacks, Rootstock and Build on Bitcoin (BOB) are attempting to move computation off of the base layer in order to introduce more complex smart contract capabilities to the ecosystem. This opens the door to having dApps on Bitcoin. The means by which these projects are attempting to accomplish this vary, however, potentially creating tradeoffs on trust assumptions and security guarantees. For example, Stacks runs a separate blockchain that utilizes proof-of-transfer (PoX) to secure its network, whereas BOB relies on the base layer for its security and final settlement. Rootstock enables a Turing-complete virtual machine (RVM) that's compatible with Ethereum's EVM.

**Infrastructure.** New infrastructure like wallets might be required to take full advantage of the expanding functionalities offered by many Bitcoin L2s, particularly as this framework could require synergies between onchain and offchain transactions. Fortunately, much of the groundwork has already been established to help accommodate the new features being introduced to the Bitcoin ecosystem. This is reminiscent of how the Phoenix wallet was specifically created to accommodate the Lightning Network, having itself undergone major developments over the past 18 months.

Chart 39. Bitcoin L2 TVL remains widely distributed



Source: Footprint Analytics.

# Modular Solana (Network Extensions)

L2 architecture isn't limited to Ethereum and Bitcoin, however. Solana has embraced a [related](#) concept called "network extensions" that extends the network's scalability for a focused set of operations. These are primarily differentiated from Ethereum and Bitcoin L2s by specializing in individual applications, rather than expanding generically executable blockspace. Furthermore, L2s on Solana are not the result of scaling limitations being reached at its base later, but instead arise from the need for custom functionality not possible on the base layer.

For example, Zeta Markets, a perpetual futures DEX on Solana, built the Bullet rollup on Solana to better support low-latency trading. Bullet has no virtual machine and is solely focused on application logic. Both the data and proofs from Bullet are posted onto Solana mainnet without using an external data-availability layer (with the belief that the L1 can sufficiently scale to support data-throughput needs). Another service, Magicblock, enables the creation of ephemeral SVM rollups that can enable low-latency use cases such as gaming, while retaining composability with the base layer. It accomplishes this by turning a validator into a temporary sequencer, which reduces latency and consensus overhead.

In general, L2s on Solana currently serve a different role than those on Ethereum or Bitcoin as they are constrained to the boundaries of a single application. This minimizes the impact to user experience and liquidity fragmentation, in our view, and should be seen as a technological improvement rather than a central part of its network roadmap.

## The Broad Picture

L2s, and modular architecture more broadly, have been gaining increasing traction within crypto as both networks and applications are beginning to scale. The total value locked in smart contracts on L2 networks continues to grow as users feel more comfortable with their security tradeoffs - convincing them to bridge more assets over.

That doesn't mean a pure rollup-centric approach doesn't have its own tradeoffs or that integrated platforms will meet scaling dead-ends. Rather, we think L2s will materialize differently within different ecosystems as a result of their associated L1 roadmaps. On Ethereum and Bitcoin, this is primarily general executable blockspace due to scaling limitations on the L1, whereas on Solana it is primarily for customized application use cases.

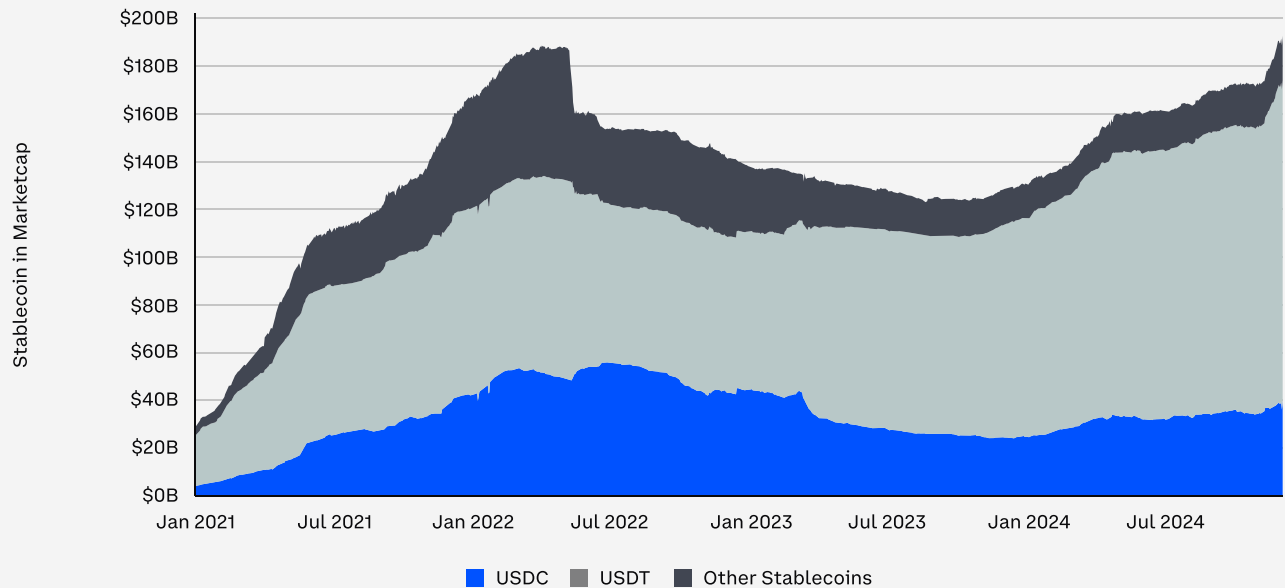
We do think that Ethereum will remain at the forefront of discussions around L2s as this scaling approach is deeply embedded into its long-term vision. On the other hand, Bitcoin may face challenges around common security and implementation standards for its L2s as they have fewer shared standards and less collaboration. Network extensions on Solana, meanwhile, are more of a technologically empowering infrastructure that is unlikely to impact the underlying asset or network under its existing roadmap.

# 6 Stablecoins

## Crypto's Killer App

Stablecoins have attracted significant attention during this crypto market cycle, with total supply in circulation reaching a new all-time high of \$193B on November 30, 2024. The 48% YTD increase partly reflects more funds being deployed into the crypto ecosystem, representing greater liquidity and trade facilitation. This is a major shift from 2023, when a rise in regulatory crackdowns in the crypto industry, the US regional banking crisis, and the high-yield environment in multiple places (including the US) drove the stablecoin market cap 5.5% lower. That said, the rise in stablecoin market capitalization has not kept pace with broader crypto performance and the massive growth of the asset class, thus bringing total stablecoin dominance down from 8.1% in January 2024 to 5.7% as of December 1.

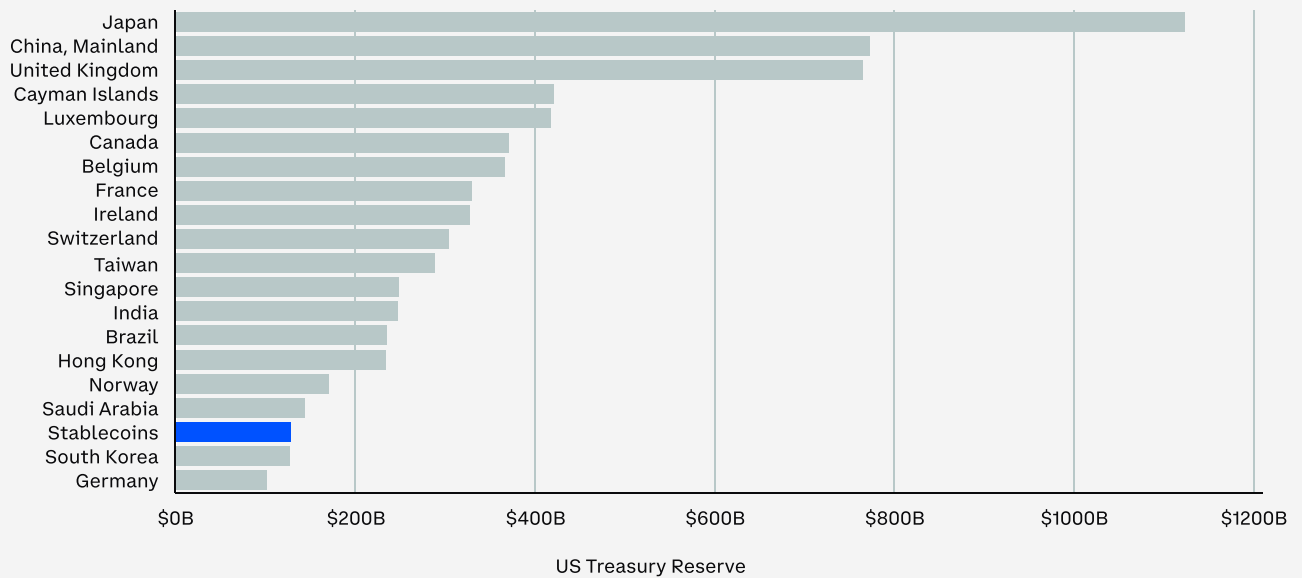
Chart 40. Total stablecoins market capitalization has increased 48% in 2024 YTD



Sources: DeFiLlama and Coinbase.

Nevertheless, we attribute the [surge in stablecoin interest](#) to a rapidly modernizing global payments infrastructure and the technological innovations offered by the programmability of these assets. The drive to modernize and improve the existing payments framework has caught the attention of key authorities in the US, including those on [Capitol Hill](#) and the [Federal Reserve](#), as well as international organizations like the [Bank for International Settlements](#) (BIS). Former House Speaker Paul Ryan argued in a [WSJ op-ed](#) that stablecoins may not only help preserve dollar dominance but also tackle the growing national debt problem. (A similar view is [shared](#) by former Comptroller of the Currency Brian Brooks, who also previously served as Chief Legal Officer for Coinbase.)

Chart 41. **Stablecoin issuers are collectively the 18th largest holder of US Treasuries**

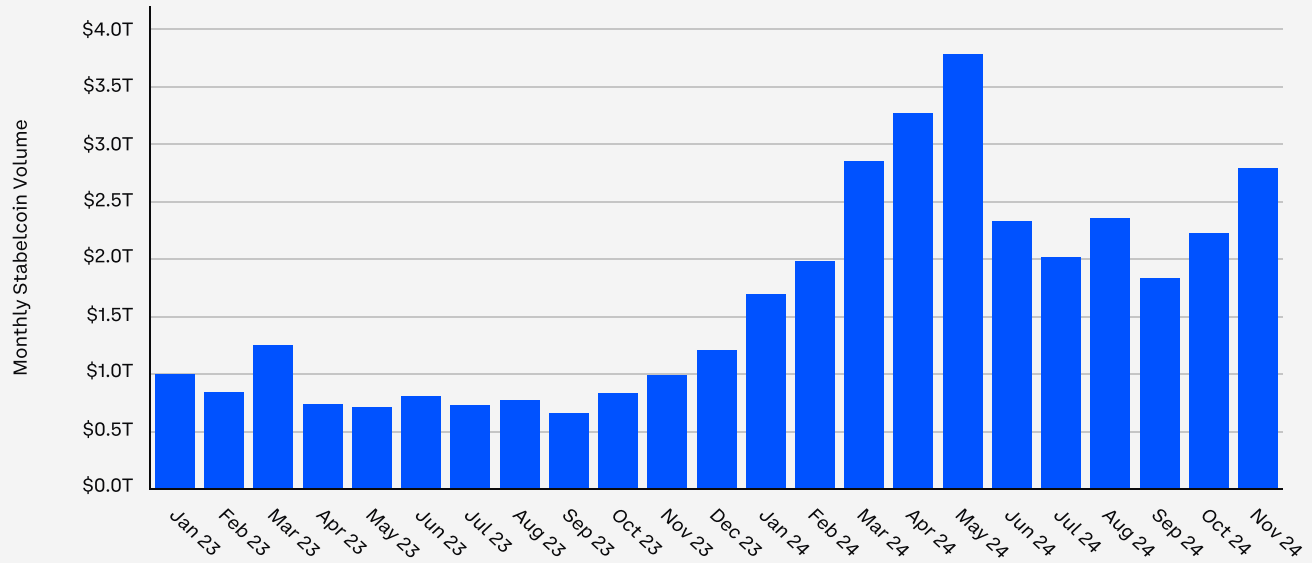


Sources: US Treasury, Tether, Circle and Coinbase.

Stablecoins are increasingly being used to construct robust payment systems on crypto rails, facilitating remittance payments and streamlining cross-border transactions. The stablecoin market has settled more than \$27.1T worth of transactions in the first 11 months of 2024, compared to \$9.3T over the same period in 2023, a nearly 3x increase. That’s consistent with the growth in overall spot activity on BTC and ETH on global centralized exchanges, which rose 2.5x from a daily average of \$16.7B in January 2024 to \$40.9B in November 2024. Even in adjusted terms (that exclude “inorganic” transactions like bots or automated transfers), [Visa’s digital assets team](#) reports that stablecoins settled US\$5.0T in 2024 YTD. Volumes on that adjusted basis are growing by around 50% YoY, which means stablecoins are quickly catching up to today’s largest incumbent payment networks.

<sup>2</sup> This includes USDC, USDP, USDT, DAI, and PYUSD based on Allium data.

Chart 42. Total monthly stablecoin volumes



Total volumes include USDC, USDP, USDT, DAI, and PYUSD.  
Sources: Allium and Coinbase.

# What Disruption Looks Like

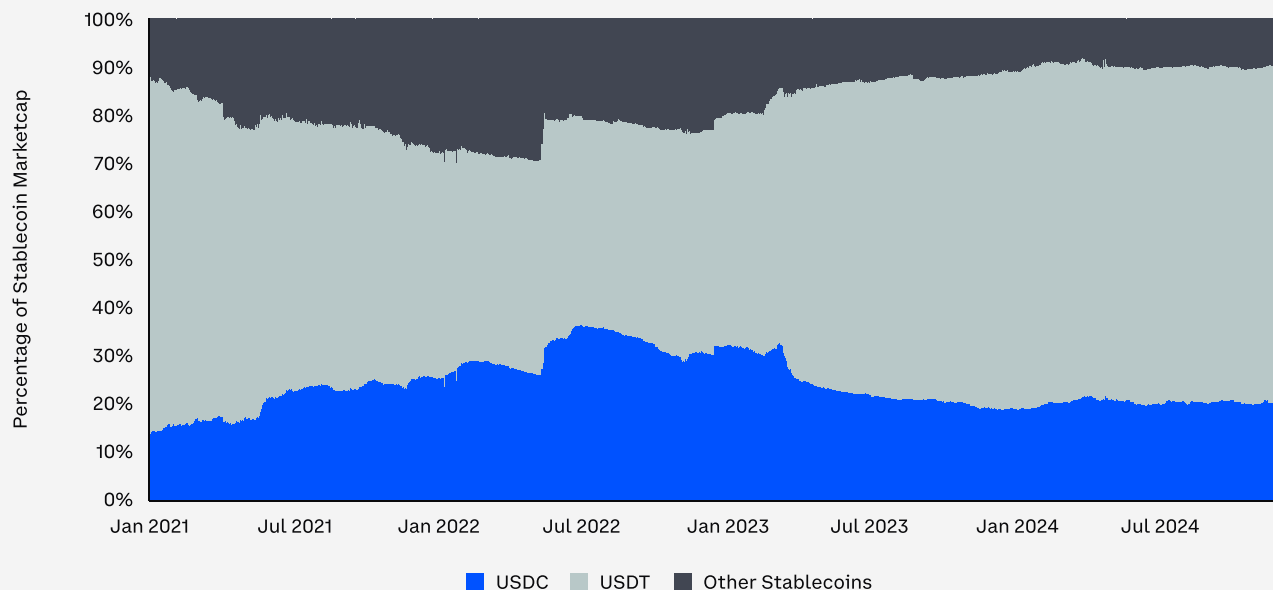
The market for stablecoins appears to be consolidating around one or two dominant issuers. However, several players in the traditional payments sector believe that the future could consist of a multitude of smaller, interoperable stablecoins that serve as the new architecture for money transfers more broadly. Thus, many incumbents in the existing payments landscape are working to embrace, or at least experiment, with stablecoins in their current workflows. Incumbents are divided across a diverse set of entities including automated clearing houses (e.g. banks), large credit card networks (e.g. Visa and Mastercard), and mobile payment systems (e.g. PayPal).

Although these incumbents enjoy some important advantages, such as liquidity and network effects, rising competition over the last 15 years has reduced the average cost of remittance payments by more than a third, according to [The World Bank](#). Nevertheless, sending \$200 overseas still costs an expensive 6.65% of the transfer amount, resulting in \$56 billion in fees annually. Comparatively, the average transaction cost of sending remittances using stablecoins is a far lower 0.25-2.00% of the transfer amount, with the potential to trend lower due to new innovations.



USDC (issued by Circle) and USDT (issued by Tether) remain the top two stablecoins by market cap at \$36B and \$134B, respectively – making up 90% of this sector. While those levels are 52% and 46% above where they started the year, neither USDC nor USDT has kept pace with the sharp rise in total value locked in DeFi protocols. The TVL across chains is currently 2.2x higher than on January 1, 2024, hinting at the vast opportunities still available in this space.

Chart 43. **Stablecoins by percentage of total supply**



Sources: DeFiLlama and Coinbase.

Ultimately, we think the market could potentially evolve towards having many interoperable stablecoins, much like how customers view dollars held at different commercial banks as interchangeable today. In a [paper](#) published in the *Harvard Business Review* (August 2024), Christian Catalini and Jane Wu argue that such an outcome could benefit consumers and businesses by facilitating lower-cost and faster payments, while simultaneously pushing leaders like Circle and Tether to differentiate themselves in a more crowded market.

For example, on [USDT redemptions](#) over \$100,000, Tether currently charges a fee of \$1,000 or 0.10%, whichever is greater (as well as a fee of 0.10% on USDT mints). Redemptions of USDC by Circle used to be free, but in 2024, Circle applied a [progressive fee structure](#) on standard (near-instant) redemptions starting at 0.03% on \$2M per day and going up to 0.10% for anything exceeding \$15M. (Basic USDC redemptions that settle in up to T+2 days are still free.) Facing a landscape with more diverse stablecoin options, it's possible that USDT and USDC may eventually need to adapt their offerings and improve the user experience to maintain their competitive edge against the distribution advantages of emerging players.

That said, the key for stablecoin issuers is integrating into the applications that rely on these payment networks – thus minimizing the frictions involved in the onramp and offramp processes. Because technology has made it easier for merchants and users to adopt new forms of payments, incumbents have become more vulnerable to fintech challengers. The integration of stablecoins into existing payment systems is one example of how crypto is increasingly being used in the real economy.

## Search For Synthetic Yield

Meanwhile, a number of alternatives to the fiat-backed stablecoin model are also being cultivated at the moment, driven primarily by user appetite for leverage and trading. In February 2024, Ethena Labs launched USDe, the first reward-accruing, onchain “synthetic dollar” protocol built on Ethereum. In basic terms, the concept behind Ethena is that it tokenizes the “cash and carry” trade between spot and perpetual futures (perps). Specifically, USDe pays earnings from the basis trade structure of long staked ETH (or the equivalent liquid staked tokens) and short ETH perps, which works as long as the combination of funding rates and staked ETH yield stays positive.

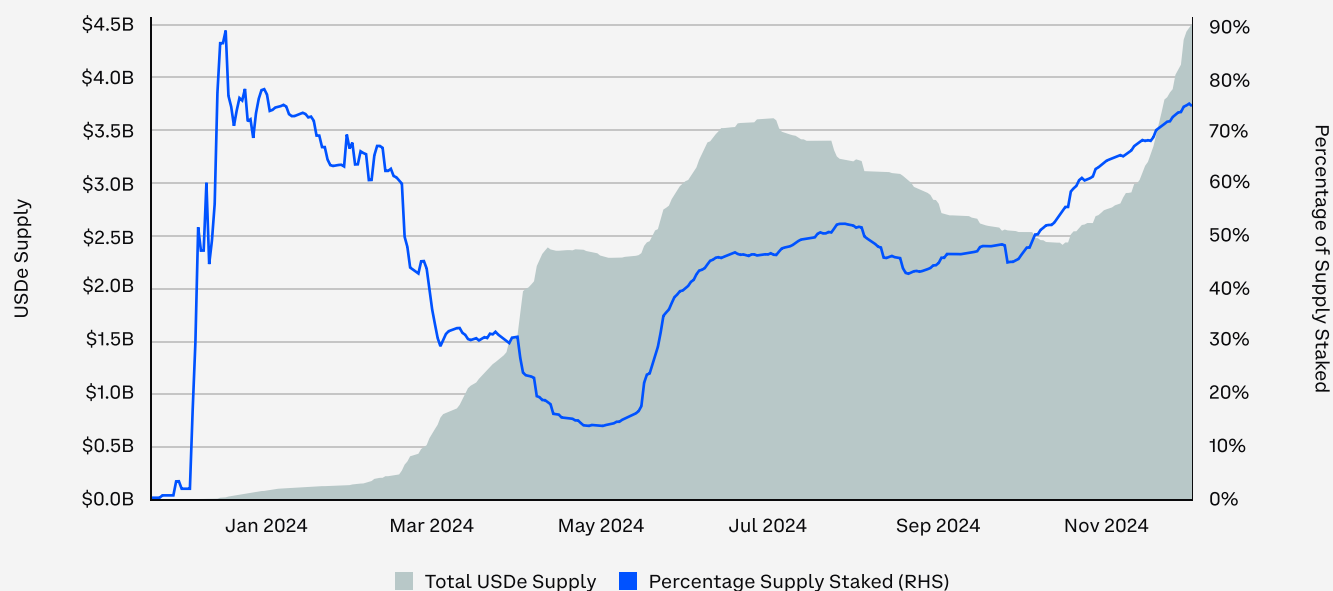
That is, USDe holders theoretically earn the (1) staking yield on the staked ETH plus the (2) funding rates received from being short perps. (Note that Ethena has [an insurance fund](#) to guard against negative funding rates.) Also, returns are earned only by the proportion of USDe that is staked (similar to sDAI on Gnosis), which enables USDe stakers to receive a higher annualized reward that is greater than the sum of the funding and staking yields.

In our view, Ethena’s earning mechanics are rooted in real value capture that justify the high rates it offers. Similar basis trades have long existed in traditional finance to take advantage of the gap between futures and spot markets. That said, the structure embedded in USDe is not risk-free, and Ethena has been transparent about that.

Separately, one concern we have for markets as a whole is that should this protocol grow substantially, it could cause a possible imbalance in favor of shorts in the perps market, thus having a disproportionate effect on funding rates. However, so far that hasn’t happened, particularly amid the current bull cycle. Funding rates drop when deposits grow significantly, since the funding market compresses as the number of short perp positions increases. This may pose a natural ceiling of sorts on the total value locked in the protocol – albeit this could fluctuate depending on the positioning of other perps-market participants.

Indeed, depending on that variability, annualized USDe staking returns may find themselves competing with similar deposit rates in mature lending protocols, which carry lower premiums because they ostensibly have fewer risk vectors, in our view. For example, deposit rates on stablecoins lent on Aave have climbed to a reasonably attractive 4.5%, and [Pendle](#) offers a compelling 9.0% for a 45-day lock-in period. More broadly, we believe that Ethena is reflective of the central role that real ETH yield will play in novel DeFi innovations this cycle.

Chart 44. Ethena's total USDe supply and staking ratio



Data spans 12 months up to December 1, 2024.  
Source: Dune (@hashed).

# Future Plans

The confluence of these developments sets the stage for the broader adoption of stablecoins in remittances, digital capital markets, and financial services for the unbanked or underbanked. With stablecoin growth potentially continuing at approximately \$500M per day (based on November’s trajectory), an expanding suite of sophisticated onchain products promises to enhance access to faster and cheaper forms of payment, driving significant capital inflows back into the crypto space. However, for stablecoins to fully realize their potential, it will be crucial to abstract away some of blockchain’s technical complexities and establish clearer regulations to ensure consumer protection and promote broader financial inclusion.

As we look ahead, the impact of potential Federal Reserve rate cuts on the profitability of stablecoins, particularly those holding substantial amounts of US Treasuries, and the implications for borrow/lend platforms like Aave, remain key considerations. While trading may remain a primary use case for stablecoins, projections indicate substantial growth and diversification of use cases in the near future. With initiatives like a [global stablecoin network](#) in the works, the landscape is poised for transformative change.

# 7 Tokenization

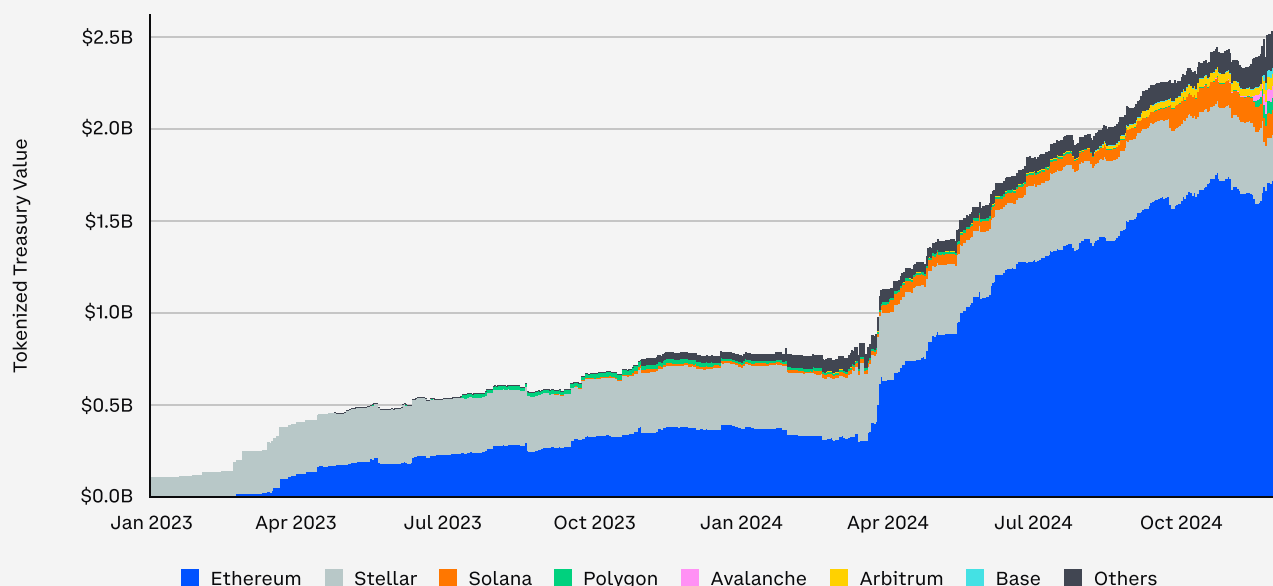
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The tokenization of real-world assets (RWAs) – that is, the creation of digital tokens representing ownership of traditional offchain assets such as real estate, art, equities, and bonds – remains a prominent theme in the digital asset space. Building on the significant traction gained in 2023, tokenization advanced meaningfully throughout 2024, driven by higher yields and evolving regulatory landscapes. In 2025, we anticipate the sector will mature further as institutional players refine their approaches and technological innovations address key pain points.

In the [2024 Crypto Market Outlook](#), we noted that the pace of tokenization around US Treasuries in particular was likely to accelerate as interest rates remained elevated and investors sought more onchain yield opportunities. Indeed, throughout 2024, onchain US Treasuries have grown more than threefold, from \$760M to \$2.6B as of December 1, 2024. This growth was driven primarily by three new tokenized treasury funds: USYC by Hashnote, BUIDL by BlackRock, and USDY from Ondo, which together account for more than half of all tokenized US Treasuries at \$1.5B in value. These have all launched on Ethereum, potentially reflecting the importance of security and decentralization over low fees for this sector.

That said, growth in these funds somewhat stalled following the first Fed rate cut in September 2024, though they have since resumed growing as medium- to long-term yields have begun to rise again. We think the start of the easing cycle could decrease the relative focus on tokenized US Treasuries in 2025, particularly as native forms of onchain stablecoin yields via lending are growing amid the bull market. Stablecoin lending rates, for example, have been above 10% for much of November 2024, nearly double the rate of long-term US Treasury yields.

Chart 45. Tokenized US Treasury growth has mostly taken place on Ethereum



Source: rwa.xyz.

The largest sector for onchain tokenization remains private credit, however, with more than \$9.5B onchain. This has been driven primarily by Figure, a home equity line of credit (HELOC) lender based in the US. Figure currently has more than \$8.8B of active loans, accounting for 92% of the total onchain private credit market. However, this loan tokenization is not done on more commonly used public blockchains. Instead, Figure leverages the Provenance Blockchain to connect buyers and sellers of private credit loans, and is separately building out a crypto exchange. In our view, Figure is a prime example of a traditional financial institution expanding into the tokenization realm, rather than a crypto-native firm venturing into the tokenization of TradFi assets. This is a trend we think will pick up as blockchain education continues to increase and more firms recognize the bottom line improvements to operational costs that this technology enables.

## Institutional Recognition

With household names like BlackRock and Franklin Templeton also embracing tokenization, we expect 2025 to sustain the growing focus on blockchain solutions for institutional use cases. Some of this will remain on permissioned chains with technology providers like Hyperledger, Consensus’ Quorum, Digital Asset’s Canton, and R3’s Corda catering to specific enterprise needs. However, we believe the future of tokenized assets remains on public chains as they benefit from shared onboarding, better transparency, improved liquidity, and atomic settlement.

From an institutional perspective, we see three major challenges to public blockchain usage for tokenization. First is the technological risk of smart contract exploits or private key leaks. The immutable and distributed nature of public chains means that no single jurisdiction can unilaterally revert that state of a ledger like Ethereum. Second are the custodial and infrastructure buildout risks. Many firms are ill-equipped to handle public and private keys for blockchains and the associated user-access management for onchain actions. (For example, different employees in different portions of the organization should have limited access to the corporate wallet.) Managing this onchain remains an unsolved problem. Third, and perhaps most important, is the need to comply with KYC and AML restrictions.

In a permissioned blockchain, all entities are verified during the onboarding process in order to meet compliance and regulatory requirements for financial counterparties. On a public chain, however, users across the globe can permissionlessly create a wallet. Without knowledge of whether a counterparty is on a sanctions list, for example, financial institutions would not be permitted to engage in dealings with them. Many tokenized US Treasuries on public chains currently meet compliance requirements by handling KYC offchain and whitelisting a select number of known wallets.

We think this wallet verification process will improve meaningfully in 2025 as onchain attestations gain traction. Verifications by Coinbase, for example, are now being [used](#) in RWA marketplaces on Base (in a partnership with Centrifuge and Morpho) to restrict users to those who have undergone KYC checks by Coinbase. In this scenario, Coinbase publicly attests that a wallet is owned by a Coinbase account holder in a given jurisdiction. In the long term, other protocols can also reuse these same attestations to build out programmatic token “whitelists” without requiring a separate KYC onboarding process.

Overall, we view 2025 as a pivotal year for tokenization growth. Improved tokenization technology, better compliance tooling, and potential advancements in the regulatory landscape will enhance the scalability and utility of tokenized RWAs. The institutional case for tokenization is also no longer speculative; the benefits of faster settlement, reduced transaction costs, and increased capital efficiency are abundantly clear. Although the broader market impacts may remain limited in the near term, we think the cumulative effects of sustained investment and technological refinement in 2025 may set the stage for tokenization to emerge as a cornerstone of the next crypto market cycle.

# 8 Regulation

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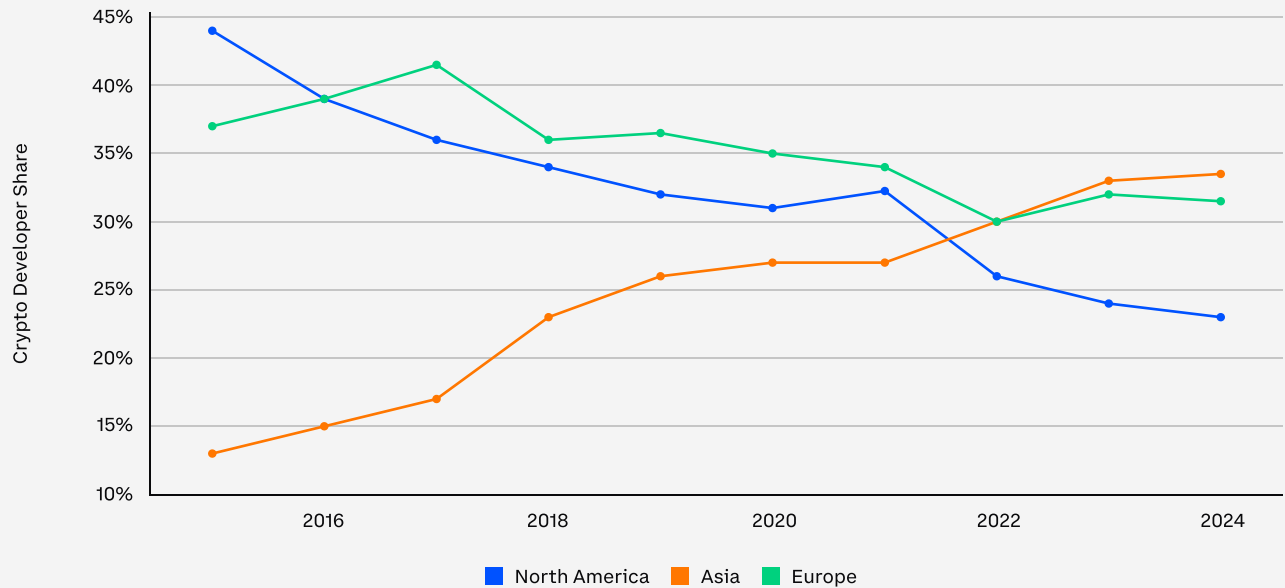
## A New Era For US Regulatory Clarity

The US policy outlook is poised for some significant developments in 2025. Mobilized crypto advocates in pivotal swing states highlighted the community's political clout during the 2024 US general elections, paving the way for greater regulatory clarity. For many years, the lack of clear regulations in the US has impeded both consumers and businesses, while repressing national competitiveness in the crypto space. But crypto's emergence as an electoral issue underscored the urgency for policymakers to align with the evolving demands of this influential voting bloc, potentially shaping the legislative and regulatory landscape in substantive ways.

The momentum for building a crypto policy framework will likely be shaped through a combination of executive and agency actions and new legislation, in our view. Notably, political momentum was building even ahead of the US elections. Bipartisan support for clear crypto policies was evidenced by the passage of the [Financial Innovation and Technology for the 21st Century Act \(FIT21\)](#) in the House of Representatives in May 2024. FIT21 passed by 279 to 136 votes, with 71 Democrats crossing party lines in support of this bill. This proposal provides an excellent template for both defining a token's digital commodity status as well as setting clearer guidelines for the jurisdictional separation of the Commodity Futures Trading Commission (CFTC) and the Securities and Exchange Commission (SEC).

Under a new administration, we think that the odds of achieving a new legislative milestone are strong, particularly since the elections propelled 278 pro-crypto candidates to the Lower House and 20 pro-crypto candidates to the Senate. Nine newly elected Senators received either an A or B rating on [Stand With Crypto](#), underscoring their alignment with crypto-friendly policies. Lawmakers have already introduced proposals such as the [Clarity for Payment Stablecoins Act of 2023](#) and the [Lummis-Gillibrand Responsible Financial Innovation Act](#), which could be a starting point for negotiations on a bill that reaches the finish line in the new session.

Chart 46. **Crypto developer share by continent**



Source: Electric Capital, October 31, 2024 (Geographic Data).

Changes in key regulatory positions, such as the Chair of the SEC, may also be closely watched by the crypto market as [Gary Gensler](#) will depart the agency on January 20, 2025. He could be replaced with [Paul Atkins](#), a familiar crypto advocate and former SEC commissioner. Of course, the authority of executive agencies was already affected by the US Supreme Court’s ruling on two cases that [overturned Chevron Deference](#) in late June 2024. This doctrine granted deference to an administrative agency’s interpretation of federal laws when those laws are ambiguous as written. Narrowing the scope of such deference could have significant implications for the crypto industry by compelling greater legislative precision and reducing regulatory volatility. The full impact will likely take time to be felt, however, as both courts and executive agencies are still in the process of adapting to the new legal landscape.



# Europe Enforces MiCA

In our view, Europe's policy outlook will continue to be defined by the comprehensive framework established by the Markets in Crypto-Assets (MiCA) regulation, previously created by the European Commission and [approved in 2023](#). MiCA's legal framework has put the European Union (EU) ahead of other regions, fostering the potential for greater innovation in the industry there. The regulation is being implemented in phases across the EU.

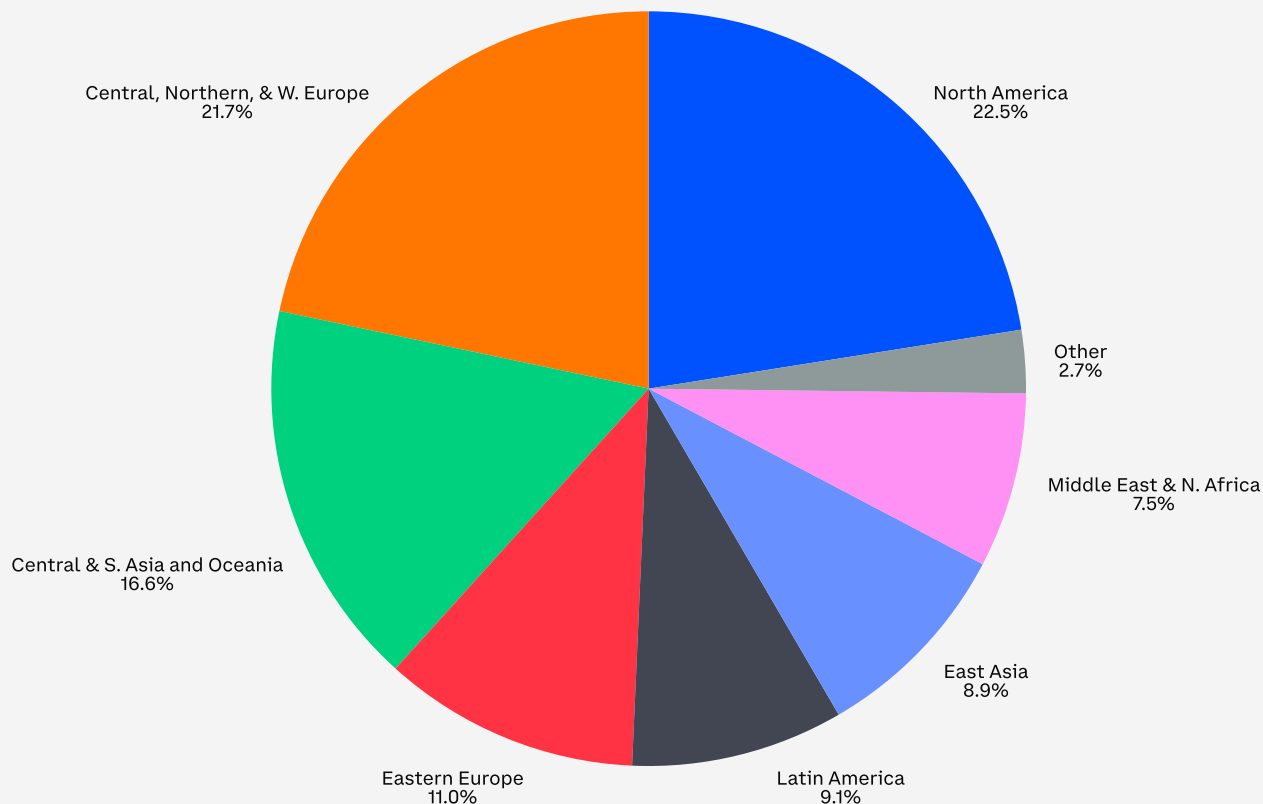
First, the rules governing stablecoins went into effect on June 30, 2024, creating provisions for issuers of these so-called electronic money tokens (e-money tokens or EMTs) that include guidance on reserve requirements (for fiat-backed stablecoins) and redemptions. Stablecoins deemed "significant" by the European Banking Authority face stricter requirements, based on meeting at least three criteria among many. Those may include market size, transaction volume, customer base, use on an international scale for payments and remittances, and interconnectedness with the financial system.

Second, the rules governing exchanges (trading platforms), brokers, custodians, and other crypto-asset service providers (CASPs) will go into effect on December 30, 2024. MiCA requires these firms to seek authorization from one of the member countries' financial regulators. In turn, firms that receive a MiCA license in one member state will gain access to the entire EU single market. Note that the European Securities and Markets Authority (ESMA) has been granted additional powers to take direct action against non-compliant CASPs. Rigorous standards on licensing, consumer protection, and operational safeguards will be enforced.

Third, CASPs may benefit from a transition period (maximum 18 months, lasting through mid-2026) in individual member states where the CASP is already registered and operating prior to the MiCA implementation date. Note that crypto lenders are a notable omission under MiCA that will be addressed by authorities later, possibly with future amendments.

Meanwhile, the United Kingdom has been taking a thoughtful and strategic approach to digital asset innovation, and under the new Labour government, which took power in July 2024, it could introduce an extensive, regulatory framework [in early 2025](#). Recall that under the Financial Services and Markets Act 2023 (FSMA 2023), the UK government and regulators have the power to develop more detailed rules for crypto. Authorities intend to establish rules for governing stablecoin activity as well as classify staking services under a potentially new regime, according to Economic Secretary to the Treasury Tulip Siddiq.

Chart 47. Cryptocurrency value received by region



Data from Jul 2023 to Jun 2024  
 Source: Chainalysis, 2024 Geography of Crypto report.

# The Race In The Middle East And North Africa

The United Arab Emirates (UAE) has been at the forefront of crypto regulations in the Middle East and North Africa (MENA), an area that [Chainalysis](#) ranked as the seventh-largest crypto market globally in 2024. The UAE’s position in the region has been growing ever since the Financial Services Regulatory Authority (FSRA) of the Abu Dhabi Global Markets (ADGM) became the first jurisdiction globally to introduce and implement a comprehensive regulatory framework in 2018. In Dubai, the [Virtual Assets Regulatory Authority](#) (VARA) was established in March 2022 as an independent regulator for virtual assets.

More recently, the Central Bank of UAE (CBUAE) established the Payment Token Services Regulation (PTSR) in July 2024 to regulate stablecoin issuers, otherwise known as “payment tokens” service providers. The transitional phase will last for 12 months through June 14, 2025, wherein stablecoin issuers incorporated in the UAE will need to comply with licensing and registration requirements to operate in the region, except in the ADGM and the Dubai International Financial Centre (DIFC). The UAE also [recently updated](#) its value-added tax (VAT) regulations in October 2024 to exempt all crypto-related transactions, retroactive to January 1, 2018.

Separately, VARA also updated its [marketing regulations](#) for virtual asset service providers (VASPs) in Dubai, introducing guidelines effective October 1, 2024. These updates include mandatory disclaimers, a prohibition on misleading information, and restrictions on offering incentives that could harm customers. This framework aims to balance marketing capabilities with robust consumer protection, ensuring transparent and ethical practices in the virtual asset space.

Elsewhere in MENA, Saudi Arabia has had a historically more conservative approach to crypto regulations, but the country’s growing interest in DeFi and other crypto activities is leading to greater efforts to lay a foundation here. For example, the Saudi Arabian Monetary Authority (SAMA) is already monitoring cryptocurrency transactions to maintain investor protection without stifling innovation, while a prominent Saudi cleric (Sheikh Abdul-Rahman bin Nasir al-Barrak) [issued a Fatwa](#) stating that bitcoin and crypto are Sharia-compliant.

More progress is being made in [Qatar](#), where the Qatar Financial Centre Authority (QFCA) and Qatar Financial Centre Regulatory Authority (QFCRA) together launched the QFC Digital Assets Framework 2024. This covers key areas such as the custody, transfer, and trading of cryptocurrencies as well as granting legal recognition to smart contracts that aligns with international standards.

## Regulatory Trends In Asia

Asia’s policy outlook for 2025 appears quite dynamic, with several countries actively shaping and refining their regulatory frameworks for digital assets. For example, Hong Kong has been reasserting itself as a global financial hub by introducing crypto legislation and issuing licenses for virtual asset trading platforms (VATPs). Licensed crypto-trading platforms have been allowed to serve retail and institutional investors since June 2023, although as of publication, there are only three fully licensed VATPs in operation. Another 16 exchanges are awaiting approval from the Securities and Futures Commission (SFC) on their VATP applications, [some of which](#) may come as early as end-2024. Many of those firms have been allowed to operate while awaiting SFC decisions.

Meanwhile, the Hong Kong Monetary Authority could soon release [draft legislation](#) on stablecoins before the end of 2024, focusing on the transparency of reserves for fiat-backed stablecoins and making sure that these assets do not introduce any risks to the financial system. The HKMA is also conducting the second phase of its e-HKD pilot program with around 20 firms to explore the potential use cases for a central bank digital currency (CBDC). Lastly, the government could [exempt certain investors](#) – such as private equity funds, hedge funds, and family offices – from paying taxes on cryptocurrencies, in their goal to attract more offshore investment. A proposal is currently undergoing a six-week consultation.

Singapore's crypto landscape is governed by the Payment Services Act (PSA) of 2019, exemplifying the region's proactive stance to the asset class. This framework is overseen by the Monetary Authority of Singapore (MAS) and ensures that crypto service providers must (1) receive the requisite licenses and (2) adhere to stringent operational standards that safeguard consumer interests and market integrity. In 2024, the MAS [expanded the scope](#) of the PSA to cover crypto custody and crypto brokerage for Digital Payment Token (DPT) service providers including stablecoin issuers. Looking ahead, we could see authorities take additional measures on [market integrity](#) in 2025 and expand on their existing financial infrastructure initiatives such as Project Guardian and Project Mandala. There may also be a consultation on a MAS-regulated stablecoin regime under the PSA.

In Japan, crypto became a politically catalyzing issue during the October 2024 general elections, as several opposition parties' campaigns [highlighted](#) the importance of crypto regulations. For example, Japan's second largest party, the Constitutional Democratic Party of Japan, had an [agenda](#) that included crypto tax reform and granting decentralized autonomous organizations (DAOs) legal status. Additionally, the new Japanese Prime Minister [Shigeru Ishiba](#) of the ruling Liberal Democratic Party (LDP) is a crypto advocate, interested in the growing significance of digital assets in Japan's industrial strategy. The country's Financial Services Agency (FSA) [plans to assess](#) its current crypto regulations under the [Payment Services Act](#), potentially reclassifying digital assets as financial instruments under the [Financial Instruments and Exchange Act](#). This would potentially lower taxes on digital assets from 55% to 20% and enable the introduction of domestic crypto ETFs.

Elsewhere, India concluded its G20 Presidency at the end of November 2023, but anticipated progress toward a crypto regulatory framework from its Ministry of Finance has been [delayed](#). Prime Minister Narendra Modi's government will present its initial budget in February 2025, followed by a formal budget in June. These will be critical opportunities to revisit crypto-taxation policies, in our view. Meanwhile, the Financial Intelligence Unit (FIU), which oversees exchange AML registrations under the Prevention of Money Laundering Act (PMLA) of 2002, is pushing for public-private collaborations to combat fraud and illicit activities. In response, the Bharat Web3 Association has established an alliance among member firms to work with the FIU and other authorities. We expect continued focus on crypto regulations in India throughout 2025.

Finally, Thailand's SEC has been a pioneer in establishing digital asset regulations since an emergency decree in 2018, continuously refining rules to strengthen market integrity and incentivize legitimate activities. The Thai SEC has actively blocked unauthorized market participants and recently proposed rules that could allow institutional players like mutual and private funds to invest in crypto products like US-based spot ETFs. Such developments align with efforts in other Southeast Asian (SEA) markets, including the Philippines and Malaysia, where regulators are taking initiatives to integrate crypto assets into their financial systems while ensuring robust consumer protection.

## Australia's Evolving Regulation

Around 20-25% of all Australians hold crypto, giving it one of the highest crypto adoption rates in the world. This is putting pressure on the Australia government to turn their proposed framework to regulate digital asset platforms into law. In this regulatory vacuum, the Australian Securities and Investments Commission (ASIC) has stated that they believe that many crypto assets and related services are financial in nature, which has culminated in a consultation released on December 4, 2024.

ASIC's consultation asks for industry input on updated guidance that would bring a wide variety of crypto assets and services (including stablecoins, wrapped or bridged tokens, staking, and wallets) into ASIC's regulatory perimeter. If adopted as is, there are questions regarding the feasibility of implementation and what it would mean for the Australian crypto ecosystem more broadly.

We also expect more crypto legislative reforms from the Australian Government in 2025, including legislation for stablecoins and staking that may clear up some of the questions posed in ASIC's consultation.

## Latin America's Varied Approaches

According to [Chainalysis](#), Latin America hosts four of the top 20 countries for crypto adoption, reaching a total of [55M crypto users](#) to date. Several of these countries have made significant progress in establishing crypto regulatory frameworks, but a unified regional approach, such as MiCA in Europe, has not been put into practice. For example, Argentina appointed the National Securities Commission (CNV) as crypto's regulatory authority in March 2024 to enhance oversight and support growth in the crypto sector. The CNV has drafted rules to govern VASPs, which are currently under public consultation.

Brazil, the region's largest economy, is also pushing ahead to establish rules for the asset class. Its central bank, Banco Central do Brasil (BCB), recently opened a public consultation on initial regulations to govern VASPs, with submissions set to close on February 7, 2025. Currently, while VASPs need to receive authorization from the BCB to operate in the country, the specific process for obtaining that authorization has [not yet been defined](#). [Mexico](#), the second-largest regional economy, recognizes cryptocurrencies as "virtual assets" under the Law to Regulate Financial Technology Institutions, overseen by its central bank, Banco de Mexico (Banxico). Crypto can be traded as there is no explicit prohibition on transacting with virtual assets.

Finally, Uruguay passed a law in [October 2024](#) that empowers the Banco Central del Uruguay to regulate crypto, including overseeing VASPs and granting them permits. The framework also tasks the Superintendencia de Servicios Financieros (SSF), the agency responsible for supervising the financial system, with identifying the trading platforms, miners, and other entities that might qualify as VASPs.

# 9 Coinbase Institutional Update

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## 2024 In Review

In 2024, Coinbase made impressive strides across several dimensions to advance the cryptocurrency ecosystem and expand its offerings. Specifically, we've taken significant steps in enhancing wallets and facilitating onchain payments, marking a transformative phase in our journey. The introduction of the [new Coinbase Wallet web app](#), coupled with the ambitious goal of evolving wallets, underscores the focus on providing secure, efficient, and user-friendly tools for managing cryptocurrencies. The development of [smart wallet technologies](#) further enhances the user experience by integrating advanced features that cater to both novice and seasoned crypto users.

Meanwhile, onchain payments received a considerable boost with strategic moves, such as the acquisition of the specialized [Utopia Labs team](#) to accelerate these solutions and the integration of Bitcoin's Lightning Network through a collaboration with [Lightspark](#). These initiatives are complemented by influential partnerships with global companies like [Stripe](#), [PayPal](#), [EY](#), and [Google Cloud](#), which leverage Coinbase's robust B2B payment systems to streamline and expand the global adoption of cryptocurrencies for various payment needs.

A key focus area has been bolstering our infrastructure with significant investments in platform and engineering enhancements. A noteworthy initiative is the establishment of a new [Engineering Hub in Singapore](#), which underscores Coinbase's commitment to fostering regional developer ecosystems. Additionally, the rollout of advanced SDKs, including the Coinbase [Advanced TypeScript SDK](#) and the [Coinbase Prime and International Exchange \(INTX\) Java SDKs](#), speaks volumes about the company's efforts to empower developers with robust tools. Leveraging [machine learning](#) to predict traffic and efficiently scale databases is yet another testament to Coinbase's dedication to technological excellence.

[Coinbase International Exchange](#), launched in May 2023, has continued to exemplify our commitment to expanding sophisticated trading opportunities for institutional clients in eligible non-US jurisdictions. Offering access to over 100 perpetual futures, spot, and pre-launch markets, this platform enables versatile trading strategies with reduced friction and leverage. Recent enhancements include the addition of USDC rewards, portfolio margin, and margin loans, which significantly improve asset management and capital efficiency for institutional clients. Furthermore, the introduction of robust security measures, such as address whitelisting, ensures that cryptocurrency withdrawals are limited to pre-approved addresses, enhancing the overall security framework.

Finally, Coinbase has substantially expanded its derivatives offerings, introducing futures contracts for commodities like [oil and gold](#), in addition to futures contracts for digital assets including, but not limited to, [BCH, LTC, AVAX, DOT, LNK, SHB and XLM](#). Alongside these developments, the launch of [Coinbase Wrapped BTC \(cbBTC\)](#) has further positioned Coinbase at the forefront of cross-asset integration, enabling users to utilize bitcoin within Ethereum's DeFi space.

Chart 48. Trading volumes on platform

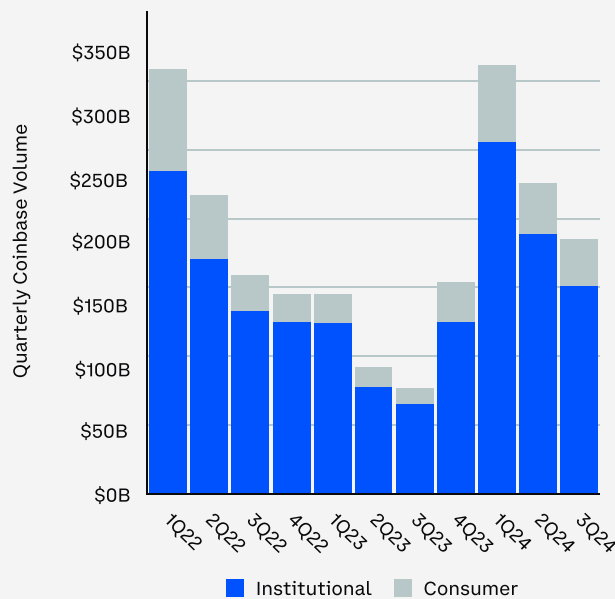
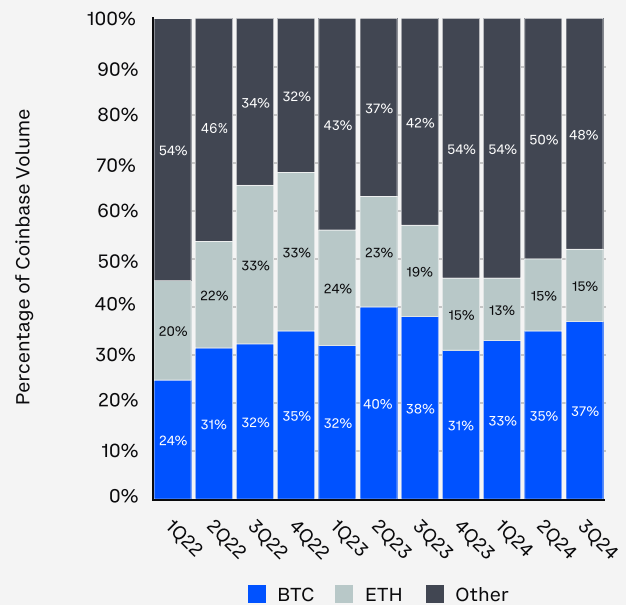


Chart 49. Trading volumes by asset



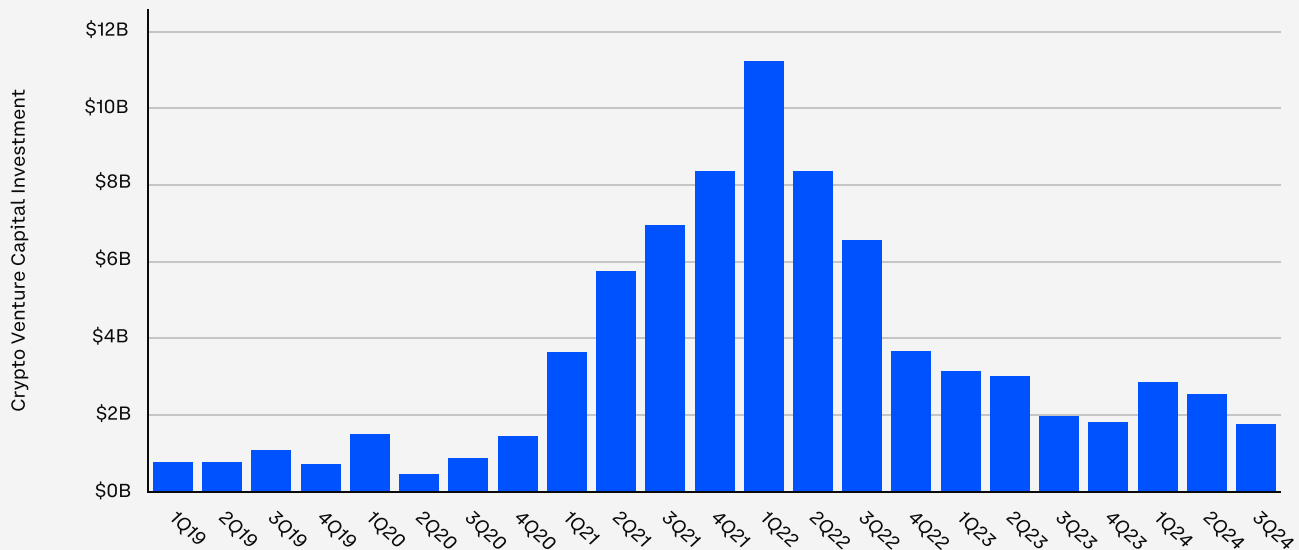
Source: Coinbase.



# Venture Capital

Crypto venture capital (VC) deals totaled \$7.1B globally in the first three quarters of 2024, according to [PitchBook data](#), below the \$8.1B in the same period in 2023. VC activity has failed to keep pace with performance in the broader crypto space in part because developments like the approval of US spot BTC and ETH ETFs have primarily benefitted the secondary market. Moreover, the development of frontier technologies such as generative artificial intelligence has presented crypto with new competition for potentially limited pools of capital and talent. However, we could see a positive correlation between crypto VC dealmaking and liquid token performance in 4Q24 driven by optimism over the US regulatory environment. That could augur well for 2024's ultimate chances of exceeding the previous year's \$9.9B total.

Chart 50. **Global crypto VC investment (US\$ B)**



Source: PitchBook.

One of the ways that Coinbase directly supports the crypto economy is through its investment arm, Coinbase Ventures. Coinbase Ventures – launched in 2018 – invests in exceptional founders who share Coinbase's mission of creating more economic freedom for the world. In 2024, Coinbase Ventures has strategically directed its investments across multiple sectors, particularly projects that solve critical infrastructure challenges and improve user experiences within the cryptocurrency ecosystem. Key themes include stablecoin payments, DePIN, DeFi onchain consumer applications, and the convergence of crypto and AI. Additionally, they are supporting the development of tooling and enabling infrastructure that make it easier for developers to build and deploy applications leveraging these advancements. Some specific areas they're focusing on include:

## Smart Wallets

[Smart wallets](#), or smart accounts, represent a significant evolution in how users interact with the cryptocurrency world, representing a major transition from self-custodial wallets, where users manage their own keys. These contracts automatically execute transactions on a blockchain, making smart wallets more versatile and user-friendly than traditional ones. Key features include sponsored gas, where a third party covers transaction fees, and one-click transactions that bundle complex tasks into a single action, simplifying their use for newcomers. This combination of flexibility, security, and ease of use could significantly streamline and personalize crypto management.

## L3 Future

In terms of scaling, L2 and L3 solutions are gaining momentum as key components for handling more transactions at lower costs, essentially functioning as "hubs" and "servers" in the blockchain ecosystem. [L3s](#), application-specific blockchains built atop layer-2s (L2s), provide developers with a customizable and isolated environment to deploy their applications. These solutions promise significantly lower costs due to alternative data-availability methods and enhanced customizability, while also tapping into the liquidity and user base of underlying L2s. The potential for millions of L3s, each tailored to specific use cases, paints a future of a vibrant and diverse blockchain ecosystem.

## Convergence of Crypto and AI

The convergence of [cryptocurrency and AI](#) presents a transformative opportunity with respect to the emergence of an "Agentic Web" where AI agents interact and transact autonomously on cryptocurrency infrastructure. Experts predict that crypto will become the preferred payment rail for this AI-driven economy due to its efficiency, borderless nature, and programmability. Crypto transactions are generally faster and cheaper, making them ideal for high-volume microtransactions. Although not all AI development requires blockchain, Coinbase Ventures sees strategic value in leveraging crypto for distribution, verifiability, and censorship-resistance of AI resources. They actively invest in the middleware and application layers of the Crypto x AI stack, including decentralized training solutions, privacy-preserving techniques, AI-powered wallets, and natural-language interfaces.

## Other Themes

Finally, Coinbase Ventures is investing in robust bridging solutions that facilitate smooth asset transfers and data flow between different blockchain networks, ensuring seamless access to various crypto services and applications across different networks. This focus on interoperability is complemented by their belief in the transformative potential of zero-knowledge proofs ([ZKPs](#)). ZKPs represent a fundamental shift in building secure, private, and scalable applications, crucial for driving mainstream crypto adoption. Their investment strategy covers all layers of the ZKP stack, from foundational infrastructure to innovative applications, actively seeking partnerships with teams that are pushing the boundaries of ZKP technology.

## Base

Base is a secure, low-cost, builder-friendly Ethereum L2 designed to help bring a billion users and a million developers onchain with an ecosystem of onchain applications. Base has typical transaction costs of less than 1 cent (USD) and speeds of just a few seconds, plus a 24/7 global payment rail, which makes onchain technology more accessible to anyone.

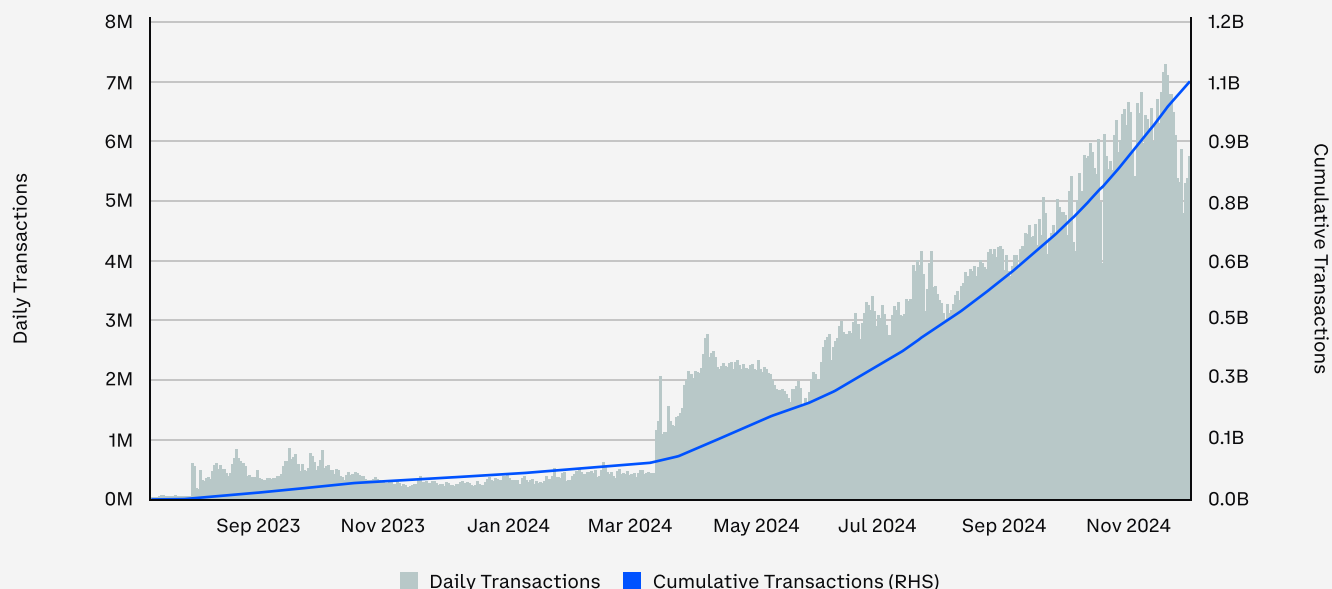
Base is open, permissionless, and built on the OP Stack, in collaboration with the Optimism Collective, as part of the broader vision for creating a standard, modular, rollup-agnostic [Superchain](#). Chains that are part of the Superchain will allow builders and users to transact and move across chains easily and affordably, creating a consistent user experience and laying the groundwork for teams everywhere to build a decentralized future.

Base has committed to sharing a percentage of the Base sequencer revenue with the Optimism Collective. This amount is contributed onchain, split from sequencer revenues, and routed to the Optimism Collective to be allocated towards Retroactive Public Goods Funding (RetroPGF) or other ecosystem projects.

Base experienced remarkable growth in 2024, becoming the second largest Ethereum L2 by total value locked with \$11.9B, up from \$750M at the start of the year – an increase of nearly 16x, according to [L2Beat](#). That represents around 23% of the cumulative TVL sitting on Ethereum L2s as of November 30, 2024.

The growth is consistent with a corresponding spike in daily transactions on Base by more than 15x in 2024, reaching an average of 6.2M in November, according to Dune data. Part of that increase had to do with Ethereum's Dencun Fork (EIP-4844) which drove a massive 100x reduction in fees on the L2 to a [total cost](#) of  $\text{€}0.000001$  per transaction. This has driven a substantial increase in trading activity on the network. The daily trading volume on decentralized exchanges on Base recently registered new highs of \$1.5B in November 2024 (averaged across the month), up from \$30M in January 2024.

Chart 51. **Daily transactions on Base**



Source: Dune (@tk-research).

In terms of the latest developments, [fault proofs](#) are now live on Base Mainnet, marking a significant step towards Stage 1 decentralization by allowing anyone to propose and challenge claims about the blockchain’s state, thereby reducing reliance on a central authority. To further this progress, Base will soon expand the approval process for smart contract upgrades to a decentralized "security council," with full decentralization aimed for 2025. Additionally, Base has partnered with Hexagate to offer free [smart contract monitoring](#) and analytics, enhancing onchain security and transparency. Builders on Base can access Hexagate's Ecosystem Tier for real-time, ML-based threat monitoring. This initiative underscores Base’s commitment to fostering a secure and decentralized environment for developers.

Looking ahead, Base is committed to its [ambitious goal](#) of scaling its infrastructure to achieve a 1 giga gas per second (Ggas/s) capacity for the network, which means increasing the gas target by 1 Mgas/s each week. Separately, the Base core team has been actively working towards preparing PeerDAS (Peer Data Availability Sampling – see Ethereum section above) for inclusion in the Pectra upgrade, thereby increasing the total blob capacity without requiring every node to download every blob.

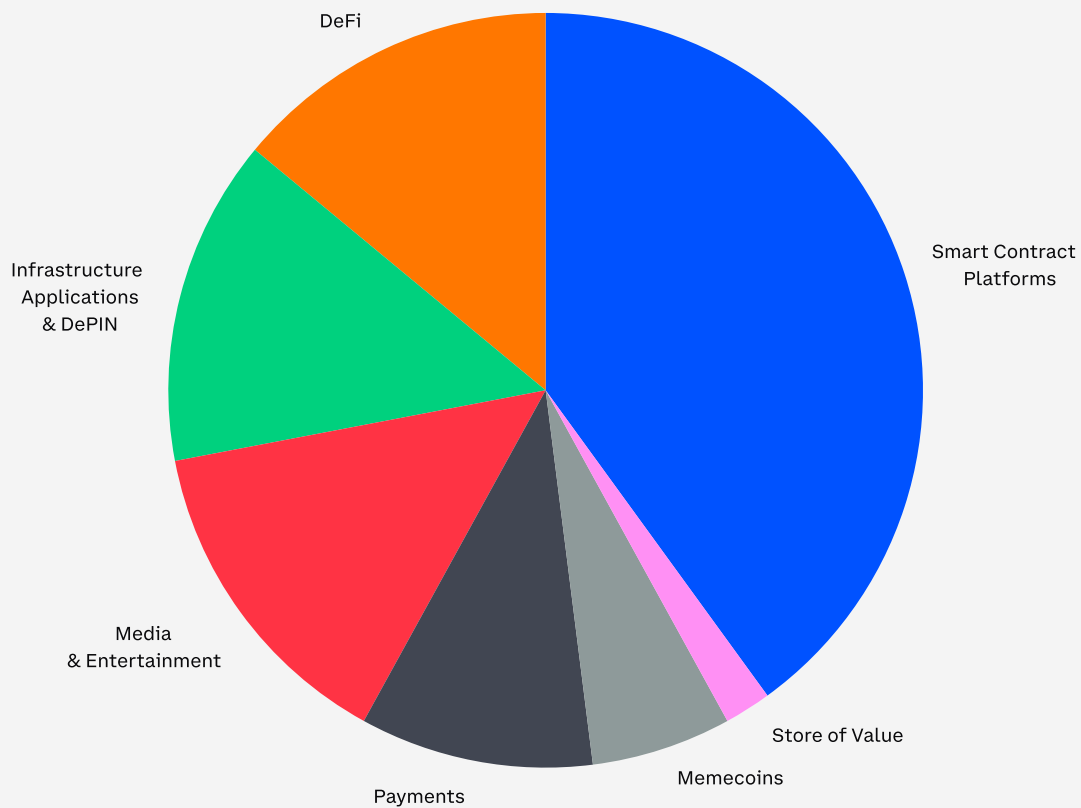
# COIN50 Index

The Coinbase 50 Index ([COIN50](#)) is a market cap-weighted index of the top 50 assets that meet the index's filters, launched on November 12, 2024. It is intended to be the broadest crypto benchmark and the market standard, taking the thousands of tokens that make up the crypto universe and narrowing the eligible assets based on fundamental filters. A key constraint is that the largest asset is capped at 50%. Three categories of fundamental screening are applied to Coinbase Indexes:

- **Token Economics:** This refers to the economic design structure of the token. Assets pegged to other digital assets, a fiat currency, a group of those currencies, or any hard asset are disallowed. Assets must also have most of their token supply in public circulation.
- **Blockchain Architecture:** This refers to the inherent design of the blockchain, where applicable. Critical features that categorize a network as a public blockchain must be adhered to – transparency, immutability, cryptographic algorithms, permissionless consensus, pseudonymity, and peer-to-peer networks.
- **Security:** Only digital assets with no known security vulnerabilities, including critical bugs, undue exposure to 51% attacks where applicable, or other factors, are allowed. Assets must also fulfill the availability of custodians approved by Coinbase.

Investors shouldn't underestimate the significance of how the Coinbase 50 has been constructed. Existing indices in this space have tended to be heavily concentrated in crypto infrastructure (e.g. overexposure to layer-1 or smart contract platform tokens). By comparison, the Coinbase 50 is the first index that truly covers all the main sectors in the space. In that way, the Coinbase 50 Index is aspirational, as was the start of the S&P 90 Index in 1923 – before it grew into the S&P 500 in 1957, becoming the global bellwether. The capitalization of the index, at 80% of the crypto market total, is similar to the share of the S&P 500 Index relative to the overall US market. Moreover, one of the key benefits of the COIN50 is that it now enables us to more accurately calculate the beta for crypto assets, given that we have a more representative market side of the beta coefficient.

Chart 52. The Coinbase 50 constituents by category



Last index rebalance as of November 30, 2024.  
Sources: MarketVector Indexes.

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