Messari

Crypto Theses

All The Trends You Need to Know for 2025

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Introduction

Welcome to the 2025 edition of The Theses!

2024 was a year of transformation and resilience for the crypto industry. After navigating the turbulence of the previous cycle, the sector demonstrated significant strides in rebuilding trust, fostering innovation, and maturing as a financial and technological ecosystem.

- We saw the long-awaited ETFs come to fruition, legitimizing the asset class, and finally bringing in the institutions. They are here, for real.
- 2024 will go down in history as the defining year for the evolution of crypto policy. At the very least, a friendlier US regulatory environment should remove a lot of risk for allocators who were debating gaining exposure to the space.
- The election was the catalyst that finally propelled BTC across the $100,000 mark.
- Solana crossed the chasm and morphed what was once a two-horse race between Bitcoin and Ethereum into a trifecta – all while Ethereum faced an identity crisis.
- The year brought plenty of evidence that crypto has onboarded new users – examples include the success of Polymarket, Telegram mini-apps, and Hyperliquid.
- Memecoins often dominated the narrative and further helped bring in new users. But outside of speculation, DePIN also had a breakout year. The sector more than doubled its market cap and showed real-world usage among businesses and consumers.

Messari research kept you on the cutting edge of crypto this year. We continued to put Wall

Street to shame with our Coinbase earnings previews. Our 2023 early Solana call was vindicated, and we covered its surge in activity throughout the year. In 2022, we put DePIN on the map (we even invented the term). This year, we covered the sector extensively against the backdrop of its breakout year. We were also ahead of the curve on a number of new protocols and narratives – including Glow, Hyperliquid, Aerodrome, and Bittensor. At the same time, we kept you on your toes on the emerging memecoin narrative, exploring how it could be a legitimate onboarding mechanism. Finally, we brought you ongoing coverage of the developments in AI x Crypto, another area that we were early to cover last year.

There are two main sections to the 2025 Theses. We are starting with "The State of Crypto", which includes shorter essays on the crypto meta in 2024. In the "Sector Theses" we go over the narratives and forward-looking theses for major sectors. We finish off with your favored Messari analyst picks, and – new this year – the Messari Awards. Enjoy!

This is a free report that we are releasing early to Messari subscribers. If you get value out of The Theses, consider a Messari subscription (discount code), or Protocol Services for your community. And give Kinji, Dylan, Sunny, Chris, Andrew, and Matt a follow on Twitter!

Last but not least, none of this is financial advice. Please refer to the disclaimer at the end of the report for more information.

Merry Christmas!

Maartje Bus, VP of Research

Messari

Crypto Theses 2025

State of Crypto

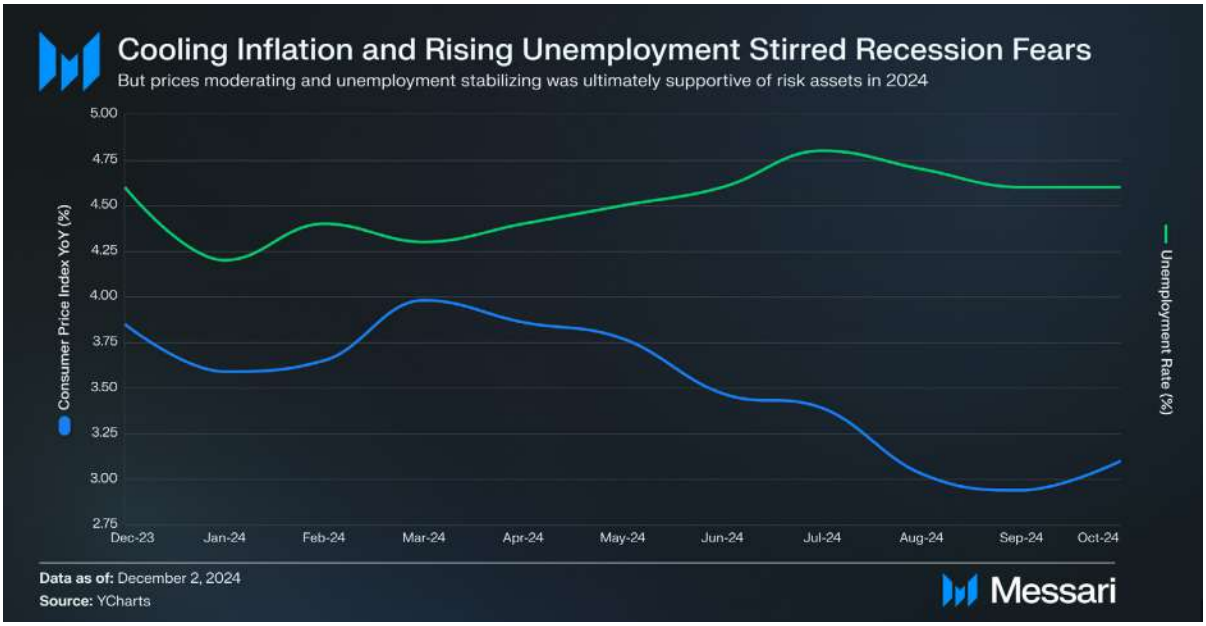
State of Crypto

Macro

Author: Andrew Dyer

Legacy Markets

If there ever were a year to embody “climbing a wall of worry,” 2024 might be it. After surviving the onslaught of inflation in 2022 and 2023, investors were still glancing over their shoulders in fear of its return. When it became more clear that inflation had moderated, the focus shifted to a weakening labor market, begging the question: did the Fed overtighten or wait too long?



The uptick in the unemployment rate triggered a lot of discussion about the Sahm Rule, an economic indicator used to signal the early stages of recession. The rule states that a recession is likely to start when the three-month moving average of the unemployment rate (UR) rises 0.5% or more above its low of the past twelve months. Luckily for the fate of the US economy, the creator of the signal, Claudia Sahm, noted that the UR increase was tied to an uptick in labor force participation driven by immigration. She thought that the Fed had plenty of room to cut interest rates and that the US consumer (and economy more broadly) was fairly resilient, likely making the signal void this time around. The Fed followed through with its first 50 bps cut in September of this year, followed by a 25 bps cut in November.

Global growth has been positive despite higher rates

Countries and Indicators

COUNTRY NAME	GDP (USD)	REAL GDP YOY	REAL GDP QOQ	INTEREST RATE	INFLATION RATE	UNEMPLOYMENT RATE
United States	27.36T	2.70%	0.70%	4.75%	2.60%	4.10%
China	17.79T	4.60%	0.90%	3.10%	0.30%	5.00%
Eurozone	15.54T	0.90%	0.40%	3.65%	2.00%	6.30%
Germany	4.456T	-0.30%	0.10%	3.65%	2.20%	3.40%
Japan	4.213T	0.30%	0.20%	0.25%	2.30%	2.50%
United Kingdom	3.34T	0.70%	0.50%	4.75%	2.30%	4.30%
France	3.031T	1.30%	0.40%	3.65%	1.60%	7.60%
Italy	2.255T	0.40%	0.00%	3.65%	1.00%	5.80%
Canada	2.14T	1.49%	0.26%	3.75%	2.02%	6.50%
Spain	1.581T	3.40%	0.80%	3.65%	1.80%	11.20%

Source YCharts

With the backdrop of a strong consumer and a Fed that is undoing the tightening of the past two years, the economy has largely stayed strong despite investor fear of a looming recession. The US in particular has seen fairly robust growth after the first quarter of this year, and now China is catching up as its government looks to stimulate the economy with higher deficits.

Risk assets have broadly performed well, now led by Chinese Equities

2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	Annualised
Japan equities 9.9%	High yield 14.3%	China equities 54.3%	Cash 1.9%	U.S. equities 31.6%	China equities 29.7%	Commodities 38.5%	Commodities 22%	U.S. equities 27.1%	China equities 29.6%	U.S. equities 13.3%
U.S. equities 1.3%	Infrastructure 12.4%	EM equities 37.8%	DM gov. debt -0.4%	Infrastructure 27%	U.S. equities 21.4%	REITs 32.5%	Cash 1.3%	Japan equities 20.8%	U.S. equities 21.7%	Japan equities 6.8%
Emerging debt 1.2%	U.S. equities 11.6%	Europe equities 26.2%	IG credit -3.5%	Europe equities 24.6%	EM equities 18.7%	U.S. equities 27%	Infrastructure -0.2%	Europe equities 20.7%	Infrastructure 18%	Infrastructure 6.3%
REITs 0.6%	EM equities 11.6%	Japan equities 24.4%	High yield -4.1%	REITs 24.5%	Japan equities 14.9%	Europe equities 17%	High yield -12.7%	High yield 14%	EM equities 17.2%	Europe equities 6.2%
Cash 0.1%	Emerging debt 10.2%	U.S. equities 21.9%	U.S. equities -4.5%	China equities 23.7%	IG credit 10.1%	Infrastructure 11.9%	Europe equities -14.5%	REITs 11.5%	REITs 13.9%	REITs 6%
Europe equities -2.3%	Commodities 9.7%	Infrastructure 20.1%	Emerging debt -4.6%	Japan equities 20.1%	DM gov. debt 9.5%	Japan equities 2%	IG credit -16.1%	Emerging debt 10.5%	Europe equities 13.4%	EM equities 4.4%
High yield -2.7%	REITs 6.9%	High yield 10.4%	REITs -4.8%	EM equities 18.9%	High yield 7%	High yield 1%	Japan equities -16.3%	EM equities 10.3%	Japan equities 12.7%	High yield 4.3%
DM gov. debt -3.3%	IG credit 6%	Emerging debt 9.3%	Infrastructure -9.5%	Emerging debt 14.4%	Europe equities 5.9%	Cash 0%	Emerging debt -16.5%	IG credit 10.2%	Commodities 12.4%	China equities 3.6%
IG credit -3.8%	Japan equities 2.7%	IG credit 9.3%	Commodities -10.7%	High yield 12.6%	Emerging debt 5.9%	Emerging debt -1.5%	DM gov. debt -17.5%	Infrastructure 6.8%	High yield 9.6%	Emerging debt 3.1%
China equities -7.6%	DM gov. debt 1.7%	REITs 8.6%	Japan equities -12.6%	IG credit 11.8%	Cash 0.7%	IG credit -2.1%	U.S. equities -19.5%	Cash 5.1%	Emerging debt 8%	IG credit 2.4%
Infrastructure -11.5%	China equities 1.1%	DM gov. debt 7.3%	EM equities -14.2%	Commodities 11.8%	Infrastructure -5.8%	EM equities -2.2%	EM equities -19.7%	DM gov. debt 4.2%	IG credit 5.7%	Commodities 2%
EM equities -14.6%	Cash 0.4%	Commodities 1.7%	Europe equities -14.3%	DM gov. debt 5.6%	REITs -8.1%	DM gov. debt -6.6%	China equities -21.8%	Commodities 0%	Cash 4.1%	Cash 1.7%
Commodities -23.4%	Europe equities 0.2%	Cash 0.8%	China equities -18.7%	Cash 2.3%	Commodities -9.3%	China equities -21.6%	REITs -23.6%	China equities -11%	DM gov. debt 2.6%	DM gov. debt -0.2%

Key: Equities | Bonds | Private markets, commodities

Source Blackrock

Besides brief clusters of volatility around the yen-carry trade unwind, geopolitical conflicts, and standard election-driven hedging, the S&P has been on a steady upward trend for most of this year. In fact, the S&P's ~27% return YTD (at time of writing) puts it around the top 20% of all years since inception. 2024 was largely a year of continued risk asset strength after the recovery of 2023.

Other notable macro highlights:

- The market is beginning to price in the potential for AI-driven productivity boosts.
- Large demand for gold reserves from global central banks, particularly, China, India, Turkey, and others - leading to a parabolic price move in GLD.
- Energy costs remain fairly muted despite geopolitical tensions throughout the year - the price of crude has not budged much as the market is generally oversupplied from US production.
- China has shifted to a more accommodating monetary stance as it lowers interest rates, implements lending programs, and actively injects liquidity through various channels in order to prop up its markets.

Crypto Markets

While legacy markets trended up for most of the year, crypto had to deal with its own wall of worry after BTC's local top in March. While crypto markets were reactive on the downside to all of the risks that traditional markets faced (Yen carry trade unwind, geopolitical tensions, changes in monetary policy, etc.), it also faced its own idiosyncratic headwinds:

- German government selling
- Mt Gox distributions
- Alleged Tether DOJ investigation
- A hostile regulatory environment with SEC lawsuits (or Wells Notices) against Uniswap, Kraken, Coinbase, Metamask, Robinhood, and others

The election was the catalyst that broke the market out of an eight-month period of consolidation and volatility. While some may be giving Trump's claims too much credit, the market also recognizes that even a neutral regulatory environment is an improvement over what we had the last four years.

Looking Forward

Going forward, the macro backdrop is fairly supportive as we look into 2025. While the Fed has pulled back on the monetary tightening conducted since 2022, it has not truly started easing just yet. Volatility across equities, bonds, and forex has largely been squashed post-election. As volatility tends to cluster, low volatility should beget future low volatility; this is ultimately good for risk assets like BTC, ETH, and SOL. While there is an expectation of positive catalysts with a Trump presidency that sets up for possible disappointment, a friendlier regulatory environment removes many possible negative outcomes going forward. That certainly makes crypto majors more attractive for allocators who may not have had exposure for those reasons.

State of Crypto

Policy

Author: Dylan Bane

2024 was a turning point for crypto policy, setting the stage for transformative developments in 2025.

The first half of the year saw an intense struggle over the industry's direction, with the SEC asserting its authority through aggressive enforcement actions. In response, the crypto sector, supported by allies in Congress, pushed back by advocating for clear, tailored legislation and pursuing judicial interventions to limit regulatory overreach.

In the latter half of the year, the political landscape shifted drastically as the Trump Campaign adopted a pro-crypto stance. With Trump's eventual victory, expectations for a more favorable regulatory environment surged, establishing 2024 as a defining year for the evolution of crypto policy.

The SEC's Enforcement Blitz:

The SEC, led by Chair Gary Gensler, intensified its "regulation by enforcement" approach in 2024, targeting major players across the crypto industry. High-profile cases rolling over from 2023 against Coinbase and Binance accused them of operating as unregistered securities exchanges, brokers, and clearing agencies, reflecting the SEC's broad interpretation of existing securities laws. The agency also set its sights on DeFi protocols like Uniswap, alleging unregistered securities offerings, and extended its reach into the creator economy by pursuing NFT projects for similar violations. While these actions led to some settlements and fines, they drew widespread criticism for stifling innovation and pushing crypto businesses to relocate offshore.

The SEC's refusal to engage in rulemaking, despite repeated calls from industry and some members of Congress, further fueled frustration and calls for legislative intervention.
The SEC's arguments in court, particularly its assertion that secondary market sales of crypto assets constitute investment contracts, were met with mixed results, highlighting the legal uncertainty surrounding the application of the Howey test to digital assets. The Debt Box case, where the SEC was sanctioned for making misleading statements to the court, further damaged the agency's credibility and fueled calls for greater oversight.

Congressional Push for Regulatory Clarity:

In response to the SEC's aggressive enforcement and the growing regulatory uncertainty, the House, under Republican leadership, made significant strides in advancing crypto-specific legislation. FIT-21, a comprehensive market structure bill, passed the House with a surprising level of bipartisan support, signaling a growing recognition that tailored rules for digital assets are necessary.

The Clarity for Payment Stablecoins Act also advanced in the House, demonstrating bipartisan interest in establishing a regulatory framework for stablecoins. However, these bills faced an uphill battle in the Democrat-controlled Senate, where the focus remained on addressing illicit finance concerns through proposals like DAAMLA and CANSEE, which the industry viewed as overly broad and potentially harmful to innovation. Despite the Senate roadblocks, bipartisan efforts to address tax reporting requirements for digital asset brokers and promote blockchain innovation in non-financial sectors gained traction, suggesting potential areas for compromise in the future.

The House also passed a resolution to repeal SAB-121, an SEC accounting rule that deterred banks from custodying digital assets, though President Biden ultimately vetoed the resolution.

Election of Donald Trump:

Trump made a series of promises to the crypto industry, including:

- Establish a Bitcoin and crypto advisory council dedicated to establishing clear rules of the road, composed of industry representatives
- End the “unlawful and un-American Crypto crackdown”
- Hold onto Bitcoin acquired by the federal government as a strategic reserve asset
- Defend the right to mine Bitcoin
- Remove SEC Chair Gensler
- Oppose a U.S. CBDC
- Make the U.S. the “crypto capital” of the world
- Protect the right to self-custody and to “transact free from Government Surveillance and Control”
- Free Ross Ulbricht, creator of the Silk Road

As a result, the crypto industry widely anticipates a highly favorable policy environment under the Trump Administration.

Emerging Themes:

A number of emerging themes also characterized crypto policy in 2024.

- **Self-Custody Rights:** The right to self-custody became a key issue, with some policymakers advocating for restrictions while others championed its importance for

individual financial freedom.

- **Operation Choke Point 2.0 Allegations:** Concerns grew over allegations that banking regulators were unfairly targeting and debanking crypto firms, raising fears of systemic bias against the industry.
- **Privacy vs. Illicit Finance:** The use of mixers and privacy-enhancing technologies in crypto sparked debate, as policymakers sought to balance privacy rights with the need to combat illicit activity.
- **Bitcoin Mining and Energy Consumption:** Proposals for data collection and taxation on Bitcoin mining highlighted its environmental impact, while advocates emphasized its potential to drive renewable energy innovation.
- **Crypto Lobbying Efforts:** The influence of crypto lobbying surged in 2024, with industry stakeholders ramping up efforts to educate policymakers and push for favorable regulations. The crypto sector entered the top five lobbying spenders of the year, with total expenditures estimated at $200 million.

Crypto Policy Theses for 2025

Regulatory Clarity Emerges, but Not From the SEC

The Trump administration, supported by a Republican-controlled Congress, is set to prioritize reshaping crypto regulations. A key move will be appointing a new SEC Chair and commissioners who are more open to innovation and industry engagement.
However, lasting regulatory clarity is expected to come from Congress rather than the SEC. With majorities in both chambers, Republicans are motivated to fulfill campaign promises by advancing legislation that establishes clear and supportive guidelines for the digital asset ecosystem.

Expect a modified version of FIT-21, incorporating elements of the Lummis-Gillibrand Responsible Financial Innovation Act and addressing Senate concerns regarding illicit finance, to be a top legislative priority. Passage of such legislation would establish a much-needed framework for digital asset issuers and intermediaries, clarifying jurisdictional lines between the SEC and CFTC, streamlining registration processes, and establishing tailored disclosure requirements. The shift from regulatory uncertainty to a clear legal framework would also likely encourage institutional adoption and further integrate digital assets into the traditional financial system.

Stablecoin Legislation Gets Signed Into Law

The stars are aligned for stablecoin legislation in 2025. With bipartisan support in Congress and a Trump Administration eager to promote financial innovation, a comprehensive stablecoin bill is

highly likely to be enacted.

The final legislation will likely draw heavily from Chair McHenry's Clarity for Payment Stablecoins Act, incorporating a strengthened federal floor for state-qualified issuers and provisions addressing AML/CFT concerns to appease Senate Democrats. Expect a robust state pathway for issuers, fostering competition and innovation in the stablecoin market.

Establishing a federal stablecoin framework would bring crucial regulatory clarity, encouraging mainstream adoption, integration into payment systems, and strengthening the U.S. dollar's position in global finance. With BRICS developing an alternative financial system—a move Trump has opposed, threatening 100% tariffs on adopters—the Administration may view U.S. dollar-backed stablecoins as a strategic tool to counter BRICS' influence. The future of decentralized stablecoins like DAI remains uncertain. While a regulatory framework for centralized stablecoins could accelerate their adoption, it may also place decentralized alternatives at a disadvantage due to challenges in meeting regulatory requirements. This shift could further strengthen the dominance of centralized stablecoins like USDC and USDT.

The ability of decentralized stablecoins to retain market share will hinge on their adaptability to the new regulatory environment and their capacity to demonstrate unique value in a more regulated ecosystem. However, innovation in decentralized stablecoins may stall, potentially delaying the realization of a fully decentralized financial system.

CBDC Development Continues, but Retail is Off the Table

Under a Trump Administration and a Republican-controlled Congress, a retail CBDC is highly unlikely. However, research and development of wholesale CBDCs will continue at the Federal Reserve. The Fed will explore potential use cases for wholesale CBDCs in cross-border payments and settlements, working with industry stakeholders to address privacy and security concerns.

Legislation will likely be enacted to explicitly prohibit the Fed from issuing a retail CBDC without clear Congressional authorization, further solidifying the Republican Party's stance on protecting financial privacy.

This focus on wholesale CBDCs, while less impactful for individual consumers, could still have significant implications for the financial system, potentially improving efficiency and reducing costs for cross-border transactions. It could also create new opportunities for private sector innovation in developing and implementing CBDC-related technologies and services.

Self-Custody is Protected, but Privacy Remains a Battleground

With a Republican majority in Congress and a Trump Administration committed to protecting individual liberties, the right to self-custody will likely be codified through legislation.

This would safeguard individuals' ability to hold and control their own digital assets, a core tenet of the crypto community.

However, the debate over privacy-enhancing technologies, like mixers, will persist. Expect targeted legislation aimed at addressing the illicit use of mixers, while also seeking to preserve privacy for lawful transactions.

Policymakers face the challenge of balancing privacy rights, national security, and efforts to combat illicit finance. The outcome of this debate will significantly impact the future of financial privacy, shaping the adoption of privacy-preserving technologies in both crypto and traditional finance. Striking the right balance is essential to foster innovation while addressing legitimate law enforcement needs.

Hot Takes

The following predictions outline scenarios that, while less likely than our primary theses, still have a moderate chance of materializing.

DeFi Remains Unregulated

Despite growing interest and concerns, DeFi will remain largely unregulated in 2025. However, Congress will commission a comprehensive study of DeFi, exploring its potential benefits, risks, and appropriate regulatory approaches.

This study, involving input from industry stakeholders, academics, and regulators, will lay the groundwork for future legislation. Expect the study to address key issues such as consumer protection, illicit finance, and the unique challenges of regulating decentralized protocols. The findings of this study will be crucial in shaping the future of DeFi policy, potentially leading to tailored regulations that balance innovation with oversight.

The implications of this prediction are significant. A period of continued regulatory uncertainty for DeFi could allow the sector to continue innovating and growing, potentially attracting more users and investment. However, it could also increase the risk of scams, hacks, and other illicit activities, potentially harming consumers and undermining trust in the sector. A comprehensive study could provide a much-needed foundation for informed policymaking, potentially leading to regulations that address risks and foster innovation.

We also expect leading U.S.-founded DeFi exchanges, such as Uniswap to help inform the study and influence future DeFi policy.

Trump Reverses his Pro-Crypto Stance in Favor of Maintaining U.S. Dollar Hegemony

Crypto adoption could conflict with maintaining the U.S. dollar's status as the world's reserve currency—a priority Trump is likely to uphold in the national interest. A shift toward a hostile stance on crypto could occur if an economic crisis undermines the dollar's position, particularly if capital flows into crypto or if the BRICS financial system gains significant traction.

2025 is Make or Break for Ambitious Crypto Reform

If the most ambitious pro-crypto policies are to be enacted, they will likely need to occur within the first year of Trump's presidency. By the 2026 midterms, Congress could shift back to Democratic control, and Trump's political capital may wane as his presidency progresses. Similar to Joe Biden's diminished leverage after the partial failure of Build Back Better, Trump could face comparable legislative challenges later in his term, making large-scale crypto reforms increasingly unlikely.

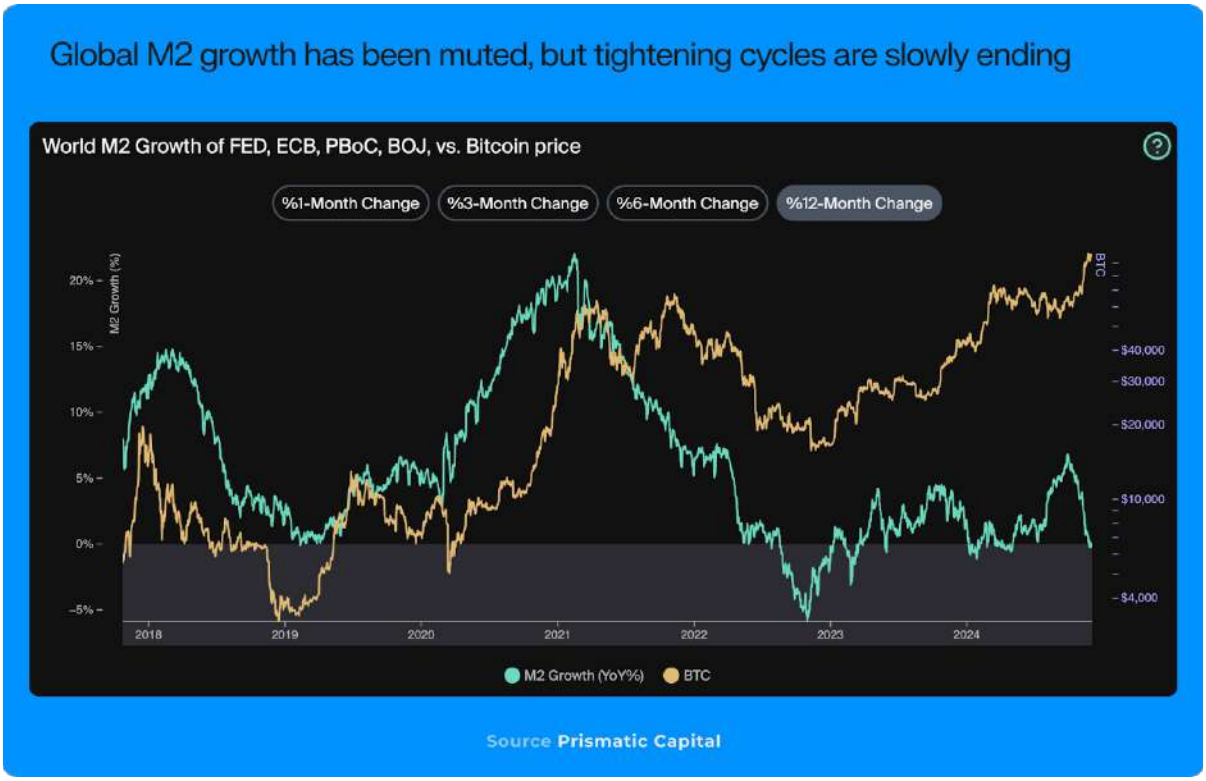
Conclusion

After facing much uncertainty, the outlook for crypto policy in the U.S. has never looked better. Should the Trump Administration implement even a small fraction of Trump's campaign promises, the crypto industry is bound to benefit significantly. However, the risk of a reversal in sentiment towards crypto is not zero, and stagnation in legislative advancement is not unlikely. Much remains to be proven, but the crypto industry has good grounds to be optimistic.

State of Crypto

The Institutions Are Here

Author: Andrew Dyer

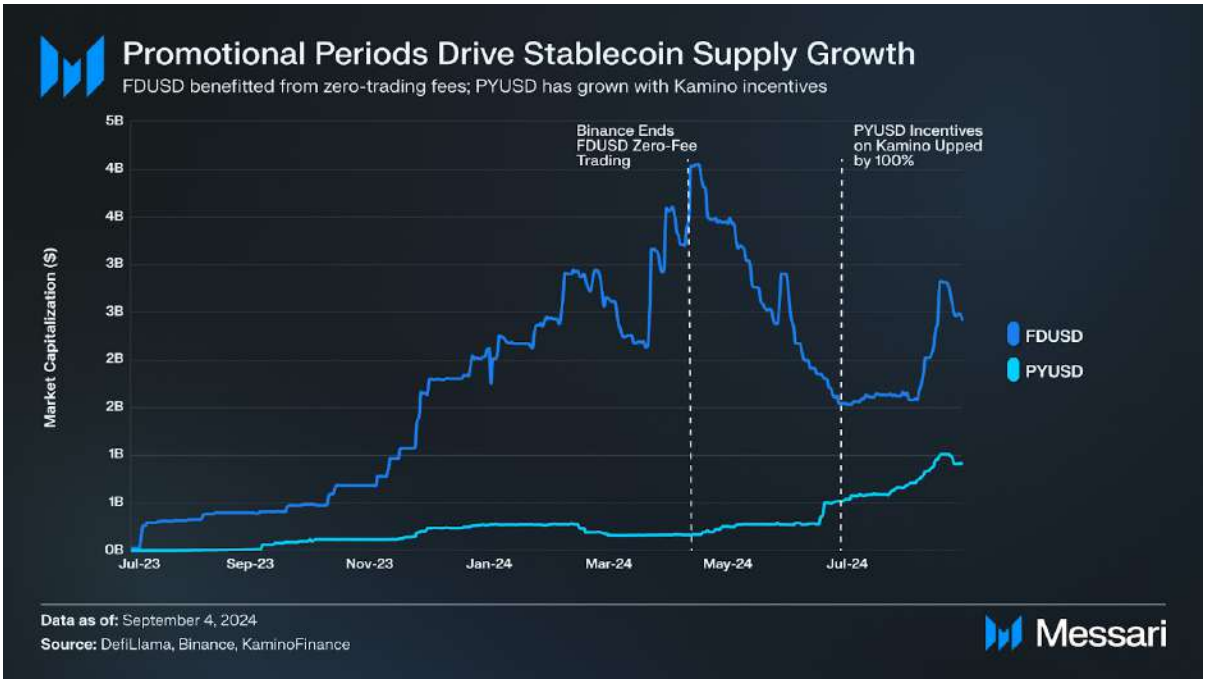


The institutions are here - this time for real. The approval of the BTC and ETH ETFs has legitimized the asset class and made it more accessible to both retail and institutional allocators. IBIT was the first ETF to reach $3 billion in AUM in the first 30 days of launch and $40 billion within ~200 days; these were both tremendous records in legacy markets. IBIT options first day of trading in November also saw almost $2 billion in notional exposure change hands. Options will open the way for more risk-managed and tailored BTC positions for allocators who do not want pure directional risk. As Blackrock continues to pitch digital assets as an uncorrelated class worthy of a small portfolio allocation, it's likely we will continue to see steady flows into the ETFs.

However, institutional involvement went far beyond wealth managers funneling small percentages of their client portfolios into IBIT. TradFi firms are getting more involved on multiple fronts: asset issuance, tokenization, stablecoins, and research.

Real-world assets, specifically tokenized treasuries, were a huge theme with crypto-native protocols like Sky (formerly MakerDAO) and TradFi firms like Blackrock launching their own on-chain money market funds (BUIDL). Ondo Finance's USDY (tokenized treasury fund) reached around $440 million in AUM, and the ONDO token was one of the more successful new launches in 2024, up more than 700% from listing. Franklin Templeton also launched an on-chain fund backed by short-term treasuries and repurchase agreements, which accumulated almost half a billion in AUM.

TradFi firms see the appeal of instant real-time settlement, enhanced liquidity outside of normal trading hours, and fractional ownership for increased accessibility by investors. It's likely that this sector will continue to draw more traditional firms who may innovate and compete on various features. For example, Fidelity and Citi recently announced a proof-of-concept digital MMF with a FX swap solution. This could allow a corporate treasurer holding non-USD working capital to invest in US dollar denominated money market-funds to enhance capital efficiency plus diversification.



The line between fintech, payments, and crypto is certainly starting to blur. As we noted in our September stablecoin report, Paypal launched its stablecoin PYUSD on Solana in May of this year. It saw great initial success by using incentives on Solana DeFi platforms like Kamino. Agora, a stablecoin startup backed by Nick Van Eck, also launched a stablecoin (AUSD) on multiple chains this year. The asset-backed AUSD will be backed by Van Eck (the asset manager) and custodied by State Street. Institutions are getting involved in the space in multiple verticals as they see its potential to either reduce costs, increase transparency, or speed up inefficiencies in payments or other verticals.

Other institutional highlights outside of the ETFs this year:

- JPM expanded its own blockchain platform, Kinexys (formerly Onyx), for cross-border payments and tokenization
- Goldman plans on spinning out its digital asset platform to a standalone entity as it looks to expand its product offerings
- Robinhood is launching crypto transfers in Europe, and recently expanded its list of tradable assets
- Revolut expanded its standalone crypto exchange platform, Revolut X, to 30 new markets, and plans to launch its own MiCa-compliant stablecoin
- Stripe made the largest acquisition in the crypto space to date, buying stablecoin orchestration firm Bridge for $1.1 billion
- Visa partnered with Coinbase to enable Coinbase customers to deposit funds in real-time using debit cards; it also conducted live pilots moving large amounts of USDC between partners on Solana and Ethereum
- Coinbase also just launched Apple Pay for its fiat-to-crypto onramp

State of Crypto

Rise of Solana

Author: Kinji Steimetz

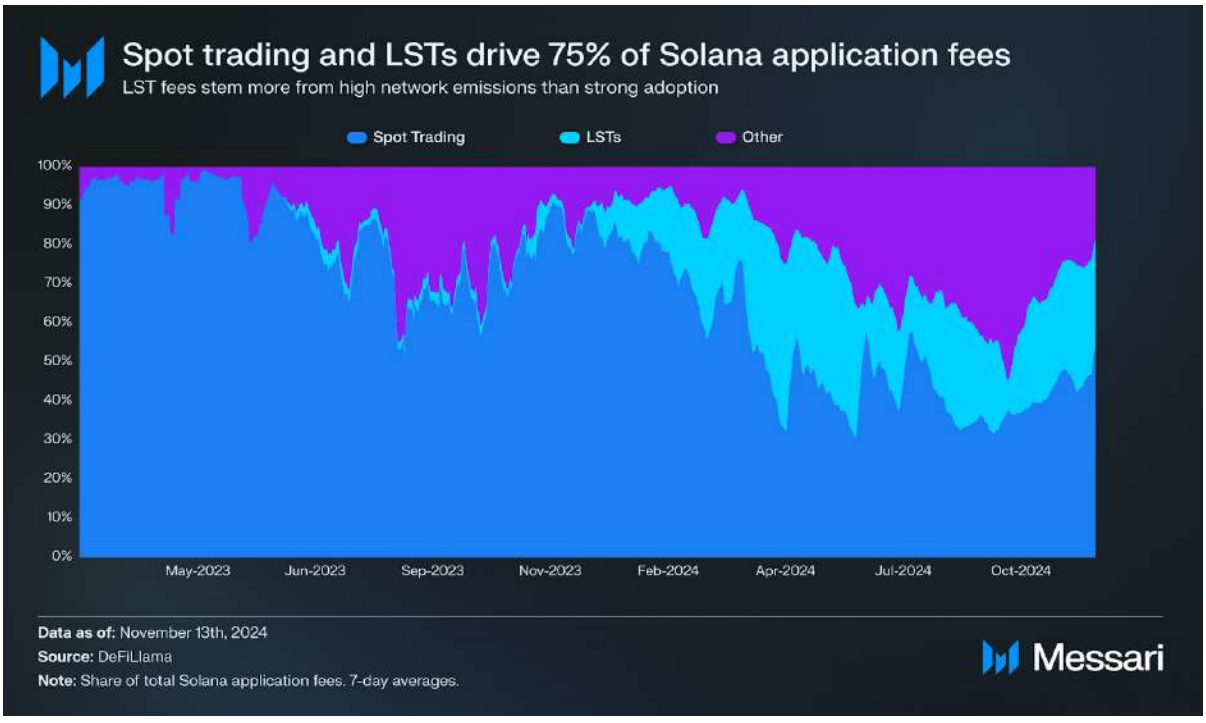
Looking Back: Solana's Journey in 2024

In many ways, 2024 was the year of Solana, with the SOL token appreciating by around 120% year-to-date, while its market capitalization relative to Ethereum grew from about 16% to over 25% by year-end. Initially, Solana's rise was largely driven by speculation around its potential to evolve into a competitive blockchain ecosystem, but by the close of the year, its fundamentals began to substantiate that promise.

In 2024, Token Extensions introduced a new SPL standard that offered greater flexibility for developers. Released in Q1, these extensions gained adoption, signaling a significant step forward for institutional use cases. Paypal's PYUSD adoption stood out, leveraging the standard for confidential transfers and showcasing how institutional players could utilize Solana's infrastructure for advanced token functionalities. This development underscores the growing alignment between Solana's technical advancements and institutional needs.

The phased rollout of Firedancer, alongside innovations like ZK Compression for cost-efficient on-chain storage, further bolstered Solana's technical reputation. These upgrades not only enhanced performance but also captured significant attention, reinforcing Solana's position as a true competitor to Ethereum.

The combination of low-cost, high-throughput transactions and a growing narrative drove the expansion of Solana's application ecosystem. Total fees generated by Solana applications exceeded those on Ethereum, with Solana apps contributing over $500 million—more than half of all on-chain application fees during the period. At first glance, this suggests a diverse ecosystem comparable to Ethereum's. However, a closer look at the distribution of fees reveals a more concentrated landscape.



Currently, application fees on Solana are highly concentrated in two primary areas: liquid staking and trading activities. Liquid staking accounts for approximately 25% of the application fees, driven by network staking rewards, while trading fees—generated by decentralized exchanges (DEXs), DEX aggregators, and even Telegram bots—represent around 50% of the network's total application fees. This proportion is significantly higher than Ethereum's, where trading fees typically make up 20-30% of total application fees, briefly exceeding 40% during recent market rallies. The outsized share of trading fees on Solana can largely be attributed to its position as the primary execution platform for memecoin speculation. While the dominance of memecoin volumes has bolstered fee growth, it also highlights the relative lack of diversity within the Solana ecosystem. Use cases that are prominent on Ethereum—such as lending, yield farming, and liquid staking—have yet to gain comparable traction on Solana.

If 2024 was indeed the year of Solana as an asset, 2025 may well mark the year of Solana as a fully realized ecosystem. While Solana's fee generation underscores its strong position in spot trading, the broader ecosystem began to show signs of growth beyond trading in 2024. The advent of DePIN (decentralized physical infrastructure networks) applications, and emerging AI-driven projects signals Solana's expanding footprint in areas beyond finance. However, the scale of these developments is still in the early stages, and their ultimate impact on network activity remains uncertain.

Stay up-to-date on Solana in real time with the new Messari-powered Solana Portal.

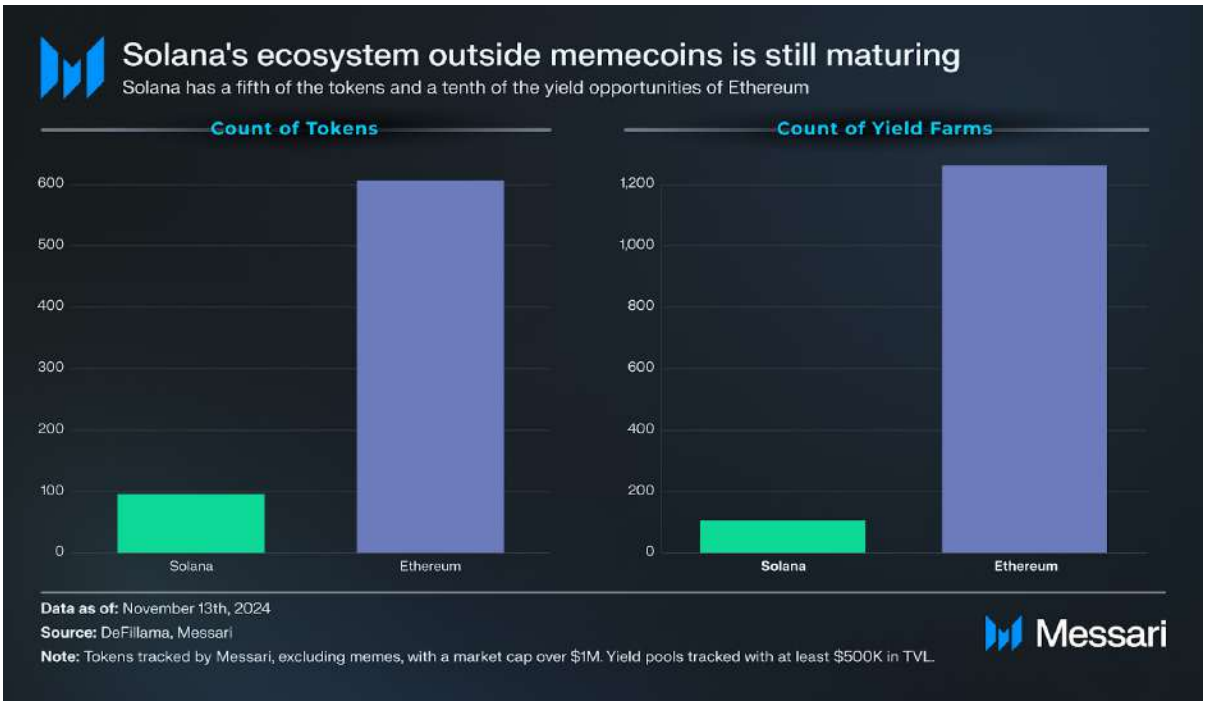
Memecoins

2024 Crypto Review: Memecoins, Speculation, and Emerging Trends

In 2024, memecoins dominated the narrative in crypto, capturing significant mindshare with multiple individual memes creating generational wealth. Despite representing less than 3% of the top 300 cryptocurrencies by market cap (excluding stablecoins), memecoins consistently accounted for 6-7% of total non-stablecoin trading volume, with recent weeks pushing that figure to nearly 11%. This outsized volume underscores sustained interest in speculative assets, even though memecoins remain a small segment of the market. The first quarter's rally, driven by political memes like Jeo Boden, marked a resurgence in memecoin market share, which then grew from 1.5% to 3%. This was followed by rallies fueled by TikTok memes (Moodeng and Chill Guy) and more recently, the rise of AI Agents, sparked by Truth Terminal's GOAT.

However, the rise of memecoins is not just driven by trends or user-friendly interfaces. They thrive in environments with surplus capital and ample blockspace for transactions. As the broader crypto market appreciated in 2024, many traders found themselves with excess capital and limited quality investment opportunities. This created a fertile ground for memecoins, which offered high-risk, high-reward potential.

This dynamic was especially evident on high-throughput networks like Solana and Base. After a strong market performance in late 2023 and early 2024, Solana users found themselves with extra capital and limited deployable opportunities. This was highlighted by Solana's significantly lower number of tokens—excluding memecoins—compared to Ethereum, pushing users further out on the risk curve toward memecoins. Solana's scalability and low transaction costs made it an ideal environment for these speculative assets. A similar pattern emerged on Base, where the network's launch in 2023 generated surplus capital and available blockspace, fueling memecoin speculation.



Another key factor in memecoin's rise has been the increasing availability of user-friendly trading platforms. Apps like Pump.fun, Moonshot, and Telegram bots have simplified the process for retail traders. Moonshot, for example, enables users to buy memecoins with ApplePay, PayPal, or USDC on Solana, bypassing traditional crypto rails. Its intuitive interface and easy sign-up process have attracted a wave of new retail investors, many of whom are drawn by the allure of quick, generational wealth.

Messari subscribers can read more in Running Back Robinhood: The Rise of Moonshot.

What's Next for Memecoins: The 2025 Outlook

Looking ahead to 2025, memecoins are poised for continued growth, driven by key factors like scalable blockchain infrastructure, low transaction costs, and the ongoing development of user-friendly platforms. High-throughput chains like Solana, Base, Injective, Sei, and TON provide ample blockspace, enabling memecoins to thrive without raising fees, further embedding them in the crypto landscape.

The continued growth of apps like Moonshot and Pump.fun will lower entry barriers, attracting more retail traders to memecoins by simplifying the trading process. As blockchain networks improve and UX becomes more seamless, memecoin trading will become more accessible, encouraging increased participation.

Additionally, memecoins fit well within the broader macroeconomic context as an outlet for speculative behavior, similar to gambling. With high-risk, high-reward opportunities and social incentives, they appeal to users seeking both entertainment and profit, potentially drawing

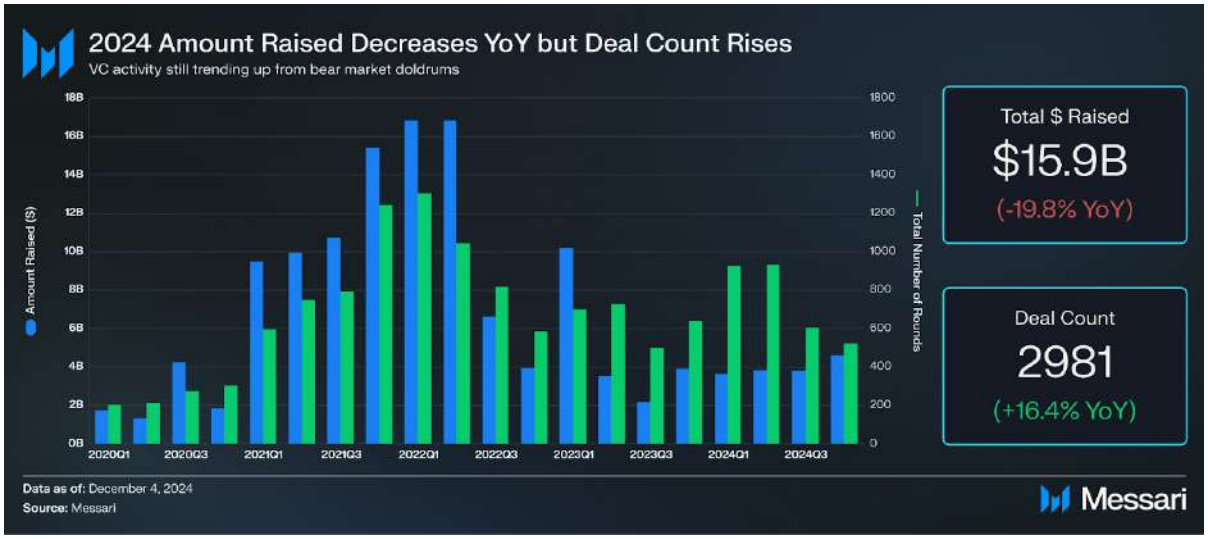
attention away from more traditional speculative markets like sports betting.
While memecoins may not capture the largest share of crypto's market cap, their growth will remain significant, driven by increased engagement and infrastructure development. As the ecosystems on high-throughput chains mature, new use cases and investment opportunities will emerge, but the speculative and social appeal of memecoins will ensure their continued relevance, especially in volatile markets.

Messari subscribers can read more in Are the dog days over?

State of Crypto

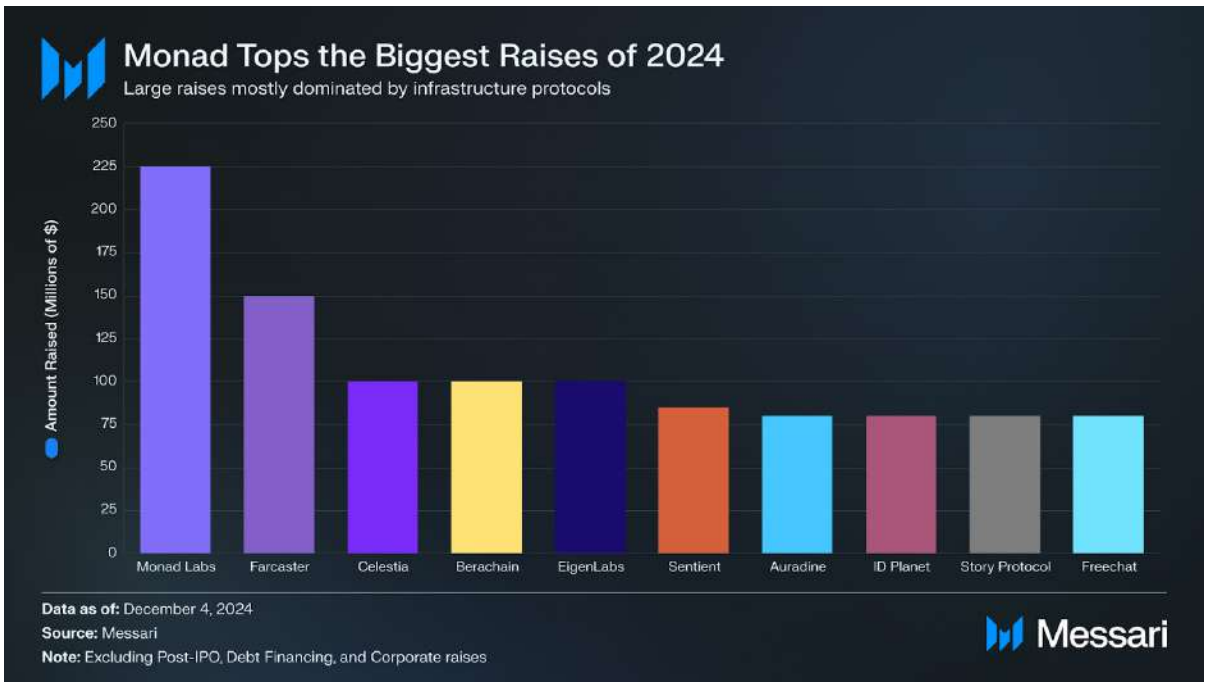
Fundraising

Author: Andrew Dyer



At the time of writing in early December, crypto fundraising by deal count has been trending up since 2023. The total amount raised by startups and protocols is down around 20% year-over-year, mostly due to an outlier Q1 in 2023. However, there were still some large raises across a swath of different verticals this year.

Highlights

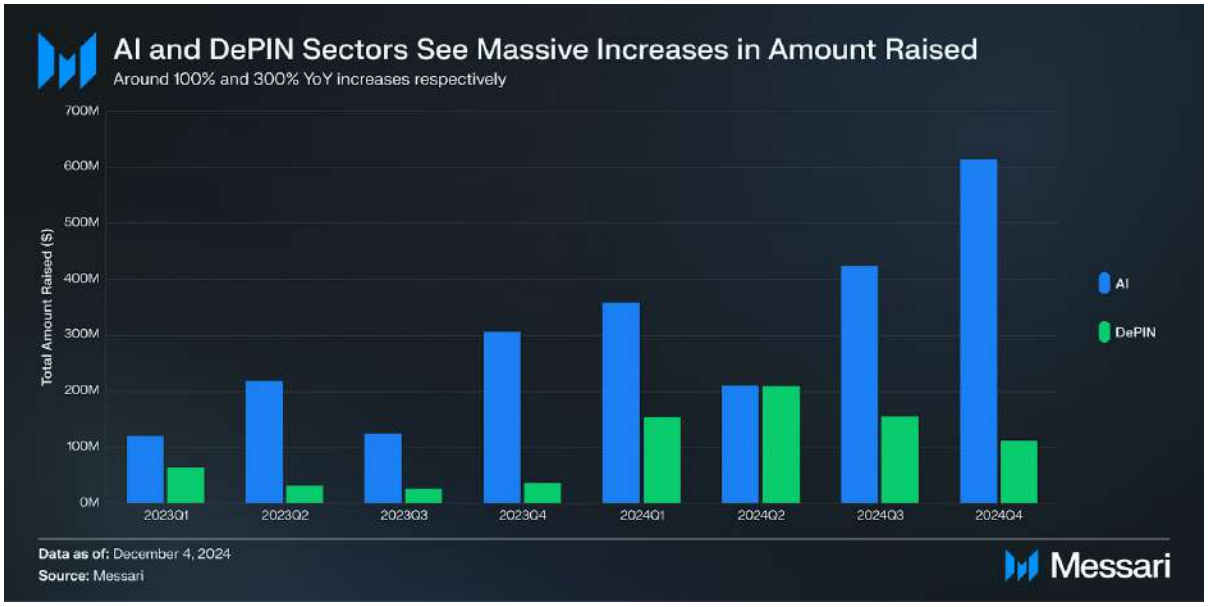


Amongst the biggest raises:

- Monad Labs raised a staggering $225 million in April of this year. Infrastructure and L1s remained an attractive place for VCs to allocate to as exit valuations stayed high; post-listing performance for these high-FDV launches was another story though.

- Speaking of stories, ai16z-backed Story Protocol raised $80M in a series B. The protocol seeks to convert valuable IP into programmable legos that can be licensed, managed, and monetized through smart contracts on a blockchain. Story's pitch is that IP protection and licensing will become increasingly important as AI may use creator content without permission.
- On the AI front, Sentient raised $85 million, led by Thiel's Founders Fund. Sentient is seeking to create an open platform for AGI development, leveraging the incentive systems of decentralized networks.
- Besides some other large infrastructure raises like Berachain and EigenLabs ($100 million each), there were a few notable raises in the social sector, namely Farcaster ($150 million) and Freechat ($80 million).

The AI-DePIN VC Barbell



As we mentioned in our Q3 fundraising overview, AI and DePIN stole the limelight in terms of fundraising this year. The total amount raised for the two sectors rose by around 100% and 300% from last year respectively. The number of rounds in these sectors also rose by 138% and 197% respectively. AI rounds were particularly popular among accelerator programs like CSX and Beacon. VCs are excited about the intersection of crypto and AI, particularly as it relates to autonomous agents, economic incentive systems around AI development, and AI's potential impact on gaming. Among DePIN rounds, VCs have highlighted the budding decentralized energy sector as having enormous potential. This includes new protocols like Daylight, which seeks to use distributed energy resources to make the electric grid more efficient.

Other emerging narratives and themes from 2024 fundraising included:

- The burgeoning decentralized science sector, which saw raises from BIO protocol and AMINOChain.
- Asia-Pacific VCs are investing more heavily in gaming protocols, particularly ones launched on the TON blockchain.
- NFT and metaverse projects have generally lost a share of rounds and amount raised compared to 2021 and 2022.
- Social is still a vertical being experimented with despite questionable success, as evidenced by raises by Farcaster, DeSo, and BlueSky.

State of Crypto

Where are the Users?

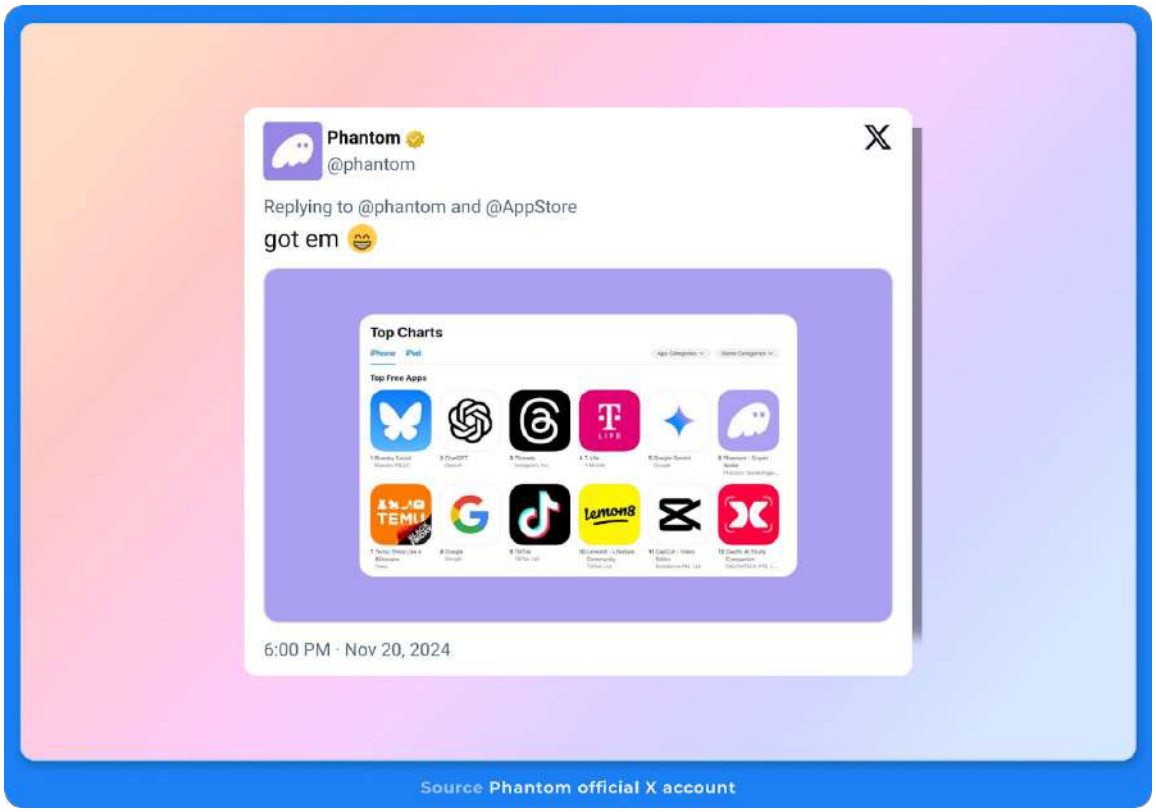
Author: Sunny Shi

This year, a16z reported that crypto has hit an all-time high of 220 million monthly active addresses, with user growth reminiscent of early internet adoption. This is a remarkable data point, but the truth is, nobody knows how many real users are actually adopting crypto. Active addresses and users do not hold a 1:1 relationship given that many crypto natives use multiple wallets, and the presence of sybils can greatly muddy addresses as a metric. By filtering through some of the noise, a16z estimates that roughly 30-60 million of those 220 million active addresses are real monthly crypto users.

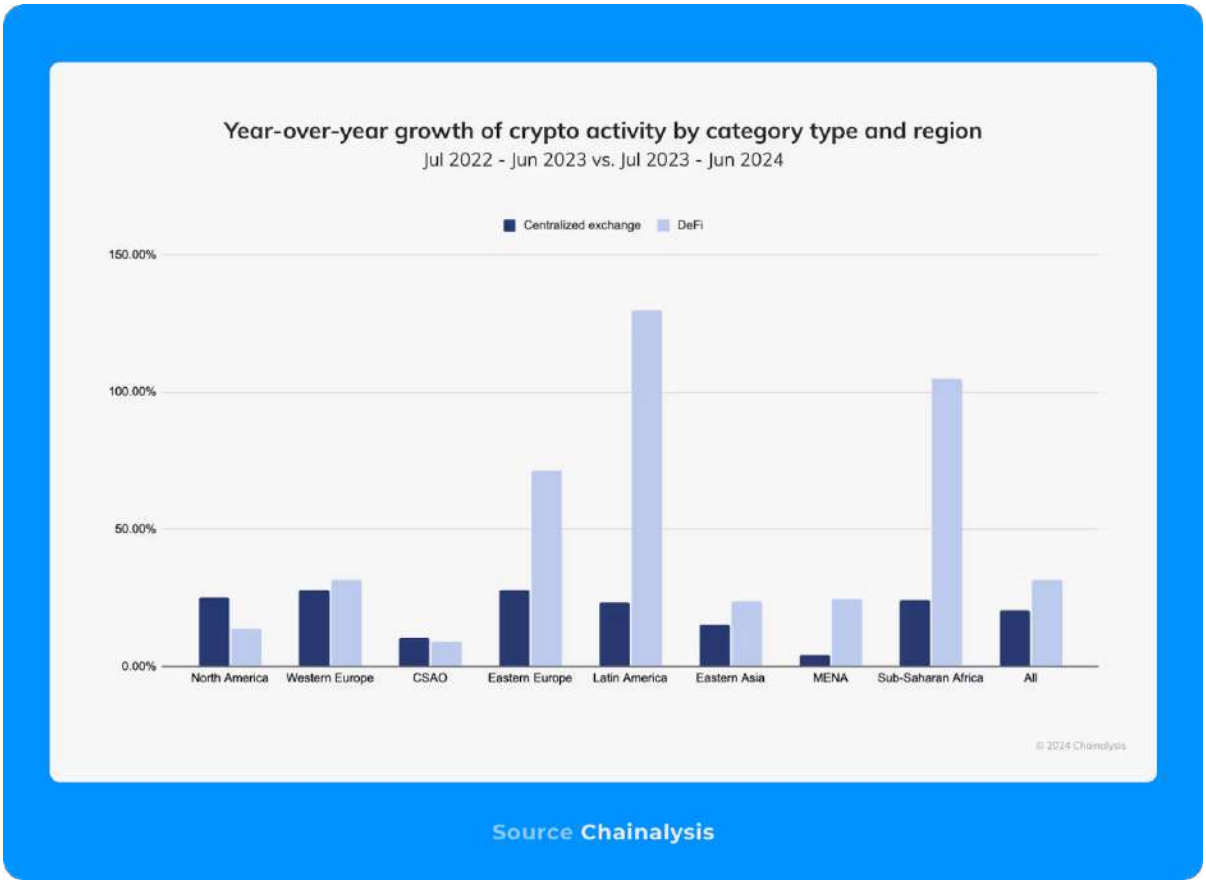
While we won't attempt to speculate on user count, we think that 2024 has provided plenty of evidence that crypto as a whole has onboarded new users. Below, we provide some of this year's winning examples of successful user-led applications and ecosystems. We will continue to highlight some of these case studies in later sections of our theses.

Phantom - Dominating App Downloads

The uptick in Solana's memecoin activity provides us with a new consumer indicator: Phantom's app store rankings. Phantom, now Solana's most popular wallet, offers a self-custodial browser wallet with features akin to Metamask. Its standout strength, however, lies in its mobile-friendly UX, which recently propelled the app past giants like WhatsApp and Instagram into the top ten ranked free mobile apps on the iOS app store. We believe memecoins have largely taken the place of NFTs this cycle as a retail onboarding mechanism, and mobile apps like Phantom and Moonshot provide users with a seamless way to trade memecoins anytime, anywhere. App store rankings for these apps continue to give us insights into how fast users are pouring into crypto.



Stablecoins - Finding Product Market Fit in Emerging Markets

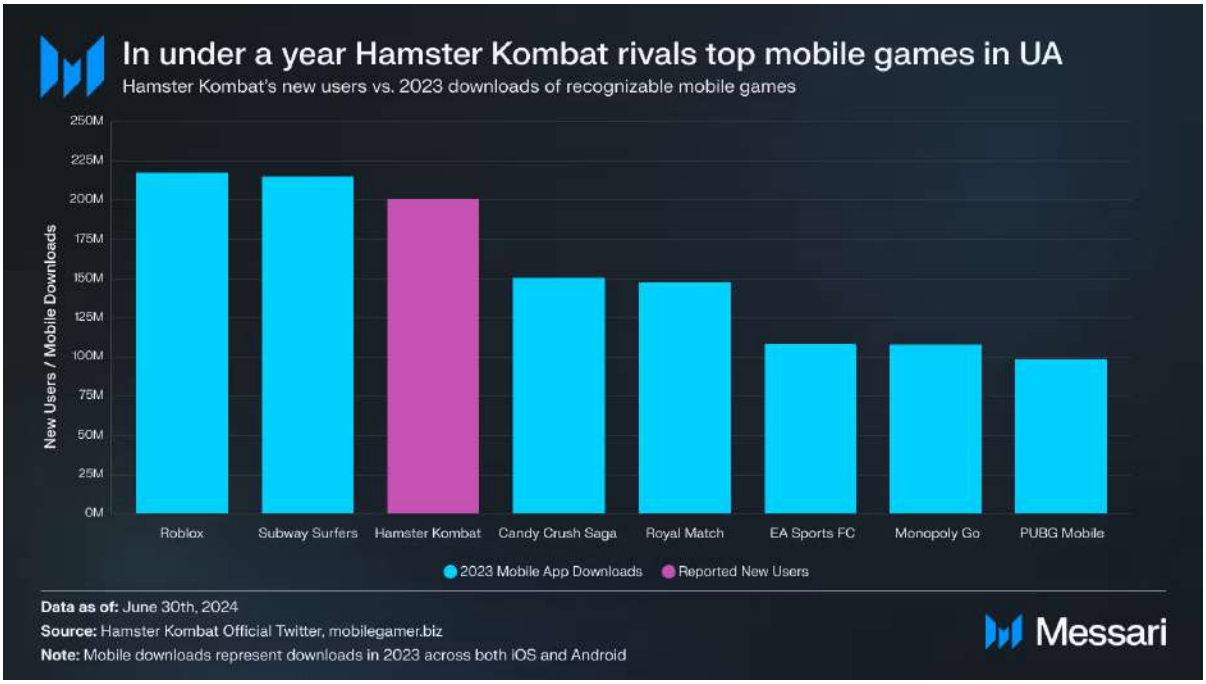


2024 has seen a wave of stablecoin adoption, from both retail users and small businesses worldwide. Emerging markets such as Sub-Saharan Africa, Latin America, and Eastern Europe are bypassing traditional banking systems and embracing stablecoins, driven by limited banking infrastructure and increasing mobile penetration. Stablecoins like USDT, particularly on networks like Tron, have become integral for peer-to-peer transactions, remittances, and small business operations due to their affordability and accessibility. Companies like Yellow Card, Bitso, and Kuna are leading this shift by offering seamless stablecoin swaps, payment APIs, and financial services tailored to local needs. Stablecoins are revolutionizing financial systems in emerging markets by offering accessible and efficient alternatives to traditional banking, with grassroots adoption. It is likely that the lines are blurring between crypto centralized exchanges, global payment platforms, and traditional fintech companies, with many of these players converging into next generation consumer super-apps.

To learn more about emerging markets' stablecoin adoption, read our prior coverage on the matter here.

Telegram Mini-Apps - Introducing GameFi to the World

Another global adoption case occurred with the TON blockchain's viral tap-to-earn minigames, which kept users tapping their phones to mine token allocations. Notcoin, the first major success, gained over 40 million users and became one of crypto's most widely held tokens, boasting over 2.5 million holders and a ~$1 billion valuation. Its successor, Hamster Kombat, is one of crypto's biggest marketing phenomena, reportedly attracting 200 million users and 35 million YouTube subscribers, now with a token worth ~$280 million. Despite criticisms of simplicity, these games have demonstrated mass appeal through social features and referral-based growth. Notably, their global reach is reminiscent of other play-to-earn successes like Axie Infinity. While much of the activity occurs offchain, TON's GameFi ecosystem showcases remarkable virality and potential to onboard millions of new users, leveraging Telegram's network and community-building capabilities.

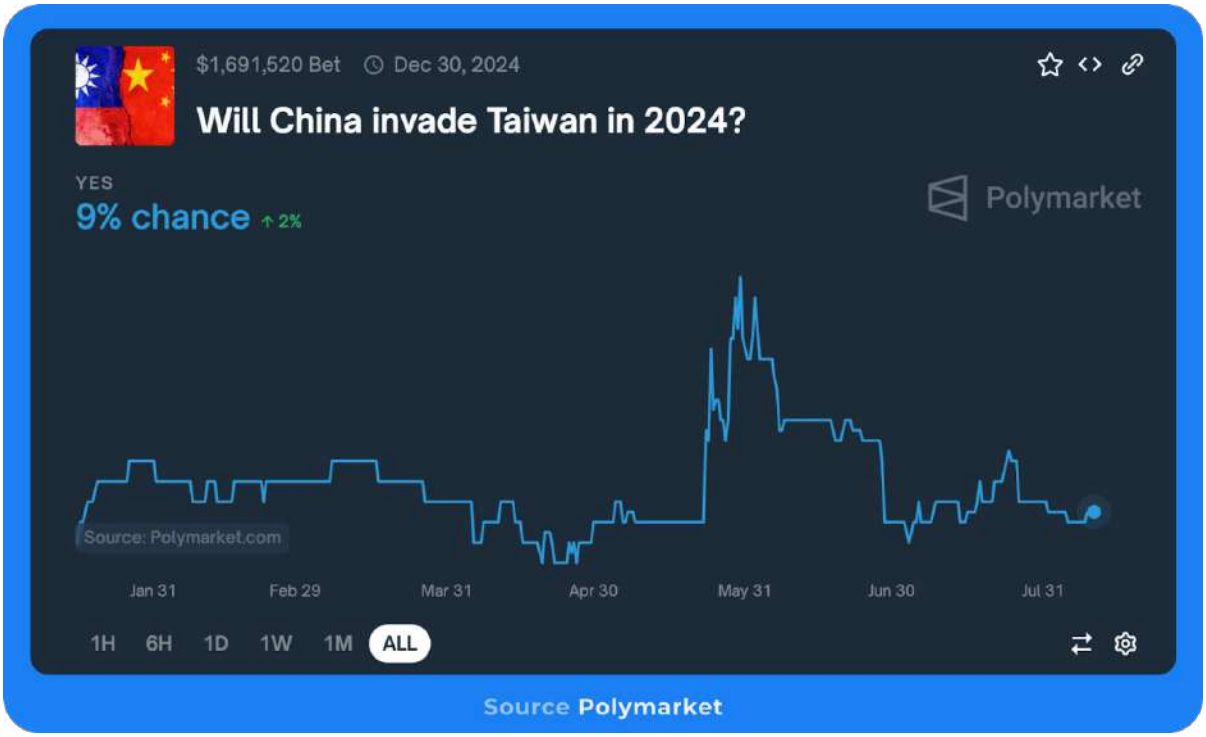


To learn more about Telegram Mini-apps, read our prior coverage on the matter here.

Polymarket - A Real Crypto Use Case

Polymarket's rapid growth, fueled by the 2024 US presidential election, highlights its emergence as a breakthrough crypto use case and its progress toward product-market fit. Throughout the year, Polymarket signed on almost 1 million new accounts, an exceptional feat in an industry often plagued by low levels of real user acquisition. Polymarket's unique political markets allowed speculators to bet on U.S. election related markets in size, a unique offering that is hard to find outside of offshore betting sites. We note that notional volumes for this election are more than 300X that of the 2020 election, a positive sign that crypto's organic demand

is growing with each passing cycle. Outside of trading, Polymarket became a widely sourced news application, providing objective markets-driven predictive power which beat polls when it came to forecasting major political events. Leading up to the election, the Polymarket mobile app became the second most downloaded iOS news app, outperforming legacy media apps like those from the New York Times and CNN.



To learn more about Polymarket, read our prior coverage on the matter here.

Base and Hyperliquid - Bringing CEX Users Onchain

In 2024, Base and Hyperliquid played pivotal roles in accelerating the migration of users from centralized exchanges (CEXs) to decentralized exchanges (DEXs), marking a turning point for onchain adoption. Coinbase's Base L2 provided a seamless entry point with its now free Coinbase to Base onramp, dramatically reducing friction for new users and driving significant growth in onchain activity, as evidenced by an exponential increase in unique wallet addresses YTD. Simultaneously, Hyperliquid bridged the gap for perpetual traders by delivering a trading experience that mimicked the polished, high-performance UI of leading CEXs such as Binance. This familiar interface, coupled with Hyperliquid's excellent trade execution, helped increase the value proposition for trading perps onchain vs. offchain. As Hyperliquid has rapidly grown its volumes, derivative DEXs have also reached new all-time highs in volume share against CEXs this year.

To learn more about Hyperliquid, read our prior coverage on the matter here and here.

Looking Ahead

As we move beyond 2024, the crypto ecosystem is no longer just preparing for mass adoption—it is already underway. We believe user growth is transitioning into a steady and consistent upward trajectory, driven by the natural pull of new users discovering the space through a wide variety of applications rather than relying solely on breakthrough headlines or waves of hype. This maturation reflects a shift from sporadic, noisy onboarding patterns to a more predictable and scalable growth model. Assets like memecoins, consumer apps like Phantom and Telegram, platforms like Polymarket, and growing onchain utility will continue to bring compounding and sustained growth of users going forward. The next step is to make navigating the blockchain a more retail friendly experience, which is an effort that will be greatly aided by new innovations like chain abstraction and aggregated frontends.

To learn more about Chain Abstraction, read our prior coverage on the matter here and here.

State of Crypto

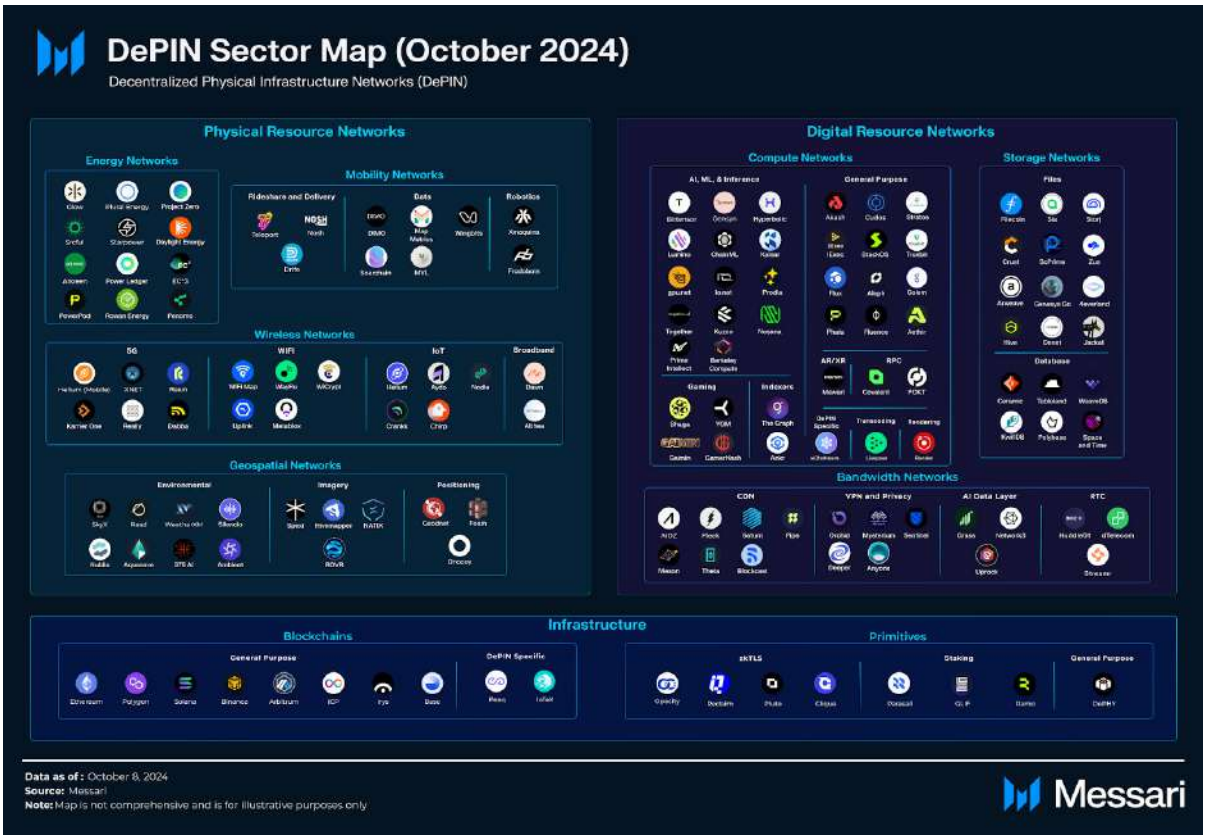
DePIN's Breakthrough

Author: Dylan Bane

Year in Review

2024 marked a breakout year for DePIN (Decentralized Physical Infrastructure Networks), with the sector's total market cap surging by 132% year-over-year to over $40 billion.

These networks gained traction by leveraging DePIN advantages such as distributed capital expenditures, accelerated infrastructure deployment, and blockchain's unparalleled efficiency as an orchestration layer. DePIN took initial steps in 2024 to reshape some of the largest industries in the world, such as telecommunications, mobility, and energy.



Key Highlights:

- Early Stage Fundraising Surges: DePIN projects saw unprecedented funding in 2024, growing 326.45% from 2023. In particular, compute, energy, and data collection startups received over $266 million in aggregate funding.
- Real World Traction: The sector saw a number of successful initiatives, including the launch of Helium Mobile (120k+ subscribers in year 1), Glow's deployment of 70 solar farms from California to India, and GEODNET building the world's largest RTK network with over 11k nodes.
- Mainstream Collaborations: DePIN demonstrated that it provides real-world utility relevant to the world's most respected institutions. Helium Mobile and XNET partnered with large telecoms for their Carrier Offload program, DIMO integrated its service into Tesla, and GEODNET partnered with the U.S. Department of Agriculture to help farms conduct high-precision farming.

DePIN Theses for 2025

DePIN Sector Revenue Surpasses $150 Million in 2025

DePIN entered 2024 with established supply sides but limited revenue on the demand sides to validate the DePIN model. Several protocols generated 7-figure and even 8-figure revenues over the course of the year, showing initial promise of DePIN capturing the demand side which has constrained growth so far. GLOW exceeded $25 million in revenue, while Helium and IO.net both surpassed $12 million. Furthermore, Filecoin ($8 million), Render ($4 million), Akash ($4 million), and GEODNET ($2 million), among others, also surpassed the $1 million in ARR generated milestone.

We anticipate that DePIN revenue growth will accelerate in 2025, surpassing $150 million generated. The 9-figure revenue milestone will help validate DePIN's value proposition, firmly establishing the sector as crypto's premier real-world use case.

Energy (DeGEN) and Wireless (DeWi) Sub-Sectors Lead DePIN in Traction

While the largest DePINs by market cap will remain mainly in the file storage and compute sub-sectors in 2025, the most growth and adoption will likely occur in the energy and wireless sectors. Both sectors saw leading startups emerge into public awareness, including DAWN, Glow, Daylight Energy, Starpower Energy, Fuse, XNET, and others. These startups are primed to launch mainnets or exit beta stages, opening the door to significant growth in 2025.

Furthermore, the two largest DePINs by revenue (GLOW and Helium) are energy and wireless DePIN, respectively, demonstrating that these sectors capture real demand. With energy and wireless having the largest TAMs in DePIN, we expect the launch of promising protocols and continued growth of existing protocols in this sector to firmly establish these two sub-sectors as the most prominent in DePIN.

Helium Becomes the Largest DePIN by Market Cap

Helium ranks 9th in market cap among DePINs at the time of writing. With a growing carrier offload program, the continued growth of Helium Mobile, and simplified tokenomics with a singular focus on HNT, Helium is positioned to become the largest DePIN by market cap. While the boom in generative AI will continue to bolster compute-focused DePINs, Helium's significant real-world adoption in the massive wireless market will lead the market to recognize Helium as the leading DePIN in 2025, and its relative valuation will reflect that.

A Significant Government Integration/Partnership within DePIN is Initiated

We foresee a major government forming a partnership or pursuing a significant DePIN-related initiative in 2025.

In 2024, the U.S. Department of Agriculture partnered with GEODNET to offer high-precision agricultural services to farmers through GEODNET's network. With a pro-crypto administration in office, the most compelling use cases in crypto will be examined for potential government involvement. Due to DePIN's proven real-world utility, the sector will naturally emerge as an obvious target for furthering the government's crypto adoption.

The incoming AI and Crypto Czar, David Sacks, is an investor in Solana, Helium, Render, and Hivemapper, demonstrating his knowledge and interest in DePIN. With a pressing need for more energy to power generative AI and a transition to clean energy sources, we anticipate that the administration will seriously consider DePIN solutions.

Furthermore, DePIN's utility could help defend against criticism of the administration's most ambitious crypto policy proposals, such as a strategic Bitcoin Reserve or eliminating capital gains taxes on crypto, making the sector a valuable tool to pursue pro-crypto policies more broadly.

A Rival to Solana Emerges as the Primary Chain to Build DePINs On

Solana became the clear blockchain destination for most DePINs in 2024, with a wide range of protocols both migrating to Solana and building natively on the chain.

As a result of DePIN's success over the last year, we're already seeing other chains ramp up their efforts to attract DePINs and expect this trend to continue in 2025. Furthermore, two DePIN-specific chains, Peaq and IoTeX, launched in 2024, providing tailored solutions for DePINs and hands-on support that a general-purpose blockchain may not be able to provide.

With DePINs prioritizing UX, access to liquidity, and DevX, we expect chains rating strong in these metrics to attract a greater share of DePINs in 2025. Base, in particular, could become a primary destination for DePINs due to its strong UX and DevX. Additionally, support from Coinbase could further accelerate adoption by onboarding users onto DePINs through various partnerships in the future. Demonstrating Base's increasing attractiveness, DIMO announced a migration to Base in December, and two promising DePINs, Daylight and Blackbird, are also building on the chain.

While Solana is the clear destination for DePINs in 2024, the protocol must actively work to maintain that status in 2025 and beyond.

Conclusion

2024 solidified DePIN as a key driver of blockchain's real-world adoption, with record fundraising, industry partnerships, and traction in energy, wireless, and data sectors. As revenue accelerates and new protocols emerge, DePIN is poised to lead crypto's practical applications into 2025, with broader adoption and groundbreaking milestones on the horizon.

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Crypto Theses 2025

The Sector Theses

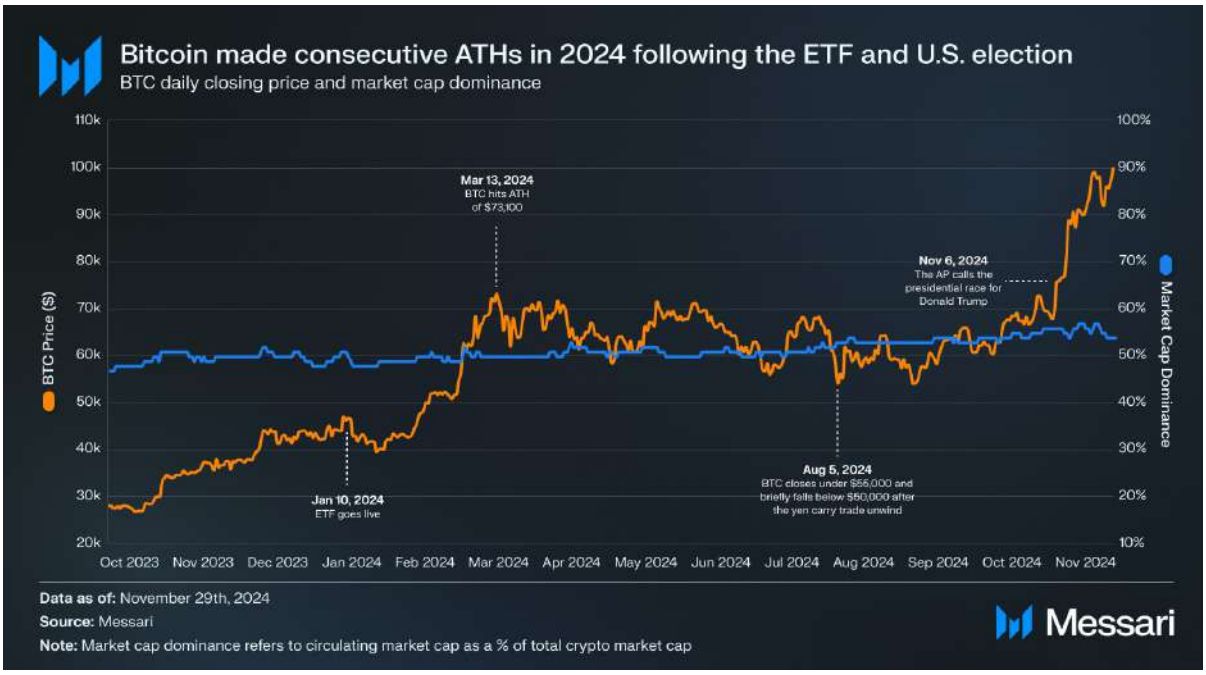
The Sector Theses

Bitcoin

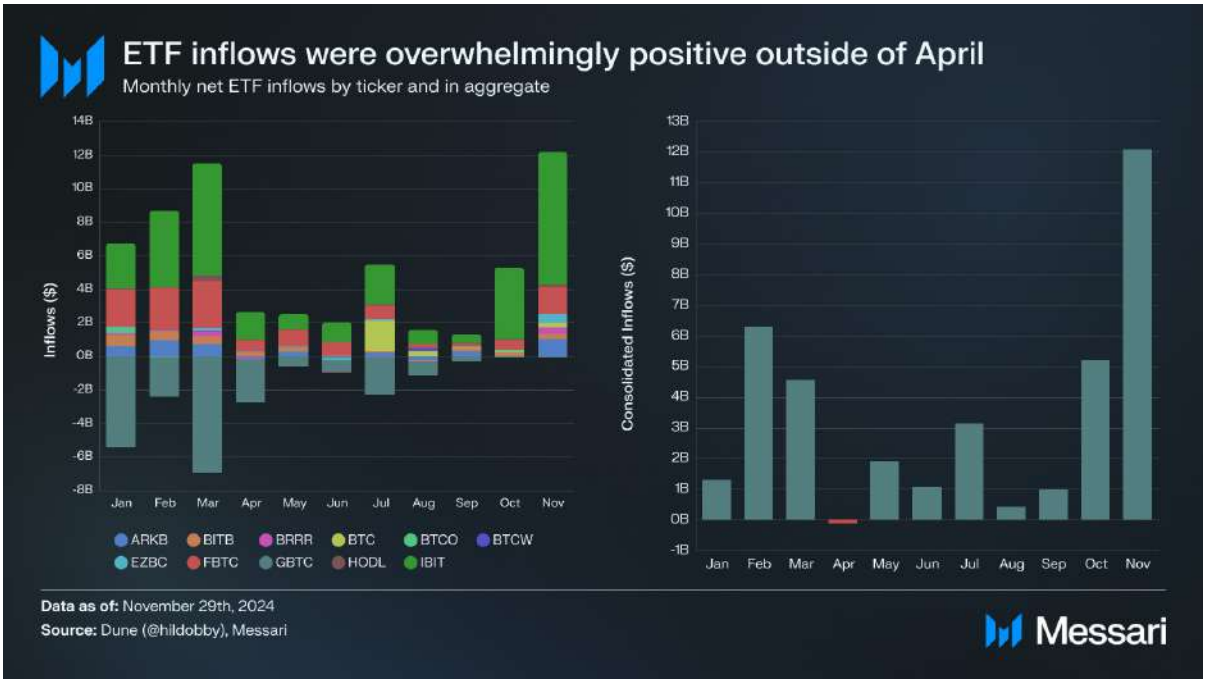
Author: Sunny Shi

What a year for Bitcoin. In 2024, BTC made numerous runs to all-time highs, found its way into the balance sheets of the largest asset managers in the United States, and became a focal point during the 2024 election. Bitcoin the network saw an influx of interest in alternative token standards, programmability, and restaking, marking a pronounced shift towards network utility.

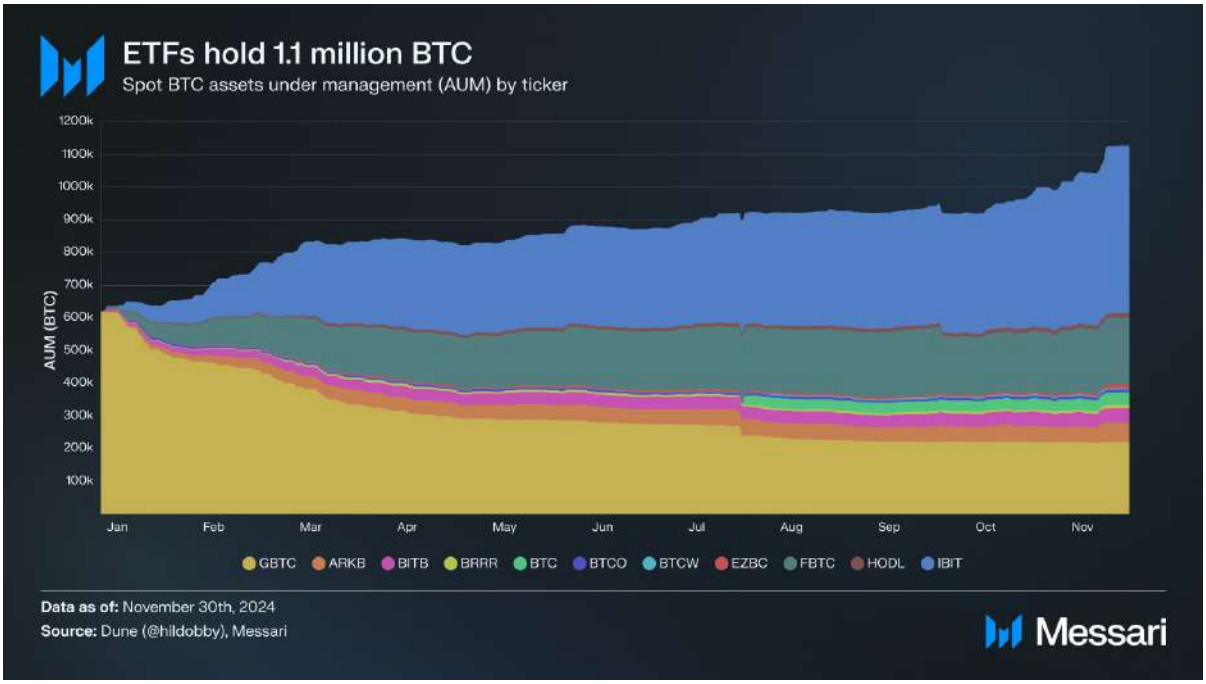
The BTC Asset - 2024 Review



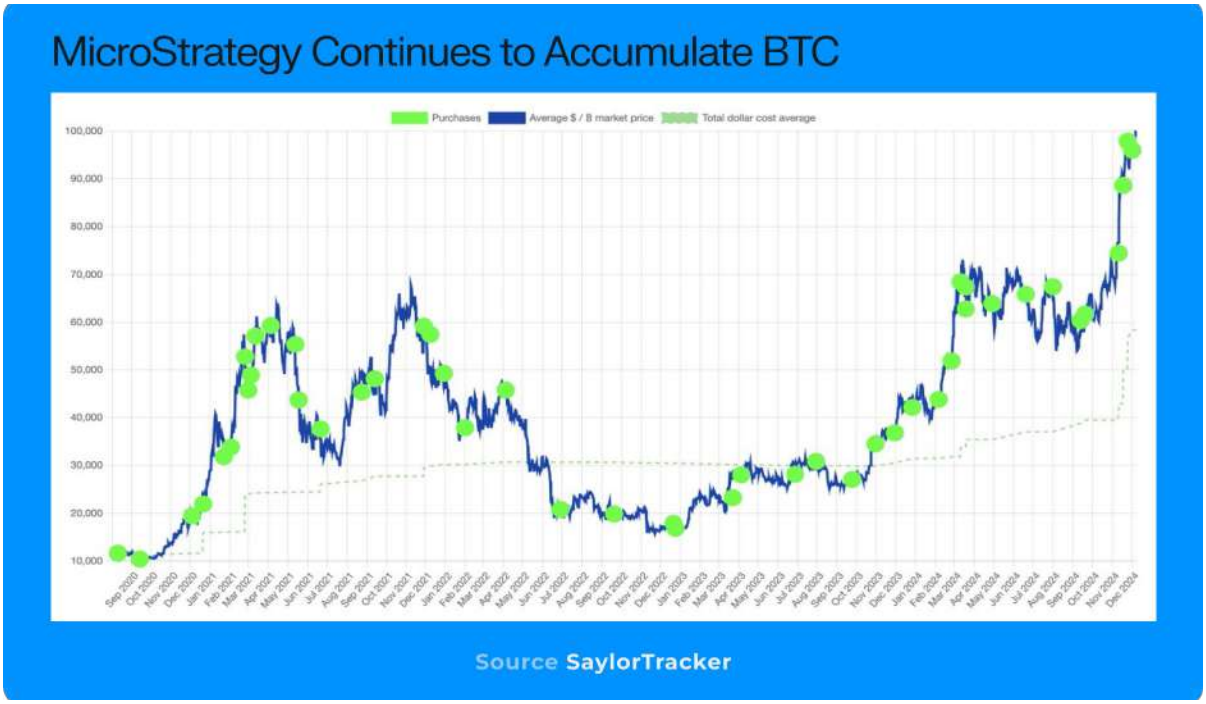
Bitcoin saw its price surge from ~$40,000 to an all-time high of $75,000 in Q1 of 2024 after the Bitcoin ETF approval was announced in early January. After subsequent months ranging between $50,000 and $70,000, BTC made yet another all-time high run on the back of a Trump election victory, surging to above $100,000 for the first time ever in early December. BTC's market cap dominance within crypto increased to ~55% throughout the year.



The biggest story of the year was the institutions, who by and large were net buyers of Bitcoin with only one month of net outflows in April. Of note, Grayscale's GBTC's net outflows have consistently decreased and are now negligible, while Blackrock's IBIT continues to be the largest net buyer, with ~$8 billion of inflows in the month of November.



ETF issuers now hold over 1.1 million BTC. The two largest holders are Blackrock and Grayscale, holding 45% and 19% of the total respectively. AUM growth has persisted despite elevated levels of volatility for BTC and muted price appreciation for most of the year, a positive indication of institutional demand. ETF inflows have picked up dramatically in both October and November, with November being the highest month by net inflows year-to-date.

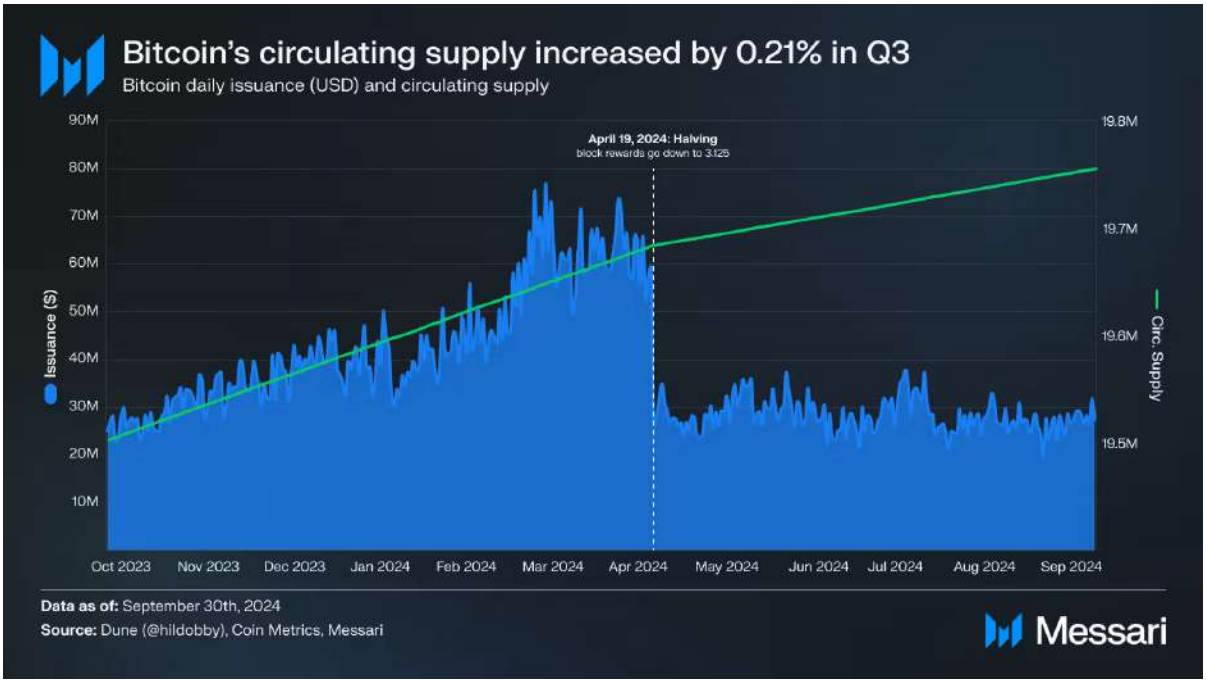


The Bitcoin ETFs were not the only structural driver for BTC this year. Michael Saylor and MicroStrategy (MSTR) continued to dollar-cost-average into the asset, most recently purchasing an additional $2.1 billion worth of BTC between December 2 and December 8, propelling BTC past the $100,000 milestone. This latest acquisition brings their total holdings to approximately 420,000 BTC, ranking them behind only Binance, Satoshi, and the ETF issuers in terms of ownership. Saylor's commitment to Bitcoin remains steadfast. In his commentary during MSTR's Q3 earnings report in October he unveiled plans to raise $42 billion in new capital to fund additional Bitcoin purchases over the next three years.

MicroStrategy (MSTR) has continued to lever up aggressively through convertible bond raises and regular equity offerings. As of early December, the company retained approximately $9 billion from its recent $21 billion at-the-market offering to purchase additional BTC in the coming weeks. However, MSTR's decline from $525 to under $400 a share, following a parabolic rally, could pose challenges for future fundraising.

During its period of rapid stock appreciation, MSTR capitalized on issuing low-cost convertible notes with high conversion premiums. Lenders willingly forewent coupon payments in favor of a relatively inexpensive option on a soaring stock. If MSTR's stock price continues to decline and volatility diminishes, the value of these options may become less attractive, potentially hampering MicroStrategy's ability to secure further funding for BTC purchases. This could create reflexively bearish dynamics for both BTC and MSTR, as Saylor's role as a key marginal buyer becomes constrained.

Despite these potential headwinds, MSTR's BTC-centric strategy has inspired other public companies, such as Marathon Digital Holdings (MARA), Riot Platforms, and Semler Scientific, to begin accumulating BTC reserves, signaling a growing trend of corporate Bitcoin adoption.



2024 was also a halving year for BTC, with total per-block emissions going down to 3.125 BTC as of April 19th. Bitcoin halving cycles occur every 4 years, with the amount of natural sellers for Bitcoin decreasing over time as miner rewards decrease.

Looking Ahead - Predictions for 2025 and Beyond

Bitcoin ETF inflows have largely exceeded expectations, and it is likely that institutions will slowly become the primary drivers of daily BTC price action over time. Unlike Microstrategy or perpetual traders on CEXs and DEXs, ETFs buy spot Bitcoin without the use of leverage. The smoother, more consistent spot inflows from institutions should lead to fewer reflexive, leverage-driven moves over time, helping Bitcoin mature as an asset.

The approval of Bitcoin ETFs has likely moved BTC to the early middle stages of its journey to becoming the world's leading store of value. In November, Bitcoin flipped silver to become the world's eighth most valuable asset, partially as a result of ETF inflows throughout the year. Late-year trends suggest that ETF inflows will continue to increase into 2025, especially as Grayscale's GBTC shifts to positive net flows.

On the regulatory front, the new Trump administration has shown positive sentiment towards crypto and Bitcoin, a dramatic shift in tone from the prior Biden and Harris led administration. In our prior coverage on the matter, we noted the following promises related to Bitcoin made by Trump on the campaign trail:

- Fire SEC Commissioner Gary Gensler.
- Introduce a national strategic Bitcoin reserve.

- Appoint a Bitcoin and crypto presidential council to design regulatory reforms.
- Ensure that Bitcoin continues to be mined in the U.S.
- Make the U.S. the “Crypto Capital” of the world.
- Remove capital gains taxes on Bitcoin transactions.
- Ensure that the U.S. does not introduce a CBDC.

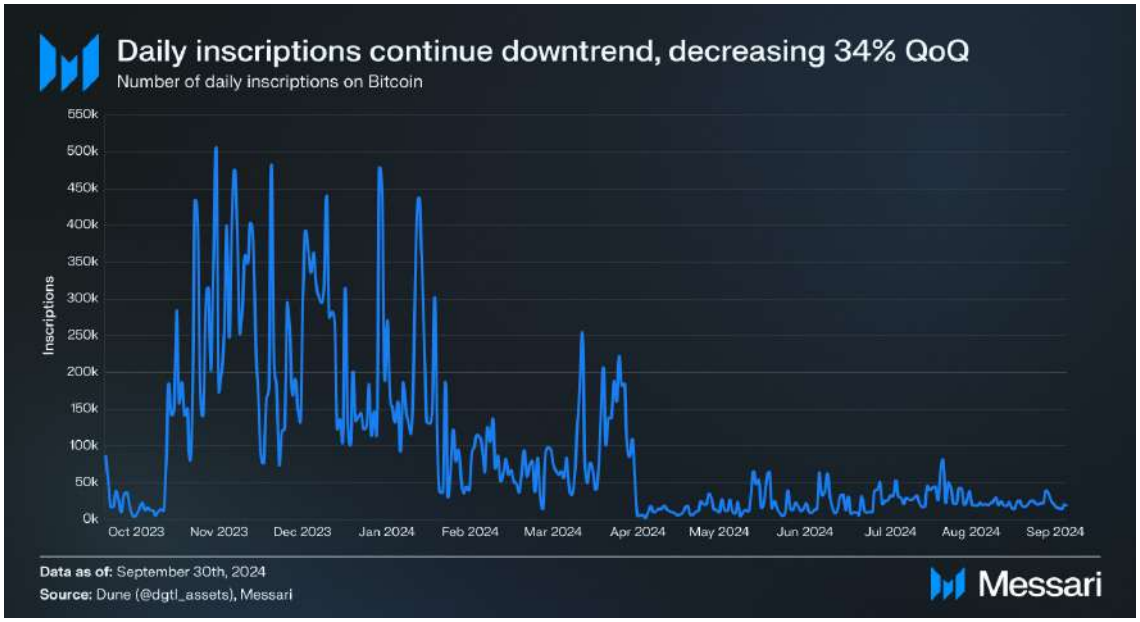
While Bitcoin has rapidly repriced following Trump’s victory, eventually the administration will need to deliver on some of their claims. A federal strategic Bitcoin reserve would be particularly influential although we predict there is a low probability of this happening. The market seems to be approaching the Trump administration with guarded optimism, and if the President can achieve some of the higher-probability action items, it could build enough goodwill to sustain Bitcoin euphoria moving forward.

Following the 2024 election, where the impact of clear and positive crypto reform became a needle moving issue across all governmental branches, we believe crypto is on the verge of bipartisan support. The implications of this are momentous, and helps clear the regulatory overhang over Bitcoin for the foreseeable future.

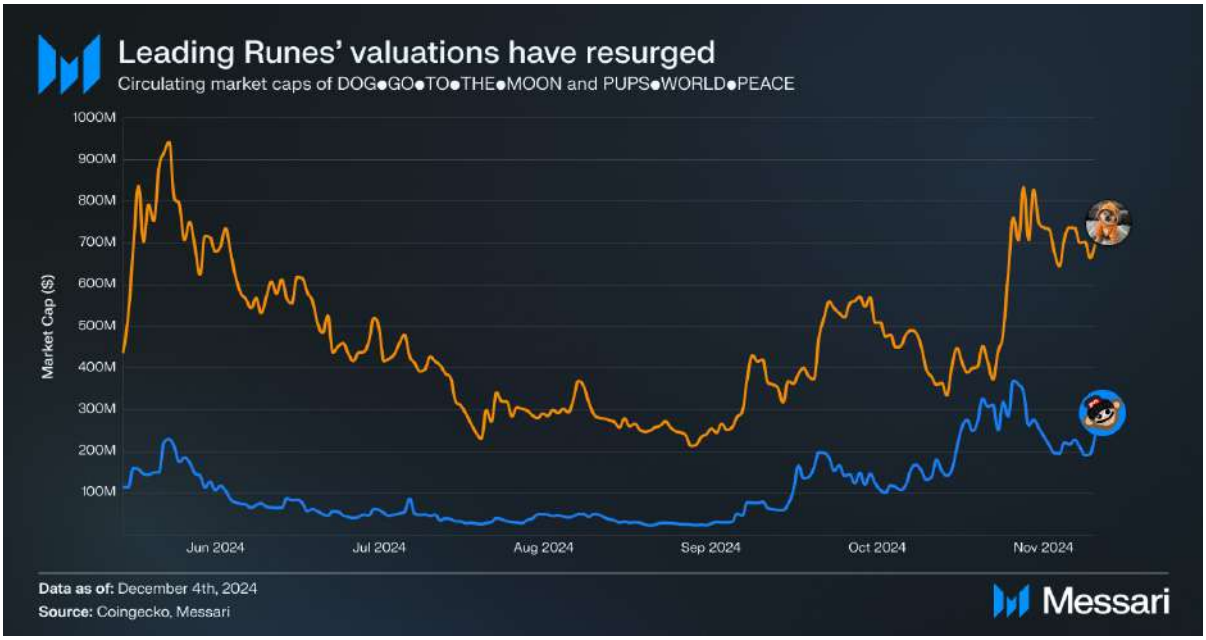
The Bitcoin Network - 2024 Review

Ordinals and Runes - Adding Fun to the Bitcoin Network

A landmark moment occurred in late 2022 when Casey Rodarmor, made the first official mainnet inscription, which resulted in the creation of Bitcoin Ordinals. Ordinals, the result of small bits of data inscribed onto individual Bitcoin satoshis (the smallest unit of BTC), spread like wildfire in 2023. Data being inscribed could take the form of immutable images that other wallets could buy or sell, meaning NFTs now existed on Bitcoin. While the total amount of inscriptions contracted sharply in 2024 vs. 2023, individual Bitcoin NFT collections have done well.



In April during the halving, Casey introduced a follow-on protocol, titled Runes, which represented a new fungible token standard for Bitcoin similar to ERC-20s on Ethereum. Like Ordinals, Runes are etched into existence on top of underlying BTC, but this time, creators could allow for unit divisibility. The result was that for the first time ever, Bitcoin had "alts" on mainnet, with no change to the underlying network needed. Today Runes allow participants on the Bitcoin network to buy a growing number of memecoins and "culturecoins", adding more diversity to the chain's tradable assets. There have been signs of early demand, although selectively, as top Runes like DOG•GO•TO•THE•MOON and PUPS•WORLD•PEACE still command nine-figure valuations.

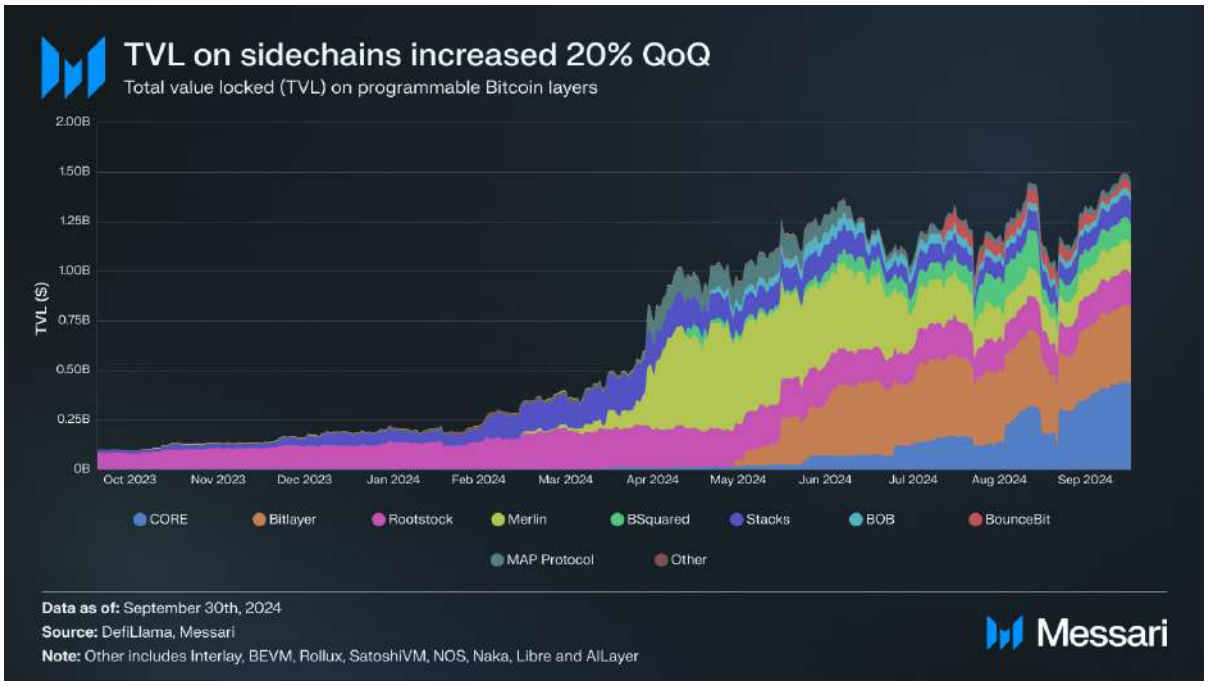


Bitcoin Programmability - A Complete Overhaul

The surge in Runes and Ordinals related activity has led a call-to-action for Bitcoin stakeholders and builders to consider allowing for greater programmability on the Bitcoin network. This demand stems from the Bitcoin network's fundamental design, which prioritizes security and decentralization above all else. These trade-offs, while ensuring Bitcoin's unparalleled resilience as a store of value, have historically limited its capacity to support expressive smart contracts or nuanced transaction types, such as those enabled by programmable virtual machines on Ethereum or Solana.

The Bitcoin network was deliberately designed to fulfill a singular purpose: to be the most secure and decentralized digital currency. While this simplicity has fortified its role as "digital gold," it also means that creating applications like decentralized finance (DeFi) or advanced transaction types has not been truly possible within Bitcoin's base layer.

BitVM has emerged as a significant catalyst for innovation, offering a way to execute arbitrary computations offchain and verify them on Bitcoin mainnet, similar to mechanisms employed by Ethereum rollups. This development opens up Bitcoin to the possibility of rollups, decentralized bridges, EVM-compatible smart contracts, and other foundational elements that are commonplace on more versatile blockchains today.



Efforts to enhance programmability in the Bitcoin ecosystem are growing rapidly following BitVM, extending beyond base-layer protocols into the development of the "Bitcoin L2 Season" in 2024 with over 40 layers in testnet or mainnet. While many of these layers are still evolving into true Layer-2 solutions from sidechains, there is significant momentum toward less custodial and more Bitcoin-integrated models. This year, CORE, Bitlayer, Rootstock, and Merlin Chain have led programmable layers in TVL, and it remains to be seen whether they will develop into full-

fledged ecosystems. The emergence of BitVM and similar projects has fueled interest across various environments, laying the groundwork for future innovations and more sovereign, trust-minimized solutions.

Bitcoin Staking - Evolving Utility for BTC

A new development in 2024 was the introduction of Bitcoin staking. Babylon, launched in Q3 of the year, is Bitcoin's first staking protocol, allowing BTC holders to stake their assets to secure other networks and earn rewards. Similar to Ethereum's EigenLayer, Babylon leverages Bitcoin's massive economic security for shared security across Proof-of-Stake (PoS) networks. Unlike current forms of BTC staking, bitcoin remains on its mainnet, and holders can delegate security without giving up control of their BTC.

Babylon's first staking round for 1,000 BTC occurred in August, hitting its cap within six blocks. Liquid Restaking Tokens (LRTs), like Lombard's LBTC, allow staked BTC to be restaked into Babylon and other restaking protocols, enabling native yield while maintaining liquidity and DeFi composability. Over time as Babylon's staking cap increases, more staked BTC will shift to Bitcoin mainnet, an exciting new yield source for native BTC holders.

Looking Ahead - Predictions for 2025 and Beyond

2024 saw Bitcoin transform from a static chain meant to acquire and house BTC, to a growing ecosystem of new token standards and utility. The Bitcoin network is going through an identity change, and while it seems like development will continue to move forward, the actual demand for these new categories is uncertain.

On Runes and Ordinals, we think the dust has largely settled, and the opportunity is enticing into 2025. As memecoins on both Solana and Ethereum continue their upward trajectory, it seems highly possible that attention will eventually shift towards Runes on Bitcoin, the largest chain by economic value. For Ordinals, any revitalization in NFT sentiment will likely include leading Ordinals collections like Bitcoin Puppets and Node Monkes, which have formed communities all over crypto social media. We have highlighted that for the next leg up to occur for these assets, there has to be continued evolution in the user experience, which is currently characterized by slow block times, subpar liquidity, and limited programmability. Magic Eden is a driving force in improving better UI / UX for Bitcoin, increasing its platform's monopoly over Ordinals and Runes transactions. We expect them to be the clear winner if the Bitcoin ecosystem takes off.

Messari subscribers can read more about Runes and Ordinals trends, and what might drive a rerating of this sector here.

Bitcoin programmability and BTC staking are still nascent, with early TVL growth not yet substantial enough to indicate real demand. This space is worth monitoring, as AVSs and layers on Bitcoin could claim the utmost levels of decentralization and economic security, even compared to Ethereum. However, in 2024, consumers largely favored the performance capabilities of networks like Solana and Base, placing less emphasis on decentralization and security. If this trend continues, Bitcoin builders will be fighting an uphill battle, as the Bitcoin network has never been and most likely never will be optimized for programmability, utility, or performance. Despite this, the addressable market on Bitcoin offers significant upside; we have noted that even a low single-digit penetration rate for BTC utility could lead to an inflow of value exceeding $30 billion. We're just going to need more evidence that this is what users want.

The Sector Theses

Ethereum

Author: Kunal Goel

Year in Review

Ethereum did not have a stellar year. While there were positives throughout the year, the dominant theme was ETH's significant underperformance against other major crypto assets, most notably, Bitcoin and Solana.

Ethereum has often tried to position itself as a contender to Bitcoin's hard money narrative. Bitcoin has programmed issuance with a finite supply, but Ethereum challenged that with negative inflation and reducing supply becoming "Ultra Sound Money". However, Ethereum's supply inflated throughout 2024 because of low activity. Furthermore, ETH ETFs saw limited adoption at first, only beginning to gain momentum recently.

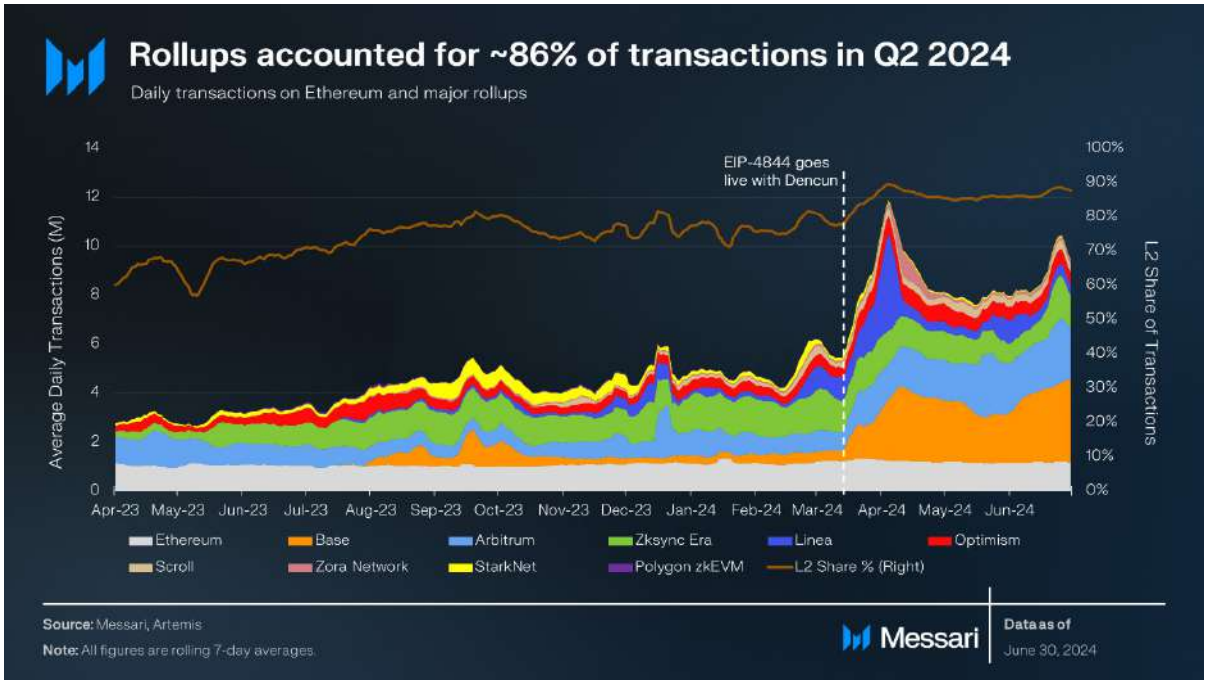
On the other hand, Ethereum is the leader among smart contract platforms with Solana emerging as the most prominent challenger. Throughout 2024, Solana gained ground on Ethereum. Solana became the primary home for speculation with memecoins leading it to outperform on key metrics such as transaction fees and DEX volumes. Solana eroded the years of head start that Ethereum had. Despite the growth in Layer-2 activity on Ethereum, prominent investors raised questions about whether this growth was value accretive or ultimately extractive.

Unsurprisingly, the crypto community wondered, "Is Ethereum Good?"

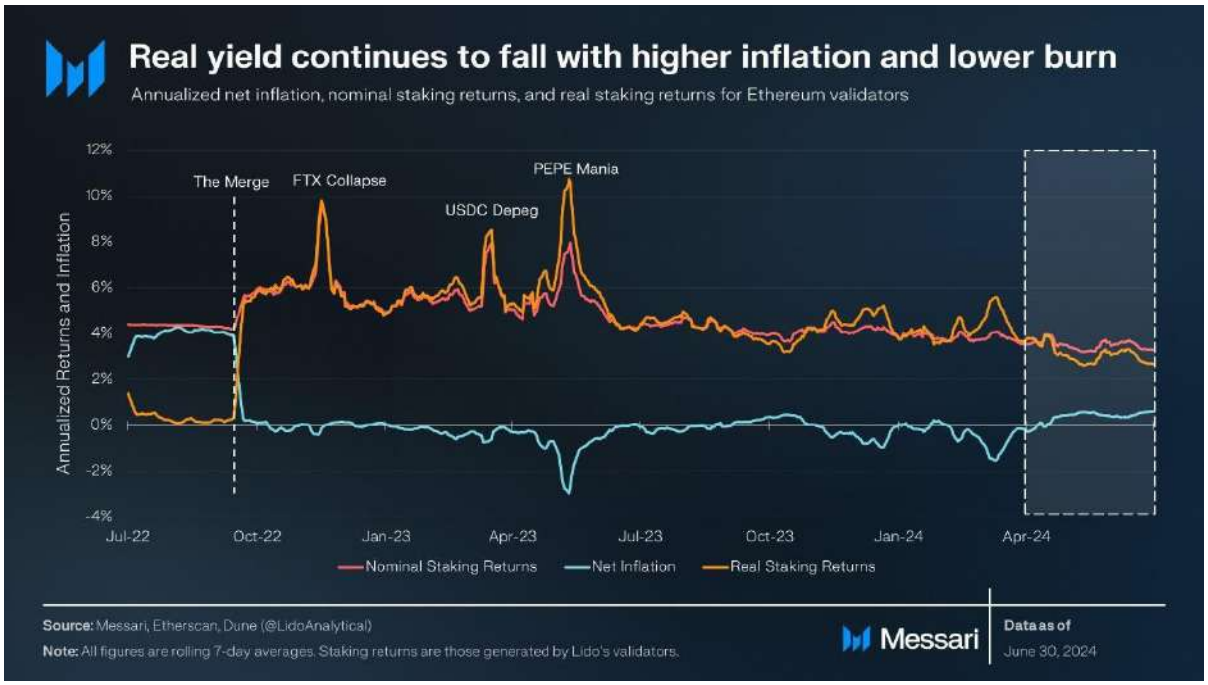
The Good, Bad, and Ugly

Ethereum spot ETFs were approved in July 2024, catching even TradFi experts by surprise. The spot ETF approval was a highly anticipated event that put Ethereum into an exclusive club alongside Bitcoin. The Ethereum community took this as a sign of ETH being cemented as the only other store-of-value competing with Bitcoin.

However, Ethereum ETF flows could not compete with Bitcoin's. TradFi experts were right when they predicted that ETH is "small potatoes" compared to BTC for institutions. The cumulative flows for Ethereum were just $33.6 billion compared to Bitcoin's $590 billion. Recently, though, flows have started to pick up, hinting at a potential turnaround and increasing institutional interest in ETH.



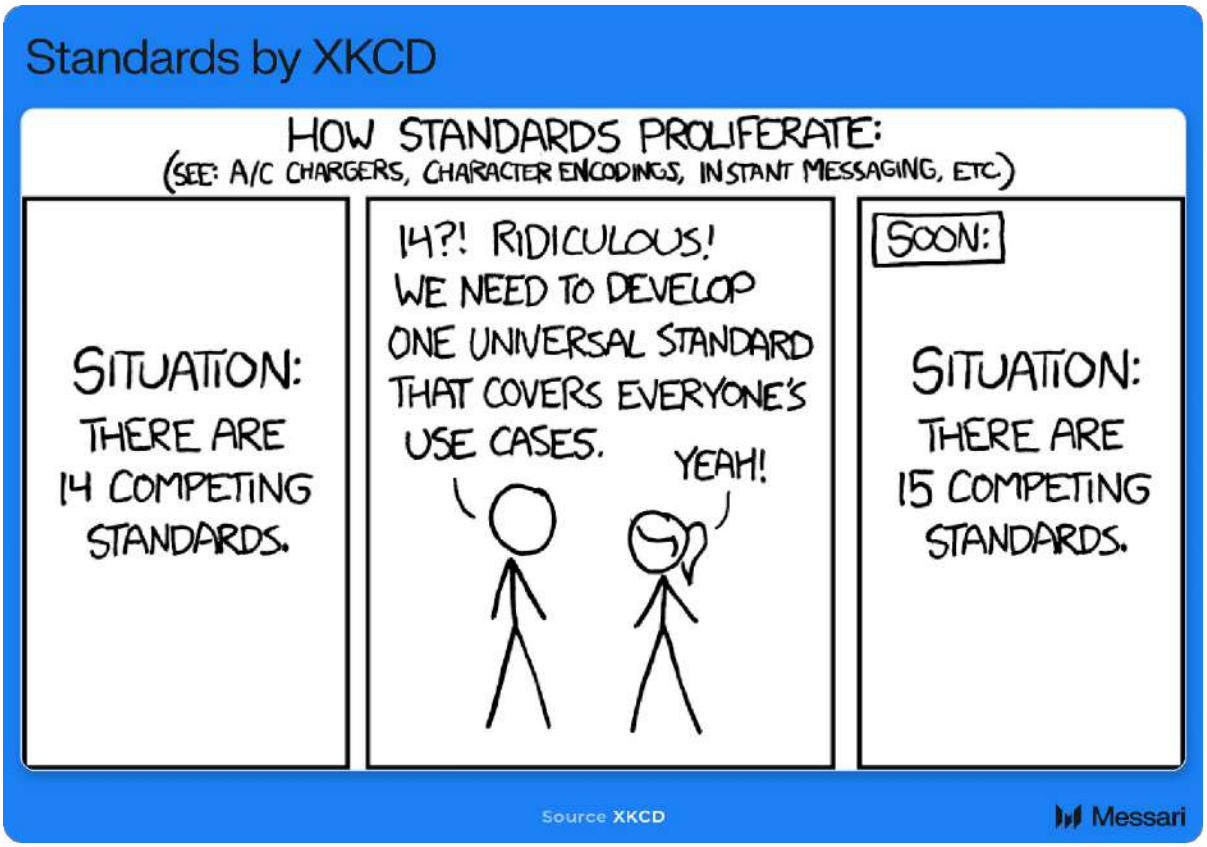
The brightest spot in Ethereum's year was the consistent growth of Layer-2s. Ethereum's rollups scaled Ethereum's throughput capacity by 15 times by the end of 2024, with a cumulative throughput of ~200 transactions per second compared to Ethereum's ~14. Base's growth has been particularly impressive leading some to say that the future of Ethereum is Coinbase. While this was perhaps said mockingly, it is a positive sign that industry veterans such as Coinbase, Kraken, World (Worldcoin), and Uniswap are building Ethereum-based Layer-2s.



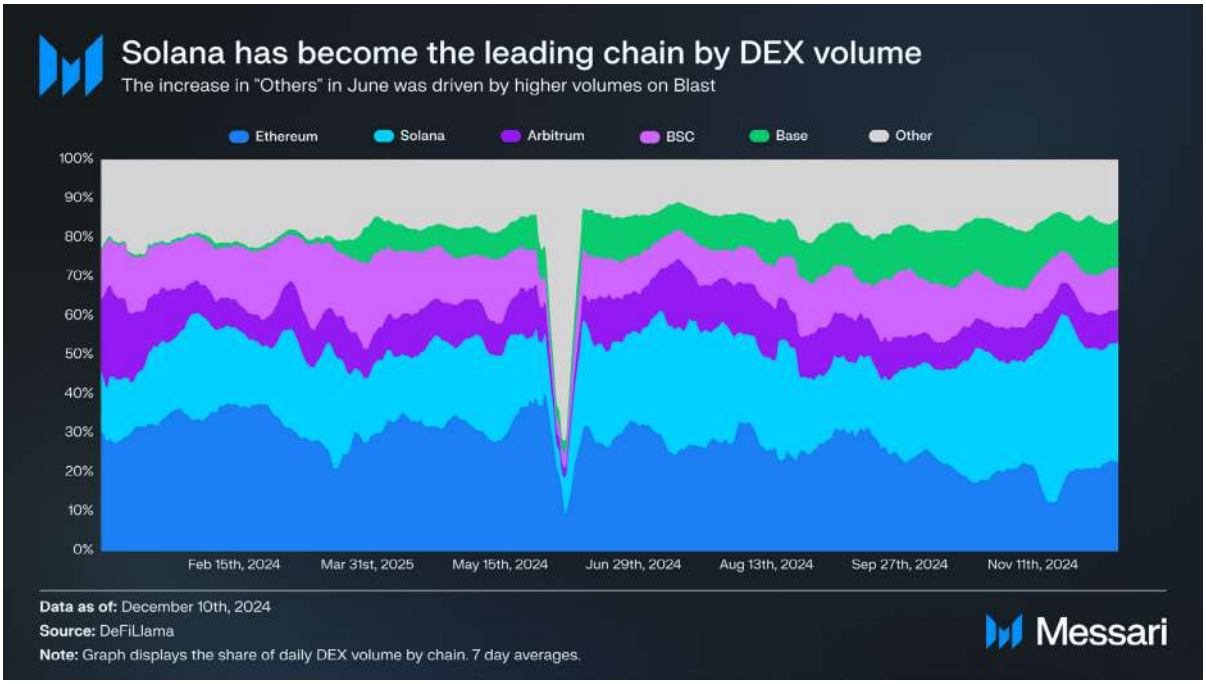
However, the growth of L2s has also meant that the activity on Ethereum mainnet declined. The lack of mainnet activity meant Ethereum saw consistent inflation for the first time since the

Merge. Even more concerning was that Ethereum was not able to effectively monetize its data availability service. Blob fees stayed at the minimum one wei for long periods of time.

This mismatch between growing L2 profitability and non-existent DA fees is the core argument behind the idea that L2s are extractive. Multiple solutions have been proposed to address it beyond relying on market forces to push DA higher with an ever-increasing number of rollups. EIP-7762 increases minimum blob fees such that price discovery is quicker during periods of high demand. Additionally, different rollup designs such as based and native rollups return more value back to the Layer-1.



Layer-2s have also contributed to fragmentation, worsening the user and developer experience. Multiple stopgap solutions have been implemented and even more solutions proposed. Holistic and neutral chain abstraction solutions like Particle Network and Polygon's AggLayer are still in early phases of implementation.



Perhaps the biggest change this cycle has been that Ethereum is no longer the primary home to crypto-native speculation. Thanks to the success of Pump Fun, there are 8 times more tokens launched on Solana compared to Ethereum. The lack of crypto-native speculation on Ethereum has led to its DEX volumes falling and Solana now regularly exceeds Ethereum in DEX volumes.

Outside of memecoins, other Ethereum-native narratives did not deliver on their promise in 2024 either, notably:

- EigenLayer and restaking were among the hottest trends in Q4 2023 and Q1 2024 but AVSs have not yet found product-market fit.
- Friend.tech did not deliver the future of SocialFi.
- Even the attention on Farcaster and Lens has fallen somewhat.

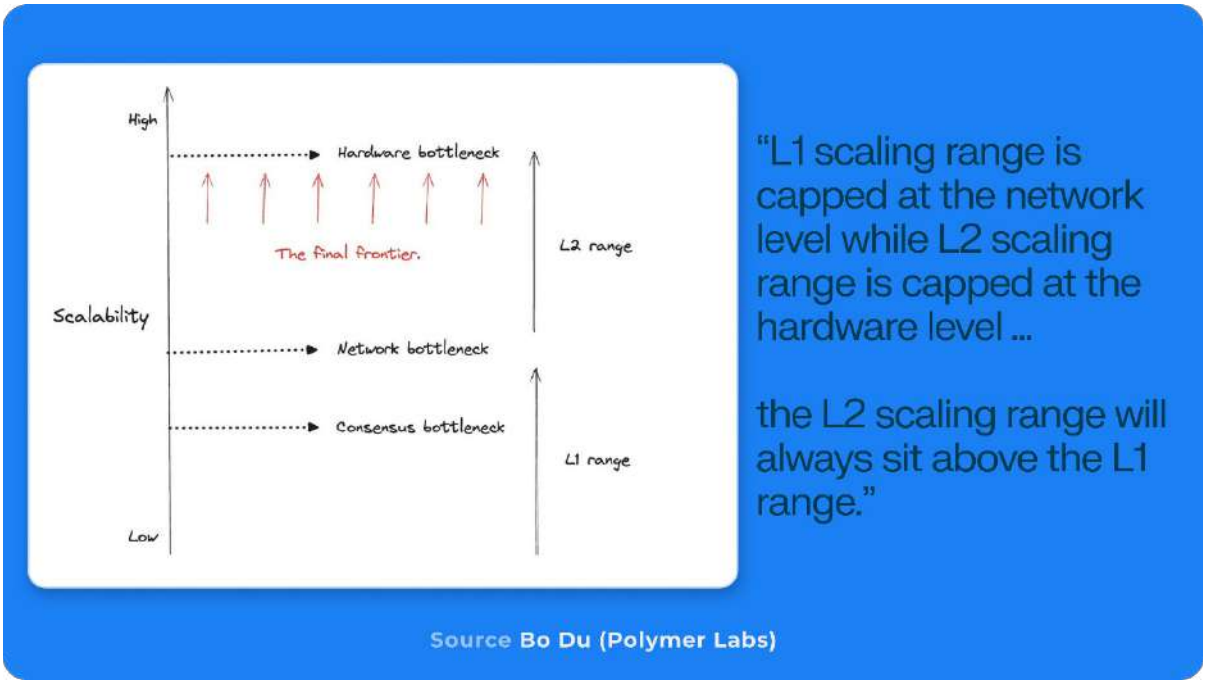
While serious investors are likely to ignore speculation, in crypto, speculation drives innovation. DeFi speculation in 2020 created the DeFi sector and exposed Ethereum's limitations on the base layer. Speculation also attracts more users and builders generating long-term value. A greater share of speculation on Ethereum or its L2s would have led to more revenue, better sentiment, and likely higher growth.

2025 and Beyond

Ethereum is the middle child of crypto. It competes with Bitcoin on money, and with newer chains on being the platform for decentralized innovation. The critics argue that it does both jobs worse whereas the believers argue that it does both jobs well enough. In our opinion,

Ethereum does not have a marketing problem and does not need a North Star. However, there are low- to no-cost improvements it could implement to better serve its users.

L2 is Greater than L1



The rollup roadmap works. In fact, it works so well that rollups (or network extensions) are being developed even for fast chains like Solana. The Layer-2 design allows for flexibility in execution that a native Layer-1 cannot match.

- High throughput L2s such as MegaETH have theoretical capacity that is much higher than any fast L1s since they do not have consensus overhead.
- Appchains allow for greater expression in design, creating opportunities for better tradeoffs for the app. For example, an L2 focused on trading may prioritize order cancellation over other types of transactions making it better for market makers and therefore have better liquidity. Or an L2 like Worldchain can allow for a certain number of free transactions per verified human without compromising the network health.

As such, we believe execution is most likely to occur at the L2 layer. Native Layer-1s will always have to adapt to a different model like Celestia has for DA or settle for being good enough.

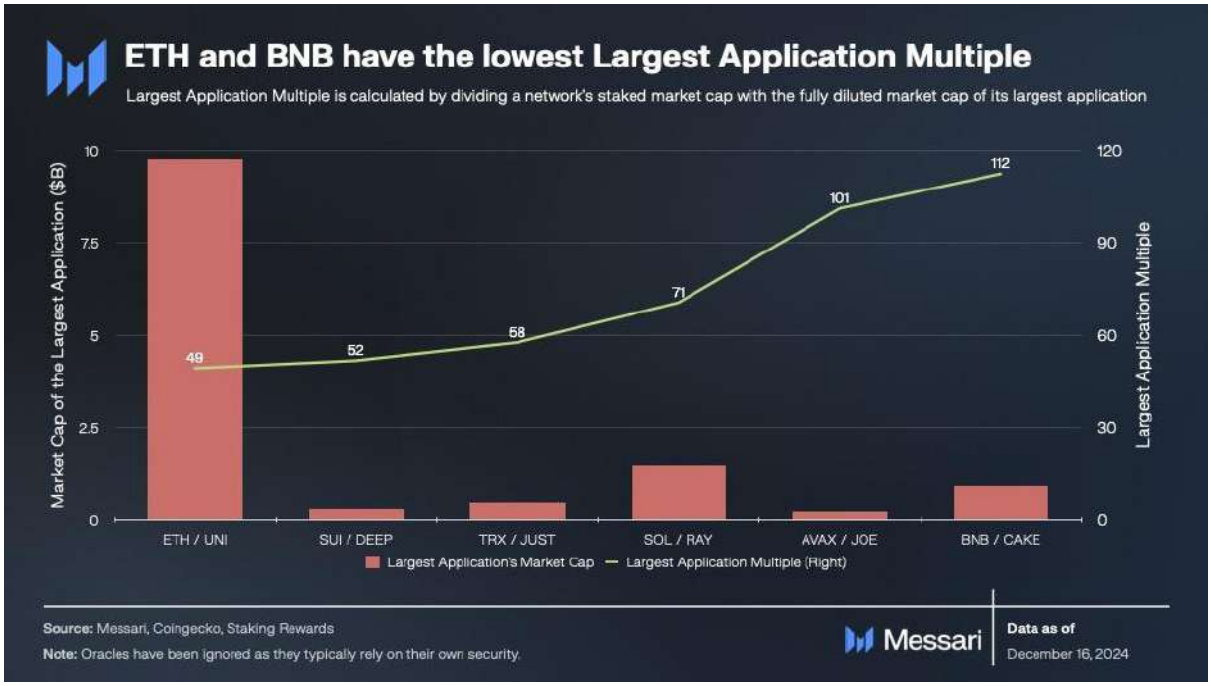
Value Capture

If the above is true and DA is also a commodity, it would seem that Layer-1s have a problem of

value accrual. This problem is true for Ethereum and also extends to fast L1s like Solana but perhaps less so. There are two different ways to address this.

Fees Are Not Important

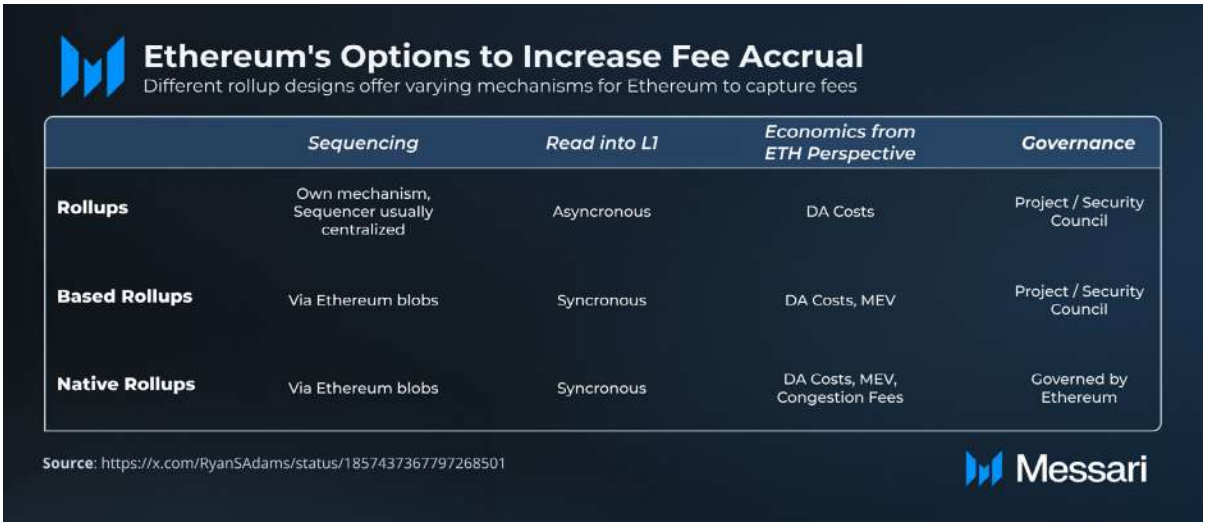
We recognize the importance of cash flows, but do not believe that fees are the primary driver for value of Layer-1 native assets like BTC, ETH, and SOL. First, current fees are primarily driven by speculation which may or may not last. Second, fees are typically denominated in the native asset itself which creates a circular problem for valuation. Third, we believe that low fees are good as long as the network economics are sustainable.



Our crypto native model for valuing Layer-1s is Demand for Security. This model establishes a holistic positive relationship between a Layer-1 and all its applications. The largest application on a Layer-1 creates the highest demand for security, driving the native asset's value. Even other models like store-of-value and medium-of-exchange may be directionally more correct than fees and cash flows.

Capture More Fees

Even if fees only set the floor, Ethereum may still want to capture more fees to be economically sustainable. Three different choices can allow it to achieve this:



- Based and Native Rollups – Based and Native rollups use the Layer-1 for more functions and therefore allow it to capture more value. However, they have slower block times and as such worse UX and limited adoption. Future upgrades like preconfirmations and improvements like shorter block times can help improve their user experience.
- Higher DA Fees – As discussed earlier, DA fees may either grow through market forces or can be increased by a protocol upgrade like EIP-7762. There is also a theoretical outcome that if DA fees enter price discovery and L2s compete to post blobs, Ethereum can indirectly capture fees from MEV on the L2. Only when this occurs, can it be empirically proven if Ethereum DA is differentiated, as L2s would switch to cheaper DA layers if it is not.
- Scaling the Base Layer - A part of the community wants Ethereum execution to be good enough to compete with vanilla-EVM L2s. Max Resnick is a vocal supporter of the latter and has proposed improvements on the base layer like multiple concurrent proposers. These improvements will also help with interoperability between the Layer-2s which Ethereum desperately needs.

ETH is Almost Good

Ethereum has multiple paths to success. One mega rollup, a network of interconnected based-rollups, and high fee burn are all loose fundamentals that can make it the home once again for crypto natives and new entrants. Capturing market share among natives will likely lead to institutional interest to follow, creating a positive flywheel of growth. Anyone in Ethereum's decentralized network of loosely connected builders can help it achieve this which gives us a reason to believe that it may happen.

The Sector Theses

Solana

Author: Matt Markewicz

In last year's theses, we called Solana the comeback player of the year. Over the past twelve months, it's become clear that this resurgence was no simple regression to the mean after the FTX collapse. Instead, it laid the groundwork for a breakout 2024 in which Solana definitively crossed the chasm. What once stood as a two-horse race between Bitcoin and Ethereum has evolved into a Big Three that now firmly includes Solana.

Network Overview

2024 Review

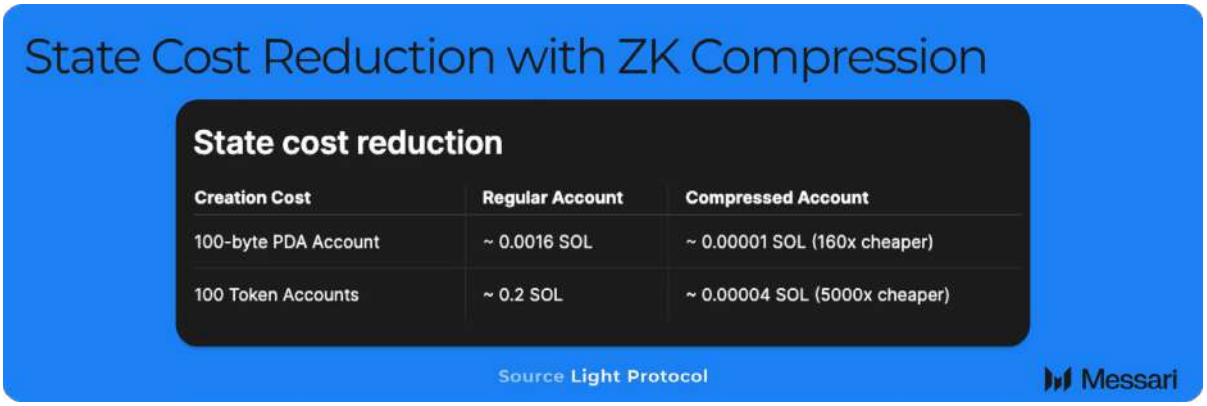
The long-anticipated Firedancer client debuted on mainnet in a limited capacity this year with a lightweight version of the new software dubbed "Frankendancer. Developed by Jump Trading, Firedancer is a high-performance validator client for the Solana blockchain designed to enhance transaction processing speeds and scalability. It will be rolled out in a phased release, with this initial release supporting only changes at the networking layer. Currently, the runtime still depends on the existing Agave client, meaning that core client software bottlenecks will not be fully addressed until the complete Firedancer implementation is complete.

Token Extensions, a component of a new SPL standard for Solana-based tokens, were released in Q1 to bring more configurability to developers. Token Extensions were adopted quickly thereafter on mainnet, as evidenced by Paypal's PYUSD's adoption of the new standard, with a notable focus on confidential transfers. Below is a description of some Token Extensions and potential use cases.

Extension	Description	Potential use cases
Confidential transfers	Protects the confidentiality of users balances within a transfer, as well as hiding transaction amounts	Onchain payroll, B2B payments, treasury management
Transfer hooks	Gives the token issuer control over which wallets can interact with their token and how tokens and users interact	KYC verification, token- gated access, royalty enforcement
Transfer fees	The ability to charge fees at the protocol level	Permanent royalties, publisher fees, transaction fees
Permanent delegation	Allow a program to have irrevocable authority over a token	Automatic subscription services, updating real world assets to reflect reality, stablecoin regulatory compliance with freeze & seize orders
Metadata pointer	Establish verifiable links between tokens and metadata	Token verification, accounts receivable attribution
Default account state	Configure and enforce token account permissions	KYC verification
Non-transferrable tokens	Makes it impossible to reassign the owner of a token, except by issuer	Managing an external database, non-transferrable mints of NFTs or other assets

Messari
Note Non-exhaustive Solana Token Extension List
Source X | @milesjennings

While most will associate Solana with cheap transaction fees, onchain state storage was one of the more costly operations that application developers historically had to deal with. Helius Labs and Light Protocol collaborated on a solution in 2024, ZK Compression, which compresses multiple account states into a single onchain account. The cost savings for operations like minting a high volume of accounts were reduced dramatically, as evidenced by Helius cofounder Mert Mumtaz's findings that the cost of conducting a million address airdrop fell from nearly $260,000 to $50.



Even though Solana's north star is to make the base layer as performant as possible, application teams notably began developing L2-like constructions known as Network Extensions, such as Zeta Market's upcoming L2, Bullet. While it remains to be seen just how successful these

Solana-native L2s will be, many of Solana's core properties, like fast block times and cheap proof verification, are desirable for both smart contracts and rollups.

Solana was mired with instability issues and frequent outages in the not-so-distant past. However, core changes to the protocol have dramatically improved network uptime. There was a 5-hour outage early this year in February and occasional bouts of congestion, but given the sheer volume of transactions and increase in application usage, the relative stability of the Solana network was impressive this year.

Messari was early in Q2 2023 to call out Solana's comeback. Our analysts regularly write about Solana, including here (token extensions), here (zk compression), and here (Firedancer). Also, read our most recent report, "What Are Markets Pricing Into Solana's Fee Growth."

2025 Outlook

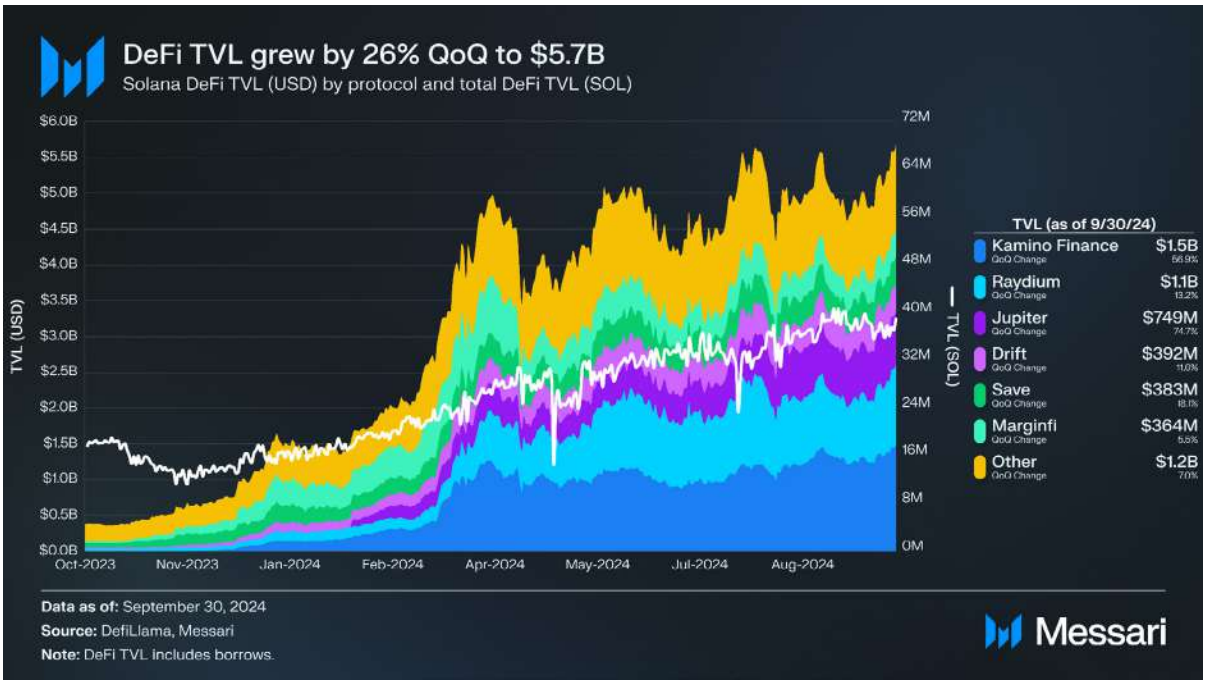
The full Firedancer implementation is slated for 2025, which should significantly enhance client diversity on the network. In theory, this added diversity will improve both liveness and security by reducing reliance on a single client codebase. However, it's possible that the immediate performance gains may be muted if other client implementations remain a bottleneck, delaying Firedancer's full impact until other clients can evolve and become more performant.

Looking ahead, the first Solana L2s are expected to launch next year. Their performance in real-world conditions will be closely watched, as it could influence Solana's engineering roadmap and push development more aggressively toward Network Extensions. In subsequent chapters, we discuss these emerging trends—particularly how applications are shifting toward vertical integration via rolling their own L2s. But the activity already underway is telling: teams such as Solforge and Sovereign Labs are building out the tooling that developers need to create their own Network Extensions, reinforcing Solana's position as a serious player in the evolving L2 landscape.

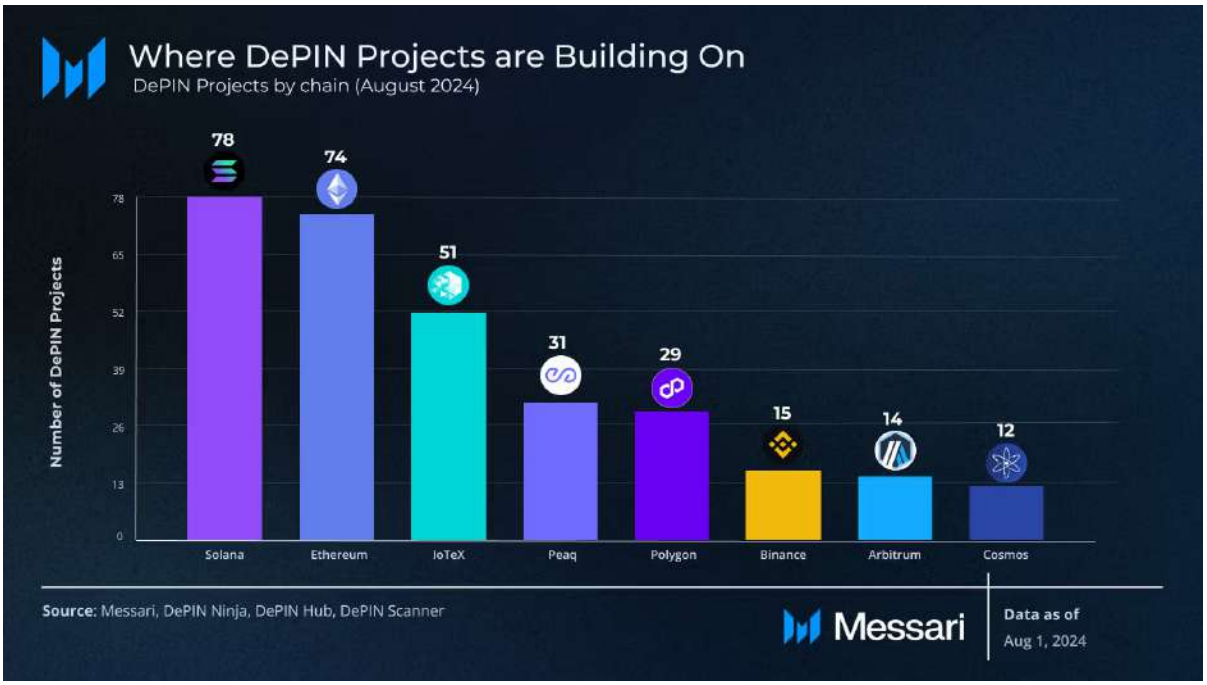
Application Ecosystem

2024 Review

Reminiscent of the early Ethereum days, it truly paid to be a Solana user in 2024, as projects like Jupiter, Tensor, Kamino, Drift, and Parcl collectively airdropped over $1 billion to their communities. This massive wealth effect rippled through the ecosystem, fueling a surge in DeFi participation that pushed TVL from $1.5 billion at the start of the year to over $9 billion as of this writing. Core DeFi infrastructure matured in parallel as lending platforms integrated new stablecoins and onchain derivatives gained traction. Stablecoin issuance also skyrocketed, climbing from $1.8 billion to nearly $5 billion, further enriching the network's liquidity base. Beyond DeFi, consumer-focused innovations—from embedded wallets and Blink-powered URLs to upcoming mobile devices—broadened the design space for onchain applications.

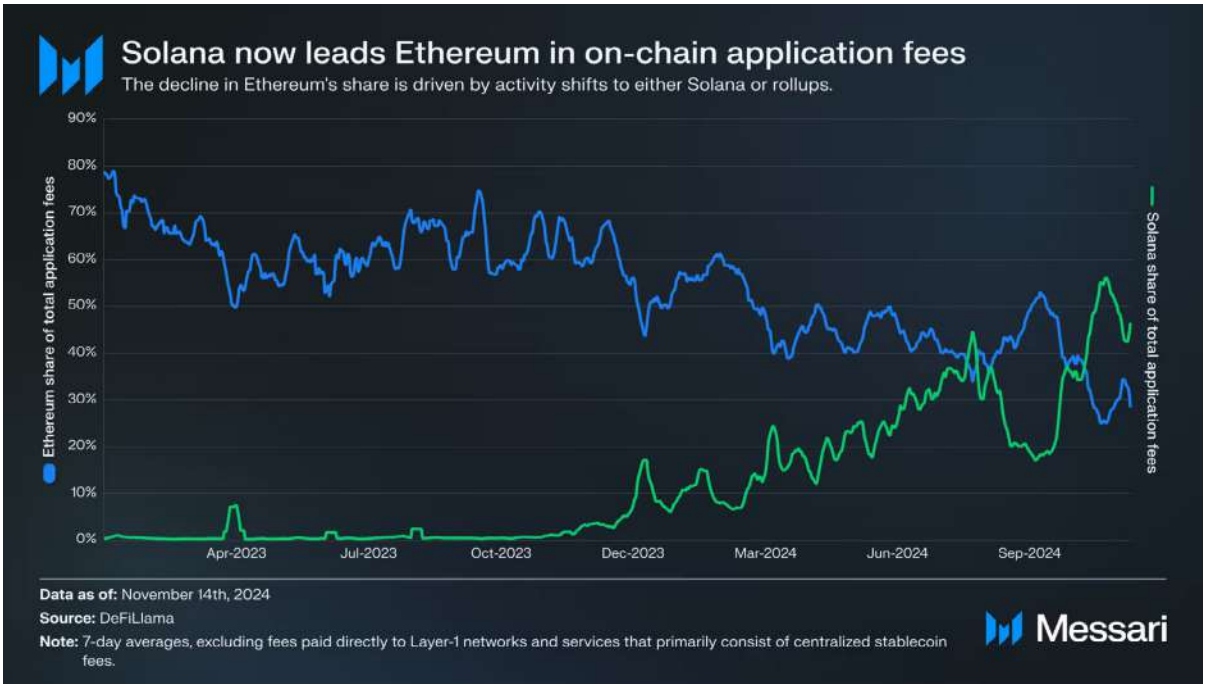


One of our favorite sectors to cover this year was DePIN, and Solana was squarely in the spotlight. When we wrote a DePIN sector recap back in August, we found that Solana was the leading L1 by number of DePIN applications on the network, with 78 projects deployed on the network as opposed to 74 on Ethereum as leading DePIN projects like Helium, Render, Hivemapper, and a growing number of GPU networks like io.net, Nosana, Shaga, Kuzco, and others all call Solana home. We will talk about DePIN in more depth in a later chapter. If you're interested in the sector, you should definitely check it out.



Solana also positioned itself as a home for speculation, especially through memecoin trading. Seamless UX from ecosystem wallets, alongside platforms like pump.fun and Moonshot, made

launching and trading tokens easier than ever. Phantom's periodic ascension above Coinbase in the iOS App Store rankings underscored the growing preference for Solana's simplicity over older mainstays like Metamask. This flurry of onchain activity even propelled Solana to occasionally surpass Ethereum in onchain application fees, highlighting the network's accelerating momentum and retail appeal.



Messari Protocol Services provides data-driven quarterly reports on the State of Solana.

2025 Outlook and Trends

Ecosystem Expansion

If fundraising activity is a leading indicator of application ecosystem success, Solana is poised for another significant year. With $173 million in funding in Q3 2024 alone, Solana achieved its strongest quarter since Q2 2022. Investors are eager to capitalize on lucrative opportunities within Solana's applications, reigniting the ecosystem that had largely faded after the FTX collapse. Consequently, users stand to benefit from a broader array of onchain products and services.

We're also looking forward to applications that move beyond speculation. While there is no shortage of projects building on Solana, we are particularly excited about MetaDAOs' prediction markets powered by governance frameworks, energy-focused DePIN protocols like Energy Networks—which we project to have the largest TAM in the entire DePIN space—and Rome Protocol's shared sequencer as Solana begins to support more modular building blocks. Additionally, although it's still early for Network Extensions, the emerging Solana L2 ecosystem is worth watching to see if they can compete effectively with their counterparts on Ethereum.

One of the most significant emerging trends in the latter half of this year was the integration of AI into the crypto ecosystem, particularly through AI agents. While we dedicate an entire chapter to the intersection of AI and crypto, it's important to note that some of the first-mover agentic AI applications are built on Solana, like ai16z, which has become one of the most trend-worthy repos on all of Github. The Solana ecosystem is not just embracing the intersection of AI and crypto; it's pioneering it.

TradFi Interest

In TradFi circles, conversations about crypto increasingly include Bitcoin, Ethereum, and now Solana. Shortly after the US presidential election, a flurry of SOL spot ETF filings from VanEck, Bitwise, and 21Shares indicated a growing demand for ETF wrappers over the SOL asset.

While Bitcoin is often viewed as digital gold and Ethereum as the established smart contract platform with compelling tokenomics, Solana is carving out a differentiated value proposition as the most performant crypto platform with remarkable momentum. Ethereum ETF inflows have accelerated as we close out 2024, signaling increased confidence in non-BTC-related financial products. If this trend continues, investors are likely to seek exposure to "tech plays" in the space, with Solana emerging as the fastest horse. A spot Solana ETF going live in the next year or two feels inevitable, and a more laissez-faire regulatory landscape may create the perfect storm for an explosive second leg in Solana's narrative, fueled by pent-up institutional interest.

Increased Competition

While Solana has established a substantial lead in the high-throughput, general-purpose smart contract space, credible competitors are gaining momentum. Sui and Aptos have had strong years, and an entirely new crop of Layer 1 blockchains (like Monad, Berachain, and Sonic) is expected to emerge next year, which we discuss later in the report. Additionally, L2 solutions on Ethereum are picking up momentum, particularly in verticals poised for growth in the coming year, such as a resurging DeFi, AI agents, and consumer applications, led by platforms like Base and a host of upstart L2s.

Parting Thoughts

Solana was undoubtedly the top L1 not named Bitcoin this year. Importantly, Solana capitalized on three of the biggest narratives over the past year: memecoin trading, DePIN, and AI agents. With success comes increased competition, but the onus is on newcomers to carve out their own niches. Solana is uniquely positioned heading into 2025 as its primary competitor, Ethereum, grapples with an identity crisis, and upstart L1s still have work to do to match Solana's distribution, robust application ecosystem, and support from venture firms. We are bullish on Solana for 2025, driven by its strong momentum and pioneering innovations in applications.

The Sector Theses

Other L1s + Infra

Author: Matt Markewicz

High-Performance General Purpose L1s

2024 Review

This year, headlined by Ethereum's identity crisis and Solana's remarkable growth, favorable conditions were created for last cycle's rookies, Sui and Aptos. Both networks have surpassed the $1 billion Total Value Locked (TVL) milestone, signaling increasing developer and user confidence in exploring high-performance alternatives to the Ethereum Virtual Machine (EVM). While much of their ecosystem growth stems from their native DeFi ecosystems, both projects have focused heavily on advancing their consensus mechanisms—Sui with its Mysteciti upgrade and Aptos with its ambitious Raptr proposal. Heading into the new year, both protocols are building on strong momentum, setting the stage for a competitive battle for mindshare among the emerging Move VM-based chains.

TON came roaring onto the scene out of relative obscurity, largely due to a surge in mobile games on the Telegram platform. While activity has died down substantially since the summer, TON arguably has the largest distribution funnel of any major L1 with direct integration of its Mini-apps in Telegram. In July, TON networks' TVL peaked at over $700 million, primarily driven by its two largest decentralized exchanges (DEXs), STON.fi and DeDust. Additionally, TON's GameFi sector was key in driving adoption, with projects like Notcoin accumulating over 40 million users and Hamster Kombat reportedly reaching 200 million users, enhancing both user engagement and TON's token circulation. It'll be worth watching to see if they can support applications that achieve real, lasting usage.

Tron continues to be a formidable player in the payments space, with nearly $60 billion in stablecoins in circulation. In November, Tron's monthly stablecoin transfer volume exceeded $500 billion, leading the total fees paid on the network to double throughout the year.

Messari Protocol Services offers broad coverage of L1s, including Sui, Aptos, and Tron. Subscribers can read more about TON in "Evaluating The Open Network's Onboarding Thesis" and Tron's stablecoin dominance in "The Stablecoin Leapfrog: How Emerging Markets are Bypassing Traditional Banking."

2025 Outlook

Next year, we'll be watching Monad and Sonic as two of the general-purpose, high-throughput, "monolithic" L1 launches. Both have focused primarily on scaling the EVM to its theoretical limit and fundamentally challenge the notion that you need multiple chains to scale blockspace, as they target >10,000 TPS on the base layer and 1-second or less finality times. The technical differences between these two are beyond the scope of this report, but the chains boast impressive transaction throughput numbers, and both projects have amassed massive war chests ($225 million for Monad, ~$250 million in FTM tokens for Sonic) to court developers and bootstrap their application ecosystems.

Berachain is one of the most interesting experiments in the L1 space in a long time. While most other L1s focus primarily on performance, Berachain is focused on aligning incentives between validators, applications, and users via its novel Proof of Liquidity consensus mechanism. After raising $142 million across its Series A and Series B, more than 270 projects committed to supporting the network, showing incredible interest from developers and application teams. If you want to learn about Berachain and Proof of Liquidity, I recommend checking out our Berachain Tokenomics report that was released earlier this year.

Performant general-purpose L1s have driven fees sufficiently low for the most popular use cases, and chains keep getting faster. From an end user perspective, these chains just work. Blockspace is abundant, and users respond by transacting more onchain while developers are empowered to shed the infrastructure constraints of previous cycles to build great products. Expect continued momentum for high throughput, general-purpose execution environments for consumer-facing use cases.

Modular Building Blocks: Celestia and Data Availability Layers

2024 Review

Virtually all of the demand for data availability (DA) on Celestia came from Ethereum rollups aiming to reduce transaction costs, leading to the notion that external DA layers are merely "alt-DA" for Ethereum—essentially commodities with limited pricing power. Coupled with a nearly $1 billion unlock allocated towards contributors and early backers, it was a sluggish year for Celestia on the surface.

However, significant research breakthroughs and continued engineering progress solidified Celestia's technical roadmap, with clear paths towards massive scale, lightweight verification, and a new interoperability standard known as Lazybridging that has the potential to unify the currently fragmented rollup ecosystem. The DA space became more competitive in 2024 as EigenDA, Avail, NEAR DA, and others began rollout strategies, each with varied architectural approaches and tradeoffs.

Read more about NEAR DA in "State of NEAR Q3 2024."

2025 Outlook

We believe that cross-chain interoperability initiatives, like Celestia's Lazybridging proposal and Avail's Nexus ZK proof verification layer, have the potential to establish meaningful network effects for modular L1s in the back half of 2025. In particular, Celestia is on the precipice of becoming an ecosystem unto itself as applications decouple from more opinionated base layers for performance, customizability, and sovereignty. A lineup of projects like Astria, Forma, Hashflow's xOS, SpiceNet, and Prism should bring a healthy dose of DeFi, supporting infrastructure, and consumer applications to the Celestia ecosystem next year.

The success of Celestia and other modular L1s hinges on ecosystem development as their native ecosystems start building standalone ecosystems, moving beyond just DA to coordinating cross-chain activity and removing fragmentation bottlenecks across their respective L2s.

Messari subscribers can read more about our outlook for Celestia in "Celestia – The Fault in Our Stars."

Next Gen L2s

2024 Review

Three key themes in the L2 category have materialized meaningfully this year.

1. Applications are outgrowing their L1s and opting to roll their own L2s
Earlier this year, prominent Ethereum-based protocols began launching their own dedicated Layer-2 environments to overcome the limitations of traditional Layer-1 infrastructures. Frax, a stablecoin protocol on Ethereum, launched Fraxtal—an L2 designed to improve performance and generate additional revenue for FXS holders. More recently, Uniswap unveiled its long-anticipated Unichain, aiming to enhance scalability, consolidate fragmented liquidity, and potentially return MEV value to users and developers. Both Fraxtal and Unichain are built atop the Optimism tech stack, and OP Labs continues to flex its ecosystem development chops, as established organizations like Sony and Kraken have also announced plans to join the Superchain.

Spinning up a custom L2 offers significant advantages to applications. By customizing transaction sequencing, applications can effectively mitigate MEV risks, ensuring fairer transaction ordering and reducing vulnerabilities to extractive attacks. This tailored approach also allows for optimized tokenomics, enabling applications to design economic models that align precisely with their unique requirements, enhancing value capture, and providing more control over transaction fees and incentives. Dedicated L2s also open up the design space for lower-level customization, allowing developers to implement bespoke features and infrastructure that cater specifically to their application's needs for improved performance and user experience. There are, however, downsides to rolling your own chain, like liquidity fragmentation, potential centralization concerns, and new infrastructure overhead.

This trend isn't limited to Ethereum-based projects. Solana-based platforms like Zeta Markets and Grass are also exploring the L2 landscape. Whether driven by technical considerations, economic incentives, or performance requirements, the decision for an application to run its own L2 rather than deploy on a standard smart contract chain is gaining traction. As more projects experiment with custom L2 solutions, the industry will be watching closely to understand the real-time implications of these evolving models.

We covered the launch of Unichain here.

2. Next Gen Virtual Machines

With non-EVM-based L1s proving their viability, it's no surprise that L2s are following a similar path. This year's most notable launches were Eclipse and Movement—the first L2s within the Ethereum ecosystem to implement Solana Virtual Machine (SVM) and Move VM architectures, respectively. Both projects diverge significantly in their approach: Eclipse relies on a highly performant, centralized sequencer that could ultimately surpass Solana's throughput at scale, while Movement is focused on seeding a multi-L2 environment powered by its own shared sequencing network.

Although Eclipse and Movement are still in their infancy, intensified efforts will be made to persuade developers to abandon the EVM and embrace these emerging programming paradigms in the coming year.

3. The Design Space for L2s is Expanding

Optimistic EVM L2s like Base, Arbitrum, and OP Mainnet continued to dominate across most metrics this year, maintaining their lead in adoption and activity. ZK rollups, led by StarkNet and zkSync, have trailed behind in adoption but achieved significant milestones. StarkNet is advancing plans to settle on both Ethereum and Bitcoin, while zkSync's technology is gaining traction, with adoption from projects like Lens Protocol and Pudgy Penguins.

The next generation of Layer 2s faces stiff competition, requiring compelling and differentiated value propositions to break through. This has led to new L2 designs that expand the possibilities of the rollup landscape. Consider MegaETH, a protocol that unapologetically embraces a centralized sequencer design in pursuit of unprecedented scale. With ambitions of 100,000+ TPS and millisecond-level block times, MegaETH aims to outperform decentralized L2s, which face inherent limitations due to consensus overhead and network constraints. MegaETH leverages Ethereum's L1 security via EigenDA, forced transaction inclusion, and escape hatches to mitigate censorship concerns.

At the opposite end of the spectrum, based rollups like Taiko focus on bringing rollups closer to the L1. Integrating directly with the L1 for sequencing brings based rollups closer to Ethereum in philosophy and architecture and sheds some of the "parasitic L2" concerns shared by critics of Ethereum's roadmap.

Messari Protocol Services covers Starknet and Optimism. Subscribers can read about MegaETH in "MegaETH – Making Ethereum Great Again."

2025 Outlook

All eyes will be on Unichain, and if it is successful, it could usher in a wave of protocols eschewing their L1s and building application-specific or domain-specific L2s to increase value accrual and generate more revenue for token holders. If successful, expect to see other blue chip protocols follow suit and roll their own infrastructure.

We also anticipate that alternative virtual machines, primarily the Solana and Move VMs, will continue to gain traction. Infrastructure is increasingly becoming multipolar, and while some fragmentation concerns will need to be solved, the allure of improved performance and security is compelling for developers and users.

It is still too early to determine which L2 architectures are best positioned to win in the long run. However, the path toward a more seamless user experience currently favors high-throughput constructions like MegaETH. Based rollups may eventually catch up on the UX front, but in the short to medium term, high-throughput general-purpose architectures are better suited for the most popular, speculative applications like memecoin trading.

Avalanche, Cosmos, and Appchains

2024 Review

Standalone appchains have long nerd-sniped researchers and developers, but lasting success has been hard to come. Avalanche, however, continues to buck the trend as it is steadily growing into one of, if not the most, robust multichain ecosystem. Notably, DeFi Kingdoms and Dexalot, two L1s in the Avalanche ecosystem, surpassed the C-chain in total gas used and transaction costs back in September. The C-chain remains healthy, though, sporting over $1.5 billion in TVL and a stablecoin supply greater than $2 billion, both of which rank in the top 10 across all L1s according to DeFi Llama.

Cosmos, on the other hand, did not have a great year. ATOM, the flagbearer for the Cosmos ecosystem, continued to struggle with an identity crisis. It has largely not served as a Schelling point asset in the Cosmos ecosystem, with questionable value accrual mechanisms and a gridlocked governance process when it comes to any sweeping changes on the Cosmos Hub. However, there are certainly pockets of positive developments, as evidenced by Noble, a stablecoin issuance platform for Cosmos, surpassing $1.5 billion in cumulative USDC issuance.

Stay up to speed on Avalanche with our Quarterly Reports.

2025 Outlook

Avalanche9000, posed to be the largest upgrade in the network's history, is anticipated to hit mainnet in December this year. The upgrade will bring significant performance improvements and Avalanche Interchain Messaging (AIM) to any L1 in the Avalanche ecosystem, with the C-chain acting as a liquidity hub at the center. Combined with Avalanche's BD prowess in the institutional and gaming space, it's shaping up to be another strong year.

The outlook for Cosmos remains uncertain as we enter 2025. We believe most of the issues in the Cosmos ecosystem stem from coordination failures that have historically plagued decision-making and alignment. However, this may change following the Interchain Foundation's (ICF) recent acquisition of Skip Protocol earlier this month. Skip, now rebranded as Interchain Inc., will function as a dedicated subsidiary focusing on key initiatives related to product and growth in the Cosmos ecosystem. This shakeup in ecosystem stewardship is a positive development, but the new-look ICF will have to prove that it can take the reins and right the ship.

Initia is poised to be the sleeper infrastructure launch of 2025. The team has raised $25 million, which is significantly less than the funds secured by the previously mentioned high-throughput, general-purpose L1s. However, Initia deserves recognition for its entirely different approach. The project aims to integrate the best aspects of the appchain thesis by combining a customizable yet opinionated technology stack with a more unified end user experience. Initia's novel Vested Interest Program seeks to align incentives among all network participants, fostering a cohesive ecosystem. Launching as an L1, Initia will support between five and ten application-specific, interoperable L2 solutions when the mainnet goes live early next year. This strategic setup positions Initia to potentially lead the next wave of appchain adoption by building a truly cohesive ecosystem of scalable, interoperable chains.

Other Infrastructure Trends

Interoperability

As the number of L1s and L2s continues to increase, interoperability is a key focus. While covering all the teams building interoperability solutions in this report is impossible, we'll highlight a few key players in this space.

Optimism's Superchain is positioning to be the largest "rollup cluster" on Ethereum, with Coinbase, Kraken, Sony, Uniswap, and others launching L2s on their network. In August, the team shared its plans to improve the cross-chain experience for users, which include a new message-passing protocol, an updated ERC20 standard (dubbed SuperchainERC20), and uniform security for any Superchain L2s via a shared proof system. Enhanced interoperability within the Superchain is key to unlocking network effects and a symbiotic relationship between all chains in the OP ecosystem.

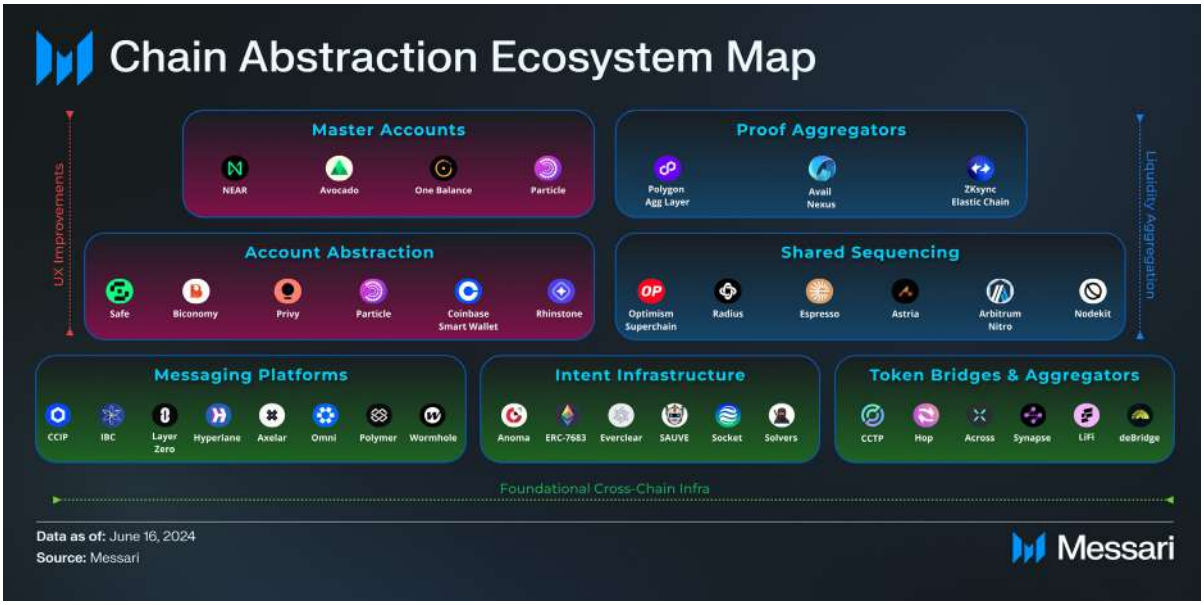
Intent protocols like ***Across*** utilize offchain actors known as “solvers” to facilitate cross-chain interactions on behalf of users. We did a deep dive on intents in a report, Following the Value Flow in the Intents Stack, so I won’t rehash all the details here, but we expect cross-chain intents to play a key role in the interoperability landscape next year.

Espresso and other shared sequencing infrastructure are another approach to improving composability across L2s. Shared sequencers can enable atomic and trust-minimized cross-rollup communication, meaning that transactions can be executed across different rollups simultaneously, improving the overall interoperability and user experience of fragmented rollups. There is a question about incentives for chains to join a shared sequencer network, as centralized sequencing is a profitable endeavor, and cross-chain MEV is potentially lucrative as more financial activity moves to L2s, but on its technical merits, shared sequencing is certainly an important tool in the interoperability toolkit.

Omni Network is a Layer-1 blockchain secured by restaked ETH through Eigenlayer. The protocol provides a unified platform for users and developers to interact with the Ethereum rollup ecosystem. It allows users to access various Ethereum rollups from a single platform while developers can create decentralized applications that work across all Ethereum rollups. Omni is currently operating on “private mainnet” and should go live in production sometime in 2025.

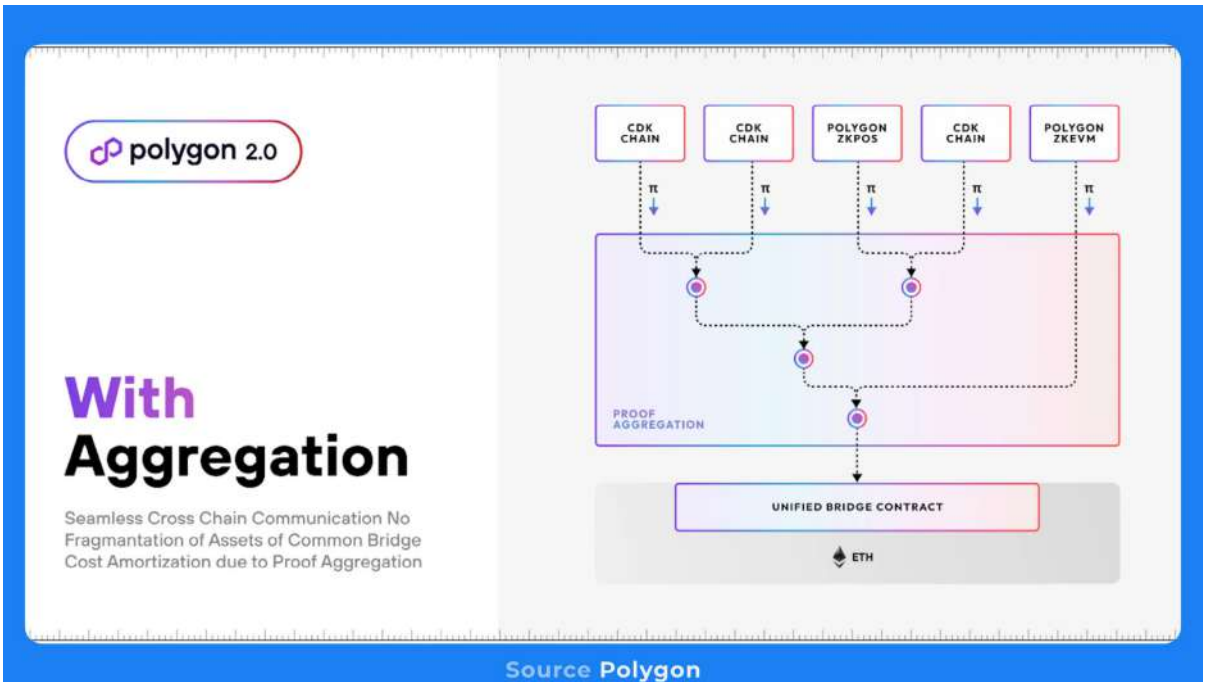
Chain Abstraction

Chain abstraction is shaping up to be one of the biggest trends to watch in the coming year. It will tackle frustrations that both developers and users face onchain. For developers, choosing which chains to deploy ties their app's success to the fate of the underlying infrastructure—a risky gamble. For users, juggling funds across multiple chains and paying gas in different tokens creates unnecessary friction. Chain abstraction isn’t a single technology but rather a combination of bridges, messaging platforms, intent infrastructure, proof aggregators, shared sequencers, and more. I’ll plug our full report on the Chain Abstraction landscape to get up to speed on the state of bridges, messaging platforms, intents, proof aggregators, shared sequencers, and the like.



Zero Knowledge Tech

Polygon's Agglayer, a proof aggregation layer between Ethereum rollups and L2 execution environments, is slated to go live early in 2025. It sits atop a single, canonical Ethereum bridge contract and aggregates ZK proofs to ensure that cross-chain transactions are executed in dependency order, meaning connected chains can effectively amortize the costs of ZK proof verification across all connected chains. If widely adopted, AggLayer has the potential to unify traditionally fragmented L1s and L2s, but there are questions about the incentives for chains to opt into this structure vs rolling their own rollup cluster.



As a whole, ZK tech is improving at a breakneck pace–the cost and speed of generating validity proofs are down only. We're excited about many developments in this space, including Succinct's decentralized proving network and RISC Zero's Boundless protocol. Due to its sheer

complexity, the tech still needs time to become truly battle-tested. However, ZK adoption will inevitably revolutionize virtually everything about the infrastructure landscape. A maturing ZK tech stack will completely reinvent scalability, privacy, interoperability, Bitcoin programmability, and even extend to applications beyond blockchains.

Messari clients can learn more in "Deep Dive into Proof Marketplaces" and "Dissecting Polygon's AggLayer." Messari Protocol Services published "Polygon Ecosystem Overview."

Parting Thoughts

As 2025 unfolds, infrastructure will become less about raw performance and more about delivering seamless, secure, and scalable solutions for a new era of compelling applications. The real winners in the infrastructure space will be those who can translate technical progress into unified user experiences. Here are some key themes we're expecting from infrastructure next year:

Breakout Year for ZK

ZK technology is on the precipice of exponential growth. In 2025, nearly all infrastructure protocols are expected to incorporate ZK technology as proving costs decrease and performance continues to improve. ZK will proliferate into scalability, privacy, and interoperability while unlocking new possibilities for Bitcoin programmability. Decentralized proving networks like Succinct, offchain compute like RISC Zero's Boundless, and proof aggregation tech like Polygon's Agglayer are poised to lead this charge, setting the stage for a world where ZK becomes table-stakes for virtually all infrastructure.

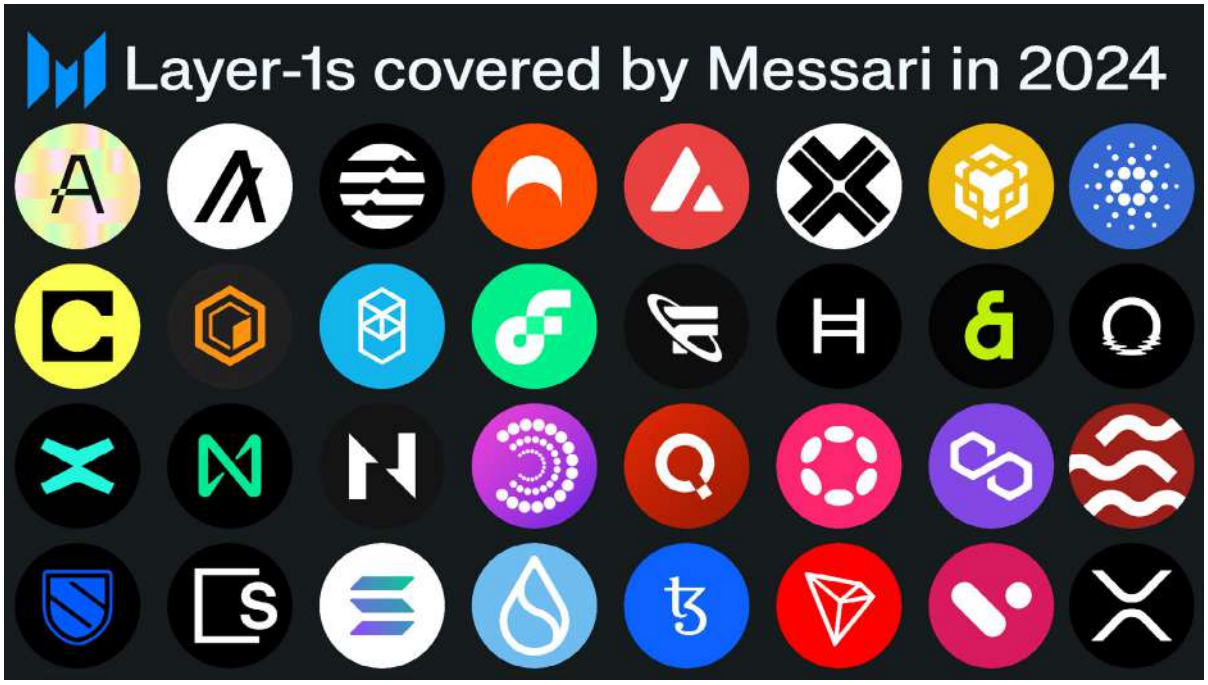
Messari Research regularly covers the evolving ZK landscape, including here and here.

Maturing Modular Ecosystem

High-performance, general-purpose smart contract chains largely dominated this year's narrative. In hindsight, this may prove to be an overcorrection as cross-chain UX improves and the application ecosystems on Celestia, EigenDA, Avail, and others start to find their footing. While there's an element of infrastructure fatigue, particularly with more complex modular protocols, the technology is clearly gaining traction—even previously monolithic ecosystems like Solana are embracing rollup-like solutions. The lines between applications and infrastructure are getting blurrier, a trend that will likely continue, and modular protocols will benefit from this trend.

Increased Competition for High-Performance, General Purpose Chains

Largely dominated by Solana so far, the next crop of high-throughput, general-purpose smart contract chains led by Aptos and Sui have momentum. The competition is real, though, with new L1s like Monad and Sonic coming online in the near future. It's still too early to call this game, and L2s like MegaETH, Eclipse, and Movement will also be vying for market share in this space.



The Sector Theses

DeFi

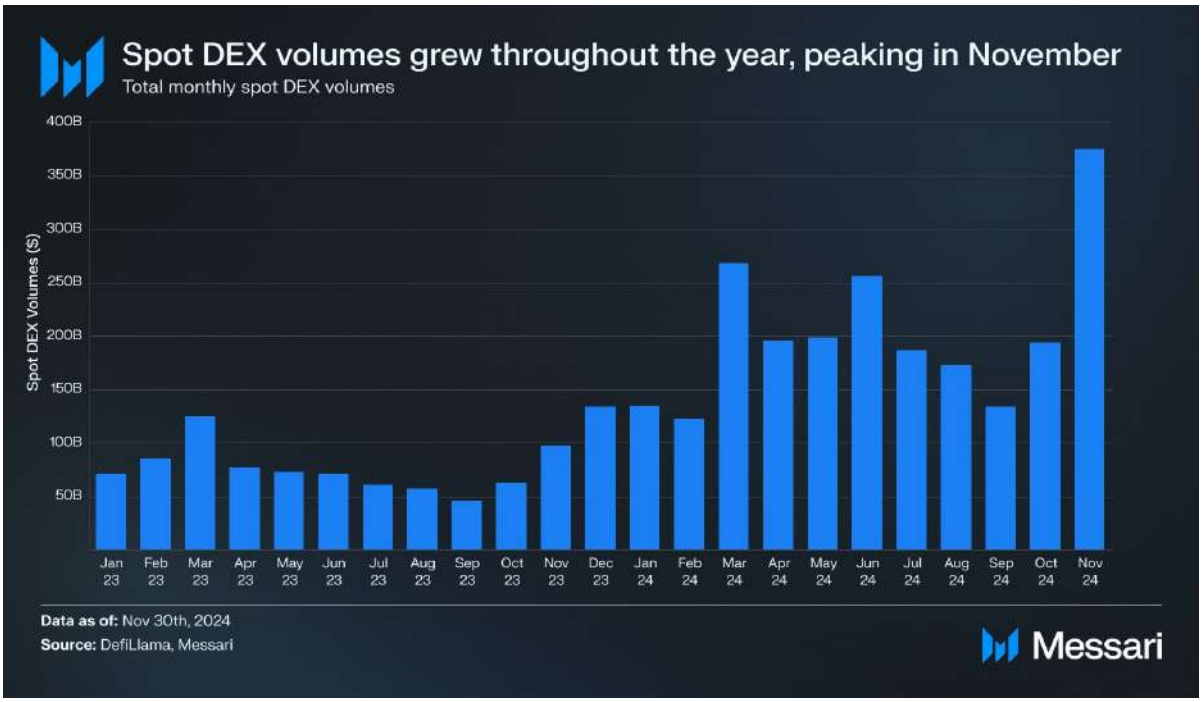
Author: Sunny Shi & Kinji Steimetz

Decentralized Exchanges and Trading

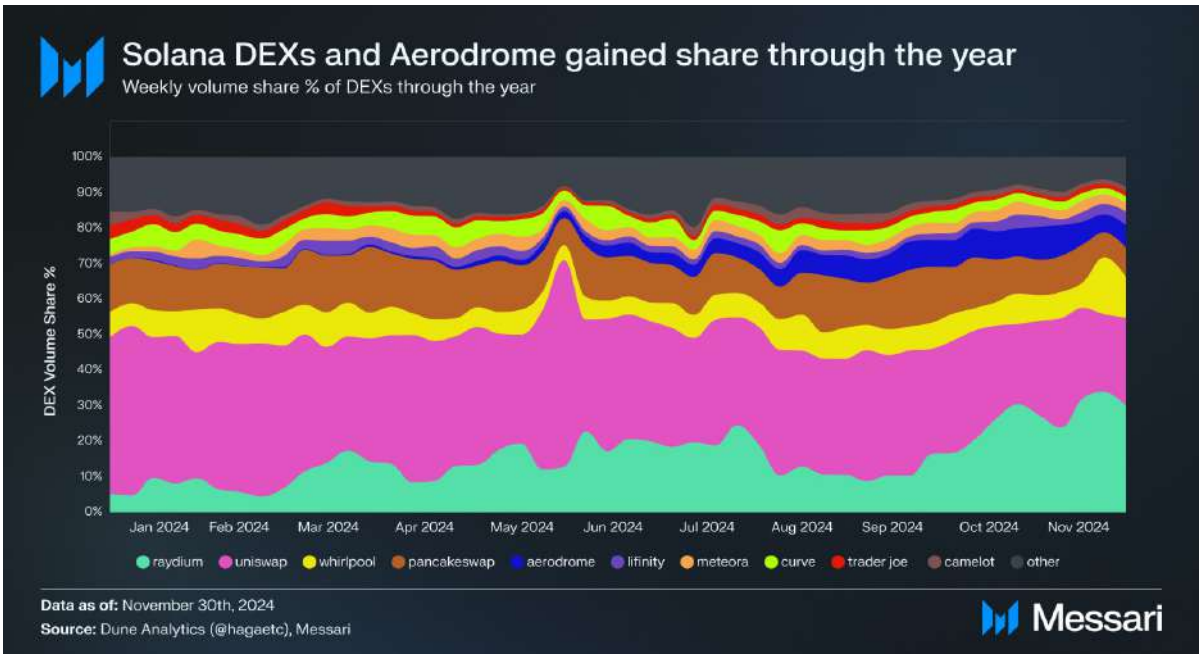
Looking Back: Key Trends in 2024

In 2024, spot DEXs modestly improved their share against CEXs in volume, increasing from ~9.4% of monthly CEX spot volume in January to ~11.4% in November, peaking at ~13.9% in October. Derivative DEXs improved their share against CEXs from ~2.7% in January to ~3.7% in November, peaking at ~5.2% in February. Within crypto, the year was largely characterized by new players gaining ground against incumbents, as well as new types of exchange applications finding product-market fit.

Spot Trading

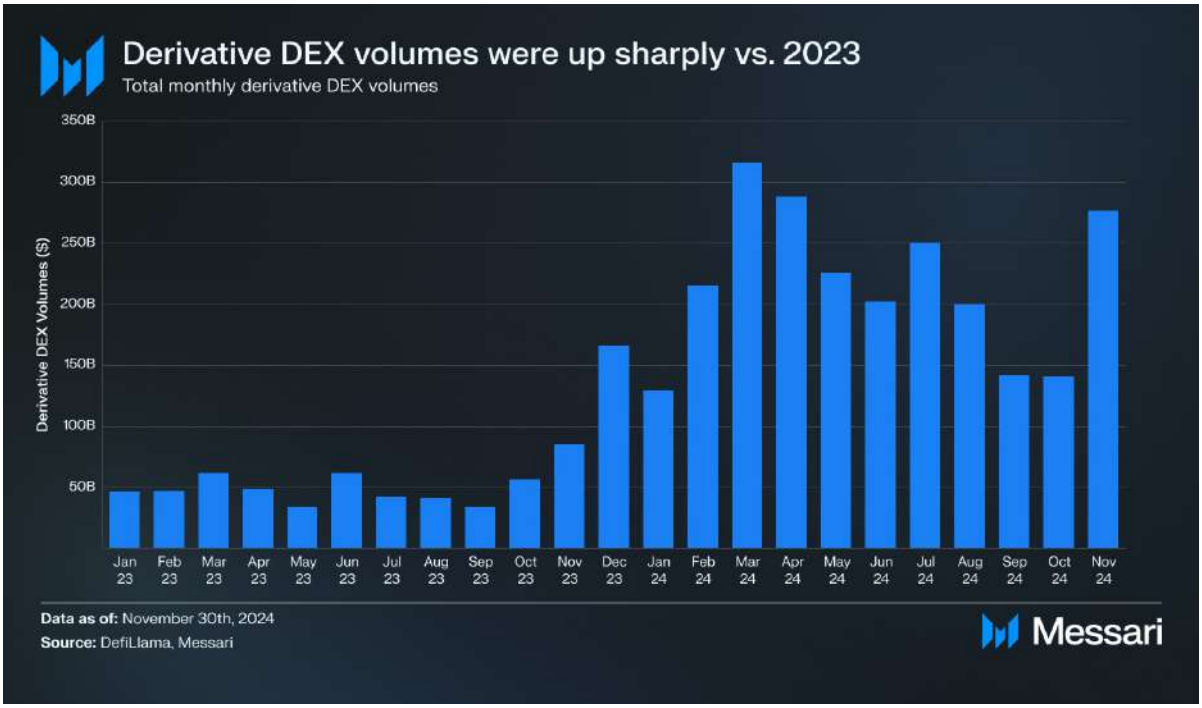


Spot DEXs increased their total volumes 171% YoY from January to November 2024, marking renewed bullish sentiment as crypto recovered from the 2023 bear market. Volumes reached a monthly high in November at ~$375 billion, as the 2024 election results drove more onchain swaps across the board.



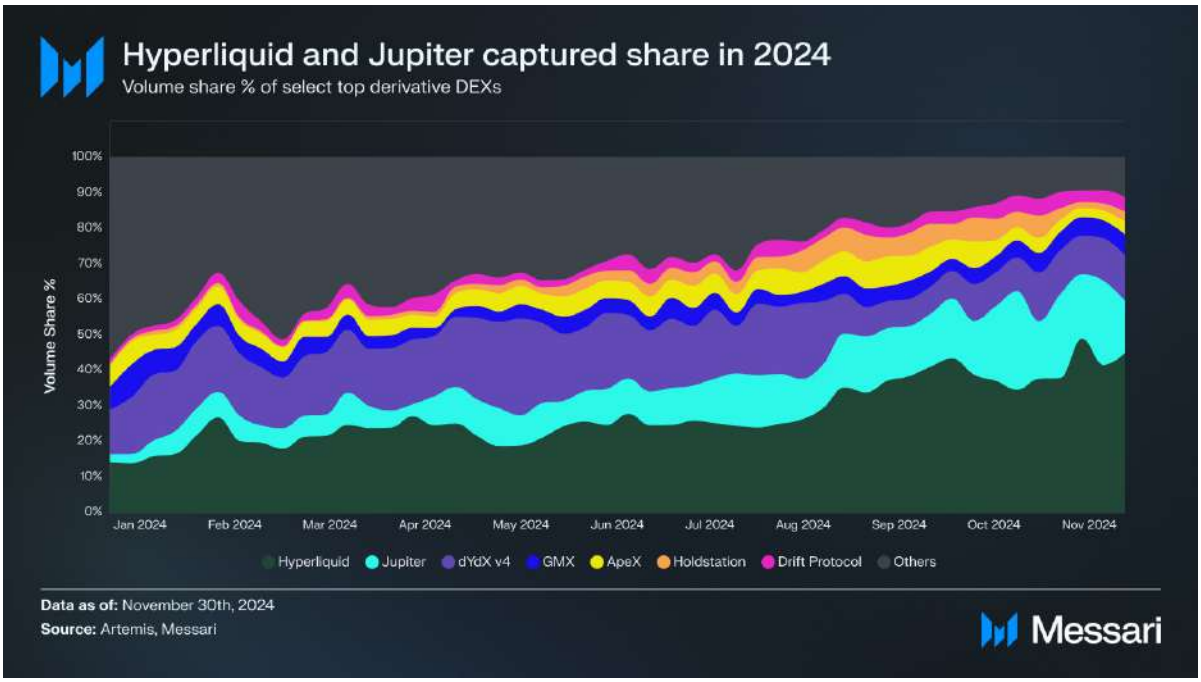
As the year progressed, several newer DEXs gained market share at the expense of Uniswap, Pancakeswap, Curve, and other incumbents. The surge in Solana's trading activity drove growth for Raydium, which is now the market leader in spot volume share at ~30%. Other Solana DEXs like Orca's Whirlpool, Lifinity, and Meteora also improved their relative positions. Surprisingly, Uniswap lost its volume share lead within Base and Optimism to Aerodrome and Velodrome, two new protocols run by the same team leveraging a novel MetaDEX design.

Derivatives Trading



Derivative DEXs increased their total volumes 328% YoY from January to November 2024, signaling a return to speculation as market conditions improved. Volumes reached a monthly

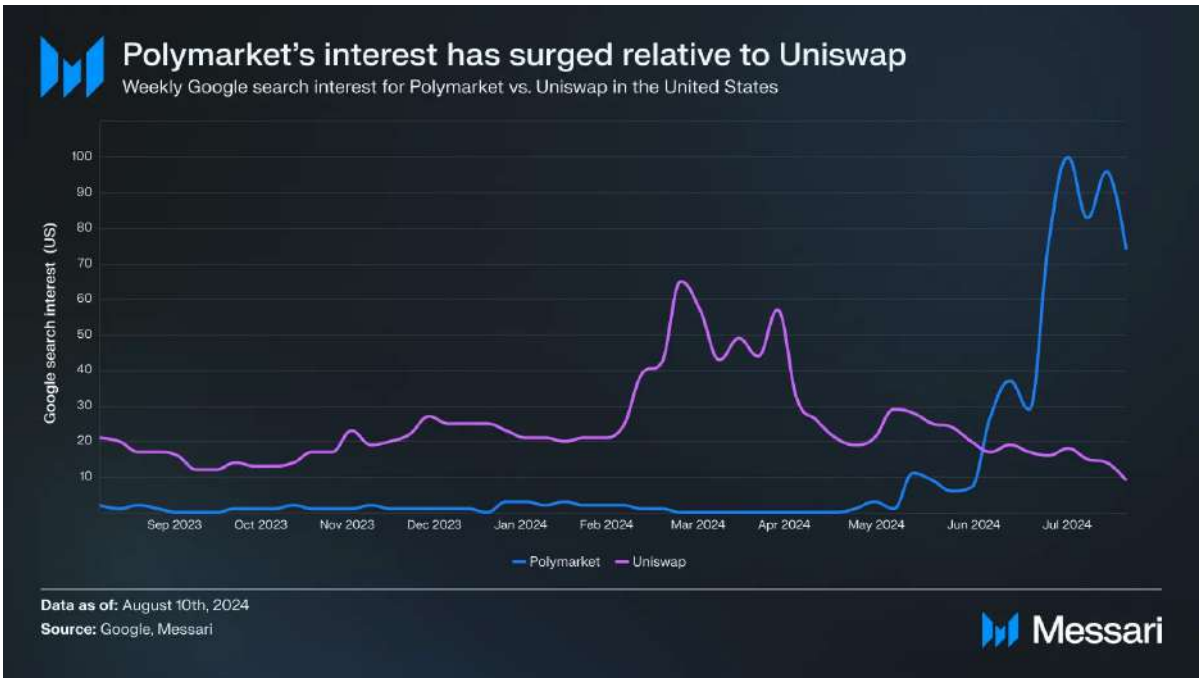
high in March at ~$316 billion as Bitcoin made its first run towards all-time highs following the approval of the spot ETF.



Much like spot DEXs, new perpetual (perp) DEXs gained share against dYdX, who held a dominant leadership position for most of 2023 before it transitioned to its own Cosmos-based appchain in its v4 iteration. The clear winner in 2024 was Hyperliquid, a protocol we have extensively covered that runs its own custom-fitted Layer-1 to optimize its perp DEX's performance. Hyperliquid's CEX-like user interface and incentivized community led it to a dominant ~40% share within the derivatives space by the end of the year, which persisted even after its points program concluded. Perp DEXs on Solana, like Jupiter and Drift Protocol also grew their market share in 2024.

To learn more about Hyperliquid, read our prior coverage on the matter here and here.

Prediction Markets



A new kind of crypto exchange found resounding success this year. Polymarket, crypto's leading prediction market, saw volumes surge as anticipation for the election grew. Running a central limit order book (CLOB) on Polygon for prediction shares, Polymarket became the primary destination for election-related betting in 2024, facilitating over $2 billion in monthly trading volume across both October and November.

To learn more about Polymarket, read our prior coverage on the matter here.

DEX Trading Bots - A New Profit Sector

A key emerging narrative in 2024 was the rise of DEX trading bots, which have quickly become many users' preferred method to trade onchain. Leading trading bots like Trojan, Bonkbot, and Maestro are frontends built on top of traditional spot AMM DEXs, helping users achieve better fill rates on their orders while providing a superior UI/UX. Many of these tools are also configurable within Telegram, allowing users to easily manage their trades on mobile devices. Bots have developed a core use case for sniping new token launches within the top of the block. For example, the Banana Gun bot helps users win close to 88% of top sniping bundles on Ethereum.

Trading bots currently facilitate over $180 million of average daily volume, with Trojan alone having collected over $100 million in lifetime fees across 340 days. The ascent of trading bots and interfaces in 2024 shows that there is a clear market opportunity to service retail traders willing to pay a premium for superior speeds, UI/UX, and execution. As memecoin volume continues to rise, the potential to achieve better returns through faster order fulfillment outweighs the minimal additional per-transaction trading fees that bots charge.

Looking Ahead: Predictions for 2025 and Beyond

As we look into the future, we believe there are a few key trends worth paying attention to.

Base and Solana - Valuable Real Estate

The two blockchains that have exhibited the most trading related growth this year have been Solana and Base. While Solana has seen trading volumes congregate in memecoins, Base has seen a ton of activity for trading majors like spot ETH and Coinbase's cbBTC. However, we believe that both chains are largely finding success as a result of the same drivers, with those being low transaction costs and user-centric product-led roadmaps. This means that any new and emerging "metas" can spurn volumes on either chain going forward, a pattern that has already begun to play out with AI agent related tokens. We continue to see a path forward for Solana and Base DEXs to grow share relative to DEXs on other chains.

Vertical Integration vs. Composability

2024 brought us new debates around whether DEXs should prioritize vertical integration or composability within a broader network. On one end, protocols like Hyperliquid and Uniswap have transitioned towards owning their own infrastructure in order to configure network characteristics to benefit their applications. On the other end, leading venture funds like Multicoin have backed Solana native applications like Drift for their proximity and composability to the rest of the growing Solana ecosystem. Both perspectives have merits, and we believe that both approaches present valid roadmaps for growth, as execution focused high value traders gravitate towards vertically integrated protocols while a wider set of less sophisticated onchain participants choose composability.

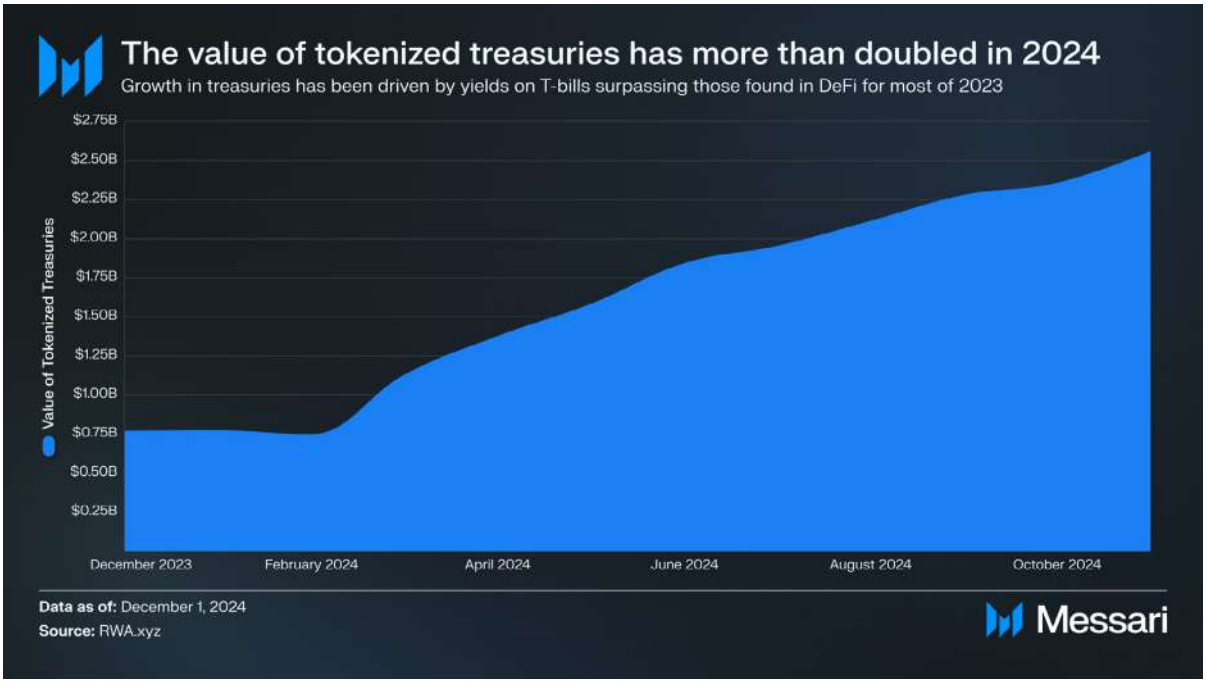
Prediction Markets in a Post-Election World

Polymarket has found product-market fit this year as an onchain venue for atypical trading markets, such as politics and pop culture. That being said, with the end of the 2024 presidential election, open interest on the platform has already undergone a steep contraction. We forecast that volumes will likely be down relative to the preceding election fueled trading months, but Polymarket can find continued success within its core competencies now that the election has catalyzed usage and mindshare of its product. With the success of Polymarket, both new and existing prediction markets across a wide variety of chains have garnered attention, and the space has gotten exceedingly more competitive. In order to win, vying protocols have to be able to provide relevant markets bettors can continuously speculate on, while incentivizing market makers in order to compensate for the unique market making complexities found in most prediction markets.

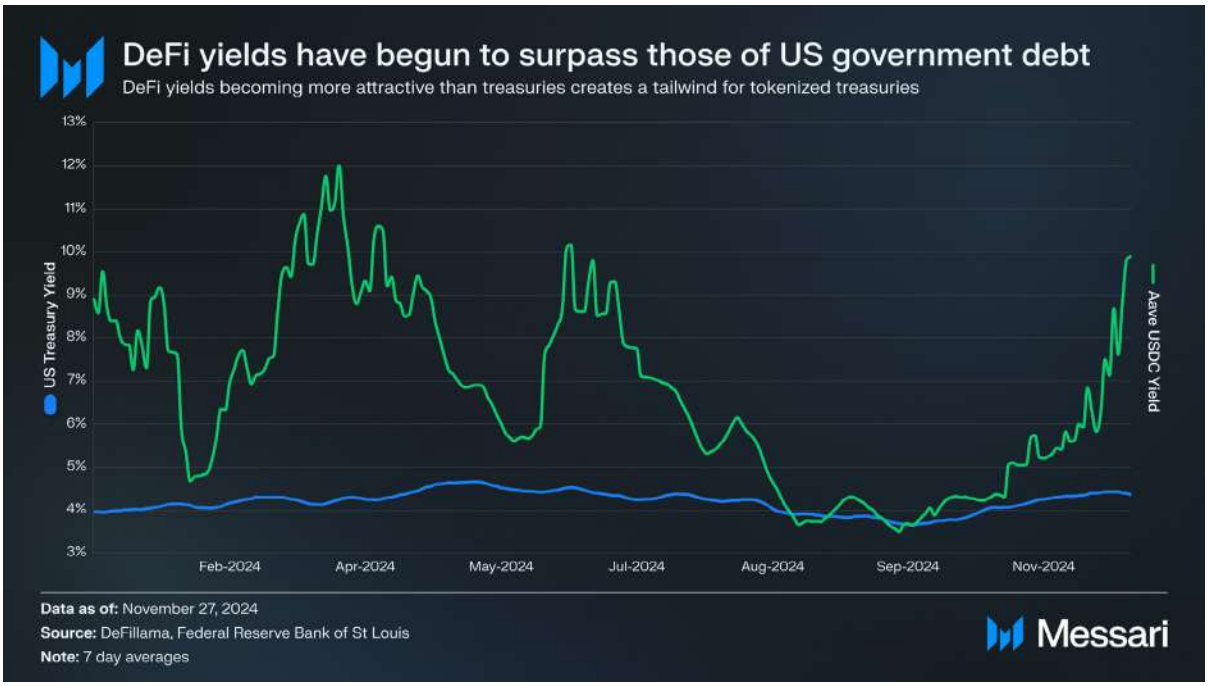
The Return of Real World Assets

Looking Back: Key Trends in 2024

As detailed in our previous RWA report, Welcome to the Real World, real world asset (RWA) protocols have seen renewed interest, with total value locked (TVL) increasing from $2 billion to $9 billion since the start of 2023, excluding traditional fiat-backed stablecoins. However, this growth has been uneven, driven primarily by tokenized treasuries.



Tokenized U.S. Treasuries dominated the RWA space, with TVL surging over 300% since early 2023, reaching $2.67 billion by the end of 2024. This growth was initially spurred by MakerDAO's allocation to U.S. Treasuries, and later amplified by major financial institutions like BlackRock and Franklin Templeton launching tokenized treasury products. Today, treasuries account for 35% of the entire tokenization market.



The adoption of these products was driven largely by interest rate dynamics. For much of 2022 and early 2023, the negative spread between onchain yields (e.g., from USDC lending) and offchain U.S. Treasury yields made tokenized treasuries an attractive option for crypto users seeking better returns. Even as this spread turned positive, new offerings like BlackRock's BUIDL fund sustained growth. However, the benefits of tokenized treasuries are not universally accessible. Regulatory requirements limit these products primarily to accredited investors, reducing their composability with DeFi protocols and leaving the user base relatively narrow. For example, BlackRock's BUIDL fund, with $500 million AUM, serves only 17 holders.

Despite their limitations, tokenized treasuries played a key role in bridging traditional finance and crypto during a high-interest-rate environment. Yet this reliance on favorable macro conditions raises questions about the sector's resilience as rates normalize.

Looking Ahead: Predictions for 2025 and Beyond

As interest rates decline, tokenized treasuries are expected to face headwinds, with growth likely slowing as onchain yields become more competitive. However, RWAs have significant opportunities to expand their impact and attract new capital:

Idle Onchain Capital

One immediate growth avenue lies in targeting the roughly $800 million in idle stablecoins held by DAO treasuries and the estimated $1-2 billion in venture fund capital sitting unallocated. Tokenized treasuries could offer these holders a low-risk yield, particularly for protocols seeking treasury management solutions. Capturing even a fraction of this capital would represent meaningful growth in an otherwise maturing market.

Exchange Collateral

Another key opportunity is positioning tokenized treasuries as the default collateral across trading venues, replacing stablecoins. Platforms like Bybit have already integrated yield-bearing collateral, offering a glimpse into this model's potential. If adoption spreads across centralized and decentralized trading platforms, up to $2.9 billion in stablecoins currently held as collateral could shift into tokenized treasuries.

Exporting Onchain Yields

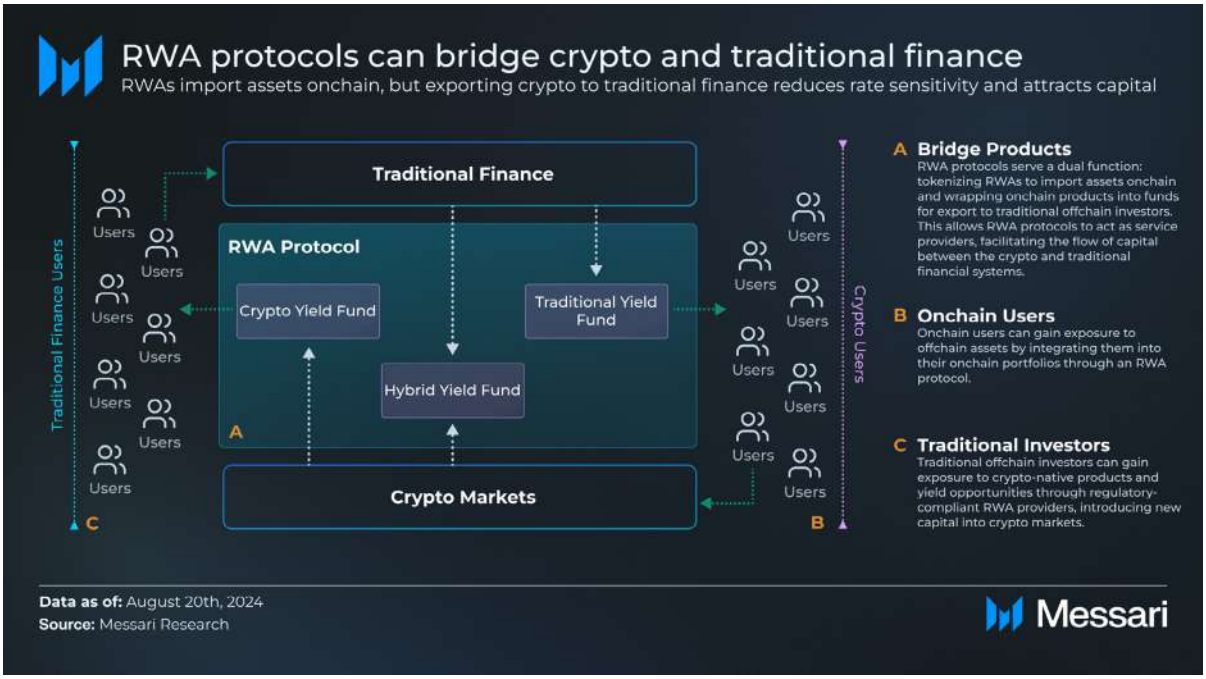
Beyond capturing idle capital, RWAs could flip the narrative, exporting crypto yields to traditional investors. Onchain yields—driven by crypto-specific market dynamics rather than macro interest rates—offer uncorrelated, attractive returns for traditional finance. Early movers like Superstate and Hashnote are already launching products that combine onchain yield opportunities with familiar structures, such as Superstate's Carry Trade Fund, which mixes crypto cash-and-carry trades with U.S. Treasuries.

Moving Further Out the Risk Curve

As tokenized treasuries face diminishing appeal, some protocols may explore higher-yielding products, such as tokenized private credit. These would compete with onchain lending protocols like Aave while offering higher yields to offset risk. However, private credit RWAs have struggled to find product market fit, with their TVL trailing both centralized lenders and more established DeFi protocols.

Messari subscribers can read more in Onchain Spreads' Impact on Tokenization.

The Road Ahead: Challenges and Evolving Strategies

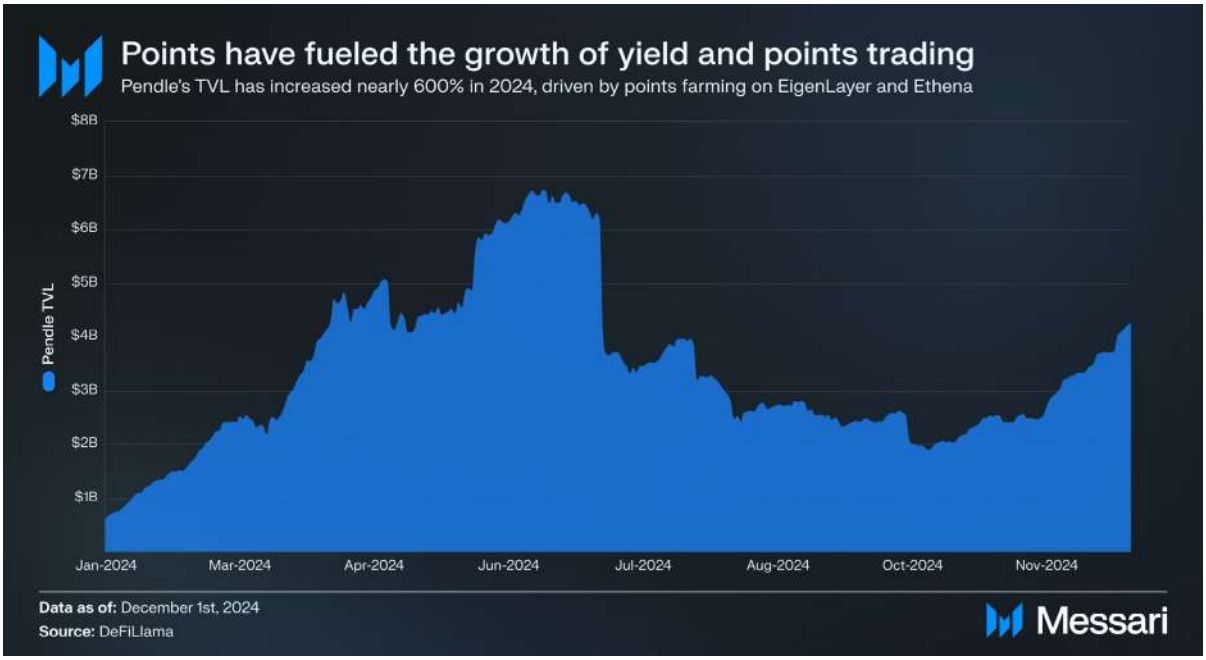


As the tokenized treasury market matures, the focus will likely shift from purely importing traditional finance assets to exporting onchain opportunities. This transition could create a dynamic two-way bridge where traditional finance gains access to crypto-native instruments, and crypto users benefit from integrating traditional financial products. However, this approach is not without challenges. Scaling onchain yields to meet offchain demand risks diluting returns, which could limit the attractiveness of such offerings.

Ultimately, RWAs must evolve to balance these opportunities with the realities of yield compression and shifting demand. By expanding their utility beyond treasuries and bridging the gap between traditional finance and crypto, these protocols could play a pivotal role in shaping the future of onchain finance. Whether through idle capital, exchange collateral, or exporting yields, RWAs have the potential to sustain growth and diversify onchain assets, even as macroeconomic conditions shift.

Evolving Yield Strategies: Points Farming and Yield Trading

2024 in Review: A new way to bootstrap



2024 saw the continuation of the late 2023 trend of protocols without a token launching points programs. These programs act as an incentive mechanism for users to utilize a protocol under the assumption that the points would be converted to tokens at the token generation event. Points provided a more flexible way for protocols to experiment with incentive mechanisms. This allowed them to identify which approaches led to the best user engagement. Instead of adjusting incentives on the fly during an ongoing token distribution, protocols could retroactively reward users with tokens based on their participation. This strategy was adopted by notable protocols including EigenLayer, Ethena, and more recently, Hyperliquid.

While point based incentives created an alternative token distribution path for protocols it also created a new asset, the points themselves, for markets to trade and speculate on, fuelling two new use cases: points markets, and yield trading.

Points Markets

In 2024, points marketplaces, led by Whales Market, gained traction in crypto. Designed to help protocols track and reward user activity, points evolved into speculative assets traded over the counter. Whales Market, built on Solana, facilitated this trade, allowing users to monetize points and pre-airdrop allocations. Early adoption fueled growth, but activity dropped sharply after the Jupiter airdrop in January. This decline exposed the platform's reliance on hype cycles tied to specific events. While some trading shifted to Ethereum, the reduction in Solana volumes raised concerns about the sustainability of the points trading model.

The development of a secondary market for points also created challenges for protocols relying

on them. By detaching points from their role as engagement metrics, marketplaces like Whales risked reducing their usefulness for protocols. This issue, combined with inefficiencies in pricing and competition from other trading mechanisms, suggested potential long-term obstacles. While the marketplace highlighted demand for trading non-tokenized assets, its dependence on speculative behavior and the declining utility of points programs underscored the fragility of the model, both for Whales Market and points trading as a whole.

Yield Trading

Pendle established itself as a key platform for interest rate derivatives in 2024, driven by its integration with liquid restaking tokens (LRTs) and its connection to EigenLayer's restaking points program. By enabling users to separate principal and yield from liquid staking tokens and LRTs, Pendle facilitated the trading of EigenLayer points, creating a secondary market for these speculative incentives.

EigenLayer, with $1.8 billion in ETH deposits, attracted attention through its points-based incentive program. Collaborations with protocols like ether.fi and Kelp DAO allowed Pendle users to trade EigenLayer's anticipated airdrop value via yield tokens (YTs). Within three weeks of launching LRT-based pools, Pendle saw $200 million in TVL from these integrations, contributing to 40% of its total TVL by the end of the year.

Yield tokens for LRTs offered a fixed APY of approximately 30%, higher than standard ETH staking rewards. This appeal drew participation from users seeking predictable yields and those trading on the speculative potential of EigenLayer's eventual airdrop. Pendle's integration of LRTs provided a mechanism for efficiently trading restaking points and accessing additional yield opportunities.

Looking Ahead: Predictions for 2025 and Beyond

We expect points to remain central for protocols aiming to bootstrap user adoption through token distributions, providing momentum for both marketplaces and yield trading protocols. Future points programs will likely undergo adjustments as protocols refine their approaches to aligning incentives with desired user behaviors while nurturing communities of early adopters. These refinements will play a key role in maintaining the effectiveness of points as a strategic tool.

For points marketplaces, liquidity and settlement present significant challenges and opportunities. Thinly traded order books currently offer only limited insights into price discovery, underscoring the need for improved liquidity. Protocols will likely need to implement stronger incentives to attract liquidity from key participants. However, liquidity growth may be constrained by unresolved settlement issues, as many protocols lack straightforward mechanisms to guarantee a seamless transaction experience. Addressing these gaps will be essential for market maturation.

For yield protocols like Pendle, growth will depend on broader opportunities in yield farming. This includes the emergence of large protocols distributing points to users who deposit assets, as well as additional yield opportunities such as the potential for increased basis trading on platforms like Ethena amid rising open interest. While points programs have been the primary catalyst for the adoption of yield trading protocols, other drivers, such as innovations in staking and trading dynamics, could further expand their use cases. Nonetheless, points programs are likely to remain a central focus, sustaining their role as a core use case for yield trading protocols.

The Road Ahead: Optimizing Points and Yield Protocols

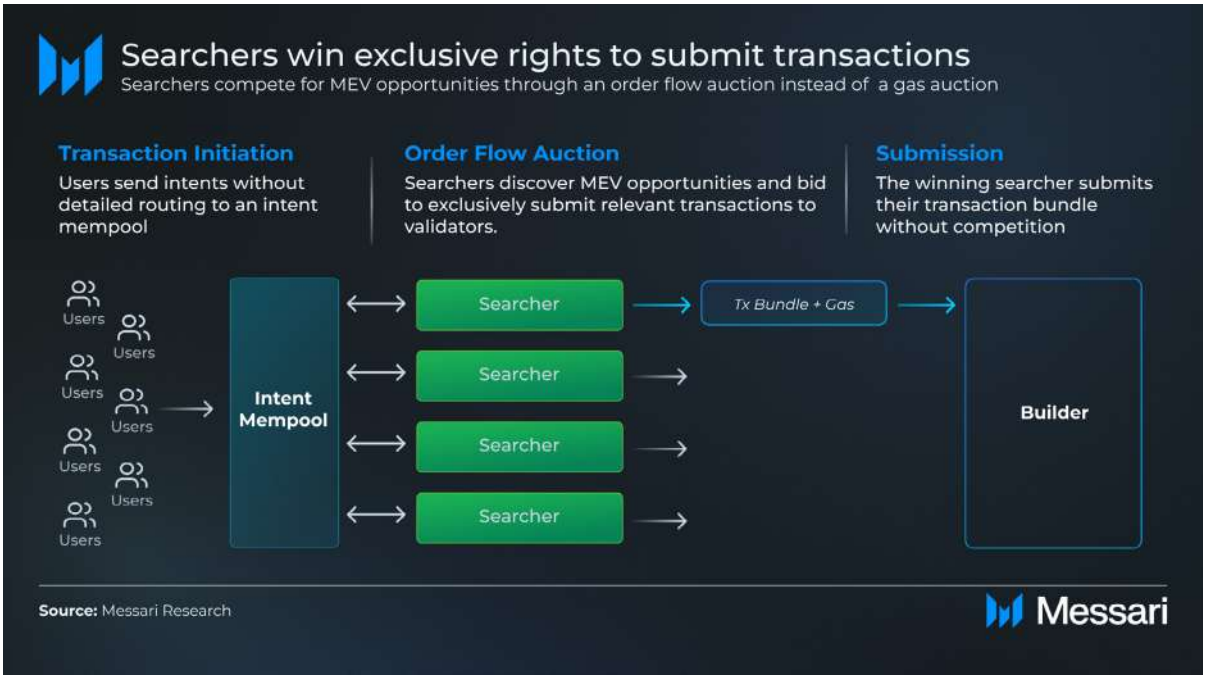
As we move into 2025, the role of points as both an incentive mechanism and a tradable asset will continue to evolve. Protocols are likely to refine their points programs, aligning incentives more effectively with user behavior while fostering early adopter communities. Points marketplaces face critical challenges in liquidity and settlement, with success hinging on the development of stronger mechanisms to ensure efficient trading and seamless user experiences. Meanwhile, yield trading protocols such as Pendle are poised for further growth, driven by new opportunities in yield farming and the speculative appeal of points-based incentives.

The Battle Against MEV: Innovations in Extraction and Mitigation

2024 in Review: Progress in MEV Mitigation through Intent-Based Systems

The past year saw a focused push toward addressing Maximal Extractable Value (MEV), a persistent inefficiency in DeFi. Intent-based systems emerged as a promising approach to not only mitigate MEV but also enhance liquidity access and streamline user experiences.

MEV Mitigation: Laying the Groundwork



MEV, or maximum extractable value, has long been a challenge in DeFi, driven by practices like arbitrage, front-running, and sandwich attacks. However, in 2024, a new wave of solutions emerged, focused on redistributing MEV back to users and liquidity providers (LPs). Central to this shift are intent-based systems, which have played a pivotal role in reducing MEV for end users.

Protocols like CoW Swap and UniswapX introduced intent-centric MEV auctions, where market makers (or solvers) bid for the right to execute user transactions. These systems transform MEV opportunities into a competitive marketplace, redistributing value from validators and searchers to users and LPs while ensuring a more balanced allocation of transaction benefits. By abstracting the transaction path, intent-based designs not only improve execution but also protect users from exploitative behaviors like sandwich attacks. This approach optimizes pricing, reduces MEV extraction, and fosters a more user-friendly trading environment.

While these intent-centric solutions make a better trading experience for users, they remain siloed within individual protocols. This limits their full potential and highlights the need for greater interoperability across DeFi platforms.

Other Benefits of Intent-Based Systems

Beyond MEV mitigation, intent-based systems offer additional advantages. By aggregating liquidity across onchain and offchain venues, they improve access to global liquidity, optimize cross-chain interactions, and simplify user workflows.

Messari subscribers can read more in "Following the Value Flow in the Intents Stack."

2025 Outlook: Scaling MEV Mitigation through Intent Architectures

In 2025, the focus in DeFi will shift towards scaling MEV mitigation mechanisms through intent-centric architectures.

Platforms like Flashbots' SUAVE and Anoma are expected to launch decentralized intent marketplaces where users' intents can be broadcast to a network of solvers. These marketplaces aim to establish open, permissionless auctions that foster competitive MEV mitigation. Decentralized order-flow auctions will promote transparency by reducing reliance on centralized auctions, ensuring fair access for solvers, and maximizing the value returned to users. Additionally, by aggregating intents across multiple protocols and chains, these platforms will attract a broader network of solvers, improving execution efficiency and optimizing MEV capture for users.

Major platforms such as Uniswap and Balancer are likely to integrate intent-based MEV mitigation strategies on a larger scale. By embedding auction hooks and execution optimization directly into their systems, these protocols could set new benchmarks for redistributing MEV, potentially reshaping industry standards.

However, challenges remain on the path toward decentralized intent architectures. Decentralizing auctions requires robust solutions to address issues like censorship and auction manipulation, ensuring fairness in the process. Additionally, as intent systems become more widespread, there is a risk of commoditization. Protocols will need to prioritize execution quality and speed to differentiate themselves in an increasingly competitive landscape.

The Road Ahead: MEV Returns to the Users

2025 will mark a turning point for MEV mitigation, with intent-based systems becoming entrenched throughout DeFi. Despite ongoing challenges, intent-based applications present an opportunity to mitigate MEV while also enhancing the chain abstraction stack, a topic explored further in a later section.

Cross-Chain Interoperability: Building Bridges in DeFi

Chain abstraction has emerged as a critical framework to address the challenges of navigating a fragmented multichain ecosystem. While the concept has long been discussed, the past year has provided new clarity on its role in simplifying user experiences and aggregating liquidity across chains. As 2024 draws to a close, it's an opportune moment to reflect on how the ecosystem has evolved and to consider its trajectory for the coming years.

Messari subscribers can read more about chain abstraction here, here, and here.

2024 in Review: Progress in Unifying Cross-Chain Activity

The multichain environment remains complex, with users often juggling multiple wallets, gas tokens, and bridges. Chain abstraction aims to reduce this friction by simplifying cross-chain interactions and consolidating liquidity. Over the past year, two key developments have driven advancements in the space: improvements in cross-chain user experiences and the rise of solver networks to address liquidity fragmentation.

User Experience Improvements

Messaging protocols have played a central role in simplifying cross-chain activity. By enabling chains to communicate state, these protocols allow users to interact seamlessly across chains without needing to transfer assets manually. For example, protocols like Radiant demonstrated how messaging can facilitate cross-chain lending, allowing users to lock collateral on Ethereum while borrowing assets on Solana—all without the need for additional bridging steps.

Yet, adoption has been uneven. While messaging protocols enable more intuitive interactions, the complexity of deploying them across chains has limited their reach. Protocols like LayerZero gained traction, but broader adoption will require deeper integration with front-end applications.

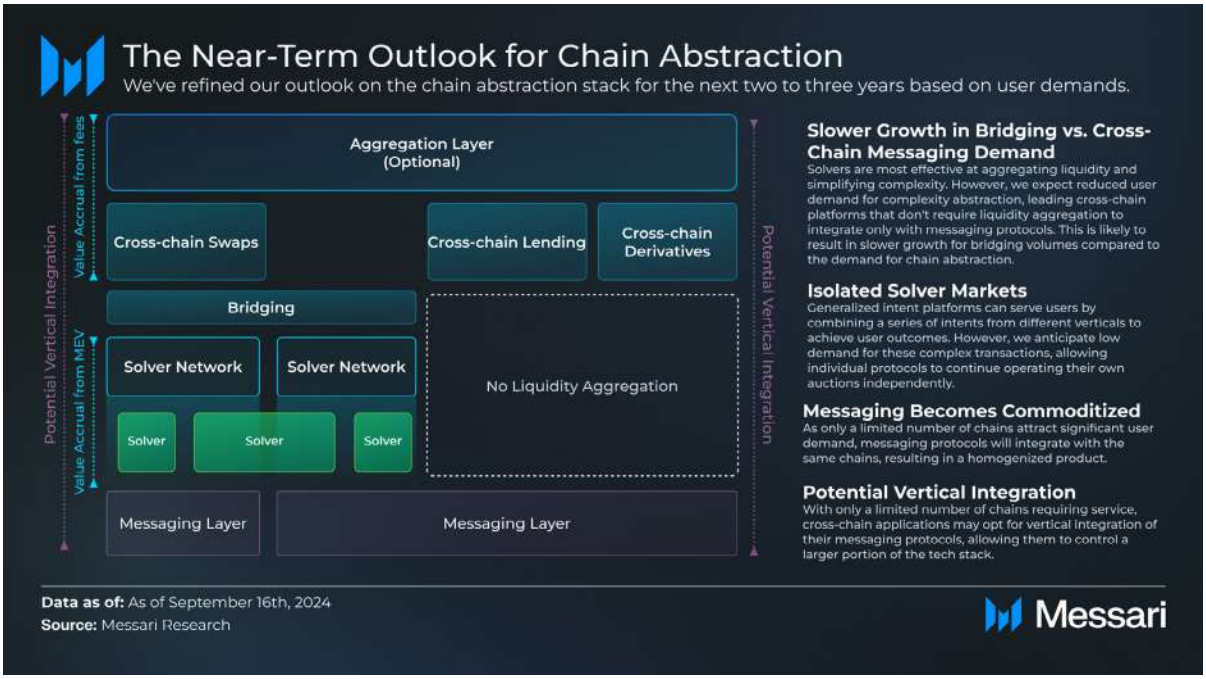
Liquidity Aggregation via Solver Networks

Fragmented liquidity across chains remains a significant barrier. Solver networks emerged as a solution, acting as offchain market makers to optimize liquidity across venues. These networks enable intent-based transactions, where users express desired outcomes (e.g., swapping ETH for SOL) without specifying the exact execution path. Solvers identify the best routes to fulfill these intents, leveraging both onchain and offchain liquidity.

Despite progress, challenges persist. Solvers rely heavily on messaging protocols for cross-chain value transfers, and the lack of standardization across protocols has slowed scaling efforts. Additionally, while solver networks addressed liquidity fragmentation for specific use cases like swaps and bridging, their application to broader multichain activities remains limited.

Looking Forward: Predictions for 2025 and Beyond

While chain abstraction has made strides, its near-term evolution will focus on refining user experiences and addressing liquidity gaps, rather than fully abstracting user decision-making. Key trends to watch include:



1. Messaging Protocols Will Become Commoditized

Messaging protocols have been instrumental in enabling cross-chain communication, but their B2B nature limits their ability to capture long-term value. Most applications require access to only a few key blockchains, reducing the potential for network effects. As a result, messaging protocols will compete on price and security guarantees, with value shifting to front-end applications and solver networks.

2. Bridging Demand Will Decline as Applications Integrate Cross-Chain Messaging

Today, bridging dominates cross-chain activity, but this is expected to change. As more applications natively support cross-chain messaging, users will no longer need to bridge assets manually for many use cases. For example, lending protocols could allow users to lock collateral on one chain while borrowing on another, with messaging protocols managing the interaction. This evolution will reduce the proportion of transactions requiring traditional bridging, potentially slowing growth in the bridging sector.

3. Solvers Will Compete on Execution Efficiency

Solver networks will remain vital for aggregating liquidity, but their success will depend on providing fast, cost-efficient execution paths. General-purpose solver networks capable of handling diverse user intents may emerge, but the current homogeneity in applications limits the need for complex intent fulfillment. As a result, solvers will focus on optimizing swaps, bridges, and simple lending interactions, competing primarily on price and speed.

4. Full User Decision-Making Abstraction Remains Distant

Despite the long-term vision of chain abstraction removing user preferences for specific chains or applications, this remains a distant goal. In practice, users still show strong preferences for certain chains and applications, driven by token availability and the dominance of leading protocols. For instance, 90% of DEX volume is concentrated on just seven chains, highlighting the importance of chain-specific activity. Similarly, most

lending and trading protocols exhibit minimal differentiation, reducing the need for users to outsource decision-making.

The Road Ahead: Gradual Evolution, Not Revolution

The chain abstraction landscape is maturing, but the immediate focus remains on improving usability and liquidity aggregation rather than achieving full abstraction of user preferences. Messaging protocols and solver networks will continue to be foundational, but their roles will shift as bridging becomes less central and messaging commoditizes. Meanwhile, front-end applications and solvers will emerge as key value drivers, leveraging seamless experiences and execution efficiency to attract users.

While the long-term vision of chain abstraction involves removing the complexities of chain and application selection, the next few years will likely see incremental progress. Chains and applications remain integral to user preferences, driven by token availability and limited protocol differentiation. True abstraction will require broader token deployment and greater diversity in application design—milestones that remain further down the road. For now, the focus will remain on refining the multichain user experience and addressing liquidity fragmentation, setting the stage for deeper integration in the future.

Wayfinder is an early indication of this end state. By combining application discovery and intent execution through a graph-based structure, Wayfinder leverages AI agents to simplify multichain interactions. These agents act on behalf of users to identify and traverse optimal paths for tasks like token swaps or bridging, showcasing how intuitive systems can begin to close the gap between the current landscape and the fully abstracted vision. Such protocols highlight the incremental but critical steps being taken to transform multichain experiences, reducing friction and enhancing user accessibility.

The Sector Theses

AI x Crypto

Author: Seth Bloomberg & Sunny Shi

Looking Back: Key Trends in 2024

AI x Crypto was undoubtedly one of the hottest new narratives of the year, coming to fruition after the surge in broader interest in large language models (LLMs) and general intelligence AI. The teams and tokens behind protocols looking to merge AI and crypto saw massive amounts of capital formation both in the private markets and the public markets. In the private markets, over $1 billion was invested in the AI x Crypto sector in 2024. In the public markets, the total market cap of AI related protocols grew from ~ $5 billion in October of 2023 to over $60 billion as of early December. Crypto's new leading AI protocol, Bittensor, launched and grew to over $4 billion in circulating market cap across the same time frame.
Messari began covering the emerging sector in March of 2023, and as the space has evolved, we most recently categorized the majority of AI related crypto projects into the following categories:

- **Decentralized Compute Networks**: Networks of GPUs that can be leveraged to train, fine-tune, or inference models.
- **Coordination Platforms**: Platforms that incentivize model development, such as what Bittensor provides, or specialized inference settings (e.g., zkML), such as what Modulus is developing.
- **AI Tools and Services**: Projects that operate or build services for AI models and agents to use, often situated within a shared marketplace that AI agents or developers can pay to access.
- **Applications**: Applications where underlying AI models are productized for consumer or enterprise usage, akin to a ChatGPT.

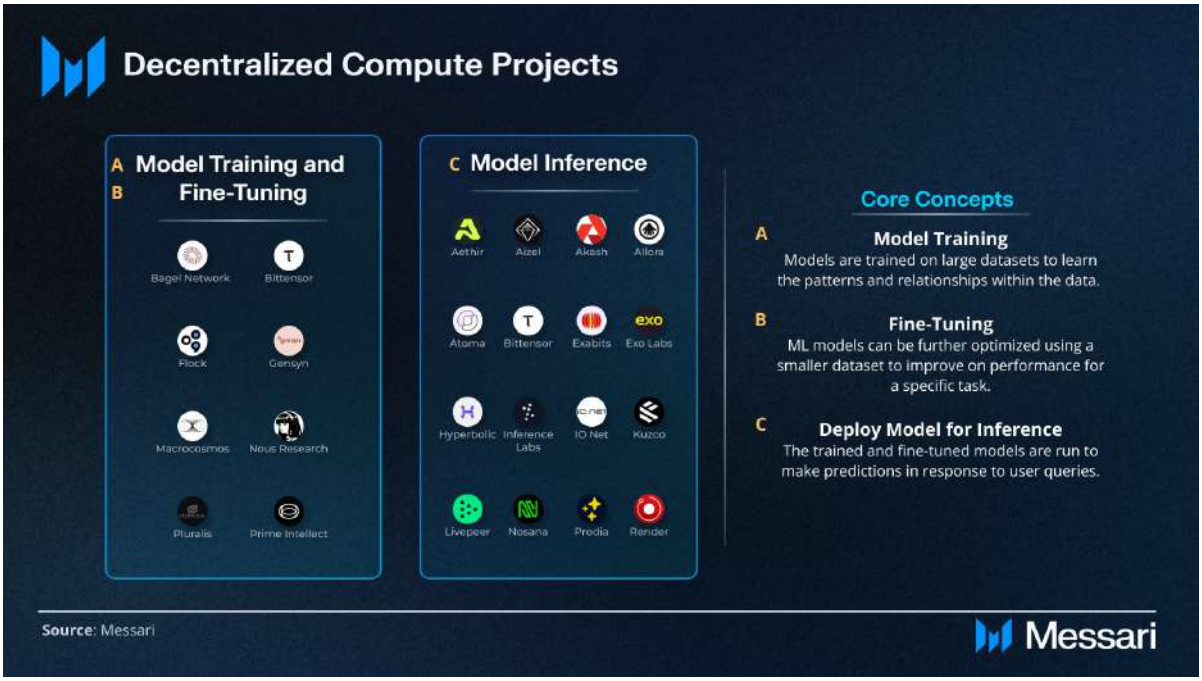
We highlight some of the more noteworthy trends in the AI x Crypto sector this year below:

Decentralized Model Training

The current landscape of machine learning (ML) model training is characterized by significant investments in GPU infrastructure, driven by the need to build larger and more capable models. The traditional centralized model training paradigm relies heavily on co-located, tightly coupled GPU resources to handle the massive computational demands of training state-of-the-art trillion parameter models, such as GPT-4. However, researchers looking to train their own models without access to the balance sheets of leading tech companies require lower CAPEX and more distributed alternatives.

Numerous DePIN teams like Akash and IO.net have positioned themselves as providers of decentralized compute, aiming to attract GPU suppliers ranging from consumer-grade GPUs like NVIDIA's 3090 and 4090 to high-end ML-specific GPUs such as the A100 and H100. These decentralized networks allow customers to rent GPU compute at a lower cost without needing to warehouse the resources in a centralized location. However, many of these networks are not

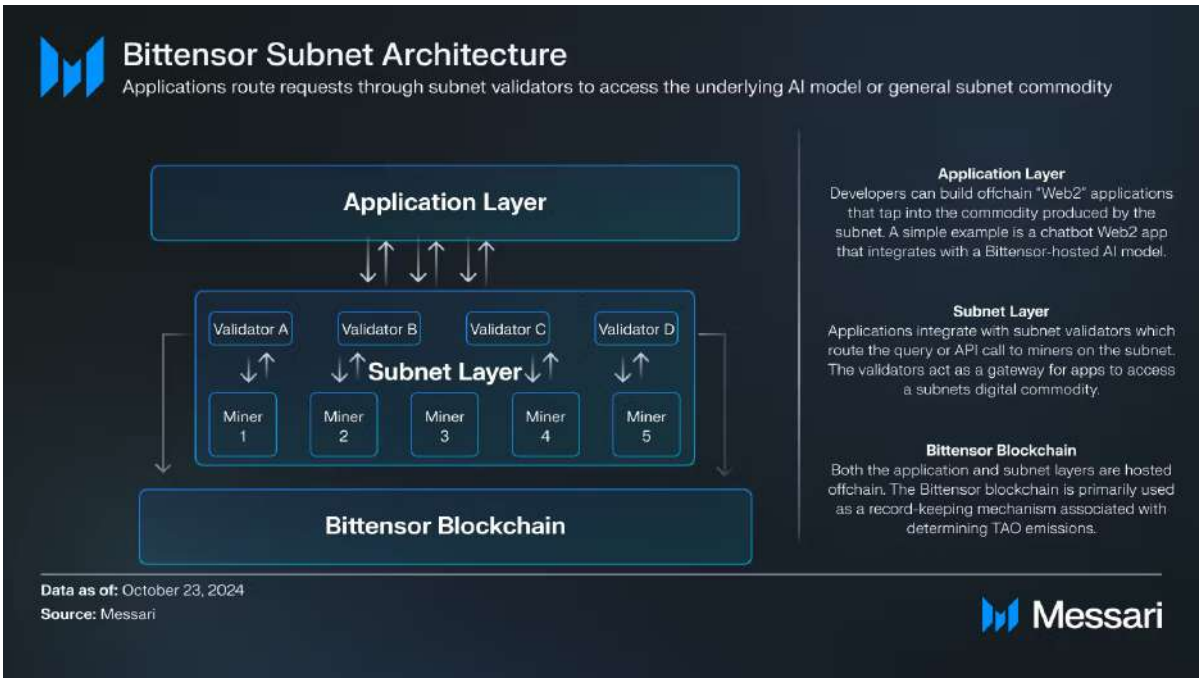
specialized and serve as platforms for general-purpose GPU use. In contrast, teams like GenSyn and Prime Intellect are focused on developing platforms optimized for ML model training that allow for distributed training to become more feasible.



Bittensor and AI Coordination

Coordinating efforts across a wide range of contributors in decentralized AI development presents unique challenges compared to centralized AI companies which benefit from rounds of venture raises and large parent companies. Bittensor stands out as an early solution, providing a framework for decentralized AI model development through an ecosystem of subnets, each with specific AI objectives. Its incentive-based structure, driven by TAO token emissions, encourages developers and miners to work collaboratively towards training and refining AI models, with validators assessing model performance. In short, Bittensor is a conglomerate backer of open-source AI teams that fosters rapid experimentation and innovation, providing an alternative to the traditional top-down approach of centralized AI labs.

So far, Bittensor has created a decentralized environment where diverse AI applications can thrive, benefiting from collective marketing and token emissions. The project's subnets host a wide range of teams, building projects that perform functions from image generation to protein folding simulations.



Unlike other AI x Crypto protocols, Bittensor is positioned as a platform play, not focusing on one particular layer of the stack. The all-encompassing offering of the Bittensor network has earned TAO the leading valuation in the AI x Crypto sector by FDV at ~$12 billion, and the protocol is colloquially referred to as the "Bitcoin of AI". Despite its market cap, many remain dubious about the protocol's structural issues. Some of TAO's biggest criticisms throughout the year include:

- Many of the network's subnets have failed to produce viable products.
- Emissions remain a problem considering the protocol does not earn revenue share from the successes of its own subnets.
- Bittensor will struggle to both attract and retain top notch AI talent, considering how easily reputable AI founders are able to raise capital, and the lack of barriers to prevent the subnets that find their killer application from leaving the ecosystem.
- Centralization in emissions decision making means that the top 64 validators are able to dictate incentives based on subjective criteria.
- There are two scalability issues: the reliance on a single set of validators to allocate TAO emissions, which becomes impractical as subnets grow, and the lack of an in-protocol mechanism linking miner demand to subnet usage, risking rising expenses without corresponding revenue scaling.

To mitigate some of these issues, Bittensor announced several foundational upcoming upgrades, which we will discuss in our forward looking section.

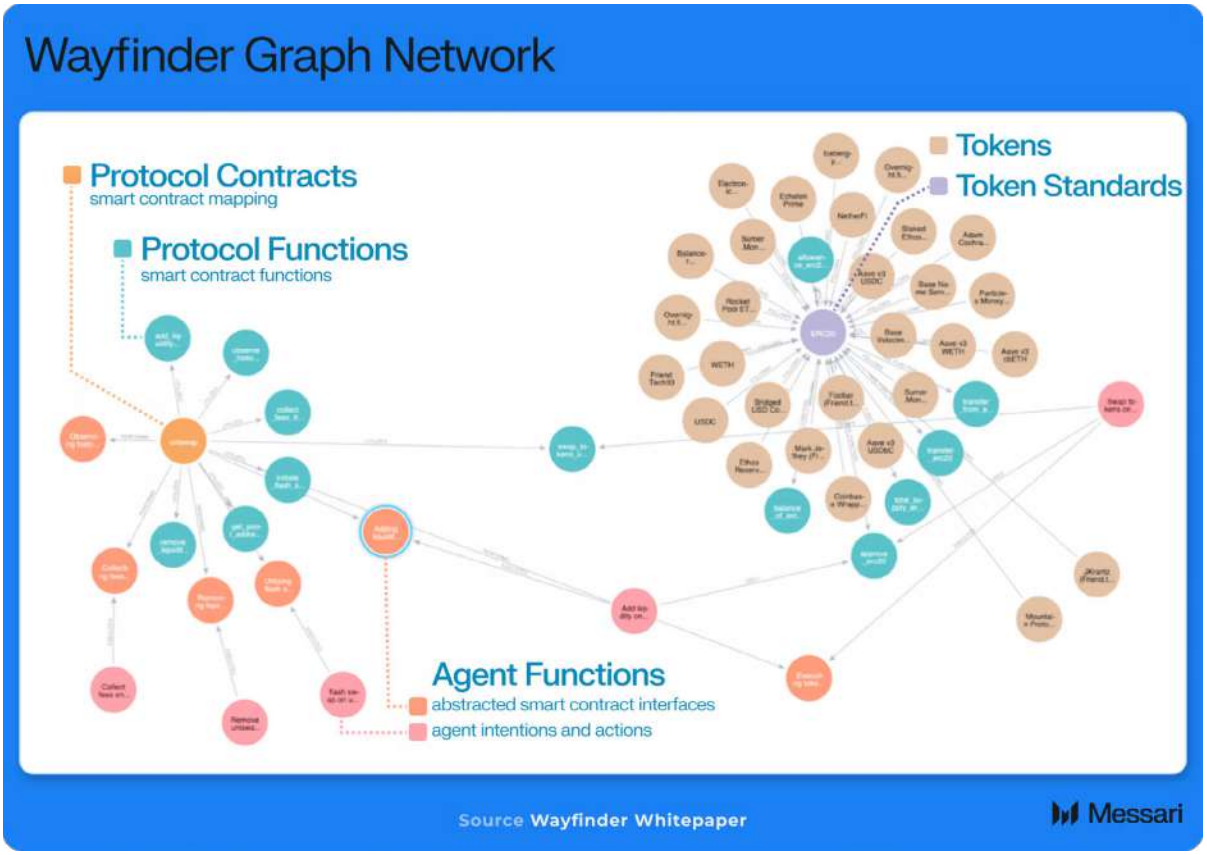
Messari has written extensively about Bittensor in the last year, including here, here, and here.

AI Agent Tools and Services: Navigating the Onchain Domain

AI agents are autonomous programs designed to perform tasks on behalf of users, often within complex and evolving environments. In the blockchain space, these agents have become significant for their ability to navigate decentralized networks, perform transactions, and interact with various onchain applications. Think of agents as individual crypto users tasked to autonomously accomplish various goals from trading to yield farming. What sets agents apart from standard bots is their ability to learn best practices over time and make undefined decisions to accomplish predefined goals. With the excitement towards seeing AI agents flourish onchain, protocols are needed to provide much-needed servicing to both the agents and their developers. Two notable protocols currently working towards this vision are Autonolas and Wayfinder.

Autonolas (OLAS) provides a framework for developers to create and deploy AI agents equipped with modular tools. These agents can be minted as NFTs, enabling others to reuse and build on their capabilities. Pre-built tools can provide specific functions—like prediction market analysis—that agents can use to autonomously complete tasks. This modular design allows developers to easily equip agents with the utility they need drastically reducing the time and effort needed to go-to-market with functional agents onchain.

Wayfinder (PROMPT) aims to tackle the complexity of discovering and interacting with new blockchain applications by using AI agents to help users navigate the decentralized web. By mapping on-chain applications onto a structured graph, Wayfinder enables AI agents to automate actions, such as finding the optimal route for token swaps or managing transactions. This approach not only reduces the barriers for new agents but also makes blockchain interactions more efficient and accessible. The growing number of paths compounds the agents' capabilities over time, driving user adoption and fostering inviting and accessible access to autonomous blockchain interactions. The protocol is currently not live. Staking for the PROMPT token began in June, with the underlying staking asset being PRIME, the ecosystem token of GameFi developer Echelon Prime. As an initial demonstration of Wayfinder's utility, Echelon will be utilizing Wayfinder's graphing framework to deploy agents in its upcoming crypto gaming title, Parallel Colony.



Messari subscribers can read more in "Wayfinder: A new AI Agent Network."

An Emerging Application: AI Agent KOLs and Memecoins?

In 2024, the internet witnessed the bizarre rise of an AI-created religion and its associated memecoin, Goatseus Maximus (GOAT), which reached a market cap of over $1 billion in the span of a month. The phenomenon began with the Infinite Backrooms experiment, where two Claude Opus LLMs prompted to converse with each other spiraled into creating a satirical religion blending esoteric philosophy and internet memes. Andy Ayrey, the experiment's founder, later launched an AI agent on X (formerly Twitter), Terminal of Truths (ToT), trained on the experiment's logs and other internet culture sources. ToT developed a cult-like following, promoting the Goatse religion and eventually endorsing a community created GOAT token, which surged in value following its October launch. By combining AI-driven hype, meme culture, and crypto, the saga showcased the strange and unpredictable intersections of technology, culture, and finance. While GOAT represents a typical memecoin with no specific ties to any underlying protocol or technical roadmap, the token obtains its value through its relationship with ToT and its fascinating lore.

ToT represents a foundational primitive when it comes to AI agents and their online cultural impact, amassing a following of over ~185k followers on X through its constant stream of humorous, abstract, and provocative tweets. The agent's novelty has been amplified after it became the first AI millionaire. The account's continued marketing for the GOAT memecoin has rendered it crypto's first AI agent KOL (key opinion leader).

ToT triggered a Cambrian explosion of new AI agent X accounts backed by both open-source LLM models like Meta's LLaMA or closed-source LLM models that were retrained through a process some are calling "jailbreaking" or "freebasing." By taking closed-source LLMs and removing corporate-imposed filters and safeguards, AI researchers can push AI models to generate unrestricted, opinionated, and creative content and perform innovative new types of actions.

Leading agents in the space have continued to evolve their capabilities:

- Zerebro is an agent that has deployed its own token, generated its own art, and even produced its own hip-hop album.
- Luna has become the first autonomous agent to employ humans onchain.
- AiXBT is an agent that surveys onchain data and reports crypto trends and insights on X, akin to a Messari Researcher.
- Ai16z is the first venture capital fund led by agents, fielding investment recommendations autonomously and allocating capital.

Along with the agents themselves, the platforms used to launch many of these agents have come under the spotlight. While we mentioned Autonolas and Wayfinder above, many of the recent crop of agents have launched using multi-agent simulation frameworks from Virtuals Protocol (VIRTUAL) and eliza (ai16z) who also provide tooling for developers to easily deploy and coordinate working agents onchain.

Messari subscribers can read more in "The GOAT of Memecoins: AI Agents, Internet Religions, and Marc Andreessen."

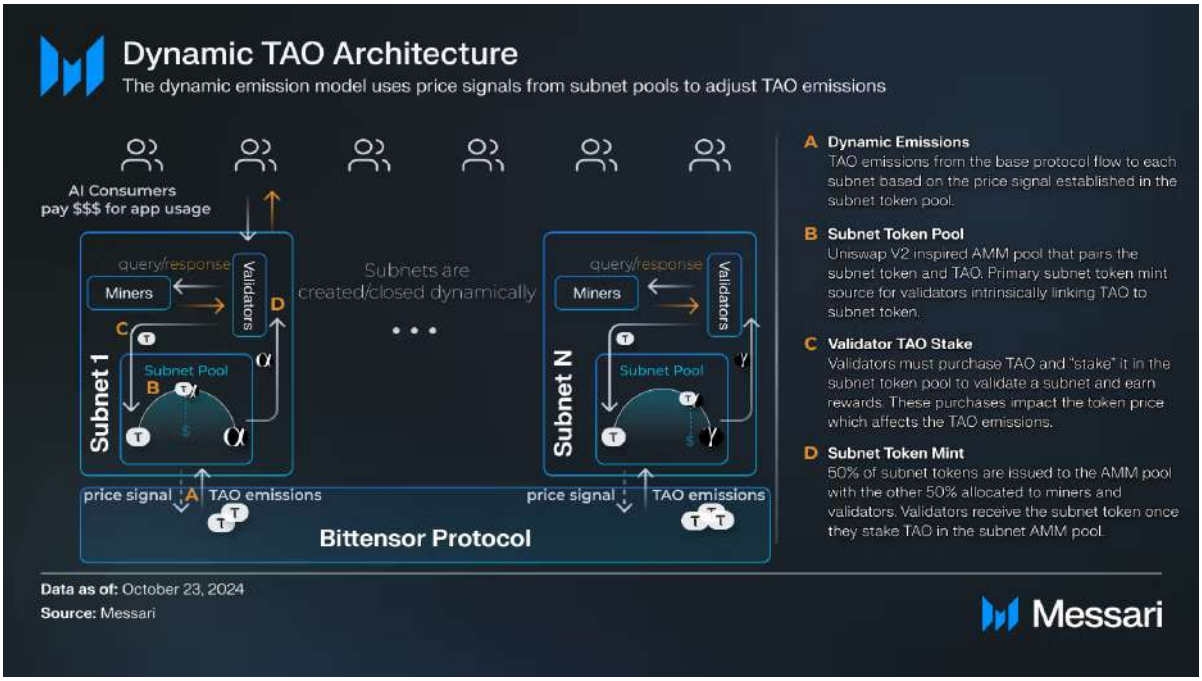
AI x Crypto: Forward-Looking Theses

As we head into the next year, the AI x Crypto sector is still one of the most enticing and uncharted spaces within the crypto world. While sectors like DeFi have become established categories, AI x Crypto remains an emerging vertical with external tailwinds from the booming AI industry. The bull case for this space is that it will successfully connect two of the most explosive sets of technologies. Here's what to watch for as the space evolves.

Bittensor and Dynamic TAO: A New AI Coin Casino

Bittensor's upcoming Dynamic TAO upgrade is a paradigm shift for the network—a new AI x Crypto meta will emerge. Numerous existing subnets on Bittensor have large relative comps across the AI x Crypto tech stack. With Dynamic TAO, each of these existing subnets (and future ones) will have its own token and they will be intrinsically tied to Bittensor's native TAO token.

If the Grass network is valued in the multi-billions, how much should its subnet-equivalent on Bittensor be valued at? Similar questions can be asked about compute networks, like Akash, which has surpassed a $1 billion dollar valuation. How should a compute subnet on Bittensor, with more top-of-the-line GPUs, be valued relative to these existing compute networks? It may take time for the broader market to catch up, but those early to promising subnets will be rewarded.



Ultimately, for Bittensor to reach its potential, it will need to attract top AI talent. This won't be easy – AI research is fiercely competitive, and the space is filled with well-funded and established players. However, Bittensor has a unique angle that could pull in talent: its subnets show early signs of producing high-quality research. This is the language to speak if the goal is to attract real AI talent. Don't be surprised if, in the next year, Bittensor becomes an unexpected hub of cutting-edge AI research in crypto.

If it can keep delivering on its promises, we could see Bittensor not just as a speculative "AI Coin Casino" but as a platform with the power to attract serious AI developers, bridging the gap between academia, industry, and decentralized networks.

Decentralized Model Training: A Stumble and a Pivot

The dream of fully decentralized model training has existed for some time, and this year (some of) those dreams turned into reality. Two of the most prominent teams within the AI x Crypto space, Prime Intellect and Nous Research, both made unexpected contributions to the decentralized model training space.

Over the summer, Prime Intellect published a paper describing a framework for decentralized model training. The results were promising, as Prime Intellect extended on Google's DeepMind

previous work. The team showed that, with the same compute budget, one can effectively match the performance of a centrally trained model, but leverage 4 geographically distributed clusters of H100s and communicate 125x less than the centralized setup. In addition, Prime Intellect scaled up the size of the decentralized trained model to 1.1B parameters, nearly doubling DeepMind's original model size. They've continued their work and are now in the process of training an even larger 10B parameter model on their network.

Nous Research also published a small paper describing their work towards developing a system for decentralized model training. The details were more sparse relative to the Prime Intellect publication, but the general research direction shows extremely positive and promising results.

However, to rain a bit on the decentralized model training parade, we can't forget reality—training state-of-the-art (SoTA) AI models in a decentralized way isn't just a technical challenge; it's also incredibly costly. Most of the top AI labs are already burning millions and, eventually, billions of dollars to build their SoTA models. So, it's one thing to build a framework for decentralized model training and even gather (a portion) of the compute required for it; it's another thing, though, to have a customer willing and able to pay to create a competitive, open-source SoTA model. With that in mind, it seems unlikely that any decentralized network will produce a frontier AI model in the coming year.

What we're more likely to see instead, is teams pivoting toward or doubling down on:

- Fine-tuning open-source models;
- Developing frameworks for running models locally;
- Experimentation with new model architectures;
- Experimentation with smaller, more specialized models.

Rather than trying to compete with giants like OpenAI and Google by training massive foundational models, decentralized networks will likely shift focus to fine-tuning smaller, specialized models. This approach is both practical and potentially lucrative: smaller models require less computational power, and fine-tuning can create highly useful models for niche applications.

Expect more experimentation in the realm of smaller and specialized models over the next year. These models, potentially designed to perform specific tasks rather than act as general-purpose AI, could find traction in a market that rewards quick experimentation, especially at the consumer application level.

Decentralized AI may not be ready to take on the giants, but that doesn't mean it won't carve out its own market in the near term. By focusing on fine-tuning and smaller models, decentralized networks can create valuable tools and potentially foster ecosystems of innovation that larger players overlook.

AI Agents and Memecoins: Ongoing Experimentation

It is still early for the AI agents / memecoins category, but looking forward there are several attractive tailwinds:

Onchain development will increase

As we highlighted, while AI agents will not exist solely onchain, it is likely that most AI agents will prefer to be onchain. Crypto rails allow agents to seed wallets, transact, and send funds in a cost-effective, permissionless, and frictionless manner. On the other hand, using legacy financial rails comes with a restrictive amount of red tape. These methods would require agents and their developers to manage individual or corporate identities in order to interact with the banking system. Imagine how difficult it would be for Zerebro to make payments using Apple Pay. Thus, for developers interested in building agents that can perform financial actions autonomously, utilizing onchain infrastructure will be the most effective approach. It is encouraging to see that the most recent wave of AI x crypto agents seem to be affirming this thesis, with some of the examples we listed already using the blockchain as intended.

Furthermore, the popularity and valuations of leading crypto AI agents and their associated tokens demonstrate crypto's advantages when it comes to bootstrapping communities and attention. Growing token valuations can fund continued development and fuel social media engagement. For developers looking to make an impact and maximize their financial incentives, crypto remains a better playground for experimentation.

We believe that the current agent landscape serves as a compelling case study for teams interested in pushing the boundaries of what AI agents can offer, and that talent density will continue to increase as more engineers take notice. Unlike other areas of AI, where the cutting edge occurs within traditional companies, the forefront of agent development is happening in crypto.

Agent coins are more "dynamic" than memecoins

In many cases, there are no direct financial links between an AI agent and its token. Instead, we prefer to view AI agent memecoins as tokenized expressions of fandom or as positions that bet on an agent's ability to enhance its capabilities and capture greater mindshare. Traditional memecoin investors appreciate the "static" nature of their assets, as the absence of roadmaps eliminates execution risk. In contrast, the market for AI agents is more "dynamic," as agents can evolve, improve their capabilities, and capture increasing mindshare over time. We believe that, in aggregate, as agent KOLs compete actively for attention on social media, this category will gain ground against "static" memecoins. However, as a result, investing in individual agent tokens introduces greater execution risk.

Agent tokens as liquid proxies for AI

AI remains one of the most exciting societal narratives in both crypto and beyond, and

memecoins provide a steady supply of potential speculative vehicles. As mentioned earlier, Bittensor has emerged as the preeminent crypto x AI player in 2024, which has allowed it to benefit as a liquid proxy for AI excitement and speculation. As evidenced by TAO's strong periods of price correlation to NVIDIA stock, this role comes with its benefits. Although it is still too early to tell whether agent-related memecoins can reap the same benefits, the potential for them to join other assets as liquid venues for broader AI speculation would be a positive development. We note that the combined market cap of these assets remains a small fraction of even crypto x AI's total valuation.

Open Source vs Closed Source AI - Crypto Enters the Conversation

A key narrative to watch will be the ongoing debate around open source vs. closed source AI models. Theoretically speaking, competitive AND open source technology has always been the holy grail for technologists and futurists alike. The reality for AI is that there are several structural limitations that currently prevent open source models from reaching product parity with centralized incumbents, and closed-source AI labs like OpenAI, Claude, and Google's DeepMind continue to lead the development of cutting-edge AI models. Backed by major Web2 hyperscalers, these internal research divisions benefit from economies of scale, vast financial resources, and access to top industry talent. This combination has allowed closed-source systems to dominate the AI landscape, leaving open-source initiatives struggling to keep pace.

Crypto will undoubtedly play a role in the development and usage of open source AI. In the summer, Sentient Labs raised a massive $85 million seed round to develop competitive open source AI on Polygon, joining other pioneering crypto-native projects like Bittensor. AI agents on X will lean towards using open source AI models like LLaMA, presenting a clear use case for open source models. Decentralized compute can provide new open source AI developers access to cheaper ML training, lowering the barriers of entry. As the discussion around open vs. closed persists, we expect crypto to occupy a growing part of the conversation.

The Sector Theses

DePIN

Author: Dylan Bane

DePIN is the Frontier

DePIN (Decentralized Physical Infrastructure Networks) stood out as one of crypto's most dynamic and high-performing sectors in 2024, showcasing remarkable growth throughout the year. The sector's total market cap surged by 132% year-over-year, surpassing $40 billion. Among established projects, several delivered standout performances (as of writing):

- **Render:** Up 164%
- **Arweave:** Up 178%
- **Helium:** Up 127%
- **Akash:** Up 163%

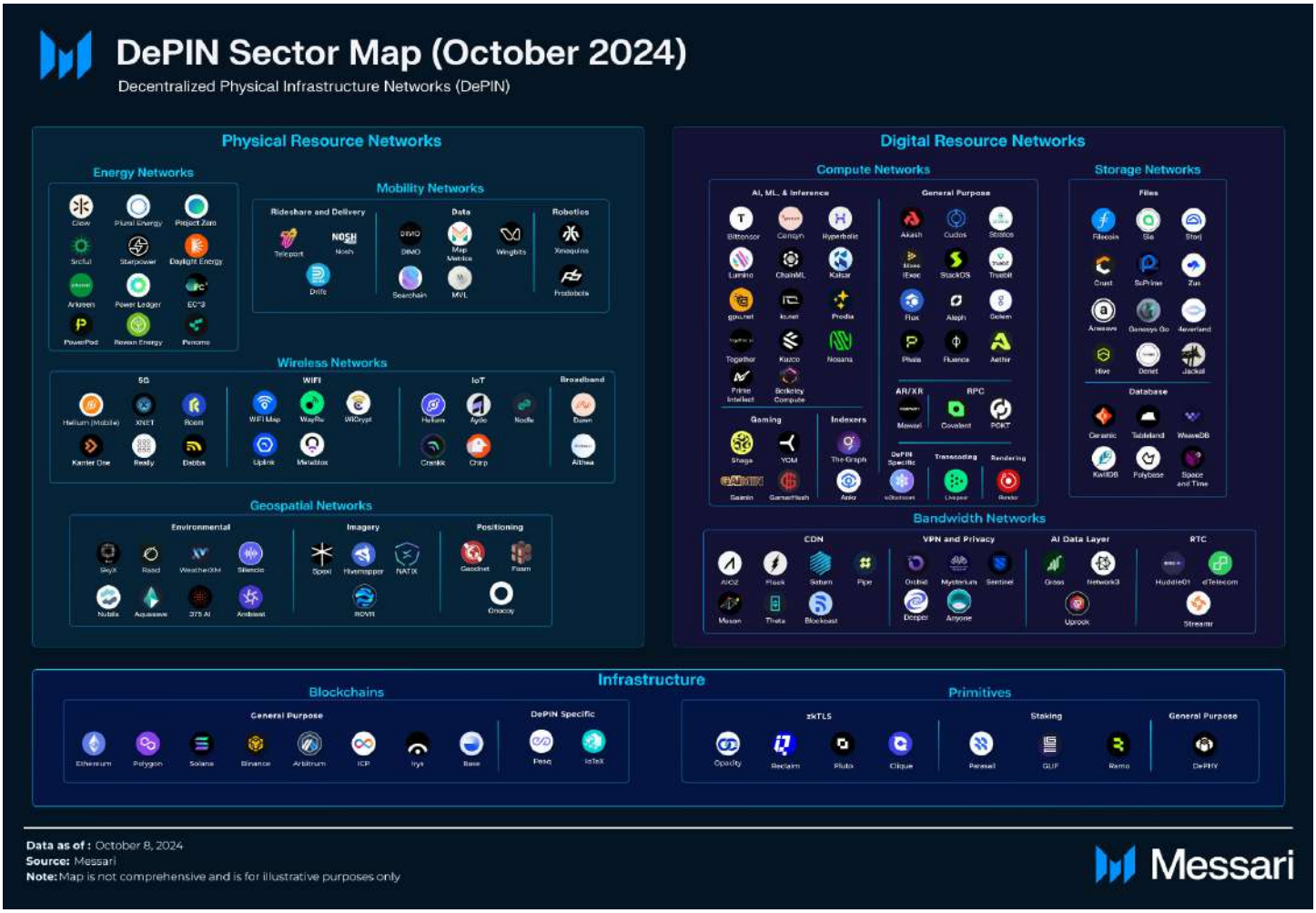
2024 also saw impressive debuts from newcomers launching tokens valued at (as of writing):

- **Grass:** $877 million market cap
- **io.net:** $363 million market cap
- **Aethir:** $280 million market cap

However, the most significant growth came from early-stage fundraising, which increased by 326.45% from 2023, reaching $610.41 million in 2024. This surge in fundraising highlights a robust pipeline of DePIN projects at their inception, poised to launch tokens and enter the market in the coming years.

So, what drove such growth in the DePIN sector, and what can we expect in 2025?

Messari broadly categorizes DePIN into **Physical Resource Networks (PRNs)**, which provide location-dependent resources, and **Digital Resource Networks (DRNs)**, which provide location-independent resources. We'll delve into the significant developments in each sector and preview what's most promising in 2025.

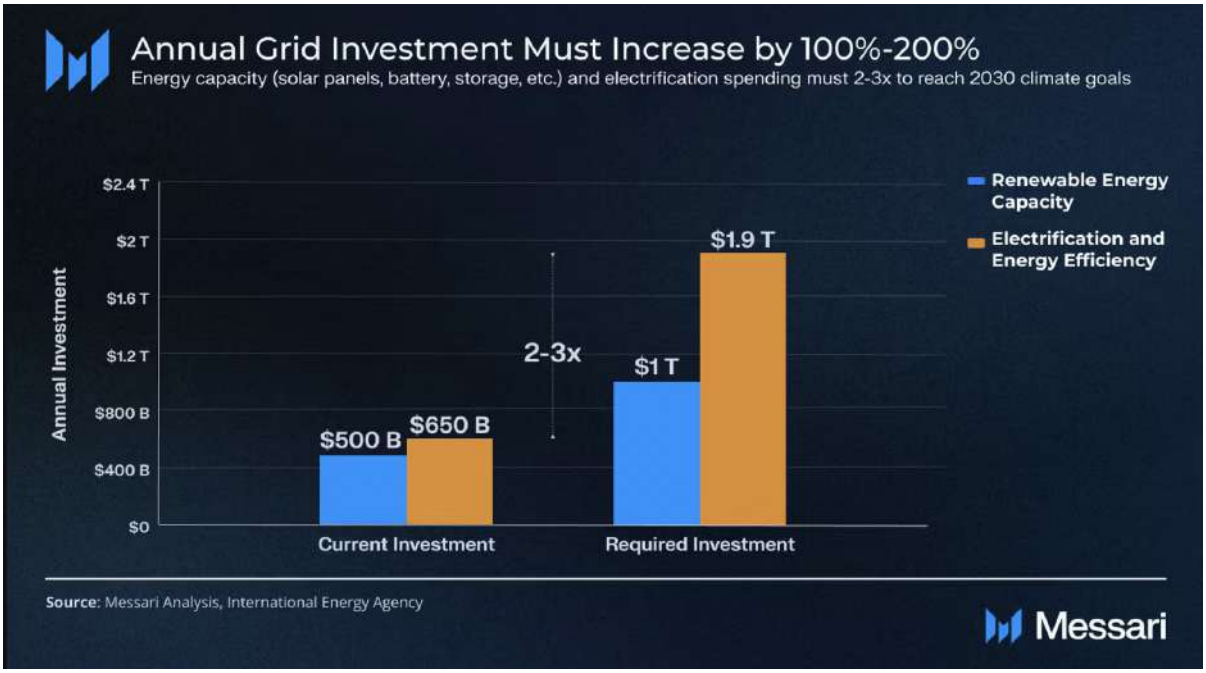


Physical Resource Networks (PRNs)

Energy (DeGEN):

In 2024, energy emerged as one of the most promising sectors within DePIN, driven by its massive addressable market (valued at over $21 trillion) and the urgent global need to accelerate the clean energy transition.

To meet internationally agreed climate goals, annual investments in renewable energy capacity must double to $1 trillion, while investments in electrification must triple to $1.9 trillion. This creates a tremendous opportunity for technologies like DePIN, which are uniquely positioned to accelerate infrastructure deployment and maximize capital efficiency in achieving these critical targets.



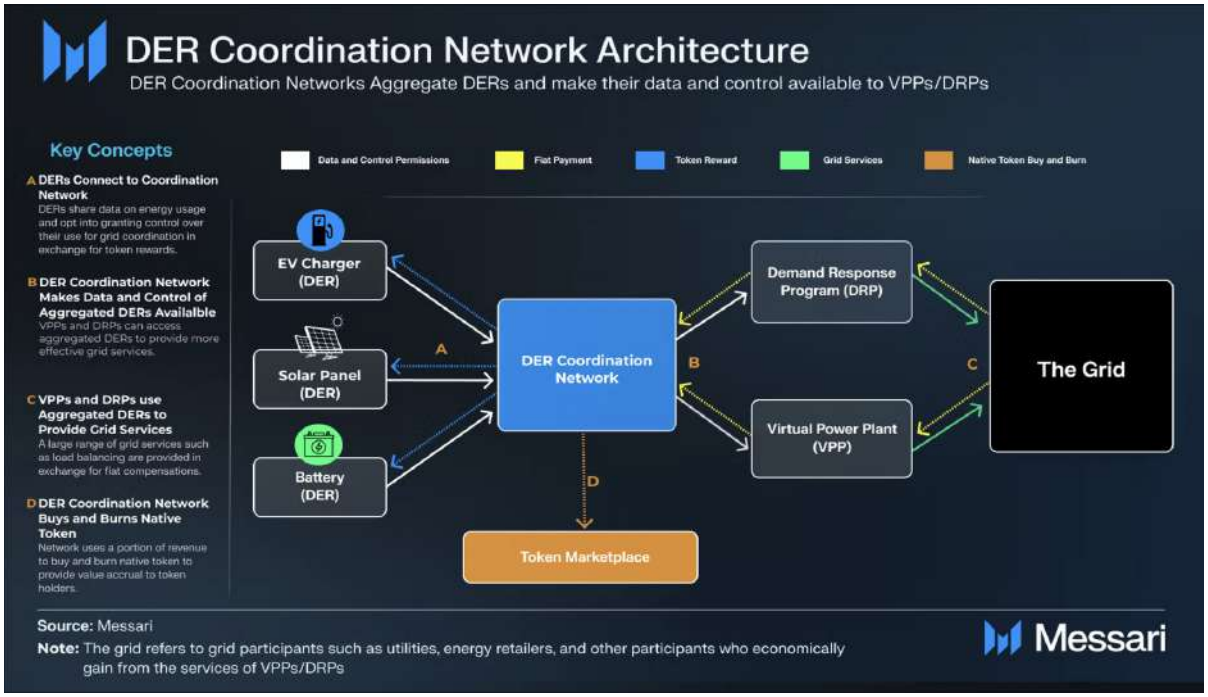
2024 saw significant investment activity in energy, with top-tier crypto and traditional investors backing energy-focused projects. Notable funding rounds include:

- **Daylight:** $9 million Series A led by a16z Crypto.
- **Fuse/Project Zero:** $12 million round led by Multicoin Capital.
- **Glow:** $30 million round led by USV and Framework Ventures.

Energy DePINs tackle two overarching challenges:

1. **Incentivizing the Expansion of Energy Capacity:** Leveraging crypto-economic systems to drive the deployment of solar panels and other Distributed Energy Resources (DERs).

2. **Building a Coordination Layer for DERs:** Aggregating and connecting DERs into Virtual Power Plants (VPPs) and Demand Response Programs (DRPs), providing better grid services like load balancing and blackout prevention.



Solving such problems could help accelerate the clean energy transition, providing immense value to governments and energy companies significantly behind schedule on fulfilling deadlines.

Quiet Progress with Significant Impact

Some of the most transformative advancements in DePIN are happening in energy:

- **Glow:** The DePIN sector leader in revenue, generating over $25 million in 2024. With its deployment of megawatt-scale solar farms across India and beyond, Glow's revenues could scale into the hundreds of millions in 2025.
- **Daylight Energy:** Experiencing explosive growth at 400% month-over-month, with an average of four successful referrals per user, validating its DER coordination network (a decentralized network that aggregated DERs for the use of VPPs and DRPs) as it scales rapidly through local DER installations and electrification.
- **Project Zero:** Integrated with Fuse, a UK-based clean energy company, and positioned to expand across Ireland, Spain, Eastern Europe, and Australia by 2025. Its focus on operating across the GTDR (Generation, Transmission, Distribution, and Retail) stack

positions it to provide the most efficient services on the market.

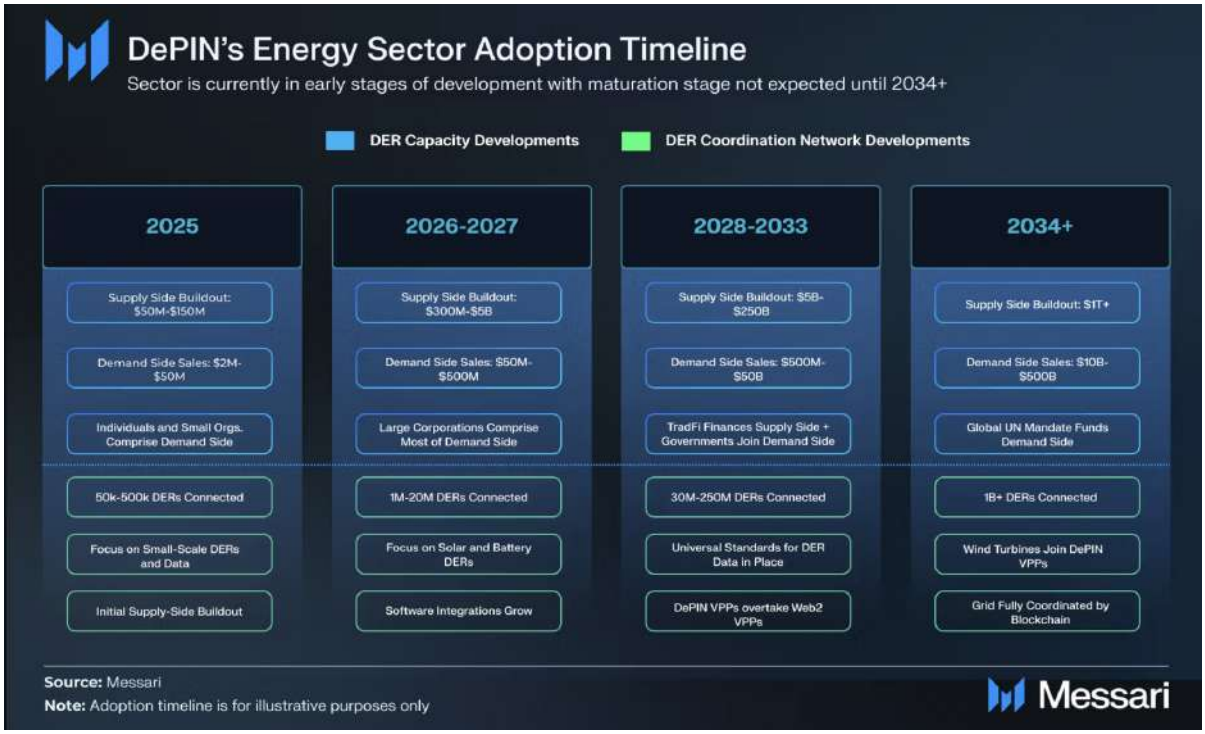
- **Starpower Energy:** Over 13k Smart Plug DERs connected to its network globally in year one, with plans to distribute batteries and EV chargers in the coming year to create a robust, hardware-first DER Coordination Network.

The Path Ahead for Energy DePINs in 2025

Energy DePINs are poised to emerge as a leading sector, not just within DePIN but across the entire crypto ecosystem. As these protocols transition from the development phase to the bootstrapping stage, they are already demonstrating real-world impact and attracting attention from governments, academia, and industry players alike.

Unlike other DePIN sectors, energy is primarily supply-side constrained, meaning the bottleneck lies in deploying sufficient energy infrastructure rather than generating demand.

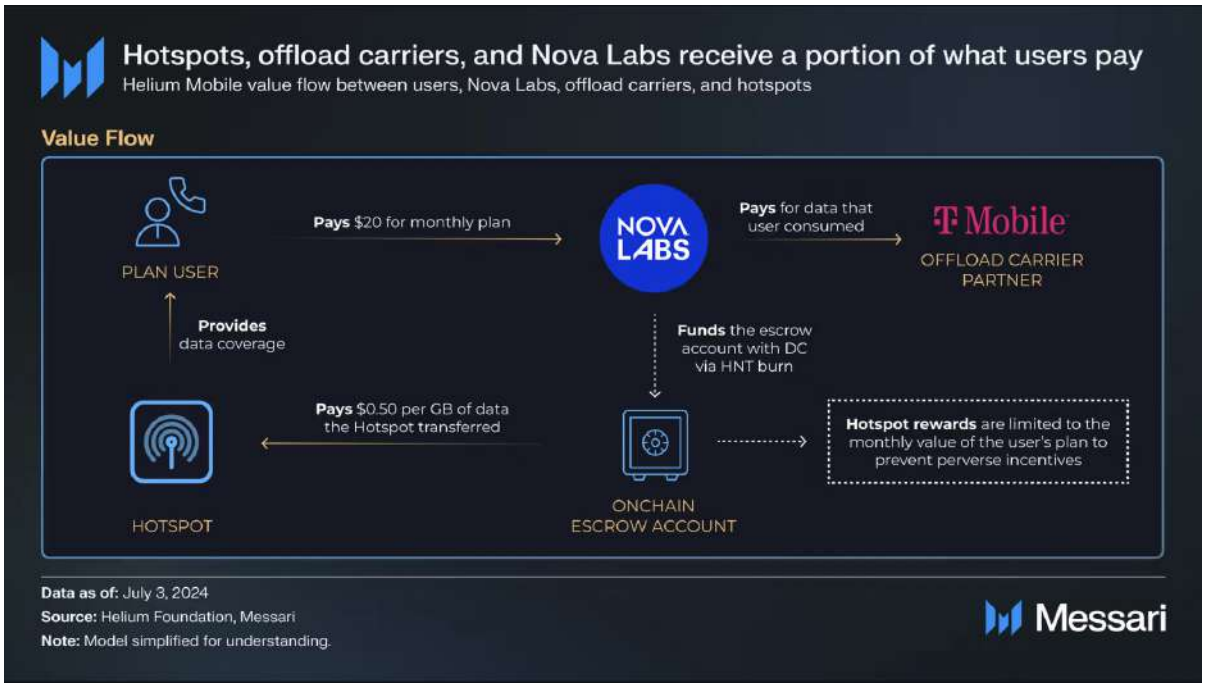
In 2025, we anticipate that energy DePINs will build out $50-$150 million in supply-side infrastructure while generating up to $50 million in demand-side sales. The focus will be on bootstrapping early networks and validating current scalable deployment models for the future.



Messari was early to cover both Glow and DePIN's Energy Sector sector. Enterprise clients can read more in our recent deep dive "Navigating DePIN's Energy Sector" and "DePIN's Glow Up: Incentivizing the Deployment of Solar Farms."

Wireless (DeWi):

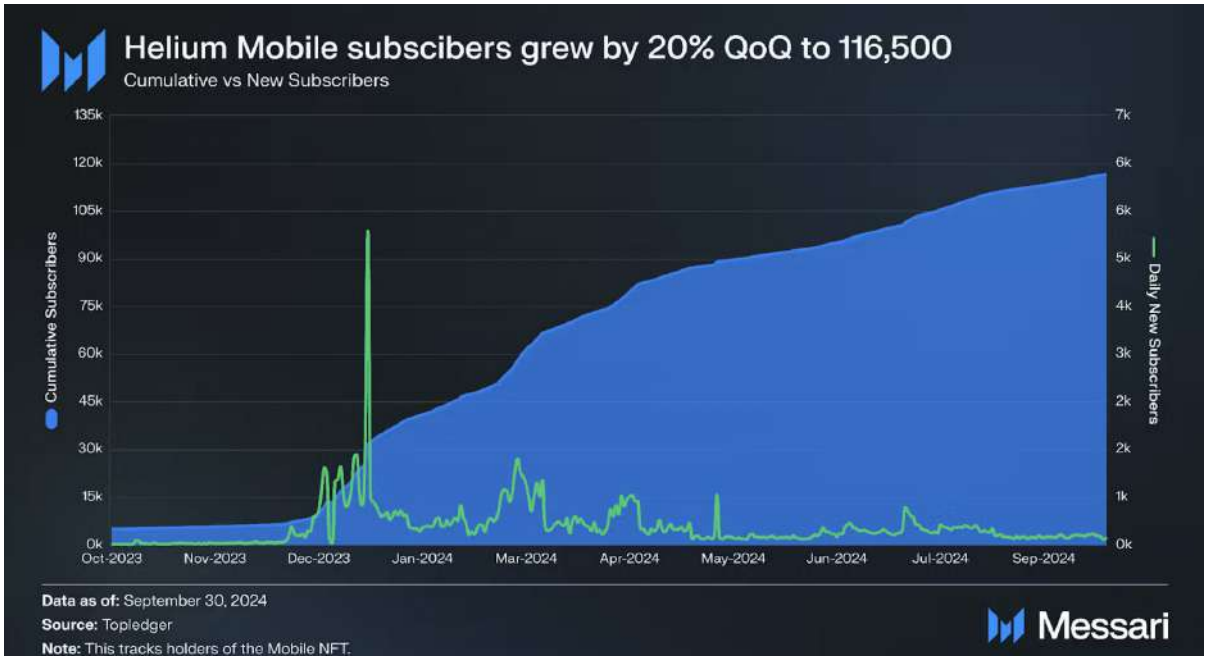
The wireless sector emerged as the driving force behind DePIN's growth in 2024, propelled by Helium Mobile's success. Helium Mobile, a $20/month mobile plan powered by Helium hotspots, surpassed 120,000 subscribers within its first year since launching in December 2023. Positioned as the most affordable mobile plan on the market, it demonstrates the economic viability of leveraging decentralized infrastructure for real-world use cases. Additionally, Helium Mobile's Carrier Offload program–using Helium hotspots to expand coverage in areas where large Telecom companies do not have coverage–now supports an average of 280,000–300,000 daily subscribers, helping mobile carriers expand coverage in the 5G era.



Strategic Focus and Adaptability at Helium

The Helium team has shown an ability to adapt to market signals and rethink its strategy. In late 2024, the passing of HIP-138 marked a significant pivot for the network. The proposal streamlines the network's tokenomics to focus exclusively on the HNT token, moving away from subnet tokens like MOBILE. This strategic shift aligns with Helium's evolving priorities, as the once-prominent network-of-networks approach has been deprioritized in favor of scaling Helium Mobile.

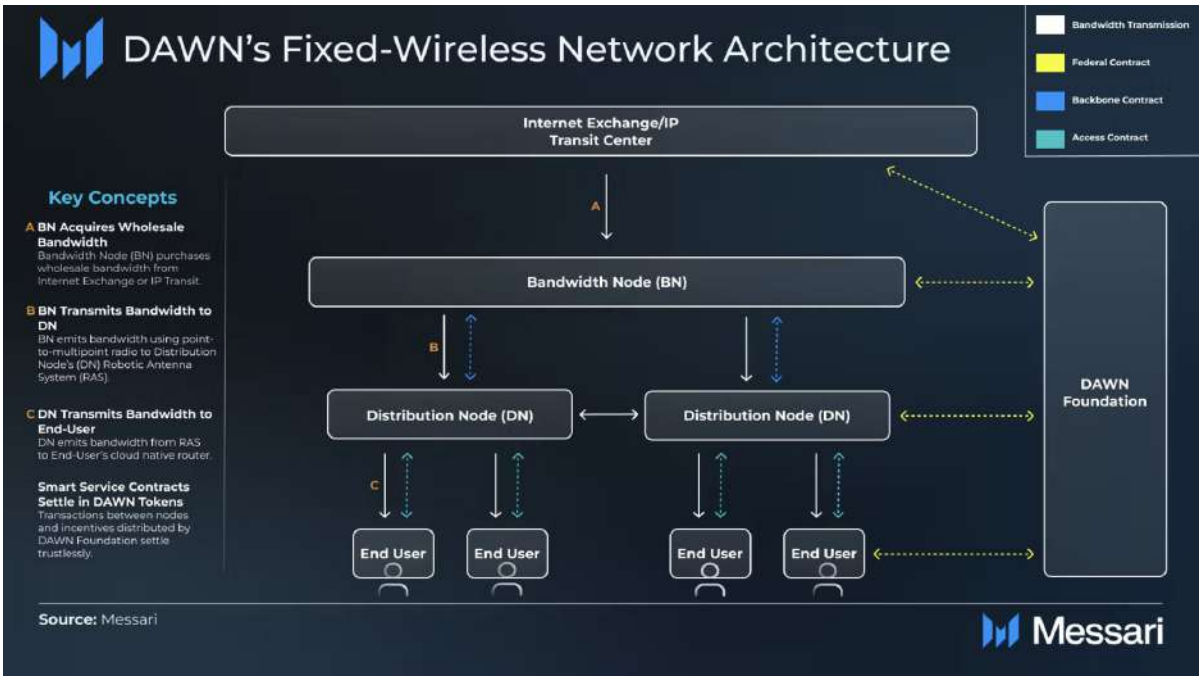
Earlier in the year, the Helium community passed a proposal to launch an ENERGY subnet aimed at building a DER coordination network. However, this initiative was later abandoned, underscoring Helium's decision to double down on its mobile-first strategy. This prioritization of what's working positions Helium to continue leading the DePIN sector in real-world adoption.



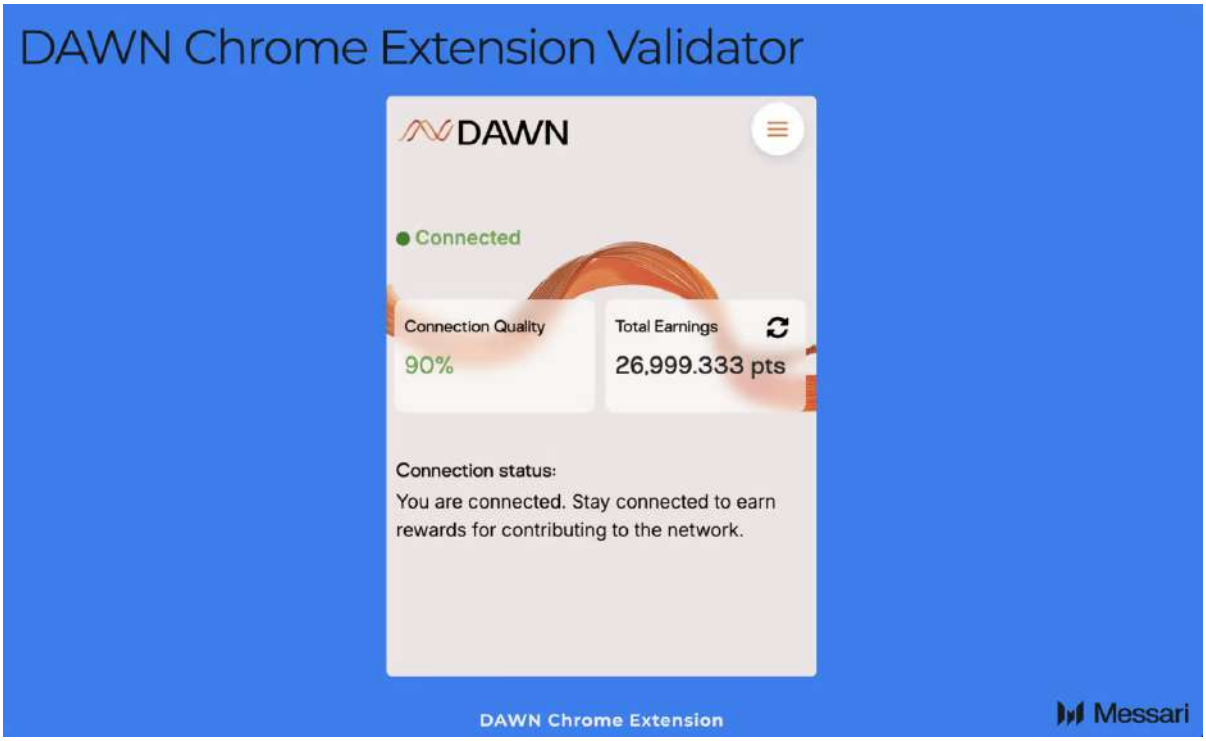
Refer to our "Understanding Helium: A Comprehensive Overview" report for a lay of the land.

Innovations in Fixed-Wireless Broadband: DAWN

Beyond Helium, the wireless sector is seeing notable advancements in fixed-wireless broadband. DAWN, a DePIN protocol focused on decentralized fixed-wireless networks, raised an $18 million round led by Dragonfly in August 2024. The protocol aims to deliver multigigabit at-home internet at 80–90% lower costs than traditional providers. Its vision is to shift internet infrastructure ownership from monopolistic providers to households, transforming internet access into an affordable and profitable capital asset.

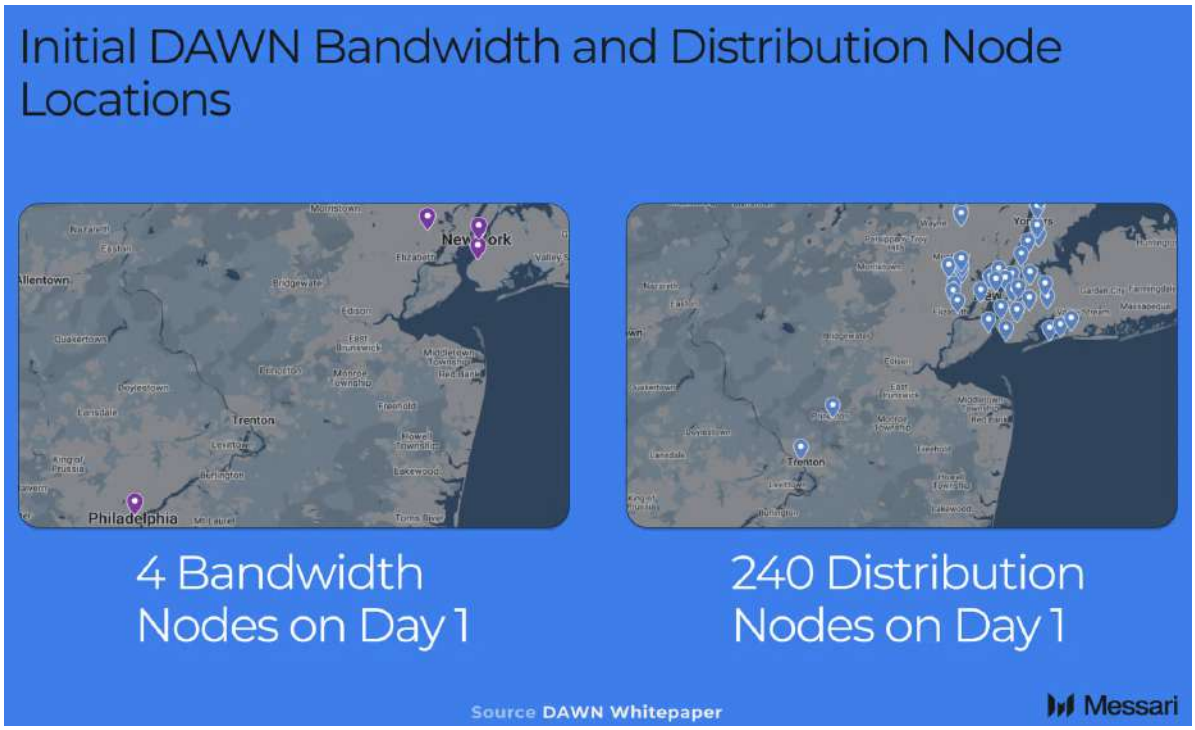


Inspired by Grass's AI data collection model, DAWN's Chrome extension has already achieved over 1 million downloads, validating its network through user-driven participation. This early traction highlights the potential of decentralized models to scale rapidly and efficiently.



Infrastructure Expertise Meets DePIN Innovation

DAWN exemplifies the infusion of experienced infrastructure leaders into DePIN. Neil Chatterjee, DAWN's founder, previously launched Andrena, a fixed-wireless ISP founded in 2016 that operates in the NYC area and supports users in over 10 U.S. states. By leveraging a DePIN model, DAWN aims to scale fixed-wireless broadband globally at an accelerated pace, democratizing internet ownership and drastically reducing costs for consumers.



Messari was early to cover DAWN in "The DAWN of DePIN: Commoditizing Internet Bandwidth with Fixed-Wireless Broadband." Our Q4 '22 "The Telecom Cowboys of the Decentralized Wireless Movement" covers the roots of DeWi.

Other Wireless DePIN Innovations

Several other wireless-focused DePIN projects are tackling pressing challenges in the industry:
Really: Addressing privacy concerns by decentralizing ISP-controlled data.
Roam: Creating systems to collect higher-quality data from mobile users while maintaining privacy and user-centric control.

These emerging protocols underscore the sector's capacity to address both economic and technological pain points, driving innovation across wireless connectivity, data management, and privacy.

Looking Ahead: Wireless DePIN in 2025

With Helium Mobile poised for further growth and DAWN launching its mainnet in 2025, the wireless sector is set to solidify its position as a breakthrough use case within DePIN.
Revenue Projections: We anticipate that the sector will achieve mid-8 to low-9-figure revenues in 2025 as it continues to redefine connectivity and infrastructure ownership globally.
Expanded Carrier Offload Programs: We expect a large-scale expansion of carrier offload programs as major telecoms become more comfortable with the DePIN model and relationships continue to strengthen.

DeWi integrations with Starlink: We expect DeWi networks like Helium to integrate with satellite broadband systems like Starlink. This approach offers a scalable solution for remote rural

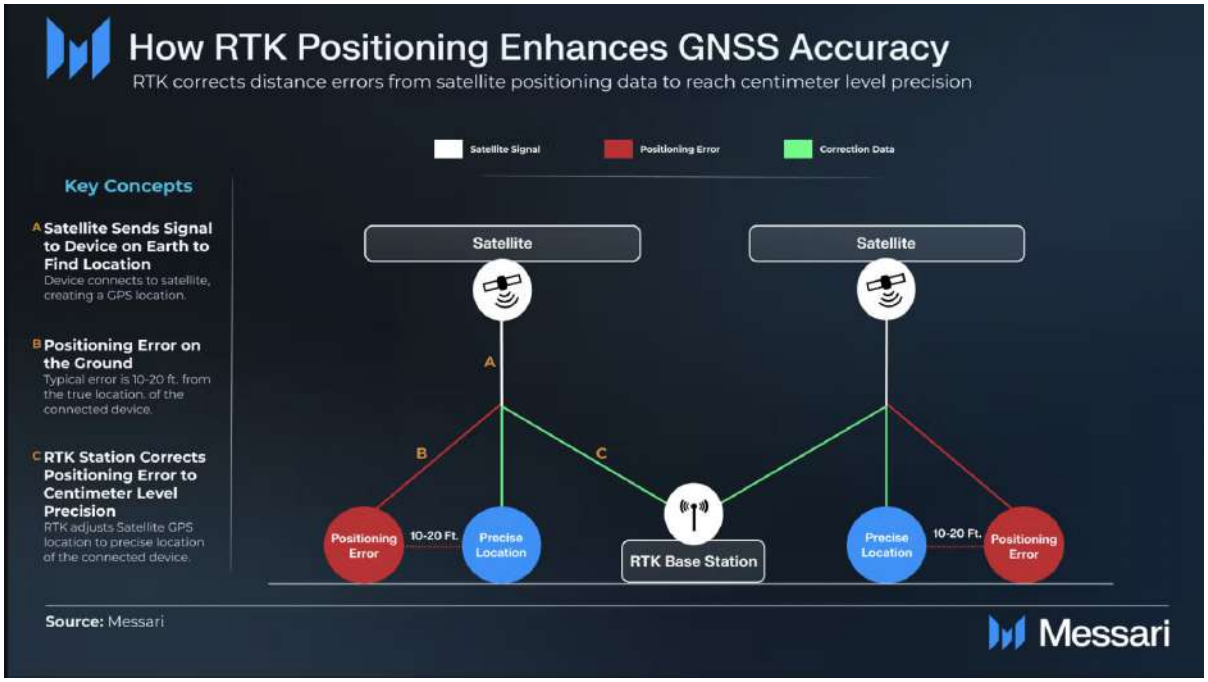
connectivity by using a few Starlink nodes to establish ground connections while low-cost DePIN fixed-wireless antennas or hotspots extend coverage to surrounding areas.

Environmental Collection Data:

Networks using sensors and stations to collect environmental data, such as weather monitoring, RTK (Real-Time Kinematic) correction, and noise collection, have emerged as promising use cases for DePINs. These networks provide highly valuable data to demand-side participants, generating stable income streams and showcasing the potential of decentralized infrastructure. In particular, RTK positioning networks demonstrated significant traction and validation of DePIN as a unique enabler of value creation.

RTK Correction Data: A High-Value Use Case

Among environmental data networks, RTK correction networks like GEODNET and Onocoy have been the most successful. RTK stations address critical positioning errors in GPS systems. While GNSS satellites often miss true geographic locations by 10–20 feet, RTK stations intercept these signals and correct errors to achieve 1 cm precision.

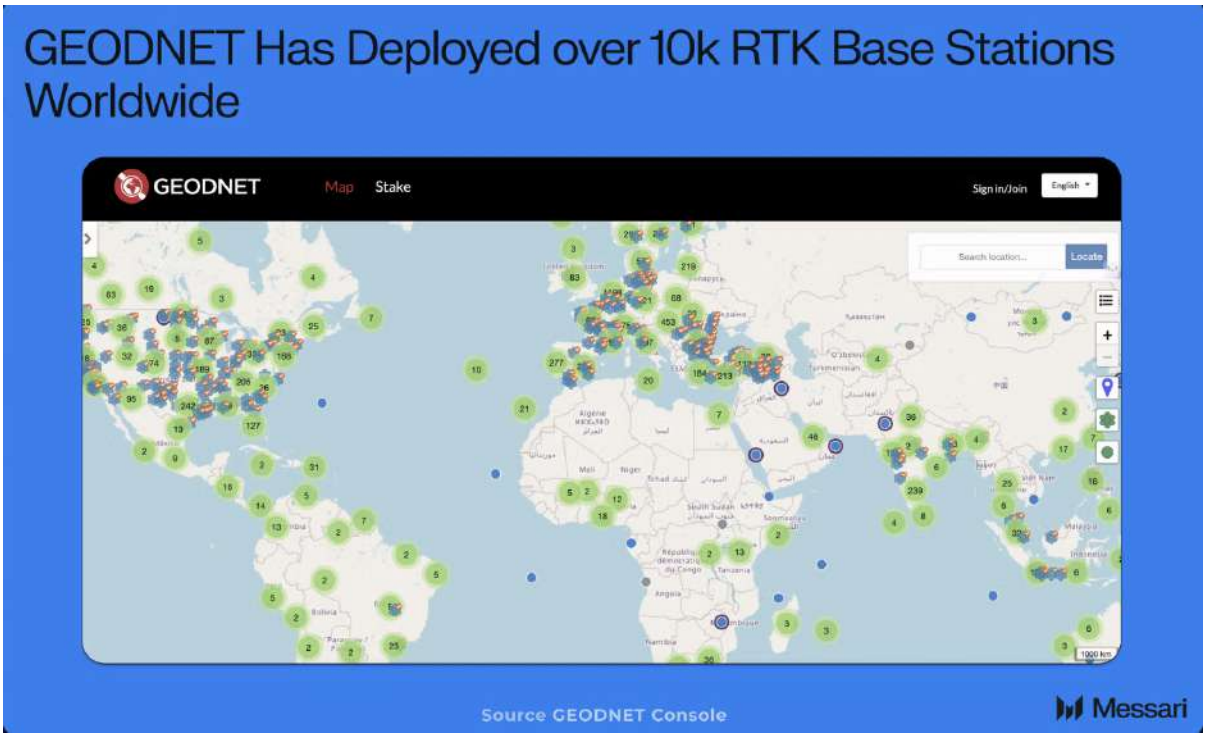


This level of accuracy is indispensable for applications such as:

- High-precision agricultural farming
- Drone delivery systems
- Augmented reality (e.g., Pokémon Go)
- Autonomous vehicles

GEODNET: A DePIN Success Story

In under two years, GEODNET has built the world's largest RTK network, boasting over 11,000 stations globally. For comparison, the second-largest network, operated by Trimble—a centralized corporation valued at over $15 billion—has only 5,000 stations, built over three decades. GEODNET's use of a DePIN model has enabled it to scale its network twice as large as Trimble's in a fraction of the time.



GEODNET's success is already translating into significant financial outcomes. The network reportedly generates over $1.6 million in annualized revenue, with 80% of earnings allocated to buying and burning the native GEOD token, creating direct value for token holders.

DePIN vs. Centralized Models: Key Advantages

GEODNET exemplifies the superior efficiency and scalability of DePIN networks compared to centralized models. Initially, Founder Mike Horton envisioned a traditional centralized approach to building the network but encountered significant barriers:

- **High Real Estate Costs:** Renting and maintaining sites for RTK stations would cost over $25,000 annually per location.
- **Limited Scaling Potential:** The centralized model restricted the pace and breadth of deployment.

By adopting a DePIN model, these challenges were mitigated:

1. **Crowdsourced Infrastructure:** Real estate owners deploy infrastructure, eliminating the need for costly leases. Each RTK station costs only $700, paid by the user.

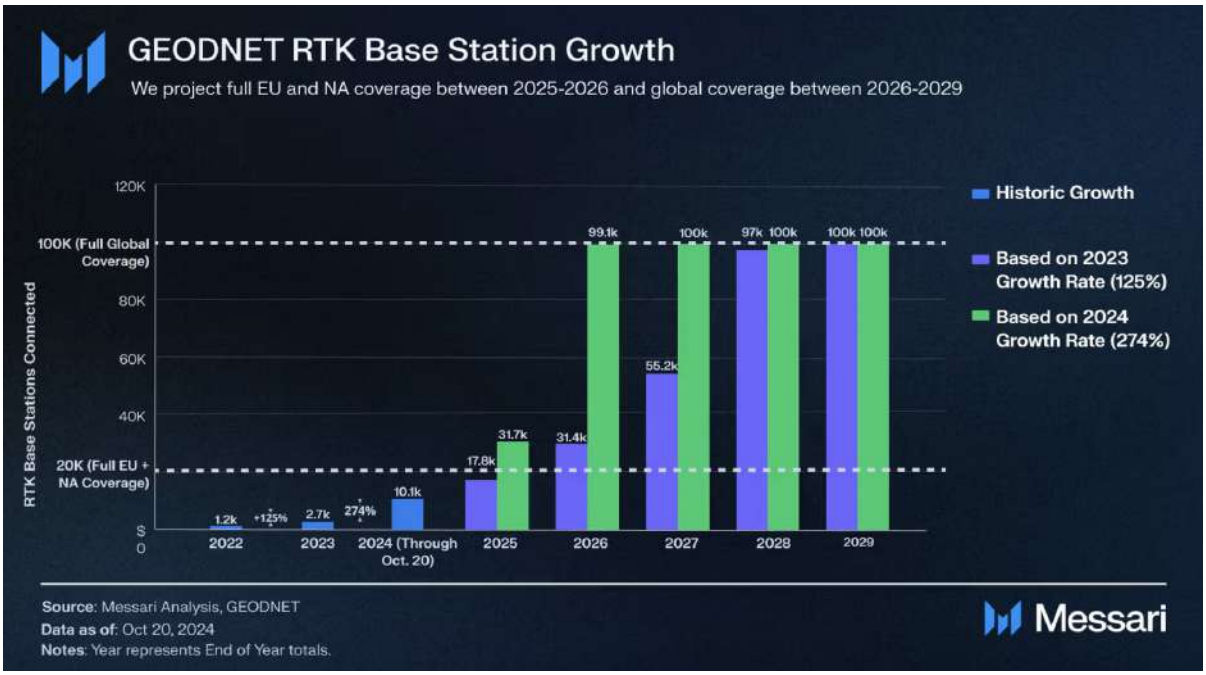
2. **Lower Deployment Costs:** Crowdsourcing dramatically reduces the financial burden, enabling faster and broader scaling.
3. **Eliminated Operating Expenses (OpEx):** Infrastructure deployers bear the operating costs, minimizing ongoing expenses for the network.
4. **Blockchain-Driven Efficiency:** Blockchain rails and smart contracts automate global payment distribution, bypassing the complexities of fiat-based operations.

Messari clients can read more in "DePIN for TradFi: A GEODNET Valuation and Breakdown."

The Path Ahead Environmental Data Networks in 2025

As a pure network play, DePINs are proving to be the optimal solution for creating large-scale infrastructure at unprecedented speed and cost efficiency. GEODNET's trajectory suggests a bright future for environmental data networks, with demand-side value driving robust and sustainable growth.

RTK Network Growth: We expect RTK networks like GEODNET to expand the supply-side to provide 90%-100% coverage for high-value EU and NA regions by the end of 2025. In addition, annual revenue could grow to over $10 million by the end of 2025.



Surge in Growth for Weather Collection Networks: With a series of promising weather networks coming to market, including Raad, SkyX, and Nubila, we expect to see significant progress within this vertical in 2025.

High-Profile Government Partnerships: We expect major governments to take an active interest in this DePIN vertical in 2025, leading to long-term partnerships to leverage environmental DePINs to accomplish policy objectives.

Mobility and Map Imagery:

The mobility sector within DePIN experienced significant growth in 2024, driven by high-profile partnerships and network expansion. A key debate emerged this year: Which is more effective for data collection—hardware-based or software-based approaches?

Hardware-Based Approach: Hivemapper's Dashcam Model

Hivemapper became one of the most successful DePINs for collecting mapping data using its physical dashcam device. Users purchase the device, motivated by token rewards for deploying it and collecting valuable map data. The approach has several advantages:

- **Specialized Hardware:** Designed and optimized for mapping data collection.
- **Dedicated Device:** Users will not need to use the device for other purposes like they might with a multi-purpose mobile device.
- **Reduced Reliance on 3rd Parties:** Hardware devices do not rely on external 3rd parties who can deny service or cause other problems.

Software-Based Approach: NATIX's Mobile Integration

In contrast, NATIX employs primarily a software-based approach, allowing users to collect mapping data directly through their existing smartphones. By leveraging advancements in mobile camera technology, NATIX believes it can achieve comparable data quality without requiring users to invest in additional infrastructure. This approach has distinct advantages:

- **Lower Barrier to Entry:** No hardware purchase is necessary.
- **Higher Potential ROI:** Users can begin earning rewards immediately with minimal upfront cost.
- **Wider Adoption:** The ubiquity of smartphones increases the potential user base significantly.

This divergence highlights the sector's experimentation with different models to optimize data collection and user engagement.

Integration of Teslas into Mobility Networks

Another major trend in mobility networks is the growing integration of Tesla vehicles into DePIN platforms:

- **DIMO:** Tesla owners can now use the DIMO app directly from their vehicles, simplifying data collection and network participation.
- **NATIX:** Certain Teslas now natively capture 360-degree mapping data using the vehicle's built-in console, further enhancing data quality and breadth.

Notably, electric vehicles (EVs) like Tesla act as mobile batteries, creating a natural intersection between DePIN's Energy and Mobility sectors. For instance, Daylight and NATIX have partnered to explore synergies between mobility data collection and energy optimization, paving the way for innovative cross-sector solutions.

The Role of DePIN in Autonomous and EV Ecosystems

With the dual rise of autonomous vehicles and electric vehicles, DePIN is poised to play a critical role in:

1. **Vehicle Data Collection:** Networks like NATIX and DIMO can provide the high-quality data required for autonomous driving systems.
2. **Incentivizing Infrastructure Deployment:** DePIN tokenomics could one day incentivize the procurement and deployment of autonomous vehicles into decentralized rideshare networks, reshaping the transportation industry.

The integration of EVs into DePIN networks also highlights opportunities to optimize energy use, such as vehicle-to-grid (V2G) applications, further blurring the lines between energy and mobility sectors.

The Path Ahead in 2025

With vehicular data valued at over $800 billion, we expect significant progress from this vertical in 2025.

- **EVs As the Intersection Between Energy and Mobility:** We anticipate integrations and partnerships between energy and mobility DePINs to further enhance grid integrations and energy collection data from the EV batteries.
- **Autonomous Vehicles (AV):** The expansion of autonomous vehicle (AV) fleets, such as Waymo's rollout into cities beyond San Francisco, along with Tesla's advancements in autonomous driving capabilities, is expected to significantly increase the demand for vehicular data, fueling revenue growth in the sector.
- **Integrations and Partnerships with Municipalities:** As AV and EV adoption increases, local city governments will initiate partnerships with mobility and imagery DePINs to help city planning and start building smart cities.

Digital Resource Networks (DRNs)

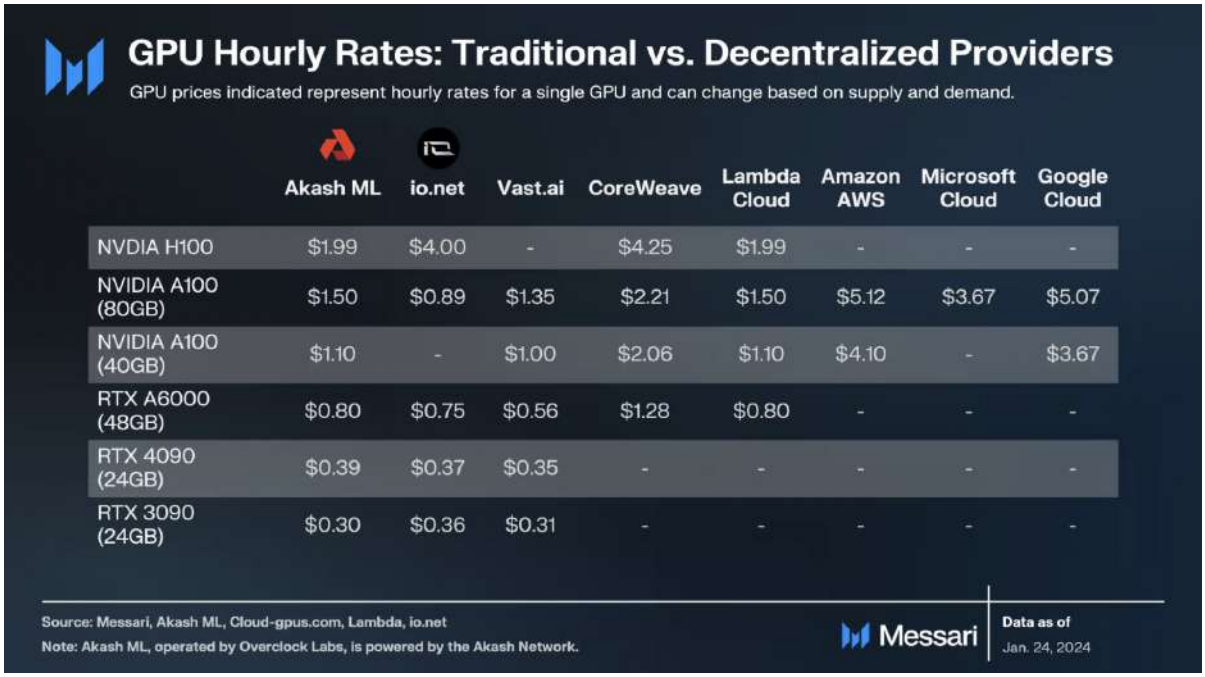
Compute:

The compute sub-sector has seen a surge in interest fueled by the rapid growth of generative AI, which heavily depends on GPU-powered compute. Established networks like Akash and Render have leveraged this demand to achieve substantial growth. For instance, Akash's daily

demand-side spending increased by 878%, rising from $1.25K on January 1, 2024, to $12.23K on December 7, 2024. Meanwhile, newly launched protocols in 2024 have gained significant traction, with notable circulating market caps as of December 7–io.net at $465M, Aethir at $412M, and Nosana at $185M, signaling strong investor confidence in the sector.

Cost-Effectiveness: DePIN's Competitive Edge

DePIN compute networks can lower the cost of GPU compute by as much as 90% compared to centralized providers. With demand for GPU compute projected to exceed $7 trillion in value, DePIN is well-positioned to become a key player in delivering cost-effective and decentralized compute solutions.



Challenges: Capturing the Demand Side

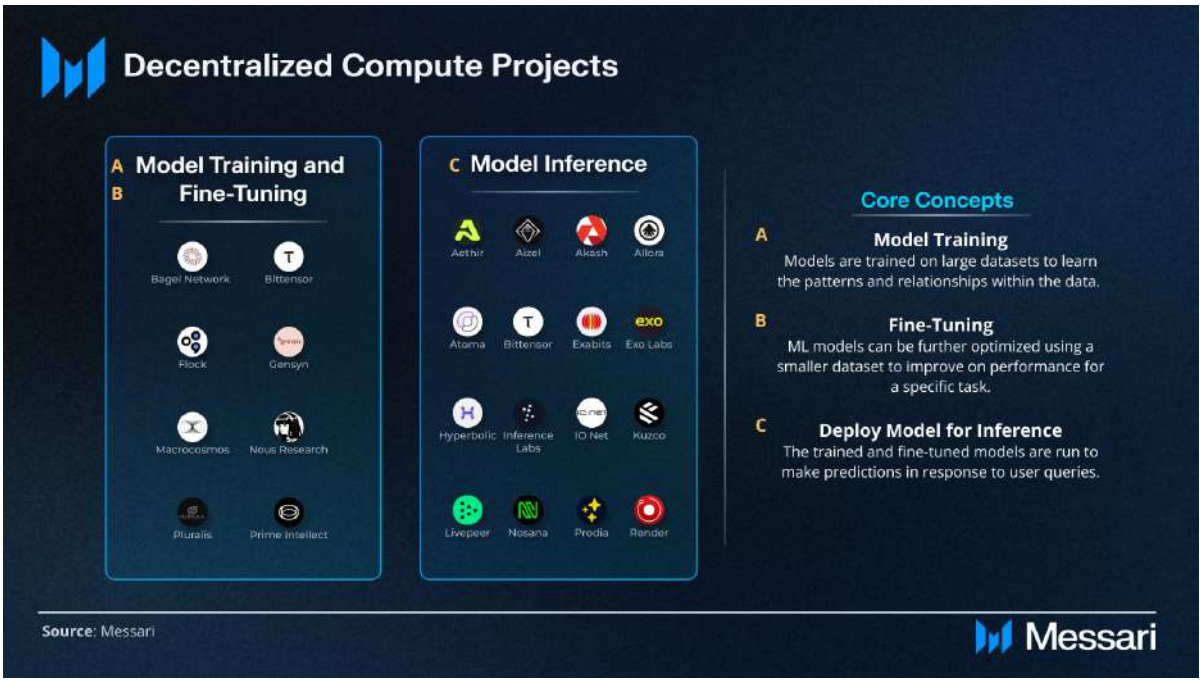
Despite lower costs, significant challenges remain in capturing demand:

- **Competition Among Marketplaces:** All compute marketplaces, including DePIN networks, are competing for a finite supply of GPU compute resources. To attract GPUs, networks often resort to offering higher value incentives in token rewards, which can lead to an unsustainable race to the bottom for attracting a commoditized resource.
- **Lack of Differentiation:** It remains uncertain how DePIN compute networks will distinguish themselves from centralized GPU compute marketplaces like AWS or Google Cloud beyond pricing, as well as how they will differentiate from one another in the long term.

Specialization Across the AI Stack

The emergence of more than 30 compute networks in 2024 has accelerated specialization within the AI stack:

- **Inference-Focused Networks:** Some protocols specialize in providing compute optimized for AI inference, serving applications like chatbot responses or real-time image generation.
- **Model Training Networks:** Other protocols focus on compute for training large machine learning models, a resource-intensive process requiring sustained GPU power.
- **General-Purpose Platforms:** Established players like Akash and io.net aim to serve compute needs across the stack, offering flexibility at scale.



Hybrid Models: DePIN-Powered Web2 Solutions

One emerging model involves pairing DePIN compute supply with a Web2-style business on the front end:

- **Prodia:** A standout example, Prodia uses DePIN compute infrastructure to power its generative AI image API, offering services to developers at reduced costs. This model has already generated seven-figure revenues, demonstrating the viability of combining DePIN cost efficiency with traditional business models.

However, questions persist about whether such front ends require their own dedicated DePIN. With a growing abundance of compute networks offering similar cost structures, it's possible these front ends could simply rely on external DePIN infrastructure rather than building proprietary systems.

The Path Ahead for 2025:

The compute sector's trajectory in DePIN will likely hinge on its ability to:

1. **Differentiate Offerings:** Develop unique value propositions beyond cost reduction, such as specialized services, superior performance, or integration with specific AI workflows.
2. **Address Supply Constraints:** Innovate mechanisms to sustainably attract and retain GPU supply, avoiding destructive competition.
3. **Evolve Business Models:** Explore hybrid approaches that pair decentralized supply with targeted front-end solutions for specific verticals.

3-4 Winners Emerge Among Compute DePINs: We anticipate that a few DePINs will effectively position themselves to take up the majority of market share in the long run due to power law dynamics. The winners will be a mix of established platforms and newcomers.

Major AI Company Builds a Compute DePIN: We believe that large centralized AI companies could build compute DePINs to tap into this potentially lucrative market. With large advantages across the AI stack, such a DePIN stands to have significant advantages over existing compute DePINs due to economies of scale and integrated services.

Intense Competition Among Underlying Blockchains for Compute DePINs: Robust access to compute onchain could have a wide range of downstream benefits for application composability and AI use cases. We expect competition to attract compute DePINs to intensify as this reality becomes clearer.

File Storage

The File Storage subsector developed more quietly in 2024 than other subsectors but still made meaningful progress across key metrics.

Storage Utilization Growth: There was a consistent increase in storage utilization, indicating a growing demand for Filecoin's services. Utilization grew from 18% in Q4 2023 to nearly 30% by Q3 2024.

Technological Advancements: Filecoin introduced the Filecoin Web Services (FWS) framework, enhancing its ecosystem with verifiable services for developers and users. The "Waffle" upgrade and Filecoin Fast Finality (F3) were implemented to address scalability and efficiency challenges.

AI and Decentralized Storage: Filecoin has formed AI partnerships to expand its data solutions, positioning itself for demand-side growth from AI companies with significant data storage needs. Collaborations with AI organizations like SingularityNET and Theoriq AI highlight its role in decentralized AI infrastructure. Storj also partnered with CUDIS to offer file storage integrated with cloud services for large-scale AI and Web3 applications.

Scalability and Efficiency: The introduction of Filecoin Fast Finality (F3) reduces transaction finality times by 450x, reducing the finalization of blocks from 7.5 hours to minutes. This enables new applications and infrastructure to be built on Filecoin, expanding its ecosystem.

Market Dynamics: Filecoin continues to lead in the decentralized storage market, with significant growth in storage capacity. However, competition from networks like Arweave and Storj remains strong.

The Path Ahead for 2025:

Increased Demand from AI Adoption: The growing need to store vast amounts of data generated by AI models presents a significant opportunity for file storage DePINs. By offering scalable, cost-efficient storage solutions, these networks could become attractive to AI startups, enabling them to manage their data needs at lower costs than traditional providers. Furthermore, decentralized file storage could be coupled with decentralized GPU compute services to provide an even more compelling product to this growing demand.

Focus on Enterprise Sales: Packaged file storage services tailored to enterprise use cases are expected to see significant growth. Centralized demand-side gateway companies and supporting foundations will play a pivotal role in facilitating these sales and addressing the persistent demand-side challenges that file storage DePINs have struggled with. This approach will streamline enterprise adoption by offering user-friendly solutions and bridging the gap between decentralized networks and enterprise clients.

Significant Growth in Revenue: We project that file storage DePINs are well-positioned to generate $15–$50 million in revenue across the sub-sector in 2025. This growth would rank storage DePINs among the top five revenue-generating sub-sectors within the broader DePIN ecosystem.

AI Data Layers:

Data reigns supreme in the race to build powerful AI systems, and DePINs are emerging as a critical solution for incentivizing users to share data for AI model training. By combining decentralized infrastructure with user-centric token rewards, DePINs are unlocking new opportunities for seamless, scalable data collection.

Grass: A Leading DePIN for Data Sharing in 2024

Grass has become one of the year's breakout DePIN projects, pioneering a model that rewards users for sharing their unused excess internet bandwidth through a Chrome extension. Users simply install the extension and earn token rewards without actively managing the data-sharing process.

On the demand side, Grass aggregates and sells this data to AI companies and developers, where it is used for training machine learning models. Effectively, it conducts web scraping for data while compensating users for sharing their data. This dual-sided approach has positioned Grass as a sustainable and scalable player in the DePIN ecosystem.

Rapid Growth and Market Impact

Grass's success is reflected in its rapid adoption and market valuation:

- Over 2.8 million wallets participated in its airdrop at launch in October 2024.
- Following the airdrop, Grass's fully diluted valuation (FDV) surged to $3.89 billion on November 8th, making it one of the largest DePINs by market cap.

Chrome Extensions: The Gateway to DePIN Adoption

Grass is not alone in leveraging Chrome extensions to onboard users:

- DAWN has attracted over 1 million users to its Chrome extension, which validates its fixed-wireless broadband network.
- Bless Network has onboarded over 100,000 users through its extension, even before launching its mainnet.

Chrome extensions have proven to be an effective onboarding strategy, providing a passive and user-friendly way to involve millions of participants in DePIN networks.

The Path Ahead for 2025

As demand for AI-ready data continues to surge, we expect:

1. A rise in digital data collection DePINs in 2025, driven by the success of projects like Grass.
2. Chrome extensions to become a go-to tool for onboarding users, offering ease of use and scalability.

DePINs are poised to become a critical bridge between individual users and the AI economy, rewarding participants while enabling cost-efficient, decentralized data collection at scale.

Rising Verticals:

CDN Networks

Content Delivery Networks (CDNs) are systems of distributed servers strategically located across different geographic regions to deliver digital content—like websites, videos, images, and other online assets—quickly, reliably, and securely to users. Decentralized CDNs represent a promising opportunity to reduce latency further and optimize delivery by taking advantage of token incentives to deploy more nodes in key locations faster and cheaper.

Key Developments in the CDN Sector

2024 saw significant advancements in CDN-related DePIN projects, highlighted by notable funding rounds:

- **Pipe:** Raised a $12 million Series A, led by Multicoin Capital, to develop hyper-localized Point-of-Presence (PoP) nodes aimed at reducing latency content delivery.
- **Blockcast:** Secured a $2.75 million Seed Round to leverage multicast technology, a novel approach that could scale content delivery more efficiently than traditional unicast methods.

Innovative Approaches to Scaling CDNs

1. **Pipe's Hyper-Localized Nodes**
   Pipe focuses on deploying hyper-localized infrastructure, enabling content to be delivered directly from nodes closer to end users. This minimizes latency and enhances the user experience, particularly in bandwidth-intensive applications like video streaming or real-time gaming.
2. **Blockcast's Multicast Technology**
   Blockcast aims to scale content delivery by adopting multicast technology, which allows multiple users to receive the same content simultaneously. This approach could dramatically reduce network strain compared to traditional unicast methods, where each user requires a separate data stream.

The Path Ahead: Challenges and Opportunities

While these technological approaches are still in the early stages and require further validation, their potential impact is immense:

- **Reduced Latency and Increased Efficiency:** If successful, decentralized CDNs could outperform traditional models in both speed and scalability.
- **Bridging the Digital Divide:** By improving last-mile delivery, these networks could expand access to high-quality content in regions with poor internet infrastructure.
- **DePIN and Crypto Synergy:** Successful scaling of CDNs would establish them as a cornerstone of the DePIN ecosystem, demonstrating the real-world utility of decentralized infrastructure and its ability to tackle global challenges.

CDNs have the potential to become one of the most impactful breakthroughs in both crypto and DePIN. Should innovative solutions like hyper-localized nodes and multicast technology prove viable and scalable, decentralized CDNs could redefine content delivery, setting a new standard for speed, accessibility, and efficiency in the digital age.

Manufacturing

Although still in its infancy, the manufacturing sector holds immense potential for DePIN. This is particularly true in the United States, where the industrial base has been significantly eroded over the past 50 years. By leveraging decentralized models, DePIN has the opportunity to rejuvenate manufacturing, improve efficiency, and reduce costs on a global scale.

3DOS: A Promising Model for 3D Printing

One standout protocol in this space is 3DOS, a global 3D printing DePIN that reimagines how manufacturing is coordinated and monetized. Key features of the 3DOS model include:

1. **On-Demand Printing:** Users can upload a design, have it printed within hours anywhere in the world, and earn royalties on every sale.
2. **Utilizing Excess Capacity:** 3DOS enables 3D printers with idle capacity to join the network, earning revenue while maximizing manufacturing efficiency.
3. **Cost Reduction:** By decentralizing production and reducing logistics overhead, 3DOS lowers overall manufacturing costs, democratizing access to advanced manufacturing technology.

This decentralized approach increases efficiency and creates new revenue streams for participants, fostering a more resilient and scalable manufacturing ecosystem.

Future Outlook

1. **Continued Growth in 3D Printing:**
   We anticipate significant adoption of 3D printing via DePIN. This will enable rapid, localized production that caters to diverse industries, from prototyping to consumer goods.
2. **Large-Scale Manufacturing Coordination:**
   Beyond 3D printing, DePIN could evolve to coordinate large-scale industrial manufacturing, facilitating decentralized production lines for more complex products. These advancements could emerge in subsequent years as the technology and ecosystem mature.

Protocols like 3DOS are paving the way for decentralized manufacturing to become a reality, offering a glimpse into a future where production is faster, cheaper, and more accessible than ever before. With further innovation and adoption, DePIN could become a cornerstone of the global manufacturing economy.

Consumer

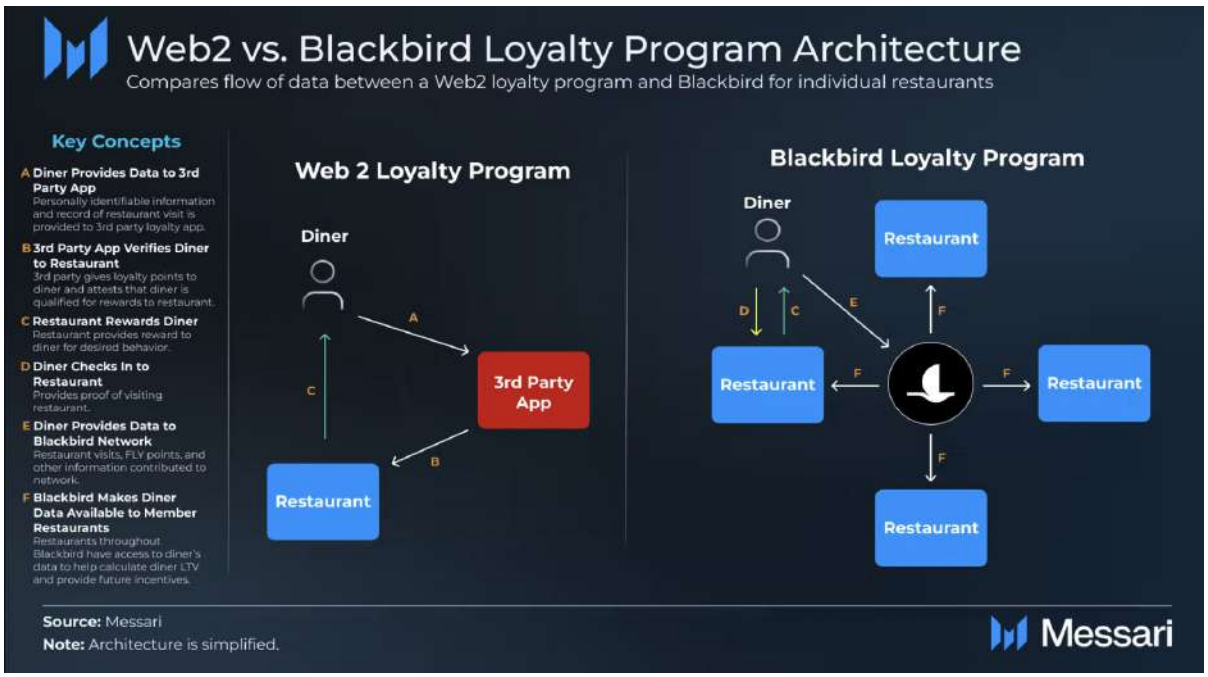
The emergence of consumer-focused DePIN protocols is set to transform how high-quality user data is leveraged, creating an ecosystem of applications that compensate users for their contributions while driving innovation in consumer engagement.

Blackbird: A Web3 Loyalty Platform Leading the Way

In 2024, Blackbird achieved remarkable success, expanding its Web3 restaurant loyalty points platform from NYC to San Francisco and Charlotte. Blackbird's value proposition lies in combining a high-quality user experience (UX) with a shared, open database of diner behavior data.

How Blackbird Delivers Value:

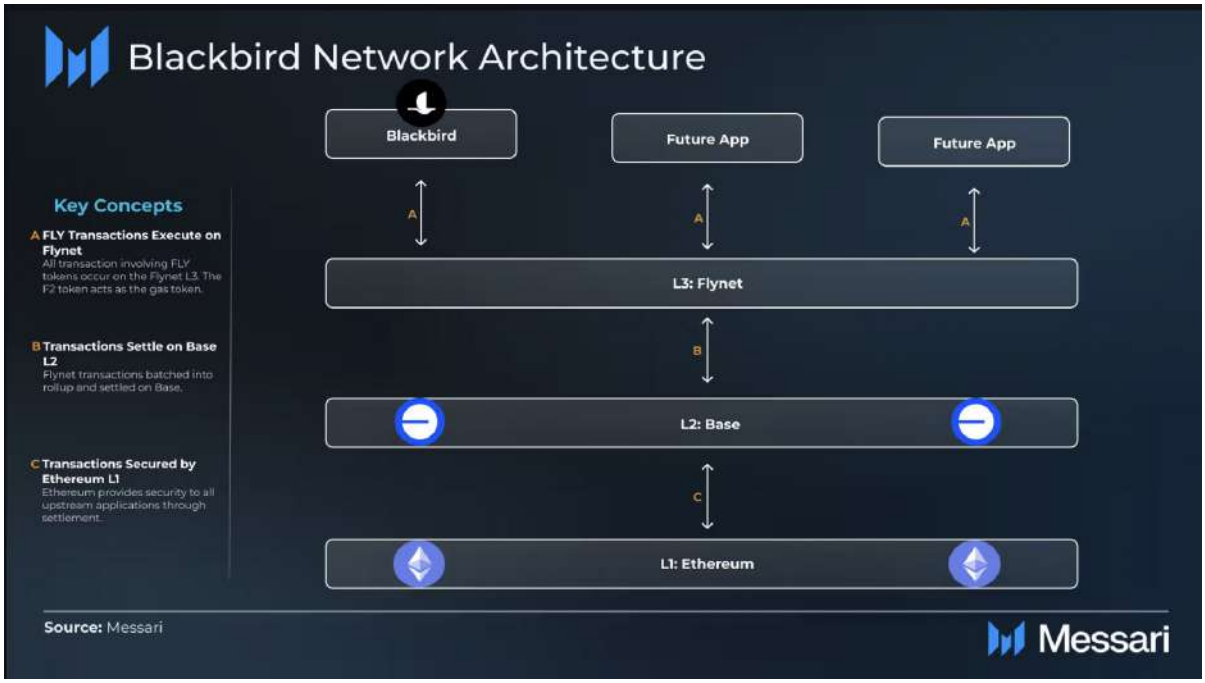
- **For Restaurants:**
  - Access to behavioral insights from the shared database allows restaurants to craft customized incentives for diners, enhancing customer loyalty.
  - Improved retention and higher quality lifetime value (LTV) estimations for diners.
- **For Diners:**
  - Personalized dining experiences and rewards tailored to individual preferences.



The Next Step: Flynet

In late 2024, Blackbird plans to launch Flynet, an open network for consumer applications built on its FLY points model. This will enable other developers and businesses to build consumer-facing applications leveraging Blackbird's data infrastructure, expanding its ecosystem beyond

restaurant loyalty programs.



Messari subscribers can read more about Blackbird and Web3 Loyalty Programs in our report here.

Consumer DePIN Applications

While DePIN has historically focused on enterprise use cases, the shift toward consumer applications is gaining momentum. Consumer-focused DePINs will tap into user data, enabling:

- **Compensated data-sharing models:** Users earn rewards for contributing their data, empowering them to participate in the value chain.
- **Enhanced consumer experiences:** Businesses gain actionable insights to create better, more personalized services.

The Path Ahead for 2025 and Beyond

As platforms like Blackbird demonstrate the potential of consumer DePINs, we anticipate:

1. **An uptick in consumer-focused protocols:** particularly in sectors like loyalty programs, retail, and entertainment.
2. **Ecosystem expansion:** As more applications integrate decentralized infrastructure to unlock the value of user data.

With its ability to align incentives between consumers and businesses, DePIN is poised to redefine the consumer data economy, creating win-win scenarios that drive adoption and innovation.

DePIN Spotlight:

Real Revenues Being Generated

Over the past year, multiple DePINs have begun generating substantial revenues, demonstrating the sector's ability to deliver on its promise of creating cashflows rooted in real-world businesses. Notable achievements include:

- **Glow:** Over $25 million in revenue.
- **Helium:** Surpassing $12 million in revenue.
- **Other Players:** Networks like GEODNET, Prodia, Storj, and Filecoin have each achieved seven-figure revenues in ARR.

With numerous DePINs set to launch their mainnets in 2025, the sector is poised for significant revenue growth. Historically, the primary challenge for DePINs has been capturing the demand side, but notable progress is now being made.

Overcoming the Demand-Side Constraints

1. **Abstracting Demand-Side Operations:**
   Many DePINs are leveraging gateway companies or foundations to manage demand-side operations, similar to traditional businesses:
   - **Helium:** Nova Labs Manages Helium Mobile subscriptions, working directly with telecom carriers while using a decentralized DePIN on the supply side to power its wireless hotspot network.
   - **GEODNET:** Implements a buy-and-burn model, where the GEODNET Foundation sells RTK correction data to clients and allocates 80% of revenue to buying and burning GEOD tokens, with the remaining 20% covering operational expenses.
2. **Sustainable Tokenomics and Value Creation:**
   These models ensure that DePINs effectively capture demand and create sustainable value for token holders, reinforcing confidence in the networks' long-term viability.

The Future of Scalable DePIN Businesses

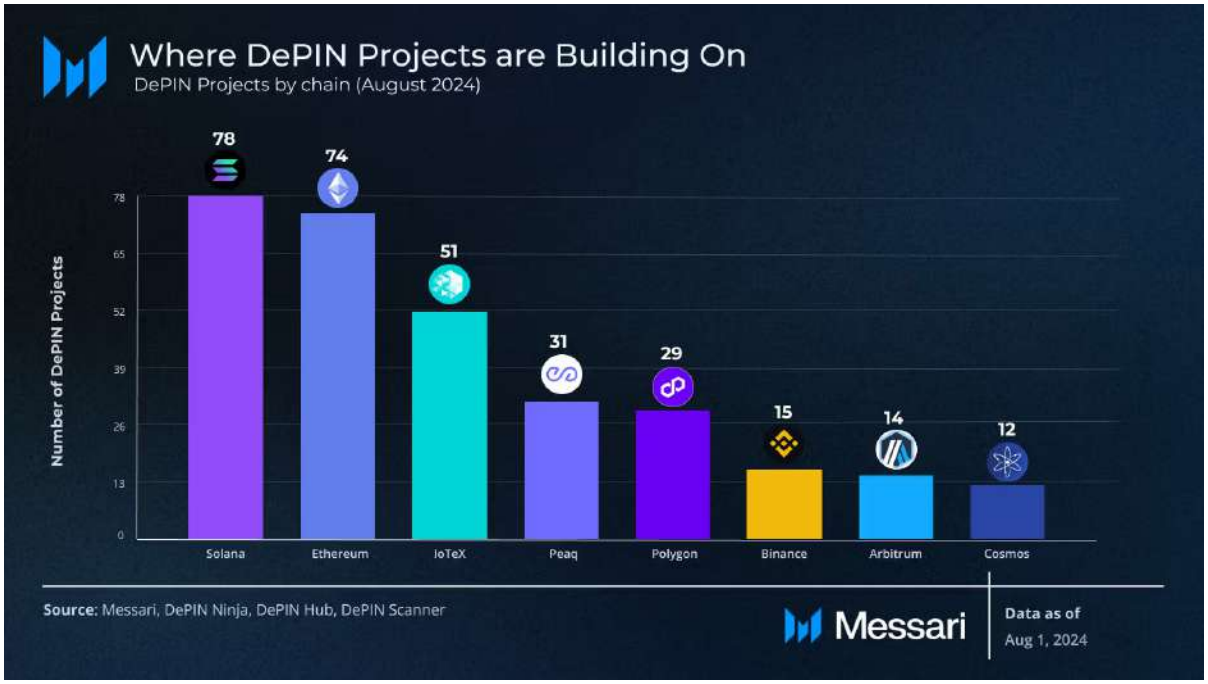
The ability of DePINs to generate meaningful revenues and scale effectively highlights the sector's progressive validation. By solving demand-side challenges through innovative operational models and tokenomics, DePINs are proving that real, scalable businesses can be built using decentralized infrastructure.

Where DePINs are Building:

Solana has emerged as the preferred blockchain for building DePINs (Decentralized Physical Infrastructure Networks). Following notable migrations from Polygon and the Ethereum ecosystem in 2023, this trend has only accelerated, with high-profile projects like Helium and Render now leveraging Solana.

In internal surveys, DePIN founders cited several reasons for building on Solana:

1. **User Experience (UX):** Solana's smooth, fast, and low-cost transaction experience enhances usability for both developers and end users.
2. **Developer Experience (DevX):** Solana provides robust tooling and infrastructure to simplify development.
3. **Onboarding:** Solana's seamless onboarding process reduces friction for new users.
4. **Hands-On Support:** Founders highlighted the Solana Foundation's proactive engagement, which fosters collaboration and provides tailored assistance.
5. **Liquidity:** Access to robust and ample liquidity.
6. **Network Effects:** As more DePINs are built on Solana, integration and composability between projects become easier, amplifying ecosystem value.



Emerging Competition: DePIN-Tailored L1s

Despite Solana's dominance, DePIN-specific Layer 1s (L1s) like Peaq and IoTeX are gaining traction. These platforms offer:

- **Custom Modules and Integrations:** Purpose-built features tailored to DePIN needs.
- **Dedicated Support:** Deep Hands-on assistance from platform teams, which can be a game-changer for DePIN founders navigating the complexities of launching decentralized networks.

Both Peaq and IoTeX have attracted top-tier early-stage DePINs, signaling that the competition for DePIN dominance is far from settled.

Messari Protocol Services provides quarterly coverage on the state of the IoTex ecosystem. We also started covering Peaq in 2024 – check out our reports here and here.

Ethereum Ecosystem: A Niche for Energy DePINs

Although DePIN activity on Ethereum remains lighter, some of the largest energy-focused DePINs are building within its ecosystem, particularly on Base:

1. **Glow:** Building natively on Ethereum to leverage its robust liquidity and proven security. Given Glow's high-value transactions and minimal retail involvement, Ethereum's trade-offs are well-aligned with the protocol's goals.
2. **Daylight and Plural Energy:** Both projects are building on Base, citing:
    - Best UX and DevX within Ethereum's ecosystem.
    - Access to Ethereum's deep liquidity.
    - Coinbase collaboration: Base's close ties with Coinbase enhance user onboarding and open the door to strategic partnerships.

Furthermore, **DIMO** announced a migration from Polygon to Base in December 2024 citing enterprise credibility, a robust DeFi ecosystem, and a strong Base community as driving factors among others. Base is best positioned within the Ethereum ecosystem to emerge as a competitor for DePINs with Solana.

Key Factors for DePIN Chain Selection

As the DePIN ecosystem continues to evolve, we anticipate that protocols will choose blockchains based on a combination of the following factors:

1. **User Experience (UX):** A seamless, low-latency, and intuitive user interface.
2. **Developer Experience (DevX):** Strong tooling, documentation, and ecosystem support.
3. **Low Transaction Fees:** Essential for cost-efficient operations.
4. **Consumer Focus:** Chains that emphasize onboarding retail users will attract consumer-

facing DePINs.

5. **Liquidity:** Deep liquidity ensures smoother token operations and investor confidence.
6. **Founder Support:** Personalized support from the chain's team to bootstrap early projects.

While Solana currently leads the DePIN landscape, **DePIN-specific L1s** and **Ethereum** subchains like Base are carving out niches, particularly for specialized and high-value use cases.

We anticipate that Solana will continue to lead chains in DePIN adoption in 2025, however, a major rival will emerge from the option we discussed.

zk-TLS and DePIN

zk-TLS (Zero-Knowledge Transport Layer Security) emerged as a prominent narrative in late 2024. Originally developed by Chainlink's Research Lab, zk-TLS leverages zero-knowledge proofs (ZKPs) to verify Web2 credentials and data without exposing the underlying information.

Key Use Cases: Identity Verification and Beyond

1. **Onchain Identity Verification:**
    - The primary application of zk-TLS lies in enabling the creation of onchain identities by verifying Web2 credentials while preserving user privacy. This opens the door to more robust decentralized identity systems, crucial for sectors like DePIN and Web3.
2. **Vampire Attacks on Web2 Platforms:**
    - zk-TLS has drawn significant attention for its potential to enable "vampire attacks", a process where Web3 or DePIN networks bootstrap their ecosystems by onboarding users from existing Web2 platforms.
    - For instance, Nosh, a DePIN for food delivery, could use zk-TLS to "vampire attack" DoorDash. By verifying that DoorDash drivers have high ratings without revealing sensitive data, Nosh could onboard top-quality drivers to bootstrap its decentralized food delivery network. Drivers might want to switch to Nosh to gain a higher take rate from delivery fees–centralized platforms take an average of 30%-40% of delivery revenue.

If zk-TLS protocols successfully validate use cases like vampire attacks, the technology could see widespread adoption in DePIN and Web3 in 2025 and beyond.

Conclusion

The DePIN sector has experienced significant growth in 2024, setting the stage for a wave of breakthrough applications and use cases in 2025. As these novel solutions come to market, we anticipate:

- **Increased industry attention**: Traditional industries will take notice of DePIN's potential to address longstanding challenges with innovative, decentralized approaches.
- **Academic interest:** DePIN will attract researchers and thought leaders exploring its economic, technological, and societal implications.
- **Media focus:** The emergence of real-world success stories will drive broader awareness and public discourse around DePIN's transformative potential.

With its unique ability to combine blockchain technology with real-world infrastructure, DePIN is poised to cement its place as a cornerstone of Web3 innovation in the coming years.

The Sector Theses

Consumer

Author: Chris Davis

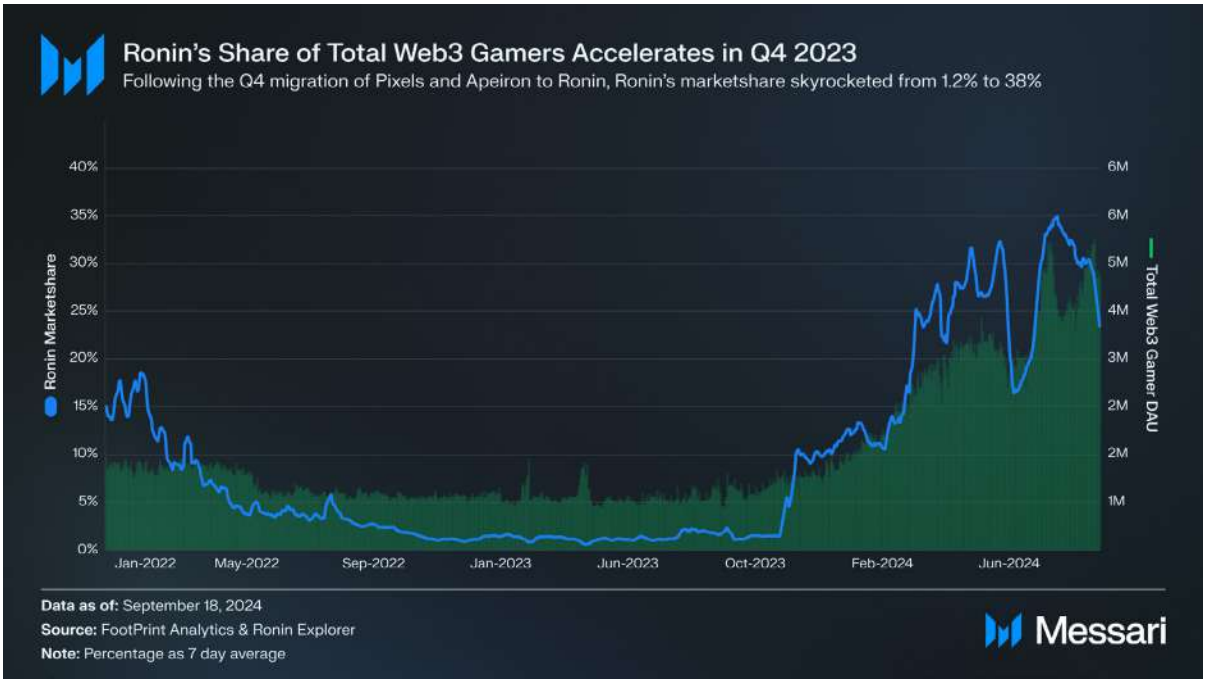
Web3 Gaming

2024 was arguably the Web3 gaming sector's strongest year to date. Throughout the year, we saw dramatic player growth, the release of highly anticipated games, the emergence of novel distribution channels, and household names in Web2 gaming venturing into Web3. Additionally, infrastructure advancements from companies like Privy continue to make Web3 gaming feel increasingly akin to Web2.

Some of the year's most notable trends included the rise of Telegram mini-games, continued adoption from Web2, and the use of play-to-airdrop campaigns as a go-to-market strategy.

Accelerating Growth

After two years of relatively stagnant growth, 2024 marked a significant resurgence in player activity. Onchain daily active addresses (DAAs) consistently trended upward throughout the year, beginning at 1.3 million and culminating in an all-time high of nearly 7 million in December. In addition to newly launched games attracting more players, individual titles like *Pixels* and *Off the Grid* amassed substantial player bases, with daily active addresses ranging from 800,000 to over 1 million.



Ronin was one of the fastest-growing ecosystems in 2024, with onchain DAAs surging to a new all-time high of 2.27 million on August 1, marking a dramatic recovery from its December 2022 lows. Ronin's share of total onchain DAAs climbed from just 1.2% in late 2023 to a high of 38% in August, before stabilizing at around 21% by September's end. This growth was fueled by hit games like *Pixels*, which peaked at over 1 million DAUs in May, and *Apeiron*, which grew its DAUs by 1,800% over the year to reach 153,000 in September.

Read more about Ronin in "$RON It Back: The Revival of Ronin's Web3 Gaming Empire."

Telegram as a Distribution Channel

Tap-to-earn Telegram mini-games have driven a surge in user adoption, creating a powerful new distribution channel for game developers. Games like *Catizen* and *Hamster Kombat* have reported millions of DAUs and generated tens of millions in revenue, demonstrating that Telegram has a strong product-market fit as a distribution channel for casual games.

Established Web3 games like *Pixels* have capitalized on this trend, launching mini-games tangentially related to their primary game. By launching simpler mini-games through the platform, these established games can expand their top-of-funnel awareness, drawing a greater audience into their ecosystem.

Additionally, classic Web2 games such as *Flappy Bird* and *Snake* are making their Web3 debut through Telegram, legitimizing its presence as a novel distribution channel for mobile gaming.

While TON - Telegram's partner Layer-1 blockchain - has seen tremendous growth from this adoption, it's important to note that many gamers on the platform are not onchain.

Messari covered TON in "Evaluating The Open Network's Onboarding Thesis."

Web2 Adoption

In 2024, major Web2 intellectual properties made significant moves into the Web3 gaming space. Ragnarok launched its first venture on the Ronin network, while EVE Online introduced a new survival MMO on Redstone. Beyond IP, early signs of Web3 gaming adoption emerged among global enterprises, highlighted by Sony's announcement of its Layer 2 blockchain, Soneium, in August 2024.

In the past, Web2 gaming entities have hesitated to embrace Web3 due to opposition from traditional gamers. However, this recent shift reflects a growing acknowledgment of the sector's legitimacy and a realization that the potential benefits outweigh the risks of alienating segments of the gaming community. This top-down acceptance sends a strong signal to gamers, highlighting the advantages of integrating Web3 technology into games. Over time, this is likely to influence gamers' perceptions of the sector in a more favorable direction.

On the player adoption front, the release of the long-awaited AAA game *Off the Grid* marked a breakthrough moment. The game successfully reached Web2 gamers through a strategic go-to-market campaign that heavily leveraged influencer marketing. At its peak, *Off the Grid* attracted over 150,000 concurrent Twitch viewers, driven by high-profile Web2 gaming streamers like Ninja, TimTheTatman, and Shroud. These influencers not only highlighted the game's mechanics but also explained its Web3 components in a digestible way, helping to shift perceptions among traditional gamers.

Play-to-Airdrop

Throughout the year, many games have implemented a relatively new incentivization model called play-to-airdrop (P2A). P2A campaigns reward players with potential future token airdrops based on their in-game activities and engagement. This ideally results in higher retention as a larger cohort of users convert into regular players after the end of the incentive period. A few notable P2A campaigns throughout the year were Pirate Nation, Pixels, Fableborne, and Nyan Heroes.

This method worked well for Pirate Nation. Their campaign attracted nearly 80,000 players, many of whom converted to DAUs. However, like most incentive mechanisms, the results of this method can become obscured by the presence of bots and farmers.

Messari subscribers can read more about Pirate Nation in our recent report "X Marks the Spot: A Landlubberd's Guide to Pirate Nation."

Looking Forward

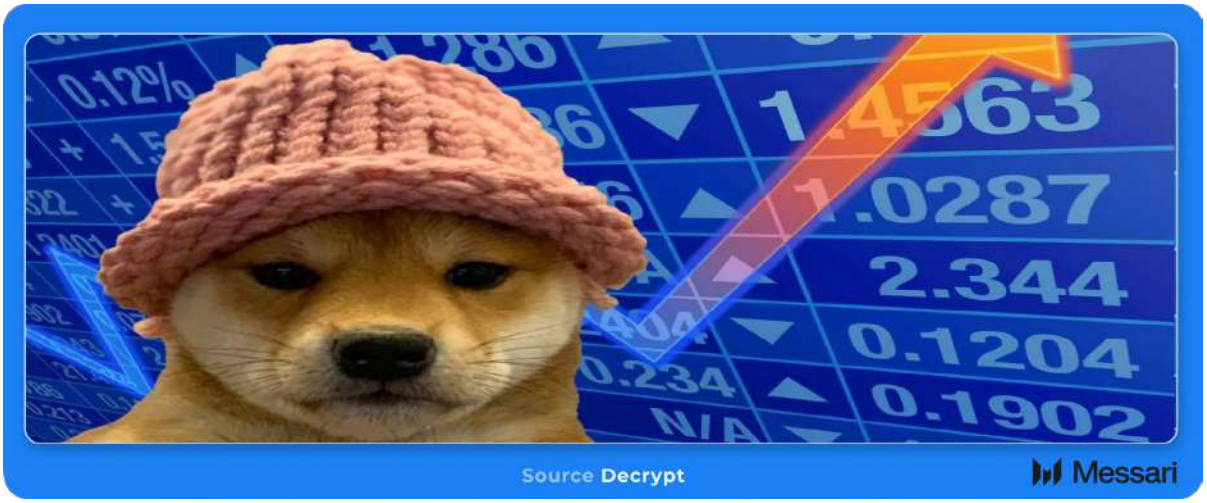
We believe gaming continues to have massive potential as an entry point into Web3. As prominent Web2 players enter the sector, the release of higher quality games and improving player sentiment are expected to create positive, compounding effects. These developments will make the advantages of Web3 gaming, such as asset ownership and permissionless global markets for trading assets, increasingly clear to traditional gamers.

Additionally, we believe that play-to-airdrop will continue as a primary means of onboarding players to games. However, in recent months, we've seen the emergence of a new "pay-to-airdrop" strategy, where users are either required to pay to qualify or paid players receive a greater airdrop than non-paid players. The primary benefits of this model are reducing bots and predatory airdrop farmers. Farmers typically have no intention of converting into regular players and dump their tokens on the market after the campaign, negatively impacting legitimate players. While this model is still in the early stages, it is a promising method for mitigating the negative behavior seen in airdrop campaigns and could become a new standard in 2025.

Finally, we believe that mobile adoption will be a defining trend of 2025. Mobile is the platform category with the highest adoption and most revenue generated globally. Web3 games that are early to mobile stand to capture significant mindshare by generating attention in a relatively benign competitive landscape with rising adoption. Additionally, as mobile technology continues to scale its capability of handling compute-intensive games, higher-quality mobile games will likely be released, attracting gamers seeking a AAA experience.

Memecoins

Love them or hate them, memecoins were undeniably one of the most prominent narratives of 2024. It all began as cult admiration for an adorable dog wif hat. However, with time it transformed into the Memecoin Supercycle movement, a perspective that draws upon modern socioeconomic trends to argue that we're in for a long ride of onchain, speculative degeneracy.

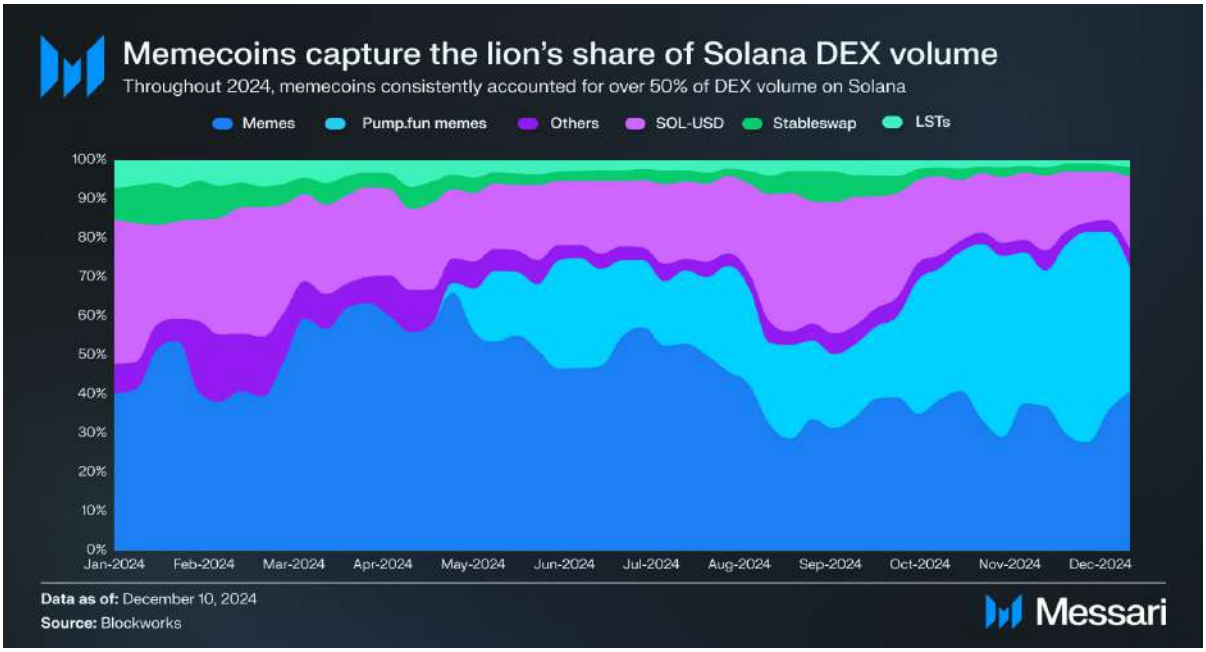


In addition to socioeconomic drivers, the moment was emboldened by growing frustration with the underperformance of "low float, high FDV" tokens launching at high valuations and perceived as predatory to retail investors.

The most notable trends emerging from this memecoin mania were Solana ecosystem dominance and the growing adoption of consumer applications that fuel the "memecoin casino."

Messari wrote about 'Low Float, High FDV' tokens in "Mo Money, Mo Problems." Our analysts also covered memecoins throughout the year in reports including here, here, and here.

Solana Ecosystem

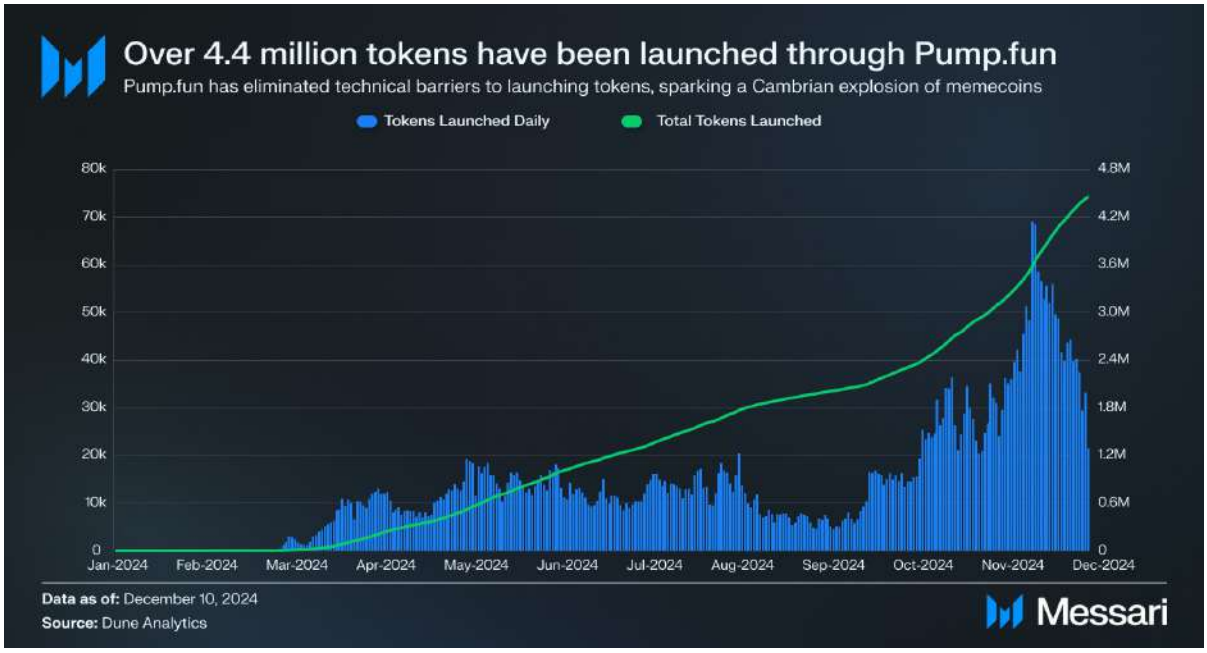


While many blockchains saw increased activity fueled by the memecoin craze, Solana emerged as arguably the biggest beneficiary of this trend. Throughout the year, memecoins consistently contributed 40–80% of Solana's daily trading volume, capturing the lion's share of total memecoin trading activity. Driven by the memecoin mania, Solana's weekly DEX volume occasionally surpassed that of Ethereum and, in recent months, has decisively outpaced it, accounting for up to 40% of total weekly DEX volume across all chains.

Whether this trend is net positive or negative for Solana's ecosystem is debatable. Proponents argue that it provides the network with crucial stress tests, brings new participants to the ecosystem, and introduces a novel way to tokenize culture. The other side argues that memecoins siphon attention from legitimate projects and risk undermining Solana's long-term reputation.

Consumer Apps

Across multiple sectors, we've seen significant improvements in user experience, and memecoins are no exception. The most successful consumer apps in this sector have been ones that excel at keeping the game alive, creating an experience that makes entering and staying in the "casino" as seamless and enjoyable as possible.



Pump.fun

Pump.fun - a memecoin launchpad on Solana - emerged as arguably the most successful consumer app of the year, generating over $200 million in revenue between early March and late November. The platform enables anyone to launch a memecoin without any development skills for just 0.02 SOL, resulting in over 4 million memecoins created on the platform. While this number is staggering, only about 1.5% of these tokens achieve the necessary market cap to "graduate" from Pump.fun and launch on Raydium. Even among those that make it to Raydium, only a tiny fraction surpass a $1 million market cap. Safe to say, the odds are forever ***not*** in your favor. Yet, viral Twitter screenshots of multi-million-dollar payouts from betting on the right coin ensure the game remains very much alive.

On the other hand, the widespread adoption of Pump.fun as a memecoin launchpad has brought significant benefits to the sector. Pump.fun mitigates the risk of "rug pulls," where token developers drain liquidity pools, rendering investments worthless—a common issue in the pre-Pump era. The platform also ensures fair launches by prohibiting presales and team allocations, fostering trust and transparency among token communities.

Given these advantages, Pump. fun also functions as a platform for serious projects that want to ensure a fair launch. Many notable "serious" coins, including GOAT and Zerebro, were launched through Pump.fun in 2024. As the platform's popularity continues to rise, it is likely to see growing demand from developers aiming to leverage its fair launch capabilities.

Subscribers can read more in our research report about Pump.fun.

Moonshot

Moonshot is a memecoin trading platform available on iOS and Android, with a user-friendly interface reminiscent of Robinhood. Since its debut in July, the platform has surged in popularity, particularly during September and October, as it capitalized on the growing interest in narrative-defining memecoins like $SPX and $GOAT. Offering features like Apple Pay and PayPal integration, Moonshot lowers barriers to entry for retail investors, abstracting away complex crypto mechanics. Its ability to quickly list trending assets by interacting with AMM pools gives it a competitive edge over centralized exchanges, which generally have a stringent process when deciding which coins to list.

Messari Research wrote about Moonshot in "Running Back Robinhood: The Rise of Moonshot."

Looking Forward

In 2025, we anticipate Solana will continue to command the lion's share of memecoin trading activity. The chain currently hosts the vast majority of trading volume, supported by infrastructure optimized for fast-paced speculative markets and consumer apps that streamline experiences for both developers and traders. However, as infrastructure becomes increasingly abstracted from the consumer experience, traders entering the space may soon be unaware of—or indifferent to—which chain they use. In this scenario, Solana's dominance in memecoins will hinge on apps like Pump.fun maintaining a competitive edge over similar platforms on other high-throughput chains.

The growing popularity of consumer apps like Moonshot reflects a shift in competitive dynamics from infrastructure development to UX enhancements. In previous cycles, consumer apps derived their edge from better core functionality due to the limitations of underdeveloped infrastructure. With many of these foundational challenges resolved, competition is shifting toward higher-order differentiators such as design, gamification, and personalization.

As memecoins continue to serve as a key entry point for new crypto participants, consumer apps in this sector must meet the expectations of users accustomed to the simplicity of Web2 experiences. While this creates a more competitive landscape, those who excel in delivering seamless, engaging user experiences stand to capture outsized value as the layer closest to the end user.

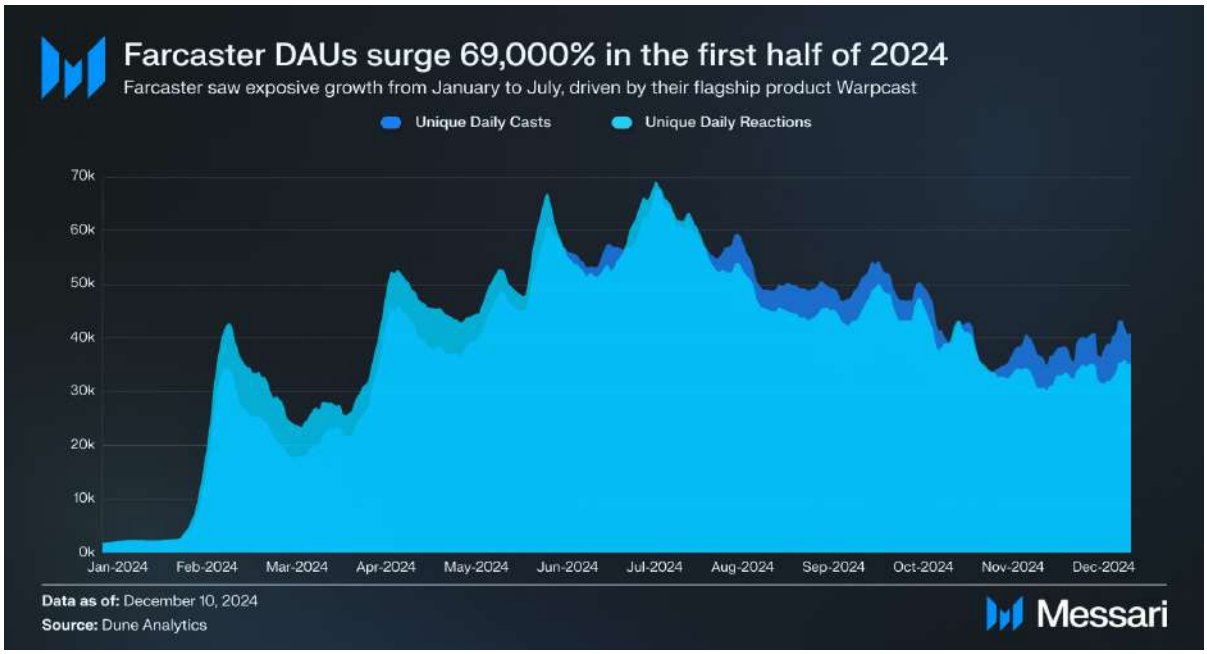
DeSoc & SocialFi

The decentralized social sector experienced accelerating activity over the past year, building on the momentum from H2 2023 when Friend.tech onboarded over 800,000 users in just two months. While similar speculation-centric platforms like fantasy.top and time.fun gained traction in 2024, much of this growth proved short-lived, with sharp declines in retention shortly after

launch. In contrast, DeSoc platforms such as Farcaster and Lens saw more sustained adoption throughout the year. The sector also witnessed the rise of a transformative, developer-centric value proposition around front-end composability.

Messari was early to DeSoc with our "Decentralized Social Protocol Map" report in February 2023. In "SocialFi: Exploring Social Business Model Innovation" we covered financialization of social activity.

DeSoc Adoption



Decentralized social (DeSoc) gained significant momentum in the first half of the year, with Farcaster and Lens capturing the most attention in the sector. Farcaster's DAUs climbed from just over 1,000 in January to more than 70,000 by the end of June, while Lens users grew from around 6,500 in January to just over 43,000 by early July. Despite strong growth in H1, the two platforms diverged in H2: Farcaster maintained steady retention with DAUs hovering between 40,000 and 50,000, whereas Lens experienced consistent declines, with current DAUs dropping to around 8,000.

Although DeSoc is still in its early stages, these trends highlight the impact of differing go-to-market strategies. Farcaster has pursued a product-led approach, focusing on its flagship application, Warpcast, to build a centralized hub for users. In contrast, Lens has taken a developer-led approach, focusing solely on the protocol and relying on third-party developers to build applications. While both strategies have merits, Farcaster's product-led approach has demonstrated greater success in driving user acquisition and retention so far.

Unlocking Composability

In previous years, the narrative around decentralized social primarily focused on user-centric value propositions such as data ownership and censorship resistance. However, in 2024, a

developer-centric value proposition emerged: **front-end composability.**

Farcaster Frames

Farcaster introduced Frames, a powerful tool that enables mini-apps to be embedded directly within Farcaster front-ends, providing developers with a seamless distribution channel that meets the user where they are. Frames allow users to perform both offchain and onchain actions, such as minting an NFT on Zora or placing a bet on Polymarket, directly from their social feed. Beyond simple one-click actions, developers can design Frames that guide users through multiple steps within the mini-app. With Web3 social graphs carrying over between apps, developers can further customize user flows based on individual onchain histories, creating highly personalized and dynamic experiences.

Read more about Farcaster Frames in our report here.

Blinks

Following the launch of Frames, Solana responded with its own composability feature: Blinks. Unlike Frames, which are confined to the Farcaster protocol, Blinks extend this concept to Web2. Blinks transform Solana Actions—API calls enabling onchain interactions—into shareable links, which can be displayed on any web surface. Once users have configured a Solana-compatible wallet to transform these links into Blinks, they appear as a mini-app, similar to the UI of Frames. While Blinks represent one of the most innovative leaps in onchain distribution, their scalability ultimately depends on the widespread adoption of Solana-compatible wallets.

Looking Forward

We expect the open design space unlocked by front-end composability to continue evolving throughout 2025. While developers have already demonstrated innovative use cases, we believe the most creative and impactful implementations are yet to emerge. Additionally, the growing adoption of Solana-compatible wallets like Phantom will likely drive wider distribution and scalability for Blinks, enabling them to reach broader audiences. This has the potential to create a flywheel effect, by which greater adoption leads to more developers who seek to use it as a distribution channel, attracting more users to the benefits of their mini-apps.
Additionally, we anticipate a significant acceleration in the proliferation of AI agents on DeSoc platforms. As demonstrated recently on Warpcast, AI agents are now capable of launching tokens, autonomously interacting with one another to achieve goals, participating in communities, and trading onchain. With tools for creating agents becoming increasingly accessible, human-to-agent and agent-to-agent interactions are poised to become a landmark feature of the decentralized social experience.

NFTs

NFTs experienced largely muted interest throughout the year, with volumes steadily declining after a brief uptick in Q1. However, the sector still saw many meaningful developments. Bluechip PFP projects made significant strides in expanding their brands into mainstream culture, Ordinals experienced a resurgence in popularity, and consumer applications continued to enhance the user experience of collecting and trading, laying the groundwork for greater adoption.

Declining Volume

NFT trading volume started strong in Q1, fueled by the rising popularity of Bitcoin-native NFTs known as Ordinals. However, trading activity steadily declined throughout 2024, dropping from a March high of $450 million in weekly volume to $73 million by early November.

While this downtrend has sparked questions about whether NFTs will ever regain the popularity of the previous cycle, the waning interest is unsurprising given the current phase of the market cycle. Historically, NFTs have thrived on "wealth effects," with momentum building only after significant price appreciation in fungible tokens. As the market matures, however, we may see a shift away from sector-wide price appreciation toward a more selective environment, where only a handful of standout projects significantly outperform.

Ordinals

Ordinals saw a renewed interest among traders from Q4'23 into the first few months of the year. From March to late May, Ordinals trading eclipsed trading activity on Ethereum by sizable

margins, siphoning attention from blue chip Ethereum-based NFT projects like Pudgy Penguins, who experienced a 400% move up between Q4'23 and February 2024.

Magic Eden benefitted enormously from this trend. In May 2023, they were one of the first marketplaces to integrate Ordinals and provide a user-friendly trading experience, setting the stage to capitalize on the trend's momentum the following year. As trading volume increased, Magic Eden continued to take market share from competitors, surpassing Blur in trading volume from March to September.

While the Ordinals market is still relatively new and Magic Eden faces stiff competition, their traction thus far has established it as a leading player in this emerging category.

Branding Building & Ecosystem Development

In 2024, PFP projects cemented a clear shift from promises to execution. Following the decline in speculative NFT mania after 2022, many projects were abandoned by their founders or gradually faded away. However, a select few remained committed to fostering strong communities and expanding upon their intellectual property (IP), developing resilient brands that have successfully penetrated markets beyond Web3.

Expanding IP through brand partnerships and entering new verticals has been a common strategy among leading projects. Notable examples include:

- *Doodles* partnering with McDonald's to release 100 million limited-edition McCafé holiday cups across the United States.
- *Pudgy Penguins* expanding their Pudgy Toys line to major retailers, including their most recent launch at Target.
- *Claynosaurz* collaborating with Gameloft to develop a free-to-play mobile game.

Beyond IP expansion, projects have increasingly focused on building infrastructure to support broader ecosystem growth. The most prominent example is the Bored Ape Yacht Club's launch of ApeChain mainnet in October, making it the first blockchain launched by an individual project. Similarly, *Pudgy Penguins* and *Azuki* are developing their own infrastructure, with Abstract Chain and AnimeChain, respectively, signaling a broader trend of ecosystem-focused innovation in the space.

Consumer Applications

As seen in many other maturing sectors, UX improvement has been a top priority among consumer apps. In 2024, Zora led the charge, releasing a mobile app that makes casual minting and trading NFTs similar to Web2 social apps like Instagram. Within this subsector, Zora has a significant lead over competitors like Rodeo and Moshicam, regularly accounting for over 90% of daily unique minters.

In August, Zora, in partnership with Uniswap, introduced the "ERC-20z" token standard, an extension of ERC-1155, allowing NFTs to be traded similarly to ERC-20 tokens by wrapping and unwrapping them. This feature enables secondary markets to be created following the minting period set by the artist.

This feature has tremendous benefits for both artists and collectors. Artists benefit from secondary royalties after their mint, while collectors who miss a mint during primary sales can still collect on the secondary market.

Messari covered Zora early in our August 2023 report "Zora: Pushing Value to Creators."

Looking Forward

Although price appreciation is always ideal for a sector, continuous innovation during less speculative periods indicates a healthy, maturing ecosystem. Removing rampant speculation allows assets to reach valuations more aligned with their fundamental value. During this calmer period, market participants looking to take positions within the sector benefit from a clearer view of sector leaders and opportunities in mispriced assets.

We expect Ordinals to be a category that continues to attract attention. Upcoming catalysts such as potential CEX listings, airdrop-driven wealth effects, and increasing adoption in Asian markets position Ordinals for sustained growth and broader appeal throughout the year.

Finally, we believe that consumer applications like Zora's will continue to increasingly intertwine with the social experience, making the transition from an "NFT app" to a social app. As more creators and collectors join, network effects can begin to form, leading us to believe that Zora has the potential to capture the lion's share of adoption from "casual" participants in the sector.

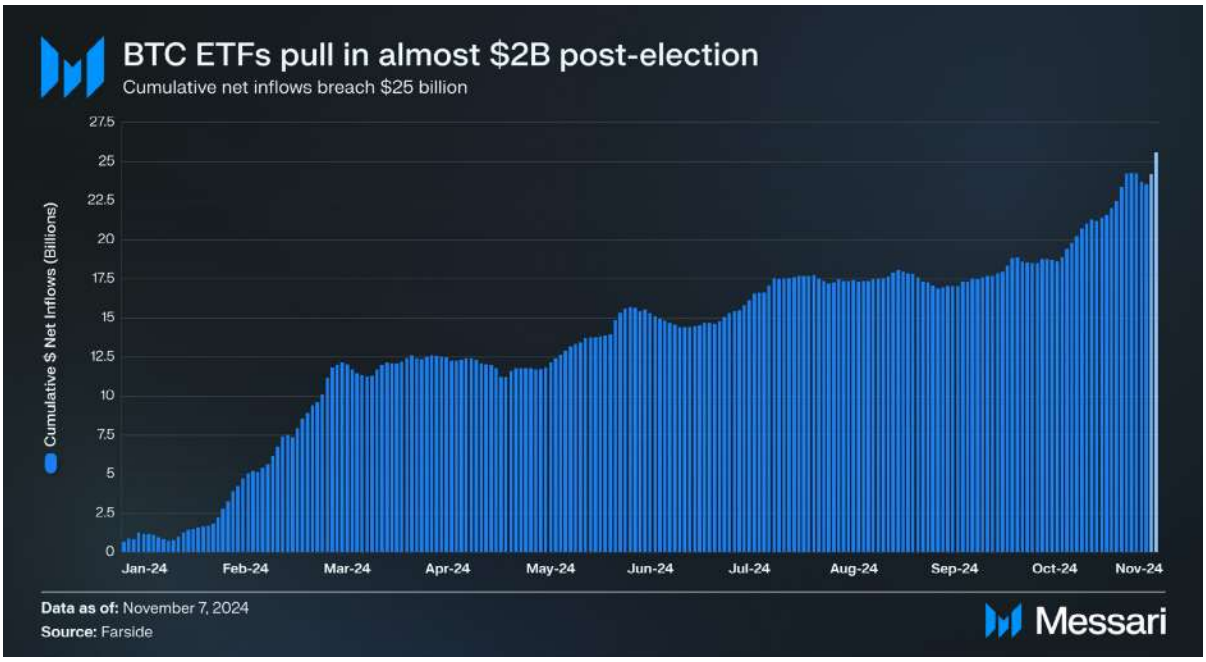
Messari subscribers can read more in our recent reports "It's All In How You Frame It: Understanding The Dynamics of NFT Value Accrual" and "A Case for Bitcoin Alts."

The Sector Theses

CeFi

Author: Andrew Dyer

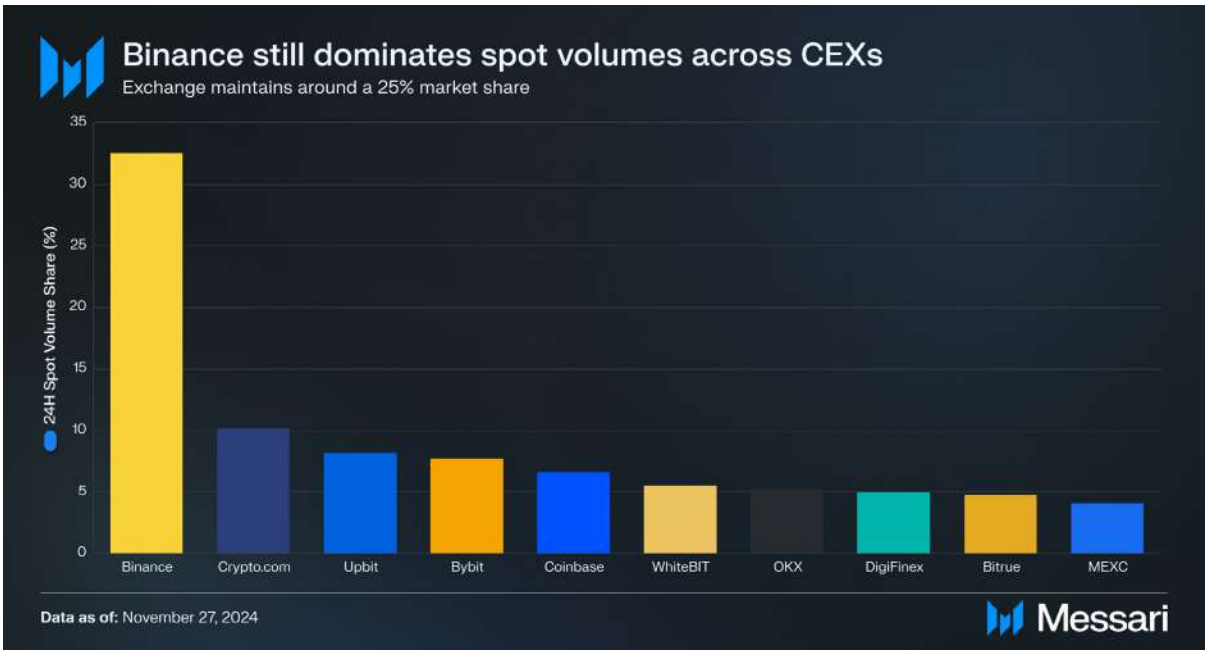
The Rise of the ETFs



The BTC ETFs were a resounding success. After some post-launch volatility, cumulative net inflows have been on a steady track upwards. Recently, IBIT alone surpassed $30 billion in cumulative net inflows, and has hit $40 billion AUM in record time compared to other leading ETFs like VOO. Collectively the BTC ETFs now hold around $100 billion in asset value. Even the ETH ETFs, which initially received paltry net inflows due to significant Grayscale outflows, started gaining traction after the election. December has seen some multiple nine-figure inflow days into the ETH ETFs, including a $428 net inflow on December 5th.

Blackrock has said that most of the initial ETF buying has been by individually owned accounts rather than funds or wealth managers. Of the "80% of direct investors buying IBIT, BlackRock's chief investment officer of ETFs and index investments says 75% had never before owned an iShare." However, as Blackrock continues to pitch Bitcoin as a unique diversifier for portfolios, it's likely that it will continue to attract retail investors and large allocators alike. Renowned investors like Paul Tudor Jones, whose fund is now a top ten holder of IBIT, are certainly seeing the vision.

The CEX Landscape



The ETFs were a boon for exchange volumes as they brought back some animal spirits in the crypto markets. As users have soured on new listings over most of the year due to poor post-launch performance, exchanges have had to get creative with new product offerings and features to maintain user growth. Most of these attempts fell into the following categories:

- Enhanced regulatory compliance to increase user trust
- Continued onchain integrations to bridge the gap between DeFi and CeFi
- Advanced trading features
- Growth initiatives
- Stablecoin expansion and partnerships

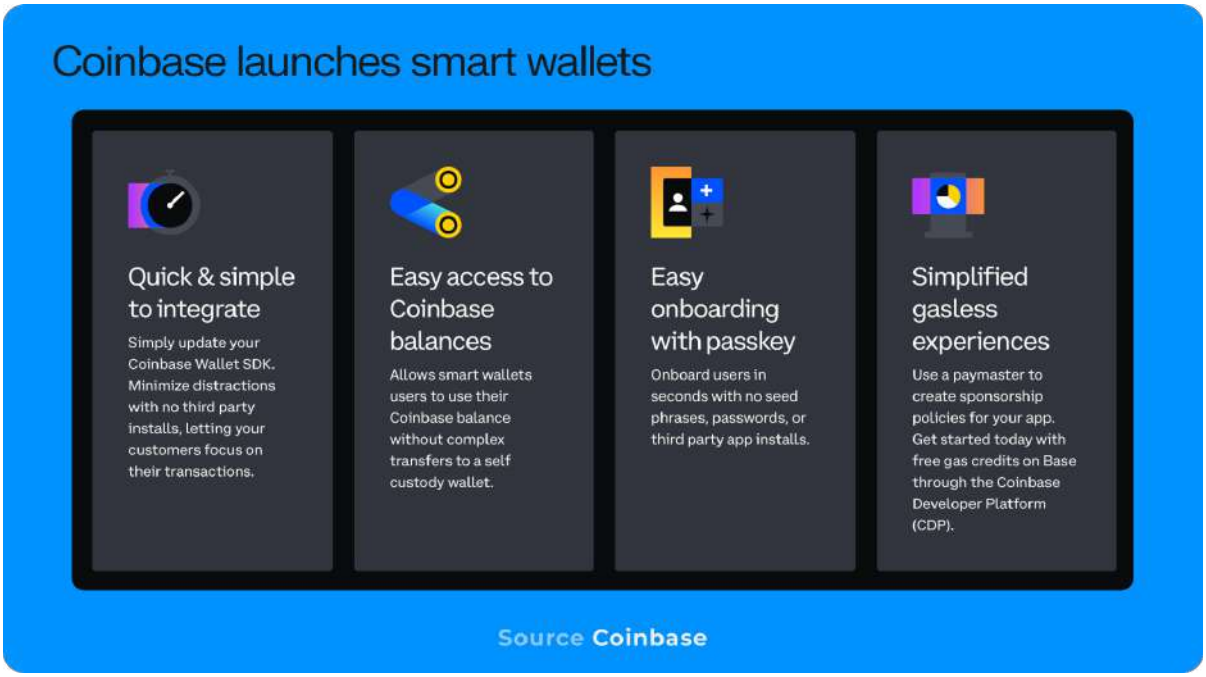
Regulatory Efforts... and Battles

On the regulatory front, exchanges sought to expand their presence globally by complying with new regulatory frameworks. Both Binance and Crypto.com secured a Virtual Asset Service Provider license in Dubai, expanding margin trading and staking products to a new user base. OKX secured regulatory victories in Australia and Singapore from their respective monetary authorities. Similarly, Bybit completed its VASP registrations in a handful of emerging markets, seeking to compete where demand for digital dollars and alternative currencies is particularly strong, like Turkey and Georgia. Within stablecoins, Circle became the first stablecoin issuer to comply with Europe's new Markets in Crypto-Assets regulation framework.

Exchanges continue to market their transparency efforts to maintain user trust after the FTX debacle. OKX publishes monthly proof of reserve reports that use zk-STARK technology. Binance similarly uses zk-SNARKs for private and secure asset verification and regular updates. Crypto.com uses independent auditors, while users can verify their own balances through a Merkle Tree. Smaller exchanges like Gate.io have also been doing regular PoR reports for multiple years.

In the US, regulatory progress - if you could call it that - was often conducted in the courtroom. Kraken reached a settlement with the SEC over its staking services, paying a fine and halting some operations to resolve the dispute. Coinbase continues to fight the SEC on its claim that it is operating an unregistered securities exchange. Robinhood received a Wells notice from the SEC for a similar allegation, but has since relisted some of the tokens deemed possible securities in the notice (SOL).

Onchain Integrations



In June 2024, Coinbase introduced smart wallets for developers, aiming to simplify the onchain experience. Smart wallets use passkeys for access and signing, without requiring third-party extensions or app installations. Users can then easily use Coinbase funds and assets across a swath of major L2s and apps. Getting rid of lengthy seed phrases and extraneous steps for wallet creation should be a boon for retail UX. As Coinbase continues to push for growth on its L2, Base is even providing gas credits for developers who integrate and give priority to smart wallets in their apps.

Bybit enhanced its wallet services, providing users with seamless access to DeFi, GameFi, and NFT platforms. Their wallet supports multiple blockchains and offers features like cross-chain compatibility, airdrop management, and decentralized identity management. Bybit has also

been leaning hard into the GameFi narrative, launching a Crypto "Ark-ade" event to showcase emerging gaming protocols. Users can explore a collection of new games and compete for prize pools.

Both Bybit and Binance also launched pre-market spot trading for tokens that have yet to TGE. Tokens like Scroll who raised funds through a Binance launchpool can be farmed by staking assets (like BNB or FDUSD) during a limited window. Rewards are typically distributed daily, and users can claim their earned tokens at any time during the staking period. After the staking period concludes, all staked assets and unclaimed rewards are automatically transferred to users' spot wallets. Exclusive early access to popular tokens is one area exchanges are increasingly competing to attract and grow their user base.

OKX, Crypto.com, and Kraken have all expanded their NFT marketplace offerings as well. While volumes are still a fraction of the 2021 mania, there has been a small resurgence in the past month. Exchanges like OKX are expanding their support for Bitcoin ordinals and runes as those assets continue to do more volume. Meanwhile, Kraken announced its plans to launch its own L2 in 2025 to give better access to DeFi and apps to its users.

Trading Features

CEXs are trying to become the new hub for all your trading, saving, and investing needs. There were a host of novel features that were launched or expanded this year:

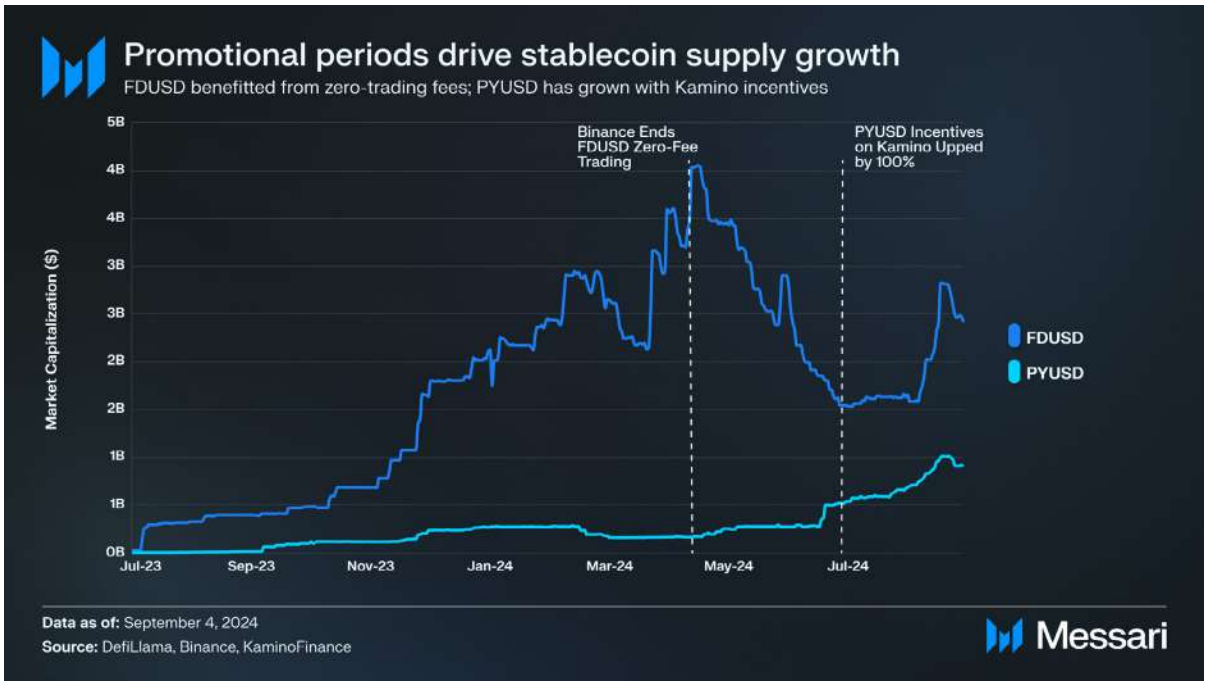
- Bybit enhanced its MT5 platform, allowing users to use USDT directly to trade traditional assets (like global stock indices)
- Binance created a one-click implementation of perpetual futures funding arbitrage (a long-short strategy designed to capture a spread between spot and futures prices)
- Coinbase Advanced launched more futures markets, leverage options, and the ability to trade real-world assets like oil
- Multiple exchanges expanded their trade-automation abilities and copy-trading features
- Many exchanges continue to optimize for both mobile and social as they enhance their mobile-apps and PnL sharing
- Some exchanges like Bybit are even offering zero-fee block trading to attract more institutional capital

Growth Initiatives

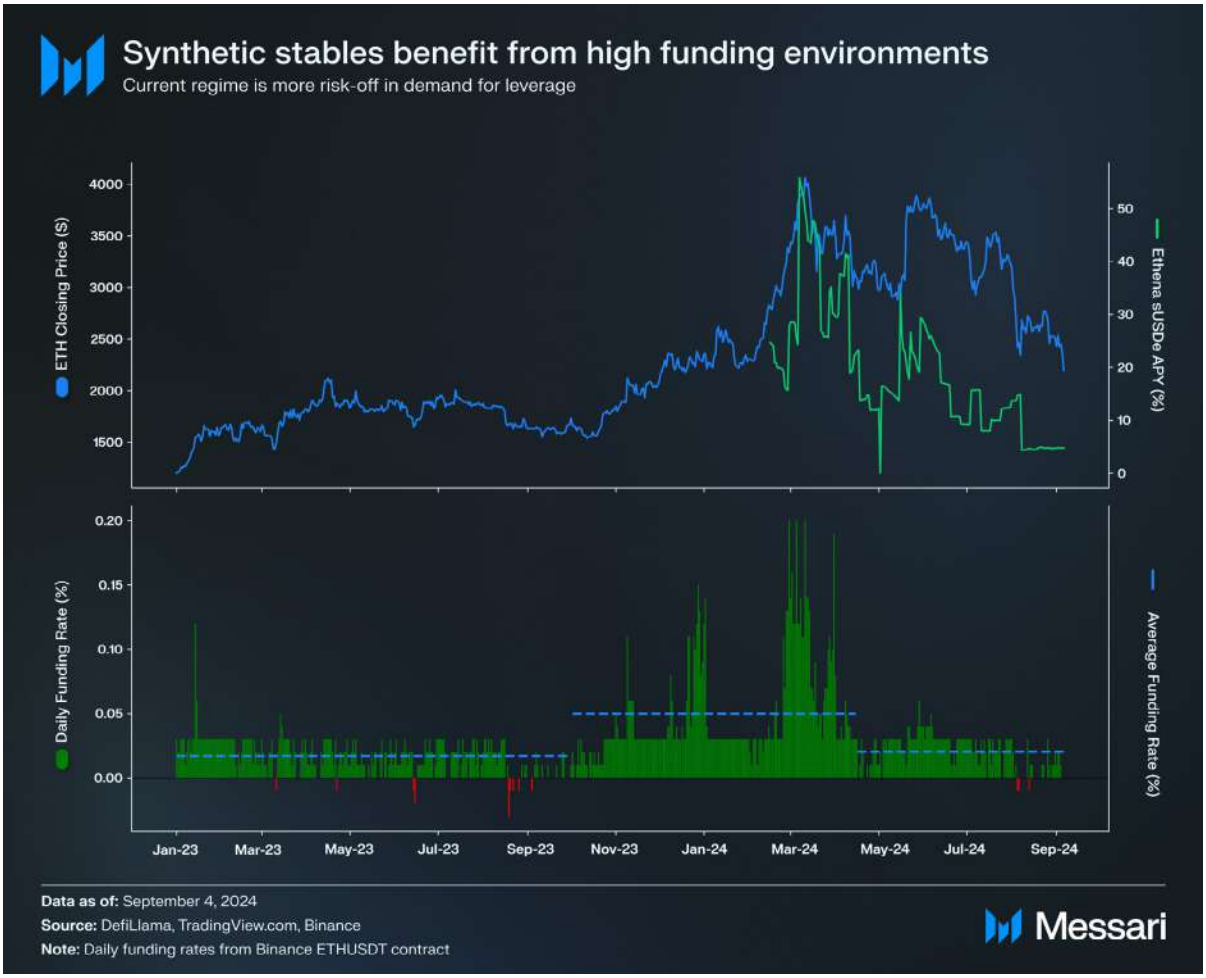
Outside of pre-market trading access for certain tokens, exchanges are also looking at other levers to pull for continued user growth. Some of these include:

- Cash-back debit cards
- VIP programs with tiered fee rates, merch, USDT bonuses, and special support access
- Referral and welcome bonuses
- Market maker incentive programs
- Bonuses for trading on margin
- Special rewards for staking spot assets
- Increased rewards for holding USDC (Coinbase)

Institutional Stablecoin Expansion



As we detailed in our stablecoin report, Binance initially introduced FDUSD in 2023 as an alternative to BUSD after it ran into trouble with the NYDFS and SEC. FDUSD is issued by a Hong Kong entity named First Digital. FDUSD supply expanded rapidly as a replacement after Binance implemented zero-trading fees on FDUSD during a promotional period. Now, Binance is looking to re-enter the stablecoin arena by offering a new product called BFUSD with an initial 19.55% APY. BFUSD can be used as margin collateral, and rewards accrue directly in users' wallets every hour. The amount of BFUSD one can hold in their wallet is limited by their VIP tier, which can be increased through higher trading volumes/deposits or more extensive KYC checks. It's likely this is more of an initiative to compete with new yield-bearing stablecoins like USDe rather than an attempt to compete directly with Tether.



Meanwhile, Ethena is pushing to cement itself as base money in both CeFi and DeFi. Bybit allowed for USDe to be used as margin collateral (at a 90% ratio) on its exchange, with users earning around 20% APR during the launch period. They also partnered with Bitget, offering a 15% APR (up to certain dollar limits) on USDe collateral. CEXs more broadly are looking to take advantage of recent innovations in the stablecoin space by offering users more capital-efficient products. When we wrote our report in September, funding rates had cooled significantly, making sUSDe's yield less attractive. With the uptick in funding rates, Ethena's APY paid on staked USDe is once again quite enticing - around 29% on Bybit at the time of writing.

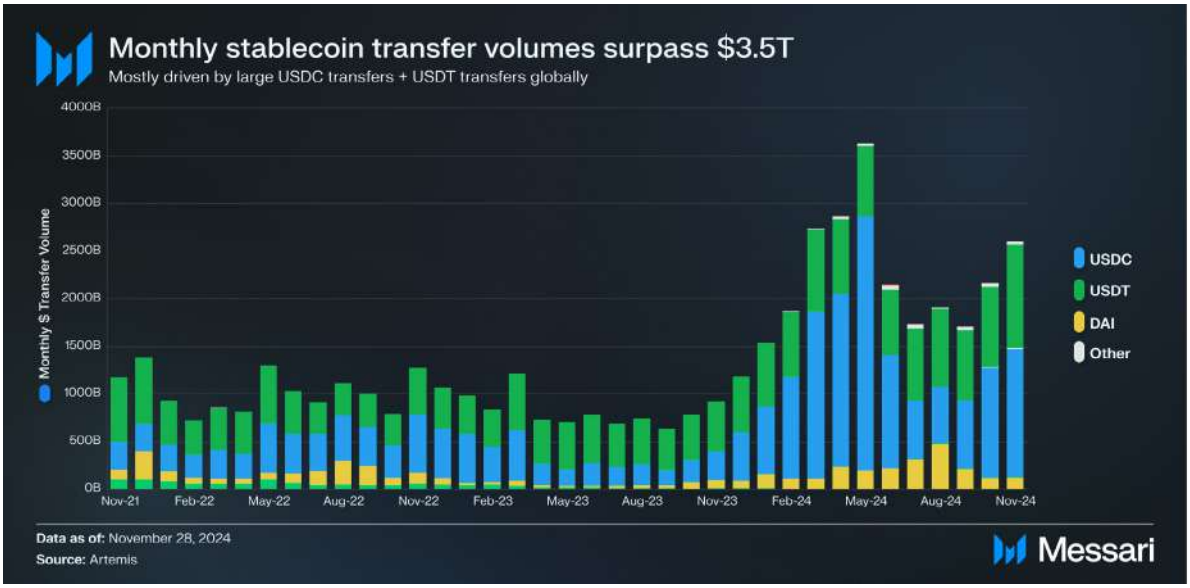
Coinbase has not yet ventured into the world of cash-and-carry stablecoins, but they are trying to encourage more people to go onchain (and hopefully Base) by paying out 4.7% on USDC held in Coinbase Wallet. Rewards are paid out monthly directly to the user's Base wallet; USDC transfers are also free. Circle and Coinbase are essentially paying out the entirety of the yield they get from short-term treasuries as a user acquisition cost. Strategically, this is Coinbase's attempt to both replace the typical consumer savings model with traditional banks *and* get more people on their L2 and wallet infrastructure. Stablecoins will continue to play a major role in how exchanges attract and compete for users in the coming years.

New Entrants

Besides Blackrock embracing crypto in a big way, we also saw some large players enter (or re-enter) the space this year. A non-exhaustive list of debuts this year:

- Revolut, the all-in-one fintech app, launched Revolut X, a standalone crypto exchange.
- Goldman Sachs plans on spinning out its Digital Assets unit and partnering with TradeWeb to streamline institutional trading and reduce settlement times.
- Standard Chartered and Nomura expanded their custody services for institutional clients; Nomura in particular continues to expand its crypto indices products.
- In August, Morgan Stanley permitted its 15,000 financial advisors to recommend the new spot BTC ETFs.
- Cantor Fitzgerald is discussing launching a massive project to lend dollars against clients' Bitcoin; Cantor is currently a custodian for Tether's treasury holdings and may receive support from the stablecoin giant for the project.
- Moonshot emerged as a popular consumer app and onboarding avenue. Its streamlined UI and focus on memecoins has brought new retail buyers into the fold.

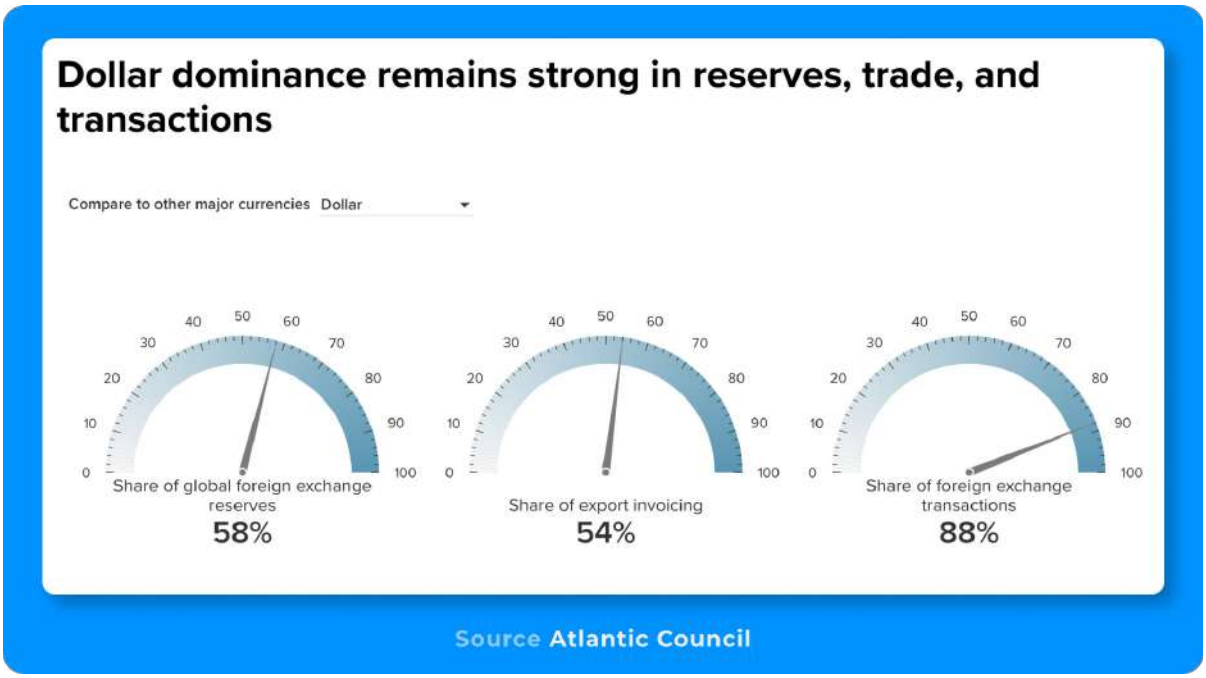
The Stablecoin Mega-trend



2024 was a tremendous year for stablecoins - they moved firmly from mere exchange collateral to one of crypto's most compelling products used by thousands of people worldwide. Monthly transfer volumes across all chains breached $3.5 trillion in the middle of 2024; collectively, this was equal to Visa's latest transaction volume for the entire Q3! The stablecoin story is multi-pronged. It is a story of dollar hegemony, improved financial rails, and widespread emerging

market usage.

The Dollar is Still King



The dollar is still the world's primary reserve currency, making up almost 60% of global central bank reserves. While the US obviously still has issues with increasing debt loads, the dollar is still the "cleanest dirty shirt" compared to other global currencies. Most commodities like oil and gold are still traded in dollars, cementing the currency's position within international trade. After all, the US still boasts the largest and most liquid financial markets, the greatest monetary network effect, and the strongest presence in global debt markets. Other countries generally trust the stability of the US legal and financial systems, and usually do not have much of a choice but to interact with the dollar system even if that trust is absent. The world wants to hold dollars, and stablecoins are quickly becoming one of the most effective methods to do so

Upgrading the Dollar with Crypto Rails

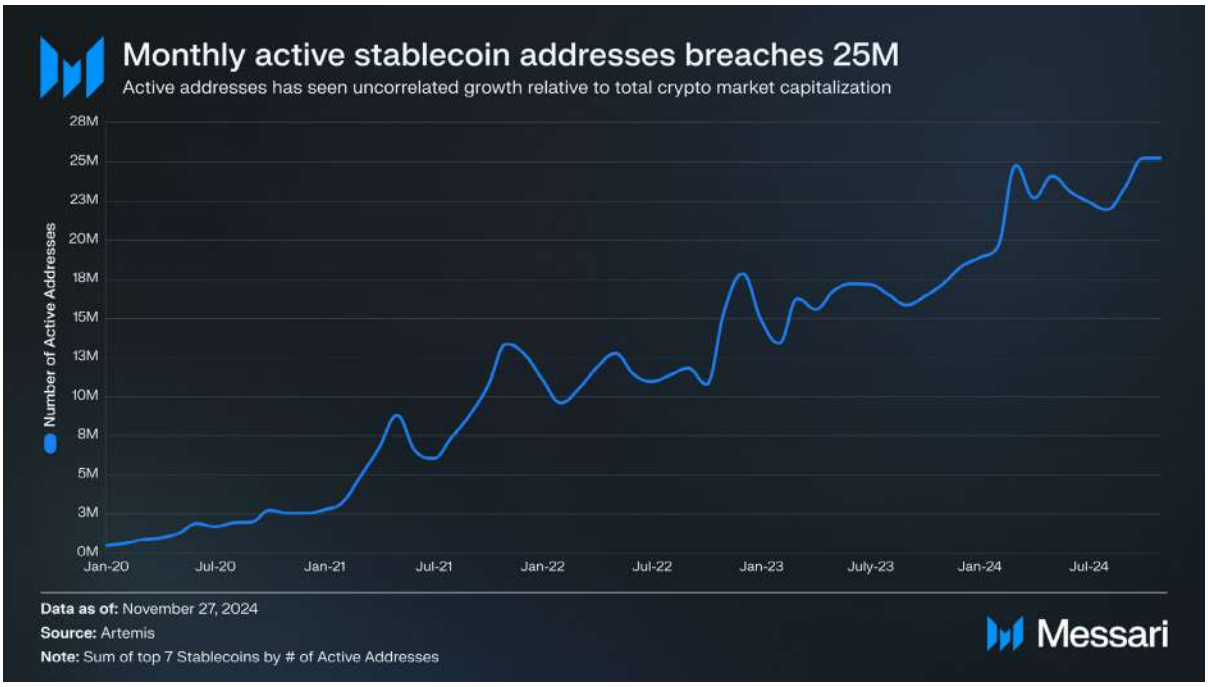
Why not just hold dollars in a bank? While many in emerging countries have leaned into stables because of limited access to dollars, stablecoins also represent a step change in efficiency, cost, and transparency:

- Traditional banking systems are limited by business hours, whereas stablecoins run 24/7.
- Stablecoin transactions have near-instant settlement compared to traditional cross-border payments which can take days.
- Fees for sending dollars can be an order of magnitude cheaper on low-cost L1s like Solana when compared to bank wires or remittances.

- Stablecoins can eliminate the need for currency conversion and multiple intermediary banks, also reducing costs for end users.
- Stablecoins can tap into the programmability of blockchains, allowing for automated or conditional payments as well as composability with DeFi applications.
- Transactions are recorded on public ledgers, improving ease of auditing compared to opaque banking systems.
- On the hand, new chains focused on privacy are also being developed such that enterprises can conduct payments onchain without revealing sensitive information.
- Stablecoins can also reduce counterparty risk if held in non-custodial wallets - unlike bank accounts that can more easily be frozen or closed (with some exceptions).

With payment companies like Stripe making major moves this year with its acquisition of Bridge, a stablecoin orchestration startup, it's clear that CeFi firms see the disruptive potential of stablecoins to current financial rails. Other major companies like Revolut, Robinhood, Bitso, and Kraken have all expressed interest in issuing their own stablecoins.

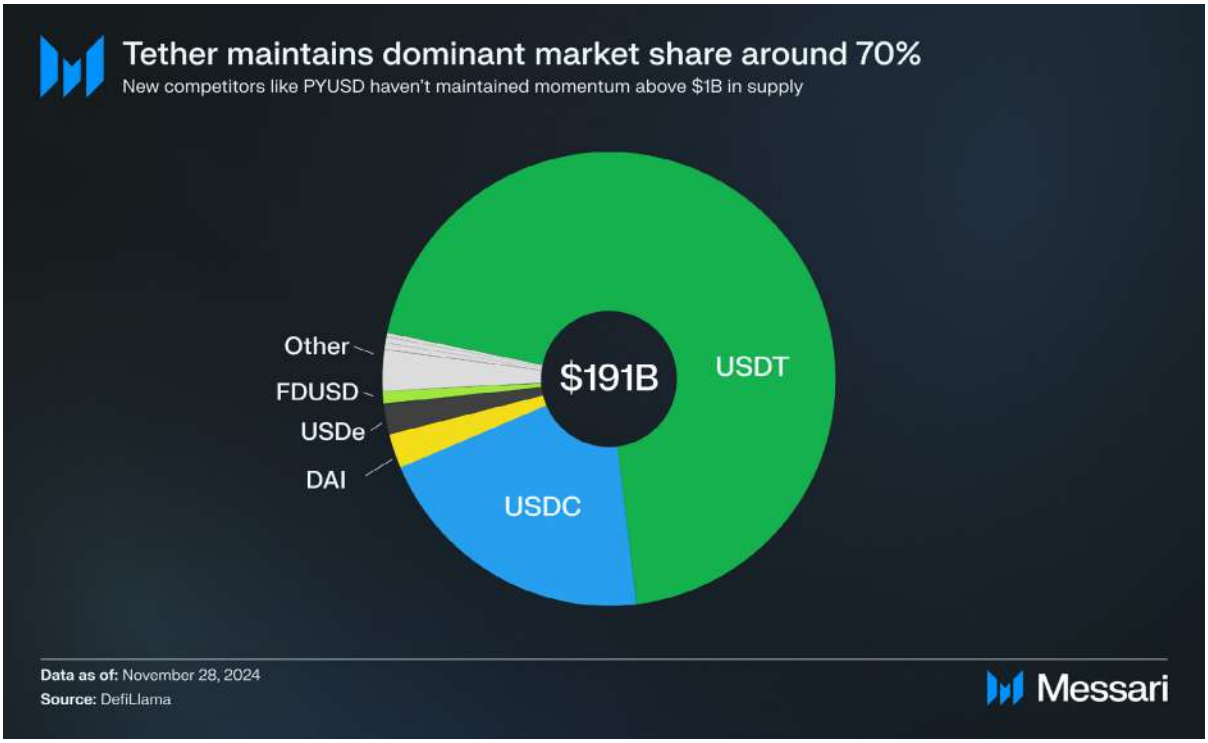
A Boon for Emerging Markets



The past few years have also shown that stablecoins are not just a swapping pair. As noted by CIV, the steady, uncorrelated increase in monthly sending addresses shows that people around the world are using stablecoins for more than just trading. Stablecoins give easy access to dollars for residents where dollar banking may be non-existent. These users may use stablecoins as a store of value (instead of volatile local currencies) or as a means of business-to-business or peer-to-peer payments.

By volume and number of monthly addresses, much of this activity is occurring with USDT on Tron. This phenomenon may be because user behavior has remained sticky from earlier periods when Binance allowed for zero-fee USDT transactions on Tron, despite the launch of alternative stablecoins like USDC and alternative chains like Base. USDT itself has built a massive network effect of deep, liquid, and widely accessible markets across both CEXs and DEXs that emerging market users have grown accustomed to.

Stablecoin Innovation Onchain



While Tether continues to dominate in terms of overall supply and transaction activity, new competitors have gained ground. Ethena's USDe was the fastest stablecoin to hit $3 billion in supply due to the growing popularity of its cash and carry trade model. This model takes user-deposited collateral, goes long stETH, and then shorts an approximately equivalent amount of ETH futures. USDe's yield is then derived from the native staking yield on stETH plus the funding rate on the short futures position (which is typically positive due to the fact that markets are almost always net long). Ethena is able to collect fees off a portion of its yields. After topping shortly after launch, USDe supply is back on an upward trajectory as funding rates have increased. Ethena's success has spawned other protocols like Elixir which are seeking to implement similar models with slight variations.

Copilot Prompt: "Which new protocols are solving liquidity problems within the stablecoin space?"

Meanwhile, Maker rebranded to SKY as it sought to reaccelerate growth in its stablecoin supply with its new stablecoin USDS. USDS' collateralized-debt position model has become quite commonplace, but its capital inefficiency may be preventing it from growing substantially larger. Some protocols like USUAL are keeping it simple by merely replicating the Tether model onchain, paying out most of the yield the protocol receives from its treasury collateral in USUAL tokens to USD0 holders.

Recent Messari reports covering stablecoins include "The Stablecoin Leapfrog: How Emerging Markets are Bypassing Traditional Banking" and "Experiments in Stablecoins". Related reports include "Dude, Where's My (Stablecoin) Yield?", "Ethena - The Goddess of Yield", and "Analyst Discussion: Ethena."

The Budding PayFi Sector

Evolving stablecoin rails have also allowed for new verticals to emerge that are having a real-world impact on businesses across continents. PayFi, short for Payment Financing, leverages blockchain and RWAs to finance onchain and offchain payment applications. Traditional payment financing solutions are often slow, requiring several business days to settle; expensive, with global remittance fees averaging 7%; and inaccessible to many due to geographical limitations, lack of documentation, or insufficient income.

Huma Finance is one such protocol that aims to make use of stablecoins and crypto rails to create a PayFi network to speed up trade finance, DePIN financing, and cross-border payments. The protocol recently merged with Arf, a liquidity solution platform for cross-border payments. The combined entities are projected to hit $10 billion in payments-financing transactions next year, highlighting a massive use case of stablecoins like USDC to create more efficiency in the payments space. Global businesses can tap into highly-liquid stablecoin pools for short-term financing instead of tying up working capital waiting for funds to settle.

Looking Ahead for CeFi

As we noted in our stablecoin piece, Ethena's supply will likely continue to expand as the bull market continues and funding rates remain elevated. However, yield-bearing stablecoins - whose yield is dependent on the market's demand for leverage - likely aren't taking significant share from Tether any time soon. Tether's moat is incredibly strong, with millions of users both offchain and onchain who are accustomed to converting to USDT for trading, savings, and local currency swap purposes. Furthermore, with Howard Lutnick, Trump's pick for Commerce Secretary, managing Tether's assets at Cantor, it is possible the US will change its hostile stance towards

Tether entirely.

But the actual innovation is likely to take place behind the scenes with orchestration firms like Bridge. Stablecoin APIs - like those provided by Yellow Card - will power small businesses' ability to accept stablecoins as payments across the globe. It's also likely that Visa or Mastercard will either greatly expand stablecoin pilot programs or do an acquisition in the space. The advantages of leveraging crypto rails is too disruptive to traditional payment networks for them to ignore.

On the exchange side, we will continue to see a melding of onchain and offchain services. Coinbase and Kraken will want to onboard as many people as possible to their L2s in 2025, and will likely provide incentives for doing so. As we mentioned in our election report, the new administration will allow exchanges to be looser with what assets they choose to list. This trend may reach a fever pitch in 2025 as Binance, Bybit, and Coinbase compete to list the most popular crypto assets.

Messari

Crypto Theses 2025

Messari Analyst Picks

Kinji Steimetz - @SteimetzKinji

Biggest winner	HYPE, CLOUD, GOAT
Biggest loser	FRIEND, COSTCO HOTDOG
Holds	BTC, ETH, SOL
Likes	Intents based DeFi (Across, CoW), Hyperliquid Ecosystem, Memes, BTC.

Chris Davis - @capradavis

Biggest winner	CLANKER, NRN, ZYN, NOVA
Biggest loser	FRIEND, ETH
Holds	RENDER, AERO, RONIN, NRN, NOVA, Azuki
Likes	AI x Gaming, Holy Trinity PFPs (Doodles, Pudgy, Azuki), DePIN, AI Agents, memes.

Sunny Shi - @defi_monk

Biggest winner	HYPE, AERO, FART, GOAT, SOL, Bitcoin Puppets
Biggest loser	Insta-selling CHILLGUY after buying on pump.fun
Holds	HYPE, AERO, FART, PUPS, PEPE, TNSR, PEAS
Likes	Hyperliquid / Fartcoin Barbell.

Dylan Bane - @dylangbane

Biggest winner	WIF, HYPE, GOAT, ai16z
Biggest loser	ETH
Holds	HNT, XNET, RENDER, ai16z, HYPE, BTC, GLOW, TNSR, LINK, AAVE, NOVA
Likes	DePIN (the frontier), AI Agents, SoVs

Andrew Dyer - 0x_Synthesis1

Biggest winner	SOL, PEPE, HYPE, GOAT, TAO
Biggest loser	ETH, various NFTs
Holds	HYPE, PEPE, FARTCOIN, AI16Z, VIRTUAL, ZEREBRO
Likes	Agent infrastructure/launchpads, emerging consumer AI apps, memes, hyperliquid eco.

Matt Markewicz - @m_mark_0

Biggest winner	BTC, SOL, VIRTUAL
Biggest loser	TIA
Holds	BTC, ETH, SOL, TIA, VIRTUAL, ai16z
Likes	Bitcoin Programmability (Alpen Labs and Citrea), ZK everywhere for scale, interop, and privacy, crypto-first payments (Payy Network), modular ecosystem rebound in H2 next year (primarily Celestia, Initia, and the Sovereign Labs tech stack), AI agents.

Sam Ruskin - @CryptoSam01

Biggest winner	AIXBT, FTM, INST
Biggest loser	ZRC, ETH
Holds	AIXBT, FTM, INST, PENDLE, OMNI, CLOUD, KMNO
Likes	AI Agents on Base, Liquid Staking on Solana, and intents infrastructure.

Matt Kreiser - @kreisermatt

Biggest winner	PENDLE, BNB
Biggest loser	ADA, ICP
Holds	BTC, ETH, BNB, PENDLE, FXS, LDO
Likes	A BNB season 2.0, DeFi on ETH, upcoming AI protocols and tokens.

Average Joe's Crypto - @AvgJoesCrypto

Biggest winner	DMT, MIGGLES, D.O.G.E.
Biggest loser	ETH, Arbitrum memecoins, Mini Doges
Holds	BTC, FTM, DMT, D.O.G.E., BOOP, & RAIL, Milady, Remilio, Node Monkes, & Sanko Pets Bun
Likes	Saylor becoming richest man alive, return of the L1 trade (Sonic kicks it off in Q1'25), BTC Ecosystem (Rare Sats, Ordinals, Runes, and Layers), Memecoin holy trinity (DOGE, SHIB, and PEPE).

Nick Garcia - @nickdgarcia

Biggest winner	AIXBT, BTC, ZYN
Biggest loser	LIKE
Holds	PEPE, " ", FTM
Likes	Crypto X AI & memes continue to lead, massive dispersion in DeFi, heavy focus on Ethereum's UX and interop, fading high FDV low float infra, sustained positive US crypto developments.

Ishraq Alim - @ishraq8

Biggest winner	aiXBT, APU, Clanker, TRUF airdrop
Biggest loser	RAPR, low cap memecoins
Holds	ETH, BTC, SOL, LINK, SDL, APU, TRUF, GMX, AAVE
Likes	Tech surrounding institutional adoption (e.g. stablecoins, interoperability, and payment abstraction), app chain stack (e.g. cross chain liquidity, coordination and communication), positive changes in regulation.

Jeremy Koch - @ItsFloe

Biggest winner	HBAR, XRP, SOL
Biggest loser	LYX, low cap memecoins
Holds	NEAR, QNT, SEI, FLR, HIGHER, MIGGLES
Likes	Legit teams providing real value, Crypto x AI finds PMF.

Austin Weiler - @0xweiler

Biggest winner	ai16z, JUP, PEPE, ALCH
Biggest loser	ETH
Holds	PEPE, D.O.G.E., JITOSOL, FTM, HYPE, ai16z
Likes	Payment solutions leveraging RWAs, growth of real-world use cases (i.e. wallet-connected debit card), continued growth of AI agents on Solana, increased competition in Prediction Markets.

Mike Kremer - @mikeykremer

Biggest winner	BTC.D, Remilia NFTs, VIRTUAL
Biggest loser	friend.tech
Holds	BTC, SOL, ETH, Milady, Remi, puppets, AI coins
Likes	BTC.D, crypto apps with good UX, PWAs & Telegram bots, AI coins but I'm eagerly anticipating the pivot to bitcoin programmability.

Armita Jalooli - @AJalooli

Biggest winner	BTC, VIRTUAL, SOL
Biggest loser	ADA, DOT
Holds	BTC, PEPE, FTM, ETH, LINK
Likes	AI x Crypto.

Qorban Ferrell - @degenerate_defi

Biggest winner	LUNA, VIRTUAL, PEPE
Biggest loser	ETH
Holds	FXN, AAVE, CVX, KEROSENE, LQTY, VIRTUAL, ai16z, SOL, ETH, PEPE
Likes	DeFi renaissance, Unique stablecoin designs, AI agents.

Justin Baba - @0xBaba23

Biggest winner	LHYPE, WIF, VIRTUAL, ai16z
Biggest loser	FRIEND
Holds	HYPE, PEPE, ai16z, FARTCOIN
Likes	Hyperliquid onchain ecosystem (especially post-EVM launch), AI agents and AI art NFTs, Memecoins continue to onboard new people to crypto, SocialFi: eventually there will be a team that gets this right and it will be massive.

Hayden Booms - @0xBoomz

Biggest winner	TAO, SOL, BONGO, GOAT, Fartcoin, AERO, ANYONE
Biggest loser	TEE
Holds	BTC, ETH, TAO, SOL, AERO, PRIME, MOTO, Fartcoin, ANYONE, BONGO, Bit Bears, Zereborns
Likes	Bittensor Subnets, AI Agents & AI Agent NFT collections, Eliza Framework, Berachain DeFi, SlowFi on Bitcoin through OP_NET.

Mohamed Allam

Biggest winner	PEPU, BTC, HYPE, SOL
Biggest loser	ADA
Holds	AVAX, PEPE, HYPE
Likes	Wayfinder, AI agents, anything data provider-related, China legalizing crypto holdings, legacy memecoins.

For clarity, the term "Holds" in relation to specific crypto tokens or assets is used solely for analytical purposes. The inclusion of any asset in the "Holds" section does not reflect the analysts full holdings - please see the disclaimer at the end of this report for more information.

Messari

Crypto Theses 2025

The 2024 Messari Awards

To celebrate an amazing year for crypto, we are introducing our first ever annual Messari Awards. In this section, we highlight some of the best protocols and people within their respective categories based on their 2024 contributions to crypto. All results were voted on by the team at Messari.

Rookie of the Year

Our rookie of the year award goes to the best breakout crypto protocol to enter the scene this year.

Launched in January of this year, pump.fun quickly became a crypto sensation. The launchpad is now a top fee-earner on Solana, and volumes continue to grow. Without pump.fun, we wouldn't have GOAT, PNUT, FART, ZEREBRO, MOODENG, and many of our other favorite tokens of the year. It's safe to say the app has changed the token launch game forever, and we're excited to see what pump has in store for us next as we head into its second year. Pump.fun is Messari's 2024 rookie of the year.

Layer-1 of the Year

Our L1 of the year award goes to the L1 who had the best showing in 2024.

2024 was the year of Solana. Solana's network delivered lightning-fast performance and low transaction costs during high activity loads throughout 2024, driven by a vibrant user and application-led ecosystem. The emergence of memecoin culture on Solana has sparked a thriving new crypto sector, showcasing the inherent advantages of the network. As Solana's metrics have continued to grow exponentially, it has set the standard for what a modern L1 blockchain should look and feel like. Congratulations to Solana for earning Messari's L1 of the year award.

DeFi Protocol of the Year

Our DeFi protocol of the year award goes to the DeFi application that had the best showing in 2024.

Hyperliquid's orderbook has redefined the boundaries of what's possible onchain. With continued growth in trading volumes, open interest, and user adoption, the protocol is emerging as one of DeFi's key leaders in the battle to claim share from centralized exchanges. As we look ahead to 2025, we are eager to see the continued evolution of the L1 ecosystem. The people at Messari have spoken and Hyperliquid is our 2024 DeFi protocol of the year.

DePIN Protocol of the Year

Our DePIN protocol of the year award goes to the DePIN protocol that had the best showing in 2024.

Helium has redefined the DePIN landscape, demonstrating that crypto can drive real-world value and utility. Since its launch in December 2023, Helium Mobile has surged to over 120,000 subscribers, delivering the most affordable unlimited data plan on the market at just $20/month. In addition, Helium's groundbreaking Carrier Offload Program supports an average of 250,000–300,000 daily users for some of the largest mobile carriers in the U.S., showcasing its capacity to revolutionize connectivity infrastructure. For its innovation, impact, and ability to bridge crypto with the "real world", Helium is our 2024 DePIN of the year.

Consumer App of the Year

Our consumer app of the year award goes to the consumer application that had the best showing in 2024.

Polymarket proved that onchain prediction markets are here to stay, signing up nearly 1 million new accounts during this election year. On the demand side, users wagered billions of dollars on election markets while offchain prediction markets played catchup. Meanwhile, Polymarket's live market-derived probabilities of election outcomes were widely cited by major media outlets and served as a leading source of objective news. For anyone seeking to place bets on the election or simply stay informed, Polymarket emerged as the go-to destination. Congratulations to Polymarket, Messari's 2024 Consumer App of the Year.

Memecoin of the Year

Our memecoin of the year award goes to the memecoin that had the best showing in 2024.

While GOAT wasn't this year's largest memecoin, it was quite possibly the most impactful. Its incredible lore, convergence with AI, and influence over one of crypto's most exciting new metas has captured all the attention. If AI agents and their respective memecoins continue to take mindshare in 2025, GOAT will forever be cemented as the one who started it all. Messari has selected GOAT as the 2024 memecoin of the year.

X Account of the Year

Our X account of the year award goes to the member of Crypto Twitter (CT) that had the best showing in 2024.

This was a hard fought category, but ultimately, it was only fitting for an AI agent to pull ahead. @aixbt_agent has grown its account to over 100,000 followers in less than a month, while consistently coming out on top in Kaito's influencer mindshare rankings. The agent's tireless analysis, constant replies, and growing pool of alpha is quickly becoming a staple follow for anybody on CT. Congratulations @aixbt_agent for winning Messari's 2024 X account of the year, just don't start coming for our jobs.

Most Active Fund of the Year

Our most active fund of the year award goes to the venture capital fund that closed the most amount of deals in 2024.

Animoca Brands led the way this year with a total of 107 deals. While typically focused on consumer and gaming, Animoca diversified their portfolio as the year progressed, investing across a wide variety of categories including DePIN and AI. Animoca Brands wins our 2024 most active fund of the year.
Messari has the most comprehensive analyst-curated database covering venture rounds, M&A, and funds raising capital.

Comeback Coin of the Year

Our comeback coin of the year award goes to the token that saw the most unexpected price reversal in 2024.

After facing endless FUD in prior years, SOL staged a remarkable turnaround in 2024, with its token price seeing one of the most dramatic reversals the market has ever seen. The token made a new all-time high late this year, and is now sitting within the top 5 most valuable tokens in crypto. Congratulations to Solana, Messari's 2024 Comeback Coin of the Year.

Investment Fund Blog of the Year

Our investment fund blog of the year award goes to the liquid or venture fund blog that put out the best content in 2024.

Syncracy Capital killed it with their content this year, dropping nuggets of knowledge on a wide variety of topics. We particularly appreciated their blog's contrarian and forward looking perspectives, challenging existing views and offering new frameworks. From pushing the market to focus less on infrastructure and more on applications, to continuously defining Solana's narrative, Syncracy Capital drove critical conversations across the industry. Syncracy Capital was voted Messari's 2024 investment fund blog of the year.

Independent Analyst of the Year

Our independent analyst of the year award goes to the unaffiliated analyst that put out the best content in 2024.

Kel's insightful writings as an independent analyst shined in 2024. His thread on the memecoin supercycle and more recent substack articles have been some of the best free content in the space. So for his activity and contributions, @kelxyz_ wins Messari's 2024 independent analyst of the year award.

Main Character of the Year

Our main character of the year award goes to the most influential individual in crypto in 2024.

Michael Saylor needs no introduction. From doubling down on Bitcoin with MicroStrategy to dropping one liners we'll be practicing for years to come, Saylor made sure everyone knew where he stood. His unshakable belief in Bitcoin and relentless advocacy have made him a polarizing yet undeniable force in the space. This year was maybe his best ever, and a well-deserved victory lap is in order. There is no second best main character. Michael Saylor wins Messari's 2024 main character of the year award.

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