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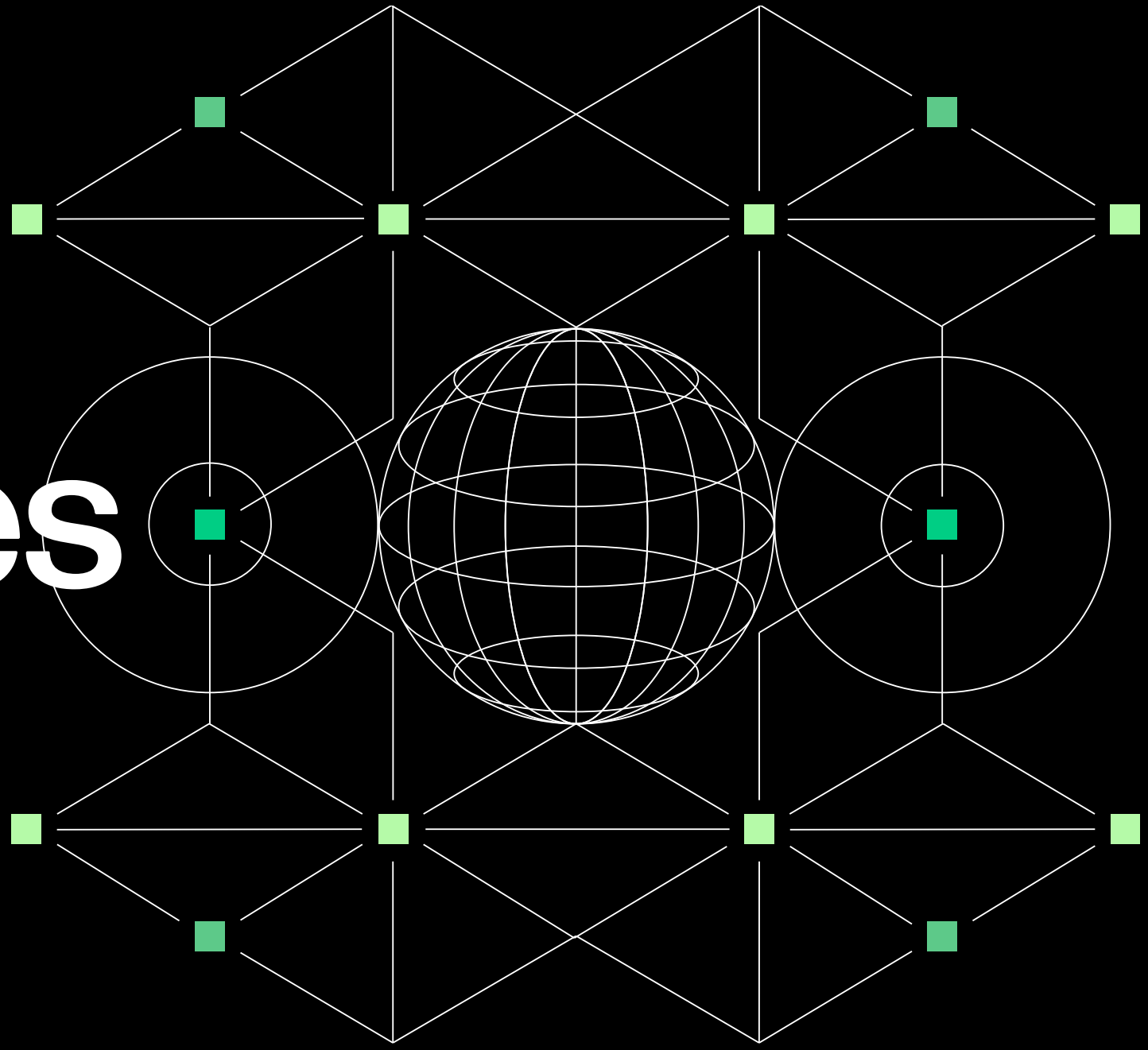
Crypto Use Cases

Highlighting Real Utility Beyond Speculation



MAY 2024

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Introduction

In recent years, businesses and organizations have devoted time and resources to adapting their traditional business models to incorporate cryptocurrency ("crypto") and other disruptive technologies like AI, cloud computing and big data. Crypto offers benefits such as speed, resilience, transparency, cost efficiency and accessibility. While there are critics who remain skeptical, most people understand that crypto has utility beyond speculation.

> The overarching mission of crypto is to foster a more equitable and inclusive digital economy built upon decentralized, trust-minimized blockchain infrastructure. Unlocking new capabilities and streamlining information sharing in an individual-centric approach, crypto is a fundamentally new tech paradigm that transforms the ways in which we create and share value.

However, a valid criticism is that the industry's proponents often conflate the end state with the current state of adoption by making forward promises about crypto's utility.

> Crypto is facing the cold start problem – the underlying technology is still in the early development stages and its adoption faces significant barriers including customer education, trust gaps, and regulatory uncertainty, along with UX challenges to interacting with decentralized applications. Widespread adoption requires products and services must be intuitive and accessible. However, improvements to performance, scalability and reliability are constantly being made to the infrastructure layer to make it even easier to launch and scale new useful products, which then can create network effects that add to the value of crypto platforms.

While the crypto industry has a long way to go achieve its overarching vision, it has already achieved product-market-fit (PMF) in several use cases across various verticals.

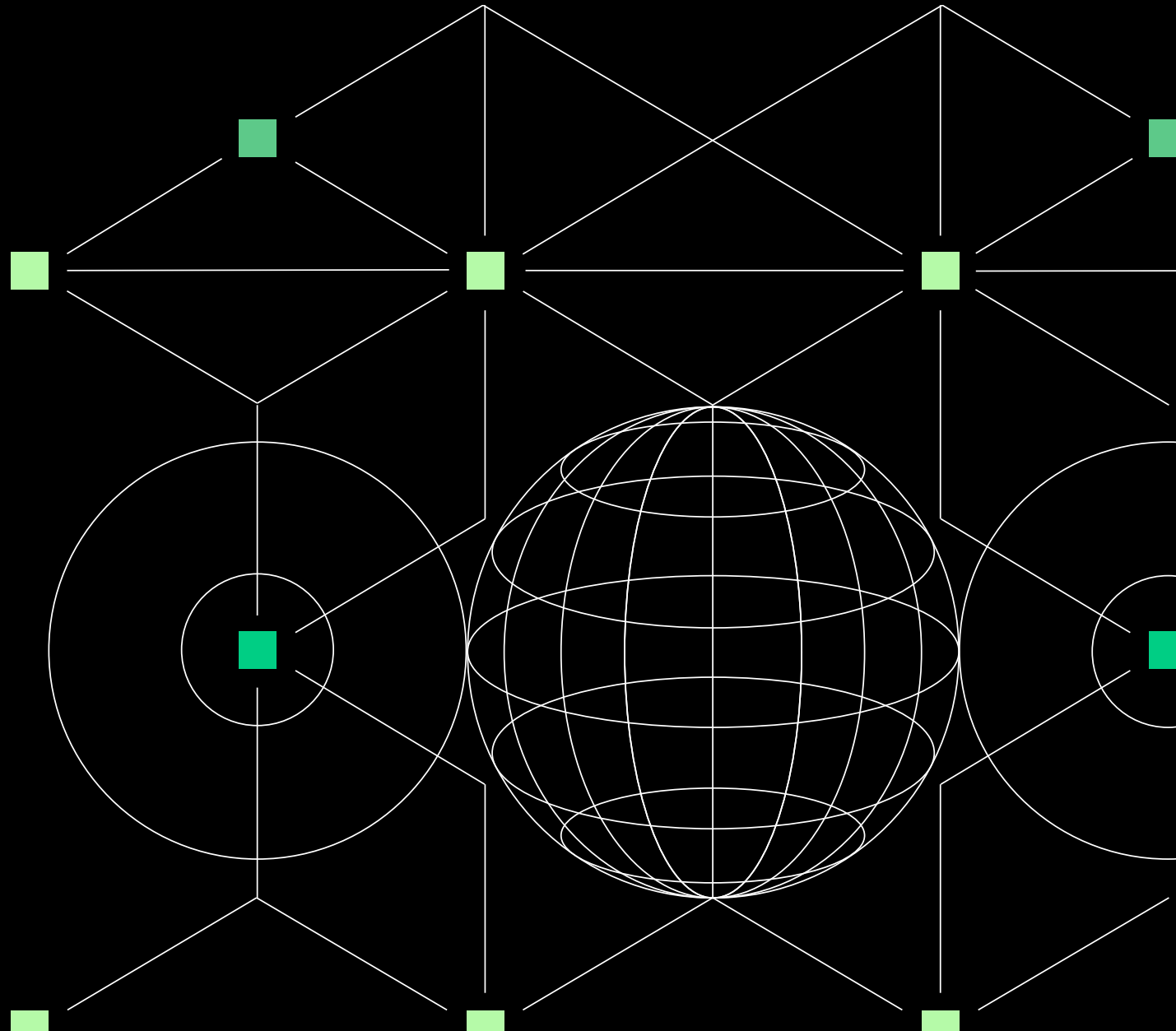
Contents

Projects & Entities Featured in this Report

Logos shown in order of appearance

Money

Store of Value, Money Transfer / Remittances / Payroll, Payments



Store of Value

Bitcoin, often referred to as “gold with wings,” is a digitally scarce asset with advantages such as divisibility and transportability over a decentralized, permissionless global network. Bitcoin and other crypto assets serve as a hedge against uncertainty in monetary systems, the credibility of central banks, authoritarian regimes with strict capital controls, and unstable financial systems due to strong value transfer and property rights. Bitcoin has been adopted across various end markets, including retail, institutional, corporate, government, and nation-states as an emerging market currency, seizure-resistant asset, and treasury asset.

Stablecoins democratize access to programmable digital cash instruments and other digital representations of value such as currency buckets or gold. Despite the lack of comprehensive federal regulation of stablecoins across major economies, many individuals from emerging markets hold stablecoins to hedge against fluctuations in their local currencies.

Money Attributes: Bitcoin vs. Traditional Stores of Value

Attributes	Bitcoin	Gold	Fiat
Scarce	✓ ✓ ✓	✓ ✓	✓
Easily divisible	✓ ✓ ✓	✓ ✓	✓ ✓ ✓
Durable	✓ ✓ ✓	✓ ✓ ✓	✓ ✓ ✓
Easy to transact	✓ ✓	✓	✓ ✓ ✓
Portable internationally	✓ ✓ ✓	✓	✓
Easy to verify authenticity	✓ ✓ ✓	✓	✓
Resistance to seizure / confiscation	✓ ✓ ✓	✓	✓
Accessible	✓ ✓	✓	✓ ✓ ✓

bitcoin MicroStrategy TESLA BLOCK

Corporates including MicroStrategy, Tesla, Block (fka Square) and Reddit have purchased Bitcoin for their treasury reserves.

El Salvador has adopted Bitcoin as its 2nd national currency alongside the US dollar.

International conflict events and political unrest (e.g., Russia-Ukraine conflict and Canadian Truckers Protest) have spurred Bitcoin adoption as individuals opt-out of their restrictive financial systems.

tether USDC

Stablecoins like Tether and USDC maintain price stability to the dollar with full collateralization via cash, US Treasuries & other financial assets. Stablecoins are primarily used for trading, payments, and in decentralized finance (“DeFi”).

Stablecoins create new demand for US Treasuries, expand international dollar access and can help maintain the dollar as the world’s reserve currency. As of 3/31/24, stablecoin issuers in aggregate held ~$85bn in USTs, which would collectively rank among the largest sovereign holder of USTs.

MAKER Mountain Protocol Ethena

Yield-bearing stablecoins use a variety of strategies to earn token holders a passive income stream. Examples include:

- MakerDAO’s sDAI (“savings DAI”) passes protocol revenue from stability fees & RWA investments through partnerships w/ Monetalis Clydesdale & Coinbase Custody.
- Mountain Protocol’s USDM launched as the ‘first regulated and permissionless yield-bearing stablecoin with its reserves (mostly T-bills) held at regulated custodians.
- Ethena’s USDe is a synthetic dollar that is collateralized using ETH and delta-hedged short futures positions.

Remittances / Payroll

Crypto enables significant cost savings to money transmitter businesses and individuals that rely on international remittances and other cross-border transactions which are subject to high fees. Traditional methods of transferring money through established money transmitter organizations incur significant costs, averaging 6.3% of the amount sent, according to estimates by The World Bank. In contrast, crypto offers a more accessible alternative with borderless, permissionless, and 24/7 transaction capabilities, often at lower cost and faster settlement times. Furthermore, the scalability of blockchain technology allows for efficient processing of both large and small transfers, including micropayments that may not be possible through traditional channels.

Crypto also facilitates swift data aggregation, validation, and social coordination, making it an effective tool for distributing income, claims or social benefits, particularly to marginalized groups. By encouraging participation in the financial system, crypto contributes to expanded financial inclusion, benefitting workers across borders and those facing challenges in unbanked regions.

Money Attributes: Bitcoin vs. Traditional Stores of Value

Payment Method (Network)	Uses	Standard Processing Time (Funds availability)	Standard Cost to Send Payment (outgoing)
Checks	Large purchases (e.g., payroll and rent)	1-2 business days after depositing	$2.01 - $4.00
ACH – standard (Automated Clearing House)	Bill pay, direct deposit, claims & reimbursements, P2P (domestic only)	1-3 business days	$0.20 - $1.50
ACH – same-day (Automated Clearing House)	(same as above)	Two hours to next business day (depending on cutoff windows)	$1.00 - $5.00
Wire Transfer – domestic (SWIFT, Fedwire, CHIPs)	Large purchases, transfers between accounts (personal / business)	Within hours to next business day	$15 - $30
Wire Transfer – international (SWIFT, Fedwire, CHIPs, etc.)	Large purchases, transfers between accounts, remittances (personal / business)	1-5 business days (international)	$35 - $50
Bitcoin	P2P, payments, remittances	10-50 minutes	$0.31 - $1.66 (5y interquartile range)
Bitcoin Lightning Network	P2P, payments, remittances	Immediate	<$0.01 (or 0.0029%)

Source: AFP Payments Cost Benchmarking Survey, Flagship Advisory Partners, Modern Treasury, Federal Reserve, Coin Metrics

strike FéliX Yellow Card

Leveraging Bitcoin's Lightning Network, Strike enables users to send cross-border remittances across to over a dozen countries including in Asia, Africa, and LatAm.

Félix allows users to send US-to-Mexico remittances in USDC from WhatsApp over the Stellar blockchain in a more efficient, cost-effective manner than SWIFT.

Yellow Card is Africa's largest stablecoin on-/off-ramp to/from USDT, USDC & PYUSD for individuals and business across 20 countries.

AIRTM Bakkt belo

The rise of the gig economy has spurred demand for crypto to facilitate on-demand or even instant settlements. Bakkt's Gig Workers & Crypto Study finds that 20% of surveyed gig workers (freelancers, social influencers, rideshare, food delivery, etc.) have already been paid in crypto. Airtm facilitates cross-border payouts in USDC for contractors in LatAm with $900m annual transaction volume and 35% average savings. Working with fintech app Payoneer, Belo facilitates crypto payments for freelancers in 13 countries including Argentina, Brazil & Mexico.

Superfluid Sablier LlamaPay

Rather than standard bi-weekly payroll, payroll can be automated for contractors or salaried employees with continuous payments that can even be streamed by the second. Money streams mitigate risk of non-payment and improve labor retention.

Many DAOs and other crypto-native companies use Superfluid, Sablier, Coinshift & LlamaPay for customized payroll streaming or other recurring payment services like subscriptions and continuous vesting services for token unlock schedules.

Payments (Merchant Acceptance)

The acceptance of crypto as a medium of exchange continues to rise with an increasing number of merchants now able to accept payments in crypto. This trend has been propelled by mainstream payment service providers such as PayPal, Shopify and Square, who have integrated support for crypto into their platforms. Major players in the payments industry like Visa and Mastercard have included crypto card programs including crypto debit, prepaid, and credit cards backed by crypto, as well as rewards programs in crypto. Furthermore, Visa and Mastercard have expanded their capabilities to enable the settlement of select digital currencies, including central bank digital currencies (CBDCs), directly over their networks.

By leveraging crypto payment rails, merchants can realize significant cost savings by bypassing traditional checkout intermediaries such as banks, card networks and processors. This enables them to offer competitive pricing to consumers while avoiding bank fees and reducing risk of fraudulent chargebacks, as crypto transactions are irreversible. Crypto payments provide merchants with real-time access to funds and enhanced control over working capital, liquidity, and liability protection.

Traditional Merchant Payments vs. Crypto Payments

	Traditional Card Payments	Payment with Crypto (off-chain settlement)	Crypto Payments (on-chain settlement)
Settlement Speed	1-2 business days (cards)	Same business day (digital wallets); 10 minutes (Coinbase Commerce)	~1 second (Solana)
Costs	1.5% - 3.5% of transaction	Free (Coinbase Commerce); fixed $0-$2.49 plus 1.5%-2.3% amount (PayPal)	~$0.005 (Solana)
Fees paid	Interchange fees, gateway fees, assessment fees, scheme fees	Conversion fees, processing fees	Network tx fees
Fee recipients (intermediaries)	Issuing bank, card network, payment processor / gateway, acquirer	Digital Wallet / payment processor	Blockchain network

PayPal Square stripe

Mainstream payment service providers have expanded support for businesses to accept payments in crypto, while still aiming to provide seamless checkout experiences for consumers. In August 2023, PayPal launched its own PYUSD stablecoin (issued by Paxos) on Ethereum for online payments including in virtual environments like gaming and metaverse platforms. PYUSD has attracted $200m+ in supply to date.

Stripe extended its payments acceptance solutions and banking-as-a-service APIs to power crypto businesses. Stripe's crypto offerings include fiat-to-crypto onramps (incl. fraud prevention & authorization optimizations) and payouts in USDC.

Opera CELO Grab

Outside of the US – Opera, the multi-platform web browser, launched MiniPay, a self-custodial stablecoin wallet available through the Opera Mini browser for mobile payments over Celo blockchain, which offers sub-cent transaction fees. In 5 months after launch, MiniPay amassed over 1m users across Nigeria, Kenya & Ghana, and plans to expand further across Africa.

Grab, a leading superapp in Southeast Asia, offers Singaporean users the ability to make payments in crypto via the GrabPay Wallet through its payments partner, Triple-A. Grab also has other crypto initiatives including partnering with Circle to trial a Grab Web3 Wallet for digital payments with NFT-based rewards.

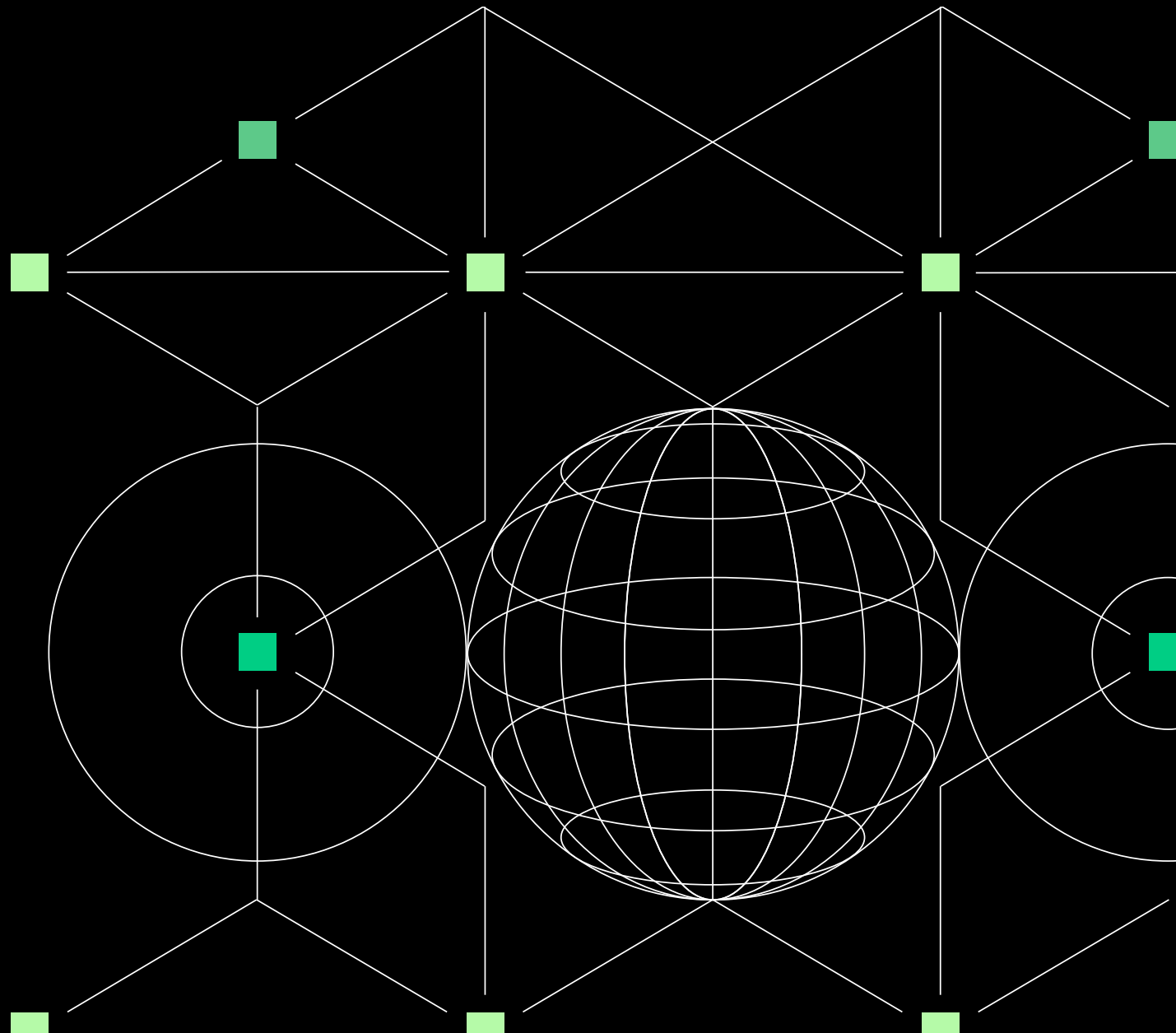
Pay shopify VISA

Solana Pay enables users to pay merchants in USDC with near-instant confirmations with minimal fees both in-person at point of sale or through online checkout (Solana transactions are typically confirmed in ~0.5 seconds with avg network fees of ~$0.0005). Solana Pay is available across Shopify-powered storefronts as an integrated plug-in option.

Solana's feasibility for settling payments has been applauded by Visa, which uses the crypto network for USDC settlement capabilities, which have been expanded to merchant acquirers Worldpay and Nuvei so they can diversify funding options and offer merchants more choices for receiving funds.

Financial Services

Tokenization, Borrow & Lend, Capital Markets, Risk Management / Insurance

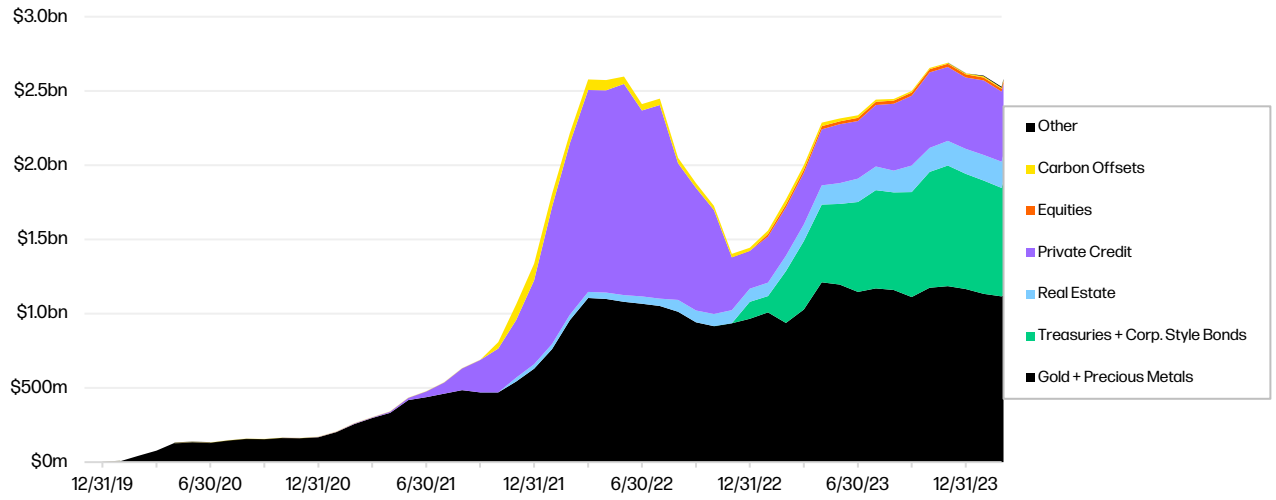


Capital Markets

Tokenization of real-world assets (RWAs) is the process of issuing blockchain-based tokens that represent tangible physical or financial assets such as stocks, bonds, real estate, commodities and art. RWAs deliver the benefits of the open crypto economy to familiar off-chain assets, enhancing their liquidity, utility and efficiency. They offer broader accessibility to investments, reduce lock-up periods, and improve price discovery over a 24/7 market.

Though tokenization efforts are still in the early stages of development, the issuance of RWAs by trusted traditional finance brands can accelerate the adoption of crypto by new users and investors. Despite the vast potential of the multi-trillion-dollar market, only a fraction of financial assets (approximately $1.5 billion) has been tokenized on public blockchains, indicating significant growth opportunities in the market. Tokenization stands out as one of crypto's most promising use cases and will continue to shape the industry's trajectory.

Real World Asset (RWA) Token Market Cap



Data: DeFiLlama, Dune, CoinGecko, RWA.xyz

Centrifuge Ondo

In 2021, Centrifuge integrated the first RWA pool with MakerDAO – the first instance of DAI being backed by RWA. Centrifuge is available to KYC'd accredited US investors and, as of 3/31/24, has $270m in TVL across 8 RWA funds that are backed by US Treasuries, invoice receivables, real estate & more.

While Centrifuge aims to tokenize previously illiquid debt, Ondo Finance offers access to major fixed income ETFs for US Dollar Yield, Treasuries, and Money Markets. Ondo offers qualified access products accredited investors AND qualified purchasers (own >$5m investments). Ondo has attracted $205m in TVL as of 3/31/24.

SECURITIZE BlackRock KKR Republic

Securitize works with top-tier asset managers and VC firms to unlock access to private market investing normally only available to institutions. Securitize tokenized fund offerings include KKR's Health Care Strategic Growth Fund II, Hamilton Lane Equity Opportunities Fund V, and BlackRock USD Institutional Digital Liquidity Fund (BUIDL).

Republic's tokenization platform provides end-to-end technology and support to tokenize real-world assets like real estate, private equity, and money markets.

SYNTHETIX

Synthetics are tokenized derivatives that mimic the value of another asset. Synthetics allow investors to benefit from price fluctuations in the given asset without having to hold the asset directly. The most popular synthetics protocol is Synthetix, which offers creation of Synths for assets including commodities, fiat currencies, crypto assets across platforms, indexes, and inverse products.

As of 3/31/24, Synthetix has facilitated over $50bn in total volume over its lifetime with $920m in total value locked.

Borrow & Lend

Crypto allows individuals to leverage any financial asset as collateral or lend passive assets to earn interest. Smart contracts can be programmed to automate processes such as loan issuance, repayment, and liquidations based on pre-defined conditions. This offers distinct advantages over traditional banks & credit institutions:

- **Borrowers and lenders are connected directly.** Depositors on a DeFi lending platform can earn a larger share of the interest paid by borrowers than at a bank.
- **Automated decision making.** There's no lengthy credit application process. Borrowers can access liquidity immediately. This means there is no preferential treatment or repayment negotiations for any borrower to avoid liquidation (e.g., 3AC repaid Aave loans before repaying CeFi creditors).
- **Other benefits:** permissionless access/listings, composability, non-custodial, more resilient than CEX (ideally). Also enables features like flash loans, a type of uncollateralized loan in DeFi where assets are borrowed and returned within the same transaction, requiring no upfront collateral.

Methods To Obtain Leverage in Crypto

Credit Protocols	Description	TVL (3/31/24)	Annual Activity (3/23/24)
Borrow / Lend (overcollateralized)	Protocols that allow users to borrow and lend assets	$33.8bn	~$13bn in active loans
Borrow / Lend (undercollateralized)	Protocols that allows known parties to borrow against off-chain assets or 'reputational collateral'	$600m	~$500m in active loans
Perpetual Futures	Protocols for betting with leverage	$3.1bn	~$600bn
Options	Protocols that give you the right to buy an asset at a fixed price	$160m	~$110m in premiums ($33bn notional)

Data: DeFiLlama, RWA.xyz

AAVE MAKER Compound

Aave and Compound are two of most popular applications in DeFi. Aave offers overcollateralized lending with variable or fixed interest across a range of crypto assets. Compound was one of the first DeFi platforms to introduce yield farming, rewarding users with COMP tokens. As of 3/31/24, they held ~$11bn and $3bn in TVL, respectively.

While Aave & Compound support multiple crypto assets, Maker allows borrowers to take out DAI-denominated loans only. MakerDAO launched Spark Protocol, a lending solution to complement Maker protocol with support for a wider range of crypto assets. Maker & Spark held ~$9bn and $3bn, respectively.

Goldfinch MAPLE Clearpool

DeFi also offers unsecured / undercollateralized lending. These protocols rely on borrowers' creditworthiness or reputations to determine risk profiles, and mostly serve institutional borrowers:

- Goldfinch relies on "trust through consensus" via collective assessments to offer loans backed by off-chain assets/income.
- Maple Finance relies on professional credit underwriters to vet borrowers, who can access a range of unsecured loans.
- Clearpool lenders pick which institutional borrowers to lend to based on customized, dynamic borrower pools. Over $480m loans have been originated through Clearpool.

dYdX Aevo GMX SYNTHETIX

Perpetual Futures ("perps") are derivative contracts without an expiration date. Perps are used for continuous trading / hedging on asset value changes and are only available in markets that trade 24/7 (e.g., for commodities & crypto; n/a for equities & FI that operate on bank hours).

Derivatives protocols employ different liquidity models: dYdX and Aevo operate as central limit orderbooks (CLOBs) while GMX leverages asset pools and relies on external price oracles. Aggregate perp volumes in DeFi regularly exceed $100bn monthly.

Risk Management

Crypto offers full transparency into counterparties' holdings, allowing for easy verification and traceability at any given time. Participants can actively monitor for any mismanagement of customer funds. Leveraging decentralized, immutable infrastructure ensures data authenticity, while programmable smart contracts enable self-execution of decision making across a wide range of processes.

These characteristics provide significant risk management advantages for financial applications in crypto compared to traditional finance ("TradFi"). Market participants can obtain performance insights into counterparties in real-time (rather than having to wait monthly or even quarterly on a lagged basis for companies to report basis), manage collateral efficiently, and hedge risk positions across a broad spectrum of customized products/markets. Crypto unlocks new risk management use cases for real-time monitoring (e.g., 'Proof of Reserves' for custodial businesses), insurance and auditing in decentralized marketplaces.

Benefits of Blockchains for Risk Management

- Data Integrity
- Data Privacy
- Auditability
- Distributed Architecture
- Immutability
- Security

kraken OKX Chainlink

Blockchains enable real-time risk monitoring for centralized crypto reserves held by custodial exchanges through a procedure known as 'Proof-of-Reserves' (PoR). Exchanges adopting PoR can prove ownership of client assets and demonstrate outstanding liabilities owed to clients. PoR is only possible with crypto assets as it relies on access to cryptographic signatures representing the total balance of customer assets (not possible for equities, bank deposits, or gold).

Following FTX's collapse, most CEXes & their custodians have adopted Proof of Reserves with full liabilities disclosure or with auditor oversight, such as BitMEX, Kraken, and OKX.

ETHERISC INSURace opencover

Blockchain-based insurance solutions can offer more efficient and transparent underwriting, reinsurance, and claim management processes. Blockchains enable expanded access to new insurance markets, reduced coordination requirements and policy costs and faster insurance disbursements.

Through its integration with Chainlink for real-world data, decentralized insurance provider Etherisc offers coverage of carbon offsets for reforestation projects flight delays. Etherisc also provides stablecoin depeg insurance, along with other crypto-focused insurance platforms like InsurAce.

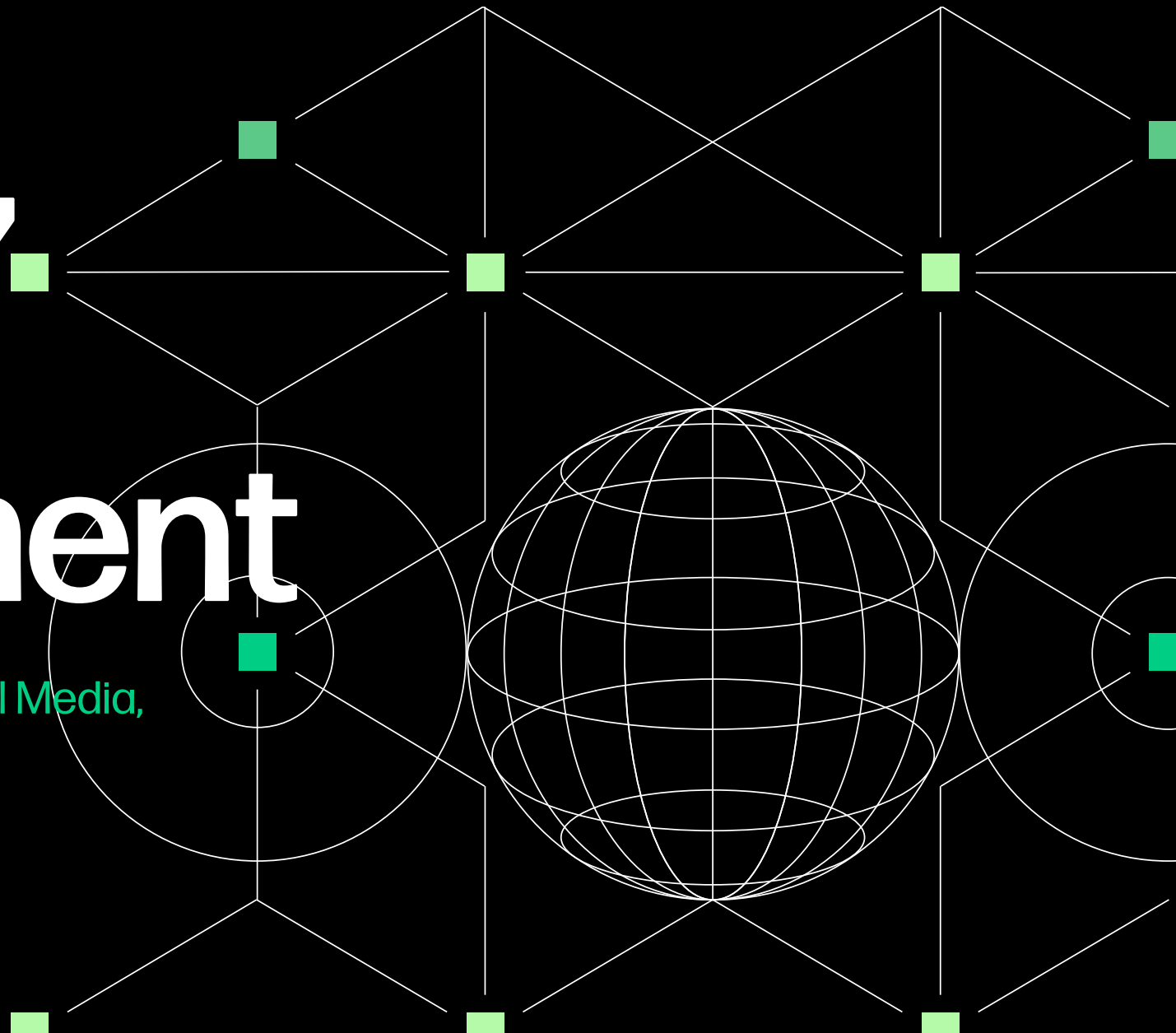
SHERLOCK code4rena

In addition to traditional audit services, Sherlock & Code4rena offer audit marketplaces where crowdsourced security experts are incentivized to find security vulnerabilities in audit contests. Other participants can also earn yield by providing underwriting capital. Clients pay a fixed fee to post a bounty for community participation in exchange for a comprehensive code review by numerous sets of eyes.

The two platforms have completed hundreds of audits with thousands of unique findings. Over $25m worth of payouts have been facilitated by Sherlock & Code4rena in total.

Consumer, Media & Entertainment

Commerce & Loyalty, Gaming / GameFi, Social Media, Creator Economy & Intellectual Property Mgt.



Commerce / Loyalty

Loyalty rewards programs serve as strategic marketing investments to boost sales and customer engagement. Many businesses have achieved successful loyalty programs through different types of mechanisms – such as Starbucks Rewards with points- and mission-based programs, cash back credit card programs, or airline miles and spend-based programs to achieve elite status. However, many of these loyalty programs suffer from inefficiencies – reward points are fragmented across closed systems and customers face an overwhelming number of offerings across brands, which resulting in low redemption rates, account inactivity, and increased customer churn.

Blockchains enable brands to address many of the inefficiencies and unlock greater versatility of loyalty rewards for their customers. Digital wallets & blockchain-based digital collectibles enable loyalty benefits that are earnable, redeemable, and transferrable. With participating agents of loyalty rewards programs interacting in one system, customers have greater control over their accumulated points and rewards. For brands, blockchains offer streamlined execution for cost savings, increased reach, programmable rewards, and community-driven incentives to amplify programs. In addition, leading consumer brands have been looking to meet their customers in the ~metaverse~ as they adapt to the web3 paradigm to drive new forms of digital commerce.

Web3 Elements that are Useful for Customer Loyalty Programs

Tokenization	Launch standalone token projects or tokenize existing loyalty points to incentivize and reward users and enable easier collaborations with partners
Utility NFTs	Add real world utility to NFTs and reward holders with special offers, early access to products, discounts, and priority access
Open ecosystems & token gating	Activate and engage a partner brand's customer base by granting benefits like access to exclusive offers and experiences
Community-based engagement	Create online communities for high-value customers and enable them to participate in brand governance decisions via DAOs

The Starbucks Odyssey Web3 experience integrates NFTs to complement its loyalty program – members can earn activity-based NFTs that can then unlock access to new benefits or coffee experiences.

Nike acquired RTFKT, an NFT collectibles studio that creates NFT-based virtual sneakers, collectibles and experiences. In addition, other fashion brands including Gucci, Louis Vuitton, Ralph Lauren and Adidas all have Web3 programs with 'phygital' drops, which use digital assets as add-ons to physical goods.

Built by Cosmose AI, KAIKAINOW enables smartphone users to opt-in to personalized content and ads on their lock screens. In return, users are rewarded with KAI-CHING loyalty tokens ($KAIC) over the NEAR Protocol that can then be spent in the KAIKAI gamified shopping app.

Cosmose AI has served over 20m stores and reached over 1bn phones, primarily in Asian geographies, making Kai-Ching one of the most popular applications across all crypto as ranked by active addresses.

Launched by Resy co-founder Ben Leventhal, Blackbird, is a restaurant loyalty program built on Coinbase's Base network. Users can check-in to restaurants across NYC, LA, & Chicago to earn points via $FLY tokens, which can be spent to unlock new rewards from other Blackbird restaurants on the platform including to pay for appetizers, cocktails, status, merch & more.

Blackbird restaurants can use FLY tokens as a marketing currency to acquire new customers and engage with existing ones. In addition, Blackbird enables users who check in to pay and leave whenever through their seamless checkout option.

Gaming / GameFi

Blockchain-based gaming presents gamers with the opportunity to earn and own in-game assets (e.g., avatars, weapons, collectibles, land, currencies etc.) which are typically in the form of NFTs. Specifically, blockchains enable traditional games to add in player-owned economics with the ability to spend in-game rewards with other players across NFT marketplaces and in certain cases, the value of these in-game assets may be expanded across gaming platforms. Blockchain games can offer other advantages over traditional games such as the ability to build open-ended economies to connect gamers, giving them more value and control over their assets.

GameFi (play-to-earn) combines online gaming with DeFi concepts, which can potentially drive higher engagement through play-to-earn ('P2E') mechanics. For example, Move-to-earn ('M2E') games incentivize users with crypto rewards for physical activity. Using fitness trackers to track step counts or calories burned, M2E apps encourage positive human behavior (e.g., exercise) with financial incentives to encourage greater engagement levels.

Benefits of Blockchain Gaming

Asset Ownership	NFTs representing in-game assets or media provide players with greater control over their digital possessions.
Decentralized Economy, Interoperability	Blockchain-based assets can be easily traded between players without requiring an intermediary. Assets may also be used across games for greater lifetime value and utility.
Security & Transparency	Blockchains offer transparency including provable fair game mechanics. Other benefits include improved security with assets stored on a resilient, immutable network.
Play-to-earn / GameFi	Players can earn rewards through game-play or other incentivized actions. P2E creates no revenue and player reward models and can drive greater levels of engagement.

Axie Infinity is a play-to-earn mobile battle game that allows users to own and trade NFT-based 'Axies' or other in-game assets over the Ronin Blockchain. At its peak, Axie Infinity had nearly 3m DAUs globally and has facilitated over $4bn in trading activity since its launch. Mythical Games produces high-quality gaming experiences augmented by blockchain technology to allow for ownership and trading of in-game assets. Blockade Games allows game developers to build immersive, AI generated worlds with Web3 elements.

NBA Top Shot, a joint venture between Dapper Labs and the National Basketball Association, is a virtual trading card platform built on Flow blockchain. Top Shot users can collect and trade 'Moments', which are NBA-licensed video highlights attached to NFTs. Later, Dapper Labs introduced Fast Break to allow collectors to compete against other players based on fantasy-style lineup selections. Since launch, NBA Top Shot has achieved over $1.2bn in total sales across 33m+ transactions.

Sweatcoin, one of the most popular health & fitness mobile apps, rewards its 120m+ registered users across 60+ countries with $SWEAT tokens, which can be spent across brand partners or donated to charity.

StepN rewards users for exercise, with added rewards for holders of special STEPN sneaker NFTs. StepN has partnered with popular sneaker brands such as Adidas and Asics to provide offer exclusive activations for participating users. StepN saw over 700k MAUs at its peak in 2022 with 300bn cumulative miles traveled by users.

Social Media

"DeSoc", short for decentralized social media, uses blockchain infrastructure and crypto incentives to build interactive online communities. Compared to centralized alternatives, DeSoc can enhance censorship resistance, user verifiability, and data sovereignty. Users have control over their data, including how and where it is shared, which is a significant departure from the data practices of many existing social media platforms. User data is stored on a distributed ledger, which mitigates risks associated with single points of failure, censorship and central control. Crypto also enables users to seamlessly interact and share content across multiple platforms while offering innovative ways to build communities and monetize data.

A unique feature of DeSoc is the concept of users owning their data and being able to create "social graphs." These graphs map a user's interactions and relationships within the platform, providing a digital fingerprint of their social presence. With user permission, these graphs can be shared or integrated across different applications, facilitating a more interconnected and user-controlled experience.

DeSoc is one of crypto's most powerful use cases with the potential to drive mass adoption of the technology. DeSoc applications mentioned on this slide have had 7.5m user sign-ups and enabled 75m on-chain transactions in total through 3/31/24.

Web2 vs. Web3 Social Networks

Technical Features	Web2	Web3
Platform data storage setup	Centralized - AWS	Decentralized - IPFS
Client sever relationship	Centralized	Decentralized
App API keys for integration	Closed-source	Open-source
Users own profile data	No	Yes
User profile access point	Email + password	Self-custodial wallet
Ability for platform to sell user data	Yes	No

farcaster NOSTR LENS

Farcastr, Nostr, and Lens are the largest decentralized social graphs that serve as the backbone or the deployment layer for DeSoc applications. These open-source networks aim to provide social media users with greater interoperability, privacy, and user autonomy by offering users permissioned control over their platform interactions. Applications built on top of these open data environments can all access the same composable social graphs, which can create powerful network effects.

As of 3/31/24, Farcaster had 264k user signups including 30k+ daily active addresses, while Nostr had 134k trusted users (mostly Bitcoiners) with 169k total note events published.

Damus

DeSoc apps built on top of decentralized social graph protocols include social platforms that mirror traditional Web2 apps (e.g., X & Instagram).

Warpcast, the flagship app built on top of Farcaster, closely resembles X where 'warpcasters' write 'casts' (i.e., posts) and build social network through on-chain interactions (e.g., following others, commenting on, liking or resharing casts).

Damus, built on Nostr and backed by Twitter co-founder Jack Dorsey, emphasizes content ownership and creator monetization, enabling fans to submit tips on posts and profiles over Bitcoin's Lightning Network.

DeSo, built on its own Layer 1 blockchain, offers mechanics like social airdrops and social bounties. As of 3/31/24, DeSo had facilitated 6.3m monthly transactions across 413k active user accounts.

friend.tech

Social Finance ("social-fi") is one of the fastest growing sectors within the DeSoc ecosystem, representing 20% of total DeSoc user sign-ups. Social-fi applications involve some form of financialization of a creator's content or profile via follower interactions.

Friend.Tech, deployed on Base, is the most popular social-fi app with 870k unique subjects and 13m cumulative txns - Friend.Tech users can buy other user's "keys," in return for access to their private chat and other benefits. Other Friend.Tech competitors offering similar token-gated channels have emerged on other blockchain platforms including Post Tech on Arbitrum and Stars Arena on Avalanche.

Creator Economy / IP Management

Content creators, influencers and independent artists in the creator economy currently rely on centralized platforms, facing challenges such as unfavorable revenue sharing agreements and lack of content ownership. In addition, limited ownership of content and portability of community bases create platform dependence. Crypto empowers creators to take greater ownership of their content and control over their social graphs, removing reliance on extractive centralized platforms and enabling more direct artist-audience relationships. Creators in the web3 economy can monetize, manage and distribute their content more effectively to their super fans, who can now self-identify and support their favorite artists financially.

Creators utilize blockchains for the management, distribution, and fractionalization of their intellectual property (content) through NFTs and decentralized platforms/marketplaces. Blockchains provide time-stamped and verifiable records, enhancing creators' ability to protect their work and prevent unauthorized distribution. Smart contracts enable automated streaming royalties and licensing agreements, while decentralized marketplaces facilitate transactions for fans to support their favorite artists, ensuring creators can monetize their work seamlessly.

Top 10 NFT Collections by Royalties Earned

Collection	Total Royalties Earned
Art Blocks	$86.8m
OpenSea Shared Storefront	$81.2m
BoredApeYachtClub	$60.2m
Sandbox's LANDs	$57.4m
Otherdeed	$53.3m
Azuki	$45.1m
MutantApeYachtClub	$44.5m
CloneX	$38.1m
Moonbirds	$28.4m
Doodles	$26.4m
Total	**$489,712,712**

Source: Footprint Analytics

The Bored Ape Yacht Club (BAYC) and Pudgy Penguins NFT collections grant holders of their NFTs with a license to their IP for commercial use. This includes allowing them to license, market, and develop their own creative outputs based on the original artwork.

In 2023, Pudgy Penguins secured a deal with Walmart to distribute a Pudgy Toys line with plush toys and other physical collectibles. The Pudgy Toys line has done $10m in sales in less than a year since its launch and sold over 750k toys.

Candy Digital helps major brands like Major League Baseball, DC Comics, and Netflix offer digital collectibles to their fans and users.

NFTs can be used by artists to tokenize their music and distribute it to fans, bypassing traditional music industry intermediaries for a more direct fan-to-artist relationship and ensuring artists retain ownership over their IP (i.e., masters) to control usage rights, distribution terms, and royalties.

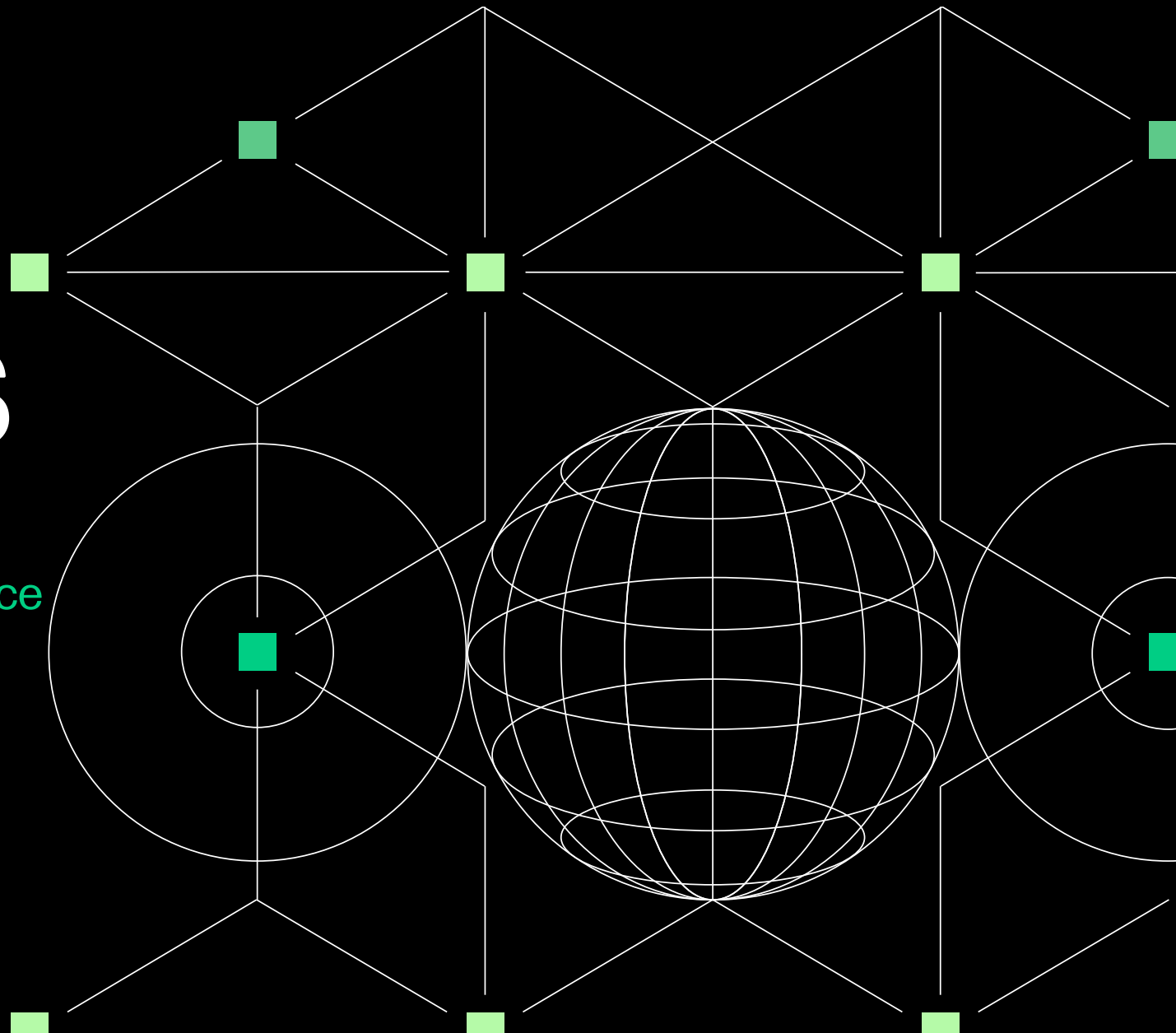
Sound.xyz is a music marketplace where artists sell their songs as NFTs directly to fans. Artists including Kings of Leon, Grimes, Deadmau5, and 3LAU have released music NFTs through Sound.xyz or other platforms like Royal and Catalog, where artists can add on unique exclusive experiences and fans can earn a portion of streaming royalties from their artists.

DRiP is a content platform that allows users to subscribe to their favorite creators and receive free collectibles. This includes all forms of content like music, art, and videos. Users own the content with the ability to keep, share, trade, or sell their assets.

Creators receive droplets tokens when fans like or engage with their work that can be converted for income. Drip is uniquely enabled by low fee blockchains like Solana that enables creators to both airdrop millions of NFTs to fans for miniscule costs and receive payments as little as $0.02 for their work. In January DRiP had 200k trailing 30-day logins with 70k DAUs.

Specialty Use Cases

Identity / Verification, Decentralized Physical Infrastructure ('DePIN'), AI, Storage, Governance



Identity / Verification

About one-seventh of the world's population are unable to attain physical identification documentation which limits their ability to open bank accounts, vote in elections, own property or find employment. Even citizens with forms of identification lack complete control over their identities and face verification frictions across numerous online accounts across various service providers, many of which are subjected to frequent hacks of sensitive user data. In addition, identity fraud has become a growing problem as insecure verification systems can be spoofed.

By leveraging blockchains and strong cryptography (i.e., zero knowledge proofs) for decentralized identity (DID), individuals can have greater control over their own online profiles without depending on a specific service provider. DID systems are trust-minimized, immutable systems that may facilitate identity verification without revealing sensitive user data. This offers benefits such as tamper-proof documentation, streamlined verification, and reduced risk of ID theft / fraud from data breaches. Verifiable identity sources may include new web3-based credentials (e.g., digital signatures or non-transferrable tokens) to coordinate and build reputation systems. Other extensions of blockchain-based identity management systems include democratic DAO voting (one-person, one-vote), equitable airdrops, and the ability to efficiently distribute value on a global scale.

Identity Models: Centralized vs. Federated vs. Decentralized

Identity Models	Centralized	Federated	Decentralized
Technology	▪ ID/Password ▪ Multifactor Authentication ▪ Single Sign on	▪ OAuth ▪ OpenID ▪ SAML	▪ DLT ▪ Cryptography
Characteristics	▪ Identity fragmented across many enterprises ▪ Enterprises control user data ▪ Centralized data is a honeypot for cyber attacks	▪ Less fragmentation of login credentials ▪ User information fragmented across many enterprises ▪ Enterprises control user data ▪ Centralized data is a honeypot for cyber attacks	▪ Identity can be portable across enterprises ▪ User information in user's wallet or a secure cloud ▪ Decentralized data limits data exposure on cyber attacks ▪ Users control their data

Source: Citi Ventures

WORLDCOIN

Worldcoin aims to create a globally-inclusive identity and financial network. Worldcoin aims to establish 'proof of personhood' (i.e., human uniqueness in a digital context). By leveraging biometric verification via iris scans with specialized hardware devices (i.e., orbs), Worldcoin distinguishes between humans and bots to protect against Sybil attacks (bots), which are a growing problem in the Internet era.

Through 3/31/24, 4.5m+ verified individuals across 120+ countries have signed up for World ID (many of whom are underbanked); World App – the official World App Wallet used to transact onchain – has facilitated 40m+ transactions, averaging nearly 500k daily transactions over the last week of 1Q24.

Microsoft ION WalletConnect SISMO

Self-sovereign identity (SSI) systems use tamper-proof verifiable credentials to allow individuals greater ownership and control of their digital identities. Examples of SSI solutions and extended use cases:

- Microsoft Entra ID (fka Azure AD) uses URL- and blockchain-based credentials (i.e., ION (Identity Overlay Network) built on top on Bitcoin)) to enable secure, simplified and unified identity and network access for numerous organizations.
- Sismo is an SSI aggregator and crypto-native SSO (single-sign on) solution using ZK-proofs. 100+ apps use Sismo Connect to offer their users data sovereignty and greater privacy compared standard centralized models.

EAS Ethereum Attestation Service GALXE

On-chain attestations representing credentials and affiliations of individuals are used to build and coordinate reputation systems.

Ethereum Attestation Service (EAS) is an open-source standard for making attestations via digital signatures. EAS has been used to verify identities for KYC/AML compliance, validate credentials and reinforce the integrity of voting & governance systems. Over 10k unique attesters have made 220k+ attestations through EAS.

Galxe issues token-based credentials based on users' onchain activities (e.g., protocol contributions, governance participation). 63k+ campaigns have been launched by 5k brands to build credentials for 16m+ users.

DePIN and AI

Decentralized Physical Infrastructure Networks (DePIN) leverage crypto's financial infrastructure and token incentives to establish impartial physical infrastructure networks, facilitating the distribution of ownership. DePINs can offer more cost-effective solutions by disrupting the high-margin models of established players and passing on savings to users. DePIN provides a new avenue for capital formation in historically capital-intensive industries such as telecommunications and cloud services. Individuals can earn compensation for contributing resources to the supply side of DePIN networks, including hardware devices, energy, data, and computing power.

An emerging category of DePIN projects integrates AI workflows, utilizing tokens to incentivize various use cases such as (1) supplying hardware for AI processes (2) data storage and indexing for model training and inferencing , and (3) providing feedback for model fine-tuning through reinforced human learning.

Types of DePIN markets

	Projects	Market Cap ($B)	Revenue ($M)
Compute	250+	$10.0	$8.0
Wireless	100+	$2.0	$0.8
Energy	50+	$0.2	$0.0
AI	200+	$7.0	$0.8
Services	25+	$0.3	$6.0
Sensors	50+	$0.3	$0.5
	>650 Active Projects	>$20B Market Cap	>$15M Onchain ARR

Source: Messari

helium T··Mobile

Helium has facilitated the build out of capex-intensive 5G infrastructure via crowdsourcing investments by using token incentives to reward individuals that operate Helium hotspots. These hotspots power decentralized wireless and IoT networks used by individuals and businesses.

- Helium Mobile's $20/month phone plan in partnership with T-Mobile has already attracted over 69,000 subscribers
- 400k+ nodes have been deployed globally to provide data coverage for the Helium Network

akash

Growth in AI services has spurred demand for compute resources. Decentralized compute marketplaces like Akash or Render enable individuals or businesses to supply/lease cloud resources (e.g., memory, storage, processing power) to ease market supply constraints as an alternative to leading centralized providers (e.g., AWS, GCP, Azure).

- Akash provides a marketplace for generic compute resources. Akash has trained stable diffusion models and can host the most advanced GPT models. 162k+ leases have been facilitated over Akash.
- Render is a peer-to-peer GPU marketplace that connects individuals with idle GPU resources contribute to compute-constrained 3D rendering tasks and AI projects. 30m+ total frames have been rendered by Render.

hivemapper

HiveMapper is building a decentralized map of the world competing with existing centralized offerings like Google Maps. Individuals purchase dash cams and receive tokens in return for uploading real-time road images. By distributing the actual mapping of roads to a decentralized network, Hivemapper can efficiently map the world and more frequently update the mapping information users rely on.

- Hivemapper has mapped more than 10% of the globe. collecting 3 billion street-level images from 72,000+ contributors.
- Token incentives are also used to fine-tune Hivemapper's AI model, using reinforced human learning feedback to verify the correct labelling of road signs etc.

Storage & File Sharing

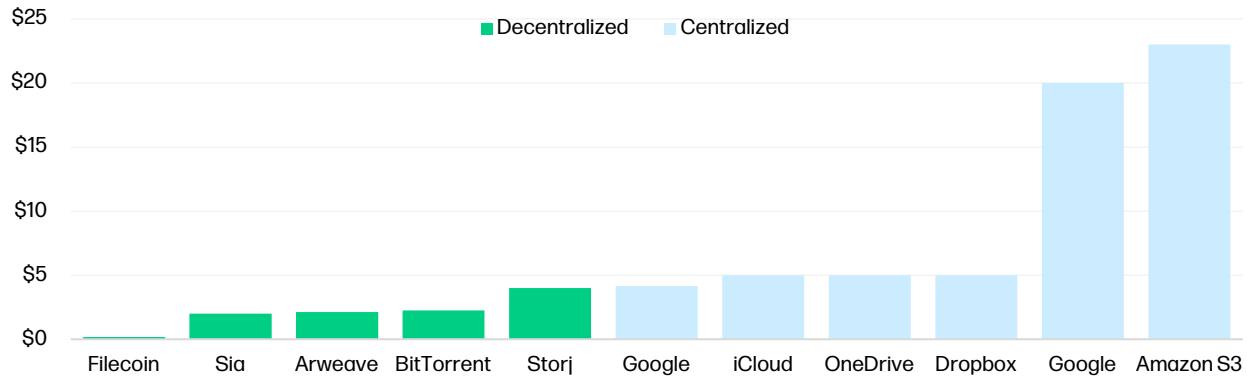
Cloud computing offers hosted data storage and shared computing storage services to businesses and organizations, reducing the cost and complexity of operating data centers. While widely adopted, the leading centralized cloud providers (e.g., AWS, Microsoft Azure, Google Cloud) have had a rich history of security incidents and privacy risks – they employed predatory pricing tactics, profited immensely off cloud-stored user data, and suffered downtimes resulting in productivity losses amounting to billions of dollars.

Decentralized storage is critical infrastructure to ensure storage clouds and node operators align with the decentralized principles underpinning Web3. These protocols aim to address many of the issues associated with centralized providers by competing on censorship-resistance, resilience (data redundancy; eliminate single point of control / failure), security & privacy, and operating efficiencies (e.g., cost & data retrieval).

- **IPFS** (The InterPlanetary File System) enables users to store and retrieve cryptographically-verified content across data storage system, centralized or decentralized.
- **Filecoin** and **Arweave** are decentralized storage platforms that offer censorship-resistant data storage and access. Filecoin charges clients in a leasing model based on amount of data stored and duration, while Arweave features a permanent data storage.

Outside of improving data resilience, other use cases in decentralized storage & file sharing include content collaboration (including decentralized science), security of voter data, and serving as raw data for training AI models.

Storage Provider Pricing for 1TB / Month (2023)



Source: Coin Gecko Research, storage providers

Filecoin

As of 3/31/24, Filecoin was used to secure nearly 2 exbibytes worth of data (~2.2m TB) across nearly 2,000 active storage deals (avg deal size ~32GiB with a median monthly storage price of 0.0445 FIL per TiB or ~$0.42 per month).

Filecoin clients span a wide range of industries, including Healthcare and Decentralized Science which accounted for over half of stored data on the network. Many academic and non-profit organizations leverage Filecoin to safeguard and share tamper-proof research data including NASA and NOAA for storing Earth science data, UC Berkeley for neutrino physics research data, and Starling Lab—a joint project of Stanford and USDC—for submitting evidence of Russian war crimes to the International Criminal Court.

bitcoin ordinals FRENCH MONTANA

Since 2023, Bitcoin has seen increased network usage for Ordinal inscriptions, which are a way of inscribing or attaching metadata as an added data layer on Bitcoin. By inscribing directly on Bitcoin, Ordinals encompass the storage of digital artifacts while inheriting the network's security and immutability. Ordinal metadata format types can be images, videos, text, audio, code and other (subject to the 4MB arbitrary data limit in a block).

In March 2024, hip hop artist French Montana inscribed an unreleased track onto Bitcoin, becoming the first mainstream artist to do so.

As of 3/31/24, 64m+ Ordinals have been inscribed on Bitcoin while other blockchains have also been used as data layers to store similar inscriptions.

Mirror arweave

Decentralized storage is useful for content publication & distribution. Social media and content sharing platforms have made non-transparent adjustments to search algorithms and user feeds (incl. spread of misinformation and censorship of political journalists), which have impacted business trends and influenced elections.

Mirror, a blog publication & distribution platform built using Ethereum tooling, leverages IPFS and Arweave to ensure published content is stored permanently online and always accessible (even if the Mirror website is unavailable). All Mirror posts are collectible as NFTs, adding an extra redundancy layer to publishers. In 2023, over 217k+ writing posts were published on Mirror's ad-free, credibly-neutral protocol.

Outlook

While many crypto applications and use cases are still relatively new and gaining traction over the past few years, the underlying public blockchain and related infrastructure has been in existence even longer. As the infrastructure layer continues to improve, more applications will be developed with greater utility unlocked. Significant industry progress has been made in speed, scale and network resiliency in just the last year alone. Ongoing technical research areas are focused on privacy (i.e., separating sensitive information from transparent, public blockchains), composability and interoperability – all of which should unlock new app utility and enhance the potential of the crypto economy.

Certain use cases with obvious beneficial value propositions have not been included in this presentation due to limited adoption or effectiveness so far. These include applications in governance, supply chain management, healthcare, and ticketing/events, which must address regulatory clarity or social coordination challenges to become effective crypto use cases. However, many of these headwinds to adoption are expected to ease with greater buy-in of crypto technology by individuals and businesses for other stated use cases. In addition, the value of decentralization should become clearer as centralized service providers inevitably face disruptions over time.

As the world undergoes a digital revolution, there is growing societal emphasis on empowering the individual, particularly among younger generations feeling disenfranchised by the old world. Positioned at the intersection of technology and culture, crypto is well-equipped to meet their needs by offering a more fair, free, and efficient system to build upon.