# CoinMarketCap's 2023 Crypto Playbook

CoinMarketCap

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# What inspired the 2023 CMC Crypto Playbook?

It's the end of yet another year in the cryptocurrency industry, and nothing has gone the way that we planned. 2022 has been such an eventful year, that's why CoinMarketCap Research has put together our inaugural end-of-year playbook, crowdsourcing part of the leading voices from every important sector in crypto about what happened this year, why it happened, and what the key crypto theses are in their own verticals going into 2023.

From CoinMarketCap:

As the gateway for crypto, CoinMarketCap stays focused on providing the infrastructure for global crypto users. This allows us to not just see, but also to experience the highs and lows with the industry together. With that in mind, we saw 2022 as being a particular "boss fight" for three reasons:

1. Economically, global markets are facing a challenging recession environment, with geo-political challenges led by the Russian war on Ukraine.
2. Crypto-wise, many key players collapsed — including Luna, 3AC, Voyager, Celsius, FTX — which had an adverse effect on mainstream adoption and is potentially a catalyst that will give rise to more serious crypto regulatory hurdles.

3. Additionally, it remains unclear whether Bitcoin's four-year cycle played any role in driving this downtrend further. While we had previously believed that institutions entering crypto meant that Bitcoin's halving would no longer play a major force in the industry, Bitcoin has proven us wrong this year.

In this challenging environment, CMC is committed to drive crypto adoption by building better, crypto-native infrastructure for users. In 2022, CMC contributed to the community via three action points:

- Increased our data inclusivity: we list over 22K coins and developed our own DexScan to enable the viewing of decentralized exchange transactions on over 37 chains.
- CMC Community: CMC created a crypto-native social media platform with over 400K daily active users to help projects socialize with their followers.
- Made exclusive things more accessible to everyone: live-streamed crypto conferences & events including CMC's own The Capital metaverse conference; shared institutional crypto research freely to wider audiences with over 59 insightful publications in over 12 different languages.

2023 will be a challenging yet optimistic year. In the crypto markets, it's quite hard to predict what the "next big thing will be." From our experience, we know well the need for positivity when looking forward in crypto. Instead of thinking of all of the reasons why a new, decentralized movement cannot work, it's much more beneficial to think about all of the ways that it can work.

So, to look to 2023 with this spirit of building (with probably some re-building to do as well), I'd like to see a new year where the crypto markets begin to recover. 2023 can be the year when the industry gets more clarity about regulation in DeFi, CEXs and DEXs in ways that can help protect both consumers and investors alike.

In 2023, CMC will continue to enhance our ability to provide unbiased data and content to our users. With the new year spirit of positivity, we will also grow our vision for our own social network, CMC Community, to become THE engagement platform for crypto users, projects, media and KOLs. CMC also looks forward to hosting our first post-Covid in-person conference in 2023 — stay tuned!

*Rush Luton, CEO of CoinMarketCap*
*Molly Jane Zuckerman, Content Lead*
*Alice Liu, Research Lead*
*Davier Mu, Managing Editor*

# 1.0 DeFi

## Introduction

Within DeFi (even without a DeFi Summer this year) we are still seeing a few major growing trends. First and foremost: self-custody and decentralized exchanges. After the FTX saga brought the topic of self-custody to the forefront of the market this fall, the trend of owning your own keys brought up the following questions in DeFi — how we can make DeFi products more user-friendly and provide easier solutions and options for people to use crypto, but not in a centralized way?

In this DeFi chapter, you will learn how two important DeFi players — Uniswap Labs and TrustWallet — have viewed the DeFi market in 2022, and what the DeFi market could look like in 2023. Some themes to follow for the next year will be how DeFi UX/UI improves to bring more new crypto users into the sector, how both education and infrastructure will grow, and whether DEXs can eat significantly into CEXs market share.

# 2023 Trends — From Centralized Exchanges to Self-Custody Wallets

**By Trust Wallet**

The end of 2022 has brought the “not your keys, not your coins” movement to the forefront on a scale that crypto has never seen before. As we’ve seen more and more big crypto institutions collapse, halting withdrawals and filing for bankruptcy, crypto users are experiencing the real-time effects of what can happen when you trust your keys to a centralized entity.

While 2022 is ending with the very foundations of the crypto markets shaken, the instability has also given crypto enthusiasts a chance to learn more about the potential benefits of self-custody. How can the crypto space come into 2023 stronger and more knowledgeable, applying the lessons they’ve now learned the hard way about centralized exchanges? Where are crypto traders now going to store their coins?

Trust Wallet

Trust Wallet is a self-custodial multi-chain crypto wallet that provides users with seamless wallet experience on both mobile and desktop.

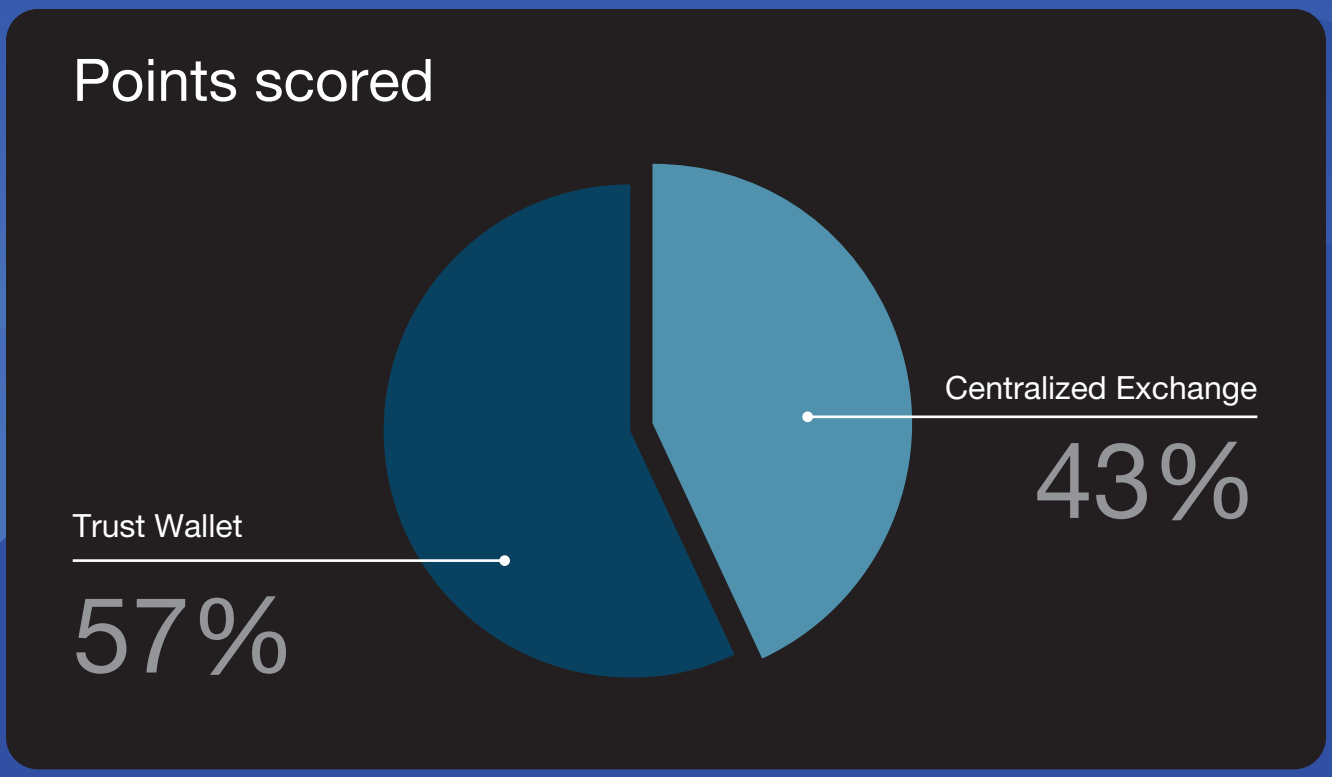
Trust Wallet empowers everyones accessibility to web3 and enables users to have full ownership of their crypto assets by giving full control of their private keys.

/trustwallet

https://trustwallet.com

**Note:** *This information was collected through user surveys conducted with Trust Wallet users.*

**There are two main takeaways from observing Trust Wallet user behavior.**




## Takeaway 1: There is a shift from custodial to self-custodial solutions by Trust Wallet users

43% of surveyed Trust Wallet users still store a considerable amount of their crypto holdings on centralized exchanges. However, the remaining 57% of users self-custody most of their assets on Trust Wallet.

**Main contributing factors:**

Given the recent events in the crypto industry, centralized exchange customers have lost confidence and are taking back control of their cryptocurrency by adopting solutions that allow them to have complete ownership over their assets. This trend is being fueled by the benefits that come with true ownership, and it's bringing about greater incentives for storing cryptocurrencies in decentralized hot or cold wallets. The aftermath of FTX's downfall is very unfortunate, but it also highlights why crypto users have more urgency now than ever before to move their funds from centralized exchanges or custodians and into noncustodial wallets where they have full control over their private keys. In fact, Trust Wallet saw a 140% increase in active users in the first few days of the FTX incident and continues to see a week-on-week increase in active users since the incident.

## Takeaway 2: New Trust Wallet users are looking to adopt a one-stop-shop wallet solution for all their crypto needs

New users who started using Trust Wallet in 2022 prefer only using one wallet for all their crypto activities. Naturally, wallets with an extensive multi-chain coverage will be in a better position to serve the demands coming from users who are looking for an easy to use solution that enables them to manage their assets across multiple blockchain networks all in one place.

**Main contributing factors:**

It is clear that the future of crypto is multi-chain. Users do not want to have to manage multiple wallets to be able to interact with different blockchains and have full utility on their assets. On the contrary, they look for seamless wallet experiences that enable them to do that all in one place. They mainly want to store and manage their crypto assets from all the leading blockchain ecosystems. They also want to be able to swap their assets across different chains, connect to DApps on different ecosystems, store and trade NFTs on multiple chains and stake different cryptocurrencies on a single wallet where they can easily track and have visibility on all their assets.

# Conclusion

It is clear that there is a fundamental need for self-custody solutions. However, reaching mass adoption requires industry players to collaboratively work together to overcome key challenges. This will ultimately empower everyone's ownership of digital assets and accessibility to Web3.

This includes delivering a secure and scalable infrastructure that is easy to use. Right now, we are still at the stage where we need to read into the code level, which means that the solution is not there yet. Users need to be relatively crypto-educated in order to be comfortable with self-custodial wallets. As well, in order to further develop the industry, wallet providers should focus their efforts on delivering real user value by enabling cryptocurrency utility in different ways.

Last but not least, we should work closely together as an industry to deliver the right Web3 education. We should focus on education on a larger scale that goes beyond our users — we must take on the challenge of showing the benefits of cryptocurrency to regulators and other stakeholders to empower each other to be able to fulfill the Web3 mission.

# How DEXs Can Surpass CEXs

**By Uniswap Labs**

Uniswap Labs is the leading on-chain marketplace for self-custodial digital assets, including NFTs and ERC-20 tokens. By building foundational infrastructure for fair and accessible markets on the internet, Uniswap Labs look to unlock universal ownership and exchange.

/uniswap

https://uniswap.org

Crypto exchanges are marketplaces that allow buyers and sellers to trade cryptocurrencies and other digital assets. There are two categories of exchanges:

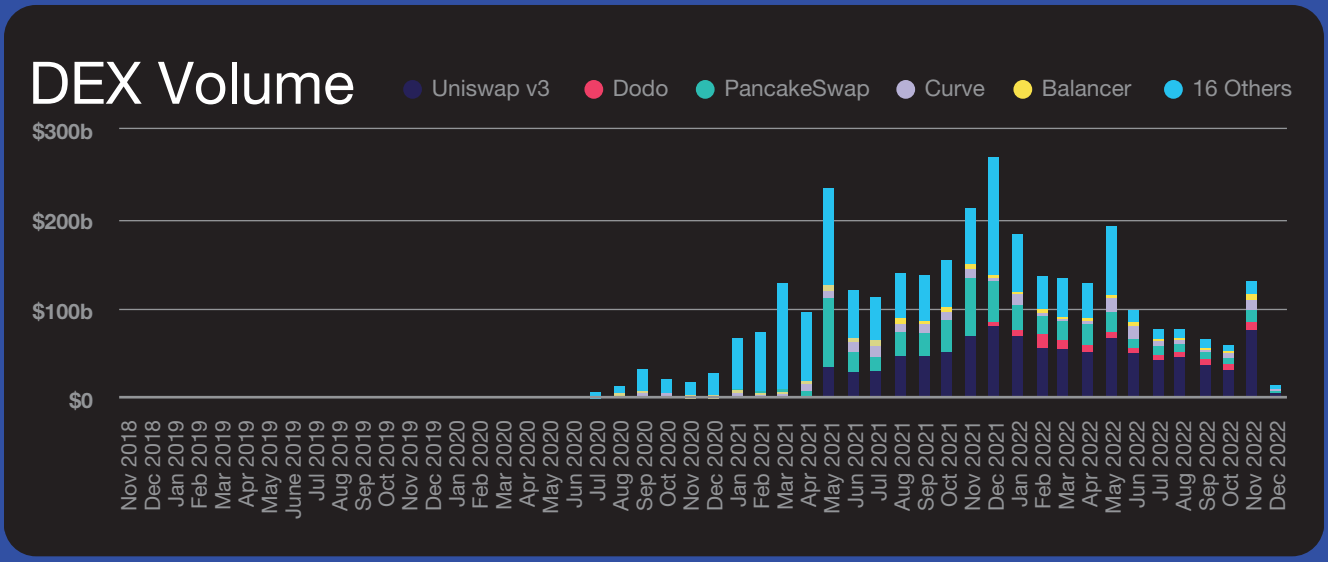
1. **Centralized Exchanges (CEX):** Run by a single entity, CEXs are intermediaries between buyers and sellers, facilitating orders and transferring funds between parties. Examples include Binance and Coinbase.
2. **Decentralized Exchanges (DEX):** Using blockchain technology, DEXs facilitate peer-to-peer transactions between buyers and sellers, eliminating the need for centralized intermediaries. Examples include Uniswap and Curve. At Uniswap Labs, we believe DEXs are the superior method to trade digital assets due to in-built user protections. They are:

- **Self-Custodial:** Users never relinquish control over their assets
- **Permissionless:** The only requirement to trade is having an internet connection
- **Immutable:** The code used to run the DEX cannot be modified or altered
- **Transparent:** All transactions are recorded on a public ledger that can be queried

These traits protect customers from negligent or malicious actions that could jeopardize assets without their consent or knowledge. Unfortunately, CEXs are not immune to these outcomes. FTX, a popular CEX, collapsed after facing a liquidity crunch after revealing it did not hold customer assets one-to-one.

## DEXs vs CEXs

DEXs exploded in popularity during DeFi Summer in 2020 and have supported over two trillion dollars in volume to date. After reaching a peak of $234B in December 2021, DEXs have averaged over $100B every month of 2022. Of this volume, roughly 70% happens on the Uniswap Protocol on Ethereum Mainnet.

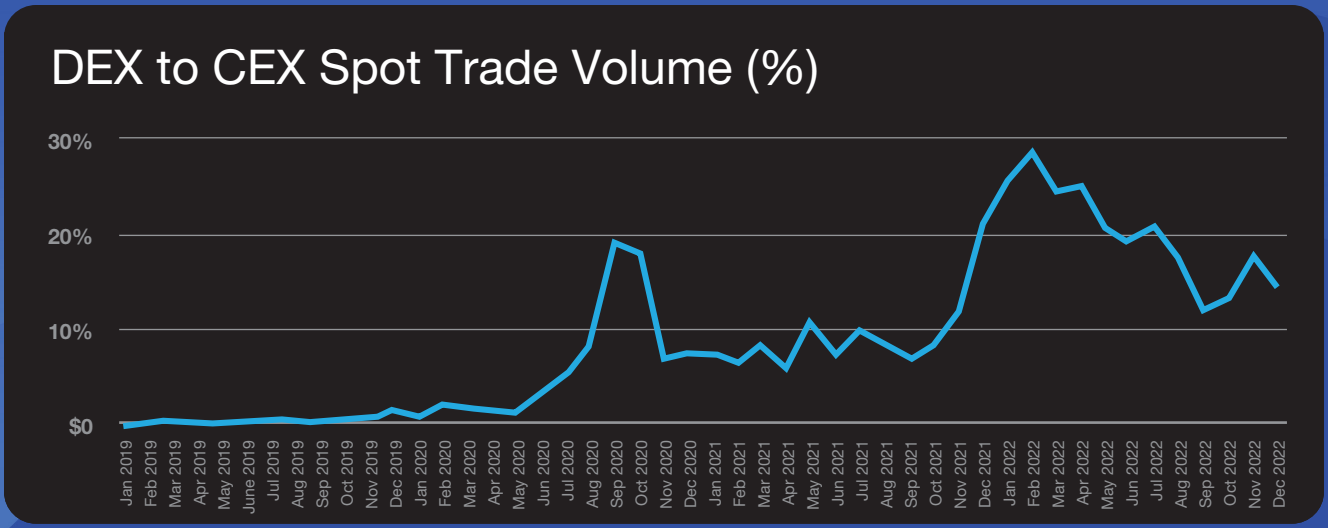



**Source:** https://www.theblock.co/data/decentralized-finance/dex-non-custodial/dex-volume-monthly

CEXs — which have been around much longer — are understandably further along. In May 2021, CEX spot volume totaled $2.3T, which is nearly equivalent to all-time DEX volume. In 2022, CEXs averaged a monthly volume of $695B, nearly 7x that of monthly DEX volume.

## Can DEXs catch up to CEXs?

Despite the multi-year head start, there is strong evidence that DEXs are eating into CEX market share. The DEX-to-CEX spot volume ratio has been steadily increasing, peaking above 25% in February 2022.




**Source:** https://www.theblock.co/data/decentralized-finance/dex-non-custodial/dex-to-cex-spot-trade-volume

With the clear user safety advantages baked into DEX technology, we anticipate that users will prefer DEXs to CEXs due to increased transparency, self-custodied assets, and permissionless access. However, DEXs and CEXs compete in the same customer market. To flip CEX market dominance, DEXs must:

- Create friendlier onboarding flows
- Improve the retail user experience
- Compete on cost and fees

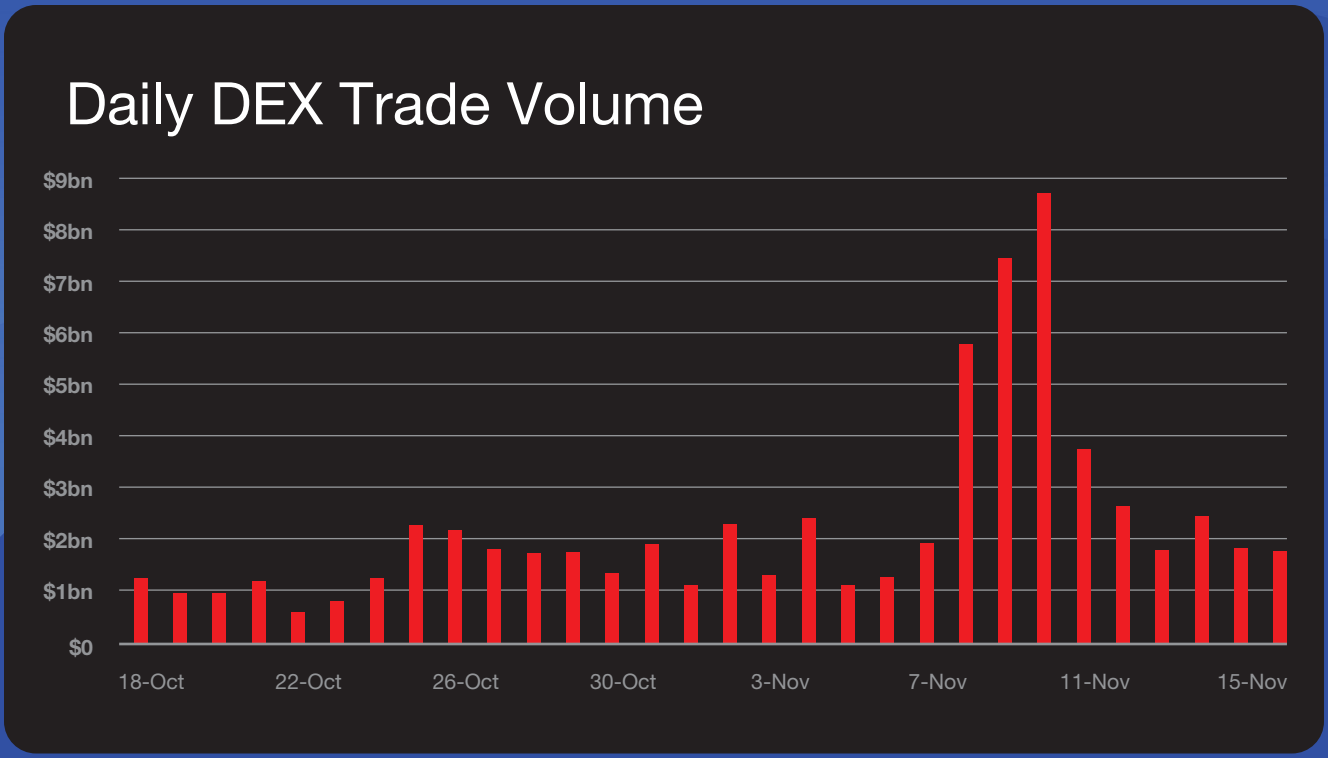
## Onboarding

Onboarding to CEXs is significantly easier than DEXs for two reasons:

1. Fiat on-ramps allow for retail users to purchase from their bank accounts or credit & debit cards
2. Users do not need to learn about wallets or key management

The first problem is an easy fix. Recently, wallets have begun to integrate with fiat payment providers, meaning users are able to purchase cryptocurrencies directly from a self-custodied wallet.

The second challenge is a bit more complex. Seed phrase and private key management is essential to navigating the crypto ecosystem but users expect to be able to recover their accounts if they forget their passwords. Methods such as iCloud backups, multi-party computation, and social recovery have made significant UX improvements.




Data: Dune, @hagaetc (as of Nov. 17, 2022) *Volume aggregated from the following DEX protocols: Uniswap, swapr, Convergence, Integral, mStable, Sakeswap, Defi Swap, airswap, Smoothly Finance, PowerIndex, Mooniswap, Synthetix, Shibaswap, Indexed Finance, Clipper, Unifi, 1inch LP, Kyber, Curve, Shell, 0x Native, DefiPlaza, DODO, 1inch Limit Order Protocol, Sushiswap, Bancor Network, LINKSWAP, DFX Finance, LuaSwap, xSigma, Balancer.

So**urce:** https://www.galaxy.com/research/insights/ftx-contagion-impact-on-defi/

In our experience addressing common user frustration navigating DEXs, we've made a number of improvements to onboard directly into DeFi. For example, the Uniswap Web App allows users to purchase and swap cryptocurrencies within minutes using a credit card, debit card, or bank transfer.

## Retail User Experience

Once onboarding is complete, users will want to swap cryptocurrencies and manage their portfolios. CEXs provide a more intuitive interface for this. Similar to financial apps like Venmo and Robinhood, CEXs have intuitive trade features where connecting to DEXs often requires navigating to the app, approving transactions, and then trading. Once again, the solution here is primarily UX with native wallet swaps, account abstraction, and intuitive user interfaces.

## Costs and Fees

CEXs offer low swap fees when converting one cryptocurrency to another. On the other hand, DEX swaps are subject to gas fees, which can spike when networks are congested. The Ethereum road-

map plans to improve scalability and capacity. In time, sharding and Layer 2 networks will lower transaction costs to be cheaper than CEXs while offering security provisions that CEXs cannot provide.

DEXs and wallets that incorporate and abstract away L2 networks will be the first to compete with CEXs on cost.

## Conclusion

For many users, self-custody, permissionless access, immutable code, and transparency come second to the user experience. These choices are certainly understandable - no one expects to be rugged. However, during times of market volatility, it's apparent that DEXs are the more popular option. For example, as markets rocked on the back of FTX's collapse, DEX trade volume skyrocketed and Uniswap did more volume than any CEX. There is verifiable evidence that DEXs can overtake CEX volume. It's only a matter of time until the UX bridges the gap.

# 2.0 NFTs and GameFi

## Introduction

The market for NFTs and GameFi has been through many ups and downs over the past year. However, developments in both of these spaces are still some of the most promising topics within this market cycle: we've seen ideas tested at the beginning of the year (like NFTFi) that have solidified into solid new use cases (like ticketing, real assets on-chain) as well as seen new NFT marketplaces grow. Blockchain gaming remains a very important topic as the industry has tested various models (like play-to-earn and free-to-earn) throughout the year: it is now ready to figure out which direction to take. With the strong amount of capital and talents coming into the GameFi space, crypto gaming is likely to be a strong trend coming out of this cycle.

In this chapter, you will read the perspectives of Sfermion and Naavik on what we can expect from NFTs and GameFi in 2023. For NFTs in particular, there is a movement towards greater adoption of Layer 2 solutions like Arbitrum and Optimism, as well as expectations of new integrations between AI and NFTs. For GameFi, this chapter will cover new wallet infrastructure improvement trends, as well as trace talent migration from traditional gaming (both in leadership and talent) to blockchain units.

# NFT Market — 2022 Recap and Outlook for 2023

**By Sfermion**

CMC spoke with Mo Patel, investor from Sfermion to provide a detailed overview of the NFT market's performance and growth during a challenging 2022, as well as what Sfermion considers the market's prospects for 2023.

Sfermion is a metaverse-focused investment firm focused on accelerating the emergence of the metaverse by investing in the founders, companies, and protocols that are forming the foundations of our digital future. Sfermion believes NFTs and associated technologies will enable the formation of the metaverse - virtual environments where people will live, work, and play. Today, Sfermion invests across the entire metaverse stacking ranging from early stage venture investments, token investments, and direct NFT investments.

/Sfermion_

https://www.sfermion.io

## Q1: How to measure the success of the NFT market in 2022?

The NFT market in 2022 has faced such a decrease in volume due to the bear market and overall downturn that there was widespread concern that NFTs are dead. However, if you exclude bull market-driven 2021 as an anomaly in terms of volume and traction, the NFT market in 2022 is in fact thriving in many areas. The drop-off in NFT trading volume as compared to the smaller drop-off in NFT transactions shows that people are still using NFTs and that the downturn is just a broader market trend.

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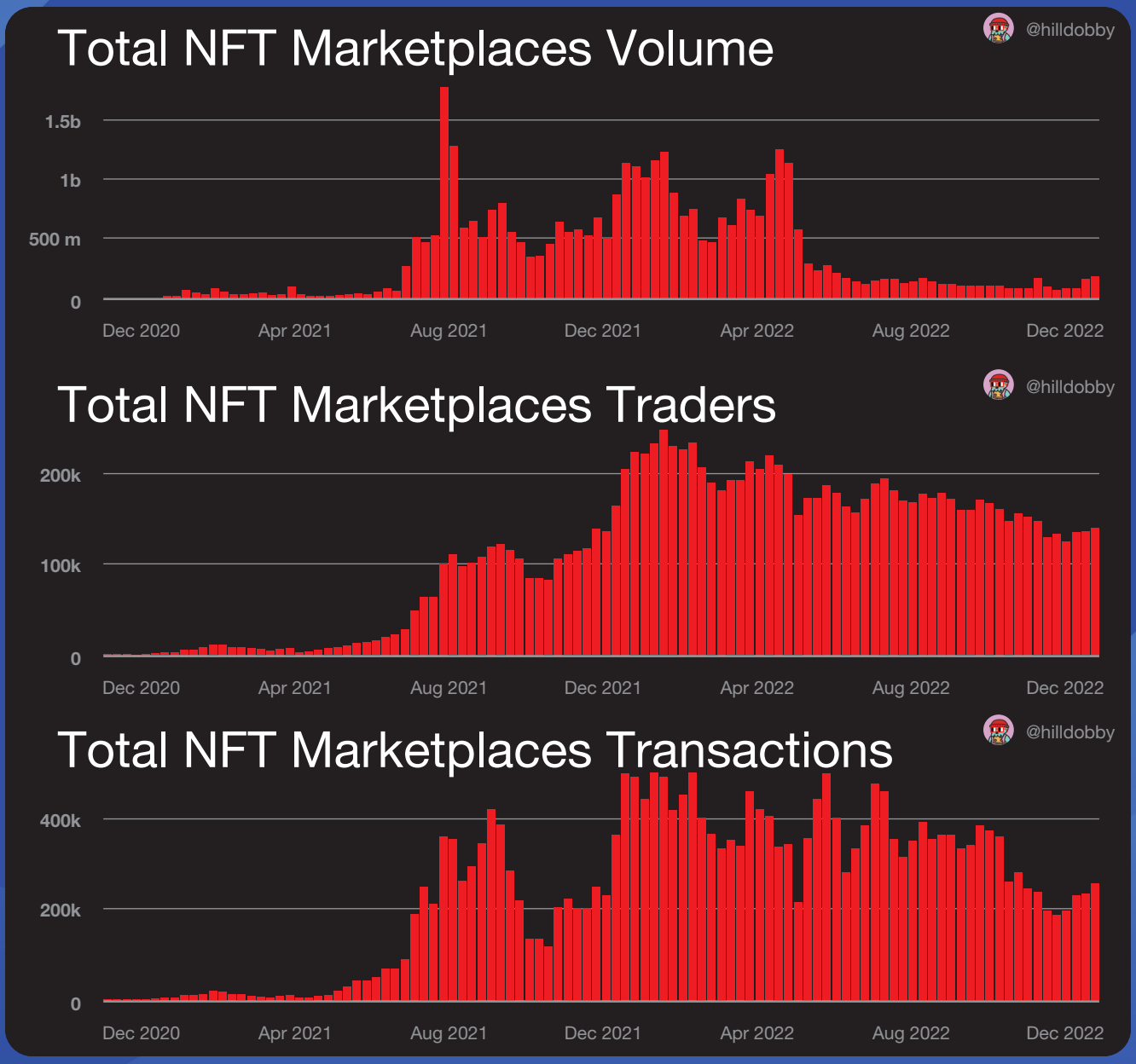


For example, the rapid adoption of layer-2 solutions like Arbitrum and Optimism meant growth in unique addresses holding NFTs, which showcases the amount of building activities supporting the L2 space. Meanwhile, Polygon is also active in NFT business development and continues to draw stellar Web2 talent and clients to blockchain.

Music NFTs are also seeing success on various platforms, with high sales volumes and increased minting.

Web3 social platforms using NFTs in various ways are also gaining traction, such as Aave's Lens Protocol that already boasts nearly 100,000 users since its May 2022 launch. In addition to a plethora of quantitative data to consider, there's also ample qualitative data available that indicates that the recent NFT craze has led to an influx of strong Web2 builders entering the Web3 space to build with NFTs. This underscores the success of the NFT market and the global attention it has garnered in a very short time.

## Leading Web2 brands and gaming studios usingWeb3 and NFTs to supercharge new applications

These new entrants include leading Web2 founders and gaming studios who have built established and enduring products in the Web2 space and are now using Web3 and NFTs to supercharge new applications, such as NetEase, Pixel Gaming, Wildlife, Square Enix, Ubisoft and Zynga. Top-tier brands such as Gucci, Nike, Adidas and Prada are all onboarding NFTs in their marketing to connect better with their customers. Instagram, with its over half a billion daily active users (DAU), is now effectively an NFT marketplace.

Reddit has come out of nowhere this year with its sudden implementation of NFTs (although they refuse to use the term) as a core technology in its digital collectible avatar program, bringing in a vast number of new users and wallet owners in the process.

Web2 giants are also using the world's biggest sporting and entertainment events, such as the World Cup and Super Bowl, to enhance In-Real-Life (IRL) experiences by leveraging NFT drops, as we saw with Coca Cola's NFT drop at this year's World Cup. Limit Break is planning a Super Bowl freemint for next year where you can scan a QR code and get a free NFT mint during the US' flagship annual sports event.
The above applications of NFTs allow for the seamless transaction of digital property rights and interoperable assets. Despite current market fluctuations, the continued involvement and innovation of top builders and brands in the NFT space are laying the foundation for strong growth in the future, as these projects come alive and, ideally, coincide with a market uptick.

While there's currently not much joy to be found in the crypto space in general, there's cause to be bullish on NFT adoption and many web consumer applications. Whether it's a bear market or bull market, the truth is that gamers are going to game and consumers are going to consume. If NFTs keep unlocking these digital property rights to allow owners to transact within these games with interoperable assets, it's just a matter of time for quantitative data to pick back up. Viewed with this lens, 2022 can therefore be seen as quite successful for NFTs.

## Q2: Which NFT verticals and use cases have been a key focus in 2022?

The main focus for 2022 has remained on Web3 gaming and related consumer services, such as loyalty and ticketing, while metaverse experiences and Web3 social applications have also garnered attention. NFT data analysis to track assets on-chain has also been a continuous trend which is somewhat well built out.

We also saw a drop-off in the DAO and Guild tooling narrative, as play-to-earn (P2E) models crashed in 2022 due to the bear market, poor tokenomics and a general failure to deliver a compelling gaming experience to retain gamers. It's clear that the industry is beginning to understand that Web3 gaming and metaverses will take time to go mainstream; therefore, the focus is shifting to building the right experiences and infrastructure around that.

This change in focus will boost the following sectors: gaming infrastructure aimed at building better gaming applications, infrastructure on wallets and marketplaces, and NFT creations that can service more complex incoming metaverses as well as Web3 social applications and products that will help unlock Web3 intellectual property (IP).

In 2021, the incredible popularity of PFP NFTs led to the creation of a significant amount of new IP, mainly consisting of pictures and images to interact with. The goal for 2023 will be to create more advanced gaming products and applications that can help unlock and enhance this IP through the potential application of AI-based utility or in-game utility.

## Q3: Why did NFT theses like NFTFi and SocialFi fall short of expectations in 2022?

A few 2022 NFT theses failed to deliver on the massive hype they carried over from last year.

Let's start with direct virtual world investing. While "metaverse" was a major buzzword for 2022, the industry now understands that the hype was premature and that fully immersive digital experiences will take time to develop. It's not even clear yet whether metaverses will be PC-based, AR-based, VR-based or a mix thereof — the market will ultimately decide. As previously explained, there is therefore an emphasis now on creating the infrastructure and experiences that will make up this overarching metaverse experience, such as catering for small games.

DAO tooling (a set of software, apps and smart contracts that a decentralized autonomous organization uses to operate) was also massively hyped during late 2021 and early 2022, but lost its luster this year as the market realized it was building a product to service needs that weren't effectively there yet. DAOs are still in their infancy— while still scaling very rapidly — and we are definitely seeing a clear use case for them. As they continue to take shape and operate, especially in this bear market, there's a better understanding now of what tools can support DAOs and service their needs.

Guild tooling has suffered a similar fate in 2022, with investors and users realizing that they latched on to this gaming-driven niche a little prematurely. In hindsight, it is now clear that it was wrong to assume that the first generation of games such as the V1 Axie Infinity model provided a blueprint for all future gaming. It will be important to remain flexible and adaptable as more games enter the market and utilize guilds in different ways.

NFTFi also fell short, largely due to the market downturn and the drop in liquidity, which will take time to flush out. Still, it has clearly demonstrated the immense potential of NFTs to offer strong financial applications, such as issuing tokens and representing bonds, as we can see with projects like Solv Protocol.

Direct NFT financial services such as lending will improve in line with pricing over time, and remains a focus thanks to better liquidity and more users than before. While there is a lot of user hesitation around the risks tied to NFT-based lending applications, it is important to note that the long-term narrative for NFTs in financial services remains strong and is also expected to take a few years to play out in full.

## Q4: What are the NFT development trends to expect in 2023?

Sfermion will continue to invest in Web3 gaming in 2023, but we are now looking for more advanced use cases within games. Companies are building entirely new NFT standards to function within their games, using new economic models like free-to-own, and attacking new verticals like fully on-chain experiences. These companies are innovating at a rapid pace and include both strong Web2 founders and studios building lasting Web2 games, even porting Web2 IP to Web3. These companies are bringing what works in the Web2 world, such as casual, mobile and PC console games, and using NFTs as a technology to enhance these experiences.

We're also tracking how Web2 brands and intellectual property (IP) entering the space are using NFTs, and the birth of new Web3-native IP will remain a core focus in the NFT space.

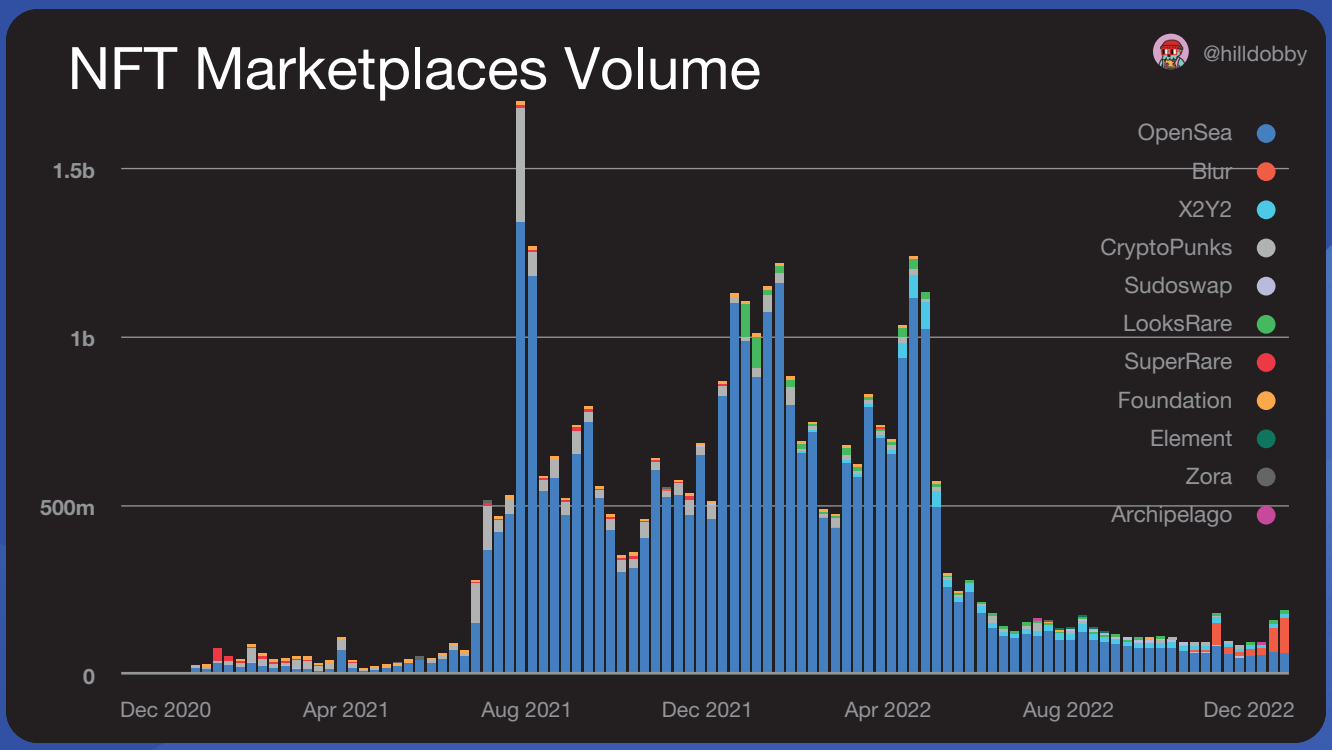
The intersection of NFT and AI, such as art and gaming asset creation, gameplay design, using AI-based NPCs and the overall creation of transmedia content, remains another fascinating focal point. The evolution of wallets and marketplaces to better serve specific users is also exciting. We are seeing a focus on building wallets that are more Web2-friendly and adding elements

like social factors and DeFi features for DeFi audiences. Standalone marketplaces for specific collections, such as gaming-focused marketplaces, are also emerging. Overall, there is a focus on looking at NFT verticals and where they can be advanced and improved going forward.

In addition, there is a strong buzz around general advancements in layer-2 chains, particularly in the zero-knowledge (ZK) rollup space, which is primed for a big year in 2023. ZK-rollups are expected to make NFT access and usage 10x to 100x easier, which should convert to an increase in builders building on these rails and using NFTs for social media experiences, with more users as a result.

Web2 social media platforms are also doing unique things with NFTs. Reddit allows you to integrate your avatar, Twitter allows you to showcase your avatar. However, avatars are really just version-0. Instagram goes further and enables you to post content as NFTs and mint them. These are version-1 applications that barely scratch the surface, and we're very excited to see where V2 and future iterations take NFT innovation. It's going to be fascinating to see NFTs used to supercharge the social media experience over time.

In 2022, we also saw the advent of a new generation of NFT marketplaces like LooksRare, X2Y2, Blur and Magic Eden that are challenging the supremacy of OpenSea and reshaping the NFT landscape.



There are a number of strong players and well-founded marketplaces that are constantly innovating, with ideas like token-based airdrops, advanced social features, shared liquidity, focusing on certain markets like hardcore traders, having optional royalties, going multi-chain, or focusing on a specific genre, such as gaming, music or video. These products and apps are only just beginning to understand their user base in full and targeting them as such.

For example, Magic Eden and Fractal understand that they're getting a lot of traction on the launchpad side and so are effectively doubling down on that, alongside their added gaming focus. Meanwhile, OpenSea continues to defend and enforce NFT royalties, and is being joined by others like X2Y2 that are choosing to respect creator fees. It'll be interesting to see how the royalty debate plays out over time, with both camps enjoying strong support.

What we are looking at is how these marketplaces cater to their users and enhance their experience through features like multi-chain, multi-wallet support, fraud detection and better discovery and recommendation tools. For example, with so many NFT collections out there, it is becoming increasingly important to help a user find the content they want more efficiently and create a more personalized marketplace experience.

## Q5: Funding — where are VCs deploying their capital in 2023?

Within the current NFT verticals, VC firms remain most excited about Web3 gaming despite its dismal performance this year, as there is a shared sentiment that gaming will eventually onboard the masses into crypto Web3. This extends not only to NFTs, but also involves crypto areas such as the use of hardware wallets, software wallets, interacting with decentralized exchanges (DEXes) and using on-chain lending sources. As users are onboarded through Web3 games, this adoption will eventually trickle down to other areas of crypto. Therefore, VCs are still looking for strong studios and builders in the Web2 gaming space, as well as strong infrastructure.

In addition, VCs are looking closely at NFT IP. Every year, there is likely to be a new IP coming out of the NFT space, as well as the unlocking of existing IP to supercharge the community experience, which has been lacking in the Web2 space.

Web3 social media is another exciting frontier which stands to benefit from the unrest on Web2 social platforms caused by user outrage over perceived censorship and the unsolicited mon-

etization of personal data. However, it is still in its early days with only a handful of platforms actively building and gaining traction.

There are many games that aim to cater at the same time to both Web2 and Web3 audiences. It is possible to have a game that is considered “Web2.5” where Web2 players (who may not be interested in using NFTs or token) can still experience the game while being slowly onboarded into Web3. This gamer-first approach makes more sense in the long term, instead of trying to force NFTs and tokens on players from the start.

It’s a New Year’s Crypto resolution of sorts to actually be able to play all the games that we’re actively looking at and really see what works and what doesn’t, since games take so long to build. With Web3 social media also projected to eventually take off, there’s definitely some value for anyone to start creating their own on-chain credentials and social presence early. The same applies for the L2 ecosystems and understanding which one(s) best serves an end user based on their interests and goals. As the UX of crypto improves with each calendar year, we anticipate more and more users to surface with crypto and NFT-based applications on a daily basis.

Disclaimer: The above overview and information contained there represents personal views of the Sfermion team and does not constitute investment advice

# Blockchain Gaming — What Lies Ahead


NAAVIK

Naavik is a research, consulting and advisory firm with a mission to enable games industry professionals to master the business of gaming, including market research, strategy, game economy and design assistance, tokenomics expertise, user acquisition support, M&A due diligence, and long-term advisory relationships.

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**By Naavik**

2022 has been a monumental year for the blockchain gaming industry. There's a strong bifurcation in blockchain gaming as play-to-earn (P2E) gaming has fallen with all once-major projects losing upwards of 90% of their market capitalization over the course of 2022. There is also a similar downtrend across other speculative game-related assets – most notably virtual land NFTs belonging to games that are yet to launch. However, the next era of fun games that are far less focused on earning are steadily being built by many talented teams around the world.

Overall, it seems like the blockchain gaming deal market continues to mature into its next stage, wherein the companies garnering most of the funding attention are no longer the ones building infrastructure, but rather the blockchain gaming studios that can produce engaging content that makes use of blockchain gaming infrastructure. Going into 2023, there are five major driving forces for the industry:

# Infrastructure

The most vital infrastructure for driving mass adoption is the one closest to the players: wallets. Despite Metamask's current popularity, it poses several challenges:

- Managing private keys is complicated and risky
- Metamask is not mobile browser-friendly
- Although there were improvements, Metamask isn't user-friendly

Naavik believes that the new wallet developments such as Sequence by Horizon and Stardust may provide improved solutions:

Sequence is a non-custodial, multi-chain wallet with multi-key support and functionality for paying gas fees in the user's token of choice. It has been in beta with Skyweaver (a game developed by Horizon) on mobile for at least a year, giving it an edge for mobile support for game developers. It comes with integrated network switches, token swaps, fiat on-ramps and NFT viewing. Similarly, Stardust Vault aims to obfuscate the blockchain layer for both players and developers. That would allow the wallet to seamlessly integrate with games in the background.

# Distribution

Major platforms are slowly warming up to the idea of distributing blockchain games, or at least finding ways to take a cut. Epic Games Store hosting Blankos Block Party and Apple allowing the sale of NFTs (albeit in a limited fashion) is the start of a movement that will increase the presence of NFTs and web3 with more consumers. Enabling the mass distribution of blockchain games is very much an important catalyst for mass adoption.

# Talent Migration

Talent migration toward blockchain gaming developers is underway in four major areas (see chart next page).

Even though the effect on the space will not be immediate, this is very good news for the long-term development of blockchain gaming, resulting in games that are more fun and built on the back of traditional gaming best practices.

# Talent Migration

**Traditional gaming leadership talent setting up blockchain gaming companies**

xterio · Laguna Games · L/B

**Traditional gaming leadership talent joining existing blockchain gaming companies**

Mythical Games · Sky Mavis · The Sandbox

**Traditional gaming developer talent joining new and existing blockchain gaming companies**

ImmutableX · Polygon · Forte

**Traditional gaming developer talent moving to newly formed blockchain gaming units within well-established traditional gaming companies**

Ubisoft · Square Enix · Konami · netmarble

Source: CoinMarketCap and Naavik Blockchain Gaming Report

# Gaming Model

**P2E — Play-to-Earn**

During this era, "get rich quick" value extraction from the game was the key player motivator, while driving long-term engagement through fun gameplay was a secondary focus.

**Play-and-Earn — P&E**

Developers realized creating fun games that drive long-term player engagement is paramount, and economic value extraction should rather be secondary.

**P&O — Play-and-Own**

This is when developers realized fun gameplay comes first and digital asset ownership second. Economic value extraction should be a third priority and maybe even omitted from the name entirely.

**Free-2-Own — F2O**

Developers realized that mass adoption of blockchain games cannot happen when game access is gated by scarce and costly digital game assets (NFTs).

Source: CoinMarketCap and Naavik Blockchain Gaming Report

Best practices that define the future of blockchain gaming are very much in the making with Free-to-Own (F2O) being the fourth evolution after Play-to-Earn (P2E), Play-and-Earn (P&E), and Play-and-Own (P&O).The killer feature of F2O is the simple fact that it dramatically lowers barriers to entry by offering NFTs for free instead of gating game access with sometimes absorbently high purchase prices. This could be an important catalyst for accelerating mass market adoption.Other important product trends include on-chain gaming, F2P blockchain gaming, evolving tokenomics models, genre and audience expansion across web3 games, the Asian blockchain gaming scene, user-generated content (UGC) and artificial intelligence (AI) in blockchain games.

## Regulation

In 2022, regulatory bodies are paying more attention to blockchain gaming and crypto firms in general — for instance, SEC Chairman Gary Gensler mentioned that all crypto tokens, except Bitcoin, could likely be a security. Further, the SEC opened an investigation into Yuga Labs. While the probe has not been completed, the result could affect all of Web3 as Yuga Labs is a pioneer in the space. But given the prevalence of rug-pulls and scams, clearer regulations are clearly desired, although the impact may negatively affect many innovators in the space.

For a more detailed version of this analysis, please refer to Chapter 4 of the **Naavik x CMC Blockchain Gaming Report**, or download the **full PDF report**.

# 3.0 Regulations

## Introduction

Another strong trend coming into next year will be on the Regulation front. In 2022, crypto regulation has been a hit or miss, with many more misses than hits. There have been major regulatory developments, like the Tornado Cash sanctions and the EU's implementation of MiCA. As well, more countries than ever are experimenting with central bank digital currencies (CBDCs). Different countries are taking wildly different stances on crypto regulation, with some moving fast and others struggling to move beyond rhetoric. Especially in this climate, with the multitude of centralized crypto entities operating in all jurisdictions (like centralized exchanges, custodians and lenders), crypto regulation will be a key focus in 2023.

In this chapter, you will read how Apco Worldwide and Blockchain for Europe see the future of cryptocurrency regulations. Their insights will touch on the future of CBDCs and how central banks can make them work. As well, this chapter will delve into the U.S. crypto regulatory debate, exploring which agency is favored to take the helm on regulation: the CFTC or the SEC. Finally, the chapter will explore how the EU's MiCA will dictate how crypto will grow in the region, including in crypto's relation to environmental impact.

# US Crypto Regulations Outlook


APCO worldwide®

APCO Worldwide works with some of today's most impactful organizations to communicate their vision and their value; navigate the toughest business, technology, policy and societal challenges; and advance their influence and advocacy with stakeholders to drive transformative change and business success.

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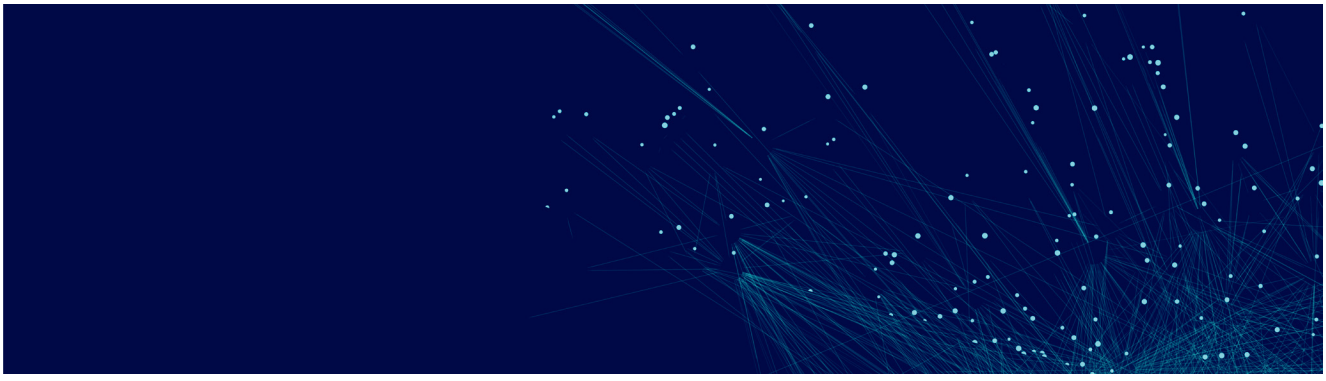
**By APCO Worldwide**

## Washington meets the wild west of Crypto

It's an odd sight to watch Congressional Democratic and Republican politicians in violent agreement with each other and working together to advance public policy. It's even more unusual to hear staid financial regulators squabbling in public and talking like a cop on the beat in a particularly tough neighborhood.

Welcome to the world of Washington meets the wild west of Crypto. What is clear is that U.S. policymakers from both major parties want to reinforce American leadership in the global financial system and at the technological frontier – while defending this frontier against bad actors. It is in this context that legislative proposals working their way through Congress and pronouncements and actions emanating from the White House and government agencies are best understood.

The plot of this story is hard to follow, with a large cast of characters and an alphabet soup of agencies. Here's the U.S. Congressional Research Service's valuable (and valiant) attempt to summarize where cryptocurrencies fit into our financial regulatory structure:



> *Currently, there is no comprehensive regulatory framework for cryptocurrencies or other digital assets. Instead, various state and federal financial industry regulators apply existing frameworks and regulations where exchanges or digital assets resemble traditional financial products. As such, regulators may treat digital assets as securities, commodities, or currencies depending on the circumstances. For example, cryptocurrency exchanges are licensed at the state level and register with the U.S. Treasury's Financial Crimes Enforcement Network as money transmitters for AML compliance. However, application of these frameworks through formal or informal guidance by disparate regulators may make the environment murkier in the event that various overlapping regulators make competing pronouncements. For example, the chairs of both the Commodity Futures Trading Commission (CFTC) and Securities and Exchange Commission (SEC) have alluded to the fact that some digital assets are commodities and others securities under their respective jurisdictions. Where crypto actors are operating without registering with these agencies, investors do not receive the protections that regulatory compliance provides.*

It is in this confusing context that President Biden issued a White House executive order earlier this year that recognized the importance of digital assets and technologies while directing government agencies in his administration to focus on several key priorities for policy development. These include consumer and investor protection, financial stability, illicit finance, financial inclusion, responsible innovation, leadership in the global financial system and U.S. economic competitiveness. Among other things, the executive order cited the regulatory principle of 'same business, same risk, same rules,' asserting that cryptocurrencies should not be treated differently or be given loopholes.

Congressional proposals working their way through various committees in the Senate and House of Representatives represent a comprehensive attempt to integrate digital assets into existing laws. I witnessed this outbreak of bipartisan consensus firsthand at the Bloomberg Crypto Summit this summer as Senators Kirsten Gillibrand (D-NY) and Cynthia Lummis (R-WY) of the Senate Banking Committee explained their landmark Responsible Financial Innovation Act.

What struck me was the collegial tone of the conversation and these lawmakers' efforts to coordinate with others working on these issues on Capitol Hill, notably a House Financial Services

Committee bill to regulate stablecoin reserves. They expressed high hopes that something could be done this year on stablecoins as a first step towards more comprehensive action.

Two things have happened to slow this momentum temporarily but that will ultimately bring about a more compliant crypto future.
First, the U.S. midterm elections. It was completely predictable that work would pause during the fall election campaign. The fact that Republicans gained control of the House of Representatives does not seem to alter the bill's prospects since the incoming Republican committee chair Rep. Patrick McHenry (R-NC) and current Democratic chair Maxine Waters (D-CA) are working together and prioritizing action for next year. Senator Gillibrand also sees prospects for a stablecoin bill out of her committee in coming weeks.

Second, the collapse of FTX. It was not the only crypto failure this year but certainly the tipping point. Explosive revelations come out nearly every day about massive fraud, misuse of customer assets, conflicts of interest between related entities, and non-existent balance sheets or risk management controls. The new CEO overseeing the bankrupt cryptocurrency exchange called FTX a failure of corporate governance worse than Enron: "From compromised systems integrity and faulty regulatory oversight abroad to the concentration of control in the hands of a very small group of inexperienced, unsophisticated and potentially compromised individuals, this situation is unprecedented."

Policymakers and regulators are looking for answers and raising questions on what issues and risks need a harder look to understand where proposals they have been working on may need to be beefed up – especially if Sam Bankman-Fried had provided any input on them. There's no doubt the hammer is coming down on a range of practices that FTX-affiliated entities engaged in that would never be tolerated in regulated financial services.

In fact, that's been happening already. While crypto industry players claim the U.S. lacks clear rules and/or that cryptocurrencies should be treated differently to avoid stifling innovation, U.S. regulators including the SEC and CFTC see it differently – and theirs is the view that matters.

The SEC's position is clear to the point of Socratic logic: The SEC has 90 years of experience regulating securities. Many cryptocurrencies meet the definition of securities. Intermediaries that facilitate cryptocurrency transactions need to know and comply with SEC rules.

Gary Gensler, Chair of the U.S. Securities and Exchange Commission, is blunt about crypto. He describes himself as "the cop on the beat." Here's Gensler telling lawbreakers to come out with

their hands up: “We brought actions against crypto lending platforms including BlockFi, and we will continue to be a vigorous securities regulator, but I really do suggest to these intermediaries, these storefronts, these casinos, if you wish, to come into compliance, work with the SEC to get into compliance, disaggregate these businesses.”
The SEC applies a decades-old Supreme Court decision known as the Howey test that defines securities as “an investment of money in a common enterprise with a reasonable expectation of profits to be derived from the efforts of others.” Whereas Gensler sees Bitcoin as digital gold that is not controlled by a central entity, he believes most cryptocurrencies are securities.

The SEC’s interpretation has much riding on a court case against Ripple that the agency filed in 2020, charging that its XRP digital tokens are unregistered securities. It has brought several dozen enforcement actions in the crypto space, and this year nearly doubled the size of its enforcement staff in this area.

That the SEC’s actions have roiled the industry is to be expected. That they prompted public criticism from a fellow regulator is unusual, to say the least. The SEC complaint in question alleges that dozens of digital assets, including utility tokens and tokens relating to DAOs, are securities. This action drew the ire of CFTC Commissioner Caroline Pham, who issued a public statement criticizing the SEC for “a striking example of regulation by enforcement.” She chided the SEC about “how critical and urgent it is that regulators work together” and that “regulatory clarity comes from being out in the open, not in the dark.”
The public debate is important because of the perception that the cryptocurrency industry generally favors regulation by the CFTC and is lobbying for legislation that would give the commodities market regulator authority over Bitcoin, Ethereum and other cryptocurrencies.

The Digital Commodities Consumer Protection Act introduced by Senators Debbie Stabenow (D-MI) and John Boozman (R-AR) gives the CFTC jurisdiction over “digital commodities,” and defines that term broadly to capture potentially a lot more than just the top two cryptocurrencies. The bill was met favorably by most of the crypto industry as well as consumer groups when it was announced in August – but that may change in a post-FTX world.

Rostin Behnam, the CFTC’s Chair, has argued that “Bitcoin might double in price if there’s a CFTC-regulated market” and recently suggested that the only cryptocurrency that should be viewed as a commodity is Bitcoin. He has also sought to minimize the CFTC versus SEC debate and draw instead on their commonalities grounded in investor protection, citing decades of regulatory experience in adapting to each new market innovation and learning from each crisis.

In that regard, Behnam asked Congress to plug the regulatory gap he identifies as putting the U.S. public at risk. The CFTC only has authority over derivatives, not cash commodities markets. It has intervened in cash markets to bring enforcement actions in limited cases when there is fraud and manipulation that impacts investors in the derivatives. He asked Congress to give the CFTC authority it currently lacks over digital commodities so it could regulate markets and intermediaries to safeguard investors before the harm has already occurred.

All this is to say that while the system is confusing and imperfect, the overall picture is becoming clearer. There seems to be an appetite and a willingness by policymakers from both parties to get something done. The regulators are demanding action and accountability to protect the investing public, and the failure of FTX has made the public case for regulation better than anything Sam Bankman-Fried did to promote it.

Yet these innovations can potentially address many problems better than the existing financial system and advance goals that are important for policymakers, the American public and U.S. economic and national security interests. Likewise, there are important international considerations for borderless and permissionless systems that people in many other countries around the world depend on to advance values and freedoms that Americans care about deeply.

That means there is still a conversation to be had on shaping the policy framework in which rules create the trust in programmable money, digital assets and blockchain technologies that is essential for the level of market adoption, scalability and real-world utility that are the dream and promise of crypto innovators and their communities.

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# EU Crypto Regulations Outlook


BLOCKCHAIN FOR EUROPE

Founded in 2018, Blockchain for Europe is a Brussels-based membership organization for companies driving innovation, integrity and empowerment through blockchain technology. The association represents the blockchain and crypto sector at EU level by engaging with policymakers, regulators, academics and media to develop a European regulatory framework which supports and promotes blockchain-based innovation. To achieve this goal, BC4EU collaborates with partners in the EU and across the globe.

/BlockchainforEU

https://www.blockchain4europe.eu


**By Blockchain for Europe**

## Europe wants to become crypto's global standard setter (and they might well succeed)

2022 was a big year for crypto, although probably not in the sense that most people were initially hoping for. The crypto space saw an incredible uptake in institutional adoption and developments but also witnessed some of the biggest scandals, hacks and frauds to date. Optimism about the future vied with, amongst other things, the risks associated with unregulated crypto markets.

If there was already general agreement, at the global level, on the need to introduce rules to protect consumers and avoid systemic risk and contagion effects, the events of 2022 have reinforced calls by regulators for jurisdictions all around the world to rapidly rein in the sector. The European Union (EU) is taking a lead in doing so via its the Markets-in-Crypto-As-

sets (MiCA) Regulation, which sets out rules for issuers of crypto assets and the entities providing related services in the EU, as well as for stablecoins and other relevant types of tokens. As a consequence, it is worth understanding a little more about the approach of this European economic powerhouse, with its nearly 500-million consumers and a commitment to being a global regulatory superpower.

## Focusing on service providers and stablecoin issuers

The EU's push to regulate crypto-assets started in 2019 with the Markets-in-Crypto-Assets (MiCA) Regulation. Initially, its sole focus was on rules for those crypto-assets service providers (CASPs)[1] which were trying to provide their services in the EU market. Then, the Libra stablecoin was launched and those rules were quickly considered to be inadequate. Countries such as Germany and France were very hostile towards Libra and its goal to launch a private payment alternative to Europe's main fiat currency, the Euro. In the face of this new, digital "Zuck Buck" politicians across Europe pushed for the inclusion of stablecoins in the EU's new rules and also accelerated the development of a Digital Euro by the European Central Bank.

The resulting MiCA text was modified to link rules for stablecoins (or e-money tokens (EMTs) in European terms) to existing banking, payments and e-money rules. The new rules also banned the granting of interest rates on stablecoins, as these are not considered equal to bank deposits. Only licensed institutions, such as banks or e-money providers, were allowed to issue stablecoins in Europe.

Complexities and exceptions then emerged, as you might expect. Algorithmic stablecoins were excluded from MiCA's framework. That means they can still be listed on regulated exchanges but cannot be marketed as "stablecoins", as the claim of a stable value needs to be demonstrated and backed by reserves. For non-EU based stablecoins, such as USD-denominated ones like USDC or USDT, there are additional restrictions, although the final details of these are still to be decided in the technical debates post-implementation. The outcome of these debates will be essential for the well-being of the crypto-market in Europe, as EUR-denominated stablecoins will not be able to provide enough liquidity by the time MiCA enters into force.

## The EU's light(er)-touch on DeFi and NFTs

Stablecoins are not the only topic which played a disruptive part in the formulation of the final MiCA text. Over the last three years, Decentralised Finance (DeFi), Non-fungible Tokens (NFTs)

and the environmental footprint of proof-of-work projects such as Bitcoin have also become important in the EU's legislative debates.

The original aim of MiCA was to provide a legal framework allowing centralised regulated entities to passport their services across Europe, while protecting EU investors, consumers, market integrity and financial stability. On the one hand, the DeFi industry managed to ensure a broad exemption from MiCA (in case of "true decentralisation"), to encourage the future growth of a promising space. On the other hand, the collapse of Terra/Luna meant that policy-makers came to see algorithmic stablecoins as largely unstable and highly risky financial instruments, not to be trusted in absence of reserves clearly backing them.
In the case of NFTs, which are key to the future token economy, there was a clear divide between EU institutions. Whereas EU Member States, such as France or Germany, were clearly in favour of a complete exemption of NFTs, the European Commission steadfastly and successfully pointed out that NFTs issued in a "large collection or series" should not fall outside the scope of MiCA, as that would be an indicator of their potential "fungibility". The final definition of NFTs is still to be determined, as it is not yet clear what the EU will consider as "non-fungible tokens". The EU is clearly trying to lay out the groundwork for NFTs to flourish in Europe, recognising that a specific and fine-tuned policy approach is needed to ensure that NFTs' vast range of technological applications are not dragged wholesale into the realm of financial regulation.

## The environmental impact of Bitcoin and how the EU reacted

The environmental impact of Bitcoin and other proof-of-work (PoW) projects has been a source of growing concern for the EU. During the MiCA negotiations at the end of March 2022, the EU was extremely close to banning PoW-based cryptocurrencies from being listed on regulated exchanges as of 2025. Luckily, the industry managed to highlight the potentially catastrophic consequences that such a decision would have had on the EU crypto market, for example forcing EU citizens to rely on unregulated and decentralised exchanges to trade Bitcoin and other PoW tokens.

Creating a parallel and unregulated trading market and completely undermining the objectives of MiCA was not ideal but nonetheless, in order to appease green-minded policymakers, the final compromise means issuers of crypto-assets will be required to provide information about their project's environmental impact in the whitepaper they would need to publish. The specific

criteria on how to provide this information will be defined by the European Security and Markets Authority (ESMA) in its “level 2” legislative work.

## The fear of money-laundering and terror financing still looms strong

Another key aspect of the negotiations was the link between MiCA and Anti-Money Laundering (AML) rules, especially with regards to personal, or self-hosted, wallets. This issue was debated in a separate, but highly interconnected, piece of legislation which was meant to implement the so-called “Travel Rule” as part of the EU’s compliance with the FATF Recommendations.
The debate was, once again, highly polarised. On one side, crypto-sceptic policy-makers pushed for verification requirements for transfers to self-hosted wallets, which would have forced regulated entities to verify the identity of users behind each wallet they interacted with, effectively going further than FATF’s own recommendations. On the other side, industry-friendly policymakers argued that such requirements would not only have been unfeasible, as the verification would have been based on self-provided information, but also contrary to the overall objective of AML rules.

Once again, the EU was wrestling with instincts that if implemented could have simply pushed users into unregulated spaces with little or no oversight from regulators and law enforcement authorities.  Fortunately, the final political agreement recognised that going down this path could push users to only transact crypto-assets between self-hosted wallets, using peer-to-peer transactions that remained outside of the regulatory scope rather than going through regulated exchanges. This would effectively create a parallel system of less than well-illuminated transactions. Instead a clear risk-based approach to the AML and KYC requirements was imposed on regulated entities.

## The MiCA timeline

The rules described in this article will start applying as of mid-2024, for the issuers of stablecoins, and six months later for the issuers of all other tokens and for crypto-asset service providers. However, several open questions may well need to find answers by then, e.g. how to classify NFT collections to understand whether they are “in scope”, how to provide information about the environmental impact of consensus mechanisms, and how to assess the risks connected to transfers to self-hosted wallets. The industry will have to engage with ESMA and the EBA to ensure these questions are answered in the right way.

# A step in the right direction with potentially far-reaching global consequences

MiCA may not be perfect but it is here and will be coming into force soon enough. The crypto industry should embrace what is a clear set of rules from the EU. It will, finally, provide needed legal clarity for companies that want to set up shop and provide services to those almost 500 million EU citizens. Although measuring the real impact of MiCA will take a few years, jurisdictions around the world are likely to begin copy-pasting the EU's principles into their regulation. This is the so-called "Brussels' effect", sometimes also called "regulatory contagion", which underpins the EU's rise to being a global regulatory superpower.

None of this has stopped, however, a fierce debate from starting in Europe about whether MiCA would have prevented an FTX-like collapse. There are calls for MiCA to be brought in sooner, for DeFi to be folded into its rules, for entities from third countries to be held to higher standards if they provide services to EU citizens. For now, the line from the European Commission is, "We should first fully adopt MiCA before starting to call for a MiCA 2". As Blockchain for Europe, we could not agree more. One step at a time is the best way for Europe to avoid unintended consequences and to judge how any future regulation will need to be adapted to rapidly evolving technologies and business models.

**Footnotes:**

1. CASPS are globally referred to as VASPs, as defined by the Financial Action Task Force (FATF).

# CBDC and Central Banks Insight Into 2023

Stanley was Executive Director and Head of Product Design at JP Morgan's Onyx business. He was also leader of Deloitte Southeast Asia's Blockchain Lab. Prior to this, he was most recently Adhara.io's GroupNet leader. He'd spent two years as CTO at IBM Blockchain for Financial Services globally, and acted as IBM's global Central Bank Digital Currency subject matter expert.

Across a varied career, he had led the conceptualization, research and realization of Project Ubin - the MAS' central bank digital currency project for cross border payments. He was the MAS' specialist leader in blockchain and distributed ledger technology projects using Corda, Hyperledger and Ethereum. He played an instrumental role in developing the Smart Financial Strategy for Singapore's financial sector with Deloitte Consulting.

As a risk specialist, he had developed the MAS' model risk audit framework and led a team of quants in projects ranging from Basel III quantitative impact studies to the MAS' annual banking stress tests. He has conducted data science courses, equipping over 60 central bank economists with programming skills and basic machine learning expertise in R.

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**By Stanley Yong**

The world in 2023 begins with several macroeconomic themes that we believe will play a role in reshaping the focus of some CBDC projects. Let us examine some of the major thematic reasons for a CBDC that have lost their urgency and perhaps relevance.

One of the oft cited benefits of introducing a CBDC is the potential to entirely rid an economy of the physical manifestation of cash, and hence eliminate the zero lower bound on interest rates. This arguably improves the effectiveness of quantitative easing and negative interest rates in reversing disinflation. Put simply, negative interest rates are applied as a charge on the value of deposit balances held at a financial institution. One way to evade such charges is to withdraw excess deposits and stockpile the money as physical cash. The zero lower bound is a rational response when the costs of storing cash in vaults is lower than the negative interest rate charge. A total substitution of physical cash by a CBDC would remove this escape valve, and force the deployment of those excess deposits into investments, combating disinflation.

Disinflation is now a distant memory for Central Bankers that have to deal with long dormant inflation. Eurozone inflation reported in October 2022 stands at an annualised 10.7% based on Eurostat's flash estimate. The CBDC discourse has shifted as well, with arguments for a CBDC leaning towards how CBDCs would in principle allow for different interest rates for different

balances, which would aid in combating inflation. This of course conflates the CBDC with a technical implementation. Nonetheless, we will witness more multicurrency wholesale CBDC experiments using mechanisms adapted from Decentralised Finance (DeFi) like lending protocol Aave, to inject interest rates in 2023.

A related macroeconomic theme is the continuing cryptocurrency winter and the deepening scepticism against crypto. This stems from both regulators and retail investors following major bankruptcies at centralized exchanges, lending platforms and trading entities. Even the bravest Central Banks will reconsider nascent discussions about allowing some form of Central Bank liability to sit directly on a public blockchain. The urgency has surely faded for Central Banks to facilitate rapid on and off-ramping into crypto markets given the rising concerns about broadening retail access to the asset class and potential for financial contagion.

Third, the collapse of FTX in November awakened the public to the need for self custody in holding cryptocurrency. Consequently we anticipate that 2023 will bring a reexamination of key assumptions being made by Central Banks about the advisability of the two tier (Central Bank and commercial banks) intermediated distribution model for CBDCs. Single tier direct distribution models and hybrid models for distribution are likelier than ever before to become part of operating CBDC designs.

In the new era of high interest rates, interest paid on commercial bank deposits is increasing quickly and acts as a strong disincentive for excessive retail CBDC holdings which are non-interest accruing (in most current deployments).

In 2023, more Central Banks will therefore be willing to consider directly holding accounts for citizens on their books. This will need to be supported by the introduction of new and improved accounting systems and some resolution to important policy questions about the need for KYC on accounts and transactions. Some of the policy answers will mean a shift in the playing field, posing tough tradeoffs where the Central Bank must balance its desire to provide a better, low cost, single payment solution and unit of account, with the need to not stifle private sector initiatives.

We foresee that the widening of CBDC production usage and trials in 2023 will lead to more contentious and open debate about the proper scope and limits of a CBDC, with private players taking a more aggressive approach to staking their ground.

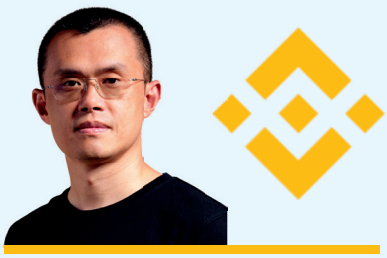
# 4.0 Adoption

## Introduction

When it comes to Adoption, 2022 could be seen as the year with the most successful adoption in the past two or three years. More institutions than ever have joined the market from the Web2 and traditional market community, meaning that more users have had access to Web3 products. Going forward, the questions that we will need to answer are: how do we bring in the next generation to the crypto space, and where will this future adoption actually come from?

In this chapter, we will hear from both CZ, Binance CEO and co-founder, and CoinMarketCap ourselves. CMC conducted an in-depth analytical interview with CZ touching on the basis for crypto adoption and what will bring in the next wave. His answer? Product improvements are more important than regulation. And in our According to CMC report here, you will see how the makeup of CMC users has changed since the start of this year and what sectors users were drawn to, ending with a word from the CMC listing team about trends in 2023.

# Global Crypto User Adoption Outlook



Changpeng Zhao, known as CZ, is the founder and CEO of the largest crypto exchange Binance. An expert in blockchain and trading systems, CZ has built Binance into the leading blockchain ecosystem, comprised of Binance Exchange, Labs, Launchpad, Info, Academy, Research, Trust Wallet, Charity, NFT, and more.

/cz_binance

https://www.binance.com/en

**By CZ**

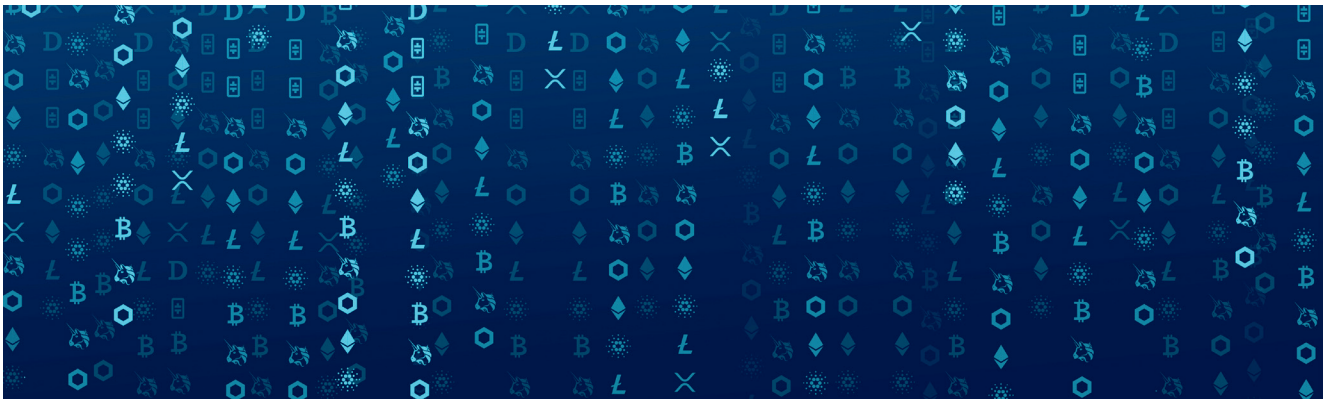
CoinMarketCap sat down with Binance CEO and founder Changpeng "CZ" Zhao to discuss the future outlook for crypto adoption in 2023.

## Measuring Adoption in an Eventful Year: 2022

**CMC:** In 2022, we've seen the fall of many big players — 3AC, Luna, Celsius, Voyager, FTX — how much have these collapses affected the industry in terms of user adoption? And how do you go about measuring adoption in general?

**CZ:** 2022 is definitely not a good year. A lot of negative things have happened.

Usually, the way I look at the measure of adoption is actually just the Bitcoin price, which usually is a fairly accurate indicator of the industry.



Historically, Binance's user registration rate, trading volume, etc. have all been very heavily correlated with Bitcoin's price: that line is actually the same shape as almost every other indicator that we use. Right now, Binance trading volume is about a third of what it was a year ago, when Bitcoin's price was near its all-time-high [of $68,800]. All these events have slowed down the industry, creating a negative impact.


**Source:** CoinMarketCap (Dec. 7, 2022)

The entire crypto industry goes through four-year cycles. Every four years, there's a bear market. I think we are in one now: bear markets have historically lasted about a year, and we are now about a year out from the last all time high.

## Next Wave of User Adoption

**CMC:** What do you think the crypto industry can do concretely to bring on the next wave of user adoption? It is about building more user-friendly DeFi solutions? Is the solution regulating more centralized crypto providers? Are there any other avenues you see to bring more people on board to crypto next year?

**CZ:** The more we build applications that people use, the better. It's that simple. If you look at the internet and how it's grown, many different people build different apps that leverage the internet. Today, we don't even talk about the Internet anymore: we just use whatever app that people are using.
It's a similar thing in crypto with DeFi, CeFi, wallets, faster blockchains, education, regulatory improvements, etc. All of those things will help. Regulatory clarity is very important: given the negative instances that happened in the industry, we have to become more transparent and build more trust. I think the industry will have to shift towards a much more transparency-based system, one that users can verify.

Given the issues with the centralized exchanges recently, more people will shift to DeFi. But then there will be a hack, there will be a rug pull in DeFi, somebody will have lost a lot of money in DeFi and then the people will move back towards centralized exchanges. The industry moves incrementally in many different aspects at the same time.

**CMC:** If you had to choose what would be more important for adoption — building those new products or increasing regulation and transparency — which one do you think has more relevance?

**CZ:** For adoption, I believe products have more influence. For example, how do we make it easy for normal people to hold their private keys securely themselves, and more practically: when they become unavailable, how do their loved ones get access? Regulatory clarity is important, and also helps adoption. But at the end of the day, it's products.

## Rebuilding in a Bear Market

**CMC:** Binance is like a microcosm of the industry at large — you have retail users with the spot exchange business, you have institution clients with the futures product, custody and the venture side. With the different types of clients and users, which area will be the most challenging for the industry to rebuild trust in and increase adoption post-2022?

**CZ:** We've seen that more people move to their own wallets. TrustWallet is growing quite quickly versus the centralized Binance.com exchange. The institutional business, Binance Custody, has been increasing quite dramatically. Those two are the more clear areas where things have grown faster, together with the growth seen on BNBChain.

FTX was a big event. When it happened, Bitcoin's price was around $18,000. Today, we are still at $17,000. Bitcoin's price didn't drop by that much — and Bitcoin's price can drop by 5-10% on an normal day without any specific incident. The industry has been resilient.
**CMC:** We've all seen some bear markets. You've seen more bear markets than I have. What are the specific differences you've noticed in this particular bear market cycle compared to any in the past?

**CZ:** The whole industry is bigger. In 2022, we have the metaverse, we have GameFi, we have DeFi, we have loans, we have NFTs.

In 2017, it was just ICOs: and with ICOs, there were too many projects that wouldn't make it. In 2013/2014, it was just the Bitcoin industry: only Mt. Gox went down.

Each cycle, the industry gets bigger. With this one, we've seen multiple players go down.

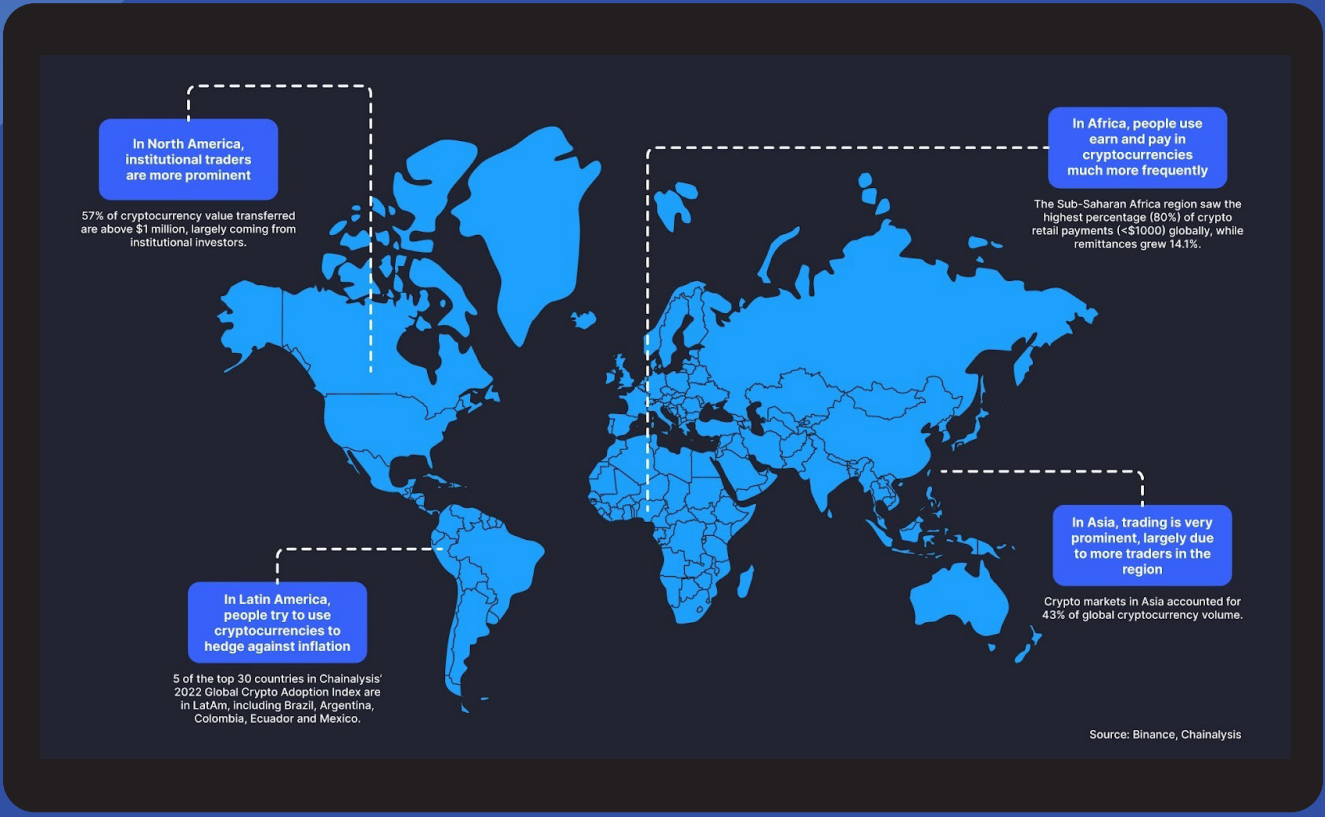
## Adoption: a Way Forward

**CMC:** Where is the next wave of adoption likely to come from? Would it be from new geographical markets (i.e areas like LatAm or Turkey that see high inflation), or new solid use cases (i.e. next-gen DeFi products, GameFi, etc.), or new participants (i.e. large asset manager/sovereign wealth, new age group users)?

**CZ:** At the beginning of 2017, I would not have said ICOs. At the beginning of 2020, I would not have said DeFi. At the beginning of 2021, I would not have said NFTs. But then six months later, all of those things happened. It's very hard to predict exactly which one will make it. It depends on the entrepreneurs that build in this industry. Whichever person or team builds a very sticky product, a very viral product, then that sector just drives a lot more users. But, collectively, everything moves forward.

I would guess as always, that adoption comes from new use cases, something that we haven't really imagined. Institutional adoption has been talked about for years and it will come. It is coming already, slowly, gradually. Binance actually does have a lot of institutional users, Binance Custody has a lot of institutional users. That's a very clear known use case and the adoption will happen at a certain rate. Regulations are coming at a certain rate, and those guys will come in.

The use of Bitcoin to hedge against inflation is a very clear use case. More and more people are learning about it and they will come in, because Bitcoin has a limited supply. We've seen that different regions do have different use cases that are more prominent. In some parts of Asia, trading is very prominent, just because there are more traders there. In the North American region, institutional traders are more prominent. In Latin America, people do try to use crypto-currencies to hedge against inflation. In Africa, people use, earn and pay a lot more in crypto. We do see that geographic distribution differs to some extent, not completely. It's not black and white, but there's some different emphases.




I always think that the next hot thing is usually the one that people don't really talk about and have not predicted.

**CMC:** Do you have any New Year's resolutions for cryptocurrency next year?

**CZ:** No, not really. I'm just glad that this whole bear market is going to be over and then…we'll see how that goes.

*This interview has been edited and condensed for clarity.*

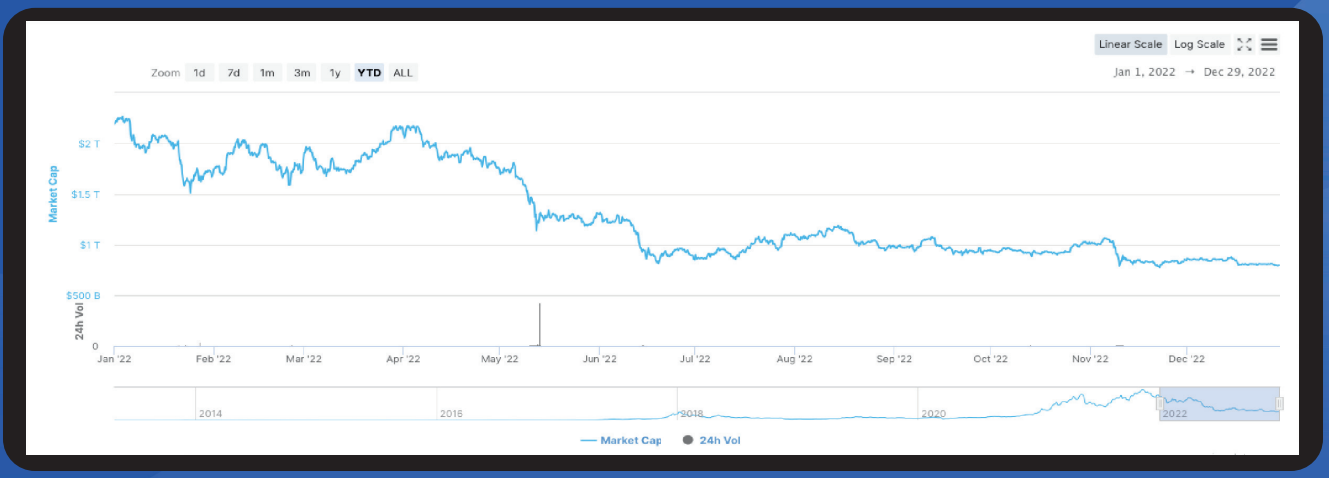
# CoinMarketReCapped: According to CMC

- **Crypto Market Overview:** how the crypto market composition has changed, which sectors experienced growth, utilizing CMC's proprietary model to analyze retail market sentiment.
- **BTC, ETH Key Events:** summarizing Bitcoin and Ethereum's key events and price changes in 2022.
- **Understanding Crypto Through CMC:** interesting findings from unwrapping CMC data.
- **Frontier of the Crypto Market:** analysis of the up-coming trends based on the CMC listing team's insights.
- **Crypto Users Around the World:** Get to know more information about who is interested in crypto.

## Section 1:
## Crypto Market Overview

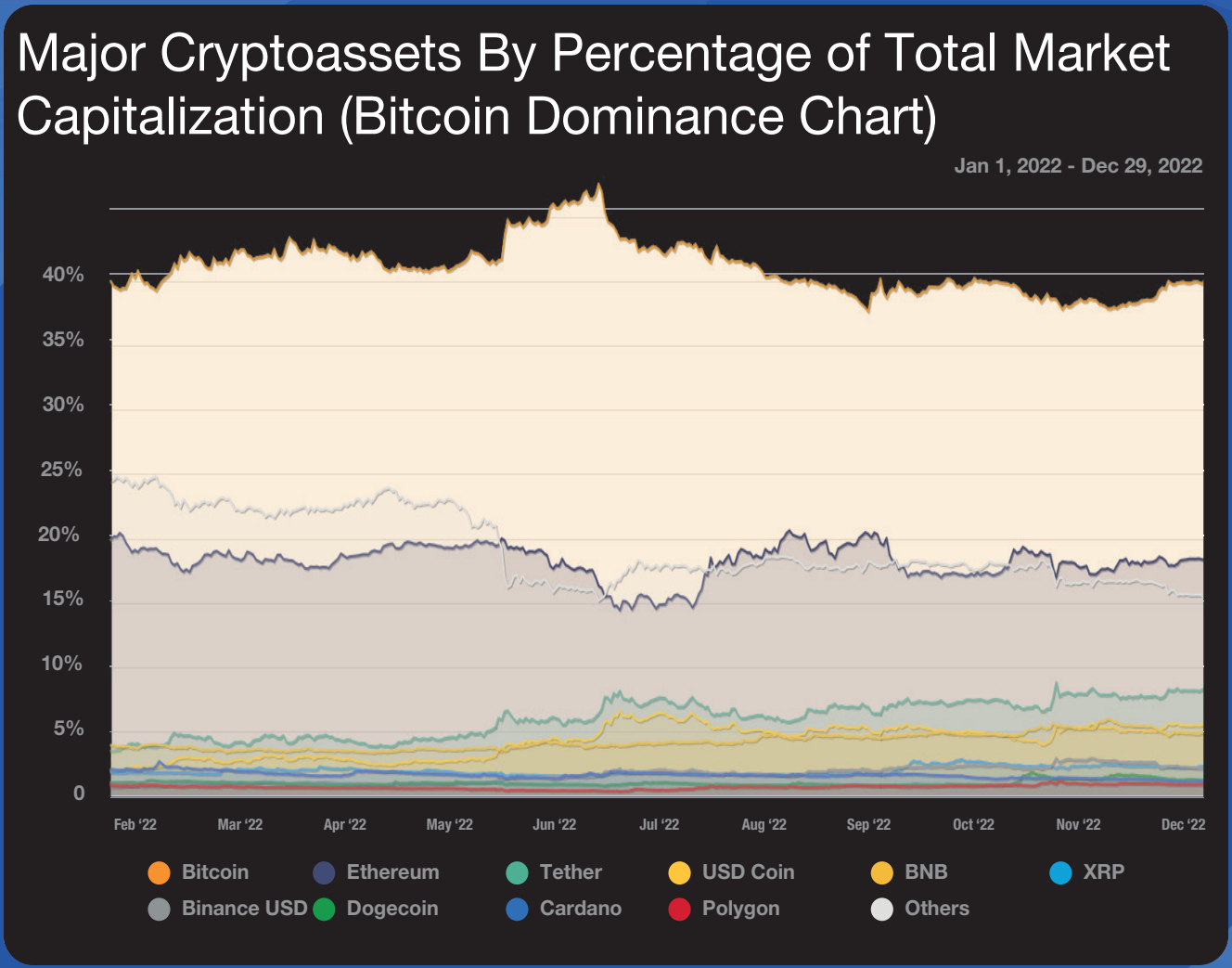
**1.1 Crypto Market Composition:** how the general crypto market cap has changed

The global crypto market capitalization has continued its downward trend in December, and has now stabilized around $800 billion, representing a 63.5% drop from the beginning of January 2022.




**Source:** CoinMarketCap, Dec. 28, 2022; https://coinmarketcap.com/charts/

Bitcoin's market dominance remains around 40%, while the altcoins (others) decreased from 25% to now only 15% of the crypto market. This decrease is often expected, as the market goes through a bear stage where capital often rotates back to the safer large cap assets and stablecoins (as seen the growth of USDC, Tether, BUSD on the chart).



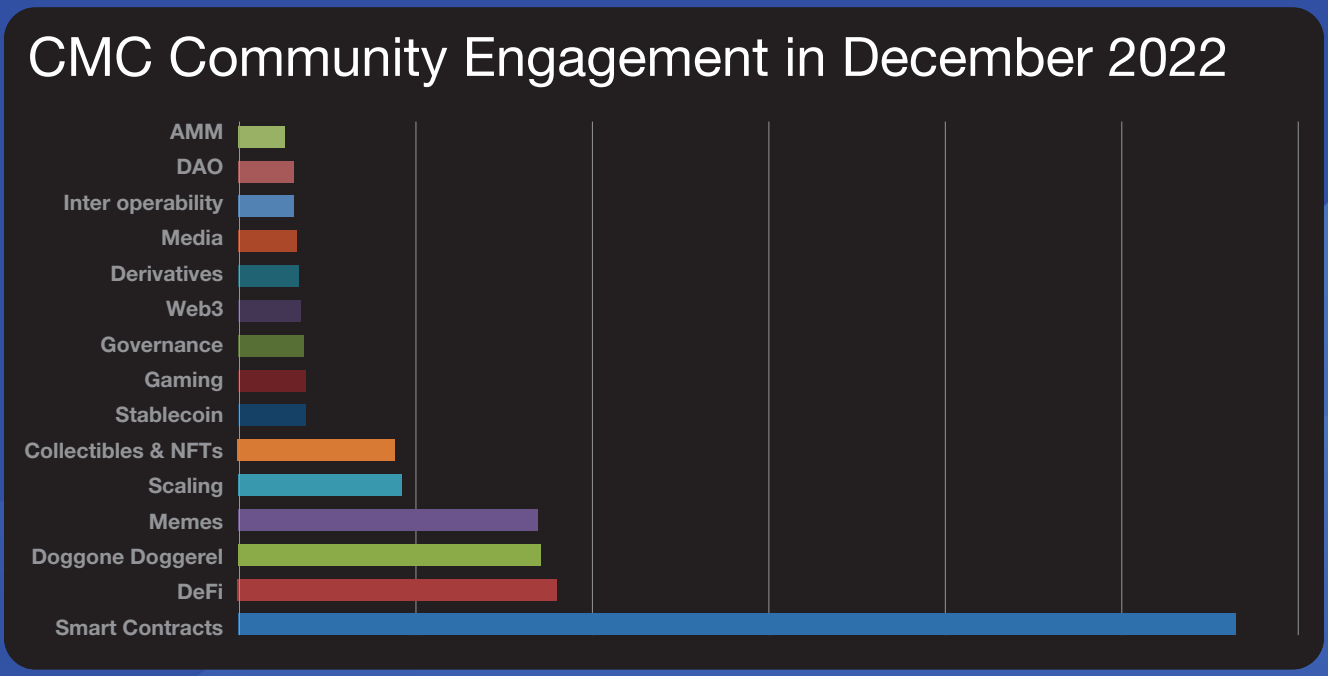

Source: CoinMarketCap, Dec. 28, 2022; https://coinmarketcap.com/charts/

**1.2 CMC proprietary analysis:** utilize CoinMarketCap proprietary models and data to analyze sector changes and retail market behavior

As one of the leading websites in crypto, CoinMarketCap attracts circa 400-700 million visits per month: therefore, we are able to collect data on what coins and sectors people are interested in, and which sectors are seeing the most growth in terms of user engagement and new project listings.

CoinMarketCap Research is now able to model this data and summarize the findings to share with you (data as of Dec. 22, 2022):

- In December 2022, the total global crypto market cap contracted by $65.64 billion (-7.72%). Even within this challenging environment, Gambling (+221.12%), Move-to-Earn (+58.42%), and DeFi 2.0 (+55.92%) are the top three leading sectors with increasing market cap. Meanwhile, the sectors that suffered the most in December are AI & Big Data (-20.96%), Asset Management (-17.13%), and Masternodes (-15.22%), which all saw their market cap dropping significantly compared with the total market.
- When it comes to new listings, there are over 34 sectors seeing an increasing amount of new coins added to the category, potentially signaling more projects are getting built and created in these areas. Among these, BNB Chain Ecosystem, Memes, Doggone Doggerel, Polkadot Ecosystem and DeFi had the most amount of new coins tagged in December.
- **Which sectors are users actively engaging with?** CoinMarketCap Community's engagement number (defined as the combination of likes, posts and comments for each crypto sector on CMC) could potentially be considered as a retail interest proxy. The data below shows the top 15 themes with the most amount of retail interest in December 2022 ranked by their respective CMC Engagement numbers. Smart Contract dominates the chart, partially driven by a few recent discussion points around Ethereum merge, Solana by the potential impact by FTX, the rising popularity of the new alternative L1s like Aptos, and the strong growth of Polygon, etc. in the past few months.




Source: CoinMarketCap, Dec. 22, 2022

## Section 2:
# Bitcoin and Ethereum Key Events

## Ethereum Key Events and Price Map 2022

**January 25, 2022**
**$2,455**
Ethereum Foundation drops "Ethereum 2.0" naming, explaining that it is "an inaccurate representation of Ethereum's roadmap," Instead, Ethereum 1.0 would be known as the "execution layer," while Ethereum 2.0 would be referred to as the "consensus layer".

**February 18, 2022**
**$2,785**
Morgan Stanley warns of Ethereum's risks and volatility. The investment bank claimed that Ethereum is "less decentralized than Bitcoin" as the top 100 Ether addresses held 39% of the entire supply. It also warned that Ethereum is 30% more volatile than Bitcoin, and 7X more than the S&P 500, since 2018.

**February 23, 2022**
**$2,590**
TheDAO hacker was allegedly unmasked by crypto journalist Laura Shin. Programmer Toby Hoenisch was allegedly responsible for the 2016 hack that led to 3.64M ETH siphoned away, and the splitting of the blockchain to Ethereum and Ethereum Classic.

**March 16, 2022**
**$2,772**
Ethereum Merge tested on Kiln testnet, expected to be the final testnet created before public testnets are upgraded, as the Ethereum network inches towards the Merge.

**March 18, 2022**
**$2,945**
Ethereum co-founder Vitalik Buterin appears on the cover of this week's TIME Magazine, as he revealed his concerns for the crypto industry's future.

**April 12, 2022**
**$3,030**
Ethereum's first mainnet shadow fork successfully launches, marking a milestone on the path to the long awaited Ethereum "Merge."

**May 7, 2022**
**$2,636**
The UST depeg and Terra crash caused investors to flee the ecosystem — resulting in a death spiral. 615,980 bETH (a wrapped bridged version of stETH on Terra) were bridged back to mainnet and offloaded on Curve. This caused a significant deviation between ETH and stETH.

**June 8, 2022**
**$1,793**
Ropsten, the longest-lived Ethereum PoW testnet which launched in 2016, underwent the first testnet Merge to adopt PoS. Ethereum developer Tim Beiko likened it to the "first dress rehearsal" before the actual Merge.

**June 13, 2022**
**$1,204**
Ether plunged 35.6% on the week, as selloffs were witnessed across crypto and global markets — fueled by fears of rampant inflation, imminent rate hikes and the prospect of recession. Crypto lender Celsius froze users assets, drawing parallels to the recent LUNA crash.

**June 18, 2022**
**$993**
Ether traded below the major level of $1,000, reaching a low of $896 after losing 40% in a week. BTC plunged below $20,000, the first time it has traded below its previous bull cycle's all-time-high.

**July 6, 2022** — **$1,186**

Sepolia, the second testnet to test the Merge after Ropsten, successfully switches to the PoS consensus. No significant glitches were reported following the testnet Merge.

**August 9, 2022** — **$1,703**

Ethereum-based Tornado Cash is sanctioned by the U.S. over allegations that it's been used to launder more than $7 billion worth of cryptocurrencies over the past three years.

**August 11, 2022** — **$1,881**

Goerli, the third and last testnet, successfully switched to PoS — in what was described as the final dress rehearsal before the Merge. Ether rallied by 11% as a result of the news — hitting highs of $1,908.20 at one point.

**August 25, 2022** — **$1,696**

The Ethereum Foundation has revealed that the long-awaited merge will be completed between Sept. 10 and 20. The foundation also announced a $1 million bug bounty.

**September 15, 2022** — **$1,471**

The Ethereum Merge, the chain's long-awaited switch to proof-of-stake, was completed without glitches. Ethereum pumped slightly following the implementation but dropped off after the excitement was gone.

**September 16, 2022** — **$1,432**

SEC Chairman Gary Gensler said that Ethereum's new proof-of-stake consensus mechanism may turn it into a security. According to Gensler, intermediaries offering staking services also looks very similar to lending.

**October 28, 2022** — **$1,555**

Ethereum ripped upwards, as liquidated shorts reached an all-time high denominated in dollars. Over $500 million in short liquidations on two consecutive days flushed out speculators betting on further downside.

**November 16, 2022** — **$1,215**

A hacker draining the accounts of bankrupt crypto exchange FTX became the 35th-biggest ETH holder. The account held over 228,000 ETH at its peak.

**November 20, 2022** — **$1,142**

The FTX hacker began dumping stolen Ethereum by converting it into wrapped Bitcoin and cashing out via the Ren Protocol. Ethereum continued to plunge on the news.

**December 20, 2022** — **$1,309**

The Commodity Futures Trading Commission again labeled Ether a commodity. The statement overruled previous opinions by CFTC chief Rostin Benham and SEC chair Gary Gensler that only Bitcoin can be considered a commodity.

**December 22, 2022** — **$1,217**

In an interview, Vitalik Buterin revealed three opportunities for crypto in 2023. He alluded to wallet infrastructure for mass use being a one-billion-user-opportunity and said a globally accessible and hyperinflation-resistant stablecoin would be revolutionary. Buterik also pointed to Ethereum aiming to take market share for internet logins from Google and Facebook.

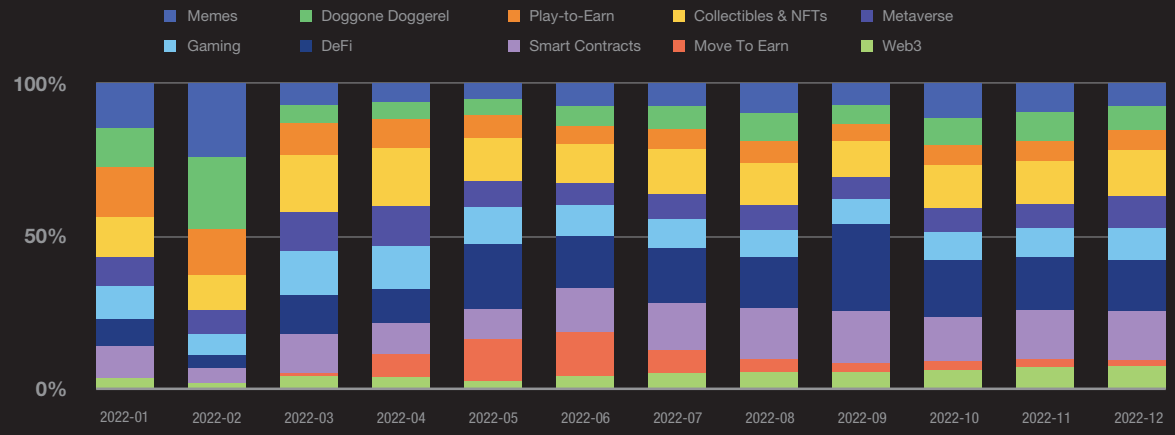
# Bitcoin Key Events and Price Map 2022

| BTC Price | |
|---|---|
| January 2, 2022 | |
| $47,345 | The Kazakhstan government removes energy price caps. After mass protests, President Tokayev blocked all internet access, ending Bitcoin mining nation-wide. Global hashrate fell by 14% in the first two days. |
| February 8, 2022 | |
| $44,118 | The United States Department of Justice announces it has seized $3.6 billion in stolen Bitcoin from the 2016 Bitfinex hack. Two individuals were arrested and charged with conspiracy to launder stolen cryptocurrency. |
| February 24, 2022 | |
| $38,332 | Russia launches a full-scale assault on Ukraine. Within 3 weeks, $54M in BTC and other crypto were sent to the Ukrainian government. BTC fell from $44,000 to $34,000 by the end of February. |
| March 9, 2022 | |
| $41,982 | Biden signs the "Ensuring Responsible Development of Digital Assets" executive order, laying out a roadmap of the U.S. plans for using and regulating crypto. BTC surged 9% as crypto execs reacted favorably. |
| April 27, 2022 | |
| $39,241 | The Central African Republic (CAR) adopted Bitcoin as legal tender, making it the second country to do so, after El Salvador. |
| May 7, 2022 | |
| $35,501 | Referred by some as crypto's "Lehman Brothers" moment, the Terra implosion and wipeout of $60 billion sent shockwaves across the entire market. BTC fell to $28,900, while the total crypto mcap more than halved to $822B. |
| June 3, 2022 | |
| $29,704 | El Salvador's Finance Minister announced the delay of the country's Bitcoin bonds. Their BTC holdings are all underwater. Moody's downgraded the country's credit rating on account of its Bitcoin holding. |
| June 12, 2022 | |
| $26,762 | As a result of the Terra crash and market downturn, major crypto lending platform Celsius announced a freeze on customer assets due to "extreme market conditions". BTC price sank 12% on the news. |
| June 15, 2022 | |
| $22,572 | Prominent hedge fund Three Arrows Capital (3AC), estimated to have $18 billion in AUM at its peak, has become the latest casualty. It later emerges that 3AC faced dozens of margin calls, and filed for bankruptcy. |
| June 18, 2022 | |
| $19,017 | The news of 3AC's implosion extended the bear market drawdown — BTC dipped below the major level of $20,000 for the first time since 2020. In the following days, BTC touched $18,000 at its lowest. |
| July 20, 2022 | |
| $24,169 | Tesla reveals that the firm has sold 75% of its Bitcoin holdings for roughly $900 million. CEO Elon Musk claimed the sale was to maximize Tesla's cash position, amidst uncertain economic conditions. |
| August 2, 2022 | |
| $22,978 | Bitcoin maxi Michael Saylor is stepping down as CEO of MicroStrategy. He will take on the role of executive chairman, focused on "acquiring and holding Bitcoin." The firm reportedly holds more than 129,699 BTC. |

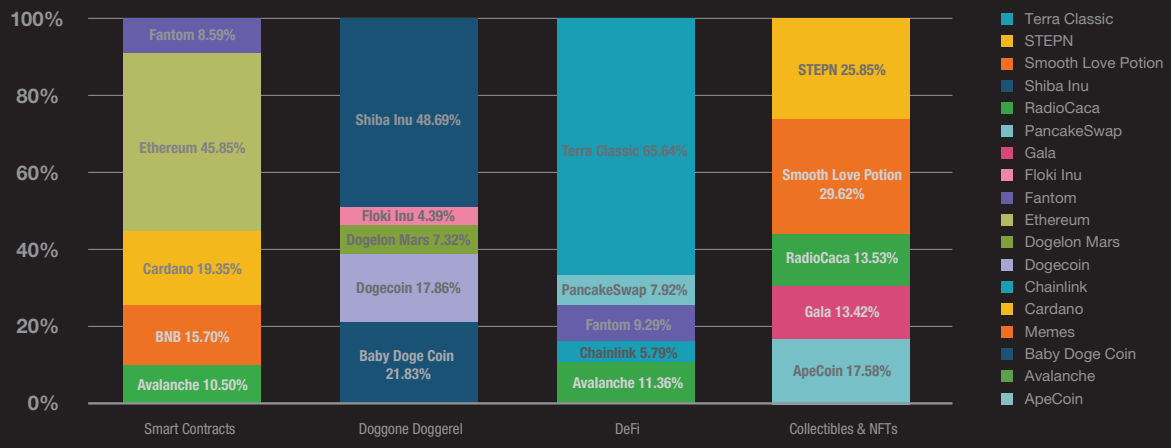
| BTC Price | |
|---|---|
| August 11, 2022 | |
| $23,957 | July's CPI came in at 8.5%, lower than the expected figure of 8.7%. Bitcoin surged 5.95% on the day and towards the psychological level of $25,000. |
| September 8, 2022 | |
| $19,329 | A White House report on the climate and energy implications of crypto suggested considering a ban on bitcoin mining unless it can be made more environmentally friendly. |
| September 21, 2022 | |
| $18,547 | The Federal Reserve raised interest rates for the third time by 75 basis points. Bitcoin seesaws almost $1,000 but closes the day significantly in the red. |
| September 27, 2022 | |
| $19,110 | A report from the Cambridge Centre for Alternative Finance said 37.6% of the energy used to mine bitcoin comes from renewables, significantly lower than the 59.5% claimed by the Bitcoin Mining Council. |
| October 21, 2022 | |
| $19,172 | Crypto influencer Hodlonaut won his libel trial against self-proclaimed Bitcoin inventor Craig Wright. Wright was ordered to cover the trial's costs of about $380,000. |
| October 22, 2022 | |
| $19,208 | A poll in El Salvador found that 77% of the country's population wants President Bukele to stop purchasing Bitcoin. Judging by Bukele's tweets, the country is down more than 50% on its purchases. |
| November 3, 2022 | |
| $20,209 | The Federal Reserve raised interest rates for the fourth time by 75 basis points. Despite warnings by the Federal Reserve that more hikes are on the way, Bitcoin hovers above $20,000. |
| November 11, 2022 | |
| $17,034 | The FTX Group, one of the largest crypto exchanges in the world, filed for Chapter 11 bankruptcy. According to the filing, Alameda Research's liabilities, which was closely intermingled with FTX, could be between $10 billion and $50 billion. |
| November 22, 2022 | |
| $16,189 | Following the bankruptcy of FTX, an IntoTheBlock report found that 55% of Bitcoin addresses are in the red, with only 44% in profit. |
| December 6, 2022 | |
| $17,089 | Standard Chartered can see Bitcoin dropping to $5,000 in 2023, according to its Financial Market Surprises report that points out potentially underpriced long-shots. The bank went against Bloomberg Intelligence's Crypto Outlook 2023, which suggested Bitcoin trades at a steep discount. |
| December 13, 2022 | |
| $17,781 | FTX founder Sam Bankman-Fried was arrested in The Bahamas. The arrest came only days before SBF was set to testify before Congress about the exchange's downfall. The disgraced founder was set to be extradited to the United States the following weeks. |
| December 21, 2022 | |
| $16,816 | One of the largest bitcoin miners in Core Scientific planned to file for bankruptcy protection. It was the first publicly listed mining company to file for bankruptcy. Bitcoin remained flat on the news. |

## Section 3:
# Understanding Crypto Through CMC

## Which Crypto Sectors Were Most Viewed on CMC?



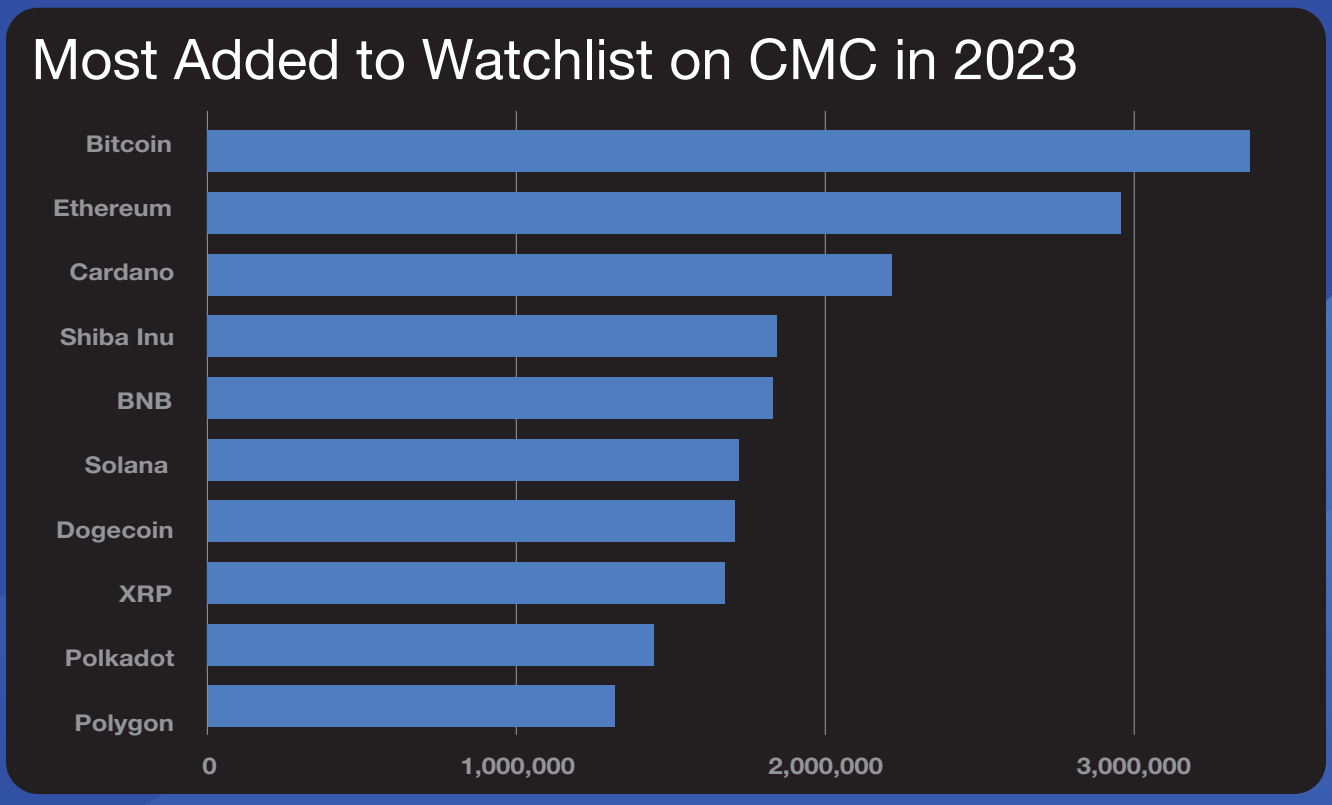

## Top 5 most viewed Coin Of The Sector



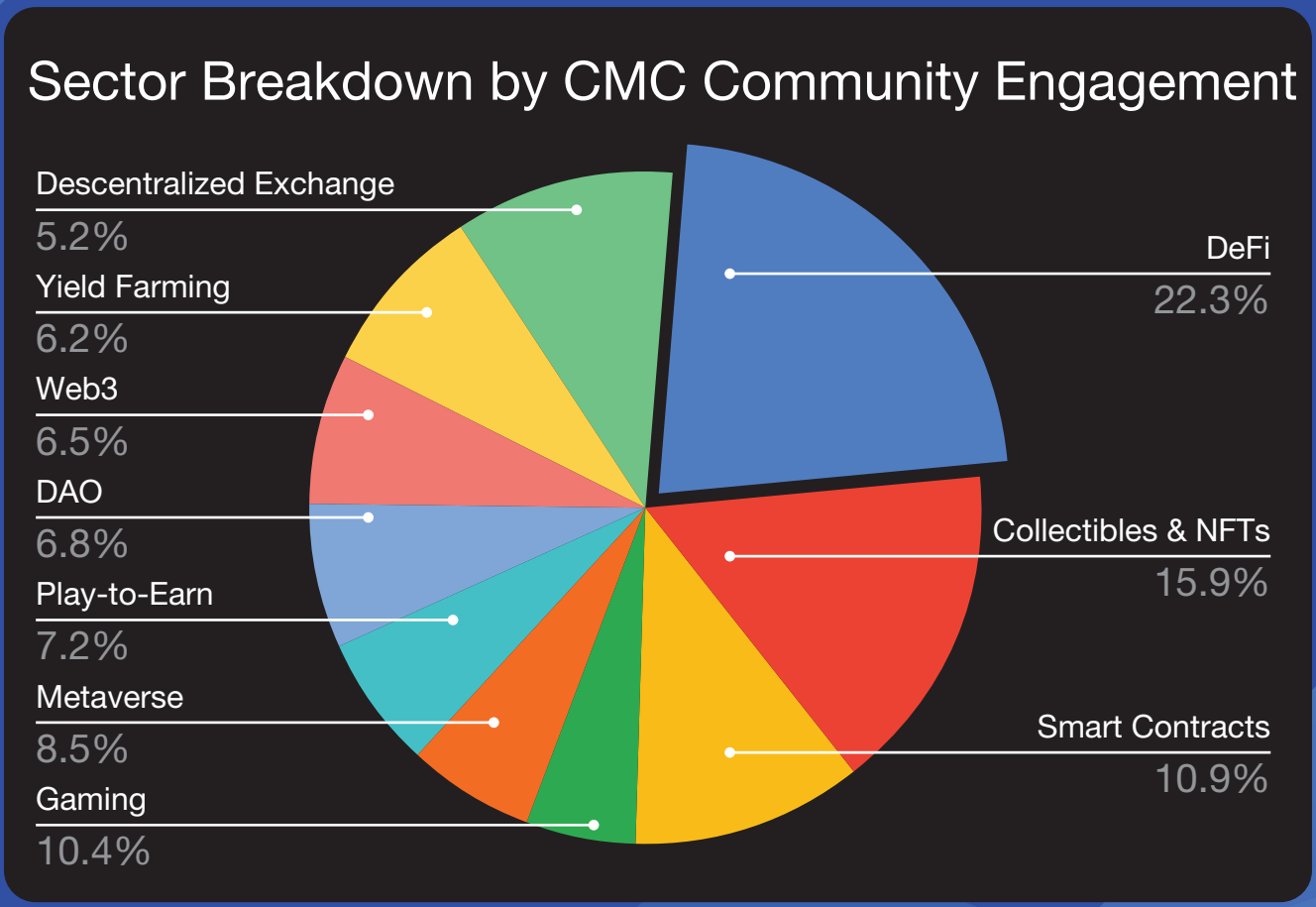

Taking a look at the most viewed categories on CoinMarketCap to draw insights into which sector or narratives retail users are interested in, we can see that:

- The year started out with strong interest in Doggone Doggerel — dog-themed memes coins, with Shiba Inu, Dogecoin and Baby Doge Coin leading this sector. Shiba Inu announced the launch of its own metaverse in February, while outspoken Dogecoin supporter Elon Musk bought shares in Twitter early this year, eventually acquiring the social media company in October. Musk's tweets have been known to move Dogecoin — and other doge-themed coins — prices significantly.

- From April to May, significant interest was on the move-to-earn (M2E) trend, pioneered by StepN and powered by the GMT token. Users buy NFTs of sneakers on the StepN platform and earn rewards based on the number of steps walked. Since launching in March, GMT rallied 25X in merely over a month, before falling just as steeply. Nonetheless, this pushed the X-to-earn narrative, with numerous projects springing up.
- From May onwards, the DeFi sector clearly stood out, led by Terra Classic (previously Terra). As covered in our previous According to CMC report, the Terra collapse saw exceptionally high user interest in tracking prices of Terra and UST. Furthermore, during times of high volatility, centralized exchanges had to halt trading, while DeFi protocols continued to operate permissionlesssly.
- Another major sector of interest since June is Smart Contracts, particularly Ethereum, which underwent arguably its most important upgrade in history — the Merge — in September this year.
- Finally, in the Collectibles & NFTs sector, another token with strong retail interest is Smooth Love Potion (SLP), the utility token of play-to-earn (P2E) pioneer Axie Infinity. While monthly active players have fallen over 80% since hitting 2.78M players in January 2022, there appears to still be substantial interest in SLP. In our 2022 Blockchain Gaming industry report co-published with Naavik, we argue that the P2E model is inherently flawed, and the industry is moving towards other models like free-to-own (F2O).



- Looking at what CMC users were keeping an eye out for the most amidst the bear of 2022, we can see that the world's most valuable cryptocurrency — Bitcoin, is unsurprisingly leading the charge, with Ethereum coming in a close second.
- In crypto winters, BTC's drawdown (-64%) is relatively less drastic compared to other altcoins like Solana (-90%), Cardano (-80%), Shiba Inu (75%). However, Ethereum (-67%) and Polygon (-68%) are not far off, while BNB (-52%) has actually bucked the trend and outperformed, showing the relative strength of these altcoins.
- As market leader, BTC leads the charge and the rest of the market follows. Retail users are likely tracking the movements of Bitcoin for signs of market recovery. Furthermore, data from Glassnode shows BTC addresses with smaller balances (likely to signify retail) are accumulating Bitcoin as prices dip throughout the year.




- Looking at CMC Community's engagement (an amalgamation of likes, posts and comments) as a proxy of retail interest and organic activity, we can see that DeFi is the leading sector of interest — coinciding with being the most viewed sector on CMC.
- This is likely due the collapse of FTX, once a top five centralized crypto exchange, and the colossal amount of user deposits squandered due to fraud — prompting widespread

awareness on self-custody and the merits of decentralized financial products. Uniswap surpassing most CEXs' (except Binance) daily trading volume for a few days in November and hardware wallet Ledger's breaking record sales numbers post-FTX are just a few examples — and where the trend (and retail interest) could be headed into 2023.

- In second place, tokens in the NFT sector are still generating considerable retail user interest, despite NFT sales volume falling over 85% since the start of 2022. In H2 2022, NFT sales and unique buyers have consolidated into a range, which likely shows that speculators in the NFT bull have left — while only the core users and enthusiasts remain.
- Rounding out the top three is the smart contracts sector. Notable tokens like Ethereum (with the Merge in September), and BNB (with its growing ecosystem and strong user activity) are likely to have contributed to the retail interest in this category.

## See which top cryptos we had our eyes on this year

| Cryptocurrency | Views | Market Cap Rank |
|---|---|---|
| **Bitcoin** | ~415 million | 1 |
| **Terra Classic** | ~265 million | 40 |
| **Ethereum** | ~200 million | 2 |
| **Shiba Inu** | ~150 million | 16 |
| **Solana** | ~110 million | 14 |
| **BNB** | ~55 million | 5 |
| **Smooth Love Potion** | ~55 million | 172 |
| **Cardano** | ~50 million | 9 |
| **XRP** | ~50 million | 6 |
| **Green Metaverse Token** | ~40 million | 114 |

- In a year filled with hacks, bankruns, bankruptcy and outright fraud, Bitcoin remained steadfast in its ethos as a decentralized, peer-to-peer digital currency. While some may criticize its relative lack of technical progress — Bitcoin's last major update was Taproot in June 2021 — its simplicity and immutability in code is partly why Bitcoin has the largest market cap.

- Coming in second with half the views of Bitcoin, Terra Classic (previously Terra) saw a wipeout of an estimated $60B ecosystem in May this year, and is arguably one of the most notable events of the year. The ripple effect on the industry brought about liquidations across over-leveraged firms, and likely even contributed to the downfall of FTX.
- Finally, in third, Ethereum's successful shipping of the Merge, a highly anticipated and complicated maneuver, was one of the standouts in an otherwise bleak year for crypto. In the months leading up to Merge, investors' interest was fixated on ETH, which rallied almost 90% from the June lows to hit the $2,000 level.

## Popular Crypto Exchanges

| Exchange | Views |
|---|---|
| **Binance** | ~3 millions |
| **PancakeSwap (V2)** | ~1 millions |
| **KuCoin** | ~1 millions |
| **Gate.io** | ~1 millions |
| **Coinbase** | ~950,000 |
| **FTX** | ~770,000 |
| **MEXC** | ~750,000 |
| **Huobi** | ~520,000 |
| **Bybit** | ~515,000 |
| **OKX** | ~495,000 |

- The most heavily traded-on crypto exchange — Binance, which processed $22 trillion in trades this year, is the most viewed exchange.
- In second is decentralized exchange PancakeSwap, which saw $136 billion in cumulative trading volume this year. Initially launching on the BNB Chain, PancakeSwap added support for Ethereum and Aptos this year, and released features like perpetual trading and NFTs.
- Notably, the inclusion of FTX in this list is resultant of the exchange's spectacular crash to the ground. Post-FTX, the industry's call for greater transparency saw the release of proof-of-reserves (PoR) by exchanges, available directly on CoinMarketCap's exchange page; seven of eight exchanges (excluding FTX and PancakeSwap) have publicly released their PoR data.

# Section 4:
# Frontier of the Crypto Market

## Key Themes for 2023

**Self-Custody**

With the cryptocurrency market in the state that it is — recovering from the shock of the Luna stablecoin collapse, the subsequent collapse of several large VC firms, and the alleged fraud and bankruptcy proceedings at FTX — one of the most important topics for 2023 is going to be self-custody. As both experienced crypto traders and crypto newbies grapple with the fallout from these "too big to fail" crypto company failures, it will become a more important narrative to provide education and resources surrounding what custody, self-custody, private keys and the like mean for your crypto investments.

Conversely, centralized crypto exchanges will need to be more transparent in order to remain competitive with self-custody solutions, namely by developing trusted ways to show both proof-of-reserves and proof-of-liabilities.

**Regulators Move In**

And — fortunately or unfortunately — 2023 is going to be a year of increased regulatory scrutiny. As the FTX bankruptcy case and the fraud trials of three of its key players play out in the United States, regulators will be taking note of any legal precedents that will be set by any rulings. SEC Chair Gary Gensler has often repeated in 2022 his desire for more regulatory clarity — perhaps this will be the year that both the U.S. SEC and CFTC come up with clearer crypto guidance that will allow crypto companies to register and operate within the country.

Another year has also passed without a spot Bitcoin exchange-traded fund being approved. With the ARK 21 Shares ETF deadlines for approval pushed back again to January 15, 2023, there is a chance (albeit a small one) that 2023 could be the year of the Bitcoin ETF.

**DeFi Summer 2.0?**

We also see DEXs playing a large role in the 2023 crypto narrative. GMX, a perpetual-focused DEX, has already surpassed Uniswap for the first time ever in daily fees earned in November 2022. The DEX (built on Avalanche and Arbitrum) saw its popularity grow in the wake of the FTX collapse as it offers crypto perpetuals trading with what it touts as low transaction fees. Another DEX, STFX, has gained in popularity this fall and brought a new economic model to the fore-

front: social trading in DeFi with a focus on short-term asset management.
With innovations and low fees like what DEXs GMX and STFX can offer, we expect more creative ways to trade in 2023, as traders move away from traditional, centralized crypto exchange trading and explore self-custody DeFi solutions. Perhaps the summer of 2023 could even be DeFi Summer 2.0.

## What's Being Built?

It's possible that if the bear market continues, coins without intrinsic value like memecoins will lose more of their popularity and that sector will shrink as it becomes more unprofitable to create/invest in memecoins. As well, with the collapse of the first real algorithmic stablecoin success story, 2023 might see less of a focus on building stablecoin projects in general.

Instead, the sectors that are most likely to see growth with more builders are GameFi, decentralized asset management (like STFX discussed above), and SocialFi (like Lens Protocol, as Twitter continues to play its weird, Elon-Musk-centered games with its users).

The CMC listings team expects to see growth in the newer L1 ecosystems that hit the industry this year, namely Arbitrum, Linera, Aptos and Sui Network (expected launch in H1 2023).

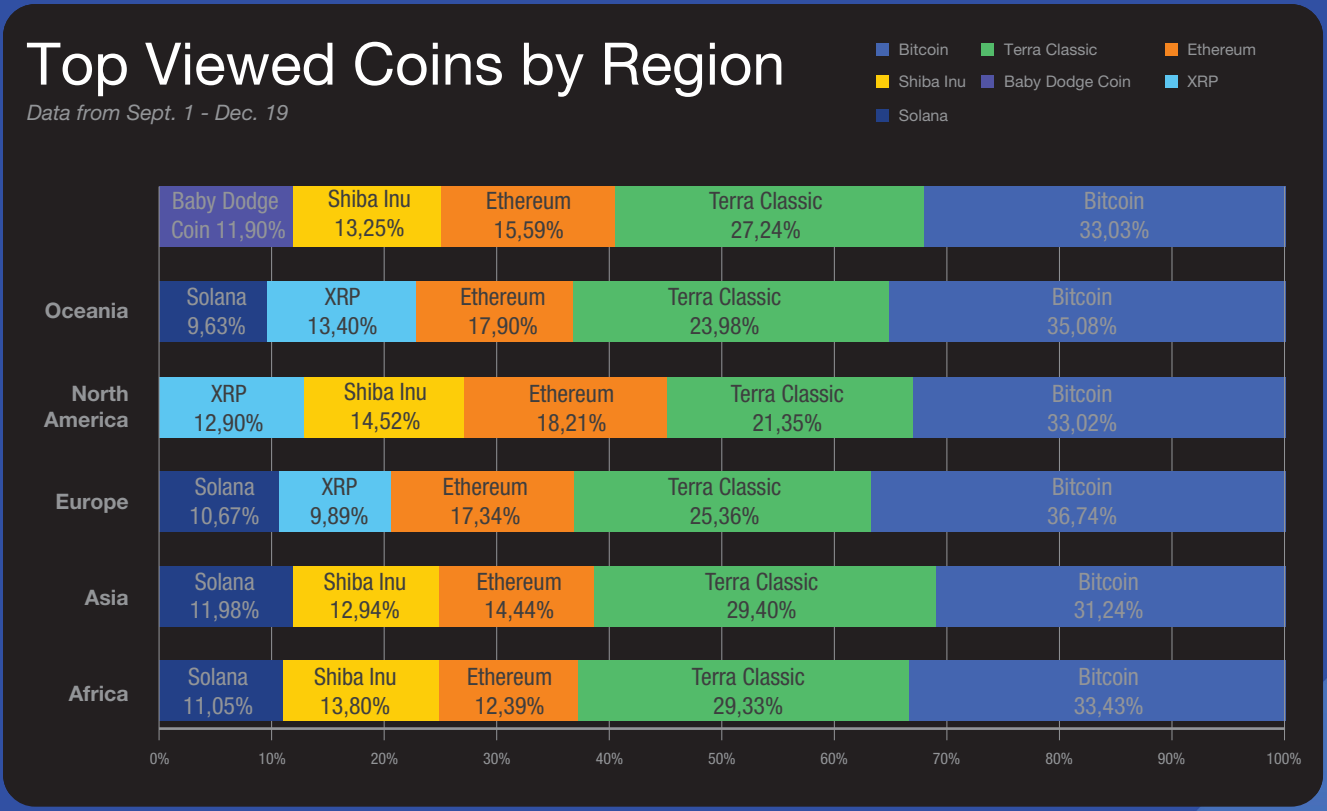
Inflation peaked in 2022, so macroeconomics in 2023 should improve as inflation starts to decrease. This combination of factors has the potential to fuel a bear market rally for Bitcoin in the new year.

# Around the World With CMC

Even throughout this bear market, meme coins like Shiba Inu and Baby Doge Coin were still viewed quite often across almost all regions globally.

As well, Terra Classic — the rebranded coin associated with the algorithmic stablecoin project that lost its peg back in Spring 2022 — is still a commonly viewed coin globally for CoinMarketCap users, despite LUNA never regaining its peg.

Solana, a cryptocurrency ecosystem that aims to provide many of the same functionalities (and more) as Ethereum, was a top searched coin only in Europe, Asia and Africa — North American

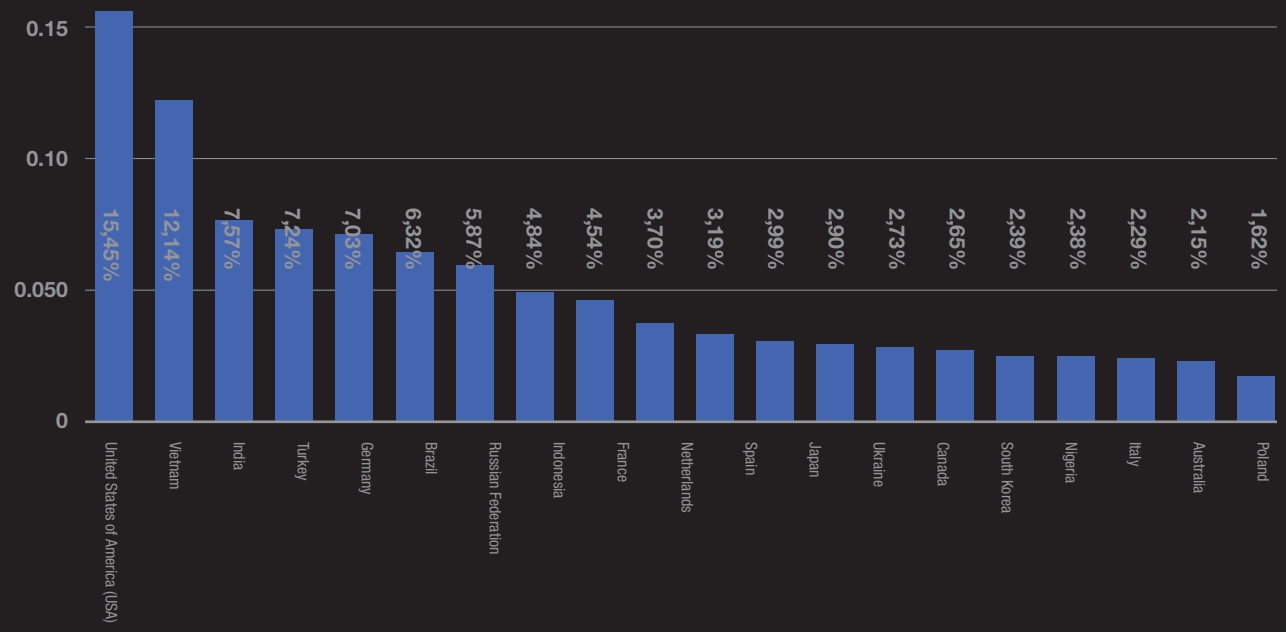



and South American users were less interested in SOL. The end of this year saw Solana Breakpoint, the ecosystem's flagship conference, take place in Portugal, which could account for the increased European interest.

Interestingly, there was less interest in viewing XRP in South America than could have been expected, as Ripple (the company associated with the XRP token) has a focus on using cryptocurrency for remittances in South America via their partnership with MoneyGram.

# Top Countries by Users on CMC

*Data from Sept. 1 - Nov. 30*




Even though CoinMarketCap is a global company, the majority of our visitors do come from the United States. But Vietnam is in second place (even with 1/3 of America's population size) for countries whose users most often visit CMC. This high ranking for Vietnam could be related to the extreme popularity of GameFi, or play-to-earn, within the country — a popularity which appears to bring Vietnamese to check GameFi token prices even as the industry has taken an overall hit (both in terms of price and amount of P2E game plays).

In third place is India, a country not known for its friendly cryptocurrency regulation or tax structure. However, the amount of negative news about crypto coming from the country's government and central bank could be responsible for a heightened interest from India in checking crypto prices — as they say, all press is good press.

In seventh place is the Russian Federation, a country whose population has had a fraught relationship with cryptocurrency this year as its citizens faced the effects of economic sanctions that both left crypto as the only viable alternative while many crypto exchanges simultaneously stopped serving Russian customers. Ukraine, the victim of Russia's war, has also used cryptocurrency this year to solicit donations for the war effort — but Ukrainians visiting CMC in the latter portion of 2022 only come in 14th place.

# 5.0 Build

## Introduction

This is a very important chapter in our playbook because as crypto remains in a bear market, the industry has been going fully into Build mode. It's never been a better time to be optimistic than now, if we look at what's being built. In the Layer 1 space, Ethereum has become much stronger after The Merge, along with other alternative L1s coming in to fill any gaps for developers to use. This development of L1s is also driven by L2 solutions, which is a trend that will continue in the coming year.

In our Build chapter, we will share insights from Binance Research, ConsenSys, SlowMist and Jumpy Crypto concerning what has been built — and what will be built. Our research partners will cover topics ranging from the increase in on-chains sleuths and better analytics tools for users to new types of decentralized governance in DAOs. As well, the reports will delve into how L1s can stay competitive, what the key trends are among developers, how L2s can gain more mindshare (such as the further development of ZK-snarks), and possible cases for NFT markets to move multi-chain.

# Layer-1s — What Has Happened and Where Are We Headed?


**By Binance Research**

BINANCE RESEARCH

Binance Research is the research arm of Binance, the world's leading cryptocurrency exchange. The team is committed to delivering objective, independent, and comprehensive analysis and aims to be a thought leader in the crypto space. Our analysts publish insightful thought pieces regularly on topics related but not limited to, the crypto ecosystem, blockchain technologies, and the latest market themes.

/BinanceResearch

https://research.binance.com


Considering the standards of 2022 and all that has happened in the crypto space, layer-1s ("L1s") can still be said to have had a very interesting and eventful year. Many notable events have taken place in the L1 space over 2022. From Ethereum's transition from proof-of-work to proof-of-stake in September, to the implosion of the Terra ecosystem in May. New L1s were announced, with Aptos launching its mainnet and Sui expected early to do so next year. Notable incumbent, BNB Chain and leading layer-2 ("L2") solution, Polygon, gained market share in the vacuum left by Terra, while Solana had a more challenging year, being one of the L1s more impacted by the recent FTX saga. The year was rife with material events in arguably the most important sub-sector within crypto.

# What has happened?

**Figure 1: L1 / L2 market cap and daily on-chain metrics across 2022**

| Blockchain | Market Cap ($B) | | Daily Txs (M) | | Daily active addresses (K) | |
|---|---|---|---|---|---|---|
| | Jan-22 | Dec-22 | Jan-22 | Dec-22 | Jan-22 | Dec-22 |
| Ethereum | 444.0 | 153.6 | 1.2 | 1.0 | 436 | 566 |
| BNB Chain | 85.4 | 45.4 | 5.9 | 3.2 | 1,240 | 1,409 |
| Polygon | 18.1 | 7.7 | 4.0 | 3.0 | 604 | 656 |
| Solana | 52.7 | 4.8 | 17.5 | 19.7 | 332 | 296 |
| Avalanche | 26.6 | 3.9 | 0.7 | 0.1 | 74 | 26 |
| Optimism | n/a | 0.2 | 0.0 | 0.4 | 3 | 42 |
| Arbtitrum | n/a | | 0.0 | 0.4 | 6 | 81 |

Sources: Nansen, CoinMarketCap, Block explorers as of 12 Dec 2022

BINANCE

# Key Observations

- **Market cap** is, of course, lower for a multitude of reasons that we are not going to dedicate this piece to. However, we should very clearly note that market cap does not necessarily correlate to very important on-chain metrics in terms of daily transactions and active addresses. As we can see, BNB Chain and Solana excel here, while Ethereum, despite the greater market cap, is evidently lower in terms of daily activity.
- **Ethereum:** The Merge! Since this topic has been covered ad nauseum by everyone and their cat, rather than repeating, we wanted to talk about its impact. Data shows that since completing the transition to proof-of-stake in mid-September, $ETH supply growth is massively down (from 3.58%/y to 0.005%/y). In fact, in combination with its burn mechanism, $ETH spent the majority of November as a deflationary asset and currently sits very close to that level.

- **BNB Chain:** a commendable year for BNB Chain, with market cap down only ~45% YTD, quite a bit better off than major competitors Ethereum (-64% YTD) and Solana (-90% YTD). BNB Chain was one of the major L1s helping onboard developers displaced by the Terra and FTX scandals. Daily activity metrics remain extremely high, with the launch of BNB Liquid Staking and zkBNB being notable highlights. Innovation and partnerships in the NFT space are also continuing in full swing, with OpenSea recently announcing support for BNB Chain NFTs on its platform.
- **Solana / Avalanche:** 2022 was challenging for the classic "alt-L1" trade of 2021. Solana saw some strong traction in their NFT ecosystem, with growth in collections, volumes and marketplaces. Avalanche saw positive headlines on the back of their Subnets, which offered scalability for decentralized applications ("dApps"), particularly in the gaming space. However, both alt-L1s have suffered from poor publicity (for Solana this came via the FTX scandal, while for Avalanche this was a product of some not-so-flattering news that got leaked a few months ago). Solana has also continued to suffer from regular outages, calling into question the reliability of the network.
- **Layer 2s:** While L2s are technically one step removed from the L1, any discussion on L1s is incomplete without at least commenting on the growing scaling market. Polygon is the undoubtable leader here, with its numerous solutions across the board. It has been a strong year for Polygon, with their business development continuing to shine (Starbucks NFTs, Reddit NFTs, Instagram/Meta NFTs to name just a few recent headlines that Polygon has been behind). More pure-play L2s, Arbitrum and Optimism have also performed strongly over the past year and continued to increase activity / take market share from some of the smaller alt-L1s. The OP token's launch was a notable moment for Optimism earlier this year, while Arbitrum continued to focus on their core product offerings with their launches of Arbitrum Nitro and Arbitrum Nova.

# Expectations for 2023

Now that we have got some idea of how the major L1s have moved through the year and some of their notable events, what about the coming year? What are our tentative expectations?

### L1s (particularly some of the smaller alt-L1s) will feel the pressure of L2s

- One of the major narratives of the year was so-called "L222" referring to 2022 being the breakout year for L2s. Did we see this? L2 total value locked ("TVL") figures show that

there was an increase of 118% (in ETH terms) since the start of the year. So, in a way, yes. It certainly has been the biggest year that L2s have had so far. However, in absolute terms, total TVL locked in L2s is only around US$4.5B. When we compare to total DeFi TVL in Ethereum (around US$25B), and total crypto market cap sitting near US$900B, we can contextualize how far L2s still have to climb.

- Consider also the fact that, as shown in Figure 1, both Arbitrum and Optimism exceed Avalanche in terms of daily on-chain activity. Add to this the increasing deployment of alt-L1s dApps on L2s e.g. Trader Joe of Avalanche recently announced their deployment on Arbitrum, and it will be interesting to monitor what happens with some of the smaller alt-L1s. There has been an idea that has been discussed among many in the crypto space that the major L1s will simply become settlement layers, while execution and activity happens on the L2s. While we are seeing a little bit of this already, 2023 might very well be the year that we see this happen on a much larger scale.

## New L1s could survive if they truly bring something new to the table

- Consider the most well-known new entrants in the L1 space, Aptos (who went to mainnet in Q4 of this year) and Sui (who are expected to launch in early 2023). Both of these L1s bring various new innovations with them, including the Move programming language. Given the background of this language and all that it promises, alongside the potential increases in transaction speed with both L1s, there is a potential for some true innovation. It should be worth keeping a close eye on whether either or both of these L1s are able to utilize their new technologies to bring about a step change in the crypto market.

# The Present and Future of Layer 2 Roll-ups


CONSENSYS

ConsenSys is a leading Ethereum and decentralized protocols software company. We enable developers, enterprises, and people worldwide to build next-generation applications, launch modern financial infrastructure, and access the decentralized web. Our product suite, composed of Infura, Quorum, Codefi, MetaMask, Truffle, Diligence and our NFT platform, serves millions of users, supports billions of blockchain-based queries for our clients, and has handled billions of dollars in digital assets.

/ConsenSys

https://consensys.net


**By ConsenSys**

## An Overview of Layer 2 Roll-ups

Over the past few years, Layer 2 (L2) rollup solutions have come to the forefront as activity on the Ethereum network has grown. Activity and engagement with non-fungible tokens (NFTs) and Decentralized Finance (DeFi) has caused a surge in Layer 1 (L1) blockchain activity. In turn, the demand for blockspace, represented by gas costs, has increased. And the time for transaction finality has risen due to the increased network load. Whilst the Ethereum Merge set the groundwork for future gas fee optimisations; it did not directly reduce transaction gas fees.

In the year between the summer of 2020 and the peak demand in the summer of 2021 gas cost in Gwei on the Ethereum network increased by up to 1300%. The need to make transactions fast and affordable spurred the creation of two primary forms of rollup: Optimistic and Zero-Knowledge (ZK).

Rollups help remove the computational demands on the Ethereum network by moving transaction processing off-chain, converting them into a single piece of data and then submitting back on Ethereum as a batch to reduce the associated cost and time. The big difference between the two is that Optimistic roll-ups utilise fraud proofs, whereas ZK-rollups rely on zero-knowledge proofs to verify changes to the main chain.

## Optimistic and ZK-rollups: Fraud Proofs vs Validity Proofs

Fraud proofs bundle transactions off-chain and then repost them to the L1. After a bundle has been submitted on the L1 there is a challenge period, during which anyone can challenge the result of the rollup by computing a fraud proof. Similarly, zero-knowledge proofs batch transactions off-chain and submit them as a single transaction. Where they differ is rather than assuming the transactions are correct initially, they use a validity proof to instantly prove whether the transactions are valid. Once the transactions have been confirmed as valid they are then submitted to the L1. This is how they derive their respective names - fraud proofs are where the transactions are checked retrospectively to see if there are any fraudulent transactions, whereas validity proofs are completed before the transactions are submitted to the L1.

Whilst there are prominent projects for both, they each come with their own respective benefits and drawbacks. Optimistic roll-ups have the advantage that fraud proofs are only required when there is an issue. This means they require less computational resources and are able to scale well. The trouble lies with the challenge period. A longer challenge period increases the likelihood that any fraudulent transactions are identified, however it also means that users have to wait longer to withdraw their funds. For leading optimistic rollup solutions, such as Arbitrum and Optimism, this waiting period can last up to a week. Alternatively, ZK-rollups have the advantage of always reflecting a correct L2 state. Their drawback is that proofs are required for all state transitions, rather than solely when they are contested, which limits scalability. This is further compounded by the complex nature and early stage of the technology.

Despite their respective challenges, ZK-rollups are being heralded as the future for roll-ups. This is primarily due to the automatic generation of validity proofs increasing the security of the protocol, the significantly reduced time to withdraw due to there being no challenge period, and that ZK-rollups boast better data compression. For these reasons we will hone in on the current state of the ZK-rollup space, the latest innovations and what lies ahead in the future.

| | Optimistic Rollup | ZK- Rollup |
|---|---|---|
| **Fund withdrawal period** | Several days | Few minutes to hours |
| **EVM compatibility** | Easier to prove EVM execution | Harder to prove EVM execution |
| **Computer costs for proof generation** | Lightweight | |
| **Complexity of technology** | Low | High |
| **Type of cryptographic proof used** | Fraud proofs | Validity proofs |
| **Inherited qualities from Layer-1** | Security | Security and liveness |
| **Data compression** | All transactionss must be compressed and commited on-chain | Only transactions relevant for computing the slate delta need to be compressed and committed on-chain |

So**urces:** Galaxy Digital

## The ZK-Rollup Space

As we've discussed, ZK-rollups are predominantly in the focal point with players like zkSync, Starknet, Polygon zkEVM, and Scroll all raising large amounts of capital to develop their solutions despite only StarkNet having launched on mainnet ($780MM in total). Each of these projects have taken their own angle, differing primarily across their rollups data availability strategy and their proving algorithm. The data availability strategy determines where the state data of a roll-up is stored, on-chain storage has increased security but it uses up block space on the Ethereum network which reduces transaction throughput.

The proving algorithm is the means of generating a validity proof, which can either be STARK or SNARK. Both of these algorithms help developers to relocate computation and storage off-chain, in turn increasing scalability. They are also able to verify whether a user has sufficient funds and the correct private key without having to access the information

itself, thus improving the security. You can read more about the technical differences here. STARKs have the advantage of offering more scalability, security and transparency compared to SNARKs. But the drawback STARKS have is a larger proof size, which takes longer to verify, and that SNARKs comparatively only use 24% of the gas. Therein for both SNARKS and STARKS we have the tradeoff between speed and cost vs. scalability, security and transparency.  Whilst many different methods are being explored there is not yet a definitive answer as to the best way to set up a ZK-rollup. Each configuration brings respective benefits and many developers are still exploring the optimal choice or combination for their rollup designs.

## The Hurdles to Overcome

As we've discussed, ZK-rollups are still in development and there are various challenges that need to be overcome before blockchain users are able to reap their full benefits. Language compatibility is one such challenge; translating EVM-friendly programming languages, such as Solidity, into a custom-built language specifically optimised for ZKP can help boost their efficiency, but it brings with it adoption challenges for developers. For example, StarkNet is looking to solve this with Warp, a Solidity to Cairo (the language of StarkNet's ZKP) language compiler that looks to automatically convert Solidity into Cairo. Using Warp removes the need for developers to rewrite their code in Cairo, making it a much smoother process.

Other challenges include the secretive nature of projects, with many going against the open source ethos of crypto due to concerns over first-mover advantage and capturing a sticky userbase. Most ZK-rollups were first launched this year, highlighting the amount of work that is yet to be done in the space.

Lastly, whilst rollups (both optimistic and zero-knowledge) have the benefits of improved speed and cost, it tends to be at the expense of decentralisation. This is due to the inherent need for sequencers, the actors batching transactions and committing proofs to the L1. All rollups currently need a centralised sequencer and use upgradeable smart contracts that are managed by a single entity. Because the space is still so early, a central focal point is typically required for quick fixes to bugs in the code. Add to that the projects aren't open sourced, creating another hurdle for community members to act as sequencers. Many projects have indicated that they plan to decentralize their sequencer functions in the future, but this will undoubtedly take additional resources and time.

## Decentralization Plans

Launching a token and open-sourcing code will be the next steps for many of the projects seeking decentralisation. Tokenisation of these services to generate activity and decentralise the product is another area where we expect to see a myriad of different solutions cropping up as projects look to create the most scalable, decentralised and active L2 on the market. StarkWare and zkSync are both planning to launch a token and Polygon could potentially use MATIC to support Polygon's zkEVM initiative. Token engineering on ZK-rollups is an even more nascent space than the optimistic rollup technology and finding an effective and sustainable model can differentiate and boost adoption.

## The Future

zkEVMs are still in their very early stages and the race is on to launch on mainnet. StarkNet has the first mover advantage but still has challenges with regards to supporting Solidity features due to the use of Cairo, leaving room for competitors to make improvements. The projects that are able to amass significant user bases will attract dapp developers, in turn bringing more dapps to their platform and increasing the feature set. ConsenSys' zkEVM is currently moving to testnet and are focussing specifically on dapp developers for this reason, leveraging tools like MetaMask, Infura and Truffle so that they can deploy and manage applications as if they were directly using Ethereum.

And whilst we have discussed the current players in the zkEVM market, other predominant rollup solutions like Polygon, Optimism and Arbitrum still command a significant market share. As zkEVM solutions mature, we may see these projects look to transition to validity proofs or hybrid solutions, leveraging their existing user bases to attract dapp development and maintain their market dominance. In the end, the many rollup solutions (and the increased competition between them) will continue to improve the web3 user experience and introduce platforms for applications to onboard the next generation of users.

Given these threats, we're not surprised at the secrecy of projects in the space, but we believe the true winner will be able to leverage the efficiency of ZK-rollups and combine it with a seamless developer and user experience to come out on top.

# Blockchain Development Trends


Since our inception in 2018, we have provided services such as security audits, security consultants, red teaming, and more. Our team has audited thousands of crypto and DeFi projects, including major exchanges, wallets, individual smart contracts, DApps, and blockchains.

/SlowMist_Team

https://www.slowmist.com


**By SlowMist**

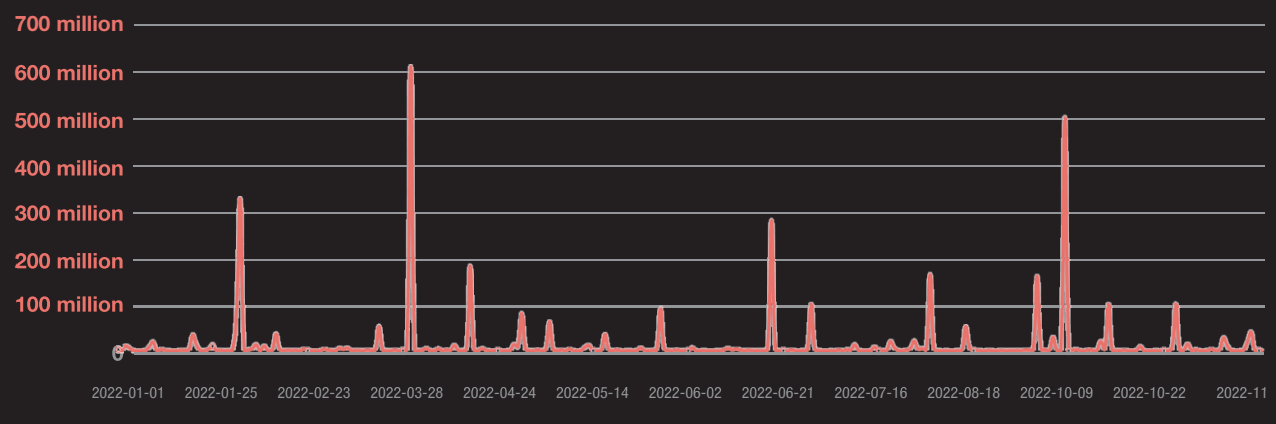
The collapse of Terra LUNA/UST, Celsius, Voyager Digital, Three Arrows Capital and the most recent FTX saga has made 2022 a tough and volatile year for many in the industry.

According to CoinMarketCap, the total crypto market capitalization has dropped to $821 billion as of the end of November, while on-chain crime has also increased in frequency and sophistication as the industry grows. As of Nov. 22, 2022, there had been 290 security incidents with a total loss of over $3.6 billion, as documented by SlowMist Hacked (an archive of blockchain-related incidents).

## SlowMist Hacked Statistical

Total 2022 hack event(s) 290

The total amount of money lsot by blockchain hackers is about: $ 3,631,139,366.15



Regulations have been at the core of the ongoing discussion over how to reduce crypto crime. Effectively regulating the market, protecting retail users, providing stability to some of the systemic challenges — these are some of the most pressing issues to be addressed.

On the flip side, this year has also brought regulators and the general public closer to crypto and blockchain technology. As a result, crypto-related policies are also becoming more transparent, which will ultimately contribute to the overall growth of the blockchain industry.

Besides regulations, what are the areas the industry should focus on in 2023?

## An Increased Focus on Security Audits

October 2022 alone has seen over 20 attacks on Web 3-related projects and trading platforms. Most of these were attacks and exploitations due to security flaws in the projects' code. Many cross-chain bridges have been launched with 0 fees and fast transactions in order to quickly onboard users and projects to the ecosystem — all done at the expense of disregarding security as the most vital consideration. Cross-chain bridges have a high level of liquidity yet little decentralization, and the majority of the authority resides in multi-signature wallets: once hackers gain access to signatures, they exert complete control. Additionally, while it's rare for cross-chain bridges to undergo security audits, the communities provide little in terms of security monitoring. As a result, cross-chain bridges often become a popular target for hackers. With the raise in security-related incidents, we anticipate that more projects will recognize the value of auditing going forward. Based on the deep knowledge and expertise that SlowMist has accumulated in blockchain security, we believe that it is essential for projects to undergo a comprehensive security audit of the front/back-end and the contract, together with other methods such as using bug bounties to improve the project's security throughout its ongoing operation and development.

## A Multi-Chain Future With Increased Interoperability

2021 started the expansion of multiple Layer 1s with Solana, Avalanche and others, and 2022 saw the continuity of this trend with Aptos and Sui attracting significant investor funding and media attention. Although the Ethereum Merge from PoW to PoS hasn't brought significant improvement to its transaction cost or speed, this theme of scalability will continue among

other L1s. Various Layer 2 projects have also been developed to reduce the network layer load, increasing its efficiency. Scalable rollup platforms, such as Arbitrum, will continue to garner interest as a medium to long-term solution to the Ethereum network congestion issue.

The impossible trilemma in blockchain — security, scalability and speed — cannot be achieved simultaneously, which means that there are now multiple L1s addressing various user demands. Consequently, we expect further development of cross-chain solutions, where EVM and non-EVM compatible chains are connected to achieve interoperability and compatibility. These developments should give the community the opportunity to find the balance between a swift cross-chain bridge, sufficient liquidity and a secure user interaction experience.

## Anti-Money Laundering and On-Chain Tracking Analysis

The importance of on-chain crime tracking is also more prominent. On-chain data can benefit blockchain analytics and anti-money laundering investigations immensely, and we're already starting to see a multitude of on-chain tracking and analysis platforms and tools. Through the data aggregation of these tracking tools, users can discover information such as the location of their funds and determine whether their assets are connected to stolen funds. In the near future, tracking tools will continue to develop and add more capability to anti-money laundering investigations.

## More Emphasis on Backing Up Your Keys

Even with all of the various self-custody wallet products available now, the loss of private keys and seed phrases has continued to be a very common reason behind many cases of crypto theft. To address this issue, backups such as multi-party computation (MPC) have gained a place in the spotlight in recent months as a viable solution to the single-point backup problem.

With MPC, when a private key is initially generated, it can then be divided into multiple shards and distributed to a group of individuals. Using this specific method, the original private key can then be restored when necessary. In the near future, we anticipate that there will be an open-source solution that conforms to industry standards on this topic.

## Zero-Knowledge Proofs: Scalability and Privacy

Zero-knowledge technology is a subfield of cryptography that can solve privacy and scalability issues for numerous Layer 1 blockchain projects. Although it is not a new technical term, it hasn't been a hot topic until recent months, and zero-knowledge proofs may be one of the most significant Web 3 and blockchain solutions in the coming years.

## DAOs: Will Their Use Cases Expand?

In 2022, DAOs became one of the hottest topics in crypto, even though the majority of DAO organizations and their creation tools are exclusive to the Ethereum ecosystem and less developed on other L1s. How DAOs can overcome incentive challenges, implement cross-chain asset management and interaction capabilities and expand use cases will be the key for the next phase of its development.

## NFT Markets Move Multi-Chain

Previously, the Ethereum ecosystem was the one processing the vast majority of NFT transactions. In the years to come, it's possible that NFT transactions will increasingly be conducted on different chains, so projects that help facilitate such transactions will be in high demand. The gaming industry is a promising new frontier for NFT applications, with a rising number of new players and developers in NFT related games in 2023.

One thing we know for sure: blockchain will be the driving force of many of the developments worldwide. We are looking forward to a compliant blockchain world, a world of expanded capacity with a multi-chain balance, mature technology and an ecologically stable ecosystem.

# Making Governance Truly Decentralized


**By Jump Crypto**


Jump Crypto is committed to building and standing up critical infrastructure needed to catalyze the growth of the crypto ecosystem. They are builders, partners, and traders who take a long-term view of crypto's prospects and operate to unlock the full potential of open, community-driven networks. Jump Crypto is the crypto division of Jump Trading Group, a research-driven quantitative trading firm that's one of the largest traders by volume across traditional asset classes.

/jump_

https://jumpcrypto.com

The central breakthrough of blockchains is to allow distrusting parties to work together on complex tasks. For instance, decentralized autonomous organizations—DAOs—have been created to govern everything from the parameters of lending protocols to the financing of a bid to purchase a copy of the US Constitution. Despite these unprecedented feats of decentralized governance, protocols remain rife with suboptimal voting mechanisms like direct democracy and one-token-one-vote. Many even seem largely unwilling to experiment with new ideas. At Jump Crypto, we believe crypto protocols should begin addressing these issues in earnest.

Let 2023 be the year that governance blossoms in crypto.

## The Flaws of Direct Democracy

Decentralized governance typically occurs in the form of referenda that all token holders can vote on, but token holders are often not actively engaged in evaluating governance proposals. New protocol governance ideas arise frequently

and voters have limited bandwidth to think carefully about all of them. Moreover, when the number of voters is large, the chance of any individual's vote being pivotal is close to zero. The effect is that even though governance functions are decentralized, protocols are dominated by interest groups and whales.

As discussed by Andrew Hall and Porter Smith, these issues have been felt throughout the history of democratic governance. Crypto protocols should more often implement representative democracy. They should hold token holder votes to elect representatives who can be relied on to make nitty-gritty decisions. Representatives enter into a social contract of sorts with protocol users, and mechanisms can be built in for token holders to check abuses of power by their representatives—the community can vote on conditioning token rewards on certain performance goals.

Protocols can also introduce representative committees tailored to particular initiatives. For example, liquid staking protocol Lido has committees for ecosystem grants, resourcing, and more. DeDAO—which manages the DeGods NFT project—takes a different approach, with different committees consisting of community leaders, elected representatives, and a "team of Alpha Gods." High-quality representation can be incentivized by conditioning rewards for representatives that demonstrate positive behaviors, like actively contributing to discussions and maintaining high approval rates. Carefully devising a representation scheme can lead to focused, deliberate governance actions unaffected by interest group capture.
Even in protocols which do not develop representative systems, token delegation can be a meaningful way to mitigate the harms of direct democracy. Stakeholders with small amounts of tokens and limited time can delegate their stakes to more informed experts, and those with large stakes but conflicts of interest can credibly contribute to decentralization. These delegations can be enforced by legal contracts or even through smart contracts.
One-Token-One-Vote and the Dominance of Whales

Nominally decentralized crypto protocols are often dominated by their developers and early investors; it is typical for the majority of circulating tokens to have accrued to these groups. For decentralization purposes, it is desirable to mitigate the outsized impact of these whales.

We have previously suggested the use of square root voting to do exactly that. In this mechanism, protocol participants vote in proportion to the square root of their token balances—so that an individual with 25 tokens has only five times as much voting power as an individual with one token. Gaining more tokens increases one's voting power, but only sub-linearly. In effect, smaller protocol participants have a greater say in protocol governance, and a balance is struck

between efficiency (maximizing expected payoff across all token holders) and equity (allowing all token holders to have a voice).

Since crypto wallets are often not tied to real-world identities, though, one person or organization could spread a large token balance across multiple wallets to accrue more voting power. Addressing this "Sybil" issue entirely is challenging, but there are a number of possible avenues to mitigate it. There are identity solutions, which link crypto wallets to the individuals behind them; friction solutions, which make Sybil attacks costly to execute; and challenge solutions, which incentivize participants to police the protocol. We give examples of each approach in our piece linked above. DAOs should consider the choice of voting mechanisms as just one tool in a broader toolkit to counter one-token-one-vote dynamics. Other levers can also be pulled. For instance, protocols can distinguish classes of tokens so that certain tokens are eligible for greater yields but cannot be used to participate in governance. This could incentivize whales to draw down their reserves of governance tokens in favor of holding a tranche of tokens with higher monetary rewards.

General mechanisms to build more "skin in the game" into governance can also be helpful, as Vitalik Buterin has written about. One example is to lock up tokens of holders who vote in favor of a proposal until that proposal is implemented. Protocols should be willing to compose these ideas and others in order to meet their own governance needs in light of any observed points of centralization.

## A Call to Experiment

Governance in blue-chip crypto protocols is fairly stale, and DAOs have converged on similar mechanisms. We believe that governance solutions should not be one-size-fits-all but instead specialized to particular protocols' needs. Protocols and their token holders should strongly consider experimenting with new ideas.

At Jump Crypto, we believe the rapid innovation and experimentation that characterizes the crypto landscape should play a role in protocol governance. After all, centralized governance might help protocols survive their initial cold start problems, but true decentralized governance is a crucial feature to ensure that they do not ossify. Protocols should be sensitive to their governance needs and ensure that they are availing themselves of all options to enable healthy decentralized governance.

# 6.0 Investment

## Introduction

2022 has been a tough year for crypto investment. The FTX saga has caused investors to completely reconsider the way that they conduct their due diligence and inject capital into the markets. On top of this necessary readjustment, crypto lenders have then also had to develop new strategies on top of the series of failures by big crypto lenders throughout the year.

In this Investment chapter, our research partners — Dragonfly Capital, Compound Labs and GSR — look at where investors will be directing their capital in 2023. One theme will be an increased focus on risk management when conducting due diligence, particularly in the field of DeFi. It's possible that 2023 will see more VCs not only increasing the level of scrutiny before investing, but demanding more from their investment (like requesting a certain number of board seats). This chapter will also try to answer the question — has 2022 dealt the final blow to the disaggregation of the exchange stack, like in traditional finance, bringing a new era of different entities serving different functions like in traditional markets?

# VCs — A New Way Forward?


Haseeb is Managing Partner at Dragonfly Capital and is a longtime technology-focused crypto investor. Haseeb was previously a General Partner at Metastable Capital where he led early investments into Avalanche, NEAR Protocol, Algorand, and Starkware. Prior, Haseeb founded a stablecoin startup, was a blockchain engineer at Earn.com (acquired by Coinbase), an anti-fraud engineer at Airbnb, and was previously a top 10 globally ranked professional poker player. He is widely recognized for his technical expertise in crypto.

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**By Dragonfly Capital**

In November 2022, the crypto industry suffered arguably the biggest shock of the year, when the Bahamas-based cryptocurrency exchange FTX collapsed following the major mismanagement of funds.

In the aftermath of the collapse, close to a dozen other crypto firms have either buckled or are struggling to stay afloat, including BlockFi, Genesis Trading, Voyager Digital and Galois Capital.

In a recent episode of The Chopping Block on Laura Shin's Unchained podcast, Dragonfly's Haseeb Qureshi and Tom Schmidt analyzed the recent FTX fiasco and its impact on the way that VCs operate in crypto.

## One of the Biggest Catastrophes in Crypto VC History

The collapse of FTX underscores a distinct lack of due diligence even at the highest levels of both crypto and traditional venture capital.

Backed by industry heavyweights like Paradigm, Sequoia Capital, and Blackrock, as well as the massive Singapore sovereign wealth fund Temasek, FTX managed to raise more than $1.5B at a valuation of $32 billion by January 2022.

Though it is now clear that FTX was operating on borrowed time and had an $8 billion hole in its balance sheet, it managed to fly under the radar for months before a wave of mass withdrawals exposed its insolvency. And just months before its collapse, it was reported that the exchange was still looking to raise a further $1 billion for acquisitions and industry bail-outs.It's now clear that dozens of prominent VCs and backers are now set to record heavy losses on their books. For example, Sequoia Capital has already written off its $210 million investment in the company. What has gone wrong that would have caused the investors to be blindsided by this exchange? Weren't there red flags?

Despite being backed by dozens of the most prominent funds in the world, none demanded a seat on the board, or financials audited by a reputable firm. Chamath Palihapitiya of Social Capital stated in a podcast that prior to a potential investment in FTX, he provided several reasonable suggestions on creating a board with external advisors but was told by Sam to "go f*ck yourself."

## A Lesson Learned by Investors

Part of this boils down to the aura that Sam Bankman-Fried had developed over the last year — which was largely fueled by crypto media painting him as a savant. Many things that would be considered as odd/red flags, would become lionized as part of his genius. This was underscored by the horde of glowing profiles that appeared in mainstream media about SBF.

Unfortunately, this allowed him and FTX to simply shirk off investors who asked too many questions. With the media continually blowing up SBF's ego, a mythology formed around him. This has crowded out the proper due diligence process that should have been carried out.

This wasn't helped by the fact that VC firms in both the crypto and tech industries are now beginning to launch their own publications to enhance the marketing/PR efforts for their portfolio companies. This includes the likes of Sequoia Capital, which published a fawning puff piece about Sam. This, some believe, may have led to other less diligent investors getting caught up in the fiasco.

Despite the calamity of the FTX collapse, there is a silver lining. Both traditional and crypto VCs are now painfully aware that deception can occur at even the highest levels of venture finance, and that even the largest institutional investors can be blindsided by it.

## The Way Forward

After FTX, diligence standards will almost certainly increase across the industry. We are likely to see more VCs demanding board seats and other corporate controls when investing into CeFi companies.
On the demand side, most institutional traders are now demanding Proof of Reserves (PoR), a cryptographic method by which exchanges can prove their assets on hand match their liabilities. Many exchanges have begun offering this already, and it's likely this will become a standard industry practice going forward.

And finally, we're likely to see more disaggregation of the exchange stack. Today, exchanges serve as custodians, brokerages, lenders, and exchanges, all in the same bundle. Going forward, we're likely to see these different functions break out among different entities as they do in traditional finance; this makes it much more difficult for an exchange to steal a customer's funds (since they don't have access; the custodian does). In other words, eventually you will not need to custody your funds with Binance to trade on their exchange.

Altogether, these changes should help reduce the likelihood of the next FTX taking place on our watch. Although crypto is often chaotic, the learnings are always public, and it is ultimately up to the users of these platforms (and their investors) to demand these changes.

# Centralized vs. Decentralized Lending Risk Management

Compound

Compound is one of the original DeFi protocols on Ethereum. It is non-custodial, open infrastructure for earning interest and borrowing crypto assets. The protocol is governed and upgraded by COMP token holders that propose and vote on parameter and code changes. Join the community discussion in Discord and the forums at https://comp.xyz.

/compoundfinance

https://compound.finance

**By Compound**

2022 saw prominent centralized lending entities falling like dominoes while decentralized lending protocols continued operating without issue. While decentralized lending has its own challenges in smart contract risk and economic design, centralized lending must face even greater risks in human bias and opacity. Given the absence of trust in a decentralized system, lending must fundamentally be approached in a guarded manner.

The foremost objective of a decentralized lending protocol must be to keep user assets safe. Its second objective is to increase suppliers' asset balances. Compound does this by following a few rules: Only lend out supplied assets to over-collateralized borrowers, incentivize liquidity with algorithmic interest rates, and heavily incentivize liquidation of positions that are approaching insolvency. It seems simple, perhaps limiting, but it is effective. Prominent companies entering bankruptcy in 2022 did not follow these precepts.

## Let Code Decide

In an on-chain, permissionless and decentralized system, there is no court-based recovery process to squeeze assets out of a delinquent borrower. Borrowers can be anonymous blockchain addresses, or even smart contracts with no owner or physical entity.
To guarantee a non-negative value of a loan, some party (other than the lender) must be incentivized to repay it. The borrower must be properly incentivized to close their position, or the lender must have a right to close it for them through liquidation and recover the entire balance.

These preconditions are enforced in the code of the Compound protocol, which runs autonomously and is open source. The code cannot be negotiated with. How it operates and makes decisions is completely transparent. This allows borrowers and lenders to know the rules and decide if they want to participate. Any changes to the code must pass a conservative governance process. The governance process includes a time lock, so that if any participants do not like an upcoming rule change they have ample time to exit the protocol. The code doesn't make arbitrary decisions, suffer from human bias (such as whether to liquidate your best customers), or get caught up in hype (and make risky undercollateralized loans).

This rigidity, transparency, and autonomy have proven their value, especially this year, as they stand in stark contrast to the broken centralized lending desks operating in crypto. It is worth noting that Celsius, Three Arrows Capital, and Alameda all closed their positions on Compound (and other DeFi protocols) before filing for bankruptcy. They could not ask these protocols to change the rules through bankruptcy proceedings, and by doing so they unlocked more value for themselves (due to overcollateralization) than they repaid. Their centralized counterparties weren't as fortunate, and will require years to untangle their relationships in court.

## Be Overcollateralized

Being overcollateralized sounds simple: hold more value in collateral than the value of the loan. When running in a decentralized smart contract, the part of physically holding the collateral is necessary from the start since the contract can't make any assumptions about trusting the borrower or go to court for further recovery. When the bankrupt CeFi companies originated their loans, they (hopefully) believed the borrower would pay them at least as much they owed. Using resources unavailable to smart contracts, humans determined that a loan was safe and sent

away their user's assets to the borrower. Between the time of loan origination and today, those humans seem to have been proven wrong.

One way human decision makers may evaluate borrowers is by looking at their reputation for trustworthiness and financial success. Filing for bankruptcy instantly ruins this reputation. When a debtor actually becomes insolvent, their reputation lags behind. If the reputation is based on having assets, it is better to simply treat the assets as collateral directly, rather than believing in the reputation and the assets both at once. There is also the possibility that multiple such lenders are factoring in the supposed reputation or mere knowledge of debtor assets rather than actually holding the collateral themselves. Treating reputation as collateral for a loan becomes a kind of double counting.

Another fateful way to misvalue collateral is to neglect to consider what happens when you need to sell it. The spot price for an asset can erode quickly when selling large amounts. The time to sell an asset for liquidation often coincides with a drop in the asset's price. This makes optimistic valuation of collateral in times of stability or a bull market doubly dangerous. DeFi protocols must aggressively account for this due to the extreme volatility of crypto asset prices. Compound uses collateral factors to determine the borrowing power of assets based on the volatility of the asset and the strength of the market. Third parties, such as Gauntlet, run numerical simulations, using historical data and worst-case scenarios, to help determine what these risk parameters should be for the protocol through on-chain governance.

Lenders have also fallen into the trap of letting their fates become tied to those borrowing from them. It is tempting to let the size of a single borrower or a borrow against a single type of collateral grow large in order to reap larger interest payments. In the case of Alameda / FTX, the companies were so intertwined that the motivation to liquidate Alameda's loans on FTX was apparently absent. There may have been a desire to conserve what they believed to be a lucrative relationship, but this misguided human bias (along with many other factors) ultimately led to the insolvency of both companies. It may not just be a friendly party the lender is unwilling to liquidate, but a particular type of collateral the lender is reluctant to sell. If a lender takes on, as collateral, an asset that they themselves have an interest in, they may be unwilling to sell quickly when necessary for fear of compromising their own positions. Computer programs that don't differentiate their relationship with one borrower or asset from another do not have this problem.

# What's Next

The primary strengths of DeFi risk management are its transparency and the rigidity it applies to evaluating participants equally. A DeFi protocol can make flawed risk management design decisions at launch or in ongoing DAO management, just as easily as a centralized company, but its flaws are laid bare from day one. When making purely algorithmic solutions, and relying on code running 24/7 without human intervention, personal biases (such as trusting the wrong counterparty because of personal proximity) don't exist. If a design flaw allows the potential for a position too large to liquidate, then the transparency of a DeFi protocol means users have an opportunity to avoid usage and push for a solution rather than trusting things are going well behind closed doors.

Decentralized and centralized lenders face similar risk management challenges, but decentralized protocols are by default more transparent and do not play favorites. Decentralized lending has been fortunate in that many of the easiest ways to go astray when lending are largely unavailable to an on-chain protocol from the outset. The best centralized lenders will go beyond the minimums required by regulations and bring the lessons of DeFi to the regulated world. The companies that have gone bankrupt this past year may well have already known these lessons in their hearts, but took outsized risks, in part because of the lack of transparency and human discretion. There is an opportunity for centralized lenders to learn from the successes of DeFi. Be transparent, be robotic, remove discretion, and most importantly: don't lose your user's assets.

# Pondering the Future of Market Making

**By GSR**

We review market making basics, liquidity provisioning on centralized and decentralized exchanges, and ponder what the future of market making may hold.

GSR has nine years of deep crypto market expertise as a market maker, ecosystem partner, asset manager, and investor. GSR sources and provides spot and non-linear liquidity in digital assets for token issuers, institutional investors, miners, and crypto exchanges. GSR employs over 300 people, and is connected to 60 trading venues, including leading DEXs. We approach complex problems with tenacity and imagination and build long-term relationships by offering exceptional service, expertise and trading capabilities tailored to the specific needs of our clients.

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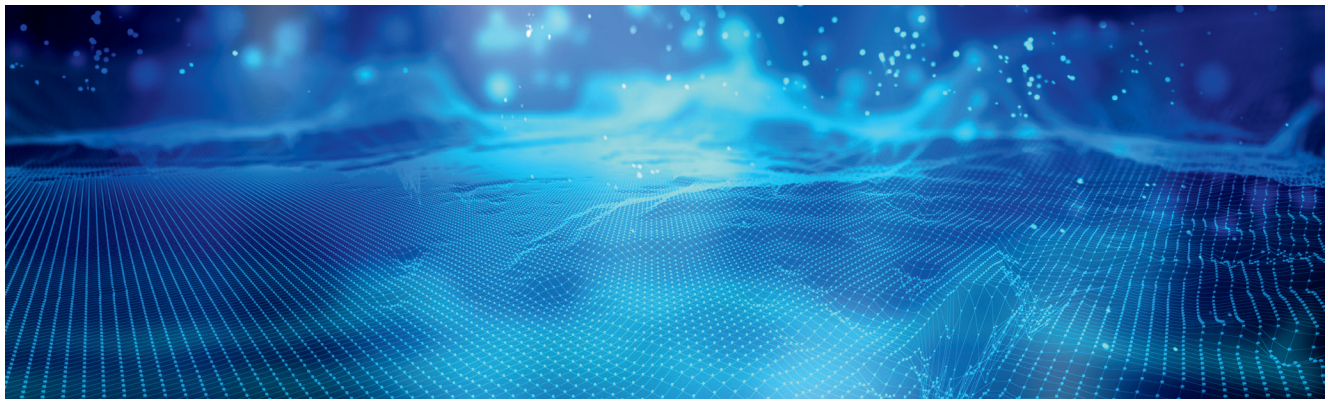
## Market Making Basics

Market making is the act of providing two-sided quotes – bids and asks – along with the quote sizes for an asset on an exchange. Doing so increases liquidity for buyers and sellers, where they otherwise may have seen worse pricing and less market depth. In theory, market makers earn the bid-ask spread – for example, buying an asset for $100 and selling it for $101 – in return for taking on price risk. In practice, however, crypto assets are volatile and there is often limited two-sided flow, making the bid-ask spread difficult to capture. As such, market makers typically seek to meet KPIs around bid-ask spread, percentage of the time the market maker is the best bid and best offer (known as top of book), and uptime to earn fees while keeping risk low. Market makers use proprietary software, often referred



to as an engine or bot, to show two-sided quotes to the market, with the engines constantly adjusting bids and asks up and down based on market price movements. The quality of market making services varies significantly by market maker, with key differentiators including liquidity provided and adherence to KPIs, technology and software, history and experience, transparency and reporting, reputation and support of fair markets, exchange integrations, liquidity provisioning across both centralized and decentralized venues, and value-added services such as OTC trading, treasury services, strategic investment, and industry network, knowledge, and advisory. The benefits of market making are vast - greater liquidity and market depth, reduced price volatility, and dramatically reduced slippage to name a few. But perhaps most importantly, market making provides a pivotal function for the crypto ecosystem, as tokens are what makes the technology work.

## CEXs vs. DEXs

Market making by professional firms has traditionally taken place on centralized exchanges, though it's increasingly occurring on decentralized exchanges as well. The differences are:

**Centralized Exchanges:** Centralized exchanges are intermediary platforms connecting buyers and sellers, and examples include Binance and Coinbase. Assets on a centralized exchange have a bid price, defined as the maximum amount anyone on the exchange is willing to pay for an asset, and an ask price, defined as the minimum amount anyone on the exchange is willing to sell the asset for. The difference between the bid and the ask price is the spread. Note that there are two main types of orders, maker orders and taker orders. Maker orders are where the buyer or seller places the order with a defined price limit at which they're willing to buy or sell. Taker orders, by contrast, are orders that are executed immediately at the best bid or offer. Importantly, maker orders add liquidity to the exchange, while taker orders remove liquidity, and as such, many exchanges charge a lower fee or even no fee at all for maker orders. Bids and asks are then encompassed in an exchange's central limit order book (CLOB), which matches customer orders on a price-time priority. Taker orders are executed at the highest bid order and the lowest ask order. Market participants can also see order book depth, i.e. bids and asks beyond the highest bid order and lowest ask order, called top of book. Market makers connect their trading engines to automatically provide bids and asks on a certain cross and are constantly sending bid and ask orders to exchanges.

**Decentralized Exchanges:** Some market makers provide liquidity on decentralized venues as well. Central limit order books used at centralized exchanges may be difficult to use on a

decentralized exchange, as the cost and speed limitations of many layer ones make the millions of orders placed per day by market makers impractical. As such, many decentralized exchanges use a deterministic pricing algorithm called an automated market maker (AMM), which utilizes pools of tokens locked in smart contracts called liquidity pools. AMMs work by allowing liquidity providers to deposit tokens, often in equal amounts, into a liquidity pool. The price of the tokens in the liquidity pool then follows a formula, such as the constant product market maker algorithm x*y = k, where x and y are the amounts of the two tokens in the pool and k is a constant. This results in the ratio of tokens in the pool dictating the price, ensures that a pool can always provide liquidity regardless of the trade size, and that the amount of slippage is determined by the size of the trade compared to the size and balance of the pool. As the price in the liquidity pool deviates from the global market price, arbitrageurs will come in and push the price back to the global market price. Various protocols iterate on this basic AMM model or introduce new models to offer improved performance for things like highly correlated tokens (Curve), many-asset liquidity pools (Balancer), and concentrated liquidity (Uniswap V3), as well as extend to derivatives such as with virtual AMMs for DeFi perpetuals protocols. Note that with the progress of newer layer one blockchains and layer two scaling solutions, several DEXs follow a more traditional central limit order book model, or offer both an AMM and a CLOB. Liquidity providers in a liquidity pool receive trading fees in proportion to the liquidity they provided to that pool, and they may also receive protocol tokens that the protocol uses to incentivize liquidity in what's called liquidity mining. Liquidity providers are exposed to impermanent loss, which is where one of the two assets provided to the pool moves materially differently than the other, causing the liquidity provider to have been better off by simply holding the two assets outright rather than providing the liquidity.

## State of the Market

The cryptocurrency market has many unique characteristics, leading to various challenges when providing liquidity. For example, crypto markets are open 24/7/365, offer the ability to self-custody, has retail interact directly with the exchange, offer instant "settlement" of virtual balances at CEXs and fast settlement of on-chain trades at DEXs compared to T+2 traditional finance settlement, and use stablecoins to facilitate trading, given BTC volatility and still-clunky fiat to crypto conversion. In addition, the crypto markets are still largely unregulated, leading to the potential for price manipulation, and continue to be highly fragmented, with liquidity bifurcated across many on and off-chain venues. In addition, trading venue technology is still evolving, as exchanges have varying quality of API connectivity and may go down during times of particularly high market activity. Lastly, the crypto derivatives market is still evolving, with derivatives com-

manding a smaller percentage of total market volume compared to traditional financial markets. These characteristics have led to various challenges when it comes to providing liquidity, including market fragmentation / interoperability, poor capital efficiency, exchange risk, regulatory uncertainty, and still-improving exchange technology / connectivity.

## The Future of Market Making

The crypto industry continues to evolve at a breakneck pace, and crypto market making is no exception. We see the following current and potential future trends:
**Institutionalization:** The crypto market is becoming more institutional by the day, and the importance of liquidity providers will only increase as institutional demand grows.

**Interoperability:** Interoperability should improve, particularly in DeFi as cross-chain bridging solutions improve and composability comes to the fore. We see a multi-chain world eventually fully abstracted away from the user, including market makers.

**Capital Efficiency:** Liquidity providers on centralized venues have to fully fund their order books at each exchange, given fragmented markets and an inability to cross-margin. In the future, greater credit extension through the use of crypto prime brokerages and a more formalized repo market could improve capital efficiency. Within decentralized exchanges, continued progress on concentrated liquidity provisioning, undercollateralized credit extension, liquid staking, cross-protocol margining, and advances in settlement speed should aid capital efficiency.

**Exchange Risk:** Given recent events, market makers are likely to reduce capital on centralized venues and cease trading altogether on less trusted, less regulated exchanges to minimize exchange counterparty risk. Market makers and other participants may look to reduce the functions of centralized exchanges, which currently play the role of broker, exchange, and custodian, perhaps through solutions that allow trading on top venues directly from third-party custodians, such as with Copper's ClearLoop. Exchanges, for their part, will likely try to entice liquidity through lower trading fees and increased transparency, the latter of which is starting to occur with several exchanges releasing proof-of-reserves.

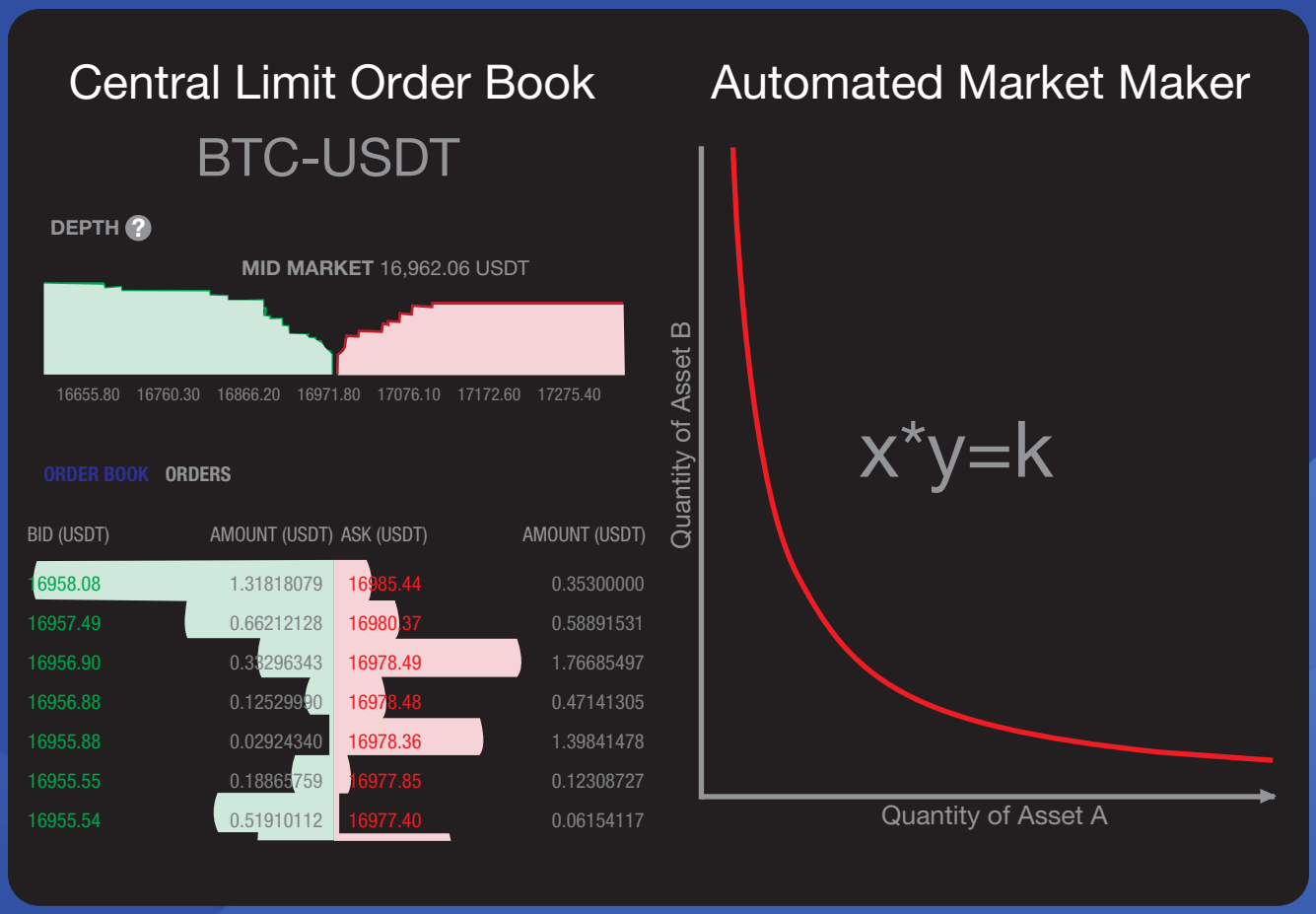
**DeFi vs. Cefi:** DeFi is likely to grow faster than CeFi, given its native trustlessness and ability to self-custody, faster innovation from being earlier in its life cycle, progress on current challenges such as improved gas fees, MEV-resistance, and greater insurance options. Regulation, however, is likely to be a key determinant, with its ability to slow DeFi adoption should regulators

take a heavy-handed approach to DeFi, or spur growth, should clear but sensible guardrails be instituted to foster innovation.

**DeFi Derivatives:** Given the prevalence of derivatives in traditional financial markets, DeFi derivatives volumes, and thus DeFi derivatives market making, are likely to grow faster than spot DeFi volumes. This may be particularly true for options, where growth has so far lagged relative to perpetuals.

**Protocol Driven Liquidity:** DeFi protocols often incentivize liquidity provisioning through liquidity mining, where the protocol gives its native token to users in exchange for providing liquidity on a DEX. Such liquidity, however, is often fleeting, leaving once the liquidity mining incentives run out. A host of projects such as Curve, Tokemak, OlympusDAO, and Fei/Ondo offer innovative on-chain liquidity direction, often through protocol-controlled value, where the projects themselves acquire funds to support their protocols rather than utilize users' funds by incentivizing them with liquidity mining rewards.

## Centralized vs. Decentralized Liquidity Mechanisms




Source: Coinbase, GSR

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# 7.0 Industry

## Introduction

Beyond builders in a traditional sense (developers, investors and the like), the crypto industry is made up of many more players that had a role to play in 2022. Crypto is an inherently internet-first community, where projects can be built and destroyed (along with reputations) using blockchain analysis and high-quality journalism as the tools to both inform and expose.

In our Industry chapter, we give room for two unique perspectives into the crypto industry — Nansen, from the POV of on-chain analytics, and the Association of Cryptocurrency Journalists and Researchers (ACJR), from the POV of crypto journalism. While Nansen will cover the importance of on-chain analytics to understand cataclysmic or black swan events like the Luna collapse, Celsius collapse, FTX collapse and others, the ACJR will examine how journalists and the media in general have dealt with covering very intricate and technical stories for both the crypto native and a wider audience.

# Fact vs. FUD — On-Chain Analytics in a Bear Market

**By Andrew Thurman**


Andrew Thurman is the Content Lead at Nansen, a former journalist and editor at CoinDesk and Cointelegraph, and a former business development executive at Chainlink.

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The crypto industry is largely defined by extremes. The abundant warmth of DeFi Summer v.s. the enduring cold of the crypto winter; euphoric dogcoin flippers v.s. some of the world's most sophisticated algorithmic operators; and, perhaps most pressingly in 2022, rumormongers v.s. a growing cadre of professional and amateur analysts ready to fact-check and hold the industry to account.

Take, for instance, the collapse of Terra's UST stablecoin in May. The week after the algorithmic asset permanently de-pegged, at least one popular social media influencer attempted to spread a rumor that the collapse was due to interference from the United States government (a particular wing or agency was not mentioned).

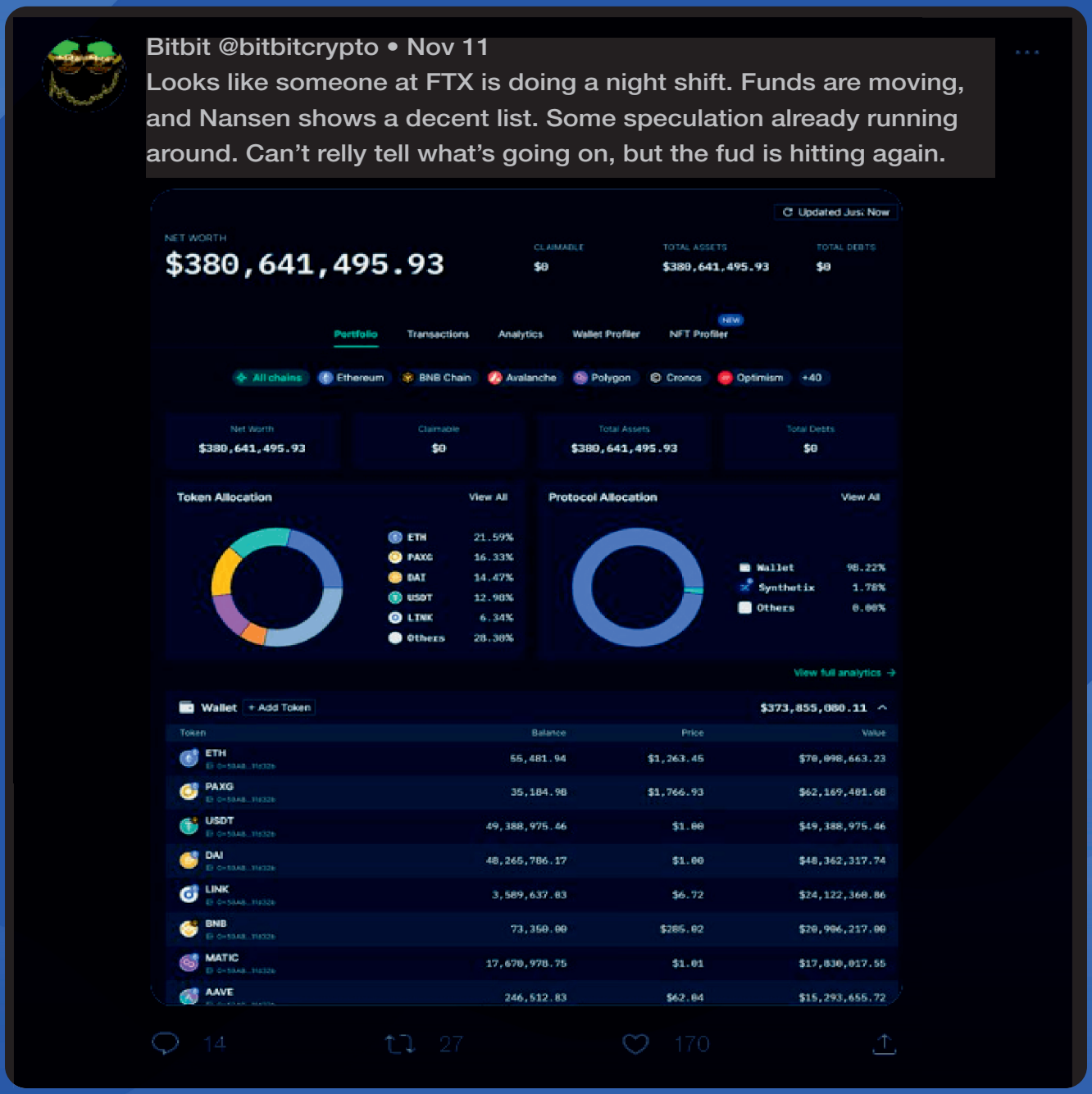
A week later, Nansen published its groundbreaking On-Chain Forensics: Demystifying TerraUSD De-peg, a painstakingly thorough look into the depeg and its key players, definitively dispelling the myth of a single attacker – let alone a responsible nation-state entity.

## Figure 7: Net UST flows to Curve entities on May 7 and May 8 2022, top inflows by wallet

| Wallet address | Net Flows (million of UST) | % of Inflows | Main Nansen Label | Wallet Reference (Flagged) |
|---|---|---|---|---|
| 0x220bda5c8994804ac96ebe4df184d25e5c2196d4 | 268 | 27% | 1inch.exchange: AggregationExecutor* | (D) |
| 0x4b5e60cb1cd6c5e67af5e6cf63229d1614bb781c | 100 | 10% | Celsius | (B) |
| 0x8d47f08ebc5554504742f547eb721a43d4947d0a | 85 | 9% | EIP 1559 User | (A) |
| 0x9f705ff1da72ed334f0e80f90aae5644f5cd7784 | 58 | 6% | Token Millionaire | (J) |
| 0x66b870ddf78c975af5cd8edc6de25eca81791de1 | 47 | 5% | Oapital | (K) |
| 0x68963dc7c28a36fcacb0b39ac2d807b0329b9c69 | 31 | 3% | Token Millionaire, Heavy Dex Trader | (F) |
| 0x22f9dcf4647084d6c31b2765f6910cd85c178c18 | 27 | 3% | 0x: Exchange Proxy Flash Wallet | (L) |
| 0x41339d9825963515e5705df8d3b0ea98105ebb1c | 21 | 2% | Smart LP: 0x413 | (H) |
| 0xdef171fe48cf0115b1d80b88dc8eab59176fee57 | 17 | 2% | ParaSwap: Augustus Swapper | |
| 0xa489e9daf10ced86811d59e4d00ce1b0dec95f5e | 16 | 2% | ETH Millionaire | |
| 0x83a30b9c73de15560aa02a18964c45ad7a41d88e | 15 | 2% | Elite Dex Trader | |
| 0x8d8b9c79196f32161bcb2a9728d274b3b45eb9af | 11 | 1% | Token Millionaire | (M) |
| 0xeb5425e650b04e49e5e8b62fbf1c3f60df01f232 | 10 | 1% | Heavy Dex Trader | (C) |
| 0x65eab5ec71cec12f38829fbb14c98ce4bad28c46 | 10 | 1% | Token Millionaire | |
| 0xe0b2026e3db1606ef0beb764ccdf7b3cee30db4a | 10 | 1% | numerium.eth | |
| 0xf97e42d65d09813f1765788bb666488b8e9f4b0a | 9 | 1% | Dex Trader | (G) |
| 0x561b94454b65614ae3db0897b74303f4acf7cc75 | 8 | 1% | Elite Dex Trader | |
| 0x4f5f3d3f8eb2896e0e865cde934fe5103f979771 | 8 | 1% | Heavy Dex Trader | (D2) |

However, the impact of thorough on-chain analysis was not limited to reports from research firms such as Nansen.

During the collapse of FTX in mid-November, investors and everyday crypto users alike monitored inflows and outflows, reserve holdings, and even individual Alameda Research wallet movements such as withdrawals from DeFi protocols to cover FTX user deposits. Together, these efforts painted a picture of an institution in much deeper distress than its executives were letting on, giving many in the community an opportunity to withdraw their funds before the window closed.



This trend continued as FTX briefly opened up withdrawals for Bahamian residents. Amateur sleuths and professional chain-checkers vetted every withdrawal, surfacing signs of foul play and laying out a playbook for bankruptcy lawyers to claw back illegally withdrawn funds. For every development in the story of FTX's demise, analysts caught and traced the updates before traditional and even cryptomedia.

While this citizen journalism movement demonstrated the power of a distributed, on-chain literate analyst community, the traditional media also showed impressive uptake when it comes to the sophistication of their crypto coverage. At the start of the year, when the press would reach out to firms such as CoinMarketCap or Nansen, the questions were rudimentary: analysts would spend hours explaining the basics of a decentralized exchange, self-custody, or the difference between centralized and decentralized lending platforms.

Contrast this lack of fundamental knowledge with the coverage of Binance's outflows just last week. Sparked by a tweet from a Nansen analyst, reporters from Reuters, Bloomberg, the Wall Street Journal, Forbes, Fortune, CNBC, NBC, the Washington Post, the BBC, and CNN – among many others – quoted on-chain data with surprising literacy. Legacy media can now reliably cover on-chain events, at times even citing specific blockchain addresses. This is a broad, nearly industry-wide improvement on seeing "Etherium" misspelled in major outlets – though that still happens with alarming regularity.

> ***Binance withdrawals hit $1.9 bln in 24 hours, data firm says***
>
> *By Tom Wilson and Elizabeth Howcroft*
>
> *London, Dec 13 (Reuters) - Binance has registered $1.9 billion of withdrawals in the past 24 hours, blockchain data firm Nansen said on Tuesday, as the world's biggest crypto exchange said it had "temporarily paused" withdrawals of the USDC stablecoin.*

As the traditional media now seems poised to cover the industry with greater sophistication, major crypto institutions are ready to greet them with growing transparency. After the collapse of FTX, multiple centralized exchanges came forward with a "proof of reserves" system where they would publish the addresses containing customer deposits. Working with the Nansen Portfolio team, users can now audit the holdings of many top exchanges.

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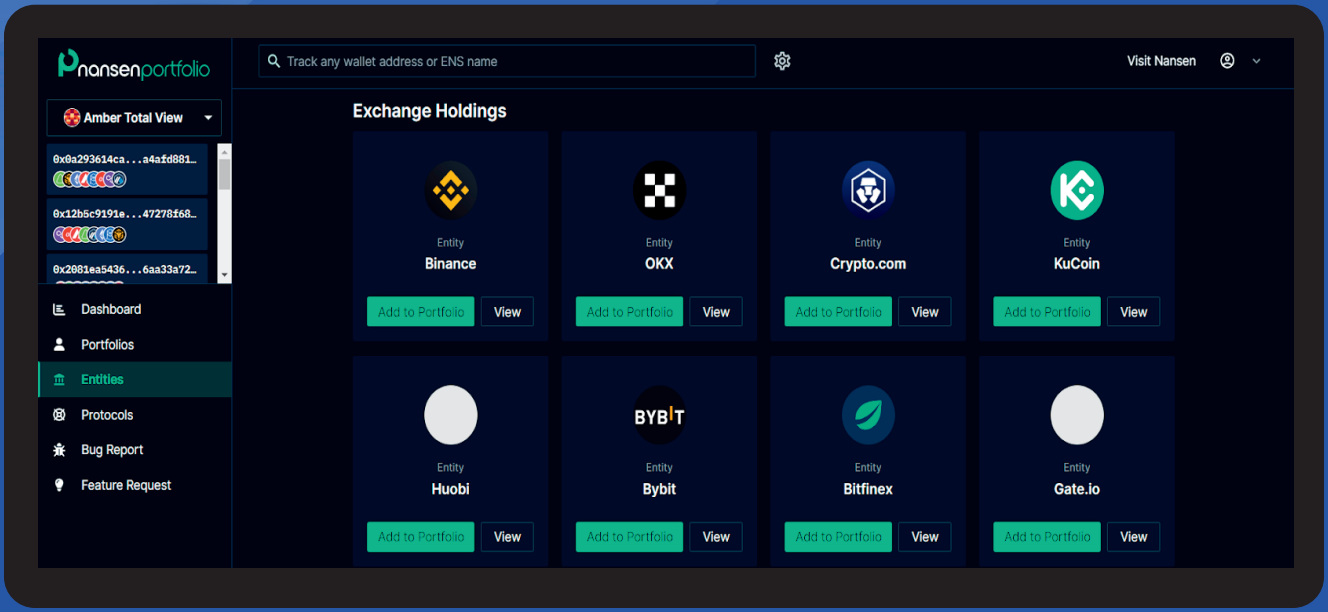
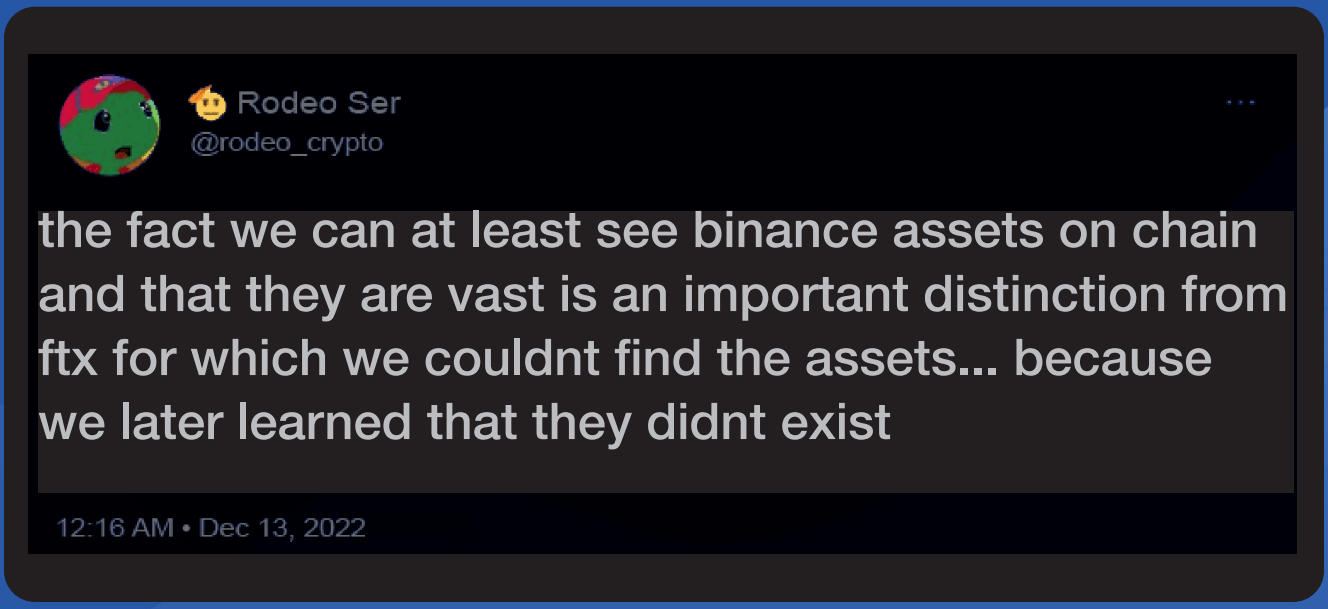
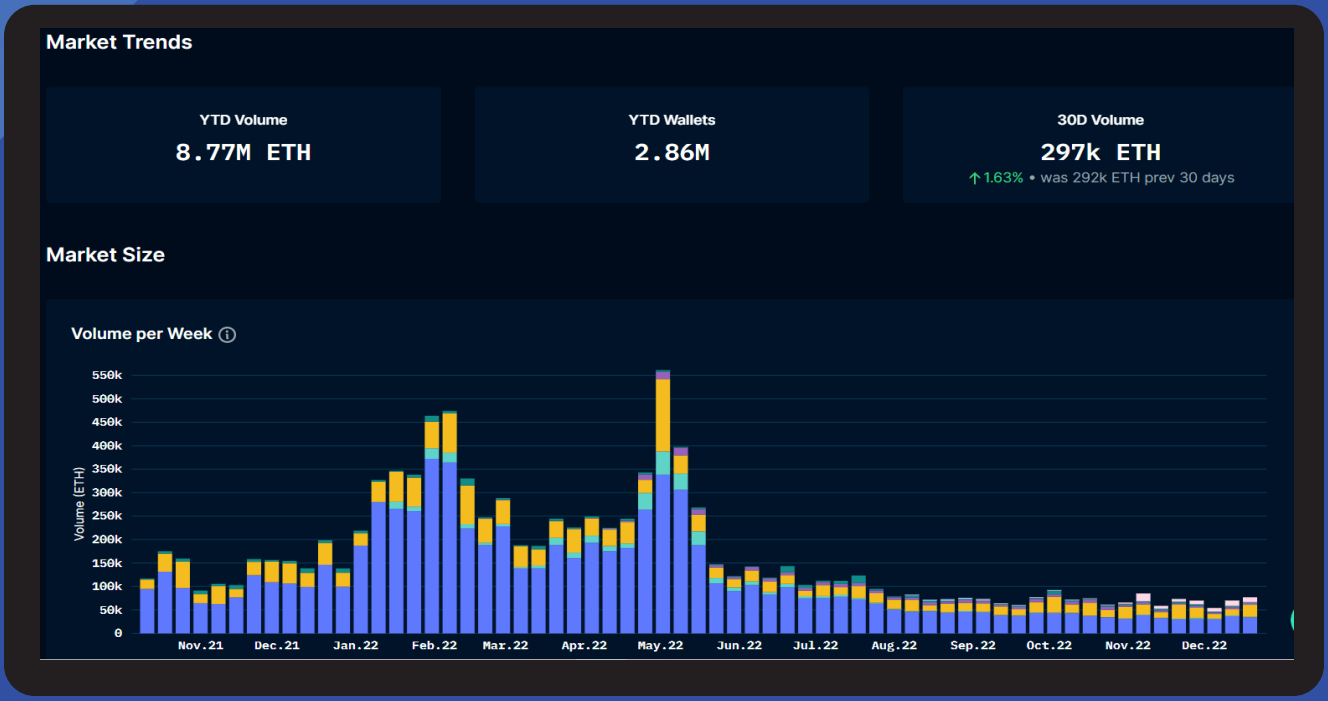



In aggregate, these efforts at transparency from various institutions – and the growing clamor of an investing public increasingly demanding them – may even eventually rise to the level of ‘self-regulation’ that many feel the industry has been lacking for so long.



As the year comes to a close, it's impossible for many investors to look back on the events of 2022 without a sense of frustration. Some of the most ambitious and outspoken members of the community were found to be frauds, and in the face of immense macroeconomic head-winds, one of the most vigorous bull markets in memory collapsed into a devastating bear.

However, looking deeper into the on-chain data, it's easy to find significant pockets of resilience and vitality. DeFi is hovering above $40 billion in total value locked, and NFTs on Ethereum alone have transacted 8.77 million ETH – just over $10 billion at current prices – in volume this year.




In contrast to previous bear markets, there remains a strong, core crypto user base and a broad array of applications for them to engage in – a thriving, decentralized ecosystem that has now proven to be resilient even to historic washouts and blow-ups from even some of the largest and most influential centralized entities.

These users also have unprecedented analytical tools and resources at their disposal in comparison with previous crypto cycles. From free resources like CoinMarketCap to subscrip-tion-based services such as Nansen Pro, the average crypto user weathering the bear is better informed than ever, and the quality of the social media chatter reflects that.

It's impossible to tell how long this bear market will last. The winners of the next bull are already beginning to surface, however, and Nansen stands poised to help them cut through the noise and identify the future of the industry.

# Crypto Journalism in 2022 — Where We Started, and Where We're Going

Molly Jane Zuckerman is a content manager at CoinMarketCap. She previously was the head of news at Cointelegraph as well as the host for the Cointelegraph YouTube channel, and has written for both Decrypt and Modern Consensus.

Molly Jane first started writing about crypto in January 2018, right as Bitcoin began its freefall from its $20,000 high. She's most interested in the intersection of the people behind emerging technologies and the technologies themselves, especially as cryptocurrency in particular attracts a diverse group of creators and entrepreneurs. Molly Jane has interviewed crypto personalities including the Winklevoss twins, former CFTC Commissioner J. Christopher Giancarlo ("Crypto Dad"), Binance's CZ and more.

Before she entered the crypto sphere, Molly Jane received her Masters of Science in Russian Political Science from King's College, London. She is also the author of a book on the birth of Russian detective fiction, "Rex Stout Does Not Belong In Russia: Exporting the Detective Novel."

Molly holds significant amounts of BTC, and less significant amounts of ETH and LTC.

**/MollyJZuckerman**

**https://www.mollyjanezuckerman.com**

**By Molly Jane Zuckerman**

f you asked any crypto journalist at the beginning of the year what they thought the biggest story in crypto would be, they'd probably have a hard time deciding between the revelations over the identity of The DAO hacker who made off with $11 billion in crypto, or the revelations over the identities of Bitfinex hackers who laundered $4.5 billion in crypto.

With hindsight, these two explosive stories breaking just a few months into 2022 now seem to have pretty accurately predicted the tone for this increasingly bizarre year of crypto. Crypto journalists and researchers have faced the difficult questions of explaining relatively complex technologies (algorithmic stablecoins, anyone?) to a wider audience than probably ever before.

## Crypto Investigates

Before we analyze any of this year's later (but quite important) coverage of what we now know is definitely the biggest story of the year — FTX's collapse and Sam Bankman-Fried's fall from grace — we must first pay homage to the aforementioned hacker story that first astonished crypto in 2022.

In February, Laura Shin broke the story of the identity behind The DAO hacker, a previously anonymous attacker who had stolen 3.6 million ETH from the original DAO (The DAO) back in 2016. With new blockchain forensic technology and the help of blockchain analytics firm Chainalysis, Shin was able to allegedly identify the 2016 hacker as Austrian programmer Toby Hoenisch (he has denied the claims, but has not followed up with details to refute the findings as promised). Shin's story was published in Forbes, as well as detailed in her book Cryptopians, and her findings were covered in mainstream media.

In the second, more recent investigative win for crypto media in 2022 was Ian Allison's story in Coindesk that uncovered Alameda Research's balance sheet, finding that it held mainly FTT tokens. The truths that this story uncovered have set off a domino series of company collapses that we probably haven't seen the end of yet, including liquidity issues with crypto lender Genesis, part of Coindesk's parent company's portfolio. Allison's story not only continued to prove that crypto trade publications can break big stories, but also that they are perfectly able to break big stories that could end up hurting their own parent company.

While I'm not saying that there was necessarily vocal doubt before in mainstream media that crypto media could break a huge story, Shin's incredibly detailed investigative piece and Allison's industry shaking revelations definitely proved that crypto journalists can find and write stories with importance beyond crypto-native platforms.

(Note: I will use the term "mainstream media" here quite liberally to lump in general trends in coverage for ease in this short piece.)

## Crypto — Just a Quirky Niche?

The next big story in the start of the year was coincidentally another unveiling of the identities behind a previously unknown hacker — Ilya Lichenstein and Heather "Razzlekhan" Morgan were

charged with laundering roughly 25,000 BTC that were stolen in an anonymous 2016 hack on crypto exchange Bitfinex. This crypto story was again covered extensively in mainstream media, due to both the extremely large amount of money involved and Razzlekhan's easily mockable amateur rap career.

But one should take note of traditional media's continued portrayal of the alleged crypto money launderers' oddities, long after the public forgot about the duo. Even though this story broke back in February, Vanity Fair only published an in-depth portrait of the two alleged criminals in September, eight months after the arrests were made.

The coverage of crypto as weird and niche is good when the stories being covered are actually strange and niche (like the initial reporting on Razzlekhan's rap lyrics and the never-ending coverage of Elon Musk DOGE tweets), but it becomes a problem when crypto stories get bigger and more serious, and outlets get stuck in the rut of still giving them the "oh, so quirky!" treatment.

## Does Mainstream Media Really Get *Everything* Wrong

Beyond what some see as a refusal to take crypto stories seriously, another recurring issue that arose in 2022 with crypto story coverage is accuracy. Did 2022 bring more crypto-savvy journalists into mainstream media (MSM) outlets, or is crypto still seen as a strange niche that doesn't require a specialized journalist to cover, leading to unfortunate inaccuracies in MSM reporting?

One battle this year over reporting accuracy occurred on Twitter (as these battles tend to do) between The Defiant's Cami Russo and the WSJ's Jon Sindreu. Russo, a former Bloomberg journalist who has a book out on DeFi and launched a DeFi trade outlet, tweeted her frustration with the WSJ's coverage of the Celsius collapse. Her issue — WSJ journalist Sindreu implied that Celsius' bankruptcy highlighted deficiencies in DeFi, while Russo maintained that Celsius is the antonym of DeFi, a custodial lender that merely provides liquidity to DeFi lenders. A potentially tricky discernment and subsequent public argument that left both Russo and Sindreu feeling like they were correct.

Beyond the DeFi vs. CeFi and algorithmic stablecoin coverage debates, where many crypto users believed that mainstream media failed to deliver nuanced enough reporting into

decentralized finance protocols like Terra, the biggest issue that the crypto space has had with mainstream crypto coverage has been what Crypto Twitter widely sees as the “soft” treatment of Sam Bankman-Fried.

Many rather vocal crypto enthusiasts have taken to the social media network to complain about mainstream media coverage’s “whitewashing” profiles of SBF with what they see as strange angles (like his political donations, inability to follow through on philanthropic promises, and the “mistakes” he made, rather than the “crimes” he committed). Crypto media has also received flak for its own, often flawed coverage of SBF before the FTX fall as well.

## 2023: What Lies Ahead

As the FTX story continues to unfold and the aftershock of Luna’s Spring collapse is clearly still going to be felt in the new year, crypto journalists and researchers are the obvious candidates to help mainstream media better understand how to cover cryptocurrency and all of its idiosyncrasies.

The ACJR already tries to be a resource in this way by inviting traditional media to our Off the Record sessions on burning crypto issues and explaining how crypto journalists see the stories. Ideas have been tossed around among our group about running workshops on blockchain forensic analysis and mentoring young journalists interested in crypto in the future.

The stories to come out of the crypto industry this year were truly explosive, forever changing how mainstream media will now cover cryptocurrency. Crypto coverage is now way beyond simple market pieces about Bitcoin going up or down or op-eds about why crypto is really dead this time — journalists from all types of publications are instead having to grapple with stories that start in the crypto industry and expand outward to the traditional financial markets, the U.S. government, foreign governments, hackers and beyond.

2023 will hopefully be a year with less crypto war zone reporting, but at the minimum, it will be a year where the mainstream media will now find it necessary to include the crypto beat.

There is a place for crypto media to become the source of truth for a wider group of people than ever before, while mainstream media works through the growing pains of having to take a new industry seriously.

# 8.0 Market

## Introduction

We started the year with Bitcoin over $46,000. Now, 12 months later, Bitcoin is under $17,000. What has happened in the course of this year in the markets to affect such a price change, and what could happen in 2023?

In our last Markets chapter, we included insights from QCP Capital and Glassnode on what has been going on in the crypto markets on a macro level. While QCP Capital looks at how inflation in the market has affected crypto (as well as any similarities to the dot.com bubble), Glassnode turns its attention to how institutional players arriving have affected the markets and market making in general. Some questions that our Markets section tries to answer are — will DeFi grow faster than CeFi? What about DeFi derivatives and spot DeFi volumes?

# Global Macro Unwrap 2023


Established in 2017, QCP Capital is a full suite crypto trading firm and global market leader in options, headquartered in Singapore. With deep multi-cycle experience, QCP Capital unlocks new opportunities for clients at the forefront of crypto capital markets through providing institutional-grade liquidity, infrastructure and research. An active early-stage crypto and blockchain investor, QCP Capital's portfolio includes core trading infrastructure, exchanges, data and token ecosystems. QCP Capital's insights cover weekly trading updates, monthly and quarterly views, and can be accessed on our Telegram, Twitter, LinkedIn page and more. More information can be found at qcp.capital.

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https://qcp.capital


**By QCP Capital**

## 3 Themes for 2023

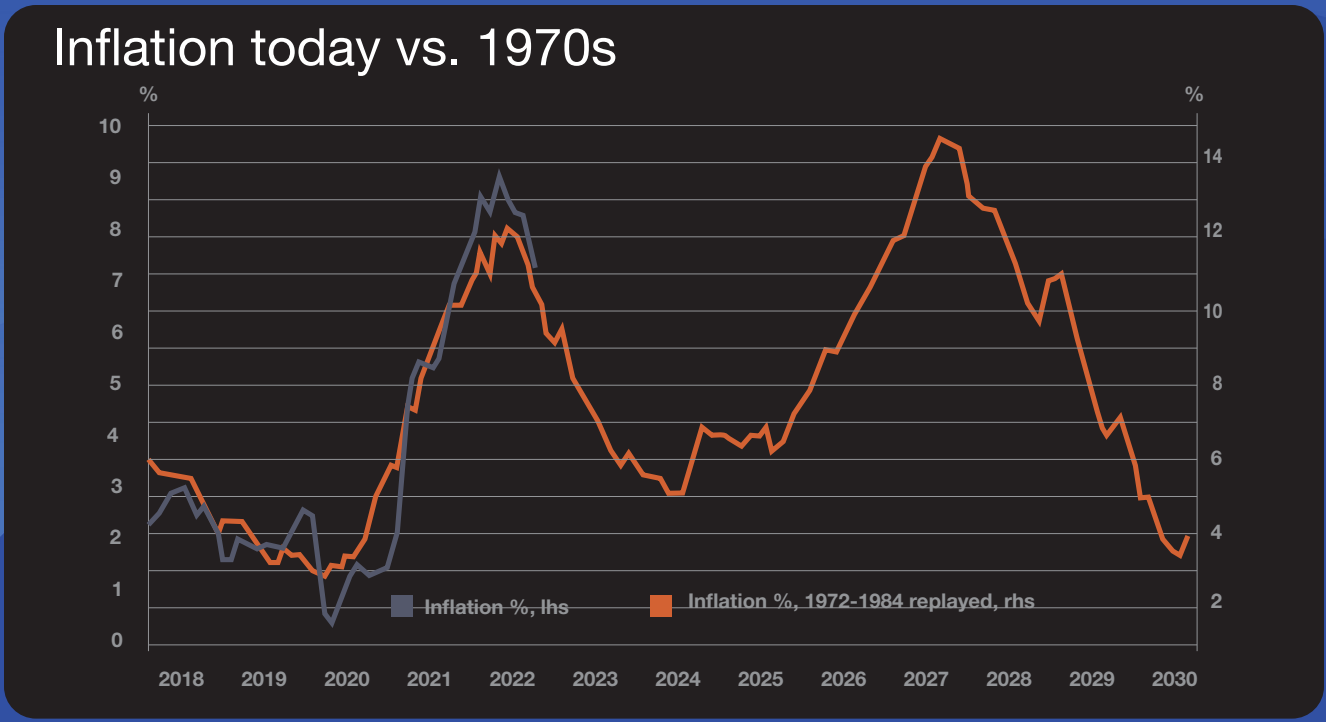
1. From Peak to Trough Inflation
2. Wave 5s across markets
3. Dot.com parallels

## From Peak to Trough Inflation

The question of where is "Peak Inflation" in 2022, will now turn to where is "Trough Inflation" in 2023.

The 9.1% YoY CPI in July 2022 now looks very likely to hold as the peak of inflation this cycle.

However an analog to the stagflationary 1970s shows that while the inflation downturn is imminent, it is likely it will not reach the Fed's 2% target. More worryingly, there is also a significant risk of a V-shaped rebound if the Fed loosens policy prematurely.

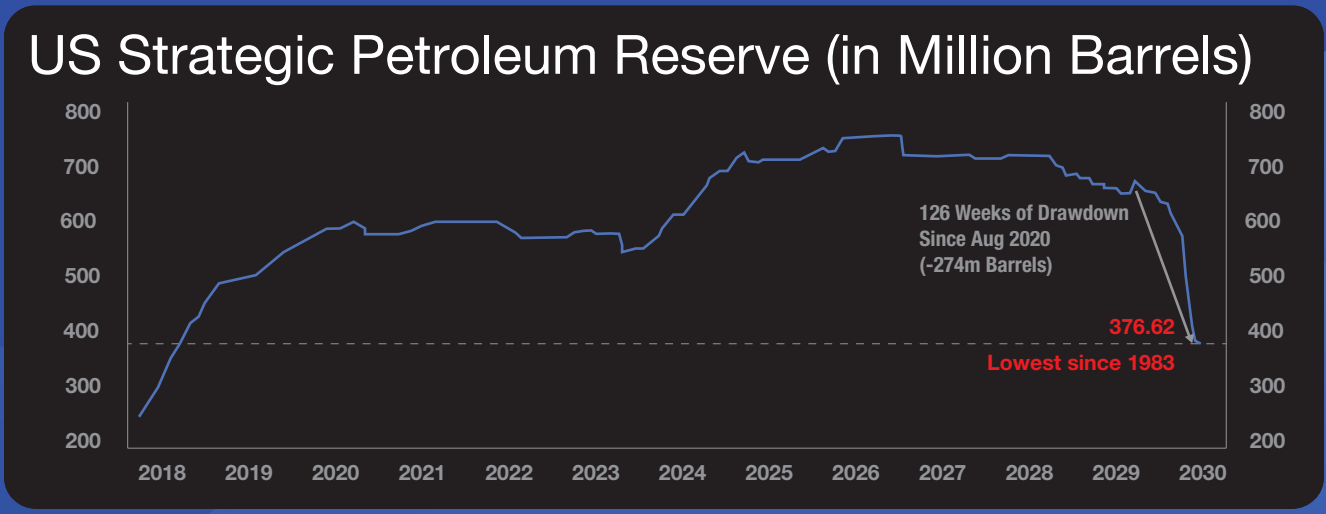



Source: Steno Research, Macrobond

What could drive this stickier and possibly V-shaped inflation trajectory?

- A resurgence of oil prices due to China reopening its borders; and an escalation in Ukraine coupled with the US refilling its SPR reserves on the back of geopolitical tensions.
- Oil prices back above $100 would drive a significant and entirely unexpected rebound in inflation.

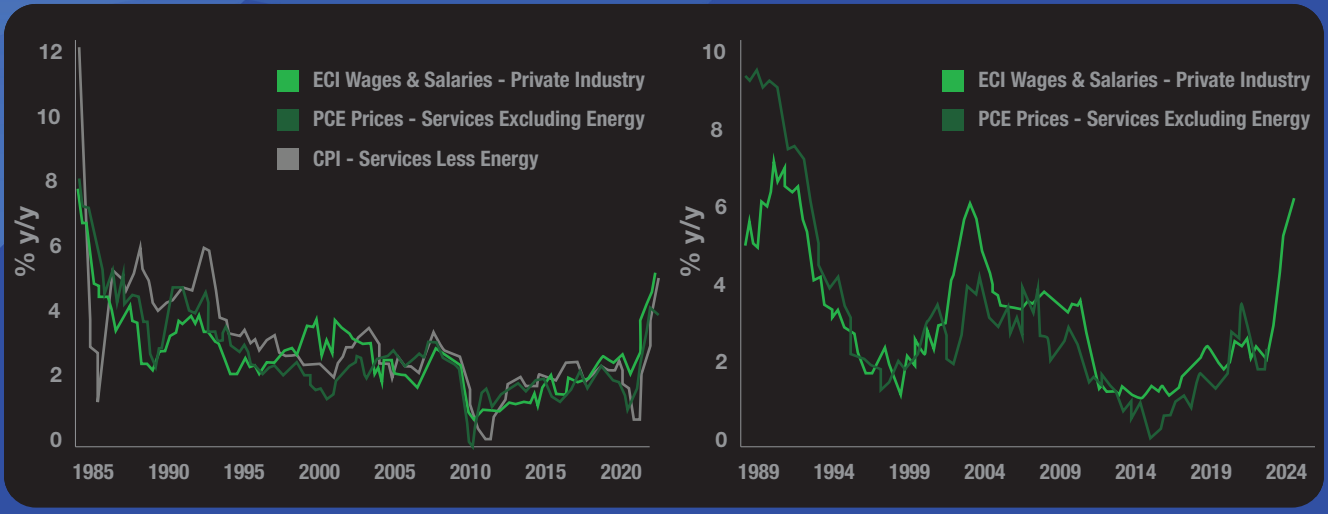
We recall it was OPEC's oil embargo in October 1973 that quadrupled oil prices, leading to the V-shape rebound of the 1970-80s, just when Arthur Burns' Fed thought that they too had conquered inflation.




Source: Bloomberg, QCP Insights

A spike in oil prices will reverse the Goods deflation we are seeing now. Goods deflation is the only reason we are seeing overall CPI disinflation now.

Services inflation will continue to remain strong, as the tight relationship between wages and service prices continues. And with wages in many sectors still on the uptrend, the worst of the inflationary pass-through is still yet to hit for many service sectors!




Source: BLS, BEA, TD Securities


Fears of the same double-dip inflation as the 1970-80s is deeply edged in the FOMC's psyche.

Source: Bloomberg, NY Fed

This will lead them to accept a recession rather than risk a rebound in inflation, even if the inflation spike is again due to supply side shocks.

In terms of recession probabilities, we are now above the 2020 Covid highs, and fast approaching 2008 GFC and 2001 Dot.com levels.

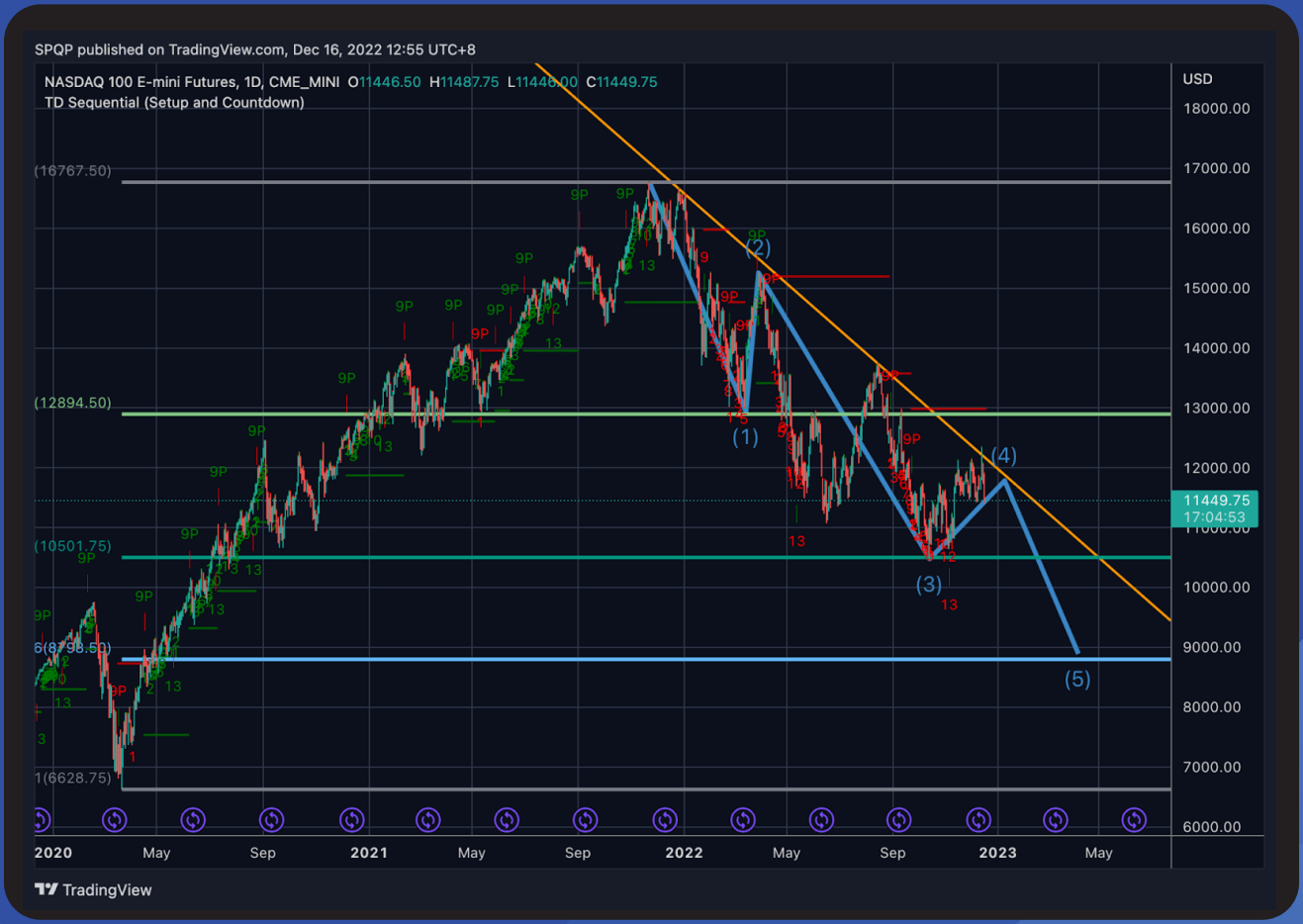
# Wave 5s across markets

A stickier inflation trajectory and a blinkered Fed will set us up next year for the final Wave 5 sell-off across all major asset classes.

We believe that markets are still unprepared for a break of this year's extreme levels on the downside.

Below we show 5 highly correlated risk assets that look poised to begin their respective impulsive Wave 5 extensions higher/lower:

### 1. NASDAQ - Wave 5 Lower




For NASDAQ, we are still unable to break above the trendline that has held throughout the decline since Dec 2021.

12,000 is a key level to the topside that needs to break to reduce any near-term bearish pressures.

An unexpected break above 13,000 will be the pivot for us to change our thesis.

On the downside it is likely that Wave 5 takes us below 10,000, with even a tail risk of a retest of Covid lows at 7,000.

The 78.6% Fibonacci of last resort is a sensible target for this bear market to end at 8800.

**2. US 10-year yield - Wave 5 Higher**


10-year yields have been holding its parabolic trendline, supporting the rally in yields all the way from 0.5% in Aug 2020, to a high of 4.3% in October this year.

It is the retracement in yields since the top in October that has driven this cross-asset risk rally.

An uptick in 10-year yields, coupled with a bear flattening in the 2s10s curve would be bearish for risk assets and bullish for the USD - as it would imply the market is catching up to the Fed's hawkish terminal rate forecast of 5.5% for next year.

### 3. US Dollar (DXY) - Wave 5 Higher


USD Index has retraced significantly, falling 10% in just 6 weeks.

This sharp retracement has the hallmarks of a textbook Elliot wave alternating Wave 2 and 4 - with Wave 2 in 2020 being long-drawn, while this Wave 4 is short but sharp.

Hence, we expect a Wave 5 that would be similar in magnitude to Wave 1. That would be a ~16% rally from here that takes us to 120 on the DXY.

### 4. ETH - Wave 5 Lower

ETH also played out a textbook triangle ABCDE Wave 4 correction, and looks poised to continue its bear market selloff in Wave 5.

Levels to watch are 1600 on the topside, which would negate immediate bearish pressure. A close above 2000 on a weekly basis will force us to reconsider our bear thesis.

On the downside 1000 followed by 800 are key.

We recommend selling near-dated 1600 calls, and longer dated 2000 calls; along with physically settled near-date 1000 puts and longer dated 800 puts.


## 5. BTC - Wave 5 Lower

BTC is trading in lock-step with ETH, although its own Wave 4 - a falling wedge implies more bearish pressure than ETH itself.

We continue to expect any large rallies in BTC to meet significant selling pressure.

The way we will be trading BTC is by selling 20,000 calls and rallies in spot.


An interesting relationship between ARKK (blue line) and BTC (orange line) implies further down-side for BTC to come.

ARKK price action is leading BTC by 2 months, which forewarns of lower BTC prices to come.

ARKK was the poster child stock of the post-pandemic tech bubble era, and has been leading the tech rout on the way down as well.

And it has already embarked on its own Wave 5 lower, which has now taken it below its March 2020 lows!

# Dot.com parallels

After the Dot.com bubble burst in 2001, fraud was uncovered in many of the tech firms - including behemoths like Enron and WorldCom, which to this day still ranks in the top 10 largest bankruptcies in US history.

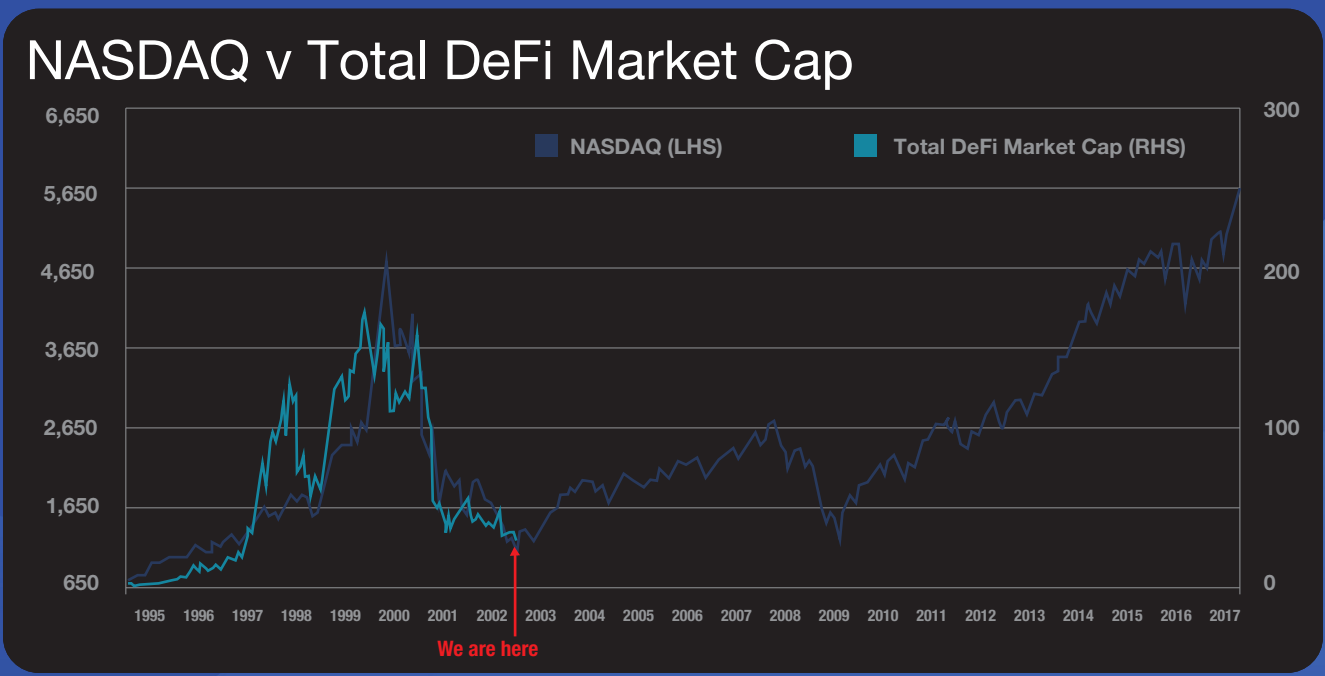

During boom times, much of this fraud goes unnoticed as investors are willing to pay high valuations when money is cheap. However, when liquidity gets withdrawn and the tide goes down, this is when many of these balance sheets come up naked.

What allowed bad actors to operate in the grey was the lack of definitive regulation. And while the wave of regulatory reform post-Enron stifled rapid business growth, it also set a strong foundation for stable returns in the years to come thereafter.

> Enron is often seen as the gold standard for corporate fraud, malfeasance, and complacency, with the scandal leading to the largest bankruptcy reorganisation so far in U.S. history.
>
> The Enron scandal triggered a wave of regulatory reform, culminating in the Sarbanes-Oxley Act of 2002 and changes to the NYSE and NASDAQ listing rules.
>
> In the bankruptcy petition for FTX over the FTX collapse, the new CEO shredded FTX, Alameda, and FTX's former management team. Tellingly, he states:
>
> "Never in my career have I seen such a complete failure of corporate controls and such a complete absence of trustworthy financial information as occurred here"

**Source:** UNSW news

Our DeFi analog is still tracking the Dot.com era perfectly. It goes to show the exponential growth we have ahead of us once regulation draws a sandbox by which all builders, investors and market participants can operate in, fairly and justly.




**Source:** QCP Insights, Bloomberg, DefiLlama

**In summary:**

- Although we are past peak inflation, we now expect inflation to remain stickier than most have forecasted, and crucially to hold significantly above the Fed's 2% target. This implies that the Fed will indeed be hiking rates 4-5 more times to their 5.5% forecast and hold it there until Q4 2023.
- The world's growth will not be able to withstand these extreme rates, and this generation will see a stagflationary environment for the first time in the developed world - even if the recession proves a mild one in comparison to the 1970s.
- This means that our trading base case from last year is now imminent - a final "Wave 5" sell-off to come following this recent Q4 "Wave 4" recovery. This upcoming Wave 5 will be long and painful across all asset classes and will likely last until Q3 2023, breaking new lows in the process.
- Finally, the immediate aftermath of the Dot.com bust also unveiled multiple fraud cases like Enron and WorldCom, which remain some of the largest bankruptcies to this day. Similarly, in the crypto bust of 2022 we are now seeing such cases surface as well.
- Parallels to 2001 imply that forthcoming regulations aimed at tackling these gross negligences will weed out potential bad actors, setting the standards for the industry to regain trust and prevent such recurrences for a long time to come.

# On-chain Macro Review


Glassnode is the industry's leading blockchain data and market intelligence platform. We offer the most comprehensive library of on-chain and crypto-financial metrics, and provide a holistic and contextualised view of the industry through intelligible, and actionable insights.

/glassnode

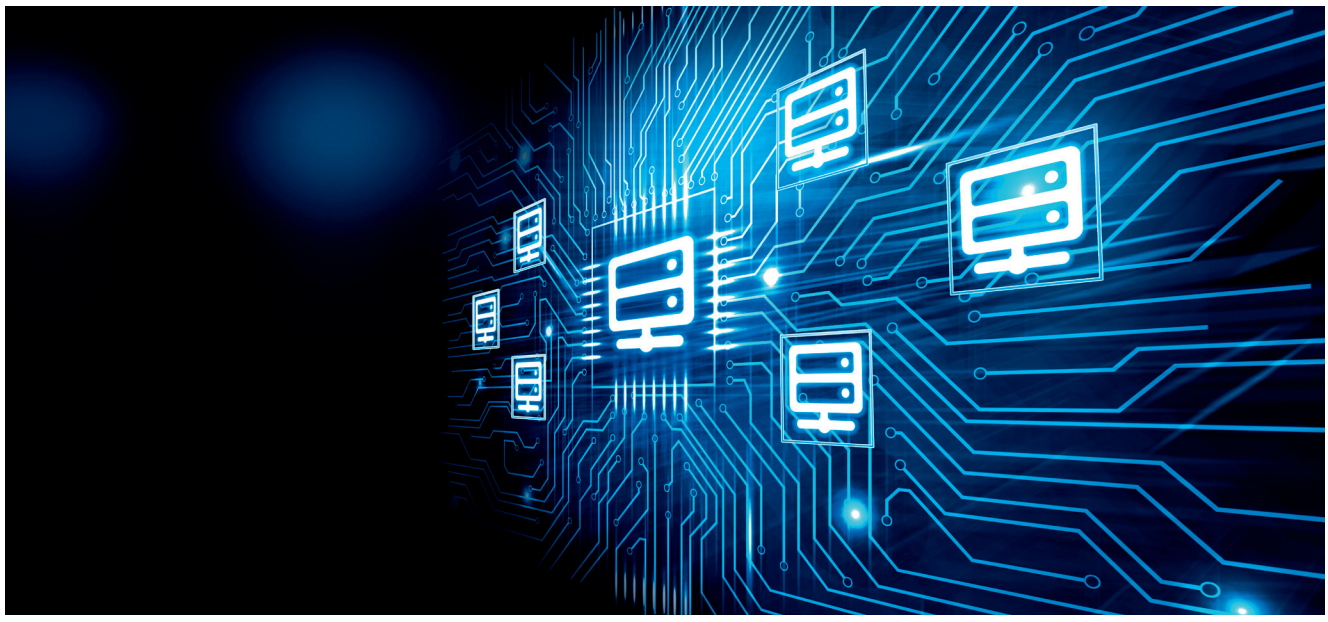
https://glassnode.com


**By Glassnode**

The bear market of 2022 has been brutal for the entire digital asset industry, with prices drawing down over 75% from the ATH for both BTC and ETH. In this piece, we take a big picture view of the big events and trends from an on-chain data perspective.

## Bitcoin

Bitcoin spot prices fell below the Realized Price (currently ~$20k) in mid-June, which is often considered the aggregate cost basis of the market. This indicates that the average BTC investor is underwater on their holdings, and has been for 143-days so far. Both in scale and duration, this is now on par with prior bear markets.



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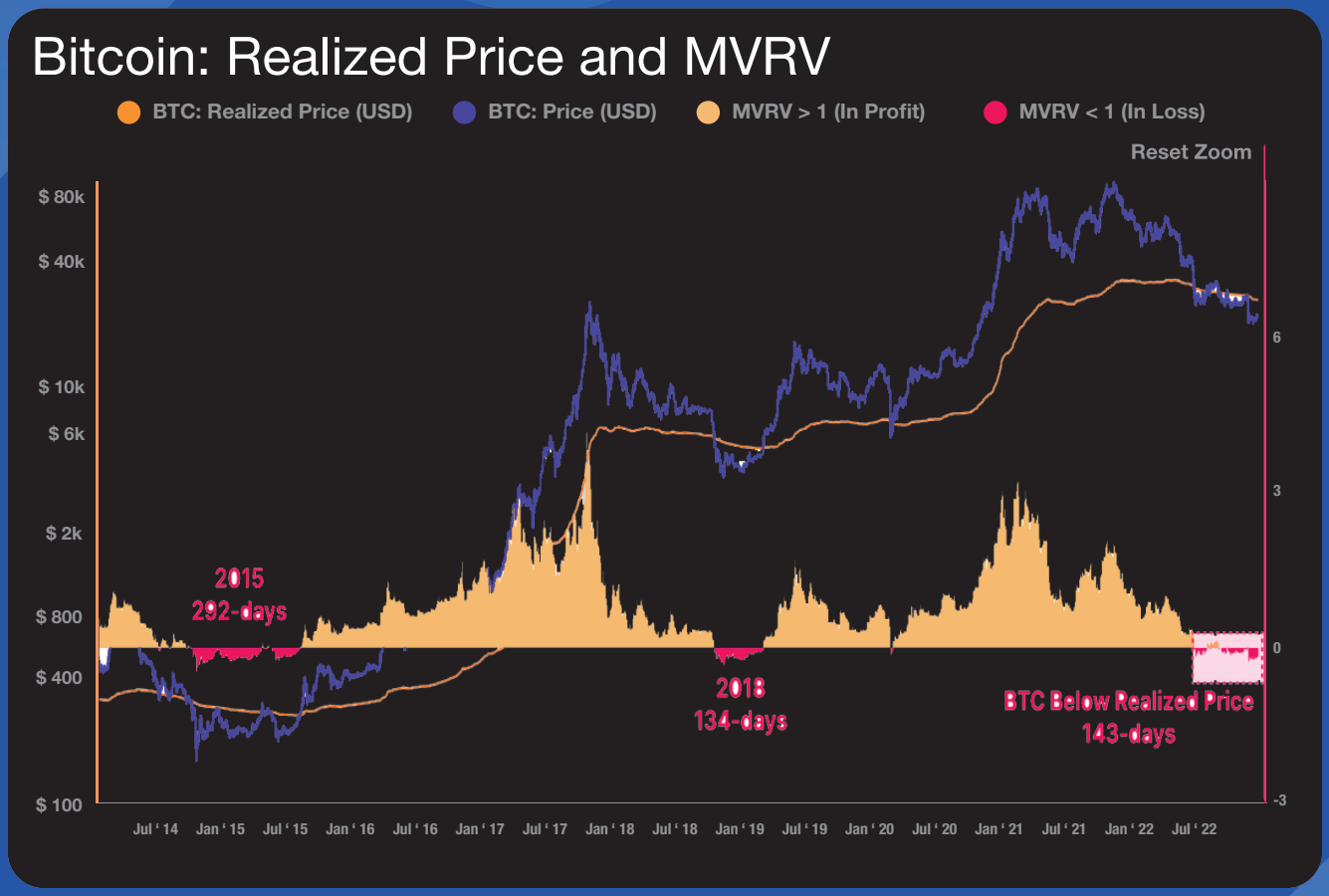
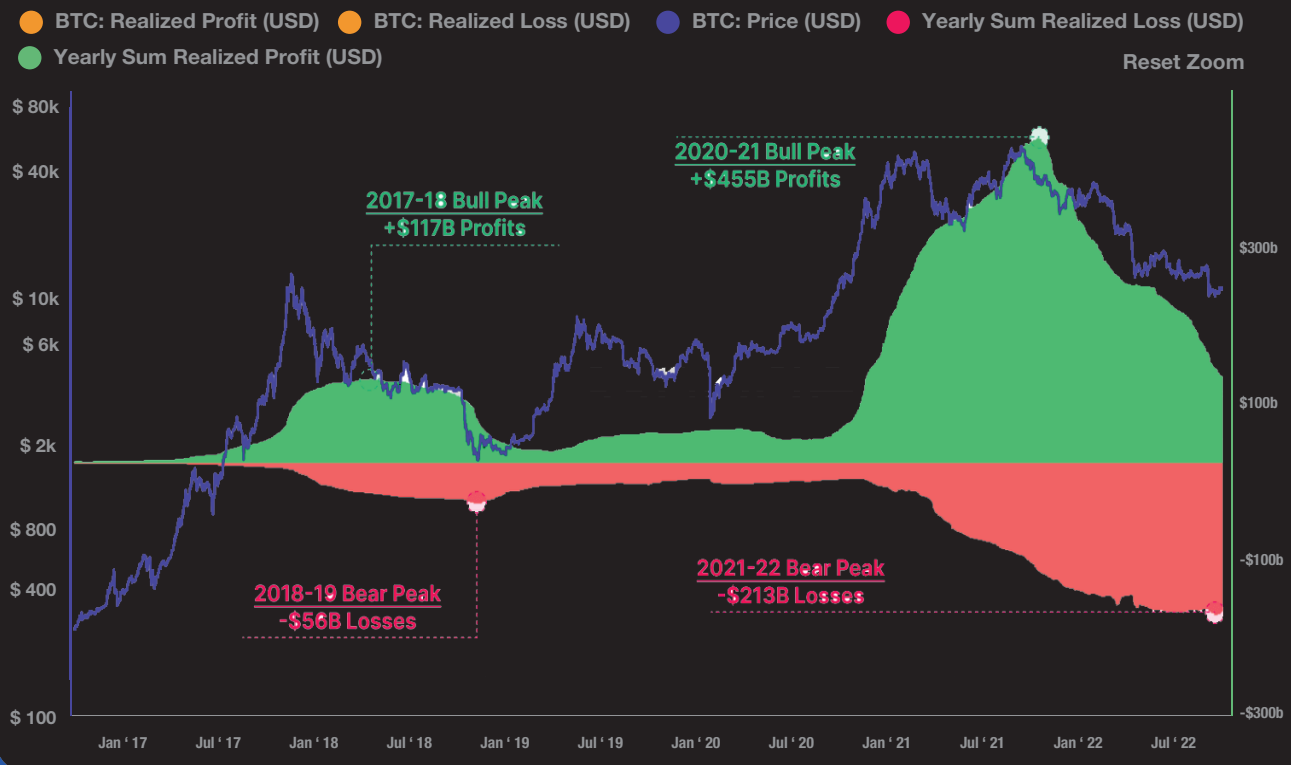


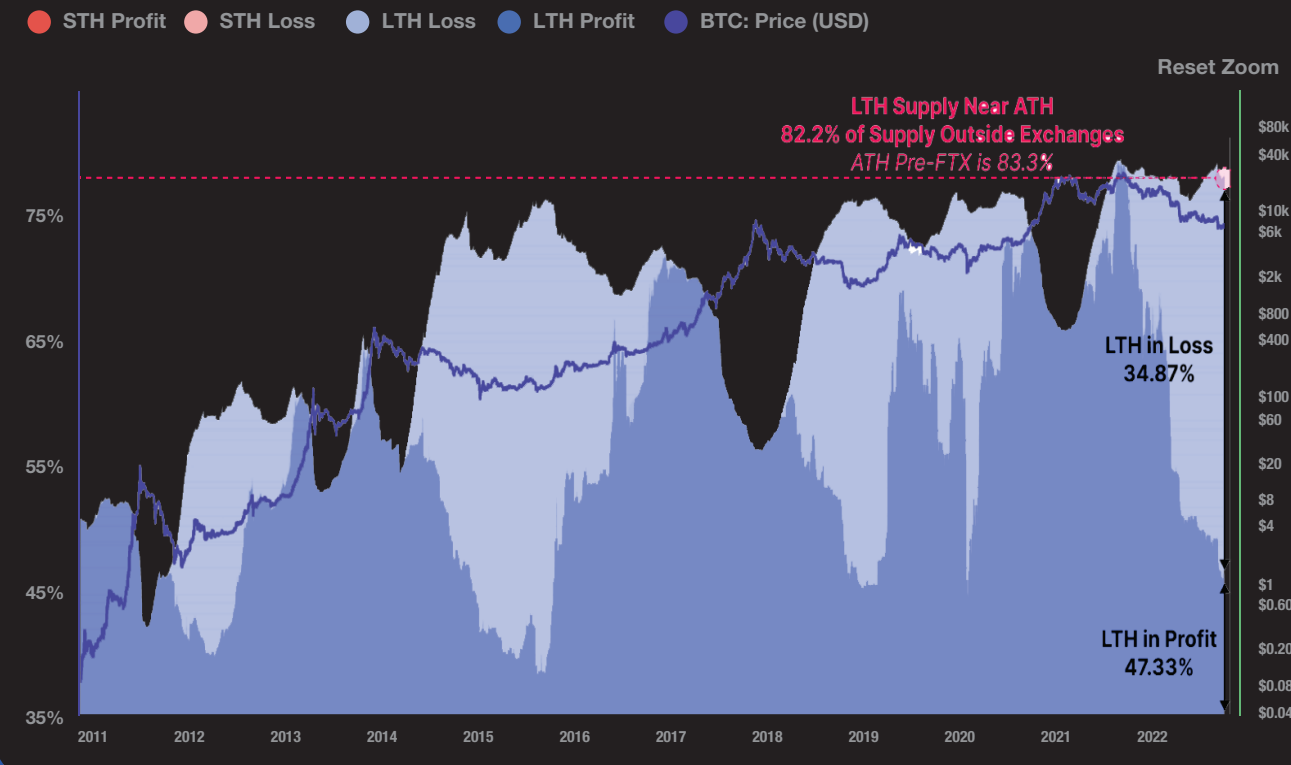

We can assess the rolling yearly sum of realized profit and loss. Here we can see that the 2022 bear has resulted in over -$213B in realized losses, indicating the market has given back 46.8% of the $455B in profits taken in 2020-21. Most of it followed the failures of LUNA, 3AC and FTX.

However, even with the prevailing bearish trend in play, the proportion of BTC supply held by Long-term holders (LTHs) is near all-time highs. In the wake of the FTX collapse, LTH supply declined by just 1.3%, which suggests that HODLer conviction remains remarkably intact. LTHs currently hold 82.2% of the supply, with 34.87% of it held at an unrealized loss.

# Bitcoin: Yearly Sum of Realized Profit and Loss



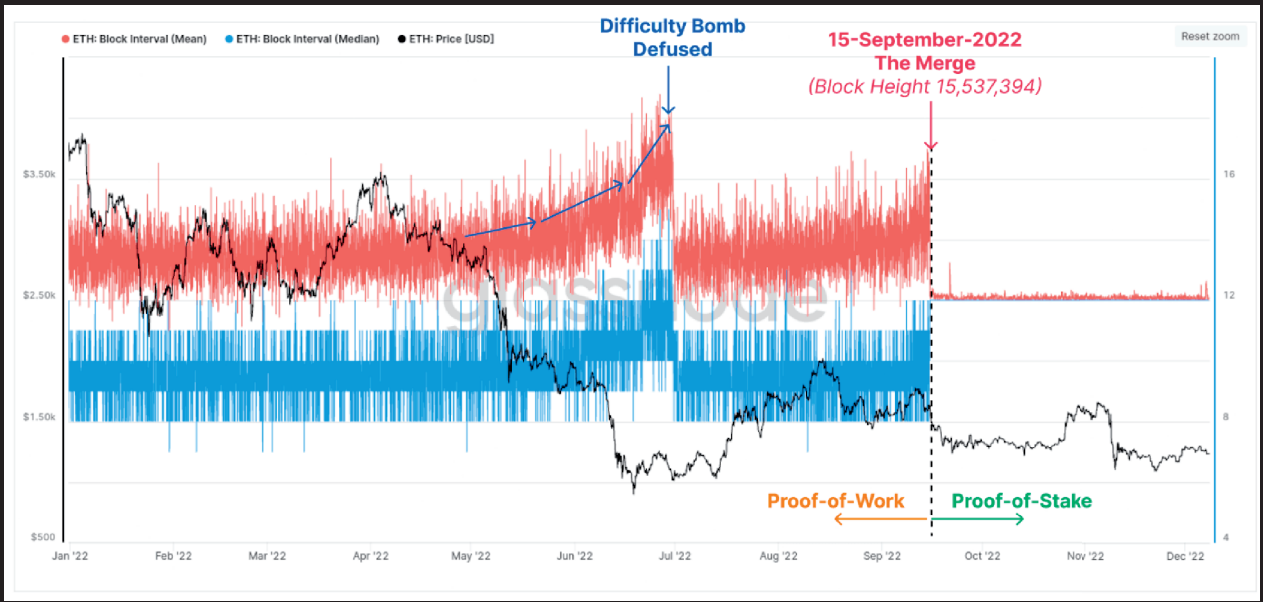

# Bitcoin: Long-Term Holder Supply in Profit/Loss



# Ethereum

For Ethereum, there was a brief moment of bear market relief, as The Merge took place on 15-September. This chart presents the mean and median block interval throughout 2022. We can clearly see where the probabilistic, and naturally variable PoW mining came to an end, and switched over to the consistent 12-second blocktime of PoS. Also notable is the activation and defusing of the fifth and final difficulty bomb in June.

## Ethereum: Mean and Median Block Interval




With the Merge came a significant drop in the ETH issuance rate, falling to around 0.5% per year on a nominal basis. However with EIP1559, much of the new supply is offset by a burn mechanism, resulting in just 1,245 new ETH entering circulation since. This compares to approximately 1.04M ETH that would have been issued under the previous monetary policy.

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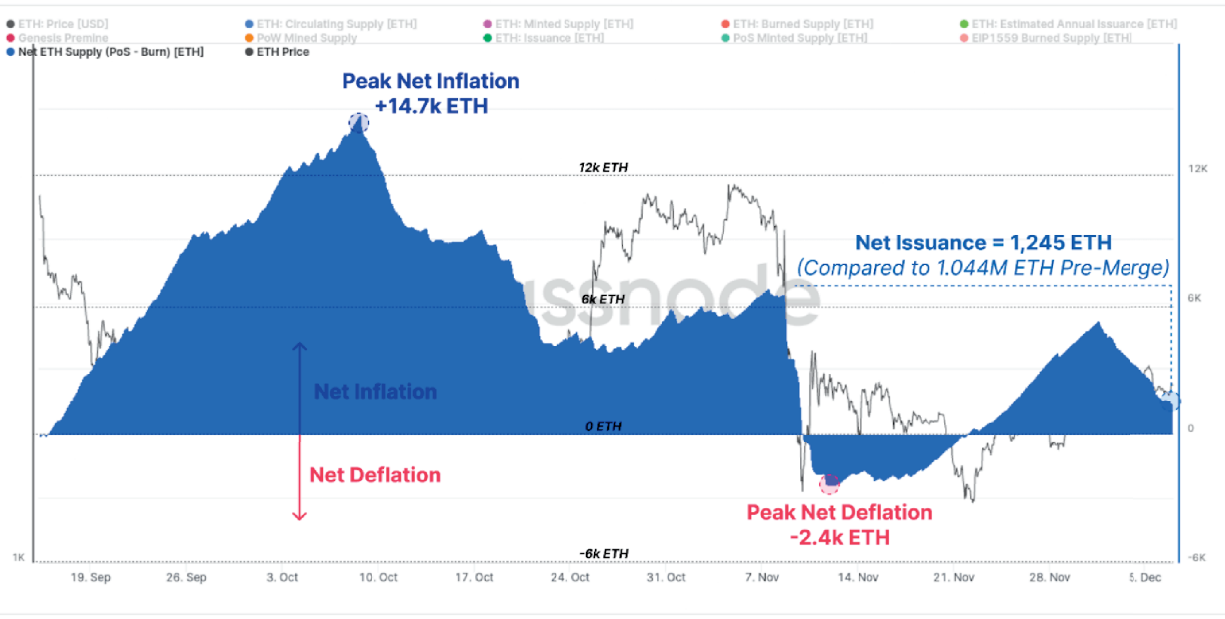
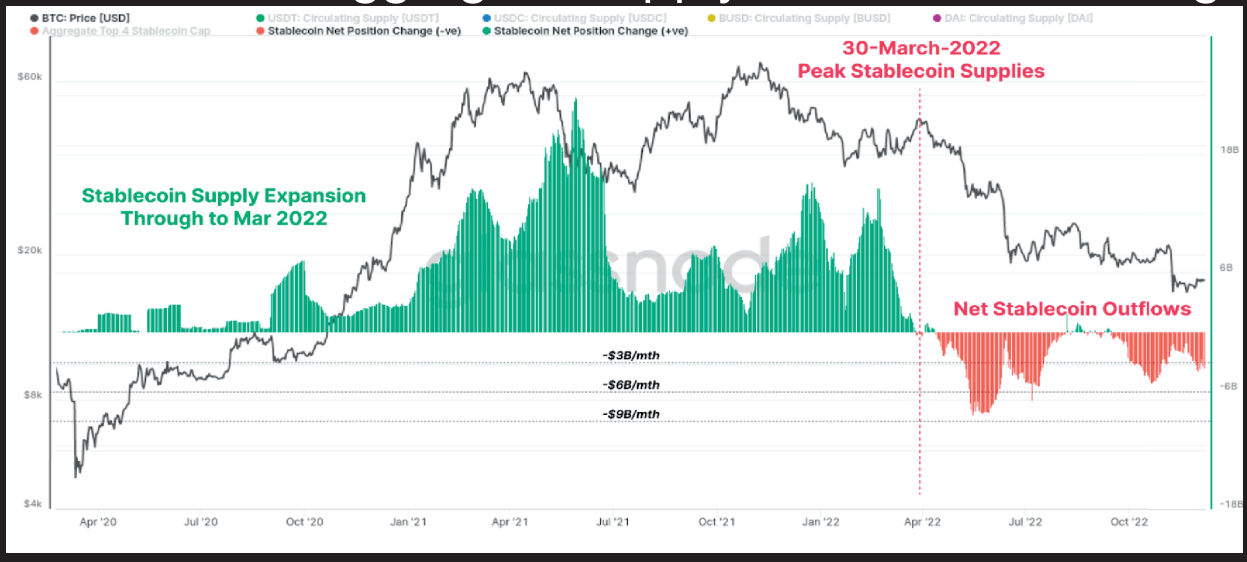
## Ethereum: Post-Merge Net Supply Issuance




# Stablecoins

Stablecoins have become a cornerstone asset of the industry since 2020, with 3 of the top 6 assets by market cap being stablecoins. Total stablecoin supply peaked at $161.5B in March 2022, however has since seen large scale redemptions of over $14.3B. Like realized losses, this reflects net capital outflows from the space, however is also just 8% of the peak, suggesting a majority of capital remains.

## Stablecoins: Aggregate Supply Net Position Change



With 2022 drawing to a close, we can assess the large scale trends occurring in on-chain data. The majority of the year has been dominated by bearish sentiment, capital outflows, and several high profile failures of centralized entities. The result is Bitcoin and Ether trading below their respective Realized Prices, $14.3B in stablecoin outflows, and 75% price drawdowns for BTC and ETH. Despite this however, Bitcoin HODLers remain remarkably high in their conviction, and Ethereum successfully completed the long awaited engineering feat of The Merge.

# Acknowledgements

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