

GLOBAL CRYPTO

Industry Overview and Trends

2022-2023 Annual Report





Abstract

In 2022, the crypto industry entered a deep bear as the Federal Reserve continued to raise interest rates and global liquidity tightened. This year, the total market capitalization of crypto assets shrank by more than \$2.2 trillion, and the size of institutional business in CeFi declined by approximately 71.4%. The industry was devastated after a series of incidents, such as the collapse of Terra, the bankruptcy of 3AC and FTX; many giant institutions, such as BlockFi and Genesis, cannot escape from the nightmare of either being bankrupted or liquidated. However, the development of the industry did not stop here: the total amount of investment and financing in the primary market exceeded US\$27.7 billion; Ethereum opened a new era of PoS and Layer2 has seen unprecedented growth; X2E pitched a new business model of GameFi, etc. This report provides forecasting and suggestions for 2023 by comprehensive analysis on developments and losses in 2022 on 7 aspects: market, data, investment, region, application, technology, and regulation.

We established regional crypto market development maturity index by inputting variables from four dimensions: percentage of crypto users in total population, CEX volume, DeFi traffic and Internet search hotness, with the U.S., Vietnam and Russia ranked the top three (in the order mentioned). There are approximately 320 million crypto users worldwide in 2022, with over 40% being Asian, and new user growth declined to 25 million from 194 million in 2021. The U.S., South Korea and Russia have the largest number of visits to CEX exchanges, with accumulative share of over 22%. The U.S. has the largest share in DeFi, with almost six times more traffic on DeFi than the second, Brazil. South America, South Africa and the Middle East are highly interested in the crypto industry. The crypto population in Southeast Asia reached 46 million, second only to North America. Cryptocurrencies are used for payments and store of value in most application scenarios in South America and Africa, with more than 1/3 of the nationals using stablecoins daily.

The infrastructure segment is still centered with performance optimization, and service facilities are more advanced. Layer2 projects on Ethereum spring up. Multi-chain networks and high-performance L1 chains have vastly developed thanks to modularization of new L1 chains. The storage segment has seen a diversified growth that storage capacity and utilization rate have gradually climbed. Domain names, as the infrastructure of application layer of Dapps, and DID are also experiencing a boom. Cross-chain bridges are not uncommon, but there is still room for security and interoperability improvement. Although little progress has been made in Bitcoin mining, the Ethereum staking rate is only at 12.56%; a new era of staking-as-a-service is about to begin.



On application layer, DeFi's TVL across chains is cut over 70% from all-time high; leverage is disappearing and the ROI decreased. The NFT market has cooled down to a bear market from the craze at the beginning of the year, with a decrease of 42% in market cap and a sharp decrease of 88.9% in the number of active users. NFTfi has emerged to be the next breaking point for wild growth. GameFi and Metaverse have eye-catching performance, but still are underdeveloped.

In terms of regulations, over 42 sovereign countries and regions around the world have adopted 105 regulatory measures and guidance for the crypto industry this year; the positive ones accounted for 36% of all the policies, which is a major increase from that of last year. A full-scale regulatory framework for the industry is on the agenda in all countries that regulations on CEXs are tightening and on-chain regulation might be incorporated into the system.

As the bear market continues, we hereby suggest 4 valuable indicators on bottom of the market and provide some suggestions to endure the bear market avoiding traps and enhancing assets protection. Finally, we make some forecasting for the industry in 2023. (1) The market will reach the bottom in early 2023; (2) Social tycoons in Web2, such as Twitter, will continue to pursue Web3, introducing new paradigm of SocialFi; (3) Ecological prosperity for Layer2 will happen in 2023; (4) Accelerated ZK network will start to launch; (5) Dapp chain will usher in a period of rapid growth; (6) bona fide demand for on-chain storage is growing rapidly, and the storage segment will embrace substantial and organic development; (7) on-chain regulation will be strengthened and some protocols may be endangered; (8) cryptocurrencies will be adopted as payment or authorized as fiat currency by more countries.

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1. Crypto industry under global economic condition

1.1 Global macroeconomic condition: inflation, interest rate hike and depression

If a story line were to be sketched for 2022, global inflation and the tightening monetary must be on the main line. They are the keynote of the macro market movement that influence all aspects of the global economy, including the cryptocurrency market. Besides, we are currently facing a macroeconomic situation rarely seen in recent decades, macro factors are driving the change of the cryptocurrency market this year over endogenous factors such as regulations, new technologies and segments. The global macro market situation is elaborated in the following graph based on the two main factors: global inflation and tightening monetary policy.

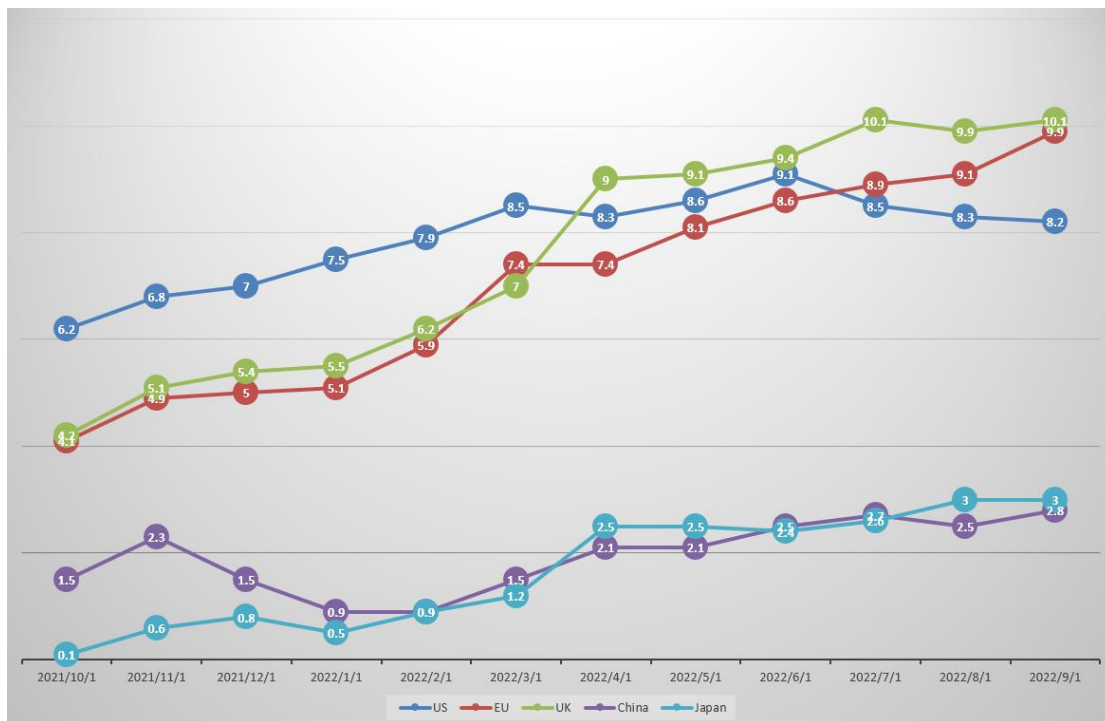


Figure 1-1: CPI YoY of the US, EU, UK, China and Japan

Source: Bloomberg, data from 10/1/2021 to 9/30/2022

The above chart demonstrates the year-on-year CPI data from October 2021 to September 2022 for major economies: the US, EU, China, Japan and the UK. It reveals that inflation in several major economies has been on the rise over the past year and, except for China, is currently at highest level in the last decade. In this case, central



banks in countries with high inflations around the world have generally adopted a tightening monetary policy by raising interest rates and withdrawing from QE to cope with the increasing inflation by suppressing the demand.

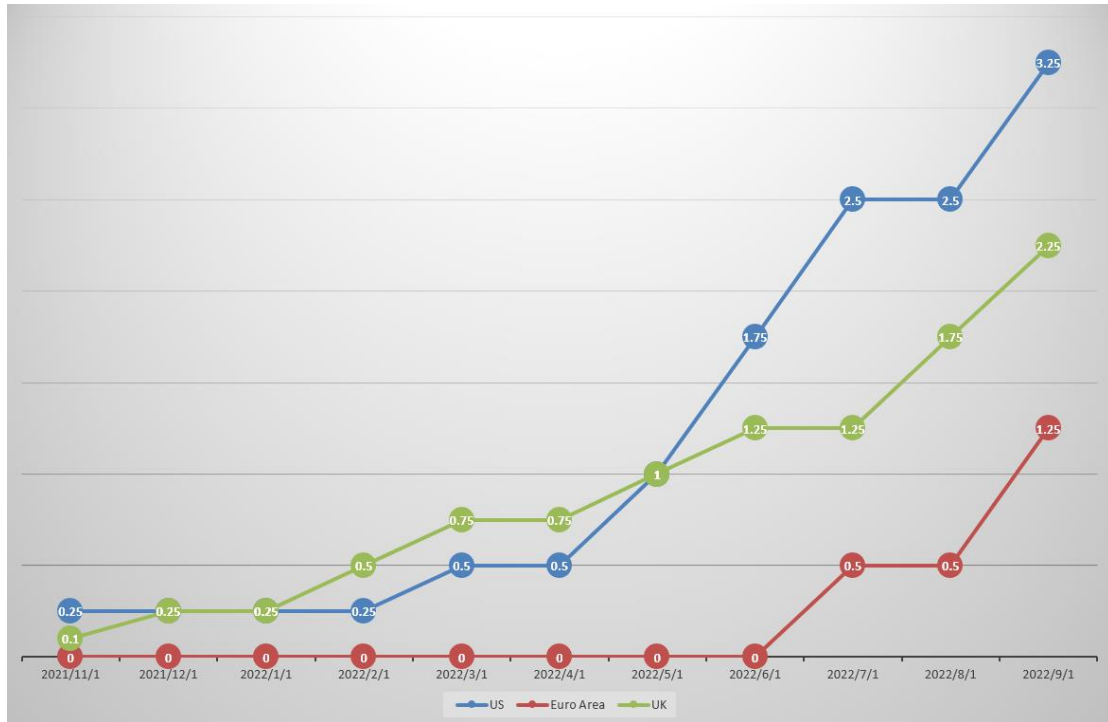


Figure 1-2: Benchmark interest rate of the US, EU and UK

Source: Bloomberg, Data from 10/30/2021 to 9/30/2022

The chart above is a portrait of the trend of benchmark interest rates in the U.S., EU and U.K. from the end of 2021 to date. The most recent round of global interest rate hike has been characterized by a fierce and fast-paced intensity. In the U.S., for example, the Federal Reserve raised the benchmark federal interest rate to 2.5% in 8 months; it took 2 years in the last round to do so. The fast and furious rate hikes have undoubtedly distress tremendously on the price of risky assets all over the world, of which cryptocurrencies are not immune.

Coin	Price at 1/1/2022	Price at 10/31/2022	Change pct
BTC	47200	20500	-56.6%
ETH	3780	1580	-58.2%
XRP	0.841	0.456	-45.8%
ADA	1.355	0.400	-70.5%
SOL	175.71	33.31	-81%

Table 1-1: Changes of top 5 cryptocurrencies by market capitalization in 2022

Source: Tradingview



The table above illustrates the year-to-date changes of major cryptocurrencies. Evidently, along with the tightening of monetary policy, each one of them has suffered significant declines regardless of the segments. Although the crash of Terra and the merge of Ethereum have had game-changing influences to the industry this year, these events are either one of the consequences of the deteriorating macro environment or did not change the overall downward trend of the industry from the root. Therefore, it can be said that the keywords for the macro market environment of this year are inflation, interest rate hike and depression.

1.2 The year of evanescence for crypto

2022 was a year of lengthy downturn for cryptocurrency, with the external financial environment inundated with panic and a number of devastating internal incidents, almost \$2 trillion vanished in market capitalization.

1.2.1 Market: from bull to bear and getting worse

Market Value	Highest \$	Lowest \$	Change	Current \$
Total Market Capitalization	2.93 trillion	800 billion	-72.6%	1.01 trillion
BTC	1.27 trillion	355 billion	-72%	392.7 billion
ETH	571.7 billion	12 billion	-79%	186 billion
Defi Board	172 billion	33 billion	-80.8%	47 billion
Gamefi & Metaverse	29 billion	4 billion	-86.3%	5.5 billion

Table 1-2: Changes of market cap in major segments

Source: coinmarketcap, Huobi Research Institute

BTC and ETH have remained pillars during the bear market, with relatively small decrease while maintaining high market cap. While the total market cap has fallen between 80%-90% for DeFi and GameFi, most individual assets have fallen on a larger magnitude: for new assets continue to flow in, and the increasing quantity of assets flattened the overall decline; popular assets depreciated faster affected by the overall downturn than that during a bull market with decline of 90% or even more.

200-Week SMA Indicator



For BTC, as a mainstream crypto asset, the 200-week SMA indicator is more suitable for observing the range of BTC's lowest price from the historical data of over a decade.



Figure 1-3: BTC price under the 200-week SMA indicator
Source: Tradingview

The indicator starts from mid-2014 since BTC did not meet the prerequisite of 200 weeks for the indicator before 2014. From historical data, the two breakdowns in 2015, the intersection in 2019, and the "March 12" breakdown in 2020 were mostly un-abiding and followed by a rebound by market adjustment. However, price of BTC has been swinging in the lower part of the indicator for a long time since it fell below the indicator in June this year, and fell again back after the breakout in August. According to the indicator, BTC is historically seen for the first time below and wandering in the lower area, signaling an unprecedented intensive bear market at current.

1.2.2 Applications: developments and innovations in the downturn

According to DeFillama data, TVL of DeFi went from 171 billion USD in January 2022 to lowest at 50 billion USD in October 2022, and it is around 55 billion USD at the end of October. With a series of incidents, such as Terra, TVL of DeFi has also fallen sharply for twice, the market is hence accelerated to bearish.



Figure 1-4: On-chain TVL

Source: DefiLlama

The following figure exhibits the value of outstanding debt in lending protocols. Current balance is about 4 billion USD, 84% less compared to 25 billion USD at highest last year. The demand for leverage on-chain declines, resulting in decrease on-chain trading activity; it is another characteristic of current round of bear market.

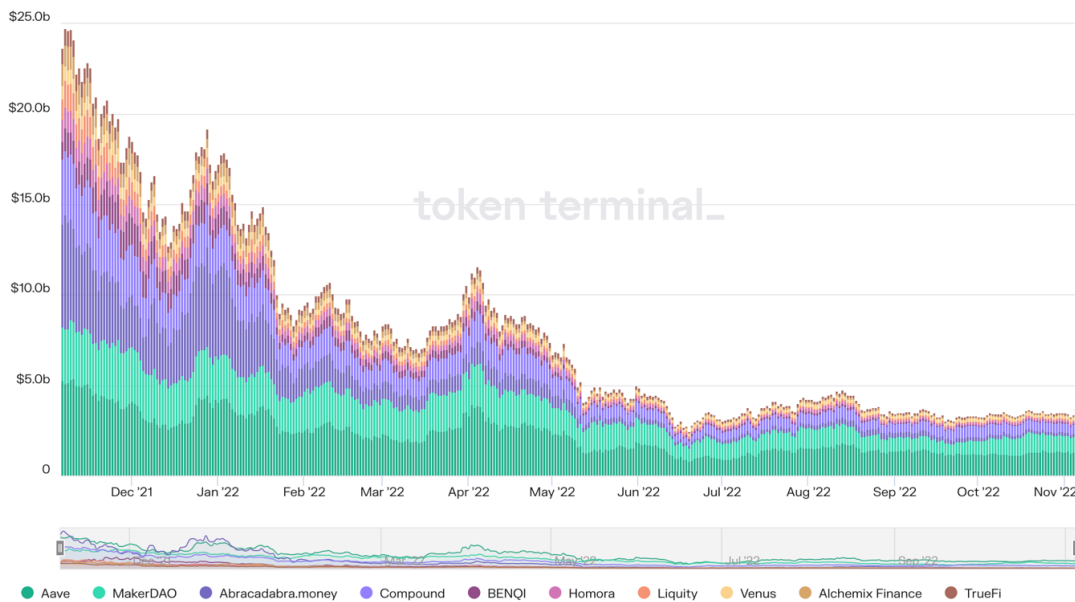


Figure 1-5: Total volume of lending on-chain

Source: token terminal

Ethereum is still the main battleground for DeFi. Entering to a bull market in the second half of 2020, the explosive growth of the protocols accompanied by simultaneous rise in token prices and rate of return has been long pursued by large amount of funds; liquidity was also enriched in the wave. Whereas in 2022, token prices are cut and so is the rate of return. As liquidity is being extracted and capital is escaping from the market,



the panic is further aggravated. Current rates of deposit on stablecoin on mainstream lending protocols are even lower than that of U.S. Treasury. What’s worse, many more protocols have been hacked and more incidents have been triggered, such as the collapse of Terra and the liquidation of FTX, causing risk-averse funds to be withdrawn.

Under such market condition, Layer2 has been vastly promoted, and DeFi ecosystem could have a second spring on Layer2. Scaling is faster and cheaper, the cost for ordinary users will be lower, more users with relatively small amount of capital can also surf in DeFi, which is also beneficial for DeFi.

From TVL of Layer2, in April 2022, the TVL of Layer2 reached a peak of 7.5 billion USD and then went all the way down to 3.7 billion USD in July. Unlike other ecosystems, the TVL of Layer2 has been rising to currently at 5.32 billion USD since the touch of bottom in July. The credit may go to the token offerings and the landing of large number of applications, as well as the fact that most of the Layer2 development teams are actively working on incentives, such as pre-airdrop campaigns and token offerings. With the progress of Layer2 scaling solution, more on-chain activities and ecological projects will eventually become available.



Figure 1-6: On-chain TVL of Layer2

Source: L2BEAT

As the market cooled down, trading volume of NFT seems to be in the doldrum. The ultra-high volume occurred in the May was due to the FOMO sentiment generated by the otherdeed issued on otherside at the time. Meanwhile, NFT's total market cap fell by half, the pricing unit for NFT is in ETH, and ETH per se is highly volatile. The market cap of NFT market dropped from about 35 billion USD to 21 billion USD by



over 40%. The drop in NFT's total market cap was not as large as ETH's because new releases of NFT have been feeding the market, which has also converted non-NFT users to NFT users at the same time.



Figure 1-7: NFT Volume

Source: NFTGO

Despite the fact that the NFT market is shrinking, current average daily trading volume is only 15% of that in the bull market or even lower, the growth rate on the number of wallets with NFT has never stalled with increases by about 80,000 per week as charted below. The market continues to inflate with new users and new products, while the total market cap of NFT is slowly diminishing (as shown in the chart above), which is a phenomenon of popping the bubbles in the NFT market: prices of NFTs tend to be rational, and more users will buy and hold NFT at the same time, signifying healthy development patterns for the market.

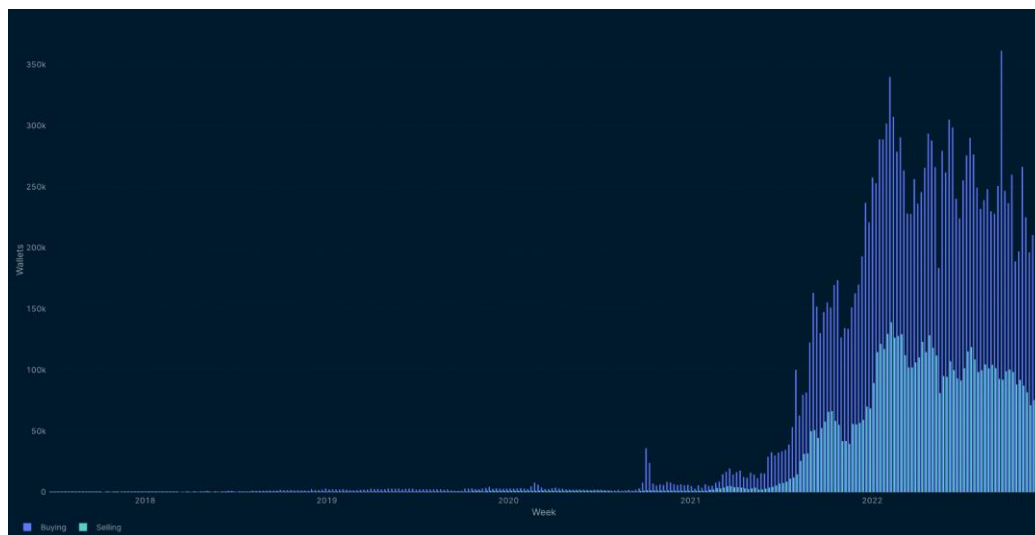


Figure 1-8: Number of wallets that have owned NFT

Source: nansen



1.2.3 Investments: seeking hope in bear market

The secondary market continues to look sluggish in numbers, not to mention the primary market. According to incomplete statistics from Odaily, the total disclosed fundraising of the cryptocurrency market globally in the third quarter of 2022 was \$5.841 billion, with a total of 442 investment and financing events (excluding fundraising by mutual funds and M&A); including 20 on infrastructure, 50 on technology service providers, 49 on financial service providers, 246 on applications and 77 on other service providers. Among them, the application segment received the largest amount of funding at \$2.605 billion. Compared to the first and second quarter of 2022, the third quarter saw a significant decline in both the total amount raised and the total number of fundraising events.

According to statistics by publicly available information reported by Odaily and PANews, there were 511 investment and financing events (excluding fundraising by mutual funds and M&A) in the global crypto market in the second quarter of 2022, with a total disclosed amount of \$12.71 billion. Among all funding events, there were 28 deals with a funding size of more than \$100 million. In Q1, there were 461 global crypto fundraising events with a total disclosed value of \$9.2 billion.

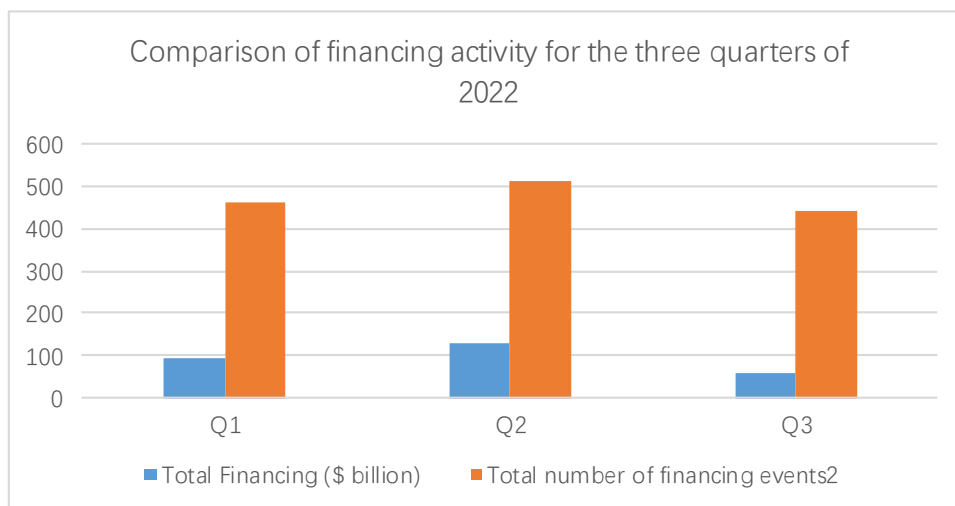


Figure 1-9: Comparison of Financing Activity for the Three Quarters of 2022

Source: Huobi Research



In Q2, GameFi and NFT were the most pursued for institutional investors, with 82 fundings for gaming, gaming-related infrastructure and technical solutions, ranking first by number of fundings and accounting for 16% of the total events. GameFi has the largest funding volume with \$2.996 billion, which is 23.5% of the total funding volume.

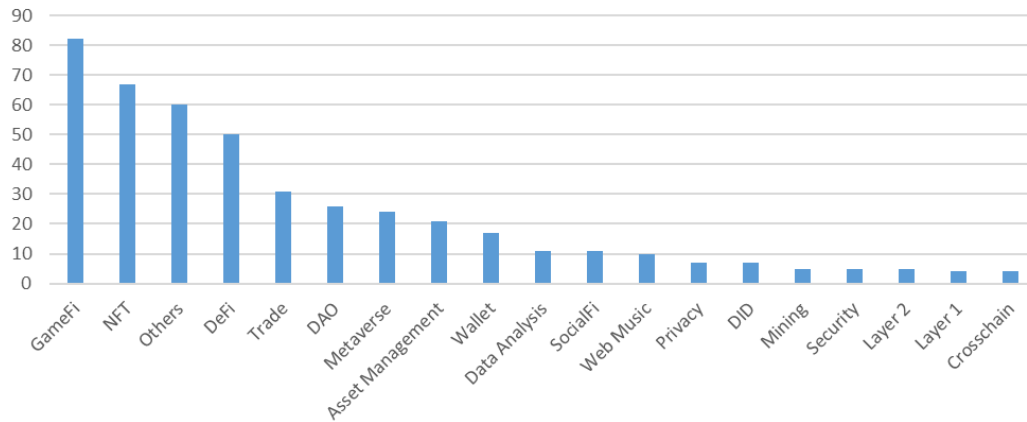


Figure 1-10: Breakdown of the number of funding events in Q2 2022

Source: Huobi Research

GameFi continued to be favored by capital funds in Q3: \$963 million was raised within the GameFi sector, accounting for 16.4% of total fundings by volume and 15% by number (67 out of 442). Most invested targets are blockchain gaming companies, blockchain game guilds and X2E blockchain games.

L1 projects also performed well in Q3 in terms of funding. Although only 13 fundings were made on L1 segment, accounting for only 3% of the total fundings in number, the amount raised reached \$625 million, second only to GameFi. The most outstanding two L1 chains are Sui and Aptos built with Move language, which claim to have inherited the Move language from Libra that emphasized in improving security and scalability of L1 chains while massively enhancing the functionality of network. The two appeared on the capital market with valuation of so high that astounded the entire market. With the star effect of new L1 chains, new projects sprung out one after another.

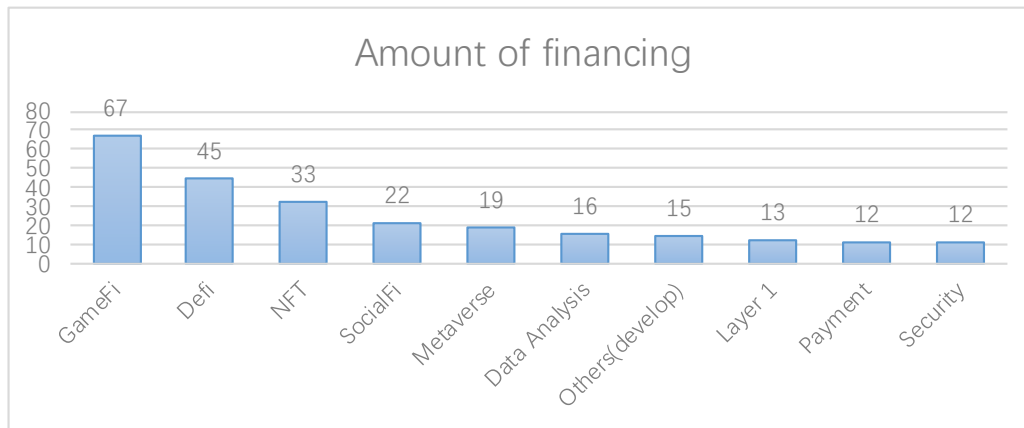


Figure 1-11: Breakdown of fundings for each segment in Q3 2022

Source: Huobi Research

Under the influence of bear market, many institutions did not survive, and some others were severely devastated by some major incidents, dissolved or bankrupted. Most of the crypto investment institutions have switched investment philosophy as opposed to that in a bull market and strengthened level of scrutiny of targets. Not all birds are meant to be caged, as their feathers are just too bright, even in this bear market. The areas that institutions have been interested¹ can be divided into 2 categories, infrastructure and applications. Overall, infrastructure type of projects are the emphasized ones. According to Huobi Research, the word “Infra” has the highest frequency of mentions, where the 2 main lines are ZK and new L1 chains, with branches being middleware, data, oracle, DID, etc. On application layer, DeFi, GameFi, and social ranked the top 3. Although DeFi has been deserted for a while, it is still the most anticipated for institutions.

¹ For more information, please refer to research report of Huobi Research: "Gold Mines in the Future: Insights from Interviews with 20 Institutions" @<https://research.huobi.com/#/ArticleDetails?id=312>



2. Geographic Analysis of the Crypto Industry

2.1 Regional market traffic analysis

After 14 years of development, crypto assets represented by BTC have spread to all regions of the world and exerting influences on many aspects. In order to measure the overall development level of the crypto market in different regions, the degree of penetration and the pace of development in crypto business of each region will be dissected based on the following four dimensions.

(1) Total crypto population and occupation rate: The occupation rate of crypto population refers to the ratio of the number of crypto users to the total population of a country, which most visually reflects the level of adoption for crypto in a country.

(2) Traffic from CEX² : Centralized exchanges are vital in the cryptocurrency market. These exchanges are usually user friendly and many crypto novices start with them; most of the users and liquidity in the crypto market are aggregated in centralized exchanges. Our data is extracted from top 100 CEXs in the market based on active users, trading depth, trading volume and reliability.

(3) DeFi traffic³ : DeFi has become one of the markets with skyrocketing growth in the crypto world in the last two years. With the birth of AMM, liquidity mining and other models, DeFi has absorbed a large number of funds in the market: experienced users and practitioners have actively interacted in Defi applications, and an analysis of the defi protocols could appropriately sketch the landscape of the experience user distribution worldwide. Our analysis is based on the data drilled from nearly 300 mainstream DeFi projects and different L1 chains in terms of TVL, transaction volume, and daily active users.

² The centralized exchanges targeted for data input are Binance, Coinbase, FTX, Kraken, Kucoin, Huobi Global, Gate.io, Bitfinex, Bitstamp, Coincheck, Gemini, Bybit, MEXC, Bithumb, OKX, Poloniex, etc.; traffic data is from similarweb.

³ The targeted DeFi protocols for data input are MakerDAO, Lido, Curve, AAVE, Uniswap, Convex Finance, Justlend, Pancakeswap, Compound Finance, Instadapp, Balancer, Sushiswap, GMX Yearn.finance, Synthetix, dYdX, etc.; traffic data is from similarweb.



(4) **Keyword search heat:** Heat from internet keyword search reflects the level of public interest in the crypto market from a macro perspective.

2.1.1 Global crypto user growth slows, with Asia accounting for over 40% of the total

The chart below reflects the total number of cryptocurrency users worldwide with KYC based on multiple sources, including but not limited to trading platforms, on-chain wallet information and different service providers.

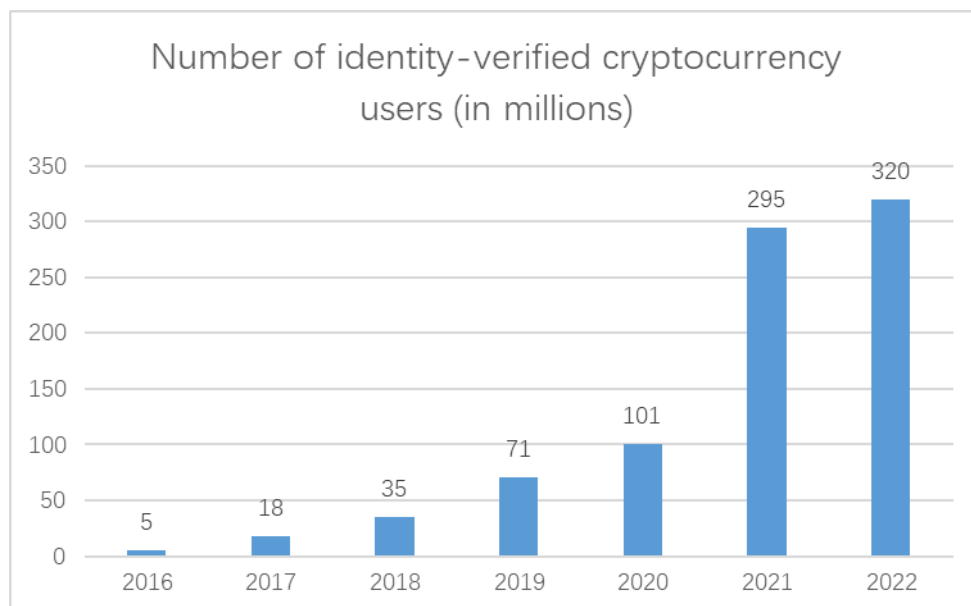


Figure 2-1: Total crypto users worldwide

Source: Statista, Huobi Research

From 2018 to 2020, the global cryptocurrency market is in the early stage of development with relatively slow user growth; after 2020, the prosperous development of the market attracts many crypto-native users and explosive growth has been seen. The chart above also demonstrates that the growth rate and the absolute value of growth in 2021 are the highest in recent years. The reason might be attributed to the entry of various financial institutions and traditional traders, and with the prevalence of NFT, the crypto market is completely ignited. As we enter 2022, the global macroeconomy is on the verge of recession, **but the falling crypto market was surprisingly resilient. By the numbers, the net crypto user population continues to grow worldwide.** As



of November 2022, the number of crypto users worldwide is approximately 320 million, with a penetration rate of approximately 4.3%. Among these, Asia has the largest crypto user base at approximately 40%.

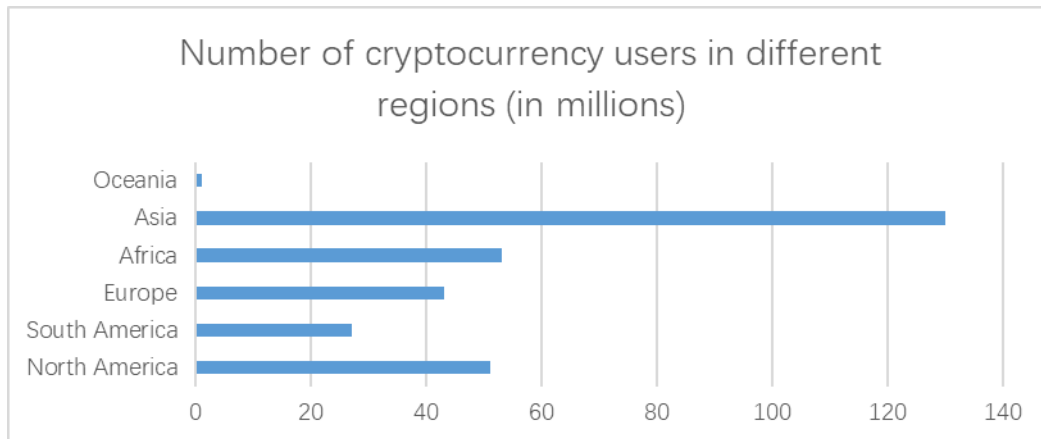


Figure 2-2: Distribution of crypto users worldwide

Source: Statista, Huobi Research

2.1.2 Top 3 traffic source in CEX: U.S.A, South Korea, Russia

From the data, the overall market size of centralized exchanges declined more significantly in 2022 than that in 2021. Specifically, total crypto asset market capitalization declined by approximately 66% over the past year, cryptocurrency spot trading volume declined by approximately 27%, and the number of unique visitors declined by 24%. It is evident that **monthly visits to centralized exchanges are decreasing for both website and mobile App crypto users**. This may coincide with the market turning into a deep bear. The continuous gloomy market condition and the depreciating assets are both depressing existing users that interest for trading is slowly worn out.

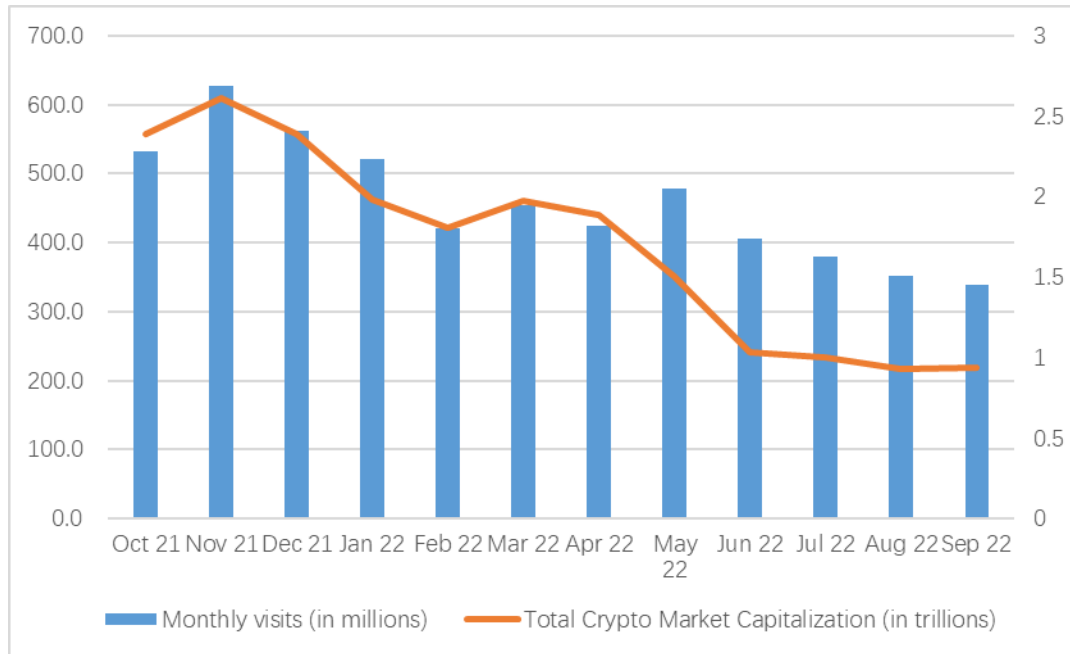


Figure 2-3: Monthly traffic and crypto market cap of major CEXs in the past year

Source: Similarweb, Huobi Research

The graph above illustrates the relationship between the monthly traffic of major CEX visits and the total crypto market capitalization over the past year. The correlation coefficient between the two is 90.8%, which is a strong positive correlation. However, two points are worth noting. First, there is a small divergence between the two in May 2022. This could be due to a black swan event, namely the LUNA crash, where a large number of users were taking advantage of the incident to buy in, or selling on the exchange, instead, pushing up the number of visits in that month. Second, although exchange visits were lower, **the decline was much less than the decline in market capitalization**. In other words, a large portion of existing users sit tight and assess in the market.

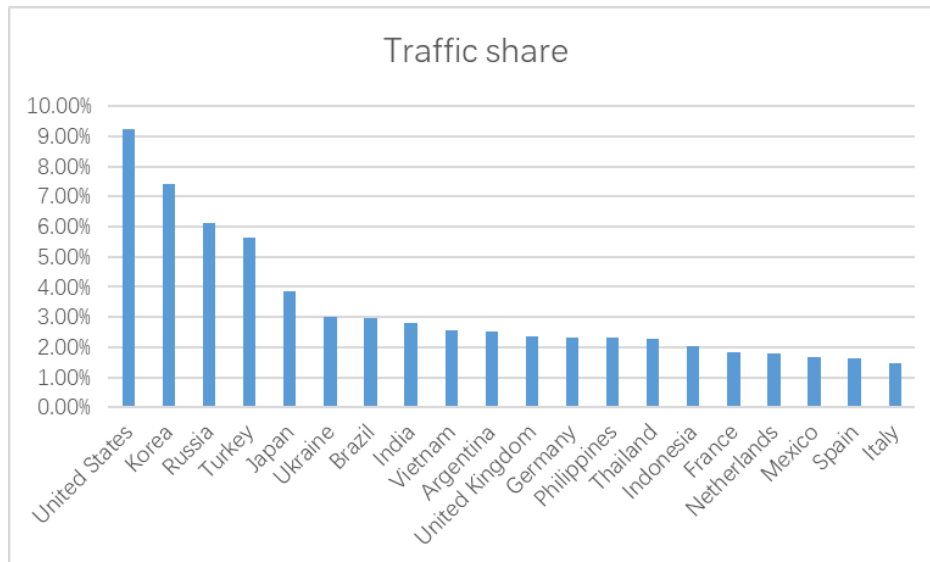


Figure 2-4: Major CEX Traffic in Selected Countries

Source: Similarweb, Huobi Research

In terms of CEX traffic, the US firmly holds the championship with absolute number of crypto users and market size per se, followed by South Korea, Russia, Turkey and Japan with 7.4%, 6.1%, 5.6% and 3.8%, respectively. Overall, countries on the list all have relatively friendly policies for crypto. South Korea and Japan have high level of solidification in social class due to high unemployment rate and housing prices, so that the younger generation is pinning their future to cryptocurrency investments. Russia, nevertheless, has no other choice but embracing a more open and liberal financial system in light of the strict sanctions from the US. For Turkey has long suffered from hyperinflation, cryptocurrencies have emerged as a monetary alternative in the country.

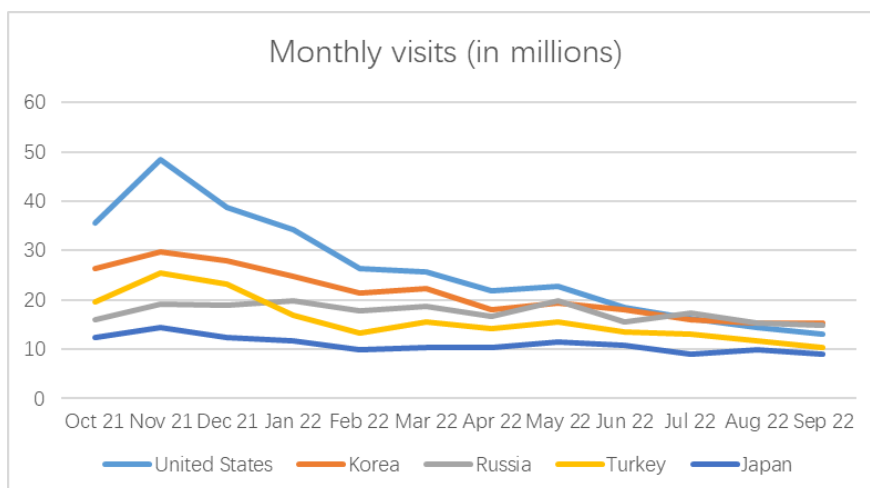


Figure 2-5: Major CEX traffic share and monthly traffic in selected countries

Source: Similarweb, Huobi Research



The graph above depicts the change in monthly visitors for the top five countries. The rate of decline in the United States, South Korea, Russia, Turkey, and Japan are 72.9%, 48.6%, 25.6%, 59.6%, and 38.6%, respectively. Among them, the U.S. has the largest decline, which is mainly due to the macroeconomic impact of the Fed's successive substantial interest rate hikes, which tightened liquidity while interrupted the risk aversion of funds. Russia has the least decline: economic sanctions are filled all over the world by the war; it seems to have given a place to the borderless cryptocurrency acting as one of the country's effective complementary payment and trade venue.

2.1.3 The US: where majority of DeFi users are from

The total number of unique users in DeFi worldwide has relatively increased over the past year. Although a series of unfavorable incidents happened in 2022, these users remain confident about the market recovery as they firmly believe in the long-term value of DeFi and its indispensable functions as pillars to the industry. As a result, **we believe the fundamentals of the DeFi market remain relatively healthy.**

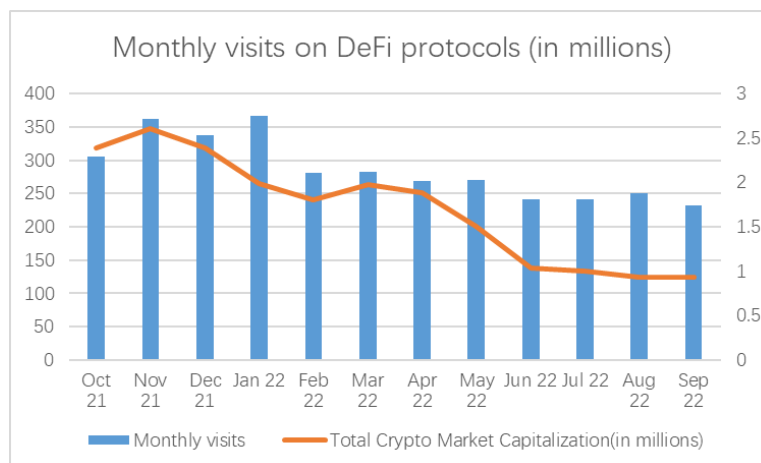


Figure 2-6: Monthly traffic for major DeFi protocols in the past year

Source: Similarweb, Huobi Research

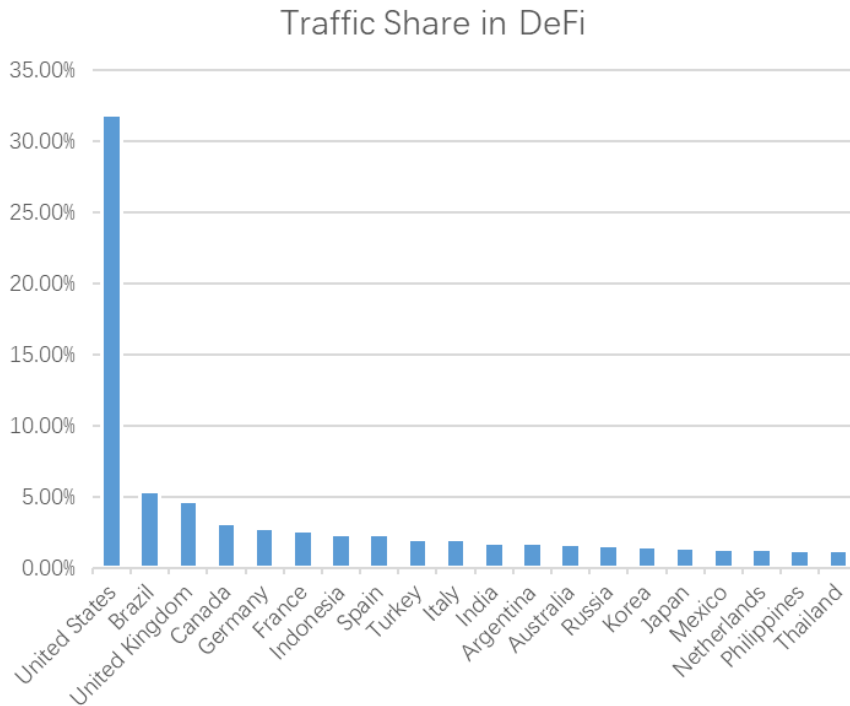


Figure 2-7: Major traffic of DeFi in various countries

Source: Similarweb, compiled by Huobi Research

Geographically, the U.S. has an absolute advantage of DeFi market share at 31.8%, far beyond other countries, which may be tied to the fact that DeFi originally rooted in the U.S soil. The U.S. has invested tremendously in the crypto industry with ongoing influx of funds and talents; many startups flocked to tech and financial hubs such as Silicon Valley and NYC. Slightly different from CEX traffic, some developed countries, such as the UK, France, Germany, and Canada are seeing large DeFi traffic. The probable cause may be that DeFi's user base is more skewed towards professional and experienced users with a higher threshold, which coincides with the macro image of these countries: established financial systems and complete investor education. Brazil is ranked second as it is the number one cryptocurrency market in South America, and several banks and investment firms are offering or preparing to offer services related to the crypto market; asset management firms QR Capital and Hashdex have also launched DeFi ETFs, which have increased the awareness of crypto at large.

2.1.4 "NFT" has become the most discussed topic on crypto worldwide



We have collected keywords related to the crypto market in the past year. With the selection of the 5 most mentioned (in no particular order), we visualized on a map for a more intuitive perception of the distribution of interest in the crypto industry by regions.

● cryptocurrency ● defi ● gamefi ● nft ● btc



Figure 2-8: Worldwide keyword volume in crypto

Source: Google trends

In terms of keyword distribution, "BTC", "DeFi" and "Cryptocurrency" are most frequently searched in South America, South Africa and the Middle East. This is largely due to the underdeveloped financial infrastructure and payment systems in these regions, as well as the suffering from high inflation rate, which makes cryptocurrency a perfect alternative for payments and store of value. "NFT" is surprisingly popular, as it has stormed every single corner of the world: partially because NFT can be well integrated with various industries, such as sports, arts, entertainment, cultural creations, expanding the application scenarios on a larger scale. In addition, with the unique community culture and wealth effect of each NFT, NFT has gone viral worldwide.

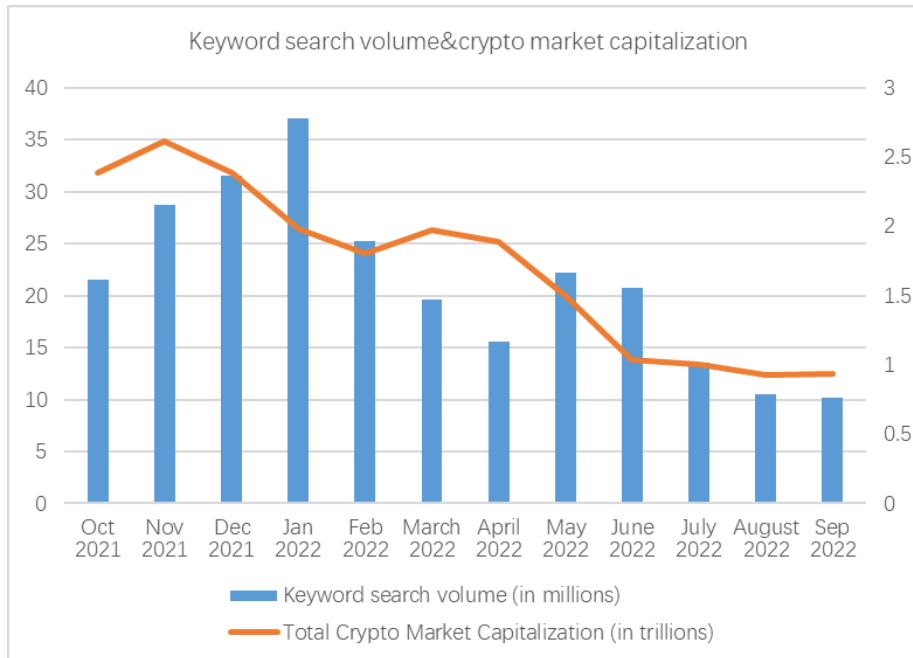
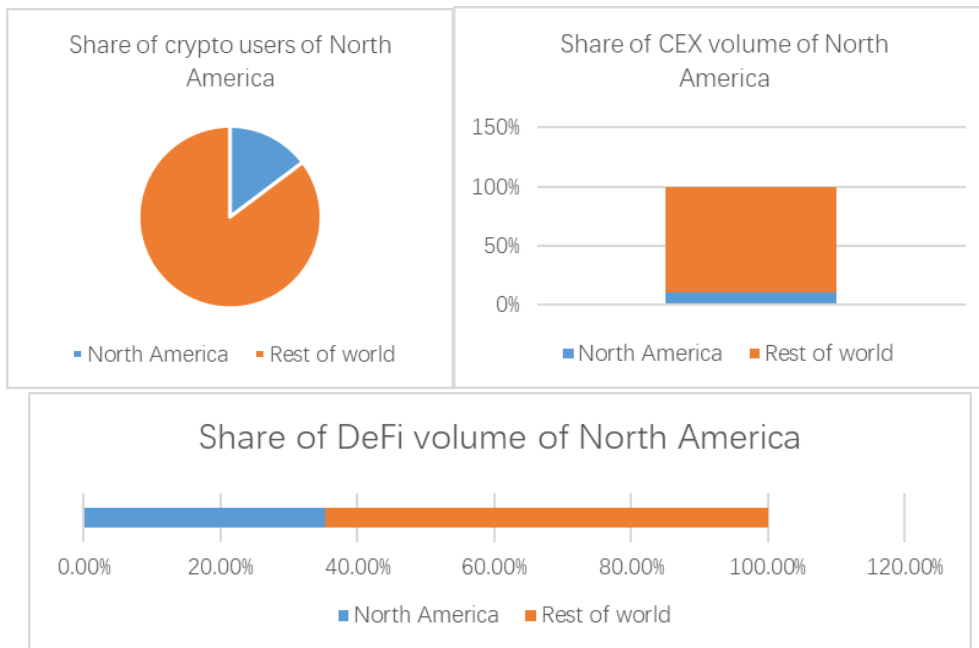


Figure 2-9: Keyword search volume and total crypto market capitalization
Source: Similarweb, compiled by Huobi Research

The above chart reflects the search volume of various crypto keywords over the past year, which mirrors the level of public interest in crypto. The NFT market lighted the boom of the crypto market: all crypto-related keywords became top searches on the Internet, and the heat continued rising. In 2022, as the overall crypto market went downward, the attention on the industry declined. What's worse, a series of incidents during Q1 and Q2 added insult to injury. The crypto market entered a dormant state along with the end of several industrial hotspots in the second half of 2022. Due to the nature of mass communication, audiences are more interested in negative news; it explains the spike in search volume tends to occur whenever in market downturns or negative news. But on a wider range of the timeline, the degree of attention on the crypto industry has dropped by nearly half.

2.2 Regional Market Industry Analysis

2.2.1 North America: The main battleground for DeFi innovation



North America is crucial to the global crypto market. The region currently has about 47 million crypto users, representing 14.7% of the global crypto population. As North America is one of the most developed regions in the world, the crypto market is also prosperous. In terms of traffic, the DeFi business conducted within North America is particularly strong. Below we provide a specific analysis on one of the major countries in the region: the United States.

- **The U.S. is the indicator of the crypto market**

Over the past few years, the overall attitude of general public on cryptocurrency has rolled back the United States: more people have started to notice and join the crew of cryptocurrency trading and investments, and the phenomenon is in line with our findings that the U.S. wins in every dimension.

Currently, there are about 46 million crypto users in the U.S., accounting for 13.7% of the total population; the traffic in centralized exchanges and DeFi sector is 9.2% and 31.8%, respectively. Looking at the types of transactions in the U.S. across CEXs, BTC is the main target for U.S. crypto users, followed by Ethereum, Dogecoin, ADA, and other alter coins. To be more specific, the U.S. has the largest BTC trading volume at \$1.5 billion. The number also explains why there has often been a strong correlation



between price volatility in crypto markets and the U.S. financial markets in recent years. In particular, since 2022, the crypto market has been almost entirely manipulated by the Federal Reserve's monetary policy; on the other hand, the U.S. has the largest trading volume in DeFi with 31.8% among others. The tolerate environment of DeFi in the U.S. has created fertile soil for innovations as Silicon Valley and New York are filled with enthusiastic developers and strong academic interests, and most projects are more likely to receive early funding and talent support in this paradise.

United States	
Total crypto population	46,020,521 (1st)
Density population occupancy	13.70%
CEX traffic share	9.2% (1st)
DeFi traffic share	31.8% (1st)
Network Hotness Index	100

Table 2-1: U.S. crypto market development indicators

Source: Huobi Research

The rapid growth of the US crypto market can be attributed to the following reasons.

1. Young generation are the **main user group in the crypto market**. According to Finder survey, young adults aged 18-34 in the US are the main group, accounting for 56% of the total crypto users. Young people appear to be more risk-tolerant compared to middle-aged and elder people who prefer traditional portfolios such as stocks and bonds: the high return potential from cryptocurrencies have strongly stimulated the morale, driving the overall market adoption rate to rise.

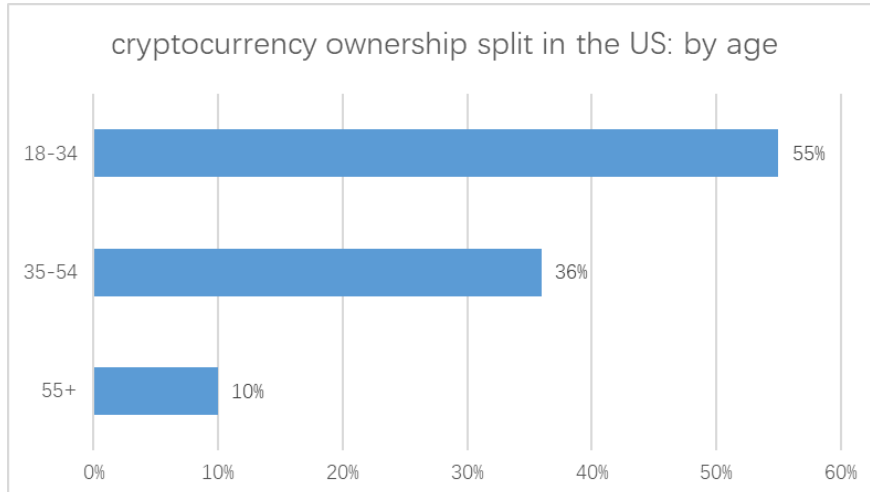


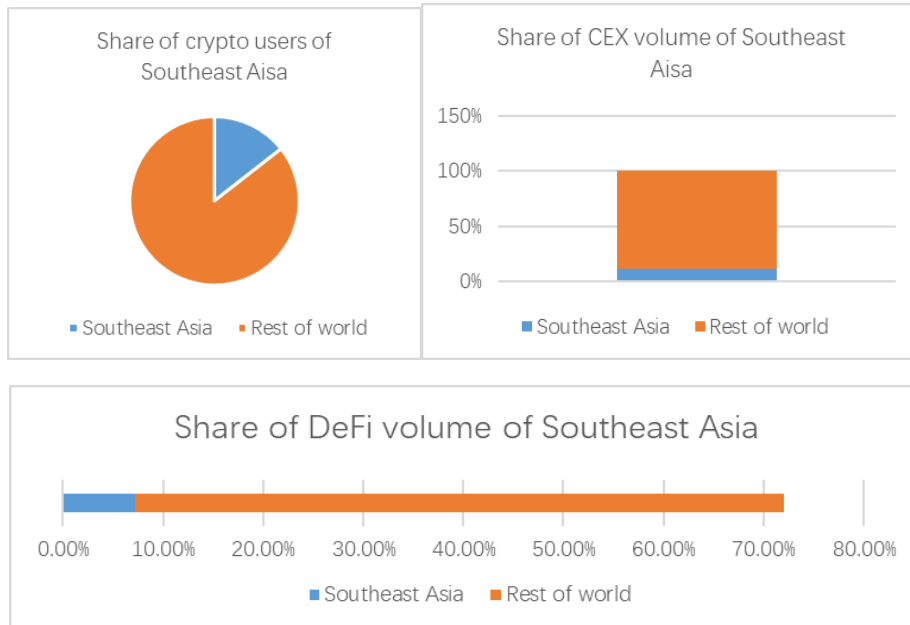
Figure 2-10: cryptocurrency ownership distribution in the US (by age)

Source: Finders

2. The regulatory mechanism is more complete day by day. Most states in the U.S. have introduced crypto-friendly bills that promote local crypto activities within the law frame. For example, Ohio has proposed a bill to pay taxes in cryptocurrencies; Wyoming has passed 13 laws, including recognizing cryptocurrencies as currency and allowing local banks to provide custody services for digital assets. With the legal protections, large institutions and financial service providers are able to offer legitimate asset management and related crypto services to U.S. citizens.

3. Others. In addition to the reasons mentioned above, we believe there are a number of events have played an important role in driving the adoption of the U.S. crypto market, such as the entry of large institutions, i.e., Microstrategy and Tesla, the continuous enrichment of the scenarios accepting cryptocurrency payment in the U.S., and the spring of large crypto startups to the U.S.

2.2.2 Southeast Asia: the emerging market, crypto user base surged



The crypto market in Southeast Asia has grown very rapidly in recent years. The total crypto population is currently about 46 million, second only to the North American region. Although it is mostly composed by medium-low and medium-high income countries, the purchasing power per capita is not as high as that of developed regions. However, some Southeast Asian countries (e.g., Vietnam, Philippines, Thailand) have relatively outstanding crypto user base, and crypto has penetrated scenarios in daily life.

- **Vietnam: the nation with the highest adoption rate in cryptocurrency**

With around 20 million crypto users, or more than one-fifth of its total population, the country has managed to become the first nation with the highest adoption rate in cryptocurrency.

The main reasons for the growth of the emerging crypto market in Southeast Asia, represented by Vietnam, are the following: (1) It conforms with local financial development and modernization standard. Over the past decade, governments of Southeast Asian countries have been keen to emerging technologies, such as blockchain, and relying higher degree of digitalization of the economy on it. In Vietnam, cashless is becoming the norm in the country, and the local government has set a relatively



flexible crypto tax standard to further facilitate the adoption of cryptocurrencies. At the same time, traditional financial system in the region is still primitive, turning users away to the more efficient alternative: cryptocurrency; (2) Gamefi has become a popular investment destination for users. Based on the humanitarian environment and consumption preference in Southeast Asia, gaming is somewhat essential in this region. According to public data, the highest number of mobile game downloads in Indonesia was 38% in 2020, followed by Vietnam reaching 22%; the Philippines and Vietnam ranked high in in-game purchase, 55% and 50% respectively. The mature gaming market is the perfect greenhouse for blockchain games to flourish. The phenomenal blockchain game, Axie Infinity, whose innovative "play-to-earn" model reaved the market; people feared to miss out and popped in, and so did the funds, Southeast Asia has become the GameFi hub thereafter.

Vietnam	
Total crypto population	20,210,834
Density population occupancy	20.27% (1st)
CEX traffic share	2.56%
DeFi traffic share	1.04%
Network Hotness Index	9

Table 2-2: Indicators for crypto market in Vietnam

Source: Huobi Research

- **Singapore: the new hub of crypto, and the prime node of Web3**

Singapore has seized the opportunity in the vicissitude of the US and China Internet markets and the rise of the Southeast Asian economy in recent years, especially in the momentum of digital transformation after the pandemic. Singapore has become the best destination for technology startups, luring a large number of innovators and unicorn companies, which naturally includes the crypto players. Singapore maintains highly tolerance and openness for the crypto industry: regulations are enforced, but there is still plenty of room for innovation. According to the Gyro Finance, the Monetary Authority of Singapore offers a more open approach of regulation in DeFi as the Regulatory Sandbox Plus that specific payment services are temporarily allowed to be

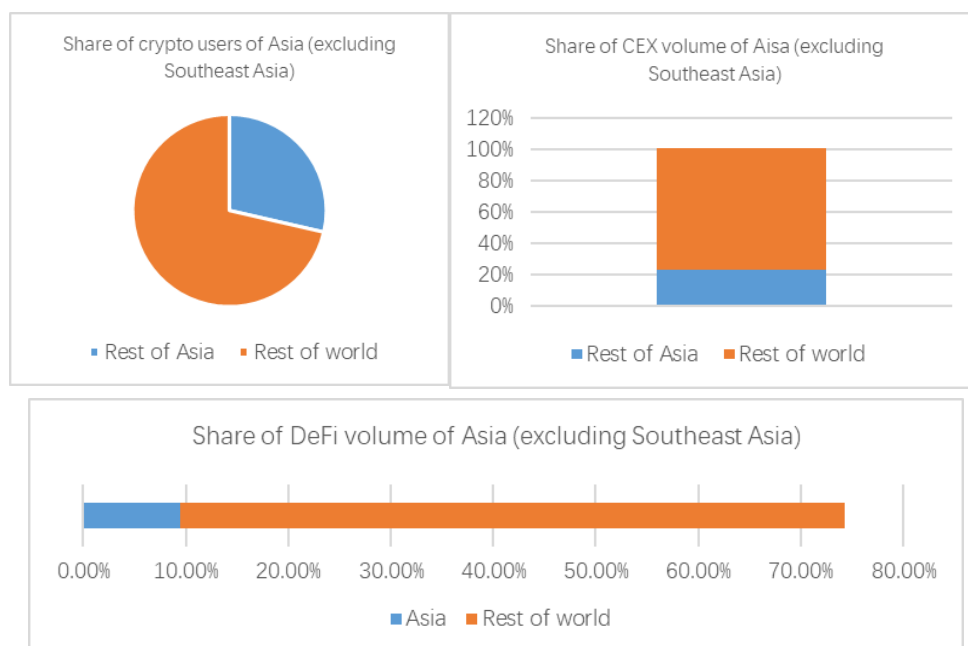


offered under exemption regulations even if for a license is not yet applied. As a result, Singapore is emerging as one of the most crypto-friendly regions in the world. According to data released by KPMG, there were over 80 venture capital investments in Singapore in 2021 on crypto, totaled \$1.48 billion; compared to 2020 when the number was only 26, totaled \$110 million, a nearly 1400% increase in terms of value.

Singapore	
Total crypto population	286,481
Density population occupancy	4.92%
CEX traffic share	0.84%
DeFi traffic share	0.73%
Network Hotness Index	2

Table 2-3: Indicators of crypto market development in Singapore
Source: Huobi Research

2.2.3 Other regions in Asia: huge market to be explored, market enthusiasm remains



Asia Pacific is vast in territory and constituted by many countries, and it has the most crypto users in the world. The following countries has been actively engaged in crypto.



● **Japan and South Korea: Crypto trading activities are extremely active**

Japan and South Korea have contributed tremendous traffic to exchanges. Specifically, South Korea ranked second with 7.4% and Japan ranked sixth with 3.85% in Asia. On the one hand, major crypto exchanges such as Upbit, Bithumb, CoinOne, Korbit and Gopax are located in Japan and South Korea, piling up the numbers; on the other hand, according to Coindesk, high unemployment rate and high housing prices in both countries have daunted domestic young fellows that they have to seek out other alternatives for wealth creation. People in South Korea, in particular, are most all in the game of cryptocurrency speculation. In addition to the stress of high unemployment and high consumption, the stationary state of social class and monopolistic economy has paved the way of entrepreneurship with full of thorns for people in the bottom. Cryptocurrency, however, as a type of borderless investment, is perceived as the only antidote to escape from poverty, become rich and even squeeze in an upper social class. According to the data, 1 in 5 young Koreans has investment in Bitcoin. In addition, local government encourages their citizens to buy, sell and own crypto assets, among other things, as well as a possible future proposal for a preferential tax law to be in effect; all the efforts have made the crypto market increasingly popular in the region.

	Japan	Korea
Total crypto population	2,882,116	2,015,027
Density population occupancy	2.31%	3.88%
CEX traffic share	3.85% (5th)	7.43% (2nd)
DeFi traffic share	1.40%	1.45%
Network Hotness Index	33	30

Table 2-4: Indicators of crypto market development in Japan and South Korea

Source: Huobi Research

● **Hong Kong: the sleeping financial center in the East**

The crypto market in Hong Kong has been gray for a long time. As the former center of Asia, Hong Kong has attracted a large number of well-known crypto companies like Animoca, FTX, BitMEX, etc. thanks to its financial establishments and the intimacy with Mainland China. However, with a series of sweeping bans on crypto activities in



Mainland China, Hong Kong has lost the advantage. Moreover, as the CBDC pilot work landed gradually in Hong Kong, the Hong Kong Monetary Authority is looking to add potential cryptocurrencies to the range of regulation. The tightening policy environment has accelerated the exodus of a large number of practitioners and crypto businesses, resulting in Hong Kong's crypto market shrinking over the past few years. However, the re-opened Hong Kong crypto market is expected to be boosted in the future with the release of a new virtual asset policy declaration on October 31, 2022, which clarifies the legitimacy of local crypto activities.

	Hong Kong
Total crypto population	205,507
Density population occupancy	2.65%
CEX traffic share	0.75%
DeFi traffic share	0.7%
Network Hotness Index	6

Table 2-5: Indicators of crypto market development in HK

Source: Huobi Research

● **India: crypto market marches ahead as regulation swings**

The Reserve Bank of India is not as interested in crypto as other central banks, and its Minister of Finance had declared to the public in 2018 that the Reserve Bank of India would ban cryptocurrencies in all aspects, but the subject matter does not reach the height of law enforcement. The blurred attitude has put the crypto market of India nowhere but in the shade as it is not illegal as a crime, nor it can be brought on the table. The crypto market in India has not stalled in progress, despite the fact of a large resistance from the government for a long time.

Until last year, the Supreme Court of India arbitrated that the RBI's ban on cryptocurrencies was a violation of the Indian Constitution Law, marking an era of loosened regulatory environment. The change in regulatory attitude has substantially promoted economic growth of India. According to Coindesk, there has been a significant increase in investors looking to buy and trade cryptocurrencies in rural India, with Coinswith Kuber seeing a 135% increase of registration from rural India;



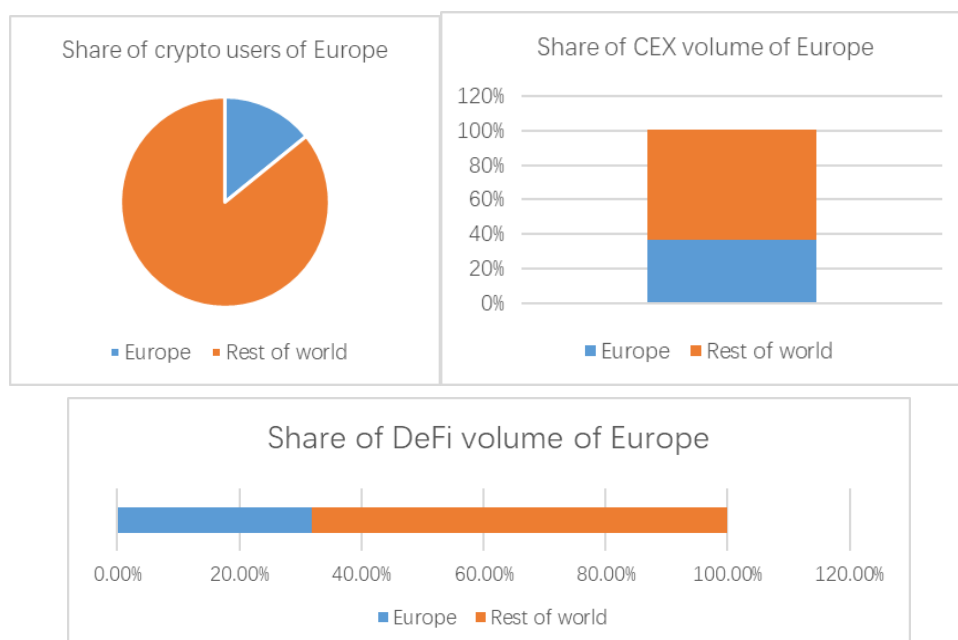
meanwhile, 16 crypto deals were closed for fundraising this year in India, totaled more than \$627 million, 14.25 times more than that in 2021. In addition, although India has a large population, the overall education level of younger generation is high, which provides the ground building for better understanding of the concept of blockchain and cutting-edge technologies of cryptocurrency. A large number of outstanding developer teams in crypto, such as Matic and Starkware, are from India, and they have become the headlines in their respective technological segment. In all, it is no doubt that the crypto market in India has huge potential in the future.

India	
Total crypto population	27,416,309 (2nd)
Density population occupancy	2%
CEX traffic share	2.82%
DeFi traffic share	1.74%
Network Hotness Index	19

Table 2-6: Indicators of crypto market development in India

Source: Huobi Research

2.2.4 Europe: the war never stops the march of crypto legion





In the European region, not only us but the whole world lay eyes on Russia and Ukraine. From our data, both Russia and Ukraine also ranked high in all indicators. This is due in large part to the outbreak of the Russia-Ukraine war, which led to an increase in crypto activity in both countries.

From the Russian side, there are currently more than 14.6 million people holding cryptocurrencies, representing 10.1% of the total population. The country has taken a lot of proactive steps in establishing regulations related to cryptocurrencies. In September 2022, Russia passed legislation approving the activities of utilizing hydro and nuclear power for cryptocurrency mining in some parts of the country. Additionally, cryptocurrencies could be a significant tool for foreign trade settlements as the country has had to withdraw from global SWIFT due to sanctions from countries around the world. Also in September, Russia's central bank officially announced the legalization of cross-border payments with cryptocurrencies such as Bitcoin and Ethereum.

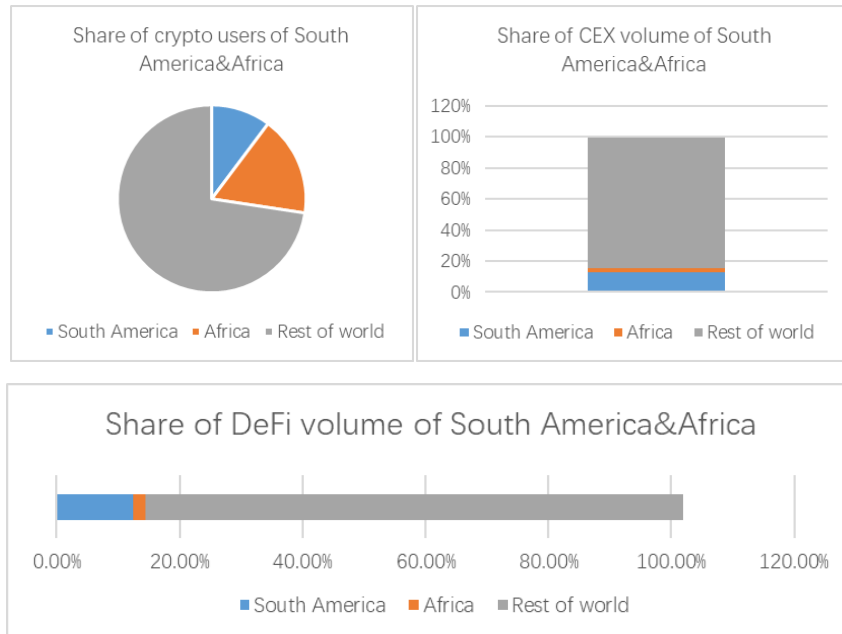
As for Ukraine, the country's economy has been hit hard by the sudden war and faced hyperinflation; what's worse, local central bank's issued martial law, restricting cash transactions for Ukrainian citizens, many Ukrainians consider cryptocurrencies as an effective method to hedge against inflation. As a result, the volume of cryptocurrency transfers in Ukraine has continued to grow since the war started.

	Russia	Ukraine
Total crypto population	14,647,694	6,516,114
Density population occupancy	10.10%	15.72%
CEX traffic share	6.14%	2.99%
DeFi traffic share	1.56%	0.73%
Network Hotness Index	13	4

Table 2-7: Indicators of crypto market development in Russia and Ukraine

Source: Huobi Research

2.2.5 South America & Africa: application scenarios are dominated by payment processing and store of value



Most of the major countries in South America and Africa have adopted cryptocurrencies for almost the same rationale: domestic financial crisis, high inflation and devalued local currency. Some of the typical countries are Venezuela, Argentina, Brazil, Morocco and Egypt.

While not all cryptocurrencies can be used as a risk hedging tool, stablecoins are always ideal for value preservation of assets in these regions. According to publicly available data, at least more than 1/3 of the population in South America and Africa are used to paying stablecoins for retail transactions or as savings due to the perennially high annual inflation of over 8%. At the same time, these regions also have the highest percentage of paying stablecoins as compensation in the world.

2.2.6 Crypto market development maturity index, the U.S. on the top

Finally, based on the above analysis combining the four indicators in this chapter, the crypto market development maturity index for 15 different countries in the world⁴ is listed below.

⁴ All inputs are equally weighted to simplify the model and avoid subjective bias, even though we are aware that this may cause a certain amount of error but as big.



Country	Percentage of crypto users		Share of CEX volume		Share of DeFi volume		Internet population index
	Value	Index	Value	Index	Value	Index	Value
United States	13.7%	67.6	9.2%	100.0	31.8%	100.0	100
Argentina	5.2%	25.6	2.5%	27.2	1.7%	5.4	4
Brazil	7.8%	38.2	3.0%	32.2	5.4%	16.9	15
Ukraine	15.7%	77.6	3.0%	32.4	0.7%	2.3	4
Russia	10.1%	49.8	6.1%	66.6	1.6%	4.9	13
United Kingdom	6.2%	30.4	2.4%	25.5	4.7%	14.8	14
South Korea	3.9%	19.1	0.4%	4.2	1.5%	4.6	30
Japan	2.3%	11.4	3.9%	41.8	1.4%	4.4	33
China	1.3%	6.6	0.8%	8.8	0.8%	2.5	6
India	2.0%	9.9	2.8%	30.6	1.7%	5.5	19
Vietnam	20.3%	100.0	2.6%	27.8	1.0%	3.3	9
Philippines	6.1%	30.2	2.3%	25.1	1.2%	3.9	3
Singapore	4.9%	24.3	0.8%	9.1	0.7%	2.3	2
Republic of South Africa	12.5%	61.4	0.4%	4.2	0.3%	1.0	1
Turkey	4.5%	22.2	5.6%	61.1	2.0%	6.3	11

Table 2-8: Crypto market development maturity index for selected countries⁵

Source: Huobi Research

⁵ Please refer the specific meaning of each indicator to the elaboration at the beginning of this chapter. The index is calculated by: $index = (value_n / \max(value1: value15)) * 100$

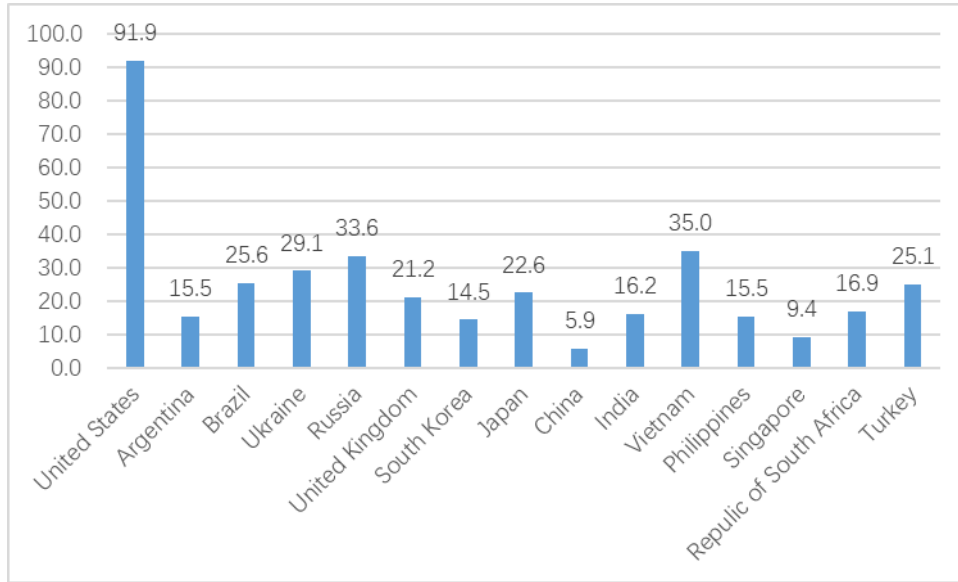


Figure 2-11: Scores for each country

Source: Huobi Research

From the matrix, the U.S. has the highest crypto market maturity, but not as much as emerging markets such as Vietnam in terms of market penetration. This may be due to the fact that the U.S. financial system is more developed: although the amount of funds is substantial, investors have many asset allocation alternatives other than cryptocurrencies. In contrast, investors in emerging markets such as Vietnam, Argentina and Brazil have rather few options, cryptocurrencies, therefore, as borderless, highly lucrative and highly liquid as it is, are extremely favored. The potential emerging markets should not be underestimated as the regulatory environment is completed along with the development of the crypto market.



3. Top 10 events in the crypto industry in 2022

3.1 The collapse of Terra: the beginning of deeper bearish

Terra's collapse is to be said as the most infamous incident ever, which was once praised as one of the top 10 crypto assets. Many investors went broke because of the meltdown, and the crypto market has become even worse despite of the presence of a long existing bearish.

Founded in 2018, Terra is a blockchain for payments built on a dual-currency mechanism of a "stablecoin" UST and a "governance token" Luna. At the beginning of 2022, Do Kwan, the founder of Terra, announced a protocol of Anchor: 20% in annualized returns for deposits of UST; it has lured many investors by not only the high return but the decentralized nature. After the launch of Anchor, most of the USTs on the market were deposited into the protocol, even before the collapse of UST, nearly 75% of USTs (up to 14B) were on Anchor, and many investors borrowed UST for staking with mortgaging other cryptocurrency assets just to earn the 20% APR of UST. As the demand for UST soared, the price of LUNA climbed over \$100; UST has had its glories being the largest decentralized stablecoin by issuing over \$15 billion.

In May 2022, Terra has lost the buttress as some users were dumping USTs in Curve, de-pegged UST from USD, and the price fell dramatically; Do Kwon sold 80,000 BTC in LFG holdings to rebalance UST, but the confidence of the market has long gone that many others joined the dumping. Terra's algorithm has altered LUNA into large issuance phase; hence LUNA & UST are all stormed into a death spiral. On-chain traders were unable to keep pace with the dumping, and the collapse therefore became inevitable.



Figure 3-1: LUNAUSD



Source: [Coinmarketcap.com](https://coinmarketcap.com)

Terra's collapse has incurred countless losses on the market that the price of UST fell to \$0.2 within days and LUNA's price slide to almost zero; Terra's market cap evaporated by \$40 billion, and many investors have seen severe damages. On top of that, the 80,000 Bitcoins sold by LFG further deteriorated the market that the price of BTC was lower day by day, leading the market to a deeper bearish market.

3.2 The bankruptcy of 3AC: the “Lehman Moment” in crypto

Three Arrows Capital (3AC) is a cryptocurrency hedge fund founded by Su Zhu and Kyle Davies in 2012. Known for highly leverage philosophy, 3AC has borrowed large amounts of money from different companies and invested in different digital asset projects. As of March 2022, its assets under management had reached \$10 billion, with a portfolio that included tokens such as Avalanche, Solana, Polkadot and Terra. Three Arrows Capital is undoubtedly an investment giant within the cryptocurrency community.

In the immediate aftermath of Terra's collapse, news circulated that Three Arrows Capital was facing liquidity problems and that the company was suspected of misappropriating client funds. On June 14, 2022, Su Zhu removed the digital currency tab from his social media Twitter account profile, which included ETH, and tweeted, "We are in communication with the relevant parties and are fully committed to resolving this issue." However, Su Zhu did not specify the exact content of the "issue" he was responding to.

The following week, digital asset broker Voyager Digital said it had lent 15,250 Bitcoins and \$350 million in stablecoin USDC to Three Arrows Capital. The loans totaled more than \$675 million back then. Voyager Digital urged that Three Arrows Capital repay all outstanding loans by June 27, or default; Three Arrows Capital did not repay the loan in time, and Voyager then sought compensation from Three Arrows Capital through legal means. After the incident came to public exposure, other lenders of Three Arrows Capital, including Genesis Global Trading, BlockFi, BitMex, FTX, and Blockchain, among others, screamed for repayment of their loans. Three Arrows Capital was compelled to liquidate, and even sold off 80,000 stETH (over \$84 million)



in the stETH/ETH pool on Curve, causing stETH to a state of de-peg (stETH was once 0.94 ETH).

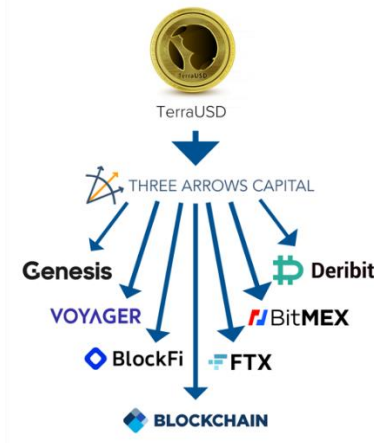


Figure 3-2: Diagram of Three Arrows Capital

Source: CNBC.com, Huobi Research

Three Arrows Capital opened up an exposure in the cryptocurrency world that had far-reaching consequences. However, due to the lack of transparency, no one knew who held the next grenade; as more and more institutions disclosed bad debts of Three Arrows Capital, the whole industry was in the horror, and money continued escaping the scene, since then, the crypto industry encountered the "Lehman Moment".

3.3 The FTX incident: an earthquake in the industry

In November, FTX declared bankruptcy due to a run on its users that drained its liquidity to insolvent. This must be the incident of the year since entering the current bear market, and the impact is beyond imagination and the scope of time.

FTX was founded in 2019, along with its sister company Alameda, by Sam Bankman-Fried. In the three short years since its inception until the crash, FTX had become a tycoon with \$24 billion in market cap, the second largest centralized exchange in the industry. For SBF, the core founder, had \$15.6 billion in personal assets. But within a week, all of those assets had been wiped out.

The shocking incident is rooted long before as it is holding client assets as a centralized exchange. Meanwhile, since Alameda, as a sister company, is in need of working capital



for business development, it lent from FTX by mortgaging FTTs and SOLs as collateral. In this way, the original mix of client assets is replaced by highly identical and volatile altcoins, such as FTT and SOL, from stablecoin and BTC, although the change in book value is not significant. Coindesk pulled the trigger by a posting on findings from FTX’s balance sheet. The founder of Binance, CZ, then announced that he would sell off his FTT holdings to hedge the risk, which blew up the panic and caused the price of FTT to plummet, thus the mass devaluation on FTX’s assets on the book and users are turning their back on FTX simultaneously. Ultimately, FTX filed for bankruptcy protection as the liquidity was vacuumed and the remaining assets, which are the severely depreciated FTTs and SOLs, are too little to pay off the debt.

The market has been catastrophically damaged by the FTX incident. As leading companies in crypto, FTX and Alameda have been seen involved in numerous projects, especially during this year's bear market, they have repeatedly come to the rescue of companies in the industry during crisis, portrayed an image of being the central bank in the cryptocurrency world. According to incomplete statistics, FTX has participated in more than 110 projects in the form of direct investment, some of which are listed below :

Project	Project Description	Participation
FTM	Fantom, a public chain based on DAG technology	Direct Investment
SUSHI	DEX Sushiswap	Direct Investment
SOL	High Performance Public Chain Solana	Direct Investment
SRM	DEX Serum on Solana	Direct Investment
DODO	DEX Dodo	Direct Investment
MAPS	Maps.me, the map travel app	Direct Investment
FORNT	DeFi Mobile App Frontier	Direct Investment
UPXT	Trading ecosystem solution UpBots	Direct Investment
HGET	Decentralized Options Trading Protocol Hedget	Direct Investment
FIDA	Bonfida, which provides API data and web front-end support for Serum	Direct Investment
RAMP	Multi-Chain DeFi Lending Platform	Direct Investment
LINA	Cross-chain Derivative Asset Synthesis ProtocolLinear Finance	Direct Investment
PERP	Perpetual, a decentralized derivatives trading protocol	Direct Investment

Table 3-1: Projects received direct investment from FTX (partial)

Source: Dune, Huobi Research



In addition, other projects that have dealings with FTX, such as bitDao and MIM, as well as investment companies, such as Sequoia Capital and Temasek, have also suffered severe losses with plunge in token price and write-offs as bad debts. The incident of FTX can be called the “Lehman Moment” for the crypto industry that the impact and losses are far more devastating than that of the crash of LUNA and the bankruptcy of 3AC.

In addition to the meltdown of the market and losses of the companies and projects involved, this incident has also had a serious impact on the entire ecosystem that centralized exchanges, being the most directly affected, have faced unprecedented distrust. Since the outbreak, all major exchanges have been under the pressure of mass withdrawals from users, revealing the huge distrust of centralized exchanges by current users under the influence of panic. In response, major exchanges have taken remedial actions, such as disclosing proof of reserve, calling on establishing code of conduct and setting on funds for industrial resurrection. However, in the long run, the ecosystem will be subject to more changes: decentralized exchanges may become popular again as the ongoing trend of distrust on centralized exchanges and the voice of decentralization is louder; licenses for compliance will be more expensive and more difficult to be issued, and regulations will be stricter; the information transparency of each project or institution will be significantly improved after this incident; users are starting to be wary of the industry, and the bearish market will be prolonged along with the continuous drop in token price etc. Nonetheless, for a wound cannot heal without pains, and greater opportunities always come out of higher risk. As the market is slowly tranquilized, the industry will become healthier as the infected area is properly treated and come off.

3.4 Radical interest rate hikes: highly-risky assets bear the brunt

As forementioned, the most critical factors in global macro markets in 2022 are global inflation and responsive monetary tightening policies, i.e., interest rate hikes, by central banks of each country. This round of inflation is high and recurring, and the interest hikes are fast with large increment. The following chart illustrates the inflation and benchmark interest rate of the United States since 1980.

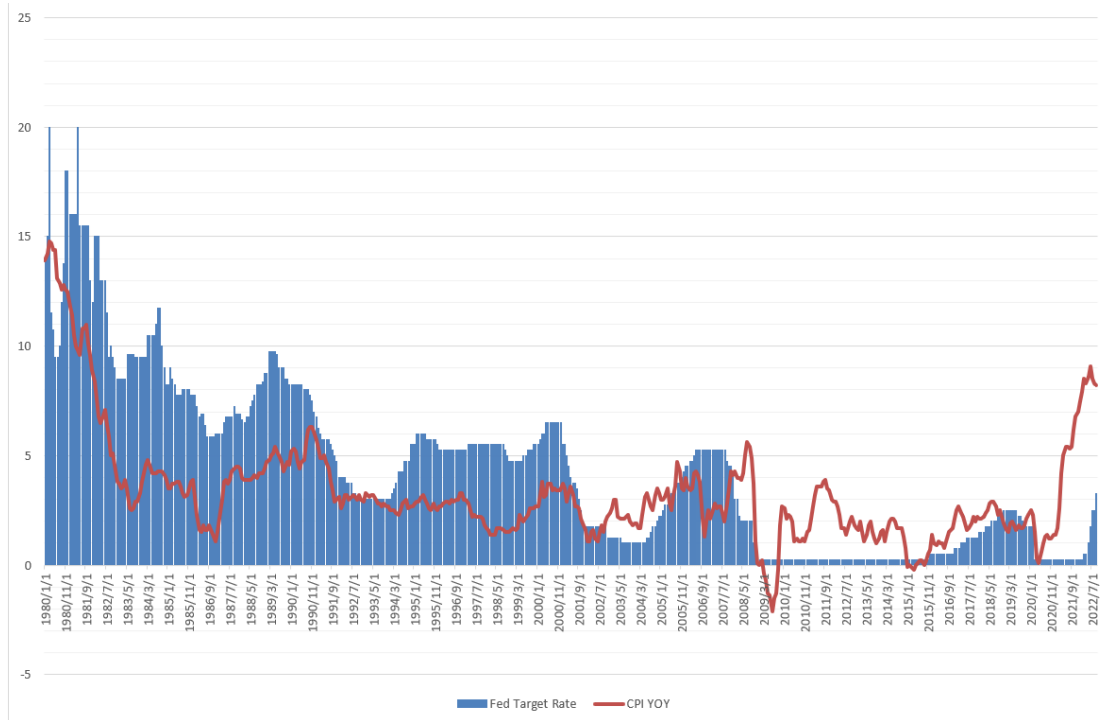


Figure 3-3: U.S. 40-Year CPI and benchmark interest rate

Source: Bloomberg, Huobi Research

From Figure 3-3, current inflation rate in the US has reached highest level since 1980, while the benchmark interest rate has also reached highest level since 2008 in eight months, and it is expected to be raised until the second quarter of next year. In this context, various countries and industries around the world reflected the frugidity of the financial winter. The table below depicts changes of various assets classes in 2022.

Asset Classes	Asset	Change pct
Currency	USD index	16.2%
	EUR/USD	-12.95%
	GBP/USD	-14.82%
	JPY/USD	-27.99%
	CNY/USD	-14.5%
Stock Index	Dow Jones	-10.14%
	S&P 500	-19.09%
	NASDAQ	-30.39%
	FTSE100	-2.69%
	STOXX50	-15.06%
	Nikkei225	-3.88%
	SSE Index	-17.71%
US Treasuries	10-year US Treasury yield	167.06%



	2-year US Treasury yield	516.26%
Commodity	WTI Crude	18.85%
	Brent Crude	23%

Table 3-2: Changes in major asset classes in 2022

Source: Bloomberg, Huobi Research

From Table 3-2, influenced by radical interest hikes from the Federal Reserve, all asset classes are influenced globally; except for bulk commodities, which the price increased and influenced by exogenous forces other than the monetary policy, a substantial decline was spotted on various stock markets, currencies, and treasuries across the globe; the 2-year U.S. treasury bonds, which represent the short-term cost of funds, and the NASDAQ, which is dominated by technology stocks, fell relatively more. In this situation, the cryptocurrency industry is hardly immune. What's more, the cryptocurrency industry has a high leverage ratio compared to traditional industry due to its nature of speculation, and the deleveraging process is relatively more violent and drastic under the global tightening of capital. To be more specific, although the Terra crash, the bankruptcy of Three Arrows Capital and the other major incidents were triggered by problems of their own, the problem underneath it was the exhausted liquidity under the overall environment of tight monetary policy. Therefore, contraction of liquidity by interest rate hikes of the Federal Reserve would have become the one to blame when viewing critical events in crypto in 2022 retrospectively in the future.

3.5 The merge of Ethereum: a new era of POS has come

On September 15, 2022, the much-anticipated merge of Ethereum was successfully completed, officially switching from Proof of Work (PoW) to Proof of Stake (PoS) as the consensus mechanism for the mainnet of Ethereum.

As a world-class computer, Ethereum has been implementing the proof-of-work consensus mechanism to ensure the security of the system since its inception, and various transactions, smart contracts, accounts and other complex functions are running on top of this core mechanism. As the ecological applications on Ethereum continue to flourish, the current infrastructure poses a challenge to system scalability, and the limitations of PoW severely limit the future development of Ethereum. To address the scalability issue, the team has given a series of network upgrade solutions.



The merge is the second network upgrade in the series, which combines the two existing independent blockchains in the eco, namely the mainnet Ethereum and the Beacon Chain, achieving a switch in consensus mechanism while retaining the original function of executing smart contracts with complete historical data and user states.

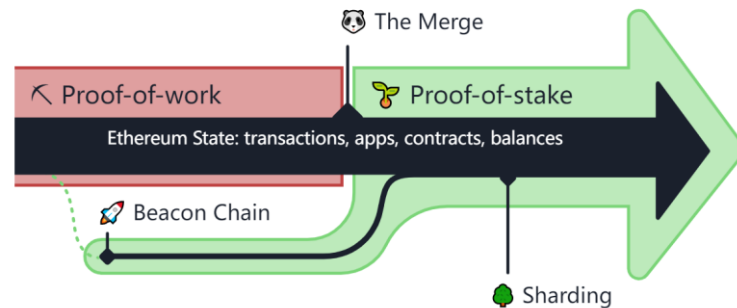


Figure 3-4: Diagram of Ethereum merge
Source: Ethereum.org, Huobi Research

After the merge, Ethereum will have corresponding changes in block structure, network structure, consensus mechanism and node types. The new blocks can be regarded as a combination of beacon blocks and original PoW blocks, in which the strings in the block related to PoW consensus will be modified to 0 or constant accordingly; the network structure will adopt the architecture of "consensus layer + execution layer", in which the consensus layer will coordinate and command the execution layer to generate and synchronize blocks; after the merge, the types of Ethereum nodes will be more abundant. The addition of stateless nodes will contribute not only in maintaining the level of decentralization of the network, but also preparing for sharing in the future.

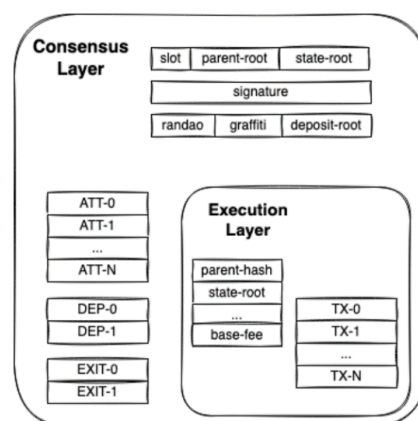


Figure 3-5: Structure of Ethereum block after the merge
Source: Ethereum foundation blog, Huobi Research

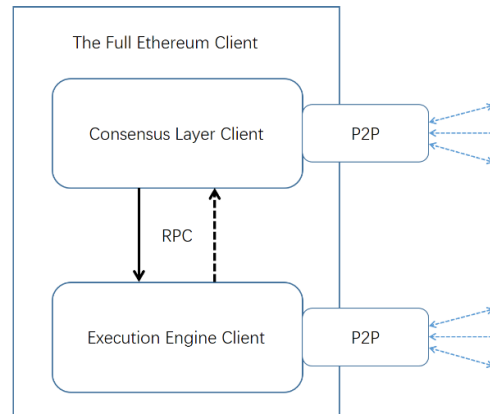


Figure 3-6: Ethereum client structure after the merge

Source: ethresearch.ch, Huobi Research

The merge of Ethereum is a landmark for the cryptocurrency market: for Ethereum, the merge is a key step to further performance improvement, and the conversion to proof-of-stake lays the foundation for the subsequent sharding and scaling of Ethereum. Besides, the issuance of ETH will drop significantly after the merge, and with the destruction of EIP-1559, ETH will most likely enter deflation in the future. For the industry, the merge has renounced mass GPU mining, and miners will have to switch to alternative chains or exit. As Ethereum gradually making upgrades to remedy the shortcomings, other POS chains will inevitably become less competitive in the future. From a deeper view, the merge is a significant change responding to the appeal of reducing carbon emission globally. Although Bitcoin's endurance has once proved the robustness of PoW, the iterated calculations for finding the unique hash value on miners has been a burden to energy consumption. The transition of Ethereum to PoS will reduce global energy consumption by about 0.4% per year as a result.

3.6 Sanctions on Tornado Cash raised industry-wise concerns on regulations

On August 8, 2022, the U.S. Department of the Treasury's Office of Foreign Assets Control (OFAC) added Tornado Cash and its associated crypto wallet addresses to its Specially Designated Nationals List (SDN), prohibiting U.S. citizens from interacting with the protocol or any addresses on Ethereum associated with it, and if they do so,



penalties will be charged. According to the official Tornado Cash Twitter, they face the following sanctions.

- Tornado Cash page suspended by GitHub
- Tornado Cash contributor accounts are banned
- USDC in the Tornado Cash protocol are seized
- RPC requests rejected by Infura, Alchemy



Figure 3-7: OFAC's Sanctions File for Tornado Cash

Source: <https://home.treasury.gov/>

The main reason for Tornado Cash's ban is that the North Korean hacker group Lazarus Group used Tornado Cash for money laundering on a large scale at up to \$7 billion in illegal activities, posing a threat to U.S. national security; \$437 million assets for on-chain addresses are included in the sanctions.

In response to the sanctions, a large number of service providers with DeFi protocols banned access to Tornado cash and blocked relevant wallet addresses. Tornado Cash also sparked discussions on whether the blockchain should resist censorship and whether the cryptocurrency industry should cater to regulation, etc. Core Ethereum developers also set up a developer conference call to discuss in detail the response strategies to national-level regulatory scrutiny, etc. The Tornado Cash incident not only brought up profound thinking about the conflict between privacy and regulation, but also marked the official launch of actions by regulatory entities worldwide against the wild west of DeFi.



3.7 The Layer2 craze is back: tokens were offered by OP

The biggest event in Layer2 this year was the issuance of OP by the mainstream Optimistic Rollup protocol, Optimism, driving the growth per se along with the Layer2 segment against the overall market condition.

Growth in Layer2 slowed down in early 2022; Layer2 protocols attempted attracting users and spurring the growth by all means. First, in April, the number one Optimistic Rollup protocol, Arbitrum, released a campaign for ecological exploration, "The Arbitrum Odyssey", to encourage users to engage in on-chain activities to be eligible for NFT rewards. As the morale soared, it was too overwhelming and exceeded the network's preset capacity, the event had to be called off. Not long after, Optimism announced the issuance plan of native token, OP, and unveiled the economic model. In early June, Optimism released an incentive fund with 5.4% of the initial supply of OP tokens to fund builders and projects in the OP ecosystem. These initiatives helped Optimism's TVL (in ETH terms) grow more than four times in six months.

Date	4/18	10/18	Change Rate
TVL (ETH)	192,100	1,090,515	467.7%
Total Address	325,890	1,601,786	391.5%
Transactions per Day (7D MA)	43,600	170,190	290.3%

Table 3-3: Comparison of various data of Optimism protocol

Source: L2beat, optimistic.etherscan.io, Huobi Research

Optimism is the first one to issue tokens out of the four famous projects in Rollup, and the performance has served as a role model for others. On July 13, the ZK Rollup team, StarkWare, released three articles in a row stating the plan of token issuance on affiliate product, StarkNet, along with the application scenarios, initial supply of issuance and distribution of tokens; 10 billion tokens are already minted on StarkNet, and part of the initial supply will be awarded to the contributors and related investors of StarkNet.

At this point, two of the four staring projects have either issued tokens or had clear plans to do so; the remaining two will follow sooner or later. While zkSync has stated in its official user documentation on token issuing, and Arbitrum cannot avoid token issuance unless the championship is no longer the intention to maintain.



In addition to token issuance, technical upgrades are being made (detailed analysis followed in later part). Arbitrum launched the Nitro network as upgrade in August, increasing network throughput and reducing transaction costs. Optimism announced a major upgrade of Bedrock to be launched in Q4 this year, enabling Ethereum equivalence, shortening deposit time from L1 to L2, and reducing transaction costs. StarkNet implements Rust-VM, significantly lowering the barriers for developers on the Rust language. ZkSync 2.0's mainnet will be released in November. (Phase 1 available to developing team only)

Layer2 protocols dedicated to improving user experience and performance by technical upgrades; when more methods are introduced, such as token issuance, the network will be endowed with the capability for value discovery that developers and users can further be incentivized. In retrospect, the timing of Optimism's token offering coincided with the turning point in Layer2's overall TVL this year. From then on, TVL of Layer2 grew by 63%, making it one of the few areas that still managed to grow in the bear market. This summer is not quite a "Layer2 Summer," but Layer2 has demonstrated exuberant vitality, and maybe next summer would bring a surprise.

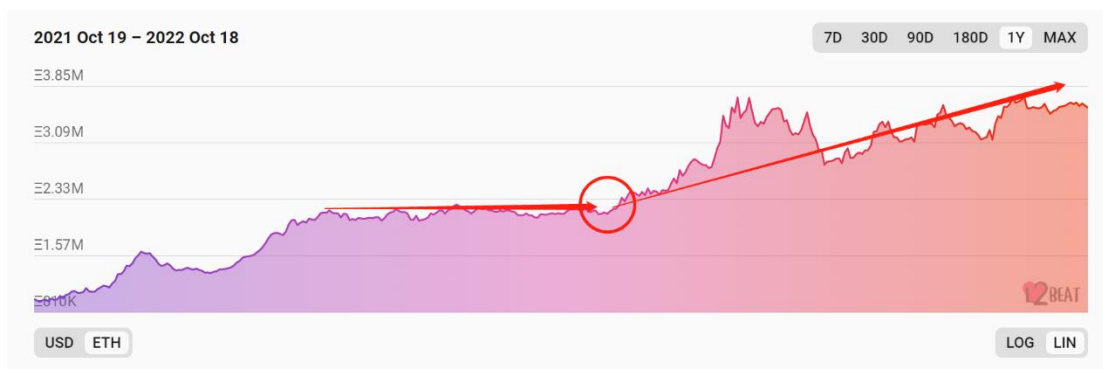


Figure 3-8: Turning point of TVL for Layer2 in recent years, also when OP offered tokens
Source: L2beat

3.8 Where is GameFi heading: X to Earn ends with StepN

Once with 1 million in number of active users and 4.72 million in number of registered users with up to \$122.5 million profit in a quarter, STEP N was one of the most remarkable projects of GameFi and X to Earn in 2022. But STEP N eventually entered a bottleneck, and falling into a death spiral, burying the boom of X to Earn in 2022.



Figure 3-9: STEPN

Source: coinmarketcap.com

Walking to earn is the core scheme for STEPN to convince users. Since the launch, STEPN has seen exponential growth favored by crypto-native users as well as users from the world of Web2. At its peak in May, STEPN had 700,000 active users, accounting for nearly 20% of Solana's unique daily paid users; STEPN saw a linear decline in active users and a steady decline in new users since then.

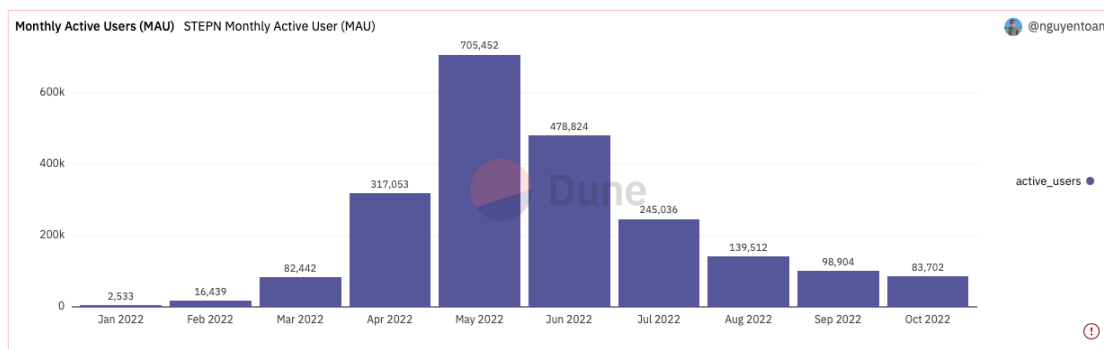


Figure 3-10: Number of active users on STEPN

Source: [Dune Analytics](https://duneanalytics.com)

In addition to the impact of the bear market in cryptocurrencies and the panic caused by the LUNA crash, the announcement in July 2022 that STEPN was clearing users in Mainland China, added fuel to the fire that users were dumping crypto assets relevant to STEPN. GST, as STEPN's utility token, lost control in inflated during descending demand, causing a plummet in price. STEPN opened up a new paradigm for X to Earn,



and also presented future projects of X to Earn with textbook model of methodology on mass growth and decay by unsustainable user acquisition and retention.

3.9 The largest M&A of the year: the acquisition of Huobi

The largest crypto exchange in mandarin-speaking market, Huobi, was officially acquired by About Capital in Hong Kong in early October 2022, which is mostly the largest M&A deal in the cryptocurrency industry so far this year.

Huobi Group was established in 2013 by Lin Li. Along with the growth of the cryptocurrency market, the market share of Huobi exchange gradually increased and became the exchange with the largest market share in the mandarin-speaking world after 2017; the overall Huobi eco is in the leading position, and each business branch has earned quite good reputation, such as Huobi University and Huobi Investment. Until 2021, Huobi, Binance and OKEX are regarded as the top three of cryptocurrency exchanges in Chinese-speaking market.

However, the Mainland China has promulgated the strictest regulatory policies on cryptocurrency among various countries in the world, including complete ban on cryptocurrency trading, cryptocurrency mining and any businesses related to cryptocurrency by companies registered within Mainland China. Followed by the bans, crypto-related companies represented by Huobi, abandoned the market of Mainland China and started a brand-new sail for the market overseas. Before the complete change of strategy, the average daily trading volume of Huobi exceeded US\$60 billion, with over US\$90 billion at highest; it shrank to US\$5 billion, a decline over 90%, with the side effects of the exit along with the bear market then.

Nonetheless, as a legacy exchange, Huobi has solid foundation and countless valuable assets, Huobi Global holds legitimate licenses in the US, Hong Kong, South Korea and Japan, and has a publicly-traded company in Hong Kong as Huobi Tech Holdings (now as New Huo Tech, HK.1611), which are quite attractive to potential buyers. Therefore, after several rounds of negotiations, in early October, About Capital in Hong Kong announced the final acquisition of all shares of Huobi Global held by Lin Li.



About Capital Management is a Hong Kong-based asset management firm founded in 2008 by Ted Chen, who is also a partner at Greenwoods HK. In the first plenary meeting after the acquisition, About Capital announced the establishment of a global advisory board with the aim of guiding the strategic moves and development of the Huobi Global, whose list includes Ted Chen, founder of About Capital, Jun Du, co-founder of Huobi, Justin Sun, founder of TRON, Yang Wang, Vice President of Hong Kong University of Science and Technology and Leah Wald, co-founder of Valkyrie Investment. Justin Sun, as the representative of the advisory board, announced several important initiatives, including empowerments on \$HT and upgraded strategy on business development overseas. In the following week, the price of \$HT rose more than 80%, reflecting the market's recognition of this acquisition and the strategic adjustment of Huobi. It is believed that Huobi will retrieve the glory in the future after this acquisition and a series of strategic adjustments.

3.10 Framework design on upper-level: complete regulation is on the agenda

Almost all governments, represented by the US and EU, have seen an accelerated pace on completing regulation framework on crypto since last boom of the crypto market.

On March 9, 2022 President Biden signed the Executive Order on Ensuring Responsible Development of Digital Assets, the first-ever governmental actions in whole from U.S. to address the risks and harness the potential benefits of digital assets and their underlying technologies. The order establishes a national policy on digital assets covering six key priorities: consumer and investor protection, financial stability, illegal fundraising, leadership of the US in the global financial system and economical competition, financial inclusivity and innovations with responsibility.

The White House released its first draft regulatory framework for the cryptocurrency industry on September 16, which is consistent with the Executive Order on Ensuring Responsible Development of Digital Assets; it also mentioned existing regulators such as the SEC and CFTC for enforcement purpose, and provided a new frame for expanded cooperation between the U.S. and its partners through the G7, G20, Financial Action Task Force (FATF) and Financial Stability Board (FSB).



Figure 3-11: Bitcoin Regulation

Source: allrecode.com/post/31774

On June 30, 2022, President of the EU Council and the European Parliament reached provisional agreement on the Markets in Crypto Assets (MiCA) proposal, the EU Council approved the text of the final Markets in Crypto Assets on October 5, and the MiCA bill was passed by the European Parliament Committee on October 10 with 28 votes in affirmative and 1 vote against, followed by a final vote on the MiCA in the plenary session of the European Parliament, which will take effect in 12-18 months once passed. On October 10, the European Parliament Committee also conducted a vote on the Transfer of Funds Regulation, which serves as a bill of anti-money-laundering that requires the identity of both the sender and the recipient to be included in a crypto transaction. Both bills, once in effect, will establish a unified crypto regulatory framework in the EU, and it will be the most comprehensive regulation of crypto assets in major judicial areas all over the world; it also forms a strong shield for service providers and investors engaged in crypto assets.

The regulatory framework regarding crypto launched by the U.S. and EU will have a huge impact on the global crypto market. The U.S. and EU will take the lead in establishing a unified crypto regulatory system, which will not only enhance the regulatory efficiency and enforcement efforts in their own jurisdictions, but also provide a reference model for other countries.



4. Infrastructure of Web3

4.1 The breakthrough of Ethereum

4.1.1 Rollup

Rollup is a promising solution for off-chain scaling: the main idea of Rollup is that users make transactions in Layer 2 (off-chain), the Layer 2 operator compresses and packages the transactions, submits the compressed transaction data and proof of conversion of the off-chain state to the chain, and the data is finally subject to validations by validators on the main Ethereum network (in the future, other Layers 1 may also be capable of this work). The number of bytes required to store this batch of data consists of off-chain transactions on the Ethereum mainnet has been reduced due to the use of more efficient encoding methods, the intervention of data size to be uploaded along with other measures. Rollup saves the consumption of on-chain resources on the one hand, and retains the availability of data on the other hand, that is to say, the Ethereum main network can censor and guarantee that no one could tamper with the off-chain transactions. Vitalik has also claimed, "Rollup is the only trustless scalability solution for Ethereum in the short-medium term, and possibly the long term."

Rollup has taken shape at the beginning of 2022, and achieved massive growth against the pessimistic market condition this year. According to L2beat data⁶, on January 1, 2022, Rollup's overall TVL was 1.56M ETH, which is about 4.5% of the TVL of Ethereum. As of October 20, 2022, Rollup's TVL has reached 3.62M ETH, an increase of 131%, which is nearly 7.5% of the TVL of Ethereum. The overall crypto market is somewhat cheerless this year, the price of ETH was merely 65% compared to the same period last year, and it is not easy for Rollup to achieve growth in such an environment.

⁶ The TVL of Rollup accounts for 97% of the overall TVL of Layer 2, so the former term is hereby used to represent the latter. The price of ETH is volatile in USD, so this article uses ETH as price unit to measure the value of TVL instead of USD.

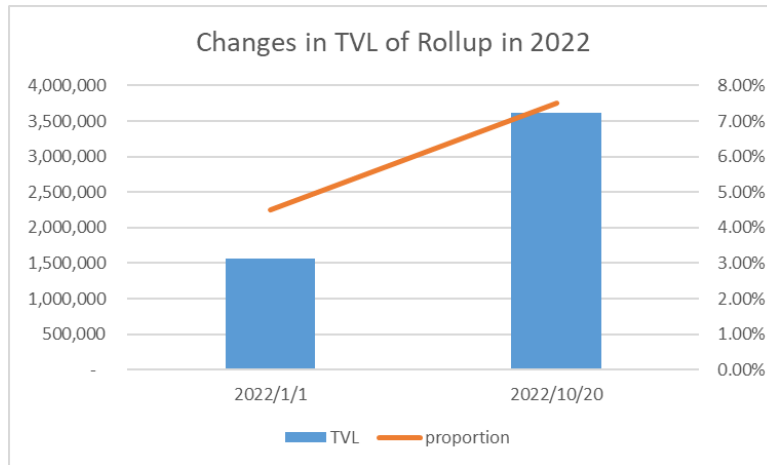


Figure 4-1: Change in TVL for Rollup in 2022

Source: L2beat, Huobi Research

In terms of the number of project deployments, according to DeFiLlama, there were approximately 210 projects on Rollup (projects deployed on multiple Rollups are counted as only 1) and 585 projects on the Ethereum mainnet as of the end of October 2022, which is 35.9% of the total number of projects, a significant increase from 19.3% at the beginning of the year. It was previously proposed that Rollup would become less important if the gas fee on the Ethereum mainnet dropped. But the fact is that both the price of ETH and the average gas fee have dropped this year, and the gas fee of the Ethereum mainnet will drop even more, but Rollup still attracts a large number of project deployments. This proves that many project teams are optimistic about the future of Ethereum and Rollup, and a "Rollup-centric" Ethereum network is in its rudimentary shape.

For the number of addresses, based on the estimated number of addresses published by each Rollup's blockchain browser, Rollup has a total of 4M addresses, quadrupled from the beginning of the year. There are 209M addresses on the main Ethereum network, and the number of Rollup addresses now accounts for approximately 2% rather than less of 1%. Although some growth has been made, there is still a long way to go in user acquisition.

Rollup's growth against the market is mainly driven by the technology per se. This year, Rollup's progress has been made mainly in 5 perspectives: improving compatibility, reducing costs of data availability, lowering validation costs, improving the level of decentralization, and developing zkEVM.



- Improving compatibility

As compatibility with EVM facilitates the deployment for all kinds of projects, OP Rollup's TVL accounts for more than 80% of the current Rollup. However, compatible with EVM does not guarantee the deployment without a single glitch; in other words, code adjustments must be made prior to the deployment. As a result, improving the compatibility of EVM and eliminating the difference with Ethereum has always been the focus of OP Rollup.

Arbitrum One migrated to Nitro in early September in order to improve the network compatibility, and the base layer of Nitro's client software is compiled directly from the core of Geth (the mainstream Ethereum client), which replaces Arbitrum's custom EVM simulator to carry out execution and state maintenance functions, ensuring that Nitro is highly compatible with Ethereum. Optimism has introduced "Ethereum equivalence" this year after an EVM equivalence upgrade late last year. It will be implemented in Bedrock, a major upgrade planned for Q4, designed to minimize differences with Ethereum so that Optimism could share and collaborate on the same core of code. With better compatibility, it will cost projects less to deploy as more Ethereum compatible tools could become available, and the network effect of the OP Rollup protocol could be optimized.

- Reducing costs of data availability

Rollup has 2 major costs, one is the cost of data availability (DA) handed over to L1, and the other is its own operational costs. Since the execution of Rollup is off-chain and the workload is low in most cases, therefore, the operating cost accounts for a relatively small portion while the DA cost dominates.

To reduce DA costs, teams have worked on improving bulk processing and compression systems. Optimism, for instance, has reduced fees by 30% by setting more reasonable fee parameters, and more efficient compression algorithms will be engaged to reduce fees even further. In addition to these conventional interventions, Arbitrum has introduced a new product, Nova, which reduces DA fees to the bottom line. Nova is built on Arbitrum's Anytrust technology, which stores and provides data off-chain utilizing the Data Availability Committee (DAC), switching back to Rollup mode only when the DAC is questioned by users. The DAC operates only when there are at least



2 honest members present, which is a much weaker trust assumption and much feasible to implement than the traditional BFT-type consensus, which requires 2/3 of all the nodes to remain honest. Inherently, it is a tradeoff that a minimal additional trust assumption is exchanged for a lower cost and faster withdrawal time. Nova is perfect for gaming and social projects, and around 10 projects are already running on Nova. Volition mode is also officially available on StarEX, which provides options to users that raw transaction data could be either stored on Ethereum or in the DAC according to specific application scenario.

- Lowering validation costs

OP Rollup resolves disputes relied on fraud proof, which can be further classified as one-round of interactive fraud proof and multiple-round of interactive fraud proof. Previously, Arbitrum used multi-round interactive fraud proofs, while all OP Rollups based on Optimism's code apply one-round interactive proofs. Multi-round interactive proof reiterates the process of narrowing down the range of dispute off-chain until an execution of dispute is found, then it goes back on-chain to re-execute and arbitrate, thus downscaling the on-chain resources consumed to resolve the dispute at a lower cost than one-round interaction. Optimism is working on a new generation of fraud proof, Cannon, which is a multi-round interactive fraud proof. Other OP Rollups are likely to follow Optimism's step, and the overall cost of OP Rollup dispute resolution will eventually drop in the future. More importantly, Cannon will use MiniGeth (Optimism's simplified version of the Geth client) as the EVM simulator, which is essentially a decoupling of Rollup from the main chain. On the one hand, adaptations could be made to EVM upgrade by upgrading MiniGeth, on the other hand, MiniGeth could be replaced with other tools to support other virtual machines on the main chain to implement Rollup.

Differed from OP Rollup, ZK Rollup relies on validity proofs (Zero Knowledge Proof, ZKP) to resolve disputes: no interactive proofs are needed but ZKPs are generated for all the executed statements at once, and the ZKPs are subjected to validations from validators to determine whether the providers of proofs are honest. To improve the efficiency of validation, StarkNet upgrades the recursive STARK proofs. This upgrade takes advantage of the "logarithmic compression" property of STARK proofs, i.e., the time required to generate a proof is approximately linear in the time required to execute the statement, while the time required to validate the proof is approximately logarithmic



in the time required to generate the proof. The original SHARP technique generates an accumulative ZKP1 for multiple propositions to be proved, while after the upgrade, the mother proposition is divided into groups, subsidiary proofs are generated for each group, and then these subsidiaries are inputted as propositions to generate an accumulative ZKP2. Due to the logarithmic compression property, validating ZKP2 is much faster than ZKP1, and consumes much less computational resources from the chain. The process of generating proofs is also expedited since multiple subsidiary proofs can be computed in parallel.

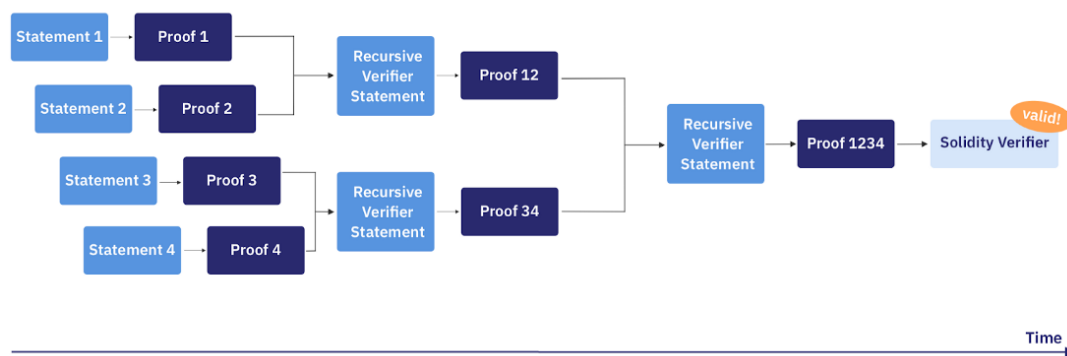


Figure 4-2: Recursive Stark proof

Source: medium.com/starkware

- Improving the level of decentralization

An OP Rollup network had an incident earlier this year; the network remained disabled for several hours: Rollup protocols all require Sequencer to sort transactions, and currently Sequencer is operated by the project team or a single closely-related service provider, which is highly centralized. When the Sequencer fails, there is no other equivalent node that can take the duty, so the network hence becomes paralyzed. Only by improving the level of decentralization of the Rollup protocol can the Gray Rhino be eliminated.

Optimism has made attempts to build a multi-client ecosystem in Bedrock, working with external teams and incentivizing them to create other clients. In turn, multi-client implies that the Sequencer is naturally decentralized, and the risk of single point failure is reduced. This vision is rather ambitious, and it is yet to be proved right. As a high standard may only produce an average output, it could be considered a major victory if



Optimism could somehow achieve decentralization of the Sequencer. The possibility cannot be ruled out that when the new version becomes mature, the prerequisite condition for becoming a node is staking OP tokens. In this case, the token would endure a clearer application scenario and revenue stream, and perhaps leading to an unprecedented decentralization in Rollup.

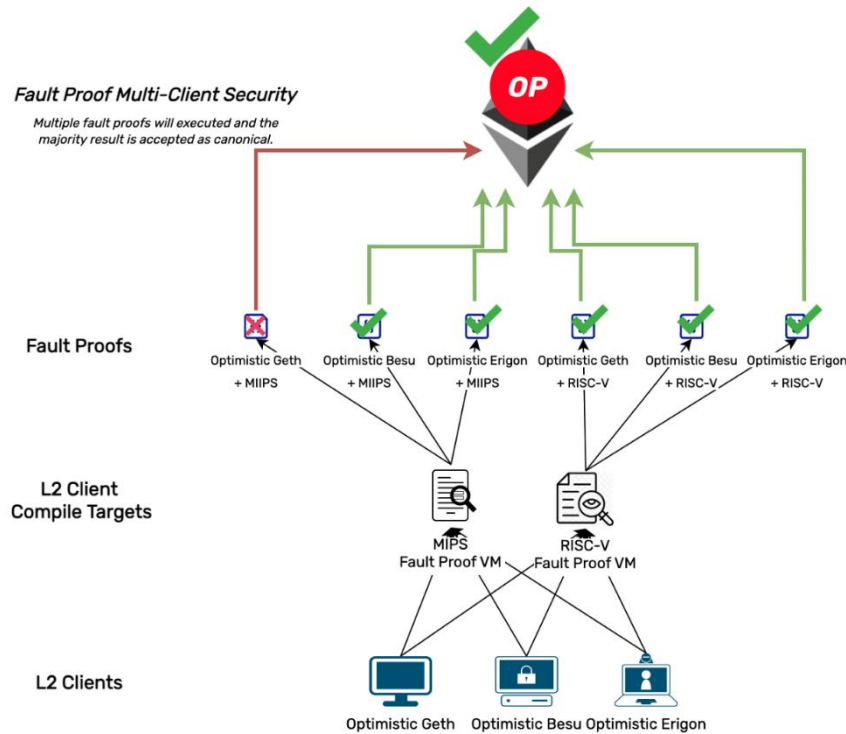


Figure 4-3: The multi-client ecosystem envisioned by Optimism

Source: optimismmpbc.medium.com

- Developing zkEVM

The focus of ZK Rollup's development over the last 2 years has been zkEVM. ZkSync, Polygon and Scroll are all actively working on this subject matter and have announced that zkEVM by various versions will be launched on the beta or mainnet by the end of 2022. So far, zkSync is staying at the top that the trial version was on the test network in April and has now achieved compatibility with EVM at bytecode level, materialized the implementation in the circuit and execution environment. In terms of completion on core infrastructure, full node integration is completed that encoded smart contracts are able to be deployed and executed. Recently, the team reiterated that the first zkEVM-compatible ZK Rollup on the Ethereum mainnet will be launched on October 28 this year (it was already online as of this article is published). Although the team is



confident about what is coming, the safety switch remains on. The launch version will not contain any project deployment; only the official team will be able to test it with real assets on the mainnet, and other developers will have to wait for further notice. A number of well-known protocols and companies have announced deployment plans on zkSync 2.0, including Uniswap, Chainlink, OKX wallet, Ramp and Banxa (fiat exchange solutions), Hashflow (decentralized crypto exchange), Nexus Mutual (insurance protocol), and so on. When it is available to the public, zkSync's ecosystem may embrace a boom.

4.1.2 The merge of Ethereum

The biggest upgrade to Ethereum this year must be the merge. The intention of the merge was to transform Ethereum's original POW consensus mechanism to POS. With the shift in consensus mechanism landed profound changes in the network structure, which also affected Ethereum's degree of decentralization.

After the merge, Ethereum adopts the architecture of consensus layer + execution layer (execution engine) to generate and synchronize blocks. Transfers and smart contract calls are packaged, broadcasted and executed by the execution engine (the original ETH full node), with the tip portion of the GAS fee still going to the execution engine. The consensus layer acts to first establish communication with the execution engines, requesting to generate or validate Execution Payloads, so that the beacon nodes could generate complete beacon blocks by the output as a basis for consensus. After EIP-1559, the tip portion from the revenue is reduced significantly; the major income of miners comes from rewards. After the merger, lone operation of execution engine is no longer lucrative as it only earns tips; the execution engine must be bundled with the consensus node for staking rewards as revenue. As a result, it is more reasonable to deem the merge as the formation of a new symbiosis that the consensus layer absorbs the execution engine rather than just the joint of two networks. The PoS Ethereum has 450,000 validators, while the PoW version has merely more than 10,000 nodes; the dramatic increase in the number of validators can also enhance the degree of decentralization for the network. However, the huge number of GPU miners are not part of the plan, and they must seek their own way out; it will be discussed later in this report.



Ethereum has always had the problem of state overload, which refers to the fact that the network accumulates more and more data, and requires more and more storage space. In this case, hardware of the nodes bears the burden day by day so that it appears to be more centralized as it goes. For this subject matter, the community has proposed the goal of statelessness, hoping that a light version of client could validate all transactions and states without actually storing any. After switching to PoS, Ethereum aims to achieve statelessness, so that nodes with all states and stateless nodes could all participate in the validation process and keep the network highly decentralized. With statelessness, 3 types of nodes (clients) will be present on Ethereum consensus layer:

- 1, Client without ETH1 execution engine
- 2, Client with stateless ETH1 execution engine
- 3, Client with ETH1 execution engine containing all states

Type 1 client is the lightest client that it only participates in consensus reaching but ineligible to validate the transactions at the execution layer. It supervises other nodes at the consensus layer. Type 3 client has full state, execution capability and consensus capability, in other words, a full node. For full node, investments have to be made on hardware for storage, computation and tokens for staking, it is also more expensive to operate, and certainly there will not be a large number of full nodes. Type 2 nodes are stateless nodes that could request data from type 3 nodes and then process with their own execution engines to validate the eligibility of transactions.

Ethereum has been questioned for the degree of decentralization after the merge. While the changes to the network structure and statelessness both improve the degree of decentralization of the network, the rapid growth of the staking solution provider, Lido, carrying over 1/3 of the total amount at staking, has raised concerns. Some believe that if Lido manages to gather another 1/3 of the equity, it will have control over the network. One thing worth noting is that Lido is not controlled by a single entity. There are 30 node operators inside Lido that are not affiliated with Lido; they are all top-notch node operators with reliable records and subject to legal recourse, requiring a vote from the DAO to qualify for operation and always remaining supervised by the DAO. Therefore, Lido cannot be deemed as a centralized mining pool. On the contrary, it is precisely because of Lido's continuous efforts in decentralization that it gradually reaches a favorable position in the battle against CEX mining pools. Evidently, the chance of the



network being monopolized by a large single entity/consortium is not as great as one might think.

Where is it heading then? In a recent interview, Vitalik expressed four key goals of Ethereum to achieve next year, including scalability, privacy, censorship resistance in base layer and account abstraction, with scalability as "top priority. The Ethereum team believes that scaling will be achieved through Rollup, and the post-merger plan is to become a robust settlement and data availability layer that allows Rollup to operate securely and cost-effectively. As for the future of Ethereum, it will be given in the 10 Predictions section later in this report.

4.2 The breakthrough of L1 chains

One of the biggest technical problems universally faced by L1 chains is scaling, and it is also constrained by the impossible triangle of blockchain (decentralization, scalability, security). Monolithic chains have made attempts to improve performance by adjusting block size, but on-chain congestion, high gas fee, and over-centralization still remain headaches. Currently, the following methods are applied to solve the impossible triangle: 1. Optimize the consensus algorithm to improve consensus efficiency (PoS or NPoS mechanism, finality gadget), which is essentially a trade-off between decentralization and security; 2. Optimize the execution environment to process transactions in parallel, rather than one transaction at a time like EVM; 3. Modularization.

4.2.1 Modularization

Modularization will remain the disrupting topic that cannot be bypassed by any L1 chains in the context of future development. Modularization refers to the process of splitting a complex system into multiple modules that are mutually exclusive from each other: each module has independent logic and function, and they could be assembled to a whole, performing all the functions as a complex system. Modularization has the following advantages: 1. during the development phase, each module can be developed or outsourced at the same time to improve efficiency; 2. each module can work



independently, which facilitates isolation in case of problems; 3. pluggable, each module can be combined with each other to perform more functions.

The architecture of blockchain has evolved through three phases. That is, from the traditional monolithic blockchain, to the separation of execution and consensus layers (Layer2), and now to the separation of data availability layers (Celestia and Polygon). Modularization is inevitable in the road of development for L1 chains. This can be illustrated from two aspects: 1. the limitations of monolithic chain; 2. the impossible triangle of blockchain. The limitations of monolithic chain are actually more on the surface, such as Solana, which needs to complete the underlying infrastructure development, network security maintenance and upper ecological construction. If the L1 chain is non-EVM compatible, ecological construction will be even more difficult. In addition, monolithic chains are unfavorable in terms of cost for cross-chain and composability. For Cosmos and Polkadot, on the other hand, unified modular tools are in place on consensus layer and cross-chain, so that L1 chain developers could, instead, focus on design of economic model and innovative explorations on application layer since they are not bound to repetitive work.

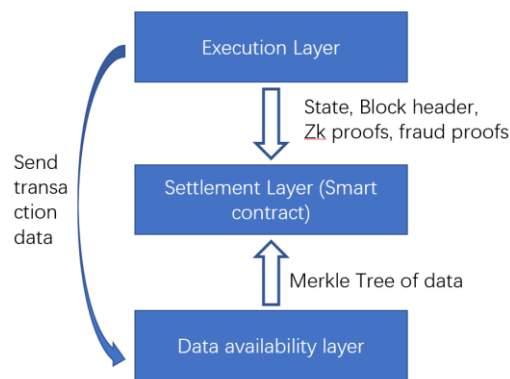


Figure 4-4: Modular architecture of L1 chain

Source: Huobi Research Institute

Currently, L1 chains, including Ethereum, are already moving forward on the technical route of modularization. The modularization of the consensus layer is represented by Tendermint from Cosmos and Substrate from Polkadot, providing modularization tools for the consensus and communication layers. The separation of the execution layer is represented by Ethereum Layer2, but Layer2 is not authentic blockchain but the scaling components of Ethereum that execute transactions and upload the results to the chain.



The separation of the data availability layer is represented by Celestia and Polygon Avail, which are independent L1 chains capable of undertaking data availability. Data availability can also be solved with sharding, which ETH2.0, Near and Polkadot all desire to achieve by different sharding techniques. The common goal of the variety of techniques is to maximize performance on different modules, and each architecture layer could achieve further scaling and optimization without undermining the decentralization and security of the main chain.

From the above modular implementation mechanism, Celestia, a modularized L1 chain, has a more innovative design that it focuses on dealing with data availability issues of other chains, and Layer2 is built on top of it as an execution layer. The development of independent data availability mode is also being replicated, such as Polygon Avail and zkPorter.

From technical implementation and on-chain data reveals these modularization technologies are still in early stages: the on-chain ecosystem and TVL of L1 chains solely related to modularization are relatively weak. However, there are still handful of a plethora of issues yet to be solved regarding sharding, such as the cross-chain interaction and validation between the shards, Rollup will be the scaling solution for Ethereum at least for a long time. Modularization will have its time and room for growth.

Overall, modularized blockchains may have more possibilities on cross-chain, not only limited to cross-chain assets, but also easier to achieve ecological composability. Yet the Terra incident may also repeat. Both sharding and Celestia are still in the early stages of development, and the actual impact on the industry will not be unraveled until they are alive. But reasonable predictions could be made regarding L1 chains in the next bull market: ETH 2.0 may become the infrastructure for the settlement and data layers of its ecosystem by sharding; when Evmos partners with Celestia, Rollup will potentially become the execution layer for other chains rather than just Ethereum. Even if sharding is successful, Celestia will still fit for a bunch of scenarios. The next theme of the L1 chain narrative remains focused on how to break the impossible triangle.

4.2.2 Development of multi-chain network



Multi-chain network is mainly built on the same development framework and modularization tools, and undergone through at least 6 years of technical development. Cosmos, Polkadot, BNB Chain, Avalanche, Octopus are currently in the network, and possibly Polygon in the future. All these blockchains can provide established modularization tools for their subnets/zones/parallel chains, but differ in terms of shared security and cross-chain capability. The advantages of a multi-chain network are: 1. modularization tools are provided for the convenience of developers; 2. Cross-chain security, fast confirmation and higher composability; 3. each sub-chain carries out specialized execution and application, forming Dapp-specific chain that provides unbiased performance.

(1) Cosmos embarks a new era

Cosmos is top-tier veteran L1 chain in the multi-chain network. With the construction of Evmos, rise of multi-chain network and modularization, and the Cosmoverse conference, the flame never lacks of heat for Cosmos. Thanks to the flexibility of Cosmos’s modularization tools and the upgraded cross-chain capability, many projects have pledged to be a member of the Cosmos ecology, and there are currently over 263 projects deployed on Cosmos with a total market cap of \$11.7 billion. According to Map of Zones, there are 51 chains connected with IBC cross-chain bridge; the 24-hour IBC transaction volume is \$26.37 million (October 24 data), the number of transactions reached 155,800. Cosmos is ranked first in mainstream cross-chain projects in terms of 24-hour IBC transaction volume and transaction amount, surpassing Multichain, Stargate, Celer cBridge, etc. It is the unique cross-chain features of Cosmos that brings about the cross-chain ecosystem, cultivating far more demand than other projects.

Cross-chain strategy	# of Blockchains	Total Volume (24H, \$Million)	Total Transfers (24H)
IBC (Cosmos)	51	26.37	155800
Multichain	69	27.76	3225
Celer cBridge	37	9.33	1905
XCM (Polkadot)	18	-	185
Connex	18	0.21	291
Allbridge	16	0.32	251
Stargate	7	3.8	4813
deBridge	7	0.07	125
biconomy	7	0.32	-



Table 4-1. Some data for cross-chain bridges in 24H (Oct. 24, 2022)

Source: Huobi Research

Cosmos Network Ecosystem



Huobi Research

Figure 4-5: Cosmos Network Ecosystem

Source: Huobi Research



Even though Cosmos has performed well in multi-chain network, it has been suffering from two problems: 1. the technical upgrade is relatively slow, which mainly focusing on the technical upgrade of IBC in 2022, while inter-chain accounts and inter-chain security have been postponed; 2. the role of Cosmos Hub has always been vague in the whole ecosystem, resulting in low value capture capability of \$ATOM. In terms of the number of addresses on chain, the number of daily active addresses of Cosmos Hub has remained above 10,000 since January this year, whereas L1 chains such as BSC, Ethereum, Solana and Polygon are all above 300,000. Compared to major Layer2 projects, the number of active addresses is not much different from that of Optimism. Currently, Cosmos Hub's network staking rate is almost maintained at a safe 66% with 175 active validator nodes, \$ATOM's annual inflation rate is 12.81%, and the overall staking annualized return is about 18.94%.

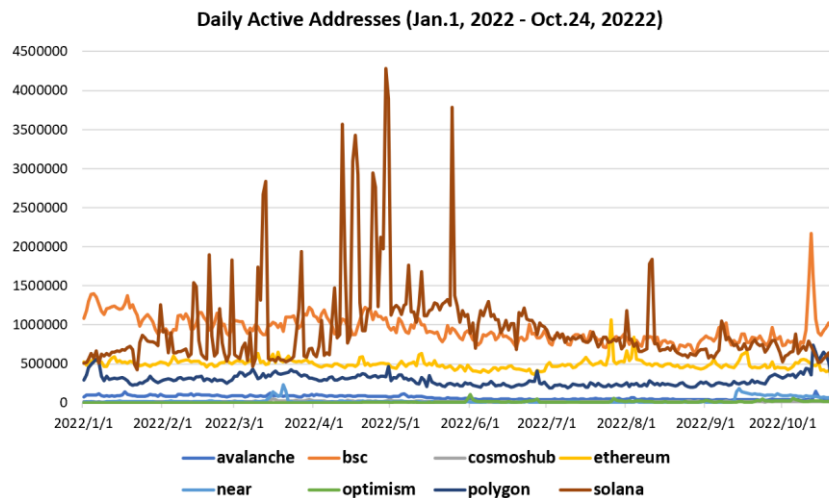


Figure 4-6: Number of daily active addresses for major L1 chains

Source: Artemis, Huobi Research

The Cosmoverse conference held on September 26 revitalized the industry. The most eye-catching part of the conference was the release of the Cosmos Hub 2.0 white paper, which proposed to solve the existing problems of Cosmos in three aspects: (1) introducing four functional components; inter-chain security, liquidity staking, inter-chain scheduler and inter-chain allocator, redefining Cosmos Hub's new role as the center of the ecosystem; (2) redesigning the economic model to alleviate \$ATOM inflation and insufficient application scenarios, and moreover, continuously providing funds for the sake of sustainable development of the ecosystem; (3) establishing a more



reasonable and orderly governed DAO to support the implementation of the first two new proposals.

It will not be revealed until next year if the outcome of Cosmos Hub 2.0 could exceed expectations. However, dYdX announced earlier on the migration plan to Cosmos and becoming an independent chain, and Delphi published an article expressing interest conducting joint research and development with the Cosmos ecosystem, leaving us enough room for imagination for the future of Cosmos.

(2) Where is Polkadot heading?

Being another multi-chain platform, Polkadot's parallel chain has been dragging compared to Cosmos, not to mention the attention received from users and capital funds. Currently, there are 297 validators in Polkadot network. The staking rate is maintained at around 55%, and the inflation rate of token \$DOT is 7.61%. Polkadot's total market cap reaches \$7.5 billion, ranking 11th in cryptocurrency with over 179 projects in the ecosystem. Only 18 chains are connected to XCM cross-chain bridge. From Subscan's on-chain data, Polkadot has around 1200 daily active addresses, while other parallel chains have only double-digit daily activities. Compared to user activeness, developer activity is more than that of last year, with a record high in September.

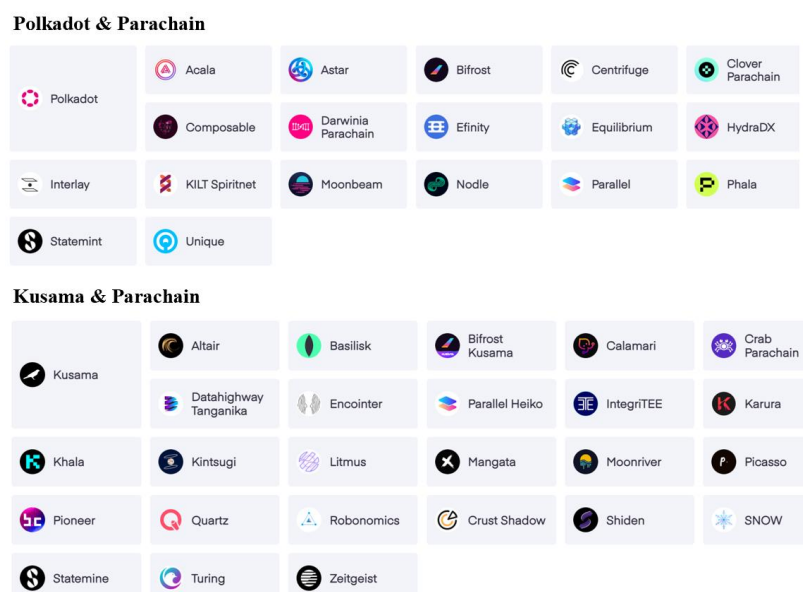


Figure 4-7: Parallel Chains of Polkadot Ecosystem

Source: Subscan



Figure 4-8: Polkadot Developer Activity

Source: santiment

Polkadot has fell behind in terms of users, size of ecosystem and market cap compared with Cosmos for several possible causes: (1) Cosmos launched its mainnet in March 2019, and IBC went online smoothly in May 2021; at the same time, it was the blossom of the L1 chains, which successfully enriched the Cosmos eco. Polkadot, on the other hand, launched its mainnet in May 2020 and XCMP in May 22. The incomplete developer tools and infrastructure somewhat deteriorated the situation for Polkadot, leading to the absence of the ride on the L1 chain blossom. (2) Compared with Polkadot, Cosmos has a lower threshold for developers to enter, and projects can participate in the ecological project without staking DOT for auction of slots. (3) During the last two years of favorable market condition, by staking Cosmos could receive a large number of airdrops from ecological projects, attracting users to become part of the Cosmos ecosystem, thus creating a certain wealth effect.

On top of that, Polkadot may face a more difficult situation as the founder, Gavin Wood, resigned from his position as CEO at Parity Technologies. Under the circumstance that Cosmos has already set foot on shared security technology, whether Polkadot could release more flexibility in the parachain slot auction or bring out more technical or model innovations in the future is the key to fight the way out of the siege of new L1 chains.

4.2.3 New technology, new outlook

The blockchain industry is still at an early stage, and there is huge room for L1 chain as infrastructure. As the applications demand for greater performance of the underlying



infrastructure, L1 chains with newer technologies came out one after another. The most appealing ones in the second half of this year must be the L1 chains derived from Diem: Aptos, Sui and Linera, whose technical highlights are centered on the impossible triangle of blockchain: the main focus is on programming language, parallelization and consensus mechanism to improve the performance, security and development friendliness of L1 chains.

	ETH 2.0	Solana	Cosmos	Polkadot	Aptos
Consensus mechanism	PoS	PoH	PoS	PoS	PoS
Actual performance	15-20 TPS	4,000+ TPS	1,000+ TPS	1,500+ TPS	4,200 TPS (Testnet)
Programming Languages	Solidity	Rust	Ethermint	Solidity	Move
Transaction confirmation time	14 mins	21-46 secs	7 secs	12-60 secs	< 1s
Number of nodes	8,182	2,281	175	297	102
	Avalanche	Algorand	Internet Computer	Near	Fantom
Consensus mechanism	PoS	PoS	Distributed Notary	PoS	PoS
Actual performance	4,500 TPS	23 TPS	11,500 TPS	1,000 TPS	9 TPS
Programming Languages	Solidity	TEAL	Motoko	Rust	Solidity
Transaction confirmation time	2-3 secs	4-5 secs	1 sec	1-2 secs	1 sec
Number of nodes	1,228	1,771	835	127	68

Table 4-2: L1 chain Performance Comparison

Source: Huobi Research

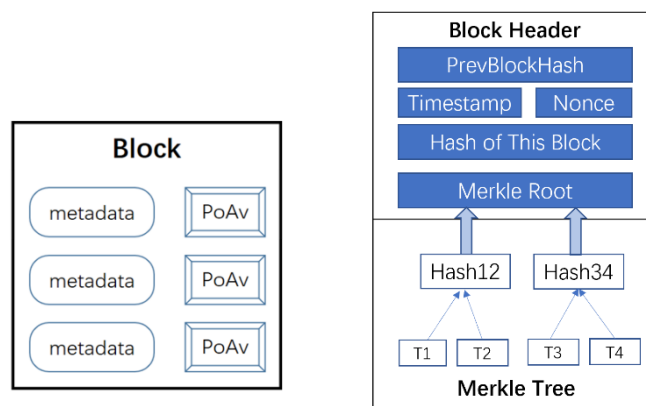
(1) Consensus mechanism



The consensus mechanism has gone through the glory days of POW led by the Bitcoin network to the new era of POS after the Ethereum merge. Currently, most of the L1 chains have adopted the POS mechanism first proposed in 2012. In addition to POS, other innovative consensus mechanisms have been seen in the field to improve efficiency of block generation and maintain network security, such as PoH of Solana and avalanche consensus of Avalanche.

Performance is reflected in the efficiency, economy and security of consensus reaching, which is mainly determined by the algorithm. Achievements have been made thanks to POS consensus algorithms, such as PBFT, HotStuff, DUMBO, Algorand, all of which could support relatively high TPS in theory.

Both Aptos and Sui inherited the DiemBFT consensus, upgraded on HotStuff consensus, one of which is the memory pool, equivalent to adding an actual storage layer, similar to Solana. This change greatly enhanced the performance of the system. Furthermore, Aptos changed the block structure to reduce the bandwidth needed for consensus reaching.



(1) Aptos block structure (2) Traditional block structure

Figure 4-9: Comparison of Aptos block structure and traditional block structure

Source: Huobi Research

Sui's consensus mechanism, as the most charming highlight, is a breakthrough both in terms of degree of innovation and performance evolution. Despite the fact that both Aptos and Sui are variants from HotStuff BFT, Sui modifies the transaction memory pool in DiemBFT, allowing transactions broadcasting directly in the memory pool. Also,



a global random coin called Tusk is in place to realize asynchronous consensus. The consensus endows Sui with higher TPS, low latency, and better scalability.

Aptos and Sui's innovation of the consensus mechanism is rare among new L1 chains at enormous cost of R&D. The innovative consensus mechanism and the finality deterministic algorithm are already challenging work for building L1 chains. It is hard enough to reach current progress, outperforming the previous ones, and it remains something to expect whether exponential growth could be achieved with further modifications on current features.

(2) Programming languages

Ethereum adopts virtual machines and the Solidity programming language to deploy smart contracts, which was one of the fundamental causations ignited the last bull market. But Solidity is unable to support concurrency, not to mention low security and other shortcomings, resulting in an exodus of many blockchains, turning to Rust or developing new programming languages. For instance, Aptos and Sui are built with the Move language. The following figure briefly compares the characteristics of Solidity, Move, and Rust programming languages. In comparison, the Move language excels in security, parallelization, and developer friendliness.

- Security: Move provides comprehensive security for smart contracts at several levels: language design, virtual machine, contract invocation and contract execution.
- Parallelization: Move specialized definitions for digital assets, classifying and identifying transactions, combined with a multi-threaded execution engine that enables transaction data to be executed and processed simultaneously.
- Developer friendly: Move lowers the threshold and reduces complexity for developer, and it takes experienced developers roughly 1-2 days to start fresh with Move; for developers with no smart contract programming experience, it takes roughly 1-2 weeks to learn Move from scratch.



	Aptos / Move	Solana / SeaLevel	EVM
Data Storage	Stored within the owner's account	Stored within the owner's account associated with a program	Stored within the account associated with a smart contract
Parallelization	Capable of inferring parallelization at runtime within Aptos	Requires specifying within the transaction all accounts and programs accessed	Currently serial nothing in production
Transaction safety	Sequence number	Transaction uniqueness + remembering transactions	nonces, similar to sequence numbers
Type safety	Module structs and generics	Program structs	Contract types
Function calling	Static dispatch not on generics	Static dispatch	Dynamic dispatch

Table 4-3: Comparison of different programming languages

Source: Aptos, Huobi Research

(3) Parallelization

Parallelization is a systematic solution to scalability that programming languages, virtual machines, underlying architecture, consensus algorithms, etc. should all be taken in to consideration. Parallel computing is already mature in web2, while it is just starting in the diffusion process in blockchain.

The newer L1 chains all take the advantage of Block-STM (Software Transactional Memory) parallel execution engine to execute transactions. Unrelated transactions are simultaneously processed on different cores on the same CPU to maximize parallelism by implementing multiple command streams and multiple data streams for transactions. Aptos and Sui differ slightly in handling parallel computing. For example, Sui classifies transaction objects by cocktail of DAG and BFT consensus.

Parallelized computing is not only reflected in the increase of TPS as the existing smart contracts are only suitable for serial execution, such as AMM and NFT minting. Yet to witness the best of what parallel computing is capable in the future, smart contracts need to be algorithmically more in line with the characteristics of parallel computing. This mandates a change in thought patterns in developers and develop better ecological applications to maximize the advantages of parallelized L1 chains.



Innovations from L1 chains out of Diem reveals that: (1) programming language for smart contract is of utmost importance for security level, parallelization and developers; (2) parallelization is undoubtedly right path for the future of L1 chains; (3) consensus mechanism is mostly modifications on BFT, which are trivial algorithm improvements; the room may be small for any more innovations.

In addition to the L1 chains from Diem, the most anticipated upgrade of L1 chains must be sharding, of which represented by, namely, ETH2.0, Polkadot, and Near. The three projects differ in: 1. the random allocation of shard validator and consensus algorithm; 2. ETH2.0 adopts homogeneous sharding, while Polkadot adopts heterogeneous sharding; 3. ETH2.0 uses proof of fraud or ZK-SNARK proofs to achieve higher security for sharding node sampling. The sharding technology has not making major progress this year, and it may take several years of development due to the difficulty of its nature. Whether more innovative technologies will be applied to L1 chains in the future is the common expectation of the whole industry.

4.3 Data dock of Web3: the diffusion process of storage

4.3.1 Status of the storage track

Storage is one of the earlier infrastructures of anticipation; the earliest in the storage segment, Storj and the IPFS protocol, launched back in 2017. As significant as it is, some rank storage alongside computation and consensus as the three pillars of Web3.

However, the primitive intention of blockchain design was not for storing large data base. In order to combine the feature of decentralization from blockchain with the requirement of the ever-expanding data volume, project teams have made diverse designs and bold moves in data storage formats, replication methods, tracking methods, proof of storage, etc., forming 2 major technical routes, which are blockchain network-based storage solutions and P2P network based storage solutions.

The principle of blockchain-based storage is relatively simple, namely storing data in blocks. Arweave is a typical project, as it is not exactly blockchain structured, and the network does not require nodes to store every block. However, its SPoRA consensus mechanism requires nodes to have access to any historical blocks randomly demanded



by the network for a block to be generated. Nodes store and accumulate historical blocks and preserve in permanent storage in order to increase the probability for block generation. A typical example of P2P network-based storage is Filecoin, where files are stored in nodes of a P2P network (IPFS) rather than on blockchain. These P2P nodes are also nodes of the Filecoin blockchain network, which relies on PoRep, a replication proof to indicate that a defined number of copies are stored, and PoST, a proof of time and space to indicate that data is continuously stored, all proving that the storage task is completed. In addition, there is an aggregated platform-based storage method, which can be considered as a combination of the above two, represented by ColdStack and Stratos. They pair with other protocols to find the most suitable way to for storage.

Categories	Technology	Chains/ Protocols
Storage on network basis	Blockweaves	Arweave
	TEE (Trusted Execution) on substrate	Crust Network
Storage on P2P network basis	IPFS	Filecoin
	Skynet	Siacoin
	StorJ Netowrk	StorJ
Coordination platform	Datamesh	Stratos

Table 4-4: Technical classification of mainstream storage projects

Source: Huobi Research

The storage segment has been greatly affected by the overall environment of the crypto industry in 2022, slowing down in growth. The table below illustrates various figures for several mainstream storage protocols in 2022. Filecoin is still the alpha in terms of available storage capacity and actual storage capacity. Filecoin's storage capacity is now entering a steady growth phase, with storage capacity grew by 15% in the first 3 quarters of the year. While some growth has been seen, it pales in comparison to the high growth rate of 52% in the second half of last year. The highlight is the steady growth in actual storage capacity in use, with 210.8 PB of data stored by the end of the third quarter, more than 700% increase from the beginning of the year. Other protocols also saw growth in storage utilization, but still at low levels, indicating that decentralized storage is still trivial in the overall market for storage. Sia's higher utilization is mainly due to its stagnant storage capacity growth and high data redundancy, while Arweave storage has a different scheme than others; a horizontal comparison does not tell the true story. Due to low token prices, storage fees and revenues among protocols have declined



significantly, and most protocols still do not have a cost advantage compared to centralized cloud storage at approximately \$0.0007 per GB per month. The number of nodes in Arweave has declined by more than 60% from last year, and all other protocols have seen modest growth. In terms of ecological construction, the data may be skewed due to the different calculation methods of each own, and the overall number of projects built on or with storage protocols appears to be small, again reflecting the fact that storage has yet to be adopted by majority.

	Filecoin	Arweave	Sia	Crust
Revenue (US\$, annual)	18.6 M	728 K	144 K	/
Storage Capacity	16.7 EB	97.92 TB	6.40 PB	766 PB
Used Capacity	210.8 PB	/	2.75 PB	25.1 PB
Usage	1.20%	/	43%	3.15%
Nodes	4,000	49	717	1,791
Storage Fee(GB/Month)	Far below 0.0001	2.66(Permanent)	0.72	0.0008
Number of Eco-projects	113	36	26	/

Table 4-5: Summary data of some mainstream storage protocols

Note: 1 EB = 1000 PB, 1 PB = 1000 TB, 1 TB = 1000 GB. other storage protocols are difficult to obtain multi-dimensional data, so they are not listed.

Sources: messari.io, filecoin.io, arweave.org, sia.tech, crust.network, Huobi Research

4.3.2 Storage + Computing

Despite the fact that storage has not become massively adopted statistically, upgrades and innovations are taking place. The primary upgrade is the addition of computing capabilities. Most of the current storage solutions only carry out the function of "decentralized hard drive" to meet the rudimentary needs, but storage-based computing remains blank. Although there are several "global computers" in the crypto industry, they are inherently not the same thing. Storage-based computing mainly includes local development environment rendering, data stream insertion and extraction, etc., which are the most common and necessary functions for Web2 applications.



Filecoin introduced the concept of FVM (Filecoin Virtual Machine) to inject programmability to distributed storage networks and unleash more value-creation potential, which was successfully launched in the Filecoin v16 Skyr upgrade in July this year. FVM is a multi-language friendly execution environment based on WASM, endowing smart contract deployments in Filecoin network. The first phase has already been achieved, where the core logic of the Filecoin network can execute smoothly in the FVM, implemented in the built-in smart contract (Filecoin calls it “actor”). The second phase is much more significant that will allow users to deploy custom logic into the network, and Filecoin is fulfilling the vision of "smart contracts + provable storage". During this phase, FVM will also complete its compatibility with EVM, so that existing smart contracts and EVM tools of Ethereum ecosystem can be leveraged, such as Hardhat, Foundry, Remix, Truffle and MetaMask. In addition, Stratos is trying to provide a more inclusive and complete solution with multiple modules including database storage, static storage, computation and consensus. It divides the network into 3 tiers, of which the resource tier will serve as a universal computing platform, providing various application-oriented function interfaces in addition to storage functions.

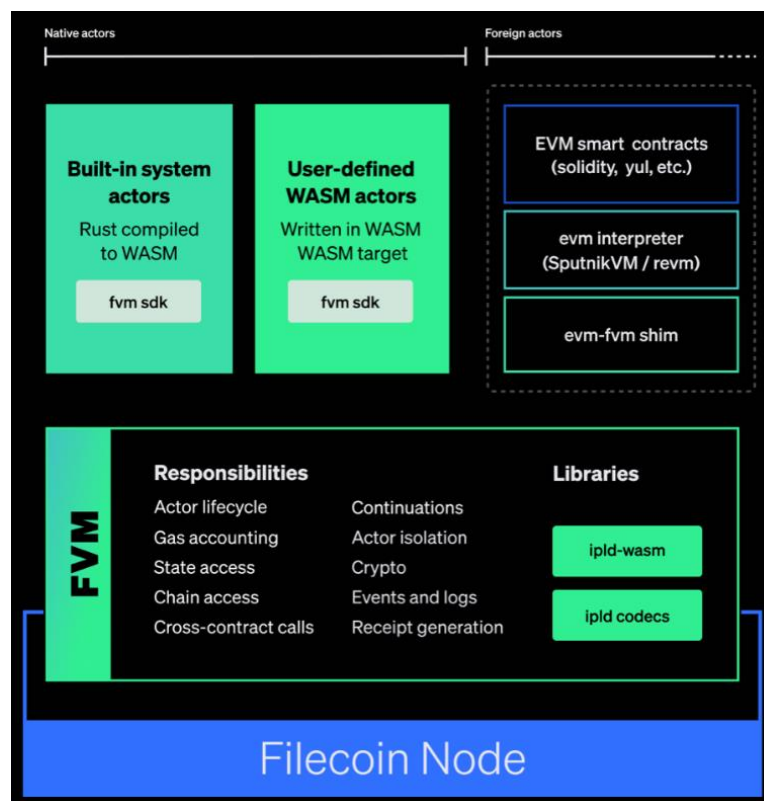


Figure 4-10: Full FVM
Source: filecoin.io/blog



4.4 The foundation of application layer: the domain name boom

In the world of Web3, all kinds of wallet addresses are nothing but a string of characters, and the domain name system was in place to simplify identification and communication to a more user-friendly appearance. A domain name can be linked with the wallet, and the domain name can replace the role of wallet in various application scenarios. By using domain name can more convenience be brought to users and fault transaction be avoided simply because of typos in address. As the leader of the DID segment in Web3, the importance of ENS domain name system has earned the reputation.

Back in 2017, ENS, the pioneer in domain name, was launched on Ethereum. It has now coronated with the largest market share in the domain name segment. It has left others so behind both in terms of volume and quality. In other words, the domain name boom of 2022 is indeed the ENS boom. As of this article is published, the market capitalization of ENS domains⁷ amounts to \$96M (about 52,720 ETH), accounting for 90% of the entire domain name segment. The .sol domain on Solana and the multi-chain domain service provided by Unstoppable also takes a small bite, at \$5.8M and \$4.17M respectively, accounting for less than 5%. The rest of the domain name projects have too small share to be noticed. In terms of the number of registrations, the difference is not as significant as that of market capitalization. If suitable strategies are applied, other projects could still catch up.

Domain Name Project	Introduction	L1 chain	Suffix	MarketCap (\$US)	Number of registrations (K)
ENS	The largest domain name service on ETH	Ethereum	.eth	96M	586
.bit	Cross-chain authentication applications	Ethereum, Nervos, etc.	.bit	65K	6

⁷ The market value of a domain name is calculated by: whichever of the most recent transaction price of this domain name as NFT or the floor price of NFT from the same series is greater would be considered the value of a single domain name. Possible laundering transactions are excluded, the total value of all domain names is calculated afterwards.



SpaceID	Domain Name Services on BNB Chain	BNB Chain	.bnb	57K	92
Bonfida	Domain services on the Sol chain provided by Bonfida	Solana	.sol	5.8M	/
Unstoppable	Domain name services for multiple chains	Ethereum, Polygon, etc.	Multi-Category Suffixes	4.17M	372

Table 4-6: List of Domain Name System by L1 chain

Source: Huobi Research

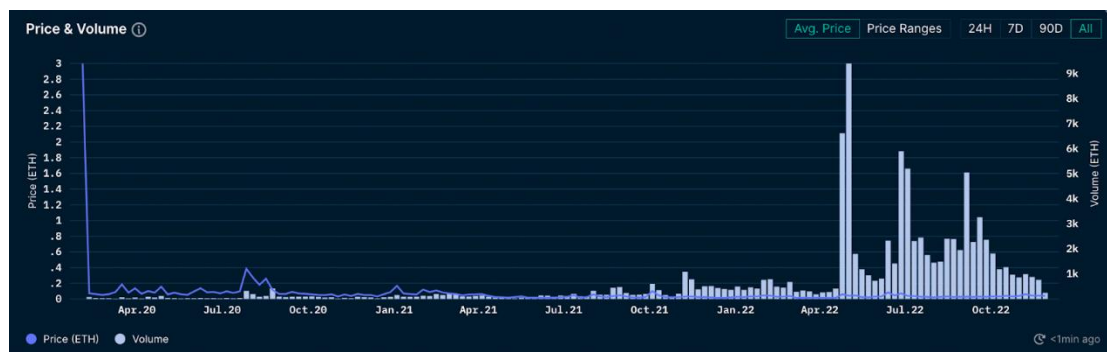


Figure 4-11: Basic data of ENS

Source: nansen

ENS domain names have seen explosive growth this year. From the number of transactions distribution throughout the year, the whole market reached climax in April-May, experienced a short period of stagnancy (a series of incidents in the crypto market happened during April-June), and then revitalized in September-October, with single-day transactions climbed to \$12 million.

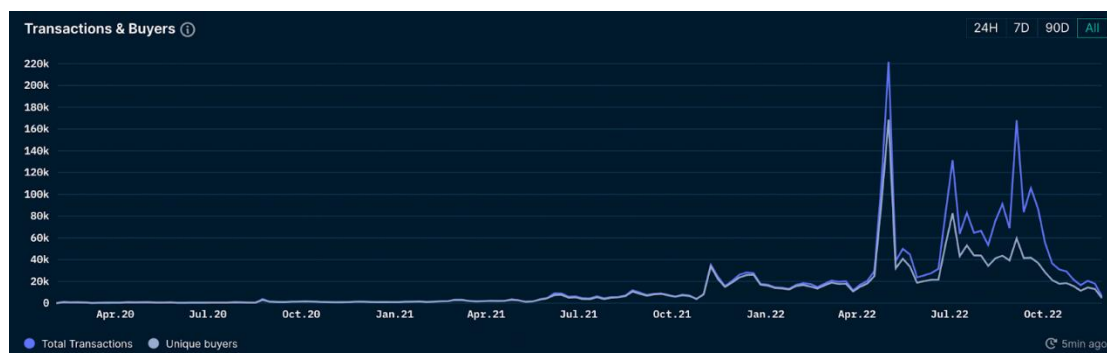




Figure 4-12: ENS transactions in the past year

Source: NftGO.io, Huobi Research

During August-October, ENS dominated the top 5 of Opensea's transaction list for a long time, being the pole star in the bear market throughout the year. Driven by ENS domains, other L1 chain domains such as ". apt", ". bnb" and ". bit" domain names have all published offering plans and roadmaps, lighting the fuse in domain names in the second half of the year.

4.4.1 Why domain name prevails

Despite the various reasons behind the prevalence of domain names, the following 3 are the most convincing:

First, scarcity of domain names per se. After a particular domain name (especially three-digit and four-digit) is registered, it becomes henceforth the only piece in the world. Anyone familiar with Internet domain names should be aware that during the boom of Internet domain names around 2000, the scarcer an Internet domain name is perceived, the greater the premium will be as time goes. Domain name investors in blockchain are quite familiar with the history of the Internet domain name boom back then, so it would be a lifetime shame for them missing this once-in-a-lifetime opportunity.

Second, the innovative mode of blockchain domain name provides ceaseless power for the lasting of domain name era. Traditional domain names are parsed through centralized DNS servers, while blockchain domain names are through on-chain smart contracts, which are also decentralized and more secure for assets. Through on-chain contracts, it is wallet addresses, personal web pages, avatars, Twitter accounts, email addresses, and other objects being resolved by blockchain domain names, more scalable and more applicable at a larger scope. At the same time, as an NFT, it is eligible to engage in all kinds of transactions with other NFTs to participate in ecological interactions on-chain. In addition, the sub-domains derived from the NameWrapper function can be transferred and resolved independently, making ENS domain names even more appealing than traditional domain names.



Third, continuous narratives have pushed the prevalence of domain names to a zenith. Starting with 3D (three-digit domain names) and 4D hype, the concepts of 5D, 6D, emoji, 100 family names, Web3 moments, country codes, etc. continued the storytelling one after another. At the same time, the continued preaching of some well-known KOLs on Twitter (e.g., Nick.eth, 139.eth), etc. also attached more social attributes to the narrative, amplifying the effect to wider range outside the crypto world. It has become the bestseller in the NFT market of 2022.

Due to the scarcity of the domain name per se, the prevalence continues. It will refresh new records in the future, despite there may be some occasional breaks and declines, the wave never stops.

4.5 Cross-chain bridge: the rise and the threat

4.5.1 Status quo and future trend

4.5.1.1 Status quo

As the ecosystems of L1 chains have prospered since 2021, nourishing L1 chains and L2 networks, according to Blockchain-Comparison, the number of Layer1 and Layer2 is now at a sum of 126 at least. As the demand for cross-chain interaction becomes more urgent, cross-chain bridges are thus becoming one of the most needed infrastructures.

According to the latest data from debridges.com, more than 111 cross-chain bridge projects are currently on the stage, with TVL of more than \$16.4 billion for major projects. Most cross-chain bridges are compatible with mainstream L1 chains, supporting more assets from different ecosystems, for example, more than 1,700 cross-chain tokens are supported by major cross-chain bridges. Cross-chain assets are mainly stablecoins and L1 chain tokens, such as USDT, USDC, DAI, WBTC and ETH.



Cross chain Bridge	TVL (USD)	Rank	Total TVL (USD)
Orbit Bridge	\$4.97b	1	\$16.4b
Polygon Bridge	\$2.95b	2	
Arbitrum One	\$1.20b	3	
Optimism	\$1.19b	4	
Multichain	\$0.35b	5	
Rainbow Bridge	\$0.23b	6	
Wormhole Portal	\$0.22b	7	
xDAI Bridge	\$0.12b	8	

Table 4-7: Major Cross-Chain Bridge TVL

Source: debridges.com

Due to the large differences in the underlying architecture of each L1 and L2 network, the difficulty of implementing cross-chain interoperability remains tough. Current cross-chain bridge mainly plays the role of a bridge for asset to function across different networks. Cross-chain of assets does not stand for moving the bona fide assets from one place to somewhere else, but refers to the process of minting and destruction of native assets on another chain by certain rules, or the exchange of native assets from and to cross-chain assets. Current technical solutions of cross-chain bridge are mainly 3 types, such as lock + minting/destruction, liquidity pool and atomic swap. In terms of cross-chain mechanism, it is mainly achieved by three ways: native cross-chain, external validation and atomic swap. The external validation has lower deployment cost and faster response, and it has been the most common method for cross-chain bridge. However, the security is vulnerable, which has already directed a large number of cross-chain bridge security incidents.

4.5.1.2 Development Trends

Based on the data of cross-chain bridges in 2022, the competition of top cross-chain bridges is inclined to be more intense in the future: the number of cross-chain bridges will continue to increase; ultra-light node is expected to become a new way of cross-chain bridge; cross-chain aggregators will become a new direction; and NFT cross-chain is expected to see a breakthrough.

Currently cross-chain bridges are mainly on top L1 chains, for example, the number of cross-chain bridges on Ethereum, BSC and Polygon reached 101, 74 and 48



respectively. With the emergence of new L1 chain narratives recently, such as high-performance L1 chains and modularized L1 chains, it will inevitably lead to more cross-chain bridges. Only 8 of the current 111 cross-chain bridges have over 100 million in TVL, which accounts for more than 90% of the total cross-chain bridge TVL. This oligopolistic effect is expected to be stronger in the future.

Current cross-chain bridges and communication are conducted by external validation and native validation, with the former being validated by multiple relays and forwarding on-chain messages, while the latter requires running light nodes on chain. Both modes are flawed in some aspects: the former is less secure but less costly and more responsive, while the latter is more costly but more secure for light nodes. Ultra-light nodes (ULN), on the other hand, combine the security of light nodes and the low cost of relays by performing the same validation as light nodes. Instead of preserving all block headers by sequence, ULN block headers are distributed on demand by a decentralized oracle. LayerZero is the first cross-chain bridge to achieve native cross-chain via ULN (Figure 3). By far, there have been several major security incidents with cross-chain bridges powered by external validation, and the emergence of ultra-light node cross-chain is expected to be trending.

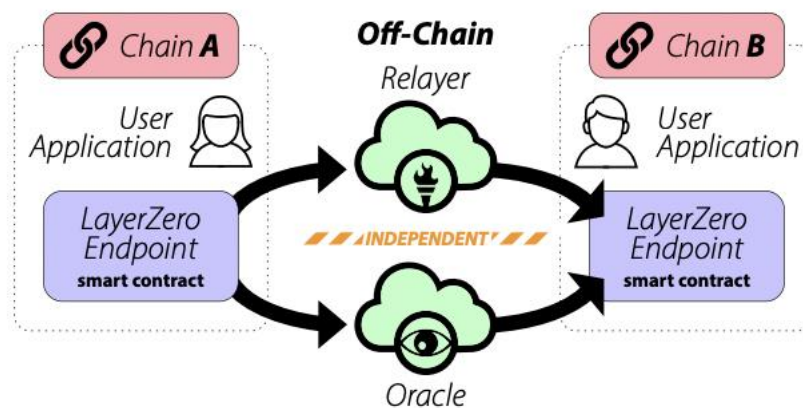


Figure 4-13: LayerZero's ultra-light node architecture

Source: layerzero.network

Cross-chain transaction aggregation also comes into being along with cross-chain bridge. Cross-chain transaction aggregation employs algorithms to provide users with the optimal choice of cross-chain paths between chains. Cross-chain + liquidity aggregation can improve capital utilization to a certain extent, and is expected to



become a new direction. In addition, NFT assets have not appreciated much compared to other token assets this year. According to nansen data, the total trading volume of NFT in ETH in the past 12 months is only about 21 million ETH, which is less than the total spot trading volume of top NFT exchanges in a day (Figure 4). Although all mainstream cross-chain bridges have supported NFT cross-chain, the handful trading volume of NFT cross-chain has no one to blame as most NFT projects have not discovered suitable application scenarios, let alone most NFTs are short of liquidity. It is expected that in the next year, NFT projects will see a rise in cross-chain demand with the landing of a large number of application scenarios, and the cross-chain volume will see its day till then.

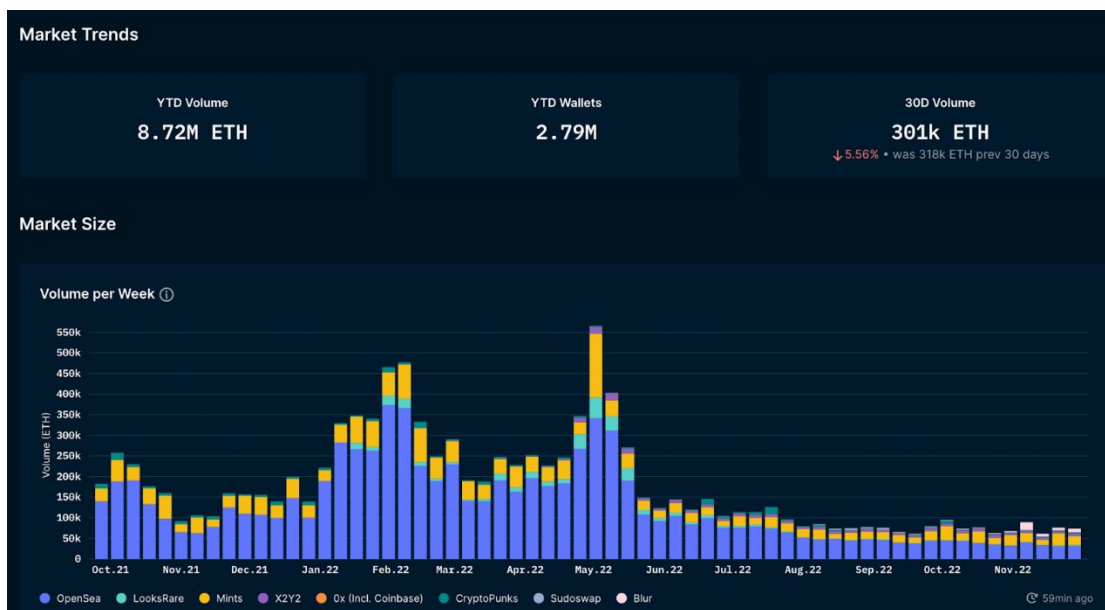


Figure 4-14 Trading volume on mainstream NFT exchanges in ETH

Source: nansen

4.5.2 Summary and analysis of cross-chain bridge security events

Cross-chain bridges have now become an inelastic demand, therefore, also the ideal target for the outlaws. Last year, there were 4 major security incidents of cross-chain bridges, and this year, the number increased to 9. The funds stolen also incremented from \$660 million last year to \$1.38 billion this year; more than \$2.2 billion are involved in the incidents. The main causes of the security incidents are code vulnerabilities and logic vulnerabilities, with only 2 of them are the theft of private key.



Major cross-chain bridges involved in the theft are summarized in below. In fact, most of the cross-chain bridges had some technical problems one way or another.

Project name	Involved chain	Date	Amount of loss	Explained
Multichain	Multichain	2022-01-18	455ETH	Exploited approvals
Qbridge	BSC	2022-01-18	\$80,000,000	Exploited vulnerabilities
Wormhole	Solana	2022-02-03	12,000ETH	Forged the signature
Meter.io	Moonriver	2022-02-06	\$4,000,000	A mistaken assumption in code
Ronin Bridge	Ronin	2022-03-21	\$610,000,000	The leaked private key
Marvin Inu	Etherum	2022-04-11	110ETH	Smart Contract Vulnerability
MM.finance	Cronos	2022-05-04	\$2,000,000	DNS hijacking
Horizon	Horizon	2022-06-24	\$100,000,000	The leaked private key
Nomad	Etherum	2022-08-02	\$164,000,000	Smart contract failed to properly validate the input of the transaction
BSC Bridge	BSC	2022-10-07	8,00,000BNB	Exploit a relayer bug in the code
pNetwork	BSC	2022-11-04	/	A misconfiguration of bridge

Table 4-8: Summary of security incidents on cross-chain bridges in 2022

Source: Huobi Research

Cross-chain bridges are frequently hacked because, on the one hand, hackers covet the large amount of crypto assets; on the other hand, cross-chain technology is still relatively new that a large number of cross-chain bridges just started in 2021, and the technical complexity and immaturity of cross-chain bridge coding standard have exposed many types of bugs, which are mainly concentrated on multi-signature and smart contract vulnerabilities /execution errors.

From project side, the cross-chain bridge per se is vulnerable so that eyes of hackers never left; a project has to prioritize security at the beginning of the design, such as screening for more reliable service providers, higher level of decentralization, more rigorous programming, etc. In addition, external audits should be more emphasized and bounties could be introduced to ensure the security of funds furthermore. For users, cross-chain is safer when choosing a mainstream cross-chain bridge with high security, disabling the authentication of high-risk projects in time and utilizing reputable centralized exchanges to complete the cross-chain.



5. CEFI

5.1 Status quo of institutional business developments

The institutional business portrait of 2022 is highly correlated with the crypto market as a whole. According to CryptoCompare's data from November 2021 to October 2022, the size of institutional business declined from nearly US\$70B at the end of last year to around US\$22B. It is encouraging to see a small recovery in October compared to September, an increase about 1.76%, the first rise since July, but still below the peak in March. In terms of net inflows, it went from negative to positive in October, reaching US\$730K, compared to negative US\$9.2M in September. It reveals the perfect match with the April-June institutional turmoil (see 5.3 in this chapter).

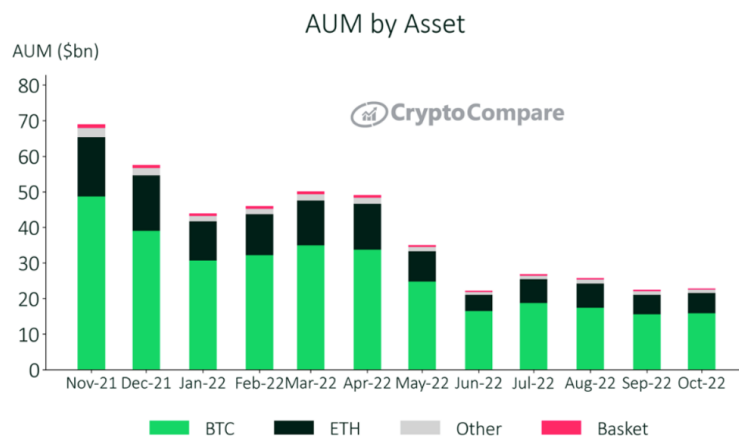


Figure 5-1: Statistics of institutional asset size under management

Source: CryptoCompare

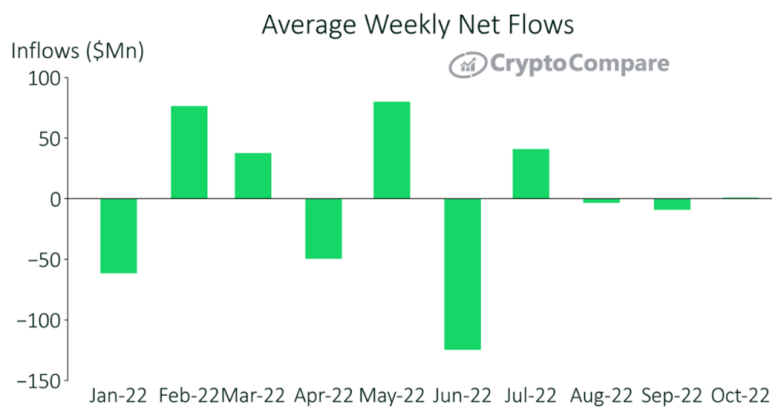


Figure 5-2: Statistics of institutional net asset inflow

Source: CryptoCompare



5.2 Custodial business competition/service landscape

The trust business (crypto asset custody) is the primitive institutional business to be developed. In 2022, there are more than 150 institutions offering custody service. Among the leading ones remain Fireblocks, Coinbase, BitGo, ledger, etc. As demonstrated in the chart below, Fireblocks ventured into the crypto trust market back in 2018, supporting more than 1,500 types of assets in custody. In terms of geographical distribution, most of the leading players are concentrated in the United States; most of the methods are sole-proprietary (only one adopts hybrid custody). From technical point of view, MPC (multi-party computing) technology has been gradually integrated to the past single HSM technology.

Custodian	Custody Founded	Domicile	Type	Technology	Assets Supported
Anchorage Digital	2017	US	Direct	HSM	74
Bakkt	2018	US	Direct	HSM, Multisig	2
Bitcoin Suisse	2017	Switzerland	Direct	Multisig	14
BitGo	2013	US	Hybrid	HSM, Multisig	400
Coinbase	2018	US	Direct	MPC	140
Copper	2018	UK	Direct	HSM, MPC	400
Fidelity Digital Assets	2019	US	Direct	Undisclosed	1
Fireblocks	2018	US	Tech Provider	MPC	1,500
Gemini	2019	US	Direct	HSM, MPC	74
Genesis	2020	US	Direct	MPC	20
Hex Trust	2018	Hong Kong	Hybrid	HSM, Undisclosed	100
Ledger	2019	France	Tech Provider	HSM	1,500
NYDIG	2017	US	Direct	Undisclosed	1
Qredo	2019	UK	Tech Provider	MPC	15
SEBA Bank	2018	Switzerland	Direct	HSM, Multisig	11
Silvergate	2020	US	Direct	Undisclosed	Undisclosed

Figure 5-3: List of mainstream institutions of trusts

Source: gs.r.io

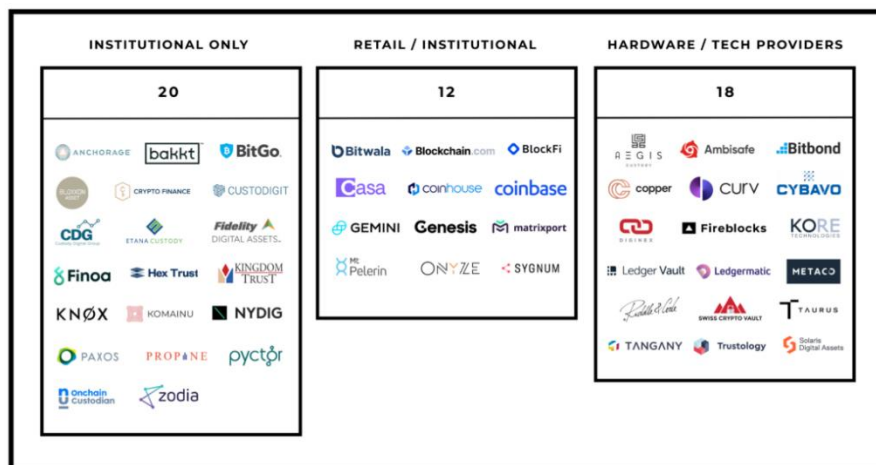


Figure 5-4: Categories of institutional trusts

Source: <https://cointelegraph.com>



In terms of products offered, they are divided into three categories. The first is to provide services only to institutional customers, represented by BitGo and Hex, while another is to provide services to both institutional customers and retail customers (including high net worth individuals), such as BlockFi, Coinbase, etc. The third category is relatively peculiar, specializing in providing hardware services to the market, such as hot and cold wallets, custodial systems, etc., represented by Fireblocks, Bitbond, etc. These three categories form the current competitive landscape of the custody market.

5.2.1 Lending/Borrowing and Asset Management in CeFi

Institutional lending/borrowing business refers to the provision of crypto asset lending/borrowing services to institutional investors and users, including high net worth individuals (including family offices). Borrowers are usually quant-trading institutions, exchanges, mining pools, project teams, etc. Quant-trading institutions and exchanges usually utilize institutional services for hedging or as part of working capital, while mining pools pay electricity bills and purchase fixed assets such as mining machines with the credit. Correspondingly, lenders of institutional services are usually long-term holders, such as wealth management institutions and family offices.

The major players in CeFi lending/borrowing in 2022 are Copper, Hex, Matrixport, BitGo, etc. Their main services and deal models are summarized in the table below.

Institution	Services	Deal Model
Copper	Provide borrower matching services (via Tesseact's API)	broker mode
Hex	Provide borrower loan with collateral and other loan services (email or chat)	broker mode
Bitgo	Provide borrowers with loans with or without collateral, and other loan services (email or chat)	/
FTX	Provide borrower loan with collateral and other loan services	broker mode
Matrixport	Provide borrower loan with collateral and other loan services	dealer mode

Table 5-1: Introduction to the main players of Cefi lending.

Source: Huobi Research



So far, the faster and more convenient way to match deals is through email or WeChat (in Hex or Bitgo's model) with broker mode; dealer mode of fund pool is relatively harder to construct due to compliance conditions.

5.3 Statistics and impact of institutional turmoil

After the collapse of Terra, many investors are under severe loss. Three Arrows Capital and its investors are the first on fire. Three Arrows Capital suffered devastating losses in the Terra incident due to undue risk management, with so many investors implicated, the maelstrom has created a giant exposure of funds in the crypto world. As a result, institutions that had financial dealings with Three Arrows Capital were embroiled. The bankruptcy of Three Arrows Capital reflects the huge risk exposure of lending without collateral (credit lending) in the cryptocurrency market, which has led to a spate of institutional meltdowns. Various governments become more cautious after the string of risky bursts in the cryptocurrency market and have decided to impose stricter regulations to prevent similar incidents from repeating.

The other thunderstorm is the FTX incident. It all stems from Alameda, which is the sister company of FTX, that it borrowed funds from FTX for business purpose on the cost of mortgaging SOL and FTT; the funds lent out are all client funds. CoinDesk published an article and warned the general public by indicating the risk on the balance sheet of FTX, and CZ responded to this post by another post, claiming the plan of selling off all FTTs in his holdings; the market was hence in a deep panic that the price of FTT plummeted, triggered a selling climax. FTT suffered from the selling climax and the liquidity was drained; meanwhile, the underlying FTT and SOL lost the buttress of value, pushing FTX to a state of insolvency that led to the bankruptcy in the end. Before all these, FTX was the second largest centralized exchange only to Binance. Despite that the FTX incident is already one of the catastrophes in the financial world, it was hacked merely hours after the declaration of bankruptcy, with assets worth over 600 million dollars in theft, and most of the users cannot withdraw their money back for ever. It is indeed a tsunami for the whole industry, and some of the consequences are still yet to come.

5.3.1 Details of the incidents



1. Terraform Labs

Terraform Labs is the cryptocurrency company carrying out the responsibility of developing and maintaining Terra Network and Anchor. The company created the stablecoin TerraUSD, which later de-pegged from U.S. dollar and led to the collapse of Terra and dumping in the market. The Luna token, once a cryptocurrency worth over \$40 billion in market cap, became worthless when TerraUSD lost the peg to U.S. dollar, and losses of Terraform Labs are beyond countable. Terra's collapse was merely the start of a series of subsequent institutional meltdowns.

2. Three Arrows Capital

Three Arrows Capital is a cryptocurrency hedge fund in Singapore. Until March 2022, Three Arrows Capital had \$10 billion in assets under management, known as one of the most prominent cryptocurrency firms in the world. However, the \$200 million investment in Luna was one of fuses that lighted the fire of bankruptcy. The company declared bankruptcy on June 29, two days after it received a notice of default on a loan from Voyager Digital; the defaulted amount exceeds more than \$650 million as of June 2022. British Virgin Islands court has since ordered Three Arrows Capital to liquidate its assets after the court found the fact of insolvency.

3. Voyager Digital

Voyager Digital is a US-based cryptocurrency lending company operating primarily in the US and Canada. On July 6, Voyager Digital disclosed that it had filed for Chapter 11 bankruptcy protection after losing more than \$650 million in bad debt to Three Arrows Capital, plunging it into a financial crisis, suspending trading and freezing customer funds a couple times. Despite a rescue loan from FTX founder Sam Bankman Fried's trading firm, Alameda Research, to Voyager Digital in June, the bankruptcy is the unavoidable finale of Voyage Digital. The company also claimed in its Chapter 11 filing that it had more than 100,000 creditors at this point, along with liabilities of between \$1 billion and \$10 billion. FTX has since acquired Voyager Digital for \$1.4 billion. After the crash of FTX, CZ has expressed interest in November again on acquiring Voyager Digital.

4. Celsius Network



Celsius Network is an American and Israeli cryptocurrency company. The company was once a leader among cryptocurrency lending platforms. However, in June 2022, trading and withdrawals are halted from the platform, and about \$12 billion in user assets were frozen. Celsius Network filed for bankruptcy protection on July 13. The company also fired about a quarter of workers on July 4. Around 354 million worth of assets from Celsius are implicated in the FTX incident.

5. Babel Finance

Babel Finance is a cryptocurrency lender based in Hong Kong. The company stopped all withdrawals from its users in June. After announcing the cessation of user withdrawals, Babel Finance disclosed that it was hit by unprecedented liquidity problems due to volatile cryptocurrency market conditions. Babel Finance was one of the many cryptocurrency companies devastated by Terra and Three Arrows Capital, which triggered mass frozen on billions of dollars of funds.

6. ConFLEX

CoinFLEX is a futures exchange. It temporarily closed all withdrawals in June due to financial distress in light of the recent cryptocurrency downturn. CoinFLEX later announced plans to recover \$84 million in funds outstanding. It also partially reopened withdrawals with a cap at 10 percent, leaving 90 percent of user balance as locked funds that users still cannot withdraw or trade. This incident was indeed a liquidity issue that a \$47 million security deposit is defaulted by one of CoinFLEX's borrowers. CoinFLEX's hole is hence estimated at \$84 million.

7. BlockFi

BlockFi is one of the world's leading cryptocurrency companies, which provides financing services and loans. Nearly 80 million dollars are at loss from the bad debt of 3AC. In June this year, BlockFi announced a plan of layoff for almost 20% of the payroll; the tormented BlockFi was acquired by FTX with 240 million dollars afterwards. In the FTX incident, BlockFi declared on a working proposal for filing bankruptcy by huge risk exposure to FTX, and all withdrawals were suspended.

8. Genesis Trading

Genesis is a famous crypto trading company that provides crypto exchange, lending/borrowing, custodial and brokerage services; the overall scale of assets under



management exceeds \$10 billion. In the FTX incident, \$175 million worth of assets are stuck on FTX. With this risk, an urgent announcement was made on Nov 16 that all new loans and redemptions were suspended. Genesis is currently seeking an emergency loan to be sufficient to pay off the redemption requests of large amount.

9. Vault

Vault, a Singapore-based cryptocurrency company that provides cryptocurrency lending and investment services to more than 800,000 customers. On July 4, the company announced all customer withdrawals and deposits are closed. Vault's CEO Darshan Bathija claimed that unreliable and unstable market conditions prompt financial distress to the company. Vault had been operating with powerful appearance in the market for about four years and had raised \$27 million through investors such as Coinbase Ventures. Vault has also faced liquidity problems because of the collapse of the Terra stablecoin UST and other institutional meltdowns; \$197.7 million were taken away in the retreat of the customers since June 12.

10. Statistics of institutions involved in the FTX incident

The following chart summarizes the known institutions encumbered by FTX so far (not all institutions chose to declare exposure of funds involved in the FTX incident). Most institutions on the list have remaining funds on FTX that cannot be withdrawn, and some of them have suffered from overwhelming holdings of FTT.

Institutions	Business	Damage	Capital
Block Fi	Lending and Borrowing	Asset locked in FTX, suspended withdrawals afterwards.	Undisclosed
Binance	Crypto Exchange	Exposure to FTT tokens.	\$580 million worth of FTT
Digital Surge	Crypto Exchange	Suspended withdrawals.	Undisclosed
Celcius	Lending and Borrowing	Asset locked in FTX, suspended withdrawals afterwards.	Estimated \$354 million USD
Sino Global	Investment Funds	Suspended withdrawals.	7 figures USD in loss
Genesis Trading	Investment Funds	Asset locked in FTX, suspended withdrawals afterwards.	\$175 million USD
Coinbase	Crypto Exchange	Asset locked in FTX.	\$15 million USD



Coinshares	Asset Management	Asset locked in FTX.	\$30.3 million USD
CRYPTO.COM	Crypto Exchange	Asset locked in FTX.	Less than \$10 million USD
GALAXY DIGITAL	Asset Management	Asset locked in FTX.	\$76.8 million USD
GALOIS CAPITAL	Hedge Fund	Asset locked in FTX.	\$100 million USD
KRAKEN	Crypto Exchange	Asset locked in FTX.	9,000 FTT
SILVERGATE CAPITAL CORP	Asset Management	Asset locked in FTX.	Less than \$119 million USD
VOYAGER DIGITAL	Lending Platform	Asset locked in FTX.	\$3 million USD
Multicooin Capital	Investment Funds	10% of assets locked in FTX	Undisclosed
Pantera Capital	Hedge Fund	3% of their \$4.5 billion assets exposed to FTT tokens.	Undisclosed

Table 5-2: List of institutions involved in the FTX incident

Source: Huobi Research



6. NFT

6.1 Status quo of NFT market

NFT is a new crypto segment that emerged in 2021 and has received a lot of attention from the market since April 2021. It has continuously heated up and entered the sight of general public since the second half of last year and climaxed at the beginning of 2022. However, the performance demonstrated weakness and lack of momentum amidst the worrisome atmosphere of the crypto industry.

6.1.1 Overall decline in NFT market

Throughout 2022, NFT's total market cap declined from \$31.14B in January to \$21.73B in October, a decline of about 42%, and single-day closing declined from \$842M in January to \$48M in October, a decline of roughly 94%.

In 2022, the NFT market saw a decline in active traders from 45,000 at the end of 2021 to 5,000, with a correspondingly large decline in both buyers and sellers. Major transactions were spotted in January, April and June, and a rather dismal performance from the second half of the year onwards. In contrast, the cumulative number of NFT users reached 3,426,600 from 1,445,900 at the beginning of the year, a comparative increase of 138% (the NFT market embarked in the second half of 2021). The increase in the total number of users is accompanied by a decrease in the number of active trading users, indicating an increase in the number of price takers, with the majority of users holding at loss.

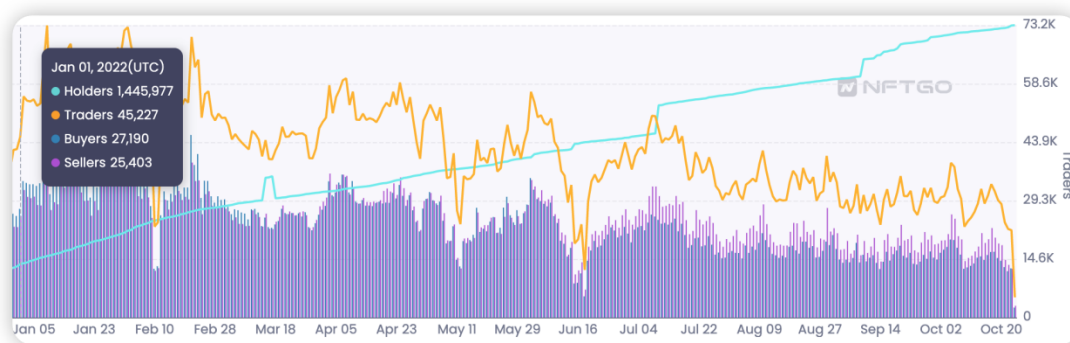


Figure 6-1: Days of NFT Meme Ups & Downs

Source: NFTGO.IO



6.1.2 Interest in NFT remains heated in Asian Markets

From Google Trend, searches on NFT peaked in mid-January 2022, and started to decline thereafter. With another small recover in April-May, it has been on a diminishing trend since then.

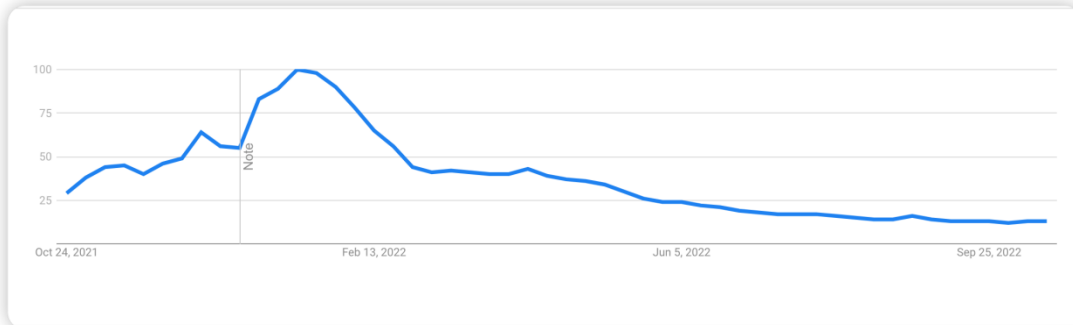


Figure 6-2: NFT Global Trends
Source: Google Trends, Huobi Research

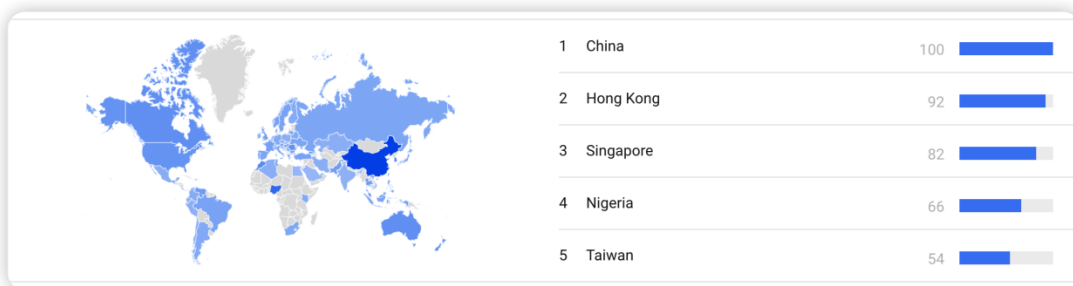


Figure 6-3: NFT Regional Interests
Source: Google Trends, Huobi Research

Geographically, Mainland China ranks first in the search index, followed by Hong Kong, and the 3rd-5th are Singapore, Nigeria and Taiwan respectively, while the US ranks 19th. It is still considered high compared to previous year, when the interest in NFT from Mandarin-speaking regions (Mainland China, Hong Kong, Singapore) gradually surpassed that from Europe and the US in the context of the bear market.

6.1.3 Leading players dominate with majority being PFP, cultivating the market of long tail



From the classification of NFT, about \$12.67B out of \$21.73B falls within the PFP category in 2022, accounting for 58%, followed by collectibles and gaming NFT. It indicates that the NFT market is still dominated by avatar series; nothing new in terms of category compared to 2021.



Figure 6-4: NFT Category Market Cap

Source: NFTGO.IO

In terms of collections, the top3 are BAYC, CryptoPunks, lands from Otherside. Almost more than half of the top ten (Meebits and CryptoPunks were acquired by Yuga Labs) are occupied by Yuga Labs, revealing the trend of sustainable dominance from leading players.

NFT Collection	Conviction	Avg. Error	Avg. Calibration Error	Est. Marketcap (ETH)	Vol. Change (3D)	Floor Change (3D)
CryptoPunks	Medium	13%	16%	1,062,113	11%	-0.7%
Bored Ape Yacht Club	High	11%	13%	967,144	-78%	-3.69%
Otherdeed for Otherside	Medium	11%	14%	343,813	-17%	0.76%
Mutant Ape Yacht Club	High	6.1%	8.65%	293,010	-11%	-5.43%
CloneX	High	7.4%	11%	184,394	-12%	-20%
Chromie Squiggle Art Blocks Cur...	High	8.21%	12%	170,496	-	-2.79%
Azuki	Medium	12%	14%	142,816	22%	2.07%
Fidenza Art Blocks Curated	Medium	20%	24%	129,462	-	2.84%
Ringers Art Blocks Curated	Medium	22%	20%	98,430	-	0
Moonbirds	High	5.7%	8.13%	91,069	12%	-0.68%
Doodles	High	6.76%	8.91%	89,701	19%	-3.45%
VeeFriends	Medium	13%	20%	80,082	662%	-0.52%
Meebits	High	8.91%	15%	74,632	-52%	0
BoredApeKenneIClub	High	8.26%	11%	69,114	155%	-3.12%
Space Doodles	Low	21%	31%	57,073	-	0

Figure 6-5: NFT Collection Distribution

Source: NFTGO.IO



However, excluding the first ten comparatively famous NFT series, other niche NFT accounted for 62.05%, the long-tail begins to be unveiled, and the NFT market is slowly conforming to the 20/80 principle.

6.2 New trends in NFT –layer upon layer, the Meme bubble popped

Throughout 2022, the NFT market began its downturn in May (marked by the Otherdeed for Otherside offering on May 1) after a honeymoon period from January to April. From May to October, all kinds of Meme NFTs sprung out against the backdrop of the bear market. From the preliminary series of *we-are-going-to-die* to the pyramid-marketed Mts, along with *goblintown.wtf*, in the bear market continues to drain the confidence of NFT players. Especially *goblintown.wtf*, which raised \$20m in 1 week with strong pyramid marketing, also being the "ugliest" NFT ever. The subsequent Shit or Shit Beast series was a nesting operation based on this, which also attracted a large number of people out of FOMO. NFT Meme is one of the distinguishments of the NFT market in 2022, even if it prevails first and breaks down at last.

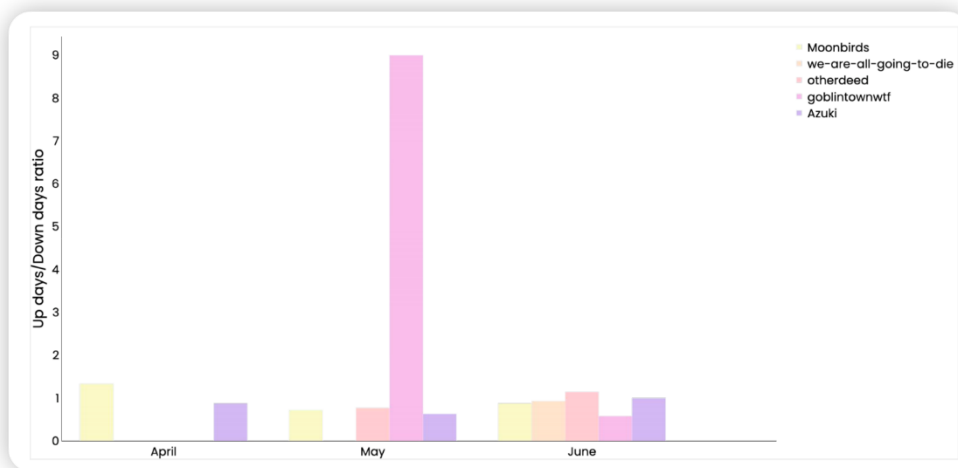


Figure 6-6. Days of ups & downs for NFT Meme

Source: NFTGO.IO

Another innovation for the NFT market in 2022 is the increasingly appealing storytelling relationship and augmented narrative between NFT series. Combined with airdrops and token issuance, a gameplay combo with crypto is discovered and trending. Especially in light of the success in DeFi, a new chapter of NFTfi is on the way.



6.3 NFTfi – The rise continues after a popular debut

NFT (non-fungible token) has become an indispensable part in the crypto world, and now NFT has evolved from pure PFP project to more advanced form combined with games, metaverse, collateralized lending, etc., forming a new model of NFT + decentralized finance. However, inherently, as non-fungible token, the indivisibility results in weaker liquidity compared to FT, such as limited trading precision, higher cost, and lack of price discovery mechanism.

As solutions, financial applications and tools regarding issues on NFT assets have emerged in the market, aiming to add liquidity and increase certainty on pricing of NFT assets, and improving the utilization of funds on NFT by the combination of NFT and finance in order to create better user experience in the NFT market, which we collectively refer to as NFTfi applications.

6.3.1 NFT lending/borrowing – a budding market

NFT lending/borrowing is the most direct way to address the liquidity issue of NFT assets, and the most sought-after demand in current NFT market. Prior to 2022, barely any voices of NFT lending/borrowing were heard, while it gradually started to appear in conversations. There are 2 mainstream modes for NFT lending/borrowing: P2P (peer to peer) and P2Pool (peer to pool), represented by the NFTfi protocol and the BendDAO protocol. They differ in terms of transaction frequency, trial scope and price discovery effectiveness; the overall market is still relatively small compared to that of fungible tokens.



Figure 6-7: NFT lending/borrowing landscape

Source: Twitter



As stated earlier in this report, it is undoubtable that the NFT market in 2022 is in the downturn, thus NFT lending/borrowing does not perform quite well. Current NFT lending/borrowing stays in the scope of blue-chip; for the low-to-medium NFTs, it is not widely recognized in the market for the time being due to high price volatility and the lack of oracles.

Overall, even though NFT lending/borrowing has seen some innovation in 2022, but the development is still relatively slow, and the market size is rather small in compared to FT, let alone the market cap. The market will expand to more NFTs at the bottom, along with the realization of more financial derivatives and application scenarios on current model.

6.3.2 Status quo of NFT liquidity-providing solutions

The entire crypto market contracted in 2022, and NFT liquidity solutions were just in time. Current prevailing NFT liquidity solutions are fractional NFT, crowdfunding protocols, and liquidity pool protocols.

- Fractional NFT enhances both the trading experience and capital utilization: by transforming NFT into fungible tokens with higher transaction precision, it becomes eligible for various financial tools such as collateralization, staking and leverage of fungible tokens or equity.
- Crowdfunding protocols delicately address the excessive threshold for users to hold an NFT from the market demand side, enabling participants to pool their funds and co-manage an NFT in a multi-sig environment.
- Liquidity pool protocols gathers NFTs near the floor price, providing users with a stable platform for market-making.

Overall, liquidity solutions emerged one after another in 2022; some projects (such as PartyBid) successfully caught the eyes of capital funds and investors. More innovated projects are burgeoning.



The above-mentioned liquidity solutions are diverse, all of which can improve funding efficiency to a certain extent. However, limited by pricing difficulties, the liquidity of long tail NFTs as well as rare ones has never been effectively addressed. In the future, with the accumulation of historical trading prices gradually completing the NFT quotation mechanism, the market of NFT would become more liquid than ever.

6.3.3 NFT aggregator – Duopoly landscape

On one hand, NFT aggregator is an integrated platform consists of asks and bids from different orderbook trading marketplaces, providing one-stop buying, listing and selling. Current universal aggregators are Genie and Gem, and various segmented aggregators as ENS.vision. NFT aggregators performed extremely well in the first half of 2022; Genie and Gem were acquired by SudoSwap and OpenSea respectively. The entire aggregator track is basically dominated by Gem and Genie, demonstrating sustainable market power of duopoly.

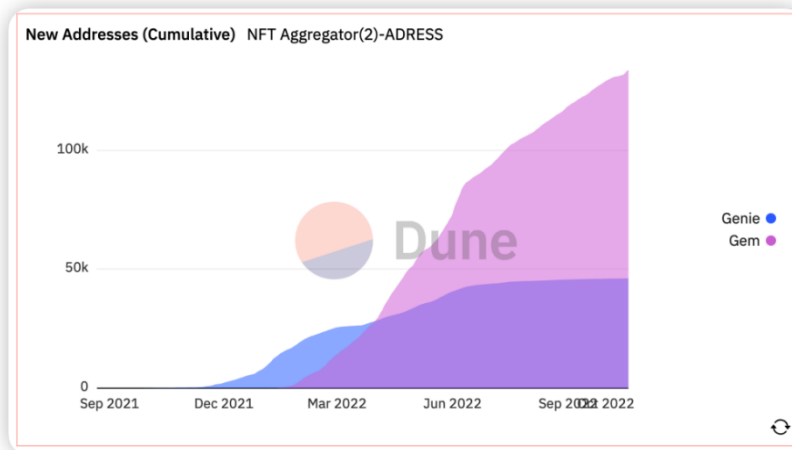


Figure 6-8: Days of NFT Meme Ups and Downs

Source: Dune

On the other hand, NFT aggregators are capable of meeting demands of information aggregation and trading aggregation. Deep integration with upstream trading marketplaces in the upstream and data analytical tools in the downstream is in progress: trading marketplaces/protocols in the upstream naturally rely on aggregators as channels, while data analytical tools in the downstream provide users with features, ranking, distribution and other services when screening. The first half of 2022 has already seen some acquisitions of aggregators by trading protocols in the upstream, and



the integration of aggregators with data analytical tools is in transit; more cases are expected next year. Vertical integration of NFT aggregators with trading marketplaces and data analytical tools is destined to happen.

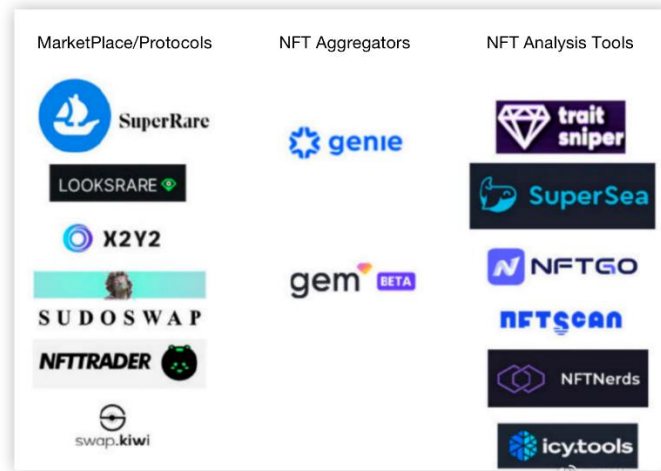


Figure 6-9: NFT aggregator: upstream and downstream
Source: Wu Talk, Huobi Research



7. DeFi: the darkness before dawn

In early days, the development of DeFi had been mediocre: the types of protocols are rather limited, and most of them are but duplicates of traditional finance projected to infrastructures on blockchain. It was not until 2020 that DeFi saw explosive growth with the introduction of the Automated Market Maker (AMM) and liquidity mining, funds started flooding to DeFi. At the end of 2021, DeFi's Total Value Lock-in (TVL) reached the summit at \$182.16 billion.

In 2022, DeFi has also been distressed by chain reactions of macroeconomic uncertainty, tensions across borders, black swan events (Terra crash, 3AC, Celsius and FTX incident), increase in DeFi on-chain attacks and vulnerabilities, and general downturn in the crypto market. This chapter aims to reveal the status quo of the DeFi market on different dimensions.

7.1 Status quo of the DeFi in bear market

- TVL

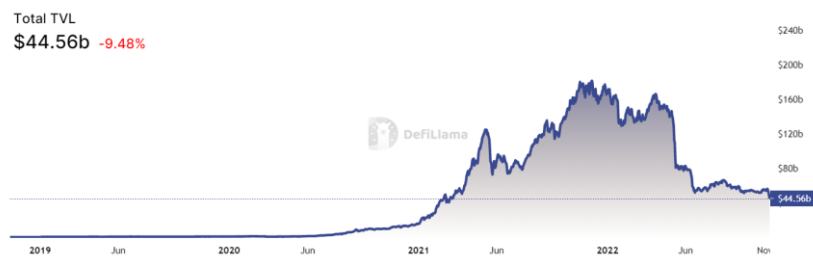


Figure 7-1: DeFi TVL (Nov. 10, 2022)

Source: DeFiLlama

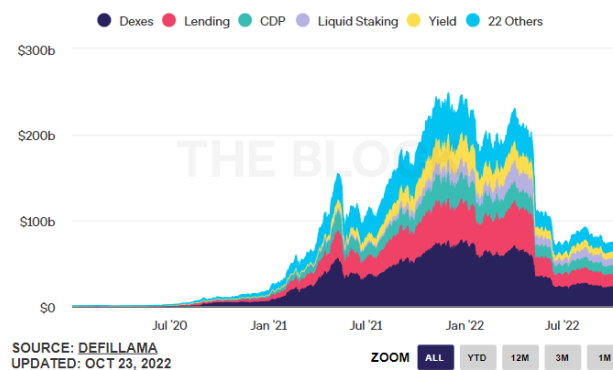




Figure 7-2: DeFi TVL by segment

Source: The block

The TVL in DeFi protocols is currently \$44.56 billion, which has dropped 75.5% from the all-time high of \$182.16 billion, directly reflecting the massive devaluation and withdrawal of capital from the DeFi market. In terms of protocol categories, DEX and lending remain the main battlefield in DeFi, with the sum of the two accounting for approximately 68.1% of TVL, less than that in 2021. In the L1 chain category, Terra has the largest drop in TVL over the past year, mainly due to the collapse of UST, which swept the value of down to almost zero, and in the FTX incident, the Solana ecosystem is devastated again. The rest of the major L1 chains also saw decline in TVL, such as BSC with decrease about 45.1% and Avalanche about 59.2%. The bear market only did part of it; according to Beosin's blockchain security report, over 30 hackings happened in Q3 2022 in DeFi, over \$400 million were lost and the whole segment pays the bill.

- **DEX**

DEX is a fundamental infrastructure in DeFi that its trading volume is a direct reflection of market confidence and activeness. Among the top 10 DEXs, the total daily trading volume fell steeply from of \$19.19 billion max to as low as only \$740 million. However, the DEX segment continues to appear as oligopoly. According to Dune Analytics, Uniswap, DoDo and Curve have ruled the market by nearly 90% of total trading volume. Among them, Uniswap is in a monopoly-like position in the industry with 67.5% of trading volume.

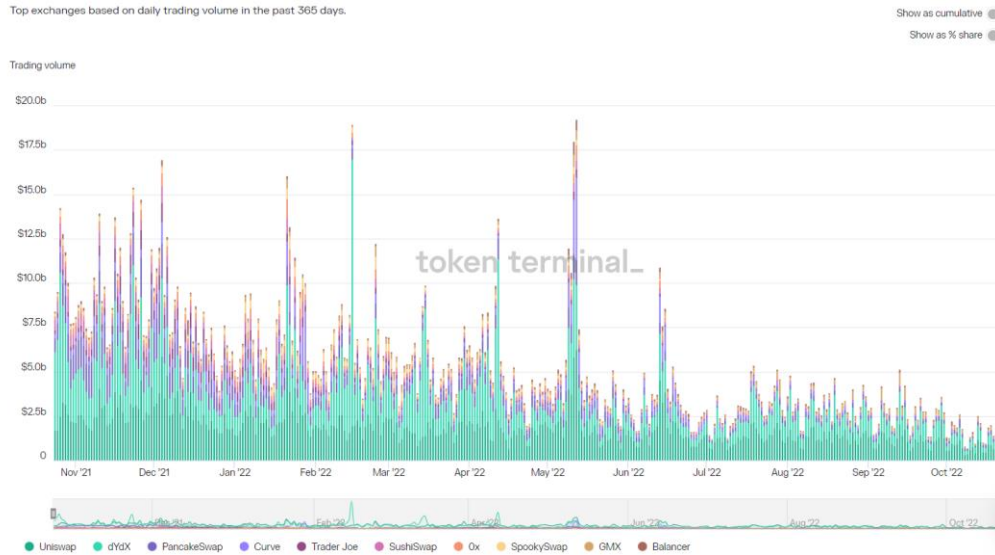


Figure 7-3: Changes of major DEX volume in the past year
Source: Token terminal

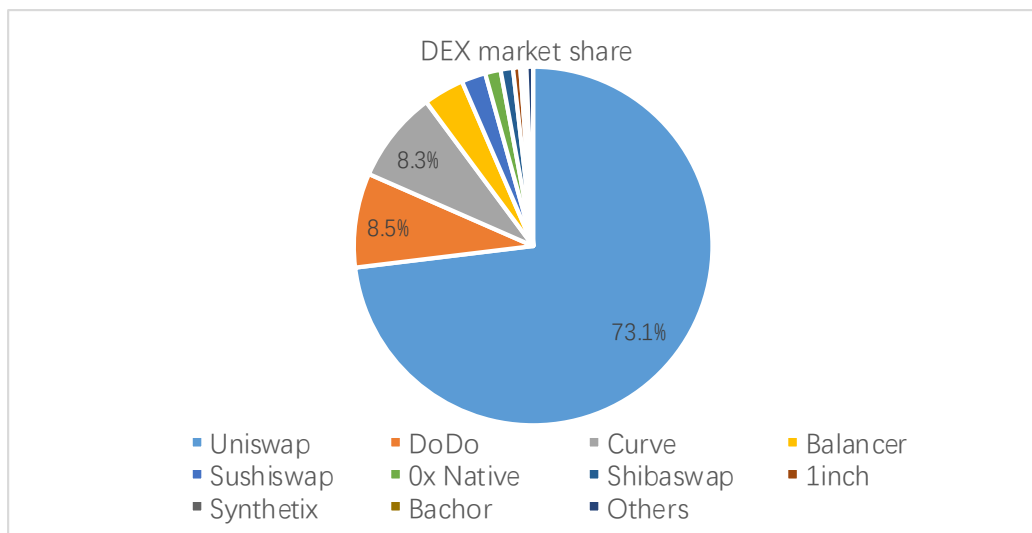


Figure 7-4: Major DEX market share
Source: Dune Analytics, Huobi Research

While DEX has not seen a major update as Uniswap V3 in the past year, some minor upgrades were completed by various DEX protocols to pass the winter in crypto.

1. Integration with NFT trading is trending for DEX. On the one hand, the leading DEX, Uniswap, for example, announced at the end of July that NFT trading will be supported after the upcoming integration of the existing NFT trading platform-



Sudowap, and users will be able to access on-chain liquidity provided by sudoAMM in the future. On the other hand, other DEXs, represented by PancakeSwap, have also developed and integrated NFT trading marketplaces on their own platforms, boosting the growth of over 40% in revenue.

2. DEXs are investing in diversification of products to provide one-stop service. Currently, many DEX protocols are no longer monotonic in Swap, but cross-chain, lending/borrowing, staking and wealth management are available as services on the platform to enhance degree of loyalty and attract more funds. In addition, some DEXs based on AMM (SushiSwap, PancakeSwap, etc.) have also derived the traditional limit order mode on the platform for better trading experience.
3. DEXs have started full migration to Layer2 with acceleration in multi-chain deployment. With the diffusion of Layer2, represented by Rollup, many DEXs have announced plans on adopting scaling solutions to reduce transaction costs and improve TPS. At the same time, more and more protocols are being deployed to emerging L1 chains other than Ethereum for incremental user base.

- **Lending and borrowing**

Lending/borrowing is the second largest in terms of TVL in DeFi. Total borrowings in DeFi fell from \$28.4 billion to \$16.2 billion at lowest, and total deposits decreased from \$78.2 billion to 40.3 billion at lowest. Lending agreement yields are also declining significantly. The yield on mainstream lending platforms, such as Compound, AAVE and MakerDAO, for stablecoin USDC and DAI lenders is only between 0% and 1.5%.



Figure 7-5: APY of USDC, DAI lenders on major lending protocols
Source: Loanscan.io

The cheerless market has forced many lending protocols to start actively seeking alternatives in their business. Taking the leading lending application AAVE for example, native stablecoin GHO will be in effective to shield the ecosystem by exploiting the wide spread of stablecoin and amplifying the influence of the platform. On the other hand, with the official launch of ERC-4626 protocol, all interest-bearing certificates, such as Lido's stETH and cToken on Compound, could be incorporated to various lending protocols through this interface seamlessly. In the future, as more types of interest-bearing certificates enter the list of supported assets for collateral and lending, the capital efficiency of funds can further be elevated.



7.2 Survival and outlook of DeFi

From the data above, we can tell the unfavorable situation DeFi is facing during the bear market. We have the following suggestions for projects hanging in through this round of bear:

(1) Forget about subsidies and build a stable revenue stream. Liquidity mining is the universal ignition for DeFi projects from cold start, and it has become a standard feature for all DeFi projects. However, the nature of liquidity mining is a form of subsidy that some projects coax users into investing in native tokens for seemingly high rate of return on the subsidy out of thin air, while the projects do not have stable liquidity themselves, or even worse: they do not wish to carry on at the very beginning. When a DeFi protocol subsidizes users with tokens and fees for a long time, the loyalty of these users will be attached to liquidity mining. At this point, if the token price were to be diluted by mining and selling, the subsidies will be eroded, the trading volume, liquidity of the pool and trading depth will quickly drain. Therefore, blind excessive returns or subsidies are not sustainable for DeFi in the long run. In other words, only those who could get over with subsidizing day by day and create a bona fide revenue stream will survive till the next boom.

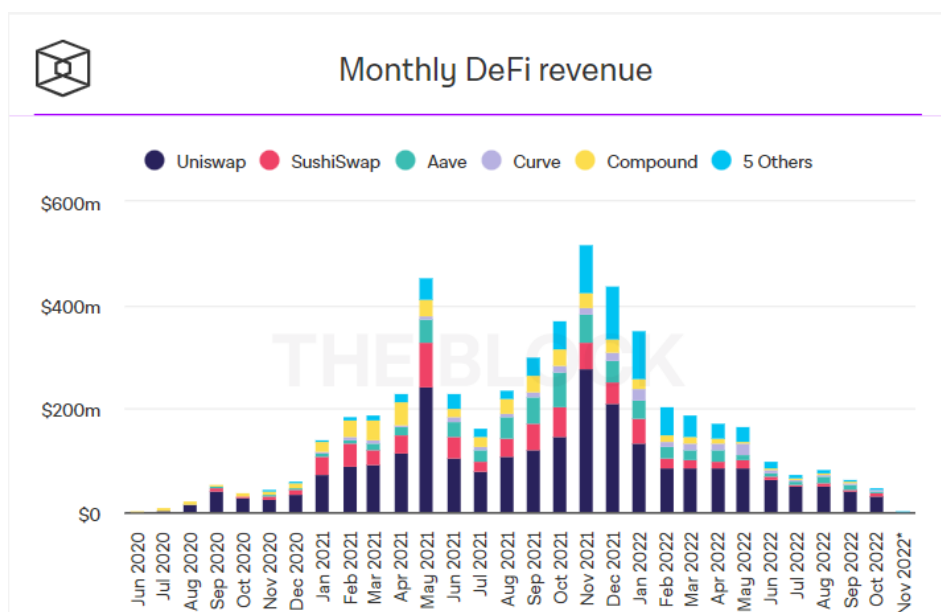


Figure 7-6: Revenues from major DeFi protocols in the past year

Source: The block

(2) Renovate token economics to a sustainable one. Currently, many DeFi protocols



have difficulty accumulating and capturing the value of tokens. Some existing protocols have made attempts on developing sustainable token economics, such as Curve's VE model: The staking of CRV must not stop as long as users yearn for better governance and corresponding rewards so that whales cannot simply buy in for higher governance authority and rewards in the short term; meanwhile, tokens are endowed with more value and circulating supply is also decreased. As a result, more and more protocols are setting foot on explorations and optimizations in token economics for another growth opportunity by adding more value to tokens.

- (3) Explore financial derivatives of DeFi.** Each subsidiary in DeFi is almost in equilibrium, and the domination power of leading projects is absolute. There are hardly any new growth opportunities unless disruptive innovations emerge in a bigger picture. Therefore, new projects yet to start could consider something rather mature in traditional finance but almost rare in blockchain, which mostly are derivatives. Although current protocols of derivatives have demonstrated certain competitive advantage, they are at a fairly early stage.
- (4) Embrace regulation appropriately.** Since the Tornado Cash incident, the crypto industry has officially become the target under severe surveillance of various modern regulatory parties. In addition to the U.S., the EU will also formulate the bill of Markets in Crypto Assets (MiCA) for DeFi next year. In the future, regulation will not only aim at a certain protocol or segment but on the entire blockchain application layer. Therefore, instead of going against traditional financial regulation, it is smarter for DeFi protocols to proactively seek for a balance between blockchain and censorship.

7.3 Stablecoin

7.3.1. A new round of prosperity and crisis for algorithmic stablecoin

Evolution and Collapse

Algorithmic stablecoin was a star back in DeFi Summer 2020, and after two years of development, it has evolved into third generation.

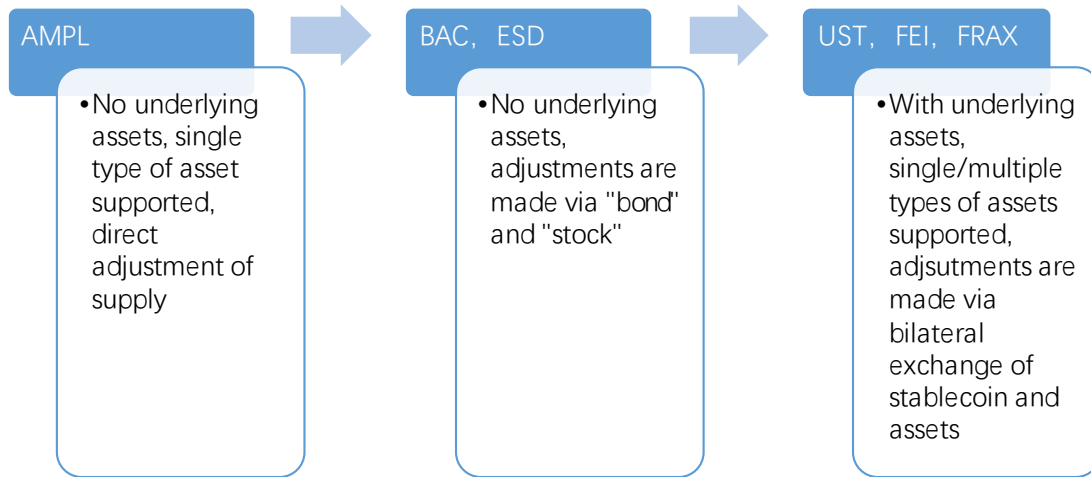


Figure 7-7: Evolution of algorithmic stablecoin

Source: Huobi Research

The most notable difference between third generation of algorithmic stablecoin and predecessors is the collateral of sufficient assets to avoid a "death spiral". In the issuance mechanism, destruction or full collateralization must precede the issuance, which almost fundamentally altered the inherence of algorithmic stablecoin. In this report, we will continue to use the term "algorithmic stablecoin" and define it as a "crypto-asset backed" stablecoin. Only with underlying assets can algorithmic stablecoin withstand the market volatility and decrease in price, thus maintaining the price in peg with the pricing unit in the long run.

Stablecoin	Backing Assets	Type of Backing Assets	Disposal of Backing Assets
UST	LUNA	In-System	Burn
FRAX	FXS+USDC	In-System+ Off-System	Burn
USDD	TRX	In-System	Collateralize
USDN	WAVES	In-System	Collateralize
USN	NEAR	In-System	Collateralize
FEI	ETH	Off-System	Collateralize
UXD	delta-neutral contracts with SOL as collateral	Off-System	Collateralize

Table 7-1: Issuance mechanisms of mainstream algorithmic stablecoin

Source: Huobi Research

Modifications are also made in terms of the stabilization of price, mostly as the the figure demonstrates below.

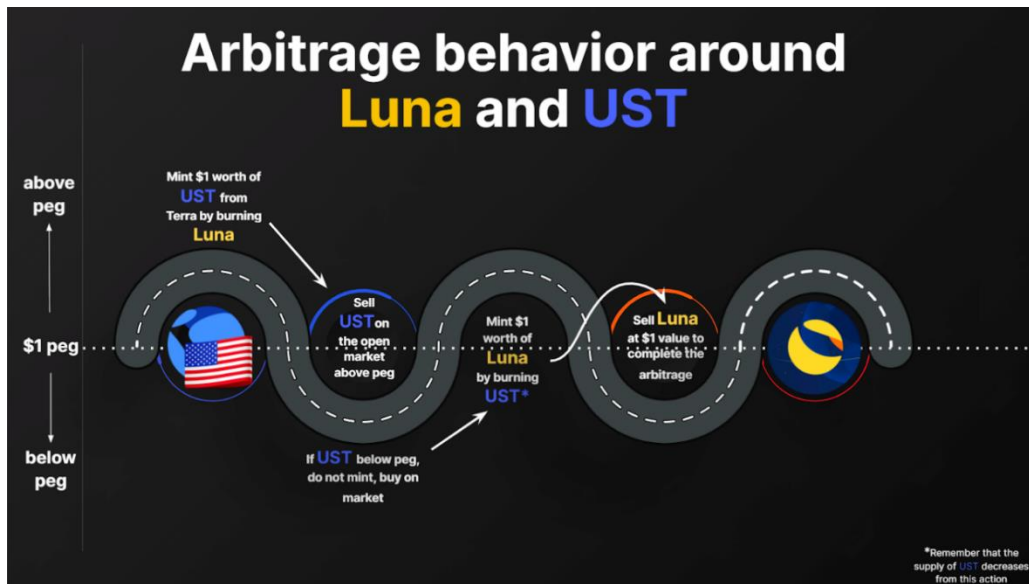


Figure 7-8: Stabilization of price for UST

Source: figment.io

A delicate mechanism design does not guarantee a vast growth of stablecoin. Anchor, a lending protocol on Terra, was the core contributor to the mass growth of UST, where users deposit UST and become eligible for a fixed return of 20% APY. With the influx of users and funds, price of LUNA, issuance amount of UST and TVL of Anchor skyrocketed as a bundle. In March this year, it even passed DAI and became the largest decentralized stablecoin in value.

However, in May this year, price of LUNA has continued to fall first, and a change to floating rate announced by Anchor followed. Meanwhile, the proportion of UST in Curve have lost the balance, and dumped by whales, UST has completely de-pegged from USD and never recovered. Price of LUNA vanished more than 99%, and TVL of Anchor halved within a week. The collapse of UST and Terra has taken the breath of the market. What's more, some other stablecoin also de-pegged from USD for a rather short period, even being accused as fake.

Other projects have also fell off to abyss in light of the consequence. FEI, which used to call itself DeFi 2.0 project on Ethereum, failed to reach consent with the victims and the community on the amount to compensate for the loss and the handling of assets in treasury in the incident of theft on Rari, the lending protocol it merged with. The co-founder resigned before long, and the protocol is therefore completely dissolved. In



July, USN on Near claimed that only USDT is accepted for minting as USN, which, in effect, is indeed a nullification of USN as an algorithmic stablecoin; an announcement was made in October on the cease of future operations due to insolvency. Although still alive, the circulating supply of USDN on Waves was reduced by nearly 90% after repeated de-pegs, once again seeing the bottom of algorithmic stablecoin. The only one that has managed to withstand the pressure is USDD, which has a collateralization rate of over 300%, supported by a group of CEXs (such as Huobi, Poloniex, Kucoin, Bybit, Gate) and DeFi protocols (such as Sun.io and Ellipsis), and some restrictions apply on redemptions; the issuance instead is almost doubled.

The chart below compares the market capitalization of UST before and after the collapse across current mainstream algorithmic stablecoins. The sum of the market cap of the top 5 algorithmic stablecoins in issue at the time slide from \$23 billion on May 8 to less than \$4 billion on May 22, a drop of 82.6% in 2 weeks. The total market cap of these 5 algorithmic stablecoins is now just under \$2.5 billion, which is about less than 10% from before the UST collapse.

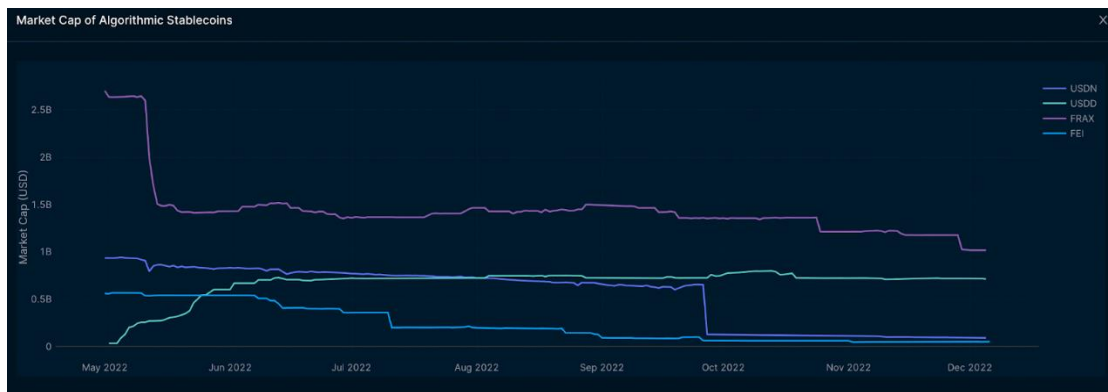


Figure 7-9: Changes in market capitalization of mainstream algorithmic stablecoins in the last six months

Source: nansen

For USDD, the issuance mechanism combines the features of both algorithmic and over-collateralized stablecoin. Only whitelisted institutions by TRON DAO Reverse (TDR) can issue USDD by full collateralization of TRX (as algorithmic stablecoin), for which TDR has a reserve of nearly 200% assets for collateralization (externally considered as over-collateralized) consisting of TRX, BTC, and USDC; only these whitelisted institutions have the right to burn USDD and exchange it for TRX. If any risk is incurred towards the event of de-peg, USDD will not face dumping as it kills the



opportunity in the future to do so. USDD is widely adopted by various scenarios, and supported by credible CEXs, such as Huobi, Poloniex, Kucoin, Bybit, Gate and a number of other CEXs, as well as established DeFi protocols, such as Sun.io and Ellipsis. It nearly doubled in issuance despite the almost doom of the whole segment. It was also granted as fiat currency status in the Dominican Republic on October 7, 2022. It is the second cryptocurrency in the world, after Bitcoin, to be granted legal currency status.

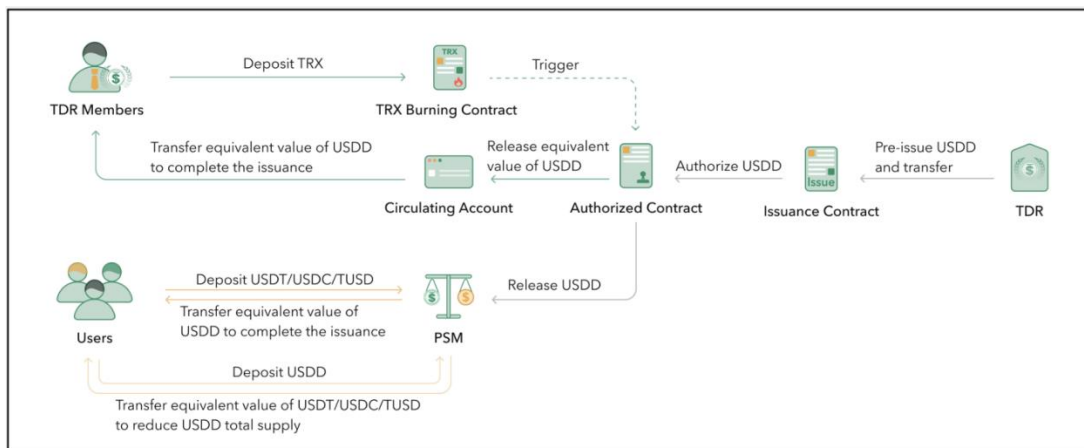


Figure 7-10: USDD's issuance mechanism
Source: usdd.io

Recap and foresights

Why is this generation of algorithmic stablecoin always crashing? What happened to the seemingly flawless mechanisms?

There are two main types of crypto-assets backed stablecoins according to how they are minted: one is destruction of underlying assets while the other is putting assets in collateral. The risk associate with destruction-based algorithmic stablecoins is that the system may overmint the underlying assets when both the price of underlying assets and the stablecoin fall, leading to a steep drop of the price for the underlying asset, and landing a collapse of the entire system.

As what happens to UST, most LUNA are destroyed at high prices and the underlying assets appear to be adequate, but not enough new assets are being added in the unit of crypto. The underlying assets become inadequate when the price of LUNA suddenly drops. As long as the stabilization mechanism is still running, the selling pressure of



LUNA will keep climbing, aggravating the decrease of LUNA price, and more LUNA must be in stock to meet the demand of redemption. In the end, it will be difficult to make up the deficit even if all LUNA is resurrected; additional LUNA has to be minted. Within 1 week after the crash, total supply of LUNA has reached nearly 7,000 times than the initial supply; LUNA is just one step away from zero, and UST has become past tense as the foundation is gone once and for all.



Figure 7-11: Relationship between LUNA price and user behavior

Source: Huobi Research

Stablecoin with collateralization, similar to stablecoin with destruction of underlying assets, is also subject to a situation where both the price of underlying assets and the stablecoin decrease, and the underlying assets are insufficient. In this case, it is basically “first come, first serve”: users who redeem early are more likely to retrieve full amount of assets, while users who arrive late could receive nothing. As a result, users who are unable to redeem from the official channel will instead turn to the secondary market to sell their stablecoins, thus causing a steep drop in price.

Algorithmic stablecoins were born to improve capital efficiency in a decentralized mechanism. The capital efficiency of centralized stablecoin is to be evaluated by the efficiency of issuance and long-term returns, and only one can be maximized. Over-collateralized stablecoin is sacrificing capital efficiency of issuance in exchange for long-term appreciation of assets; whereas algorithmic stablecoin tends to capture short-



term capital efficiency, which in the long run, it depends on how much revenues are generated by the applications accepting the stablecoin.

Algorithmic stablecoins are complementary to over-collateralized stablecoins. For users, if they are more optimistic about the potential of an asset, excessive future returns can be preserved by over-collateralization. If they are confident about the development of one particular ecosystem and desire relatively stable income out of it, algorithmic stablecoins are better.

In the future, if any stablecoin solution could guarantee sufficient collateral assets in reserve, operate under healthy stabilization mechanisms, satisfy various scenarios and adopt flexible asset management strategies, the market will acknowledge.

7.3.2 Reinventing over-collateralized stablecoin

In July, two legacy DeFi protocols, Aave and Curve, both announced plans on issuing stablecoins, rejuvenated the segment from dead silence: the stablecoin from Curve will be named crvUSD without any more details, and GHO, while still a traditional over-collateralized crypto-assets backed stablecoin, introduced some minor innovations, namely the new role of facilitator.

A facilitator is a protocol or entity that has been approved by Aave Governance to exercise the right to mint and burn GHOs. Facilitators can design their minting and burning methods accustomed to the characteristics of their own business. From the perspective of risk management, Aave Governance will set a cap on the amount of GHOs that can be minted per facilitator.

The facilitator will mainly change the game by:

- (1) Enhancing the flexibility of the GHO stablecoin system. Multiple institutions are able to issue stablecoins at their own convenience, and a wide range of assets are allowed in the collateral. In addition to the traditional minting methods of staking ETH or AAVE, more minting methods are available as input to collateral, such as real world assets (RWA), Delta mutual positions, credit scores, etc.; liquidity of more assets



can be revived in this case.

- (2) Performing as the catfish in the Catfish Effect and facilitating the economics of facilitators per se. GHO carries the same functions as a normal stablecoin, but it is bound to the facilitator's own economic model to drive business operations, incentives, token staking, and other activities. If properly designed, there should be many protocols willing to become facilitators.

The main risk of this move is the increased complexity of the protocol, which could be found exploitable by hackers. The overall risk should be manageable considering the strong technical strength of Aave, and the cap on the issuance of facilitators. It is anticipated that GHO can become an essential asset in the future to meet a wide range of application scenarios.



8. GameFi & Metaverse

8.1 GameFi

8.1.1 Status quo and outlook of GameFi

GameFi is a new segment born during the 2020 bull market. GameFi is a unity of gaming and finance: gamers play for fun, while some others profit by financial incentives; games are delicately financialized and incremental traffic was injected and rejuvenated the market. GameFi scored big during last year's bull market, however, GameFi has seen strong positive correlation with BTC index during the market downturn (Figure 8-1 and Figure 8-2). In the bearish market of this year, projects relied on hype and unsustainable profit models have doomed even worse.

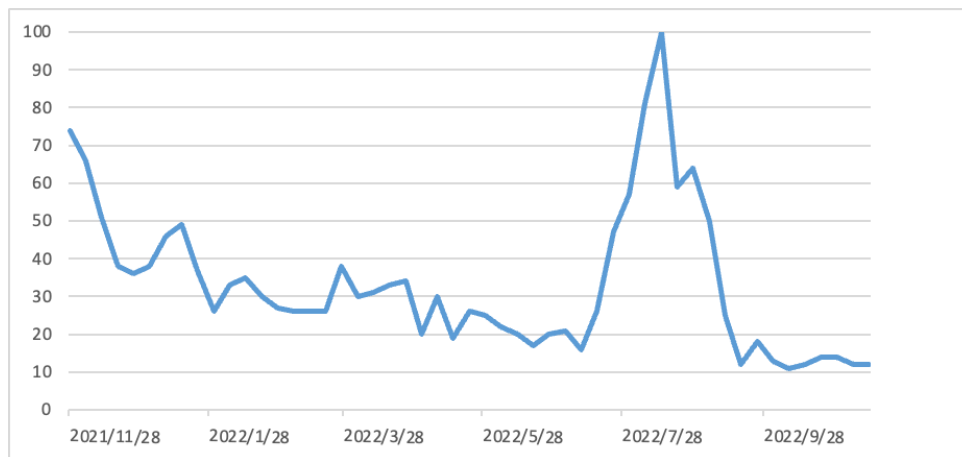


Figure 8-1: Global Search Trends of GameFi

Source: Google Trends, Huobi Research



Figure 8-2: GameFi Market Cap vs. BTC Market Cap

Source: Footprint, Huobi Research



According to Footprint's on-chain data, the growth of GameFi projects slowed down significantly in May, with only 41 new projects launched during the month, much lower than the number of projects launched in Q1 (Figure 8-3). BSC now has the largest gaming ecosystem after one year of growth in 2022, with over 582 GameFi projects currently (Figure 8-4).

Number of GameFi Protocols by Chain

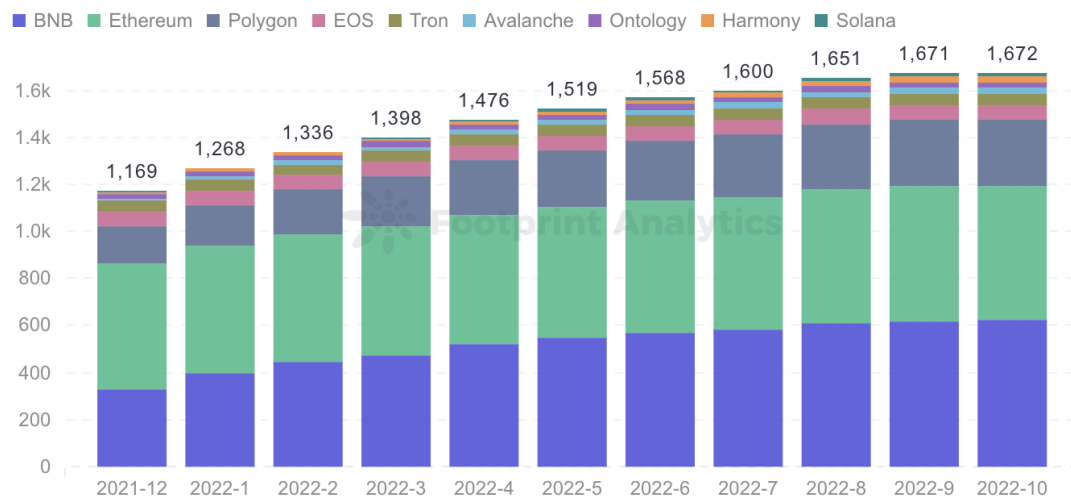


Figure 8-3: L1 Chain Monthly GameFi Project Statistics

Source: Footprint

Market Share of Protocols by Chain



Figure 8-4: L1 chain GameFi projects statistics by percentage

Source: Footprint



Axie Infinity was the hottest GameFi project for last year and Stepn for this year, but they are no longer in the range of top three in terms of the number of average active users; they have fell way behind the top three blockchain gaming projects, implying that unsustainable gaming economics is not conducive to a project's growth in the long run (Figure 8-5). On the contrary, Alien Worlds and Splinterlands, two dark horses outside the GameFi scope now rule the market. They are still favored by players even the price of tokens has dropped and the return on investment has decreased. This also suggests that the playability of games can somewhat prevent from falling into asset inflation during a downturn.

Average Active Users by Game

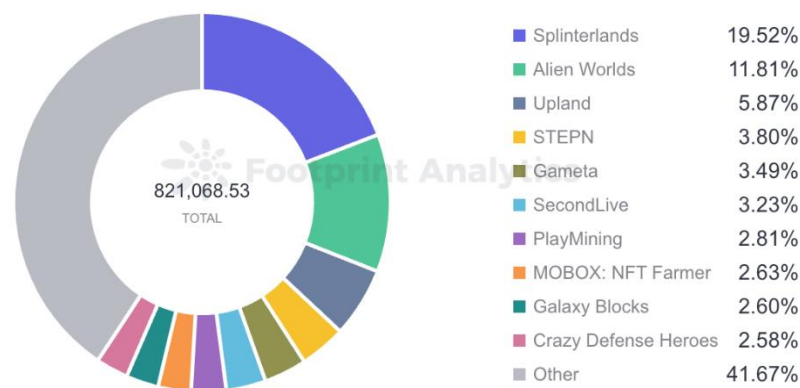


Figure 8-5: GameFi active user statistics, 2022

Source: Footprint

In 2022, capital funds are continuously watching for Web3 investment opportunities, particularly GameFi and Metaverse, as shown in the chart below. For the second year in a row, GameFi and Metaverse exceeded the number of investments under the category of Tooling, Trading and Lending/Borrowing (Figure 8-6). Capital investments in these two categories have surged from \$874 million in 2021 to \$2.4 billion in 2022.

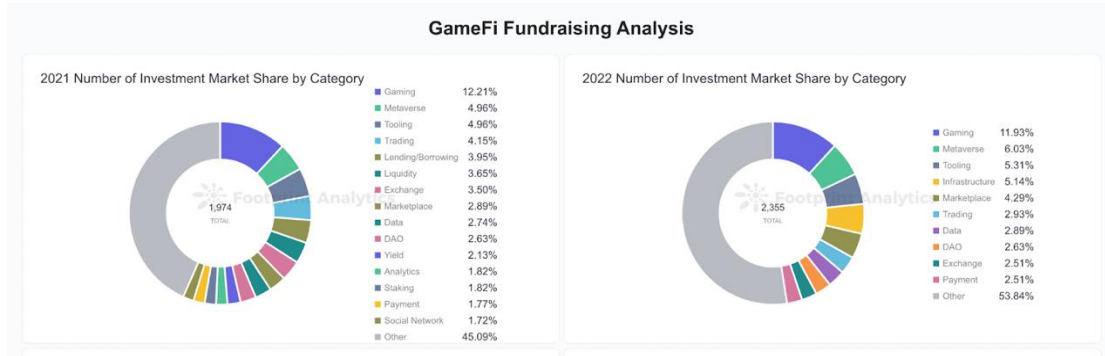


Figure 8-6 GameFi Fundraising Comparison on 2021/2022

Source: Footprint

8.1.2 X 2 Earn brings the pop, what about the next pop?

In the first half of this year, Stepn introduced the economic model of Move to Earn to blockchain for the first time, and it literally discovered a treasure island of its own. A large number of Web2 practitioners began to realize that the economic model of Play 2 Earn is not only limited to games; applying token economics to traditional Web2 scenarios will be icing on the cake, and the X to Earn model was born in this context. All kinds of scenarios, including sports, learning, singing or even sleeping, began to be adopted as inputs of the X To Earn model, making attempts to duplicate the token incentive model from online to real life experience. However, with a retrospective view on the development of X To Earn in the past year, the data is somewhat a disappointment. For example, the highest number of daily participants of Stepn reached 100,000 in May, but now it is less than 10,000; new users and investors after the decrease in the number of participants should no longer be able to calculate the return cycle (Figure 8-7).



New & Existing Daily Active Users on STEPn

@nguyentoon

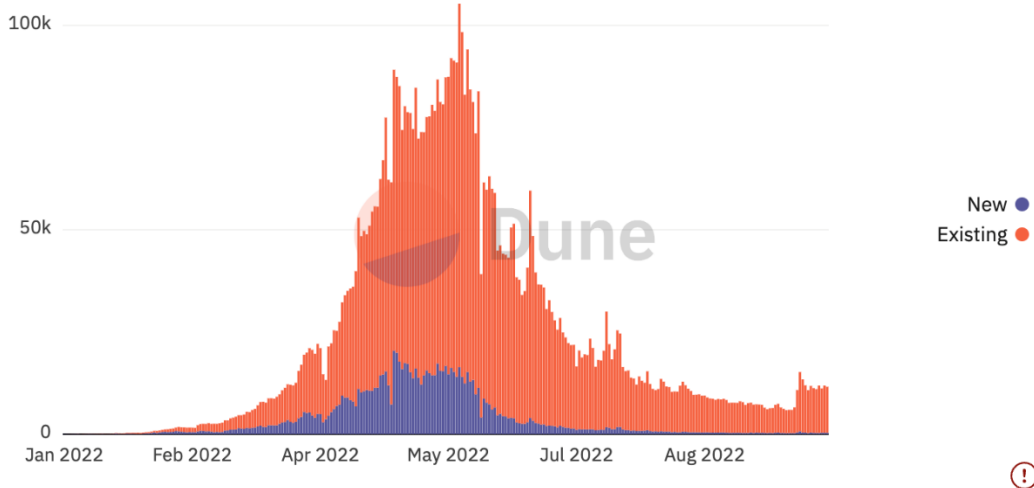


Figure 8-7: Stepn's daily new participants across the network

Source: Dune Analytics

For the project team, X To Earn introduces more brick-and-mortar scenarios to players compared to Play 2 Earn, which to some extent solves the current problem of poor playability of blockchain game and enhances the level of user loyalty to the game, but it remains controversial whether numerous scenarios are in bona fide need of token economics, and whether it is a sustainable business model that can be justified.

For users, projects with X To Earn sets high threshold to enter as users must hold designated NFT to get in. This marketing strategy is friendly to early adopters: the early holders often purchase at a lower price. In a typical hunger marketing strategy driven by “invitation only” mechanism, users would flock to join. With the increase in the subsequent reproduction of NFT, the value is constantly diluted; in other words, it is almost rare not to see dumping activities by early users in a bear market when no fresh blood is injected to the market. Users with such FOMO mood often buy at overpriced with more risk exposure to loss. The simple swift hand-changing activity from the hand of old to new, in fact, is also the main reason for X 2 Earn being infamous and accused as a Ponzi.

X to Earn inherited the dual token + NFT incentive model first introduced by Axie Infinity, which, if not designed properly, could severely affect the value of token incentives and impede the retention of daily users. So far, neither Play 2 Earn nor X to Earn has been able to effectively control the inflation of in-game tokens.



In the long run, the influx of X to Earn players will naturally escort X to Earn projects out of current dilemma, but the aforementioned issues are urgent, such as how to offset the inflation of game NFTs and game tokens, enhance the ecological construction of the project, reduce the financial attributes of gold farming, and implement business model in brick-and-mortar. Only when all the issues above are deliberately handled could X to Earn stepped out of the mist.

8.2 Status quo and outlook of Metaverse

The year of 2021 is the genesis of Metaverse, relevant games such as Roblox, Decentraland and Axie Infinity became more well-known last year. In November of last year, the hype of Metaverse stormed the world. This year, as the market went bearish, Metaverse related segments and projects have cooled down a bit (Figure 8-8).

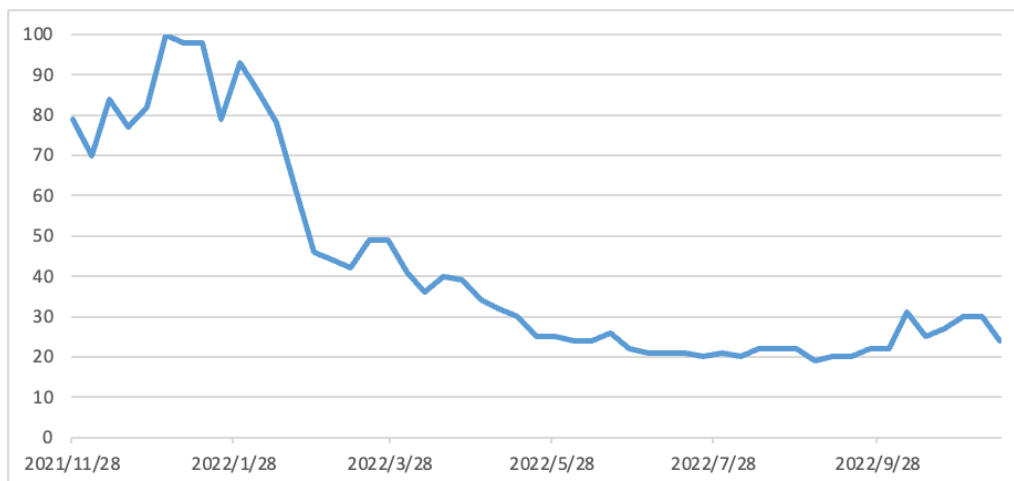


Figure 8-8: Metaverse Search Global Trend 2022

Source: Google Trends, Huobi Research

According to Statista, the market size of Metaverse reached \$38.5 billion in 2021, \$47.48 billion in 2022, and is expected to reach \$678.8 billion in 2030 (Figure 8-9). For cryptocurrency, a relatively large variety of assets are throughout the Metaverse segment with a total market capitalization of more than \$1.8 billion.

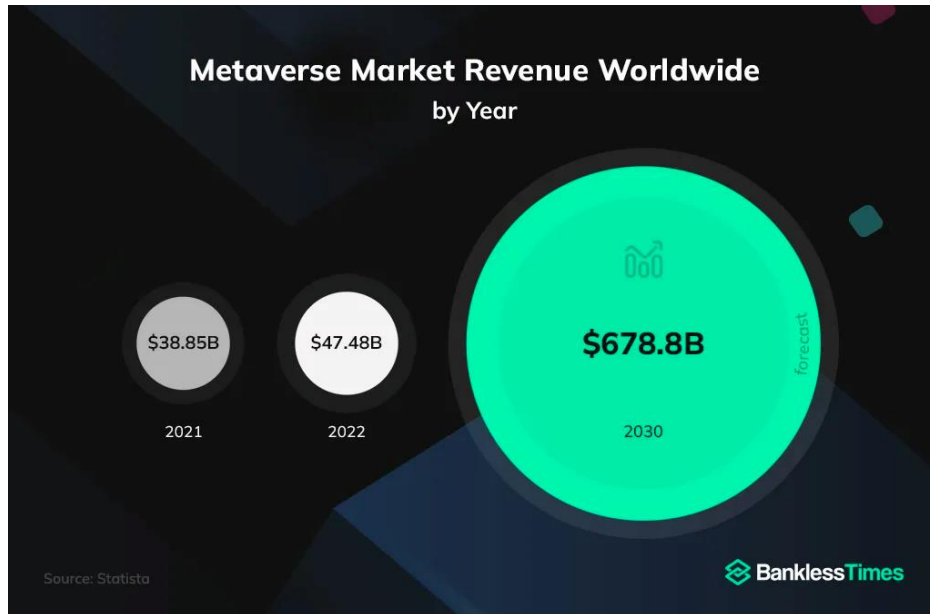


Figure 8-9 Metaverse Global Market Size and Forecast, 2022

Source: BanklessTimes

Metaverse is a new type of internet application and social existence combining many innovative technologies that integrates the real world and the virtual world to a whole. Metaverse is powered by virtual reality technology that provides an immersive experience based and projects as a mirror image of the real world based on digital twin technology; an internal economy is operated based on blockchain technology, enriching the virtual world with inputs from the real world, such as economics, social system, and identity system, enabling productive content generation activities to be done by users. On the industrial level, the underlying technologies of Metaverse involve a series of cutting-edge technologies, including but limited to 5G, cloud computing, expanded display, robotics, neural interfaces, artificial intelligence and blockchain.

As for national interest, many governments have already dabbled to joint venture with enterprises in commercial development and institutional design of various versions of Metaverse, striving to be the rule maker, for example:

China: In January this year, officials of Ministry of Industry and Information Technology of China made an announcement at a press release of the development of small-medium-sized enterprises (SMEs) that the government strongly encourages and aims to nurture a number of innovative SMEs to enter into avant-garde technology markets such as Metaverse, blockchain, and artificial intelligence. In addition to the



voice at the national level, more than 20 provinces, cities and regions have issued relevant supporting documents to provide soil for related industries to land and prosper.

United States: In March 2022, President Biden signed the Executive Order on Ensuring Responsible Development of Digital Assets, which urges all agencies to conduct research on technological innovations and regulatory policies for cryptocurrencies, digital assets, and other technologies, emphasizing the cementation of the U.S. leadership in the global financial system as well as digital assets [4]. Big social companies represented by Meta are also actively talking with policy makers and industrial experts to provide reference suggestions from a practitioner perspective in order to coordinate with various stakeholders in Metaverse and enforce a code of conduct for the virtual world.

EU: On September 20, 2022, the President of European Commission Ursula von der Leyen claimed the adoption of the Work Programme for 2023. As part of the agenda, the letter of intent proposes an initiative that “continue looking at new digital opportunities and trends, such as the metaverse.” The European Commission desires to ensure safety and equivalent opportunity in Metaverse, and plans to set out a series of specific legislations in 2023.

South Korea: On July 2, 2022, the South Korean government announced that direct investment will be made in Metaverse project from the government. According to a statement by the Minister of MSIT Lim Hyesook, more than \$177 million will be invested to state-owned enterprises in this field. South Korea is one of the first countries in the world that makes direct investments. This batch of investment is part of South Korea's intentions to incorporate latest technology focus into its new ruling regarding digital governance. It is also considered the guidelines the government is following to set industry standards and drive the transition of the society to a fully digital one.

In the blockchain field, Metaverse can be segmented to several specific areas, including: GameFi, NFT, Platform, Web3, Social, and Virtual World.



Project name	Category	Description
Sandbox	Virtual land, game	Blockchain game
Decentraland	Virtual land, game	Virtual social and real estate
Gala	Platform, game	Steam for blockchain games
Axie infinity	game	A game famous for its economics and wealth generation
Enjin	platform	Gaming community platform
Flow	NFT, L1 chain	Supporting game applications and digital ecosystem
My neighbor Alice	Virtual world, game	Farming game with collaboration
Chromia	Platform	Blockchain platform
Yield Guild Games	DAO, game	Invest within the virtual world and NFT for blockchain games
Adventure Gold	NFT	Popular loot in social media, NFT as on-chain text
Define	Platform, NFT	A social platform that supports free communications and community building for users and content creators

Table 8-1: Hottest concepts and segments in Metaverse

Source: Huobi Research

So far, although an initial sketch of the industry has been shaped, some remain in the phase of concepts merely existing in the hype of capitalists; it takes time for the concepts to materialize. Stories are easier to be told in the context of Metaverse, it is not just more convincing for average investors but also the capitalists; that is how bubbles are generated by storytelling. During last year's bull market, a large number of projects sprung everywhere, but hardly any of them is active now; it is a perfect example elaborating significance in long-term R&D and input. Nonetheless, we should still be optimistic about the market of Metaverse, for even with the market downturn, the scale of Metaverse still exceeded that of last year, which further depicts the potential of the industry.

In the market of Metaverse, finally blockchain and traditional businesses found something in common, giving birth to countless opportunities. It is evident that traditional technology companies, game companies, internet companies, and others are starting to explicitly step into this field, and this topic has always been the center of the conversation in the primary and secondary markets of traditional financial market. In the future, we believe that Metaverse will be one of the bridges connecting the inside and outside of the blockchain world, becoming an epoch-making existence.



9. Mining: threats and opportunities of POW and POS

POW mining has seen the vicissitude in 2022 influenced by the bear market and the merge of Ethereum. In the bear market, mining costs are rising, and many miners are not able to sustain; Bitcoin are sold at low prices to pay off the debts that less Bitcoin are seen in holdings of crypto mining firms. Meanwhile, the coming merge of Ethereum has shut the door to some POW miners; they instead turn to other POW mining. After the merge of Ethereum, liquidity staking has become prevalent and vital in Ethereum on validations of nodes.

9.1 Status quo and changes in POW mining

POW mining is highly controversial because of the consumption of electricity as the government are concerned on both the environmental effect and regulation. The largest project representing POW consensus is Bitcoin. The changes in the Bitcoin mining this year can be elaborated in terms of (1) the advantageous/disadvantageous policies of various governments, (2) the restructuring of power grid in various countries, and (3) changes in the crypto market. The two cycles must be taken into consideration: the macroeconomic cycle and the halving cycle for block rewards.

In terms of policies, the largest influential event on Bitcoin mining in 2021 must be the expel orders in China: many Bitcoin mining activities are transferred to other nations, with the U.S. becoming the country with the largest share of Bitcoin hashpower; some states in the US enacted specific policies as support to mining firms. For example, Bitcoin mining activities could be conducted with renewable energy in Texas, such as powers from wind turbines, and Oklahoma offers tax incentives for Bitcoin mining firms.

According to HashRate Index, hashpower of Bitcoin mining is dominated by the four major mining pools: Foundry USA, AntPool, F2Pool and Binance Pool, occupying more than 70% of the hashpower. In terms of the market, the efficiency of Bitcoin mining depends on three major factors: hashpower, level of difficulty, and Bitcoin price. In 2022, the accumulated hashpower for Bitcoin network is around 200 EH/s, with mining difficulty has escalated. Moreover, upgrades of mining methods and hardware even accelerated the increase in hashpower as well as the cost of mining, miners are



making less profits. Many mining companies faced financial distress this year. Since mid-June, price of Bitcoin has fallen below \$25,000, close to the shutdown price for most miners. The "difficulty/price" curve unravels that profit margins are much lower in 2022 as the overall "difficulty/price" curve is higher in 2022 compared to 2021. The difficulty level is growing much faster than the price of Bitcoin, more miners were escaping as revenues for miners hit all-time low for the entire third quarter despite the difficulty/price ratio had a slight decline in August.



Figure 9-1: Comparison of Bitcoin price and difficulty level
Source: CryptoQuant, Huobi Research

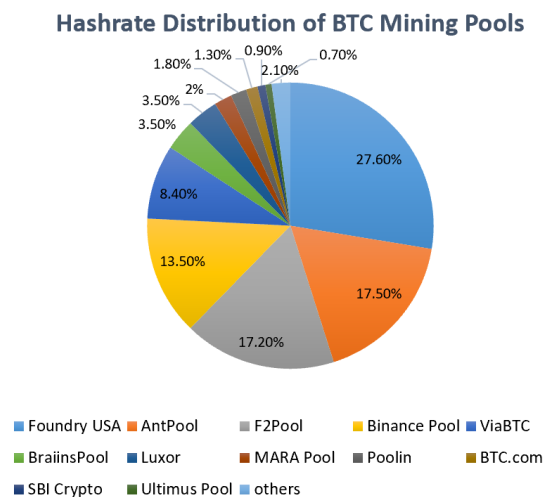


Figure 9-2: Distribution of Bitcoin mining hashpower
Source: CryptoQuant, Huobi Research

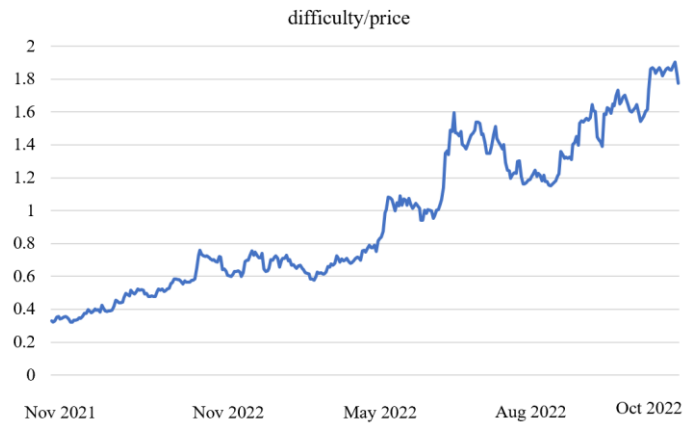


Figure 9-3: Bitcoin "difficulty/price" curve (2021.10.27-2022.10.27)
Source: Huobi Research

According to CryptoQuant, there were numerous dumping activities of Bitcoins by miners in April, June and September; Bitcoin holdings by miners decreased to 1.91 million, a nearly 12-year low. Core Science (CORZ), the world's largest Bitcoin mining company, sold 7,202 bitcoins in June, and only 24 Bitcoins are in the wallet; a bankruptcy and liquidation are on the way. Other POW networks are also facing decline in hashpower and token price, specifically, Monero. With the continuity of bear market and global recession, bitcoin prices could fall below the bottom line for mining entities, and with soaring energy costs, more mining firms will face bankruptcy.

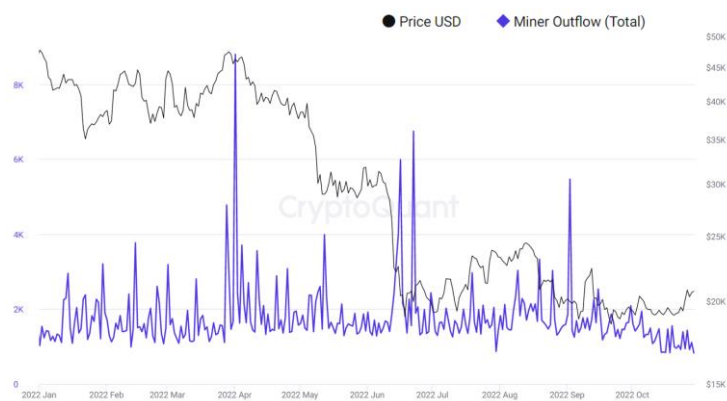


Figure 9-4: Bitcoin outflow from mining parties
Source: CyptoQuant, Huobi Research

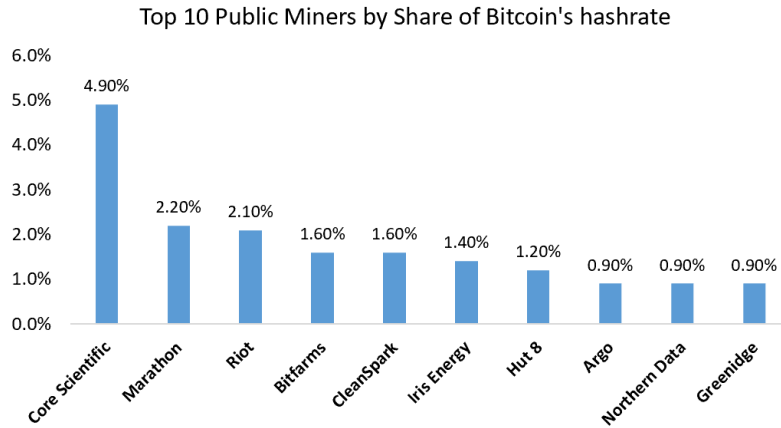


Figure 9-5: Top 10 Bitcoin mining companies
Source: HashRate Index, Huobi Research

9.2 The merge of Ethereum: a different mining landscape

On September 15, 2022, Ethereum completed the merge, stepping into a brand-new era: the consensus mechanism was converted from POW consensus to POS; under POS, block generation will not depend on computing power any more, and the miners will not work under the new scheme, and outdated. In May 2022, the hashrate of the Ethereum network reached an all-time high. Not long after, expectations on the merge started to influence miners that almost all miners started to exit, and the hashrate dropped.



Figure 9-6: ETH price and hashrate of Ethereum
Source: CryptoQuant



There are two types of Ethereum miners: ASIC miner and GPU miner. An ASIC miner has absolute advantage on performance as it specifically uses ASIC chips as core computing parts for algorithms, whereas a GPU miner is also known as graphics card miner. ASIC could mine Bitcoin, ETH, Ether Classic (ETC), but the ASIC miner for Ethereum can only be functional in ETH and ETC mining; as it cannot be converted to other algorithms, it barely could be sold. L1 chains that support GPU miners are Ethereum, Litecoin (LTC), Ether Classic (ETC), Dash, Zcash. Besides mining, GPU miners can also provide computing power in Web3 applications, or be deployed in Web2 data centers for hyper computation.

Upon merge, miners had three exits: (1) sell GPU miners; (2) switch to miners on other L1 chains; and (3) adhere to hardfork. As it is not economically feasible to switch to other networks since the risk in a bear market cannot be estimated and the overall return is minimal, most miners chose to sell their GPU miners, resulting in a decline of over 50% in graphics card price since December 2021. The remaining small percentage of miners went to ETC, and the ETC price had a significant increase in July, but the income from ETC mining is still trivial compared to Ethereum; the price increase of ETC was mainly caused by speculative activities. After the smooth merge of Ethereum, ETC's hashpower increased by 5 times and now maintained at 141.4571 TH/S, while DASH had some increase of hashpower for rather short time in September.



Figure 9-7: Change of hashrate in ETC network before and after the merge of Ethereum
Source: minerstat

The third option for miners has sparked a huge controversy in the industry. So far, it seems that hard-forked project from Ethereum, ETHW, is indeed successful. Early supporters are some miners, users and exchanges. The main ETHW mining pools are 2Miners, F2Pool, Nanopool, HeroMiners and Poolin; the whole network has a total of 209 mining entities and the network hash rate is currently 35.11 TH/s. ETH holders also



received candies from the hardfork, and the circulating supply of ETHW is 106 million with the price of \$7, ranked 63 in terms of market cap. Early ecosystem is established by developers with a sum of 52 projects, including 3 cross-chain bridge projects, 7 wallet projects, 10 DEX projects, and 5 NFT trading markets, etc. Whether ETHW could become a competitive L1 chain in the future depends on future movements of performance improvement and the number of featured projects.

9.3 POS as a service: grand opening of a new era

The merge of Ethereum disbanded POW mining by GPU to an end, but also embarked a new opportunity of POS. At least 32 ETH must be in staking to run a validating node as a validator. As of October 2022, about 15 million ETH have been in staking in the network since the launch of staking as a service a year ago, accounting for 12.56% of the total ETH supply; total validators reached 455,066. Validators must stay online or the ETH in staking will be forfeited. Based on current state of the network, the APR for validators is around 4%.

There are 3 ways to participate in network validation and functional nodes even if the criterion of 32 ETH in staking or conditions on hardware is not met: (1) through a node operator, known as an ETH 2.0 staking service provider; (2) a custodian; and (3) liquidity staking. Even with staking service from a node operator, 32 ETH must also be deposited while hardware is not mandated. The operator can act on behalf of validators, for which a service fee is applied. Some CEXs and wallets offer staking services for smaller amount (less than 32 ETH), which users with less than 32 ETH could participate in staking jointly. The first two methods are similar to escrow services, and the credibility of service providers must be verified before action.

The ETH and proceeds from staking will not be available for withdrawal until the next network upgrade, and liquidity staking was born in response to the long period of staking, which is, in fact, a waste of resources for investors. A liquidity staking protocol is a smart contract that creates a staking pool on Ethereum. The protocol supports staking less than 32 ETH; by minting exact same number of dummy tokens as credentials for the actual ones in staking, users are able to interact in other protocols by



holding the dummy tokens with the same functionality, resolving the liquidity dilemma for staking.

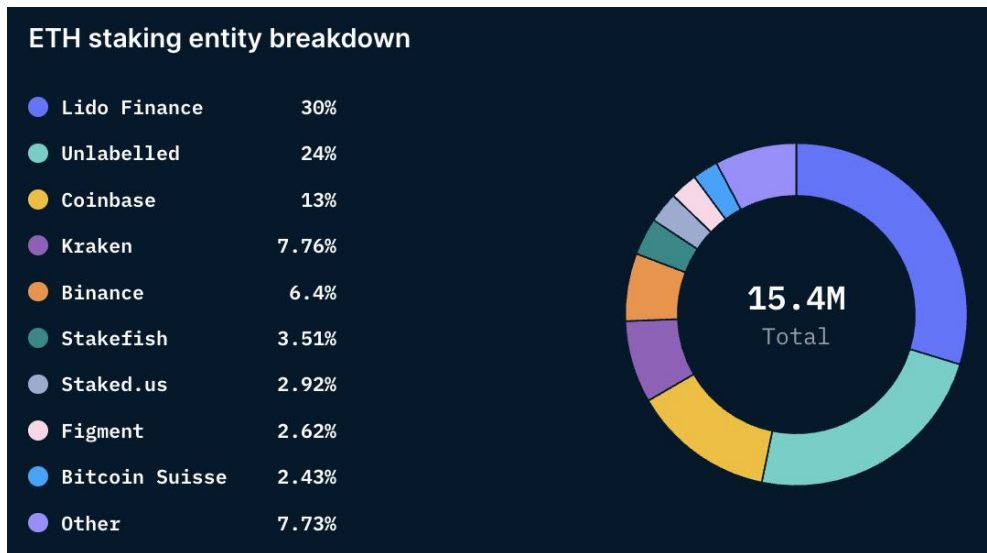


Figure 9-8: TOP 10 ETH 2.0 depositor identified entities (Dec.2, 2022)

Source: nansen

9.3.1 Analysis of liquidity staking segment

Liquidity staking is worthy of attention: (1) The competition in staking is intense. Except for staking of ETH 2.0, most POS chains provide staking services; besides, more than 40,000 service providers of staking are plotted on each chain. (2) ETH staking has great potential. Compared with the staking rate other POS networks, such as Cosmos, the staking rate of ETH has larger room for growth. Moreover, for the security concerns, official team will invest in bringing more participants into staking. (3) Liquidity staking has demonstrated advantages. Liquidity staking is a derivative entirely from ETH 2.0 and also diffused on other POS networks based on specific scenarios. In terms of staking market share for ETH 2.0, liquidity staking protocols have taken up a significant proportion, with Lido ranked first and other protocols thriving, such as Rocket Pool and Stkr (Ankr).

Network	Staking Ratio	Staking Yield
Cosmos	64.0%	19.91%
Polkadot	55.2%	7.60%
Solana	76.8%	7.04%



Avalanche	65.6%	8.35%
Cardano	71.52%	3.57%

Table 9-1: Staking in major L1 chains of POS (Oct. 30, 2022)

Source: Stakingrewards.com

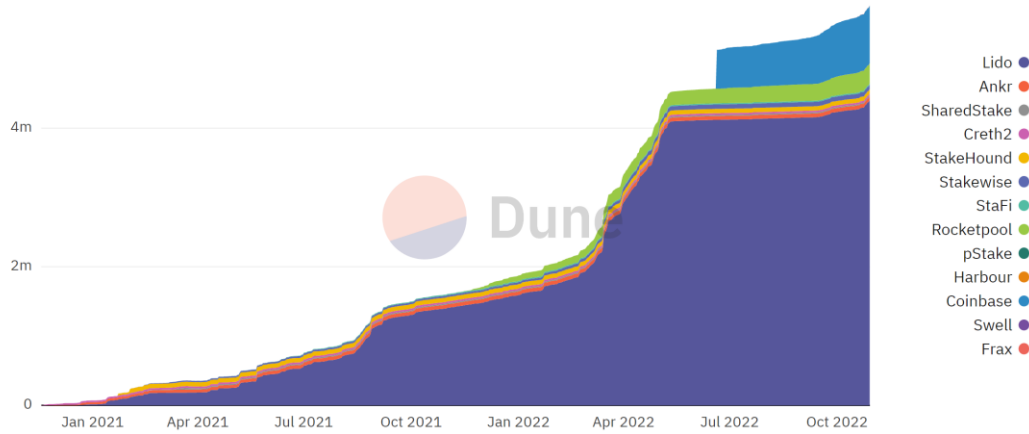


Figure 9-9: Change in staking of major liquidity staking protocols

Source: Dune, @LidoAnalytical

For users, liquidity staking protocols are appealing in 3 ways: (1) as user-friendly it is, not all 32 ETH must be on hand to participate in network validation and benefit from the profits; it could be deemed as a relatively stable and safe fixed-income type of product; (2) tokens in staking can be withdrawn at any time, and no threshold; (3) the dummy tokens could liberate the liquidity in staking and release it elsewhere in ecological applications, such as DeFi; the capital efficiency is vastly improved; (4) not only earnings from validation can be received, but earnings from governance also become feasible.

Each staking pool differs from each other:

- Lido

The relative replicate of staking on Ethereum is stETH, capable of receiving rewards for staking and transaction fees in ERC-20 tokens. The whitelist of validators is selected by the Lido DAO via governance. Holders of \$LDO are endorsed with rights in governance.

- Rocket Pool



The relative proof of staking on Ethereum is rETH, which differs from Lido in that the Rocket Pool does not leave the decision of validator assignment to token holders. Anyone could become a node operator in the network by creating a "minipool", subject to certain conditions in staking as security measures.

- SSV

SSV is the most anticipated project of liquidity staking. The most notable feature is the complete decentralization of the protocol, which is known as the king of anti-censorship. Security of asset is ensured the adoption of Distributed Validator Technology (DVT) technology.

The risks of liquidity staking protocols have become never more prominent in current bear market:

(1) Certificates from liquidity staking, which are similar to futures, representing the principal and right of collecting return from participation in staking; the price is decided by supply and demand. In the bear market this year, especially when there is a lack of confidence in the merge of Ethereum, de-peg of the price of stETH appeared;

(2) All DeFi protocols are subject to attacks on smart contracts. Although liquidity staking protocols are all secured by multi-signature technology, they are essentially custodial services, which the risk for being the target of attack applies.

(3) Even though each liquidity staking protocol works differently, the tokens in staking would ultimately circulate through validating nodes. That being said, misconducts from nodes may still be an issue regardless of which nodes are on the whitelist of Lido.

(4) Certificates from liquidity staking are flowing everywhere in the DeFi world, but origin of liquidity might drain;

(5) Liquidity staking protocols dominate the validation network of Ethereum, imposing a threat on the level of decentralization to the network; governance tokens may also have influence to the ecosystem somewhat.



Figure 9-10: stETH/WETH price curve

Source: TradingView

Liquidity staking protocols face intense competition from each other, comparative advantages could be found in two ways: (1) cooperating with other Dapps and providing more application scenarios for minted certificates, especially on revenue-bearing products; (2) deploying on more L1 chains; and (3) improving the security level of the protocol, for example, on verifiers. The future of liquidity staking protocol depends on the overall development of the main chain in the long term, incident like the crash of LUNA means doomsday to such protocols. Besides, the capability in the capture of value, construction of the on-chain DeFi ecosystem, and many other factors all have an impact on the protocol. The expectations on deflation of Ethereum and the increase on returns from staking have brought opportunities on liquidity staking protocols in the bear market.



10. Global crypto regulatory environment

The year of 2022 is a milestone for crypto in terms of regulations.

In August, Tornado Cash was sanctioned by the U.S. Treasury Department, and the launch of regulations on on-chain activities triggered profound discussions in the industry. After the FTX incident in November, the regulation of centralized institutions such as CEX will become stricter; self-discipline of exchanges and transparency on reserve of funds may become the standard.

The mainstream countries that support cryptocurrency, represented by the U.S. and Europe, have set the basket of regulations on cryptocurrencies on the agenda from upper-level framework this year. In March, President Biden of the US signed the Executive Order on Ensuring Responsible Development of Digital Assets, which urges all agencies to conduct research on technological innovations and regulatory policies for cryptocurrencies, digital assets, and other technologies, which is the first time the U.S. government enacted full-scale measures to regulate the crypto market. In October, the EU passed MiCA and TFR at large, and a unified crypto regulatory framework will be established internally. Compared to 2021, the number of favorable regulatory policies gradually increased and the number of negative ones were less heard in 2022, and the policies introduced were mostly on cryptocurrency trading and stablecoins.

Thorough analysis on policies of various countries worldwide towards cryptocurrency will be given in this chapter to interpret status quo and trends of global crypto regulation in depth.

10.1 The global crypto regulatory landscape in general

According to statistics on global regulations by Huobi Research, over 42 sovereign countries and regions around the world, excluding mainland China, have issued 105 regulatory measures and guidance for the crypto industry since 2022.

From a regional perspective, the crypto regulatory measures adopted by the US, EU and South Korea are more concentrated and intensive. The US has been the center of attentions from others, with a sum of 22 federal and state regulatory statues, aiming at



crypto transactions, crypto regulatory guidance, judicial decisions, stablecoins, etc.; 9 regulatory policies were published by the EU, mainly in crypto regulatory guidance, stable coins, anti-money laundering and other concerns mentioned in MiCA and TFR; South Korea passed 8 related regulations, mostly in judicial decisions, stablecoins, crypto regulatory guidance, crypto transactions, etc.

Cryptocurrency Regulatory Policies in Various Countries Around the World in 2022 (Except Mainland China)

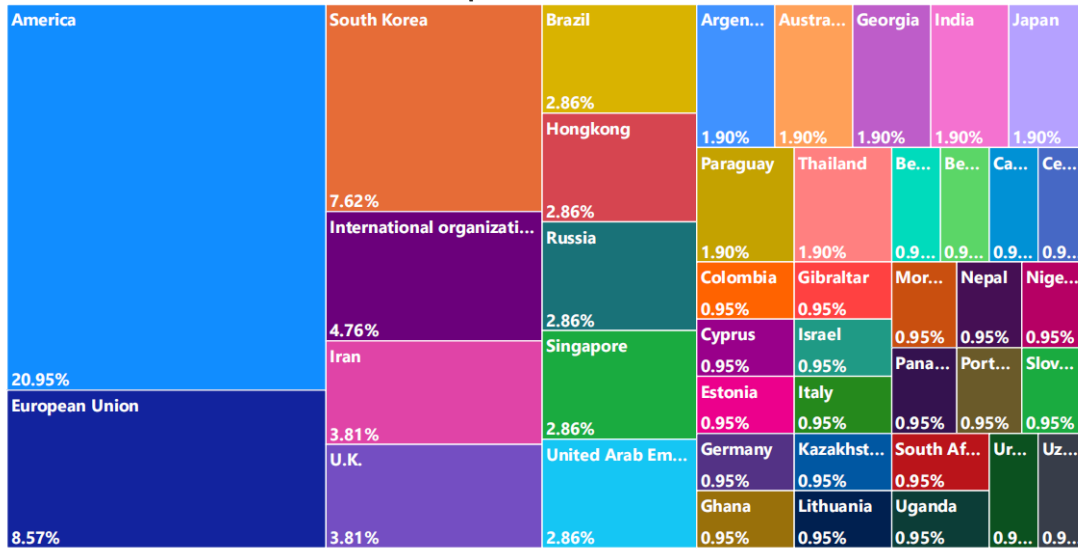


Figure 10-1: Heat map of regulations on crypto worldwide

Source: Huobi Research

For further analysis and interpretation on the attitudes from various sovereign countries on crypto, existing policies are categorized as positive, neutral and negative based on the type of policies, where positive policies are those with a positive effect promoting the crypto industry, neutral policies are those standard measures that will not impose either a positive or negative effect on the crypto industry, and negative policies refer to those bans or administrative penalties, etc.

By classification, the percentage of positive, neutral, and negative policies are 36%, 57%, and 7%, respectively, in 2022 compared to 23%, 59%, and 18% in 2021; there were more positive ones and less negative ones in 2022, a symbol indicating a favorable attitude of the overall regulatory environment. In addition, most countries are still inclined to regulate and guide the crypto industry on the basis of modest regulation.

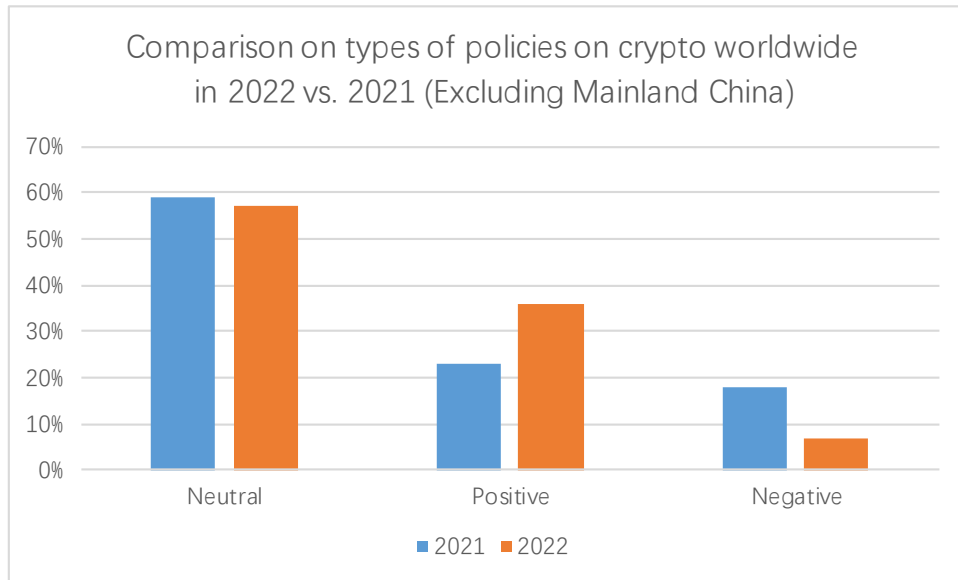


Figure 10-2: Comparison on types of policies on crypto worldwide in 2022 vs. 2021 (Excluding Mainland China)

Source: Huobi Research

The policies can further be divided to the following categories by segments in crypto: crypto regulatory guidance, crypto trading, stablecoin, DAO, NFT and other 12 categories, among which crypto regulatory guidance, crypto trading and stablecoin are the top three areas of all policies, accounting for about 62% of the total. The number reveals that most countries or regions are actively promoting regulatory frameworks and regulatory guidance for corresponding businesses of crypto in 2022 in order to be competent with the rapid growth of the crypto industry, as well as supplementing gaps in current regulations on crypto trading. In addition, affected by the Terra crash, almost all governments are highly cautious on the regulation of stablecoins.



Statistics of fields involved in global cryptocurrency regulation in 2022 (excluding mainland China)

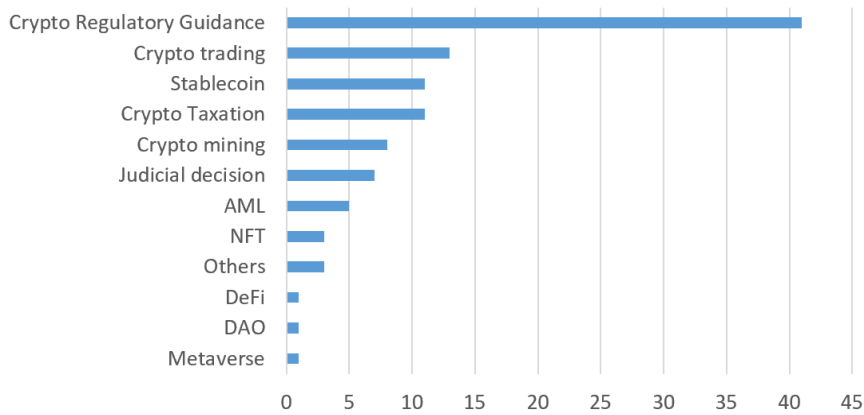


Figure 10-3: Segments of which the global regulations are on
Source: Huobi Research

10.2 Changes in global regulatory environment

The year of 2022 has special meaning to the crypto industry from the perspective of regulations that regulatory frameworks are continuously being developed by various countries, represented by the US and EU; with effectuation of such regulatory policies in the future, the crypto industry will complete the transition from the unregulated wild zone to a civilized legal ear with definitive regulations. The frameworks adopted by the US and EU and iconic cases of regulations will be dissected in this chapter.

10.2.1 The US and EU: upper-level regulatory framework is on schedule

MiCA and TFR were initially passed by the European Parliament on October 10, 2022, and both bills are expected to enter into effect in 2024.

No definitive regulation framework applied in the EU except for the unified AML that the internal of EU is somewhat fragmented as each member enacted regulations to meet their own domestic need. As a result, the overall regulation environment for the EU is relatively conservative and behind. MiCA, once adopted and implemented, will be applied throughout the EU and superior to laws of individual member states, granting additional power of enforcement to various national authorities.



MiCA primarily establishes a regulatory framework for crypto assets that are beyond existing financial laws of the EU, such as security tokens and central bank digital currencies (CBDC). MiCA classifies crypto assets into electronic money tokens (e-money tokens or EMT), asset referenced tokens (ART), and asset reference tokens ('asset tokens'), depending on whether the value of the token is pegged to other underlying assets.

- EMT is an electronic alternative to coins or banknotes, whose value is pegged to fiat currency. In other words, it is actual money but in digital form, commonly seen in payment processing applications, such as Alipay, WeChat Pay, etc.
- ART is designed to anchor its value by reference to any other things of value or right, or combination of both, including one or more official fiat currencies. ART covers all other crypto assets backed by underlying assets other than EMT. For example, USDT and USDC, stablecoins backed by U.S. dollars, treasury bonds, and Pax Gold backed by physical gold, etc.
- Other Crypto Assets are all other crypto assets that are not ART or EMT. Compared to regulations on ART and EMT, regulations on Other Crypto Assets are relatively flexible that they are deemed as in compliance of the regulations as long as a whitepaper is submitted and approved, and standard rules are met in marketing, organizational code of conduct, and technologies.

MiCA's limitations on non-euro stablecoins are 1 million in the number of daily transactions and 200 million euros in daily trading volume. USDT, USDC and BUSD have accounted for more than 75% of total trading volume in EU, far more than the limited number of daily transactions and daily trading volume. If regulatory policies regarding non-euro stablecoins were continued to be pursued by the EU in the future, it may harm the competitiveness and hinder the innovative potential of the EU in the crypto market.

DeFi and NFT were not included in MiCA. The European Commission is piloting a trial of "embedded regulation" mechanism for DeFi, and NFT could be subject to the same regulatory scrutiny as cryptocurrencies by rumors prior to the official



announcement of MiCA. May be concerned by the possibility of ruining the innovations of NFT, MiCA does not appoint NFT inside.

The voice appeared two-sided from general public in EU regarding TFR (The Transfer of Funds Regulation): supporters argue that it is helpful in clarifying regulatory boundaries and speeding up the regulation of crypto assets, while opponents claim that it violates the right on privacy in Charter of Fundamental Rights of the European Union, and the collection of personal data is not necessarily helpful in eliminating money laundering activities.

The U.S. regulatory framework came out later than that in the EU, consistent with the Executive Order on Ensuring Responsible Development of Digital Assets issued by President Biden, the first draft of regulation framework on crypto was released on September 16 2022, aiming at adopting consumer protections, maintaining financial stability, fighting the illegal use of cryptocurrencies, cementing leadership of the US in global finance, and technical innovations with responsibilities.

10.2.2 Regulations on CEX are tightening, on-chain activities are now regulated

As the crypto market becomes more influential, regulatory frameworks on crypto assets are being constantly developed by various sovereign countries and regions, but there are many influential regulatory events in 2022 during the transition of the old regime to new: one being the collapse of centralized entities, such as FTX and 3AC, reflecting the missing of appropriate regulations to some extent; and the other being the judicial judgements on Tornado Cash, signifying the beginning of regulations on on-chain activities.

The FTX bankruptcy is the third most influential incidents in 2022 after the collapses of Terra and 3AC. The main issues of the FTX case are the misappropriation of funds, affiliate transactions with Alameda Research, etc. At the time, some U.S. regulators expressed that they were investigating or had already started investigating the issues a few months ago. However, the FTX incident will not happen if regulations of crypto assets in various countries are appropriately in place. Traditional financial markets have a clear regulatory system for assets in reserve and clear requirements for affiliate transactions and companies like Alameda Research; most countries currently have



either a lack of clarity or a gap in the regulation of crypto markets, For example, The CFTC has jurisdiction over crypto derivatives and crypto assets that qualify as securities under certain rules are subject to approval of the SEC. These two are also responsible overseeing investment companies, but FTX and Alameda Research are apparently not properly regulated. Many in the US have appealed to intensify regulations on crypto assets after the FTX incident.

On-chain activities are also frequently discussed in the industry and among regulatory parties, including: the sanction of Tornado Cash by the U.S. Treasury, the filing of a lawsuit against Ooki DAO members by CFTC, the prosecution of SEC towards Ripple Labs, and whether ETH should be considered as security.

From regulatory motives. Tornado Cash was sanctioned because it helped illegal organizations or individuals, such as the North Korean hacker group, to launder large amounts of money by mix of coins, which could potential undermine national security, financial stability and cyber security, and no countries would tolerate such activities for long. The CFTC's prosecution of Ooki DAO members, the SEC's prosecution of Ripple Labs and whether ETH is a security, etc. are nothing more than the discussion on whether crypto assets should be included in the existing regulatory system of securities. Regulators, such as the SEC and CFTC, expressed interest on including more crypto assets into the range of current regulations, while some parties in the crypto world are reluctant to such activities, even searching and exploiting legal loopholes for temporary shelters.

From the approach of regulations, for atypical issues as Tornado Cash, U.S. regulators directly act directly with iron fists: arresting developers, banning U.S. users from accessing Tornado Cash's official website and restricting third-party cooperations. For the prosecution of Ooki DAO members, economical penalties, namely fines, are applied in this case, The litigation of Ripple Labs by SEC began in December 2020 and prolonged to this year. The merge of Ethereum has completed for some time, SEC and other regulatory agencies have not yet taken any actions so far. Although regulators, such as the SEC and CFTC, have the power to regulate securities, and sometimes even have more power interpreting the securities laws, regulators are currently exercising the power cautiously and restrainedly, and prosecutions can sometimes be dismissed by courts at all levels.



From the consequences and degree of impact by the incident, although sanctions of the US Treasury did tremendously cut the number of users of Tornado Cash, Tornado Cash is still operating as it is a decentralized application deployed on Ethereum, but some DeFi protocols and developers began to worry about their own security and position of compliance. Members from Ooki DAO were fined \$250,000, setting a reference for regulators on DAOs: if a DAO commits something that the responsibilities are traced back to itself, then all members are subject to be held accountable; to be more specific, for the multi-signature process, the signers will likely be held accountable, and the proposers and voters for on-chain governance. In SEC's lawsuit against Ripple late September, the U.S. District Court rejected a motion to withhold documents from former senior officer Bill Hinman's 2018 speech on cryptocurrency-related presentations; Ripple won the lawsuit from the perspective of litigation.

In the future, there will be more and more regulations on on-chain protocols, and regulators will likely continue to take strong measures, such as sanctions and arrests, for illegal acts that jeopardize national security, financial stability and cyber security. For cases of determining crypto assets are securities, on the one hand, with the introduction of new regulatory policies and more references, the boundaries of regulations will become more accurate that on-chain protocols could come up with preliminary solutions to respond. On the other hand, if prosecutions were charged regarding security, litigations and arguing within the frame current security laws can be adopted as strong responses.

10.3 Trends and characteristics of regulations worldwide

New trends and characteristics of global regulations can be found by sorting out all regulations worldwide in 2022:

- Regulations of on-chain protocols may become regular

As the crypto market continues to expand, on-chain protocols are becoming increasingly influential. Many on-chain protocols and assets are currently outside existing regulatory frames in various countries, and some even have a tendency to challenge existing regimes. Tornado Cash being sanctioned by the US Treasury, Ooki DAO members sued by the CFTC, and discussions on whether ETH is a security are



just some examples implying the beginning of on-chain regulations, and more regulatory actions will be seen in the future. While the motto of "Code is law," is firmly believed by the crypto community, governments will not tolerate anyone or any actions that attempt to bypass the enforcement of laws. Accordingly, demand for compliance is inclined to soar for on-chain protocols.

- Tightened regulations on CEX and other centralized institutions

MiCA and TFR will be effective in the coming years, the US crypto regulatory framework will be perfected and integrated to existing law frame, and more regulatory policies will be landed in more countries. Till then, a clear and unified crypto regulatory system will be formed within each country, and international regulatory cooperation will be strengthened as a grid, which will serve as the fundamental rules for regulations and enforcements on crypto assets.

The exposure of under-regulated and the huge consequences after the FTX incident will prompt various national regulators to lay eyes on the risks of CEX and other centralized institutions: they will be under the same regulations in the short term, but more thorough and detailed regulations will apply along with the development of new regulatory framework in the long term. For example: most CEXs were under-regulated prior to the FTX incident, but Binance, Huobi, Gate.io, KuCoin, Poloniex and OKX announced the release of the Merkle Tree as proof of reserve right after the incident; the CEXs have, to some extent, consented to higher industrial code of conducts for self-discipline. Taking the advantage of actions by CEXs, regulators may mandate CEXs to publicize proof of sufficient funds periodically, or set strict requirement on the amount of funds in reserve; in all, regulations on CEXs are becoming more specific in details.

- More intense competition of countries on crypto

-Singapore is becoming the hub for crypto assets.

-In mid-October, Hong Kong's Financial Secretary Paul Chan published an article entitled "Hong Kong's Innovation and Development", which mentioned "promoting Hong Kong as an international hub for virtual assets", and in late October, Hong Kong published a virtual asset policy manifesto.



-The newly appointed British Prime Minister Rishi Sunak is a crypto asset enthusiast, and he has tweeted in the past that he will work on making the UK the center of crypto assets.

-By statistics, Middle East and North Africa have the fastest pace of growth in cryptocurrency market in 2022. The UAE continues to adopt rather crypto-friendly regulations that more crypto companies have headquartered in UAE so that the crypto market in the UAE is 10 times larger.

At the very moment that the global economy is in depression, laying hands on crypto and striving to become the center for crypto assets are already on the to-do list of some countries and regions. The competition on crypto assets will produce more crypto-friendly regulations, facilitating the overall development of the crypto industry and more innovations to come out.

To sum up, by reading all regulations on crypto from all over the world, it is undeniable that almost all governments are actively establishing and improving regulatory framework and policies for crypto assets, and striving to keep pace with the development of the crypto industry, which lays foundation for a boom entering the next phase of crypto by clarifying the routes for future developments.



11. Survival guide for bear market

11.1 Parameters indicating the bottom of a bear market

The crypto industry was repeatedly devastated in 2022, and the interest rate hikes made it even worse. But, for greater opportunities always appear in desperate situations, a bear market is full of treasures. Warren Buffett has once said, "We embrace market downturns because it allows us to pick up more stocks at new and astonishing cheap prices." The same holds true in the crypto industry: since bear market hides opportunities for investors, the question comes down to "how to define cheap (undervalued)".

Parameters that indicating the bottom can be considered in determining "cheap price"; the capability capturing the signs of market touching the bottom ensures best optimal time for buying underestimated targets.

Here are a few indicators that are informative for determining the bottom.

(1) The Fed's overnight reverse repo as a basic condition to effectively determine whether funds will flow into the cryptocurrency market

Overnight Reverse Repurchase Agreement (ON RRP) of the Federal Reserve is a tool to absorb excess market liquidity. An increase in ON RPP means the Fed is absorbing more money, and vice versa. When determining the bottom of the market, we would like to see a continued reduction in the number of ON RPP, as it implies market liquidity is being released, equivalent to quantitative easing. Because it takes some time for money to flow, ON RPP is a leading indicator of market liquidity for one to two weeks ahead. (Weekly industry report of Huobi Research contains this indicator, which is valuable for determining the flow of funds and the movement of Bitcoin price. For more information, please refer to this in-depth research report: [Reverse Repurchase Agreements as an Indicator for BTC](https://research.huobi.com/#/ArticleDetails?id=304) (https://research.huobi.com/#/ArticleDetails?id=304).

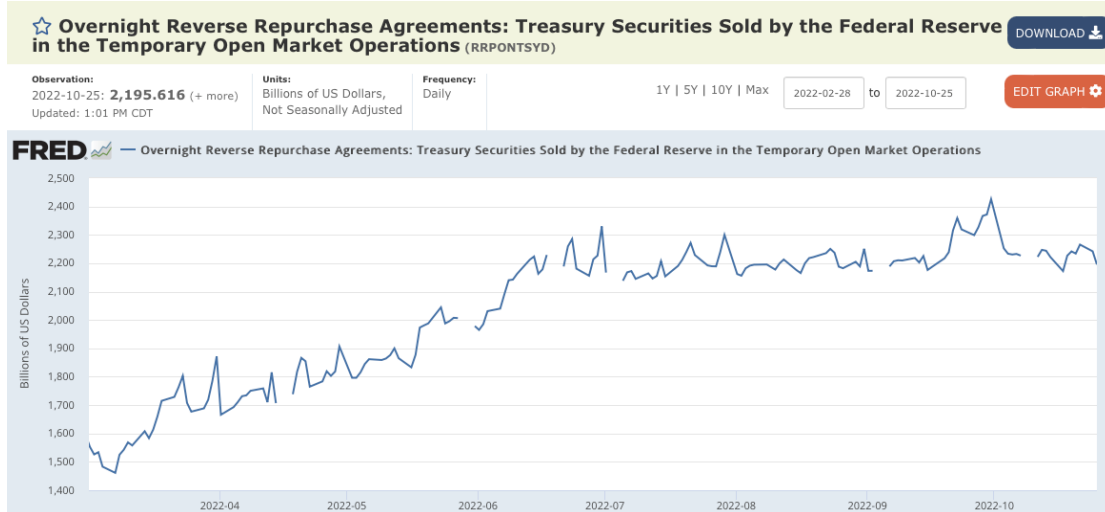


Figure 11-1: Overnight Reverse Repurchase Agreements (Oct. 27, 2022)

Source: <https://fred.stlouisfed.org/series/RRPONTSYD>

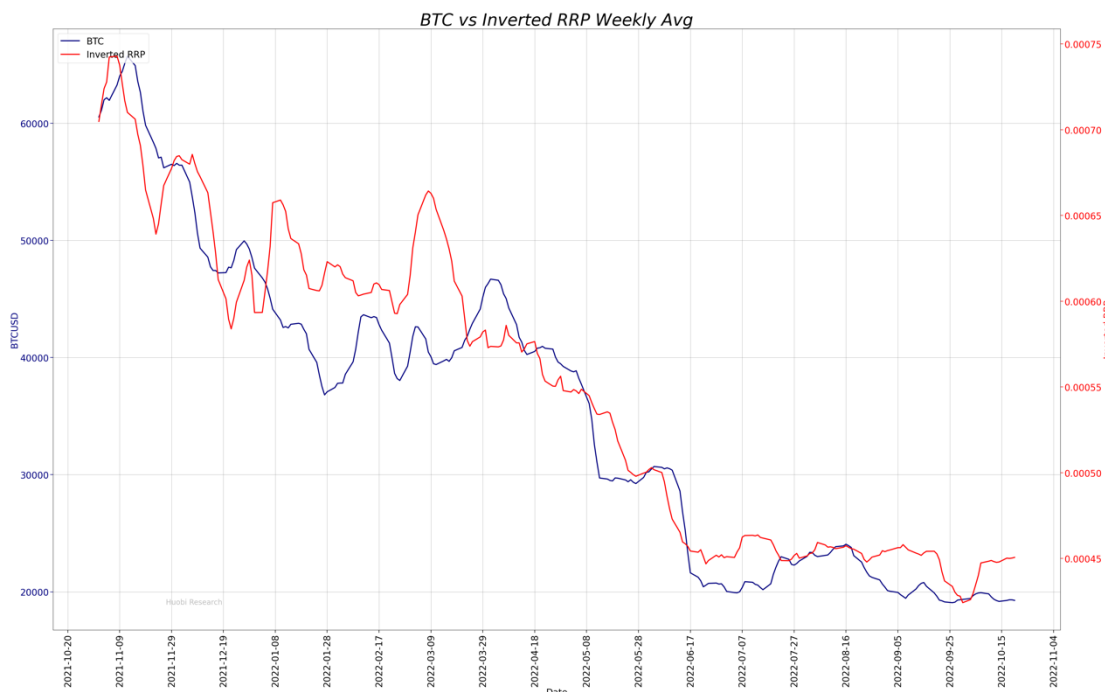


Figure 11-2: Overnight Reverse Repurchase Agreements vs BTC (Oct. 27, 2022)

Source: Huobi Research Institute

(2) M2 of major central banks

The price of Bitcoin and the total market capitalization of cryptocurrencies are proportional to M2. There is a limited supply of Bitcoin; as major central banks issue more bills, more liquidity is released in the market, resulting in a consequent devaluation of currencies. Raoul Pal, CEO of Globalmacroinvestor.com, believes this is the most important driver of the rise and fall of the cryptocurrency market, not the



supply: "In the market price of all commodities, I have always believed that demand is more important than supply. It is the ebb in demand that has led to the outflow of capital and the denominator of *BTC/USD*."

The following chart reflects the relationship between cryptocurrencies and M2, which explains the inundation of funds into the cryptocurrency market.

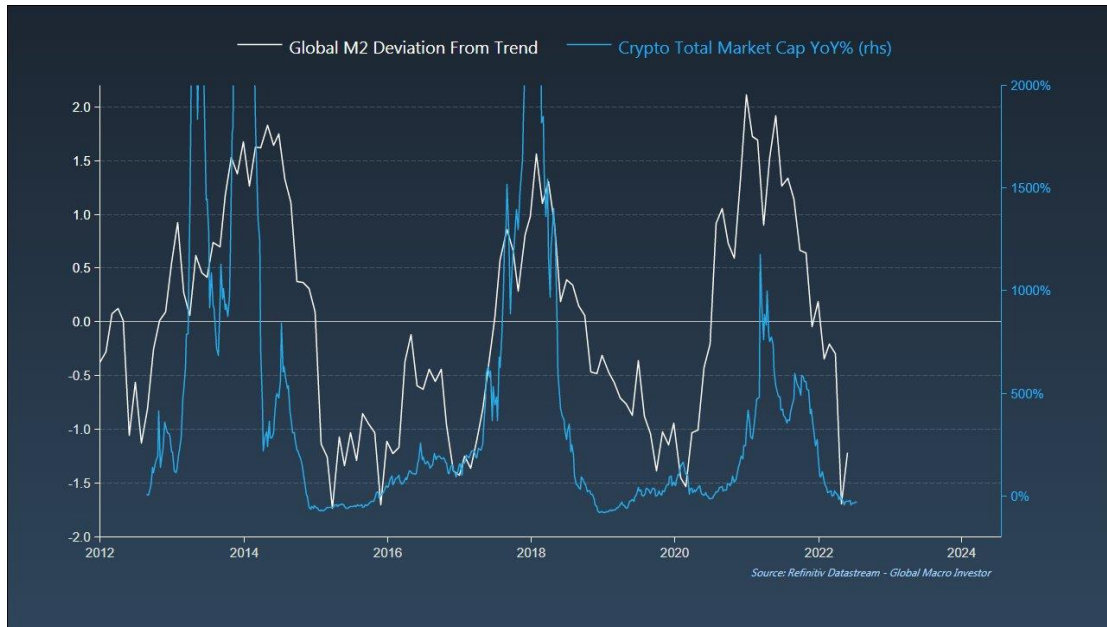


Figure 11-3: Global M2 deviation from trend vs totalmarket cap of crypto YoY%

Source: Refinitiv Datastream - Global Macro Investor

When the Federal Reserve and major central banks proclaim that tightened monetary policy will be postponed and QE is on the way, M2 will rise in response, signaling the end of a bear market. By buying underestimated targets at relatively cheap price during this period, it is more promising in terms of rate of return over risk.

(3) MVRV Ratio



Figure 11-4: MVRV ratio
Source: cryptoquant.com

The MVRV ratio is defined as market value over realized value. By comparing the two valuations, it reveals the difference between market value and realized value, therefore, reflecting if it is cheap to buy an asset, which is an ideal tool indicating the climax or bottom of a market. MVRV takes both realized value and market value into account, and the numbers are critical when making investment decisions. If the value is above 3.7, it may be at the ceiling that the decision may be shorting. If the value is below 1, it may be a market bottom, and it is reasonable to be incrementally longing.

(4) Cumulative value and days destroyed (CVDD)

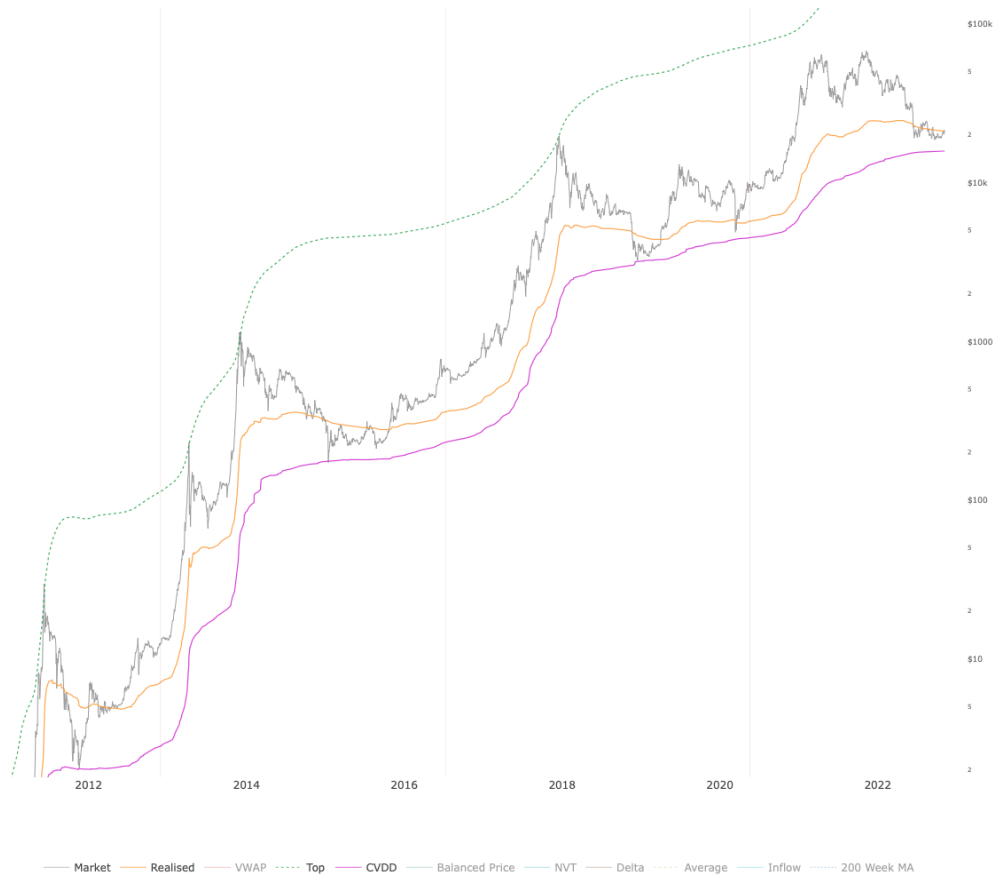


Figure 11-5: Global M2 deviation from trend vs total market cap of crypto YoY%

Source: charts.woobull.com

Cumulative value, provided by Coinmetrics, is an approximation of what the entire market is paying for Bitcoins. In this chart, the price cap is calculated by dividing by the total Bitcoin supply. CVDD (Cumulative Value Days Destroyed), developed by Willy Woo, historically indicated the bottom of the market. When Bitcoin changes hands, the transaction carries dollar value but destroyed holding period of previous holder. CVDD is the ratio of the cumulative sum of such value in days destroyed to the age of the market, calibrated by dividing by 6 million. This model accurately captured the bottom of the market in 2012, 2015, and 2019.

11.2 How to avoid traps in bear market

In both bull and bear markets, it is absolutely essential for investors to critically assess the sustainability of projects. During a bear market, quality projects will continue to



develop and upgrade, while inferior projects are valueless and useless in practical scenarios, and usually die out in a short period of time. In addition, users are inactive in a bear market, in other words, the capacity of the market is rather limited that hypes will become more intense. Users must be wary of scams coated with high returns, possible hacking and asset security risks.

(1) Be wary of fraudulent money markets with high rate of returns

During a bear market, high-yield projects will be most sought-after by users, which are less expensive to increase awareness. High-yield projects are inherently highly-risky, and project teams can push the button to end the game anytime as long as expectations are low on future market; the possibility cannot be ruled out that some teams may still be working on future developments. As a user, the best way is to invest after thorough research with due diligence. Here is an overview of some characteristics of fraudulent money markets that have existed during a bear market for reference.

- The project is an autarky

Most fraudulent money markets promise high returns, but where the high returns come from is a critical question to consider. The mechanism of a typical fraudulent money market is constant, characterized by: (1) a ticket must be bought upfront to participate, and this amount of money usually goes to early participants; (2) returns are distributed in short cycle, possibly weekly or even daily, stimulating users to recommend and market the project to others (3) tokens lack of application scenarios, for which there will be the phenomenon of nesting within the project, such as nesting between multiple tokens and multiple NFT; (4) new features are launched in a rather short period, which are mostly fake without actual on-chain interactions. For example, the minting of various NFTs and token offerings are completed within a month.

- No reputable institutional investors are involved

During the screening of an institutional investor, a potential target would be vigorously scrutinized in terms of team composition, project quality, and performance on market. A direct launch on chain of a project without any participation of institutional investor is more likely to be deemed as poor quality or inability for long term operation so that the team is desperate to retrieve some money and cover costs for initial development.



- Monotonous atmosphere in community

You may want to enter the community on Discord and feel the atmosphere before investing in a project. FOMO is a common in the crypto industry, but a community that only talks about profits without rationally discussing the future development is more inclined to be a fraudulent money market.

(2) Risk of theft

In Web3, hacking is much harder to track and regulate. According to the statistics, 273 hacking incidents were spotted with a total loss of over \$3 billion as of October. For average users, smart contracts are nothing but codes, and the risk of being hacked cannot be eliminated, but at least projects that are audited by credible organizations like Certik could be more secure. The biggest threat must be phishing: hackers use emails, SMS, forged apps to send phishing links, any unconscious clicks on the links may divulge wallet information or even accidentally sign some authorizations. Therefore, the source of links, the address and the contents must be censored thoroughly before clicking on any links or signing any transactions.

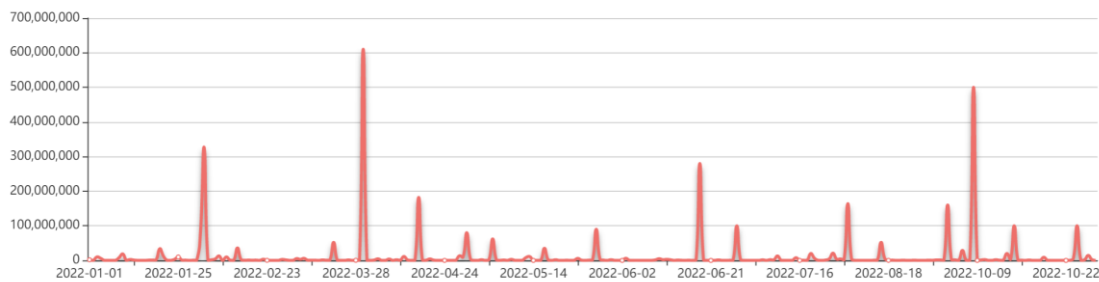


Figure 11-6: Statistics of damages in hacking incidents in blockchain, 2022

Source: Slowmist

(3) Liquidity risk of CEX after deleveraging

The crypto industry is severely harmed by institutional incidents, especially by FTX. Even well-known institutions could become the next for bankruptcy. For users, the threats of these centralized institutions reside in: (1) bankruptcy of the custodian; and (2) bankruptcy of the centralized exchange.

Ordinary users do not have direct access to the custodian, but the assets being used in various scenarios, such as the cross-chain asset WBTC, stablecoins, are actually backed by the custodian behind the scene; these assets will be worthless once they went broke.



Runaways are also common on centralized exchanges, which are also technically custodians. The tokens deposited into the exchanges are not really controllable by users. Due to the lack of regulation, even exchanges could flee, and it is difficult to press charges on current law frame. To avoid such risk, users could deposit funds on chain or choose large credible exchanges like Huobi, which regularly publish proof of sufficient funds to users and prevent any appropriation of funds. In addition, outflow of funds must be monitored for CEXs, especially on those large ones. A credible CEX with proved history of operations, good reputation and high transparency would ideal to avoid the forementioned risks.



12. Future forecasts for the encryption industry

12.1 The bottom has appeared, the bear market continues

As far as the market looks, it is already at the cyclical bottom of crypto: leverage on the centralized institutions and on-chain DeFi protocols has faded, and mostly being a game between existing users that is trivially affected by macroeconomic; unless more severe systemic risk is exposed, such as the fluctuations answering to prompt regulations, otherwise the room for decrease is little. Mainstream crypto assets, such as BTC and ETH, have become major asset class in long-term investment portfolio. The price of BTC may reach the bottom at \$15000 and \$1000 for ETH in this round of bear market, and it may consolidate to 1 quarter of 2023, after which there will be a decent rebound. The reasons are:

On macro, after four consecutive interest rate hikes of 75bp, the U.S. CPI has been alleviated significantly, and voices on stalling the rate hikes are heard from several officials from the Federal Reserve; it is expected that the rate hikes will be lower starting in December, and the raising will cease around March 2023. In other words, the pace of hikes is slowing, the toughest part in this cycle has passed, and the bottom of monetary policy has nearly been shaped.

From the perspective of the crypto market, although the FTX incident in November broke the price of \$18000 for BTC, which withstood for over 5 months, to once lower than to once \$15500, we believe the opportunistic and blind optimistic emotions in the market have been swiped out by the magnitude and duration of the market downturn; the FTX incident may be the last bullet that problematic institutions and projects will be swept out of the scene. Consequences have been seen on the market, the effects will gradually be digested by the market and a bottom will be formed during the fluctuations, which is expected to last until the first quarter of 2023, and the subsequent remedial self-discipline actions and strengthened regulations will facilitate shaping the bottom of current bear market.



12.2 Social tycoons in Web2 are flocking to SocialFi

On October 28, 2022, Elon Musk, CEO of Tesla, closed a \$44 billion deal to buy Twitter. Musk is closely involved in the crypto industry: for example, Tesla currently holds \$218 million worth of digital assets. In addition, Musk has been publicly supporting Dogecoin and attempting to expand the payment scenarios. Some crypto-friendly features also appeared on Twitter prior to the acquisition, such as the tip feature launched in May 2021 to support Bitcoin as payments and NFT is compatible to be used as personal avatar. If Twitter were to enter the crypto industry, it would become undoubtedly the unicorn in SocialFi that fixes the stereotyping in SocialFi with poor user experience and lack of data. Furthermore, Twitter will not serve just as a social platform but a crypto application, allowing more users to walk into the crypto industry and producing new traffic to Web3.

In addition to Twitter, Reddit and Instagram have also entered the Web3 industry as the social segment in Web2 is already crowded that the competition is too intense to attract any new traffic; whereas the Web3 industry is a newly emerged market, and in order to establish comparative advantage by entering early, these top platforms need to build their own moat, or even create their own metaverse as soon as possible to increase the barriers of entry. More innovative actions may be seen next year in the thriving SocialFi and NFT segments.

12.3 Rollup is steps away from prosperity: more technical breakthroughs and lower costs

Rollup is the bona fide solution for scaling of Ethereum and the merge is trivial in terms of performance; the upgrade of Rollup is to improve performance and compatibility while reducing cost.

ZK Rollup has been praised by the community for a long time, but never a mass adoption was seen because of the difficulty on EVM compatibility. By optimistic estimate, zkEVM will achieve a greater degree of progress in 2023. The fastest progress at the moment is achieved by zkSync 2.0, which, if developed well, will make zkEVM available for developers to deploy applications and users for unlimited interactions between Q4 2022 and 2023. Polygon zkEVM will also launch on the mainnet in early



2023 and strive to be EVM-equivalent (the ability to directly code with Ethereum smart contract without any changes).

Furthermore, ZK Rollup has greater ambition than both zkSync 2.0 and StarkNet have plans fully exploiting ZK Rollup to improve performance and reduce costs rather than “it works”; the bold move will likely be completed between the second half of next year to 2024, when Bitcoin halves and possibly lights the market again. Besides, Optimism's BedRock is likely to be completed next year, and OP Rollup will also continue to progress.

In addition, the introduction of EIP-4844 will greatly reduce Rollup's gas fees: it is mostly constituted by the cost of calldata, and reducing data availability costs is a key move for Rollup to further reduce costs.

Proto-danksharding (EIP-4844) proposes to introduce a new transaction format as “blob-carrying transactions”, where Rollup's raw transaction data will be stored in a blob at a much lower cost than calldata. EVM does not have to access this data, instead, it only needs to validate the availability, i.e., accessing the KZG polynomial commitment of the data.

EIP-4844 will allow Rollup to massively upscale with less effort, and at the same time, transaction costs can be significantly reduced, Rollup can be as cheap as other L1 chains in terms of fees, illuminating the whole ecosystem upon then. However, the workload is huge that it cannot be done in days: if everything is ideally functioning, it may be deployed in the Shanghai upgrade along with the withdrawal function, which is still an optimistic estimate; if the workload turns out to be too stressful, it may be postponed as late as the second half of next year, even in 2024.

12.4 Accelerated ZK network: the foundation for mass adoption of ZK

Among Rollups, ZK Rollup has more long-term advantages because of the smaller amount of data that needs to be uploaded to the chain and the absence of a 7-day challenge period. With the development of zkEVM, the biggest problem that originally troubled ZK Rollup is about to be overcome. After being able to be compatible with



more types of operations, the main paradox in the development of ZK Rollup leaves the slow and costly generation of ZKP.

The process of constructing a zero-knowledge proof is complex: it requires transforming the program logic into a mathematical circuit, which includes not only arithmetic operations, but also logical operations such as "with", "or", "not", bit operations, hash operations, and operations on smart contracts. However, a mathematical circuit only has simple calculations as addition and multiplication, and it is almost a mission impossible to simulate complex programs with such simple tools. Ethereum was not originally designed to be compatible with zero-knowledge proofs so that the opcode is not friendly to zero-knowledge proofs; even for simple transactions like transferring, the TPS only reaches 1 transaction per second at best. With zkEVM, the complexity of the syntax for ZKP will be significantly increased, resulting in slower proof generation and only with special hardware can a proof be generated in a timely manner.

Customized high-performance ZK accelerator chip is the only antidote currently for accelerating the process of ZKP generation. It is also a good idea to introduce an incentive mechanism to motivate the validator in competing for the incentive but on one condition: it must be more decentralized in operations; at least multiple teams must be present during the validation phase even if the sorting or executing phase is centralized. In this case, an accelerated ZK mining industry will be formed similar to Bitcoin mining, and ZK Rollup will step into a more developed phase. When faster generation of ZKP and lower cost are achieved, ZK will receive more adoption other than Rollup; hardware for ZK acceleration is also likely to follow a "GPU-FPGA-ASIC" development path. Since ASIC is obviously not yet feasible, the winner remains within the first two, and it is yet to be unraveled.

It needs nothing but time for accelerated ZK network, and by optimistic expectation, it is likely to see projects that could satisfy basic demand, but never a mass adoption can be achieved in a year or so,



12.5 Multi-chain network facilitates the boom of Dapp chain

The concept of application chain was not born yesterday, Cosmos envisioned from its inception that to create an ecosystem of universal connectivity. Application chains are independent blockchains for specific applications, which could be built with the same development tools of the primary chain and share cross-chain and security features within the ecosystem of the primary chain. It is not a technical difficulty for a Dapp to build a proprietary chain, and most L1 chains could provide the soil, such as Cosmos, Octopus Network, Polygon, Avalanche, BNB Chain, etc. However, a Dapp chain is constrained by other conditions: (1) greater cost to maintain its own network security; (2) the degree of matching between mother chain and Dapp chain in features, such as performance, user habits, EVM compatibility, etc.

Currently, Dapps that have successfully transitioned from on-chain eco-applications to proprietary blockchains include DeFi Kingdoms, dydx, and Axie Infinity; the latter two are on Layer2. Moreover, about 46% of the ApeCoin community supports building ApeChain; it is becoming more commonly seen and trending, especially for projects in GameFi and Metaverse.

Among the applications mentioned above, certain revenue level and user volume are already achieved before building independent chain; they do not live off the primary ecosystem so that the fate is in their own hands, becoming a Dapp chain does nothing harmful but to improve performance, user experience, and valuation of the project. In addition, Dapp will be more competent in value discovery, such as participating in staking, running its own sequencer or verifier to capture MEV, thus reducing transaction fees, etc. Dapp chain brings vitality to the competitive landscape of multi-chain network, and for more Dapp chain to be built, more supports must be provided by various chains in terms of cross-chain capability, security and ecological fundings.

12.6 Expansion and upgrades: the storage segment is waiting to launch

Continued progress is made regardless of the fact that the storage segment is not quite the focus as more authentic demand has appeared or on the way for the storage segment with more channels and more developed features, which promotes the storage segment to become one of the most important infrastructures in Web3.



First, more real data are stored in various storage protocols. Filecoin released the Filecoin Plus (FIL+) program late last year and real data storage continues to increase accordingly. As of Q3 this year, 138 customers are using large datasets (100TiB). Among them are Web3 platforms and blockchain projects like OpenSea, Rarible, MakersPlace, MagicEden, Project Galaxy, etc., but also a large number of more traditional customers like UC Berkeley, USC Shoah Foundation, Starling Labs, etc. Arweave has entered into a partnership with Meta, which will store the digital collections from Instagram creators on Arweave. More authentic demand is received by storage protocols, which is more stable and expected to pile up rather than the volatility of the crypto market, providing a viable ground for storage protocols.

Second, more channels are connected. Arweave completed its integration with Avalanche and zkSync: users are now able to access the Web3 data stored on Arweave by paying with AVAX, ETH or tokens to upload data to the Arweave network via Bundlr Network. Imitations may be seen by other storage protocols: storage protocols may be extended with more channels and penetrate to every corner of the Web3 world, cementing the fundamental feature as storage.

Third, more features will become available. The most exciting upgrade to storage is the overlay of computing layer, which will enable more functionality beyond as a hard drive. Currently, FVM is not competent to realize any desired logic by users, while Ceramic is still slow to access, and the developer kit is incomplete. Optimistically, the second phase of FVM may be completed between next year and 2024. After FVM is in place, some unique features for storing and indexing may become available in specialized segment for better management on data and higher security to apply. Ceramic still needs efforts in improving its infrastructure, whereas Stratos is pushing forward with the launch of mainnet. Different technical solutions will appear from various projects, and they sure could teach lessons and inspire each other. It is reasonable to expect new applications and features to stem from this computing layer based on massive data storage; it is only a matter of time, and next year may still be the necessary input for further improvement.



12.7 Embedded regulations: stricter regulations for on-chain activities

Some on-chain activities have already been regulated, such as Tornado cash was sanctioned by the US Treasury, Ooki DAO members sued by the CFTC, and ETH is in the discussion of being treated as a security.

Regulation of on-chain protocols is inherently tricky that it cannot proceed without considerations on cost and feasibility. Some cases this year are regulated or prosecuted within the existing law frame, such as the U.S. Securities Laws, the Bank Secrecy Act, etc. The costs of regulation, prosecution and enforcement are relatively high, and high costs impede mass adoption, which leaves the room applicable just for minority cases.

In the next year or two, with the maturing national regulatory frameworks for crypto assets, on the one hand, legislation specifically for on-chain protocols may be introduced, such as the DeFi "embedded regulation" program being tested in the EU; on the other hand, on-chain protocols may be required to be compliant with KYC and AML. When the associated costs are effectively reduced, the regulation of on-chain protocols will be strengthened.

The on-chain protocols that are most likely to be interested by regulators may share the following characteristics in common: first, the projects that may threaten national security or economic security, such as Tornado Cash that helped the North Korean hacker group, Lazarus Group, launder over \$455 million; second, the projects that the founders/developers are in possession or control of most assets, and the corresponding party has been identified, such as XRP to be prosecuted and accused as a security, etc. Regulatory parties may adopt a precaution approach by requiring all on-chain protocols to comply with KYC and AML so that whenever an illegal incident happens, identities can be confirmed at the very beginning before anything is worsened. Furthermore, if an on-chain protocol is to be judicially sanctioned, the founders/developers/community voting users, etc. could be held responsible, and restrictive orders can be issued on users, assets and partners involved.



12.8 More developing countries are adopting cryptocurrencies as payment or fiat

El Salvador has been in trouble since BTC was endorsed by official government as fiat currency in September 2021. Even though, some countries followed the step, such as the Central African Republic. It is expected that in 2023, there will be more countries legalizing BTC as fiat currency or payment method: on the one hand, hyperinflation could be alleviated, and economic growth is desirable as new industry can be introduced, on the other hand. However, since the bear market is discouraging and the incidents were daunting, the countries would appear more meticulous when taking actual actions.

Except for developed regions, such as California in the United States that the adoption of cryptocurrency as payment method is nothing more than an experiment on new technologies, most of the other countries adopting crypto as payment method are relatively far less developed countries like El Salvador and the Central African Republic; their currency systems are dominated by other mainstream currencies, i.e., US dollars, and their own currencies are fragile somewhere on the edge of collapse; whenever there are economical adjustments from the issuing country of the currency, their domestic economies would be severely devastated, just as it was during the recent rounds of interest rate hikes. Therefore, cryptocurrencies that are less affected by economical adjustments yet transparent in issuance inevitably become favored by such countries. Moreover, the economic landscape around the globe is fragmented by the Russia-Ukraine War. As Russia is under multiple sanctions from the western countries, crypto transactions, such as BTC, have seen tremendous growth inside Russia: many are willing to set off the devaluation of assets from the sanctions by holding cryptocurrencies. As a result, more countries may adopt cryptocurrency to hedge the risk from wars or sanction, and because of this, we believe more countries will support cryptocurrency as fiat or payment method next year.



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