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From Walled Garden to Civic Square
An Overview of the Decentralized Social Protocols

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"During 1992 the operating system graduated from being mostly a game to something that had become integral to people's lives, their livelihoods, commerce."

—— Just for Fun: The Story of an Accidental Revolutionary by Linus Torvalds, 2001

Executive Summary
Key takeaways from the survey of the social protocol

Social networking is one of the key themes in the next cycle, with the protocol and application layers being the two main focus areas
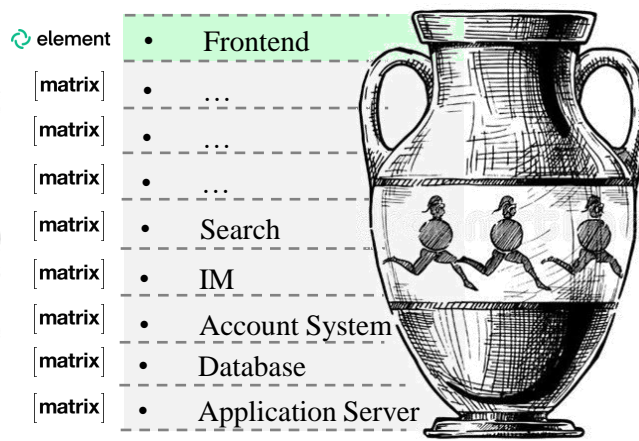
- Protocol layer: "personal identity (DID) → relationship (graph)" as the basic framework to expand various upstream and downstream protocols (e.g. storage, communication, content distribution, reputation/certification, etc.)

- Application layer: two sub-categories, native applications (various social products on the chain, such as IM/forum/Discord, etc.) and retrofit applications (Web2 social application plugins)

Blockchain-based social protocols and applications deconstruct the social applications of the past. The application clay pots used to contain user data in the past are broken into tiny modules, which are re-linked by a unified account system to become the new blockchain-based social ecosystem

Closed-source & centralized social platform

- Frontend
- Membership
- Search
- Feed
- IM
- Social Graph
- Account System
- Database
- Application Server
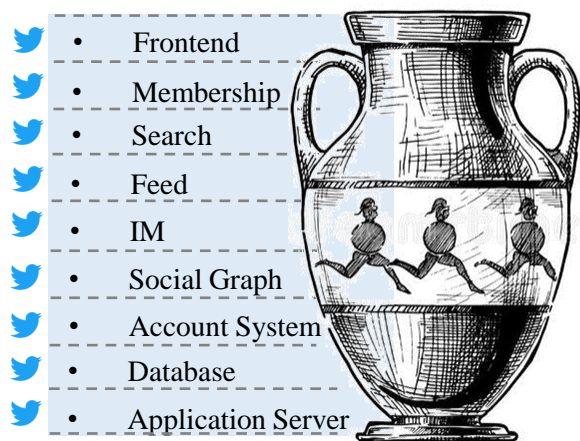
Open-source & decentralized social ecosystem without tokens

- Frontend
- …
- …
- …
- Search
- IM
- Account System
- Database
- Application Server

Open-source & decentralized social ecosystem with tokens

- Frontend
- Membership
- Search
- Feed
- IM
- Social Graph
- Account System
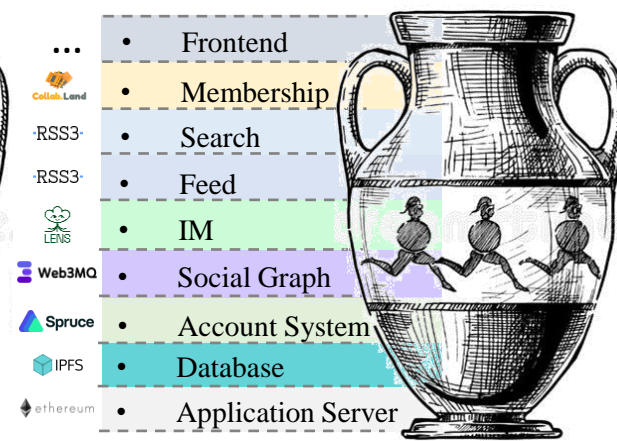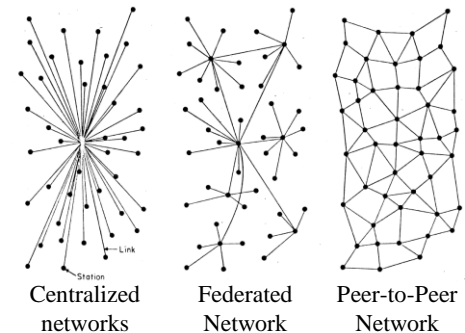- Database
- Application Server

Table of contents: an overview of the typical social protocols that have emerged throughout history, divided by the three network structures proposed in the early days of the ARPANET

Centralized networks   Federated Network   Peer-to-Peer Network

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Glossary

Concept	Explanation
Protocol	A set of rules and standards that enable computers to communicate with each other
Implementation	Any software that complies with protocol rules or standards
Server	A physical or virtual computer running software implementations
Client	Mobile, desktop or web applications that users can use to interact with the server
Three network architectures (centralized network/federated network/peer-to-peer network)	Paul Baran's 1962 paper "On Distributed Communications Networks" published by the RAND Corporation mentions three network architectures (Centralized Network, Decentralized Network, Distributed Network)
Centralized Network	The centralized network is built around a single centralized server or master node that handles all the primary data and stores data and user information accessed by other users. Instead of executing them directly, client nodes can connect to the master server and submit requests. The centralized network is fragile, and damage to the central node will affect the communication of the end nodes
Federated/Decentralized Network	A federated network is a compromise between a centralized network and a peer-to-peer network that distributes the information processing workload across multiple servers rather than relying on a single central server, a distributed network with multiple central nodes. In a federated network, users still interact with servers, but anyone can run a server that communicates with others in the network, thus providing users with more server providers
Peer-to-Peer/Distributed Network	Peer-to-peer networks consist of equal, interconnected nodes where data ownership and computing resources are shared equally throughout the network in the network
Decentralized Identifier, DID	An identifier that enables verifiable, decentralized digital identity
Social Graph	Diagram representing the social relationships between entities

The emergence of decentralized social networks is inevitable

1958-1990: pre-Internet era. The first generation of the Internet, ARPANET, was created in the context of the U.S.-Soviet Cold War, and a civilian version was launched in 1983

The number of hosts of the ARPANET from 1969 to 1990: The ARPANET was born in 1969, and in 1990 the project was closed and the network was handed over to the private sector

- *1958: ARPA was founded (the predecessor to DARPA)*
- *In the early 1960s, the U.S. Air Force and RAND Corporation discussed how to protect their communications systems in war. Paul Baran proposed replacing the centrally controlled network with a distributed network, and his proposal was supported by the military*
- *1968: DARPA launches a solicitation to build an Interface Signal Processor (IMP, the predecessor of today's routers) to create an IMP-based distributed network*

- *1977: DARPA specifies the standard for Email on the ARPANET (RFC733), providing users with an online post office*
- *1979: Usenet is born, providing users with an online chat room*

- *1986: NSF established the National Center for Supercomputer Applications (NCSA) at UIUC and other locations*

- *1985: The DNS emerges*

- *1972: Telnet appears (RFC318)*
- *1973: FTP protocol appears (RFC454), allowing users to send files online*
- *1974: DARPA signs research contracts with three research teams at the same time to study the TCP/IP protocol, with Vinton Cerf's team being the first to produce a well-defined TCP/IP draft*

- *1984: The Macintosh, the world's first mass-market personal computer with a graphical interface, is created*

- *1969: The first four nodes are born at SRI, UCLA, UCSB and UTAH*
- *1969: The first RFCs are created*
- *1970: First version of NCP protocol released for p2p communication between hosts*

- *1983: All ARPANET hosts communicate using the TCP/I P protocol*

313,000

159,000

56,000

25,000

5,000

1958	1969	1971	1972	1973	1974	1976	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
	4	13	23	35	49	63	213	235	562	1,024	1,961					
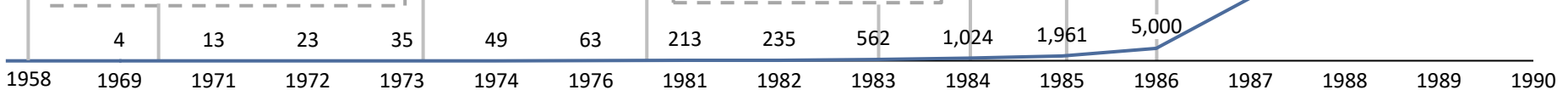
1989-1996: in the early days of military-to-civilian transformation, the Internet accelerated into thousands of households

Number of Internet hosts 1990-1996

Netscape

YAHOO!

12,881,000

- *In 1989, Tim Berners-Lee established in his paper URI, HTML, HTTP and other standards to enable users to access specified files by sending requests to the server with a browser, in order to enable internal staff at CERN to manage and retrieve internal files efficiently*

- *In 1991, Tim Berners-Lee put the WWW system he had written in-house at CERN on the Internet*

- *In 1992, Stanford built its first web server and released the Midas browser*
- *In 1992, Dr. Fu Ping of UIUC NCSA suggested that his undergraduate assistant Marc Andreessen write a Web browser, and Marc joined the WWW newsgroup on Usenet, discovered the Midas browser and suggested many improvements to it*

MOSAIC

- *In 1993, Marc and Eric Bina, a Unix expert at NCSA, wrote the browser Mosaic based on the Midas and CERN codebases and released it on Usenet's WWW newsgroup. Tim Berners-Lee's reaction was, "Brilliant!"*

- *In 1994, Marc Andreessen co-founded Netscape with Jim Clark, and the success of the browser caused the amount of information on the Internet to skyrocket, making it a needle in a haystack for users to find useful information and making information retrieval services a necessity.*

- *In 1995, Jerry Yang and David Filo founded Yahoo!*

Google!

- *In 1996, Larry Page and Sergey Brin wanted to improve the traditional search engine ranking method, and started to develop the PageRank engine, and in 1998, Google was launched.*

6,642,000

3,212,000

2,056,000

1,136,000

617,000

313,000

159,000

| 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 |

Source: w3.org/History/1989/proposal.html, 《网络创世纪——从阿帕网到互联网》

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Summary: web history review

The ARPANET period (1969-1990):
the birth of the Internet

Web1 (1990-2004): Open protocols and communities
Web2 (2004-2020): Data monopolies are growing up

Web3 (2020-): Blockchain-based open ecosystem

Fat Platforms / Applications

Thin Applications

NFT
GameFi
(2021)

(2007)
AWS S3

(2010)
MS Azure

Fat Protocols

Uniswap
(2020)

Mosaic
Netscape
ICQ
(1993-1996)

(2013)
Google Cloud

ERC721
(2018)

WWW

ERC20
(2017)

IRC
(1988)

(2000s-2010s)

Ethereum
(2015)

Usenet
(1979)

Thin Protocols

BitTorrent
(2001)

Bitcoin
(2009)

TCP/IP
(1974)

RFC733
Email
Standards
(1977)

HTTP
(1989)

RSS
(1999)

The definition of Web3 is a bit confusing, but it's good to know that Paul Graham had a similar reaction when he heard about Web2 around 2005
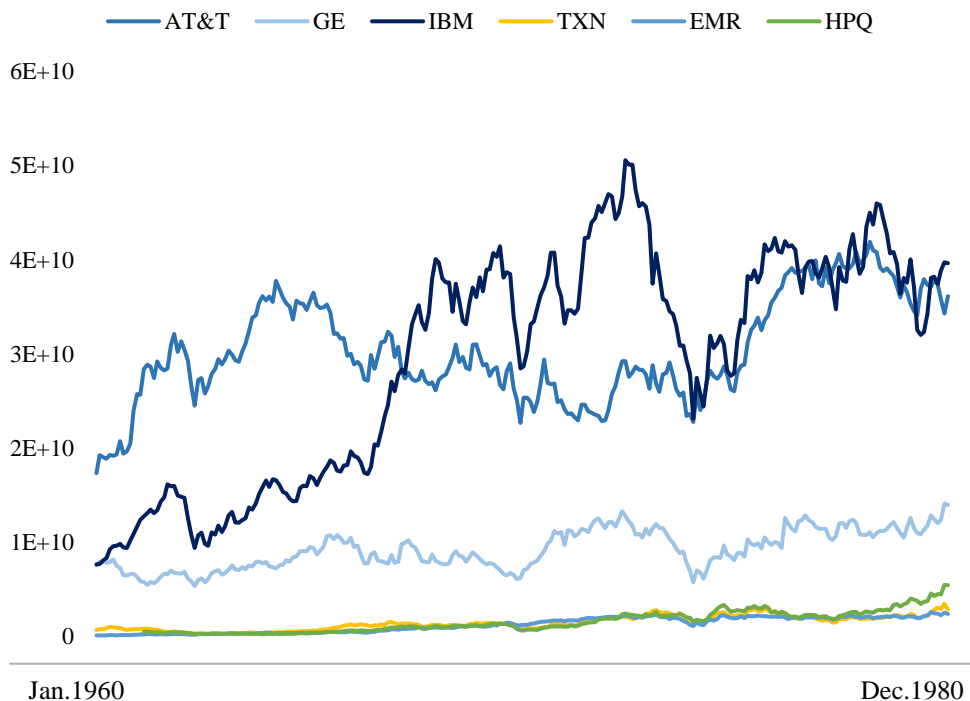
2005 | Paul Graham

Y Combinator

I first heard the phrase "Web 2.0" in the name of the Web 2.0 conference in 2004. At the time it was supposed to mean using "the web as a platform," which I took to refer to web-based applications.

So I was surprised at a conference this summer when Tim O'Reilly led a session intended to figure out a definition of "Web 2.0." Didn't it already mean using the web as a platform? And if it didn't already mean something, why did we need the phrase at all?

Non-consensus in the early days of Web1: IBM and AT&T also thought distributed networks were impractical

Chart: Changes in market capitalization of some leading U.S. electronics stocks between 1960 and 1980
USD, 1960.01-1980.12

1968 | IBM & AT&T

Legend: AT&T — GE — IBM — TXN — EMR — HPQ

Y-axis: 6E+10, 5E+10, 4E+10, 3E+10, 2E+10, 1E+10, 0
X-axis: Jan.1960 — Dec.1980

*In August 1968, ARPA releases a Request for Quotation (RFQ) looking for bids to construct a network of 4 IMPs, with possible growth to 19. Many large companies like AT&T and IBM do not submit bids, saying that such a network was **not possible**.*

In December 1968, a small consulting company called Bolt Beranek and Newman (BBN) located in Cambridge wins the ARPA IMP contract. The group, headed by Frank Heart, would have $1 million and less than a year to turn theory into a working system.

[Note 1] The eventual winner of the ARPANET project was BBN, which in 1968 had fewer than 20 employees and was mainly engaged in project consulting in the field of acoustics, while it beat out competitors such as IBM, which was unconcerned about distributed networks and had about 220,000 employees at this time and was one of the most important computer companies of the 1960s, and AT&T, which had had a monopoly on U.S. postwar telecommunications networks for more than 20 years and had one of the greatest laboratories of the 20th century, Bell Labs

[Note 2] IBM had almost the best computers at the time, but they were expensive and could only be used to build distributed nodes, which was a good idea but not realistic; and AT&T should have understood Packet Switching-based signaling better and could have even used it to better serve the largest U.S. telephone network they already had, but they didn't, and ended up missing the distributed network wave because they were already used to using Circuit Switching to transmit analog signals

Source: WRDS, zebu.uoregon.edu/2005/ph155/communications2.html, The Maverick and His Machine: Thomas Watson, Sr. and the Making of IBM, Wikipedia

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Each generation of the Internet, from Web1 to Web3, has provided solutions to some of the problems that arose in the previous generation of the Internet, and they have all created new problems. We have gone from a protocol-driven world to a world where centralized platforms control everything, and it may be of tremendous benefit to Internet innovation to get us back to a world where protocols dominate platforms
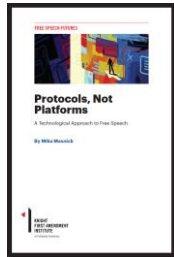
|	Web 1.0 Innovations in Protocols	Web 1.0 Issues in Protocols	Web 2.0 Innovations in Applications	Web 2.0 Issues in Applications	Web 3.0 Innovations in Protocols	Web 3.0 Issues in Protocols
Content Censorship	• Provides a communication channel for users in the digital space	• Data is disseminated on different servers and there is no central authority to handle malicious activities	• Set up a centralized audit mechanism	• The platform abuses the right to review and hinders people's freedom of expression and information	• Web3 protocol retains all information, user selects filters to filter information	• The filters are uneven and objectively more problematic content will emerge
User Flexibility & Data Privacy	• Users build their own servers and access other people's servers as clients	• With the promotion of the Internet, more and more new users lack the need and ability to build their own servers	• The user outsources the work of building his own server to the Internet platform and retains access and control of the server in the form of an account password	• Users have no say in the changes to the Internet platform they are entrusted with, nor do they have ultimate control over the flow of data	• The data is returned to the user and placed in the custody of the blockchain without any active action. The end user authorizes the use of the data in a disaggregated manner and captures the potential value of the data	• The authorization process for information may be too complex and cumbersome and not user-friendly
Innovation & Business Models	• Early prototype of the Internet	• Web development does not require fixed costs, which determines a mismatch between funding and service. On the one hand, products with funding but inadequate services are prevalent; on the other hand, good services do not receive rewards	• Early stage can be financed through VC, and after maturity can achieve platform profitability through advertising and other means	• Web2 platforms are too big to fail, limiting the emergence of innovation and new business models	• Unlike Web2, where only the final form of the information is visible, the Web3 protocol exposes the process of processing information and allows anyone to add to the current process, enabling co-creation and innovation in an open environment • Protocols can be valued by the market through tokenization	• Token holdings do not match project contributions. Many wildly growing funds can interfere with the healthy development of the protocol. On the other hand, the rights and obligations of token holders are still in flux and there is no uniform standard yet

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Web3 gives us the ability to rekindle the glory of Athens in Cyberspace: a free market with a currency (i.e. Bitcoin), a governance system (i.e. Ethereum), a financial system (i.e. DeFi), an entertainment system (i.e. GameFi/NFT), and a protocol-based civic square (Social Protocol)

The agora at Corinth, Greece.
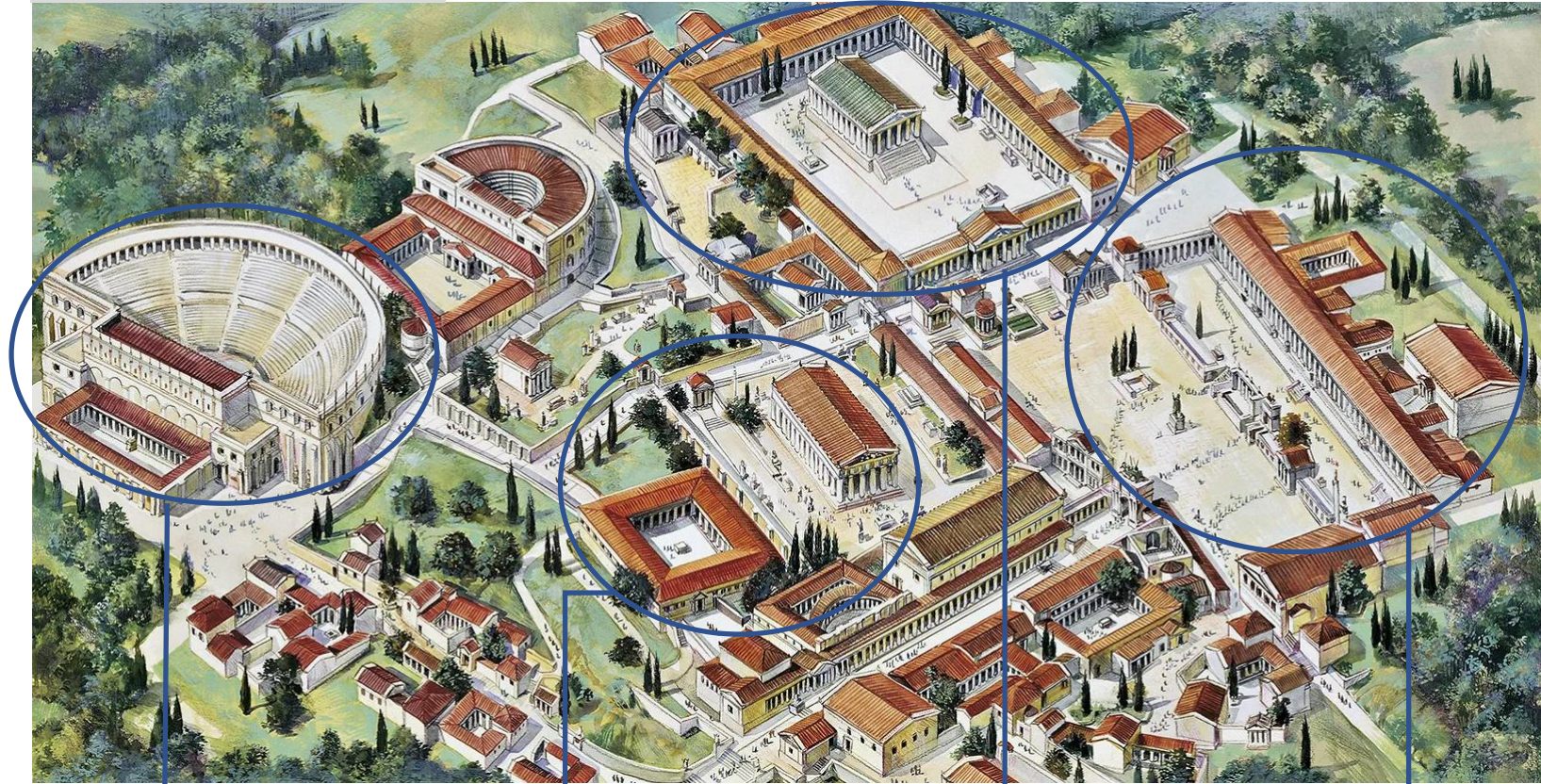
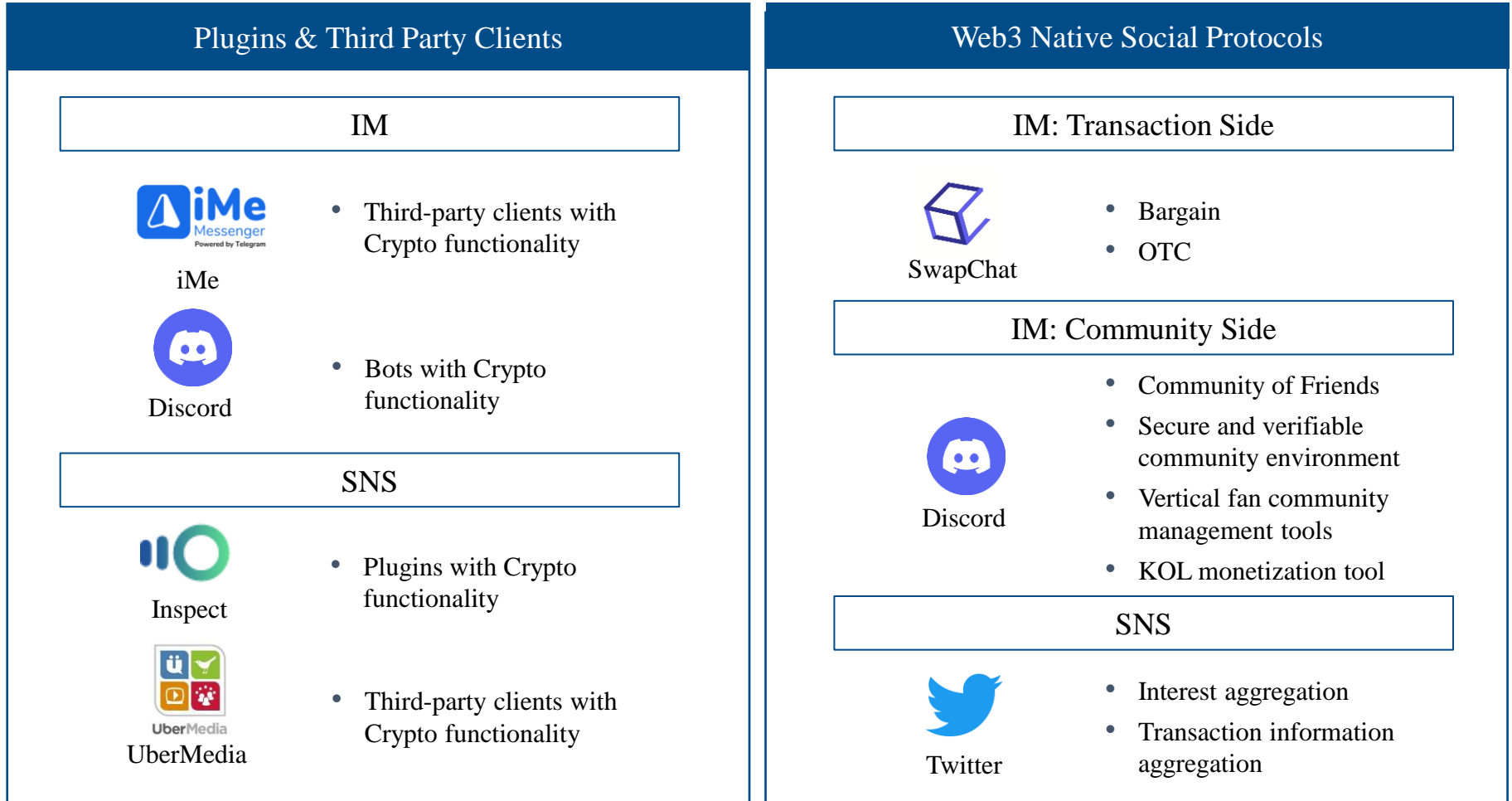| **Entertainment**	**Financial Protocol**	**Currency & Governance**	**Social Protocol**
Axie Infinity CryptoPunks	Uniswap	Bitcoin Ethereum	?

Overview of the social scenarios: penetrating Web2 through plugins/third-party clients and actively building Web3 native social protocols

At present, Web3 has not yet surfaced a phenomenal application or protocol to fill the gap of decentralized social. At present, there are two major directions and several small scenarios worth focusing on: "plug-in & third-party client" and "Web3 native social".

Plugins & Third Party Clients	Web3 Native Social Protocols

Plugins & Third Party Clients

IM

iMe
- Third-party clients with Crypto functionality

Discord
- Bots with Crypto functionality

SNS

Inspect
- Plugins with Crypto functionality

UberMedia
- Third-party clients with Crypto functionality

Web3 Native Social Protocols

IM: Transaction Side

SwapChat
- Bargain
- OTC

IM: Community Side

Discord
- Community of Friends
- Secure and verifiable community environment
- Vertical fan community management tools
- KOL monetization tool

SNS

Twitter
- Interest aggregation
- Transaction information aggregation

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Catalyst: Regional policies, security and uncertainty risks from regional unrest are speeding up the migration of users to decentralized applications

Privatization risks

Case in point: favoring Mastodon, a decentralized Twitter app based on the federated network model

- In mid-April 2022, Elon Musk issued an acquisition offer for Twitter through the SEC, followed by a two-week increase in the number of users of Mastodon, Twitter's decentralized alternative, by about 100,000

Privacy risks

Case in point: Benefit Matrix/Element, a decentralized Discord app based on the Federated Network model

- Element has seen a 400% increase in new users since WhatsApp announced its user-unfriendly privacy policy in January 2021

- Element is one of the ultimate destinations for outgoing users of IM apps. in 2020, Element grew to 27 million users, up from 12 million at the beginning of the year

Uncertainty risks from wars

Case in point: Benefit Matrix/Element, a decentralized Discord app based on the Federated Network model

- Matthew Hodgson, co-founder of Matrix and Element: I've seen a huge uptick in usage in Ukraine in the last few weeks, tens of thousands of downloads per day, enough to move us from basically zero to top 10, top 20 in the App Store

Regional policy factors

- Bans on Facebook, Instagram, Twitter, VK and other social media are gradually being implemented in some European countries and regions

- In Russia's largest social media VK, many official media outlets have been progressively shutting down comment sections or implementing pre-censorship of comment content in recent years

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Web1 has a Netscape moment, Web2 has an iPhone moment. Protocols are important, but great products will bring Web3 into the mainstream, and Web3 needs its own Netscape/iPhone.

Protocol-based social squares represent an inevitable historical trend

Building upon the reconstructions of the monetary system, financial market, and labor forces in the scheme of the Web3 revolution, we are now at a historical turning point where the decentralization of social networks is inevitable. Cyber citizens need a new-age public forum and information market that align with the values of decentralized cyberspace.

Evidence has shown that centralized social media platforms in Web2 are stifling innovations of third parties and hitting the glass ceiling in their own growth. **Decentralization is the most optimal way out for new builders and giants themselves.** Witnessing how Web3 technologies (blockchain, cryptography, P2P networks) have shaken the order in the global economy gives us enough faith for the rise of a new order in the digital public discourse.

Understanding and being part of the historic movement towards decentralized social networks will make it easier for us — builders, investors, and cyber citizens — to remain agile and relevant.

In the era of Web3, social networks still play the role of the marketplace of ideas and public forums. **The Web3 revolution is cultural, financial, and social, and the impact of this revolution will permeate every corner of cyberspace.** From this perspective, the preconditions of the revolution are all in place:

- An independent treasury (BTC, ETH)
- A separate financial system (DeFi)
- Independent art and culture alliance (NFT)
- New ways of human collaboration and organizing labor forces (DAOs)

The missing jigsaw piece is a new infrastructure and ecosystem for cyber citizens to gather and participate in public discourse. Today, most people are largely using the Web2 communication tech stack (Discord, Twitter, Telegram, Google) to do so, but the various restrictions of Web2 social networks will inevitably make the early Web3 adopters feel restricted and call for changes.

Meanwhile, we don't want to renounce the value and importance of Web2 social media. The platform effect of Web2 social networks can amplify voices and mobilize massive actions. Web3 revolution is spreading like wildfire thanks to such effect. Digital citizens have also become accustomed to using social networks to share and receive information daily, establishing social media as an infrastructure for the functioning of a cyber society. The goal of the Web3 social networks is not to build a blockchain replica of the Web2 giants, but to use innovative designs and technologies to counter the centralized and monopolistic behavior of Web2, to wrestle back the right to information and digital identities from the platforms to the netizens.
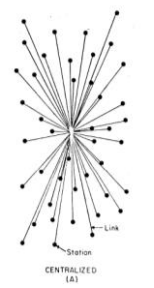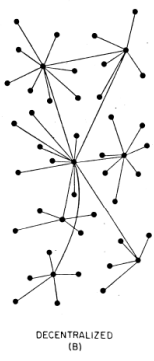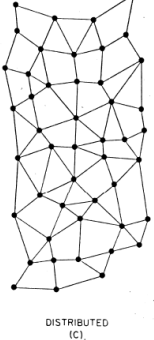
From new financial systems to new cultural symbols, then to the organization of labor forces, the Web3 revolution is here. These preconditions build up the pursuit of an open, transparent, and impartial public forum and information marketplace, free of political interference, for the Web3 citizens who long for freedom and autonomy. **Now, the latest stage of this revolution is decentralized social networks.**

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Overview of Social Protocols

- Three structures of social protocols:
  - Centralized networks
  - Federated networks
  - Peer-to-peer networks

Social network structures can be divided into centralized networks, federated networks and peer-to-peer networks

Structures	Protocol layers	Sources	Funding Sources	Upper Layer Services	Limitations
CENTRALIZED (A)	• Twitter API	• Twitter	• In-house funding • Revenue	• Third-party client ecosystem	• Centralization: As soon as the central application closes the API, the whole ecosystem will disappear
	• Reddit API	• Reddit	• In-house funding • Revenue	• Bot ecosystem	• *as above
	• Applet API	• WeChat	• In-house funding • Revenue	• Mini-program ecosystem	• *as above
DECENTRALIZED (B)	• SMTP	• Information Sciences Institute, USC	• Government	• Gmail, Yahoo • Mr. Privacy	• Government funding
	• ActivityPub	• World Wide Web Consortium	• User Grants • Third party Grants	• Mastodon • PeerTube • PixelFed	• Funds mainly rely on external donations, and the sustainability is relatively weak • Slow user growth makes mass adoption difficult
	• Matrix	• Amdocs	• In-house funding • PE/VC • Revenue	• Element	• Servers consume more system resources than other federated protocols (e.g. XMPP)
	• ADX	• Bluesky PBLLC	• Corporate Grants • Individual Grants	• N/A	• *still in the early days of development
DISTRIBUTED (C)	• Hypercore (Dat)	• The open source community led by Max Ogden	• Grant from a foundation	• Cabal • Beaker	• Relies heavily on external donations for funding • DHT-based, slow and unreliable network • Slow user growth, difficult to achieve mass adoption
	• Secure Scuttlebutt (Ssb)	• Dominic Tarr	• N/A	• Patchwork • Manyverse	• Nodes do not store global information
	• Lens Protocol	• AAVE	• In-house funding • Tokenization	• Lenster • Lensfrens	• *still in the early days of development

Source: Mr. Privacy: Open and Federated Social Networking Using Email
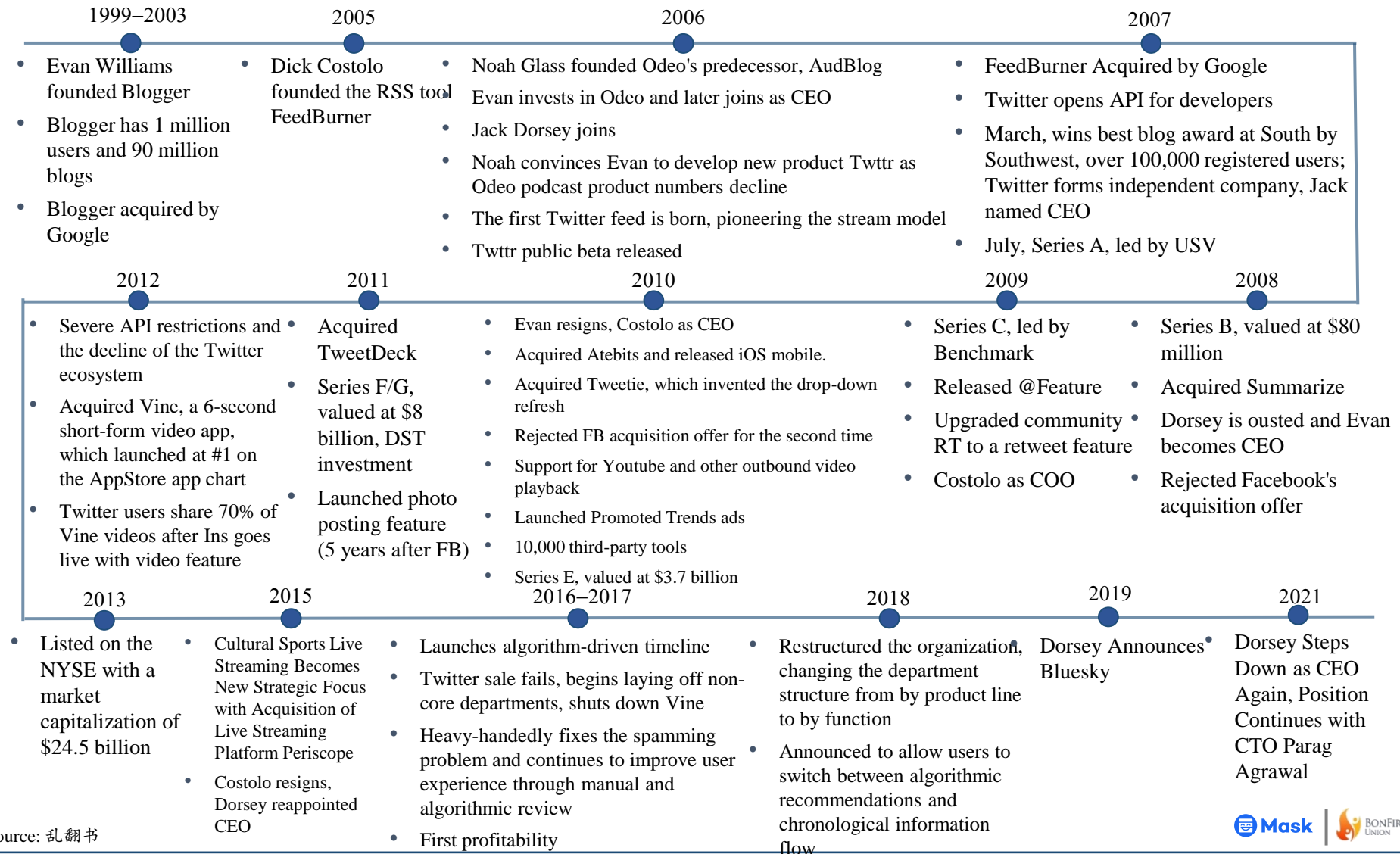
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Centralized networks

- Twitter: became the de facto governance system around 2010 through extremely open APIs

- Reddit: added an economic system to the platform by issuing community tokens on Ethereum

- Telegram: added a system of governance + economy to the platform through the TON

Twitter has long been considered one of the most likely social platforms to become a social protocol: in its early days, Twitter had an extremely large Twitter third-party ecosystem because of its open API permissions, and at one point VCs were looking specifically in that direction. With Dick Costolo's appointment as CEO in 2010, Twitter redirected traffic to Twitter's main end by acquiring a series of third-party clients and tightening API permissions, and since then the Twitter third-party ecosystem market has disappeared and Twitter has gone from an open square to a closed garden.

A Brief History of Twitter

1999–2003
- Evan Williams founded Blogger
- Blogger has 1 million users and 90 million blogs
- Blogger acquired by Google

2005
- Dick Costolo founded the RSS tool FeedBurner

2006
- Noah Glass founded Odeo's predecessor, AudBlog
- Evan invests in Odeo and later joins as CEO
- Jack Dorsey joins
- Noah convinces Evan to develop new product Twttr as Odeo podcast product numbers decline
- The first Twitter feed is born, pioneering the stream model
- Twttr public beta released

2007
- FeedBurner Acquired by Google
- Twitter opens API for developers
- March, wins best blog award at South by Southwest, over 100,000 registered users; Twitter forms independent company, Jack named CEO
- July, Series A, led by USV

2012
- Severe API restrictions and the decline of the Twitter ecosystem
- Acquired Vine, a 6-second short-form video app, which launched at #1 on the AppStore app chart
- Twitter users share 70% of Vine videos after Ins goes live with video feature

2011
- Acquired TweetDeck
- Series F/G, valued at $8 billion, DST investment
- Launched photo posting feature (5 years after FB)

2010
- Evan resigns, Costolo as CEO
- Acquired Atebits and released iOS mobile.
- Acquired Tweetie, which invented the drop-down refresh
- Rejected FB acquisition offer for the second time
- Support for Youtube and other outbound video playback
- Launched Promoted Trends ads
- 10,000 third-party tools
- Series E, valued at $3.7 billion

2009
- Series C, led by Benchmark
- Released @Feature
- Upgraded community RT to a retweet feature
- Costolo as COO

2008
- Series B, valued at $80 million
- Acquired Summarize
- Dorsey is ousted and Evan becomes CEO
- Rejected Facebook's acquisition offer

2013
- Listed on the NYSE with a market capitalization of $24.5 billion

2015
- Cultural Sports Live Streaming Becomes New Strategic Focus with Acquisition of Live Streaming Platform Periscope
- Costolo resigns, Dorsey reappointed CEO

2016–2017
- Launches algorithm-driven timeline
- Twitter sale fails, begins laying off non-core departments, shuts down Vine
- Heavy-handedly fixes the spamming problem and continues to improve user experience through manual and algorithmic review
- First profitability

2018
- Restructured the organization, changing the department structure from by product line to by function
- Announced to allow users to switch between algorithmic recommendations and chronological information flow

2019
- Dorsey Announces Bluesky

2021
- Dorsey Steps Down as CEO Again, Position Continues with CTO Parag Agrawal

Source: 乱翻书

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Review: Twitter had a thriving third-party ecosystem before and after 2010, and Twitter's acquisition of TweetDeck marked the end of that era

Twitter Eco Universe

The relationship between third parties and Twitter

Twitter vs UberMedia

- Bill Gross, founder of UberMedia, graduated from Caltech and previously founded three companies that were sold to Cendant, Lotus Software and Yahoo!

- In 2010, Bill Gross founded and launched Twitter search engine TweetUp, later renamed UberMedia, with the goal of replicating a new Twitter through the acquisition of a third-party Twitter client.

- UberMedia acquired UberTwitter (Twitter's third-party BlackBerry client), Twidroyd (Twitter's third-party Android client), UberCurrent and EchoFon (Twitter's third-party iPhone client), and in 2011 received Twitter has a high volume of quality tweets coming from TweetDeck, which offers users a better message management service than Twitter's own client software. If the UberMedia acquisition is successful, Twitter will send 20-30% of its tweets to UberMedia, which could ask Twitter to share advertising revenue with it and place its own ads in the client belonging to UberMedia, which would put huge pressure on Twitter's advertising revenue. This will put a huge pressure on Twitter's advertising revenue.

- The end: In May 2011, Twitter repelled UberMedia's attack by acquiring TweetDeck, and then in September 2012, it announced a very strict platform policy: no support for three-party apps to post hashtags, blocking the image feature, limiting the number of users of third-party apps to 100,000, and strictly limiting the frequency of API requests regardless of the type of app and number of endpoints Only 60 data requests could be made per hour, and developers were warned not to spend their efforts on Twitter's core users and interactions, but to move to non-core Twitter terrain such as social data analytics. Twitter's thriving third-party ecosystem has since come to a temporary end

Fred Wilson: Twitter should be a protocol, not a platform

- Jack Dorsey reappointed as CEO in 2015, followed in 2016 by Fred Wilson, who said:
    - This is super important because the more open protocols we have, the more open systems we will have. If Twitter had been built and monetized this way, things could have played out very differently. In the early days of Twitter, there were third party applications (Summize for Search, Tweetie for iOS client, etc). These were all built on Twitter's API. If Twitter had imagined itself as a protocol instead of an application, these third party applications would not have had to compete with (or get bought by) Twitter. But at the time, there wasn't an obvious way for Twitter's founders and management team to benefit from a protocol-based business model
- With Elon Musk making a formal offer to buy Twitter in 2022, Fred Wilson once again said:
    - It (Twitter) needs to be a public good at a protocol level
    - Twitter should be decentralized as a protocol that powers an ecosystem of communication products and services

Jack Dorsey: Launched Bluesky, a decentralized social project

- Inspired by the booklet Protocols, Not Platforms: A Technological Approach to Free Speech (summarized on page 13 of this research), Jack Dorsey announced the launch of Bluesky in late 2019, although the early Bluesky community was more of a volunteer club. The actual project was slow for a number of reasons until August 2021, when Jay Graber formally started working with a team to push the project, which gradually began to take hold and open-source the code in early May 2022 (the project is still in its very early stages of development)
- Jack Dorsey：
    - I think it should def be a client of an open protocol. it could provide a view others do not
    - the days of usenet, irc, the web...even email (w PGP)...were amazing. centralizing discovery and identity into corporations really damaged the internet. I realize I'm partially to blame, and regret it

Introduction to Community Points

- Reddit launched Community Points, a token based on the Ethernet Rinkeby test network, in May 2020, which is distributed to users based on Reddit's native honor system, pointskarma. Currently Reddit is only piloting the token in the r/Cryptocurrency (4.9 million subscribers) and r/FortNiteBR (1.9 million subscribers) subreddit communities. Each subreddit has a separate token logo representing their Community Points, with Moons for r/Cryptocurrency and Bricks for r/FortNiteBR.

- Karma is the sum of the points earned by users in the Reddit community for comments and posts on different subreddits, representing the user's reputation on Reddit. The more likes a user receives, the more karma points they earn, and conversely if a post is stepped on, karma points decrease

Chart: Moons historical prices
USD, 2021.01-2022.05
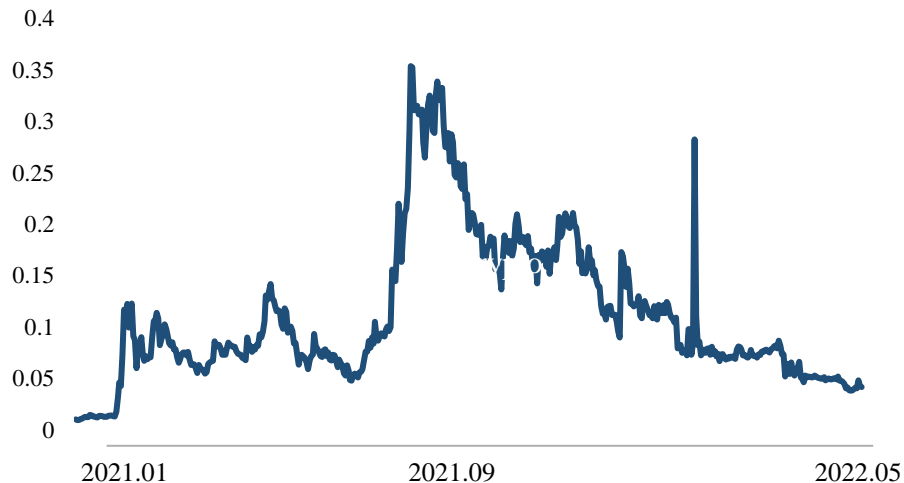
Introduction to Moons

- Moons is an ERC-20 token on the Rinkeby Arbitrum network (migration completed July 2021), Moons are managed by a set of smart contracts that handle balances, transfers, allocations/requests and the purchase of special memberships. The smart contracts and mobile app have been reviewed and audited by independent security firm Trail of Bits, and users can view balances in a wallet built into the Reddit mobile app, with approximately 94 million Moons currently in circulation and approximately 165,000 wallet addresses

- Distribution mechanism.
    - Moons will be distributed once every 28 days, and the corresponding tokens will be automatically sent to users on the settlement date. Users can get Moons by participating in knowledge contests such as Trivia and Cointest, and posters of the top five votes in each round will also be rewarded with Moons
    - Initially: 50 million Moons will be distributed based on users' historical karma points
    - Every 28 days will be a settlement cycle, and Moons will be distributed to users according to their karma points list during this cycle.

- Token roles.
    - Voting/community governance: the number of tokens represents the corresponding voting weight
    - Moons can be sent between users as tips
    - Tokens can be used to purchase r/CryptoCurrency special memberships
    - Reddit Coins can be exchanged for Reddit Coins, which can be used to purchase premium membership in the community (with privileges such as ad-free, Coins can also be purchased directly in USD)

Source: CoinGecko

Telegram: added a system of governance + economy to the platform through the TON

Telegram Open Network (TON, the predecessor of The Open Network) is an Ethereum-like Layer1 blockchain designed to monetize Telegram and drive widespread adoption of cryptocurrencies based on Telegram, which was launched by Telegram founders Pavel Durov and Nikolai Durov launched in 2017 and had set a record for the largest ICO in history. But unfortunately the project was forced to shut down in 2020 because of compliance issues.Almost simultaneously, community developers forked TON based on its source code, creating the Free TON and The Open Network (TON), which was backed by Pavel Durov in late 2021 and welcomed Andrew Rogozov, former CEO of VK.com, early the following year. VK is one of the most influential social networks in Eastern Europe (the Facebook of Eastern Europe), Rogozov was an early member of the VK team, and Pavel Durov is the founder of VK, so it's safe to say that after the closure of the project in 2020, TON re-entered the market in 2022 with a more community-oriented look and is now growing rapidly.

2017Q2
- TON (Telegram Open Network) launched

2018-01至2018-03
- ICO, raising $1.7 billion in two phases
- Sold 2.9 billion Grams to 175 investors, of which over 1 billion were purchased by US investors

2019-04
- Telegram goes live internally with TON test client

2019-05
- Launch of TON's test client
- Plan to officially launch TON main network on October 31, 2019

2019-09
- Telegram Releases Alpha Version of Crypto Wallet

2021–05
- Newton team changes its name to TON (The Open Network) Foundation

2020–05
- Pavel Durov Announces Termination of TON Project, No Longer Supports Testnet2
- Two developers launch Newton open source community, fork TON network, and gradually devote themselves full-time to Testnet2-based TON network development

2020–04
- U.S. regulators ban Telegram from selling Gram tokens to investors outside the U.S.
- Telegram postpones TON mainline launch for the second time until April 2021
- Telegram triggers ICO redemption provision, plans to return up to 72% of each investor's shares

2019–11
- Launched a new version of the test network Testnet2

2019–10
- SEC issues emergency restraining order against Telegram's $1.7 billion ICO, preventing Telegram from selling or otherwise distributing Gram tokens in the U.S.
- Telegram Delays TON Mainline for the First Time Until April 2020

2021–10
- TON-BSC and TON-ETH cross-chain bridges launched one after another
- TONcoin goes live on Uniswap

2021–11
- TONcoin is continuously online on FTX, OKEx, Gate.io and other exchanges
- TONcoin is embedded in the Telegram web terminal as a plug-in, allowing users to send Toncoin tokens directly to each other.

2021-12至2022-01
- Pavel Durov expresses support for TONcoin project
- Former CEO of VK.com joins TON Foundation

2022–04
- Launched $250 million TONcoin Fund with LPs including Huobi, Kucoin, MEXC, 3Commas, etc.
- TON Foundation raised over 527 million TON tokens from 176 investors for a total of $1 billion, with 18 donations of over 10 million TON and 37 donations of over 4 million

2022–05
- Telegram allows users to send and receive Toncoin and BTC directly in the chat window via a wallet bot.
- More than 800,000 users have used the bot (Telegram's MAU is around 500-600 million)

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Federated Network

- Usenet: BBS communities in the pre-Internet era
- ActivityPub and Matrix: the most important social protocols in the modern federated network space
- Mastodon: a decentralized Twitter, and the largest social application on ActivityPub
- Element: a decentralized Telegram/Discord, and the most important frontend application on Matrix
- Bluesky/ADX: the decentralized social protocol supported by Twitter

Usenet: BBS communities in the pre-Internet era

Introduction

- Created by graduate students at Duke University in 1979, Usenet itself does not refer to any specific physical network or Internet technology, but rather a logical network of users

- Usenet is a globally distributed Internet discussion system:
    - Earliest internet community
    - It's a mix of email and online forums
    - No central server and administrator

- Usenet articles are formatted and transmitted similarly to Internet email messages

Usenet is culturally significant in the digital world

- Source for numerous networking concepts and terms:
    - Frequently Asked Questions (FAQ)
    - Internet debate
    - How to use "spam" to wash editions

- A paradise for engineers and geeks:
    - Linux: In 1991, Linus Torvalds, a student at the University of Helsinki in Finland, posted a message on the Usenet comp.os.minix discussion group: "I'm making a free operating system, just a hobby, not as big and professional as GNU", The operating system is Linux
    - WorldWideWeb: In 1991 CERN researcher Berners-Lee released the first browser WorldWideWeb in the Usenet discussion group alt.hypertext

Server/Client Architecture
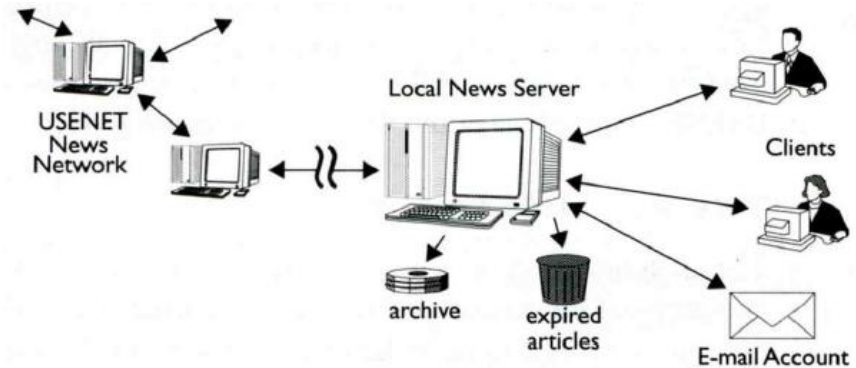
Founded in 1979, it has grown steadily and rapidly for more than ten years

Year	Websites	Traffic (Mega/day)	Number of articles (articles/day)
1979	3		2
1980	15		10
1981	150	0.05	20
1982	400		50
1983	600		120
1984	900		225
1985	1300	1	375
1986	2200	2	946
1987	5200	2.1	957
1988	7800	4.4	1933
(Data from 1989 to 1991 are missing)			
1992	63000	42	17556
1993	69000	50	19362
1994	190000	190	72755

WorldWideWeb and Linux are the first two groundbreaking products to be released in the Usenet discussion group

The original text when WWW was first released

```
From: timbl@info .cern.ch (Tim Berners-Lee)
Newsgroups: alt.hypertext
Subject: Re: Qualifiers on Hypertext links...
Message-ID: <6484@cernvax.cern.ch>
Date: 6 Aug 91 14:56:20 GMT
References: <1991Aug2.115241@ardor.enet.dec.com>
Sender: news@cernvax.cern.ch
Lines: 52


In article <1991Aug2.115241@ardor.enet.dec.com> kannan@ardor.enet.dec.com (Nari
Kannan) writes:
>
>    Is anyone reading this newsgroup aware of research or development efforts
 in
> the
>    following areas:
>
>    1. Hypertext links enabling retrieval from multiple heterogeneous sources
 of
> information?

The WorldWideWeb (WWW) project aims to allow links to be made to any
information anywhere. The address format includes an access method
(=namespace), and for most name spaces a hostname and some sort of path.

We have a prototype hypertext editor for the NeXT, and a browser for line mode
terminals which runs on almost anything. These can access files either locally,
NFS mounted, or via anonymous FTP. They can also go out using a simple protocol
(HTTP) to a server which interprets some other data and returns equivalent
hypertext files. For example, we have a server running on our mainframe
(http://cernvm.cern.ch/FIND in WWW syntax) which makes all the CERN computer
center documentation available. The HTTP protocol allows for a keyword search
on an index, which generates a list of matching documents as annother virtual
hypertext document.
```

The original text when Linux was first released

```
From: torvalds@klaava.Helsinki.FI (Linus Benedict Torvalds)
Newsgroups: comp.os.minix
Subject: What would you like to see most in minix?
Summary: small poll for my new operating system
Message-ID:
Date: 25 Aug 91 20:57:08 GMT
Organization: University of Helsinki


Hello everybody out there using minix -

I'm doing a (free) operating system (just a hobby, won't be big and
professional like gnu) for 386(486) AT clones.  This has been brewing
since april, and is starting to get ready.  I'd like any feedback on
things people like/dislike in minix, as my OS resembles it somewhat
(same physical layout of the file-system (due to practical reasons)
among other things).

I've currently ported bash(1.08) and gcc(1.40), and things seem to work.
This implies that I'll get something practical within a few months, and
I'd like to know what features most people would want.  Any suggestions
are welcome, but I won't promise I'll implement them :-)

                Linus (torvalds@kruuna.helsinki.fi)

PS.  Yes - it's free of any minix code, and it has a multi-threaded fs.
It is NOT protable (uses 386 task switching etc), and it probably never
will support anything other than AT-harddisks, as that's all I have :-(.
```

Source: cs.cmu.edu/~awb/linux.history.html, scientificamerican.com/article/facts-about-the-webs-creation, w3.org/People/Berners-Lee/1991/08/art-6484.txt

ActivityPub and Matrix: the most important social protocols in the modern federated network, with Mastodon and Synapse (Matrix), alternatives to Twitter and Telegram, owning about 54% of the nodes in the network and being the most influential federated network social applications

Major Protocols and Applications in Federated Networks

User-Facing Application	Jabber	Synapse		Mastodon, PeerTube, Pleroma, PixelFed, Friendica, Misskey, WordPress, Write Freely	N/A
Identity	XMPP	Matrix	Diaspora	ActivityPub	Solid
Data					
Networking					

Percentage of total nodes in the federated network by platform, June 2022

Pixelfed
Friendica 2.49%
Misskey 2.98%
WordPress **Medium** 3.39%
Write Freely **Medium** 3.94%
4.06%
Pleroma 9.09%
PeerTube 10.52%
Mastodon 37.28%
Synapse (Matrix) 16.46%
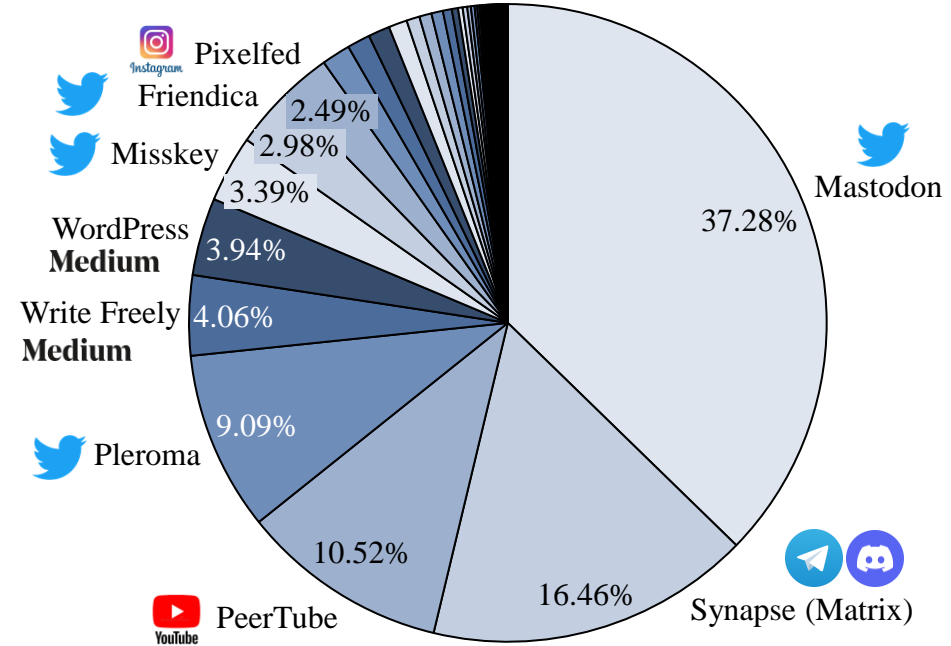
- Statistics on the number of nodes on the federated network protocols #ActivityPub, #Matrix, #Diaspora, #Zot and #XMPP.
- Mainstreams (number of nodes in total).
  - Microblogging (Twitter alternative): Mastodon, Pleroma, Misskey, Friendica
  - Chat (alternative to Telegram/Discord): Synapse
  - Video sharing (alternative to YouTube): PeerTube
  - Blogging (alternatives to Medium): Write Freely, WordPress (means: WordPress + ActivityPub plugin)

Source: Ecosystem Review by Jay Graber, socialhome.network/p/a5474d4d-8a99-4b16-950d-e388514d07ec/all

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Introduction to Matrix and ActivityPub

ActivityPub Protocol

- Intro: micro-blogging federated network protocol
- Project start date: 2018
- Project Source: W3C Council
- ActivityPub implementations tend to merge the server with the main client: e.g. Mastodon is both a server implementation and a client
- ActivityPub also has more server implementations than Matrix, such as Mastodon, Pleroma, Misskey, etc. Their functionality is not identical, but since they all use the ActivityPub protocol, they can unite well
- The most important frontend application: Mastodon

Matrix Protocol [matrix]

- Intro: IM Federated Network Protocol
- Project start date: 2014
- Project Source: Amdocs
- Project characteristics.
- Matrix's implementation tends to separate server and client: e.g., its server (Synapse) and client (Element.io) are independent
- Matrix has fewer server implementations, the mainstream implementation is Synapse
- Has more government clients than regular users
- The most important frontend application: Element.io

ActivityPub eco-app has about 4 million users, of which Mastodon has about 3 million users

Percentage of users in each instance of mstdn

pawoo.net, 731612, 26%

mstdn.jp, 211587, 8%

mastodon.social 719261, 26%
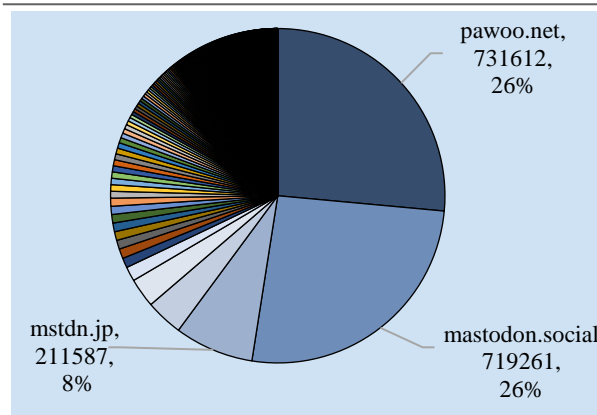
Percentage of user posts in each instance of mstdn

pawoo.net, 66841645, 18%

mstdn.jp, 61126432, 17%

mastodon.social, 36529330, 10%
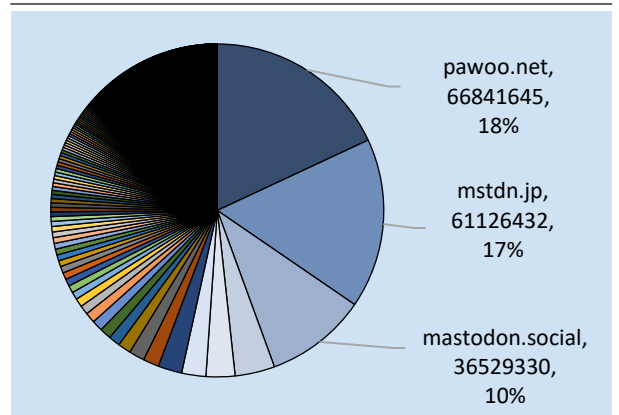
Matrix eco-app has over 60 million visible users, with a large number of remaining users from government

55+ Million addressable users
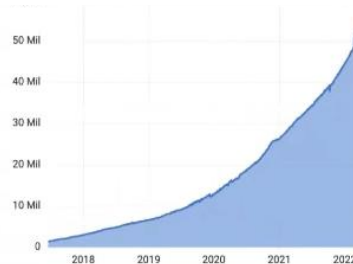
85K+ servers
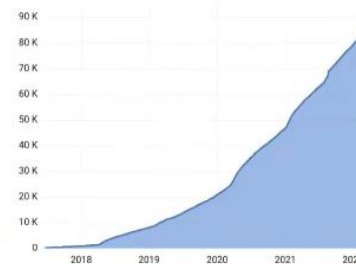
1000+ projects

- Official communication application of the French government
- Official communication application of the Bundeswehr (German Federal Defence Force)
- The official communication application of the German National Health System (NHS)
- Mozilla, Wikimedia, KDE, GNOME and other open source projects preferred communication tools

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Mastodon: a decentralized Twitter, and the largest social application on ActivityPub

Introduction

- Overview: Mastodon was released in 2016 by German developer Eugene Rochko and started using the ActivityPub protocol in 2018. Each server site in the network is called an "instance", and these instances vary in size, mostly by region, hobby, profession, and community

- Current status: There are currently 1109 sites with 2.765 million users, of which the top three instance sites have 60% of the users and 45% of the posts. The top three instances are from Japan, except for Mastodon.social, which is an official instance. Overall, 25.5% of instances are hosted in Japan and have 41% of Mastodon users, 21.4% of instances are hosted in the US with about 23% of users, and 16% of instances are hosted in France with about 9% of users.

- Top Categories: 16% of instances have tagged themselves with a theme, and these instances involve 13% of users overall. Despite the low coverage of the above data, it is still useful to examine these tags to gain insight into ongoing usage. It can be seen that 55% of instances are Tech-themed but only aggregate 21% of users in the Mastodon network, while Adult-themed instances aggregate 61% of users in the network, although they only represent 12% of the total

Number of instances, Toots and users in different categories in the Mastodon network
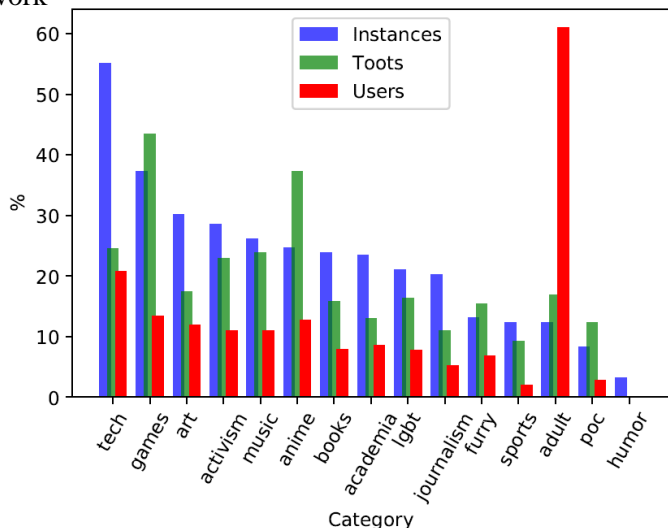
Regional distribution of active Mastodon users

- The figure shows a sankey diagram of Mastodon instance distribution. The left axis shows the 5 countries hosting the most instances and the right axis shows the location of Mastodon clients, with 89% of clients accessing instances in Japan, USA and France
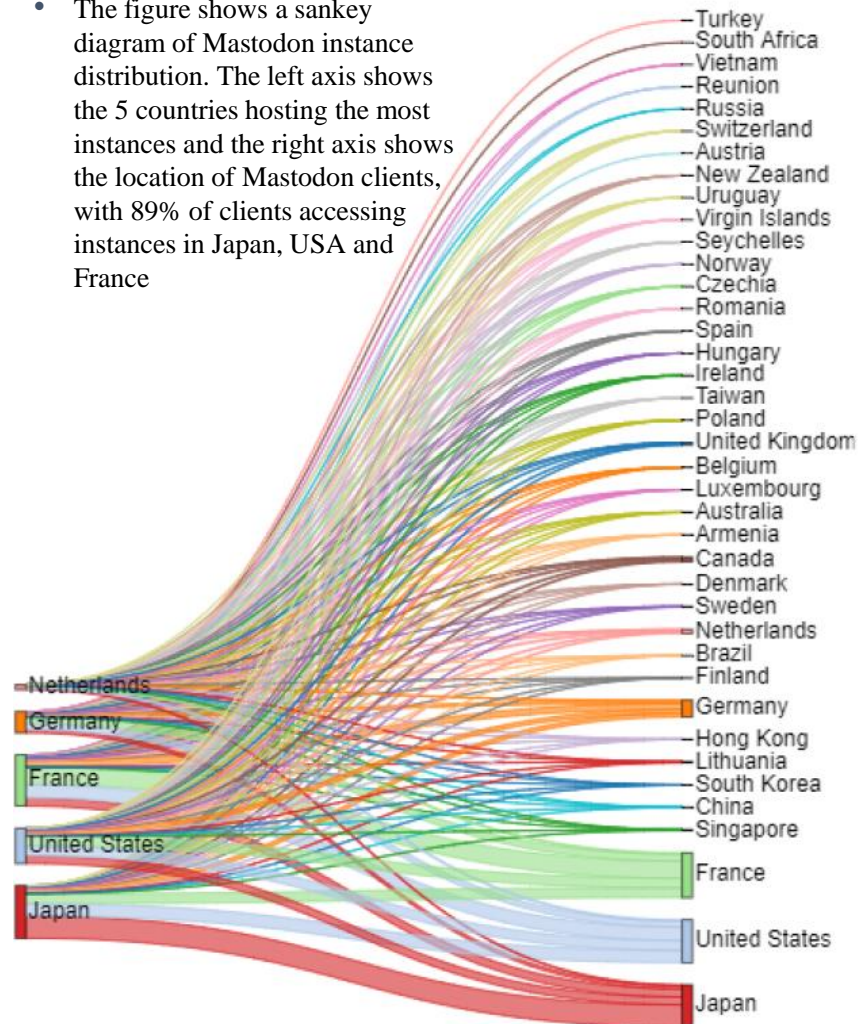
Source: instances.social/list/old, Challenges in the Decentralised Web: The Mastodon Case

Introduction

- Overview: Matrix is an open, federated open standard for Instant Messaging (IM), Voice over IP (VoIP) and the Internet of Things (IoT)

- Based on chat room: Private chat is a special case of group chat, chat content is encrypted, and supports embedding and displaying third-party applications (such as embedding TradingView to view Ethereum prices, embedding open source meeting tool Jitsi Meet to realize intra-group video chat, etc.)

- Events in the chat room are synchronized between servers: (1) the chat records of a chat room have a copy in all servers participating in the chat; (2) there is no single server controlling the chat room; (3) to avoid a single point of failure

Matrix's open source ecosystem
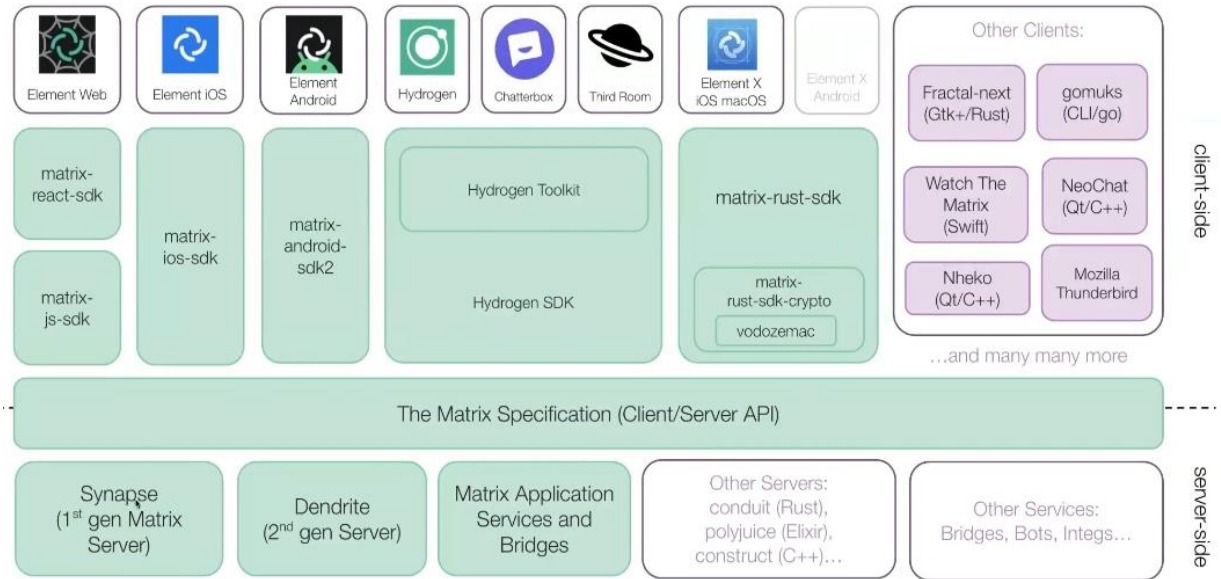
Development stages

- Start-up phase (2014-2017): Internal incubation of parent company Amdocs, providing it with millions of dollars in funding

- Transition phase (2017-2018): Spin-off from parent company, has some government clients, but is expected to hold funds until October 2017, at which time $5 million is raised from Status

- Acceleration stage (2019-present): At least 12 governments adopt Matrix, generate revenue through Open-Core, and obtain about $43 million in financing from institutions such as Protocol Labs

Partners
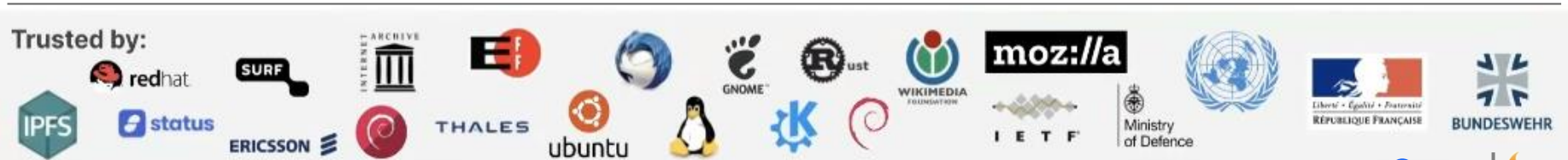
Bluesky: a decentralized social protocol supported by Twitter, which is mainly based on the design ideas of protocols such as Matrix, and is currently in its early days

Bluesky

Bluesky Social Protocol Stack
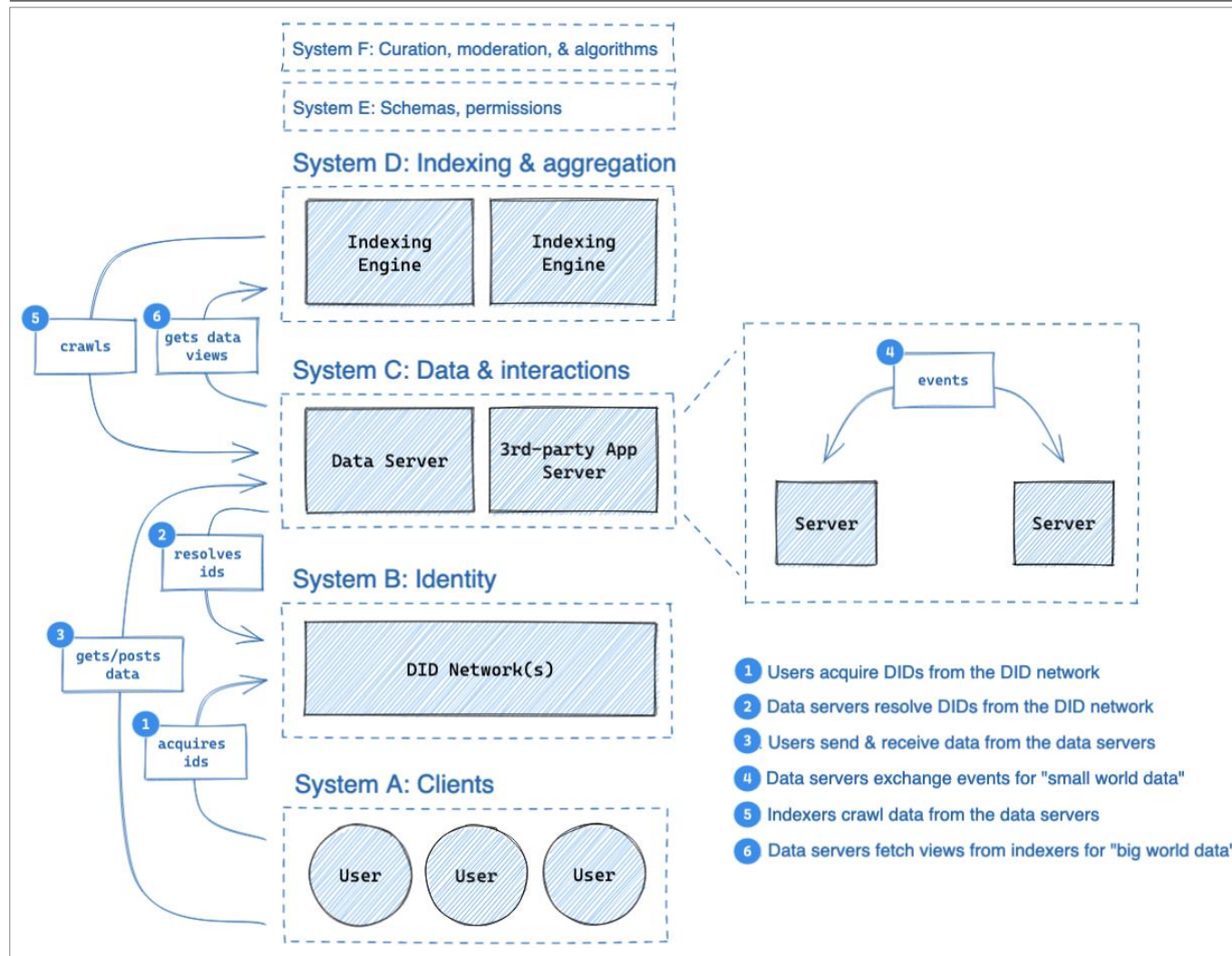
The Initial Bluesky Team

Initial Members

- Daniel Holmgren, a former protocol engineer developing on IPFS at Fission and previously co-founded a Consensys-backed startup

- Paul Frazee, who previously built Patchwork, the first application using the SSB distributed social protocol, and Beaker Browser, the first web browser for the Hypercore distributed web protocol

- Aaron Goldman, a former security engineer at Twitter and Google

Technical Advisors

- Jeromy Johnson, the first employee at Protocol Labs and lead engineer on IPFS and Filecoin

- Martin Kleppmann, author of Designing Data-Intensive Applications and researcher at the University of Cambridge

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Peer-to-peer network

- **Summary of peer-to-peer social protocol ecosystem**
- **Blockchain-based Social Protocol Ecology**
- **Case Studies: Lens, Ceramic, RSS3, etc.**

Overview: The Ecosystem of Social Protocols in Peer-to-Peer Networks

Main Protocols and Applications in Peer-to-Peer Networks

User-Facing Application		OpenBazaar, Peepeth...				Anytype	Cabal, Beaker Browser	Patchwork, Manyverse...	Iris, Notabug	
Identity	Peergos		ION	Ceramic, 3box			Hyperdrive			Aether
Data		IPFS		OrbitDB	Textile		Hypercore Protocol (Dat)	Ssb	GUN	
			IPLD							
Networking		libp2p					Hyperswarm			Mim
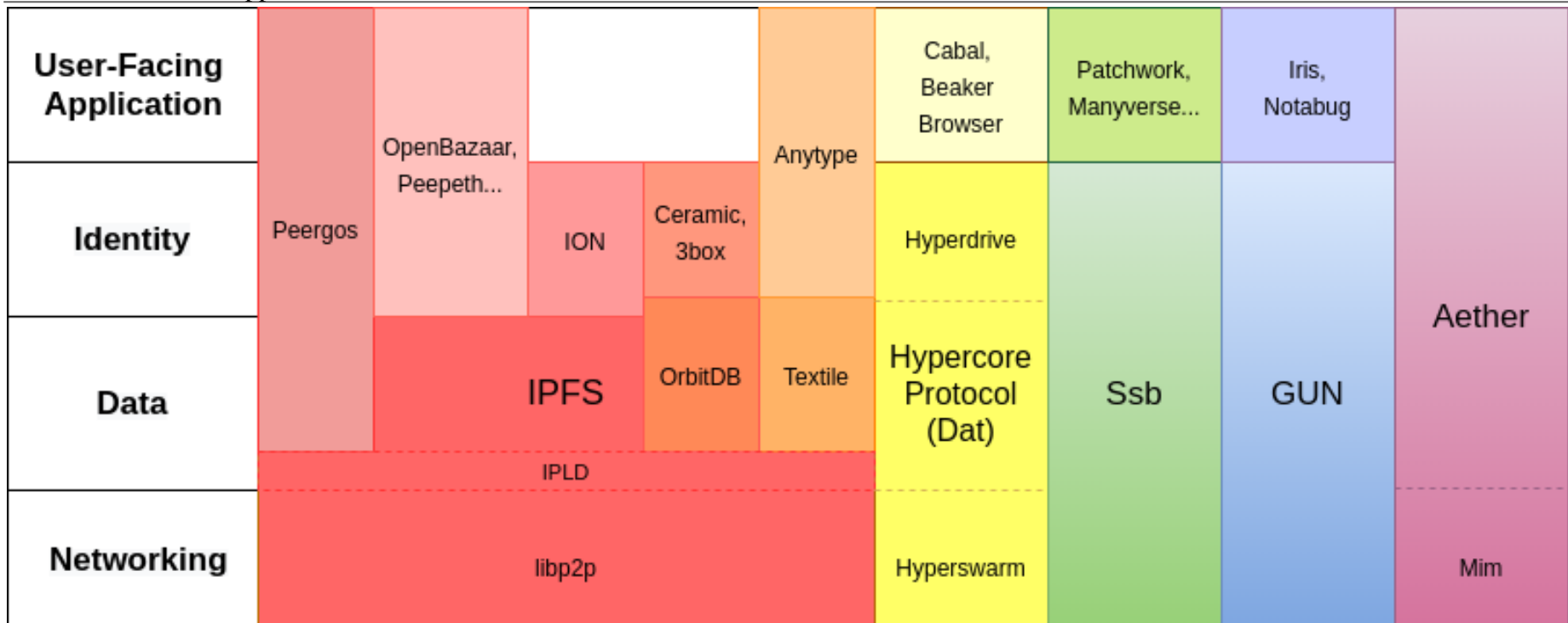
- In the peer-to-peer network ecosystem, sometimes there is no clear distinction between protocols and applications, and it is difficult to clarify what a project contains. This diagram attempts to outline where these peer-to-peer projects are located in the stack

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Social Protocol Ecology based on Blockchain

L1s
Ethereum
Avalanche
Polygon
Arbitrum
BNB Chain
Fantom
Flow
Solana

Storage Facility

Static Storage
IPFS
Arweave

Layer2
Lighthouse
Bundlr
Kyve

CDN
Meson

Data Model
Ceramic
Kwil

Off-chain Data
Twitter
Instagram
Jike

IM
Waku
XMTP
Web3MQ
Dialect

Data Index
The Graph

Data Service

Social Graph
Lens Protocol
Farcaster
CyberConnect
Mem Protocol
KNN3

Algorithm
Tureco

Credential
Project Galaxy
DegenScore
POAP

Domain/Account
ENS
Nametag
Unstoppable
.bit (DAS)

Feed
RSS3

Frontend

Community
Metalink
Metaforo
ShowMe
Atem Network

Profile
Cheers bio
Shil.me
Phi

Middleware
Mask Network

Blog
Mirror

Feed
Interface

Access Control
Lit
Unlock
Collab.Land

DID
Spruce
Ceramic
Violet
Next.ID
Polygon ID

End User

Social related modules

Infrastructures

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At present, the ecosystem is mainly based on Web3.0 native projects on protocol layer, while some teams are working on existing social platform (such as Twitter, Instagram) plugins and on-chain social projects on application layer

📒 Protocol layer

KNN3
KNN3

0xScope

Lit Protocol
Lit Protocol

Unlock
Unlock

IPFS
IPFS

arweave
Arweave

ceramic
Ceramic

LENS
Lens Protocol

mem m
Mem Protocol

CyberConnect

XMTP
XMTP   Swapchat

RSS3
RSS3

DS
Degen Score

PROJECT GALAXY
Project Galaxy

ENS
ENS

).ID
Next.ID

.bit

Violet
Violet Protocol

Spruce
Spruce

🧬 Native

🛠 Modified

Shil.me   **Mask**
Shil.me   Mask Network

Collab.Land
Collab.Land

Inspect

Metaforo   Metalink

Atem Network   ShowMe

Phi   **Cheers**
Cheers Bio

Mirror
Mirror

📱 Application Layer

Lens Protocol: A permissionless relationship layer that aggregates on-chain social information through Profile NFT

- Lens Protocol is an NFT-based social graph infrastructure and is now launched on the Polygon Mainnet. The protocol defines 6 behaviors for users: (1) Create profiles; (2) Follow profiles; (3) Create posts; (4) Collect posts; (5) Comment on posts; (6) Mirror posts (reposting); User behaviors are supported by three types of NFTs: (1) Profile NFT; (2) Follow NFT; (3) Collect NFT
- Profile NFT contains all Posts, Comments, Mirrors information (collectively referred to as Publication) published by users in history, and the content itself can be stored in centralized solutions (such as AWS S3) or decentralized solutions (such as IPFS, Arweave)
- Follow NFT firstly has the id attribute, the id of the first follower is 1, the id of the second follower is 2, and so on; Secondly, it has a programmable governance mechanism; The NFT contains the content of the user's latest tweet (including text, pictures, etc.)
- Features: Use NFT to represent the follow relationship between user profiles and addresses, which is a natural social graph and can achieve content monetization at the same time

Lens Protocol Architecture Overview

Case Study: Information Indexing and Distribution
RSS3: Decentralized Information Flow Protocol, Aggregating and Indexing On-chain and Off-chain Information
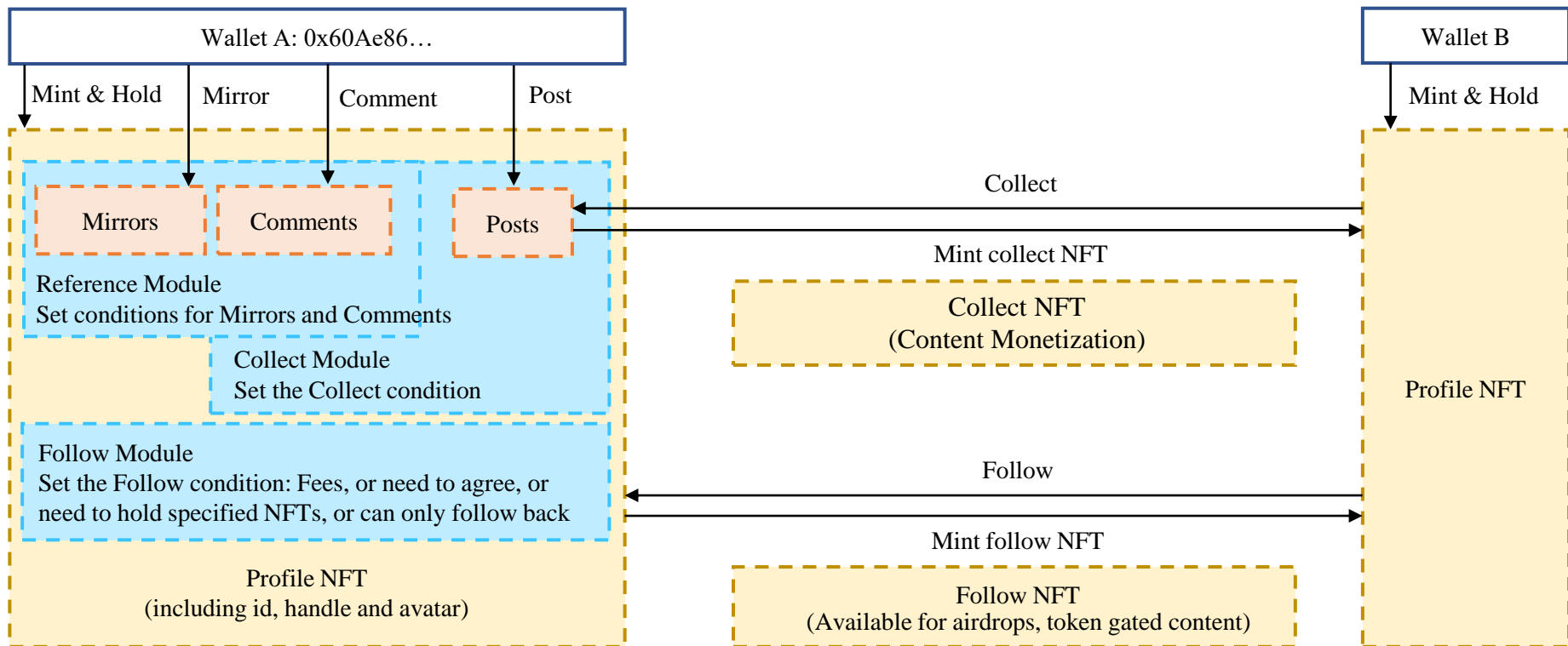
-RSS3-

Product Portfolio

- **RSS3**: An infrastructure for parsing and distributing on-chain information

- **Unidata**: Developer SDK. Unidata.js provides development-friendly APIs, and developers can easily access the underlying data in a unified format
    - Assets: NFT (EVM/Solana/Flow), Gitcoin donation badge
    - Notes: Articles (Mirror/Crossbell), Events (NFT/Gitcoin)
    - Profiles: Profile (Crossbell), Domain Name (ENS)
    - Links: Follow relationship between addresses (Crossbell)

- **Crossbell**: A dedicated EVM chain for social graphs similar to Lens positioning

- **Tureco**: Algorithm Module

- **RNS**: Domain Name

- **Cheers.bio**: Personal Profile
    - Basic information: Avatar/Nickname/Bio/Followings/Followers/Other Profile
    - Account binding: Twitter, Jike, Ethereum address, etc.
    - Basic Feed Streaming (Mirror+Twitter+Jike)
    - Collectibles/Badges/POAP/Footprints
    - Gitcoin donation history

- **Revery**: Advanced Feed Streaming
    - A feed stream featuring people you follow in Cheers.bio
    - Search: Search users by address/RNS/ENS
    - Filter: Filter the feed stream based on tags
    - Discovery: Recommend other users to follow

Overview of RSS3 Data Stream
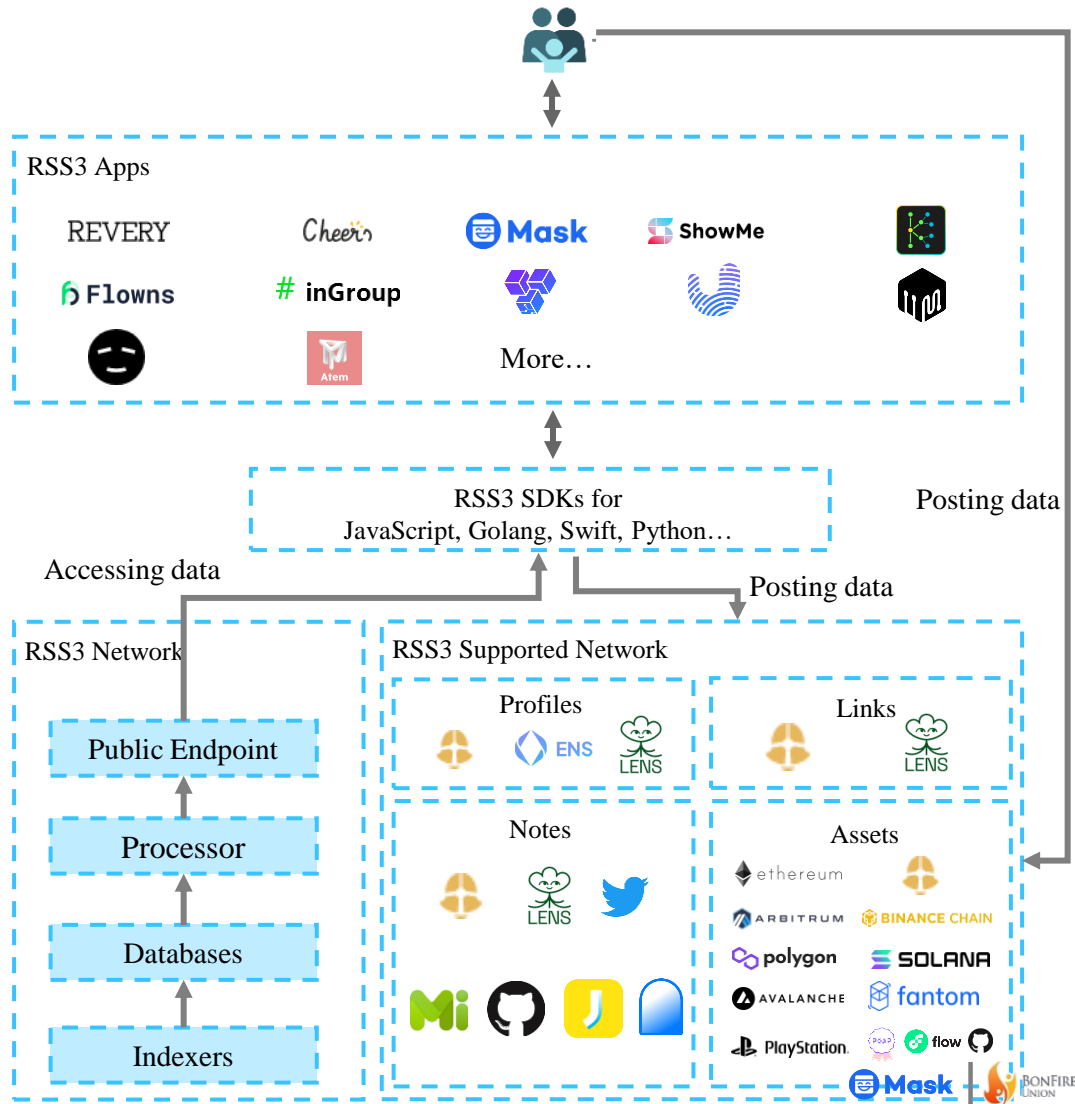
Ceramic: Scalable Identity Data Structure for Applications based on IPFS

- Concept: Ceramic is a public, decentralized data network for managing dynamic and variable information on the Internet
- Workflow: **DID** can create and manage **dynamic content** stored on a decentralized P2P storage network using **flexible** Data Models
- DID:
  - There is only one DID, and multiple wallets can link a DID through 3ID Connect. This DID can index the Stream ID, provide verification when data is updated, and manage the user's on-chain information. Using the profile created by Self.id, the user connects the wallet in any dApp and signs 3ID Connect to access their own DID Profile
  - One of Ceramic's key tools is IDX, a cross-chain identity protocol that provides a unified repository where all applications can register and discover data sources related to a user's DID. It can be thought of as a decentralized user table. Thus, IDX allows users to control their identities and data without locking down any single application, and to easily secure and port their data across applications. At the same time, it allows developers to build data-rich applications without forcing users to recreate the same data on each application
- Data Models: Ceramic has introduced Data Model encapsulation on top of Streams, which helps to improve the cross-application composability of data. Data Model is driven by the community and can be created by the community
- Dynamic content:
  - Ceramic uses IPLD to create the data structure of Stream. Each submission (data creation/.update) of the user is a commit, and a commit is a data block on IPFS, and each data block has a unique CID identification for content addressing
  - When the first commit is submitted, a constant Stream ID will be created. Each commit contains the data content and timestamp. The submission of the commit requires a DID signature
  - Stream is conceptually similar to a Git tree, each stream can be thought of as its own blockchain, ledger or event log, content modification requires DID signatures
- Composability: A Lens profile NFT can control a Ceramic data stream

Example: As shown below, each decentralized Twitter can be implemented based on some shared Data Model: one Data Model to define the tweet format, one to define the social graph pattern, one to define the DM format, etc.

Data Model, Data Stream and Commit
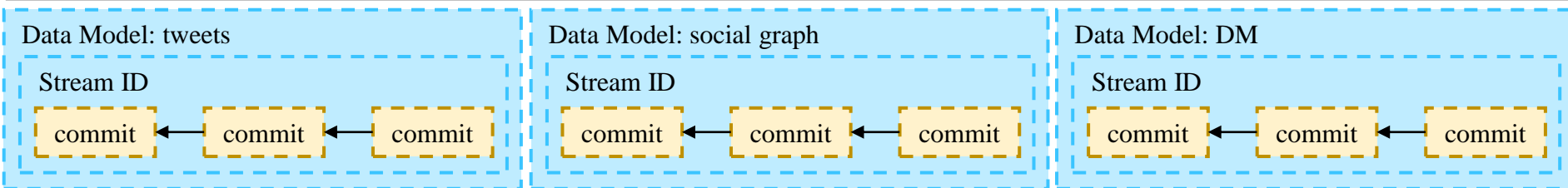
- Main functions: (1) Account binding and verification: With Persona as the center, the user's Web2 account and Web3 address are strongly bound to the same Persona based on cryptography, to achieve a strong association between accounts; (2) Relationship service: Provide aggregation of existing IDs, ID queries and IDs which are bound or parallel to Next.ID, opening up a range of possibilities for integration with external protocols

- Account binding idea: User A needs to bind the Identity of Persona and a certain platform (such as Ethereum/Twitter), which is equivalent to proving that both Persona and the Identity of a certain platform are held by A, which is equivalent to requiring the user to sign in to Persona with the private key, and the user can use an Identity to execute a specified command. So if a user can log into Persona with a private key, create a signature, then publish that signature publicly through the Identity to be bound. The content published by the user using Identity will come with the link ID of the platform. This ID needs to be recorded and verified by the Proof Service. After the verification, the binding of the two accounts can be realized. At the same time, this account association information will be appended to User A's Proof Chain as a block. Each block in the proof chain contains the signature corresponding to the Identity bound by the previous user (except for the first block)

- Identity relational query: Developers can visit this link to learn about the Relation Service server prototype: https://relation-service.nextnext.id
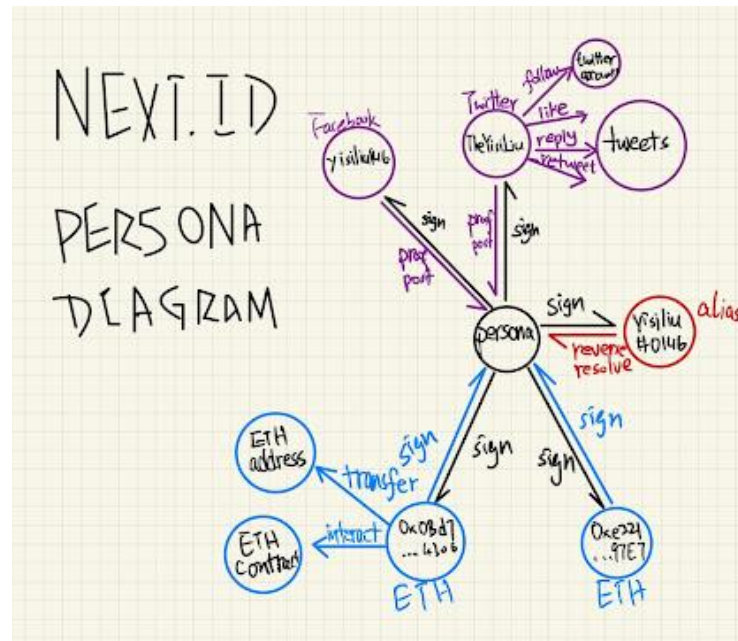
Use case 1: Secure verification of transfers between addresses

You're now transferring 10.0 ETH

to 0x1234567890123456789012345678901234567890

To proceed,

Please enter the target's Twitter username:

@Frank_

| Cancel | Transfer |
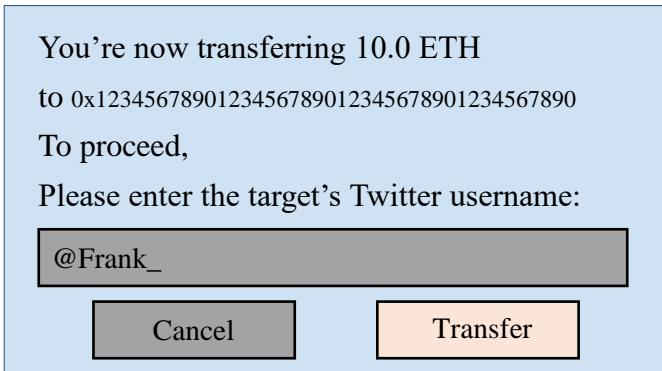
- Based on the information provided by Next.ID, user A transfers money to user B. In addition to user B's wallet address, user A also needs the handle of the designated social account bound to user B's wallet address

- If the entered account number matches the account number bound to the address, the system allows the transfer, otherwise it cannot be transferred

Use Case 2: Finding People

)ID	Next.ID: 0x12xxx890
🐦	@Frank
🌊	0x23xxx753
💬	Frank #9308

- Next.ID-based binding relationship can quickly and accurately find people across platforms

Source: Next.ID Docs

XMTP: An Encrypted Instant Messaging Network based on Waku V2

- XMTP network:
  - Built on Waku V2 and Libp2p
  - Messages are stored in network nodes, and users can access data through clients built on the XMTP network
  - The XMTP-based network can implement basic inter-address (wallet-to-wallet) communication and dApps message alerts (dapp-to-wallet)
- Client:
  - Parse the message format through a standardized interface
  - Encrypt and decrypt content
  - Send and index encrypted information to XMTP
  - Generate an Identity that can encrypt and decrypt information based on the wallet address
- Nodes: At present, all nodes are managed by XMTP. In the future, XMTP will launch an incentive model and decentralize the nodes.
  - Copy encrypted information to all nodes
  - Retrieve encrypted information stored in the node and send to client

XMTP Architecture Overview
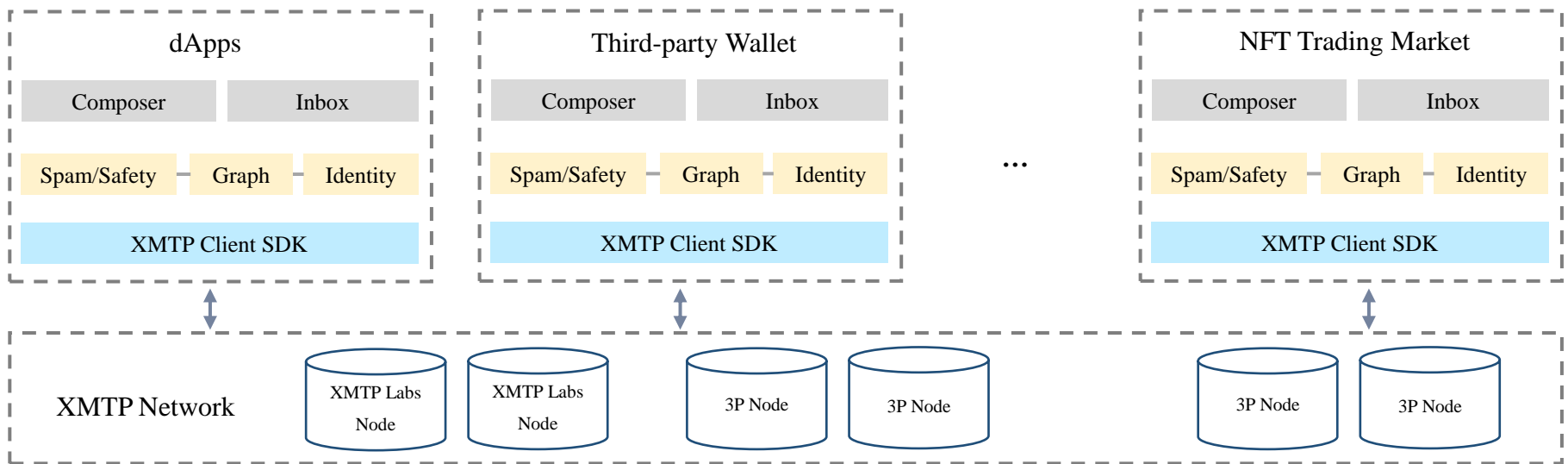
Case Study: Messaging Protocol
Evolution and Relationship of Major IM-related Protocols/Applications
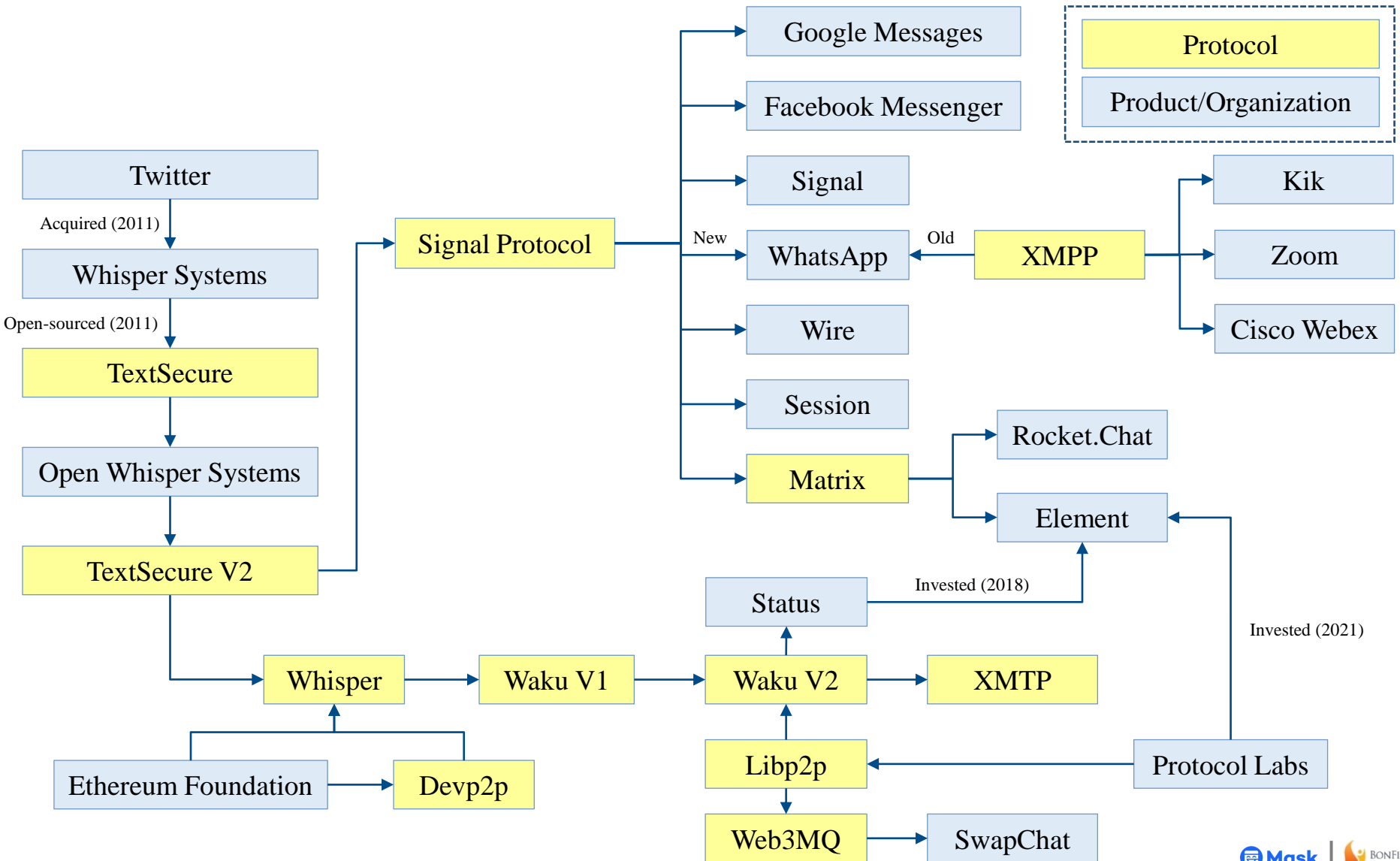
Ethereum Name Service (ENS): Decentralized Domain Name Service Protocol based on Ethereum

Introduction

- In 2016, ENS was launched within the Ethereum Foundation (EF). When it was first launched, the .eth domain name was only open to auction and registration of domain names with a length of more than 5 digits. At the same time, a free registration model was adopted, that is, users obtained the right to use the domain name by locking ETH. After the expiration, the ETH will be returned with the release of the domain name.

- In 2018, Nick Johnson left EF to form a non-profit True Name LTD full-time for the development and operation of ENS, and received a $1 million donation from EF

- In 2019, ENS upgraded the domain name to a token contract that complies with the ERC721 standard, opened the auction of short domain names with a length of 3 to 5 digits, and changed it to a rental model. When registering a domain name, the user pays rent according to the length and registration period, and obtains the right to use the domain name. Shifting from a free model to a rent model raises the cost of speculation for squatters, while bringing stable cash flow to ENS

- According to the 2020 revenue and expenditure report, the ENS team spends about $760,000 in total annually

- In May 2022, total domain name registration/renewal revenue was approximately $9.6 million

Use Case

- Transfer: Transfer between addresses as a binding address

- NFT works: Sell on NFT exchanges

- dWeb domain name: By setting the content hash, web pages can be accessed directly through the ENS domain name. For browsers without native parsing capabilities, direct access to such domain name URLs may be inaccessible, and ENS purchases the traditional domain name of eth.link, so that any browser can access these websites in the form of website domain name + .link

- ENS Avatar: Modify the logo image of the ENS domain name by setting the Avatar property

- Account soft binding: Bind ENS to Email, Github account, Reddit account, etc. without cryptographic verification

ENS Monthly Revenue (May 2019 – May 2022)
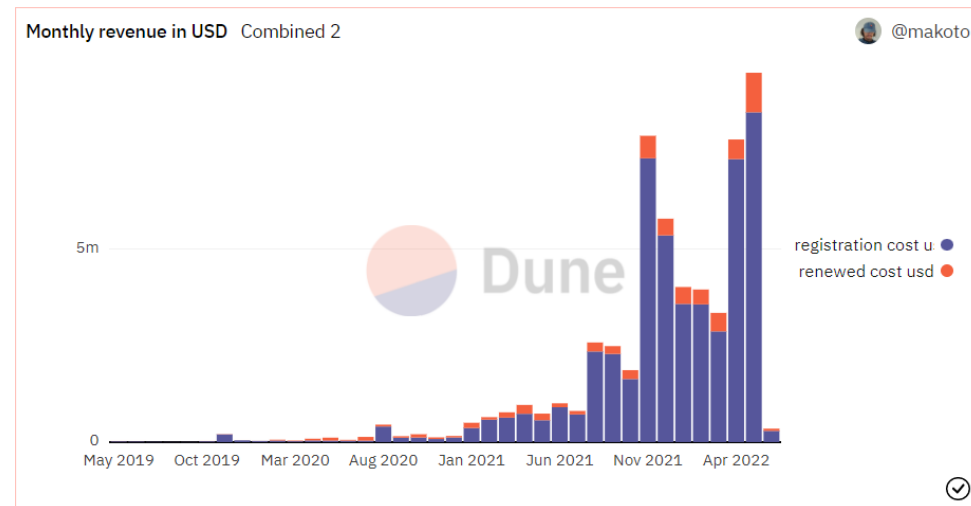
ENS monthly new registrations/renewals (May 2019 – May 2022)

Source: ENS Docs, Dune Analytics

Sign-in With Ethereum: Users can improve address readability by binding ENS and wallet addresses
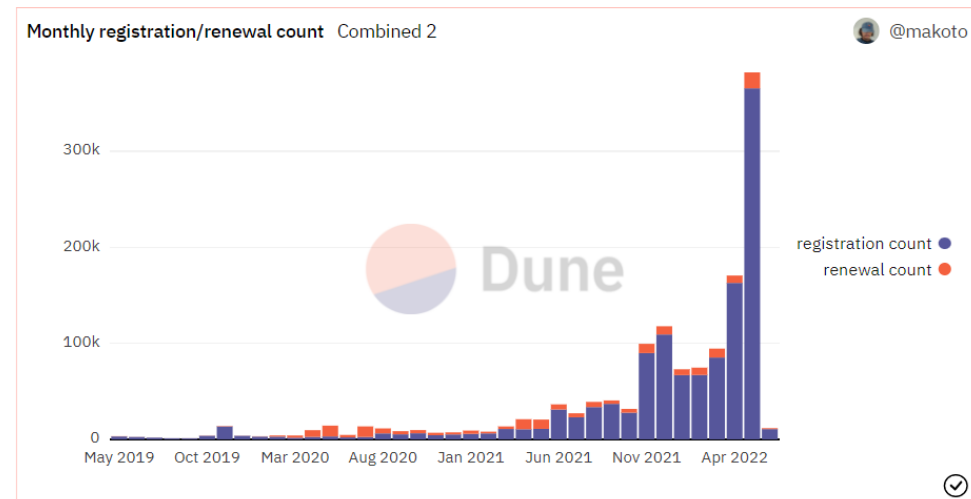
	Sign in with Account	Sign in with Google	Sign in with Ethereum
	Login 1.0	**Login 2.0**	**Login 3.0**
Username	Username	Social Account	Public Key
Password	Password	Password of Social Account	Private Key
Account Provider	Application Itself	Google, Facebook, Twitter…	Ethereum, Solana…
Account Aggregator	N/A	Auth0	Auth0
Advantages	N/A	• Simple Cccount Management: Users do not need to memorize multiple corresponding account and password pairs when switching between different applications	• Data Sovereignty: Users own their data • Interoperability: User data is communicated between applications
Disadvantages	• Hard Account Management: Every time a user uses a new application, they need to register a username and password • Data Isolation between Applications	• Difficult to Ensure Data Security/Privacy: Google, Facebook, Twitter, etc. have experienced large-scale user data breaches many times • Data Isolation between Applications	• Poorly Readable Account (Public Key): Hard to remember • Difficulty to Manage Private Keys
Solutions to disadvantages	• Third-party Account Management Software: Users can rely on software such as 1Password, Chrome plugins, etc. to manage multi-app accounts	N/A	• ENS: Users can use ENS as their account name to improve account readability • Wallet application: Users can use hardware wallets, MetaMask and other wallets for private key management

Introduction

- From the creator's point of view, Mirror is a crowdfunding platform for a single piece of content. Since its birth, Mirror has been bound with value attributes. The digital content published on it is given value through NFT tokenization, and ownership of a single piece of content can be sold to multiple investors through crowdfunding

- Different from the previous knowledge payment model, the core innovation of Mirror is that it builds a new ownership economic model through NFT and smart contracts, bringing real value to creators

Core functions

- Article Publishing: Involving Arweave and Optimistic

    - Arweave: Perpetual Content Storage. Every time a user saves or publishes content, Mirror will automatically initiate a transaction to store the content on-chain. The fee for storing articles in Arweave is paid by Mirror, and the average single fee for the last 1000 transactions is about $0.000619139. It should be noted that Mirror will only store text information in Arweave, and content forms such as pictures and videos will still be stored in the centralized server

    - Optimistic: Minting NFTs for Article Auctions. Authors can mint Writing NFTs for free on Optimism. The price and number can be determined by themselves. The minted NFTs will be available for trading in Optimistic's NFT trading market Quixotic. The articles with the most purchases and the highest sales NFTs will appear in Top of the Mirror Leaderboard

- Crowdfunding: Creator Value Returns to Creators

    - Mirror gives crowdfunding a stronger narrative: Different from medium-funded platforms such as JuiceBox, Mirror integrates "article + NFT + crowdfunding" on the same platform. For example, the documentary project Ethereum: The Infinite Garden once raised 1035ETH in only three days. (at the time about $1.9 million)

    - Community management is simple and efficient: Users who have donated to the project will automatically get a certain number of ERC20 tokens for the corresponding project. By combining tools such as Collab.Land, it can automatically build a fan community for creators on Discord

Development Stage

- [Phase 1] 2021.2 - 2021.9: Through the $WRITE Race, the 10 best content contributors will be selected each week to join the Mirror DAO. With a total of more than 240 people, it has almost included all the Web3 KOLs on Twitter. These KOLs are one of Mirror's core competencies

- * [Phase 2] 2021.10 - present: Determine the mission, vision, and values of Mirror DAO; determine the process and standards of member onboarding in the next stage of Mirror DAO; filter capable builders and contributors to join Mirror through activities such as Spotlight and Reflection DAO

Quantity of Entry

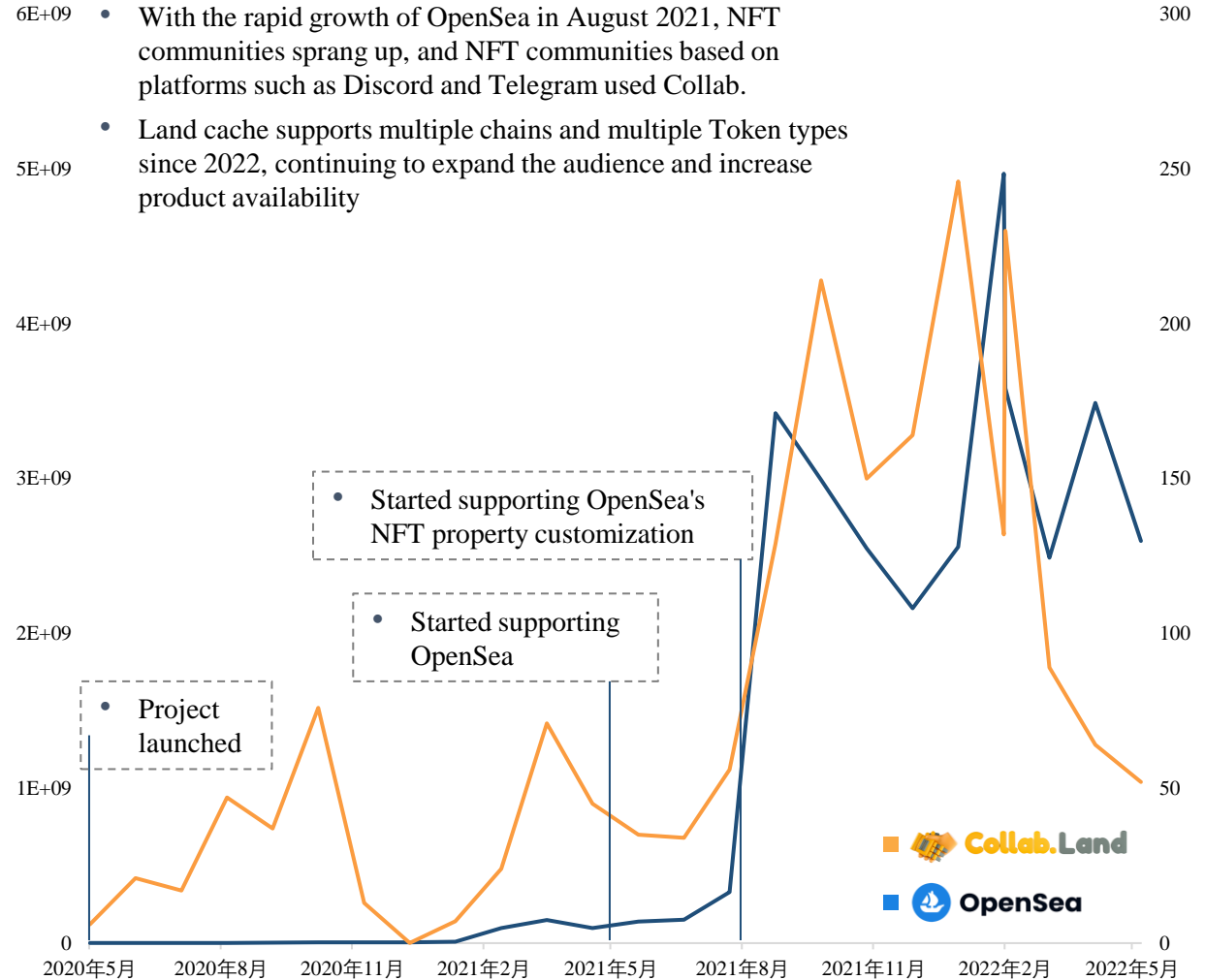# Collab.Land: Token-based Membership Management System
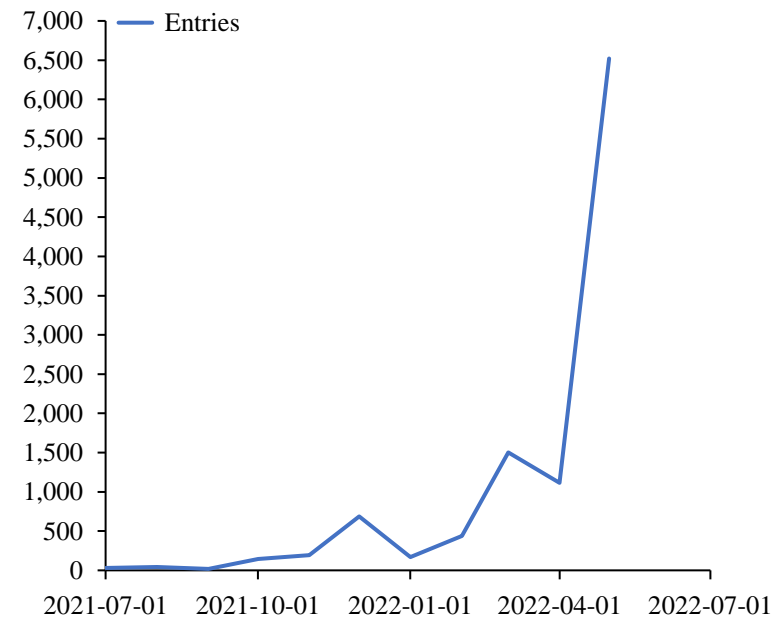
Introduction

- Collab.Land is a membership management system that relies on bots (bots) to monitor membership in the community. Simply put, potential community members must hold tokens with specified conditions (number, attributes, etc.) to enter the community, and Collab.Land's Bot, developed based on platform APIs such as Discord, will automatically check their membership. Members who meet the criteria will be eligible to join the community, and if a member sells the corresponding tokens and falls below the threshold, the Bot will automatically kick the member out

- Land's Discord Bot was created in April 2020 and is currently used in 32,600 Discord servers, with more than 3.4 million verified wallets on Discord, Telegram and other platforms combined

- Token support for 16 chains:
  - EVM: Mainnet / Rinkeby / Polygon / BSC / xDAI / Arbitrum / Avalanche / Optimism / Palm
  - Other：Solana / Eluvio / Flow / Kusama / Nifty / Polkadot / Tezos

- Supported Token Types (Ethereum Mainnet for example): ERC20, ERC721, ERC1155, ROLL, POAP, Moloch, OpenSea

- Supports customization of parameters such as the number of tokens held, NFT properties, etc.

OpenSea Monthly Volume vs Collab.Land Monthly Tweets

- With the rapid growth of OpenSea in August 2021, NFT communities sprang up, and NFT communities based on platforms such as Discord and Telegram used Collab.

- Land cache supports multiple chains and multiple Token types since 2022, continuing to expand the audience and increase product availability

- Started supporting OpenSea's NFT property customization
- Started supporting OpenSea
- Project launched

Case Study: Plugin
Mask Network: Web2 social applications for the small program ecological base

Frontend - Social Plugin

- Based on Web2 core social networks such as Twitter, Mask connects users' Web2 social accounts and Web3 wallet addresses through plugins, allowing users to directly use Web3 applications such as DeFi, NFT, games, social, and cloud storage in social pages based on plugins (similar to WeChat applets). Leveraging on the main battlefield of Web2 social traffic and the burgeoning Web3 ecosystem, Mask is a middleware that straddles Web2 and Web3, pivoting both ends simultaneously to further expand user usage and application ecosystem.

Backend - Middleware-based dApplet and Developer Services

- The Mask plugin connects Web2 social platform, Web3 infrastructure/tools and Web3 application side. With more and more eco-partners connected at each end, Mask is aimed at Web3 application developers by means of SDK: 1) connecting Web3 protocols/applications and Web2 social platforms; 2) connecting Web3 applications and various Web3 infrastructures; thus building up an eco-system of Web3 application developers

Mask Network Ecology Overview
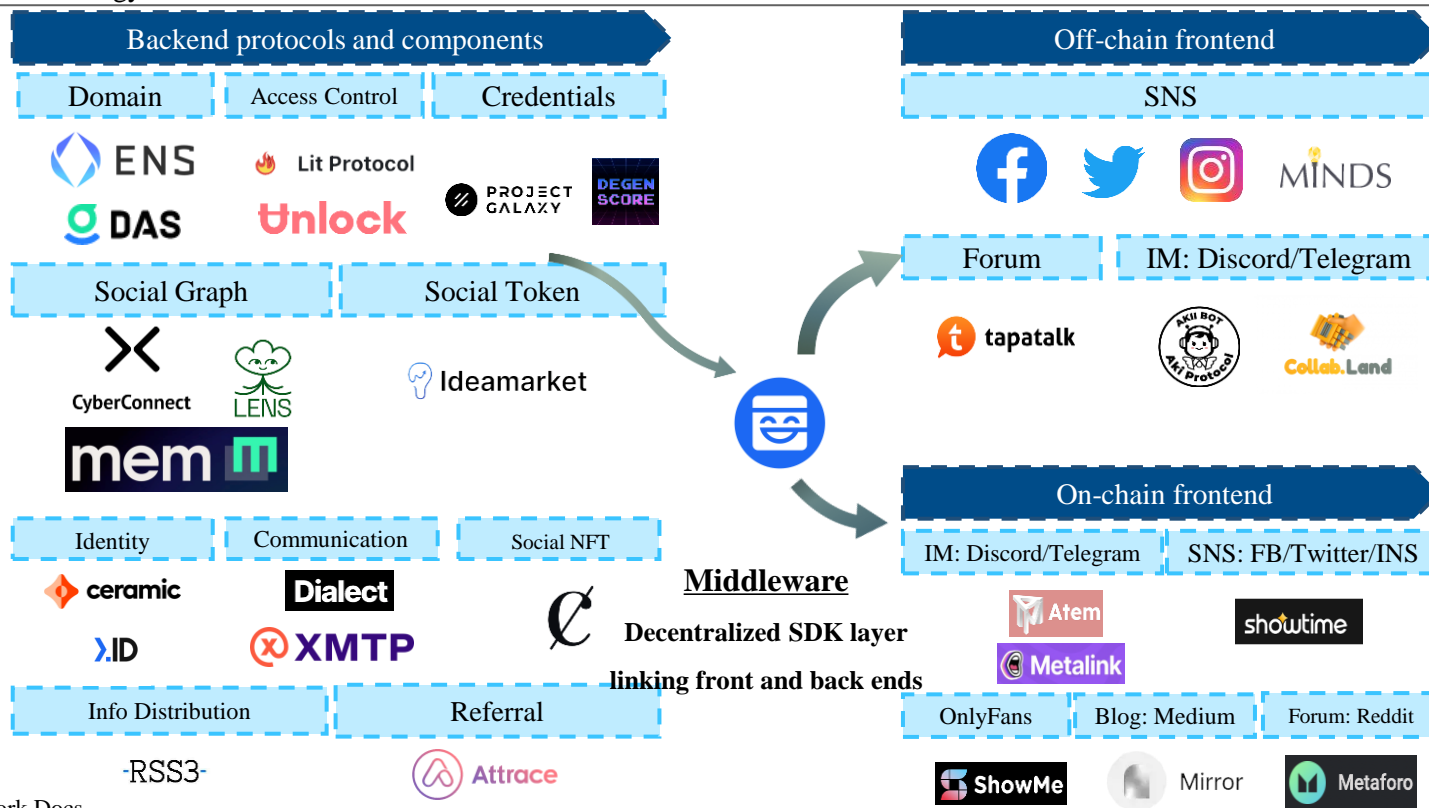
Data Storage Solutions
Typical Decentralized Storage Project Summary

IPFS

IPFS is a distributed file protocol that uses content addressing to uniquely identify files
- Store response information within a fixed period of time in accordance with the established contract between the buyer and seller
- Filecoin is the incentive layer on IPFS where miners in the Filecoin network can gain access to FIL by providing storage and retrieval services for their clients

Lighthouse

Layer 2 of IPFS, with support for affordable pay-at-once perpetual storage and native tokens for users to pay for storage
- Contracted multi-chain deployments, such as Polygon, Fantom, BSC, Optimistic, etc.
- An Endowment Pool is set up, and a portion of the user's contribution is deposited into the pool to cover long-term storage costs

Arweave

Arweave is a distributed storage protocol that supports permanent storage with a single payment
- Permanent storage
- The tokens spent by users to store data are partly given to miners and partly deposited in Storage Endowment to enable long-term release of miners' rewards

Bundlr

Arweave's Layer 2 solution that supports packaged transactions and allows users to pay for the storage in multiple currencies
- Supports cross-chain storage and can use each chain's native tokens to pay for storage
- Bundlr can pack any amount of data into a single block that can be processed by layer1 through layer2
- Solves the problem of large amounts of single data that cannot be uploaded at low cost
- Bundlr currently handles 98% of the transactions on Arweave

Kyve

A middleware for on-chain projects with a standardized data upload and validation architecture
- Kyve nodes can calculate the latest state of contracts and make them available to users
- Upload and validate data through a standardized framework: Data providers can create storage pools to store and validate their data
- Full data backups can be made for any blockchain, such as Solana's choice to back up Solana's entire chain of books to AR via Kyve

Meson

Decentralized CDN, aggregating idle servers through mining, a caching layer on top of IPFS and Arweave
- Meson's nodes maintain routing tables, which allow the application layer to find the nearest and fastest nodes
- When there is a user request, the txid of the file stored in Arweave or IPFS will be saved in some nodes, and when the number of requests for the txid increases, the txid will be automatically backed up to more nodes, this automatic scaling mechanism can improve the data retrieval and reading speed for users
- The current number of nodes is 30,000+ worldwide, Asia ~ 8,000, North America ~ 10,000, Europe ~ 13,000

Mask | BONFIRE UNION

What are the advantages and disadvantages of decentralized storage over traditional storage?

Comparison of three types of storage solutions

	On-chain storage: smart contracts	**Off-chain storage: centralized servers (e.g. AWS S3)**	**On-chain storage: decentralized storage protocols**
Pros	• Secure, data cannot be tampered with • Decentralized, the chain is in the data • Data is part of the network state and is stored in each full node	• Cheap price • Flexible configuration and good server performance • Large storage space • Data can be accessed directly • Complete CDN network, fast data access	• Cheap price • Data can be accessed directly • Large storage space • Data cannot be tampered with

Cons	• Ethernet Layer1 is not designed for storage:
	  • Extremely expensive
	  • Small storage space
	  • No direct access to data, need to call smart contracts
		• Platform risks associated with centralized hosting: platforms may modify or delete data for various reasons
		• Risk of data availability due to payment model: users need to pay rent (monthly/annual fee) for a long time to prevent data loss
			• Data availability risk: data may be lost (IPFS)
			• Payment model risk: need to pay rent over time to prevent data loss (Filecoin, Sia, etc.)
			• Regional policy issues: need to use hard-to-get tokens to pay for storage (Arweave, e.g. AR tokens cannot be shelved on local exchanges due to policy in some regions)
			• Performance issues: Low access performance in some regions due to uneven distribution of nodes globally

Summary: Web2 storage solutions have many advantages over decentralized storage, such as better performance, more configurability, and cheaper prices, but Web3 storage data will have the characteristic that it cannot be tampered with, and users can choose to entrust files to nodes/code rather than centralized servers

Comparison of decentralized storage solutions: IPFS/Filecoin for storing short-term/cached/temporary data, Arweave + Bundlr combination of projects for storing long-term data (e.g. NFT metadata) or making permanent backups of data on IPFS/Filecoin

	IPFS	**Filecoin**	**Arweave**		**Bundlr（Arweave 的 Layer2）**
Features	• No guarantee of data availability	• Long-term rental payments are required, and data may be lost when rental payments stop	• Cheap • Can't be tampered with • Pay once for permanent storage • Guaranteed data availability • Data can be indexed directly via subgraph	• Requires several minutes of data confirmation time • Tokens are more difficult to obtain in regions such as the US • Requires entering private key on website to upload files	• Cheap • Data can be accessed directly • Data cannot be tampered with

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Appendix: Mailing lists were also an early form of group chat similar to Usenet, such as the first release of Mosaic on CERN's www-talk mailing list

The email from the first release of Mosaic	Details

```
From: marca@ncsa.uiuc.edu (Marc Andreessen)
To: www-talk@nxoc01.cern.ch
Subject: NCSA X Mosaic 0.5 released
Date: Sat, 23 Jan 93 07:21:17 -0800
```

By the power vested in me by nobody in particular, alpha/beta version 0.5 of NCSA's Motif-based networked information systems and World Wide Web browser, X Mosaic, is hereby released:

file://ftp.ncsa.uiuc.edu/Web/xmosaic/xmosaic-0.5.tar.Z

This release of X Mosaic is known to compile on the following platforms:

    SGI (IRIX 4.0.2)
    IBM (AIX 3.2)
    Sun 4 (SunOS 4.1.2 with stock X11R4 and Motif 1.1).

Binaries for these platforms are available on ftp.ncsa.uiuc.edu in /Web/xmosaic/binaries-0.5. More binaries will be supplied as I am able to find other Motif-configured platforms to use (DEC MIPS probably within the next half hour).

Although this is alpha/beta software, I'm looking more for feedback on design and functionality than bug reports right now -- down the road the bulk of the program will be rewritten in C++ anyway, so don't take the current code too seriously. But bug reports are welcome too. New releases will probably come out about every 7-14 days until 1.0 arrives.

A list of current and future capabilities of X Mosaic follows this message.

Cheers,
Marc

--
Marc Andreessen
Software Development Group
National Center for Supercomputing Applications
marca@ncsa.uiuc.edu

- First public version of Mosaic released by Marc Andreessen
- Release location: public mailing list created by CERN www-talk@nxoc01.cern.ch
- nxoc01.cern.ch: address of the first CERN server
- nxoc01: indicates (NeXT, Online Controls, 1), NeXT refers to NeXT, the computer used to write Web code and design Web browsers, released by NeXT, Inc. which was founded by Steve Jobs
- Mailing List: Similar to Usenet, this is a service that sends out emails within a specific group, where members can send emails to all their subscribers. Specifically, all group members can send messages to other members of the group - the group member sends the message to the group's public email, and the system processes the message and sends it back to all group members

Source: kanzaki.com/works/2001/pub/wtalk-mosaic.html, scientificamerican.com/article/facts-about-the-webs-creation, w3.org/People/Berners-Lee/1991/08/art-6484.txt, zhihu.com/question/23757640

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Appendix: A summary of mature open source business models, among which the federated social protocol Matrix adopts the Open-core as its business model

Business Model	Introduction	Feature	Case
Support	• Users only pay for technical support and consulting services	• Labor outsourcing, low-profit margin • Low replicability of work, difficult to scale • Low customer conversion rate, usually <1%	Hortonworks, redhat
Hosting	• Vendors host their open source software as a service on the cloud and profit by charging monthly/annual hosting and service fees	• The model has become a way for some cloud vendors to package open source projects to earn profits	databricks, Acquia
Restrictive Licensing	• Incentivize users to pay by offering an open source license with slight restrictions	• Vague definition of license, court decision required • Some companies are prohibited from using open source software under this business model	redis, neo4j
Open-core	• Most of the code in this model is open source, while a small amount of code (for enterprise users) is proprietary and requires a fee • The proprietary part can be packaged as a single module or service linked to the open source base part or distributed in a forked version	• The model avoids the need for cloud vendors to package open source projects to earn profits • Difficult to pinpoint the scale of open source scope • Difficult to completely separate open source from proprietary features in the code	confluent, cloudera
Hybrid Licensing	• The latest model that improves on the open core • Hybrid license mixes open source and proprietary code in the same code base • Users can choose to use only open source code, or both open source and proprietary software code	• Code in the same codebase makes management and development easier • Allows users to easily upgrade to a paid model • Allows external community (e.g. GitHub) members to make improvements to proprietary object functionality modules	elastic, Cockroach LABS

Currently, open core + hybrid licensing is becoming a mainstream business model for the following reasons:
• Open source software vendors can easily manage the code base without having to pinch the scale of open source
• Customers can easily switch from the free open source model to the paid model (no additional deployment and no need to communicate with sales staff)
• The external open source community can also improve the proprietary paid module code, reducing development costs

Source: Yunqi Partners

Mask | BONFIRE UNION

Appendix: A non-exhaustive summary of features and applications contributed by Twitter users/third-party developers

twitter

Third-party developers' contributions:

- First Macintosh client
- First iPhone client
- First to use "tweet" to describe a status update
- First character counter when users type tweets
- First support for replies (in collaboration with Twitter engineering)
- First pull-to-refresh: Loren Brichter pioneered the pull-to-refresh interaction in Tweetie 2 in 2009, and Twitter acquired Tweetie and hired Brichter in April 2010. Twitter's iPhone app is largely just a renamed and updated version of Tweetie
- …

User's contribution:

- The first re-tweet function: When early users want to re-tweet, they first enter "RT @" and then add the source (user) and message content of the re-tweeted target message after the @ symbol. That is: RT @Username XXX

Source: daringfireball.net/2011/12/new_twitter, furbo.org/2011/03/11/twitterrific-firsts

Mask | BONFIRE UNION