Numbers Protocol Whitepaper
2023/10/16

Introduction

About

Provenance is key to the success of establishing trust and credibility in the online space and is also one of the most important factors that lead to the success of monetization of digital media. Without provenance, it can be difficult to determine the reliability of the information or the value of digital assets.

In the centralized internet, trust is often established through recognized intermediaries like search engines, social media platforms, and news organizations. However, this centralized model has faced criticism as instances of censorship and biased content moderation challenge the idea of a free and open web. However, in a decentralized, user-owned and controlled internet, individuals and organizations are able to verify the authenticity of the information and assets they encounter.

Numbers Protocol is the decentralized provenance standard. It secures digital media provenance through a decentralized ecosystem and blockchain technology, similar to a version control system like Git. Numbers creates immutable birth records of digital content and tracks changes made, allowing for collaboration and management. The Numbers Mainnet functions as a decentralized Github, storing data related to assets, such as provenance, ownership, and historical records, securely and transparently.

In the future of AI, provenance ensured by Numbers Protocol can help to provide references of where the data came from and how it should be used. This is important in building trust between individuals and organizations that collect and use personal data, identifying whether the content is generated by AI or not. The Assetization process further helps users of Numbers Protocol build user-owned and user-controlled content datasets. With proper consent, the registered digital content and their provenance metadata can be used by AI models or other variety of purposes.

Our long-term vision is to establish a transparent, fair, and authentic digital media ecosystem that promotes accountability and ensures the safe and secure use of digital content.

Project History

Founded in 2019, it has been our long-standing goal to address critical issues in the digital media space, namely misinformation, copyright and royalty distribution. Our use cases include Reuters coverage of the 2020 US Presidential election, climate-change photo collections, cataloging and preserving war crime evidence in Ukraine, and supporting artists and creators to monetize their creative work with better controls. More use cases can be found [here](#).

Numbers Protocol is an innovative and flexible solution that can be adopted on all EVM-compatible blockchains. The currently supported blockchains can be found in our [dev document](#). However, in order to deliver consistent and dependable services, the need for a dedicated blockchain became apparent. This led to the development of Numbers Mainnet.

Launched in December 2022, the Numbers Mainnet is a major milestone in our mission to revolutionize the digital media content industry. It is the first blockchain dedicated to ensuring the provenance of digital media, offering improved efficiency, enhanced stability, and reduced costs. Numbers Mainnet is more than just a technological advancement; it is a symbol of our dedication to authenticity in the digital media content space.

The Numbers Mainnet was preceded by the launch of its native token, NUM, in 2021. NUM not only secures the essential funding for the construction and smooth operation of the Numbers Mainnet, but also enables the creation of a DAO for the future management of the network.

Defining Web3 Assets

Numbers Protocol has pioneered the process of "Assetization" that reshapes the standard narrative of digital media, setting a new bar for transparency, traceability, and authenticity. Assetization process transforms digital media files into Web3 assets, boosting their value, uniqueness, and trustworthiness. A unique identifier, "Numbers ID (Nid)", is created, which conforms to the [EIP-7053](#) standard and serves as the unique signature for each digital content, enabling easy identification, tracking, and verification.

Assetization

Assetization process creates a unique identifier called the "Numbers ID (Nid)", that is cryptographically generated and serves to distinguish the vast ecosystem of digital assets within the network. Assetized content in the network have associated "Commit" records that capture context, ownership, and creator signature. These commits linked to Nid to allow tracking changes made to the assets over time. Each commit is also linked to an "AssetTree" file which describes the property of the asset including creator, creation time, license, etc.

Numbers ID (Nid)

The Numbers ID (Nid) is the interoperable identifier of digital media following [EIP-7053](#) standard. It is a unique identifier to identify each content file within the Numbers Protocol network. The Nid is a 59-character string that is cryptographically generated and serves to distinguish the vast ecosystem of digital assets within the network. The use of Nid ensures that all content files within the network can be easily identified, tracked and verified.

Commits

Similar to commits in the Git system, every asset in the network has its own "Commit" history recorded on the blockchain. This allows for the tracking of the asset's journey from its creation to the present time, making it easy for anyone to verify the authenticity and integrity of the asset. This simplifies the concept for developers that are familiar with Git to understand the concept of AssetTree and Commit in the Numbers protocol system.

AssetTree

AssetTree, an integral component of Numbers Protocol's assetization process, is a metadata repository that describes the important properties of digital assets. Complying with international standards like [IPTC](#) and [C2PA](#), AssetTree ensures the credibility of digital assets and respects the creators' intent. Consequently, it encourages responsible and ethical use of digital content in AI workflows, ensuring respect for creators' rights and preferences.

More descriptions of the assetization process and details of each component can be found in the [Gitbook](#).

Roadmap & Milestone

- Q4 2021: TGE & Listing
- Q1 2022: Launching deflationary strategy
- Q2 2022: Listed by 4 top CEX
- Q3 2022: Launching API for enterprise users
- Q4 2022: Launching Numbers Mainnet
- Q1 2023: Archiving 2022 historical events on Numbers Mainnet
- Q2 2023: Winner of SXSW 2023
- Q3 2023: Integrated by AI platforms
- Q4 2023: Supporting personalize handle on Numbers Mainnet
- 2024: Leading provenance infrastructure in AI and creator economy

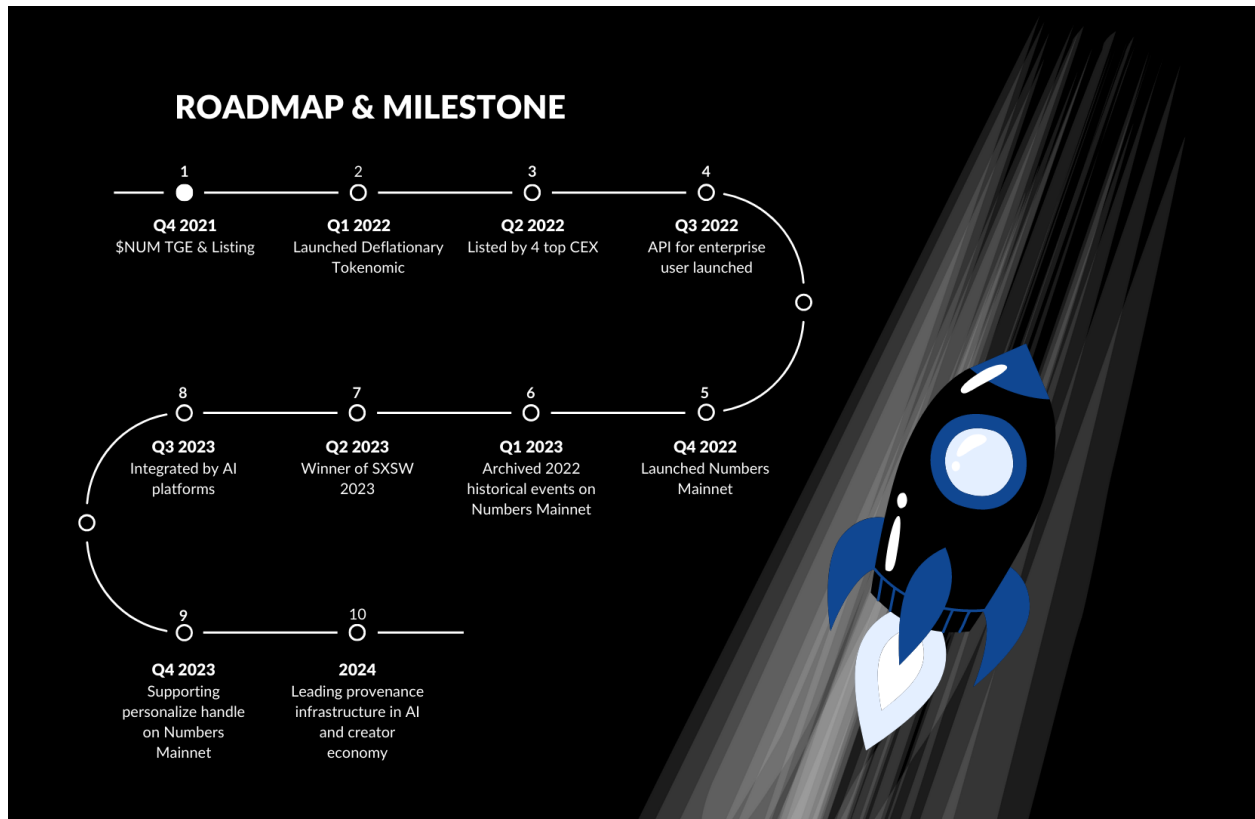More details please see update on [Numbers Protocol Wiki](#).

Figure 1 : Roadmap & Milestone

NUM Token

NUM token is the native token of Numbers Protocol. It is primarily a utility token designed to secure the Numbers Mainnet and incentivize users to archive/verify content with good provenance. NUM is utilized for various functions within the Numbers Protocol as outlined below in [NUM utility](#).

Token Name	NUM Token
Token Ticker	NUM
Supported Chains	Numbers Mainnet, ERC-20 & BNB Chain
Token Supply	1,000,000,000
Token Contract - ERC20	0x3496B523e5C00a4b4150D6721320CdDb234c3079
Token Contract - BEP20	0xeceb87cf00dcbf2d4e2880223743ff087a995ad9

Table 1: Token specification

NUM Utility

Delegated proof of stake

Numbers Mainnet is a Layer 1 blockchain solution that defines its own networking, provides its own security, as well as its own execution logic and fee structure. Facilitating on-chain data archiving, revenue sharing and NFT minting, Numbers Mainnet plays an important role in facilitating Numbers Protocol's core functionality. It also allows for native transactions of NUM, the native token of the Numbers Protocol network.

Following through with the 4th NumbersDAO meeting result, Numbers network will migrate gradually from permissioned PoS to permissionless PoS with delegation support. This change will be implemented 12 months after the DAO meeting, approximately July 2024. After this implementation, NUM tokens can be delegated to validators who are securing the Numbers Mainnet utilizing a mechanism called delegated proof-of-stake (DPoS). This enables any NUM token holder to help secure the blockchain. In return, they share in the validator rewards given to the validator they are delegating their NUM tokens to.

Governance

Community-focused and decentralization are core values of Numbers Protocol. As a reflection of our values, NUM token holders can stake their tokens to become members of the Decentralized Autonomous Organization (DAO). As DAO members, they are granted the privilege to voice their opinions, participate in voting processes, and influence the direction and policies of the Numbers Protocol. More details can be found in the "Becoming A DAO Member" session.

Payment Within the Ecosystem

The NUM token acts as a form of digital currency within the Numbers Protocol ecosystem. Developers and users can utilize NUM as payment tokens for accessing ecosystem apps, notably enabling pay-as-you-go APIs. This ensures seamless transactions and fosters an environment where innovation is continuously incentivized.

Content Verification

In the digital age, ensuring content authenticity is crucial. The Numbers Protocol empowers users to stake NUM tokens, allowing them to act as Content Verifiers. These verifiers are evaluated by their profession, reputation and contributions. Through a decentralized, community-driven process, these verifiers collaboratively confirm the truthfulness of content sources, ensuring that information shared on the platform is both transparent and trustworthy. This collective approach harnesses the diverse knowledge of the community, minimizing the chances of misinformation.

While content verifiers earn rewards for accurate verifications, there's a measure of accountability in place. If they incorrectly Verify content, they risk losing some or all of their staked NUM. To manage workflow, verifiers can authenticate only a limited amount of content in a specified period of time. However, increasing their staked NUM allows them to expand this verification capacity, creating a system that balances incentives with diligent oversight.

Content Accessibility

In addition to the existing utilities of NUM, the Numbers Protocol has recognized the inherent need for robust and decentralized storage solutions, ensuring data resilience and accessibility. Users can offer their excess storage capacities to the Numbers users, serving as decentralized storage nodes. In return for providing this valuable resource, they are compensated with NUM tokens. This mechanism ensures data redundancy and fault tolerance, contributing to the holistic development of the Numbers Protocol ecosystem. As Numbers Protocol is a provenance protocol instead of a storage protocol, the underlying technologies are supported by IPFS and Filecoin.

As quality and stability are key factors to the success of a content network like Numbers Protocol, the implementation timeframe of decentralized Content Verification and Accessibility shall depend on the network growth and the decisions from DAO.

Liquidity Providers

Liquidity providers are an integral part of making NUM accessible to everyone. Numbers Protocol supports liquidity pools on PancakeSwap to facilitate trading of NUM. NUM tokens can be paired with a stablecoin and deposited into the liquidity pool to receive additional trading fees and NUM rewards.

Deflationary Economy

In January 2022, we announced the Deflationary Token Economy of NUM. More details can be found in the following article:

[Numbers Protocol Asset & Deflationary Token Economy](#)

Due to the increasing adoption and transaction volume on the Numbers Mainnet, After an extensive community discussion we are introducing a new transaction-based burn formula at the 2nd Quarterly burn of 2023.

This update aims to establish a sustainable burn rate by basing it on the number of transactions conducted. The proposed formula strikes a balance between simplicity and the potential for future growth and scalability. The newly adjusted burn mechanism formula is as:

$Nburn = min(max(N\_transactions, 6M), 25.5M)$

More details on the new burn formula can be found in the following article :

[Q2 Burn and Buyback report & Burning mechanism update](#)

The burned tokens will be removed from the circulating supply.

Once 50% of the NUM supply has been permanently removed from circulation, Numbers Protocol will introduce a buyback and distribute value capture mechanism. This mechanism will ensure that NUM captures value proportionally to the success of the entire Numbers Protocol and will allow for sustainable future incentives for stakers.

Value flow diagram

Below is the value flow diagram of the NUM token ecosystem ([original image](#)).
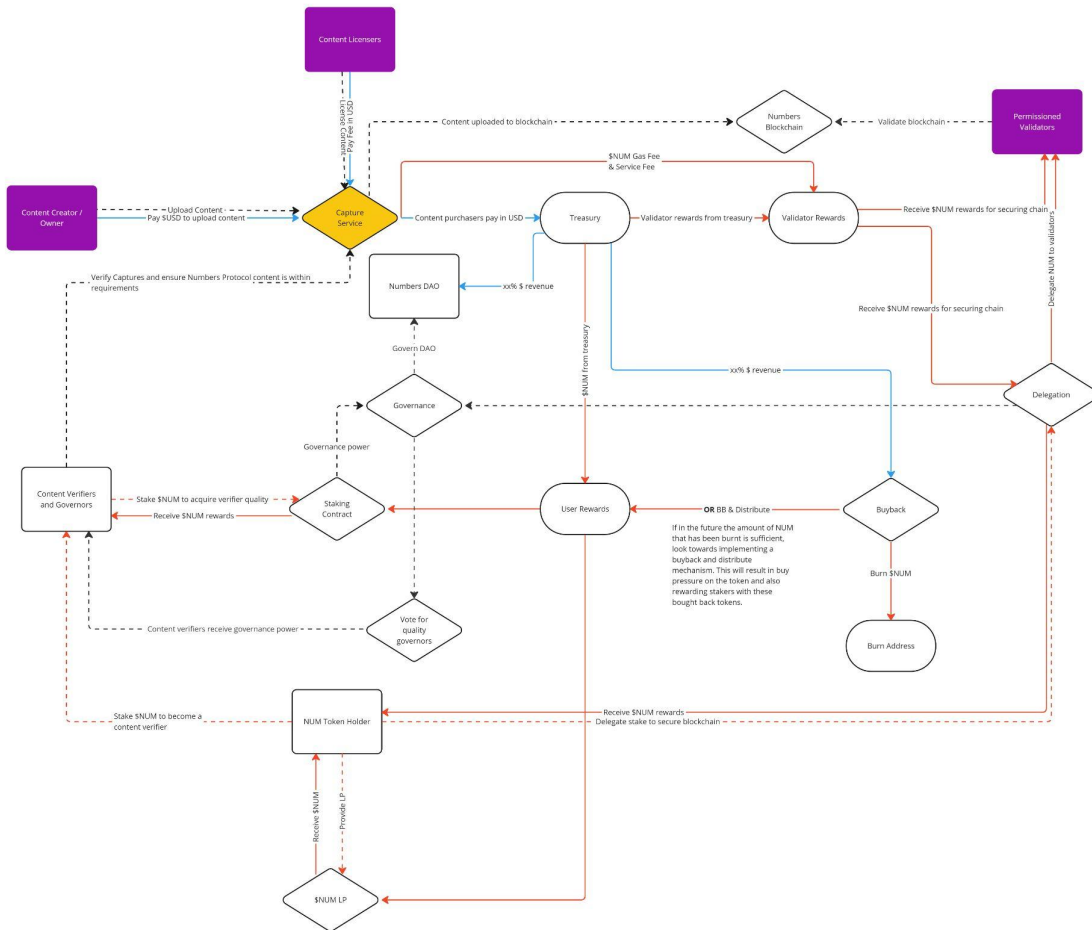
Figure 2 : FlowDiagram of NUM Ecosystem

Token allocation
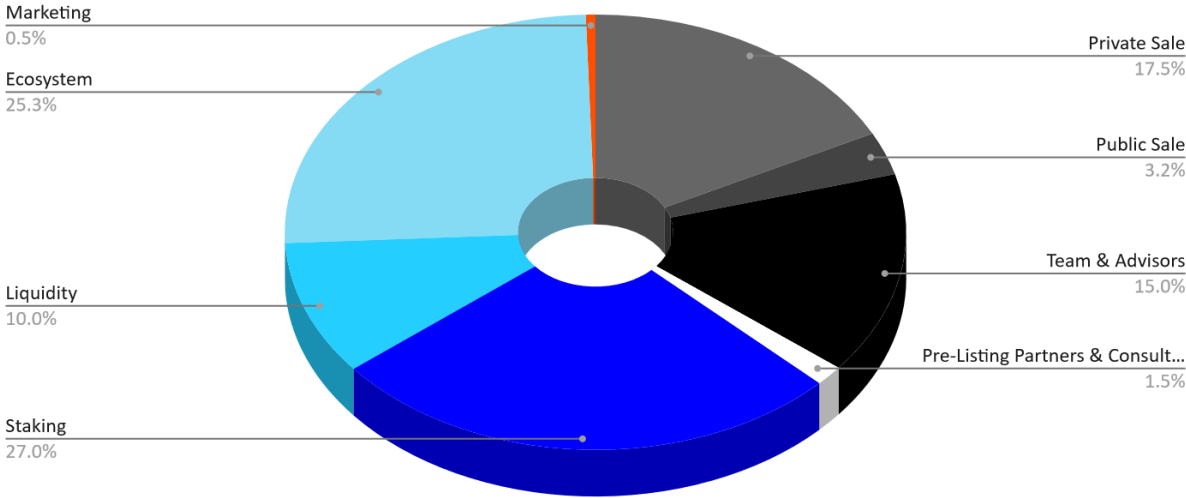
Figure 3: Token allocation chart

Lot	Percentage	Tokens
Private Sale	17.51%	175,125,000
Public Sale	3.19%	31,875,000
Team & Advisors	15%	150,000,000
Pre-Listing Partners & Consultants	1.50%	15,000,000
User Reward and Staking	27.00%	270,000,000
Liquidity	10.00%	100,000,000
Ecosystem	25.30%	253,000,000
Marketing	0.50%	5,000,000

Table 2: Token allocation

Private Sale

- Investors who invested at the early stage of the project or join the strategic round of the token sale and commit to the long-term contribution of the network as technical, business, marketing partners or the network ambassador.
- Vesting: 10% on TGE, 3-month lock, 4.29% monthly over 21 months

Public Sale

- Contributors who participate in the community round of the token sale.
- Vesting: 20% on TGE, 3-month lock, then 20% quarterly

Teams & Advisors

- Team helps build Numbers Protocol, advisors, and developers who participate in building the initial version of the decentralized photo network.
- Tokens are vested with a cliff period.
- Vesting: 1-year cliff after TGE or 3-month cliff after network launch (whichever is shorter), then 2.78% monthly, *3.06% for the last month (50th month).*

Pre-Listing Partners & Consultants

- Pre-listing partners and consultants who participate in the listing process and make sure the listing process of NUM tokens runs smoothly.
- Vesting: 10% on TGE, 6-month lock, 22.5% on month 7, 13, 16, 19

User Reward and Staking

- Benefit network users who participate in the decentralized photo network ecosystem.
- The distribution of user rewards starts after network launch.
- Vesting: 1% monthly for the first year, 2% monthly starting from the second year until all tokens are distributed.

Liquidity

- For creating a liquidity pool of AMM and market making for creating a healthy trading environment.
- Vesting: 10% on TGE, 3% monthly for the first year and 5.2% monthly for the second year.

Ecosystem

- Network operators, tech or business partners and community developers who contribute to the decentralized photo network ecosystem.
- As the network transitions to community governance, the distribution of ecosystem rewards will be decided by the network community.

- This fund may also be used for the extreme case. In the case that the network is attacked and not functional, this fund may be depleted based on the governance vote result.
- Vesting: 1.5% on TGE, 2% monthly until all tokens are distributed.

Additional Ecosystem Token

- According to the 5th NumbersDAO voting, 2.5% of Team & Advisors tokens will be allocated to the Ecosystem.
- Originally 17.5%, now Team & Advisor allocation is 15%.
- Originally 22.8%, now Ecosystem allocation is 25.2%.
- Vesting : After Team & Advisor allocation has been completed (50th month), the additional 2.5% will be allocated to Ecosystem (51st month).

Marketing

- Marketing tokens to incentive KOLs to participate and broadcast the project to the community
- Vesting: 17.5% on TGE, then 7.5% monthly

Monthly token distribution

NUM is minted and distributed on a monthly basis based on the defined tokenomics. The latest supply and distribution records with details can be found in the [community wiki](#).

NumbersDAO

The NumbersDAO (Decentralized Autonomous Organization) is a community-led governance system that allows DAO members to participate in the decision-making process of the protocol.

NumbersDAO is responsible for a variety of tasks, including
- Setting the strategic direction of the protocol
- Allocating resources
- Voting on proposals
- Determining the application standard of Content Verifier
- Resolving disputes

The NumbersDAO ensures that the protocol is governed in a fair and transparent manner. It also allows community members to have a direct say in the development of the protocol.

Roles and responsibilities

There are 5 roles of NumbersDAO, each with different responsibilities and capabilities:

- **Participant - Pebble NFT holder**: Community members who want to participate in DAO meetings. Pebbles are free to join in the DAO discussion but hold no voting power.
- **Voter - Snow NFT holder**: Have to be on the whitelist and an active contributor to the Numbers project. Be a [Tier-1 Ambassador](#) or similar qualification. Can participate and vote in DAO meetings.
- **Captain - Rose NFT holder**: Have to be on the whitelist and an active contributor to the Numbers project. Be a [Tier-2](#) & [Tier-3](#) Ambassador or similar qualification. Can participate, vote and propose in DAO meetings.
- **Creator Advisor - Sky NFT holder**: Whitelist candidates proposed by existing Sky holders. Sky holders should be reputable in the creator community as their feedback will assist Numbers Protocol in creating and updating the content governance rules to create a healthy network.
- **Council Member** - **Night NFT holder**: Whitelist candidates proposed by existing Night holders. Invited members should be reputable people with extensive knowledge of Numbers Protocol, tokenomics, and other WEB3.0 projects.

Proposal Process

Everyone in the Numbers Community is welcome to propose and discuss ideas on our Community Forum. Council members review and select key proposals for the DAO meeting.

To ensure transparency and ensure topics are well-known to all community members, all selected topics must undergo a Community Review for at least 14 days.

Becoming A DAO Member

To participate in NumbersDAO, you must be a CAPTCH-A NFT holder. CAPTCH-A is the official membership NFT of NumbersDAO.

There are 5 roles of CAPTCH-A, Pebble, Snow, Rose, Sky and Night. More details of the responsibilities and capabilities can be found in the session of [Roles and responsibilities](#).

Community members who want to participate in DAO meetings can burn 2000 NUM to acquire **Pebble** without whitelisting. To acquire **Snow, Rose, Sky, and Night**, you need to be

whitelisted. This also makes these special CAPTCH-A (Snow, Rose, Sky and Night) SoulBound NFTs, meaning that they are permanently bound to a specific wallet for the duration of the CAPTCH-A's existence.

How to get your Whitelisted CAPTCH-A

N Numbers — CAPTCH-A

	Pebble	Snow	Rose	Sky	Night
Acquisition					
Whitelist required	❌	✅	✅	✅	✅
Stake amount	❌	5000	30000	0	30000
Min stake days	❌	30	60	0	60
Burn amount	2000	5000	30000	0	30000
Public profile	❌	❌	❌	✅	✅
DAO Power					
DAO member	✅	✅	✅	✅	✅
Burn $NUM to vote	❌	✅	✅	✅	✅
Make community proposal	❌	❌	✅	❌	❌
Make creator proposal	❌	❌	❌	✅	❌
Make protocol dev proposal	❌	❌	❌	❌	✅

Figure 4 : Summary of each CAPTCH-A perks and requirement

Check our announcement channel on Telegram, Discord, Twitter, or Blog often to get more info on when we'll release the CAPTCH-A acquisition page. If you're eligible to acquire Snow and Rose, you will receive an email from service@numbersprotocol.io before the acquisition page is closed.

Sky and Night are invitation-only. Sky invites should either have a reputation in the creator community or be professional creators themselves and be proposed by at least one existing Sky member. Night invites should demonstrate a strong understanding of Numbers Protocol, tokenomics, and Web3 projects. In both scenarios, invites must disclose their profiles to be considered. The purpose of Sky and Night CAPTCH-A's is to acquire DAO members with professions that align with the visions of the Numbers Protocol.

Keeping your CAPTCH-A active

CAPTCH-A holders must be "activated" to be an active NumbersDAO member. While Pebble CAPTCH-A remains active, Soulbound NFT **Snow, Rose, Sky and Night** must be activated to be an active member of the NumbersDAO.

At the time when holders acquire SoulBound CAPTCH-A NFTs, their NFTs will be active for the first 6 months. To stay at the active member status, holders must continuously contribute to the projects to remain on the whitelist. The active status will be reviewed every 6 months based on the rules of each whitelist. In other words, if holders of SoulBound CAPTCH-A NFTs do not actively participate in the project, the qualification will be removed, and the CAPTCH-A NFTs are no longer active. Inactive holders will temporarily be removed as members of NumbersDAO.

The decision to have an "active" component to SoulBound CAPTCH-A NFT is to ensure NumbersDAO contains members that are actively invested in the health and success of Numbers Protocol. Active stakeholders are best equipped to make critical decisions in regards toNumbers Protocol.

More about Numbers Protocol

Numbers Official Site
Social Media : X (Twitter), Facebook & Instagram
Community Forum : Telegram, Discord & Reddit
News Channel : Blog & Medium
Numbers Github
Numbers Gitbook