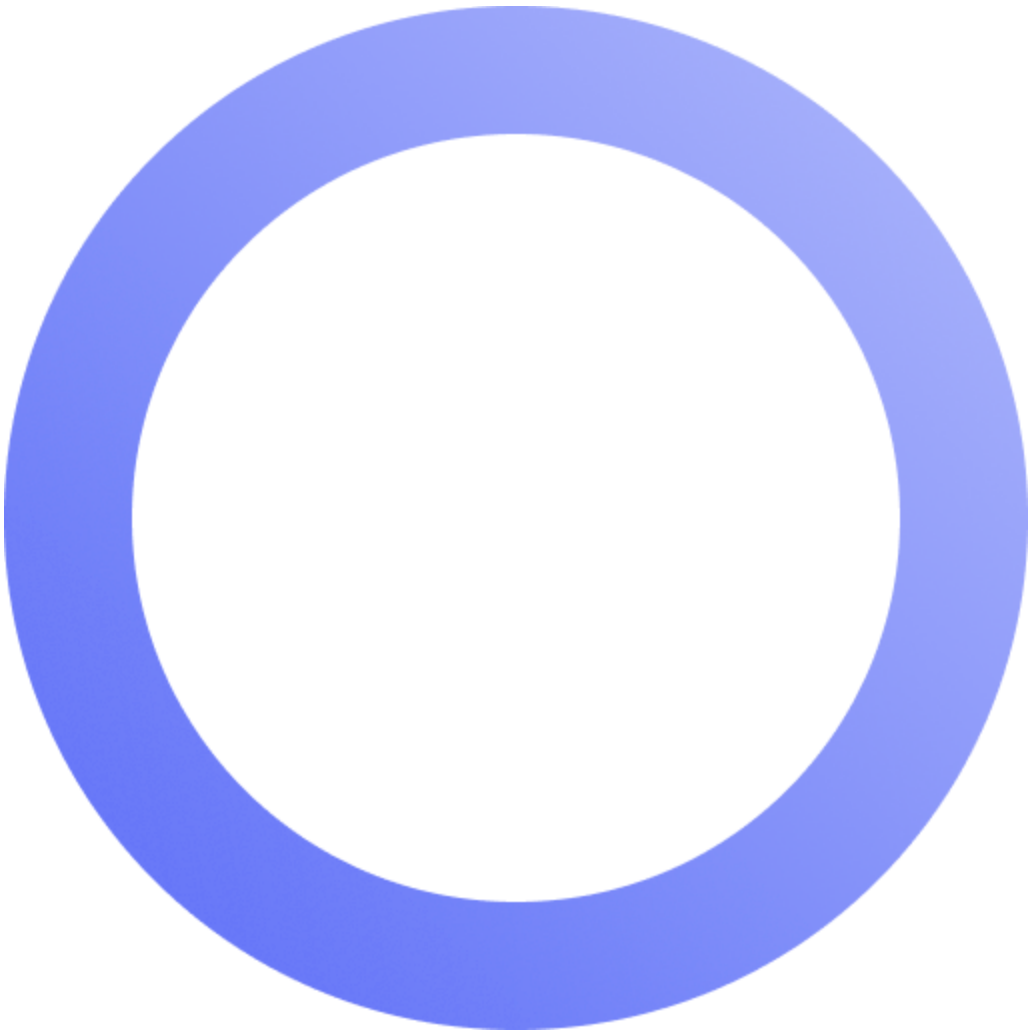


nOS

Whitepaper 2.1

Introduction

Motivation

While blockchain technologies introduce **new possible business models** for app creators to expand their revenue generating strategies with, they are often **unable to leverage these opportunities** due to the technical limitations and policies set forth by OS-managed services (e.g. *Apple iOS/macOS, XCode* and *App Store*, *Google Android* and *Play Store*, *Microsoft Windows* and *Windows Store*)

There also exists a lack of development solutions (blockchain APIs and SDKs) that support efficient implementation of these new business models.

On the consumer side, it is virtually impossible to discover and use apps on the internet without participating in **opaque** and **monopolized** services that are provided by these same OS-managed services.

This **monopolization** of app development, distribution, and discovery introduces a number of other relevant issues:

- There is **no transparency on how applications are ranked** in an App Store.
- Providers (e.g. Apple and Google) can orchestrate **deliberately disadvantageous environments** for apps that compete with the provider's own services.
- Centralized providers are **banning** and **delisting** cryptocurrency applications from their stores.
- Providers take a **large percentage of app revenue**.
- App business models are generally **limited** to sales, subscriptions, advertising, referrals, data mining, or other potentially **intrusive** and **privacy-violating methods**.
- **Free and Open Source** (or *FOSS*) apps often have no other revenue model than to rely heavily on donations and sponsorships from their users.

nOS aims to solve these issues by **overhauling** the app-, web-, and cryptocurrency experience for consumers and creators alike, by introducing new solutions for app and content development, monetization, discovery, and interaction.

TL;DR Platform Summary

nOS *(pron. æn-oʊ-æs)* is a blockchain platform for **decentralized curated content**.

NOS *(pron. nɔs)* is the network's native cryptocurrency, which powers the blockchain's **Delegated Proof of Stake** consensus model, and the B2B/B2C **business frameworks** that exist on the platform.

The platform also introduces an **App Store** that is **decentralized** (maintained entirely by voter-elected delegates) allowing for **fair and transparent** distribution and discovery of web-apps and other types of content.

While the App Store is the first end-user application that utilizes data from the nOS network, **any type of content can be curated** by delegates, and retrieved and displayed by apps and users.

With the platform's novel approaches to content monetization and distribution, even *Free and Open Source* content and applications can scale on technological and financial levels.

NOS Cryptocurrency

The **NOS** cryptocurrency (*symbol:* ◎) represents **Vote Weight** on the network (1 NOS = 1 Vote Weight). This *Vote Weight* lets NOS holders **vote for delegates**. (*Ex.: a wallet with 10 NOS is worth 10 Votes when they vote for a delegate.)*

The **top forty-seven delegates** on the network with the **most votes** forge blocks and **earn block rewards** and **transaction fees**.

Delegates also form a decentralized network of **content curators**. They can **list apps and other types of content**, which can be indexed by third-party services such as app stores, video sites, and other content sharing platforms.

The services that display this curated content can also use the delegates' received votes to measure *how* the content should be ranked and represented on their services.

NOS is *not spent* on voting (apart from a small transaction fee when setting a vote). Instead, the *vote weight* of a nOS wallet is calculated by its **NOS balance** and ***stake***:

NOS holders can **lock NOS** in their wallet for a set period of time to **increase their vote weight** without extra costs. This is called **staking**. *For example: 10,000 NOS staked for 3 months equals 50,000 Vote Weight, instead of 10,000 Vote Weight when left un-staked.*

In conclusion, the NOS cryptocurrency not only affects delegates' positions as ***forgers*** on the network, but also influences **business activity** and interaction between delegates, apps, users, and voters.

Definitions

- **nOS Network:** The platform's **public blockchain network**, employing a unique delegated proof of stake consensus model and native features for curating and listing data and content.
- **NOS (Symbol: ◎):** The **cryptocurrency** that powers all aspects of the nOS ecosystem, including (but not limited to): staking and voting, transaction fees, block rewards, decentralized database management, decentralized filesystem resources, and fast peer-to-peer payments.
- **Wallets:** Accounts, accessible by private keys, that hold NOS and can interact with nOS Network.
- **Delegates:** Nodes that verify or relay transactions on the blockchain. The top forty-seven delegates forge new blocks and receive ***block rewards*** and transaction fees (*Note: block rewards are a fixed number of NOS that are minted on each new block*).
- **Curators:** Delegates that curate and index apps and other content on the nOS network.
- **nOS Wallet:** An interoperable multi-cryptocurrency wallet with extensive *Web3* support and solutions to integrate blockchain/cryptocurrency into any app. It also includes an App Store that's curated by delegates on the network.
- **nOS App Store:** Portal where apps can be listed and discovered, managed by the voter-elected delegates of the nOS Network.
- **Voters:** nOS Wallets that vote for delegates. As only the top forty-seven delegates with the most votes can be active at any given time, voting plays a critical role in the ecosystem. Any wallet can vote, with the wallet's Vote Weight being measured by the wallet's NOS balance and ***stake***.
- **Block Rewards:** Fixed number of NOS that are added to circulation on each new block, distributed to the top forty-seven delegates.

nOS Details

ARK Core

nOS Network is built with the **ARK Core** (https://ark.io) blockchain framework.

ARK Core provides many features that allow for a modular and secure approach to blockchain development, including:

- Fast and efficient consensus algorithm (DPoS)
- Typescript codebase
- Modular directory structure
- Plug-in framework
- Generic Transaction Interface (AIP-29)
- Open-source ecosystem resources (wallet, block explorer, SDKs, etc.)

Furthermore, nOS is compatible as a **bridgechain** in the ARK ecosystem; Bridgechains have the ability to interact with the ARK mainnet and any other bridgechain-compatible blockchain built on ARK Core.

nOS and ARK are engaged in a productive strategic and technical partnership, contributing to the development and growth of both platforms.

To learn more about ARK Core, bridgechains, and DPoS: refer to the ARK whitepaper.

Delegated Proof of Stake

nOS adopts a ***Delegated Proof of Stake*** - or **DPoS** - consensus model.

DPoS enables high performance with fast block times, while governance of the network resides with the holders of the network's native cryptocurrency: **NOS.**

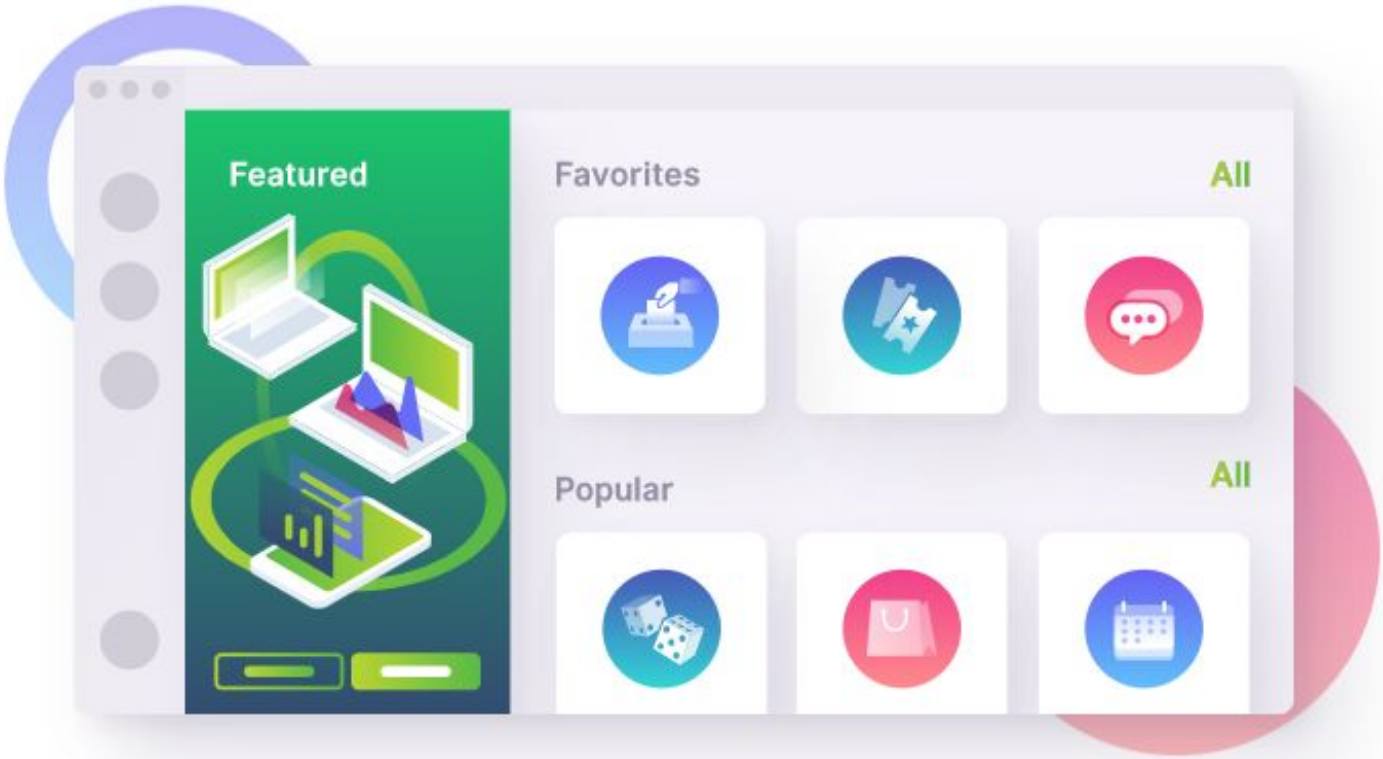
The nodes that seek to verify transactions and secure the network are called ***delegates***.

Wallets with a NOS balance and/or stake can vote for delegates.

The top forty-seven delegates (ranked by vote balance) will forge new blocks. These *forging delegates* receive a fixed ***block reward*** for every block that they forge.

Delegates that are not among the top forty-seven can still function and contribute to the network as **relay nodes**; servers that maintain a full copy of the blockchain and host API endpoints that serve blockchain data, increasing general availability and stability of the network.

App Store and Curation



The **nOS App Store** is the first service to integrate nOS Network's **decentralized curation system**. It's an accessible, decentralized portal and search engine for discovering and using apps that have been **listed by delegates** on the nOS network (as explained in the **Executive Summary**).

Any application or website can pull App Store data (or any other curated database) from the nOS blockchain and present it in their own custom fashion. For example, an Ethereum-exclusive wallet can pull data from the network and display only ETH apps within their client. A game site (e.g. a Steam alternative) could choose to exclusively list PC games. A video streaming platform can display videos that have been listed by delegates in their respective "videos" databases.

There are no specific restrictions as to what type of apps or content can be listed on the network. Furthermore, apps on the nOS App Store do not necessarily have to be decentralized nor do they need to interact with blockchains, though nOS *does* offer extensive features and resources for building and deploying crypto-powered apps.

Delegates that are not in the top forty-seven can still curate apps and share their content with voters and followers, but they only forge blocks and receive transaction fees and block rewards when they are among the top forty-seven.

Delegates have the ability to upload database files containing their curated content to nOS Network, powered by IPFS (Interplanetary File System).

For example, the "apps" database contains a list of documents that consist of app details. A single document can consist of several properties, including:

- **Title**
- **Description**
- **Author**
- **Author website**
- **Thumbnail** (file hash)
- **Images** (file hashes)
- **Type** (*string: "web", "nos", "ipfs", "swarm"*)
- **Location** (string: *filehash, nameservice domain, or http url*)
- **Blockchain** (*optional: "nos", "eth", "btc", "ark", "eos", "neo"*)
- **Categories**
- **Keywords**
- **Metadata**

Third-party services can download and aggregate the delegates' databases from IPFS and serve them to the user through a single application.

Delegates can deploy custom solutions for generating databases. Some possible solutions include:

- Periodically indexing content listed on third-party services (e.g. apps, posts, or videos that are shared on specific subreddits or websites).
- Providing a self-hosted submission and voting portal, only accessible by delegate's voters.
- Smart contract-powered submission and voting system.

- Manual curation.
- AI-powered discovery and indexing.

Delegates may also integrate commercial and for-profit features in their curation model. Voters have the power to decide whether such activities are beneficial to the delegate's product and can vote accordingly.

Voting and Staking

Voting is the primary component that powers delegate selection.

Only the top forty-seven delegates with the most votes are **active** and will earn block rewards.

Any wallet with a NOS balance and/or *stake* can vote for *one* delegate.

A wallet's vote for a delegate is reverted when the wallet has had more than two years of zero network activity.

The wallet's ***vote weight*** - or ***VW*** - represents how many votes that wallet is worth.

A wallet's VW is calculated by the wallet's *balance* and *stake*.

Staked NOS grants significantly more VW than non-staked NOS.

Staking NOS means for a wallet to *lock* an amount of NOS for a duration. Staked NOS cannot be transferred out of the wallet until after the stake expiration date.

The possible staking durations and their respective granted *voting weight per staked NOS* are as follows:

Stake Duration	**VW per NOS**
No Stake	1
3 Months	5
6 Months	7.5
1 Year	10

As shown in the above chart, NOS that has been staked for three months would grant five times more voting weight than its non-staked equivalent.

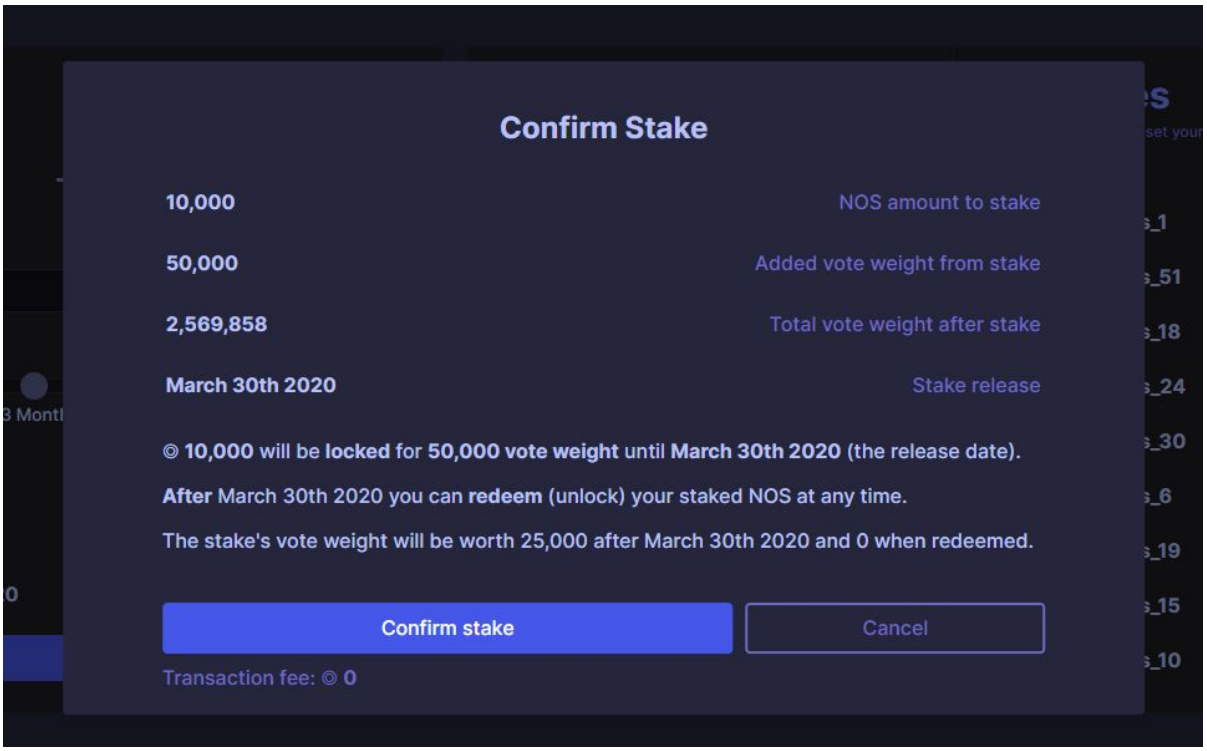
A stake must consist of **10,000 NOS** at minimum.

This 10,000 NOS minimum is the initial configuration of the network. As any other configurable network option (including future staking bonuses, though the stakes that are already locked and cannot yet be redeemed should have their vote weight

bonus remain unaffected from future configuration changes), forging nodes can adjust this minimum at future blocks should they reach majority consensus.

After a **stake expiration**, its **granted VW is halved** and the stake can be redeemed at any time. When redeemed, the staked NOS goes back to the wallet balance and the stake's (halved) VW is removed.

For example: If a wallet owner with **10,000 NOS** (thus 10,000 VW) stakes all their NOS for **three months**, their VW becomes **50,000**. After the stake's expiration (one year after creation), the granted VW is **halved to 25,000** and the stake can be **redeemed at any time**. When redeemed, the **10,000 NOS** stake goes back to the owner's balance and their VW goes back to 10,000.



A wallet can have multiple stakes (with varying amounts and durations) at any given time.

Benefits of Voting and Staking

Network benefits

The primary role of delegates is to secure the network, and optionally to provide the network with valuable content as a curator.

Delegated Proof of Stake economics give delegates an incentive to acquire votes.

If a delegate has enough votes it would become *active*, thus earning block rewards.

A delegate is active if it's among the top forty-seven delegates.

In an effort to garner votes, delegates may pledge to provide **various services that contribute to the ecosystem**. Such services could include:

- nOS codebase contributions and development.
- Distributing rewards to creators of curated content, based on quality and popularity.
- Marketing and bounty campaigns.
- Hosting events (conferences, hackathons, competitions).
- Building new applications that integrate with the ecosystem.

Voter benefits

Delegates may also choose to **offer certain services exclusively to their supporters**, with tiered benefits provided to a voter based on their VW (*vote weight*, calculated by the voter's coin balance and stake).

Such **vote-weighted services** could attract *new* voters and persuade *existing* voters to increase their vote weight. This would increase the delegate's votes, strengthening their forging position.

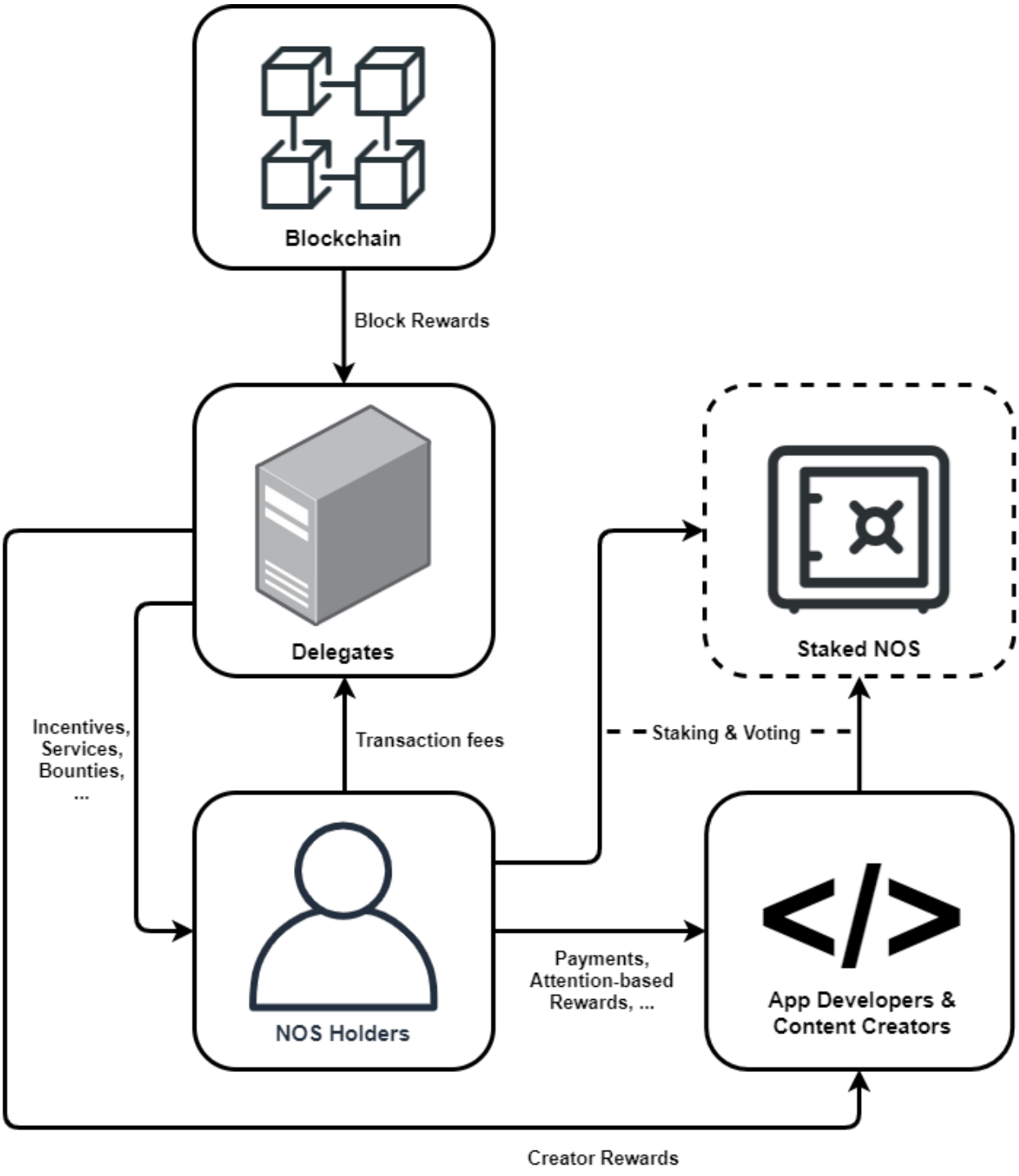
Examples of vote-weighted services include:

- Voter-exclusive bounty programs and competitions.
- The amount of resources made available to a voter in a delegate's filesystem node or web server.
- A number of advertising credits granted to a voter in a curator service.
- An online app or game with benefit levels scaled to the user's VW.

Virtually endless unique services and incentives can be created and offered by delegates to users and voters.

NOS Circulation Hypothesis

Should voters choose to elect delegates that integrate services such as those described under [Benefits of Voting and Staking], NOS and network-related services may circulate as depicted in the below chart:



Economics

Key Details

Block Time	6	Seconds
Complex Transactions per Block	150	Transactions
Est. Max. Transfers per Second	3,200	Transfers
Delegates	47	Delegates
Block Reward	4	NOS
Top Delegates	5	Delegates
Initial Circulating Supply	330,000,000	NOS

The ◎4 block reward is a fixed number that is distributed to delegates on every new block. The block reward halves every three years (see Block Reward Halving).

The **top five delegates** receive a **relatively larger reward** (which is included in the ◎4 block reward) to motivate **ongoing competition** among delegates, even when they already established a relatively secure forging position.

The **block reward distribution** is as follows:

	Individual	**Collective**	**After Delegate Cycle**
Forging Delegate	3.90	3.90	3.90
Top 5 Delegates	0.02	0.10	4.84

The "**Individual**" column displays how much each individual entity receives from a block reward.

The "**Collective**" column displays the collective amount of NOS distributed on each block *(i.e. ◎0.02 * 5 Top Delegates = ◎0.10 total distributed to Top Delegates collectively)*. Adding up all rows under the **Collective** column results in the total block reward of ◎4.

The **After Delegate Cycle** column displays how many NOS a single party would have received in total after one delegate cycle (47 blocks). For example, a Top 5 Delegate is awarded ◎4.84 after one delegate cycle (*◎3.90 as a Forging Delegate + ◎0.02 * 47 blocks = ◎0.94 from the Top Delegate reward)*.

Block Reward Halving

To maintain a balance in vote weight distribution between voters and delegates, the block reward will be halved every approximate three years until it reaches ◎0.25, after which the block reward will *remain* at ◎0.25 until a new proposal is established and accepted by network consensus.

The block reward reductions are visualized below:

Years after genesis block	Block Reward
Years 1-3	◎4
Years 3-6	◎2
Years 6-9	◎1
Years 9-12	◎0.50
Years 12-15	◎0.25

Top Delegate hold the same relative size to the block reward. **Example**: when the Block Reward is halved from ◎4 to ◎2, the Top Delegate reward is halved from ◎0.02 to ◎0.01.

Transaction Fees

To submit a transaction to the network, the signing wallet must pay a **transaction fee**. This is to discourage network abuse and to appropriately scale the rewards for delegates to process any volume of transactions.

A delegate receives a portion of the fees collected from all transactions made during their block, while **the majority of collected fees are removed permanently from circulation**.

The fee collection model is as follows:

- 100% of collected fees up to the amount equal to the block reward in a block are permanently removed from circulation.
- 50% of any remaining collected fees are also removed from circulation.
- The other 50% are awarded to the forging delegate.

This fee system helps in combating possible shifts in vote weight going from voters towards delegates during times of increased transaction activity on the network.

Example

1. A block has collected ◎**10.00** in transaction fees.
2. ◎**4.00** from the collected fees (the amount equal to the block reward) are removed from circulation.
3. *(10 - 4) * 0.5 =* ◎**3.00** from the remainder are also removed from circulation.
4. The other ◎**3.00** are awarded to the forging delegate.

The block's forging delegate receives ◎6.90 (◎3 from collected fees awarded in step 4, plus ◎3.90 block reward).

The transaction fee logic **removed ◎7 from circulation,** while the fixed block reward **added ◎4 to circulation**, causing a net ◎**3.00** reduction in NOS supply.

Any questions about nOS can be asked on nOS.Chat.

Legal Disclaimer

Definitions:

1. "**The Company**" shall mean nOS Limited, with Company Registration Number C87299 and registered office at 136 St. Christopher's Street, Valletta, VLT 1436, Malta
2. "**Website"** shall mean the website of the Company on which the *Know Your Customer* procedures and Token Generation Event has taken place at https://nos.app.
3. "**Account**" shall mean an online account created by the user on the Website.
4. "**Affiliate**" shall mean a person, entity or organization associated with the Company.
5. "**Blockchain**" shall mean a type of distributed ledger, comprised of unchangeable, digitally recorded, data in packages called blocks.
6. "**Cryptocurrency**" shall mean a digital asset designed to work as a medium of exchange using cryptography to secure the transactions and to control the creation of additional units of the currency.
7. "**Private Key"** shall mean a personalized code which is paired with a public key encrypted with algorithms.
8. "**nOS**" (always spelled with a lowercase "n" and uppercase "OS") shall mean a solution for application development, distribution, discovery, monetization, interaction, and content curation and distribution developed and created by the Company.
9. "**Services**" shall mean any service provided by the Company and/or its affiliates, including the services available to registered Users on the Website.
10. "**User**" shall mean any subscriber, acquirer and holder of NOS.
11. "**Virtual Token**" shall mean a form of digital medium recordation whose utility, value or application is restricted solely to the acquisition of goods or services, either solely within the DLT platform on or in relation to which it was issued or within a limited network of DLT platforms.
12. **"NOS"** (always spelled entirely uppercase) shall mean a Virtual Token, created by the Company, intended for practicing certain features on nOS as described and outlined in this whitepaper.
13. "**Whitepaper**" shall mean the document published on the Website containing the Token Generation Event conditions and describing the Company's project model including an understanding and description of the features and characteristics of the nOS Token.

NOS Characteristics, Features, Rights and Attributes:

1. NOS may be used by You as an instrument for practicing certain features on nOS.

2. NOS forms a digital medium recordation whose utility solely entails the utilization of features on the nOS blockchain network.

3. The Company provides no guarantees of the future use or value of NOS, which value may fluctuate and may be reduced to zero.

4. You are not expected to make a profit from the acquisition of NOS and shall have no expectation of profit from the future success of the Company's business and/or the efforts of the Company or other persons.

5. NOS do not in any way represent a share, debenture, stock or unit of the Company. NOS does not represent ownership interests or grant ownership rights, control and voting rights in the Company, nor do they grant any rights to receive a share of the Company's profit nor any distribution of assets upon the liquidation and winding up of the Company.

6. The Company is not obliged to redeem NOS at any given time.

7. NOS does not represent securities, commodities, swaps, future contracts, or either securities or commodities or a financial instrument of any kind. Purchases and sales of NOS are not subject to the applicability of any law which may govern or regulate any types of financial instrument. This Disclaimer and all other documents referred to in this Disclaimer including the Whitepaper do not constitute a prospectus or offering document, and does not represent an offer of sale to the public,

nor is this Whitepaper solicitation of an offer to buy an investment, a security, commodity, a future contract or a swap on either a security or commodity.

8. The acquirement of NOS is not for investment purposes and the User should not acquire NOS with such intentions. NOS is not designed, developed nor intended to be used for investment purposes and should not be considered as a type of investment. You acknowledge, understand and agree that the holding of NOS does not constitute a guarantee, representation or warranty that the holder will be able to make sure of any assets or profits generated or held in the name of the Company.

9. You acknowledge and agree that You are not acquiring NOS for purposes of investment or speculation, arbitrage strategy, for immediate resale or other financial purposes.