

# RSS3: The Open Information Layer

Natural Selection Labs

**Abstract**—Inspired by the original RSS Standard, this paper presents RSS3, Open Information Layer for the Open Web. The paper serves as an enhanced version of our initial whitepaper titled “RSS3: A Next-Generation Feed Standard.” Following the release of our initial whitepaper, we have adhered to its proposed architecture to conduct experiments and advance the development of the RSS3 Network. The Network has transformed into what is now known as the Open Information Layer, reflecting the evolving dynamics of the Open Web. This paper summarizes our research and development progress since then, providing insights into RSS3’s vision and its decentralization architecture.

## I. INTRODUCTION

RSS3 is the Open Information Layer, structuring Open Information for social, search, and AI. The [Open Information Layer \(OIL\)](#) is a conceptual layer where information flows openly without any restrictions, as it is supposed to be.

It is RSS3’s mission to construct the Open Web by enhancing the free flow of Open Information.

## II. RSS3 NETWORK

The RSS3 Network is a decentralized network that is formed by two sub-layers: the [Data Sub-layer \(DSL\)](#) and the [Value Sub-layer \(VSL\)](#)

[Open Information \(OI\)](#) is typically found across various types of networks, including decentralized, federated, and centralized networks that allow permissionless access. The [Data Sub-layer \(DSL\)](#) is responsible for indexing and structuring OI for interoperability. This is achieved by introducing a crucial standard, known as the [Unified Metadata Schemas \(UMS\)](#), see [Section III-C](#), enabling network-agnostic applications to be built on top of the DSL. The DSL then leverages the [Value Sub-layer \(VSL\)](#), see [Section IV](#), to build an ownership economy on the [Open Web \(OW\)](#).

[\\$RSS3](#) is the Network’s native utility token. It is used to pay query fees, operate nodes, participate in staking, and engage in various network activities.

## III. DATA SUB-LAYER

The [Data Sub-layer \(DSL\)](#) is responsible for Open Information life cycle management, which includes indexing, transformation, storage, dissemination, and consumption [1]. The DSL is formed by two components (see [section III-A](#) and [section III-B](#)), and uses the UMS (see [section III-C](#)) to structure the information for applications in social, search, AI and beyond.

### A. Serving Node (SN)

An [Serving Node \(SN\)](#), also known as an RSS3 Node, is responsible for indexing, transforming, storing, and ultimately serving the Open Information to the end users. Each SN

operates a number of workers that index and structure information from [Permissionless Data Source \(PDS\)](#), stores the information, and provides interfaces for access. Workers are community-maintained “rules” that define how information is indexed and transformed into the UMS format.

Since each SN is independent, it is possible for different SNs to deploy different workers that cover different PDSs.

This design enables node operation to be flexible, accessible and affordable, in turn, offering a high degree of decentralization and robustness.

### B. Global Indexer (GI)

A [Global Indexer \(GI\)](#) is responsible for facilitating coordination among SNs and engaging with the VSL, and performs the following functions:

1) *Performance Assurance*: A GI acts as a load balancer and query router for end users to retrieve information from SNs. The unique architecture of the DSL demands GIs to be equipped with more computational capabilities, in order to work out the optimal route for end users to retrieve specific information from SN, and frequently from a group of SNs simultaneously.

2) *Quality Assurance*: A GI acts as a supervisor for SNs to ensure the quality of service. With the DSL being a permissionless sub-layer, the quality needs to be maintained strictly to ensure RSS3 Network’s robustness and reliability. A GI monitors the quality of SNs, and slashes the SN if it fails to meet the requirements.

3) *Proof-on-Chain*: A GI keeps track of the work and slash records of SNs, and submits them to the VSL for settlement and reward allocation.

### C. Unified Metadata Schemas (UMS)

Open Information, indexed from multiple PDSs, is structured by SNs into the UMS format for interoperability.

PDSs use different data structures, within a PDS, there might be multiple products, services and protocols that leverage a different data structure to suit their needs. This means limited interoperability, and developers need to look into each and every data structure, when it comes to building. This lack of standardization means developers must investigate each unique structure individually when building applications, which is not scalable.

The UMS addresses this issue by offering a unified set of data structures that serve as an abstraction. This abstraction simplifies the integration process, making it more manageable and scalable for developers to work with data across various data sources.

For the complete set of the UMS, refer to <https://docs.rss3.io/docs/unified-metadata-schemas>.

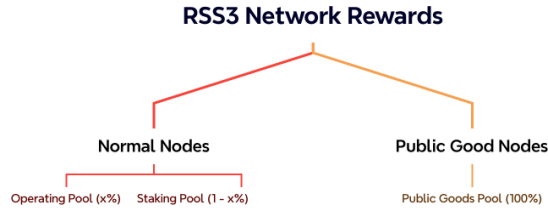


Fig. 1: RSS3 Network Rewards distribution.

#### IV. VALUE SUB-LAYER

The **Value Sub-layer (VSL)** is an Ethereum Layer 2 blockchain built with OP Stack using Celestia as the data availability layer. It is responsible for handling value derived from Open Information activities and applications, establishing a healthy ownership economy for the Network.

The RSS3 Network allocates a portion of \$RSS3 total supply to incentivize network participants on the VSL, this is known as the Network Rewards. The Network Rewards is allocated into two reward pools: the **Operating Pool ( $P_o$ )** and the **Staking Pool ( $P_s$ )** for Normal Nodes, or the **Public Good Pool ( $P_p$ )** for Public Good Nodes. See Figure 1.

The incentive mechanism of the VSL is designed to encourage the following behaviors:

1) **Node Operation:** Nodes are incentivized to operate and maintain the Network by receiving \$RSS3 as rewards.

- 1) Anyone can become a Node Operator to launch an RSS3 Node and join the RSS3 Network without requiring prior permission.
- 2) A Node Operator has the ability to configure Node's coverage, which directly influences the Node's capability to respond to various types of requests. A broader coverage means more computational resources are required, and a higher chance of receiving requests.
- 3) A Node can be operated in either a Normal mode or a Public Good mode. A Normal Node is eligible for network rewards, but requires a deposit of \$RSS3. A Public Good Node is ineligible for network rewards, but requires no deposit.
- 4) A Normal Node has a corresponding  $P_o$  and a  $P_s$ . All Public Good Nodes collectively share a single  $P_p$ .

2) **Node Staking:** Network participants are incentivized to stake \$RSS3 to secure the Network by receiving \$RSS3 as rewards.

- 1) A Normal Node accepts staking into its Reward Pool, the amount of staked \$RSS3 signifies its quality. Higher quality Nodes handle more requests.
- 2) A Public Good Node does not have a Reward Pool and does not participate in any form of incentivization. Staking into a Public Good Pool is accepted, and the stakers can assign their trust to any Public Good Node. Higher trust Nodes handle more requests.

#### V. CONCLUSION

**At the heart of Natural Selection Labs, we firmly believe in the freedom of information distribution: No**

**organizations or authorities shall prohibit the free exercise of the right of people to create, store, and distribute their information.**

#### GLOSSARY

##### Data Sub-layer (DSL)

A decentralized network where the Open Information flows from its source to its destination.

##### Global Indexer (GI)

A Data Sub-layer component that facilitates coordination among Serving Nodes and engages with the Value Sub-layer.

##### Open Information (OI)

Information that is typically found across various types of networks, including decentralized, federated, and centralized networks that allow permissionless access.

##### Open Information Layer (OIL)

A conceptual layer where information flows openly without any restrictions.

##### Open Web (OW)

The next-generation Internet where information flows openly without any restrictions, as it is supposed to be.

##### Operating Pool ( $P_o$ )

A pool of \$RSS3 that consists of 1) Fees collected from serving Data Sub-layer requests; 2) Network Rewards allocated based on the Node's work.

##### Permissionless Data Source (PDS)

A repository of data that can be accessed without the need for authorization or authentication.

##### Public Good Pool ( $P_p$ )

A collective pool of staked \$RSS3 that is used to improve the RSS3 Network by assigning trust to Public Good Nodes.

##### Serving Node (SN)

A Data Sub-layer component that indexes, cleans, stores, and ultimately serves the Open Information to the end users.

##### Staking Pool ( $P_s$ )

A pool of staked \$RSS3 that is used to improve the RSS3 Network by assigning trust to Normal Nodes.

##### Unified Metadata Schemas (UMS)

A unified set of data structures for interoperability.

##### Value Sub-layer (VSL)

A blockchain where the value created by Open Information activities is recorded and distributed.

#### REFERENCES

- [1] National Institute of Standards and Technology. Information life cycle. [https://csrc.nist.gov/glossary/term/information\\_life\\_cycle](https://csrc.nist.gov/glossary/term/information_life_cycle), 2016.

	<b>Node in Normal Mode</b>	<b>Node in Public Good mode</b>
Who can operate?	Anyone	Anyone
Can operators specify the coverage?	Yes	Yes
Is a deposit required?	Yes	No
Is the deposit considered as staking, making it eligible for rewards from the Reward Pool	No	N/A
Will the Node be slashed?	Yes, the deposit and its SP will be slashed. A Node may be demoted to receive fewer requests.	No, but a Node may be demoted to receive fewer requests.
Does the Node accept staking?	Yes. The staked tokens go to the Node's Reward Pool. RSS3-X (X being the Node's name) Chips are issued to the stakers after staking.	No, as such a Node does not have a Reward Pool. Instead, stakers stake to a Public Good Pool. RSS3-Public Good Chips are issued to the stakers after staking.
Can operators set a tax?	Yes	No, a universal tax is set by DAO.
Can operators participate in Governance?	Yes	Yes, limited to Public Good proposals.
Does it have an Operator Pool?	Yes	No, operator rewards go to [X]
Does it have a Reward Pool?	Yes	No, but a Public Good Pool with a universal incentive rate set by DAO.

TABLE I: Comparison of two Node operation modes.