NUVION
SYSTEMS

Version 0.0.1

NUVION Whitepaper

Decentralized Storage Sharing Protocol Ecosystem

NUVION SYSTEMS

Table of contents

Abstract

Decentralized Storage Sharing Protocol: Introducing the NUVION Ecosystem.
NUVION offers a trustless environment for peer-to-peer storage contracts.
Storage providers and users collaborate to build an ecosystem that enables sustainable growth through shared storage resources.
The NUVION ecosystem aims to create a borderless new global economic structure.
Participants are rewarded in tokens based on the value of shared bandwidth within the protocol.
The NUVION project, which provides a highly secure decentralized infrastructure platform, is developed by NUVION SYSTEMS.
Decentralized Storage Sharing Protocol: Introducing the NUVION Ecosystem.
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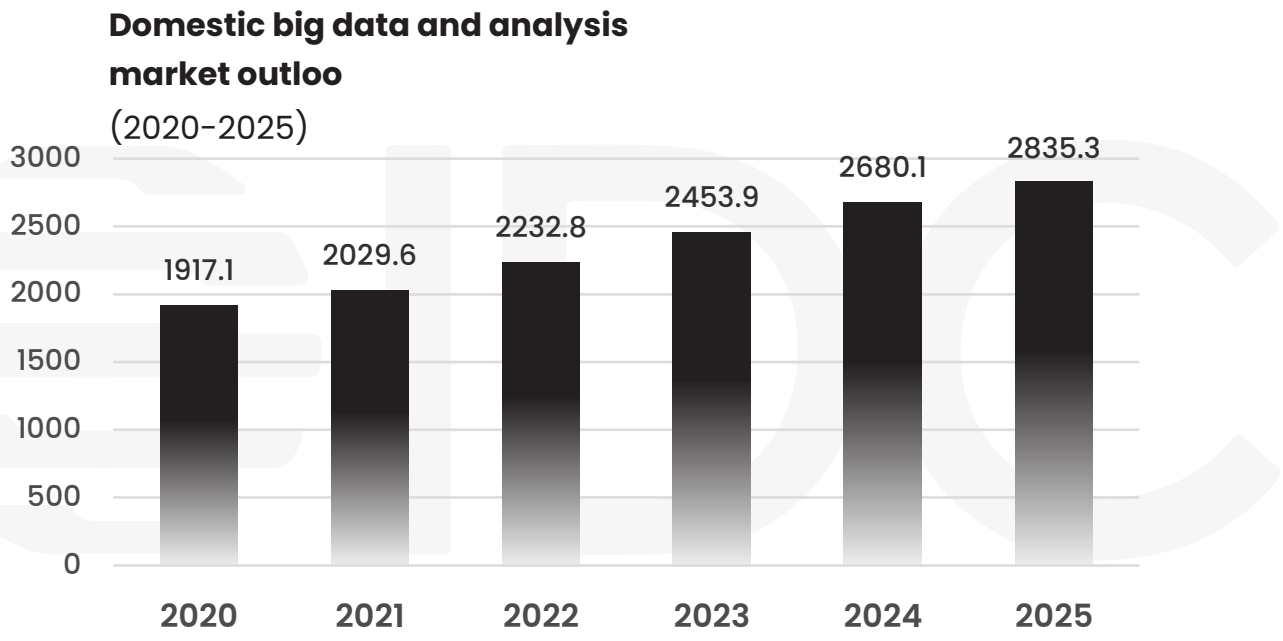
1. Introduction

The Decentralized Storage Sharing Protocol transforms the traditional, centralized, provider-driven storage economy into a user-driven economy.
By leveraging the protocol, NUVION enhances data security and privacy while eliminating risks such as data failure and system vulnerabilities.
Through the NUVION Blockchain Storage Platform service, an ecosystem is established that connects online and offline economies and enables sustainable growth.
The architecture is suitable for the decentralized Web 3.0 environment and provides improved data protection and optimization compared to existing structures.
Initially, the Decentralized Storage Sharing Protocol: NUVION will capture market share in the fast-evolving data market and achieve efficient growth through integration with the metaverse market.

1-1. Market Background

In 2025, the total volume of data generated globally is projected to reach 175 Zettabytes (ZB). This represents explosive growth compared to the 33 ZB generated globally in 2018.

International Data Corporation,「Outlook for Korea's Big Data and Analytics Market, 2021-2025」



Source: IDC Semiannual Big Data and Analytics Tracker, September 2021

2. Design NUVION

To build a sustainable and continuously growing ecosystem protocol, it is crucial to define clear requirements.
While there are various methods for building a decentralized storage sharing protocol, we have considered the following requirements to create the most efficient model.

2-1. Decentralization

Trusting companies or organizations that hold a significant portion of global data inherently carries systemic risks.
In reality, trusting third parties to store personal data involves implicit risk costs.
Moreover, the service fees charged by dominant data storage providers include the costs of service development, maintenance, and operations.
Therefore, we aim to address these inefficiencies and risks through a decentralized architecture that provides a wide-ranging, global decentralized storage system — from archives to CDNs.
Users worldwide who own smartphones, desktops, and laptops (small-scale operators) represent the potential demand base for our service.
Most of these users' computing resources remain underutilized.
However, they currently lack the means to monetize their unused resources due to the high costs and technical barriers involved in providing storage services.
Our service offers a low-cost, fast storage sharing solution, delivering significant benefits to these users.
Because storage is a fundamental infrastructure, we aim to design it as a cost-efficient and sustainable decentralized structure, rather than allowing a few centralized entities to dominate the market.

2-2. Economics

Public cloud storage is an attractive business model for large, centralized cloud providers.
The global public cloud services market is projected to reach approximately $724.5 billion in 2024 .
However, due to the inherent characteristics of the public cloud storage model, it has resulted in high levels of centralization. As a result, the number of major global providers has been consolidated to about five key players.
We believe that decentralized storage has the potential to replace today's centralized cloud storage services.

However, for partners and customers to adopt decentralized storage services, the ecosystem must offer clear advantages in terms of cost-effectiveness and convenience. Therefore, we aim to provide an economically favorable structure for the following three types of ecosystem participants, to help foster the growth of the decentralized storage ecosystem.

End Users

We aim to provide better service value to end users by offering optimal object size, durability, security, and convenience through our service.

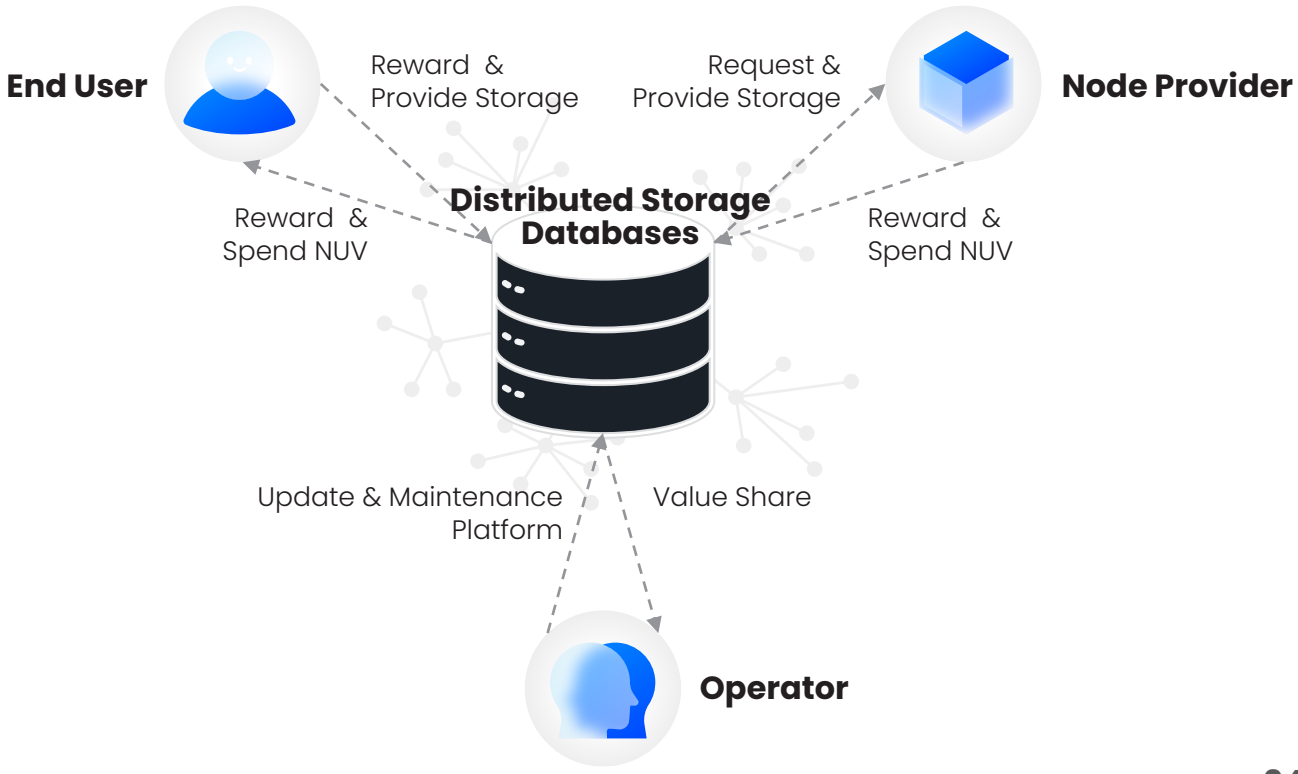
Node Providers

Node providers are essential contributors to building the NUVION ecosystem. We will offer them fair and transparent compensation to incentivize their continued participation and support the ecosystem's growth. In particular, since node providers directly affect key platform characteristics such as availability, cost, and durability, we will ensure they are motivated to maintain stable and continuous connections.

Operators

Operators, who are responsible for developing and enhancing the ecosystem, must be able to achieve reasonable profits. Operators will charge lower fees compared to traditional cloud services for end users, while fairly sharing the generated revenue with node providers.

Additionally, the implementation of new features and adjustments to framework components will be aligned with the economic drivers and cost structures of specific object storage use cases.



2-3. Durability

In storage services, the most critical factor is the data itself.
Thus, the system's durability (its ability to maintain data under any circumstances) must be carefully considered.
Potential issues include hardware failures, access disruptions, and server outages.
Because a decentralized system operates via a peer-to-peer network, NUVION must continuously offer node providers both operational convenience and sufficient economic incentives.
Through this approach, we aim to improve system durability and establish a stable storage service environment.

2-4. Object Size

To optimize service efficiency, we classify node providers into two major groups based on their storage capabilities.
Demand for decentralized storage services comes from:
- Individuals (small-scale operators), who mostly need to store small files.
- Enterprises (large-scale operators), which require vast storage capacity.

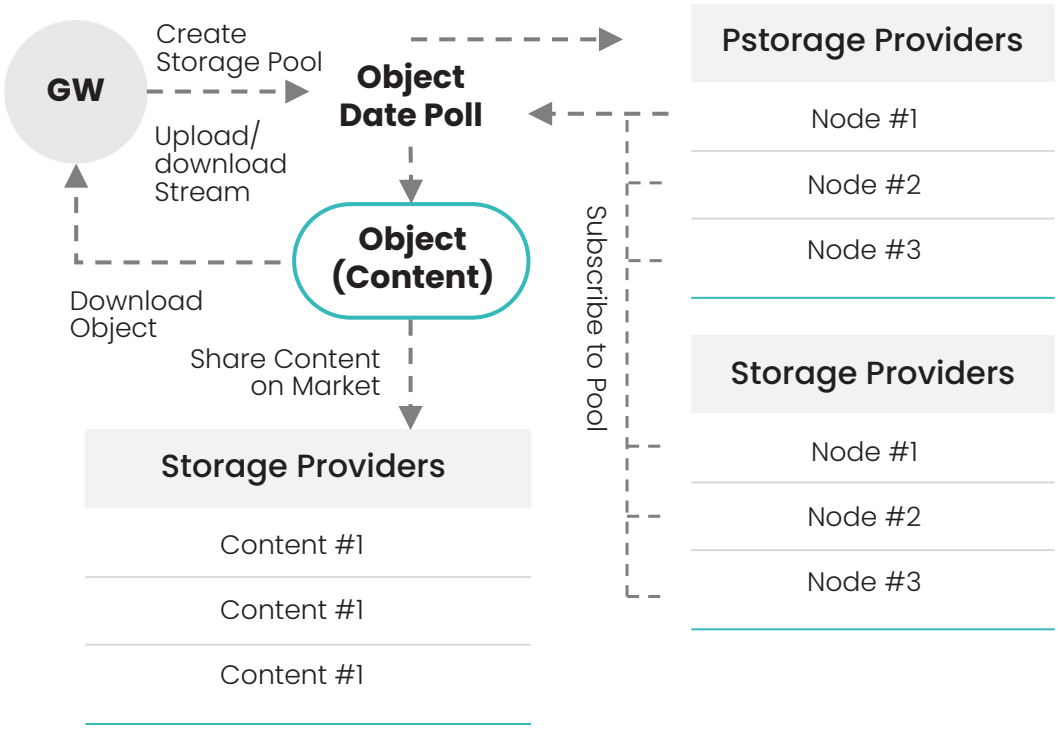
We provide tailored services for each of these user segments.

2-5. Security and Privacy

All object storage platforms, whether centralized or decentralized, must ensure privacy and security for stored data.
We have carefully considered how to mitigate risks that may arise when providing data to untrusted storage nodes.
Since traditional security mechanisms (firewalls, DMZ, etc.) are not applicable, NUVION is designed from the ground up to offer enhanced security through end-to-end encryption and system-wide protections.
In particular, NUVION implements data handling practices that comply with privacy laws such as HIPAA (USA) and GDPR (Europe).
However, it is practically impossible to apply system-wide protections to all information at all times.
Therefore, NUVION will provide transparent information to participants so they can understand and implement appropriate security measures themselves.
[Insert Figure 1 here]

3.Framework

This section outlines the framework design required to build the NUVION decentralized storage sharing ecosystem.
The framework described here is modular, meaning independent components may be modified or added to enhance user experience and support ecosystem scalability.



The NUVION ecosystem framework performs the following functions.
Data : The most fundamental element of the ecosystem. The framework supports various data formats. When an end-user creates a pool for data storage, the data is encrypted, partitioned, and distributed across network peers. During this process, metadata is generated to enable backup and download of the data.
Data Retrieval : When retrieving data distributed across peers, the system uses the metadata to locate the appropriate nodes. The data is then reassembled and downloaded to the client's local machine.
Data Maintenance : To enhance the durability of distributed data, the system manages and maintains the partitioned data across multiple nodes.
Payments : Payments for data storage usage are conducted through tokens. Additionally, the framework provides wallets and offline payment systems to facilitate transactions.

3-1. NUVION: Blockchain Storage Platform

3-1-1. Overview of NUVION

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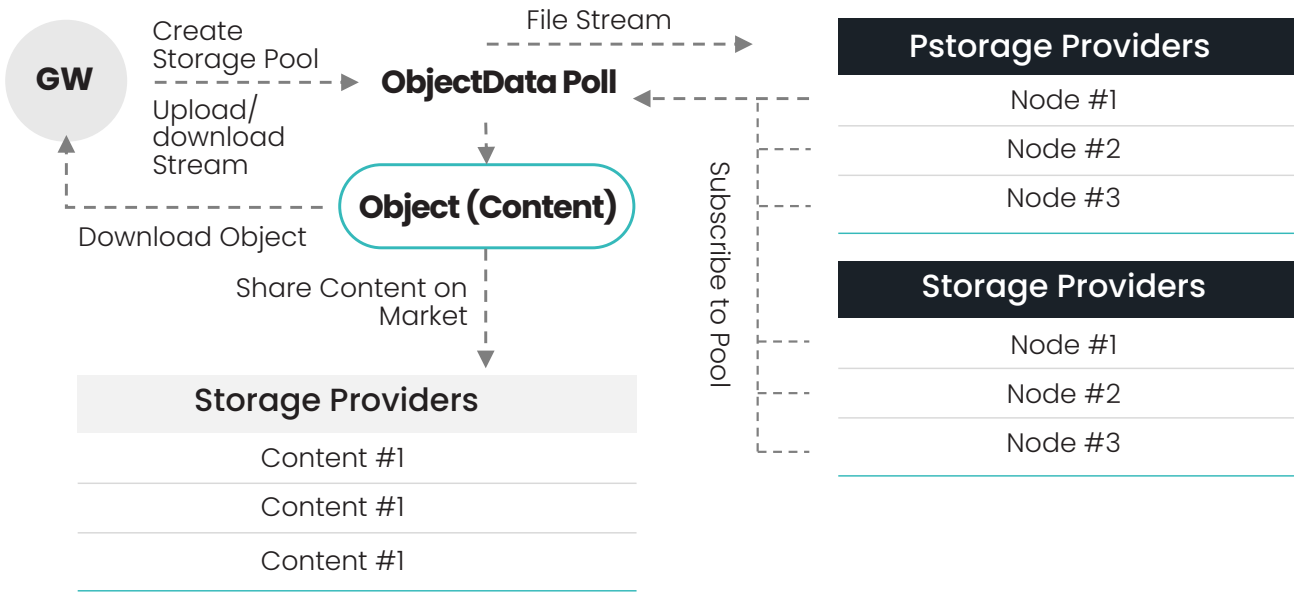


NUVION is a decentralized storage sharing service.

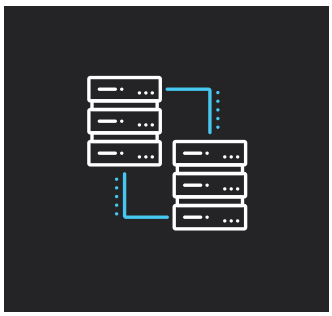
The platform is designed for global storage asset sharing, enabling users to easily utilize a decentralized storage environment.

Through NUVION, users can :

- Store their files with high security
- Share and trade data with other global users
- Lease their own storage space to earn rewards

3-1-2. Architecture of NUVION

Secure and decentralized storage



Content sharing

Exploration of shared assets

Personal Storage Sharing

NUVION's core architectural components include :

Secure and Decentralized Storage

NUVION operates through a network of decentralized storage participants, enabling a more secure storage environment compared to centralized service providers. Data (files) uploaded via NUVION is securely distributed and stored across multiple nodes. This multi-node architecture ensures that no single entity can control the storage, creating a safe and transparent environment.

Content Sharing

NUVION allows users to easily and conveniently share various files stored across multiple nodes in the global network, based on user requests. Users can also customize the scope of sharing according to their preferences, enabling a personalized and flexible sharing environment.

Exploration of Shared Assets

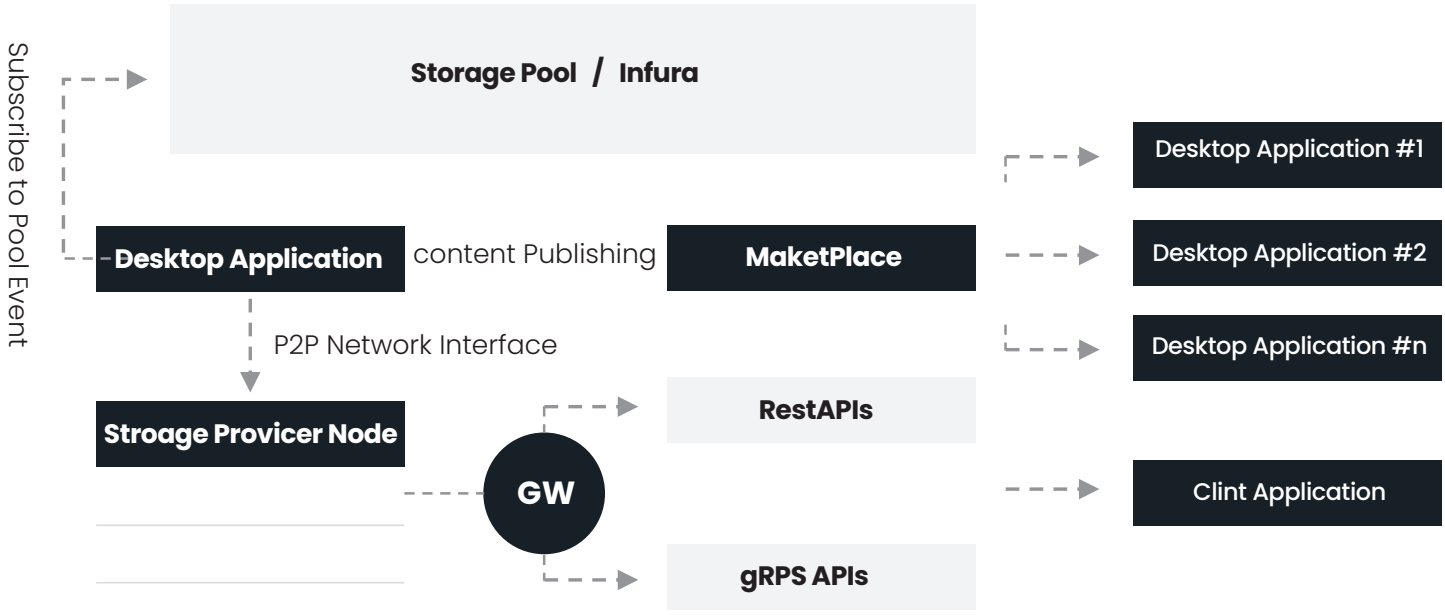
Users can explore a wide variety of data provided by NUVION's extensive network. By utilizing metadata-based search, users can access diverse types of content stored in the decentralized shared storage, including public documents, creative works, academic research, portfolios, research papers, and media files. This will serve as a catalyst for global data exchange and help NUVION evolve into a large-scale content marketplace.

Personal Storage Sharing

Users of NUVION can also act as small-scale operators by renting out their personal storage. They can allocate unused storage capacity for other users and receive rewards based on their contributions. This mechanism promotes the expansion and efficiency of the ecosystem.

3-1-3. Ecosystem of NUVION

NUVION's core architectural components include :



NUVION Software

This is the software provided to enable users to conveniently interact with NUVION services. It runs on the foundation of the Storage Provider Node.

a. Storage Provider : Users (individuals, businesses, organizations, etc.) can participate as storage providers by offering their storage resources to the NUVION platform. Storage providers are rewarded for their contributions to the ecosystem.

b. Content Publishing : Users can not only store their data across distributed nodes but also freely share their data on a global data marketplace, facilitating interaction with other users. By sharing their content, users can enhance its value and receive rewards.

By downloading the [NUVION software] (insert link), users can easily become participants in the NUVION ecosystem without any additional configuration.

Storage Provider Node

The Storage Provider Node is a critical component of the ecosystem that shares large-scale storage resources with ecosystem users. It serves as a trusted infrastructure resource, allowing file upload, download, and sharing via external API/GAPI interfaces. Providers are rewarded based on their level of contribution. To become a Storage Provider Node, users must enter into an official agreement with NUVION SYSTEMS, the operator of the NUVION platform.

Provider nodes are managed through a Linux-based CLI (Command Line Interface) or can be hosted using a VM (Virtual Machine), providing enhanced control and flexibility over network storage resources.

Infura

Infura enables ecosystem participants (such as developers) to create storage pools for their projects. When a storage pool creation is requested, the ecosystem sends requests to various storage and node providers to provision the appropriate storage resources accordingly.

Gateway

The NUVION Gateway is specifically designed to integrate with Storage HTTP APIs (Application Programming Interfaces). It serves as a bridge between existing storage systems or applications using HTTP APIs and the NUVION network, enabling broad compatibility and integration with various services. Through continuous development, the NUVION Gateway will be expanded to offer diverse gateway solutions to a wide range of service providers (including enterprises, organizations, and developers).

3-1-4. Advantages and Benefits of NUVION

Through NUVION, a global decentralized shared storage service, ecosystem participants can enjoy the following advantages and benefits :

Advantages of NUVION

a. Decentralized Storage

At the core of NUVION lies its decentralized storage system. Unlike traditional storage systems that rely on centralized servers, NUVION operates on a public decentralized network powered by participant nodes. This structure offers users the following benefits :

Category	Index
Increased security	By distributing data across multiple nodes, NUVION reduces the risk of data loss or unauthorized access, thereby enhancing data security layers for users
Improved reliability	The distributed nature of the network ensures that even if some nodes fail (unlike centralized systems where server downtime causes disruptions), data availability remains unaffected, improving the reliability of data flow
Improved reliability	The structure lowers the market entry barrier by allowing even small storage contributions, enabling rapid and flexible network expansion

b. Global Memory Unification

Computing resources from users around the world can easily join the ecosystem, facilitating the aggregation of vast storage resources. This leads to a phase of global memory unification, which brings the following benefits :

Category	Index
Access to a diverse range of data	Through a global user pool, diverse content (data) reflecting various cultures, languages, and perspectives can be exchanged.
Collaboration and knowledge exchange	Content collaboration and knowledge sharing naturally foster a large community for knowledge exchange as the network expands.

c. Seamless Integration

The flexible NUVION platform smoothly integrates authentication protocols across data interactions, enhancing user convenience. This delivers the following benefits

Category	Index
User-friendly experience	The service architecture abstracts complex protocols into a user-friendly interface, allowing for easy storage registration, data exploration, and management.
Simplified data management	Enables simple data management without the need to handle complex technical configurations or protocols
Interoperability	Facilitates interoperability with various applications and services, laying the foundation for further ecosystem expansion.

User Benefits

a. Cost-Efficiency

One of the key advantages NUVION offers users is cost efficiency. By allowing individuals to easily contribute their existing storage resources, NUVION provides a low-cost alternative to expensive centralized solutions. Network participants can effectively repurpose underutilized storage, significantly reducing the costs associated with purchasing and maintaining dedicated storage infrastructure.

b. Rewards for Contributions

NUVION provides rewards to storage providers and content contributors. These rewards incentivize participation and attract new users to the network. A fair and reliable reward system is essential for ecosystem growth, and NUVION ensures that ecosystem participants receive reasonable compensation in a transparent manner.

c. Asset Exploration

The discovery of various shared assets (content) presents new opportunities for network participants. Access to a wide range of expertise and creative works opens doors to new knowledge and fosters enhanced collaboration through the community.

4.Token Economy

4-1. Token Information

The ultimate goal of NUVION is to promote the widespread adoption of decentralized storage sharing platforms and to address the cost inefficiencies caused by centralized storage services.
NUVION aims to create an ecosystem where the improved economic value of decentralized storage can be used across various sectors by community participants.

Category	Index
Token Name	NUV
Token Ticker	NUV
Contract Address	D84xAgC4e1dtxrkvkfzrF4sHn7RWisx1DaPdAALeaydD
Token Issue	10,000,000,000

4-2. Token Allocation

Category	Ratio(%)	Amount(Units: million)
Circulation volume	61.96	6,200
Foundation	34.36	3,434
Seed Investor #1	2.00	200
Seed Investor #2	0.45	44
Advisor	0.23	22
Personal possession	1.00	1.00
Total	**100.00**	**10,000**

4-3-1. Token Usage

NUV Requirement for Decentralized Storage

NUV tokens are required to utilize the decentralized storage services within the ecosystem. We have designed the ecosystem economy to be sustainably scalable, while also recognizing that the ecosystem's economic dynamics must remain flexible and adaptable to changing conditions. Therefore, we incentivize token usage in alignment with changes in the overall ecosystem economy.

Our goal is to offer a decentralized storage service that is more cost-efficient than traditional centralized storage solutions. Accordingly, we will implement a fair pricing model that reflects this cost efficiency.

$$StorageFee_k = \frac{RequiredObjectByte_k * RequiredNodeAmount_k * RequiredTime_k}{DataPool_{t-1}}$$

Storage Usage Costs

The formula for determining storage usage costs is as follows:

$$StorageFee_k = \frac{RequiredObjectByte_k * RequiredNodeAmount_k * RequiredTime_k}{DataPool_{t-1}}$$

$StorageFee_k = Amount\ of\ storage\ usage\ costs\ required$

$DataPool_t = Pool\ Size\ of\ time\ t\text{-}1$

$RequiredObjectByt_k = Size\ of\ Object\ Capacity\ Requested$

$RequiredNodeAmount_t = Amount\ of\ Object\ Nodes\ Requested$

$RequiredTime_k = Requested\ storage\ usage\ time$

4-3-2. Token Rewards

The token reward pool is dynamically adjusted and scalable based on variables defined by each phase. The core variable influencing the size of the reward pool is the total capacity of the data pool provided. The data pool capacity is chosen as the primary variable because it reflects the fundamental usage structure of the storage platform.

Based on the size of the data pool, rewards are distributed to participating nodes according to the relevant variables.

Reward Pool Formula

The formula for determining the size of the reward pool is as follows:

$$DataPool_t = \sum_{k=1}^{n} ObjectByte_k \; NodeAmount_k$$

$DataPool_t = Pool\ Size\ of\ time\ t$
$ObjectByte_k = Object\ Capacity\ Size\ of\ k$
$NodeAmount_k = Amount\ of\ nodes\ participating\ in\ the\ data\ pool\ of\ k$

Rewards

The formula for determining the amount of rewards is as follows :
We implement a fair reward system through an algorithm that reflects a free-market economy, ensuring that participants who contribute more to the ecosystem receive proportionally greater rewards.

$$DataPool_n = \frac{StorageCapacityProvide_k * ProvideTime_k * NUVAmount_k}{DataPool_t}$$

$Reward_n = Reward\ Amount\ of\ recipient\ n$
$StorageCapacityProvide_k = The\ size\ of\ the\ capacity\ that\ provided$
$DataPool_t = Pool\ Size\ of\ time\ t$
$ProvideTime_k = Time\ the\ storage\ was\ provided$
$NUV\ Amount_k = Amount\ of\ NUVs$

5. Security Audit

The NUVION project has undergone external security audits to ensure the security of its smart contracts and overall services.
Through audits conducted by top-tier security consulting firms, NUVION aims to safeguard NFT assets, tokens, and personal data at the highest level of protection.

Disclaimer :
The security audit report does not constitute investment advice, nor does it guarantee that the business model is appropriate or that the code is free of all bugs.
This report is intended solely to address known technical issues.
Undiscovered issues may still exist — including main network defects.
To ensure the safety of smart contracts, identified issues must be fixed and adequate testing must be conducted.

6. Legal Disclaimer

1. **Customer Information Registration & KYC**
Customer information registration is conducted through the official website (https://nuvionsystems.io) and integrated within the platform to complete the KYC (Know Your Customer) process.

2. **Anti-Money Laundering (AML)**
For holdings of NUV above certain thresholds as recommended by legal firms and applicable laws in each jurisdiction, additional documentation and verification may be requested following KYC checks to ensure compliance with Anti-Money Laundering (AML) regulations.

3. **NUVION SYSTEMS Operating Board**
1.The Operating Board consists of five or more members, including the Founder (serving as Chair), NUVION developers, advisors, and strategic investors.
2.The Board is responsible for making decisions regarding fund allocation, marketing, sales planning, and ecosystem expansion.

4. **Financial Auditing**
NUVION conducts financial audits through a global accounting firm, with the results made publicly available on the website (https://nuvionsystems.io).

5. **Security**
A dedicated security team is in place to protect against cyberattacks, and regular security audits are conducted.

6. **Privacy Protection**
A. NUVION complies with the personal data protection policies of each country and strives to meet the requirements of the European GDPR (General Data Protection Regulation).
B. A Privacy & GDPR Policy Report is submitted biannually.

7. **Language**
Please note that all policies of NUVION SYSTEMS shall be governed and interpreted based on the English version of the official whitepaper.

8. **Legal Considerations**
A.The NUVION Team has prepared this whitepaper solely for informational purposes, to provide specific details about NUVION to those who have shown significant interest in the NUV token. This whitepaper is not intended as an invitation to invest in NUV or as any form of solicitation.
B.Additionally, this whitepaper is provided based on information as of its publication date. The NUVION Team does not guarantee the future accuracy of the content, including any conclusions contained herein. The NUVION Team makes no representations or warranties regarding the whitepaper's accuracy or legal validity and assumes no legal liability for any of its contents. For example, the NUVION Team does not guarantee that:
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(2) The whitepaper possesses commercial value or utility.
(3) The whitepaper is suitable for achieving any particular purpose the reader may have.
(4) The whitepaper is free from errors.
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7. Project Info

7-1. Team

The NUVION Project Team

The NUVION project team is committed to delivering cost-effective solutions to the centralized storage ecosystem and achieving seamless integration with the offline (real-world) environment.

We have already analyzed user demand based on raw data collected from various services. With research and analysis conducted on data from over 50,000 users, we aim to build an optimized and highly effective ecosystem.

Sustainable Decentralized Storage Ecosystem

We aim to create an ecosystem where all users can access storage services at reasonable costs, breaking away from the monopolized storage market.

The root causes of today's unreasonable pricing structures include opaque traffic billing methods and the monopolization of value by a few dominant companies.

By establishing a transparent cost structure and fostering a large-scale decentralized storage platform that rewards ecosystem participants as the network grows, we are building a sustainable and continuously evolving ecosystem.

Transparent Governance

Traditional Web 2.0 platforms typically follow a "provider-takes-all" revenue model, where the efforts of participants who contribute to liquidity generation are not fairly reflected in the platform's revenue distribution. Moreover, as these platforms are primarily developed and managed by centralized administrators, users often have little to no access or influence over the services they use.

In contrast, participants in the NUVION project will share in the revenues generated from the platform's growth and will be rewarded for their contributions, truly reflecting the value of platform expansion.

7-2. Logo & Symbols

Token tiker/symbol

Company logo

Thank you