JAPAN OPEN CHAIN

Japan Open Chain White Paper
as of November 2024

Japan Blockchain Foundation Co., Ltd.

1. Introduction

The emergence of blockchain has become one of the most notable fields in the modern technological revolution in recent years. Its inherent features, including data immutability, decentralization, and transparent transactions, the combination of these traits holds the potential to bring revolutionary changes to many industries and societal systems.

Blockchain technology has found applications in various domains: streamlining international remittances and reducing costs in finance, improving transparency in real estate transactions, and elevating traceability in supply chains, among many others. Additionally, with the integration of smart contracts, automation of financial transactions and facilitation of conditional automated sales become feasible. This opens avenues for the development of new innovative business models and services.

Japan Open Chain is a consortium-based public blockchain fully compatible with Ethereum. The chain was designed as an infrastructure to offer a secure environment for both businesses and individuals to participate in Web 3.0 activities, a market expected to experience substantial future growth. Japan Open Chain is operated in compliance with Japanese law by a reputable Japanese company, ensuring sufficient decentralization, high security, and stability.

This white paper provides detailed information about Japan Open Chain, envisioned as the financial infrastructure for the next generation.

1.1 History and Evolution of Blockchain Technology

The history of blockchain technology began with the release of the Bitcoin white paper by Satoshi Nakamoto in 2008. Bitcoin was designed to establish a peer-to-peer electronic cash system without the need for a central authority, and the blockchain garnered attention as the underlying technology.

Following the success of Bitcoin, numerous other blockchain projects and cryptocurrencies emerged. One standout was Ethereum, launched in 2015. Unlike Bitcoin, Ethereum went beyond currency and introduced 'smart contracts,' enabling users to execute programs on the blockchain. This shift transformed blockchain from a distributed database tool into a versatile platform for distributed computing, which significantly expanded its utility.

Since then, blockchain's application areas have rapidly expanded, with industries such as Fintech, healthcare, energy, real estate, logistics, and many others actively adopting and researching blockchain technology. It has evolved from the first generation, which began with Bitcoin, to the second generation, incorporating features like smart contracts and Dapps, and further into the third generation, which emphasizes enhanced scalability and interoperability.

1.2 Background and Purpose of Japan Open Chain

While Ethereum's potential is impressive, it faces challenges related to scalability, usability, and cost. It currently processes an average of only 15 transactions per second, with execution costs ranging from hundreds to tens of thousands of yen. Additionally, there are business-related challenges, including finality speed, chain splits from hard forks, and legal ambiguity. Japan Open Chain was established to tackle these issues as a fully Ethereum-compatible blockchain, operated by Japanese companies.

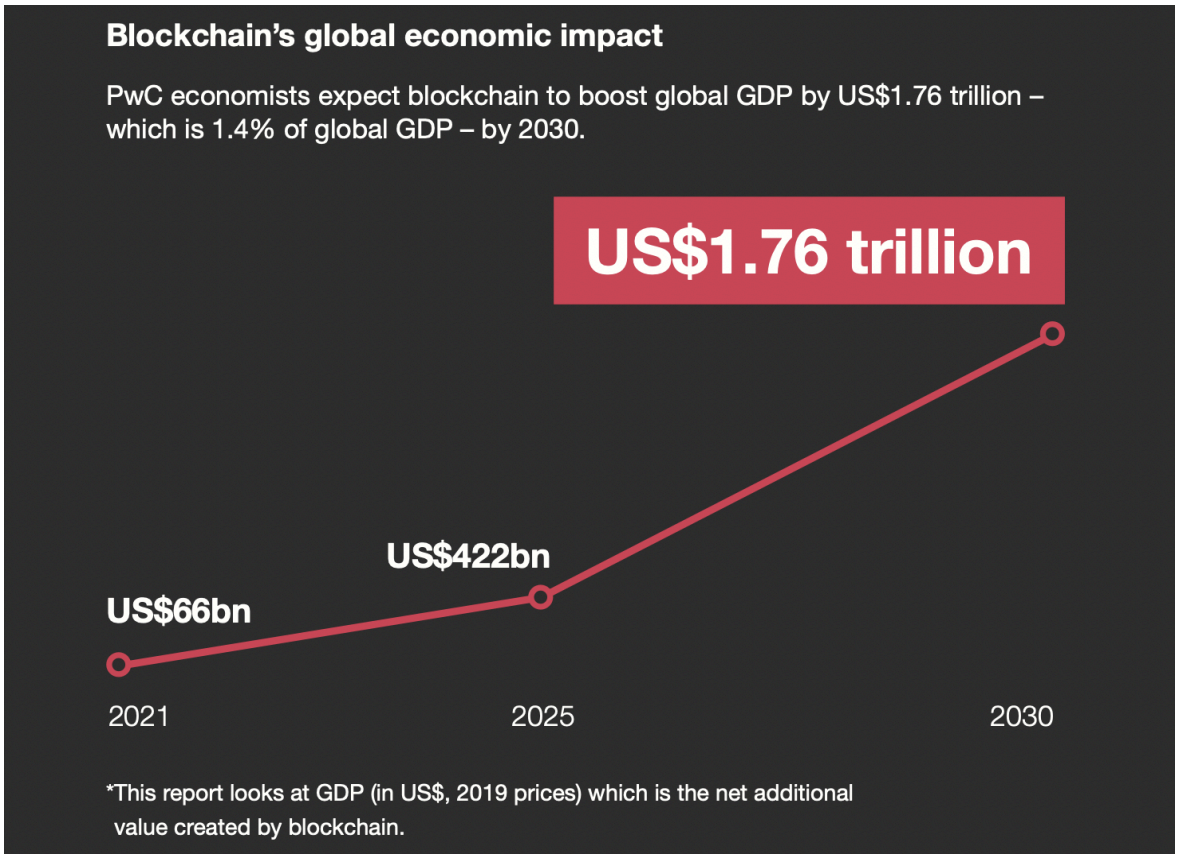
One of the major features of Japan Open Chain is that, while maintaining full compatibility with Ethereum, it adopted the Proof of Authority (PoA) consensus algorithm to enhance scalability and reduce costs. The adoption of this algorithm significantly enhances scalability and reduces costs, resulting in a dramatic increase in transaction speed, with an average of hundreds to thousands of TPS. Furthermore, by selecting validators from established Japanese companies, we improve legal stability for all businesses engaging with the blockchain. Consequently, Japan Open Chain offers a high-speed, cost-efficient, and trustworthy environment for the evolving Web3.0 business landscape.

The blockchain sector is expected to experience significant growth alongside AI in the coming years. 'Japan Open Chain' is poised to play a pivotal role in unlocking new possibilities in the IT and financial sectors. We genuinely hope that through this project, we can deliver innovative solutions to everyone.

2. Market Background and Opportunities

2.1 Expansion of the Blockchain Market

Blockchain technology continues to evolve, and the market utilizing this technology is rapidly expanding. This growth is expected to continue at a rapid pace, and by 2030, it's said to have the potential to increase the global Gross Domestic Product (GDP) by 1.76 trillion US dollars and Japan's GDP by 72 billion US dollars.[1]



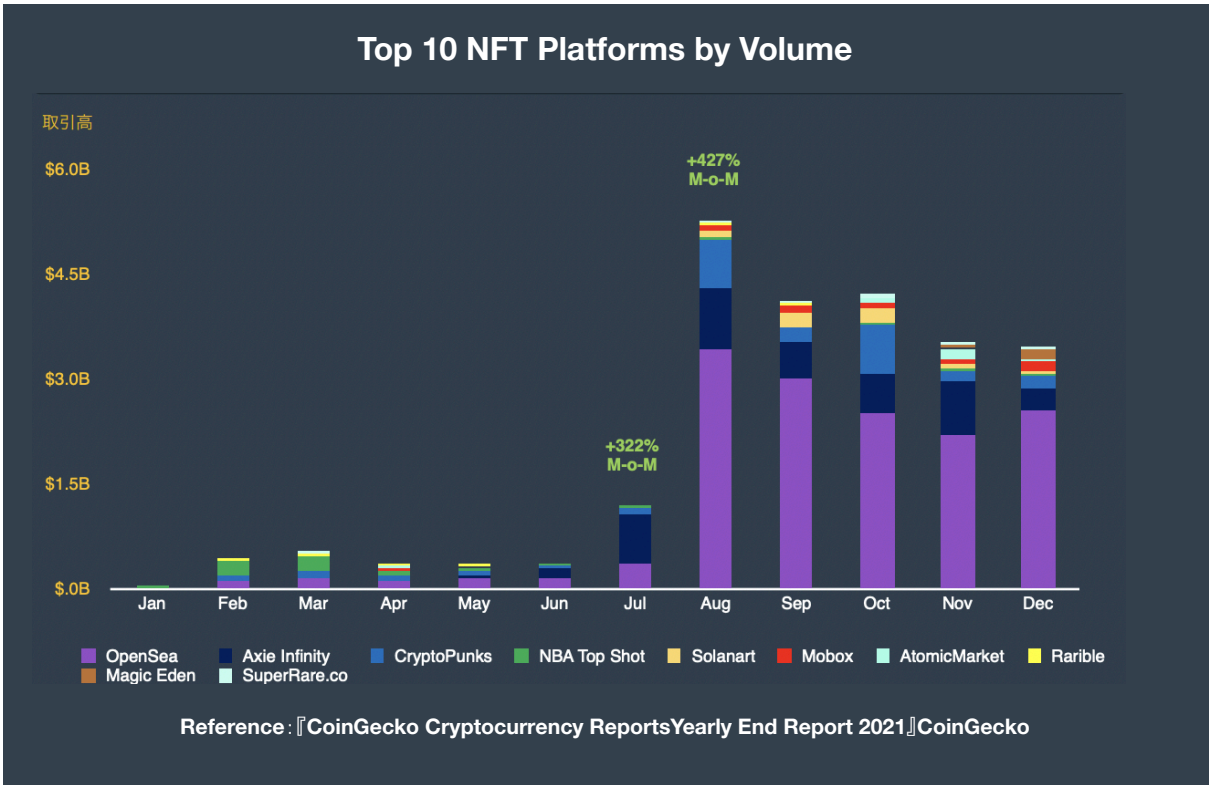
Reference：PwC『Time for trust』, 2020

Especially in industries such as fintech, healthcare, logistics, manufacturing, and energy, the advantages of blockchain technology started being recognized and also actively integrated into real-world business operations. Examples include enhanced efficiency in cross-border financial transactions, optimized management and sharing of medical data, and increased transparency in supply chains. These instances showcase the wide-ranging adoption of blockchain across diverse industries.

[1] PwC "Time for trust" , 2020

2.2 Expansion of the NFT Market

Since around 2021, attention toward NFTs (Non-Fungible Tokens) and DeFi (Decentralized Finance) has been rapidly increasing. Comparing the months of January and December in 2021, the monthly trading volume of the NFT market surged by +5,438%. The combined annual trading volume for the top 10 NFT marketplaces in 2021 amounted to 239 billion US dollars[2], with over 65% of this volume transacted on the Ethereum mainnet.



Initially, NFTs gained significant attention in the realms of art and gaming. However, their unique characteristics have led to the emergence of new use cases, such as certificates for membership, identification, and as tickets. These developments indicate promising potential for further growth in the future.

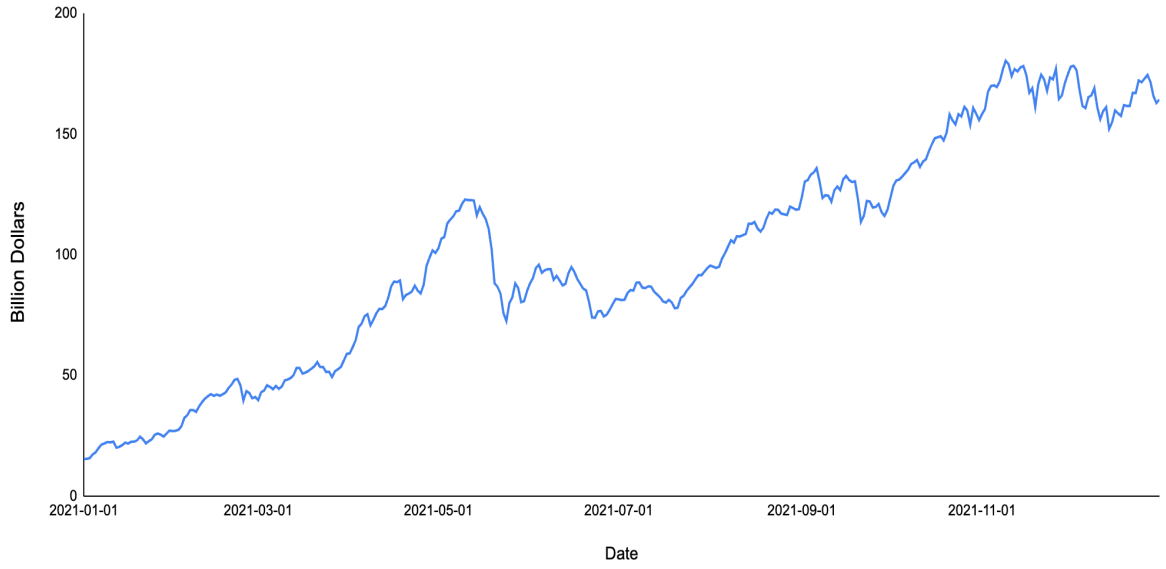
2.3 Advent of Defi

With the rise of DeFi (Decentralized Finance), trading both NFTs and financial products using programs on the blockchain has become feasible. This allows for programmable financial transactions without the intermediaries that were essential in the past.

[2] 『CoinGecko Cryptocurrency ReportsYearly End Report 2021』CoinGecko

The TVL (Total Value Locked) — a metric indicating the amount of funds committed to the DeFi market — grew from 15.8 billion USD in January 2021 to 169.2 billion USD in December 2021, which is an increase of approximately 1,070%. Over 50% of these funds were held on the Ethereum Mainnet.

Total Value Locked（2021）

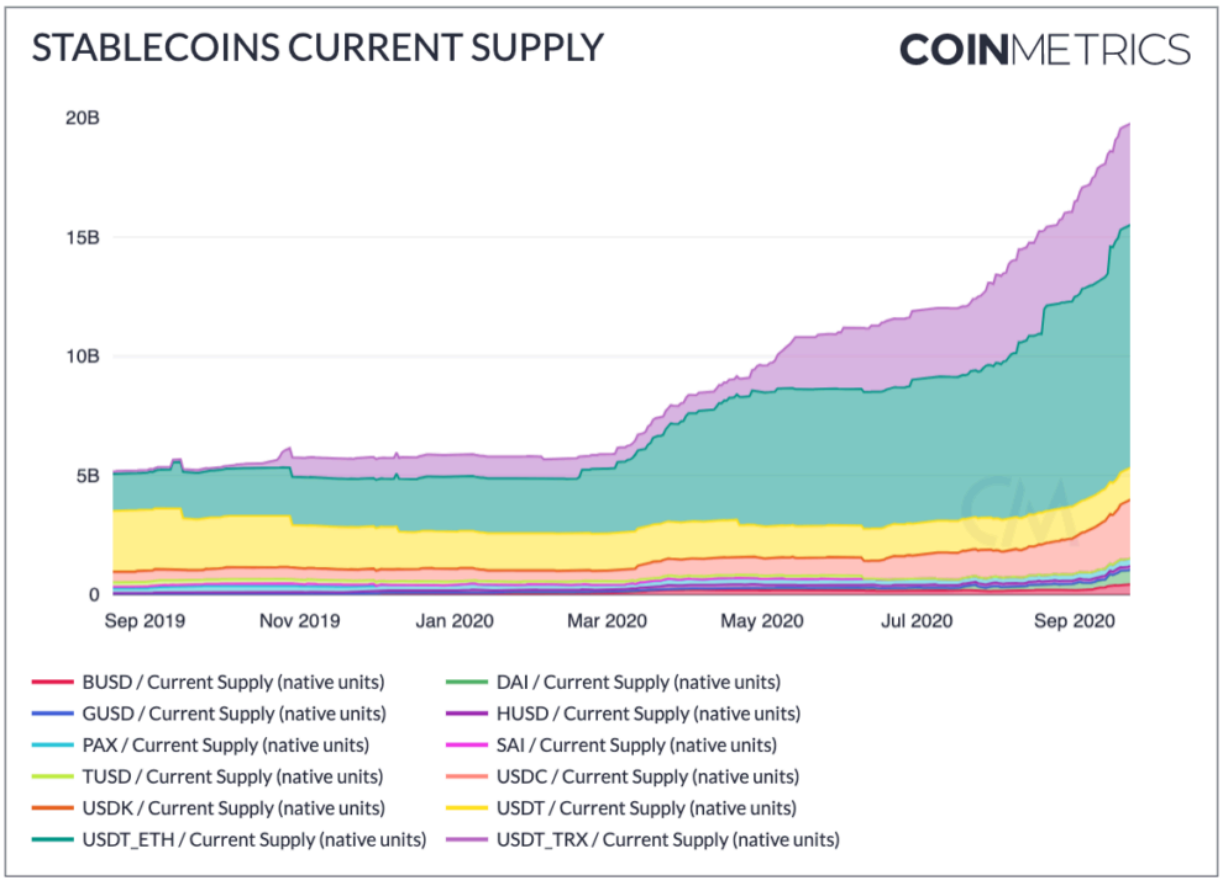


Reference: Total Value Locked All Chains, https://defillama.com/chains

The DeFi is expected to encompass the entire financial sector, including securities and real estate markets, promising a transformation away from traditional paradigms. Japan Open Chain, operated by legally established Japanese entities, provides a user-friendly blockchain, in the realm of DeFi.

2.4 Expansion of the Stablecoin Market

Furthermore, the stablecoin market has experienced dramatic growth since 2020.



Stablecoins are cryptocurrencies designed to have a stable value, typically tied to a specific asset, currency, or collection of assets. Their primary purpose is to counteract the substantial price volatility often seen in crypto assets. Over the past few years, their prominence in the market has steadily increased."

With the rise of DeFi, stablecoins have taken on pivotal roles as both mediums of exchange and collateral, and many DeFi protocols utilize stablecoins in their operations. Prominent examples like Tether (USDT), USDC, and DAI are prevalent in the market, and the collective market value has seen a swift rise, with the total issuance surpassing 20 trillion yen.

The primary advantage of stablecoins is their price stability. Additionally, they offer benefits like lower transfer fees compared to traditional financial infrastructure and programmable capabilities. They are expected to improve cross-border transfers, expand access to financial services, and have diverse applications. In developing countries, people without access to traditional banking systems can utilize stablecoins, enabling those without bank accounts to access financial services.

On the other hand, within the category of stablecoins, there are instances where tokens have been issued without genuine legal asset backing, resulting in their

value not being truly stable. Some of these tokens even border on being fraudulent. In response to legal amendments related to stablecoins in Japan, Japan Open Chain, in collaboration with validators and financial institutions, has conducted a proof of concept experiment to issue legally robust stablecoins backed by assets held by banks.

Japan Open Chain, with its legal stability and transaction speed, is expected to play a significant role in the issuance and circulation of stablecoins.

3. Ethereum and its Issues

As highlighted above, the emergence of NFTs, DeFi, and Web3.0 has brought significant attention to blockchain infrastructures, especially the Ethereum Mainnet. However, the permission-less public chain model, as utilized by Ethereum, inherently presents several challenges when applied to business contexts.

3.1 Ethereum's Mechanism（PoS algorithm）

Ethereum is designed as a "permissionless blockchain", where anyone can become an operator of the Ethereum network simply by installing the software and connecting to the Ethereum network.

Utilizing a permissionless model ensures that a blockchain operates without undue reliance on any particular individual or group. This allows for the launch of services outside countries even if they don't comply with that country's laws. Such a feature becomes especially valuable for safeguarding assets or systems against authoritarian regimes.

Initially, it adopted the consensus algorithm known as Proof of Work (PoW). However, this approach demands substantial computing power and high electricity consumption, and as a result, it has garnered concerns regarding its environmental footprint.

As a response, Ethereum is shifting to a consensus algorithm known as Proof of Stake (PoS), which notably diminishes its environmental impact. With PoS, individuals looking to operate on Ethereum can become validators by depositing 32 Ether, valued at approximately 12 million yen as of October 2024.

3.2 Challenges of Ethereum

Although the adoption of the PoS consensus algorithm has addressed some environmental concerns, Ethereum still faces various other issues due to its characteristics.

3.2.1 Slow Speed

Permissionless node model requires numerous nodes and servers to collaborate using consensus algorithms such as Proof of Work (PoW) or Proof of Stake (PoS). This makes it challenging to increase the transaction speed of blockchain. For instance, Bitcoin, the network handles around 7 transactions per second (7 TPS)

globally, and in Ethereum, the average number of TPS is around 12[3]. At the same time, as the community grows larger, decision-making such as specification changes also takes longer.

This transaction limit is considerably low to satisfy the trading demands worldwide, and as a solution to this, the Ethereum community is researching and implementing technologies like Layer2 chains and sharding to enhance its scalability. However, Layer2 technology still faces challenges in terms of decentralization, legal stability, and technical methodology, making it challenging for business applications in its current state. Moreover, sharding is still in its developmental phase, and it's said that substantial time is required for its full implementation.

3.2.2 High Gas Fee

In Ethereum, every transaction requires a fee called "gas," which is payable in Ether. Given Ethereum's limited transaction processing capacity, traffic tends to get extremely busy, and as the number of users increases, both gas prices and Ether values escalate. Consequently, in Ethereum's present state, executing a single program can cost anywhere from a few hundred yen to occasionally tens of thousands of yen.

For instance, even in a simple use case like sending stablecoins, transaction fees can range from a few hundred yen to sometimes several thousand yen. There was even an instance when issuing 50,000 NFTs cost over 10 billion yen.

The high fees on the Ethereum mainnet present challenges, limiting its usability.

3.2.3 Finality

The permissionless node model has inherent issues with the speed of finality – the duration it takes to deem a transaction as completed – due to the need to coordinate with a very large number of participating nodes.

In a blockchain, transactions are approved and 'finalized' by including them in a block. However, in permissionless blockchains, the time it takes for blocks to be finalized is inconsistent, which problem often is called 'probabilistic finality.'

The PoS consensus algorithm has somewhat mitigated this problem, and finality can be achieved after a certain waiting period. However, it still requires waiting from several tens of seconds to a few minutes for a transaction to be fully completed. Until they're finalized,their status remains probabilistic, implying a possibility of the

[3] As of the date in October 2024

transaction being reverted. Such characteristics could present considerable challenges, especially in important financial transactions and similar scenarios.

3.2.4 Takeover through 51% Attack

Blockchain consensus algorithms have a vulnerability known as the 51% attack. This refers to the issue where, if an entity controls more than half of the network's computational power, it becomes possible to alter transactions or carry out double-spending.

In PoW blockchains like Bitcoin, the ability to control 51% of the computational power theoretically grants one dominance over the network. Although achieving this level of control is deemed nearly impossible in large networks, the vulnerability becomes more pronounced in smaller ones.

In the PoS method, as seen in Ethereum 2.0, the emphasis shifts from computational capacity to the amount of assets staked. However, due to high staking prerequisites and penalty rules, direct participation becomes less accessible for average individuals.

In large PoS networks like Ethereum, individual participation can be daunting, leading to the emergence of entities that stake on behalf of individuals. These entities, by pooling substantial staking resources, inadvertently centralize influence on the network, causing the contradiction of blockchain's decentralized principles.

When significant assets like stablecoins circulate in PoS networks, there's a concern that if the staked assets get relatively small at the moment, large entities or even nations could potentially invest in that network to obtain more than 51% of the total stake to dominate the network and gain control.

Therefore, it's vital to be wary of threats like the 51% attack and the centralization of control especially in smaller PoS networks.

3.2.5 Hard Folks

NFTs are products built on blockchain technology, and one of the most significant risks to be aware of when dealing with them is the potential for a hard fork.

A hard fork involves implementing specification changes to the network, resulting in updates that aren't backward-compatible. In the event of a split, if there's no consensus on which chain is the official one, both chains might coexist after the hard fork, with new tokens being issued and existing on both of them. Permissionless node models, as it is operated by numerous participants, often face

challenges in reaching consensus. Both Bitcoin and Ethereum have experienced chain splits due to hard forks on multiple occasions.

While past hard forks sometimes brought benefits to token holders, however, in the context of chains issuing NFTs, the occurrence of a hard fork can pose substantial risks. Specifically, it could result in the creation of duplicate versions of NFTs, which undermines the uniqueness that NFTs are fundamentally designed to present.

Similar to NFTs, stablecoins are assets that ideally should not be split. Given that stablecoin isn't designed to be forked, there are concerns that stablecoin issuers might exert undue influence on the chain's operations when the hard fork takes place.

3.2.6 Legal Ambiguity of Operating Entity & Responsibility

The legal status of permissionless blockchains is still not clearly defined in many countries. As a result, the legality of NFTs, applications, and data protection remains uncertain. Particularly for businesses in countries with international data transfer regulations, it requires special caution when using blockchain.

To resolve this issue, there is a need to establish international blockchain norms and legal frameworks. Additionally, it is essential to define the clear responsibilities of operators and to formulate clear policies regarding data protection.

However at this moment, companies using permissionless blockchains may face significant legal uncertainties and challenges.

4. About Japan Open Chain

Japan Open Chain was established to solve the problems mentioned above. This chain was designed as an Ethereum-compatible blockchain infrastructure to provide a secure environment for both businesses and individuals to engage in Web 3.0 businesses. Operated by a reputable Japanese company, this consortium-based public chain ensures adequate decentralization, high security performance, and stability by being compliant with Japanese laws.

4.1 Concept and Purpose

Japan Open Chain is a globally accessible consortium-based public blockchain fully compatible with Ethereum. Its unique feature lies in its adoption of the Proof of Authority (PoA) consensus algorithm, ensuring high transaction speeds. The accessibility to this chain extends to individuals and corporations anywhere in the world, not just from Japan.

While the PoA consensus algorithm may have less validator decentralization, it boasts superior scalability compared to the PoS. Japan Open Chain intentionally chose this PoA consensus algorithm to greatly achieve high transaction speeds compared to Ethereum mainnet.

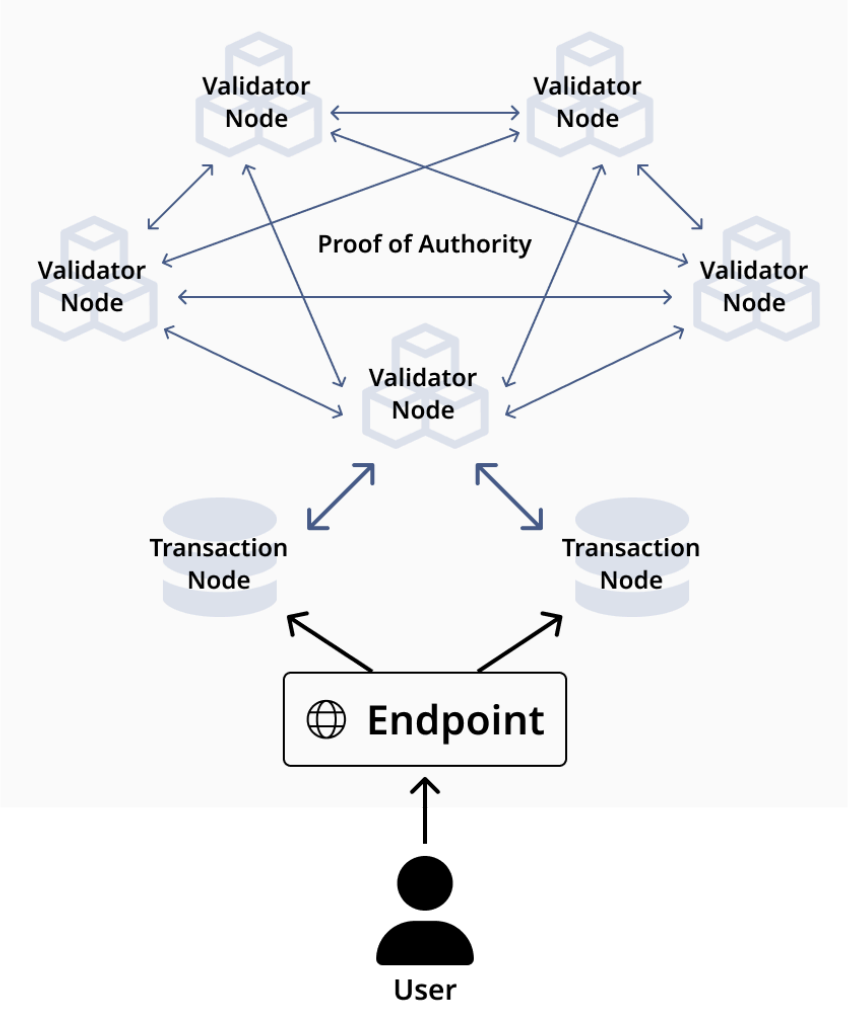
In the PoA consensus algorithm, the key lies in selecting the validators. Japan Open Chain addresses the common challenge of limited validators in the PoA model by partnering with reputable Japanese companies and institutions as validators. Currently, entities such as Sony Group, NTT Group, Dentsu Group, as well as universities and various web3 and crypto-focused firms and startups, are joining in as validators of Japan Open Chain.

In essence, Japan Open Chain is a blockchain that realistically balances decentralization and scalability. It functions as an Ethereum-compatible chain, adhering to Japanese laws, in a country known for its stable political and legal framework.

4.2 Overall Picture of the Network

Japan Open Chain utilizes the widely used open-source Ethereum node software, Go Ethereum (also known as Geth,) to build its blockchain network on Ethereum's mainnet. Nodes are operated by each validator, and the operational status is regularly audited by the Japan Blockchain Foundation Co, Ltd., which serves as the network auditing entity to ensure network's integrity and transparency.

Users can access Japan Open Chain easily through nodes provided by node providers or through endpoints provided by RPC endpoint providers. By using this approach, users benefit from a smooth and seamless experience, backed by the network's strong security and speed.



4.3 Technical Features

4.3.1 Compatibility with Ethereum

Ethereum has the largest user base among all blockchain networks in the world. Japan Open Chain utilizes 'Go Ethereum (Geth),' the leading node software for Ethereum, to prioritize compatibility with this extensive ecosystem. This ensures that tools and applications running on Ethereum can seamlessly integrate and operate on Japan Open Chain. Furthermore, developers can leverage the abundant resources within the Ethereum community.

Japan Open Chain is fundamentally a part of the Ethereum community and is designated as the number 81st entity on the list of EVM-compatible chains endorsed by the Ethereum Foundation.

4.3.2 Proof of Authority (PoA) Consensus Algorithm

The PoA (Proof of Authority) consensus algorithm is a system where specific, authoritative nodes carry out transaction verification. Japan Open Chain is composed of up to 21 validators, chosen from trusted corporations and organizations in Japan. The advantages of this system are its ability to provide fast and stable transaction processing, as well as achieving the rapid "complete finality" demanded by the financial industry.

4.3.3 Transaction Speed

By adopting the PoA (Proof of Authority) consensus algorithm, Japan Open Chain achieves transaction speeds that greatly surpass those of the Ethereum mainnet. To be more precise, it can handle thousands of native token transfers per second and execute several hundred smart contracts per second.

4.3.4 JOC Token

'Japan Open Chain Token' (henceforth known as JOC token) is the native token of this blockchain. It is utilized as a fee token which is essential for the operation of Japan Open Chain, and also functions both as a service fee within the network and as rewards for validators.

4.3.5 Legal Stability

Japan Open Chain operates in compliance with Japanese laws and regulations. Consequently, this provides a high level of legal assurance for businesses and individuals engaging in commercial or financial activities on the platform.

4.4 Security Measures

Typically, when a blockchain falls prey to hacking, it's often due to flaws in its consensus algorithm or vulnerabilities in the supporting software. Japan Open Chain's security is assured through a combination of robust underlying technology and stringent operational methods.

4.4.1 Technical Architecture

Japan Open Chain utilizes Go Ethereum (known as Geth), which has been the most widely used software on the Ethereum network, benefiting from years of testing and improvement. The software has successfully withstood numerous attacks and vulnerability tests and ensured its safety and reliability. Geth stands as the cornerstone of Japan Open Chain's security and reliability.

4.4.2 Operational Model

Our consensus algorithm Proof of Authority (PoA), is also one of the official algorithms of Geth. Due to the characteristics of its algorithm, an attacker would need to gain control over the majority of validator nodes to take over the network. In the case of Japan Open Chain, these validators are operated by companies and organizations that hold social trust in Japan. This means that to gain control over the majority of our network, an attacker would need to simultaneously hack major Japanese companies in our validator group. Such a large-scale and sophisticated attack is extremely difficult, thereby ensuring the security of Japan Open Chain.

In this manner, Japan Open Chain offers robust security through both its technical architecture and operational model.

5. Ecosystem and Partnerships

5.1 Projects on Japan Open Chain

Various projects have already been launched on Japan Open Chain. Its unique characteristics make it especially well-suited for projects that require compliance with Japanese regulations, particularly in sectors such as finance and local governance. As a result, initiatives in these fields are making more progress.

5.2 Projects related to Stablecoin

Following the enactment of a new Payment Services Act in Japan in June 2023 that legitimizes the issuance of stablecoins, G.U. Technologies, one of the validators of Japan Open Chain, is initiating a stablecoin project. As part of this project, G.U. Technologies is conducting a proof of concept experiment on Japan Open Chain to issue stablecoins in collaboration with banks such as Aozora Bank, Minna Bank, a digital bank within the Fukuoka Financial Group, Kiraboshi Bank, and Shikoku Bank. In addition to this development, financial institutions outside of Japan have also begun exploring the issuance of stablecoins on Japan Open Chain.

Stablecoins issued and backed by banks remain rare on a global scale. This project has captured widespread global attention and has been featured in renowned cryptocurrency media outlets like CoinDesk. If these initiatives continue to advance, they have the potential to facilitate transactions with minimal fees, possibly less than one yen. This is a stark contrast to domestic interbank transfers, which incur fees in the range of several hundred yen, and international transfers, which can cost several thousand yen. Moreover, it could give a huge impact on the current landscape of credit card payments, which impose percentage-based fees. Such a development has the potential to bring about significant financial transformation, potentially revolutionizing the financial world.

In addition to above, in the realm of Web3.0, there exists a concept known as "programmable money," which envisions a world where money possesses programmable capabilities and can move autonomously. For example, payments could be executed automatically under predefined conditions, or foreign exchange transactions could be carried out directly on the blockchain which can bypass the need for traditional exchanges. In this future, we could even imagine a world where AI systems manage and invest funds on our behalf.

The stablecoin market is currently worth over 17 trillion and 800 billion yen, but it is expected that the market will expand to about 400 trillion yen in the next five years.[4]Japan Open Chain aims to position itself as one of the central infrastructures and at the forefront of this substantial growth.

5.3 Projects related to NFT

To foster the digital transformation (DX) of local governments, the concept of e-residency has been attracting notable attention. Cogear Co., Ltd., a subsidiary of the Sony Group and one of the validators of Japan Open Chain, is actively collaborating with Kaga City in Ishikawa Prefecture to conduct a proof of concept experiment centered around e-residency. This innovative experiment leverages NFTs issued on Japan Open Chain to explore new possibilities within the domain of digital governance.

E-residency is a system that enables individuals, regardless of their place of residence, to access specific services or receive discounts at local businesses by holding an e-residency membership card issued by a specific municipality. On a global scale, Estonia has gained international recognition for embracing the concept of e-citizenship,

As remote work continues to be a prevailing trend, there is a growing anticipation that individuals will opt to live in various regions or even embrace a nomadic lifestyle. The e-residency system stands poised to be a pivotal force in supporting these transitions.

Furthermore, Japan Open Chain has been adopted for NFT issuance in initiatives such as Japan Post's project, "Showcasing Regional Attractions through the Post Office of the Future." Additionally, partnerships with multiple NFT issuance solution providers as development partners are progressing.We foresee a wide range of NFTs being issued and introduced in the near future thanks to these collaborations.

5.4 Collaboration with Global Projects

On Japan Open Chain, we are fostering partnerships both domestically and internationally with node providers, cross-chain protocols, cryptocurrency exchanges, DeFi projects, and beyond. Information regarding our collaborative projects will be disclosed in due time through our website, social media channels, and other communication platforms.

[4] Bernstein Research Report

5.5 Others

In addition, the potential use case of Japan Open Chain is being explored in various domains such as finance, supply chain, real estate, entertainment, and education, and several projects have already been launched. Details about each project will be announced when they are ready to be shared, either through our website or via social media platforms and other outlets.

Japan Open Chain is committed to fostering the adoption of Web3.0 technology in Japan and across the world through partnerships with enterprises from various sectors.

6. Tokenomics

6.1 Role and Benefits of JOC Token

Japan Open Chain's core token, JOC token, serves as the fee token for a wide range of activities on the platform, including transfers, NFT issuance, and the deployment of smart contracts. In essence, JOC tokens are required as transaction fees when executing various transactions. However, it's important to note that these fees can be covered by someone other than the transacting parties, allowing parties to engage in transactions without bearing the fee burden themselves.

Validators verify the authenticity of each transaction, and upon successful verification of a transaction, validators proceed to create a new block and add it to the existing blockchain under their authority. In return, validators receive JOC tokens as gas fees, and this system forms the cornerstone of the ecosystem.

Similar to Ethereum, the transaction fee mechanism for JOC tokens is dynamically adjusted with market supply and demand which can ensure fairness and transparency. As the demand for Japan Open Chain increases, the value of JOC tokens will rise, and the rise in price during heightened demand acts as a mechanism to regulate traffic. By balancing supply and demand in this manner, Japan Open Chain maintains the stability of traffic in the network.

In addition, JOC tokens will be used as funds to encourage the development of new applications and dApps by providing grants and financial support to collaborators and external developers who are believed to contribute to the growth of the Japan Open Chain ecosystem. Developers and others who receive JOC tokens can expect their value to rise, similar to stocks or stock options, if their contributions lead to the expansion of the ecosystem.

6.2 Total Issuance

A total of 1 billion JOC tokens have been minted upon the creation of the network, and there will be no further mint in the future. Japan Open Chain plans to implement the London Hard Fork, and the total available supply will gradually decrease over time. This means that the JOC token is a deflationary currency, and its intrinsic value might increase simply by holding it.

6.3 Mechanism of Japan Open Chain Transaction Fees

6.3.1 Gas

Gas is used to pay for transactions on the Japan Open Chain blockchain. The amount of gas required for each transaction varies based on the complexity of the transaction. For instance, a simple transfer of JOC tokens requires 21,000 gas, while more complex transactions, such as those used in decentralized finance (DeFi), may require over 1,000,000 gas.

6.3.2 Gas Price

Gas has a price referred to as “gas price,”[1] and it’s measured in gwei. 1 JOC is equivalent to 1 × 10^9 (1,000,000,000) gwei. So for example, if the gas price is 100 gwei, a transaction that uses 21,000 gas would have a gas fee of 21,000 × 100 = 2,100,000 gwei (0.0021 JOC.)

While the amount of gas needed for a transaction remains fixed, the gas price can vary. Users set the gas price when sending a transaction, which is often automated by wallet software. Once validators approve the transaction, they receive the gas fee as a portion of the overall transaction cost.

6.4 Interrelation with Stablecoins

Stablecoins are planned to be issued on the Japan Open Chain using the ERC20 standard, and the JOC token will be used as the fee token for stablecoin transfers. This means that every time stablecoins are issued and used for transfers on the Japan Open Chain, JOC tokens will be consumed each time.

Stablecoins are projected to be at the heart of all financial transactions in the Web3.0 era. The volume of stablecoins issued on a specific blockchain can influence the pricing of the fee token on that blockchain; in our context, the JOC. Given this, as various banks begin issuing stablecoins on Japan Open Chain, the value of its native token is expected to increase, which can benefit the entire Japan Open Chain community.

7.Token Sale

7.1 Overview of Token Sale(IEO)

The JOC token is classified as a '1st-category cryptocurrency' under Article 2, Paragraph 14, Clause 1 of Japan's amended Payment Services Act. Details of the JOC token sale are provided in the 'Token Sale (IEO Overview)' section below.

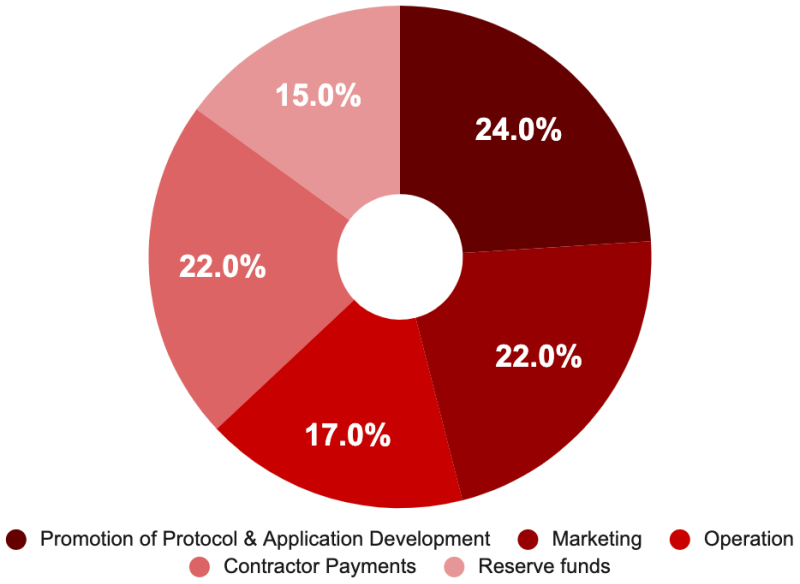
Token Sale（IEO Overview）

Token Name	**Japan Open Chain Token**
Issuer	Japan Blockchain Foundation CO, Ltd.
Ticker Symbol	JOC
Token Standard	The native cryptocurrency token used for transaction fees on blockchains based on the Ethereum protocol.
Legal State	“No.1 Crypto Asset" as defined in Article 2, Paragraph 14, Item 1 of the Amended Payment Services Act.
Quantity Sold through IEO	50,000,000（5% of Total Issued)
IEO Implementer	Japan Blockchain Foundation Co., Ltd.
Method of Sale	To be announced by exchange conducting the IEO
Target of Sales	Account Holders of the exchange conducting the IEO.
Schedule	Expected to be the fourth quarter of 2024.

7.2 Use of Funds Raised through IEO

The breakdown the usage of funds raised through the IEO is as follows:[5]

- 24%：Promotion of Protocol & Application Development:
  The funds will be used to promote the development of Japan Open Chain and applications that run on the chain.
- 22%：Marketing
  Will be used for expanding the ecosystem's user base and acquiring new content that utilizes Japan Open Chain
- 17%：Operation
  Will be allocated for compensating the operational staff.
- 22%：Contractor Payments:
  The funds will be used for payments to external professionals, such as cryptocurrency exchanges, accountants, and lawyers, who are essential for the stable operation of Japan Open Chain.
- 15%：Reserve funds



The usage allocation of funds may be adjusted based on the final amount raised.

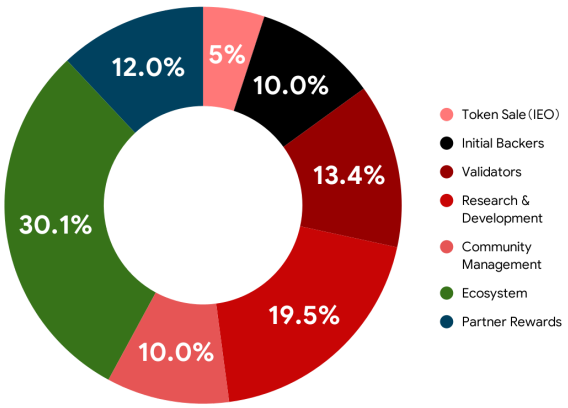
- 20 - 30%: Promotion of Protocol & Application Development:
- 20 - 30%: Marketing
- 12 - 21%: Operation
- 18 - 25%: Contractor Payments
- 10 - 20%: Reserve Funds

[5] These exclude taxes.

7.3 Initial Allocation

On Japan Open Chain, the cap for JOC tokens is set at 1 billion tokens, and this entire amount was already minted when the network started. JOC tokens are planned to undergo a review process by the Financial Services Agency (FSA) in response to a request from the cryptocurrency exchange conducting the IEO (Initial Exchange Offering). Following this review, the tokens will be offered through the IEO process. In the initial stages, the tokens will be managed primarily by Japan Blockchain Foundation Co., Ltd., which serves as the issuer, along with co-operating organizations. It will be allocated to each stakeholder within the community to contribute to the formation of a robust token economy.[6]

- Token Sale（IEO）：5% (50,000,000 JOC)
    - Sold through a Token Sale (IEO.)
- Initial Backers：10.0% (100,000,000 JOC)
    - Allocated to the early-stage backers and investors in this project.
- Validators：13.4% (134,200,000 JOC）
    - Allocated to the validators operating nodes.
- Research & Development：19.5% (195,000,000 JOC）
    - Used as incentives for the developer.
- Community Management：10.0% (100,000,000 JOC）
    - Used for the maintenance and development of Japan Open Chain.
- Ecosystem：30.1% (300,800,000 JOC)
    - Used for expanding the user base of the ecosystem and to acquire new content that utilizes Japan Open Chain.
- Partner Rewards：12.0% (120,000,000 JOC)
    - Used as incentives for supporters who contribute to expanding the ecosystem.



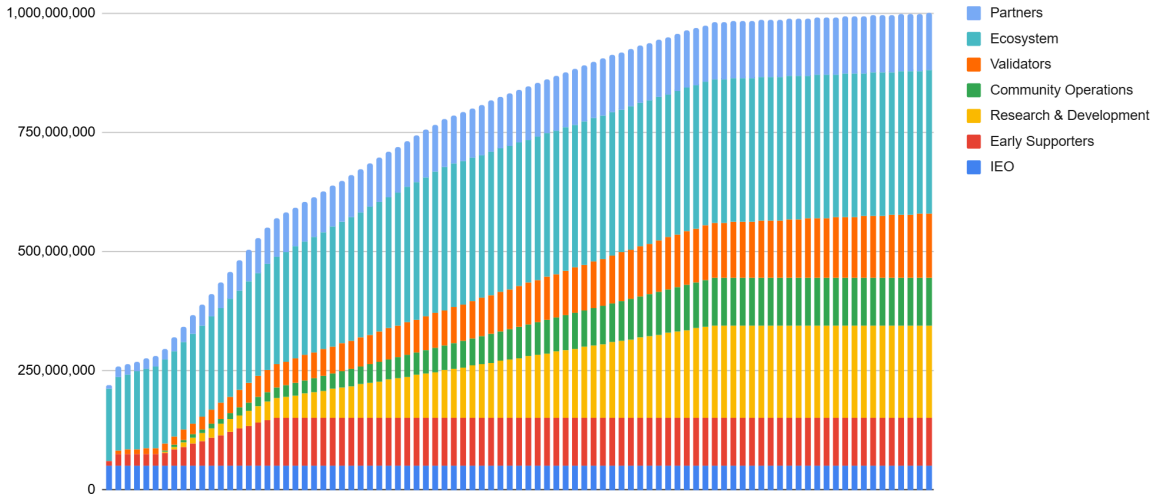
[6] Initial allocations are rounded to the first decimal place.

Once all tokens are minted, the Japan Blockchain Foundation will not mint any additional JOC tokens. The Japan Blockchain Foundation will serve as the operational and managerial entity for both the blockchain network and the JOC token. Their duties will include auditing the validator node operations, fostering a healthy token economy, driving technical research, and providing annual reports on the network and token status to regulatory authorities like the Financial Services Agency. The expenses for these activities will be covered by consortium participation fees from validators and token-related income.

7.4 Lock-up Schedule

Each allocation is subject to a lock-up period, established to prevent excessive selling pressure following the IEO

- Token Sale（IEO）：5.0% (50,000,000 JOC)
    - Sold through a Token Sale (IEO) and will be available for circulation in the market without being subject to any lock-up period.
- Initial Backers：10.0% (100,000,000 JOC)
    - A portion of the tokens will be unlocked at the time of IEO. Subsequently, starting from the 6th month, they will gradually be unlocked until after 18 months when all tokens are freely circulatable.
- Validators：13.4% (134,200,000 JOC）
    - Tokens will be gradually unlocked over a period of 100 months after the launch of the mainnet. The allocated tokens to Validators before the IEO are unlocked over a period of 18 months starting from the implementation of the IEO.
- Research & Development：19.5% (195,000,000 JOC）
    - After the 6 months of token sale, they will have their lock gradually released in equal portions over a span of 60 months.
- Community Management：10.0% (100,000,000 JOC）
    - After the 6 months of token sale, they will have their lock gradually released in equal portions over a span of 60 months.
- Ecosystem：30.1% (300,800,000 JOC)
    - Half of the allocation will be used for the expansion of the ecosystem from the time of the IEO, and the remaining half will be unlocked over a period of 36 months after the IEO.
- Partner Rewards：12.0% (120,000,000 JOC)
    - They will be gradually released over a period of 54 months after the IEO.



Token Unlock Schedule (End of Each Fiscal Year)

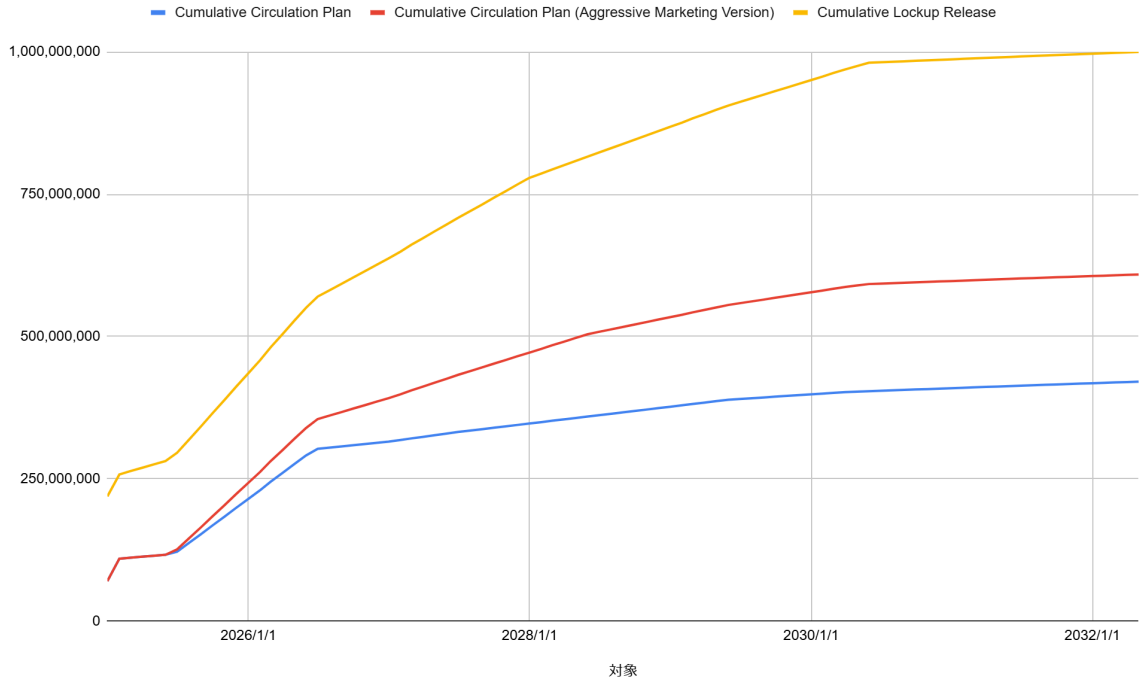
Category	Total Supply	2024	2025	2026	2027	2028	2029	2030	2031	2032
IEO	50,000,000	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%
Early Supporters	100,000,000	1.12%	6.53%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%
Research & Development	195,000,000	0.00%	2.27%	6.17%	10.07%	13.97%	17.87%	19.50%	19.50%	19.50%
Community Operations	100,000,000	0.00%	1.17%	3.17%	5.17%	7.17%	9.17%	10.00%	10.00%	10.00%
Validators	134,200,000	0.00%	3.19%	5.76%	7.42%	9.16%	10.90%	12.10%	13.10%	13.42%
Ecosystem	300,800,000	15.04%	20.05%	25.07%	30.08%	30.08%	30.08%	30.08%	30.08%	30.08%
Partners	120,000,000	0.75%	5.26%	8.56%	10.11%	11.45%	12.00%	12.00%	12.00%	12.00%
Cumulative Total	**1,000,000,000**	**21.91%**	**43.48%**	**63.72%**	**77.86%**	**86.83%**	**95.03%**	**98.69%**	**99.68%**	**100.00%**

Unlock Ratio Table by Category (End of Each Fiscal Year)

Category	Total Supply	2024	2025	2026	2027	2028	2029	2030	2031	2032
IEO	50,000,000	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
Early Supporters	100,000,000	11.25%	65.31%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
Research & Development	195,000,000	0.00%	11.67%	31.67%	51.67%	71.67%	91.67%	100.00%	100.00%	100.00%
Community Operations	100,000,000	0.00%	11.67%	31.67%	51.67%	71.67%	91.67%	100.00%	100.00%	100.00%
Validators	134,200,000	0.00%	23.81%	42.92%	55.33%	68.29%	81.26%	90.20%	97.62%	100.00%
Ecosystem	300,800,000	50.00%	66.67%	83.33%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
Partners	120,000,000	6.25%	43.86%	71.30%	84.28%	95.38%	100.00%	100.00%	100.00%	100.00%

The above table represents the current token lock-up schedule. However, due to factors such as tokens with lock-ups not yet being allocated (e.g., to future validators), the unlock schedule is subject to change. Any changes to the schedule will be appropriately disclosed to the market through cryptocurrency exchange operators.

Additionally, not all tokens unlocked from the lock-up will necessarily be sold immediately, meaning that not all tokens will enter circulation simultaneously upon their unlock. While it is challenging to provide a precise forecast of token circulation, based on the current circumstances and business plans, the estimated quantity of tokens likely to circulate is provided below.



Category	Total Supply	2024	2025	2026	2027	2028	2029	2030	2031	2032
IEO	50,000,000	50,000,000	50,000,000	50,000,000	50,000,000	50,000,000	50,000,000	50,000,000	50,000,000	50,000,000
Early Supporters	100,000,000	11,250,000	65,312,500	100,000,000	100,000,000	100,000,000	100,000,000	100,000,000	100,000,000	100,000,000
Research & Development	195,000,000	0	22,750,000	61,750,000	100,750,000	139,750,000	178,750,000	195,000,000	195,000,000	195,000,000
Community Operations	100,000,000	0	11,666,667	31,666,667	51,666,667	71,666,667	91,666,667	100,000,000	100,000,000	100,000,000
Validators	134,200,000	0	31,950,000	57,600,000	74,250,000	91,650,000	109,050,000	121,050,000	131,000,000	134,200,000
Ecosystem	300,800,000	150,400,000	200,533,334	250,666,667	300,800,000	300,800,000	300,800,000	300,800,000	300,800,000	300,800,000
Partners	120,000,000	7,500,000	52,629,500	85,561,000	101,130,586	114,450,172	120,000,000	120,000,000	120,000,000	120,000,000
Cumulative Total	**1,000,000,000**	**219,150,000**	**434,842,000**	**637,244,334**	**778,597,253**	**868,316,839**	**950,266,667**	**986,850,000**	**996,800,000**	**1,000,000,000**

7.5 Global Listing and Liquidity of JOC Token

The JOC token is planned to be listed promptly on cryptocurrency exchanges in Japan and around the world following the IEO. Negotiations with over 20 exchanges globally are already underway. Initially, the token is expected to be listed on 3-5 cryptocurrency exchanges, including some of the world's Top 10 exchanges, around the same time as its listing in Japan. We aim to achieve high liquidity not only in Japan but also globally.

8. Management Structure and Governance

8.1 Validators and their Role

Validators of Japan Open Chain are selected from leading Japanese corporations, including NTT Group, SONY Group, and Dentsu Group. These validators play a pivotal role in ensuring the stability of the network and the accuracy of transactions, and also as organizations deeply ingrained in Japan's business ecosystem, they enhance the credibility of Japan Open Chain. Furthermore, reputable financial groups, media, and other cryptocurrency-related businesses as well as startups are also planned to be joined as validators in the future to foster diversity in the ecosystem and promote sustained growth.

8.2 Management Organization of Japan Open Chain and its Responsibilities

Japan Blockchain Foundation Co., Ltd. stands at the core of the Japan Open Chain consortium which acts as its operational manager. The company is tasked with establishing and operating the Japan Open Chain Secretariat with the aim of ensuring the stable management of the community. Japan Blockchain Foundation Co., Ltd. will carry out the IEO after being reviewed by the JVCEA (Japan Virtual and Crypto Assets Exchange Association), Certified Payment Services Business Association, and the Cryptocurrency Exchange that are supervised and regulated by Japan’s FSA (Financial Services Agency.) After the IEO, Japan Blockchain Foundation will continue to be monitored by the Cryptocurrency Exchange which carried out the IEO regarding the information disclosure of the project progress and the management system for funds procured.

For more detailed information, please visit the official website at https://www.jbfd.org/.

8.3 Partners of Japan Open Chain

Japan Open Chain values its collaborations with diverse stakeholders. Specifically, we actively promote partnerships with various organizations through our dedicated development partner program. All users and partners who participate in this ecosystem are indispensable for the growth and innovation of Japan Open Chain, and we aim to co-create new value together. Details about our partners are

updated regularly. Please visit our official website at https://www.japanopenchain.org for the latest information.

9. Roadmap

In this section, we will provide a brief explanation of Japan Open Chain's future roadmap. For detailed information regarding the roadmap, please visit our website.

9.1. Development Roadmap

Japan Open Chain is committed to investing in technological research for the advancement of blockchain and Web3.0 technologies.

9.1.1 Technical Research

- Improvement of the Protocol: We aim to improve TPS (Transactions Per Second), achieve quantum resistance, and increase overall robustness through technical research.
- Tools & Applications: Enhancing user experience by advancing wallet technologies and other applications as well as supporting smart accounts, such as EIP4337.
- Interoperability: Expanding interoperability with other blockchains.

9.1.2 Tool Development

- Tools by leveraging compatibility with Ethereum
- Wallet, robust authentication mechanisms, and efficient NFT management tools to align with the rapid adoption of Web3.0 solutions.

9.2. Project Roadmap

We plan to launch and collaborate on projects with diverse companies and Web3.0 service providers to further strengthen the growth of the Japan Open Chain ecosystem.

9.2.1 Stablecoin Issuance

- We are currently undertaking proof-of-concept experiments related to issuing stablecoins pegged to the Japanese Yen and other foreign currencies in collaboration with Kiraboshi Bank, Minna Bank, Shikoku Bank, and other financial institutions.

- Furthermore, we will advance proof-of-concept experiments in collaboration with businesses keen on leveraging stablecoins to achieve more affordable fees and instantaneous payments for Web3.0 transactions, NFT sales, and traditional payment methods.
- Through these efforts, our goal is to create an environment where companies can easily and seamlessly enter the Web3.0 business, enabling, for instance, users to buy and sell NFTs without the need to transact via cryptocurrencies.

9.2.2 Expansion of Alliance Partners

- Establishing partnerships with cryptocurrency exchanges and implementing the listing of our tokens.
- Strengthening partnerships with global node providers and NFT marketplaces.
- Integrating cross-chain protocols.
- Engaging in strategic collaborations with NFT and DeFi partners.

9.2.3 Operational Phase

- Phase 0-2: Launch Phase
  - Network development, testnet operation, mainnet launch, and so on. This phase has been completed successfully.
- Phase 3：Public Release
  - Purpose
    - Establish a user-friendly environment for the broader public to access the chain.
  - Policy
    - Open the Endpoint to the general public, expand the node providers, foster ecosystem growth, and enhance the liquidity of the fee token to attract more users.
- Phase 4 and beyond:
  - Purpose
    - Expand the scale and decentralization of the ecosystem and enhance the robustness and stability of the blockchain network.
  - Policy
    - Collaborate with Web3.0 application providers worldwide, develop tools to increase usability, conduct technical research

and development for network stability and robustness, Strength the governance, etc.

10. Project Risks

10.1 Community Risk

The success of the project heavily depends on an active and healthy community. If the community becomes inactive or some internal conflicts arise, there is a risk that the development and progress of the project could be delayed. Moreover, losing the trust of the community might also lead to a potential decline in the project's valuation and reputation.

10.2 Security Risk

The security of Japan Open Chain is often equated with that of Ethereum. However, there exist factors that could potentially undermine its security, including:

- Technical Innovation in Cryptography: With the emergence of technological breakthroughs like quantum computing and the rapid development of cryptographic techniques, the cryptographic technology we currently employ may become vulnerable and susceptible to breaches in the future. Consequently, our existing security measures may become insufficient in the future.
- Simultaneous Hacking of Majority Validator Signature Servers: In a decentralized network, there's a risk that if a majority of validators act maliciously, the safety and trustworthiness of the network could be jeopardized. If the signature servers of a majority of validators are hacked, it would be possible to approve fraudulent transactions and manipulate the network.

To mitigate these risks, Japan Open Chain is committed to continually adopting the latest security measures. Additionally, we will conduct regular security audits and penetration testing to detect while exchanging information with the community to detect and address vulnerabilities at an early stage.

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