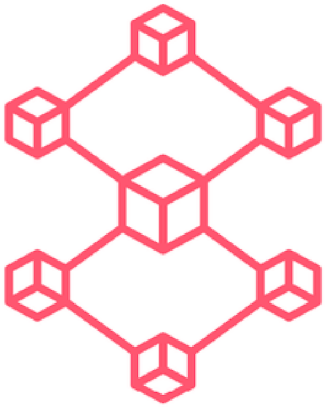

ARI CHAIN

TECH WHITEPAPER

Ver 1.0

Abstract

ARICHAIN aims to create a safer and more convenient world with innovative blockchain technology, just as the internet has transformed many aspects of our lives. By addressing the existing issues in the blockchain ecosystem, ARICHAIN strives to provide a user-friendly environment with high accessibility and low fees for its blockchain platform.

ARICHAIN's blockchain mainnet offers strong security and a fast speed of 300,000 transactions per second (TPS) with its proprietary 4th generation consensus algorithm, DRPoS (Delegated Random Proof of Stake). Additionally, the architecture is designed to provide easy access for developers to develop DApps without constraints on platform or programming language, through REST API calls.
ARICHAIN is continuously developing its exclusive blockchain technology to provide enhanced functionality and elevate the blockchain environment to a better state compared to existing blockchain mainnets.

Copyright

Disclaimer

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1. Background

In the highly competitive world of blockchain technology, owning a self-owned Mainnet, utilizing an effective consensus algorithm, and processing transactions quickly are key factors for gaining an advantage. ARICHAIN has devoted significant effort to addressing the challenges faced by previous blockchain technologies, and has developed a Mainnet program that makes it easy for nodes to utilize. This includes introducing new algorithms and improving the user interface and user experience on Linux/Windows operating systems.

To address the speed limitations of first-generation blockchains and the security vulnerabilities posed by heavily-owned or exposed nodes in second-generation blockchain technology, we have researched and developed a more reasonable algorithm for improving speed from specific Block Producers (BPs). We have also developed a consensus algorithm that uses a randomized method for Block Observers (BOs) to enhance security.

In addition, we have tackled the inefficiency of duplicate installations of the same functionality and the excessive data storage problems by providing access to the virtual machine environment of the previous Blockchain 1st and 2nd generations. By calling pre-embedded APIs instead of paying fees every time a source code is compiled and uploaded to support individual storage space for DApps, we have created a more efficient and cost-effective development environment.

2. ARICHAIN Environment

2-1. User Usage

The existing issue with centralized SNS, shopping, financial, and lifestyle convenience services is that the revenue structure flows to the server provider, content provider, or advertisers, while the subscribers or participants do not receive any revenue. However, high-quality content is determined by the active participation of subscribers and creates added value. Therefore, a reasonable reward for participants' revenue is a crucial element in the decentralized Mainnet environment.

2-2. Free Usage

The focus of the platform service value lies in providing high-quality content. To achieve this, it is important that all users have access to a secure and stable environment where diverse content can be provided, and everyone can use it without any burden or cost.

2-3. Maintenance

The competitiveness of the blockchain mainnet and DApps relies on their ability to maintain error-free maintenance and stability, especially in handling unexpected data processing issues. These issues can be addressed through developer testnets.

2-4. Resource Requirements

A total of 26 nodes are composed of 17 BP(Block Producer) and 6 BO(Block Observer), and the minimum resources required to configure them are as follows. The resources for a total of 117 nodes, including 100 random nodes and 17 master nodes for use by BP and BO, should always be in constant operation.

- Shared Memory Storage storage (Disk)
- Computational Core (CPU)
- Auxiliary memory(RAM Disk)
- Service Traffic (Network)

Node	CPU	RAM	Storage
TestNet	Dual core or more	4GB or more	free space HDD 100G or more
MainNet	4 core or more	32 GB or more	free space SSD 300G or more

[Table1. ARICHAIN's recommended specifications for Nodes]

2-5. Mainnet

There are several coins that have their own Mainnets, such as Bitcoin, Ethereum, and EOS, and DApp developers should choose a Mainnet with a superior consensus algorithm, fast transaction speed, and high security against hacking.

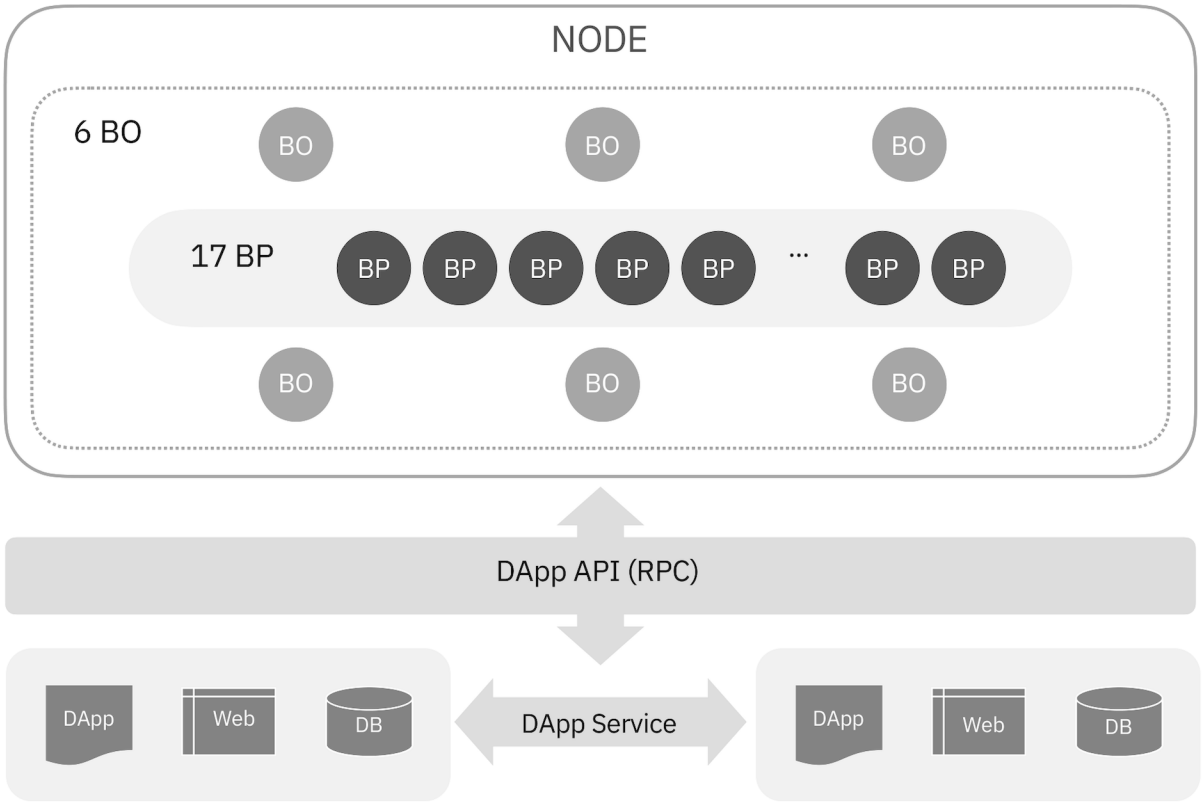
2-6. Fees

To facilitate the development of DApps, ARICHAIN has introduced Node.js technology that provides a cost-effective and efficient way to interface with the blockchain. Instead of using virtual machines and compiling source code, Node.js technology utilizes pre-developed APIs to access the blockchain. This eliminates the need for expensive upfront costs and reduces fees to near zero for uploading source code. With this technology, DApp developers can focus on creating high-quality content and user interfaces without worrying about the underlying infrastructure. Additionally, ARICHAIN is committed to continuously updating and improving its technology to provide the best development environment for DApp creators.

3. Algorithm

3-1. Consensus Algorithm

Central banks and government institutions are trusted entities that authenticate various types of values. However, if even government institutions and central banks cannot recognize the value or such a situation arises, the value of tangible and intangible assets collapses. Beyond such centralization and monopolization, the essential part of blockchain technology that cannot be missed today is the range of intangible values that many people recognize and the consensus algorithm that recognizes values democratically without being monopolized by specific targets.

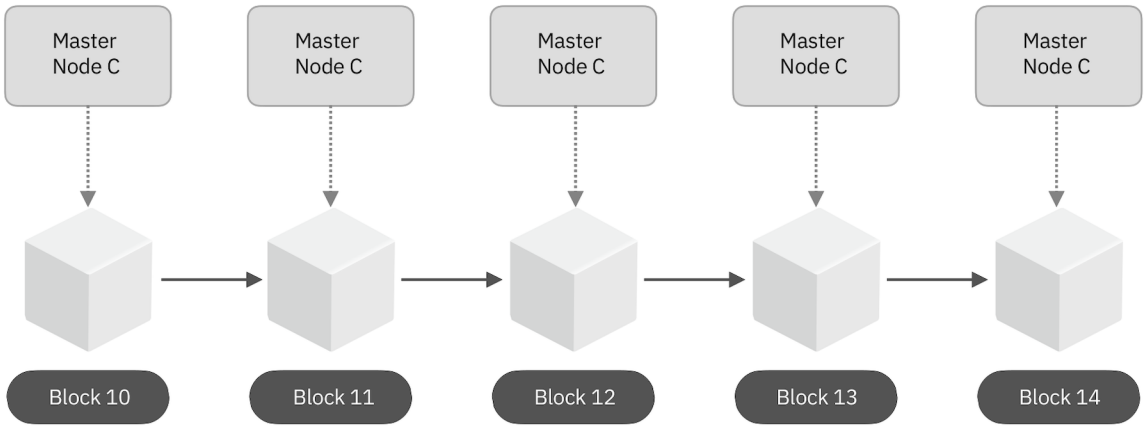


[Figure1. ARICHAIN Blockchain system]

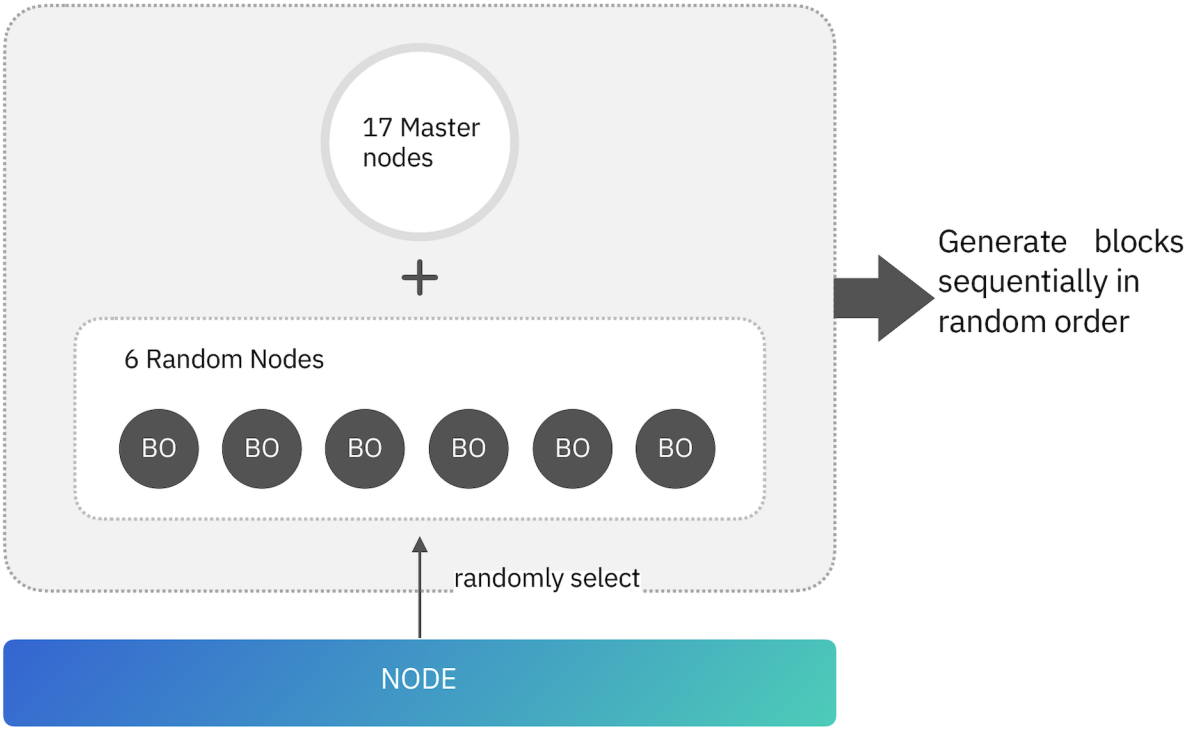
3-2. DRPoS (Delegated Random Proof of Stake)

The block generation method generated in Bitcoin and Ethereum is a first-generation PoW (Proof of Work) method. When generating a block, the hash value of the block header generated by changing the nonce value through hash operation using GPU is compared with the bits value presented, and if a number smaller than the bits value is found, a block is generated. It requires high computing power, and there is a disadvantage of high cost consumption compared to mining volume.
To reduce such cost consumption, various other blockchain mainnets such as Quantum and NEO randomly generate blocks. The second generation, which gives priority to nodes with a large stake by giving random block generation probability, invented the PoS (Proof of Stake) block generation method.
However, giving block generation priority to those who have a large stake means the monopolization of capital, distorting the democratic nature of decentralization. Therefore, there is a disadvantage of exposing representative nodes through a rational democratic method called voting based on a graph engine, which can be attacked by 51%.

ARICHAIN DRPoS (Delegated Random Proof of Stake) is a 4th generation method that supplements the existing method of randomly selecting 6 ARICHAIN Nodes (BO) with 17 elected master Nodes (BP) to maintain the integrity of the entire blockchain and generate blocks together in a random order.

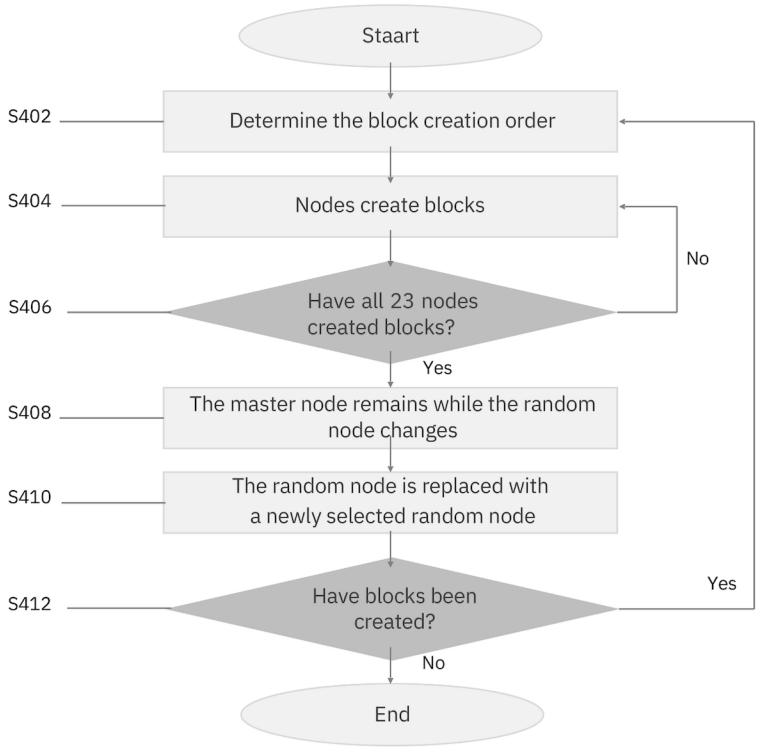


[Figure2. ARICHAIN Block generation]



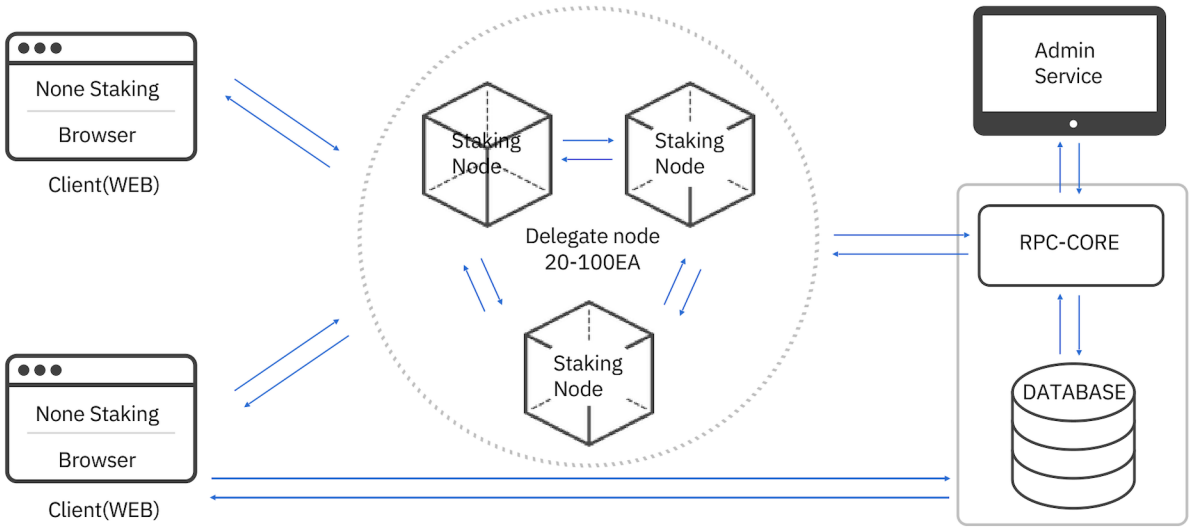
[Figure 3. DRPoS Algorithm]

[Figure 2] and [Figure 3] are improved block creation structure diagrams based on the DRPoS algorithm. Referring to these diagrams, the present invention randomly selects several nodes (BO) from among the general nodes and enables these nodes (BO) and master nodes (BP) to create blocks together in a random order.



[Figure 4. flow of block generation]

Figure 4 illustrates the flow of block generation according to the DRPoS algorithm. After determining the block generation order for 23 master nodes (BP) and random nodes (BO), all nodes are allowed to create blocks. Then, the master node (BP) remains the same while the random nodes (BO) are reselected, and this process is repeated.



[Figure 5. Structure of ARICHAIN blockchain system]

3-3. Consensus Algorithm Methods

ARICHAIN Mainnet proposes a consensus mechanism to address the risks of hacking or tampering due to exposed nodes. The strength of ARICHAIN Mainnet lies in its well-designed allocation of consensus, which combines the democratic nature of Proof of Work (PoW), the stakeholding feature of Proof of Stake (PoS), and the delegated selection of 23 nodes in Delegated Proof of Stake (DPoS). This design aims to address the risk of manipulation by hackers targeting specific exposed nodes while ensuring that individuals with a significant stake in the system do not corrupt the blockchain.

- PoW : Mining mechanism used in Bitcoin
- PoS : Emerged to improve the slow speed and ensure stability in PoW
- DPoS : Address the issue of unfairness in PoS, where a few large stakeholders dominate the decision-making process
- ARICHAIN's DRPoS : Enhances trust and security by implementing a dual-check on the representative nodes, equally improving Security, Scalability, and Decentralization.

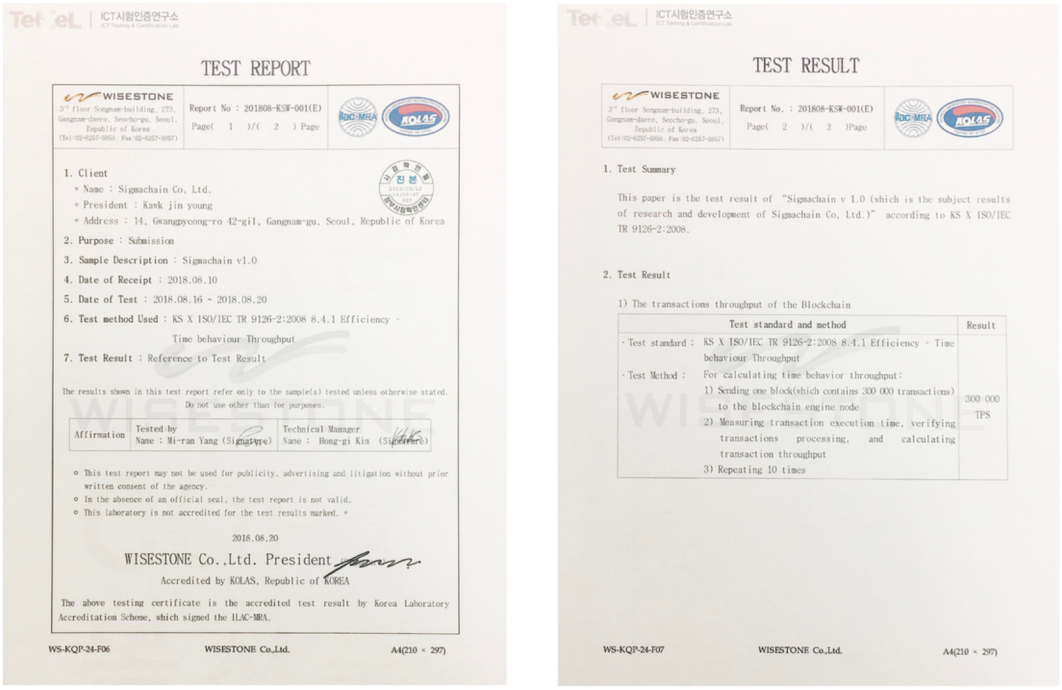
3-4. Blockchain Communication

ARICHAIN is designed to facilitate inter-block communication. During the block production round, each node supports the validation of blocks and transactions. This is achieved through a method that generates blocks with little overhead, compared to the use of hash links, enabling optimization of the time and bandwidth required to verify the chain's proof. With 23 block producers producing blocks every 3 seconds in each round, it takes 69 seconds to determine irreversibility, which proves that transactions have been processed sequentially without being skipped or omitted.

4. Transaction

4-1. Transaction Processing Speed

A transaction is an act that is recorded, and the information contained in it includes transaction details, authentication, and verification of authenticity. The moment when this information is compared with other information to determine whether it is "true" or "forged" or "false" takes 3 seconds, and when this determination is complete, a block is created.
Existing mainnets that own a mainnet face difficulty in handling the high transmission speeds of DApps. With the evolution of DApps' UI and UX, there is a demand for high-speed data processing. However, the processing speeds of previous blockchain generations, such as Bitcoin at 7 TPS, Ethereum at 20 TPS, and EOS at 30,000 TPS, posed significant challenges to providing stable services. As a third-generation blockchain, ARICHAIN enables fast and stable services at 300,000 TPS.



TEST REPORT

WISESTONE

Report No : 201808-KSW-001(E)

Page(1)/(2) Page

1. Client
   - Name : Signachain Co, Ltd.
   - President : Kwak jin young
   - Address : 14, Gwangpyeong-ro 42-gil, Gangnam-gu, Seoul, Republic of Korea
2. Purpose : Submission
3. Sample Description : Signachain v1.0
4. Date of Receipt : 2018.08.10
5. Date of Test : 2018.08.16 ~ 2018.08.20
6. Test method Used : KS X ISO/IEC TR 9126-2:2008 8.4.1 Efficiency - Time behaviour Throughput
7. Test Result : Reference to Test Result

The results shown in this test report refer only to the sample(s) tested unless otherwise stated. Do not use other than for purposes.

Affirmation	Tested by Name : Mi-ran Yang (Signature)	Technical Manager Name : Hong-gi Kim (Signature)

- This test report may not be used for publicity, advertising and litigation without prior written consent of the agency.
- In the absence of an official seal, the test report is not valid.
- This laboratory is not accredited for the test results marked. *

2018.08.20

WISESTONE Co.,Ltd. President

Accredited by KOLAS, Republic of KOREA

The above testing certificate is the accredited test result by Korea Laboratory Accreditation Scheme, which signed the ILAC-MRA.

WS-KQP-24-F06 WISESTONE Co.,Ltd. A4(210 × 297)

TEST RESULT

WISESTONE

Report No. : 201808-KSW-001(E)

Page(2)/(2)Page

1. Test Summary

This paper is the test result of "Signachain v 1.0 (which is the subject results of research and development of Signachain Co, Ltd.)" according to KS X ISO/IEC TR 9126-2:2008.

2. Test Result

1) The transactions throughput of the Blockchain

Test standard and method	Result
· Test standard : KS X ISO/IEC TR 9126-2:2008 8.4.1 Efficiency - Time behaviour Throughput · Test Method : For calculating time behavior throughput: 1) Sending one block(which contains 300 000 transactions) to the blockchain engine node 2) Measuring transaction execution time, verifying transactions processing, and calculating transaction throughput 3) Repeating 10 times	300 000 TPS

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[Figure 6. Copy of KOLAS Certificate]

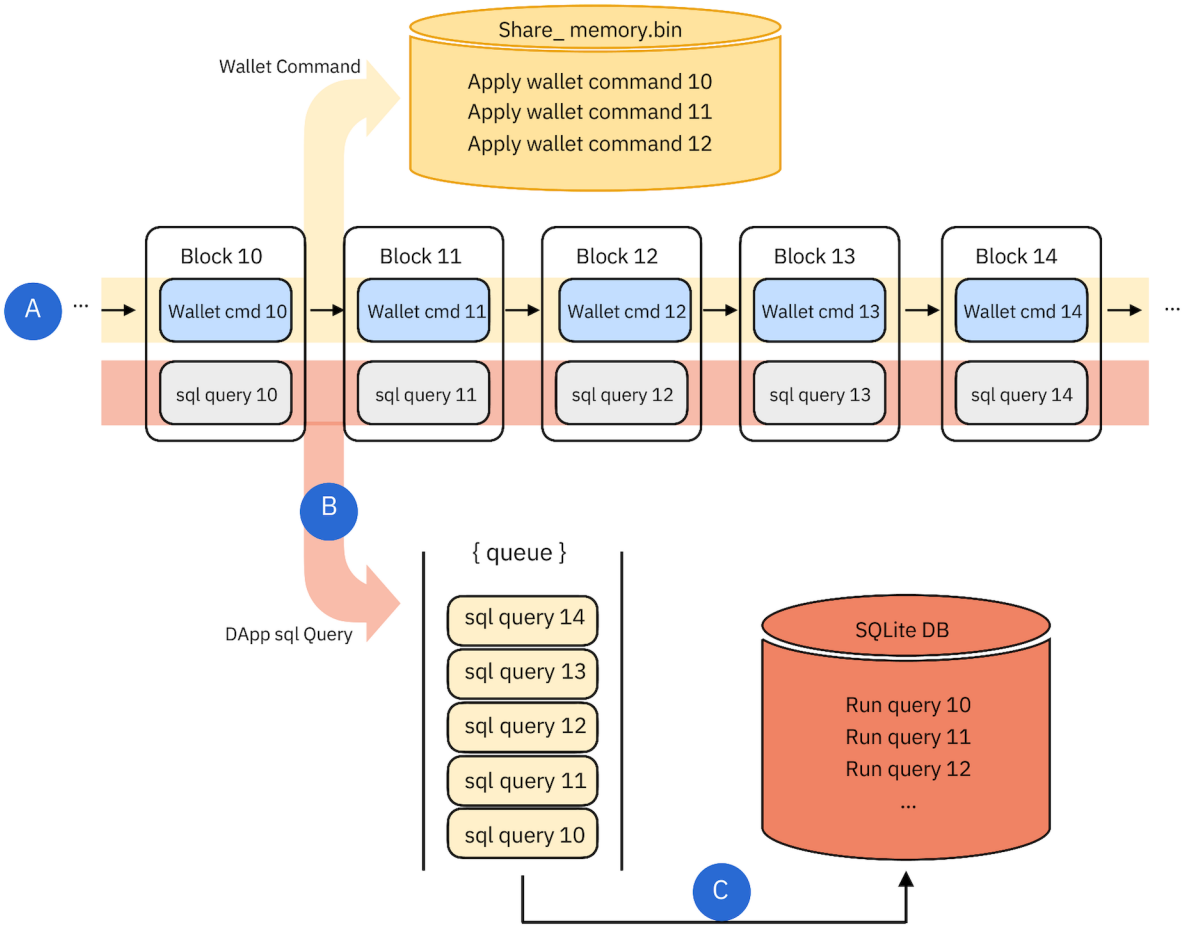
4-2. Transaction Authentication

ARICHAIN Mainnet has received certification from the objective verification institution, the Korean Accreditation Board, for stable processing of 300,000 transactions per second within the blockchain, making it the first in the world to do so. The Korean Accreditation Board provides a service that tests the quality completion of software in all fields according to the international standard specifications of ISO/IEC 25022 and ISO/IEC 25023, and issues a test certificate based on the results. The certified
test certificate issued by KOLAS-recognized testing institutions is mutually recognized by ILAC-MRA, a mutual recognition agreement (MRA) between 72 countries and 86 testing institutions, including the United States, Japan, China, and Europe, and APLAS-MRA, a mutual recognition agreement (MRA) between 24 countries and 37 testing institutions in the Asia-Pacific region, and has the same effect.

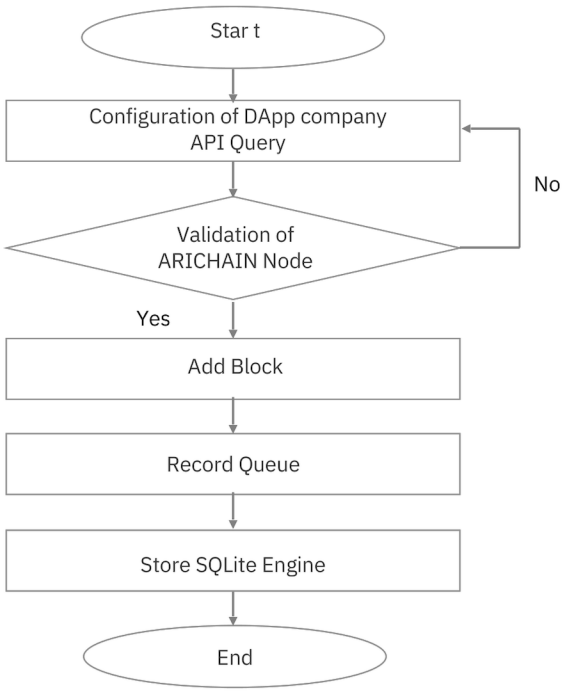
5. DApp (Decentralized Application) Environment

5-1. DApp Development Environment

DApp companies use their ARICHAIN Node.js (Web API) to record and retrieve data on the blockchain. This allows them to save space on the blockchain by not loading the source code's compile and binary files, and it also improves efficiency by eliminating the redundancy of similar codes that were previously loaded.



[Figure 7. ARICHAIN Blockchain Architecture]

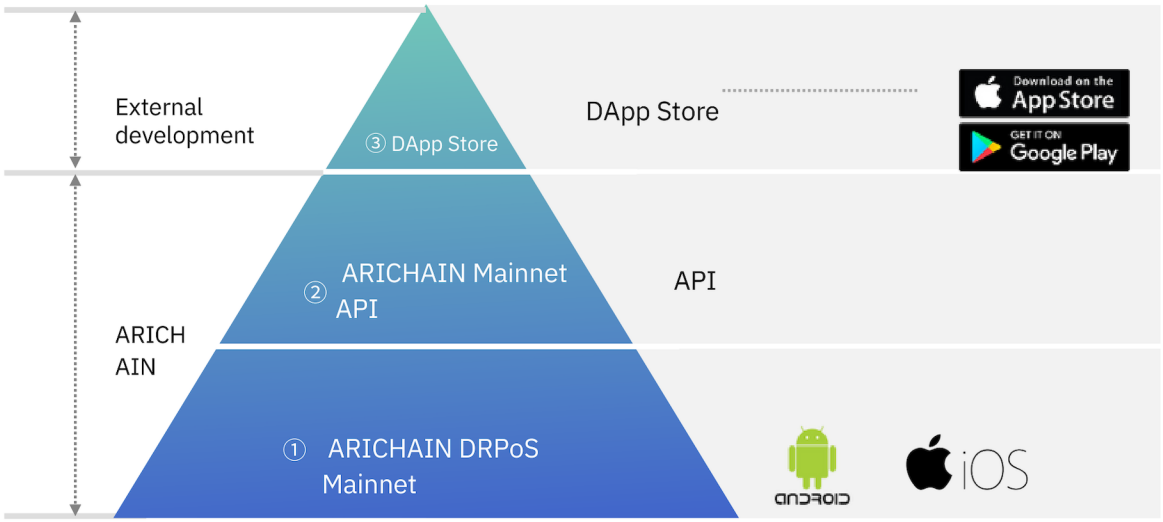


[Figure 8. DApp company ARICHAIN development flow]

5-2. DApp Data Location

The location of DApp data is not held by a centralized server, but is stored in each identical replica connected to the blockchain with the same data. Each node maintains data consistency through continuous synchronization.

5-3. ARICHAIN Mainnet Platform



[Figure 9. Architecture of ARICHAIN solution]

The ARICHAIN Mainnet service can be summarized in three layers.
(1)The foundation is the DRPoS blockchain Mainnet. DRPoS is the core technology of ARICHAIN Mainnet, which strengthens security and processing costs compared to the existing DPoS method.
(2)The middle layer consists of the Mainnet and common module APIs. In addition to the Mainnet's own API, several APIs such as real-time video streaming, P2P messenger, cloud service module, and cryptocurrency wallet will be provided to help DApps increase their service development speed. In the future, these common modules will be developed by ARICHAIN and DApp companies to operate as a single Smart Contract. Therefore, early entry of outstanding DApps can reduce development costs and time without separate costs or sponsorship.
(3) The top layer is the DApp Store, where mainly external DApp companies operate DApps that users can freely download. BP (Master Node) & BO (General Node) and CH (Coin Holder) are responsible
for voting for the selection of entry DApps. To prevent a situation like the entire network incident of EOS, ARICHAIN Mainnet provides not only one Mainnet provided to multiple DApps but also independent Mainnet construction for a single DApp with expected high initial traffic. ARICHAIN Mainnet has a total of 23 block producers, including 17 selected BPs and six BOs randomly selected per round (23 blocks created). BPs are selected as individuals with minimal equipment specifications (see Table 1). BOs monitor the BPs. If they have minimal equipment specifications (see Table 1), they are being considered for participation. This makes it difficult to attack the entire BP, including BOs, and also increases the efficiency of block creation by randomly assigning the order of block creation for each round.

5-4. Differentiation in Smart Contract Processing

In order to execute smart contracts on Ethereum and EOS, programmers need to write program code and upload the contract to the server on the mainnet for compilation, which results in significant development time and complexity. However, with ARICHAIN, DApp developers can easily develop their projects by simply calling the APIs provided on the mainnet from their own development environment. This provides a fast and stable development environment for DApp developers, making development much easier and more efficient.

5-4-1. Operation_DApp

Operation	field	type	Description
create_dapp_operation	owner	string	DApp owner id
	key	string	Active private key of the DApp creation account
	dapp_name	string	DApp name
	dapp_key	public_key_typ	DApp public key
update_dapp_key_operation	owner	e string	DApp owner id
	root	string	Administrator ID fixed as 'root'
	dapp_name	string	DApp name
	dapp_key	public_key_typ	DApp public key
comment_dapp_operation	dapp_name	e string	DApp name
	parent_aut hor	string	ID of the author of the parent post
	parent_permlink	string	Link to the parent post
	author	string	ID of the author of the post
	permlink	string	Link to the post
	tit le	string	Title of the post
	body	string	Content of the post
	json_meta	string	meta data(currently an empty string)
delete_comment_dapp	dapp_name	string	DApp name
	author	string	ID of the author
	permlink	string	Link to the post

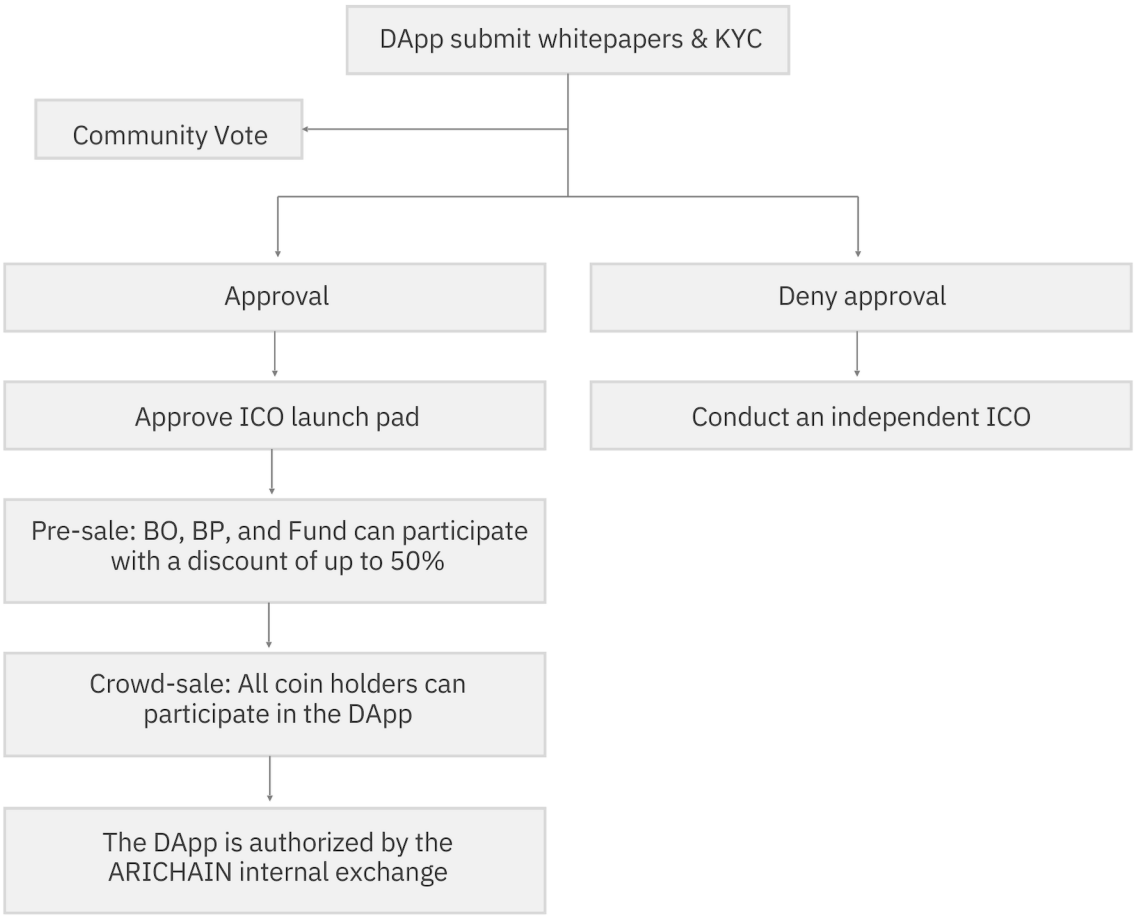
5-4-2. Operation_Token

Operation	field	type	Description
create_token_operation	name	string	token name
	symbol_nam	string	token symbol (up to 7 ASCII characters)
	e publisher	string	token create account
	dapp_name	string	Name of the DApp to which the token belongs
	dapp_key	public_key_type	Public key of the DApp to which the token belongs
	init_supply_amount	long(int_64_t)	Initial supply
transfer_token_operation	from	string	ID of the account sending the token
	to	string	ID of the account receiving the token
	amount	asset	Amount of token being sent
	memo	string	Memo
burn_token_operation	account	string	ID of the owner account of the token to be burned
	amount	asset	Amount of token to be burned

5-4-3. DApp API

API	Parameter	type	Description
get_dapp	First param(name)	string	The name of the DApp you want to search for
	return		Detailed information on a specific DApp
lookup_dapps	First param(low_bound_name)	string	search keyword
	Second param(limit)	uint32_t	Maximum number of items in the list (up to 1000 maximum)
	return		token list
get_dapps_by_owner	First param(owner)	string	Account ID you want to search for
	return		List of DApps owned by a specific account
get_dapp_content	First param(dapp_name)	string	DApp name
	Second param(author)	string	Author
	Third param(permlink)	string	Post link
	return		Details of the DApp post
get_dapp_content_ replies	First param(dapp_name)	string	DApp name
	Second param(author)	string	Author
	Third param(permlink)	string	Post link
	return		List of sub-posts of the next depth of the post
lookup_dapp_contents	First param(dapp_name)	string	DApp name
	Second param(last_author)	string	Author ID of th page e last post on the previous Empty string if it is the first page for pagination
	Third param(last_permlink)	string	Perm last post on the previous page link of the Empty string if it is the first page for pagination
	Fourth param(limit)	unit32_t	Maximber of posts to retrieve at once um num Only possible between 0 and 100
	return		List of DApp posts

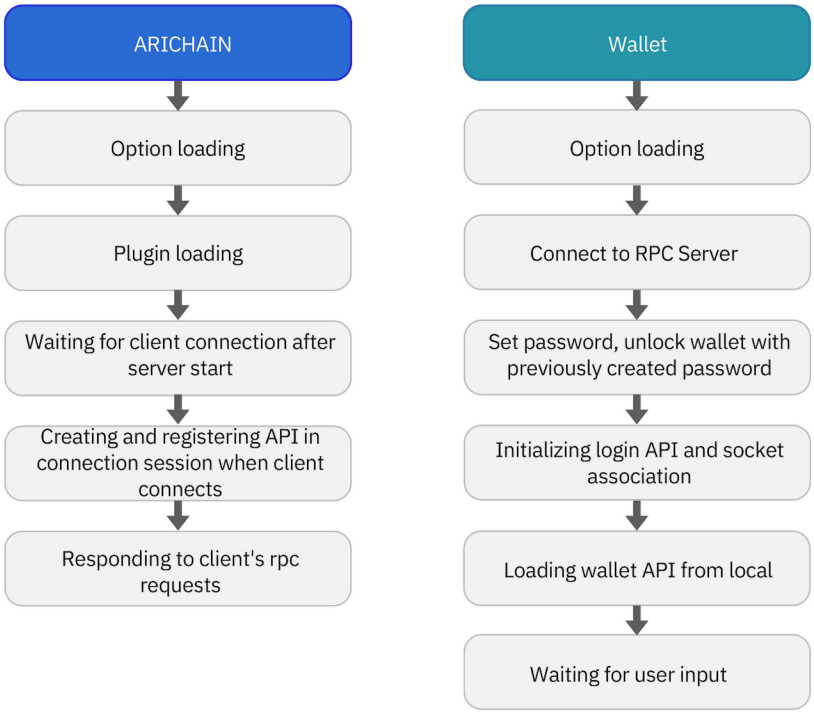
5-5. Selection process for DApps in ARICHAIN Mainnet



[Figure 10. ARICHAIN Mainnet DApp Selection Process Flowchart]

- DApps that wish to join ARICHAIN submit their whitepapers, participation request amounts, and other information to ARICHAIN. This information is then stored on a smart contract and made public for one month.
- ARICHAIN coin holders will vote on whether to include the DApps in ARICHAIN's ecosystem after reviewing the participation details. DApps that receive a certain amount of votes within a specific period are registered on the launchpad. DApps registered on the launchpad receive coin participation from the Fund, BP, BO, and CH, and are listed on the internal exchange.
- ARICHAIN BP, BO, and ARICHAIN Fund can participate in the coin sale at a discounted price of up to 50% by reviewing the coin participation details. However, they can only participate in the coin sale for up to 50% of the requested amount.
- After the Community Pre-Sale phase, the Community Crowd-Sale will commence, allowing all CHs to participate in the coin sale.
- Once the coin sale is completed, ARICHAIN will launch the DApp's tokens on its own internal exchange, enabling trading with ARICHAIN.

5-6. Communication Operation between ARICHAIN and Wallet



[Figure11. communication between ARICHAIN node and wallet]

Summary of ARICHAIN's operation

Load options from the config.ini file and configure other options
Create and store plugin objects for all plugins declared as ARICHAIN_DEFINE_PLUGIN(hello_api, ARICHAIN::example_plugin::hello_api_plugin)
Store plugins that can be enabled separately in the configuration file using "enable-plugin" and execute the initial operation of the plugins (running the plugin_initialize() function redefined in each plugin object)
Create a web server object and register the on_connection callback function (load the APIs set in the public-api option value, execute the appropriate API according to the request, and respond with a callback function)
Register lambda functions that load plugins' APIs for plugins that can be enabled
Wait for connections using the web server object

Summary of Wallet operation

Load options from the configuration file and set other options
Connect to the blockchain (ARICHAIN) RPC port
Set a password on the first run, and unlock the wallet using the previously created password
Create and store DB API and broadcast API information associated with the information obtained in step 3 Load Wallet APIs locally Register the Wallet APIs loaded in
step 5 with the current Wallet and wait for user input

5-7. Cloud

ARICHAIN is a user-friendly blockchain solution designed to simplify the deployment process. Building a blockchain and developing applications can be complex and expensive, and the current blockchain engine has a high entry barrier for regular users. ARICHAIN addresses this issue by allowing regular users to effortlessly configure and deploy their desired blockchain while ensuring adaptability to their specific needs. Moreover, it is ideal for cloud systems, allowing easy scaling and parallel servicing.

ARICHAIN also supports platformized services, which means users can perform their desired service using ARICHAIN without having to develop the blockchain according to the specific service in various fields where the blockchain engine can be used. This eliminates the need for extensive development work and makes ARICHAIN a versatile and convenient solution for a variety of use cases.

5-8. Test Net

HDD Free Space	CPU	RAM	OS
54G	Dual CORE or higher	4G	Linux : Ubuntu 16.04 or later

[Chart 2. Testnet Environment]

- How to run Node program - LinuxNode
  Navigate to the directory where the ARICHAINd file is located and execute the node program with the following command:
- >./ARICHAIN [Explanation of frequently used settings in config.ini]
  - p2p-endpoint: Set the IP and port of this node.
  - seed-node: Set the IP and port of the node from which to receive block data (multiple settings are possible).
  - rpc-endpoint: Set the IP and port to be used for RPC communication with the wallet or API. public-
  - api: Set the API to be used on this node.
  - enabled-plugin: Set the plugin to be used on this node.
  - bobserver: Set the BP or BO for block generation on this node (multiple settings are possible).
  - Private-key: Set the block generation key for the BP or BO set in bobserver (set in the same order as the bobserver settings).

6. Asymmetric Encryption key

6-1. Types of Keys using ARICHAIN platform

When using ARICHAIN, a decentralized total SNS platform, users receive a Master Key and an Active Key for their account upon initial registration. The reason for managing different keys for each function is to prevent the leakage of a single key from affecting other functions.

6-2. Master Key

The Master Key has the ability to recover accounts and change keys in the event of a hack, and is an extremely important key that must never be leaked or lost, as it provides authorization and enhances security for all accounts.

6-3. Active Key

The Active Key is necessary for sending ARICHAIN tokens (ARICHAIN) to other users on the ARICHAIN platform or for internal transactions.

7. ARICHAIN Node

7-1. Development Debug Node

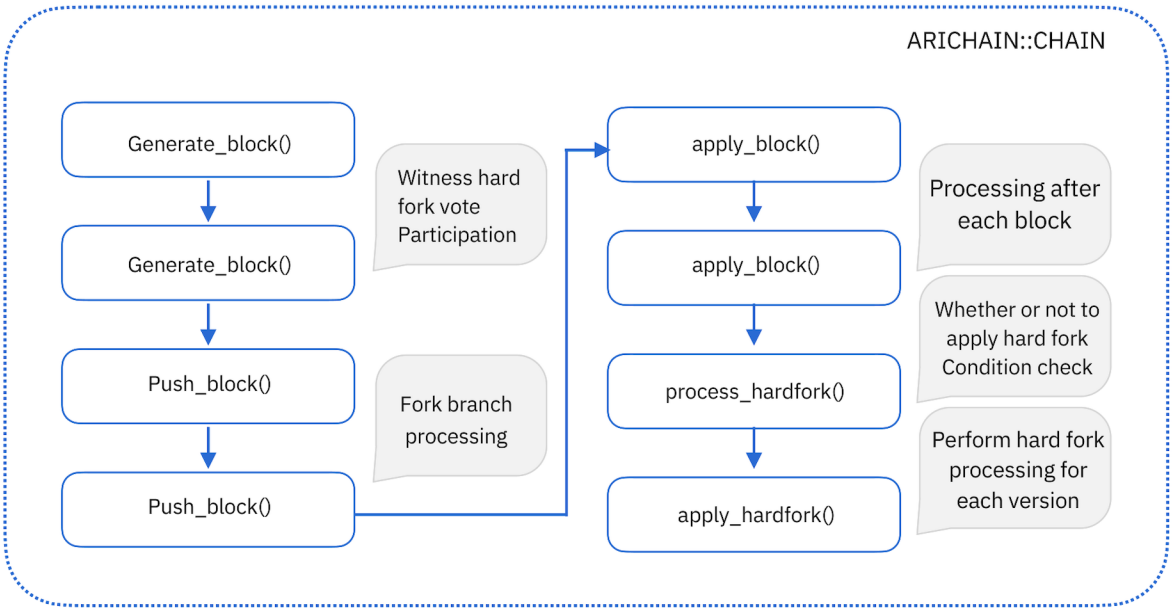
The debug node is a valuable tool for monitoring the status of the blockchain network and enabling separate development from the current blockchain service. It is not feasible to run an unstable program that cannot guarantee stability in a real service with billions of users. However, testing is essential for developing new features and improving performance. In such scenarios, additional development can be conducted through a debug node, which is separated from the operational blockchain service. If modifying the blockchain engine database is necessary to enhance new features or performance, a hard fork must be prepared. In this case, the developer's debugging information can update the existing version with a hard fork. Using a debug node also allows you to monitor the current blockchain node, ensuring the smooth operation of the network.

7-2. Test Node

Testing new DApp features or ARICHAIN developments on the currently operational blockchain can be risky as it may impact a well-functioning system. However, testing new features on the actual blockchain in use is necessary for implementing improvements. To address this challenge, we offer a separate testing node that is independent of the blockchain service. This allows users to test new features or developments without the risk of negatively affecting the operational system. With this separate testing node, users can experiment and fine-tune new features before releasing them into the production environment.

7-3. Hard Fork

If software created according to previous rules is determined to have an invalid block according to the new rules, a version update can be made through 17/23 (BP/BO) consensus.

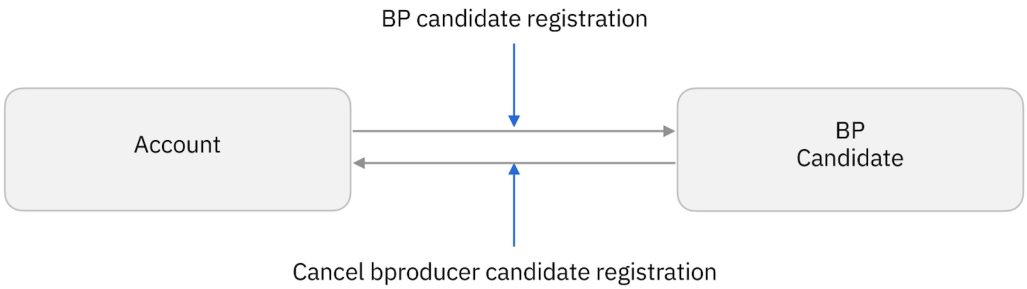


[Figure 12. Hard fork processing process]

8. BLOCK PRODUCER

8-1. Register BP Candidate

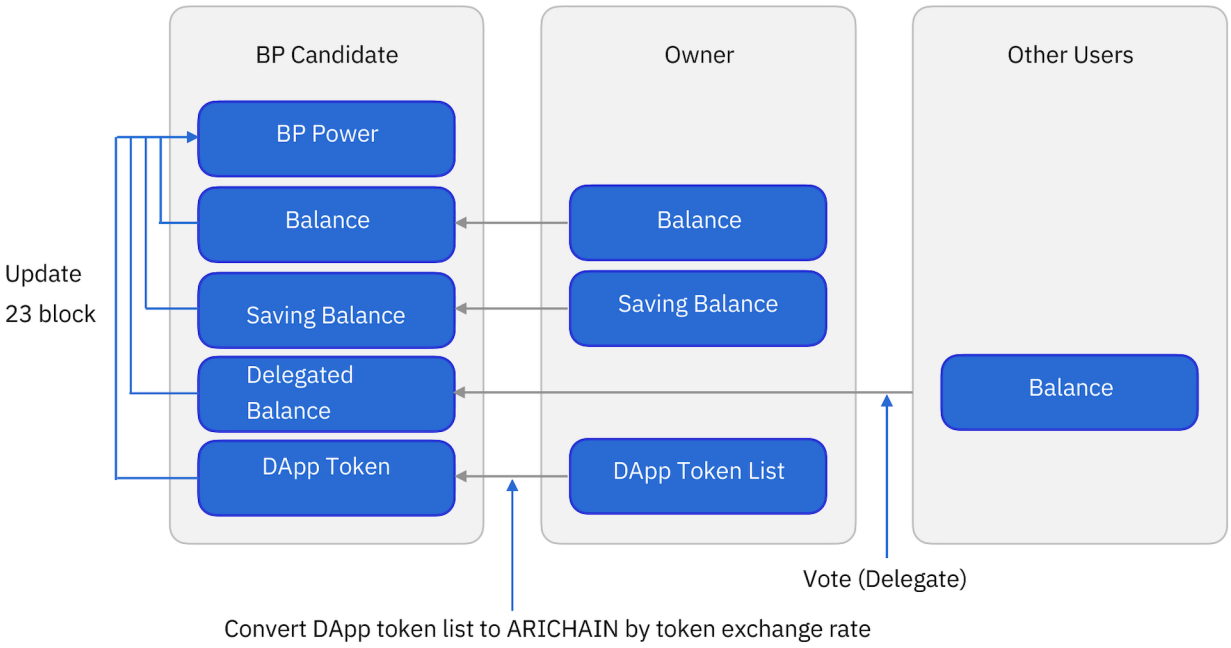
- Any regular account can apply without a time limit
- cancellation is possible at any time
- However, Block Observer accounts cannot apply for this feature



[Figure 13. BP candidate register]

8-2. Update BP Power

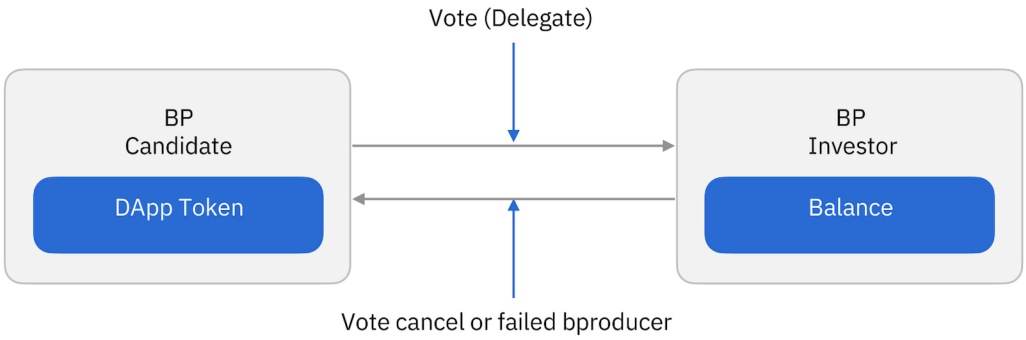
- The power of all BP candidates is updated every 23 blocks
- The power calculation formula(Owner Balance + Owner Saving Balance + Delegated Balance + DApp Token Balance)
- The transaction cost for DApps is determined by BP voting, which selects the median cost
- This voting process also applies to transactions other than DApps



[Firgure 14. Update BP power]

8-3. Vote Candidate BP

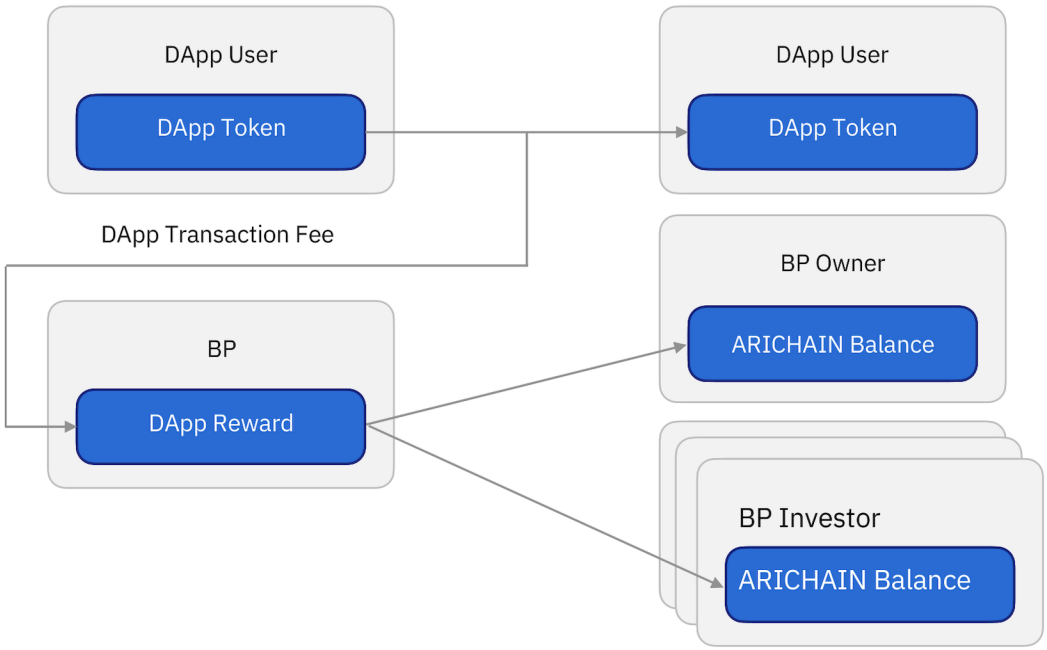
- The voting period is held every 3 or 6 months, from 5 days before the end of the month to the end of the month. For example, for February, it would be from the 23rd to the 28th for a total of 5 days.
- Voting for BP candidates means delegating the user's balance.
- During the voting period, delegation withdrawal is possible.
- If a BP candidate is disqualified, the delegated balance will be returned.
- If a voted candidate is selected as a BP, the delegated balance cannot be withdrawn until the next voting period.



[Figure 15. BP delegation]

8-4. DApp Reward Distribution

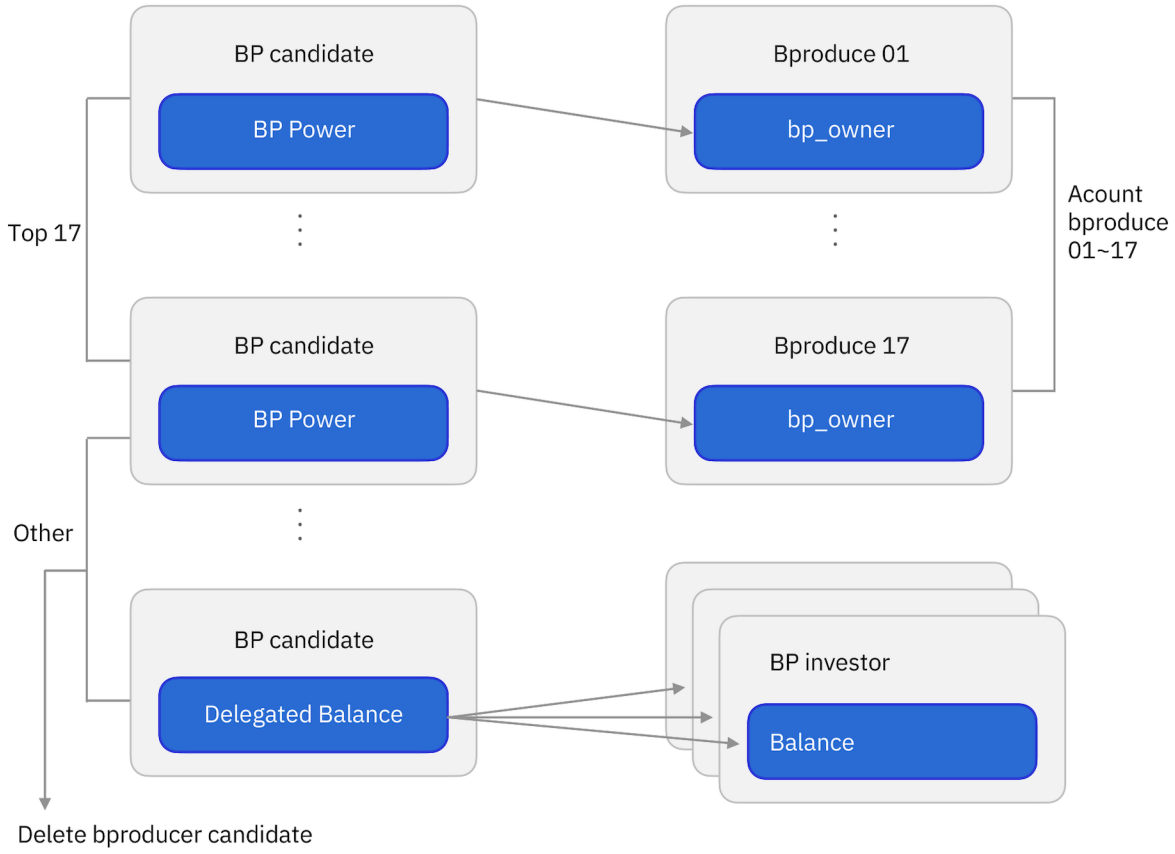
- All transactions generated by the DApp have a fee.
- The fees generated by DApp transactions are accumulated in the Bobserver account.
- At the end of the month, just before the selection of the BP Owner, the accumulated fees are distributed between the current BP Owner and investors at a ratio of 2:8.



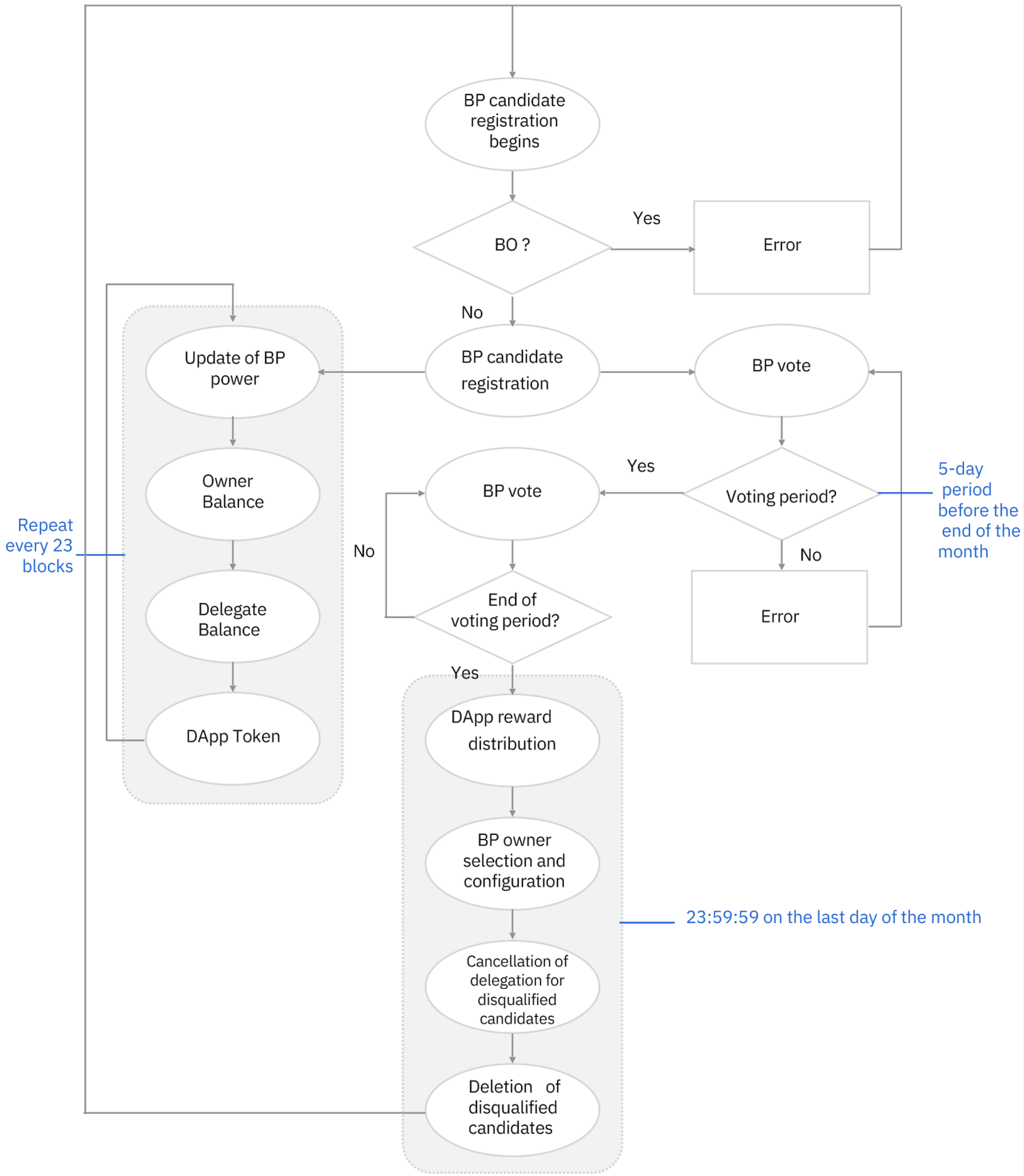
[Figure 16. DApp Reward Distribution]

8-5. BP Owner Selection

- At the end of each month, the BP Owner is selected at 23:59:59.
- BP candidates are sorted in descending order of BP Power, and the top 17 candidates are selected.
- The top 17 BP candidates are registered as the Owner of the BP 01-17 node accounts and have BP authority for one month.
- BP Authority includes :
  - Exchange settings
  - Authority to recommend DApp
  - Hardfork voting
  - Authority to propose ARICHAIN-related business projects
  - Priority of 20% for DApp Reward
  - Authority to vote on the ARICHAIN Wallet token logo setting
- Candidates who fail to be selected as BP are removed from the BP candidate list, and Delegated Balance is returned to investors.



[Figure 17. BP Owner Selection]



[Figure 18. BP Selection and Reward Process]

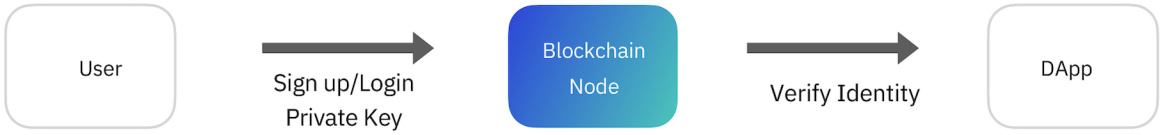
9. ARICHAIN ECO-SYSTEM SOLUTION

9-1. ATO23(ARICHAIN Standard Fungible Token)

ATO23 is a kind of token standard protocol, similar to Ethereum's ERC-20. It is composed of more than 150 customized Application Programming Interfaces (APIs) that serve as guidelines for tokens generated within the ARICHAIN ecosystem, reducing development costs and time for DApps.
It includes DSSO (Decentralized Single Sign-On) and DSTO (Decentralized Single Transfer-On) functions, which enable the secure transmission of all data, including personal information and coin transaction histories.

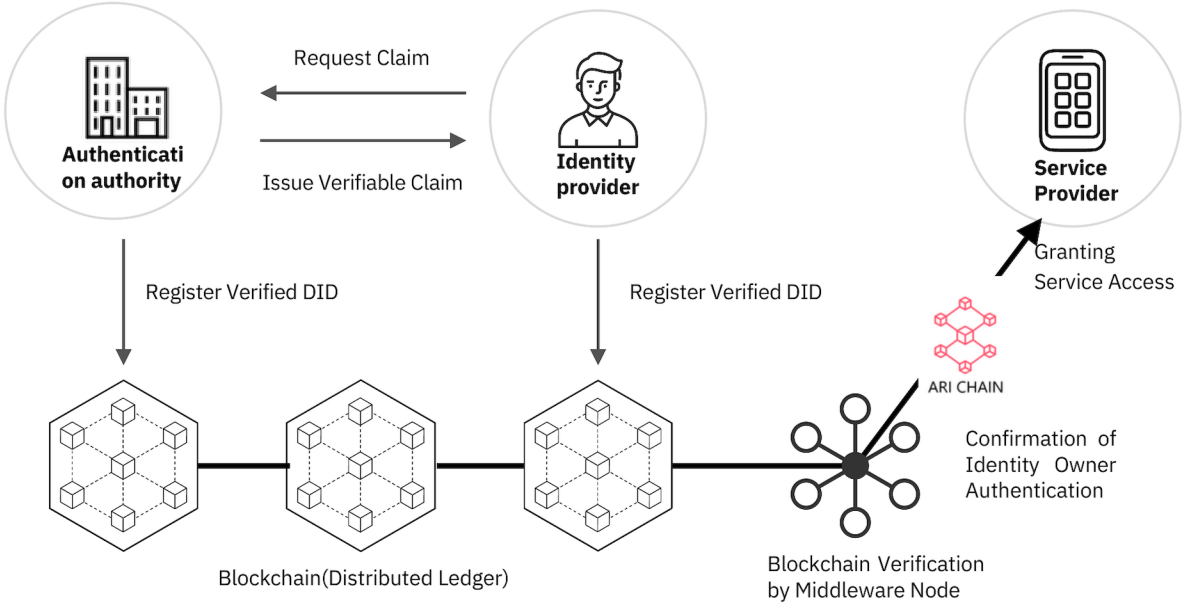
9-1-1. DSSO (Decentralized Single Sign On)

DSSO, a decentralized single sign-on, allows users to directly connect to a blockchain node using their own private key for login access, and authenticate on the blockchain. Only authenticated results are then transmitted to the DApp, preventing potential personal information hacking and leakage on the DApp. With DSSO, users can store and safely protect their IDs on the blockchain. Personal ID information exists on the "blockchain node," and external blockchain node hacking is impossible. Utilizing ID information without user consent is also impossible.



[Figure 19. DSSO Process]

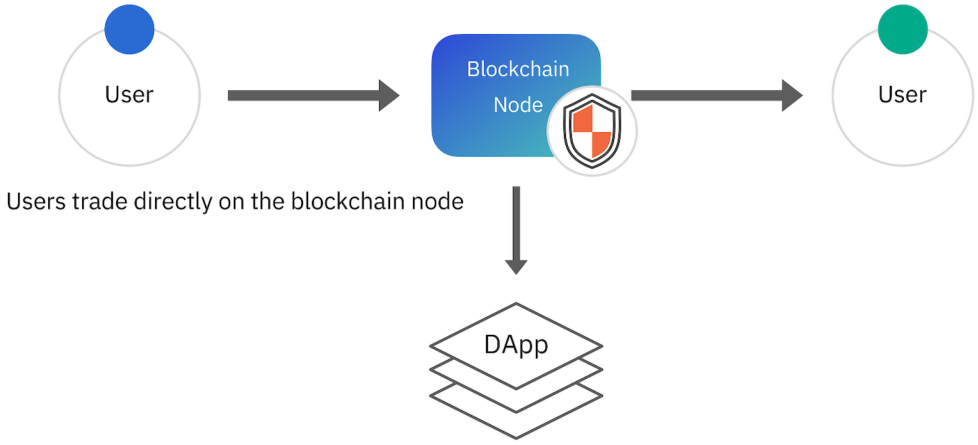
ARICHAIN DID is a system where individuals and identity verification agencies store their IDs on the blockchain, and the verification agency issues Verifiable Claims once per year. When a user signs up or logs in to a service, a middle node confirms their identity and only provides the service provider with a "yes" or "no" response. All information related to the ID is held only by the individual and the identity verifier, and no third party has access to the identity information.



[Figure 20. DID configuration]

9-1-2. DSTO (Decentralized Single Transfer On)

When users transfer electronic currency, they access the blockchain node directly with their own private key and make the transfer on the blockchain. By transmitting the transfer result to the DApp, it is possible to prevent hacking and leakage of transfer information that can occur on the DApp. DSTO ensures the complete protection of a user's encrypted assets and transactions.



[Figure 21. DSTO method structure diagram]

Token transactions take place on the blockchain node, and the process of exchange and remittance is also securely protected. Only the parties involved can access the transaction details.

9-1-3. DAPI (Decentralized Application Program Interface)

ATO23 is a connector provided as a program function for convenient development of DApps that run on ARICHAIN. It links ARICHAIN with DApps. To use ARICHAIN's blockchain, developers can directly connect to the decentralized network using their preferred programming language without needing a separate system or development language.
ATO23 also offers other useful modules such as live streaming, smart wallets, communication networks, and P2P cloud APIs.

Coding to execute a smart contract that transfers a certain amount of tokens from A to B using the API provided by ATO23
A → B, C (100 token)
The difference between using ARICHAIN API and Ethereum EVM

DApp Transfer (A,B,C) ▶ [Solidity-Programming language] EVM(Ethereum Virtual Machine) ▶ Blocked

Learn the programming language created by Ethereum, write the code, upload it to EVM, compile it, and then EVM will store it on the blockchain.

DApp Include (ARICHAIN API)Transfer (A,B,C) ▶ [C, C+, JAVA] ▶ Blocked

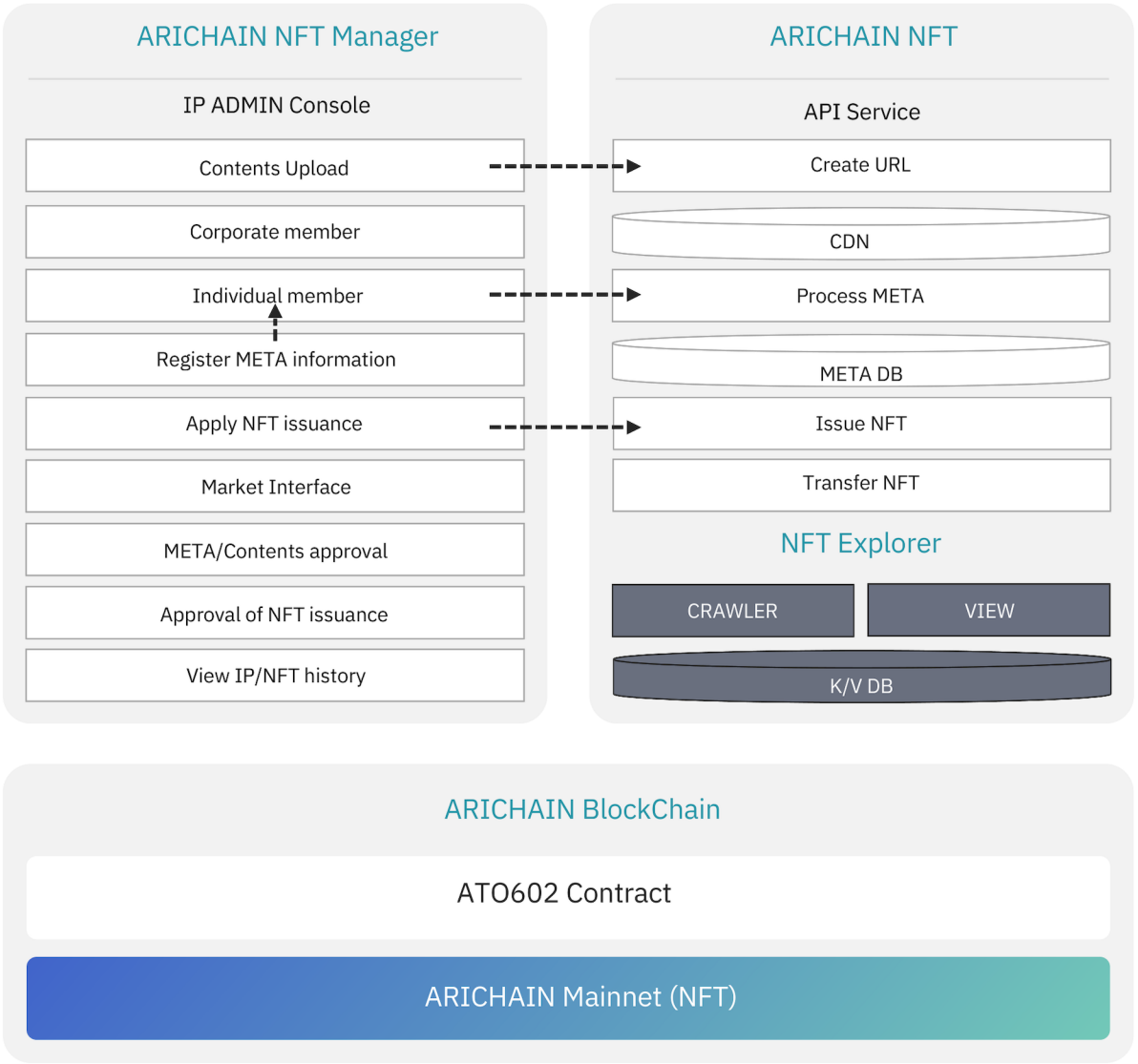
Developers can use a convenient programming language to utilize the APIs provided by ARICHAIN

and
directly store data on the blockchain.

9-2. ATO602 (NFT Standard Token Agreement-602)

ATO602 is a token introduced as an NFT standard protocol on the ARICHAIN network, which incorporates the concept of non-fungibility. When DApps utilize ATO602, they can create digital or physical assets as NFTs on the ARICHAIN mainnet, which can handle up to 300,000 TPS. As a result, even with a large volume of NFT transactions, the network can process them without any burden, and transactions can be conducted with low fees.

9-2-1. ARICHAIN NFT Platform



[Figure 22. ARICHAIN NFT Platform Structure]

9-2-2. ATO602 API

ATO602 is an open protocol for building non-fungible or unique tokens on the ARICHAIN blockchain. While most tokens are fungible or interchangeable, ATO602 tokens are all unique, meaning they represent one-of-a-kind items or collectibles.

* Non-fungible : Unique items with varying values

* Deed : Proof of ownership (rights)

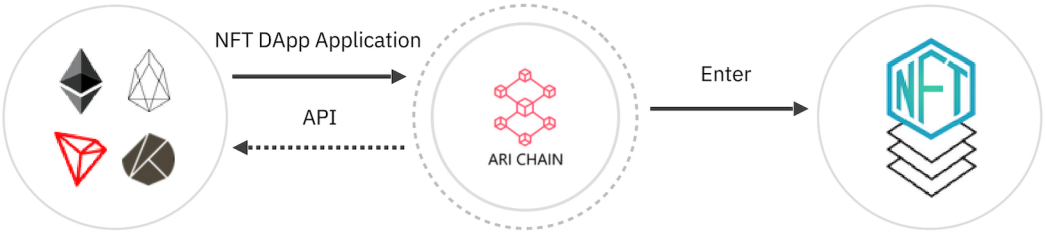
API	parameter	type	Description
ATO602_create	API Description		Name of the DApp that creates ATO602
	dapp_name	string	Name of the DApp that creates ATO602
	author	string	Author's wallet name
	wif	string	Author's wallet active private key
	unique_id	string	Unique identifier (unique for each DApp and author)
	init_supply	uint64_t	Quantity issued
	info	string	Information
	json_meta	string	Information (in JSON format)
ATO602_transfer	API Description		Transfer of ATO602 ownership
	from	string	Sender's wallet name
	to	string	Receiver's wallet name
	dapp_name	string	Name of the DApp where ATO602 was created Private
	dapp_key	string	key of the DApp where ATO602 was created author
	author	string	Unique identifier
	unique_id	string	Quantity
	amount	uint64_t	Specific ATO602 inquiry
get_ATO602	API Description		Name of the DApp where ATO602 was created author
	dapp_name	string	Unique identifier
	author	string	List of ATO602 in the DApp
	unique_id	string	DApp name
get_ATO602_by_dapp	API Description		Starting index number (latest first: -1, creation order: 0)
	dapp_name	string	Number of lists to be queried
	from	number	true: latest order, false: creation order
	limit	number	
	newest	boolean	

API	parameter	type	Description
get_ATO602_owners_by_amount	API Description		Retrieve a list of specific ATO602 owners (in order of ownership quantity)
	dapp_name	string	Name of the DApp where ATO602 was created
	author	string	Author
	unique_id	string	Unique identifier
get_ATO602_owners	API Description		Retrieve a list of specific ATO602 owners
	dapp_name	string	Name of the DApp where ATO602 was created
	author	string	Author
	unique_id	string	Unique identifier
	from	number	Starting index number (latest first: -1, creation order:0)
	limit	number	Number of lists to be queried
	newest	boolean	true: latest order, false: creation order
get_ATO602_by_owner	API Description		Retrieve a list of ATO602 held by a wallet
	owner		Wallet to be queried
	from		Starting index number (latest first: -1, creation order: 0)
	limit		Number of lists to be queried
	newest		true: latest order, false: creation order
get_ATO602_by_author	API Description		Retrieve a list of ATO602 owned by the author
	author		DApp name
	from		Starting index number (latest first: -1, creation order: 0)
	limit		Number of lists to be queried
	newest		true: latest order, false: creation order
ATO602_extransfer	API Description		Transfer of ATO602 ownership (extended API) Sender's wallet name
	from		Receiver's wallet name
	to		Name of the DApp where ATO602 was created Private key of the DApp where ATO602 was created Author
	dapp_name		Unique identifier
	dapp_key		Purchase price
	author		Transaction ID at the time of purchase
	unique_id		Memo
	price		Quantity
	tx_ id		
	memo		
	amount		

API	parameter	type	Description
search_ my_ATO602	API Description		Determine the ATO602 that I own
	dapp_name		Name of the DApp where ATO602 was created
	author		Author
	unique_id		Unique identifier
	owner		Wallet to be queried
get_ATO602_transfer_history	API Description		History of specific ATO602 ownership
	dapp_name	string	transfers Name of the DApp where ATO602
	author	string	was created Author
	unique_id	string	Unique identifier
	from	number	Starting index number (latest first: -1)
	limit	number	Number of lists to be queried

9-3. ARICHAIN NFT Platform

ARICHAIN provides a convenient and highly useful environment for NFT-related developers and other mainnet DApps.



Other Mainnet NFT related DApps	ARICHAIN's NFT Mainnet	Benefits of entering ARICHAIN NFT DApp
Ethereum DApp EOS DApp Tron DApp Klayth DApp	•NFT standard ATO602 •Support Transaction sppeed 300,000 TPS •Lowest transaction fee in the industry •Register and pay NFT transaction fees with ARICHAIN coin	The company that enters can select the coin they want and pay for NFT transactions. For example, company A issues tokens with Ethereum's ERC-20 and creates an NFT DApp on ARICHAIN. In the NFT market created by company A, it is possible to pay for NFT transactions with A company's ERC-20 tokens.

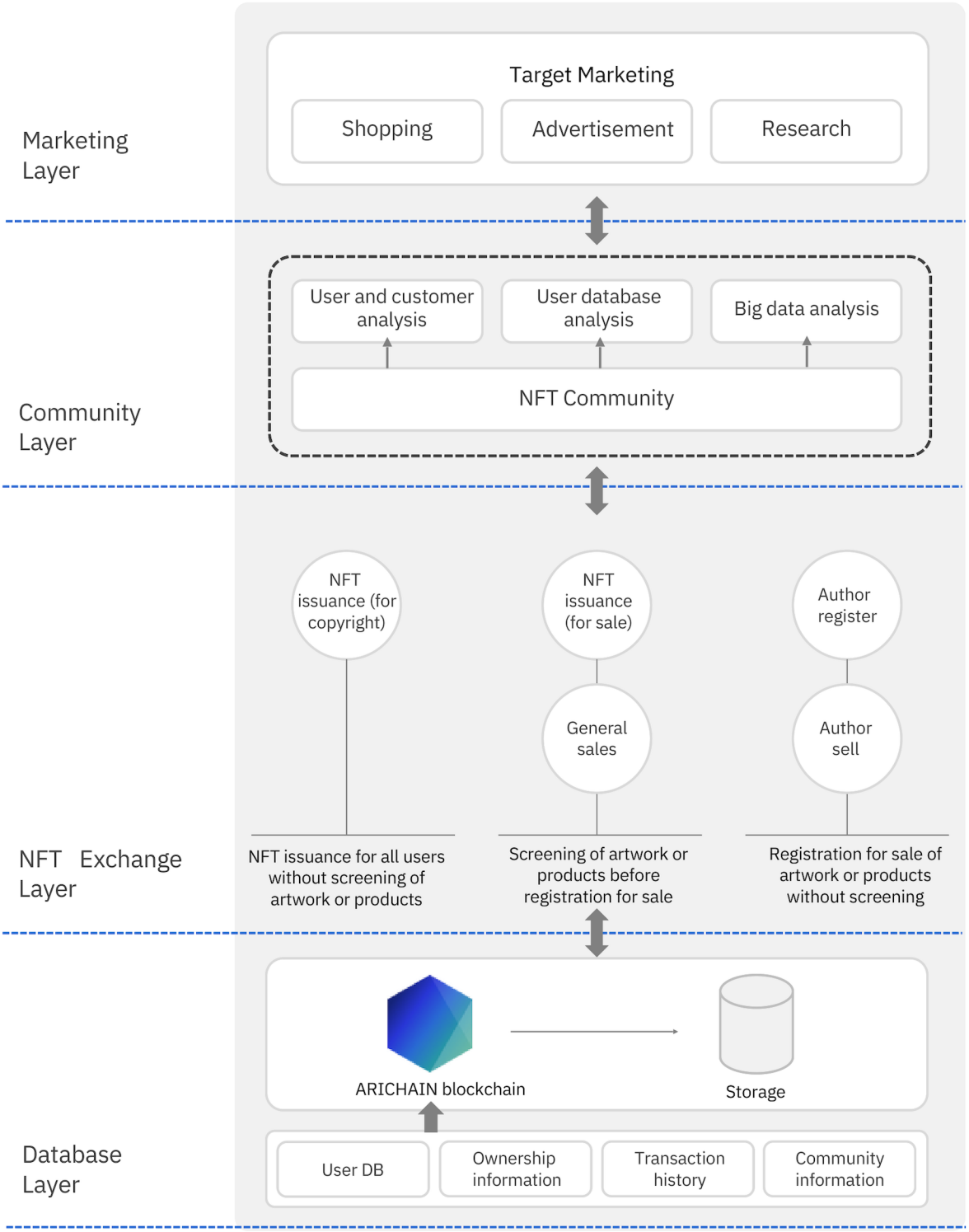
ARICHAIN's NFT exchange offers an optimized NFT solution that provides trading convenience, economics, and scalability to companies that want to conduct NFT market services among the DApps that have entered the market.

Firstly, it offers trading convenience and stability through a transaction processing speed of 300,000 TPS for large-scale users.
Secondly, DApps' NFT transaction fees are priced at the lowest cost compared to the existing NFT industry standards, supporting transaction activation.
Thirdly, ARICHAIN's NFT offers scalability that allows DApps to use NFT trading coins for the coins they
want, which can play a significant role in increasing the value of their own tokens.

9-4. Provide the Optimal DeFi Environment

ARICHAIN mainnet provides the optimal service environment for companies working on DeFi projects through low fees, fast processing speed, and improved development environment.
While Ethereum's average fee in 2020 was $1.50 and other mainnets including Klaytn charged fees ranging from $0 to $0.179, ARICHAIN offers its services with the industry's lowest fees.
Considering the aspect of fast processing speed, Ethereum's TPS is only 15 and other platforms have a theoretical max TPS of around 4000. In contrast, ARICHAIN's TPS is designed to be 300,000, enabling more transaction processing within the same amount of time.
While Ethereum only provides Solidity compatible languages, ARICHAIN offers Java/C/C++/PHP/ASP and other development languages, providing a convenient environment for developers to build their projects.

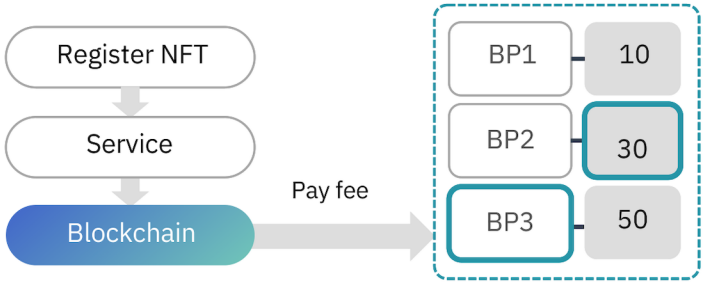
9-5. ARICHAIN NFT Exchange Platform



[Figure 23. ARICHAIN NFT Platform Structure]

9-5-1. Features of ARICHAIN NFT exchange

1. The ARICHAIN NFT service has a feature where the blockchain transaction fee is paid by the registrant at the value set by the BP of the blockchain when registering the NFT.

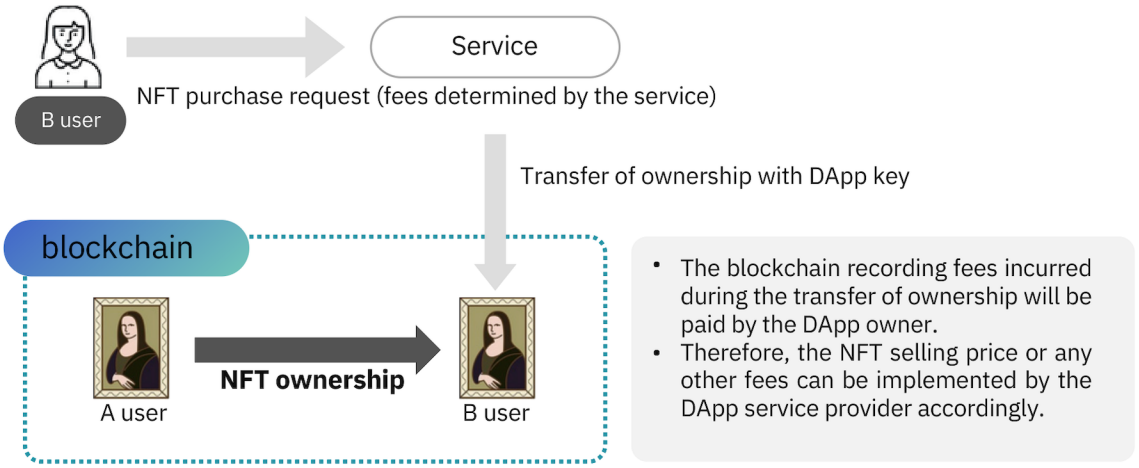


Fee

- The fee is determined every week based on the median value of the settings configured by the BPs.
- The BP that creates the block containing the transaction receives the fee.
- The initial value is 0The first NFT registrant pays a fee of 30 to BP3.

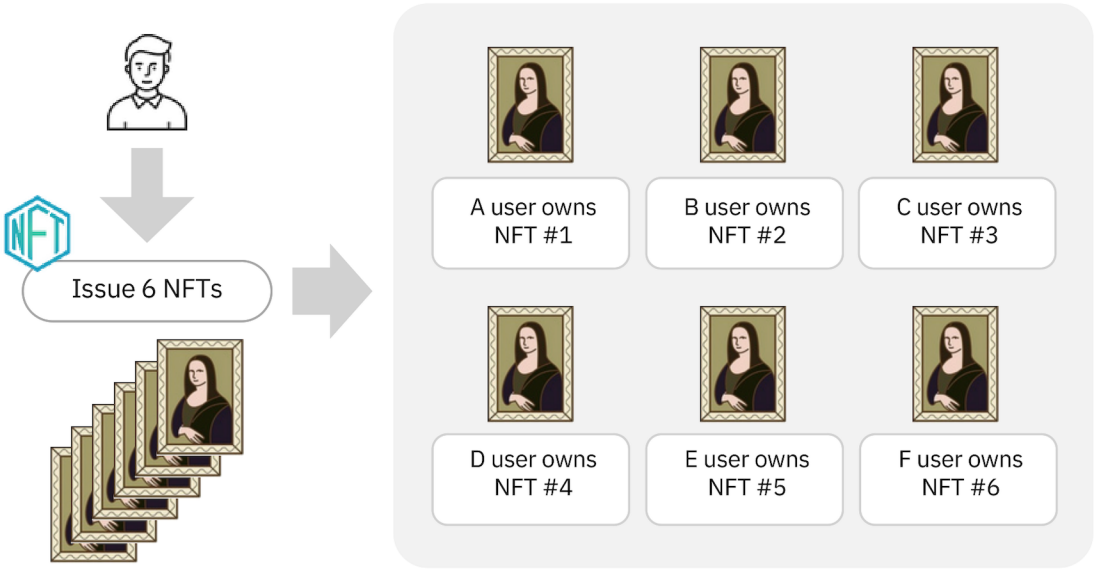
2. If the NFT registrant and owner fields exist, the ownership history can be traced through them.

3. DApp's private key is required for the transfer of ownership (approval from the DApp is required for ownership transfer).



- The blockchain recording fees incurred during the transfer of ownership will be paid by the DApp owner.
- Therefore, the NFT selling price or any other fees can be implemented by the DApp service provider accordingly.

4. when registering an NFT, it is possible to register multiple quantities rather than being fixed at one, and each is treated separately on the blockchain.



10. Conclusion

In determining the superiority of blockchain technology, the ability to process large amounts of data quickly and the capacity to accommodate and retrieve data as the number of blocks containing such data increases on the blockchain are critical validation criteria for ARICHAIN technology.

When reviewing technical whitepapers, it's important to focus on key factors that can increase the value of DApps. These factors include developing popular and emotionally appealing applications that provide high-quality content, fast data and API calls, and a secure environment. Additionally, attention should be given to the convenience of development, fast transfer speeds, and security enhancements, as well as the convenience of developing debug nodes, hard-forks, and soft-forks, and easy accessibility of the blockchain node.

ARICHAIN offers a competitive edge to DApps by leveraging our advanced technology as outlined in this technical whitepaper. Our DRPoS consensus model provides DApps with industry-leading speed, security, scalability, and decentralization. In addition, our API architecture offers a user-friendly, cost- effective, and efficient processing environment. Moreover, we remain committed to updating our technology version to incorporate the latest advancements based on the content of the Ver 2.0 technical whitepaper. We continuously improve and incorporate our technology through ongoing development of cutting-edge technologies.