

IPSE: A Search Engine Based on IPFS

IPSE TEAM

Oct 1, 2019

Abstract

IPSE2.0 is an application chain developed based on Substrate, which will soon be the first batch of Polkadot ecological applications to access the floor. It will provide data search services in decentralized networks (such as IPFS), as well as decentralized networks Data storage service, data replication proof PoRep based on zero-knowledge proof. Combined with the powerful functions of Offchain Worker, IPSE2.0 provides data decentralized storage, while accessing Phala's trusted computing, to achieve the key part of user data privacy protection and decentralization, centralized storage, trusted computing and authorized paid use in Web3.0. At the same time, IPSE2.0 will also have its own underlying consensus mechanism. The original conjugated PoC consensus mechanism also follows Satoshi Nakamoto's original intention: everyone can mine.

Glossary

IPFS: InterPlanetary File System

DAG: Directed Acyclic Graph

DSN: Decentralized Storage Network

DApp: Decentralized Applications

HTTP: Hypertext Transfer Protocol

DHT: Distributed Hash Table

PoS: Proof of Stake

PoW: Proof of Work

BFT: Byzantine Fault Tolerant

DPOS: Delegated Proof of Stake

UTXO: Unspent Transaction Outputs

Contents

1. Overview of Data Industry	4
1.1 Data Introduction	4
1.2 Introduction To IPFS	5
1.3 Introduction to Filecoin	6
1.4 Pain Points of IPFS and Filecoin.....	6
2. The Search Engine Based on IPFS	7

2.1 Disadvantages of Traditional Search Engines	7
2.1.1 Sin Stems from Monopoly	7
2.1.2 Decline Stems from Its Past Success.....	8
2.2 New Generation of Search Engines Can Solve Problems.....	8
2.2.1 Data Ownership and Privacy Protection.....	8
2.2.2 Incentive Sharing and Free Search	9
2.2.3 Search-based Decentralized Advertising Market	9
2.3 Building a Next Generation Internet Traffic Portal Based on Searching.....	9
2.3.1 Search Is Just a Traffic Entry	10
2.3.2 Business Storage Market and Copyright Protection.....	10
2.3.3 Content Creating and Sharing for Consumer	10
3. The IPSE Design Concept	10
3.1 The Starting Point of IPSE	10
3.1.1 Three Types of Decentralization.....	11
3.1.2 Impossible Triangle of Blockchain	12
3.1.3 The Position of IPSE	13
3.1.4 Two Genres.....	14
3.1.5 Value Creation and Management	14
3.1.6 Thinking About the Nature of Company.....	15
3.2 Layered Design of IPSE.....	15
3.2.1 Grading and Stratification	15
3.2.2 Five-tier Architecture	16
3.3 Application-specific Blockchain Technology of IPSE	16
3.3.1 Background of Application-specific Blockchain	17
3.3.2 Substrate and Access Slot.....	18
3.3.3 The IPSE Design to Application-specific Blockchain.....	19
3.4 IPSE's Unique Thinking on Storage and Computing.....	20
3.4.1 Storage Retrieval Service.....	20
3.4.2 Trusted Computing Service	20
3.4.3 Application-specific Blockchain	20
3.4.4 Token Distribution Service	21
4. IPSE Storage Retrieval Scheme Technology	21
4.1 Combination of Software and Hardware	21

4.2 Index Server Rights Management	21
4.2.1 Prevent Malicious Input of Data.....	21
4.2.2 Illegal Data Processing.....	21
4.2.3 SuperNodes Permissions	22
4.3 Data Changes and Cheating Submissions	22
5. IPSE Optimizes IPFS Protocol.....	22
5.1 Filecoin's Block and Storage Price	22
5.2 Filecoin Mining Pool	23
5.3 IPSE Traffic Flow and Data Sharing Mining	23
5.4 Future Role of IPSE and Filecoin.....	23
6. IPSE Incentive Mechanism and Token Allocation.....	24
6.1 IPSE2.0 Token Distribution Mechanism	24
6.1.1 Conjugated PoC.....	24
6.1.2 Native Tokens and Tokens Distribution.....	25
6.1.3 NPoS and Staking.....	25
6.2 IPSE2.0 Anti-cheating Mechanism.....	25
6.3 Economic Model of IPSE	26
6.4 Incentive Allocation Mechanism	26
6.4.1 Token Introduction.....	26
6.4.2 Token Allocation Scheme	26
6.4.3 Token Allocation.....	26
7. Commercialization Prospects of the IPSE	27
7.1 Traffic Entry for the Next Generation internet	27
7.1.1 Form New Barriers	27
7.1.2 Open Business Model.....	28
7.2 Mining that Anyone Can Involve In.....	28
7.2.1 Contributing Resources	28
7.2.2 Contributing Storage Space and Networking	29
7.3 Construction of the Traffic Matrix.....	29
7.3.1 Peer-to-peer Streaming Service	29
7.3.2 News Service	29
7.3.3 App Store.....	30
8. IPSE Trident Plan.....	30

8.1 Copyright and Token Related Resources	30
8.1.1 Copyright Protection and Content Distribution	30
8.1.2 Conflict Between Token Related Resources and VIP Modes.....	31
8.2 Open Plan of Search Sorting API	31
8.2.1 Comparison of Traditional Search Engines and IPSE	31
8.2.2 Combination of Search Sorting and Smart Contracts	32
8.3 Pixel Matrix Plan.....	32
8.3.1 Locally Save Data and 5G Opportunities	32
8.3.2 Edge Calculation and Scenario Application	32
9. IPSE Team.....	33
9.1 IPSE Team Members	33
10. Project Development Roadmap	34
10.1 Project Development History	34
10.2 Project Development Plan.....	34
11. Risk Warning.....	35
11.1 Regulatory Oversight Risk	35
11.2 Other Risks	35
12. Disclaimer	35
References	35

1. Overview of Data Industry

1.1 Data Introduction

As a fast, efficient and low-cost storage deployment method, cloud storage has gradually become mainstream in response to the massive growth of the digitalized economy. The number of registered users of cloud storage in 2017 has reached 1.3 billion, and the growth of the cloud storage market has also been rapid.

The scale of the billion-dollar cloud storage market has been sought after by major manufacturers, and competition has since been unprecedentedly fierce. Since 2016, various cloud storage networks including *Sina Microdisk*, *115 Network Disk* and *360 Cloud Disk* have been shut down due high operating costs and difficulty of profitmaking. Furthermore, user storage thresholds are low, and auditing mechanisms are imperfect. Many illegal contents such as vulgarity, pornography and violence are spread by means of

network disk, and cloud platforms are not willing to accept the responsibility of spreading bad content by shutting down their business. This has prompted the cloud storage market share to gradually monopolize, allowing only internet giants such as Alibaba and Baidu to exist. Once storage services become monopolized, storage providers gain full control of service space, price, service content, data security and privacy, and user bargaining power become greatly compressed. Some outstanding and worthwhile content are also implicated and cannot be shared. This goes against the original intention of cloud storage and gives opportunity to the development of distributed encryption storage.

1.2 Introduction To IPFS

IPFS (InterPlanetary File System) is a global, peer-to-peer distributed hypermedia file system with the goal of connecting all computing devices with its new protocol. IPFS aims to replace the domain-based address with a content-based address, that is, the content that the user is looking for is not domain but the content address itself, and does not need to verify the identity of the sender, but only needs to verify the hash of the content. This will make the webpage fast, safe, free and robust.



The existing internet is a centralized network using the HTTP protocol, which greatly relies on the central node in terms of access, storage, security and privacy. IPFS decentralizes and changes the WWW (World Wide Web) from web page addressing, access efficiency, data storage, privacy protection to data transactions. Once decentralized through IPFS, internet access will undoubtedly be faster and will save more bandwidth resources; in addition, the role of network security, data network "over-redundancy" and privacy policy will become more significant. It can be said that IPFS has upgraded the Web to the next level, which will make a better internet and lead a new and promising future.

IPFS has the quality of being an internet subsystem and can improve or even replace HTTP through reasonable configuration. IPFS can also solve the security problem that has been plaguing the HTTP for a long time, with content addressing and content signing technology that protects IPFS-based websites and eliminate the possibility of DDoS attacks. IPFS can also archive important public record content to avoid data loss from the site's termination of operations. The core improvement of IPFS is decentralizing content distribution, which allows people to access content under decentralized internet services (even offline), so that websites and web applications can be free from the source server. The pattern of the network is

distributed like Bitcoin's network. This is something that HTTP can't do, and it's a great benefit for locations with poor network conditions (such as developing regions) and suburban areas.

The combined advantages of IPFS networks bring the following 4 significant features:

- Permanently decentralizing storage and share files
- Saves various types of hypermedia data through P2P network
- Versioning, traceable file modification history, Git version control technology, Merkle DAG
- Content is addressable, and the file is identified by generating a unique hash value

1.3 Introduction to Filecoin

Filecoin is an incentive layer of IPFS. It is a combination of IPFS and blockchain technology supporting Smart Contracts. Its consensus mechanism is Proof of Storage, which includes Proof of Replication and Proof of Spacetime. Users can provide storage and broadband resources for customers to receive Filecoins as a reward. Customers can use Filecoin to get free storage or distribute data.

Filecoin's working mechanisms includes the following sections:

- Form a decentralized storage network (DSN).
- Proof-of-Replication (PoReps) that allows verification that any copy of the data is stored in a physically separated memory.
- Proof-of-Spacetime (PoST), giving sequential replication and storage as a useful working consensus for incentive metrics.
- Form a verifiable market, build a storage market and a search market, and manage how to read and write data from Filecoin respectively.
- Connecting other systems and managing how to use them.



1.4 Pain Points of IPFS and Filecoin

Although IPFS has a promising future, we also have found some of its shortcomings. For example, all data stored in the IPFS network is a series of hash values. The hash series is long, not easy to remember, and any character change means that the hash address has changed as well. The biggest technical challenge for the Filecoin project is on Proof of Replication. After an in-depth analysis of Filecoin's storage and search markets, we found that if we were to make a big advancement over peers in the storage market, it is likely to be identified as cheating mechanism, and this cheating mechanism will quickly accelerate unfairness in

the entire network. Filecoin's development team, Protocol Labs, will be made aware of this mechanism and will soon fix and defend against its own advancement. Therefore, we thought about another direction, that is, the search market. Encouraging users to search and upload more data through mining profit should be better for the entire DSN network. Therefore, we have made an IPSE search service for the search market.

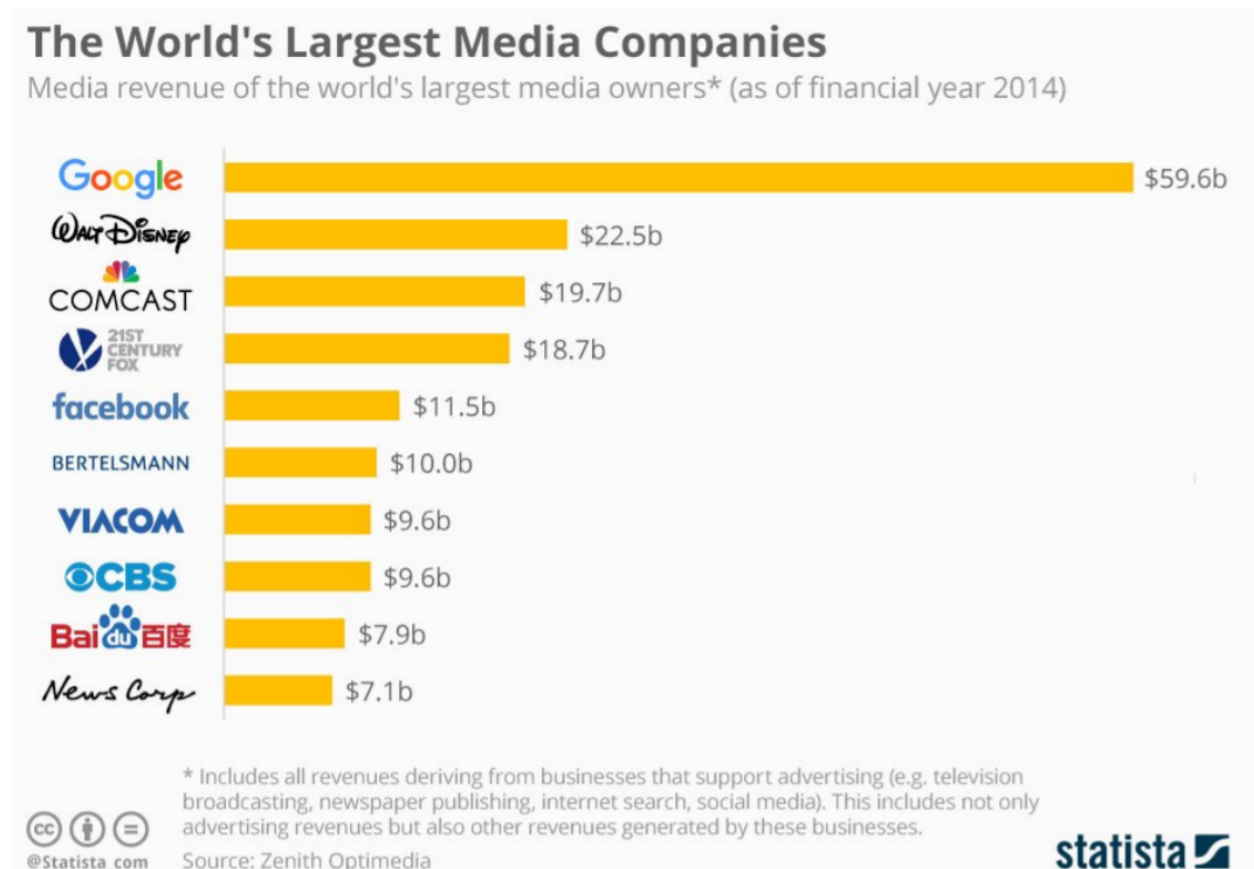
2. The Search Engine Based on IPFS

2.1 Disadvantages of Traditional Search Engines

Traditional search engines have brought convenience to our lives. However, with the development and growing power of these search engines, the drawbacks of monopoly have become obvious and have been also negatively affecting our lives.

2.1.1 Sin Stems from Monopoly

On this planet, a company controls 77% of all search traffic, affects trillions of dollars in spending, shapes global perceptions, and effectively acts as the gatekeeper of the internet. Is such a closed, profit-driven search engine really perfect? Can we trust Google's pledge to no do evil? What about the other remaining monopolists' ethical standards, which are probably even far less than Goggle?



We can easily observe the impact of these monopolies on our lives.

- **Data Retrieving:** Traditional search engines can make more personalized and accurate content pushes. This is due to the gathering of personal data, and individuals do not receive substantial benefits for it.
- **Online Advertising:** The online advertising market of \$55 billion market cap does not have many competitors. Many users feel that online advertising is awful, and companies must surrender to giants such as Google and Facebook and pay huge sums of money for product promotion to attract audiences.
- **False Traffic:** Although companies pay huge amounts of money for promotion, traditional search engines do not guarantee that traffic is real, and based on real experience in DSP, 50% of advertising traffic may be generated by robots.
- **Missing Ethical Bottom Line:** If a company is driven by interest without an ethical bottom line, then some recurring bad events will become the norm. For example, the "incident of Wei Zexi". Wei was a 21-year old Chinese college student who died due to a false advertisement from Baidu. Baidu shares fell almost 14 percent in the days following reports of his death.

2.1.2 Decline Stems from Its Past Success

In terms of the success of traditional search engines, we do not have to understand the needs of the community for information retrieval or understand the underlying technology of the inverted index. It can be determined that it is built on the centralized internet, and all the dividends brought by the centralized network after being used by traditional search engines, will decline and eventually come to an end. Centralized networks bring high efficiency, but data does not automatically participate in index building. Instead, a huge spider crawler system is needed to capture data essentially owned by all users, and traditional search engines have played a huge role in data capturing and have not shared the benefits with data owners, i.e., all users. The most severe point is that this way of thinking has become the corporate culture of these traditional search engine vendors. They will never think that it is necessary to share their interests with users. Therefore, when the blockchain technology rises, they won't think of making a search engine with a profit-sharing mechanism through Tokens.

2.2 New Generation of Search Engines Can Solve Problems

The new generation of search engines are decentralized. The first step is to clarify the ownership of data and solve the problem of unethical data capturing. This will disrupt the traditional online advertising market and bring new forms of online advertising. Finally, the clear Token economic model creates a powerful community of interests.

2.2.1 Data Ownership and Privacy Protection

随着欧盟的电子隐私权指令和通用数据保护条例（GDPR）的变化，世界各国都在逐渐迫使技术公司做出改变来保护消费者隐私。而以往长期的通行做法是消费者别无选择，只能免费赠送他们的数据，以换取免费服务，而像各种搜索引擎厂商能够获得用户数据，提供免费服务的同时夹带私货。新一代搜索引擎至少要能够做到这一点，消费者的共享数据能够明确其所有权，并且用户能够应共享数据而获得补偿。理想情况下，一个分散式的数据存储底层系统是必须的，这样用户并不用为数据存储在任何互联网巨头而担忧，同时用户也能够设置自己的隐私偏好保护。

IPSE2.0 collaborates with Phala, a deep computing solution, to deploy SDKs on various customer levels used by users, allowing users to encrypt their private data locally, while saving them through IPSE2.0's decentralized data. When calling data, Phala's Trusted Execution Environment (TEE) can perform end-to-

end data encryption and decryption, ensuring that no one can steal the user's private data throughout the process. Users can authorize third-party developers to use their own data. For example, there is an application for cryptocurrency aggregation payment TransX, which helps its users save a lot of their private data such as payments, balances, loans, investments, and distribution. While saving data through IPSE2.0, they can also use Phala to perform trusted calculations to obtain credible, private and safe credit points. Personal credit points no longer need to rely on the government or centralized institutions to collect our data, but we can keep our own data and use our data through trusted computing.

2.2.2 Incentive Sharing and Free Search

There are many ways to make a distributed search engine, and we choose to have a free searching service model. In order to make the search service more accurate and more rich in content, we use 'incentive sharing'. Shared data can be separated into two categories: one is ordinary material data, and the other is user's own preference data. Of course, the preference data can be stored with encryption.

The two points above are the core of the entire search engine, and online precision advertising is still a direction worth exploring. As users share their own preference data, advertisers can accurately locate their customer group and give reasonable compensation price. Through trusted computing, users do not disclose private data to advertisers or anyone else, and advertisers will not have to worry about fake traffic, as they only pay for matching users.

The underlying technology that can support the above models and practices can only be a distributed storage solution. IPFS-based storage can bring free storage and bandwidth costs and provide the underlying technical support for an online advertising system without any intermediaries.

2.2.3 Search-based Decentralized Advertising Market

Despite having many drawbacks, centralized search and advertising market still has an advantage of being efficient. The IPSE team will absorb some of these advantages by setting up coordination within the entire decentralized advertising market. The user's information is matched precisely according to the needs of the advertisers through smart contracts, and traded under an open and transparent mechanism so that both data authorized users and advertisers can benefit. A system that does not have a middleman allows all participants to benefit. Compared with the traditional search engine platform, the middlemen earn most of the benefit, and the advertisers and ordinary users are in the disadvantaged position. The new generation of decentralized search engine platform is built based on achieving interest on both sides, thus creating a win-win situation.

2.3 Building a Next Generation Internet Traffic Portal Based on Searching

If the underlying protocol of the next generation of internet will change, with the advent of the 5G era, the drawbacks of centralized storage will become increasingly apparent. data throughput will increase significantly, and data centrals with single nodes that have centralized storage with no orderly increase in disk read and write speeds, will have difficulty meeting the data throughput needs. Distributed data storage will be able to solve this problem perfectly. As the underlying internet protocols transition from HTTP to IPFS networks, new traffic entry disputes will reappear.

2.3.1 Search Is Just a Traffic Entry

The search service is currently able to be perfectly integrated with the IPFS protocol, and is also in urgent need for applications at the IPFS protocol layer. However, we are not just creating a search engine, but also creating a search traffic portal and to allow more expansion applications and underlying innovations. Storage of data on IPFS will gradually become mainstream, and data will naturally become popular, while long-tail data will only be found through search engines, and most of the popular data will be displayed to consumers through video portals, news portals... etc.

2.3.2 Business Storage Market and Copyright Protection

When TikTok needs to delete cold data to reduce costs, it means that its centralized storage solution will face increasing cost pressure. The search system we built will have a huge amount of storage space behind it, and it is a free storage space. The sell will be a huge business opportunity. The storage mining machine behind the search system can provide free storage, but it cannot guarantee the permanent storage of data. However, it does not require expensive bandwidth costs to provide access services. This feature is suitable search engines with huge amounts of cold data that needs to be deleted frequently such as for TikTok.

The efficient distribution of copyright data is also a huge business opportunity. Through the Token system, the search traffic portal acts as a guarantee. Copyright content can obtain copyright protection on the platform, and copyright content on the Business side can reach user terminals efficiently.

2.3.3 Content Creating and Sharing for Consumer

Consumers can easily obtain copyrighted content with Tokens in their hands. The Token economy system built by EOS's payment system will be as simple as leaving a like on Facebook. Content sharing will be as simple as sending a message on your phone, and sharing your content means you can receive Tokens as a reward. This system benefits from the powerful third generation blockchain underlying technology. More details will be described in later chapters.

3. The IPSE Design Concept

3.1 The Starting Point of IPSE

The starting point of IPSE (InterPlanetary Search Engine) is to solve real-world problems and draw on other excellent public blockchain technology to create a vertical blockchain ecosystem that focuses on storing indexing services and computing (Smart Contracts). Observing from the entire blockchain ecosystem, IPSE needs to find its own position with the concept of decentralization and the Mundellian Trilemma theory.

In IPSE2.0, it also inherited the concept of bitcoin mining. When it comes to bitcoin, if there are principles must be adhered to when Satoshi Nakamoto designed bitcoin, there may be two points. The first thing is the peer-to-peer electronic cash that can has no inflation, and the second is that everyone with a CPU can mine. But later, 'bitcoin can be mined by everyone' was broken by the ASIC chip, and it turned out a process of continuous concentration of computing power. This is also one of the reasons for the bitcoin crisis, because it is no longer possible for everyone to participate in mining, which makes the promotion of bitcoin difficult. The cost of educating users needs other ways to make up, instead of the natural mining of bitcoin Distribution. It is difficult to build a huge blueprint for peer-to-peer electronic cash with insufficient participants. The IPSE even believes that the only destination for Bitcoin

in the future is that the holders are large enough to serve as a store of value among ordinary people and work as the settlement currency in the international trade.

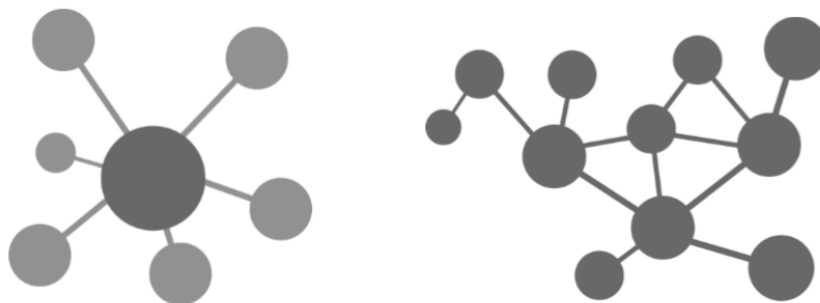
IPSE2.0 wants to restore Satoshi Nakamoto's idea that everyone can participate in mining, but the PoW consensus mechanism has been updated to the next-generation technology PoC (Proof of Capacity). There are many advantages of PoC over PoW. The power consumption of PoC mining machine only needs 1% of Bitcoin mining machine; hardware consumption is limited, PoC mining machine can easily work for 5-10 years; miners will not be pre-harvested. There is no technical threshold for the computer, and computers in your home can participate in mining; the mining site is random and the threshold is low. Whether it is a home garage or an office warehouse, it can be transformed into a mining field. Everyone can participate in mining and restore Satoshi Nakamoto's initial heart for everyone. PoC mining can promote the development of storage technology.

In fact, PoC cannot build the computing power moat of IPSE2.0. IPSE2.0 has created a consensus algorithm for conjugated PoC. Only if the computing power gain of IPSE2.0 is high enough can other PoC tokens be easily divided Power to build a moat of computing power. Of course, IPSE2.0 positioning is a mining project that everyone can participate in. If the number of main participants is sufficiently dispersed, the cost of the attack will be high enough.

3.1.1 Three Types of Decentralization

The core of the blockchain is decentralization. When you discuss decentralization, there are three different dimensions:

- Structural Decentralization: The system is composed of multiple nodes, and can tolerate simultaneous crashes of multiple nodes.
- Political Decentralization: No individual or organization controls the entire system.
- Logical Decentralization: The interface and data structure of the system display and maintenance looks more like an amorphous group of objects. Users can divide the system into many parts and can continue to operate as separate units.



(Decentralized vs. Distributed)

Observing from these three dimensions, we can draw some typical cases:

- Traditional enterprise is Politically Centralized (The CEO controls the entire company), Structurally Centralized (may have multiple branches, but there is always a headquarters at the center) and Logically Centralized (cannot really be divided into multiple units).

- The customary law system is Politically Decentralized (many customary courts have great discretion), Structurally Decentralized (many customary courts do not have absolute centers), but Logically Centralized (different customary laws are Community management).
- The language system is Politically Decentralized (no organization can control a particular language), Structurally Decentralized (there are no absolute centers in many language versions), and Logically Decentralized (such as the English system, half of the words are removed, or can be used alone).
- The BitTorrent system is Politically Centralized (can be controlled by a corporate organization), but Structurally Decentralized (multiple nodes are joined) and Logically Decentralized.
- Blockchain (including first and second generation) is Politically Decentralized (no one or institution can control the blockchain), and Structurally Decentralized (no infrastructure center failure point), but Logically Centralized (There is a recognized state in which the entire system behaves like a computer).

3.1.2 Impossible Triangle of Blockchain

In the traditional monetary theory, there is the "Mundellian Trilemma" theory, that is, a country's monetary policy cannot simultaneously achieve monetary policy, exchange rate and capital mobility. It can only meet two goals at the same time and give up the remaining goal. As the value in the traditional financial system, liquidity is its nature, exchange is an extension of this nature, and independent monetary policies cannot be abandoned by various entities using this value. The floating exchange rate reflects the value Equilibrium. This balance is lost all the time, and it is also formed all the time. Similarly, blockchain has this Impossible Trinity problem, the trilemma claims that blockchain systems can only at most have two of the following three properties:

- Decentralization: defined as the system being able to run in a scenario where each participant only has access to $O(c)$ resources, i.e. a regular laptop or small VPS.
- Scalability: defined as being able to process $O(n) > O(c)$ transactions.
- Security: defined as being secure against attackers with up to $O(n)$ resources.

In terms of blockchain system value, flow becomes its nature, security and stability are connotations, and scalability is the pursuit of most users to maintain values, while sacrificing part of the Decentralization is the choice of the last resort; in fact, this kind of decentralization is also the equilibrium of value, which means that there is no eternal decentralization, and there is no long-term complete centralization. The entire blockchain system is always breaking and constructing to a point where a decentralized equilibrium carries value.

Let's analyze several existing solutions about decentralization:

- Bitcoin is a combination of security and decentralization but it lacks scalability. And decentralization is increasingly being questioned by mining centralization, no matter what, trying to improve scalability will be the focus of innovation.
- BitcoinCash, the hardfork for the limited carrying capacity of Bitcoin blocks, has increased the computing threshold for node mining, which means that some nodes can no longer mine, thus sacrificing partial decentralization to optimize scalability. It has improved the data throughput of the blockchain, but in general it still has scalability problems.

- Ethereum sharding technology, with no doubt, will disperse the overall computing power, thus causing hidden dangers in security. Under the premise of pursuing scalability and guaranteeing decentralization, sacrificing security will also be widely questioned.
- The DPoS consensus mechanism goes to the extreme in the pursuit of scalability while ensuring security but cannot achieve decentralization. which will be widely questioned.
- P2P streaming media playback allows data to drop frames, which means that data error is allowed sometimes. Such a network can pursue scalability and decentralization, but security is not guaranteed.

3.1.3 The Position of IPSE

Thinking about the evolution of this world, in the 21st century, the causal mindset of the Newtonian world system has already been broken. The essence of complete decentralization is that each node maintains the same amount of information. Dr. Claude Elwood Shannon connects the world's uncertainty and information in the book of Shannon Information Theory. Complete decentralization is equivalent to completely eliminating uncertainty and maintaining a low-entropy network system at the cost of high external energy input of the entire blockchain network. The evolution of the entire universe is a process of increasing entropy. If the earth is regarded as a system, in order to maintain its long-term low entropy state, the sun needs to input energy continuously, but the energy obtained and the amount of information obtained by each node inside the earth (such as the mainland) is not equal. If you think deeply about the mechanism behind this, there is no doubt that the process of evolution is not designed by humans, and many uncertainties are explaining one thing: a complex system. A completely decentralized Bitcoin network is not a complex system, and there is no order gap in all the nodes. Such a system must make us think of mechanical thinking.

From the speculative thinking and logical reasoning of ancient Greece, to the invention and improvement of Euclidean, Ptolemy, Descartes and Newton, the mechanical thinking constructed by causal logic was once the commanding height of human thinking, and also gave birth to the 20th century science building. The core of mechanical thinking can be summarized in three sentences. First, the changes in the world are certain. Second, the laws can be recognized and clearly described by simple formulas or languages. Third, the rules are universally applicable and can guide practice in the unknown. In short, mechanical thinking emphasizes certainty (predictability) and causality.

If there is a standard to be discussed in this debate about decentralization, then we will admire the Gilders Law, which proposes that the most successful business operation model means resources with the lowest price will be consumed as much as possible to save up more expensive resources. Corresponding to the decentralized thinking of the blockchain, resources will have prices, which means that nodes, as a resource for saving data, will also have a price, and the price will naturally have a higher or lower level, meaning that the saved data is not completely consistent, or at least the value is not consistent. The lowest price resource will be consumed as much as possible, that is, nodes that store low value data will be sacrificed to the greatest extent, maintaining a low-entropy system by following Gilder's law while keeping the overall input energy constant.

The above discussion is only the theoretical starting point of IPSE on decentralization. Specific to the technical details, we will use DPoS to build the main chain of IPSE, which is the transaction layer of the blockchain system, and then there will be application-specific blockchain technology to save data of

different values, while selecting the number of nodes according to the value. In this way, IPSE will be compromised in decentralization. Achieving structural decentralization and political decentralization and maintaining logical centralization. However, if you don't just look at the main chain, and go deep inside the blockchain system, you will find that there will be many attempts to decentralize the subnetwork and maintain the low entropy state of the entire system with limited resource consumption.

3.1.4 Two Genres

There are basically two major genres in the blockchain game, one is the company model, and the other is the community model. The so-called company model, such as Tencent providing a BaaS platform, believes that people in the currency circle do not know much about BaaS. This is a problem of influence. If the company model is to make blockchain, the initial investment is relatively large, the preparation will be adequate, and will also need more technical accumulation and more patent applications. If you want to build your own barriers in the open source chain, the result is: It is very difficult to do. The community model is a completely different scene. The investment is relatively small; basically, it is open source. The problems and progress are shared with many participants and great influence.

From the analysis of the above two genres, if the blockchain is key to Web3.0 and represents the future, then questions are: Is the operation of the enterprise optimal? Is it necessary to apply for a patent? If the essence of the enterprise is to quickly find consensus in a dispersed group to achieve something, is the consensus on the blockchain stronger and faster? If the patent application is to gain value by using centralized authority to confirm a technical advantage, then the blockchain can realize the value by using the centralized consensus confirmation method. Is the patent application still necessary?

From the analysis of many existing blockchain projects, we can see that blockchain technology is used in traceability and deposit, distributed accounting, and expected value management. In a way, blockchain also changes the way individuals or legal persons obtain income.

3.1.5 Value Creation and Management

In modern society, in addition to capital, the source of power for individuals or legal persons to obtain income can be roughly divided into the following five aspects:

1. The community environment, such as which currency is used, is an important measure of the quality of a community. A good country will not have poor currency, while a poor country cannot have good currency. From the perspective of the ultimate believers of Bitcoin, there are only two things worthwhile in the future, one is cryptocurrency and the other is land.
2. Labor, using both hands and skills to earn income, participating in the global division of labor or community division of labor, is the invisible hand described by Adam Smith in *The Wealth of Nations*, and belongs to the category of God.
3. Nowadays, many mental workers are working in a division of labor and can gradually log into the intelligent contract ecosystem of the blockchain.
4. Machine intelligence is the ability of an individual or a legal person to manipulate many machines to work for themselves: storage, computing, network transmission, algorithms and programming.
5. In the above aspects, we also need to consider the cost of trust. From top to bottom, the required cost of trust is in decreasing order.

There is no doubt that the way IPSE creates value is a combination of decentralized capital, extremely high machine IQ and extremely low cost of trust. The IPSE will encourage users to invest in building their own

nodes, POST will be mined while the IPSE's focus on data storage, computing, and providing support to the traditional Internet and Web 3.0, fully utilizing the node machines' IQ. IPSE itself can quickly form the consensus of participants and reduce the cost of trust between participants.

3.1.6 Thinking About the Nature of Company

Coase's thought on the nature of the enterprise is very worthy of praise. Coase pointed out that the essence of the enterprise is a mechanism for resource allocation. The enterprise and the market are two resource allocation methods that can replace each other. In laymen's term, the production links of goods and services will reduce transaction costs within the enterprise.

blockchain technology originates from Bitcoin. Its ideological origin comes from Friedrich von Hayek's Denationalization of Money. Its core idea is to change the theory of super-sovereign currency. With the development of the blockchain, if the essence of the above is to change the way individuals or legal persons obtain income, it can also prove Coase's transaction cost theory: which is when transaction costs tend reduce closer to zero, The boundaries of the company is then disappeared, and everyone is no longer an employee, but a free man.

The IPSE team has put a lot of thought about the nature of enterprise and will use the community operation model to develop IPSE.

3.2 Layered Design of IPSE

3.2.1 Grading and Stratification

IPSE2.0 is a hierarchical design of the bottom consensus layer and the upper application layer, and the implementation steps are also successively implemented. Since IPSE2.0 uses Substrate to build the application chain, Polkadot's mainnet will be able to provide consensus security for the IPSE2.0 application chain after connecting to Polkadot's RelayChain through the Polkadot slot. At the same time, its original NPoS mechanism can Block node rewards.

The underlying conjugated PoC consensus is the core consensus of IPSE2.0 token distribution. 90% of the token distribution rules will follow the conjugate PoC consensus, and 10% of the token distribution will follow the NPoS consensus rules. Later chapters will explain the consensus rules of conjugated PoC in more depth.

The upper-layer applications are mainly in three major directions, one is data decentralized storage service, and the other is data search service. There is also a trusted computing service for data. IPSE2.0 will introduce stablecoins in the multi-asset module, or introduce the excellent stablecoins of the Polka ecosystem as the settlement token of the upper layer application, that is to say, the data storage service will be a regular business, storing certain data of customers, and charging them Certain service fees. The data search service will be free, and if sufficient data is provided for C-end users to search, it will need to incentivize the data providers. IPSE2.0 will use the treasury module to give these excellent data providers incentives. With the help of a third-party trusted computing platform, such as Phala's trusted execution environment TEE service, IPSE2.0 can connect user data to trusted computing and make some service APIs, such as personal credit limit API and personal portrait API.

3.2.2 Five-tier Architecture

After IPSE2.0 connected to Polkadot, as an infrastructure project in the Web3.0 ecosystem, it provides several basic services. From different levels, Polkadot's relay chain layer provides consensus security and cross-chain services. The underlying conjugated PoC layer of IPSE 2.0 provides a token distribution service, while the original NPoS consensus layer also provides token staking services. The application layer provides data decentralized storage and data facilities services. The external ecological layer, which is also Polkadot ecology, connects with Phala, to provide users with trusted computing services.

(1) Relay Cross-chain Security Layer

Polkadot's relay chain can provide consensus security for the parallel chain which plugs in. At the same time, IPSE2.0, as the parallel chain, can also obtain cross-chain capabilities through the relay chain. As one of Polkadot's ecological infrastructures, IPSE2.0 provides decentralized data storage and indexing services. Of course, it needs to be able to interface with other blockchain payment services, and it also needs to be able to make Token cross-chain payments through asset gateways. Sharing Polkadot's consensus security can provide strong support for the underlying consensus of IPSE2.0, while also allow more users to trust IPSE2.0 as a platform service for the application chain.

(2) Underlying Consensus Layer

The underlying consensus layer of IPSE2.0 involves the distribution of the token POST. The underlying consensus is composed of two parts, one is the conjugate PoC token distribution mechanism, and the other is the NPoS token distribution mechanism. Conjugated PoC is an original consensus mechanism of IPSE2.0, and can help other project parties to distribute tokens, while NPoS is Substrate's native consensus layer, which can provide Staking services to token holders, mainly POST.

Application Layer

The application layer is a unique design of IPSE2.0. After clearly thinking of token economics, it is decided to decouple the bottom layer consensus from the upper layer business. The bottom layer consensus determines the distribution of native tokens, and the upper layer application introduces stablecoins as payment token. At the time, a small amount of native token incentives are sufficient. The upper-layer applications of IPSE2.0 are mainly in three directions, the decentralized storage of data, the search service of data, and the trusted computing service of data.

External Ecological Layer

After IPSE2.0 develops into an ecosystem, it needs to be ecologically reversed, docked with the trusted computing platform that is also Polkadot ecology, save the data stored in the decentralized storage node, and access the trusted computing platform for calculation.

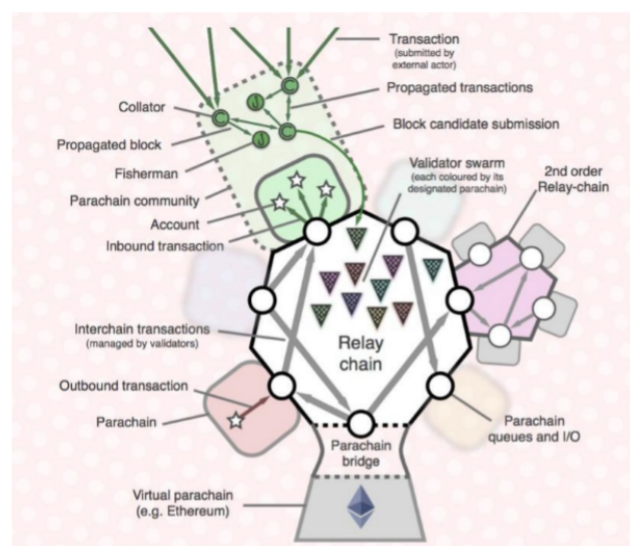
3.3 Application-specific Blockchain Technology of IPSE

When Web 3.0 was proposed, the path of development of the application-specific blockchain became clear. The past development of a public chain + DAPP combination encountered obvious challenges. Any public chain is a kind of segmentation of the current blockchain crypto economy. For a segmented network effect, such a development path is obviously constrained.

3.3.1 Background of Application-specific Blockchain

In-depth consideration of the problems encountered in the development of DAPP, in fact, has very simple reasons to explain; that is, the cost of use is high, and the benefits cannot completely offset the required learning costs. Each DAPP is architected on a corresponding blockchain. Users need to select one of the blockchains first. We have never seen a situation where someone uses an app first needs to choose an internet; because for us, there is only one Internet, and the underlying operating system shields all network differences.

For the development of Web 3.0 in the blockchain era, the most important thing is to get such an operating system first and screen the differences of various chains in front of users. Users don't care what chain DAPP runs on, and they don't have to worry about their Tokens being unusable under certain circumstances. This is the background of the application-specific blockchain.



In fact, the application chain is relative to the Web 3.0 ecosystem. The highly anticipated project Polkadot is a cross-chain technology that connects all chains together. The Substrate framework created by its team can serve as such a blockchain operating system. Users do not need to care whether the interaction on the application-specific chain is universal. As long as the Polkadot ecosystem is connected, all operations of the application chain should be universal to the user. Even if the user holds Bitcoin, it can be completed in the application-specific blockchain. In the Web3.0 ecosystem, application-specific chains can not only seamlessly interoperate with chains built using Substrate, but also connect existing blockchains together, such as Bitcoin, Ethereum, and EOS, by building bridges. From the perspective of network effects, such connections will bring network traffic to the new application-specific blockchain. The cost of bringing users into the learning blockchain is greatly reduced, and a new wave of blockchain technology dividends will be ushered in.

The main functions of the application-specific blockchain:

1. The interoperable transaction layer. As can be seen from the architecture diagram of Polkadot, parachains can achieve interoperability through the verification nodes in the relay chain, which includes basic operations such as transactions.

2. The basic user data of the application-specific blockchain (user account, permissions, token ledger).
3. The application bearer of the application-specific blockchain (smart contract, virtual machine, running platform).

3.3.2 Substrate and Access Slot

The Substrate framework modularizes the many functions of the blockchain. It is only a matter of choice for developers. It also maintains many customizable functions and modules, such as the underlying communication module, account system, and consensus mechanism, and they are customizable.

The underlying operating system framework of a blockchain must meet at least the following five requirements:

1. Functional modularity
2. Data and asset interoperability
3. Transaction scalability
4. Decentralized governance and iterative upgrades
5. On-demand security

IPSE will use Substrate to build its own application-specific blockchain. Polkadot plus Substrate can satisfy the above five basic needs mentioned. Specifically, functional modularity is the biggest highlight of Substrate. As long as Substrate is used to develop the blockchain, you can see the benefits of the loosely coupled module. You can also see the division of modules by Substrate in the following figure:



The interoperability of data and assets requires the help of Polkadot. As can be seen from the architecture diagram of Polkadot, as long as the slot of the Polkadot is accessed, the certifier node of the relay chain can verify the data and assets, so as to open up with the parachain of other access slots. Of course, the connection between the role of the bridge and the existing main blockchain can be used. Such a connection scheme can also be extended by the second layer of the relay chain.

Transactions also need to be scalable for an application. When a parachain is not enough to support a transaction in an application-specific blockchain, it can be continuously extended through new parachains. In the ecosystem of Polkadot, combined with the rapid development of Substrate, expansion needs can be easily met. Of course, when a relay chain cannot meet the demand, the multi-layer relay method can also be used to expand the number of parachains.

Substrate's framework is naturally friendly to governance. One of the biggest problem of blockchain so far is that it does not solve the problem of a source of credit. It is often said that the blockchain naturally creates trust, which is partly true. Take Ethereum for an example, the contract cannot be changed once it is released, it is indeed verifiable. As long as it can be verified to create trust, no one needs to believe that the person who issued the contract; they can verify it themselves. However, the problem is that the contract cannot be iteratively upgraded. The utilization of blockchain products are constantly evolving iteratively and iterative upgrades should be pursued. As the application chain service of IPSE, it is necessary to pursue the characteristics of iterative upgrade. However, this requires solving the problem of trust. If the projects team cannot be upgraded at will, everyone can only trust the project team unconditionally, and this is not the way to go. In order to know how to upgrade, we need to introduce a governance structure: Let the onchain governance associate with the offchain governance, so that the application-specific blockchain is iteratively adapted to the market development needs.

The security of on-demand allocation is something that every developer needs to consider. The cost of pursuing absolute security is high. For an application-specific blockchain, the pursuit of relative security is enough. The security of the Polkadot ecosystem can be provided through its own consensus mechanism or through the consensus mechanism of other blockchains. The access slot does not need to maintain the verification node itself, so that you can focus on your own applications and functions.

3.3.3 The IPSE Design to Application-specific Blockchain

After the emergence of Bitcoin, it provided enough distributed nodes and power barriers, but its congestion issues and high latency caused it to fail to achieve commercial landing, while Ethereum had the function of Smart Contracts, but it also had congestion issues. The root cause is that the entire problem set is not considered from the perspective of layering in the beginning of the blockchain design.

- (1) Application data and transaction data do not need to be stacked on a blockchain. The IPSE2.0 puts most of the application data on the chain and store it in the centralized storage service server.
- (2) A variety of application data does not need to be mixed and coexist in a blockchain. All Smart Contracts are on a virtual machine in the main chain, and the same security is obtained with reasonable cost. The IPSE2.0 will have multiple application-specific blockchains to achieve effective separation of multiple application.
- (3) The node size of the application-specific blockchain is matched with its implementation business. The importance of the data is matched with the data chain security of the blockchain application-specific blockchain. The IPSE2.0 will not be completely decentralized but pays attention to making a reasonable match.
- (4) Application-specific operations do not require equal commission. If there is only one main chain like Ethereum, then its price estimate for all operations in smart contracts is homogeneous, and its price lacks hierarchical planning. IPSE2.0 will design different gas costs in different application modules.

- (5) Trading operations do not require equal mining costs. Different transactions have different values. IPSE will use application-specific blockchain technology to put most of the transaction storage in the application specific blockchain, while mining uses the main chain multi-currency conjugate mining method to achieve multiple profits of multiple currencies.
- (6) Is a unified computing virtual machine on the main chain is unnecessary or not? For different Smart Contracts, the difference in importance is self-evident, and the importance of the data that needs to be saved is the same. If a main chain is implemented vertically, there will be serious performance expansion problems like Ethereum, and that excessive amount of synchronization can also cause security problems. The IPSE2.0 application-specific blockchain can be relied upon for these two parts. Each application module is split to solve the problem of insufficient main chain performance, and data storage is split to solve the scalability problem of data governance.

3.4 IPSE's Unique Thinking on Storage and Computing

In addition to providing the simplest wallet service in the application layer, IPSE mainly provides four major services: storage retrieval service, trusted computing service, extended application chain service and token distribution service.

3.4.1 Storage Retrieval Service

There are many public chain projects that focus on distributed storage, including the IPFS + Filecoin which is relatively successful. IPSE will build a layer of search services based on the IPFS network. Users can use the stable search service provided by the IPSE search server cluster to find the data you want, and then view it through the IPFS browser. Of course, the current browser is also compatible with some resources on the IPFS network. At the same time, IPSE2.0 has undergone a substantial upgrade, and it will also differentiate Filecoin to build a data storage service layer, which can provide decentralized data storage services.

3.4.2 Trusted Computing Service

The trusted computing service mentioned here is not a hash calculation of Bitcoin mining, nor a calculation performed in a smart contract, but a calculation based on a trusted execution environment (TEE). Generally, its data comes from a decentralized storage system. And they are all encrypted data. Only when the encrypted data is loaded into the TEE, the trusted execution environment can establish end-to-end encrypted communication with the user to decrypt the data. The external data cannot be stolen, so the user data is under the highly confidential operation which is also called trusted computing. Not only privacy protection, but also verifiable computing is obtained after multi-node trusted computing MPC.

3.4.3 Application-specific Blockchain

In the Substrate framework, the application-specific blockchain is a public chain that fully supports smart contracts, and the smart contract development is a more general WASM model. Mastering Rust language and development skills is a unique help for the rapid development of the application-specific blockchain. You can also add new extended application modules to IPSE2.0 by seamlessly upgrading Runtime.

3.4.4 Token Distribution Service

The underlying conjugated PoC consensus mechanism of IPSE2.0 is designed to be a very ingenious multi-token distribution mechanism, which can bring purchasing funds to other new teams while issuing tokens, and can be used by many miners and token users to distribute coins.

4. IPSE Storage Retrieval Scheme Technology

The IPSE has its own solution to the underlying storage technology. It involves whether the data is decentralized, whether the data should be broken up, whether the data should be backed up, and how the data is copied. The IPSE will give you directions and answers.

4.1 Combination of Software and Hardware

When a decentralized application is needed, it is always necessary to deploy some miner nodes in places where the physical distance is relatively scattered, and the IPSE team has already deployed at the hardware level such as the mining base and mining center. When the team develops an ecological application-specific blockchain that is based on IPFS and Filecoin, we can quickly deploy and test it in the initial phase.

The combination of hardware and software is not just a convenience from the engineering level, but a very high dimensional idea. When the internet was first developed, the hardware is an industry with high returns, but the software industry needs to go through several risk fluctuation periods. The development of the application of blockchain will also secure strong cash flows through hardware development initially, and the development team will not be affected by the fluctuation of cryptocurrency price.

Finally, the strategy of combining hardware and software is a long-term strategy. IPSE2.0 will be completely open, and any hardware vendor can deploy IPSE2.0 to mine.

4.2 Index Server Rights Management

4.2.1 Prevent Malicious Input of Data

The search server of the IPSE needs to prevent malicious input from two types of data. One is adding tags to the same content hash multiple times, and the other is making small changes to the content to obtain different hashes to add duplicate tags. These two situations are ineffective for the search service and will cause pressure on the entire search server. Of course, it is relatively easy to prevent the those situations. The entire search server adds tag mining behavior to the same hash address. The response is real-time, and it is easy to monitor any cheating and penalize it. For the latter kind of cheating, a review mechanism is needed. As long as the anti-cheating mechanism is added, it can effectively prevent such cheat attacks.

In addition to these two basic malicious inputs, there are some attackers who simply dislike the entire system and the network. Real-time monitoring will be adopted to prevent this type of attack. If a malicious input of a large amount of garbage data is initiated in a short time, the system will respond to this attack and will soon reject the data input.

4.2.2 Illegal Data Processing

The IPSE adopts a combination of decentralization and centralization and will also make full use of the advantages of both. Decentralized mining behavior will provide rich content resources and more dimensions of content; semi-centralized SuperNodes solution can also meet index cluster services and bring community benefits to project promotion. A centralized arbitration mechanism will prevent content

from moving in a worthless direction. The handling of non-compliance data will be inevitable, and a centralized solution will be the most efficient. The judge decides which is illegal or not and there is no need to give a definition in this judgment, and no need for everyone to dispute. The same is true of the IPSE. Centralized arbitration will save the cumbersome voting mechanism and quickly and efficiently maintain the entire service in a relatively usable state.

For data that violates the rules and data reported by the user, the IPSE will conduct centralized arbitration. If it is judged to be a violation, its index data will be deleted directly from the index server. Due to the intractability of the data source, it is impossible to delete the data source. As long as the hash address is filtered, the scope of its impact will be limited.

4.2.3 SuperNodes Permissions

The SuperNode can sort the search content provided on its own index server. If the search request accesses its own search server, it is understandable to access its own sorting algorithm. Of course, there is a competitive relationship between all the SuperNodes. If the ordering of a SuperNode is not good enough, there will be a better SuperNode to make a better sorting algorithm. Of course, this is the right of the SuperNode, but it can also directly cooperate with the project team to form a super unified external service system, and at the same time, it will not need to bear the responsibility of technology development, but also share the corresponding benefits.

4.3 Data Changes and Cheating Submissions

In the IPFS network, any changes to the original data will generate a new hash address, which can be re-tagged. Of course, there is a basic judgment in it, whether it is a reasonable content change or a malicious cheating attack. As long as the review mechanism and a large number of mining early warning mechanisms are added in a short period of time, such cheating attacks can be better prevented.

5. IPSE Optimizes IPFS Protocol

The IPSE will build a search service layer based on IPFS, and the IPFS incentive layer is Filecoin. Users can provide a large amount of storage space and then put it in Filecoin's DSN market. As long as there is a storage demander who is willing to purchase storage space, the order can be confirmed and completed. Filecoin's mining profit will be huge. The success of Filecoin will stabilize the entire IPFS network and the number of nodes will grow geometrically.



5.1 Filecoin's Block and Storage Price

Filecoin's block generate will be a huge profit, the data storage will become safe after Proof-of-Replication being enhanced, the whole Filecoin Token system will be recognized by society and the capital market, many miners will gradually involve in mining and set lower storage prices to compete for limited storage

needs. Of course, this limited storage need is only the beginning. If the storage price drops to a level that cannot be refused by a large resource, the market will change dramatically. There is also a non-negligible developer community that is most active in embracing the IPFS ecosystem, and they will no doubt prefer a cheaper and more secure IPFS network for data storage. There will even be situations where some aggressive mining behavior will directly set the storage price to be free to compete for storage orders.

5.2 Filecoin Mining Pool

Filecoin's white paper discusses two of Filecoin's mining methods and the DSN market very clearly and elegantly. Can storage markets and storage mining be able to easily design a Bitcoin-like mining pool? It is difficult to build a mining pool simply with Filecoin's storage market. Each storage miner node has a unique identity PeerID. It can't pretend and replace other nodes to get orders from the DSN market, and the matching transaction can't be attacked. Even if the miner node gains mining advantage through some mining pools, this advantage will likely be identified as an attack. Gaining mining advantage without contributing will be considered as a cheating activity, and the Filecoin team will soon remove this advantage by upgrading the mining software.

There is also another way of mining Filecoin, which through the search market and retrieval mining. Basically, data is saved in order to be retrieved, and a large amount of data should be widely used. If acquisition of search orders are improved through gaining more access traffic, such a mining pool will no longer be an attack behavior for Filecoin, but a positive mining behavior. The IPSE builds a search layer based on IPFS, which provides users with free search services. At the same time, it also helps SuperNodes to get the opportunity to build their search mining pools.

5.3 IPSE Traffic Flow and Data Sharing Mining

The traffic of IPSE2.0 are mainly from two aspects. On the one hand, application developers need to store data in a decentralized storage network, which can provide search services to users, or developers' applications can have a data docking layer. On the other hand, data sharers can share interesting data to the IPSE platform to attract the attention of others. IPSE2.0 will give certain rewards to these data sharers, including POST in the IPSE2.0 treasury. Of course, IPSE2.0 protects personal data privacy. Anyone can use search services and data storage services without any concern. Any private data will be encrypted and stored in a decentralized storage node, and it can also provide multi-party trusted computing.

5.4 Future Role of IPSE and Filecoin

With in-depth research of Filecoin's basic protocol, we can will find a controversial point. Data is saved to the IPFS network, if the data storage user chooses to use Filecoin's DSN market, then they need to pay Filecoin (FIL) to get storage space to safely store the data, but data retrieval also needs to be paid with Filecoin, and popular data will be retrieved by countless people, will these people also need to pay Token to get resources? Obviously, this is a relatively controversial point; the data is accessible to users through P2P network, and if the data allows a centralized node to pay and then distribute, it is no different from traditional HTTP. After thinking deeply about these issues, IPSE's positioning can solve these issues. The data owner can save one or two copies to IPFS for data security, and use Filecoin for security protection, but data access will not pass through the Filecoin network, but directly through the IPSE to allow a large number of users to access free, free to save, data so that users not only may get IPSE Token POST rewards, but also solve the issue of storage cost and bandwidth cost. Since Filecoin guarantees the data's Security,

loss of data on IPSE does not affect the integrity and security of the data. Very little data will be secured by Filecoin, but most of the data will be distributed and retrieved through IPSE.

6. IPSE Incentive Mechanism and Token Allocation

The IPSE cannot provide a powerful search service layer, instead the services provided by the search server is bound to the IPSE node. Therefore, the search service layer requires many data sources. As the next-generation data storage network, IPFS will have a large amount of data source, but because the data are all unsearchable through hash addresses, it has to be labeled by the uploader and uploaded to the search server to be searchable by all users.

6.1 IPSE2.0 Token Distribution Mechanism

The token distribution mechanism of IPSE2.0 is embedded in the underlying consensus layer. The underlying consensus layer involves two parts of token distribution, one is the original conjugated PoC consensus mechanism, and the other is Substrate's native NPoS consensus mechanism.

6.1.1 Conjugated PoC

Conjugated PoC is a concept in chemistry, where the break of the conjugated bond between two atoms releases energy. In the conjugated PoC ecosystem, a piece of PoC computing power can mine multiple tokens on a chain. Of course, these tokens are issued from this chain. There is a native token that other teams can issue their tokens on. Post your own tokens, and miners can mine multiple tokens as long as they mortgage the corresponding tokens. The basic rules are as follows:

- (1) If the mortgage is enough, the full reward will be released. If the mortgage is not enough, 10% will be rewarded, and the remaining 90% will go to the treasury pool.
- (2) Conjugate double mining. Miners choose any 2 tokens for conjugation, and then they can get an additional 10%. The 10% reward is allocated from the treasury until all tokens are allocated.
- (3) If other teams want to issue new tokens, they need to lock 10% of the issued amount of the native token for two years, which will be gradually released during the two years.

IPSE2.0 uses Substrate to build the project, so that the conjugated PoC has the Turing complete smart contract function, which means that the underlying mining logic based on PoC can also build a landing application ecology. Conjugate PoC has two basic advantages:

- Old tokens activates new tokens, that is to say, old coins, such as native tokens, can drive new tokens through conjugate mining which can make miners to buy new tokens to mortgage conjugate mining, and bring buying power to new tokens.

- The new token raises the old token, which means that the issuance of new token needs to lock the original token, reduce the circulation of the original token, and enhance the secondary market performance of the original token.

If IPSE 2.0 is to take the path of Bitcoin from weak consensus to strong consensus, it needs to continuously reduce the circulation ratio of tokens. That is specific to conjugated PoC. Let's see how native tokens reduce circulation.

- The first aspect is that mining requires mortgages. Miners provide equipment, and token holders provide tokens, which can achieve the cooperation in mining.

- The second aspect is the issuance of new tokens. It is necessary to lock the original tokens. Each token is locked by 10%. If 5 teams cooperate to issue 5 tokens, half of the circulation will be locked.

- The third aspect is the design of PoS. The token holders have the opportunity to mortgage interest. Thus, their tokens will not be continuously diluted by the newly mined tokens.

- The fourth aspect is that native tokens need to be used for landing applications and governance systems, such as initiating proposals, voting, etc., all need to hold native tokens.

6.1.2 Native Tokens and Tokens Distribution

The native token of IPSE2.0 is POST, and the token can be distributed through IPSE to obtain a wide range of users. At the same time, IPSE2.0 will also support developers through native modules and smart contracts, so that they are not just issued token. It needs to raise 10% of the circulating POST to lock the position, which is by no means a simple matter. It needs to have a very strong cooperative relationship with IPSE2.0 itself, and strive for the support of IPSE2.0 token holders in order to let them vote for the developers and strive for their tokens to be distributed through IPSE.

6.1.3 NPoS and Staking

NPoS is Substrate's native consensus layer, which allows token holders to give block node nominations. When each era is updated, the nodes that get enough nominations are elected. At the same time, the 10% POST of the native token will give reward to Block nodes and nominees. That is to say, token holders can vote for their trusted nodes, and these block-producing nodes can work honestly to obtain benefits, while token holders who vote for nomination can share the benefits. Such a staking function can allow token holders to participate in the governance of the IPSE2.0 chain while gaining revenue.

6.2 IPSE2.0 Anti-cheating Mechanism

First of all, the block authentication nodes of IPSE2.0 all need mortgage. The token holders choose the block authentication nodes they trust, and also supervise these nodes. If any node does evil, it can be quickly discovered and Punished.

Secondly, in IPSE2.0's conjugated PoC mining, if miners do not mortgage and use very high hash rate to conduct malicious mining, the way to prevent this attack is to make the attacker's mining cost increase. Thus, if the miners do not make the collateral, they can only get 10% of the mined tokens, and the remaining 90% will enter the treasury.

Finally, NPoS's block generation section selection is a dynamic process. In each era, a batch of block authentication nodes will be replaced, which means that no node will always occupy the position of the block authentication node for a long time.

In addition, there is an anti-cheating mechanism at the application layer. At the data storage business layer, the storage nodes of IPSE2.0 will need to verify PoRep of the stored data. Of course, in order to lower the threshold of storage nodes, IPSE2.0 will introduce the concept of snark as service which allows a professional team to support the work of zero-knowledge proof. And the storage node only needs to be responsible for data storage, preprocessing into a DRG (Depth Robust Graph) structure, submitting to snark service to calculate the proof. Then, the storage node submit Go to the main chain of IPSE2.0 and let the main chain complete the verification.

In order to prevent the storage node from maliciously deleting the user's data, a certain amount of collateral is required. After accessing Polkadot, miners can use multiple tokens to mortgage, not just POST or a stable token.

6.3 Economic Model of IPSE

A good economic model will be beneficial to the expansion of the ecosystem and the promotion of the community. IPSE will pre-mine 30% of the tokens, and the entire token will be locked and released gradually. The remaining 70% of the Tokens will be released by mining, and will be distributed in half every 2 years. The first two years will release 35% of tokens, and the fifth two years will release 2.1875% of tokens.

IPSE 2.0 will abolish the model of deflation. The halving rule is still valid. However, at the end of the halving, if the handling fee is not enough to support the incentives of miners, it will slow down the halving rule.

6.4 Incentive Allocation Mechanism

6.4.1 Token Introduction

IPSE Token name is POST. The total amount of POST is 10 billion.

6.4.2 Token Allocation Scheme

POST is mainly divided into several parts:

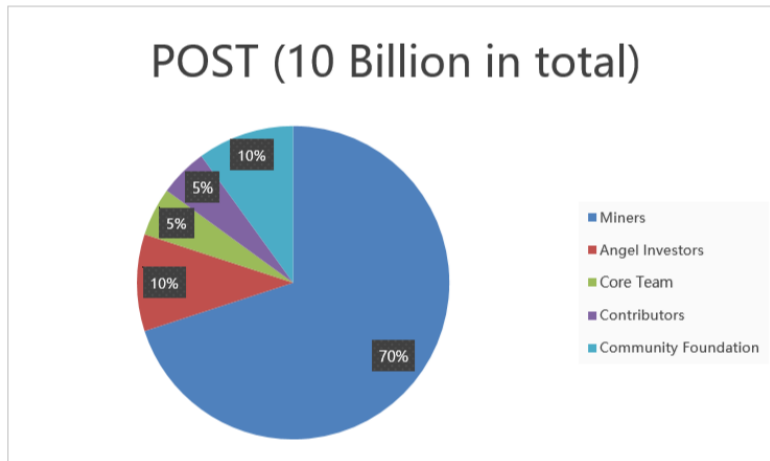
1. Early contributors and angel investors. POST will be given to those for supporting the project.
2. Community incentives. The IPSE will be motivated by multiple communities, and a portion of Token will be given to IPSE Foundation to support the entire community
3. Core team. Maintaining long-term development
4. All miners. They will get most of the POST by mining

The founding team of IPSE is a very diverse team, not only elites from the internet, but also core blockchain technology development talents, using innovative technology, building a strong economic ecosystem with multi-incentive, multi-dimensional development, guaranteeing the entire project. Which ensures long-term sustainable development.

6.4.3 Token Allocation

IPSE's Token, POST, will halve every two years. And 30% of Tokens will be pre-mined, and 70% of Tokens are directly mined by miners. And 5% of Tokens for Core Team will be locked with 3 years. The vesting schedule for each participating group is as follows:

- Angel Investors: 3 years, linear vesting
- Core Team: 3 years, linear vesting
- Contributors: 3 years, linear vesting
- Community Foundation: linear vesting
- Miners: Halving every two years



7. Commercialization Prospects of the IPSE

7.1 Traffic Entry for the Next Generation internet

If you carefully observe the development law of things, when information on the Internet first began to grow, people would learn from Linnstein's classification system, classify the content of the Internet, and then make various portals to satisfy people's needs for information demand. Immediately after the advent of search engine services, people could retrieve data according to their own needs, and the Internet advertising industry developed.

When the previous generation of internet giants overtook the search industry, 77% of the global search market ended up being controlled by a single company, and when the \$55 billion Internet advertising industry had no new challengers, Google's market capitalization easily broke through one trillion dollars. The internet of the next generation must change. Of course, along this change, the trend of fragmentation will be inevitable. The IPSE has a deep understanding of these trends. We are confident that the IPSE based on IPFS will win the next generation of internet infrastructure. IPSE will adopt an open attitude to build an autonomous community and sharing model with the CIS economy, so that fragmented traffic portals can be converted as much as possible, while not having a monopolistic value.

7.1.1 Form New Barriers

If you simply think from the perspective of doing search, IPSE can't build a competitive barrier in a short time, because it can't be compared with traditional search engine vendors in semantic analysis, big data analysis, artificial intelligence and natural language processing, etc. But blockchain technology brings changes. Traditional vendors embracing blockchain technology can never use it to reshape their core business structure. Google's search engine cannot introduce the blockchain incentive mechanism in a short period of time, but IPSE has the opportunity. All the above are just considering the issue of competition barriers from a commercial perspective. Of course, the technical perspective is also an important judgment direction.

The resources on the IPFS network are a black box mechanism and cannot be crawled by the spider search engine vendors. If users upload their own resources to the IPFS network, as long as the hash addresses of the resources are not shared, other people on the network cannot know the resources. Wherever it is stored, search engine spiders can't crawl resources. IPSE will use incentive mechanism, and let users share

resources. Users that share their resources and upload to IPFS can get Token rewards, so that resources on IPFS can be indexed in the first time and provide a search service layer for free to ordinary users.

The index data on the IPSE will not be open to traditional search engine vendors. If they infringe on the index data on the IPSE, we will not hesitate to use legal means to punish such theft. Of course, the IPFS network is not yet influential. Traditional search engine vendors will not list the IPSE as their main competitor, because the IPSE cannot compete at the level of search intelligence, but these are just a process. If we become the next generation of Internet traffic portal, the IPSE will win the next internet traffic entry battle.

7.1.2 Open Business Model

The traditional search engine constructs a weight value for each web page, sorts the web pages according to the weight value of the web page. Some search engine vendors introduce a bid ranking mechanism to maximize advertising benefits. Regardless of the method used to sort the web pages, it is product of compromise that allows users to search for the best content on the one hand while maximizing business profit on the other, and this compromise is never easy to make.

The IPSE is fortunate to adopt a completely different strategy. The basic approach is to make the premium content cost less to promote, and the inferior content resources will require higher promotion costs. This is a positive cycle. The content provider will focus on content improvement rather than promotion. The IPSE will use Smart Contracts to intelligently settle the payment of promotion fees. The promotion cost will consider factors such as the matching degree and popularity of resource seeds. Based on smart contracts, better content is pushed to users, and all parties involved can't cheat. Users will no longer be the target of exploitation, and advertisers will not be able to simply deceive users, nor will they pay heavy promotion costs. The method of earning income will be more diversified, because anyone can participate in the promotion, instead of platforms such as Google, which requires a tedious registration process, and need to connect accounts and bank credit cards. On IPSE, anyone wants to get their content promoted can just use IPSE token to place an order on the smart contract, and the system will respond to this demand.

7.2 Mining that Anyone Can Involve In

The IPSE is built on IPFS. The ecosystem of IPFS needs to share the spirit. Anyone can upload resources to the IPFS network or share storage space and network resources to gain revenue. Filecoin is an incentive layer built on IPFS, which solves the problem of data replication certification, and IPSE is a search layer built on IPFS, which solves the problem of how resources are found.

7.2.1 Contributing Resources

When a resource is uploaded to the IPFS network, the actual content is not yet shared, the process is completed when the seed of the resource is shared. Of course, the scope of the seed is limited. If the hash seed is posted after being tagged and then entered the index server, it can be easily searched by anyone, then the resource is truly shared. The IPSE is very supportive of this sharing behavior, not only technically supporting this tiny action, but the entire passthrough economy will encourage this behavior. Therefore, the Token of the IPSE will be used to motivate this multi-dimensional resource sharing. The contribution of ordinary users' resource sharing to the search service layer of IPSE is obvious. If only large video vendors upload resources, the dimension and richness of resources are inferior to the traditional Internet. If

ordinary users are more willing to share content on IPFS, while gaining higher incentive income, IPFS networks will gain an advantage over traditional Internet.

7.2.2 Contributing Storage Space and Networking

IPFS is to completely revolutionize the underlying protocol of TCP/IP. Currently, the popular browsers are based on http/https. However, the IPFS will be a completely different experience on a professional browser, and the development of the IPFS browser is also in progress while continuously improving itself.

Among them, Opera, a major browser company, already supports IPFS. IPSE will follow up as soon as possible to optimize resource search and content display. To achieve a more stable operation of the IPFS network, more nodes need to be added. These nodes can use their own storage space and network resources to obtain mining income. Ordinary users take part of the storage space for mining, which is not dominant in the entire mining ecosystem, but because ordinary users share idle resources, and the content they share is more advantageous in terms of dimension and richness, so their retrieval the mining income will be higher. The management experience of the owner will be added, and the resources will be updated and maintained.

7.3 Construction of the Traffic Matrix

The IPSE is not a complete decentralized solution. A lot of data on the search service layer uses the most efficient centralized solution. With these decentralized stored data, the team can have a deep understanding of most of the data stored on the IPFS network and create internet traffic based on commercial experience.

7.3.1 Peer-to-peer Streaming Service

The support of IPFS network for video resources is very friendly. Enough stable nodes will provide very high download speeds, which is a huge advantage for the spread and sharing of video. The decentralized p2p transmission features are like the centralized video portal. However, there is an essential difference and IPFS will have an absolute advantage in terms of cost. Of course, existing video portals can completely move their content resources to the IPFS network. There are also IPFS-based YouTube-like video portal sites such as DTude, but their fatal drawback is that they do not motivate users to upload quality video content. This causes their content to remain in a low-quality state for a long time. When traditional video portals upload resources to the IPFS network, they can only search within existing content circles. IPSE will use the token economic model to encourage users to upload high-quality content, and will also cooperate with traditional video portals .

Google has invested in YouTube and has made the world's largest video platform. Google not only gets the best bandwidth resources from operators, but also supports traffic. The same is true for the logic of the IPSE to be an IPFS video platform. It will be more advantageous in terms of storage and network costs, because it is P2P propagation, there are basically no bandwidth cost, and resources are stored by users and customers, so there is no storage cost either. The new video platform will use a very reasonable pass-through model to coordinate the distribution of interests among all parties, and these are places where POST can deliver value.

7.3.2 News Service

The traditional media is facing difficulties, and the decline of traditional Internet information portal is also accelerating. If you want to ask why, no matter how you answer it, you can always see a reason: Centralization is not friendly to the dissemination of information, no matter if it's Information

Centralization or Capital Centralization. An information portal can only feed a group of people, and this group of people's thinking in turn shapes the style of an information portal, which ultimately leads to the inability to change. A thriving ecosystem is always in dynamic equilibrium. The IPSE will adopt a decentralized solution to decentralize the production of information. At the same time, it can also match the user and use artificial intelligence as a recommending system. Users can use the IPSE to obtain high-quality content, get an ad-free information reading experience, and even get dividends from the advertiser's promotional income.

7.3.3 App Store

The main content category of the IPSE is the resource package. The existing distribution platforms for resource bundles are all closed. This ensures security but creates a monopoly of distribution. The IPSE will provide a free distribution platform for resource bundles, and any vendor can provide calibration hash values of resource bundles for security verification. Users can download the IPSE Security Certification resource package. Through such a layer of fast search, there is no need to go to each official website for downloading, and the download speed will have a huge advantage. The promotion of resources inside the app store will also use the smart contract solution like the advertising industry and will also need to use IPSE tokens and POSTs.

8. IPSE Trident Plan

8.1 Copyright and Token Related Resources

8.1.1 Copyright Protection and Content Distribution

Copyright protection is a very complicated issue. It is not a simple matter of copyrighting a copyrighted resource. However, if the IPSE project develops to this stage, anyone can easily share resources and copyright disputes will be needed. Facing the issue directly, of course, the use of containment is not the idea of IPSE. For example, adopting a one-size-fits-all approach, without any resource sharing, there will be no copyright disputes. And these copyright disputes caused by users are by no means solved by the blockchain technology itself. IPSE will adopt the opposite idea of containment, so that anyone can declare the copyright of resources in the beginning and adopt asymmetric encryption to protect their copyright.

At the project implementation level, there will be two options. The first is to choose to trust IPSE. After uploading the copyright resources to the IPFS network and uploading the hash address to IPSE and mark its corresponding copyright information, you can set the price and decide who can access it. This will protect the user's copyright from copyright infringement. At the same time, other people's payment for copyright can be settled to the copyright owner through Smart Contracts, and the IPSE platform will Get a reasonable intermediate platform revenue. Another way is to choose not to trust anyone. After uploading the copyright resources to the IPFS network, encrypt the hash address with your local private key and IPSE's public key, and upload the encrypted hash address to IPSE's Smart Contracts, save to the blockchain, and then only after paying the copyrighted content, the Smart Contracts can give the credit of the decrypted copyrighted content to the payer. The entire process does not expose copyrighted content to unpaid people.

Both methods are feasible, but the first one needs to choose to trust IPSE, which will also achieve higher efficiency, while the second method does not need to trust IPSE, but its efficiency will be lower.

Copyright protection can be achieved by IPSE through this asymmetric encryption method, but its impact will be huge. The biggest impact is the distribution of content. For example, the distribution of a song needs to go through various middlemen to earn the price difference, and the singer will face all kinds of piracy. On IPSE, copyright is protected, and copyright revenue is also protected. The key is to make the distribution of content very simple. The content of the singer can be distributed in one second, and copyright confirmation quickly reaches users through IPSE's vertical content platform, achieving a win-win situation.

8.1.2 Conflict Between Token Related Resources and VIP Modes

In addition to copyrighted resources, there are still many resources that do not have copyright, but they can be sold at a price without infringing on the copyrights of others. These large and widely distributed resources can become a currency resource on IPSE. The advantages of purchasing cryptocurrency resources on IPSE are as follows: 1. Payment is very simple and convenient. 2. You can pay for different resources with different prices. 3. The price is very low. 4. Token is very easy to get; don't worry about the Token you need to pay.

Nowadays, the VIP mode is everywhere, becoming a part of our daily lives. That is because the cost of distinguishing all users is high. It is better to set a VIP to differentiate a part of users, and the rest of users can take the ride along. However, IPSE adopts different strategies, and the cost for IPSE to distinguish all users decreases rapidly due to the token economic model of the blockchain. Take a song or an album for example, the content of the song, the amount of time being played, number of times downloaded, customer loyalty...etc. all affect the value of the album/song. Inconsistencies in all these dimensions can be calculated in Smart Contracts to come up with a fair price. Of course, the payment resources and copyright resources protected by asymmetric encryption technology cannot allow users to pirate, unless the copyrighted party is willing to allow these users who are not willing to pay to do so.

8.2 Open Plan of Search Sorting API

8.2.1 Comparison of Traditional Search Engines and IPSE

Traditional search servers store the index of resources that can be searched in a centralized server cluster. However, let's not forget that these data are basically not owned by the company behind the search engine, instead they are crawled by the spider storage engine. Based on this logic, search engines can easily track information about individuals and organizations and then match user searching needs. But there's a catch. These search engines can also use users' address for ad tracking. User data are then exploited for reasons unknown to them. Traditional search engines, because they are supported by powerful operating companies, can easily go astray with governments in censorship. If the interests of traditional search engines are inconsistent with the public interest, and antitrust laws cannot break them. In a monopoly position, a necessary evil may become the basic reality for a considerable period of time.

IPSE (InterPlanetary Search Engine) is secure and does not track user behavior and history for the benefit of the user, and the data uses a decentralized preservation scheme, with search data distributed and stored in the decentralized search cluster server. This means that IPSE will not have a plan for advertising tracking. Of course, it is necessary to pay for the construction of a commercially viable architecture. IPSE uses incentives to obtain some data shared by users. Based on the same logic, the user can transfer part of the personal data to the IPSE while getting Tokens as incentive. IPSE will ensure the absolute security and personal privacy protection of users' personal data through blockchain technology.

8.2.2 Combination of Search Sorting and Smart Contracts

Smart contracts can give any promotion a corresponding price within a certain period of time, and this pricing must fall within a reasonable range. The searched content can be sorted very intelligently, and the intelligence of this sorting work requires the support of artificial intelligence technology. Technology has never been a problem, and the data needed to train artificial intelligence models is key. Users need to transfer the right to use some data to IPSE in order to make the search service smart. IPSE will undoubtedly quickly implement this great idea: users can transfer part of the data usage rights to IPSE, not only to get Token incentives themselves, but also to make IPSE more intelligent to provide services to users, and advertisers do not need to pay expensive costs to make the promotion plan, because the pricing model of the Smart Contracts is not determined by who pays a higher price. Instead, it is determined by the quality of the information uploaded.

8.3 Pixel Matrix Plan

8.3.1 Locally Save Data and 5G Opportunities

The IPSE hardware team and software team have already begun to think about such problems when starting the project. What kind of form will the future data storage become with the advent of the 5G era? What kind of form will the calculation of data in the future become? IPSE is currently pushing data to the IPFS network, allowing it to be distributed, stored, and persist locally. The storage party is only responsible for distributing storage, not for the data itself.





With the advent of the 5G era, there are two fundamental changes. One is that data transmission efficiency will be improved by orders of magnitude, and the other is that the delay of data packets will be reduced by orders of magnitude. The changes brought about on the IPFS network will be obvious, that is, the demand for data will increase by more than orders of magnitude. Users who previously watched 1080p video will now be able to watch 2K, 4K or even 8K videos. However, the physical medium of data storage still has no essential change, that is, the ability of data to read and write I/O will not be increased by orders of magnitude. The data uploaded between single point or limited nodes and unlimited data download will be contradictory. The IPFS solution will be perfect in this condition, with unlimited data upload nodes and unlimited data download nodes being transmitted via P2P network. Accessing data on IPFS also has the problem of packet delay, but what is even more unbearable is the search time of the node. As the stable nodes on the IPFS network grow, the search for nodes on the IPFS will become gradually faster.







8.3.2 Edge Calculation and Scenario Application

The edge computing that is to be implemented by IPSE will have scenarios at the application level, such as image recognition and spatial map construction. The data is stored locally, but IPSE will adopt the upgraded localization strategy. The data local storage will not be sharding. Of course, this stored data is used for calculation, and this locally saved data will also be very suitable for computing. The IPSE storage node will support the upgrade of the graphics card and access to a powerful computing framework. It will be very flexible and powerful to implement edge computing in various scenarios. For example, if a museum needs to provide a robot's navigation map service, and a new robot requests a map service on the blockchain, a transaction can be automatically concluded in the Smart Contract if there is a stable map service for the robot in the local area. This is how IPSE's edge computing is designed and implemented for such scene applications.

9. IPSE Team

9.1 IPSE Team Members

Core Devs			
	<p>Silver Xie Founder and CEO of IPSE He is an entrepreneur in the field of big data and artificial intelligence, a member of Huawei Distributed Cloud Data Center and Global Distributed Storage Development Group, he is also a cross-disciplinary expert in blockchain technology. He Started in blockchain application development in 2016, has participated in Ethereum contract development, and he has been focusing on IPFS and Filecoin since January 2018. Currently he uses Rust and Substrate to develop blockchain, providing innovative ideas and solutions for IPSE.</p>		<p>Zhiming Lee Chief Architect of IPSE Architect of Baidu Artificial Intelligence Driving Group; Expert engineer of Tencent MIG; Senior engineer of Microsoft software development engineering department, with more than 8 years of R&D experience in artificial intelligence and software engineering. He is a PHD. in Computer Science, National University of Singapore.</p>
	<p>Zhe Wang Chief Technology Officer of IPSE University of California, Los Angeles, PHD of Computer Science and Engineering. Former Microsoft software development engineer. Former Google senior engineering manager, led a team to apply machine learning for web search.</p>		<p>Larry Liu Chief Data Scientist of IPSE Early contributors to Hadoop ecosystem at Yahoo. He invented AutoML. Has more than 15 years of experience in technology to drive innovations in distributed system. big data and AI for large IT companies and 500 fortune companies.</p>
Early Contributors			
	<p>Ender Xu Early Contributor of IPSE Managing partner of GSR Digital Funds. Funding chairman of Global Blockchain Investment Association (GBIA). Chairman of Hong Kong Blockchain Association (HKBA).</p>		<p>Brock Pierce IPSE Strategic Advisor World-renowned Bitcoin entrepreneur and investor, early co-founder and consultant of EOS, chairman of the Bitcoin Foundation, founder of Blockchain Capital, and former chairman of the Ethereum Foundation.</p>

	Khalfan Al Mazrouei Early Contributor of IPSE Former royal secretary of the United Arab emirates.		Kim Keun Koug Early Contributor of IPSE Chairman of WTIA GROUP. Senior Consultant of AI Hermas Global, Chairman of AI Hermas Korean.
Engineering Team			
	ANDY HUANG Chief blockchain Technical Engineer of IPSE Former Huawei technical engineer, has many years of technical experience, He is one of the veterans of the Internet and blockchain industry. A Leader in the technical elite group.		TOM TANG Chief Back-End Technical Engineer of IPSE Former Huawei technical engineer. Has many years of Back-end development experience. Once led the team to develop the underlying public blockchain. He is the key in the technical elite group.
	JAMES CAI Chief Front-End Technical Engineer of IPSE An outstanding Front-end developer with rich UI /UX development experience. He is also good at mobile app and wallet development. He is talented and has the ability to lead the team on site.		LUI DENT Operations Manager of IPSE Has unique insights in brand design, brand promotion and content operations. Committed to brand building and construction. Great experience with independent projects.

10. Project Development Roadmap

10.1 Project Development History

- 2018.5-2018.10 Research on market.
- 2018.10-2018.11 Theoretical verification, technical white paper released.
- 2018.11-2018.12 Product design, development associated with public blockchain and index server cluster construction.
- 2019.01-2019.02 The official website and search website went online and started trial operation.

10.2 Project Development Plan

- 2019.02-2019.04 The project officially launched and started internal test for mining.
- 2019.04-2019.05 Development on web plug-in access and blockchain browser.
- 2019.05-2019.07 Wallet development.
- 2019.07-2019.12 Index server upgrade.
- 2020.01-2020.04 Commercialization Exploration Practice
- 2020.05-2020.09 IPSE2.0 basic-level consensus conjugated PoC mainnet online
- 2020.10-2021.06 IPSE2.0 Application layer service data storage online

11. Risk Warning

11.1 Regulatory Oversight Risk

The regulation of POST is still at a very preliminary stage of development, and the applicable legal and regulatory framework may change after the release date of this paper. Such changes can be very rapid and the nature of such regulatory changes can be foreseen. POST does not express in any way the regulatory status of POST token in any form and will not be affected by any regulatory changes that occur at any point before, during and after this release. POST and its affiliates are not currently subject to the supervision or supervision of any regulatory agency, nor are they subject to standard laws of the Securities and Futures Act, the Financial Advisers Act, and other relevant regulatory requirements.

11.2 Other Risks

The tax characteristics of POST passes are unclear, so taxation faced by POST is uncertain. POST makes no representations about any tax consequences arising from the purchase or possession of a POST Token. The POST Token is a blockchain-based asset, and is not responsible for the loss and failure to POST Tokens due to third party factors. Third party factors include, but are not limited to, third party wallets, trading platforms, misconduct and fraud... etc.

12. Disclaimer

Disclaimer: The information outlined in this white paper may be missing, but it does not mean that this white paper is not reliable, and the final resolution belongs to POST. POST Tokens are not securities, bonds, commodities or any other type of financial instrument. It is not registered under the guarantee laws of any country, including the securities laws of any jurisdiction in which the potential holder of the Token is located. In no event shall any warranty be given to anyone in any form, including the accuracy of any statement, commitment or other factual statement, or the integrity of any part of the information in this white paper. This white paper does not constitute investment, legal, tax, regulatory, financial, accounting or other advice. Prior to obtaining a POST Token, potential purchasers should consult their legal, investment, tax, accounting, and other advisors to determine the potential benefits of such transactions and bear other consequences. Upon receipt of the POST Token, it is stated that the POST Token holder has read and accepted the terms of this White Paper.

References

- [1] Satoshi Nakamoto, "Bitcoin: A Peer-to-Peer Electronic Cash System" In: www.Bitcoin.Org (2008), p. 9. issn: 09254560. doi: 10.1007/s10838-008-9062-0.arXiv:43543534534v343453.url: <https://bitcoin.org/bitcoin.pdf>
- [2] Vitalik Buterin, Ethereum: "A next-generation smart contract and decentralized application platform." In: [https://github.com/ethereum/wiki/wiki/%5BEnglish%5D-WhitePaper\(2014](https://github.com/ethereum/wiki/wiki/%5BEnglish%5D-WhitePaper(2014)