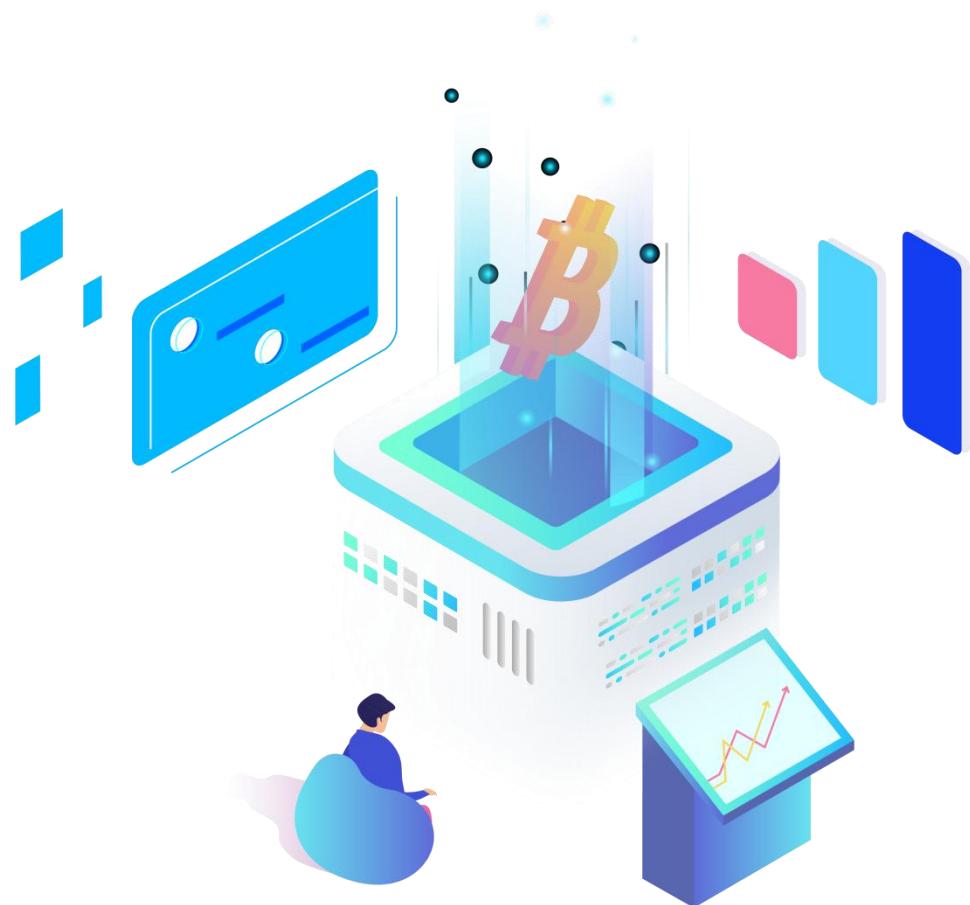




Apple

Large-scale online game NFT ecosystem based on
Apple chain





General

As an emerging technology that can provide multiple business models for the future economy, the blockchain industry has developed rapidly in the past two years. Looking back on the Internet and information technology, a new technology or new wave occurs almost every six or seven years. Blockchain is, both technically and innovatively, and has been one of the biggest waves in recent years.

Blockchain, a distributed ledger technology (DLT, Distributed Ledger Technology), which enables all parties to build trust (Trust) at the technical level, has the potential to become the infrastructure for building the future free circulation network of value, namely the Formation of Value Internet (Internet of Value). In some specific areas, several partners or industrial chain participants are jointly building a blockchain trust network, a value LAN that is already in implementation and not just a concept. The core value of blockchain lies to build a trusted multi-center system, which divides separate individual centers and improves them to a unified multi-center with multiple participation, so as to improve the efficiency of trust transmission and reduce transaction costs.

DeFi is one of the hottest concepts in the blockchain industry in 2020, which is generally understood as decentralized finance, that is, the financial system built based on the distributed network, especially represented by some well-known financial projects in the Ethereum ecology. In the second half of 2020, DeFi began to make efforts in various fields, especially by playing a strong role in boosting liquidity mining and pledge mining. There were a lot of DeFi related projects back a year ago, but what really made DeFi mining hot was mobile mining. Although the market has experienced significant declines in the past half-month, many liquidity mining projects still have many benefits. Investors who started early in liquidity mining and were familiar with the rules and had enough money to make a lot of money. In addition, the new force with computing mining as the active industry also provides help to the expansion of DeFi ecology.



With the refinement of the DeFi domain, NFT (Non-Fungible Token) once again received high attention from the market and hoped to become the successor to the DeFi explosion.NFT is a non-homogeneous token, which is inseparable, irreplaceable and unique, and can anchor the digital vouchers of items in the real world.The key innovation of NFT is providing a way to mark ownership of native digital assets (i. e. assets existing in the digital world, or originating in the digital world) and it can exist outside a centralized service or centralized library.

The earliest NFT project dates back to CryptoKitties(Crypto), a game that lets users breed and collect unique animated kittens, where many people paid attention to "tokized collectibles" that peaked for even \$170,000.Recently, including the first tweets and even NBA Top Shot, properties, there have been cases of casting NFT, and have gained great market heat and high market prices.NFT is the hottest area in the cryptocurrency market.The most popular application of NFT mode should be the field of art and games, especially the game field. The application of NFT will completely change the industry development mode in terms of asset, prop confirmation, collection, investment and trading.

Through the exploration of blockchain + NFT + games, the OKFly team realized the next tuyere of the game industry, and had a deep thinking and rock climbing about the development trend of the industry.The OKFly group believes that, if there are platforms to provide tool engines more systematically, help these enterprises in the game industry land, and combine NFT mode with games, they can create higher value for these game industry participants and users.And since the game is one of the earliest and largest blockchain applications, the OKFly team takes the needs of developers and users in the industry as the starting point of the initial version of the project.Therefore, under the leadership of the OKFly DAO(community), —— Okex Fly, a large online game NFT ecosystem based on Okex chain, was born.

This white paper describes the design ideas and technical implementation principles of NFT for developing, running, managing, and transferring decentralized game applications and assets in the blockchain ecosystem.It includes:

Under the bottom support of Apple chain, conduct the application development framework of various operating systems and a variety of blockchain environments;

Provides fully scripted, Component, and data-driven application development

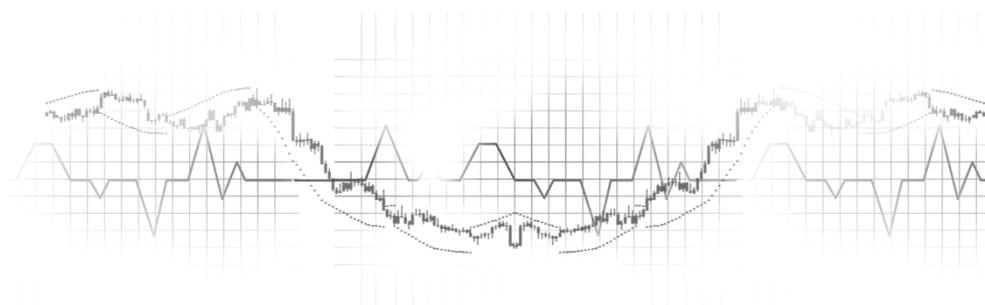


tools;

A high-performance applications, using the existing set of tools, tightly combined with the block link port layer, so that all games can easily support blockchain.

Realize the NFT of game assets and props, allowing anyone can participate in the generation, production, investment and collection of NFT, allowing each subject participating in the game to get better value.

In addition, Apple Fly can also support developers to program, debug and release blockchain environment-oriented decentralized game applications, and hybrid architecture game applications. At the same time, Apple Fly integrates a blockchain-based distributed user account system, wallet and NFT digital asset circulation platform, which can realize the off-chain permanent storage and cross-chain use of the game asset NFT in the application. At the same time, this white paper will also be from the project background, blockchain technology core, industry development pain points, technical solutions, etc., the prospect of Apple Fly, Apple Fly development mode, design principles, technical characteristics, technical structure, technical architecture, application ecology, economic model, core team, foundation management in-depth interpretation, let users, partners and investors more understand the core value of Apple Fly.





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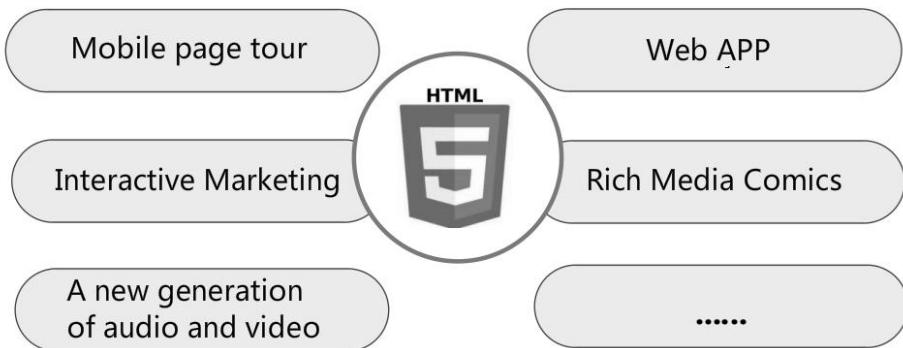
Chapter 1: Game and Blockchain Application

1.1 Overview of the global gaming market

The game industry has maintained rapid growth as a sunrise industry in the past 20 years. As Internet technology develops, the gaming industry will be a bigger industry. In 2020, 2.67 billion gamers worldwide generated \$174.9 billion. By 2023, that figure would become \$3.05 billion and \$217.9 billion, respectively. Among them, virtual goods are the main source of income in the global game market, with more than US \$150 billion, accounting for more than 66% of the consumption of the overall game market.

In terms of business model revenue, in-game purchase remains the main business model and is becoming increasingly popular, with a revenue forecast of 74% in 2020 and an increase of 77% by 2023. Regionally, revenue from the Pan-Pacific is 84.3 billion, 48%, up 17.5% year on year; North America is 44.7 billion, 26%, up 21.4%. Although the income of the Middle East, Africa and Latin America is relatively small, just exceeding 6 billion, the development prospect is good, with the growth rate of the Middle East and Africa of more than 30%.

China and the United States, the world's two largest gaming markets, expect 49% of global revenue, \$44 billion and \$41.3 billion. In addition, because the number of 637 million players in China is far greater than 190 million in the United States, the average player payment rate is weaker than the US. Japan and South Korea separated 3rd and 4th, with estimated revenues of \$19.5 billion and \$7.1 billion. As the global growth of game players continues to grow, the global game market value of GDP will continue to grow, who can occupy the top of the game industry, will have a global value users.



Global game market development growth rate, retention rate, willingness to serve the benchmark rate of game consumption and other key indicators, will also grow rapidly with the development of the game industry. The value of the game industry, game users, the number of game users, developers, operators and promoters are expected to rise rapidly. In 2021, the total output value of the global game market will exceed \$250 billion. Virtual goods, advertising and guided consumption will continue to be the major source of revenue for the global gaming market. It is predicted that virtual goods consumption will grow the fastest, with an annual compound growth rate of about 15.2%. Of these, 33% of players consume once a month and 25% once a week. With the 5G era approaching, more new types, new IP mobile end games are bound to attract more global players. In 2021, mobile games will account for more than half of the total game market output in 2021.

With the rise of NFT model, blockchain, digital currency and games will collide with new sparks, especially the DeFi ecology under the leadership of NFT. Driven by the pledge lending and liquidity mining mode, the pattern of the whole market is undergoing profound changes, and the dominant market in the future is full of opportunities.





1.2 Industry existing pain points analysis

At present, there are several pain points in the game ecology under the traditional mode, which make it difficult to achieve a truly unified and cross-platform game ecosystem under the traditional mode. These elements can be summarized as: fairness, game asset value guarantee, game asset circulation, community and distribution channels.

1) Lack of impartiality

During the development and operation of most games, there are a large number of activities involving random probability, including probabilistic items, randomly triggered events, lottery systems, skill effects, etc. However, the algorithms for these random events are usually not public and difficult. Through testing and analysis, this has resulted in game development operators being able to control these variables through unannounced "black box operations" (called "dark changes" by players), resulting in adverse effects on game fairness, operational reputation, and ability to continue operations.

2) The value of game assets lacks effective protection

The value of digital assets in the game usually fluctuates with the popularity of the game. A single game asset will become extremely bubble due to the lack of fair collateral. Once the popularity of the game drops and the loss of players causes the bubble to burst, the value of the asset will fall off a cliff. The assets between multiple games will also be difficult to obtain a unified circulation value and value support due to the lack of consistent value endorsement.

3) There is no liquidity of game assets

On the one hand, the digital assets in the game can make players have a higher user viscosity for the game, but on the other hand, the lack of liquidity of virtual assets will make the player's game enthusiasm and liquidity decrease, and the difficulty of asset exchange between games will increase, resulting in the loss of the game community. In addition, laws and regulations generally do not allow virtual



assets in the game to be traded with legal currency (RMT), which further aggravates the loss of player groups, resulting in a decline in the profitability of game companies, increased difficulty in game promotion, and reduced promotion efficiency;

4) Monopolized communities and distribution channels

How to find a good distribution channel is a crucial link for most game companies, especially for small and medium-sized game companies and independent game developers. The importance of distribution channels can even make life and death in one fell swoop. Not every game can have the good luck of Flappy Bird and Plants VS Zombies. However, large channels have 80% or even 90% of the game distribution, and the game development team won. The profit is pitiful. In addition, the establishment of a stable community is also an important part of maintaining game operations and profitability. The industry's well-known Blizzard Entertainment still has the problem of continuous loss of player groups, not to mention small and medium-sized game companies.

1.3 Blockchain technology solutions

Games were one of the earliest and largest blockchain applications. The Blockchain + game is exciting because it empowers gamers and enhances their experience. With blockchain games, players can enjoy the following main benefits:

1) Game item ownership

All the props and elements in the game can be chained. Whether it's scarce in-game resources, rare props, or coveted trophies, and characters and incarnations (avatar), any entity in the game environment can exist in the way of encrypted assets. Typically, this appears as a homogeneous token (in the form of a game token) or a non-homogeneous token (in a prop and avatar) on existing blockchain networks. The core component of the blockchain is to provide users with ownership of its value. When the game elements are linked, they can interact directly with the player. When the avatar and account are associated with the player wallet, the player can send the collected booty and accumulated money to their wallet, which they



win in the game. In such systems, players can harvest what they sow. They rarely have all kinds of props, these will always belong to the player. The developer has no right to reclaim anything the player wins, even belonging to the player even if the game is down. They can send props etc to other purses to others for real profits. Players' ownership of their items allows them to extract tangible fruits from their efforts and success.

2) Provably fair game play

Wrong gameplay is terrible. When players cheat their opponents, or the game does not run in the way people expect, this experience is very bad for every player. Blockchain games can achieve "provably fair game play". When the game is on the chain, the game logic and gameplay elements are also shared. The consensus mechanism to ensure the security of the blockchain network also ensures the security of the game. For the player, this means two things. One is that crooks or anyone else who tries to invade the player cannot succeed. If their actions conflict with the logic of the game, their activities will be rejected; second, the game is transparent.

3) Cross-game communication

What will players do when they stop playing their favorite games? Either they quit, or the game disappears. That is, either the community leaves or the developers no longer operate. Unfortunately, there is not much they can do other than find the next game and start from scratch. The game exists in a suspended independent universe. As far as the current industry is concerned, there is no continuity between different games. With blockchain, all this will change. When games and game assets exist on the blockchain, they can communicate with any other environment on the same blockchain.

If the developer makes a sequel to the game, then the props from the previous game can be brought to the second game. Avatars can be used in multiple games. Tasks or events can be carried out across games. More importantly, players may never have to start all over again. Ideally, the player has a single universal avatar that can be used in different games with the player. Players' virtual currency and props can be used across games.

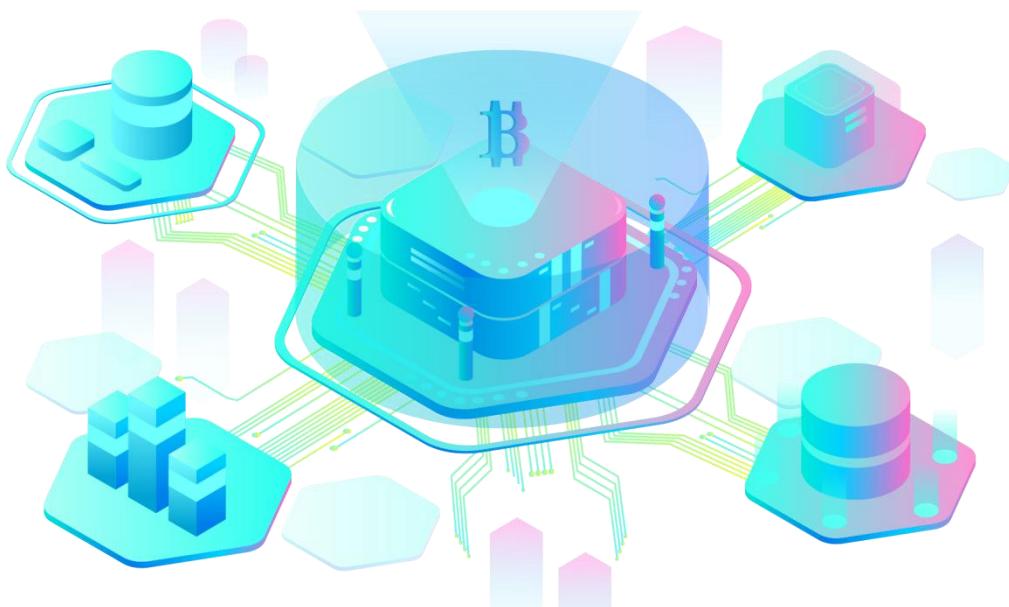


4) Reduce costs

The payment rate in the game development industry is low, and related costs may be higher than revenue. If there is no good revenue model, even if the game has a certain user base, expenditures such as game publishing, server maintenance, and player services may be an unbearable burden for developers. By building games on the blockchain, all these costs can potentially be outsourced to miners or verifiers. Online game publishing and dissemination may be a zero-cost thing.

5) Enhance the player base

Existing players and future players in blockchain games are an interesting subset of the consumer group. These players have a keen interest in their gameplay and gain more attention through game revenue. Blockchain games connect developers and the "super player" community, and have more resources and investment in games. Compared with traditional game opponents, both parties can build a more positive, efficient and beneficial relationship.





1.4 Homogeneous ized and-ogenous (NFT) assets

1) Use homogeneous assets for the settlement of the game "gold coins"

Blockchain games at this stage use digital assets in the blockchain system as the settlement vehicle for the output of "gold coins" in the game. The typical representative of this stage is the ERC20 homogeneous asset standard of the Ethereum system.

This standard is well known in today's blockchain projects. Many project homogeneous assets will be produced based on the ERC20 standard of the Ethereum network. The digital assets issued based on the ERC20 protocol are easy to exchange and compatible, and can perform their due functions on dApps. The holders of the assets can fully control the assets and Track any address and any number of its circulation, and these assets can be used in different projects and platforms. The circulation path of homogenous assets can be queried in the blockchain browser.

The blockchain technology at this stage mainly solves the following problems:

- Transparency of the output and circulation of game "gold coins";
- Cross-game circulation of "gold coins";
- Diversification of "gold coin" exchange channels.

Therefore, the digital assets at this stage are homogenized and can only express the value of points and gold coins, which are used as the settlement of game results.

2) Game "Gold" and ProFree for props (NFT)

In ERC20, for example, it can only be used to issue substitutability certificates (Fungible Token) to represent a variety of alternative things, determining whether items or quantities of equal or similar types during circulation or use can be fully interchangeable. Therefore, the project assets themselves only have the role of a single value medium (e. g., securities, points, digital assets, etc.). But, in real life,



there are things irreplaceable (anyone, thing, thing with a unique attribute, such as a relic, etc.).And these things can also be replaced by digital assets, but their value cannot be measured by Fungible Token, so, the code name 721 (ERC:Non-fungible Token Standard #721) of Ethereum's Improvement Plan (EIP) proposes the new "non-homogeneous" digital asset standard —— ERC 721 standard.

The examples of popular Ethercats with non-homogeneous digital assets (NFT) standards.Every cat is a "creature with a unique gene", not a homogeneous currency, and, every cat cannot be split, and is always a complete individual.Of course, each cat has its own label, price, and other unique attributes.

Expand, except for Ethercats, special game props or any items with a certain collection value, can correspond to an asset to indicate its identity information.And non-homogeneous digital assets (NFT) are somehow unique, inseparable and nonseparable.

In this stage, whether the game of props, equipment, player account, its value embodiment can be expressed by heterogeneous digital assets (NFT), all the game broad asset circulation behavior (including but not limited to prop circulation, asset circulation, prop drop and other scenarios) are eventually settled in the form of digital assets (homogeneous and inhomogeneous), specific game content (e. g. MOD) can even be distributed as a digital asset.

Compared with the first stage, this stage puts the props as the unique identification in the blockchain record.The output and circulation path of the props and gold coins are transparent, but the operation rules of the game are implemented outside the chain, and the production logic of the props and gold coins is still in the black box, which needs to be flexible and solved.

3) Key rules on the chain to run

At this stage, the basic setting and key rules required for the chain game will be written into the block in a contract or other convenient form for the witness of the whole network to ensure the fair and openness of the game rules and output logic.For example, the numerical logic of the game such as the probability of props in the egg, encounter setting on the RPG map, unpacking drop setting and licensing rules will be written into the chain to be open, transparent and not tamper with, ensure the fairness of the game, and enhance user experience and player confidence.



This feature effectively relieves the players' concerns about the game operation fraud, can improve the confidence of the players group and attract more players to participate in the game, more conducive to the construction and development of the community. It takes time to take the operation and witness of the contract. If you take the box refresh logic in the SLG game map as an example, you can summarize two running ideas:

All treasure box contents are generated in the contract at the same time when the map is loaded

Each unpacking behavior immediately runs the contract generation content

At this stage, blockchain games have more rules and data implemented on the chain, and user growth will lead to a sharp increase in pressure on the chain network. Before a new breakthrough, the technology at this stage could only apply to games with Cool-Down Time in the rounds. Decentralization and performance are contradictory, high performance consensus and contract virtual machines are the main tasks of the next stage. Technology with less delay such as DAG can be a breakthrough, but still far from the ultimate solution.

4) The game runs on the chain

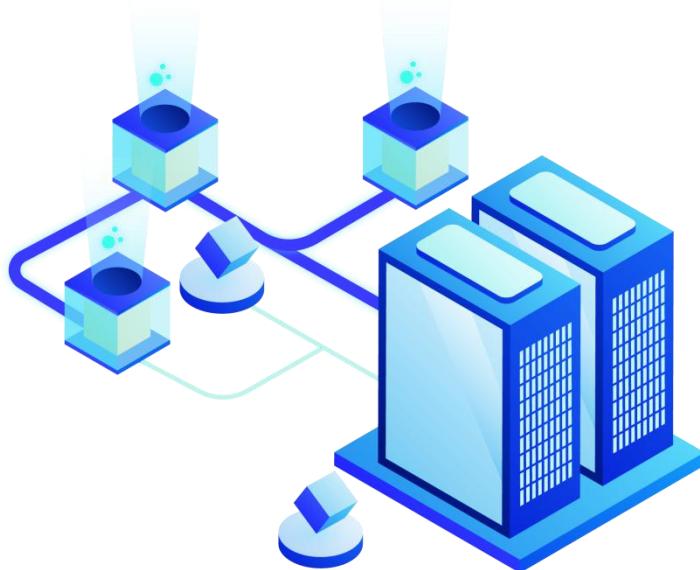
Overall chain on the game is the final form, the logic code of the game in the chain environment, and the decentralized distributed network carrying and storage data, in this scene, the game is the contract itself, the game needs credible, efficient, minimal delay of integrated operation environment and lightweight user node, the industry has no decisive technology solution.

The original intention of Ethercat was to run the game as a whole on the chain. However, due to the throughput performance of the Ethereum network, both data interaction and content carrying were greatly restricted. In the end Ethercat chose to compromise: "Interaction on the data chain, The strategy of "running outside the game chain" is the "key rules on the chain" of the previous stage. Therefore, Apple Fly reorganizes its thinking on the basis of the previous stages:

- Players have a lightweight full-node environment;
- The service stack runs in a blockchain environment;



- Game engine as one of the node's infrastructure;
- Provide a joint development/debugging environment including engine, visual IDE, and chain network interaction interface;
- The key process of the contract is witnessed by the consensus of neighboring or related nodes (like players in a copy).



1.5 NFT and the birth of Apple

NFT dates back to the original 17 years, when the hottest DApp cryptocat CryptoKitties, was all the rage as the first phenomenal DApp. It informed a lot of what DApp, caused Ethereum to experience massive congestion for the first time and also brought the NFT concept with fire. So far, cryptocats have nearly 2 million cats with different styles, nearly 90,000 addresses have at least one cryptocat, the market transaction is about 700,000, worth 60,000 ETH.

On blockchain, digital cryptocurrencies are divided into primary currencies and tokens. The former are mostly public chains, BTC, ETH, etc. through mining, using transactions on the chain to maintain ledger data; the latter, such as Link, Comp, attached to the existing blockchain, using smart contracts to record the



ledger.Tokens can be divided into homogenization and non-homogenization.

homogenized tokens, FT (Fungible Token), with ERC20 as the basic standard, are token. that are alternative to each other and accessible to infinite splittingSimply put, like Bitcoin, it can be split into 0.1 or 0.01, which is the FT.And non-homogeneous tokens (Non-Fungible Token), namely NFT, is the only, nonseparable token, such as cryptocat, token-based digital tickets, etc.

Therefore, the crux of NFT is different compared with FT(, homogeneous tokens) is the supply of the original digital asset (i. e., existing in the digital world, or originating in the digital world), which can exist outside the intermediate labor or intermediate library.NFT's all rights does not prevent others from observing it or browsing it, NFT does not capture information and then hide it, just capture information and then discover the association and cost of that information with all other information on the chain.At the same time, NFT, because of its non-homogeneous and inseparable characteristics, enables it to anchor the view of the goods in the entity. In short, it is the digital asset issued on the blockchain, which can be game props, digital art, tickets, etc., and is unique and non-replicable.Because NFT has natural collection attributes and high convenience, gamers and users can use NFT to create unparalleled high-value game assets and props.

The main application areas of NFT tokens are games, collectibles, virtual assets, real assets certification (STO) and other fields, especially games pay high attention in the market.Some game props are naturally unique and not separable, just coupled to the NFT, so the NFT can effectively prevent the counterfeiting and fraud of such items.

Through the years in the field of blockchain, cryptographic digital currency, DeFi, NFT and games, Golden apple constantly explore the application of blockchain technology in the traditional game ecology, and quickly gathered a large number of international top games, blockchain and intelligent contract talent, aimed at the blockchain game industry as an opportunity to drive industry change, to create the world's leading blockchain online game level

The "vision" of Apple is based on the large-scale online game NFT ecosystem created by Apple chain, which changes the value supply relationship and business operation model of the game industry, so that the value can be circulated in all directions.



The "mission" of Golden apple is to build a user ecosystem with all-round circulation of game value. Through the game's NFT mode and chaining, all game items can be chained to improve the shortcomings of traditional games, so that players, as the owners of the game, have a 100% sense of belonging and value return.

In addition, through the apple team's research and development on the value circulation of the physical industry over the years, the market continues to require more efficient payment infrastructure implementation. Another value born of Golden apple is to change the value circulation mode of the existing payment system, gather resources from all industries, and create the arrival of the era of borderless circulation of value.





Chapter II Golden apple Project Overview

2.1 The Golden apple profile

Golden apple is a KIP-20 project launched by TRX Chain. We are determined to create brilliance together in TRX Chain, create our own decentralized ecology and community consensus (TRX DAO), and develop together with TRX! As a large-scale online game NFT ecosystem based on TRX chain, TRX Fly introduces classic gameplay in traditional games into the encrypted world, and incorporates NFT and DeFi elements to develop a more fair, friendly and sustainable game mechanism.

Contract address:

NFT is the new carrier of the future game industry, and DeFi is the new economy in the future game system, providing a credible and intelligent economic ecology for the game ecology. Golden apple is a game ecology that combines NFT +DEFI, which can benefit more participants.

Unlike many existing game NFT projects, most of the game NFT projects on the market are based on a blockchain game to establish an NFT ecosystem, build a game NFT trading market, or use blockchain and NFT to empower games . On the basis of NFT attributes, Okex Fly combines pre-sale NFT and crowdfunding independent games to provide developers with new financing opportunities. Developers can crowdfund while retaining ownership and IP, which is equivalent to game development. Provide a hematopoietic platform. At the same time, Golden apple directly breaks the existing circle and uses game item NFT as the medium to become a decentralized value circulation platform focusing on the game NFT sector.

In addition, the NFT generated by Golden apple can be used to encrypt game collectibles transactions. It can also provide creators, gamers and prop collectors with a multi-platform environment to interact and share exclusive game content, including those used to interact with game content. AR and VR environments, etc.

In summary, Okex Fly quickly gathered a large number of top international



blockchain talents, aiming to use the online game industry as an opportunity to drive industry change and build the world's top blockchain game infrastructure and NFT ecological application system. Golden apple integrates e-sports, interactive social entertainment, mobile games, computer games, and console games through the blockchain network and token mechanism, integrating the online virtual environment and the physical environment into one, creating a borderless entertainment world for the world. Users create an unprecedented entertainment experience. In the future, Golden apple will continue to expand its diversified ecosystem including storage cloud platforms, game distribution platforms, game props trading platforms, NFT prop asset exchanges, advertising platforms and Golden apple incubators, providing players, R&D, distributors and advertisers with a complete The blockchain solution builds a complete ecology. Developers can create blockchain applications through the Golden apple tool set, and obtain comprehensive NFT service support through other platforms.

2.2 Value pursuit based on NFT

Golden apple will provide game developers with an easy-to-use and complete blockchain game infrastructure with the support of the underlying technology Golden apple chain, including a visual development kit and an on-chain ecological environment. Developers do not need to pay attention to the implementation of blockchain technology., You can directly complete the development of blockchain games in a graphical manner, with a low threshold, and quickly and efficiently.

We hope to provide game players with a fair, just and open game environment with transparent data, transparent rules, no background manipulation of props dropping rate, and malicious inducing consumption. We hope that game players' assets can be stored in a long-term, safe and decentralized manner. .

At the same time, we hope to carry the value fission of the digital asset economic model through the NFT model, and help developers and players achieve better consistency of interests:



- Help developers to capitalize the content they produce, so that they can continue to obtain benefits in the process of asset use, management and circulation, and provide convenient and decentralized game distribution channels;
- Help players convert the data formed by their time and energy and the props obtained through consumption into assets that can be safely stored and circulated, so that players have the right to manage and commercialize them.



2.3 Why choose the Golden apple chain bottom layer..

Golden apple is the underlying system for online games based on Golden apple Chain will provide more ground level, ecological and community support for Golden apple

As is known to all, the popularity of DeFi and NFT, will Ethereum high congestion, high cost, low throughput shortcomings, in order to obtain more efficient underlying solutions, the exchange platform online since the main chain, among them, Golden apple Chain with huge user flow and Ethereum related problem solving advantages, stand out.

As an open-source advanced decentralized transaction public chain developed



Golden apple Exchange, anyone can enter into a apple Chain super queue, or with the help of EVM virtual machine technology, applecross-chain gateway, and Cosmos-compatible IBC cross-chain scheme.Through apple Chain, project parties, blockchain can simply and efficiently realize blockchain value exchange, user exchange and scene application exchange, finally realize the joint construction of ecosystem, and constantly accumulate value appreciation.

For technical support, apple Chain has the following excellent features:

High performance: Although OKex Chain supports all types of DApp., it is designed for high-volume transactions typical of high-performance scenarios and transaction activities and financial services.

Diversified governance: Any user can apply to become a candidate for online verifiers and participate in community development.

EVM Compatibility: TRX Chain will support Ethereum virtual machines, including Ethereum Developer tools.Once OKex Chain supports EVM, developers, you can develop smart contracts on OKex Chain using Ethereum development tools and languages.

Cross-platform transactions: TRX DEX's desktop applications are supported by all major operating systems and provide easy access to the blockchain with its humanized design.

Cross-Chain Gateway: TRX has launched a OKex Chain-based cross-chain gateway to easily transfer assets between major public chains.

TRX Chain provides a secure and efficient infrastructure for various project applications on the chain to create decentralized applications for seamless chain trading of assets across the chain value exchange ecosystem.TRX Chain has achieved code open source, which provides more support for TRX 's innovation to drive Golden apple to build a truly decentralized, borderless game trading and NFT circulation ecosystem, allowing more users to efficiently use the online game system Golden apple to participate in the DeFi feast.



2.4 Golden apple Core components

In order to drive the efficient circulation of NFT assets in the Golden apple game ecosystem, the platform will provide core components including but not limited to the following:

- Multi-platform game operating environment with blockchain system interoperability interface;
- Improved high-speed consensus based on DPoS, and commissioned witness model;
- Test chain including high-efficiency chain network and high-speed contract virtual machine;
- Cross-chain acceptance gateway that supports homogenous and non-homogeneous digital assets (NFT);
- Enhanced asset authority system;
- Smart contracts that can be continuously executed across blocks;
- Atomic transaction operations;
- Support grammatical level consensus tasks;
- Small-scale consensus and random numbers;
- Support internal credible random process;
- Support very small transaction confirmation cycle on the chain;
- Support precision timers in the chain, support Standby mode, contract operation mode with heartbeat support;
- Transaction verification mechanism to prevent BP/developers from cheating.



At the same time, it provides functions including but not limited to the following:

- Go to the operation interface of intermediary assets (props);
- Examples of non-homogeneous assets (NFT) circulation platforms;
- Support for player autonomy and dApp mall mechanism;
- Visual IDE (including visual editing of game programs and contracts);
- Complete wallet, user system and blockchain browser;
- Smart contract system that can be updated iteratively;
- HTML5 games and applications with blockchain functions such as smart contracts and transactions.

Golden apple has complete development tools, technical support, and more than 10 years of community operation and maintenance experience. It will build the world's first complete blockchain online game development tool set, and is committed to bringing developers and mobile devices into the blockchain In the game world, open up the NFT casting, trading, collection and virtual asset circulation between games.





2.5 Golden apple 's ecosystem

As mentioned earlier, Golden apple hopes to integrate e-sports, interactive social entertainment, mobile games, computer games, and console games through the blockchain network and token mechanisms, combining the online NFT virtual environment with the physical environment. Therefore, Golden apple is more valuable in the ecological application of the game.

1) Game Assets release

Golden apple has a self-service game and asset release entry, mortgage base Token and value measurement, and digital asset value assurance.

Self-service game and asset distribution portal: Golden apple opens the self-service asset distribution portal to qualified users, and users can design their own distribution scheme and connect with their own game programs through open API.

Mortgage Foundation Token and Value Measurement: Golden apple by default requires the issuer of the asset to pay a percentage of Base Token, as collateral issued by the digital asset to ensure the initial value and credit of the issued asset. At the same time, forming trading pairs with the basic Token is also an indicator of asset value measurement.

Digital asset value guarantee: Golden apple uses compulsory liquidation and other means to ensure that digital assets with unexpected risk can stop their losses in time, and liquidation users can get a certain proportion of Token compensation through the collateral of the assets to control the scale of the loss.



2) Game asset trading

Golden apple has a safe and free decentralized trading platform composed of multiple high-performance nodes. The nodes of the exchange can be expanded and adjusted at any time to provide users with all-weather, real-time, safe and stable free matching transactions or targeted transaction services. The cross-regional acceptance gateway group provides currency exchange and consumption services for the game assets circulating in the exchange. In addition to providing automatic acceptance system construction services for game manufacturers, Golden apple also accepts them as node service providers of exchanges to jointly maintain the trading network.

3) Democratic gaming environment

- Fair and open game environment: All game data on Golden apple including the probability of game item rewards, random event parameters in the game, player matching balance values, etc., all inherit the non-tamperable characteristics of the blockchain system, and benefit from the bottom layer. The efficient processing power brought by the framework perfectly solves most of the unfair problems of game platform transaction efficiency and game oligopoly.
- Open and transparent system: Golden apple will open more than 90% of the source code of the core system on the world's largest third-party open source site Github.com. Users around the world can witness the open, transparent, safe and reliable attitude of the Okex Fly system.

4) Digital asset access

Golden apple will establish a new asset circulation and inflow mechanism. The game assets that are already in circulation on the market and request circulation on the Golden apple platform will be assessed, the number of users will be evaluated, and a sample of users will vote to determine whether to admit new assets. The admission of all new assets will be based on the prerequisite of ensuring the safety of user assets to the utmost extent.



5) Multiple incentive system

Golden apple aims to build an ecosystem of high-quality game providers, publishers, player groups, and operating groups, with activity and contribution as the standard to measure the number of user benefits. At the same time, through the generation, circulation and value fission of NFT, it gives users the maximum return value of income.

All business activities on Golden apple need to be driven by basic Tokens. These Tokens are recovered by the system in the form of fees and deposited in the fund pool for rewards to users who have contributed and active to the entire system and the entire network, and obtain Tokens Ways include but are not limited to: issuing games, issuing assets, actively participating in transactions, providing node support for the entire network, and actively operating communities.

6) Asset value protection

When asset issuers issue game assets on Golden apple, they need to use the base Token for value mortgage for the amount of the asset issued. This mortgage ratio is usually 75% of the initial total value of the issued Token. This design is to prevent this asset from being affected by the game. Under such circumstances as shutdown and capital withdrawal, a bubble suddenly formed and burst, causing the holders to suffer excessive losses.

The purpose of this design is to ensure that Golden apple has the ability to repay the digital assets purchased by users under any circumstances, and once the asset value is lower than the limit due to market fluctuations and other reasons, the asset will be forced to liquidate by the system , To reduce the loss of the holder.

7) System security

Golden apple provides users with automatic matching and targeted transaction services. The mutually redundant nodes cooperate with the connection quality detection/link selection procedure, making Golden apple sufficiently high-performance, safe and robust, and able to effectively resist access pressure, theft risks and node failures.



- Redundant security: Nodes are deployed in multiple countries and regions, and third-party node operators are accepted to provide safe, stable and uninterrupted transaction services.
- High performance: Golden apple's theoretical throughput can reach 100,000 TPS, which is enough to support asset trading behavior and game applications on the chain.





Chapter III: Golden apple Technical Architecture

3.1 The running environment architecture of the game

1) Multi-platform game integrated running environment

Golden apple provides a complete set of blockchain game development tools based on Okex chain, which is open to developers and provides one-stop development tool flow technical support.

At present, by using Golden apple Blockchain SDK, all games developed based on Golden apple engine tools can be easily connected to the blockchain, allowing developers to quickly build a blockchain that provides unified digital wallet passes, smart contracts, transactions, etc. Functional games and applications. Golden apple believes that the operating environment of future blockchain games should have the following characteristics:

- Consistent and complete chain interoperability interface;
- Downward and transparent way of undertaking;
- Encapsulated atomic operations;
- Multi-platform compatibility.

In order to simplify the developer's use process, Golden apple has designed a set of integrated operating environment that can be adapted to multiple types of APP, as well as supporting interoperability interfaces. Combined with Golden apple, it simplifies the docking process between the game program and the blockchain, and makes the interactive work in the chain transparent to developers, so that developers of traditional games can also develop or migrate blockchain games without barriers.

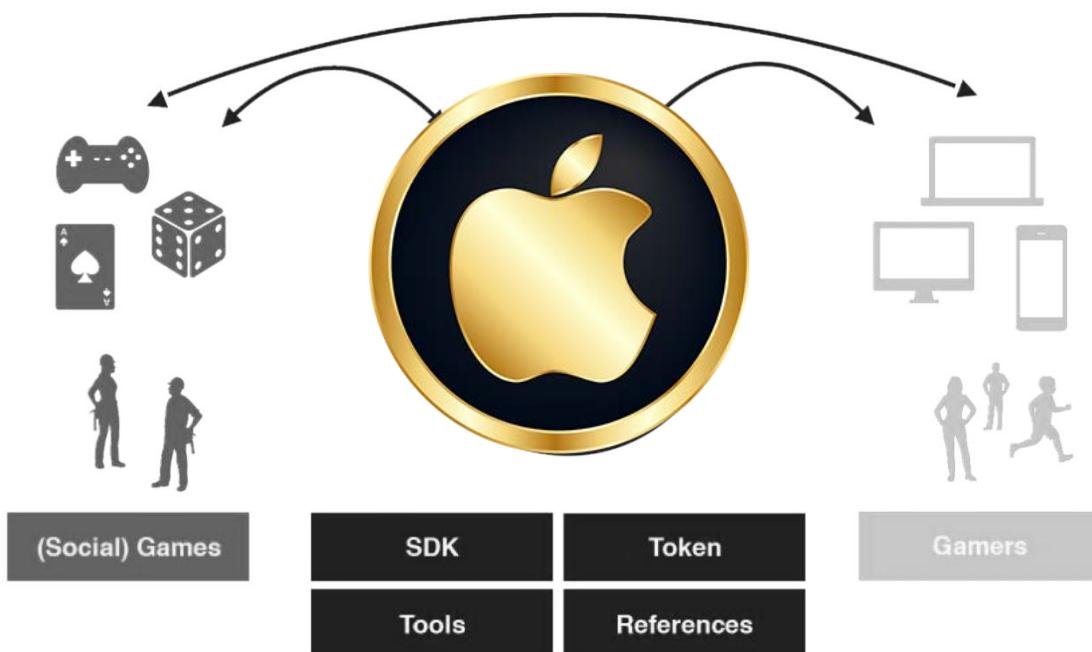
The game running SDK on the Golden apple chain is integrated into the Golden apple engine Runtime to provide a complete chain interaction interface for the game. Game developers complete the access of game content to the blockchain network



based on the Golden apple SDK. The chain interaction process is transparent, Structured, game development teams no longer need to invest in research and development efforts to adapt the chain network and different devices.

At the same time, the operating environment will be compatible with systems and environments such as native Android, iOS, PC Web, and mobile H5. The games in the operating environment will have native cross-platform capabilities to achieve the feature of barrier-free operation of on-chain games on multiple platforms.

The operating environment architecture of the Golden apple game is as follows:



2) Blockchain interaction interface

Golden apple provides a development environment for chain interaction, so that developers can easily interact with the chain through this environment. Golden apple's blockchain interactive development environment provides development components that are compatible with a variety of work platforms, including javascript libraries for SDK, adaptation for front-end web applications for Android, iOS systems, and python, PHP libraries for back-end applications.

Developers are able to use these development environments to develop their



own blockchain software, enabling data interaction with functions such as user registration, user information and asset operations, and user game data operations. The on-chain data interface allows users to store homogeneous or inhomogeneous asset (NFT data on the chain, and to provide optimal compatibility and customizable characteristics, blockchain systems do not force asset data to be stored in plaintext. Game developers can be more flexible to design their own on-chain data storage structure so that this information can be more securely resolved through the plug-in of the game client and the market. At present, the chain interactive development environment mainly provides the packaging of homogeneous, nonhomogeneous digital assets (NFT and the functions of prop inquiry, transfer, ownership change, transaction submission, proposals and voting.

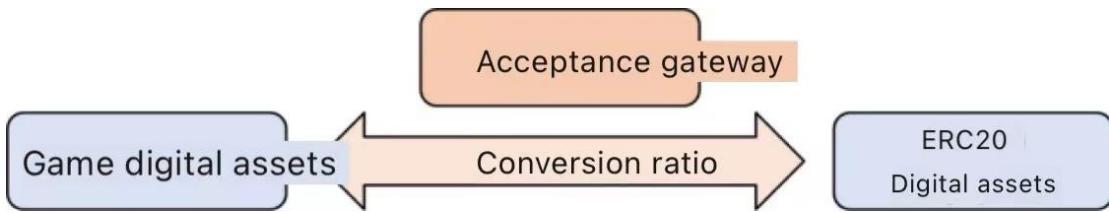
3.2 Acceptance gateway for multi-types of assets

The Golden apple supports acceptance gateways with homogeneous /inhomogeneous assets (NFT) and multi-chain riveting. In the Golden apple chain, homogeneous, inhomogeneous assets (NFT) and smart contracts are separated. Predictably, there are substantial, ongoing transactions in Okex Fly's network that minimize the operational cost of asset resolution and circulation, easier cross-chain acceptance of heterogeneous assets (NFT), and "asset and contract separation" is a safer design.

Golden apple provides a set of acceptance gateways for automatic acceptance of game gold coins and props. Under a unified value measurement system, the smooth content between different games and different platforms on the chain, which can be used for acceptance includes game gold coins, game equipment data, etc.

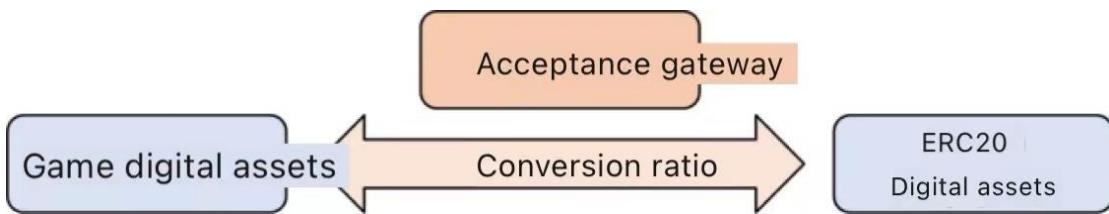
1) Acceptance of the game's digital assets

The game digital asset acceptance with Ethereum ERC20 digital asset is shown in the following figure:



Game gold supports asset transfer through acceptance gateways with other alliance chains as well as separate chains.

2) Acceptance of game non-homogeneous assets (NFT)



Non-homogeneous digital assets (NFT) standards for decentrally distributed bookkeeping networks in Golden apple applications, have the separation of asset from contract and scalable, customizable data areas, and are compatible with other non-homogeneous assets (NFT) standards.

Both the ERC875 and ERC721 digital asset standards are the standard Ethereum protocol for non-homogeneous digital assets (NFT). In some way, ERC875 is more of a "slightly shrunk" upgrade of ERC721. ERC721 has created standards for non-homogeneous digital assets (NFT), whose subsequently updated ERC841 and ERC821 are optimized modifications in some part of them; while the ERC875 standard is more simple and straightforward. The functions it defines include name, symbol, balanceOf, transfer, transferFrom, totalSupply, ownerOf, trade. The function of the ERC875 is simpler than the ERC721 standard.

By further expanding the digital asset technology supported by the acceptance gateway, the gateway will be able to support heterogeneous complex contracts represented by ERC721, ERC875 in the future, and acceptance gateway for game props and heterogeneous contracts is similar to a special compiler. Through translation and conversion of structured data, bidirectional acceptance of heterogeneous contracts to chain game props, compatible with more props circulation inside and outside the chain, and provide richer game content and user experience.

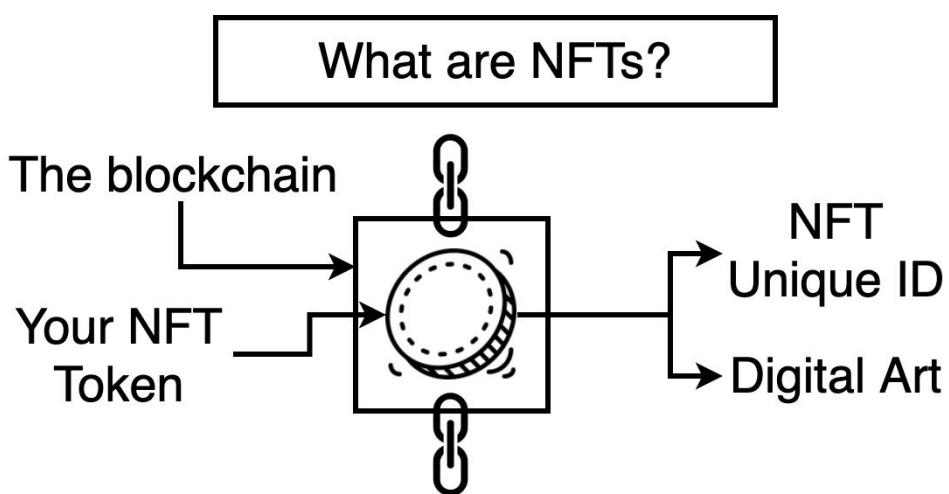


3.3 Improved inhomogeneous digital assets (NFT)

1) Improved non-homogeneous digital assets (NFT) data structure

Nonhomogeneous digital assets (NFT) is a type of digital assets applied in distributed accounting networks, where asset instances are unique and can be made more flexible to serve blockchain network games by the optimization of heterogeneous digital assets (NFT) structures.

Golden apple redesigns the data structure and adds custom data storage to accommodate possible game data and extended content. At the same time, the key processes such as consensus, witness and blocking are also adjusted accordingly to match the new data structure. Prop data in Golden apple is only fully recorded in block data during generation and attribute changes, and in ordinary transactions and circulation, only hash pointers to ensure that the volume of block data does not grow too fast by long-term transactions.



2) Data separation of the assets from the contract

The storage of homogeneous, nonhomogeneous assets (NFT and smart contract data on the chain is separated. There are a large number of continuous transactions in Golden apple network that need to reduce the operational cost of asset



analysis and circulation as far as possible. The separation of asset and contract can realize the separate analysis execution of the contract and the operation of the necessary results.

Under the design of the asset separation from the contract data storage, the asset owner has all the permissions of the asset, and the operation of the asset can be completed only by the authorization of the owner. It can avoid the destruction of assets or calling the assets of the contract, and it is easier to achieve cross-chain acceptance of non-homogeneous assets (NFT) without the restriction of contract factors. Therefore, the separation of assets and contract is a safer design.

3) Improved DPoS consensus mechanism

The consensus layer of the Golden apple test chain employs the DPoS consensus algorithm.

The DPo algorithm predicts the block producer and block exit time through the predetermined witness and the prescribed time slot. Usually the time slot interval is set to 3 seconds for the faster network broadcast speed and greater network throughput. If the predetermined witness arrives at the predetermined time slot, the predetermined time slot due to network reasons or equipment hardware failure, the time slot will not be block out, and the network will wait for the other predetermined witness to select the next time slot.

In Golden apple, all scheduled witnesses are voted from the witnesses by all stockholders, collectively known as active witnesses, and the number of active witnesses is usually 11-101. All active witnesses have the same block out predetermined probability in the witness predetermined algorithm of the DPoS consensus algorithm, which ensures that the block out probability and the block out reward for all witnesses are consistent. Graphene voting updates usually updated 24 hours, but for security, stability and fairness, it are usually shorter, possibly 12 hours or less for early projects.

4) Security using modern cryptography safeguards

The ECC algorithm, the Elliptic curve cryptography(elliptic curve encryption algorithm), was proposed in 1985.

Modern cryptography technology is a cryptography technology based on



mathematical principle, has been widely used in the field of the Internet industry, common symmetrical encryption technology including AES encryption, and asymmetric encryption algorithm (public-private key cryptosystem RSA, ECC, etc., including ECC(elliptic encryption algorithm is a commonly used encryption algorithm used in the field of blockchain.These algorithms design an unacceptable encryption and decryption system to prevent encryption from being broken.

Without correct attempts to crack the encryption algorithm, the value of cracking is lost due to excessive computation (usually taking nearly a century to try to crack / guess the key system.

3.4 Virtual machines that support large-scale games

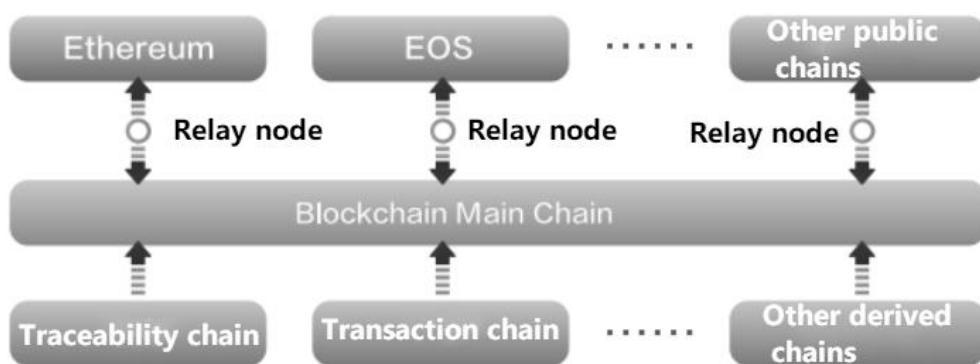
Golden apple has sufficient high concurrency processing capabilities.Most of the current networked games, with a certain scale of users, and their servers require a large amount of data processing in a short period of time, which is not available in existing Ethereum networks.

Golden apple adopts improved DPoS consensus, with theoretical throughput of about one million TPS,. Its high concurrent processing performance is sufficient to support the development and normal operation of existing games under the reasonable data management mode design, basically meets the operation demands of large-scale networked games in the platform, and ensures that the user's game experience is almost no different from the existing centralized games.

Due to the very high frequency of data interaction for large-scale online games, DNF set a record of 600,000 simultaneous online, and Steam game platform has 14.2 million amazing online at the same time.If each online user submitting data is regarded as initiating a consensus request, Golden apple 's ultimate throughput capacity is not enough to support such a level of processing request. The development team designs different witness delegation modes (Delegation Templates) according to the needs of witness speed, so that a single witness client does not simultaneously witness and process all running games, but focuses on witnessing and counting multiple blocks of games of the same type.



Moreover, in this mode, the data submission / witness of different games is a relatively asynchronous process, and each game selects the appropriate delegate mode, while the data verification in the asynchronous mode can be completed through the on-chain database service, that is, the user authenticates on the chain and completes the data access. This process is very efficient and efficient enough to support player data operations in large-scale game scenarios.



A contract is a program that automatically executes and, as a system participant, performs preset tasks according to basic environmental rules (compiler rules) to define input and output to accept and store value while sending information and value outward.

Smart contracts are designed on the premise of the "distrust principle" that each node considers untrusted. Due to the distributed preservation characteristics of the blockchain, each node on the chain has the same contract execution code. The operation result of the contract is witnessed by the computing power of the whole network, and determines whether the operation result is approved through the form of all voting. Okex Fly's contract supports the definition of the witness delegation.



3.5 Distributed bookkeeping system

In the above, we mentioned that the final form of the game on the chain is the upper chain operation of the overall logic of the game, but the existing blockchain technology does not meet the minimum characteristics necessary to carry the complete logic of the game, among which the most key points include:

1) Data volume and time cost of node data synchronization

Only the full node has the ability to execute contracts, but the full node stores all the transaction data of the entire network. The amount of data is obvious, and the time consumption of synchronizing these data when creating a new node is also very alarming;

2) The complete chain of game logic needs to be able to support large contracts

If the complete logic of the game is realized on the chain, the contract itself will contain all the background logic of the game, and the contract may become very large, even exceeding the block size of the general block. However, under the design of the existing blockchain technology, it cannot be. The contract contained in the block can never run and get a result;

3) Continuous execution of the contract

The complete chaining of game logic means that the game contract will continue to run before the end of a game application, that is, the running time of the game contract is much longer than the block generation cycle, and it is executed across blocks. Any existing blockchain technology Unable to support such contract operation mode;

4) Transaction execution delay

The complete chaining of the game means that all transactions that may be executed in the game are processed on the chain, and there are many parts that require high-speed response. The transaction response of the traditional blockchain depends on the block generation behavior, and the fastest



confirmation speed is also limited. The block generation period is limited, and it is difficult to meet the demand of the game contract for immediate response to the transaction;

5) Random process cannot reach consensus

The rules of the random process on the chain are described by smart contracts, and the process of the contract is public. If a random result that cannot be estimated by a third party needs to be generated, the noise of the node is required to participate in the input of this process when the contract is running, but different nodes' The noise cannot be consistent, that is, other nodes cannot verify whether the result of this random process is correct by running the contract again, which ultimately leads to the failure to complete the consensus;

6) Timer and heartbeat implemented in the chain

The timer and heartbeat mechanism are the prerequisites for all on-chain contracts and game content to achieve timing, automatic operation, and conditional operation. This feature also implies time synchronization, synchronization anti-counterfeiting and other processes. Blockchain technology is a completely blank area;

7) Digital asset authority

Traditional blockchain digital assets are recorded in the contract data area, and the assets cannot be separated from the contract. Therefore, the contract owner has the right to modify the digital asset data, which may cause losses to the asset owner.

In response to these problems, Golden apple puts forward the idea of in-depth transformation of the existing distributed accounting system, and proposes the following multiple characteristics and mechanism designs to finally realize the goal of real-world operation of on-chain games:

- Reduce the amount of data and time cost;
- Support consensus tasks at the grammatical level;
- Continuous execution of the contract;



- Very small transaction delay execution;
- Trusted random process within the chain;
- Realize timer and heartbeat in the chain;
- The concept of authority is added to the data structure of non-homogeneous digital assets (NFT).





Chapter IV: Golden apple Application

Ecological Support

4.1 Apply target

Based on the market pain points of the game industry, combined with blockchain technology and NFT development opportunities, the Golden apple project puts forward a vision system that matches the value of content producers and consumers in the digital world. Based on the large technical framework system, each technical link and organization has a strong targeted and logical genes, and on this basis, many modular and transformed technical schemes or mechanisms are put forward.

1) User ecology

- Hundreds of millions of users have been covered by the content created by the partner engine, and we will create the only pass for all users with digital encryption.
- Provide users with a low-threshold, high-security digital wallet, and become a secure payment platform for all game blockchain applications.
- Create Golden apple, a digital token circulating in global games: Golden apple tokens support the transaction and settlement of the entire platform.
- Build a benign and sustainable ecology around users.

2) Technical level

- Modularize the blockchain function and integrate it into the public chain engine and its front-end development tools, directly covering more than 200,000 developers, infiltrating Golden apple tokens into hundreds of thousands of games and applications, covering more than one billion users worldwide.



- Integrate blockchain technology into the back-end service logic and use node servers all over the world to provide fast communication solutions and reliable smart contract server-side logic for game products.
- Focusing on developers, we will build a complete set of development tools, documentation and development communities to provide the most complete and convenient developer ecosystem.

3) Operational level

- We have a professional game and application global publishing team, combined with an existing game platform with a monthly activity of over 10 million, will integrate the content of the Token payment system for global operations to ensure the global circulation of platform tokens.
- We will improve the online game advertising system and work with strategic partners such as Facebook and Google to promote games and products based on Okex Fly technology.

4.2 The landing of the business model

The huge traffic and revenue of blockchain turn the game field into the first choice to enter the blockchain industry, so why do Golden apple blockchain games generate revenue?

This is because of the unique mechanism of the blockchain that generates tokens during the operation to motivate users to participate in the operation. This is a virtuous cycle process, just like producing Bitcoin, but the recognition degree of Bitcoin is relatively high, and the process of playing games is a process of participating in operations and providing algorithm space, so that due to the generation of tokens and its circulation transactions, it produces appreciation income.

Golden apple integrates all the games in the market, bringing the games into the blockchain, so that every game lover can reflect the value of playing



games. Promote the circulation of game equipment, cash, and the integration of games on the market players, resource exchange sharing, when a game chain, players through the game apple Token, can better promote the value of the game let more people more willing to participate in the game, platform can also get lots of members, build apple strongest consensus, achieve win-win results.

Based on the online game user ecology, Okex Fly creates a digital token that uses engine tools + Golden apple solutions in all the world: apple Token.

- Developers use complete tools + SDK to quickly develop products that use token apple as payment.
- Users can use tokens to purchase in-game items, pay for paid content, etc.
- Users can use tokens to participate in lucky draws, discounts and other preferential activities for any application in the world on the platform.
- Developers and content distributors can use tokens to place advertisements on the apple advertising platform.
- Platform channel providers can obtain tokens through content distribution, advertising, etc.
- A virtual asset wallet created based on the user's unique Token pass, safer storage of user virtual assets, all virtual assets, props, crowdfunding rewards, platform rewards, etc. obtained in all games and content, all safely stored in the wallet middle.

In the entire ecosystem, developers can use Golden apple blockchain SDK to quickly develop blockchain games and applications. The digital token apple Token will use these game contents to cover more than 1 billion mobile terminals and users, and distribute games globally. Circulate in various ecological links such as platforms, virtual props platforms, advertising platforms, and communities.

In the increasingly rich world of blockchain games, users and players pay more attention to the novel form, theme value, market quality and other aspects of the game. If Golden apple blockchain games want to carve up the game market share, they must seek more novel forms. , To shape the healthy values of the game.



4.3 Wallet and NFT Asset Browser

1) Wallet system

With the cross-chain technical support of apple chain, Golden apple can provide digital asset wallets to various operating systems, including Android, iOS and Windows, to ensure that all users in the mainstream operating environment can participate in asset transfer. With the digital asset wallet, users can store all the game digital assets and the assets imported through the acceptance gateway, making it easier to transfer and purchase the assets on the game gold coin circulation platform. On the other hand, Golden apple provides a financial-level algorithm encryption of the digital asset wallet, and combines the KYC authentication services running the platform to ensure the security of the digital property stored in the wallet.

2) The Asset Browser

Golden apple provides NFT asset browser functionality directly in the wallet. The NFT Asset Browser is the main window to browse the blockchain information, and the content recorded in each block can be viewed from the browser. Each separate blockchain system has the corresponding NFT assets.

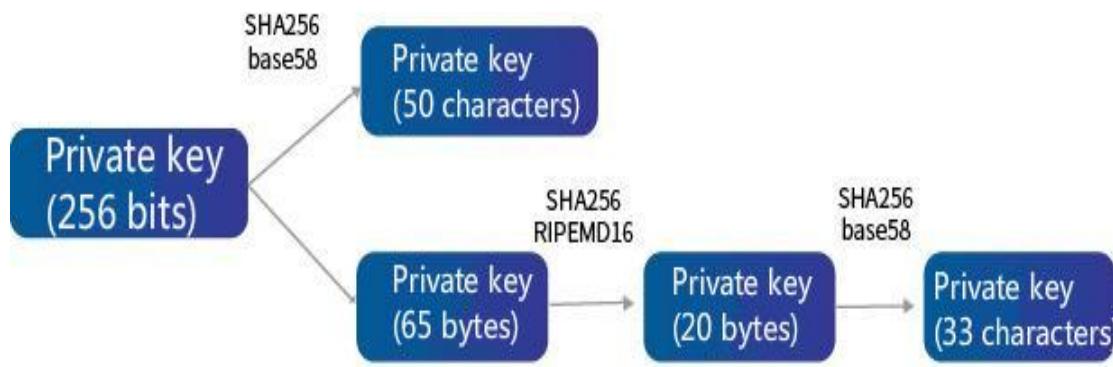
Golden apple provides a complete NFT asset with query and jump function, for example, when the user produces a treasure level prop asset in the game, the corresponding game prop data is generated in the main chain, the user can query the corresponding transaction information in the NFT asset, and Golden apple's NFT assets support atomic operation access. NFT assets can make users more transparent understanding of their NFT assets distribution, all the data recorded on the chain, real and not tampered with.





4.4 Smart contract system

The smart contract system, represented by Ethereum, cannot be modified once it is defined and released, and it is difficult to meet the needs of the contract system for game logic update and vulnerability repair on the chain. Therefore, when designing the contract system, based on the apple chain underlying technology, we made an iteratively updated contract system design for the needs of the game contract needs to update and vulnerability repair.



When the contract developer releases the defined contract to the chain network, the system allows users with the contract developer authority to update the contract with the revised contract, although the old contract still exists (to ensure the openness and fairness of the contract), but the content of the contract address on the chain will be covered by the new contract data, multi-contract application need not update the reference relationship.

4.5 Technology application advantages

The "impossible triangle" represents three characteristics that are difficult to combine in the blockchain system. Okex Fly can not be the strongest in all three



points at the same time, but through many designs, we have shortened the side length of the "impossible triangle" as much as possible.

1) Decentralization

- Improved DPoS mechanism: We improve the consensus algorithm on the basis of the traditional DPoS consensus mechanism. All active witnesses have the same block generation probability in the witness reservation algorithm of the DPOS consensus algorithm, which ensures the block generation of all witnesses. Probability is consistent with obtaining block rewards;
- Low fork risk: Golden apple uses the DPoS consensus mechanism and does not require miners to use mining machines for mining, which can effectively avoid the impact of centralized computing power on the entire basic chain, thereby reducing the risk of forks. Under the DPoS mechanism, if a witness wants to fork by voting, it is possible to ensure that more than 1/3 of the witnesses violate the mechanism at the same time;
- Lightweight nodes: Lightweight nodes are essentially an environment capable of interoperating with the chain. Unlike full nodes, light nodes do not need to synchronize the entire network data. Instead, they need to synchronize contract information and environmental data. Such a design can greatly reduce the amount of data and synchronization time for node synchronization, so that the game software on the chain has the capacity and time cost feasibility for actual use.

2) Security

Player self-control and asset security. Due to the open and transparent characteristics of the blockchain network, the digital asset information obtained by the player in the game can be browsed through the blockchain, and a guarantee mechanism is provided for the security of game assets:

- Asset operation authority: the ownership and disposal rights of the props in the game belong only to the player, and the operation of destroying the items can only be handled by the user's authorization;
- Atomization of key operations in the chain: important actions such as asset circulation and asset creation are submitted to the circulation platform, and all operations during the circulation or production process are regarded as an



indivisible atomic transaction;

- Scalable multi-step verification: In addition to the blockchain transaction verification password, the game company will provide further secondary password verification and random code verification to further improve the security of player assets;
- Guarantee of modern cryptography: The Okex Fly chain system uses common modern cryptography technology CC (Elliptical Encryption Algorithm) for encryption to ensure the security of blockchain information;
- Transaction verification mechanism to prevent BP/developers from cheating: The Okex Fly solution has designed a set of transaction execution, message transmission, and operation mechanisms for BP and developers' possible cheating links to prevent BP/developers from cheating;
- Iterable update smart contract system: Okex Fly can provide logic updates and bug fixes for game smart contracts on the chain, thereby ensuring the security and timeliness of smart contracts.

3) Expandability

Golden apple has established a total solution of decentralized game production and game economic operation through the game engine, development environment and Golden apple game chain, and built a business ecosystem with the purpose of connecting the global game ecology. The main ecological links are: developers, NFT investors, game players, key ecological links and blockchain systems, etc.

The strong extensibility of Golden apple's top-level design includes: multi-platform game integrated operating environment, blockchain interactive interface, acceptance gateway that supports homogeneous/non-homogeneous assets (NFT) and multi-chain riveting, multi-chain connection, and existing The optimization and expansion of the blockchain system, thereby expanding the integration boundary of the project.



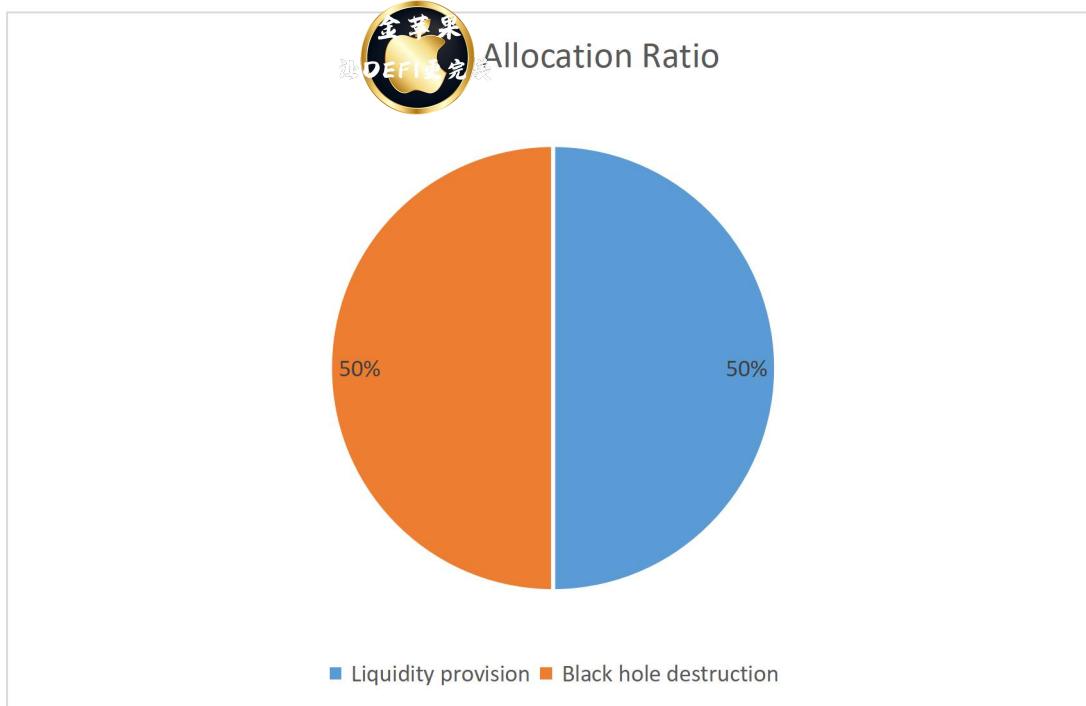
Chapter V Design of apple General Certified Economic Model

5.1 Release of the apple Pass

apple will issue apple Fly/apple tokens based on the apple chain asset agreement. Through apple tokens, games and nft systems, it will help the ecological development of the apple chain public chain, lock up more apple and give its own appletoken value. At the same time, using the game system can obtain NFT and limited NFT, consume apple tokens, anyway, consume tokens in the game, purchase items, and finally get rare NFT and rare item rewards. In this way, a benign value loop closed loop is formed, driving the infinite increase in the value of apple tokens,

apple tokens are functional tokens used on the Golden apple platform. This is a fun and practical virtual currency designed to be widely used in the circulation of game assets. apple token is the only exchange certificate for NFT items and assets in the game. It provides superior liquidity for the ecology through pledges, liquidity mining, etc., realizes the tokenized incentives of game data and item assets, and provides global players and investors. Create a high-value game entertainment token.

- apple total circulation: 1,000,000,000,000,000 pieces
- Issuance standard: apple chain
- Distribution plan: 50% of the total token users increase liquidity, 50% black hole destruction
- Opening price: 0.000000000000133 apple/okt
- Mining mechanism: holding currency dividends



1) The trading mechanism is as follows:

- Add 3% of each transaction back to the liquidity pool
- Return 3% of each transaction to all token holders
- Add 3% of each transaction back to the marketing wallet

2) Money-holding and interest-bearing mechanism:

Earn interest by holding coins: that means allowing users to lock coins in their wallets for a certain period of time to earn interest.

In order to solve the problem that users have narrowed the benefits of mainstream currency and cannot obtain more benefits from holding currency in a bear market state, apple has made innovations on the basis of wallet lock-in. Users are required to lock positions, such as a recent lock-up mining activity on an exchange. If investors need to cancel the lock-up, they need to pay a certain amount of liquidated damages. If you increase the position, it needs to be calculated as a new transaction. However, apple has no restrictions in this regard. Users can increase or decrease their holdings at any time, and the final profit will not be affected. At the same time, participating in currency-earning assets does not affect all normal usage scenarios such as transactions and withdrawals.



5.2 apple's destruction mechanism

The community has a strong consensus. 100% community managed itself. After the project launches, the community will vote to develop its own decentralized applications and DAPP. The Project Party does not hold any tokens and all tokens are allocated early (destruction, sale, liquidity pool). When the project starts, the LP will permanently break into the black hole, and the Golden apple project will never return to 0.

Golden apple destruction mechanism for the platform to take out part of the profit /income / transaction fees for regular or irregular repurchase from the market, and the repurchase part destroyed (sent to a specified black hole address), which means that the total circulation of the platform currency on the market reduced, causing deflation effect, in order to stimulate the platform currency price appreciation. That is, Golden apple officially takes part of its net profit quarterly to repurchase and destroy apple assets until the total amount of token circulation reaches a constant amount. The mechanism realizes the binding of apple assets and Golden apple official net profit, allowing apple holders to continuously enjoy the profit.

5.3 Acquisition and use of the apple

apple can be obtained from official task rewards, resource rewards, from the exchange of secondary assets, or through mining. apple is mainly used to buy props, game gold coins, acceleration services, training services, etc., and can also be converted into other secondary assets.

1) Get how

The methods of obtaining apple include but are not limited to:

- Value creation: Including (A) contribution to the act of creating digital assets,



that is, developing games and making props. For a single digital asset (including games, applications, games/in-app items, the amount of platform incentives is proportional to the value of the asset created by participants, and inversely proportional to the lifetime of the Golden apple platform and the value of the total assets of the system. The total amount has an upper limit;(B) The contribution of creating the value of digital assets, that is, the creation of assets reaches a certain fee and asset circulation scale to obtain Golden apple. For a single digital asset (including games, applications, games/in-app props), the amount of incentives issued is proportional to the total asset circulation of the asset created by the developer;

- Platform contribution rewards: Users who contribute to the Golden apple community can get Golden apple. Initially, we issued Golden apple based on the historical contribution of the developer community (code contribution points to the Golden apple engine, online community interaction points, etc.). In the later period, the platform will adopt various forms such as bounty tasks and free assets (such as free gifts of developers' game characters) to encourage developers to develop new features, upgrades, bug fixes, and tests on the platform and other community behaviors. This part will be allocated from the platform foundation's asset reservation and platform division;
- Asset Circulation: Sell prop assets acquired in the game to get Golden apple. The incentives for this part are related to game play and economic system, and are determined by game developers and market rules. In principle, the platform does not have rules and quantity restrictions;
- Behavioral incentives: A variety of effective behaviors on the Golden apple platform, community and platform games will be converted into Golden apple according to a certain degree of contribution. For example, users register for platform accounts and participate in various interactions in the community to obtain Golden apple. The platform confirms whether the user's behavior is valid by analyzing the dimensions of access effectiveness, information integrity, and behavioral rationality, and conducts Golden apple incentives. The number of incentives in this part is directly proportional to the interactive content (such as posting, likes, replies, etc.), and inversely proportional to the total number of users on the platform, and the duration of the platform. The total number of incentives has an upper limit;
- Golden apple Consensus Work Contribution Reward.



2) usage scenario

Apple can also be used to measure game services for the consumption of hardware resources, such as bandwidth and log storage resources, computing resources, state storage, and cloud service providers provide these resources to obtain Apple, and game operators use these resources through spending Apple.

Game manufacturers for game promotion, release, issuing assets and other activities and players in the game props consumption, player trading behavior will produce a certain fee, game asset transaction fee part of the recycling precipitation into the Apple digital assets network, part of the feedback to issue the assets of game manufacturers, part of the additional bonus node maintainer. Assets in the Apple Digital Asset Network provide regular rewards to the community to increase community activity and maintain long-term Applex Fly trading systems and community activity.

In addition, a part of the Apple is used as collateral during the issuance of the secondary assets, and is locked in the disk along with the issuance of the secondary assets. From the Apple's economic model, once there are more and more game assets such as distribution based on Apple foundation, the subsequent demand for Apple will become greater, whether it is game equipment or game service, there will be a need for consumption in real games. In addition, the demand of the game asset issuance mortgage Apple and the payment demand of resource consumption will increase the scarcity of Apple, thus pulling up the value of Apple. In addition, through the contribution of the game's equipment and services, users can also exchange value in digital currency exchanges through Apple, which also promotes its liquidity.

Finally, part of the Token consumed by business occurring in Apple is used to reward ongoing maintainers of trading nodes, active maintainer of the community, heavily contributing developers and Apple maintainers, keeping the entire system ecosystem in a sustainable trend to ensure the system and community have long-term activity.



5.4 Apple Digital Asset Network

Compared with traditional centralized systems, Apple has significant advantages in the field of digital assets used in games: once game assets are issued on Apple, subsequent circulation links can no longer rely on the issuer system. In circulation, assets are controlled by a single center. As socialized communication, any channel with resources may become a catalyst for asset circulation. Therefore, Apple can greatly improve the efficiency of digital asset circulation and truly achieve "multi-party issuance and free circulation". Traditional asset services require corresponding intermediaries, such as asset owner certification, authenticity notarization, etc., which require the intervention of a third party to complete. Only through the intervention of the three parties of the asset issuer, the asset receiver, and the circulation platform, can the asset be completed. Complete the entire circulation process. In the current tripartite model, there are the following pain points:

- After the game assets enter the circulation, they must still rely on the asset issuer system to complete the use and transfer, which limits the scope of asset circulation to the issuer's system user group;
- Traditional asset circulation channels are limited and almost all rely on large channels. Large channels in the industry have significantly increased their costs due to their monopoly position, which has led to a significant increase in circulation costs. Small channels and individuals are difficult to play a role in the circulation.

The core of asset circulation is channels. Okex Fly technology makes asset circulation change from the original single-center control to socialized circulation. Any channel with resources can become a catalyst for asset circulation, promote circulation and improve circulation efficiency. Therefore, in the OkFly digital asset network, the basic characteristics of OkFly tokens make real-time clearing possible, greatly improving the efficiency of post-transaction processing, and realizing the real-time query function of asset circulation. Based on the OkFly digital asset network, OkFly tokens will realize the whole game ecology and global circulation. At the same time, OkFly will also realize the docking with mainstream currencies such as BTC, USDT, and OKT.



5.5 Value circulation of the Apple

In the future, the wider circulation value of Apple will be reflected in the following aspects:

On the basis of Apple, many physical applications will be derived. It can be exchanged with all digital currencies, and supports the circulation and payment in all aspects of the ecology, such as receipt and payment, transfer, legal currency transaction, deposit, withdrawal, coin voting, STO gateway, coin distribution, mortgage, public welfare, game mall, etc. All circulation transactions use Apple as the medium. And settlement with global legal currency.

In addition to the circulation in the Apple ecosystem, it will also be circulated in third-party game applications developed based on public chain technology, and it will exist as the only value token. This will accelerate Apple circulation rate, add more circulation value attributes to the scarce A, and increase the overall value and price.

For game players, Apple can be used for game consumption (such as recharge, point card purchase, item purchase, game payment, etc.). At the same time, it can also be used as a basic means of cross-border payment, thus bringing more benefits to itself. When Apple Fly connects with the global mainstream platform, gamers can enjoy the wider global entertainment and leisure convenience brought by Apple.

The usage scenarios of Apple include but are not limited to:

- Exchange development resources from third-party developers (such as game character images, etc.);
- Exchange value-added services such as developing functional components from the platform;
- Purchasing game gold coins and prop assets from in-game or asset circulation platforms. Based on the asset rights management mechanism of the platform, a certain fee is paid to the developer for each transfer of the props in its



complete life cycle;

- Post reward tasks in the community, initiate and participate in voting on community affairs.

In terms of versatility, in the future, Okex Fly will continue to improve and explore business models to adapt to more diversified business needs and meet data sharing across the business chain of enterprises. This means that Okex Fly is sufficiently versatile in the way data is recorded. And standards, can express a variety of structured and unstructured information, and can meet the cross-chain requirements required by the expansion of business scope. And this provides a value foundation for OkFly's versatility. Let OkFly digital assets circulate more calmly in various industries and scenarios around the world.



5.6 Project development route

Project development roadmap 1.0

The Apple community is striving to build an okex fly game and NFT ecosystem that will help the ecological development of the okex chain and give token value.



2021 Q3

- Token launch
- white paper
- road map
- audit
- Launch at feixiaohao and CMC
- Advertising marketing

2021 Q4

- Ecological planning
- Game ecological development
- NFT
- Cross chain bridge of eth, BSC and heco
- Currency holding address exceeded 100000
- Landing on mainstream exchanges

2022Q1

- Global marketing campaign
- Landing on okex exchange



Chapter VI Team and DAO Community

6.1 Technical team

The okex fly R & D team consists of Asian and Chinese development, and the core members of Ethereum and OKex were the first teams to develop smart contracts. At the same time, the team also gathered together except the Ethereum team, such as EOS, MaKerDAO and other project core developers, as well as top talents in blockchain, big data, cloud computing, cloud chain games and other technical fields, with comprehensive research and development strength with global competitiveness.

Joyce Wong——An internationally renowned data engineer has assumed key positions in a number of world-renowned Internet big data research centers, is responsible for the application research and development of Internet basic technology, and participates in many internationally renowned projects. He is a pioneer in the field of blockchain technology.

Sun Yang——Doctor of Computer and Big Data, Architect, database expert, technical expert in exchange construction, has been engaged in database application, data warehouse, big data and blockchain development in the trading industry for a long time, and has rich experience in blockchain project development.

Michell——A world-known blockchain game application expert and a global commercial application leader of blockchain technology. He served as a director of the European Union Business Council, a doctor of sociology at Columbia University and a researcher at the Center for Financial Research Studies. He is an authority in the field of intelligent games and monthly entertainment technology.

Paddy——He has authoritative influence in the development of the underlying technology of blockchain. His career covers two fields of academic circles, academia and corporate circles. He is a research academic, engineer and leader. He has held several engineering management positions in Google and Amazon.



Bradley——Bradley's research focuses on big data parallel computing and distributed algorithm optimization, and has rich research experience in blockchain, cryptography, and data mining.Bradley will provide deep algorithm support for the project in the blockchain core mathematical model, artificial intelligence core algorithm and big data parallel computing level.

Wesley——He is proficient in the principles and implementation of mainstream blockchain technologies such as Bitcoin, Ethereum and HyperLedger, and has a deep understanding and rich practice of blockchain consensus mechanism, intelligent contract, cross-chain technology, side chain technology, and privacy protection.

Minkevich——Technical consultant, a world-renowned computer technology application development expert, has worked for many companies such as Apple, SGI, Microsoft and Google, with more than 15 years of global experience in IT development and operation.

Colbert——Legal director, graduated from harvard university law, with more than ten years of legal research experience, good at business architecture, convenient financial regulations, for block chain alliance financial control has the basic legal direction control, can good project development and promotion, and friendly organize and control financial and legal ideas.

Donovan Mitchell — — Global market Consultant.With decades of rich experience, we continue to provide guidance to projects on the game market.

6.2 DAO Community Construction

According to the development process of NFT, the rise of NFT has given greater support to the industry.In addition, the popularity of DeFi and NFT also makes DAO,, which has been quietly contributing core value to the industry, welcomed by users.

With the development of information technology and the increasing complexity of the organization itself, the traditional organization's employment relations, management models have been difficult to adapt to the complex and



changeable environment and the requirements of the new generation of individuals. Decentralized autonomous organization (decentralized autonomous organization, DAO) combines decentralization, autonomy, autonomy and universal economic incentives, and takes various elements in the use of the system as assets, making monetary capital, human capital and other factor capital fully integrated, so as to better stimulate the efficiency of the organization and realize value circulation, which provides a good idea to solve the existing organizational management problems.

The full name of DAO in blockchain is "Distributed autonomous organization" (Distributed Autonomous Organization), which is a blockchain-based organizational structure. It is able to operate independently without intervention and management through some open and just rules.

These rules often appear in the form of open source software, who can buy shares in the organization or participate in the provision of services. DAO is in some way like a fully automatic robot, and when all its program settings are successful, it can operate according to the original rules. In the process of operation, it can also constantly self-maintain and upgrade according to the actual situation, through the continuous self-improvement mechanism, to adapt to its surrounding environment.

DAO has changed widely, it can be some digital currency, or a system or institution, or even driverless cars. Their valuable services to their customers can be money transfer (such as Bitcoin), application platform (such as Ethereum), domain management system (such as domain currency), or any other business model, apparently more like a stock of a particular institution than a single currency. Each DAO has its own terms and conditions. Their own, disposable, digital currency form of DAO shares, users will always be entitled to view, and may receive rewards.

The Okex Fly community has a strong consensus that it will build DAO autonomous communities with 100% self-managed communities. After the project launches, the community will vote to develop its own decentralized applications and DAPP.

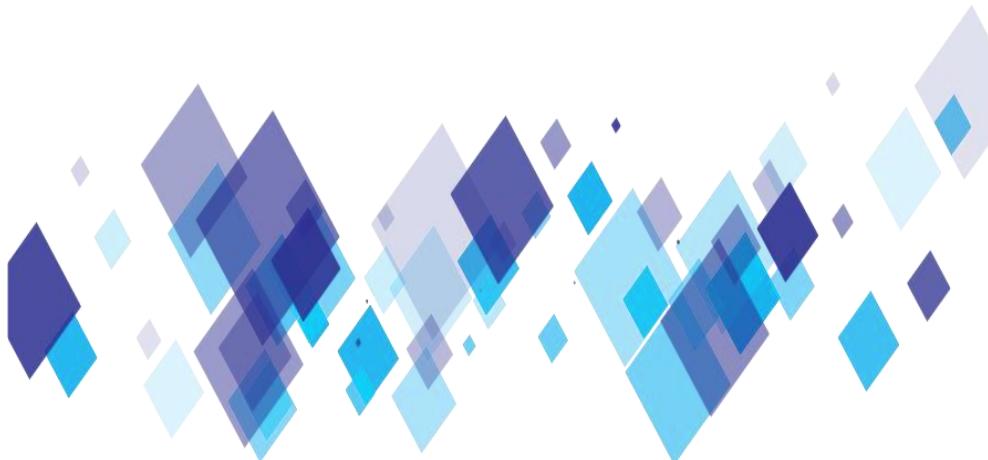
Okex Fly's global community construction follows a high degree of decentralization and is carried out through a combination of on-chain and off-chain models. After all the procedures of Okex Fly are set successfully, it can start to operate according to the original rules. In the process of operation, it can continuously maintain and upgrade itself according to the actual situation. Through



the continuous self-improvement mechanism, it not only eliminates the trust problem, but also achieves an unprecedented level of collective coordination, thus forming the technical foundation of Okex Fly.

- Smart contracts enable Okex Fly's rules to be technically implemented;
- The token economic model gives Okex Fly a realistic incentive basis for the distribution of benefits;
- The blockchain itself connects individuals or organizations around the world, allowing Okex Fly to expand beyond geographical restrictions.

OkFly tokens are used as value circulation proof and incentive means, and then smart contracts are used to determine the cooperative relationship and benefit distribution mode of members. There is no clear identity division among members, such as investors, developers, collaborators, operators, consumers, etc., will become part of the community because of holding OkFly tokens. Members can continue to optimize the contract structure on their own, constantly seek the shortest path, maintain efficient coordination and better development direction.





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