Blockchain and the Feature of Game Development

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Abstract. There are many problems when trying to trade the virtual items in games on the traditional forum as a platform. This study uses blockchain technology as an innovative element of the virtual items trading platform. From the perspective of literature research, the game virtual financial transaction platform planning in the context of chain technology is discussed. The basic structure and operational technology of this research planning platform, adding existing mainstream technologies to increase future expansion and integration technologies, blockchain technology will have a huge impact on the virtual trading of games. But strictly speaking, the impact of market mechanisms will be a huge challenge. The biggest impact of blockchain technology in the short term is the redistribution and integration of the game and trading platform markets. What is certain is that the role of blockchain in game virtual items trading is feasible for innovative business models.

Keywords: Blockchain · Virtual item · Platform planning · Business model

1 Motivation and Purpose

Driven by the Internet and mobile devices, the gaming industry has been growing rapidly. From stand-alone games to online connection games, game makers have tried their best to expand the game layout and add different game elements to attract more players to join to increase revenue.

Many games have included the element of "virtual items". The virtual items can effectively increase the player's stickiness. It is also one of the main sources of revenue for online game operators. The most common way for early gamers to trade virtual items is Face-to-face transactions, but as the market changes, there are also many virtual item trading platforms in Taiwan. However, the function of the platform only provides a combination of information publishing and trading. It seems simple, but it also has many problems, such as transaction content. The authenticity and risk must still be borne by the player, and as a result, trading disputes or fraudulent incidents often occur.

In addition to the inconvenience of the transaction, it is difficult for the player itself to verify whether the release of a specific virtual item that is really limited, whether the transaction is elected fair and square or the price is reasonable, as the game company said. The problem or the transaction process is not openness and transparency.

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After the emergence of the blockchain, there seems to be a solution. This study hopes to construct a blockchain-based game virtual item trading platform. Through the decentralization, encryption, trackable and incorruptible, anonymity, and other characteristics of the blockchain, the transaction and transfer of virtual items and ownership are recorded, so that the transaction process can be instantly, safely and transparently. There are many advantages to the operation of the blockchain. For example, through the signing of smart contracts, the number of virtual items can be accurately disclosed while the virtual items are released, so that game company can issue virtual items according to the planned way and quantity to protect the players, system platform and the rights of game manufacturers.

2 Literature Review

Today's information platform is still playing the role of intermediary in the industry chain. Therefore, the benefit of the blockchain-based trading platform to users is to make transactions transparent and to protect individual assets. In addition, blockchain virtual item trading platform can ensure the value of the creation of property rights. In section 2, we will review the game's infrastructure, including online games, virtual items, and blockchain.

2.1 Online Game

Online games generally refer to electronic games in which multiple players interact and entertain on the Internet through computers or mobile devices. In terms of game software classification, it is generally referred to as a large multiplayer online game downloaded and installed by the client. Some games can be connected to the web server for online connection and online cloud archive. Online games include strategic games, action games, sports games, fighting games, music games, racing games, and role-playing games, but there are also a few online single-player games Industry & Technology Intelligence Service 2012; Industrial Development Bureau, Ministry of Economic Affairs 2014.

2.2 Virtual Item

In the world of online games, virtual items play an indispensable role in the game. Whenever the player's character is enhanced or interacts with other players, virtual items are essential game content. Because of this, it also allows players to transfer virtual items from the game to real life and trade in cash. Cash transactions between players have become one of the business issues that game operators must facing. The study found that most online game players said they could accept and to buy virtual items in cash to save game time (Chiang and Liang 2005).

2.3 Blockchain

A blockchain can be imagine as a large, decentralized, repository on the network. For example, each of the Nodes on the Bitcoin network has a ledger, and the contents of these ledgers are the same. Because the ledgers are distributed at different nodes and the content is the same, the blockchain can also be called a "distributed shared ledger".

Many applications use the blockchain as a large-scale network accounting book. Through cryptography and special mathematical algorithms, users can directly trade through peer-to-peer (P2P) without using a third-party system, so it has faster transaction speed. The advantages of low transaction costs and anonymity are also important factors for the rapid rise of virtual currency in recent years.

The virtual currency is just one of the applications of blockchain technology. In the future, financial innovation, advertising, games, trading, insurance, medical, commodity tracking management, Internet of Things, etc., include e-commerce. The blockchain technology are also can be use in different areas such as public services. For example, the settlement system of banks in the financial sector and the issuance of stocks in the securities industry can use blockchain technology to significantly reduce costs. After the blockchain is applied to the insurance claims platform, Medical data and policy information can be linked together, and hospitals and insurance companies can share information synchronously. Blockchain technology can be used in the logistics industry to process orders safely and quickly, increasing the efficiency of logistics tracking and supply chain management.

The blockchain is a global development trend in recent years and an one of the important technology to change the life of the future. This research hopes to adopt a blockchain mechanism to develop a trading platform for trade virtual item, hoping to pass the innovative elements of the blockchain. Leading the development of the game industry into another higher milestone.

Trading Standard

There are three major groups in the enterprise blockchain community: Enterprise Ethereum Alliance (EEA), Hyperledger and R3 Corda. Hyperledger and EEA jointly announced on October 1, 2018 that the two parties have agreed to work together to develop common standards for the blockchain domain. Two-way communication extends the open source community (Enterprise Ethereum Alliance 2018).

In January 2019, Ethereum launched the Ethereum 2.0 Phase 0 pre-release. In the new version, the entire network will be converted from Proof of Work (PoW) to Proof of Stake (PoS) consensus mechanism, and the economics will be processed. Basic issues such as finality and security. This will dramatically change the way the network creates blocks and validates transactions. Beacon Chain will play multiple roles at the same time, including: management verification and related rights.

Ethereum 2.0 has two components, Casper and Sharding. Casper replaces the mining mechanism. These algorithms are more efficient. Sharding is a huge leap forward for "scalability" because it doesn't use too much computers on the network to process transactions.

Smart Contract
A new generation of blockchains such as EEA, Hyperledger and R3 Corda, in addition to the functionality of the database, can also execute applications, the account stores not only the transaction records of the assets, but also the data to be processed by the application, The logic of the application is to handle conditional and complex asset transfers in order to implement the terms and conditions of the trading contract, so this type of program is called a "smart contract".

3 Platform Planning and Design

Based on the Hyperledger Fabric version 1.4 specification (Hyperledger 2019), this study constructs an online game virtual item trading platform as an example and uses an smart trading contract. The platform defines the trading method of virtual items and the distribution of assets, and establishes trading contracts based on virtual items owners, buyers and trading platforms. When the buyer completes the payment process online, the transfer function will be triggered automatically and the profit will be automatically assigned to the seller and the trading platform account.

The blockchain virtual item transaction flat platform system architecture of this study is shown in Fig. 1. The U on the left side of Fig. 1 represents the user and A is the website platform. The N block on the right is the Hyperledger Fabric Network, where CA is the identity registration and authentication host, O is the ordering service, P is the peer host, L is Ledger, and S is Chaincode. The blockchain data is stored in multiple peer hosts. There are many roles in the right network block group, all of which are operated by Peering. It is better to have multiple Nodes throughout the system operation. And it is best provided by multiple groups of hosts to ensure the integrity and security of the blockchain data.

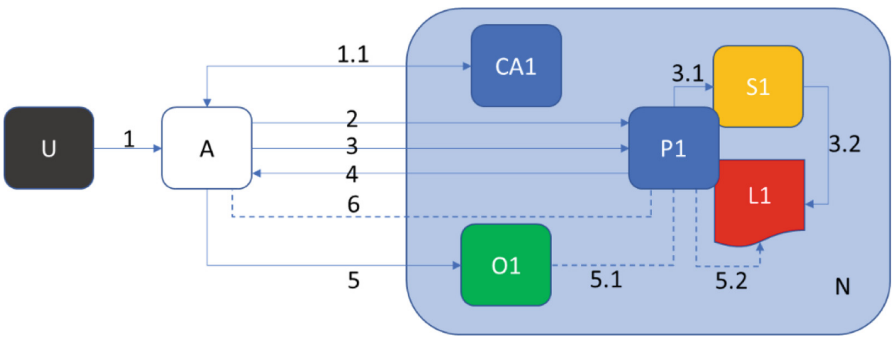

Fig. 1. System architecture diagram

This study used the Ethereum ERC20 and ERC721 mechanisms to build a platform. ERC Ethereum inquiry developers publicly to define a unified communications interface. In hope of creating a standard which all can agree and following with. It helps developers reduce time in writing a program in Smart Contract.

ERC20 is the standard for intelligent contracts on the Ethereum blockchain used to create "Tokens". ERC721 is another standard for intelligent contracts on the Ethereum blockchain. It is used to create a Non-Fungible Token (NFT)(Entriken et al. 2018). The ERC20 and ERC721 are well-tested and industry-accepted standards in the Ethereum architecture, and this mechanism is integrated into the Hyperledger to make it easier to write secure and extensible blockchain code for any Hyperledger-based warrants.

The blockchain game CryptoKitties uses NFT on the Ethereum blockchain (CryptoKitties 2019). NFT is used to process assets in the game, and players are free to control these assets rather than game developers, and allows assets to be traded in third-party markets, and players can transfer assets in different games.

- Peer host: The peer host is the host to process for running and storing data in the Hyperledger Fabric blockchain.
- Orderer: Encapsulate the transaction content into a Block.
- Users: An entity that authorizes the user to interact with the block-chain, the user can query the transaction and write the transaction to the ledger.
- Block: The block content contains transaction details and hashes to verify the integrity of the data.
- Ledger: The ledger is the block that actually stores the data in the blockchain, and contains the trading parameters and values written by Chaincode.
- Chaincode: The Chaincode is all the rules that Hyperledger Fabric uses to define assets and related assets, that is smart contracts.
- Application: The application platform provides user registration, log-in, related transaction inquiry, promotion activities, auction, bidding, forum, discussion area, bonus point program and transfer, providing information, push notification service and so on.

Assets are entities that exist in ledgers and can generate entity digital assets with the standards of ERC20 or ERC721, that are smart contracts. For example, to create a new digital asset in the system, the following operation flow:

1. When the user connects to Application platform A, (1.1) first authenticates the user's identity through CA1. If successful, CA1 will return the registration certificate.
2. Platform will connect to peer host P1.
3. Invoke chaincode S1 generate proposal, (3.1) Than peer P1 will invokes chaincode S1 with proposal, (3.2) Chaincode will generates query or update proposal response. Else reject proposal.
4. Peer P1 use api function to response proposal to A.
5. Proposal request that transaction is ordered. Orderer will organize a series of proposals for the entire network. It will check if the trans-action sequence is valid by looking for transactions that conflict with each other. Orderer broadcasts the new blocks to the Peer side of the network. So (5.1) Transaction sent to peer P1 and other peers in blocks. (5.2) Peer host will receive the new block and verify it by

looking at signatures and hash values. It is then finally submitted to ledger. So, peer P1 updates ledger L1 using transaction blocks.
6. Ledger update event to Application platform A.
7. At this point, the new asset exists in our ledger and will soon exist in all Peer's ledgers.

4 Conclusions and Future Work

This study aims to build a prototype of the blockchain game virtual item trading platform. It hopes to provide a platform that is decentralized, fair, secure and easy to expand and integrate through standard specifications, so that gamers, buyers, sellers and game developers can use this platform to get the virtual items or resources in the game. The Virtual Item Trading Platform allows all participants or gamers to share the profits generated by games and virtual items.

References

Chiang, C.W., Liang, C.Y.: A study of virtual item exchange behavior by cash for the massively multiplayer online role-playing game in Taiwan. J. Technol. Manag. **10**(4), 139–167 (2005)

Dapper Labs: CryptoKitties technical details (2019). https://www.cryptokitties.co/technical-details

Enterprise Ethereum Alliance, Enterprise Ethereum Alliance and Hyperledger to Advance the Global Blockchain Business Ecosystem (2018). https://entethalliance.org/enterprise-ethereum-alliance-and-hyperledger-to-advance-the-global-blockchain-business-ecosystem/

Entriken, W., Shirley, D., Evans, J., Sachs N.: EIP 721: ERC-721 Non-Fungible Token Standard (2018). https://eips.ethereum.org/EIPS/eip-721

Hyperledger: Hyperledger Fabric Key Concepts (2019). https://hyperledger-fabric.readthedocs.io/en/release-1.4/key_concepts.html

Industry & Technology Intelligence Service, Development and Trends of the Digital Game Market, IT Services Industry Yearbook 2012, pp. 99–102 (2012)

Industrial Development Bureau, Ministry of Economic Affairs, Overview of the development of digital content industry in Taiwan, Digital Content Industry in Taiwan 2014, pp. 120–135 (2014)