

A Study on Corporate Information Assets Management System Using NFT

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Abstract— The technology outflows of corporates are mainly targeted at information assets containing information such as core secrets or technical information, which can cause companies to lose technological competitiveness or serious economic damage, so security risk management is essential. For risk management of information assets, the corporates identify the asset, classify the security level according to its intrinsic value, and manage and control it by applying differential protection measures. As the development of ICT technology accelerates the change to the digital business environment, the protection area and assets of companies increase, making it difficult to identify and classify information assets and increasing the complexity of security risks. NFT is a technology that uses blockchain network to give the value of uniqueness and scarcity of digital assets such as images, trademarks, and game items, or real assets such as art, art, and clothing in a digital environment. In this paper, we propose a blockchain system that can support the integrated protection of corporate information assets by utilizing NFT in a rapidly changing security environment.

Keywords—Blockchain, NFT, Industrial Security, Intellectual Property

I. INTRODUCTION

With the development of information and communication technology accelerating changes to the digital business environment, corporates are introducing new IT technologies such as cloud and artificial intelligence and switching to the digital work environment. In a rapidly changing industrial environment, the introduction of new technologies and the digital work environment support business productivity, efficiency, and convenience for companies, but at the same time, information assets, targets to protect and security areas increase rapidly.

Generally, corporates perform risk management of an asset by identifying an information asset and evaluating its intrinsic value and possible risks and applying differential protection measures. Along with the digital business environment, the increases of information assets, objects to protect, and security areas intensifies the complexity of risk management and leads to added security threats and vulnerabilities of corporate information assets. Companies need to perform risk management from an integrated perspective to respond to changes in the security environment.

Recently, NFT technology has been used to provide value to the uniqueness and scarcity of blockchain-based digital assets or real assets to guarantee ownership and trade them. In this paper, we propose a blockchain system that can support the integrated protection of corporate information assets based on the value of corporate information assets using blockchain NFT technology.

II. RELATED WORKS

A. Security Management of Corporate Information Asset

With the development of ICT technology, many companies and organizations have introduced information systems, and most of the information assets have the form of electronic documents. Companies use various DRM solutions for security management of electronic documents and apply differential protection measures by classifying information assets to perform economic security activities. Information security classification are performed according to the evaluation model based on the C.I.A (Confidence, Integrity, Availability) or the corporate information rating model reflecting evaluation factors shown in Tab. 1 [1].

TABLE I. RATING MODEL OF CORPORATE INFORMATION

Factor		Rating Components
Cost of Information Creation(input) (Information Making Cost)		Manpower
		Time
		Capital
Level of Information(output)		Availability
		Usability
		Level of Quality
		Novelty
Information Utilization(use)		Use Frequency
		Use Range
Effects of Infrotmation Utilization (outcome)	Effect of Internal Utilization	Value Creation Potential
		Marketability
	Risk of External Leakage	Development Maintainability
		Business Continuity
		Competitiveness

B. Blockchain

Blockchain is a technology that distributes and stores data between all participants through a distributed network, and consists of P2P network, distributed ledger, consensus algorithm, smart contract, electronic signature and hash algorithm technology [2]. Blockchain networks are divided into public, private, and consortium types according to the network and the type of user participation [3]. Well-known blockchain networks include Bitcoin, Ethereum, Solana, klaytn, Hyperledger Fabric, Hyperledger Besu and etc [4, 5, 6]. Beyond the excessive resource consumption and performance limits of PoW (Proof-of-Work), blockchain networks are being applied to various industries with various algorithms and hybrid consensus algorithms that achieve decentralization and scalability through two or more consensus algorithms [5].

C. NFT

NFT appears as a cryptocurrency derived from the ERC-721 (Ethereum Request for Comment) token implemented on the Ethereum network, and is generated through smart contracts of blockchain technology and has the meaning of an irreplaceable token [7]. The ERC-1155 standard was then developed to support the functions of ERC-20 (Fungible) and ERC-721 (Non-Fungible) [8].

TABLE II. ERC-20, ERC-721 AND ERC-1155

Token Standard	Rating Components
ERC-20	It can be defined and replaced by providing contract addresses and token availability
ERC-721	It is attached to digital entities using metadata, and is irreplaceable
ERC-1155	It can issue both tokens and NFTs as a mixed standard that supports ERC-20 and ERC-721.

NFT needs a P2P network of digital assets, distributed ledger, content (creatures), virtual assets, and wallets. The main protocols of NFT are shown in Tab. 3 [7].

TABLE III. MAIN PROTOCOLS OF NFT

Protocol	Contents
NFT Digitize	NFT owners check details such as names and descriptions of NFTs and digitize the original data to the appropriate format.
NFT Store	NFT owner stores the original data in a database or blockchain outside the blockchain.
NFT Sign	NFT owner signs the transaction with the hash of NFT metadata and sends it to a smart contract.
NFT Mint&Trade	After the smart contract receives a signed transaction including NFT data, minting and trading are performed
NFT Confirm	After checking the transaction, minting is completed, and the NFT is connected to the blockchain address.

The NFT asset market, which represents objects such as artworks, collections, and in-game items, consists mostly of six categories of collections : Art, Collectible, Games, Metaverse, Other, and Utility, but there are studies that try to study the requirements of intellectual property assets and patents, as NFTs and propose a layered conceptual NFT-based patent framework [9, 10, 11].

III. METHODOLOGY

We proposes a NFT-based blockchain system that supports the protection of corporate information assets from an integrated perspective against increasing security threats in a rapidly changing security environment. The proposed system is shown in Fig. 1. The system organizes a private network form as it requires the establishment of a reliable and safe network and the sharing of information between trusted participants. Each company performs a corporate information security classification that reflect the various value of information assets produced through business activities. Then the data of information security classification is recorded in the blockchain, and NFT is recorded in the blockchain network based on metadata as shown in Fig. 1 of assets that need protection by the security label. The NFT token is returned and recorded in the internal storage or the database of the company, and the token ID and metadata are embedded in the header of the document. After that, we intend to apply document tracking and security management according to the life cycle of document distribution.

IV. CONCLUSION

We proposed a NFT-based blockchain system with the form of a private blockchain network for the integrated protection of corporate information assets. This system is expected to support the periodic ownership and security management of document assets in a company's digital business environment. There are limitations in that it is necessary to consider the consensus algorithm and compensation, and to discuss specific security measures for the integrated protection of information assets. Future research will fully implement and evaluate the proposed system to verify the value of the proposed system, and further specify appropriate consensus algorithms, compensation systems, and information asset protection measures for integrated protection.

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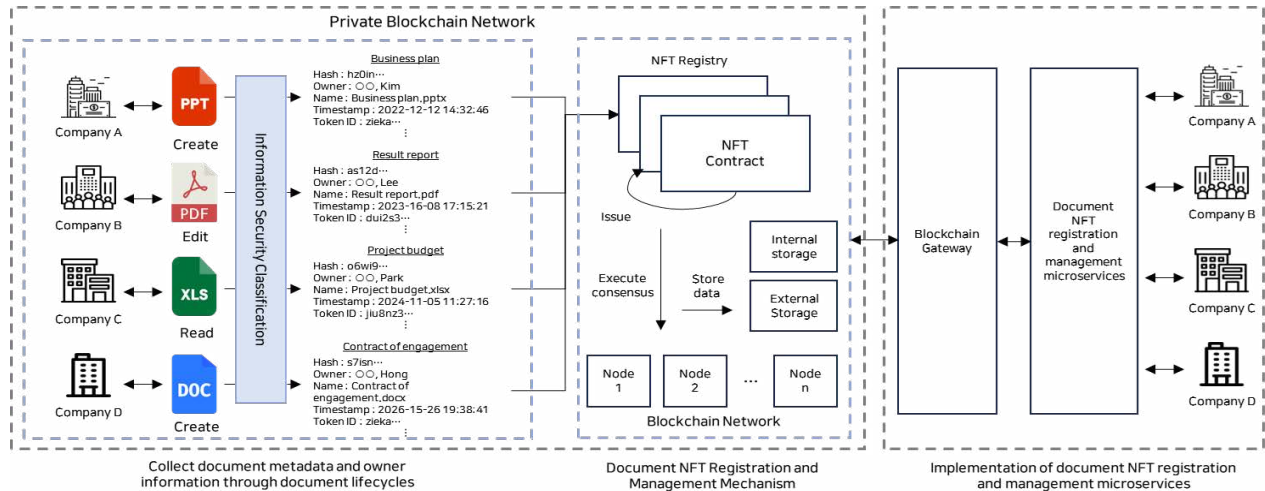


Fig. 1 The Overview of the proposed system

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