



# PROTECT INTELLECTUAL PROPERTY USING BLOCKCHAIN

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**Abstract:** A new copyright revolution was started by the emergence of digital copyright in the internet era, which changed the conventional way of information dissemination and increased revenue for copyright owners. However, due to the effectiveness and practicality of technical capture, the data-based form of copyright faces new difficulties, and the proliferation of numerous infringement activities has turned into a roadblock for the growth of the digital copyright sector. Among its many features, blockchain technology is decentralized, unbreakable, timestamped, traceable, and able to execute smart contracts. Before being applied to other industries, it was first implemented in the financial industry, leading to a range of blockchain + X concepts. The use of blockchain technology to secure digital copyrights represents an effort to safeguard copyright owners' rights by utilizing a cutting-edge technical approach and protection philosophy, and it has a promising future.

This study thoroughly examines the current state of digital copyright protection, discusses the advantages of implementing blockchain technology in three areas, including digital copyright registration and conformation, transaction monitoring, and evidence maintenance, as well as any potential drawbacks. Finally, it considers and suggests a system design for blockchain technology in the application of digital copyright protection. The study found that it is possible to completely and effectively record the entire process of copyright registration and conformation, monitor data capture infringement, provide unbiased electronic evidence, reduce the cost of copyright owner rights protection, and increase the success rate of judicial remedies by using blockchain technology to establish a unified blockchain digital copyright protection platform.

## I. INTRODUCTION

The old way of life is changing quickly along with the digital information age, and online entertainment alternatives like e-reading, digital music, and online video are taking up more and more of people's time. The online literature sector is expanding gradually with other key industry segments like online news media, online gaming, and online videos. In reaction to the trend toward networked and digitalized copyright publishing, businesses in the traditional publishing industry have steadily undergone changes. Digital information's properties, such as their simplicity in capture, copying, and rapid distribution, make infringement more straightforward and visible. The high costs, strict regulations, time-consuming challenges associated with the registration and conformation of rights, the challenges faced by individual authors of digital information in dealing with infringement, the high cost of forensics, the inadequate coverage of forensics, and the inability to detect and suppress violations have all contributed to the proliferation of violations in the field of copyright in the digital realm. As a result, the sustainable and healthy growth of the digital copyright industry is hampered. Other factors that contribute to this difficulty include the high cost of manual infringement monitoring, the low cost of infringement by infringers, and the flaws in the laws that protect digital copyrights. There have been at least tens of billions of dollars in losses for creators as a result of piracy, according to statistics that are still in the early stages. The rate of technological advancement today makes it difficult for traditional digital copyright protection systems and tools to keep up, and the emergence of blockchain technology has created new options for digital copyright protection. The data are assured to be objectively immutable and traceable through distributed storage mode and peer-to-peer chain transmission technology, realizing early prevention of digital copyright infringement while clearly articulating the attribution of digital copyright and preserving the evidence, which provides technical and legal support for the right holder's.

## II. PROBLEM STATEMENT

The Blockchain Technology to Protect Intellectual Property technology is not yet perfect, industry standards have not been established, and there is still considerable conflict with existing domestic laws. Additionally, while each enterprise has established its own blockchain-based digital copyright protection platform, there is a lack of unified regulation and information sharing. Foreign research on blockchain technology is primarily focused on specific applications.

### III. METHODOLOGY

In this we present a blockchain-based Intellectual Property Protection. The underlying model is immutable and content addressable. The primary objective of this framework is to provide peer-to-peer transmission, real-time information recording, dissemination, and shared consensus, blockchain enables information to be recorded in all data blocks in a distributed manner. The trust issue that one party could arbitrarily change data during the recording and transaction process if there is no central institution involved is resolved by the fact that each participant participates in the recording, dissemination, or transaction confirmation of information. Each participant's data block also records a complete copy of data changes, and the loss or damage of one block of data will not affect the integrity of other blocks of data.

Any party with knowledge of the block location and key can obtain all of the data information included in a data block in the blockchain, which is open, transparent, and unchangeable. It also decentralization.

### IV. OBJECTIVE

Objective of this Proposed technology is to data are guaranteed to be objectively immutable and traceable, and to focus on the benefits and applications of existing blockchain technology in the field of digital copyright protection, and to investigate the significance of this technology for digital copyright protection, and to propose solutions to the problems associated with a lack of policies and lagging laws.

### V. SYSTEM ANALYSIS

Blockchain technology along with ipsf file system ensures various features such as privacy, immutability, integrity, and consistency which are important requirements in a modern system.

FEW Applications:

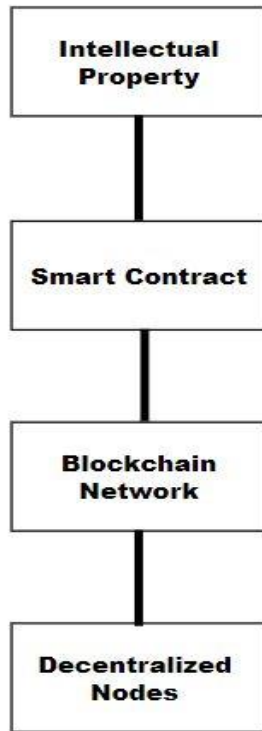
- Healthcare Management System
- Privacy
- Secure Data Management
- Blockchain
- Distributed File System
- Decentralized Data Storage
- Protect Intellectual Property

### VI. SYSTEM Architecture

Here's how the system works:

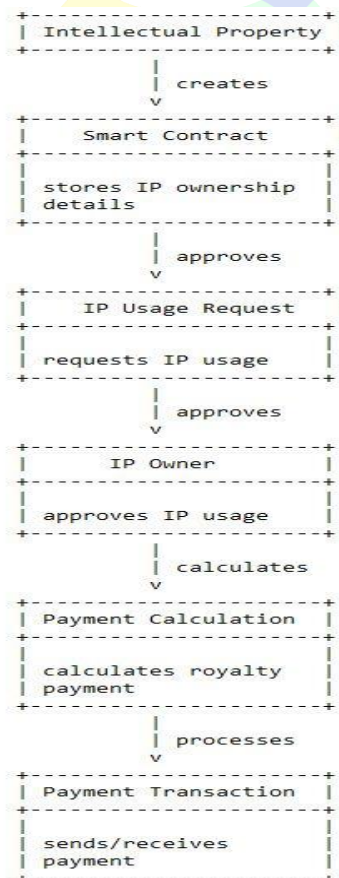
- Intellectual Property: The owner of the intellectual property (IP) creates a digital representation of their IP, such as a document, image, or video.
- Smart Contract: The owner of the IP creates a smart contract on the blockchain that specifies the terms and conditions of how the IP can be used, distributed, and sold.
- Blockchain Network: The smart contract is deployed on a blockchain network, which is a distributed ledger that records transactions in a secure, transparent, and immutable manner.
- Decentralized Nodes: The blockchain network consists of decentralized nodes that maintain copies of the ledger and validate transactions according to the consensus rules of the network.
- Protection of Intellectual Property: When someone wants to use the IP, they must agree to the terms and conditions of the smart contract. The smart contract can enforce the usage rules, distribute royalties to the IP owner, and prevent unauthorized use or infringement of the IP.

Overall, this system architecture provides a secure and transparent way to protect intellectual property using blockchain technology.



Use Case Diagram

In this use case diagram, there are five actors involved: Intellectual Property, Smart Contract, IP Usage Request, IP Owner, Payment Calculation, and Payment Transaction. The Intellectual Property actor creates the IP and sends it to the Smart Contract, which stores the IP ownership details. The IP Usage Request actor then sends a request for IP usage, which the IP Owner actor approves. The Payment Calculation actor calculates the royalty payment for the IP usage, and the Payment Transaction actor sends/receives payment for the IP usage. Overall, this use case diagram shows how blockchain technology can be used to protect intellectual property by securely storing ownership details and enabling transparent and efficient transactions for IP usage and royalty payments.

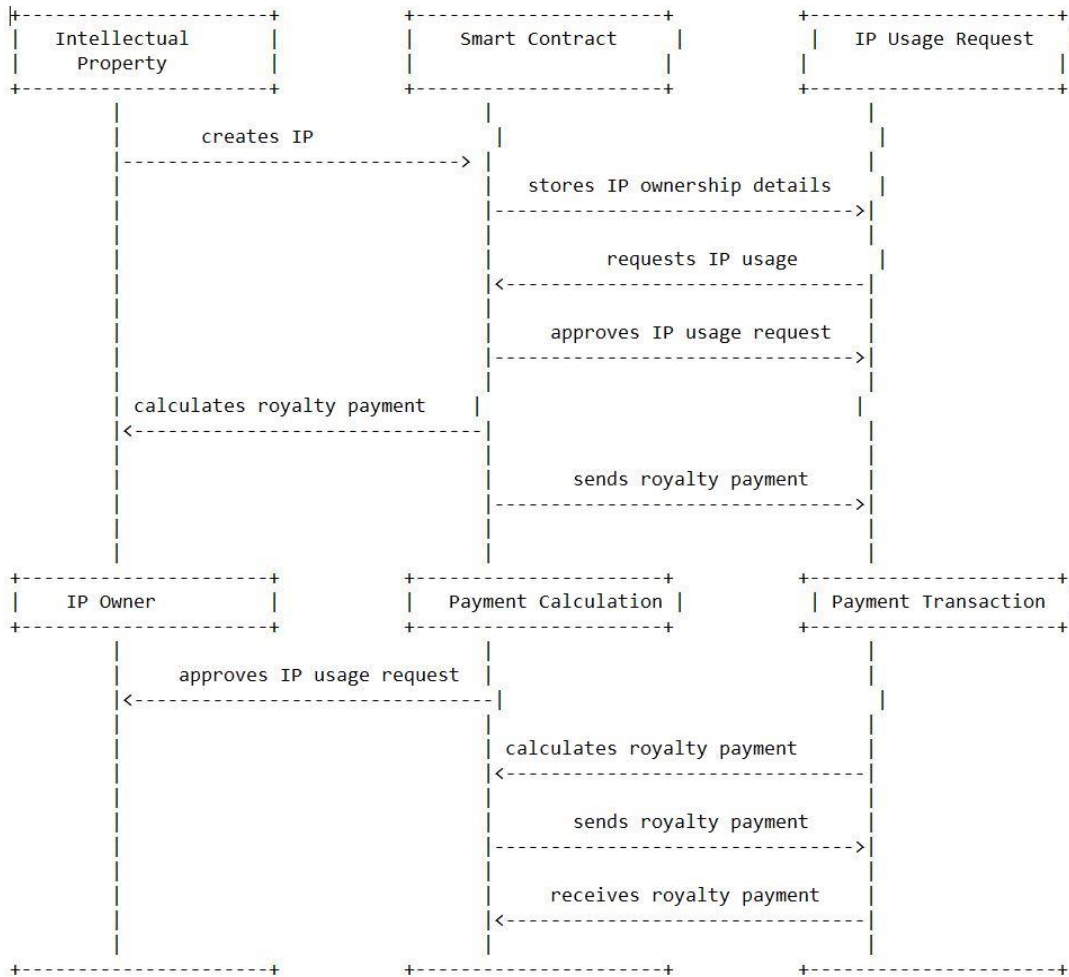


sequence diagram

This sequence diagram shows the interactions between different entities involved in protecting intellectual property using blockchain technology.

First, the Intellectual Property entity creates the IP and sends it to the Smart Contract entity, which stores the IP ownership details. Then, the IP Usage Request entity requests IP usage, and the Smart Contract entity approves it.

Next, the Payment Calculation entity calculates the royalty payment for the IP usage, and the IP Owner entity approves the IP usage request. The Payment Calculation entity then sends the royalty payment to the Payment Transaction entity, which sends the payment to the IP Owner entity. Overall, this sequence diagram demonstrates how different entities interact with each other to protect intellectual property using blockchain technology.



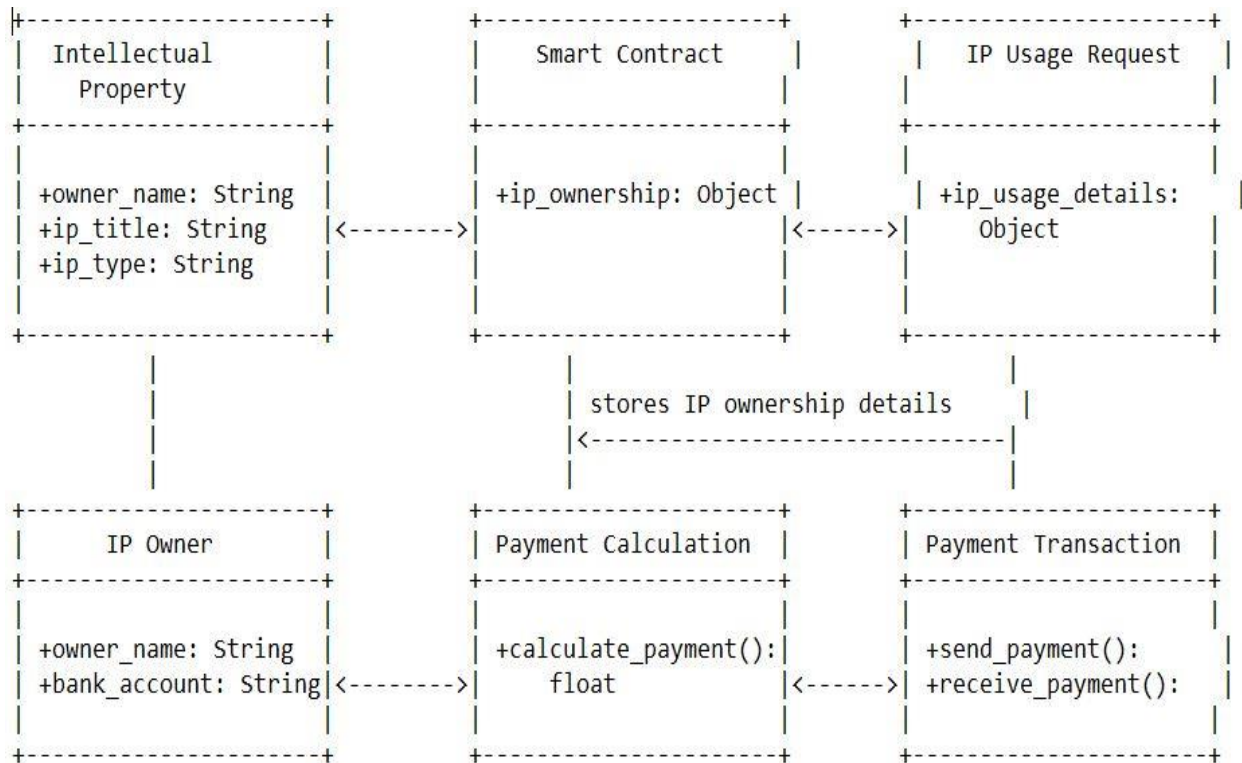
**Class Diagram**

In this class diagram, there are five classes involved: Intellectual Property, Smart Contract, IP Usage Request, IP Owner, Payment Calculation, and Payment Transaction.

The Intellectual Property class has attributes such as owner\_name, ip\_title, and ip\_type. The Smart Contract class has an attribute called ip\_ownership, which is an object that stores IP ownership details. The IP Usage Request class has an attribute called ip\_usage\_details, which is an object that stores IP usage details.

The IP Owner class has attributes such as owner\_name and bank\_account, and methods for approving IP usage requests. The Payment Calculation class has a method called calculate\_payment() that calculates the royalty payment for IP usage. The Payment Transaction class has methods for sending and receiving payments.

Overall, this class diagram shows how different entities and classes interact with each other to protect intellectual property using blockchain technology.



## VII. LITERATURE REVIEW

### [1] Application of Blockchain Technology in Intellectual Property Protection

The paper was published by Vijay Kumar. in the year 2022

proposed the application methods of blockchain technology in copyright confirmation, proof of prior use of trademark rights, and logistics tracking to prevent counterfeit goods, and discussed and suggested the legal regulation of smart contracts; Buterin and Around.

### [2] Bitcoin: A Peer-To-Peer Electronic Cash System

The paper was published by S. Nakamoto. in the year 2008

Build a digital copyright governance system, introduce the application of the technology in the field of digital copyright from the current situation of digital copyright industry, and propose that it should be fully applied in the fields of confirmation; Huang Long6 analyzed the encryption algorithm and smart contract principle of blockchain technology, proposed the copyright traceability, intelligent integration, and automated rights maintenance mechanism brought by the technology, and explained that the technology can dilute legal boundaries, integrate management systems, give rise to industrial ecology, and promote self-publishing forms, illustrating that the significant impact the technology will bring to the press and publishing industry; Corda envies.

### [3] A Next-Generation Smart Contract and Decentralization Application Platform

The paper was published by V. Buterin. in the year 2014

From the challenges encountered in the traditional online copyright protection environment, arguing that there are currently problems such as difficulty in determining the ownership of works, difficulty in obtaining evidence and limited ways, and difficulty in proving the amount of damages for infringement and proposing the new opportunities provided by blockchain technology, while also analyzing the possible problems and coping strategies in the process of technology application; McConaghy et al.

### [4] Architecture of the Hyperledger blockchainfabric

The paper was published by C. Cachin. in the year 2016.

introduced the application scenarios of block technology applied to the field of digital copyright protection. (ey also proposed suggestions for the sustainable development of the legal regulation of this technology in China, taking the existing platforms in the United States and Japan as examples; Yanchuan.

**[5] A Distributed Ledger, Blockchain, Luxembourg, Luxembourg**

The paper was published by H. M. Corda. in the year 2016.

Illustrates the problem of imbalance of interests among digital publishing stakeholders, analyzes the advantages of blockchain technology in protecting the interests of digital publishing stakeholders, and proposes practical strategies for using the technology; Yuan and Wang

**VIII. Expected Outcomes & Advantages**

blockchain-based digital copyright protection platform will offer a unique opportunity to address the aforementioned issues. In terms of digital copyright registration and confirmation, blockchain technology eliminates the time-consuming, high-cost, and difficult-to-audit problems associated with traditional registration methods, transcends space and time constraints, and enables any creator to register and confirm their rights.

There are many benefits to using blockchain as an IP registry, including decreased administrative work and minimal maintenance costs. Every asset has a transaction output known as a coin. The coin is the property of the owner. A fresh coin is given to the new owner when the previous owner's coin is consumed during the property sale. The transaction history from the genesis transaction to an unspent currency is checked for owner identification. The owner of the unspent coin is the owner of the property.

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