

# A Permissioned Blockchain for Intellectual Property Copyright Protection

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**ABSTRACT:** Copyright is essential to provide economic and moral rights to the creator of a work. The economic right allows a creator to prevent any parties from copying and using a work without permission, including reproducing, translating, or monetization. On the other hand, moral rights protect the creator's work from being manipulated or changes that risk the creator's reputation. The work creator may allow someone to use their work under licensing or agreement made by both parties; in some cases, the work creator might also sell the rights to someone, which directly made the buyer become the new owner of the work. Therefore, creation is an asset to a creator and must be protected securely. By introducing permissioned or private blockchain to the copyright asset management, we can allow only the necessary party to access the ledger or block. In this study, we will demonstrate how a permissioned blockchain can provide a secured and decentralized environment for securing copyrighted works.

**Keywords:** *permissioned blockchain, copyright, Hyperledger fabric*

## 1. INTRODUCTION

In the current digital era, information and resources can be obtained by a simple search through internet browser. Valuable assets or digital work such as images, videos, music are scattered and spread around from one computer to another as if the author or owner does not exist. Copyright is the right given to an author to protect their digital work such as photograph, music, literary work and software [1]. Since intellectual property (IP) and competition go hand-in-hand with technologies and innovations, the New Malaysian Digital Economy Blueprint or MyDigital revealed a game-changing revolution in IP [2]. In Malaysia, the copyright registration process requires the authors to register their work with Intellectual Property Corporation of Malaysia (MyIPO), which includes preparing relevant official forms, statutory declaration, hard copy, and soft copy as well as the prescribed fees [3]. However, there are several drawbacks with the copyright registration process in Malaysia, including manual submission and time-consuming process.

## 2. LITERATURE REVIEW

There are several existing systems on permissioned blockchain network architecture and application. The existing implementation of the application is an important review that allows to setup the network topology and the blockchain network that able to record the digital work submit by an author.

We can learn a lot from the existing apps because there are a lot of interesting studies. For instance, the copyright storage system that are suggested by Pengbin Han, et. al [4] is the closest application that we can make as reference to this study. However, the developed system strictly follows the rules and constraint of China's copyright system which slightly differ from the implementation in Malaysia. Hence, the smart contract of the system should follow the requirements from MyIPO to ensure the correct procedure for the copyright registration. As a result, a Copyright Protection based on a Permissioned Blockchain Platform, called Ideaku is proposed.

## 3. METHODOLOGY

The blockchain enables the discovery and registration of an author's work in a safe manner. The computational framework is depicted in Figure 1, which includes the user community, the copyright blockchain network, and their properties.

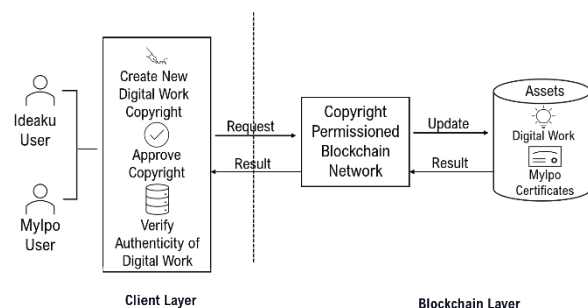


Figure 1: Permissioned Blockchain Network Architecture

From an application developer's perspective, a smart contract, together with the ledger, form the heart of a Hyperledger Fabric blockchain system. Whereas a ledger holds facts about the current and historical state of a set

of business objects, a smart contract defines the executable logic that generates new facts that are added to the ledger.

#### 4. RESULT AND DISCUSSION

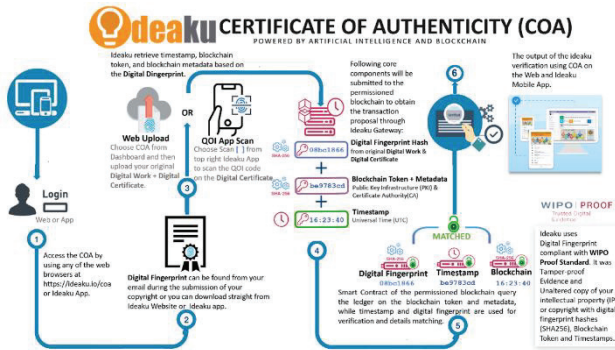


Figure 2: Certificate of Authenticity (COA).

Certificate of Authentication (COA) is the process to validate the authenticity of the digital work and digital certificates as shown in Figure 2. The proposed COA validation method is compliant with WIPO Proof [5] while adapting Quick Object Identifier (QOI) [6] to seal the blockchain information to the digital work certificates and MyIPO certificates. QOI is a customized QR technology with digital signature that aims to eradicate the global counterfeit trade with its unparalleled encryption algorithm. The verification of the COA through the Web and Mobile app shown in Figure 3.



Figure 3: COA Web or Mobile App Verification Methods

#### 5. CONCLUSIONS

The current process of copyright registration is facing challenges that greatly demotivates author in protecting their valuable digital works and assets. A permissioned blockchain network is proposed to enable a secure, trustable, and encapsulated environment that uniquely bind the digital work with author. By using the proposed blockchain architecture and methodology, a decentralized registration of copyright can be achieved to enhance the data integrity of the authors. In addition, copyright information is trustworthy and can be validated fast with the integrated QOI based COA validation. In conclusion, this paper provides a digital work copyright

architecture with the integration of fabric based blockchain network. The innovative proposed method in this paper is capable of providing tamper-proof data, effective registration time and cost management, and quick verification of an owner's digital works.

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