# AN IMPLEMENTATION OF BLOCKCHAIN TECHNOLOGY IN FORENSIC EVIDENCE MANAGEMENT

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**ABSTRACT**—Evidence management is highly valued in the field of forensic science. In order to solve crimes and bring perpetrators to justice, evidence gathered at the site of the crime is essential. Therefore, it is essential to keep these goods protected from any kind of manipulation. Chain of custody is a method used to ensure that evidence is kept secure. If the chain if custody is broken, the evidence cannot be used in court, which might lead to an automatic dismissal of the proceeding. Because the standard practice for handling forensic evidence is so wasteful, moving toward a digital system is crucial. Blockchains are public, digitally distributed ledgers comprising transactions that have been signed cryptographically and divided into blocks. The Linux Foundation created Hyperledger Fabric, a blockchain platform designed specifically for enterprise use cases. Based on the concepts of Hyperledger Fabric, this study aimed to provide a framework for implementing Blockchain Technology into the criminal records administration system while maintaining the Chain of Custody.

## INTRODUCTION

Handling evidence correctly is crucial in forensic science. Forensic investigation has major challenges in the areas of evidence management and documentation. From the moment it is gathered until the judge gives a ruling, evidence must be kept under lock and key. Evidence that has been passed from a single individual to another during an inquiry leaves a paper trail known as the "Chain of Custody" (CoC). You must maintain the CoC in excellent working order if you'd like your evidence to stand up in court. The Certificate for Compliance (CoC) procedure may only be completed successfully if the following conditions are met:  It is crucial that evidence is not tampered with or otherwise compromised.  There should be a paper trail who can be traced from the beginning of the inquiry all the way through to the presentation of the evidence

in court. Proof must be reliable and relevant to the conduct in question. All witnesses must be willing to corroborate the validity of the evidence. No one who has not been authorized to do so may touch the evidence, since this might lead to its alteration or falsification. Saving both time and money, digitizing the forensic evidence management system frees up valuable real estate. In a court about law, a Certificate of Compliance may serve as proof of legitimacy and validity. These might be updated and protected using blockchain technology. Blockchain technology allows us to save all the data pertaining to a system in a single, secure, and easily accessible place. Technology has the potential to speed up the process of evaluating printed documents. In a criminal trial, proof of the chain to custody (CoC) is essential for determining guilt or innocence. Without evidence, a case might be manipulated in the incorrect direction. Proper handling and packaging is essential for preserving evidence. When evidence is collected from the scene of a crime, it must through a process known as "Chain on Custody," which entails keeping detailed records of its trip to the courtroom. The integrity of evidence relies heavily on the integrity of the chain or custody (CoC). Only authorized persons may handle evidence, and it is the duty of the investigating officer to ensure that all documentation is filled out accurately and in a timely way. All the evidence was collected, sealed, and stored away, along with the evidence log. Credible evidence collection requires adherence to well-established norms and standards. Some countries' methods may differ somewhat from others when it comes to the finer points. Delivering evidence to a criminal justice lab requires careful labeling and packaging to avoid loss or tampering on the way to the lab.

## RELATED WORK

### "A Blockchain-based Chain of Custody for Digital Forensics Evidence"

Evidence management is difficult in digital forensics. During the period between when they are first collected and when they are used in court, many parties involved in the investigation might get access to the evidence and temporarily gain ownership of it. The "The chain any Custody" (CoC) must be preserved at all costs to ensure the admissibility of evidence gathered during an inquiry. Currently, every link in the chain is responsible for manually documenting their part in the chain of custodian (CoC) for digital evidences. This article proposes for Blockchain-based Chain of Possession (B-CoC) to decentralize the CoC process, with the goals of ensuring verifiable integrity of the obtained evidences & the traceability of owners. We implemented and analyzed a proof-of-concept for B-CoC on the Ethereum blockchain.

### Digital Forensics Using Blockchain Technology. A World View of Tomorrow's Engineering and Technology,"

Particular care must be taken to protect the unaltered and undamaged state of digital evidence from a wide range of potential threats. We must protect the integrity of the system and the integrity of the evidence so that it may be used in court. The "Chain of Custody" is just a way of keeping track of things in a certain order. A criminal investigator might check the Chain or Custody to see whether the data

they are working with is credible. Without a clear trail of custody from the moment evidence was gathered until it was presented in court, it is hard to prove that the evidence was not tampered with. That implies we can't put any faith in the data we've collected thus far. Currently used by Bitcoin along with other cryptocurrencies, a blockchain is a distributed ledger in which blocks of information are hashed and stored.Sinceblockchain permits the tracking of data access, it may increase the credibility of evidence submitted in court as part of the Chain if Custody method. Chain of Custody (abbreviated to CoC), Blockchain-Based Certificate of Custody (abbreviated to B-CoC), and Proof of Work (abbreviated to PoW) are all terms for similar concepts.

The study's findings suggest that in order to improve their leadership quality to intentionally impact employee performance, industry managers should pay attention to human resource management indicators like collaboration, involvement, actualization, perception, and teamwork [13]. This is primarily because of the inherent limitations of IoT devices and the distributed ledger architecture of the blockchain technology. There is potential for IoT to provide many advantages if blockchain capabilities can be optimized for it.

## METHODOLOGY

The malleability of digital archives is a significant advantage. Only authorized personnel will be able to access it. Multiple versions of a file may be made and stored safely without harming the original.

The whole world may easily have access to it.

Multiple files may be sent at once and received without delay. When searching for data saved digitally, you'll only need a few minutes, but when searching through paper files, you'll need considerably more time. After a catastrophe of any kind, evidentiary papers may be tampered with or destroyed. As a result, including blockchain technology into the Chain the Custody process may lessen the likelihood of these documents being tampered with. It's possible that this technology may even help humans make fewer mistakes. Taking advantage of the digitization of the world is essential for forensic evidence management systems.

A permissioned blockchain, sometimes known as a private blockchain, is one to which only a predetermined set of computers have access. Participating in authenticating transactions requires approval from a regulating organization. The blockchain might have useful applications in the business world. These types are flexible in terms of modifications, scale well, are safe, and perform well.

The integrity of the system relies on the honesty and dependability of the users. A few examples of permissioned blockchains involve Ripple, Corda, & Hyperledger Fabric.

The second category of blockchains is known as permissionless or public blockchains. Using this blockchain structure, every member of the network may process and validate transactions. All nodes in the network share the same copy of the ledger. There is no governing body over the blockchain, and nodes' anonymity is safeguarded. They are reliable and a secure choice.

Some instances of permissionless blockchains are Ethereum, Bitcoin, and Dash.

## RESULT AND DISCUSSION

Officers or administrators can send in the report after filling out the preceding page by clicking on the "Submit" button.
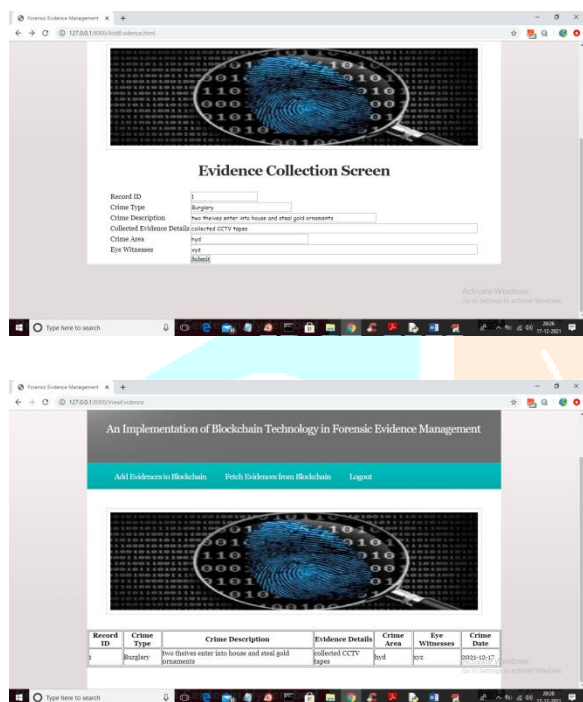




The contents of the preceding window are admissible in court since they were taken straight from the Blockchain. The administrator may input and preserve information on a comparable number of offences in Blockchain.

## CONCLUSION

From the time it is collected at the crime site until the judge issues a judgement, evidence must be stored under lock and key. The integrity of the collected and analyzed evidence may be verified by looking at the chain of custody. To ensure the security, truthfulness, and quality of forensic data transfers, Blockchain technology digitalizes the chain of custody. The implementation of blockchain technology would enhance not just environmental friendliness but also security, since data will be encrypted and viewable only by authorized parties. Our goal is to create a system that uses Hyperledger Fabric and other blockchain technologies to realize the chain and custody process. Perhaps most significantly for the field of forensics, blockchain can be used with AI/ML to provide a very effective instrument.

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