BLOCK CHAIN-ENABLED ACADEMIC RECORD MANAGEMENT SYSTEM FOR EDUCATION SECTOR

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ABSTRACT:

The Student Document Management System based on Ethereum Blockchain project aims to revolutionize the traditional approach to academic record keeping by leveraging the decentralized and secure features of block chain technology. The system seeks to provide a tamper-proof and transparent platform for the storage, verification, and accessibility of student documents. Through the integration of smart contracts on the Ethereum block chain, the project aims to ensure data security, streamline the verification process, and reduce the risk of data loss. By prioritizing user authentication, efficient document upload and verification, and a user-friendly interface, the system intends to offer a comprehensive solution for educational institutions, students, and employers, contributing to the enhancement of overall data integrity and accessibility in the academic sector. The project also emphasizes rigorous testing, scalability considerations, and thorough documentation, anticipating a positive impact on educational practices and the evolution of secure document management systems.

Keywords: block chain

INTRODUCTION

A Blockchain is a shared, immutable ledger that facilitates the process of recording transactions and tracking assets in a business network. An asset can be tangible (a house, car, cash, land) or intangible (intellectual property, patents, copyrights, branding). Virtually anything of value can be tracked and traded on a blockchain network, reducing risk and cutting costs for all involved. A blockchain is "a distributed database that maintains a continuously growing list of ordered records, called blocks." These blocks are linked using cryptography. Each block contains a cryptographic hash of the previous block, a timestamp, and transaction data. A blockchain is Business runs on information, the faster it's received and the more accurate it is, the better. Blockchain is ideal for delivering that information because it provides immediate, shared and completely transparent information stored on an immutable ledger that can be accessed only by permission network members. A block chain network can track orders, payments, accounts, production and much more. And because members share a single view of the truth, you can see all details of a transaction end to end, giving you greater confidence, as well as new efficiencies and opportunities.

II. METHODOLOGY

The existing document management system within educational institutions operates with a centralized structure, relying on traditional databases for the storage of student records. While the system exhibits familiarity and historical data retention, it grapples with significant challenges. Security concerns loom large, as the centralized nature makes the system susceptible to breaches, risking the confidentiality and integrity of student records. Additionally, limited accessibility and manual verification processes

contribute to inefficiencies. Opportunities for improvement lie in the integration of blockchain technology, promising enhanced security, transparency, and streamlined verification processes. Verification of student documents is predominantly a

manual and time-consuming process. Employers and academic institutions often rely on contacting educational institutions directly for verification, leading to delays and inefficiencies. The proposed Student Document Management System introduces a

transformative approach to address the shortcomings of traditional centralized systems in the blockchain network of the university. The new university then joins the network of the old university. Then the old university verifies there cords in their database, and it validates the certificates. The record cannot be altered retroactively without the alteration of all a decentralized, distributed and public digital ledger that is used to record transactions across many computers so that Educational institutions. By integrating the Ethereum Blockchain, the system establishes a decentralized and tamper-proof infrastructure, ensuring enhanced security and transparency in the management of student records. One of the key features is the implementation of smart contracts, automating and expediting the verification process for academic credentials. Storage mechanisms not only improve accessibility but also mitigate the risk of data loss, allowing authorized users to access records from various locations.

The decentralized nature of the blockchain facilitates global accessibility to academic records. The system can potentially be interoperable with international standards, allowing for recognition of student credentials on a global scale.

III. ALGORITHMS USED IN BLOCKCHAIN

It is a project theory mechanism for academic documents, such as mark sheets, transcripts, diplomas, and other certificates. The goal is to ensure the authenticity of academic documents, reducing the incidence of counterfeit certificates, and saving time and financial resources for all parties involved in document verification.

Issuer submits raw document can user's block chain address Send raw document to Node server Generation of UUID and QR Generate UUID and QR Code, append QR code and UUID to document Calculate hash of document with QR. Upload doc with QR code to IPFS React receives IPFS link & hash value of doc from Node server Store hash value, issue are address, user address and IPFS link React appear turns a response: hash value, issuer and user address, IPFS link.
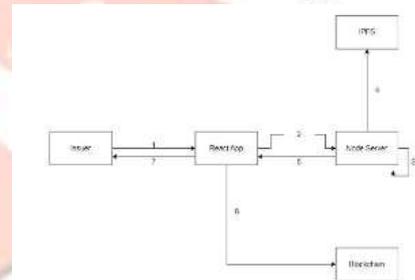
Subsequent blocks and the consensus of the network. For a new university of higher education. The new university reviews the application and contacts the old university. To verify the certificates, the old university sends are quest to join the blockchain network of the university. The new university then joins the network of the old university. Then the old university verifies there cords in their database, and it validates the certificates.

FLOWCHARTANDSEQUENCEDIAGRAM
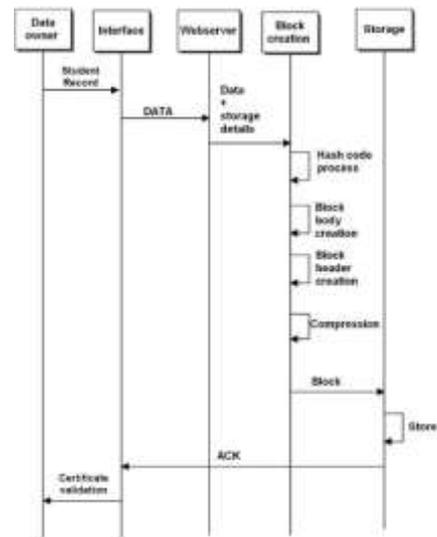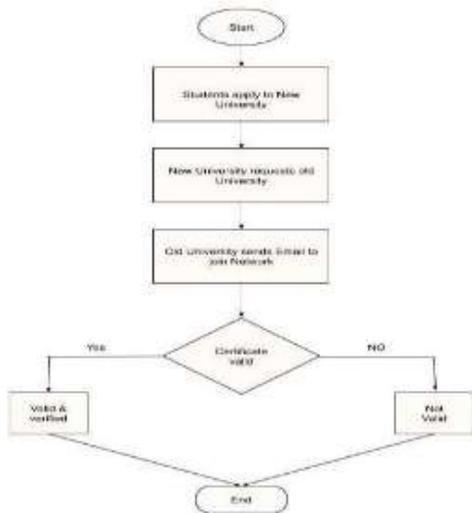
V. RESULTS

The implementation of the Student Document Management System based on Ethereum Blockchain represents a significant stride towards revolutionizing academic record management in educational institutions. By integrating cutting-edge technologies such as block chain, the system addresses the limitations of traditional centralized systems, offering enhanced security, transparency, and efficiency. The modular design and implementation ensure a robust architecture that caters to the diverse needs of students, faculty, and employers. The user authentication and authorization module establishes a secure access

framework, while the document upload and verification modules streamline processes for students and facilitate efficient verification for employers and academic institutions. The incorporation of blockchain technology adds a layer of immutability and transparency to student records. Smart contracts automate verification processes, providing a tamper-proof and efficient solution for validating academic credentials. The frontend and backend modules, along with continuous integration and documentation, contribute to the overall usability, reliability, and maintainability of the system.

VI. CONCLUSIONANDFUTURESCOPE

By leveraging blockchain technology, the proposed system ensures heightened security, transparency, and efficiency in document verification processes. The decentralized and tamper-proof nature of the Ethereum Blockchain, coupled with smart contract automation, enhances the integrity of student records. A user-friendly interface and role-based access control contribute to a streamlined and secure experience for students, faculty, and employers. The system's adaptability to technological advances, scalability, and potential for future enhancements position it as a robust solution, poised to revolutionize the landscape of academic record management and verification. Scalability Considerations: Design the system architecture with scalability in mind to handle an increasing volume of student records and user interactions.
Blockchain Upgrades: Stay abreast of advancements in blockchain technology and consider upgrades to newer versions or alternative blockchain platforms for improved features and explore integration with existing academic systems to facilitate seamless data exchange and ensure data consistency.

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