World Academy of Science, Engineering and Technology
International Journal of Computer and Information Engineering
Vol:19, No:06, 2025

Secure and Privacy-Enhanced Blockchain-Based Authentication System for University User Management

Authors : Ali El Ksimi

Abstract : In today's digital academic environment, secure authentication methods are essential for managing sensitive user data, including that of students and faculty. The rise in cyber threats and data breaches has exposed the vulnerabilities of traditional authentication systems used in universities. Passwords, often the first line of defense, are particularly susceptible to hacking, phishing, and brute-force attacks. While multi-factor authentication (MFA) provides an additional layer of security, it can still be compromised and often adds complexity and inconvenience for users. As universities seek more robust security measures, blockchain technology emerges as a promising solution. Renowned for its decentralization, immutability, and transparency, blockchain has the potential to transform how user management is conducted in academic institutions. In this article, we explore a system that leverages blockchain technology specifically for managing user accounts within a university setting. The system enables the secure creation and management of accounts for different roles, such as administrators, teachers, and students. Each user is authenticated through a decentralized application (DApp) that ensures their data is securely stored and managed on the blockchain. By eliminating single points of failure and utilizing cryptographic techniques, the system enhances the security and integrity of user management processes. We will delve into the technical architecture, security benefits, and implementation considerations of this approach. By integrating blockchain into user management, we aim to address the limitations of traditional systems and pave the way for the future of digital security in education.

Keywords : blockchain, university, authentication, decentralization, cybersecurity, user management, privacy
Conference Title : ICCSPS 2025 : International Conference on Computer Science, Programming and Security
Conference Location : Montreal, Canada
Conference Dates : June 14-15, 2025