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A Decentralised Framework for Issuing Electronic Exam Pass Using Hyperledger Fabric

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Abstract:

Conventional exam pass systems face persistent challenges of security breaches and administrative inefficiencies due to the centralised nature of these systems. There is need to address the problem of centralisation to enhance the security of these system and fortify the integrity of the examination process by mitigating the risks of data manipulation and unauthorized access. This paper introduces a decentralised framework, powered by Hyperledger Fabric private blockchain, to revolutionize exam pass management. The framework involves network initiation by an administrator, followed by the creation of specialized channels that maintain a ledger for students and invigilators alike. Furthermore, a unique channel is established for the administrator to maintain a ledger of registered students and their exam-pass information, enabling seamless sharing with peer nodes. Subsequently, distinct artifacts, including a Membership Service Provider (MSP), a Certificate Authority (CA), and an orderer node, are established to facilitate administrative rights, assign digital identities, and order transactions, respectively using cryptographic protocols. Registration and identity assignment are confined to the chain code deployed and maintained by the administrator. A front-end web application ensures seamless and secure interactions for participants of the system. The results encompass a marked reduction in fraudulent activities, optimized pass issuance procedures, and heightened security for all involved parties.

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I. Introduction

While adopting the contemporary approach of managing electronic documentation, most educational establishments still depend on manual procedures for the transfer of academic records, including transcripts, examination passes, and certificates [1]. Undoubtedly, the educational institution is undergoing a digital transformation, and one crucial aspect of this

evolution is the examination process. Traditionally, exams have been administered in physical locations, requiring paper-based admission tickets also known as examination passes, and extensive administrative efforts. However, with the rapid advancement of technology, electronic examination management systems have gained prominence as a more efficient and scalable approach [2].

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