

A Modeling Approach for Blockchain-Oriented Information Systems Design

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Abstract : The blockchain technology is regarded as the most promising technology that has the potential to trigger a technological revolution. However, besides the bitcoin industry, we have not yet seen a large-scale application of blockchain in those domains that are supposed to be impacted, such as supply chain, financial network, and intelligent manufacturing. The reasons not only lie in the difficulties of blockchain implementation, but are also root in the challenges of blockchain-oriented information systems design. As the blockchain members are self-interest actors that belong to organizations with different existing information systems. As they expect different information inputs and outputs of the blockchain application, a common language protocol is needed to facilitate communications between blockchain members. Second, considering the decentralization of blockchain organization, there is not any central authority to organize and coordinate the business processes. Thus, the information systems built on blockchain should support more adaptive business process. This paper aims to address these difficulties by providing a modeling approach for blockchain-oriented information systems design. We will investigate the information structure of distributed-ledger data with conceptual modeling techniques and ontology theories, and build an effective ontology mapping method for the inter-organization information flow and blockchain information records. Further, we will study the distributed-ledger-ontology based business process modeling to support adaptive enterprise on blockchain.

Keywords : blockchain, ontology, information systems modeling, business process

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