An extended access control model for permissioned blockchain frameworks

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Abstract

In distributed environment, a digital transaction or operation requires transparency and trust among multiple stakeholders. Several approches address such issues however, among these blockchain provides a viable solution which has received wide acceptance in the recent past. Permissioned blockchain solutions adopt more efficient consensus algorithms and smart contracts. There are many smart-contract solutions exists (such as, etherium, IBM blockchain, hyperledger fabric), however, much of them mainly follow traditional access control models. A role-based access control model provides controlled access of resources to members. This research work presents an extended usage control model known as DistU (Distributed Usage Control). DistU is proposed to capture all possible access control models required by a business for permissioned blockchain frameworks. DistU can monitor a resource continuously during the operation and update the attributes accordingly, performing different actions, such as denying or revoking permissions. We believe that the proposed DistU usage control model can provide a fine-grained control for blockchain resource management. The paper also contributes to provide a protoype implementation of fine-grained permission model on Hyperledger Fabric. The reason of selecting Fabric for this research is that, it is the first execute-order achitecture blockchain that provides a platform to develop general business applciations. Secondly, it is an opensource operating system of permissioned blockchain with huge industry support.