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Decentralized Cloud Collaboration

A Dissertation By

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ABSTRACT

Cloud collaboration is a billion-dollar industry, for sharing, storing, and co-authoring files. In the current age of information technology, cloud collaboration expects to see a significant amount of growth, as more organizations look to leverage the benefits of the industry specifically in the areas of flexibility, cost-efficiency, and security. However, existing systems basically operates in a centralized cluster to achieve high performance, though they have a demand solving indisputable benefits, there are several inherent weaknesses such as high server costs for service providers, illegal data mining in trust-based architecture, security loopholes, and unethical government surveillance.

Through an in-depth literature study and industry surveys, it was identified that a large-scale decentralized system for resource storing & sharing can mitigate these traditional server expenses, data failure, and power/network outage. Thus, a peer-to-peer system was developed to devise a successful collaboration platform for users which also enhances the data security, data confidentiality and data integrity of the data in the network. The proposed system includes blockchain, distributed storage, and distributed application which are bind together using a set of protocols.

The developed system's data availability, data integrity, and data confidentiality were tested based on practical and theoretical perspectives of the application. Thus, the usage of decentralization in cloud collaboration domain solves a number of limitations found in current systems, justifying that the research produces acceptable results.

Subject Descriptors— C.1 Processor Architectures ~ C.1.4 Parallel Architectures; C.2 Computer-Communication Networks ~ C.2.1 Network Architecture and Design, C.2.2 Network Protocols, C.2.4 Distributed Systems; F.4 Mathematical Logic and Formal Languages ~ F.4.1 Mathematical Logic; K.6 Management of Computing and Information Systems ~ K.6.4 System Management, K.6.5 Security and Protection;

Key words— Peer-to-Peer System, Decentralization, Blockchain, Distributed Hash Table, Cryptography, Fault Tolerance in Distributed File Storage, Security.