

**MASTER'S THESIS (SPRING 2014)**

TOPIC: *A Secure and Fault-Tolerant Data Storage Schema Using Multiple Cloud-Based Service Providers*

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ABSTRACT

Cloud-based data storage provides users many advantages such as scalability, global access, easy sharing and syncing, and reduced overhead of maintaining an infrastructure. However, there are also major concerns about security, confidentiality, integrity and reliability of data that prevent users from exploiting the capacity of cloud data storage to the fullest. In this thesis, we propose a secure and fault-tolerant data storage schema using multiple cloud-based service providers so that users do not need to worry about unauthorized access to their personal data or data loss due to the failure of any service provider. Different from existing approaches for data reliability using redundancy at the hardware level, we adopted the Reed-Solomon algorithm to store redundant cloud-based data with multiple service providers at the software level. With our approach, user's data stored in cloud is secure since each service provider has no access to the user's complete data. Furthermore, the failure or disconnection of service from a service provider will not lead to the loss of user's data because the missing data pieces can be easily recovered due to data redundancy. To demonstrate the feasibility of our approach, we developed a Java-based application that can randomly split a data file into multiple data pieces and upload them concurrently into cloud using multiple cloud storage services. Upon the failure of a cloud storage service, the application can successfully download the available data pieces and restore the original data file. Our experimental results show that our approach is not only secure and fault-tolerant, but also very efficient due to concurrent data processing.