Abstract

This thesis seeks to present a solution for the everlasting problem of storage limitation. The problem is addressed from the perspective of potential security leaks of existing commercial solutions offer, as well as from the perspective of recent advancements in distributed technologies. Thus, it proposes a reliable and secure application for data storage and synchronization in a peer-to-peer network. The application, IPFS-Drive is built on top of InterPlantetary File System (IPFS), an innovative protocol providing a content-addressable method for storing and sharing data in a peer-to-peer network.

Ideally, a decentralized storage system should have an extra layer for an incentive based storage renting market. This work does not intend to build such a market and therefore, the storage space for this system is provided by IPFS nodes grouped in a cluster, which act as a single entity. The cluster simulates an existing storage agreement between the IPFS-Drive user and the cluster peers.

The thesis is structured in six chapters. The first chapter presents the motivation for the selected topic and the problem statement. Next chapter offers a detailed presentation of IPFS and its underlying technologies, as well as of the IPFS cluster and synthesizes already existing work on the subject. It is followed in chapter three by an overview of what the proposed system tries to achieve and an introduction to the technologies used for building it. The fourth chapter focuses on presenting the implementation details of IPFS-Drive, spotlighting the authentication, storage and synchronization components. Further, the system evaluation is described, focusing on compliance to initial requirements and performance measurements. The final chapter discusses possibilities for extending the proposed application in the future, in order to achieve complete decentralization.

This work is the result of my own activity. I have neither given nor received unauthorized assistance on this work.

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