

Project title: Decentralized Storage Sharing with Mutual Involvement

Cluster:

- ♦ Network and Security
- ♦ EII (Enterprise, Innovation and Incubation)

Team members:

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Project overview:

The concept of a Peer-to-Peer (P2P) distributed storage sharing represents a distinct approach to file storage. Unlike traditional centralized file storage, where data is stored on a single server, a P2P distributed storage sharing leverages the collective resources of interconnected nodes to store files in a decentralized manner.

Current file storage systems predominantly rely on centralized architectures, where data is stored on single servers. However, this approach introduces limitations in scalability, maintenance and resilience. Centralized systems can become bottlenecks due to server overloads, lack of adaptability to changing user demands, and vulnerability to single points of failure.

The project aims to study and gain a thorough understanding of peer-to-peer networking and then explore its potential as an alternative to the current centralized storage system. We intend to design and develop a P2P distributed storage sharing system that allows mutual sharing of storage between users in the network. We believe that the current drawbacks of centralized storage systems can be eliminated by utilizing the potential of decentralized systems.

While the proposed system comes with its own set of challenges concerning data integrity and security as well as complexity of peer-to-peer networking, the proposed approach holds the potential to be a promising alternative to the traditional file storage system. Therefore, we aim to develop a decentralized file storage system to explore the feasibility and practicality of peer-to-peer networking.

Motivation:

We have all been amazed by the incredible file sharing capabilities of torrent. And with the recent emergence of new p2p networks like blockchain, a desire to learn about the intricacies of a p2p network has been developed inside us.

At the same time, we often encounter the issue of running out of storage space in our computer. We are presented with a choice between acquiring additional storage devices or turning to cloud storage, both of which come with financial implications and their own downsides.

The idea of utilizing the potential of a peer-to-peer distributed network to an universally existent problem is inherently captivating. This also motivates us to delve into the technicalities of a p2p networking, that we can actually use to solve existent problems.

Implementation plan:

The core of the project's implementation plan revolves around architecting a decentralized P2P connected storage sharing platform that leverages the distributed file system concept. This architecture will be structured to foster scalability, fault tolerance, and efficient data distribution.

The peer management component will encompass a peer discovery mechanism based on Distributed Hash Tables (DHTs). This will allow peers to locate one another through a unique identifier and maintain a dynamic network topology. To optimize file storage and retrieval, a content-addressable storage approach will be employed. Files will be divided into chunks, and each chunk's content will serve as its unique identifier. These chunks will be stored across peers in the network, and distributed algorithms like Kademlia will ensure efficient routing and retrieval.

Encryption algorithms like RSA will be implemented too in order to ensure the data privacy and security which is a big issue as well as the challenge of our project.

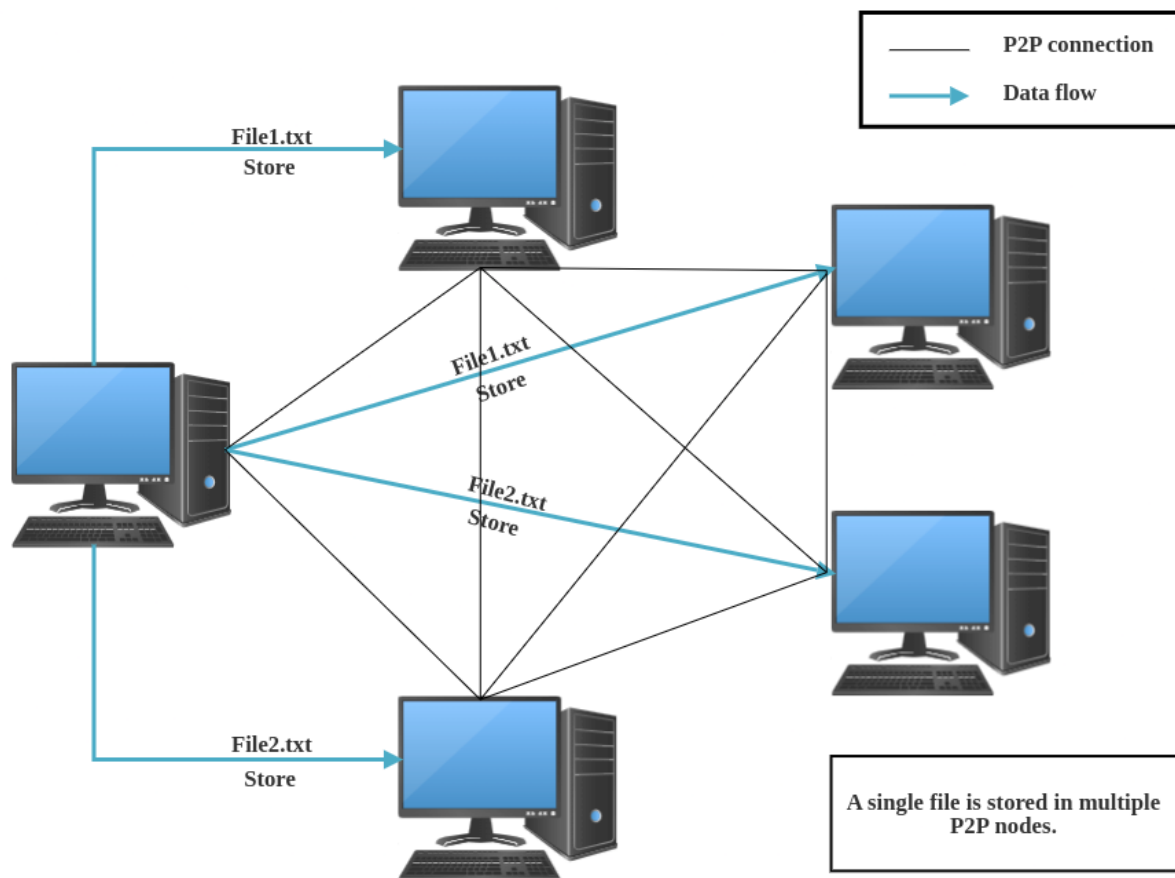


Fig : Storing Data (Block Diagram)

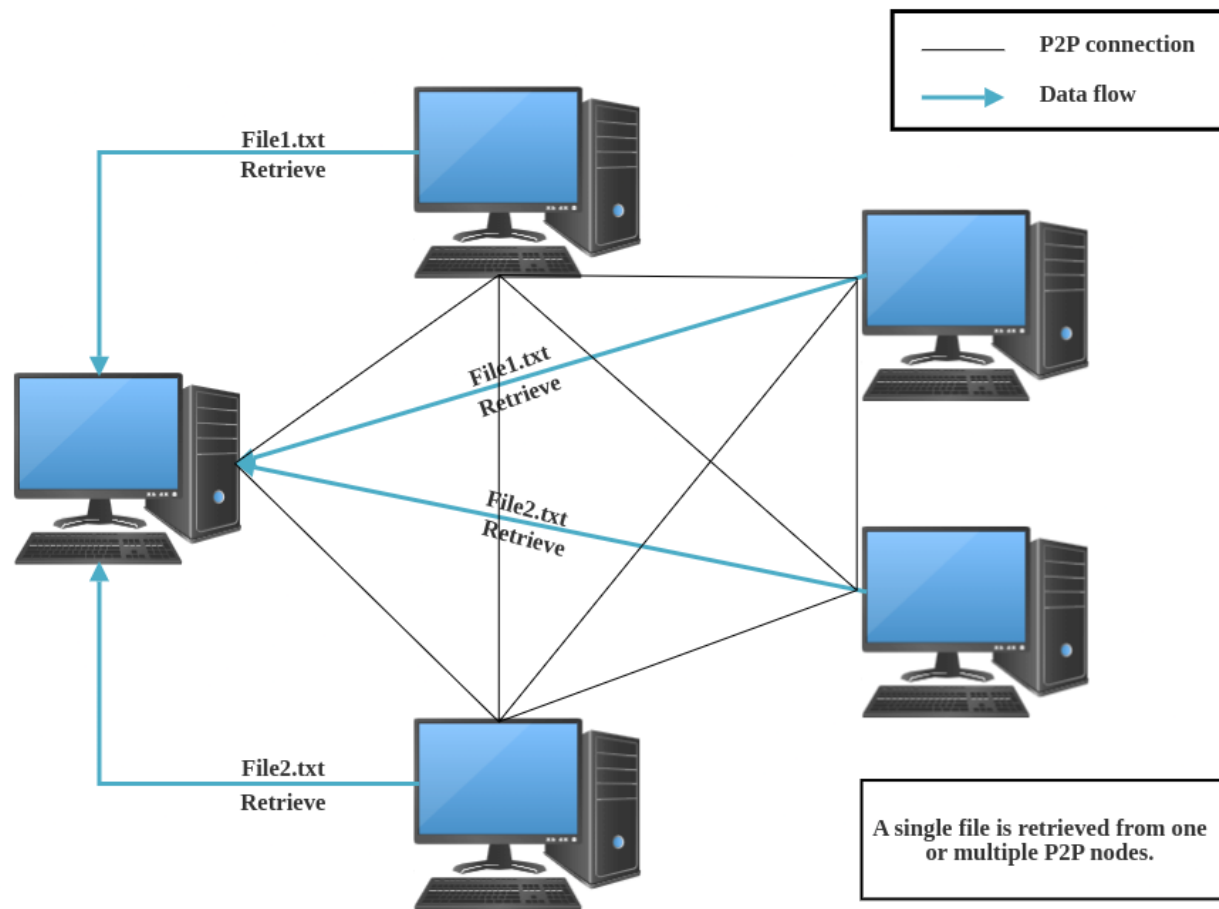


Fig : Retrieving Data (Block Diagram)

Application areas:

- ♦ Data backup and recovery
- ♦ Temporary storage solutions
- ♦ Personal storage augmentation