P2P Drive

Spring 2023 Senior Design Project

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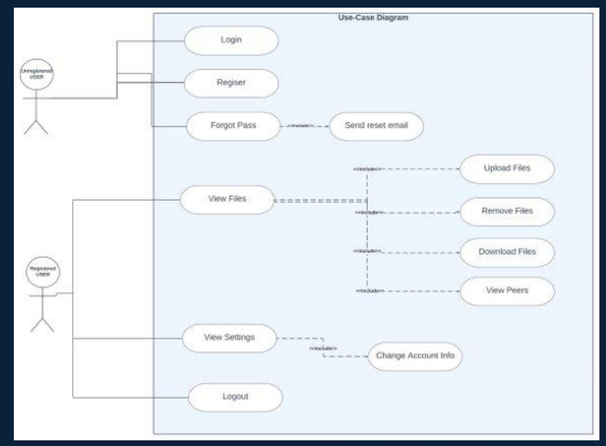
PROBLEM

The proposed system provides a solution to challenges faced by traditional data storage solutions. One major challenge is high storage costs, which the system addresses by using the decentralized IPFS network for cost-effective storage. Another challenge is redundancy and data loss concerns in centralized systems, which the system tackles by distributing data across the IPFS network to ensure accessibility even if nodes fail. The system also enhances security by combining IPFS's decentralized nature with server-side pinning and user-specific directories, and it improves scalability by utilizing the distributed IPFS network, which easily scales as nodes join. By integrating the IPFS network with Firebase, the proposed system creates a platform for reliable, secure, and cost-effective data management and storage, providing an innovative solution to traditional storage challenges.

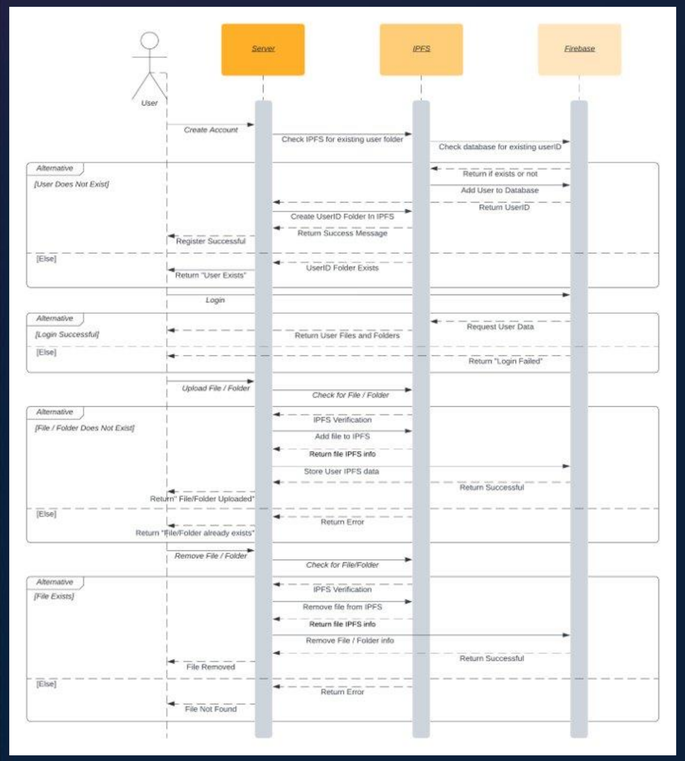
CURRENT SYSTEM

In contemporary computer systems, data is commonly stored on servers that are under the control of a single entity or group, which can present various difficulties and drawbacks. One such challenge is the substantial cost associated with acquiring and maintaining the expensive hardware necessary for storage. Furthermore, there are concerns about data redundancy and loss in the event of server failure or downtime. Security is also a significant issue, as centralized data is vulnerable to hacking and cyber attacks. Finally, the ability of a server to handle increased traffic and scale up may be constrained, leading to potential performance issues.

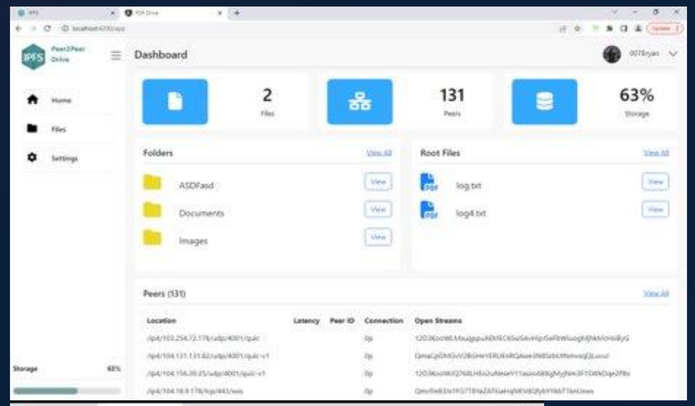
USE CASE DIAGRAM

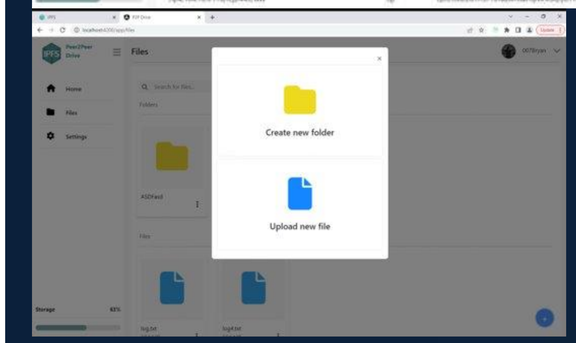


SEQUENCE DIAGRAM



SCREENSHOTS





On top of Working on Backend develop, I was personally responsible for maintaining and operating the Azure server that ran to test our progress

VERIFICATION

- Functional testing is done to check the functionalities of the system and ensure that they are working as intended.
- Registration and login processes, directory creation, file upload and download are some of the functionalities tested during functional testing.
- Performance testing is carried out to assess the system's ability to perform well under varying load conditions and increased usage.
- Integration testing is performed to evaluate the integration and interaction of different components of the system, including the front-end, back-end, and IPFS network.
- User acceptance testing is conducted to determine whether the system meets the expectations and requirements of its intended users. It involves testing the system with real users.

SUMMARY

This proposed system uses Web3, that is: a series of open-source and interconnected decentralized applications powered by blockchain computing architecture technology to overcome challenges typically faced by conventional data storage solutions. By utilizing the decentralized IPFS network, it offers a cost-effective storage alternative while addressing redundancy and data loss concerns through distributed data storage. The system also enhances security by integrating IPFS's decentralized nature, server-side pinning, and user-specific directories. In addition, its scalability is improved by utilizing the distributed IPFS network, which expands effortlessly as more nodes join. Overall, this innovative solution combines the IPFS network with Firebase to create a secure, reliable, and affordable platform for data storage and management while harnessing the power of Web3 technology.

REFERENCES

- https://ipfs.io/
- https://docs.ipfs.tech/
- https://docs.ipfs.tech/reference/kubo/rpc/
- https://proto.school/tutorials
- https://github.com/P2P-Drive/P2P-Drive

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