



**Knight Foundation
School of Computing
and Information Sciences**

P2P Drive

Spring 2023 Senior Design Project

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POSTMAN



Firestore

PROBLEM

IPFS is the Interplanetary File System. The IPFS-integrated software presented addresses multiple difficulties that traditional data storage solutions encounter. To start with, it cuts out high storage expenses by using the decentralized IPFS network, a cost-effective alternative. Additionally, it resolves concerns surrounding data loss and redundancy occurring in centralized systems by distributing data across the IPFS network. This ensures accessibility even if any nodes fail. Furthermore, the system enhances security by combining IPFS's decentralized nature with server-side pinning and user-specific directories to provide a secure data storage platform. Finally, it improves scalability by utilizing the distributed IPFS network, which can easily scale as nodes join. Our user-friendly integration addresses these challenges through the connection of the IPFS network and Firebase.

SEQUENCE DIAGRAM



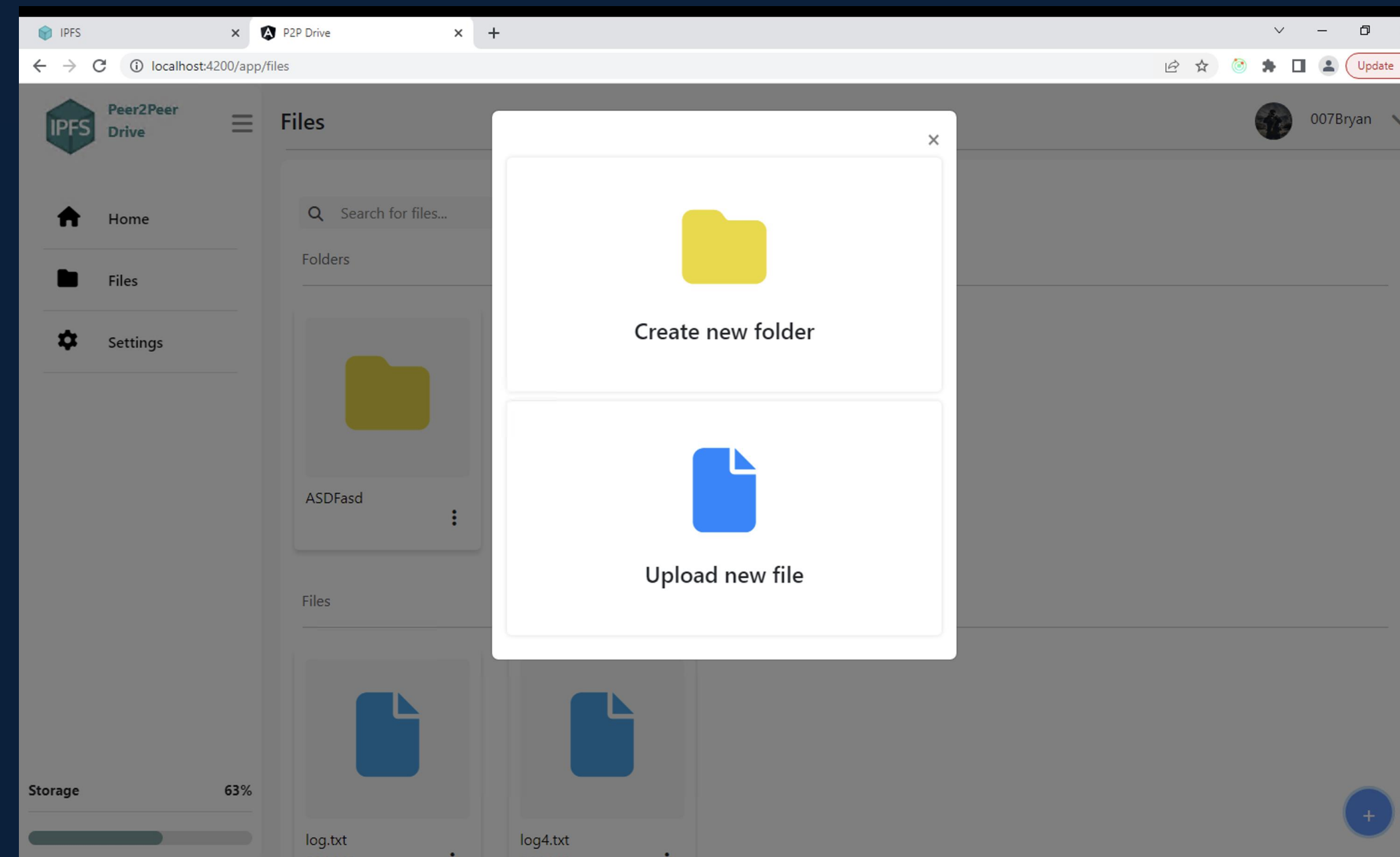
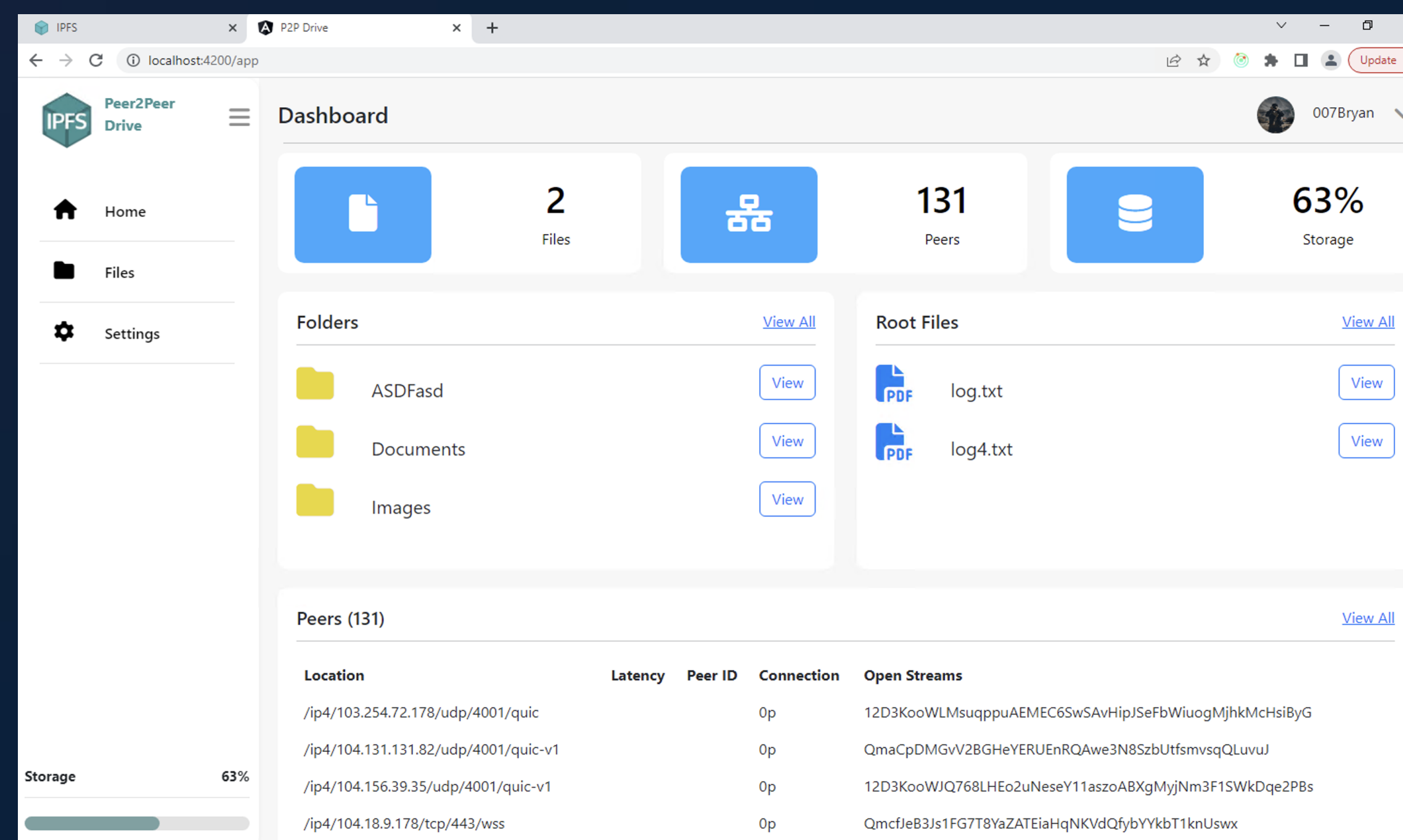
REFERENCES

- 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

CURRENT SYSTEM

- Data is stored on centralized servers controlled by one or more entities.
- Storage costs can be high due to the need for expensive hardware and maintenance.
- Redundancy and data loss concerns exist if a server fails or experiences downtime.
- Security can be compromised as data is stored in a centralized location and is vulnerable to cyber attacks.
- Scalability can be limited by the capacity of the server and its ability to handle increased traffic.

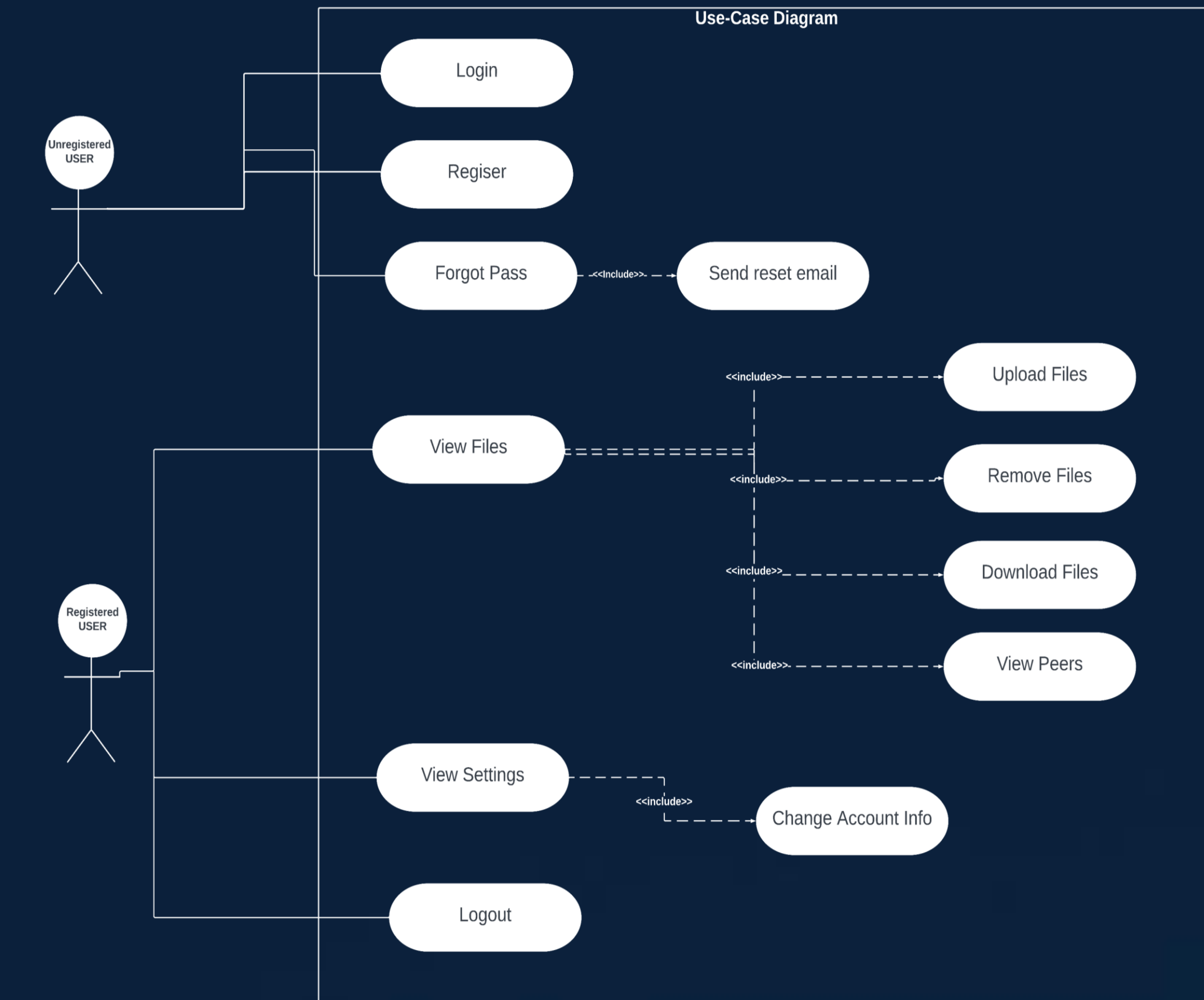
WEB APP



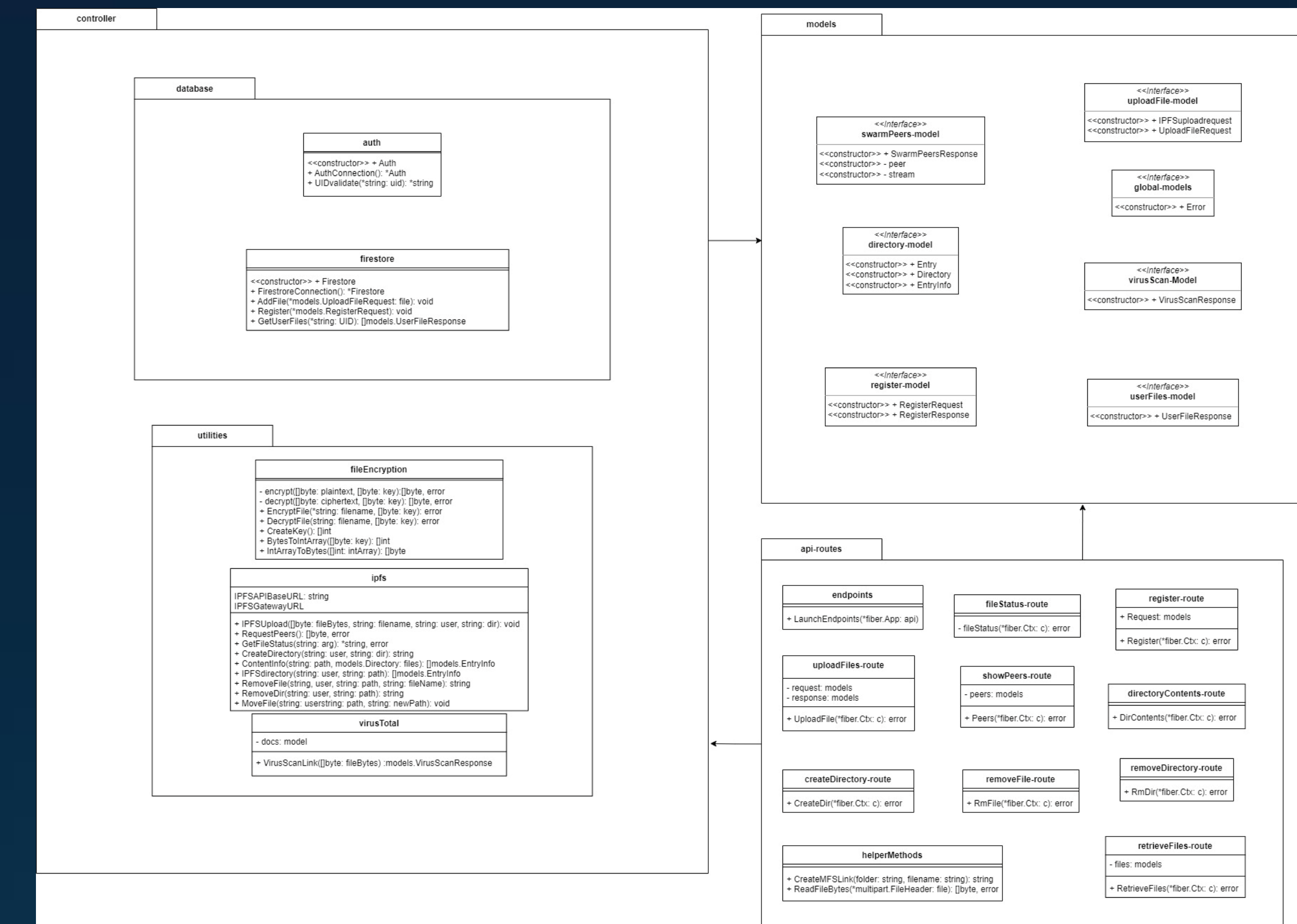
VERIFICATION

- Functional testing: This involves postman testing all functionalities of the system to ensure that they work as expected. This includes registration/login, folder creation, and file upload/download.
- Performance testing: This involves testing the system under various load conditions to ensure it can handle increased traffic and usage.
- Integration testing: This involves testing the all components of the system, such as the front-end, back-end, and IPFS network.
- User acceptance testing: This involves testing the system with real users to ensure that it meets user needs and expectations.

USE-CASE DIAGRAM



UML DIAGRAM



IMPLEMENTATION

Along with backend development, I kept track of API models, diagrams, and specific file implementations within the web app.

SUMMARY

The proposed system leverages Web3 technology to overcome various challenges faced by traditional data storage solutions. It utilizes the decentralized IPFS network to provide a cost-effective alternative for high storage costs. Additionally, it addresses redundancy and data loss issues by distributing data across the IPFS network, ensuring accessibility even in the event of node failures. The system also enhances security through the integration of IPFS's decentralized nature, server-side pinning, and user-specific directories, culminating in a secure data storage platform. Furthermore, it improves scalability by capitalizing on the distributed IPFS network, which effortlessly scales as nodes join. In conclusion, this innovative solution combines the IPFS network with Firebase to create a reliable, secure, and cost-effective platform for data management and storage, harnessing the power of Web3 technology.



**Engineering
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