Report On

Decentralized Storage System for Documents

Submitted in partial fulfillment of the requirements of the Course project in
Semester VII of Fourth Year Computer Engineering

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CERTIFICATE

This is to certify that the Course project entitled **" Decentralized Storage System for Documents "** is a bonafide work of **Shivam Pandey(45), Sayali Thakre(50), Sachin Yadav(51)** submitted to the University of Mumbai in partial fulfillment of the requirement for the award of the degree of **" Bachelor of Engineering "** in Semester VII of Fourth Year **" Computer Engineering " .**

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Course Project Approval

This Course Project entitled "Decentralized storage system for documents**"** by **Shivam Pandey(45), Sayali Thakre(50), Sachin Yadav(51)**is approved for the degree of **Bachelor of Engineering** in in Semester VII of Fourth Year **Computer Engineering .**

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Examiners

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(Internal Examiner Name & Sign)

2....
(External Examiner name & Sign) Date:

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Place:

Date:

Abstract

Abstract

Thus, there is an implicit necessity to predict the condition at the earliest.In the digital age, the need for secure, efficient, and resilient document storage and retrieval systems has never been greater. Centralized storage solutions come with inherent risks and limitations, such as data breaches, single points of failure, and lack of control over personal data. In response to these challenges, this paper presents a novel approach to document storage - a Decentralized Storage System.

1.Introduction

1.1.Introduction

In today's digital landscape, the exponential growth of digital documents and files has led to an unprecedented demand for efficient and secure storage solutions. Traditional centralized storage systems, while widely prevalent, come with their own set of vulnerabilities and limitations. These include single points of failure, data breaches, and the potential for unauthorized access to sensitive information. As a response to these challenges, the concept of decentralized storage systems has emerged as a promising alternative, offering enhanced security, data redundancy, and control over personal data.

1.2 Problem Statement & Objectives

Problem Satements :-

In the digital age, the exponential growth of documents, from sensitive corporate data to personal files, has led to an urgent need for secure and efficient storage solutions. Traditional centralized storage systems have long been the backbone of document management; however, they present a range of pressing issues.

Objectives

- Enhance Data Security: Develop a decentralized storage system that employs robust encryption and cryptographic techniques to ensure the highest level of document security, protecting against unauthorized access and data breaches.

- Eliminate Single Points of Failure: Create a system that distributes documents across a network of nodes, eliminating single points of failure and ensuring data availability and redundancy even in the face of hardware failures or network disruptions.

- Empower User Control: Provide users with greater control over their documents by implementing access control mechanisms and enabling users to manage their own encryption keys, thereby safeguarding their data privacy.

- Respect Data Privacy: Ensure that the decentralized storage system adheres to privacy and data protection regulations, offering users a solution that respects their rights and preferences regarding the handling of personal and sensitive information.

- Scalability and Performance: Design the system to be highly scalable, accommodating the growing volume of documents efficiently and delivering optimal performance even as the user base expands.

1.3 Scope

The scope of the Decentralized Storage System for Documents project encompasses a range of activities and areas to ensure the successful development and implementation of the system. The project scope includes:

System Design and Architecture: Define the system's architecture, including the structure of the decentralized network, data storage methods, and encryption mechanisms.

Security Measures: Establish robust security protocols, including encryption, authentication, access controls, and intrusion detection, to protect stored documents from cyber threats.

User Interface Development: Create a user-friendly interface for document upload, retrieval, and management, ensuring a seamless user experience.

Data Redundancy and Distribution: Implement mechanisms for distributing and replicating documents across network nodes to ensure data redundancy and availability.

3. Proposed System
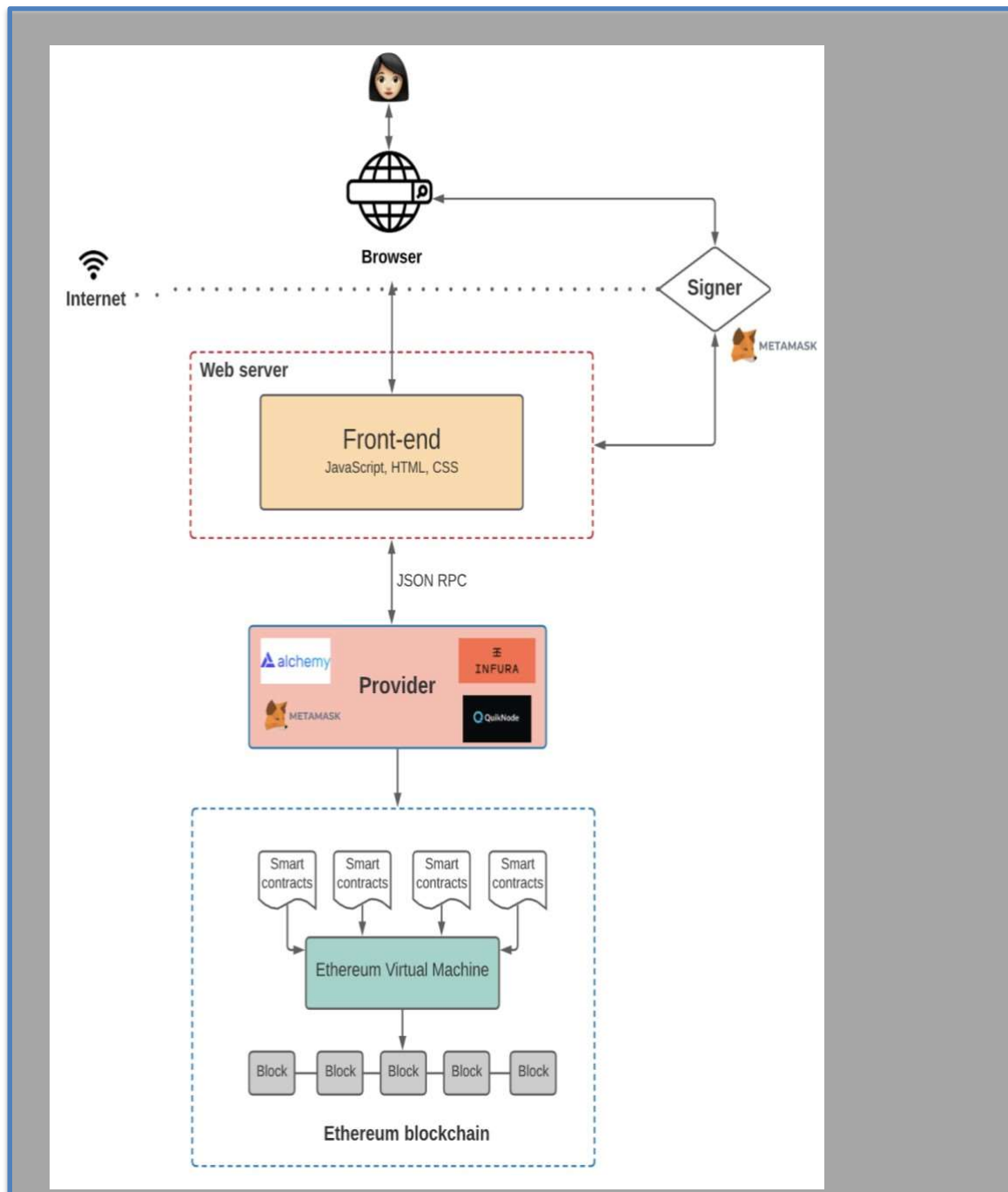
3.1 Introduction

Decentralized storage systems leverage cutting-edge technologies such as blockchain and peer-to-peer networks to distribute and manage documents across a network of interconnected nodes. Unlike traditional centralized solutions, which rely on a single or a limited number of data centers, decentralized systems ensure data is stored in a distributed and redundant manner, making it highly resistant to data loss and cyber threats.

This introduction sets the stage for exploring the concept of a Decentralized Storage System for Documents. It aims to provide an overview of the growing need for more resilient and secure document storage options in today's digital world and how decentralized systems offer a compelling solution to address these concerns. In the sections that follow, we will delve into the architecture, features, and advantages of decentralized storage for documents, shedding light on its potential to reshape the way we store, manage, and secure our digital documents.

3.2 Architecure

Caption

Figure 1.1

3.2 Architecture

Content References

ethereum

IPFS

Distributed
Application

Get
Global
State

Get
Static
Content

Caption
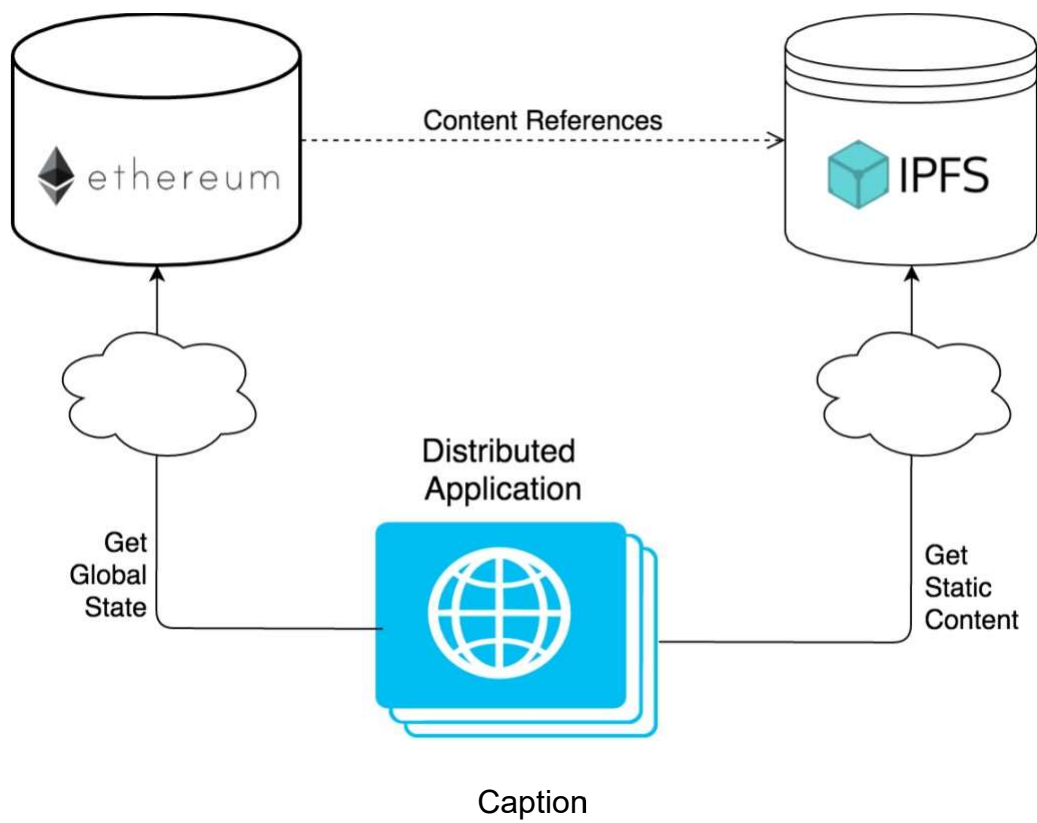
Figure 1.2

3.3 Details of Hardware & Software

Hardware

- RAM: 4 GB

- Storage: 256 GB

- Architecture: 32-bit or 64-bit

- CPU: 2 GHz or faster

- Internet connection.

Software

- Swmai hardhat

- Next js, react js

- Package manager npm

- Studio code ide

- Chrome browser

- Metamask wallet.

Results

Code:

```solidity
pragma solidity >=0.7.0 <0.9.0;
contract Upload {
  struct Access{
    address user;
    bool access; //true or false
  }
  mapping(address=>string[]) value;
  mapping(address=>mapping(address=>bool)) ownership;
  mapping(address=>Access[]) accessList;
  mapping(address=>mapping(address=>bool)) previousData;

  function add(address _user,string memory url) external {
    value[_user].push(url);
  }
  function allow(address user) external {//def
    ownership[msg.sender][user]=true;
    if(previousData[msg.sender][user]){
      for(uint i=0;i<accessList[msg.sender].length;i++){
        if(accessList[msg.sender][i].user==user){
          accessList[msg.sender][i].access=true;
        }
      }
    }else{
      accessList[msg.sender].push(Access(user,true));
      previousData[msg.sender][user]=true;
    }

  }
  function disallow(address user) public{
    ownership[msg.sender][user]=false;
    for(uint i=0;i<accessList[msg.sender].length;i++){
      if(accessList[msg.sender][i].user==user){
        accessList[msg.sender][i].access=false;
      }
    }
  }

  function display(address _user) external view returns(string[] memory){
    require(_user==msg.sender || ownership[_user][msg.sender],"You don't
have access");
    return value[_user];
  }

  function shareAccess() public view returns(Access[] memory){
    return accessList[msg.sender];
}}
```
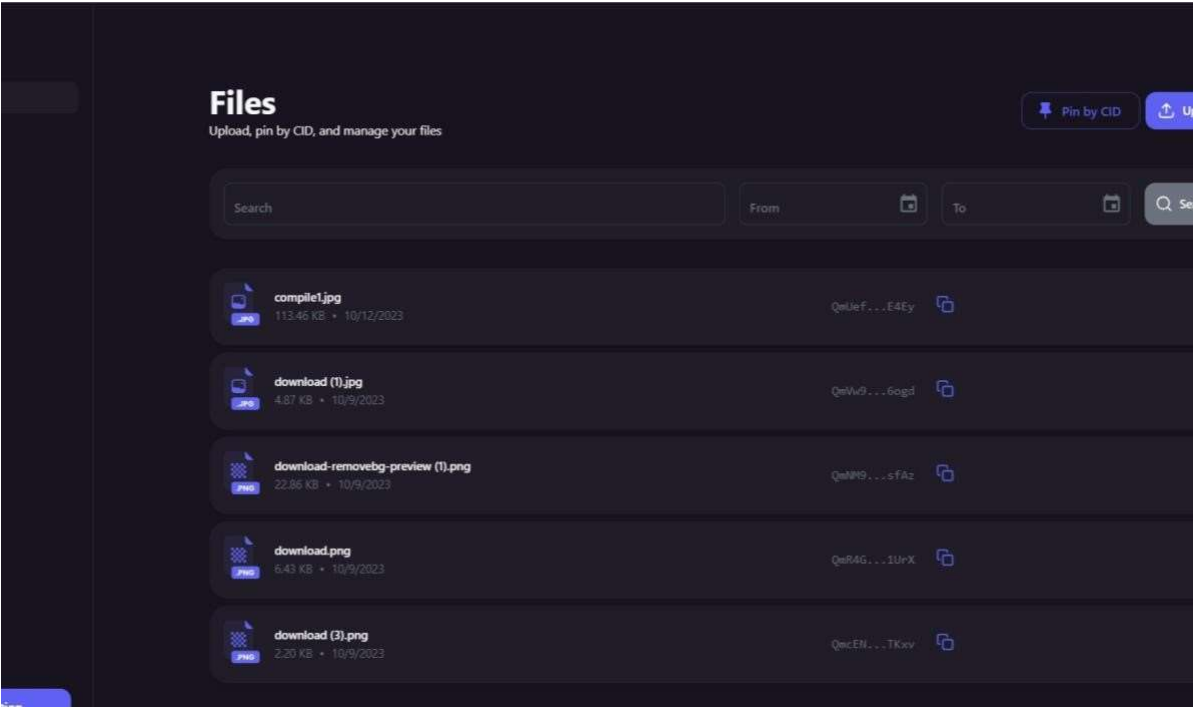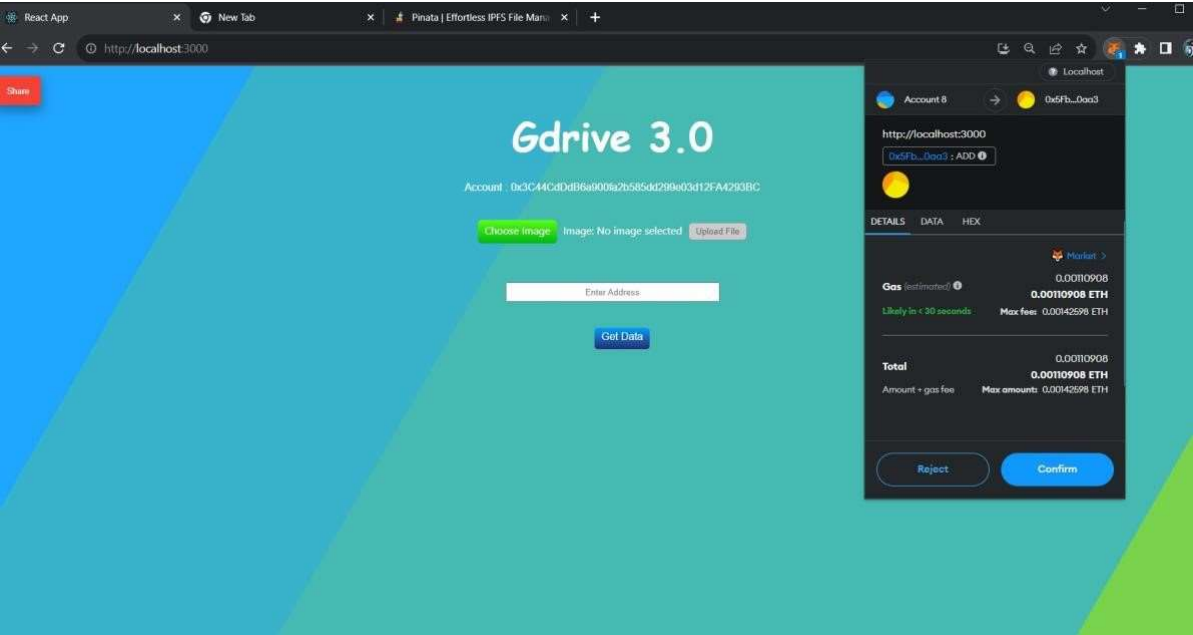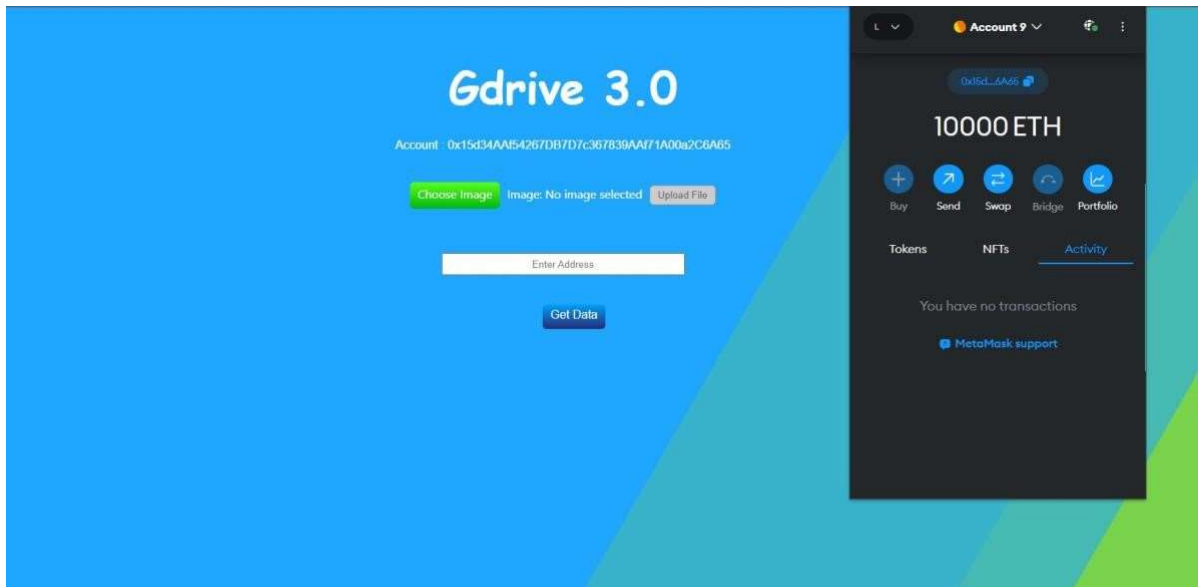
Output:

Caption

Gdrive 3.0

Account : 0x3C44CdDdB6a900fa2b585dd299e03d12FA4293BC

Choose Image   Image: No image selected   Upload File

Enter Address

Get Data

Share with

Enter Address

People With Access
People With Access
0x15d34AAf54267DB7D7c367839AAf71A00a2C6A65,true

Gdrive 3.0

Account : 0x15d34AAf54267DB7D7c367839AAf71A00a2C6A65

Choose Image   Image: No image selected   Upload File

Enter Address

Get Data

L ∨   🟠 Account 9 ∨   ⋮

0x15d...6A65 📋

10000 ETH

 +   ↗   ⇄   ↻   📈
Buy   Send   Swap   Bridge   Portfolio

Tokens   NFTs   Activity

You have no transactions

🦊 MetaMask support

Gdrive 3.0

Account : 0x3C44CdDdB6a900fa2b585dd299e03d12FA4293BC

Choose Image   Image: No image selected   Upload File

Share with

0x15d34AAf54267DB7D7c367839AAf71A00a2C6A65

People With Access

Cancel   Share

Enter Address

Get Data

1. Conclusion and Future work.

Conclusion

Rate at which Data is increasing each year is astounding. We need better and efficient Storage Systems. Future of Storage is Decentralization The day is not far when you would be able to rent your storage or computational resource as a part of a DSS and be paid for it.

Future Work

Future work for a Decentralized Storage System for Documents may involve several areas of development and improvement to ensure the system remains relevant, efficient, and secure. Some potential avenues for future work include:

Enhanced Security Features: Continuous research and development of advanced encryption techniques, access control mechanisms, and threat detection systems to keep pace with evolving cyber threats.

Governance and Consensus Mechanisms: Implement or improve governance and consensus protocols to ensure the decentralized network's integrity and reliability.

Cross-Chain Integration: Explore integration with multiple blockchain networks to provide users with flexibility and cross-chain compatibility.

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