

Group Project

Presented by Group B2



Meet the Group

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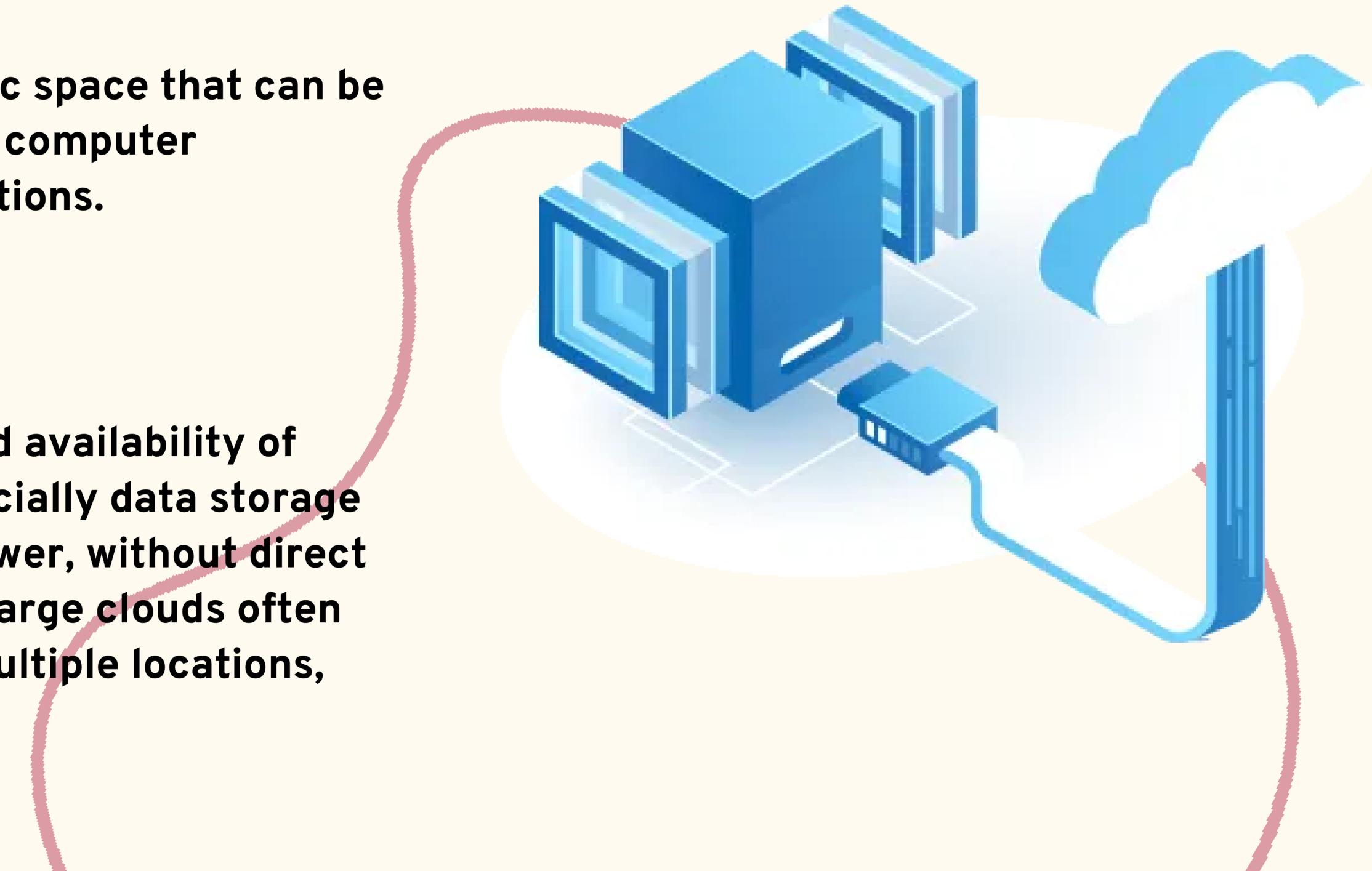
Decentralized cloud for educational institution for self dependant.

General Overview

The project aims to build extra disc space that can be linked to a blockchain registry for computer laboratories in educational institutions.

Cloud Storage

Cloud computing is the on-demand availability of computer system resources, especially data storage (cloud storage) and computing power, without direct active management by the user. Large clouds often have functions distributed over multiple locations, each of which is a data center.



Motivation

Our decision to choose this problem statement as our project was influenced by two scenarios.

- 1) Research data, student records, administrative documents, and multimedia content are all types of data that educational establishments produce and keep in large quantities. Traditional storage solutions might not be able to meet the requirements of educational institutions due to the growing volume and complexity of data.**

2) The next scenario is about our college itself. Suppose, we have 21 labs in our College.

1 PC = 500 GB

In use = 50-60 GB

Left out space :

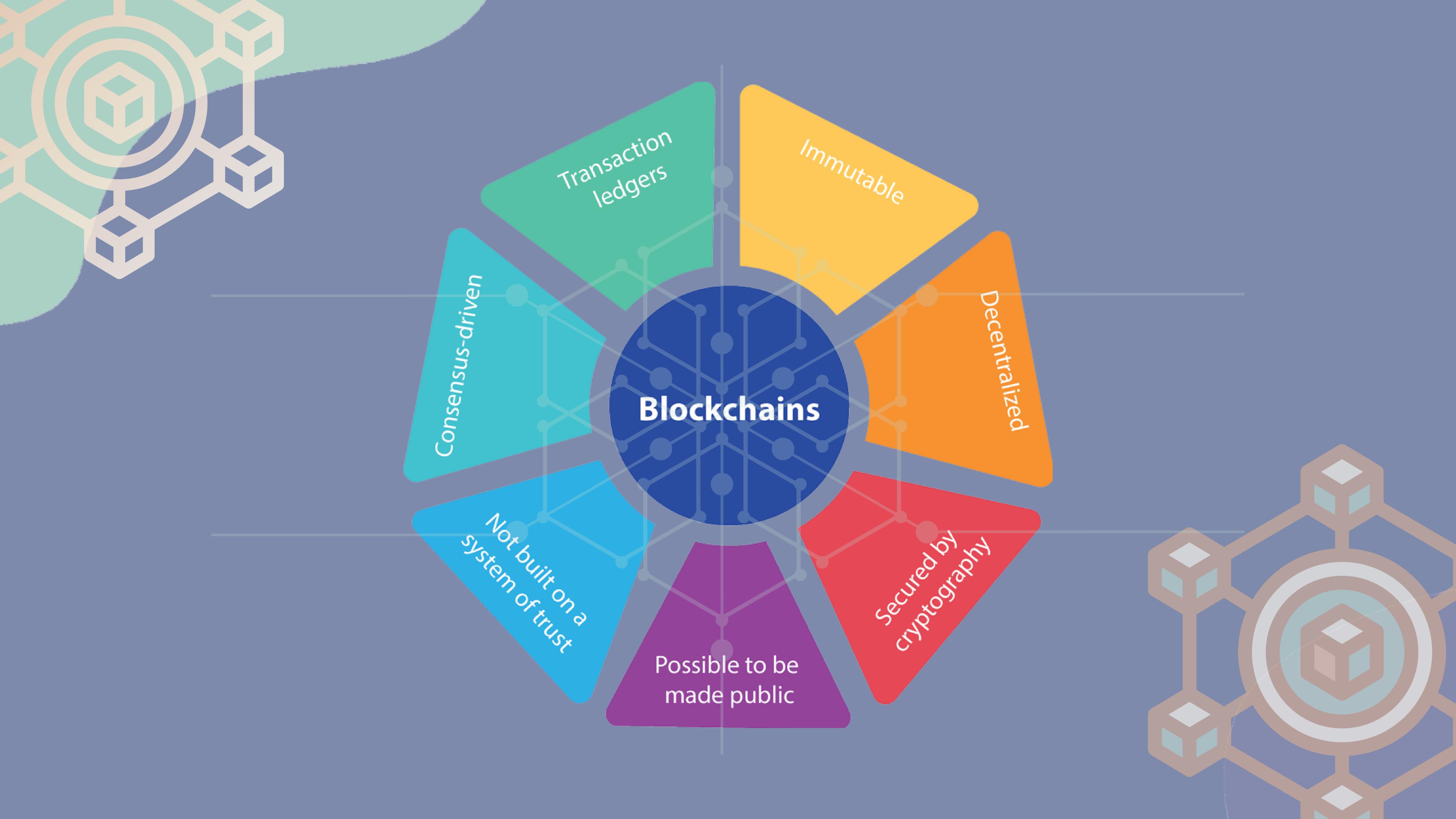
1 PC = 450 GB data

21 PC = 450 *21 GB= 9,450 GB

Total space left :

21 labs= 21*9450 GB =1,98,450 GB

So in this manner, if we calculate, then almost 1,98,450 GB of space is not in use.



Blockchains

Transaction
ledgers

Immutable

Consensus-driven

Decentralized

Secured by
cryptography

Possible to be
made public

Not built on a
system of trust

Objective or Abstract

1. Cost

The monthly fee for storage is \$0.004/GB, and the monthly cost for bandwidth (egress) is \$0.007/GB. Multi-regional functionality is free to use and included. Wasabi, Backblaze, and AWS are all far more expensive than this.

-Survey by Storj

2. Performance and Test

It is safe to state that these rates are overall quite impressive, especially considering that thanks to the decentralized nature of the network, there is no need for researching an optimal network path between the source and destination.”

3. Highly Redundant

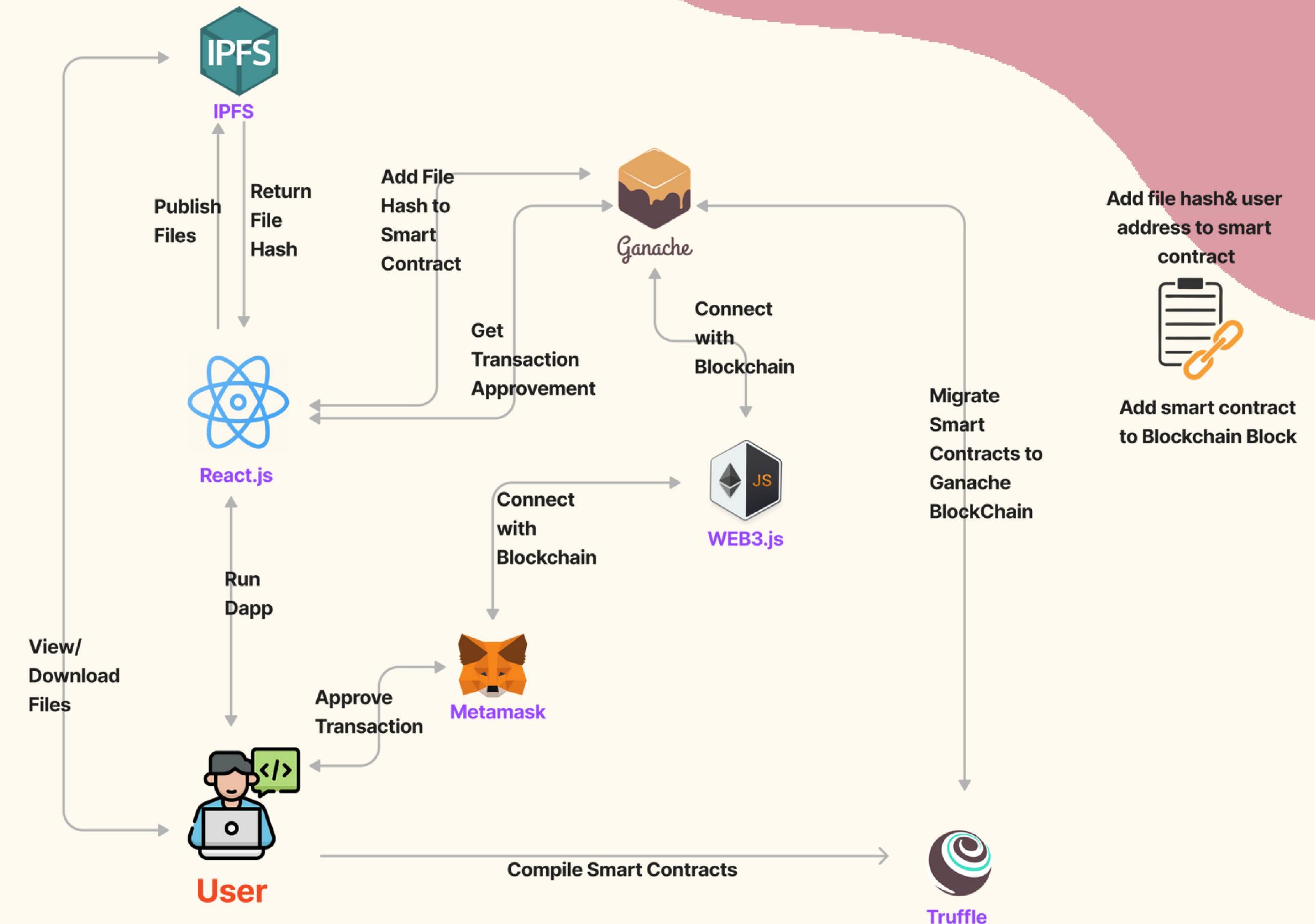
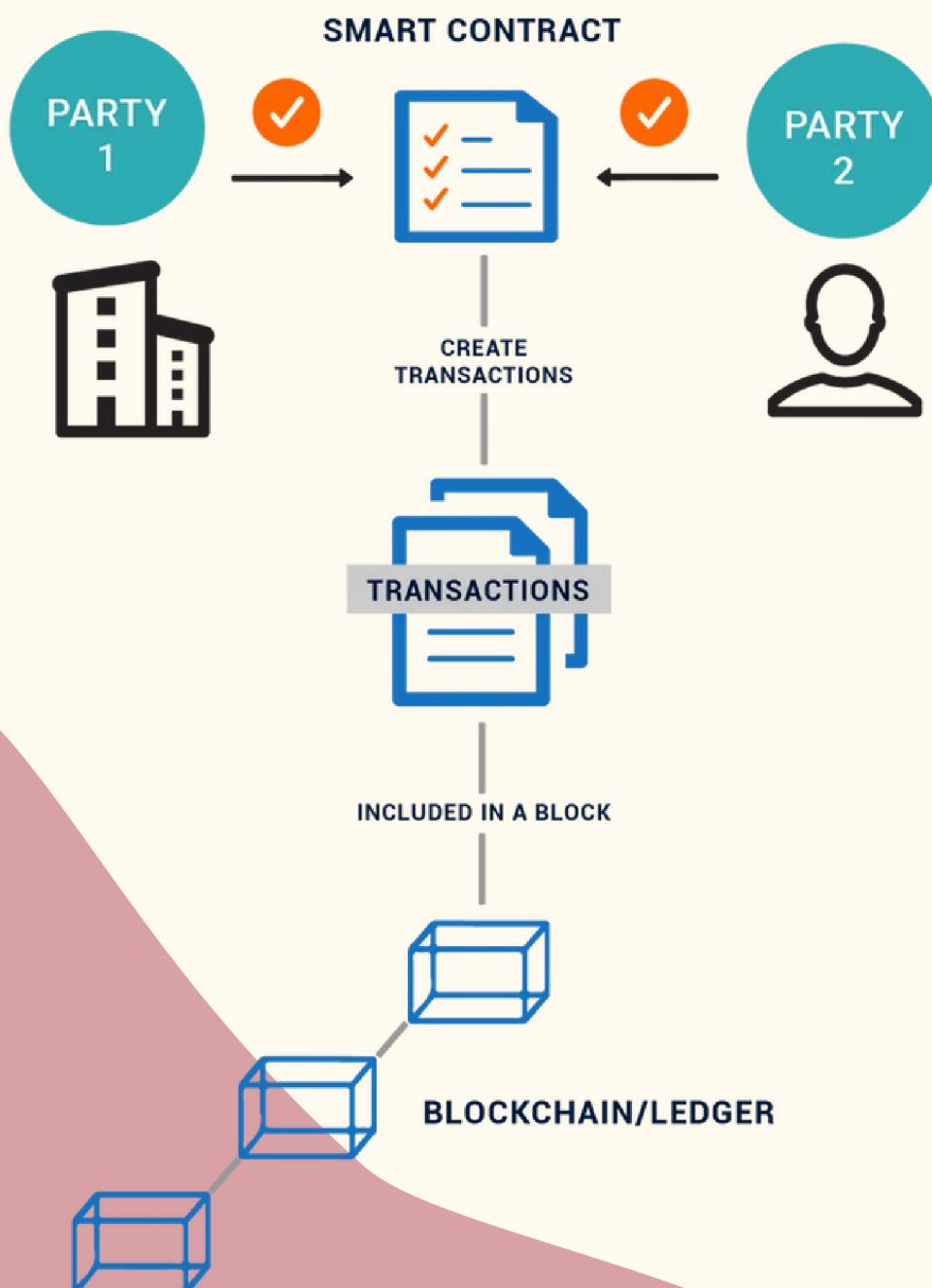
Eliminates any single point of failure and achieves uptime and throughput that no centralised provider can match by storing redundant file segments on nodes throughout the world.

4. Completely Private

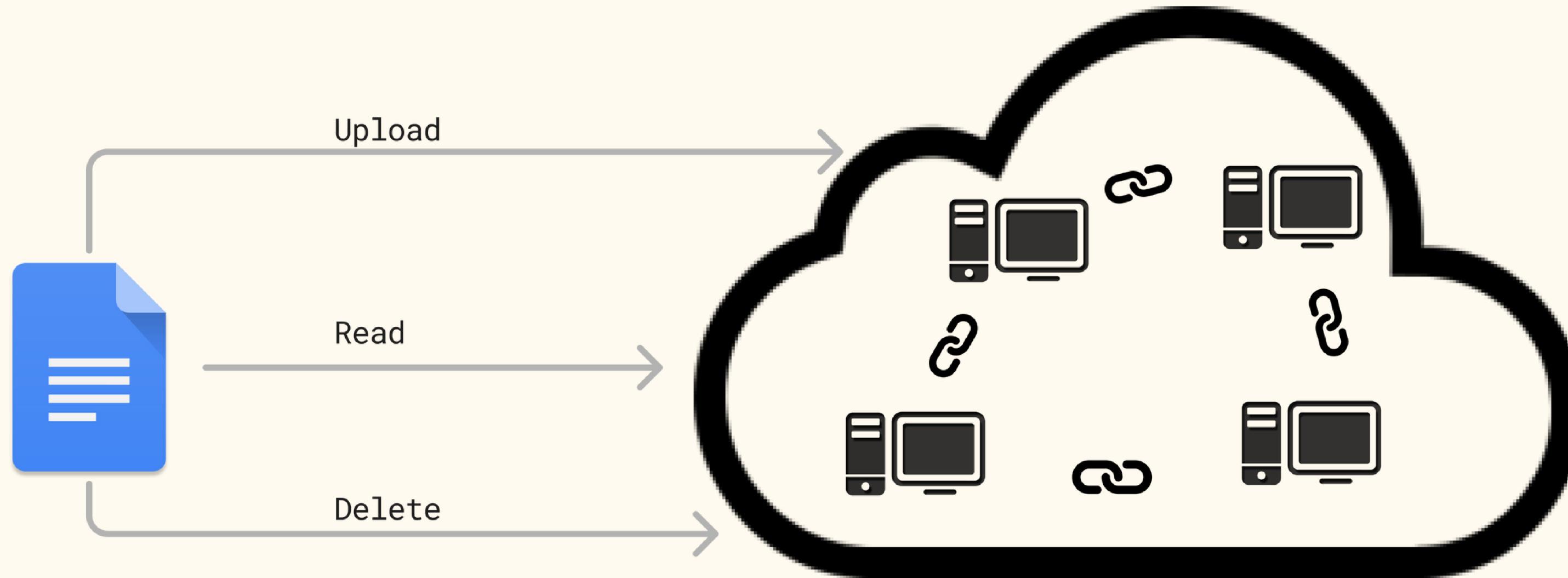
Distributes your data around a decentralised network while encrypting them. You are genuinely the owner of your data, in contrast to standard cloud storage services; no one else has access to or can stop you from accessing your files.

System Architecture

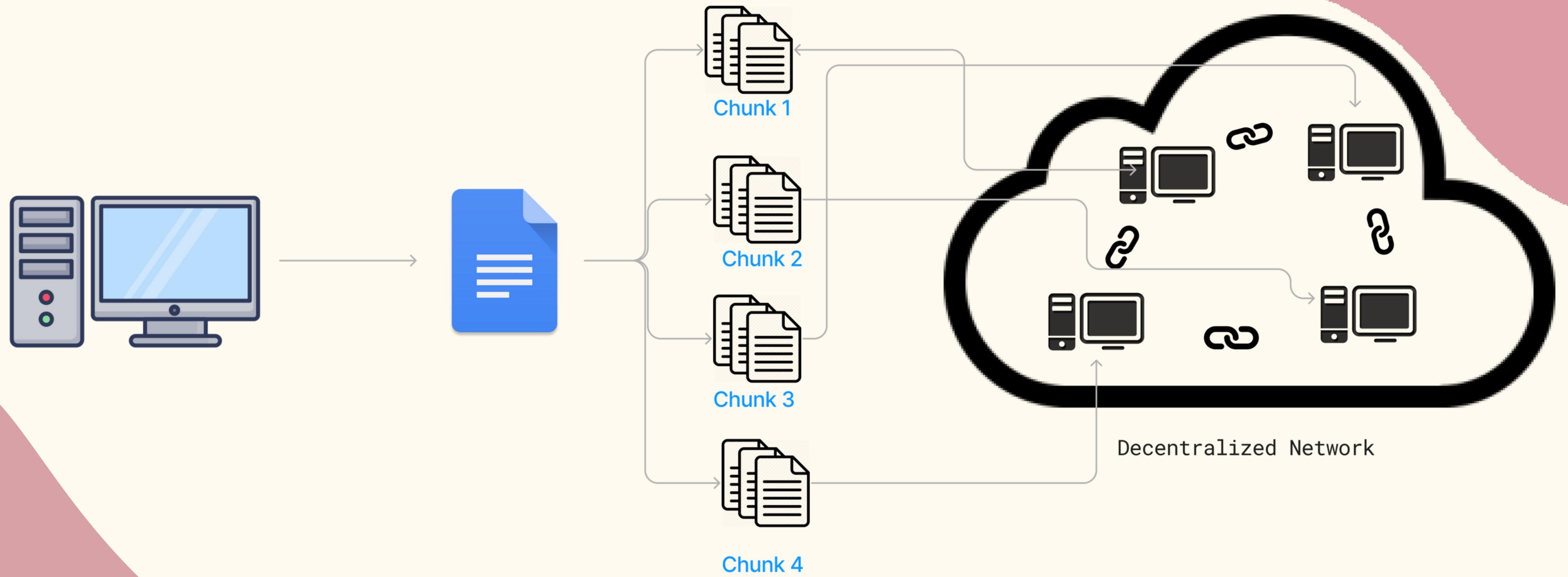
BLOCKCHAIN AND SMART CONTRACTS - FLOW DIAGRAM



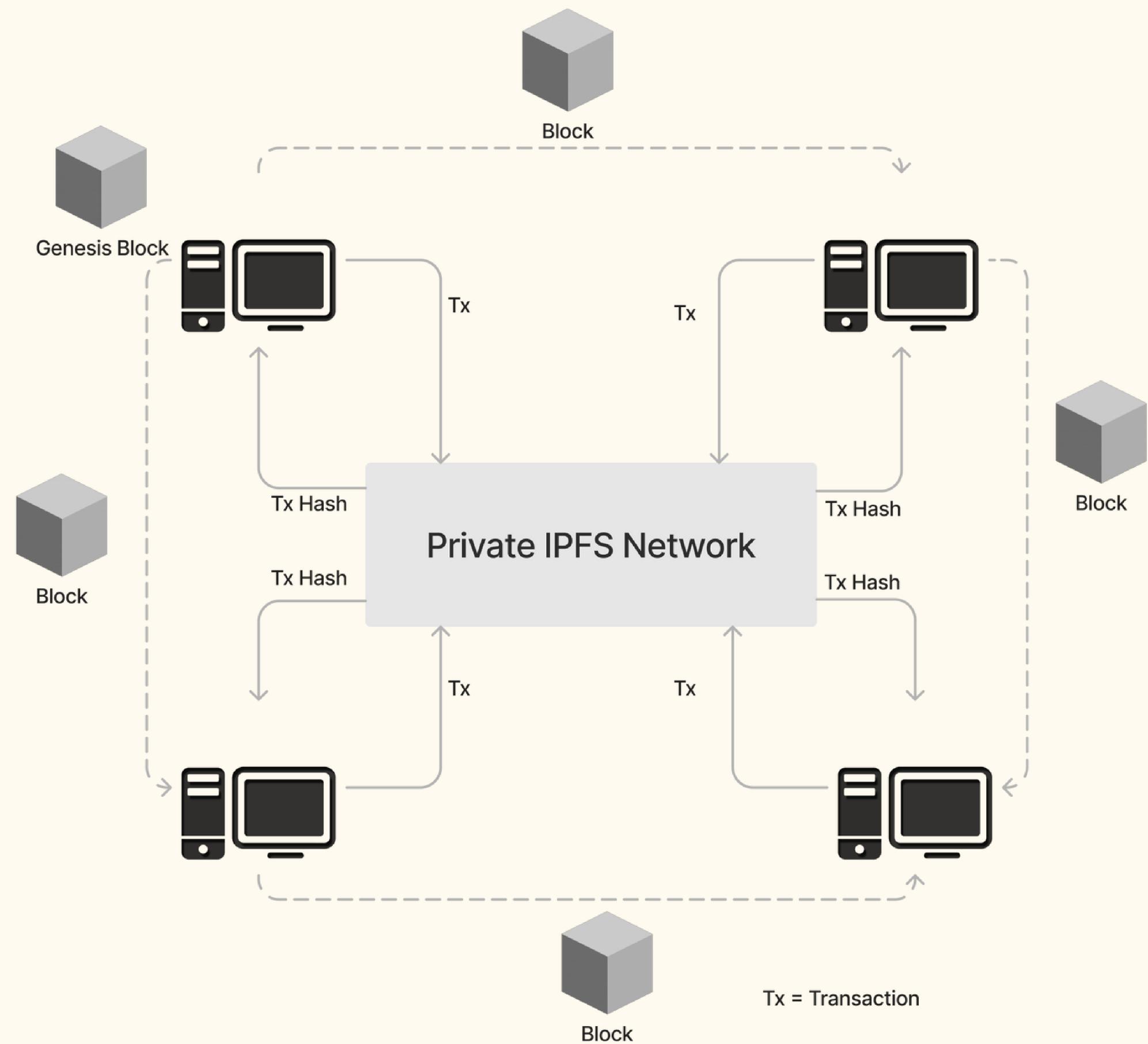
Upload/Download file



Decentralized Network

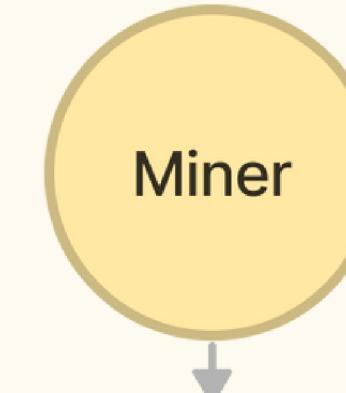
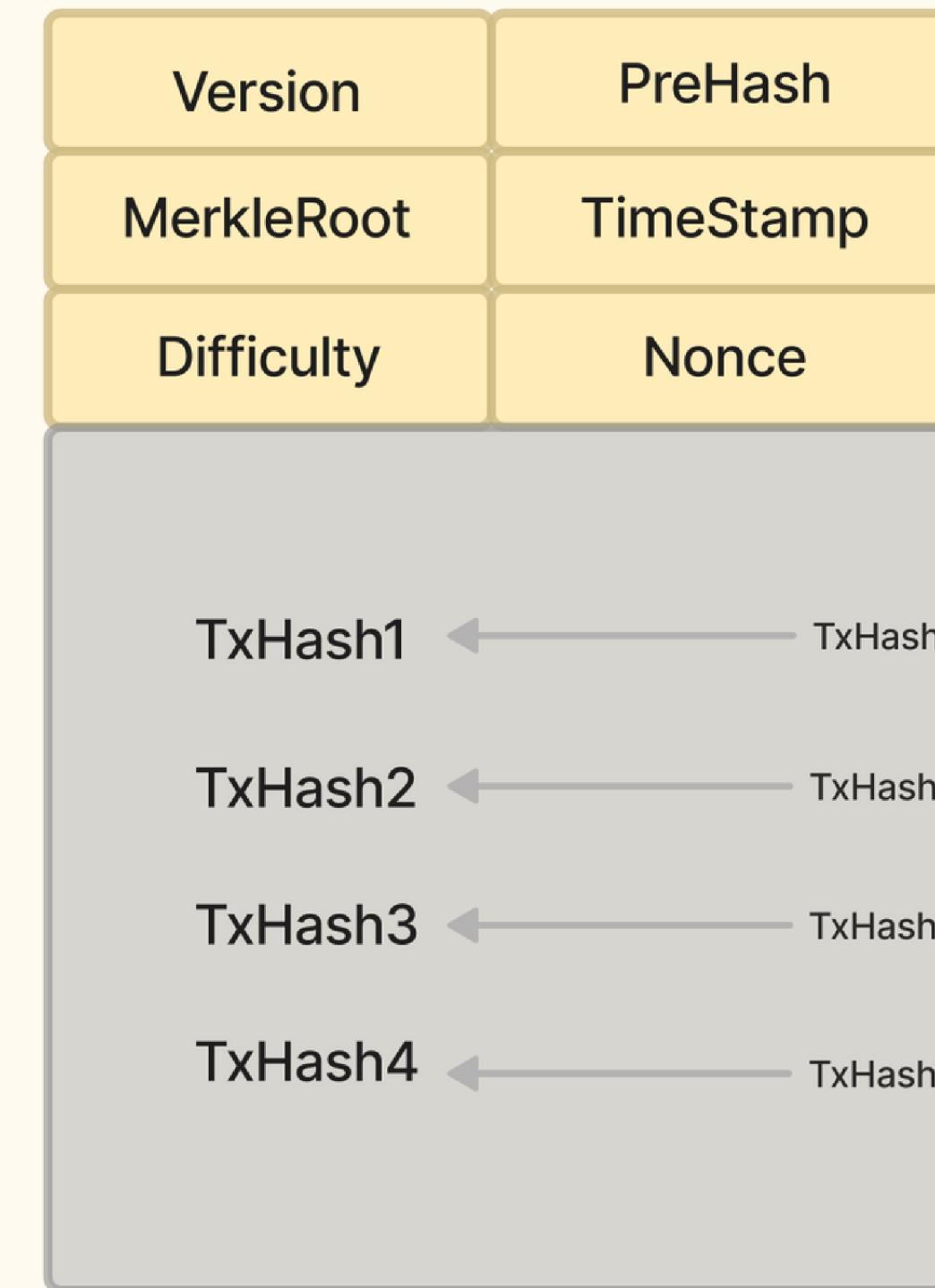


File Transfer Efficiency



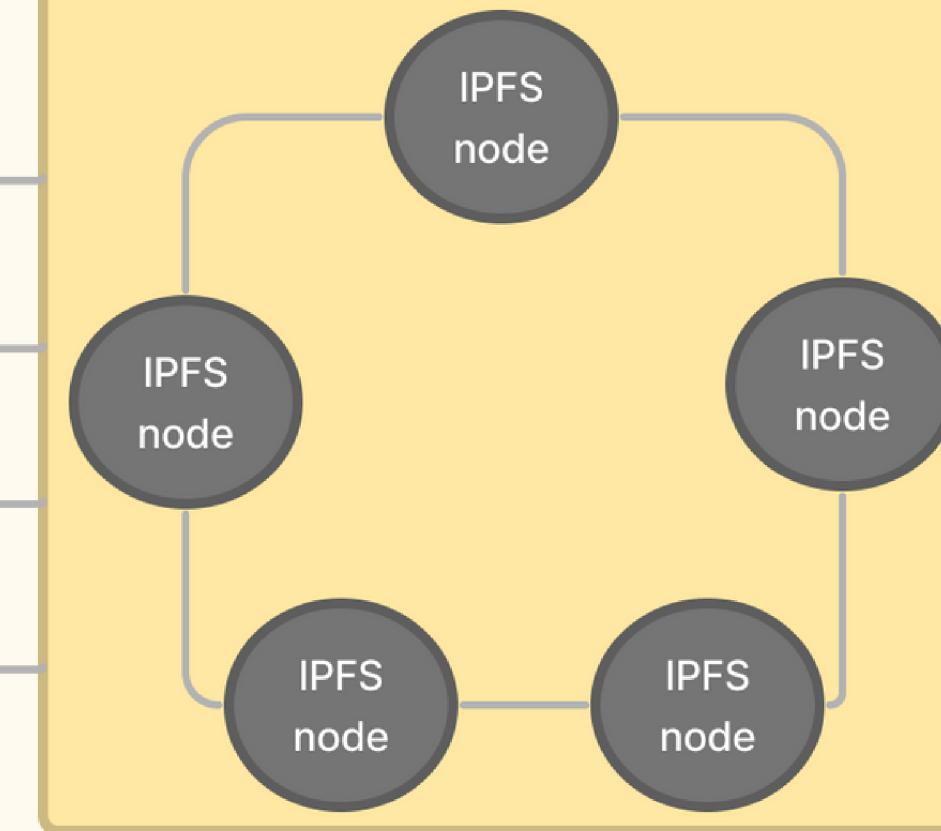
Storage Model Based on IPFS

Block Structure



Tx1, Tx2, Tx3, Tx4, ...

IPFS Private Network



Block Structure Diagram

WEB UI Design

Pro_Name 

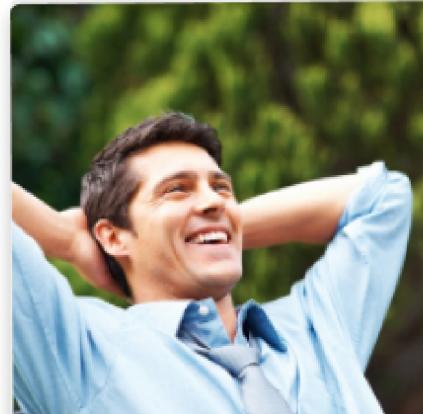
 Search for Files

 More Space 

 Press or Hover the file to Upload



Videos.zip
Size: 1,54Mb



Ava.png
Size: 1,54Mb



Video.mp4
Size: 1,54Mb

 Open

 Share

 Delete

 Download

Survey	Title	Year	Idea	Techniques	Results	Limitations
IEEE Xplore	B-Box - A Decentralized Storage System Using IPFS, Attributed-based Encryption, and Blockchain	2020	Made a decentralised storage system using IPFS ,which is completly secure by encryption and blockchain technology is use	Ethereum, IPFS Attributed-Based Encryption.	Analyse related approach for decentralized storage, data encryption ,and make them trustworthy.	Haven't focused on system evaluation and performance and privacy mechanism.
Sensors 2022, 22, 5238	Blockchain-Cloud Integration:	2022	Collect and verify cloud data provenance by embedding provenance data into blockchain transactions	Designed and built ProvChain, a system	ProvChain delivered security characteristics such as tamper-proof provenance, user privacy, and dependability with little overhead for cloud storage applications.	Built ProvChain on top of an open-source architecture.
J. Phys. Conf. Ser. 2019, 1237, 042008.	Blockchain-based Decentralized Storage Scheme.	2019	Decentralize safe storage of data.	Encrypted data using the AES 256-bit encryption method.	platform for users to rent out their unused storage and earn cryptocurrency.	Flexible scheduling method, in which files can be viewed several times and a payment system

Title	Year	Idea	Techniques	Results	Limitations
storj:A decentralized cloud storage service	2015	Present Storj ,a decentralized cloud storage service that uses a network of nodes to store and manage data	Decentralized network,smart contracts cryptographic techniques	The paper discusses the architecture and features of the system, and examines its performance and scalability	The system has not yet been fully implemented or tested
Decentralized storage system	2020	provides an overview of decentralized storage systems,including their design,features, and performance	Literature review	Discusses the benefits and challenges of decentralization, and examines various use cases and application of decentralized storage	Does not provide a comprehensive analysis of all decentralized storage systems, and does not developed into technical details of specific system
Rent your disk:A decentralized cloud storage system	2018	Presents a decentralized cloud storage system called rent your disk,which allows users to rent out their excess storage capacity to others	Blockchain,distributed hash table	The system users a blockchain to track and verify transactions, and employs a distributed hash table to facilitate data storage and retrieval	The system has not yet been fully implemented and tested

Title	Year	Idea	Techniques	Results	Limitations
Decentralized cloud storage systems	2018	History, motivation and challenges of decentralized cloud storage systems, and compares and contrasts different approaches to decentralization.	Review	Various security and privacy concerns, and examines the potential future developments and trends in the field.	Provide a comprehensive analysis of all decentralized storage systems, and does not delve into technical details of specific systems.
Filecoin : A decentralized storage network	2017	Describes the design and implementation of Filecoin, a decentralized storage system that uses a token-based system to incentivize and reward nodes for providing storage.	Token-based system, consensus algorithm, network architecture.	The paper discusses the technical details of the system, including its consensus algorithm and network architecture.	The system has not yet been fully implemented or tested.

Hardware Requirements

- 1. Processor speed: 2.3 GH**
- 2. RAM: 16 GB**
- 3. Main hard drive: 256 GB solid state drive**
- 4.(SSD)Secondary hard drive: 1 TB hard disk drive
(HDD)**

Software Requirements

1. IPFS version 0.5

Ubuntu OS

2. React version 18

Ubuntu OS, Node.js , Code Editor

3. MetaMask version 10.29

Ubuntu OS, Web Browser(chrome)

4. Ganache version v7.8.0

Ubuntu OS, Node.js , Web3Provider(MetaMask)

5. Truffle version 5.8.4

Ubuntu OS, Node.js , Web3Provider(MetaMask)

Project plan

Semester 4: Research and planning

- Conduct a literature review to gain a thorough understanding of decentralized storage systems, including their design, features, and performance.
- Define the scope and goals of the project, including its target users, key features, and intended use cases.
- Identify the technical and non-technical challenges that need to be addressed in order to build a successful decentralized storage system.
- Develop a high-level design and architecture for the system, including a roadmap for how it will be implemented and tested.

Semester 5: Implementation and testing

- Begin implementing the project, using the design and architecture developed .
- Use blockchain and distributed hash table technologies to track and verify transactions and facilitate data storage and retrieval.
- Test the system using a variety of data sets and workloads, and iteratively improve and optimize the system as needed.

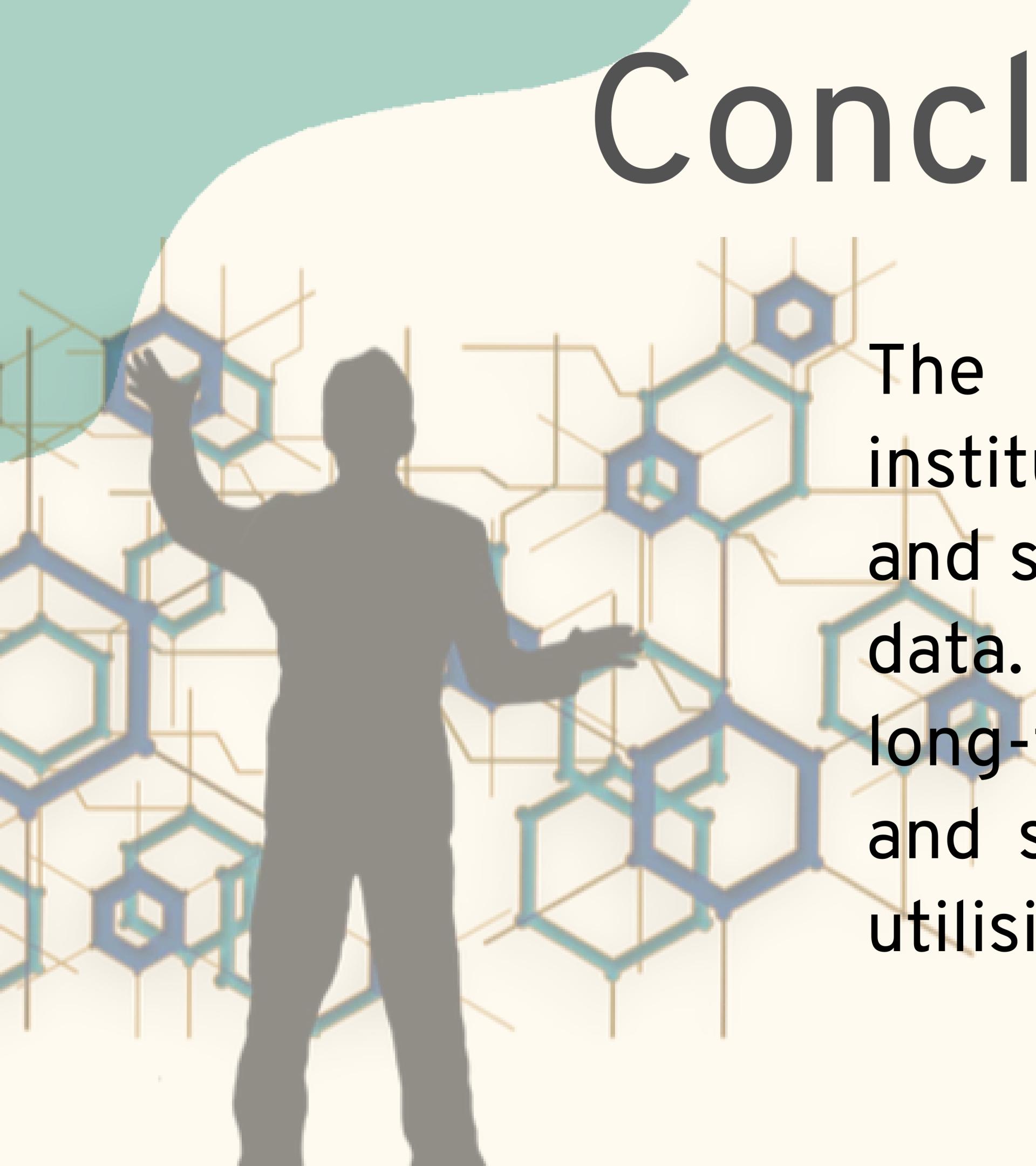
Semester 6: Integration and deployment

- Develop and test a user interface and other user-facing components of the system, including documentation and support resources.
- Conduct a pilot test of the system with a small group of users to gather feedback and refine the system as needed.

Semester 7: Rollout and expansion

- Launch the system to a wider audience, and continue to iteratively improve and optimize the system based on user feedback and usage data.
- Explore opportunities to expand the system to new markets or use cases, and consider partnerships or collaborations with other organizations.
- Conduct ongoing research and development to stay up-to-date with the latest trends and technologies in decentralized storage systems.

Conclusion:



The initiative offers educational institutions a scalable, cost-efficient, and secure way to store and access data. The project can guarantee the long-term dependability, scalability, and security of the stored data by utilising blockchain technology.

REFERENCES :

- 1) Yangheran Piao, Kai Ye, Xiaohui Cui designed "A Data Sharing Scheme for GDPR Compliance Based on Consortium Blockchain to achieve data security sharing", Future Internet 2021, 13, 217.
- 2) Abhirup Khanna, Anushree Sah, Vadim Bolshev, Alessandro Burgio, Vladimir Panchenko, Marek Jaisinski designing Blockchain-Cloud Integration: "A survey for blockchain-cloud services being offered by existing Cloud Service providers ", Sensors 2022, 22, 5238.
- 3) Yan Zhu , Chunli Lv , Zichuan Zeng , Jingfu Wang , Bei Pei designed "Blockchain-based Decentralized Storage Scheme for a decentralized storage system based on blockchain technology", J. Phys. Conf. Ser. 2019, 1237, 042008.
- 4) S. Leitner ,2015, Storj:"A decentralized cloud storage service for data integrity and security."
- 5) H. Hassanpour, 2020, "Decentralized storage system for data security."

- 6) Y. Zahang, 2018, "Rent your disk : A decentralized cloud storage system" to provide on-demand and pay-per-use storage model with low computing cost.
- 7) Kamble et al. designed "Decentralized cloud storage systems", 2018 using blockchain technology.
- 8) J. Benet, "Filecoin : A decentralized storage network", 2017.



Thank you!

Do you have any questions for us?