
# DeMedia

## Decentralized Social Media Protocol

2023-234

# DeMedia Team

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# Introduction

## What is a social media platform?

According to the Tufts University[1],

"Social media refers to the means of interactions among people in which they create, share, and/or exchange information and ideas in virtual communities and networks."




# Research Problem

- Existing social media platforms do not allow users to govern the data they upload or share on their platforms. This has resulted in numerous disagreements among users, and major social media corporations use this user information to gain revenue while compromising the confidentiality of the user data to third parties.
- The current social media platforms have given rise to a number of issues that prompt the need for a new approach to decentralized social media.

# Research Problem Contd.

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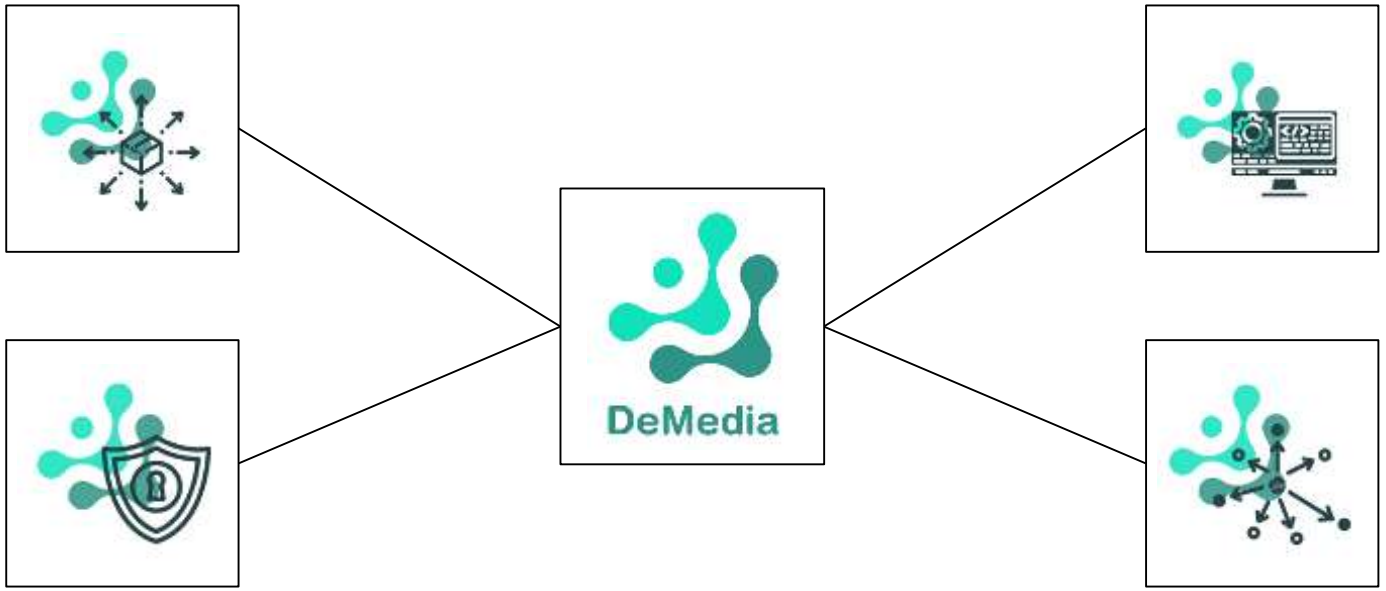
- In particular, the following issues have come to the fore:
  - How to implement decentralized protocol to support social media platforms?
  - How to ensure transparency in the flow of application data?
  - How to grant users true control over their own data?
  - How to provide a centralized application like user experience on a decentralized application?

# Solution

- DeMedia - a protocol that facilitates the development of decentralized social media platforms.



# Objectives

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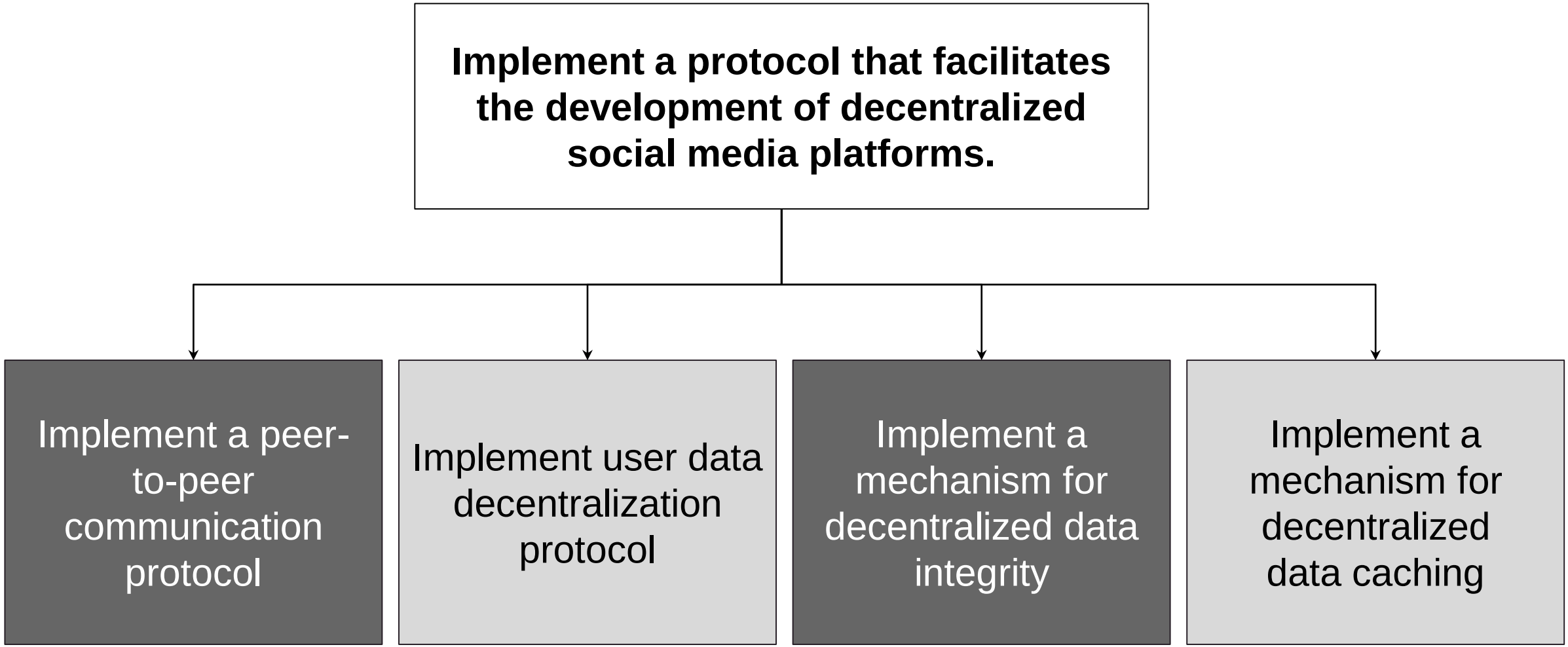
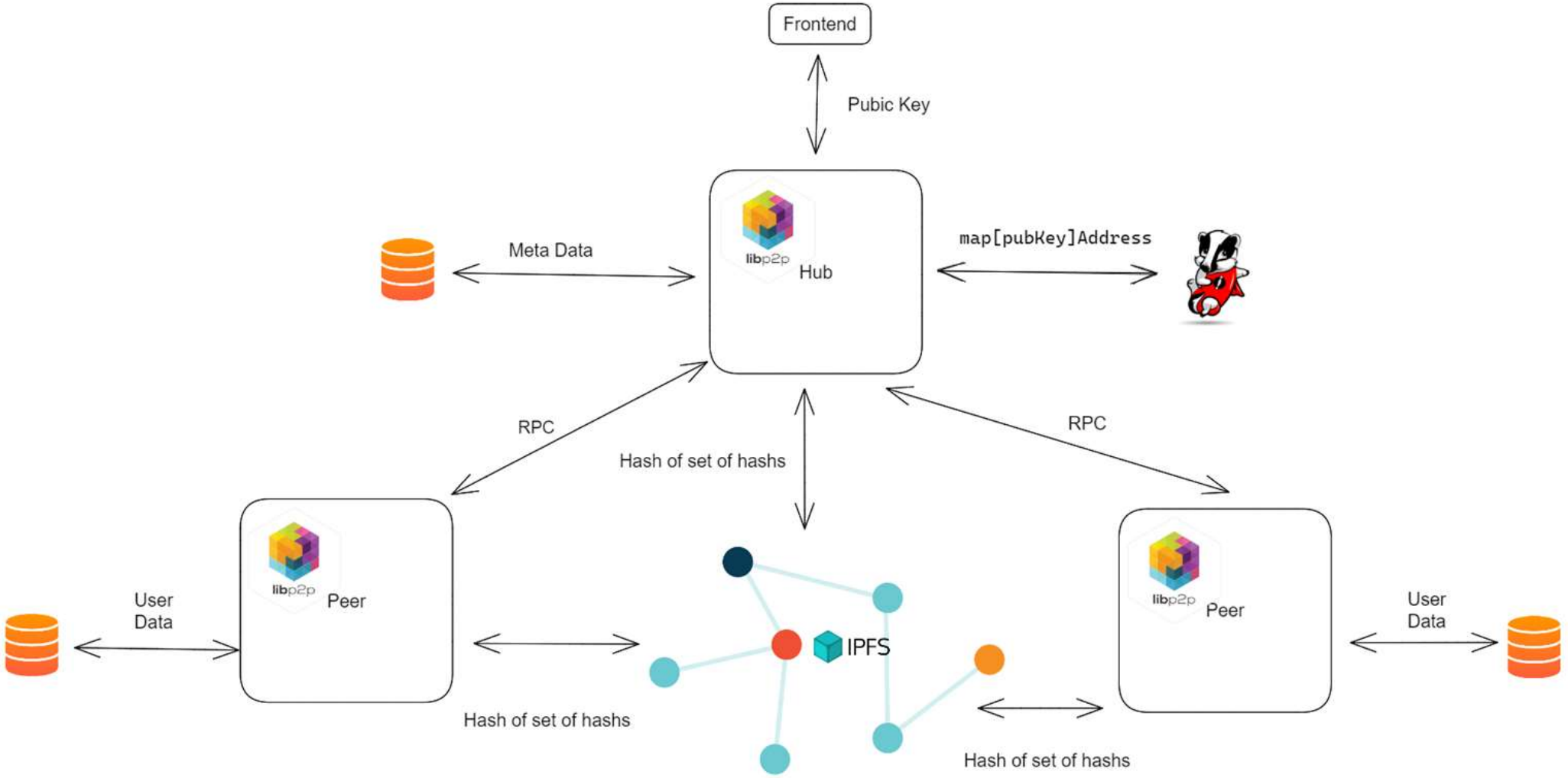


# Overall System Architecture



# System Integration

- DeMedia protocol consist of following components and is integrated in to one protocol.
- A demo social media platform is developed to demonstrate the implemented protocol.

# PEER TO PEER COMMUNICATION

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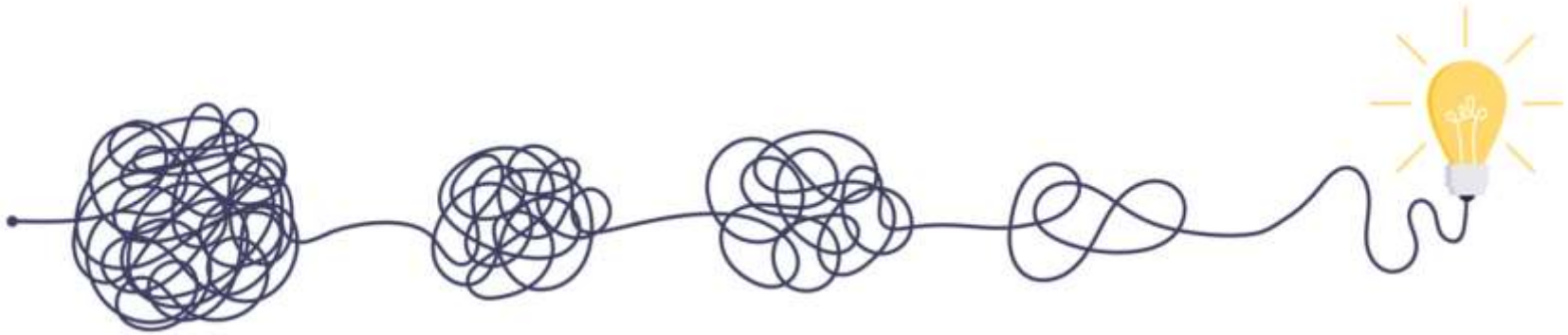
# Introduction

- Successful projects in past
  - Skype [1]
  - Gnutella [2]
  - Kazaa [2]
  - eMule [3]
  - Torrent [4]


# Research Problem

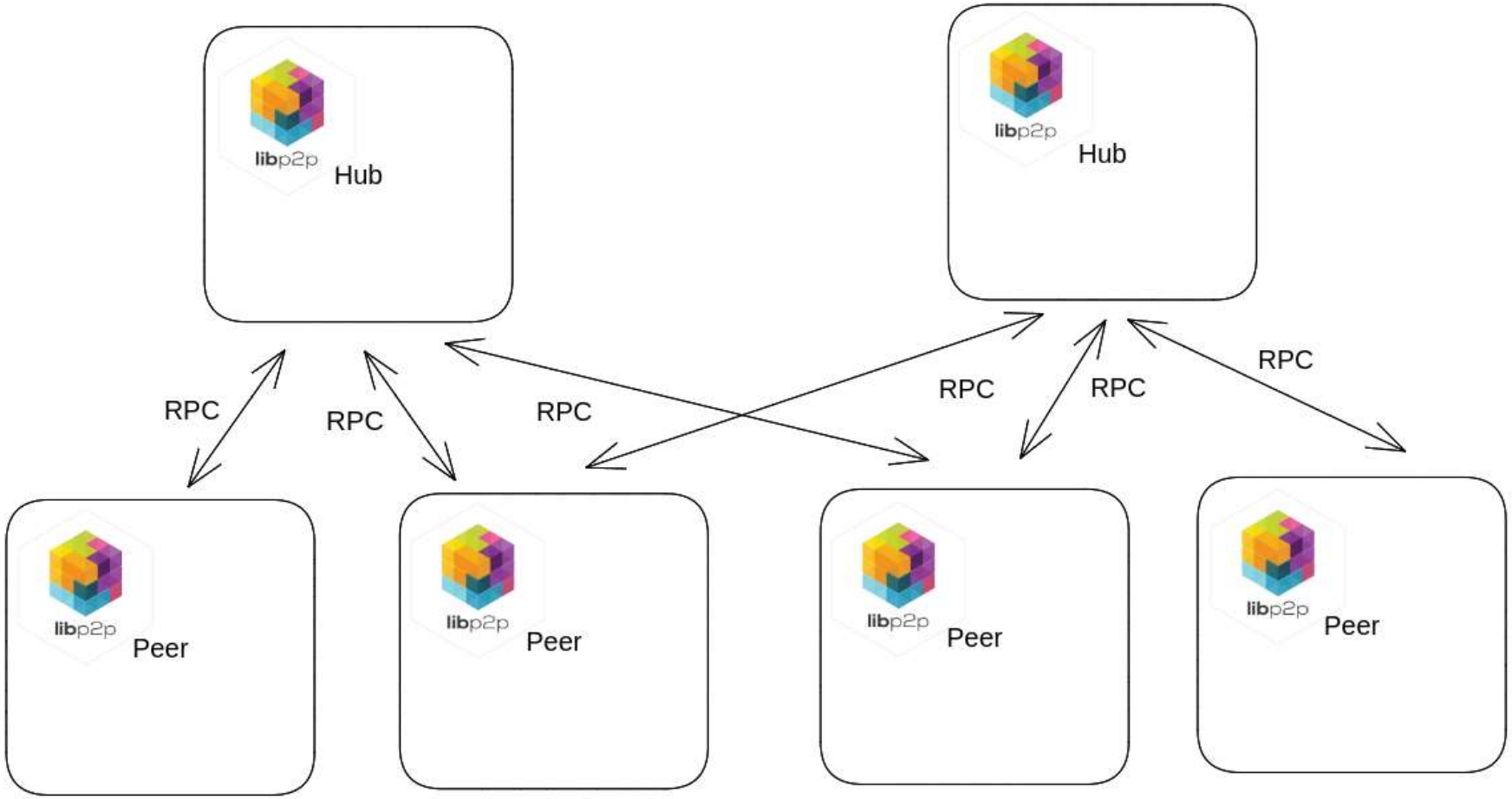
- What is the best way to communicate in peer to peer network ?
- How to scale peer to peer communication network ?
- How to implement general purpose peer to peer protocol ?



# Sub Objectives

- Design RPC style full duplex communication protocol
- Use key-value store to keep track of peers
- Utilizing third party storage providers for file sharing
- Implement a protocol with flexibility for any kind of peer to peer communication

# System Architecture



# Technologies

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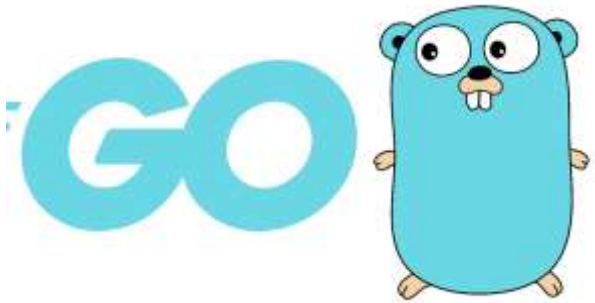

# Current Progress Of The Component

| Done | To-Do |
| --- | --- |
| • Establish RPC connection between peers and hub<br>• DNS resolving for hubs and peers<br>• Integration with demo panel<br>• Comprehensive logging<br>• Tracing and Observability | • System and load testing<br>• Integration with pricing model<br>• Performance improvements |

# REFERENCES


[1] Y. A.-N. R. M. N. Mehdi Jahanirad*, "Security measures for VoIP application: A state of the art review" [Academic Journals, 2011].

[2] S. K. M. G. Leonidas Lymberopoulos, "Deliverable D.6.1: ARGUGRID Platform Design" [2007].

[3] D. B. Yoram Kulbak, "The eMule/eDonkey protocol," 2005 17 January. [Online]. Available: http://pages.di.unipi.it/ricci/e-mule-report.pdf. [Accessed: 24-Mar-2023].

[4] B. Cohen, 22 May 2003. [Online]. Available: https://stuker.com/wp-content/uploads/import/i-1fd3ae7c5502dfddfe8b2c7acdefaa5e-bittorrentecon.pdf.[Accessed: 24-Mar-2023].

# USER DATA DECENTRALIZATION

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# Introduction

- Presently, numerous decentralized social media platforms exist in the market[1].
- A significant proportion of these platforms are blockchain-based[2].
- While many researches have been done on decentralizing social media[3], Most of them are done using blockchain, which is not an optimal solution to store large binary objects[4].

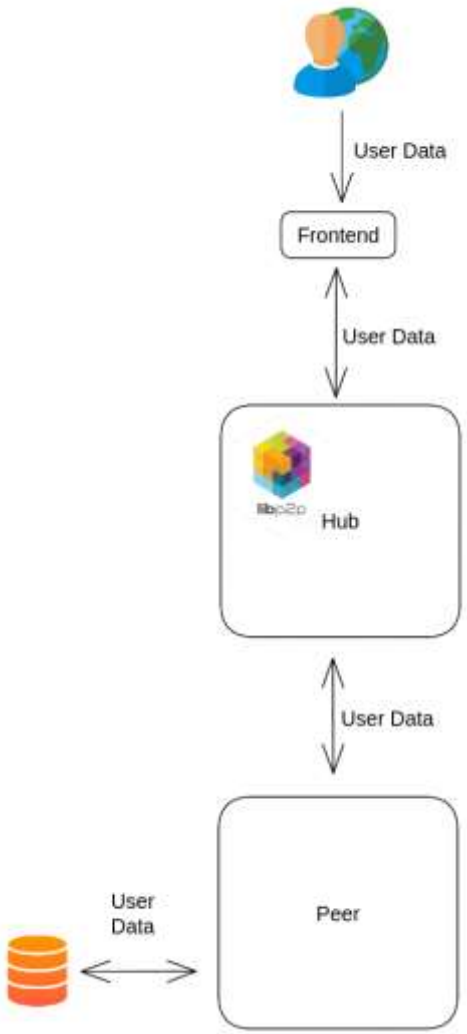
# Research Problem

- What measures can be taken to provide users with complete ownership of their data?
- What potential solutions exist for overcoming the limitations of blockchain when using it to store large quantities of data?
- What enhancements can be made to current decentralized social media networks?

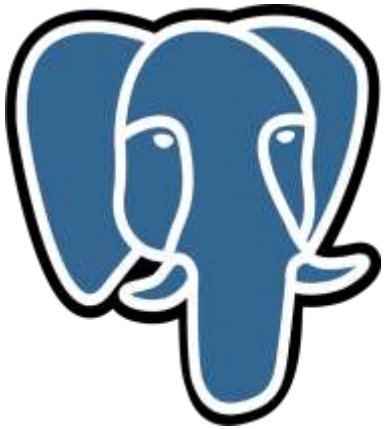
# Sub Objectives

- Enable user to control user data
- Utilizing user device to store user data
- Improving limitations in current decentralized social media platforms
- Making user data highly available

# System Architecture



# Technologies

# Current Progress Of The Component

| Done | To-Do |
| --- | --- |
| • Establishment of connection with hubs<br>• Handling locally stored data<br>• Integration of local storage with IPFS<br>• Tracing & Observability<br>• Integration with demo panel | • System and load testing<br>• Integration with pricing model<br>• Performance improvements |

# REFERENCES


[1]. C. Staff, “Blockchain social media and crypto social media,” Cryptopedia . [Online]. Available: https://www.gemini.com/cryptopedia/blockchain-social-media-decentralized-social-media#section-blockchain-and-social-media. [Accessed: 20-Mar-2023].

[2]. Sketchar, “What advantages does web 3.0 give to creators?,” Sketchar, 03-Mar-2023. [Online]. Available: https://blog.sketchar.io/what-advantages-does-web-3-0-give-to-creators/. [Accessed: 20-Mar-2023].

[3]. T. Cai, Z. Hong, S. Liu, W. Chen, Z. Zheng and Y. Yu, "SocialChain: Decoupling Social Data and Applications to Return Your Data Ownership," in IEEE Transactions on Services Computing, vol. 16, no. 1, pp. 600-614, 1 Jan.-Feb. 2023, doi: 10.1109/TSC.2021.3128959.

[4]. R. Nourmohammadi and K. Zhang, "An On-Chain Governance Model Based on Particle Swarm Optimization for Reducing Blockchain Forks," in IEEE Access, vol. 10, pp. 118965-118980, 2022, doi: 10.1109/ACCESS.2022.3221419.

# DECENTRALIZED DATA INTEGRITY

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# Introduction

- Data integrity is a main aspect of any application. [1]
- Currently, there are various mechanisms available to maintain the integrity of data in applications. [2] [3]
- In here, the focus is on implementation of mechanism to ensure data integrity on a decentralized network.

# Research Problem

- How to maintain integrity of user data which saved on user device?
- What is the best mechanism to achieve user data integrity?

# Sub Objectives

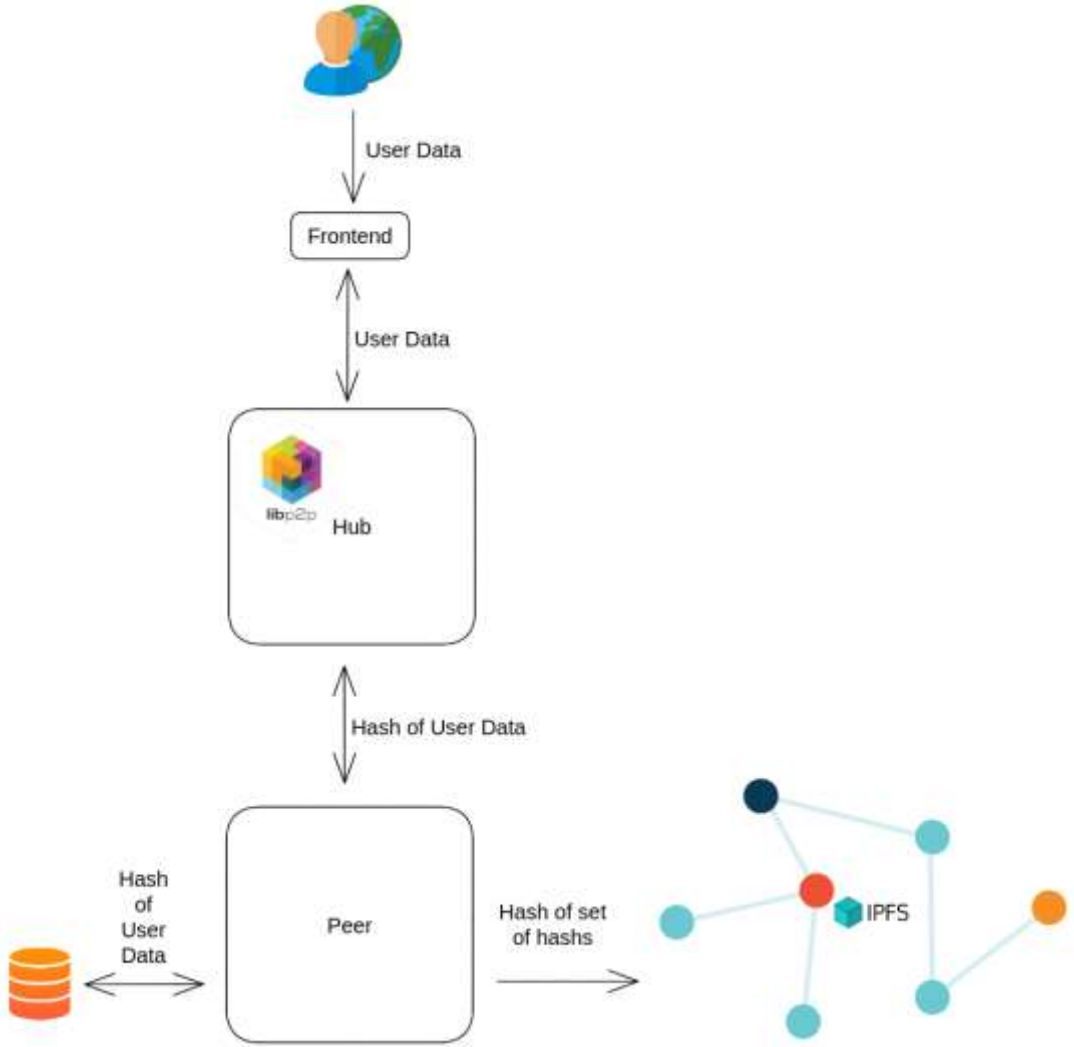
Ensure consistency in preparation for hashing and signing

Ensures the data security distributed across multiple nodes

Verify the authenticity of the data

Ensure that the data has not been altered or tampered with during storage

# System Architecture



# Technologies

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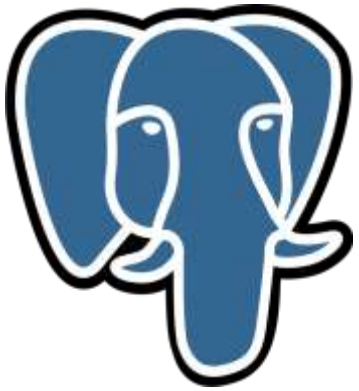


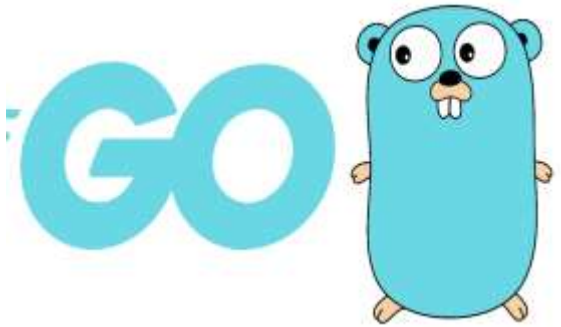

# Current Progress Of The Component

| Done | To-Do |
| --- | --- |
| • Implemented hashing of user data<br>• Implemented persist hashes on database<br>• Implemented verified flag<br>• Allow purge unverified content<br>• Integration with demo panel | • System and load testing<br>• Integration with pricing model<br>• Performance improvements |

# REFERENCES


[1] Vishwanath G. Garagad, Nalini C. Iyer, Heera G. Wali, "Data Integrity: A security threat for Internet of Things and Cyber-Physical Systems", IEEE 2020.

[2] “Decentralized social media,” Mastodon. [Online]. Available: https://joinmastodon.org/. [Accessed: 20-Mar-2023].

[3] Bogdan Tiganoaia, "The use of social platforms and personal data protection — An exploratory study" IEEE, 2017.

# DECENTRALIZED DATA CACHING

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# Introduction

- Decentralized social media protocols that preserve data caching are essential for improving network performance, reducing traffic, and improving scalability, dependability, and cost effectiveness.[1]
- They also increase storage optimization and reduce the cost of network operations. [2]
- There are many kind of decentralized storage networks [3]
  - Ex : Storj, Filecon, Arware , BitTorrent, IPFs (InterPlanetary File System)
- The primary goal is to implement a caching mechanism using IPFS [4]

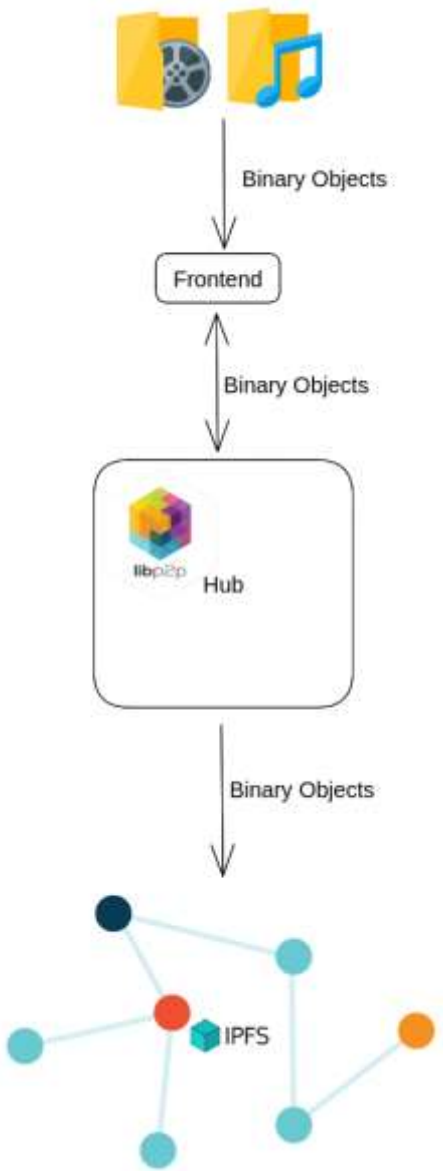
# Research Problem

- What is the most effective caching strategy for issues of caching mechanism?
- What we can do for minimize resource usage?
- Why we use IPFS to implement the caching mechanism?

# Sub Objectives

- Integrating the caching mechanism with the IPFS
- Reduce resource consumption in data storage
- Improve Scalability, Efficiency, Flexibility, and Lower transaction fees
- Evaluate the ease of integration and development efficiency with IPFS

# System Architecture



# Technologies

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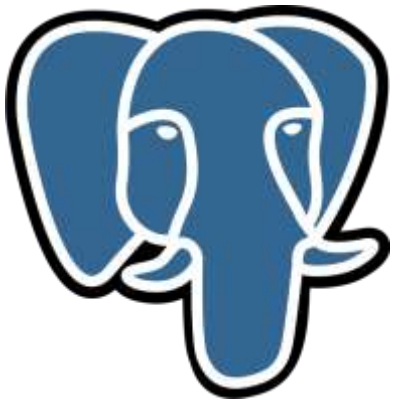


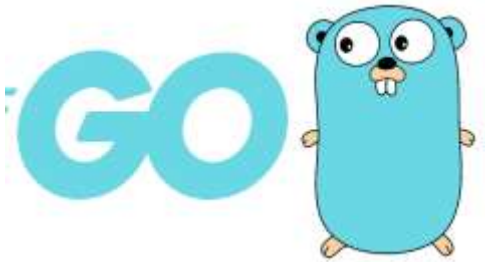

# Current Progress Of The Component

| Done | To-Do |
| --- | --- |
| • Upload binary objects to IPFS<br>• Binary object retrieval from IPFS<br>• Map binary objects content & peers<br>• Purging binary objects on IPFS<br>• Integration with demo panel | • System and load testing<br>• Integration with pricing model<br>• Performance improvements |

# REFERENCES


[1] B. Zhang and H. Wu, "A new distributed caching replacement strategy," IEEE, 2011.

[2] F. T. Erik Daniel, "IPFS and Friends: A Qualitative Comparison of Next Generation Peer-to-Peer Data Networks," IEEE, 2022.

[3] B. P. Robert Sheldon, "7 decentralized data storage networks compared," TechTarget, 05 June 2022. [Online]. Available: https://www.techtarget.com/searchstorage/tip/Comparing-4-decentralized-data-storage-offerings.

[4] "IPFS Docs," [Online]. Available: https://docs.ipfs.tech/.

# Commercialization Plan

- DeMedia is to function as an open source protocol, facilitating the creation of decentralized social media platforms that are self-hosted.
- DeMedia will provide
  - A base model which can be utilized for free of charge.
  - Additionally 2 paid models will also available:
    - A membership model based on subscription, which can be governed by the host
    - An advertising-based revenue model that can also be governed by the host

# Current Progress Of The Project

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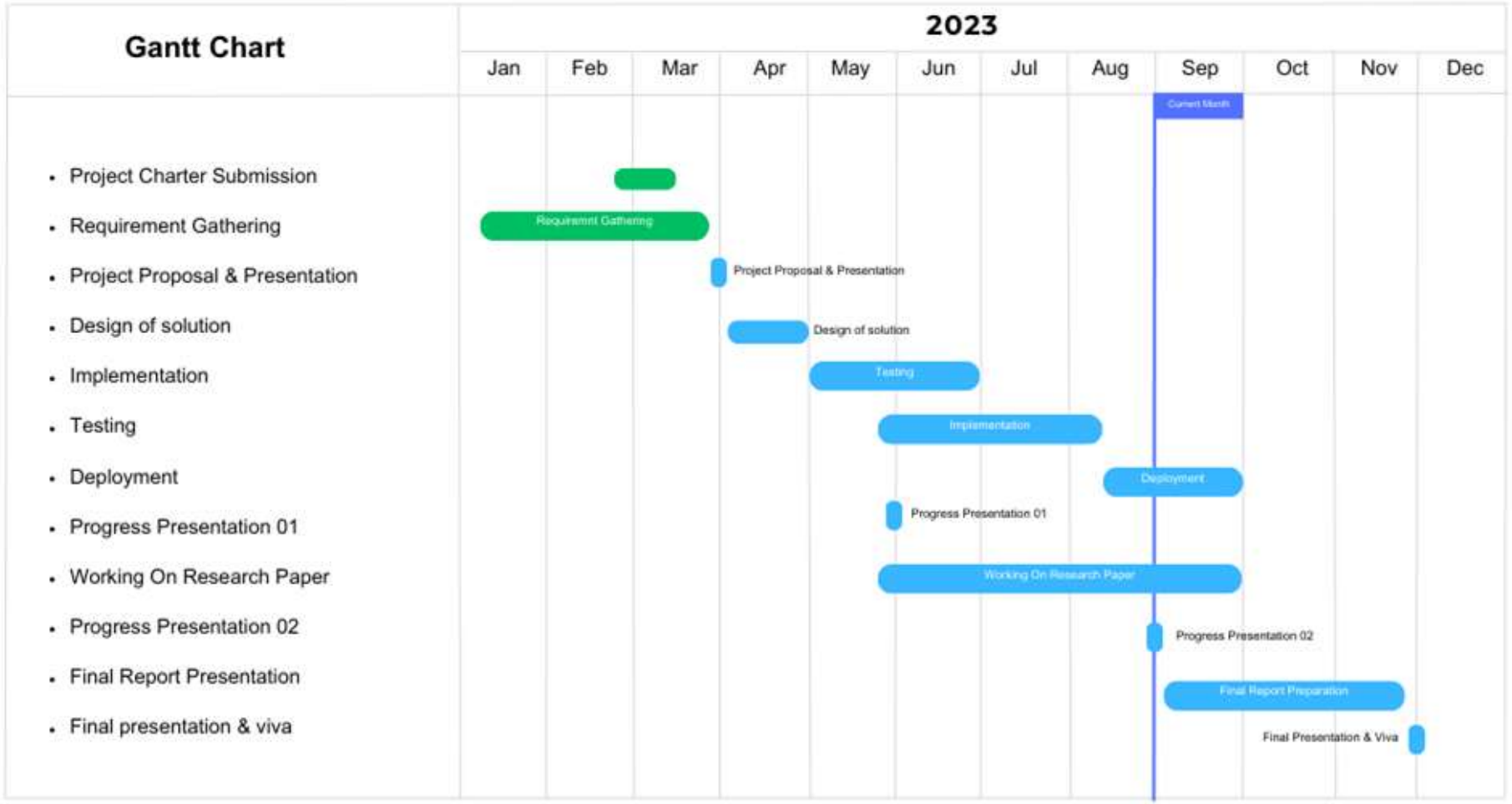

# Demo


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# Q & A

# Thank You!


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