DEMEDIA – DECENTRALIZED SOCIAL MEDIA PROTOCOL

2023-234

Project Proposal Report

Bandara A.M.C.A

B.Sc. (Hons) in Information Technology Specializing in Information Technology

Department of Information Technology

Sri Lanka Institute of Information Technology

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Declaration

I declare that this is my own work, and this proposal does not incorporate without acknowledgment any material previously submitted for a degree or diploma in any other university or institute of higher learning, and to the best of my knowledge and belief, it does not contain any material previously published or written by another person except where the acknowledgment is made in the text.

Signature:

IT20159726	Bandara A.M.C.A.	

The above candidates are carrying out research for the undergraduate Dissertation under my supervision.

Signature of the Supervisor: ……

Date: ……

Acknowledgment

I am grateful to express my gratitude towards my supervisor, Mr. Kavinga Abeywardena, and co-supervisor, Ms. Laneesha Ruggahakotuwa, for their valuable guidance and encouragement throughout this research project. Furthermore, I would like to extend my thanks to the Department of Information Technology at the Sri Lanka Institute of Information Technology, as well as the lecturers and staff at CDAP for providing me with the opportunity to undertake this research.

Abstract

Social networks have become ubiquitous in the modern world, with billions of people using them as an integral part of their daily lives. This trend has been fueled by globalization and other factors, leading to an exponential increase in the usage of these platforms. Despite their immense popularity, these networks are centralized, allowing the companies that own them to monitor and track their users' activities. This has given rise to serious concerns regarding the privacy and security of user data, which is often sold to third parties for profit. Given the immense value of user data in today's and tomorrow's world, many individuals have expressed apprehension over this issue. While decentralized, community-driven applications have emerged as a potential solution to this problem, none have yet been able to compete with centralized social network platforms. Consequently, the purpose of this research was to create a decentralized social network architecture that would incorporate the basic functionalities of a social media platform while ensuring the privacy and security of users' data, which would be stored locally on their machines. This research component entails the implementation of a user data decentralization protocol, along with the design and implementation of a client application that can effectively communicate with other network peers via the decentralized protocol implemented.

Keywords: decentralization, social media, data privacy, data security, peer-to-peer

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1.0 INTRODUCTION

1.1. Background

At present, the vast majority of individuals utilize social media, and these platforms have become integral components of modern lifestyles. Social networks have established a global presence, with the initial recognizable social network, "Six Degrees," being launched in 1997, enabling users to establish profiles and connect with other users. Today, there are numerous social networks, such as Facebook, WhatsApp, Instagram, Twitter, and others, and their usage continues to grow [1]. These social networks are becoming popular among people due to their purpose and differences which made them competitive among each other.

It is imperative to examine the reasons for the increased usage of social networks. The most prevalent reason is that users desire to stay connected with others and remain updated on global events. With hectic schedules and workloads, physical interaction with others is often impractical, leading people to connect virtually, which proves more feasible. Additionally, social media is used for sharing photos and videos for entertainment and expressing opinions and ideas. Moreover, social media platforms serve as a means of researching products to purchase, prompting businesses to concentrate on online marketing and target audience acquisition. However, centralization of these social networks has led to various problems, which have recently become hot topics.

According to article[2], MIT Sloan professor Sinan Aral said "Social media is rewiring the central nervous system of humanity in real time" at the social media Summit@MIT which brought professionals together to explore these challenges and focus on solutions, which ranged from new oversight committees to breaking up major corporations. And also, it mentions major concerns in present social media networks. The spread of false news and misinformation, the difficult balance between user privacy and platform transparency, lack of regulation for social media companies are some of the areas that has affected through social media at present.

With the emergence of web 3.0 in 2014[3], people are inclined towards seeking solutions to the issues associated with web 2.0 technologies within the web 3.0 technology stack. As a result, decentralization has become a prominent factor. Decentralized culture has been established, primarily due to the evolution of cryptocurrencies, particularly Bitcoin.

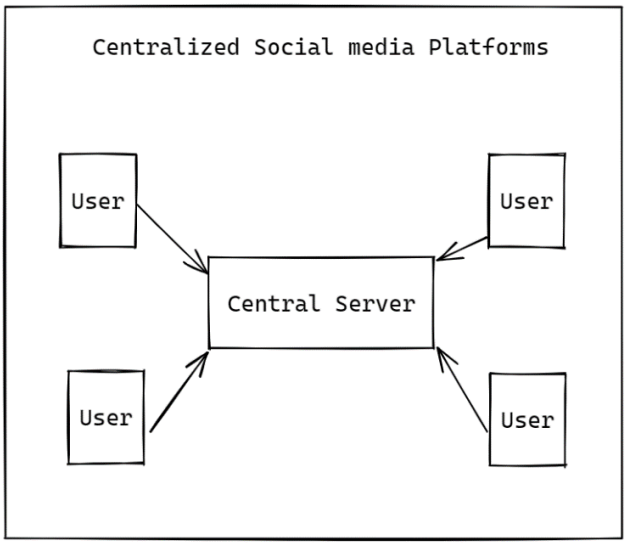

Figure 1.1.1: High-level architecture of centralized social media network

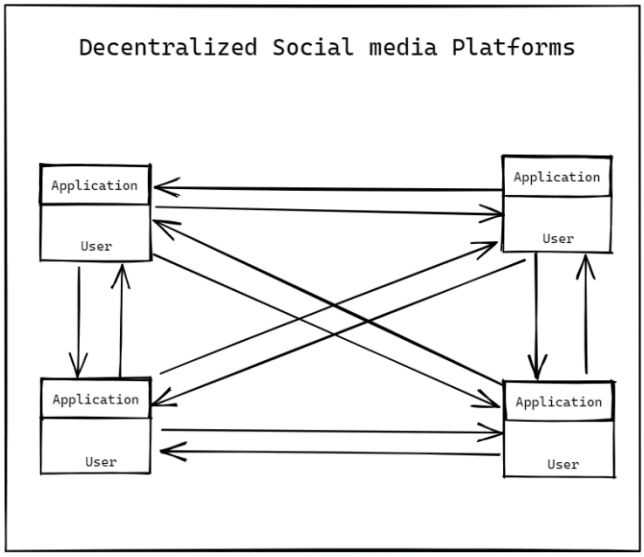

Figure 1.2.2: High-level architecture of de-centralized social media network

As mentioned in article [4], the growth trajectory of Web 3.0 is expected to persist, as individuals progressively recognize the advantages it offers in contrast to conventional social media websites. While searching for the most suitable web3 social media platforms, it is advisable to consider a range of factors such as traditional social media platforms, social media users, decentralized social networks, internet freedom, free speech, online networks, among other relevant considerations.

According to article[5], Mastodon[6] and DeSo[7] are two of the most prominent decentralized social networking platforms currently under development. The fundamental goal of these social networks is to confront and overcome the issues connected with modern social media platforms by yielding the monopolistic control

exerted by leading social media corporations and instead conceding power to the platform's actual users.

Despite the proliferation of decentralized social media platforms presently, certain limitations and challenges still require attention. A majority of these platforms employ blockchain technology to achieve decentralization, which, as highlighted in [8], can result in higher costs in terms of processing speed.

The main objective of this research is to construct a decentralized social network that utilizes the user's device as storage, while ensuring that data remains secure and authentic, with full control over user data residing with the user. The implementation of a user data decentralization protocol, along with the design and deployment of a client application capable of seamless communication with other network peers via the decentralized protocol, is focused on this research component.

1.2. Literature Survey

Currently, numerous researchers are engaged in discussions concerning the implementation of decentralized social media platforms. This topic has gained considerable attention due to the uncontrollable monopoly held by social media corporations and the substantial increase in the number of social media users. As stated in reference [9], a survey conducted by GlobalWebIndex in July 2020 reported a rise of 10.5% in social media usage compared to July 2019. Additionally, as mentioned in reference [10], the number of individuals using social media globally has exceeded 4.48 billion, more than twice the figure of 2.07 billion recorded in 2015.

In research[11], it is mentioned that the most popular systems are built on centralized servers that store data and information for users. Because of their centralized structure, such platforms are vulnerable to a variety of dangers. Without the active control of the data's owner, data can be readily controlled, sold, or stolen. Because of the rise in social media difficulties, Blockchain technology has been combined with them. The Blockchain concept dates back to 2008, when it was adopted as a core component of Bitcoin, the first cryptocurrency that did not rely on a trusted authority. According to studies, this technology has the ability to disrupt established financial processes and transform the nature of investment.

In research [12], as mentioned in the conclusion with the technological advancements, Web 3.0 is predicted to be the web's future. Yet, some people are skeptical that the centralized web 2.0 architecture can be replaced by a decentralized web 3.0 framework. This study aimed to create a decentralized social network architecture based on the Ethereum platform that can give more privacy, data ownership, and community-driven services. However, because Ethereum blockchain and other blockchains have well-known limits, the platform can be altered in the future to improve efficiency. Massive corporations like Facebook, Google, and Microsoft are also developing and testing these potential decentralized computing technologies.

In research [8], The following are some of the disadvantages of blockchains. One issue is the low transaction processing pace of blockchain systems. In comparison, Ethereum's network can execute about 15 transactions per second, but other payment systems, such as VISA, may process hundreds. As the number of nodes increases, so does the difficulty of solving this problem. In a nutshell, another problem associated with blockchain networks is scalability.

In research [13], it is discussed that, it has discussed that obstacles on the on-chain storage in aspects of the performance and cost. On-chain storage can result in significantly higher expenses. According to Ethereum's yellow paper, storing a 1 GB file on the Ethereum blockchain will cost around $316,416 USD. Storage costs on chain are several orders of magnitude greater than centralized storage (e.g., Amazon S3 HOT storage costs $0.023GB per month). Second, keeping vast amounts of data

on-chain not only slows the synchronization of new blockchain nodes but also consumes the majority of transaction throughput.

In addition to referring to research papers, existing decentralized social media platforms were analyzed in order to identify already implemented features and enhancements that needed to be implemented.

1.3 Comparison of existing decentralized social media platforms

1.3.1 Mastodon

Mastodon is an open-source platform that has resulted in a succession of alternative social media sites. The social networking sites are hosted on decentralized servers, which implies that they are not owned by a single individual or company. The free and open-source software project was launched in 2016, with a stable release scheduled for November 2022.[14]

Mastodon adheres to a decentralized architectural concept that makes use of a of the hosted server to accomplish decentralized data storage. A mastodon server can be self-hosted by any user. As stated in [15], Mastodon lacks the ability to provide scalability, which will be required when the platform is used by a significant number of users. Furthermore, Mastodon only provides their users with mobile app clients. Caching or control of caching mechanism is also not available in mastodon.

Figure 1.3.1.1: Mastodon Logo

1.3.2 DeSo

DeSo is a relatively new blockchain that was designed from the ground up to decentralize social media. The idea is to give more power to creators, consumers, and developers rather than the large tech giants that control the majority of what we see on the internet today.

Nader Al-Naji launched DeSo in 2019, and the DeSo Foundation promotes blockchain technology. The Octane Fund, a $50 million developer fund, was announced for 2021. One of the most notable benefits of DeSo is that it is not a

general-purpose blockchain, which means that it offers a limited range of social-oriented features, making it highly scalable and cost-effective for on-chain storage. [16]

DeSo also follows a decentralized social media platform which uses a blockchain built itself. Because of this DeSo can only be self-hosted partially as it has to use the DeSo blockchain.

Figure 1.3.2.1: DeSo Logo

1.3. Research Gap

There has been a lot of research done recently on decentralized social media systems. The majority of these studies utilize blockchain to achieve decentralized architecture within the social media network.

Even though blockchain can be used to establish decentralization, there will be a challenge in storing data in large volumes. To address this issue, research is presently underway.

By examining the existing decentralized social media sites, it was clear that the majority of them also use blockchain to accomplish the benefits of decentralization.

	Mastodon[14]	**DeSo[16]**	**DeMedia**
User Data Storage	In hosted server	In DeSo blockchain	In user's device
Support decentralized data storage	No	No	Yes
Self-hosting	Yes	Partially	Yes
Scalability	No	Partially	Yes
Caching	No	No	Yes
Installable client	Only a mobile client	No	Yes

Table 1.3.1: Comparison of existing decentralized social media platforms.

2.0 RESEARCH PROBLEM

To overcome the challenges of existing social media platforms, a social media platform without a central authority and driven by the platform's users must be established. Despite the fact that several decentralized social media systems have been established to address these difficulties, some issues remain unresolved. According to the principal disadvantages, keeping large volume of data on a blockchain will be an expensive and inefficient operation.

The identified challenges in the context of user data decentralization protocol for social media present several issues that need to be addressed to enable the successful implementation of such a protocol.

- Complete ownership of user data is a key challenge in decentralized social media. Users need to have full control and ownership over their data to ensure privacy and security. Therefore, measures must be taken to provide users with complete ownership of their data, including the ability to manage, access, and delete their data as they see fit. This requires a clear understanding of how user data is collected, processed, and stored and implementing appropriate measures to ensure that users retain control of their data.
- The limitations of blockchain as a storage solution for large quantities of data pose a significant challenge. While blockchain technology is a promising solution for decentralized data storage, its limitations in terms of scalability and efficiency when it comes to storing large amounts of data need to be addressed. Therefore, potential solutions need to be explored to overcome these limitations and ensure that the user data is stored securely and efficiently.
- Enhancements to current decentralized social media networks need to be made to provide users with a seamless and efficient experience. This includes addressing the limitations of existing decentralized social media platforms, such as slow transaction times, low throughput, and limited scalability. Enhancements such as improving the speed of data transfer, reducing transaction costs, and improving the overall user experience will help ensure that users have a positive experience with decentralized social media networks.

Addressing these challenges will require a comprehensive understanding of the technical, regulatory, and social aspects of user data decentralization protocols for social media. Therefore, the development of a user data decentralization protocol that addresses these challenges is crucial to enable the successful implementation of a decentralized social media network.

3.0 OBJECTIVES

3.1 Main Objective

The objective of this research is to create a new decentralized social media protocol that offers users a more secure, private, and decentralized alternative to traditional social media platforms. The proposed protocol will be designed to store user data on the user's device rather than a centralized server, ensuring that the user retains complete control over their data.

To achieve this objective, the research will involve the development of a user data decentralization protocol that outlines how the user data will be stored, accessed, and shared among peers on the network. This protocol will ensure that user data is encrypted and secured while maintaining its accessibility and availability to the user.

In addition to developing the user data decentralization protocol, the research will also involve the design and implementation of a client application capable of seamlessly communicating with other network peers via the decentralized protocol. The client application will be designed to provide a user-friendly interface that allows users to easily create and share content with others on the network. It will also include features such as encryption, authentication, and verification mechanisms to ensure that all user data and communication is secure and private.

Overall, the main objective of this research is to provide users with a decentralized social media platform that offers them complete control over their data while also providing a seamless and user-friendly experience. By developing a user data decentralization protocol and a client application that utilizes this protocol, the proposed platform will offer a more secure, private, and decentralized alternative to traditional social media platforms.

3.2 Sub Objectives

- Assess the opportunities and challenges present in existing user data decentralization protocols:

  This sub-objective involves evaluating the advantages and disadvantages of the current user data decentralization protocols. The aim is to identify the strengths and weaknesses of the existing protocols to determine their feasibility and effectiveness in addressing the problem at hand. For instance, the existing protocols' ability to provide security and privacy for user data and compare it with the required standards will be analyzed. Scalability, interoperability, and ease of implementation of the existing protocols will also be assessed. The outcome of this objective will be used to inform the decision-making process regarding the selection of a suitable protocol for implementation.

- Determine the potential enhancements and new capabilities that could be integrated into a protocol for storing user data within the user's device:

  This sub-objective focuses on identifying the possible modifications or improvements that can be integrated into an existing user data decentralization protocol to enhance its functionality. The current limitations and requirements for storing user data within the user's device and identify possible enhancements to address these limitations will be analyzed under this objective. Analysis will be conducted on need for a more robust security mechanism to protect user data or propose the integration of a backup mechanism to ensure data availability. The outcome of this sub-objective will be a list of potential modifications to the existing protocol that will be considered in the implementation phase.

- Implement a protocol with the identified modifications while adhering to best practices with following functionalities:

  This sub-objective involves the actual implementation of the protocol with the identified modifications. A protocol will be implemented while adhering to best practices to ensure the protocol's security, scalability, and interoperability. The functionalities identified, such as enabling the user to control user data, utilizing user devices to store user data, improving limitations in current decentralized social media platforms, and making user data highly available, will be incorporated into the implementation. The researcher will also test the protocol to ensure it is working as intended.

  • Enable the user to control user data:

  This functionality involves giving the user control over their data, including the ability to add, modify, or delete data. The user will also have the option to restrict access to their data or grant access to specific users or applications.

  • Utilizing user devices to store user data:

  This functionality involves storing user data on the user's device instead of centralized servers. This approach enhances data privacy and security, and it also reduces the risk of data breaches.

  • Improving limitations in current decentralized social media platforms:

  This functionality involves identifying and addressing the limitations in current decentralized social media platforms, such as slow transaction times, lack of scalability, and high energy consumption.

  • Making user data highly available:

  This functionality involves ensuring that user data is highly available by implementing a backup mechanism to prevent data loss or corruption. The protocol will also ensure that data is easily accessible to the user, even in the absence of an internet connection.

Overall, the sub-objectives mentioned above will contribute to the successful implementation of a protocol for storing user data within the user's device, while ensuring security, privacy, and availability.

4.0 METHODOLOGY

4.1 Requirement Gathering

The initial stage in this research component is to collect the requirements for the new data decentralization protocol as well as the new client that will be created to use the protocol and connect to a peer-to-peer network. The requirements are derived from current peer-to-peer apps and peer-to-peer protocols. And also, previous research on existing data decentralization techniques and client programs for connecting to a peer-to-peer network will be reviewed. The analysis is performed to identify the challenges in present research and the improvements that need to be made.

4.2 Feasibility Study

4.2.1 Technical Feasibility

Developing a client application capable of communicating with network nodes and peers will take precedence. Additionally, the client should be able to store user data securely on the user's native device storage. As the currently proposed technology stack can implement a client capable of including the abovementioned features, this can be considered technically feasible.

4.2.1 Schedule Feasibility

This research component is expected to be completed in approximately ten months, and the work has been structured accordingly. A Gantt chart has been developed to demonstrate the work to be completed within specific time frames. After contemplating the factors mentioned above, this component can be considered schedule feasible.

4.3 Proposed System Design

4.3.1 System Overview Diagram (Overall)

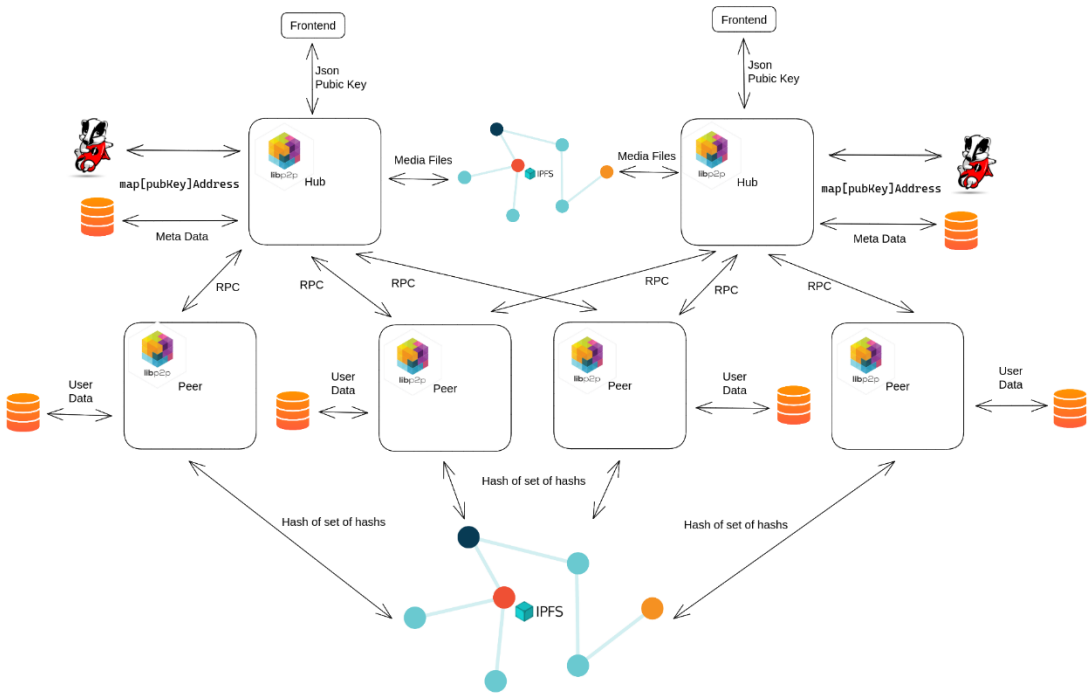

Figure 4.3.1.1: High Level architecture diagram (Overall)

The provided explanation outlines the components of the DeMedia architecture, which is a proposed infrastructure for a decentralized social media platform. The diagram accompanying the explanation provides a high-level overview of the architecture, which includes four major components: data decentralization protocol, peer-to-peer communication, decentralized data storage, and data integrity in a decentralized network.

The first component of the DeMedia architecture is the data decentralization protocol, which will enable the platform to store user data within the users' devices rather than on centralized servers. This decentralization of data will enhance user control over their personal data, as well as increase data privacy and security.

The second component of the DeMedia architecture is peer-to-peer communication, which will allow users to communicate with each other through a hub which will act only as a communicator. This will increase the speed and efficiency of communication while reducing the dependence on centralized servers.

The third component of the DeMedia architecture is decentralized data storage, which will be accomplished using InterPlanetary File System (IPFS). IPFS is a protocol that enables the creation of a decentralized file-sharing network, which is more secure and fault-tolerant than centralized file-sharing networks.

The fourth and final component of the DeMedia architecture is data integrity in a decentralized network. This involves ensuring that the data stored on the decentralized network is secure, reliable, and tamper-proof. This is accomplished through the use of cryptography and other security measures to ensure that the data cannot be tampered with or compromised.

Overall, the DeMedia architecture aims to create a decentralized social media platform that offers increased privacy, security, and user control over personal data. The infrastructure will consist of hubs, peers, and a decentralized data storage network, which will be illustrated in the high-level architectural diagram.

4.3.2 System Overview Diagram (Individual)

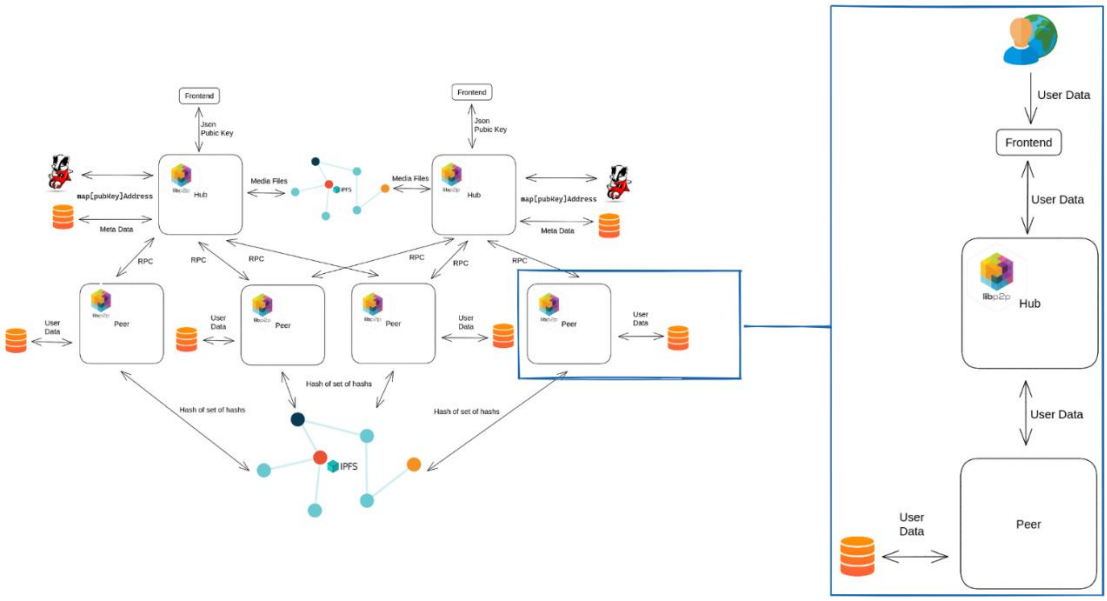

Figure 4.3.2.1: High Level architecture diagram (Component)

The component mentioned in the explanation refers to the development of a protocol that enables the decentralization of information. In other words, the focus is on creating a system that allows users to store their data on their own devices instead of centralized servers. This protocol will be accompanied by a client program that will demonstrate its capabilities.

One of the main functions of the client program will be to establish communication with hubs, which are nodes on the network that facilitate communication between peers. By connecting to hubs, the client program can then connect to other peers on the network, allowing for the exchange and sharing of data.

Another important function of the client program will be to securely store user data on the user's device. This means that the data will be stored within users device to ensure that it cannot be accessed by unauthorized parties. By storing data on the user's device, the protocol will minimize the risk of data breaches and increase user control over their own data.

Lastly, the client program will display connection information with hubs and peers, allowing users to monitor their connections and manage their data effectively. This will enable users to have greater control over their data and the information they share on the network.

4.4 Novelty Aspect

The novelty aspect of this research is implementing a user data decentralization protocol for a decentralized social media platform without using blockchain technology. The majority of existing decentralized social media platforms use blockchain technology to store user data, but this research proposes a new approach by storing user data within the user's device.

This approach is innovative because it provides enhanced data privacy and security, reduces the risk of data breaches, and minimizes the environmental impact of blockchain technology's energy consumption. Additionally, it provides users with greater control over their data, which is an essential aspect of data privacy and security.

Another novelty aspect of this research is the integration of a backup mechanism to ensure that user data is highly available. This mechanism will prevent data loss or corruption, ensuring that user data is accessible to the user even in the absence of an internet connection. This functionality is critical for a decentralized social media platform, as it ensures that users can access their data at all times, regardless of external factors.

Overall, the novelty aspect of this research lies in its approach to user data decentralization and its implementation of a decentralized social media protocol without using blockchain technology. The proposed approach addresses the limitations of existing protocols, provides enhanced security and privacy, and offers users greater control over their data.

4.5 Software Development Life Cycle (SDLC)

The SCRUM framework, an Agile software development framework, will be used as the primary software project management framework throughout the research. The reason to choose agile methodology over other software project management methodologies such as Lean, Waterfall model, and Six Sigma because it is best adapted for rapid and effective software development . According to the article[17], SCRUM is a popular agile framework because it defines the systems development process as a loose collection of activities combining the finest tools and techniques a development team can devise to create a system.

According to additional information in the same article[17], SCRUM implies that the systems development process is unpredictable, complex and can only be described as an overall progression.

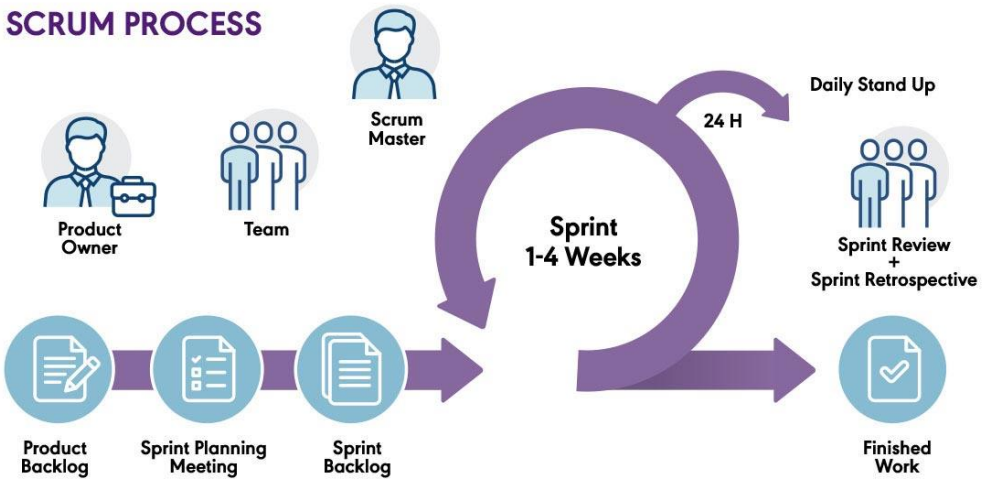

Figure 4.5.1: SCRUM process

A systematic allocation and organization of the work have been used to achieve the research's outlined objectives and achieve the desired outcomes. A detailed schedule, complete with a Gantt chart, has been made to give each part of the research sufficient time to be finished on time. In addition, the selection of appropriate technologies to effectively implement the proposed solution and demonstrate the intended results of this research has been carefully considered. As evidenced by the detailed preparation and strategic decisions made throughout this research, each step has been taken to ensure a well-structured and systematic approach to achieving the research objectives.

4.6 Work Breakdown Structure

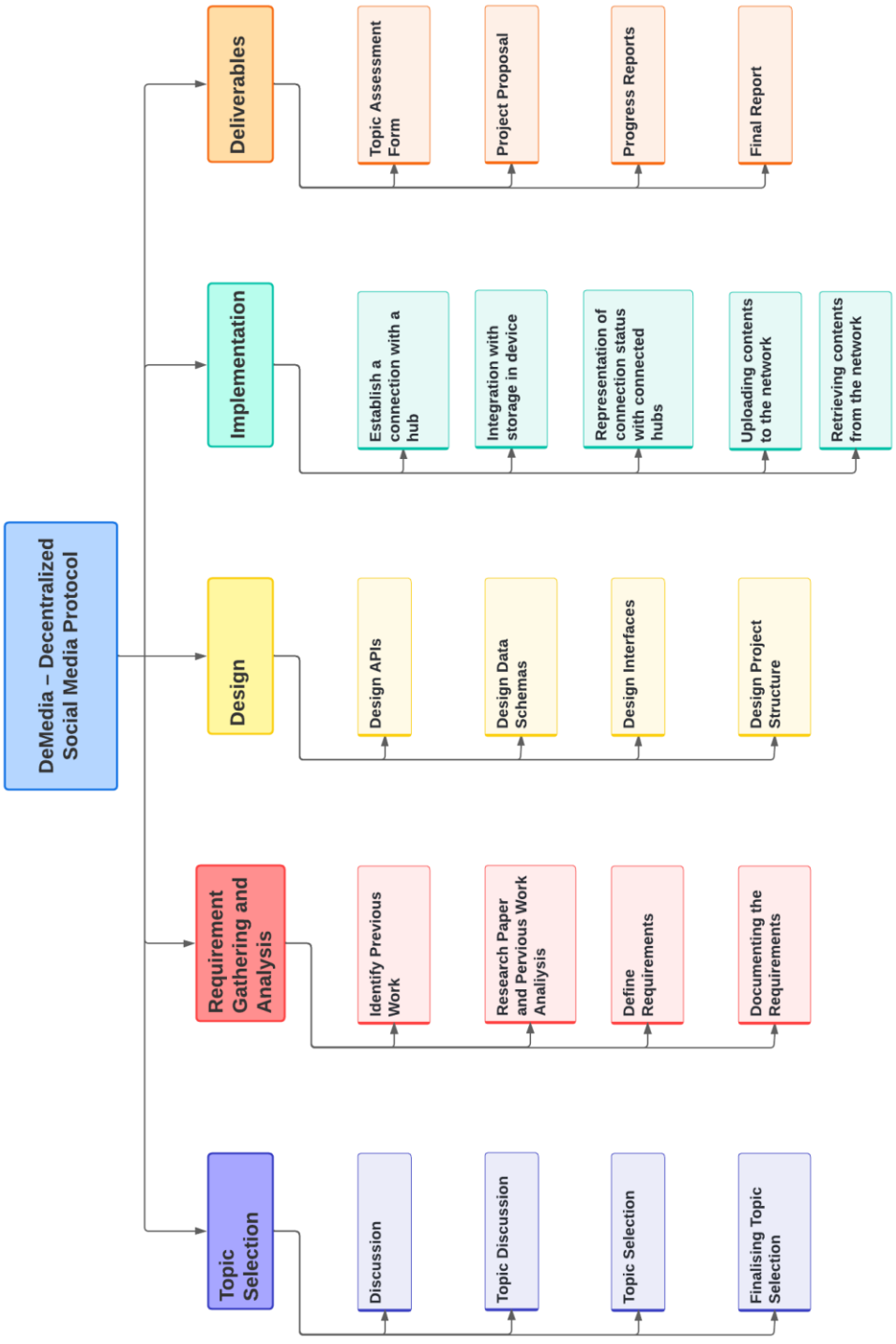

Figure 4.6.1: Work Breakdown Structure (WBS)

4.7 Gantt Chart

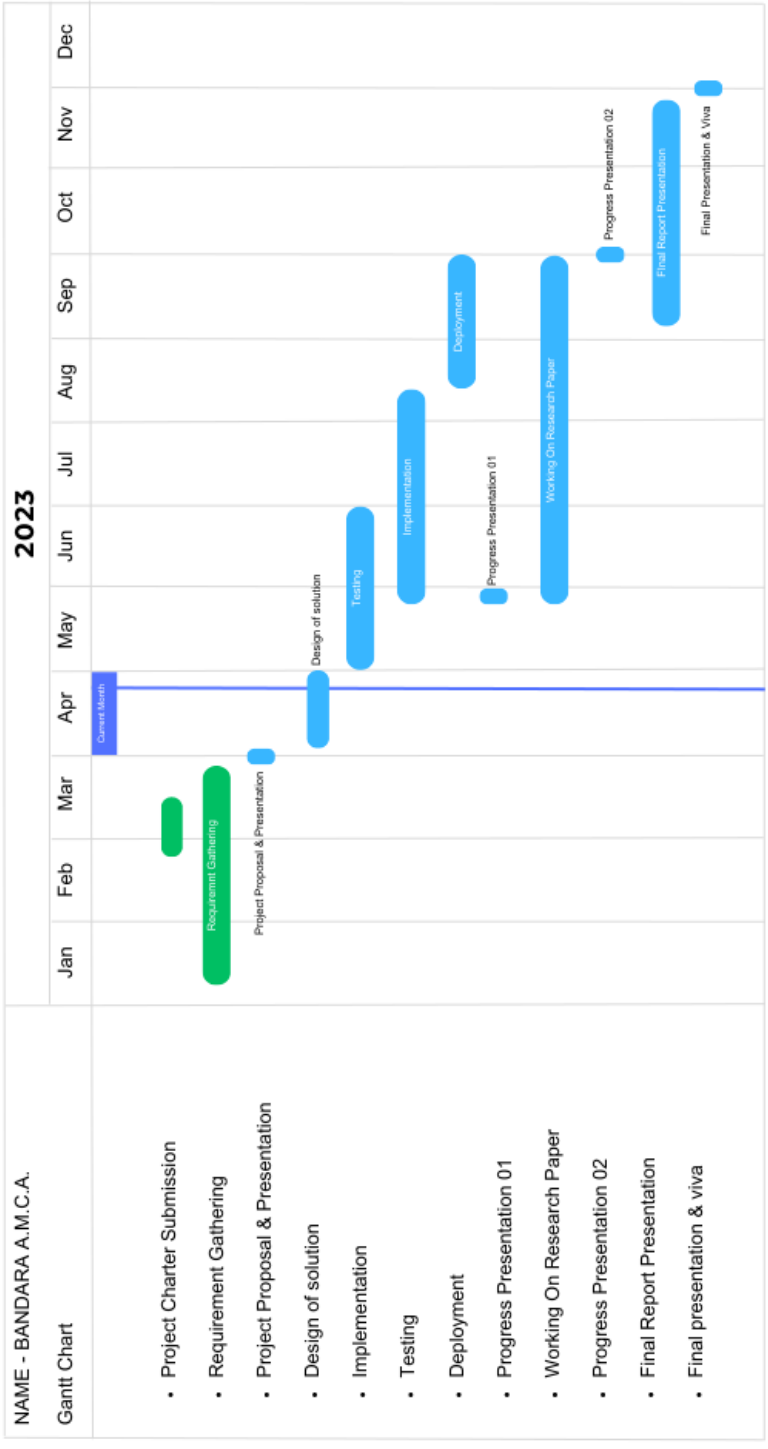

Figure 4.7.1: Gantt Chart

4.8 Proposed Tools and Technologies

Tool/Technology	Purpose
Quasar	Frontend development
Go Lang	Backend Development
Libp2p, Markdown	Libraries
IPFS, PostgresSQL	Data Storage
VScode, GoLand	IDEs
GitHub	Version Control System
GitLab	CI/CD
AWS	Cloud Service
Microsoft planner	Project Management
Microsoft Teams, WhatsApp	Communication

Table 4.8.1: Proposed Tools and Technologies to be used.

5.0 SOFTWARE SPECIFICATIONS

5.1 Functional Requirements

- Connection Establishment with hubs:

  This requirement involves establishing connections between the user's device and the decentralized social media protocol's hubs. Hubs act as intermediaries that help in connecting different nodes within the network. The protocol must establish a connection with these hubs to facilitate the seamless sharing of user data.

- In-device storage integration:

  This requirement involves integrating the protocol with the user's device's storage system to store user data within the device. The protocol must have access to the user's device storage system and be able to store data securely and efficiently. This functionality is essential to ensure that user data remains private and secure, and it also reduces the risk of data breaches.

- Representation of connection status with connected hubs:

  This requirement involves providing users with real-time information about their connection status with the protocol's hubs. The user must be able to see whether their device is connected to the network or not. This functionality is critical as it helps the user identify any issues with the connection and take corrective action if required.

- Content sharing to network:

  This requirement involves enabling the user to share content with the decentralized social media network. The user must be able to share text, images, and other types of content with the network seamlessly. The protocol must ensure that the shared content is available to other users on the network, and it must also provide mechanisms for users to control the visibility of their content.

5.2 Non-functional Requirements

- Performance:

  Performance refers to the speed and responsiveness of the system. In the context of a decentralized social media platform, it is essential to ensure that the system's performance is optimal, and users can quickly access their data. The protocol should be designed to minimize latency and ensure fast data access, even during peak usage.

- Fault tolerance:

  Fault tolerance refers to the system's ability to continue operating in the event of a failure or error. In the context of a decentralized social media platform, fault tolerance is crucial, as it ensures that user data is always accessible, even in the event of a system failure or error.

- Scalability:

  Scalability refers to the system's ability to handle increased user demand without a reduction in performance. In the context of a decentralized social media platform, scalability is critical, as it ensures that the system can handle an increasing number of users and data storage requirements.

- Availability:

  Availability refers to the system's ability to be accessible to users at all times. In the context of a decentralized social media platform, availability is critical, as it ensures that users can access their data and the platform whenever they need to, regardless of external factors.

- Usability:

  Usability refers to the ease of use and user experience of the system. In the context of a decentralized social media platform, usability is essential, as it ensures that users can easily navigate and use the platform without any issues. The protocol should be designed with user experience in mind to ensure that users can access and manage their data efficiently.

- Better developer experience:

  This requirement refers to the experience of developers working on the project, including the ease of development, maintenance, and updates. A better developer experience ensures that the protocol is well-documented, easy to use, and adaptable to future changes. This requirement is crucial, as it ensures that the protocol can be maintained and updated efficiently, leading to better overall platform performance and user experience.

  Overall, these non-functional requirements are critical to ensuring the success of the user data decentralization protocol and the decentralized social media platform. Meeting these requirements will ensure that the platform is performant, fault-tolerant, scalable, available, easy to use, and maintainable, leading to a better user experience and a more successful platform.

6.0 DESCRIPTION OF PERSONAL AND FACILITIES

Student Number	Name	Purpose
IT20159726	Bandara A.M.C.A.	▪ Implementation of data decentralization protocol. ▪ Implementation of a client which is capable of demonstrating the data decentralization protocol. ▪ Documentation of the solution implemented. ▪ Testing of the solution.

Table 6.0.1: Description of personnel and facilities

7.0 PROPOSED BUDGET

The initial phase of the project does not entail any budgeted tasks as the process of requirement gathering is accomplished through an analysis and review of previous work conducted for research or field study purposes. As the recommended technologies and tools are open source and do not incur any costs, their utilization is free of charge. However, expenses are incurred during the development phase, as it necessitates the use of cloud service providers' services.

Task	**Estimated budget (in LKR)**
Documenting and Planning	8,000
Cloud services	21,000
Other (Internet, Travelling and etc.)	5,000
Total	**34,000**

Table 7.0.1: Proposed Budget

8.0 COMMERCIALIZATION

DeMedia is focused on developing an open-source protocol that facilitates the creation of decentralized social media platforms which can be self-hosted. The project aims to provide a base model for free, which can be used by anyone interested in creating a decentralized social media platform.

In addition to the free model, DeMedia will also offer two paid models.

- Subscription-based membership model
- Advertising-based revenue model

The host can govern these paid models, allowing them to generate revenue from their platform. Therefore, one could describe DeMedia as a research project focused on commercializing the development of decentralized social media platforms. The project is developing a range of monetization models that hosts can use to generate revenue from their platforms, thereby enabling the commercialization of the technology.

To further elaborate on the commercialization aspect of DeMedia, it's essential to understand that the project is focused on creating technology that can enable the development of decentralized social media platforms. By providing a free base model, DeMedia is making it easier for individuals or organizations to create their own social media platforms that are not controlled by a centralized authority. However, to sustain and grow these platforms, there needs to be a way to generate revenue.
The subscription-based membership model allows hosts to charge users for access to premium features or content on their platform. This revenue can be used to cover the costs of hosting and maintaining the platform.
On the other hand, the advertising-based revenue model enables hosts to generate revenue by displaying ads on their platforms. Hosts can charge advertisers to display their ads on the platform, and this revenue can be used to cover the costs of hosting and maintaining the platform and generate profits.

As a summary of this proposed system, DeMedia is enabling the commercialization of decentralized social media platforms by providing a technology that allows anyone to create their own platform and monetization models that enable hosts to generate revenue and sustain their platforms. This could lead to a more diverse and decentralized social media ecosystem, with a more excellent range of platforms catering to specific sectors and communities.

9.0 CONCLUSION

In conclusion, the objective of this research is to create a decentralized social network architecture that combines the key features of a social media platform while prioritizing the protection of users' data privacy and security. In this regard, the research entails two main components: firstly, the development and implementation of a protocol for decentralizing user data, and secondly, the design and creation of a client application that can effectively communicate with other network peers using the decentralized protocol. Notably, users' data will be stored locally on their own workstations to enhance data privacy. The emphasis is on ensuring that the social network architecture is decentralized, secure, and user-centric, while retaining the essential functionalities of a social media platform.

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Glossary

- Decentralization: The process of distributing a system or service across multiple nodes or devices, reducing dependence on a single centralized entity.
- Social media: A digital platform designed for users to create and share content, interact with others, and build online communities.
- Protocol: A set of rules and guidelines that define how data is transmitted and received between different devices or nodes in a network.
- User data: Any data or information that is created or collected by a user on a social media platform, such as posts, messages, images, and personal information.
- Peer-to-peer (P2P): A decentralized network model where all nodes in the network have equal status and communicate directly with each other.
- Client application: A software program that is installed on a user's device and is used to interact with a social media platform or network.
- Encryption: The process of encoding data or information so that it can only be accessed or decoded by authorized parties.
- User control: The ability for users to have complete control over their data and how it is shared and accessed by others on the social media platform.
- Bandwidth: The maximum amount of data that can be transmitted over a network in a given amount of time.
- Node: A device or computer that is connected to a network and is capable of sending or receiving data.
- API (Application Programming Interface): A set of protocols and tools used for building software applications and integrating different software systems.
- Open source: A software development model where the source code for a software program is freely available to anyone for modification and redistribution.
- Scalability: The ability of a system or network to handle increased amounts of data or users without decreasing performance or efficiency.
- Decentralized storage: A storage system that distributes data across multiple devices or nodes in a network, reducing dependence on a single centralized server.
- Interoperability: The ability of different systems or platforms to work together seamlessly and exchange data or information.
- Data privacy: The protection of user data from unauthorized access or use.
- User experience (UX): The overall experience and satisfaction that users have when interacting with a social media platform or software application.
- Network latency: The amount of time it takes for data to travel between different nodes or devices in a network.