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IT4010 – Research Project - 2023

Topic Assessment Form

Project ID : TMP-23-234

1. Topic (12 words max)

DeMedia – Decentralized Social Media Protocol

2. Research group the project belongs to

Computing Infrastructure and Security (CIS)

3. Research area the project belongs to

Computer Networks (CN)

4. If a continuation of a previous project:

Project ID	-
Year	-

5. Team member details

Student Name	Student ID	Specialization
Leader: Perera B.S.S.	IT20254698	IT
Member 2: Bandara A.M.C.A.	IT20159726	IT
Member 3: Dhananjani G.G.S.	IT20137496	IT
Member 4: Abeykoon A.W.Y.I.K.	IT20157432	IT

6. Brief description of the research problem including references (200 – 500 words max) – references not included in word count

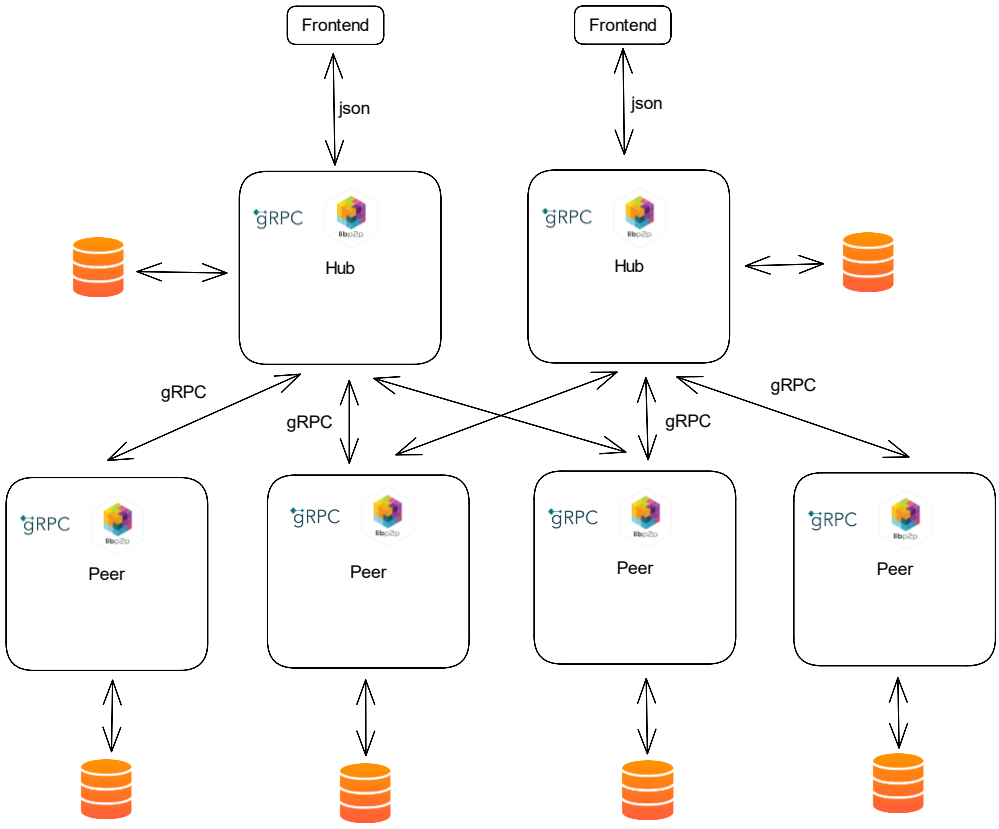
Current centralized social media platforms have many drawbacks that raise important ethical, privacy, and public policy issues, and they need reforms to better serve the interests of users and society. Currently, the following problems are prevalent on social media platforms.

- **Lack of privacy**: Centralized social media platform owners collect and store vast amounts of personal data on their users, which can be vulnerable to hacking, misuse, and abuse.
- **Censorship**: Social media platform owners can censor or restrict the content that users can post, based on their own policies or government demands.

- **Algorithmic bias**: The algorithms used by centralized social media platform owners can prioritize certain types of content over others, leading to a filter bubble and the spread of misinformation.
- **Monopolistic behavior**: A few large companies dominate the social media market, leading to concerns about market concentration and a lack of competition.
- **Dependence on advertising revenue**: Social media platform owners are heavily dependent on advertising revenue, leading to concerns about the quality and accuracy of the content being served to users.

7. Brief description of the nature of the solution including a conceptual diagram (250 words max)

DeMedia is a protocol that can be used to build decentralized social media platforms. Despite the fact that the blockchain is a widely used term when it comes to decentralization, DeMedia will not utilize it. Because the cost will be considerable, utilize a blockchain to construct a blockchain-based social media platform. It will make use of a peer-to-peer (P2P) network. Every user will have a client that will manage their data and save it on their device rather than transferring it to a central server. It will provide the user comprehensive control over their data without storing them on a server over which they have limited control. Data caching will be enabled to ensure that performance is not affected while giving the user complete control over their data by allowing them to manage the caching duration. The integrity of the data will also be secured by using a cryptographic method.



8. Brief description of specialized domain expertise, knowledge, and data requirements (300 words max)

- **Distributed systems**: Understanding of distributed systems and how to build scalable, fault-tolerant systems that can handle a large number of users and data.
- **Network protocols**: Knowledge of network protocols and how to build efficient and secure communication between nodes.
- **Data storage and management**: Understanding of how to store and manage data in a decentralized system, including data consistency, replication, and security.
- **Identity and access management**: Expertise in managing identities and access to data, ensuring that only authorized users can access sensitive information.
- **User experience design**: Knowledge of user-centered design principles and how to build a user-friendly interface for decentralized social media.
- **Privacy and security**: Expertise in privacy and security best practices, including data encryption, access control, and threat mitigation.
- **Compliance**: Understanding of legal and regulatory requirements for data privacy, user protection, and content moderation, and how to ensure compliance in a decentralized system.

9. Objectives and Novelty

Main Objective -
To implement a protocol that facilitates the development of decentralized social media platforms.

Novelty -
Although various decentralized social media platforms are being created at present, practically all of them will utilize blockchain, which will be more expensive and would store user data across a network. DeMedia focuses on developing a protocol that allows for the creation of decentralized social media platforms without the utilization of blockchain while taking advantage of a peer-to-peer network and storing user's data in the user's device.

Member Name	Sub Objective	Tasks	Novelty
Perera B.S.S.	To implement a peer-to-peer communication protocol	• Conduct a comprehensive review of peer-to-peer communication protocols and associated research. • Assess the opportunities and challenges present in existing peer-to-peer communication protocols. • Determine the potential enhancements and new capabilities that could be integrated into a protocol utilizing Remote Procedure Calls (RPC) for	Developing a communication protocol to facilitate communication between peers using remote procedure call (RPC).

		inter-peer communication within a network. • Implement a protocol with the identified modifications while adhering to best practices.	
Bandara A.M.C.A.	To implement user data decentralization protocol	• Conduct a comprehensive review of user data decentralization protocols and associated research. • Assess the opportunities and challenges present in existing user data decentralization protocols. • Determine the potential enhancements and new capabilities that could be integrated into a protocol for storing user data within the user's device. • Implement a protocol with the identified modifications while adhering to best practices.	Developing a client which will enable the storing of user data within the user's data and connect to the network.

Dhananjani G.G.S.	To implement a mechanism for data integrity preservation	• Conduct a comprehensive review of data integrity preservation mechanisms and associated research. • Assess the opportunities and challenges present in existing user data integrity preservation mechanisms. • Determine the potential enhancements and new capabilities that could be integrated into a data integrity preservation mechanism in a peer-to-peer network. • Implement a data integrity preservation mechanism with the identified modifications while adhering to best practices.	Developing a cryptographic mechanism to save signed user data within the user's device.

Abeykoon A.W.Y.I.K.	To implement a mechanism for data caching preservation	• Conduct a comprehensive review of data caching mechanisms and associated research. • Assess the opportunities and challenges present in existing data caching mechanisms. • Determine the potential enhancements and new capabilities that could be integrated into a mechanism for data caching in a peer-to-peer network. • Implement a mechanism to cache data in a peer-to-peer network with the identified modifications while adhering to best practices.	Developing a caching mechanism to fetch objects and cache them on the network while giving the ability to control the caching duration to the user.

10. Supervisor checklist (supervisors should fill sections 10 and 11)

a) Is this research problem valid?

Yes		No	

b) Is the proposed research group correct?

Yes		No	

c) Is the proposed research area correct?

Yes		No	

d) Do the proposed sub-objectives match the students' specialization?

Yes		No	

e) Is the required domain expertise, knowledge, and the data available either through the supervisor or external supervisor?

Yes		No	

f) Is the scope of the solution practical?

Yes		No	

g) Do all sub-objectives have sufficient novelty?

Yes		No	

11. Supervisor details

	Title	First Name	Last Name	Signature
Supervisor				
Co-Supervisor				
External Supervisor				
Summary of external supervisor's (if any) experience and expertise				

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Topic Assessment Form

Summary Sheet

The topic evaluation panel will use the summary sheet to evaluate the suitability of the project

1. Brief description of research problem including references (200 – 300 words max)

Current centralized social media platforms have many drawbacks that raise important ethical, privacy, and public policy issues, and they need reforms to better serve the interests of users and society. Currently, the following problems are prevalent on social media platforms.

- **Lack of privacy**: Centralized social media platform owners collect and store vast amounts of personal data on their users, which can be vulnerable to hacking, misuse, and abuse.
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- **Algorithmic bias**: The algorithms used by centralized social media platform owners can prioritize certain types of content over others, leading to a filter bubble and the spread of misinformation.
- **Monopolistic behavior**: A few large companies dominate the social media market, leading to concerns about market concentration and a lack of competition.
- **Dependence on advertising revenue**: Social media platform owners are heavily dependent on advertising revenue, leading to concerns about the quality and accuracy of the content being served to users.

2. Brief description of the nature of the solution (150 words max)

DeMedia is a protocol that can be used to build decentralized social media platforms. Despite the fact that the blockchain is a widely used term when it comes to decentralization, DeMedia will not utilize it. Because the cost will be considerable, utilize a blockchain to construct a blockchain-based social media platform. It will make use of a peer-to-peer (P2P) network. Every user will have a client that will manage their data and save it on their device rather than transferring it to a central server. It will provide the user comprehensive control over their data without storing them on a server over which they have limited control. Data caching will be enabled to ensure that performance is not affected while giving the user complete control over their data by allowing them to manage the caching duration. The integrity of the data will also be secured by using data encryption.

3. Objectives and novelty

Main Objective -
Implement a protocol that facilitates the development of decentralized social media platforms.

Novelty -
Although various decentralized social media platforms are being created, practically all of them will utilize blockchain, which will be more expensive and would store user data across a network. DeMedia focuses on developing a protocol that allows for the creation of decentralized social media platforms without the utilization of blockchain while taking advantage of a peer-to-peer network and storing user's data in the user's device.

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Member Name	Sub Objective	Tasks	Novelty
Perera B.S.S.	To implement a peer-to-peer communication protocol	• Conduct a comprehensive review of peer-to-peer communication protocols and associated research. • Assess the opportunities and challenges present in existing peer-to-peer communication protocols. • Determine the potential enhancements and new capabilities that could be integrated into a protocol utilizing Remote Procedure Calls (RPC) for inter-peer communication within a network. • Implement a protocol with the identified modifications while adhering to best practices.	Developing a communication protocol to facilitate communication between peers using remote procedure call (RPC).

Bandara A.M.C.A.	To implement user data decentralization protocol	• Conduct a comprehensive review of user data decentralization protocols and associated research. • Assess the opportunities and challenges present in existing user data decentralization protocols. • Determine the potential enhancements and new capabilities that could be integrated into a protocol for storing user data within the user's device. • Implement a protocol with the identified modifications while adhering to best practices.	Developing a client which will enable the storing of user data within the user's data and connect to the network.
Dhananjani G.G.S.	To implement a mechanism for data integrity preservation	• Conduct a comprehensive review of data integrity preservation mechanisms and associated research. • Assess the opportunities and challenges present in existing user data integrity preservation mechanisms. • Determine the potential enhancements and new capabilities that could be integrated into a data	Developing a cryptographic mechanism to save signed user data within the user's device.

		integrity preservation mechanism in a peer-to-peer network. • Implement a data integrity preservation mechanism with the identified modifications while adhering to best practices.	
Abeykoon A.W.Y.I.K.	To implement a mechanism for data caching preservation	• Conduct a comprehensive review of data caching mechanisms and associated research. • Assess the opportunities and challenges present in existing data caching mechanisms. • Determine the potential enhancements and new capabilities that could be integrated into a mechanism for data caching in a peer-to-peer network. • Implement a mechanism to cache data in a peer-to-peer network with the identified modifications while adhering to best practices.	Developing a caching mechanism to fetch objects and cache them on the network while giving the ability to control the caching duration to the user.

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Topic Assessment Form

<u>This part to be filled by the Topic Screening Panel members</u>

Acceptable: Mark/Select as necessary

Topic Assessment Accepted	
Topic Assessment Accepted with minor changes (should be followed up by the supervisor)*	
Topic Assessment to be Resubmitted with major changes*	
Topic Assessment Rejected. Topic must be changed	

* Detailed comments given below

Comments

The Review Panel Details

Member's Name	Signature

Important:

1. According to the comments given by the panel, do the necessary modifications and get the approval by the **Supervisor** or the **Same Panel**.
2. If the project topic is rejected, identify a new topic, and request the RP Team for a new topic assessment.
3. The form approved by the panel must be attached to the **Project Charter Form**.