CEng 491 -- Project KickOff Document

"DECOM" KickOff Document

Description

    End product can be defined as lightweight and portable platform which consolidates several features into single entity. The problem is current tools lack of gaining advantage of local network speed. Furthermore point of failure is a major issue as well. Therefore our end product aims to be more efficient and secure than ordinary services. Expected users are companies and teams who collaborate with each other.

Master feature list

Core module features:

MF-1: Chatting feature of core module will be implemented.

MF-2: End-to-end encryption will be implemented.

MF-3: File sharing will be designed and implemented.

MF-4: Screen sharing will be designed and implemented.

MF-5: Buffering and tracking(peer discovery) functionality will be implemented.

Web UI features:

MF-6: Chatting interface will be implemented.

MF-7: File sharing portal will be implemented.

MF-8: Screen sharing interface will be implemented.

Android features:

MF-9: Mobile chatting functionality will be implemented.

MF-10: Mobile file sharing functionality will be implemented.

Workpackages

WP #	Term	WP title (this should be as short and as descriptive as possible)	Estimated number of person-months
1	491	Project planning and architecture design	3
2	491	Decentralized architecture research and initial development	2
3	491	Basic features such as text chatting and file sharing	2
4	492	Main functions such as peer discovery and encryption	6
5	492	Screen sharing and audio/voice chatting	6
6	492	Buffering and tracking functionalities.	6
		Total:	30

Detailed Descriptions of High-Level Workpackages

WP1 - Project planning and architecture design

In this workpackage, the following functionalities / features / work items will be implemented
1. Develop the list of master features of the project.
2. Produce project development plan in accordance with Master Feature List.
3. Design the overall architecture of the project.
4. Analyze risks and make a management plan.

WP2 - Decentralized architecture research and initial development
1. Research available decentralized systems and key points of them.
2. Implement a basic text chatting application which works in a decentralized way.
3. Review and measure certain aspects such as speed, efficiency and failure risks since this project aims to solve those issues.

WP3 - Basic features such as text chatting and file sharing
1. Text chatting between computers.
2. Text chatting between computers and Androids.
3. Real time, integrated file sharing

WP4 - Main functions such as peer discovery and encryption
1. Implement discovery algorithm for peers to find each other in the network.
2. Implement end-to-end encryption for all communication.
3. Test implemented algorithms.

WP5 - Screen sharing and audio/voice chatting
1. Implement screen sharing mechanism.
2. Implement audio and voice chatting mechanism. Buffering the stream data is tricky in decentralized systems.

WP6 – Buffering and tracking functionalities
1. Implement buffering mechanism which is intended to hold certain transmission data until it is ready to send. This is a key function in a decentralized system to make it work properly.
2. Implement tracking mechanism which is intended to make peers find each other in an undiscovered network. Tracker system is a key function in a decentralized system since there is no server with static IP to connect hence peers with dynamic IP should be able to learn each other's addresses.

Overall Systems Architecture
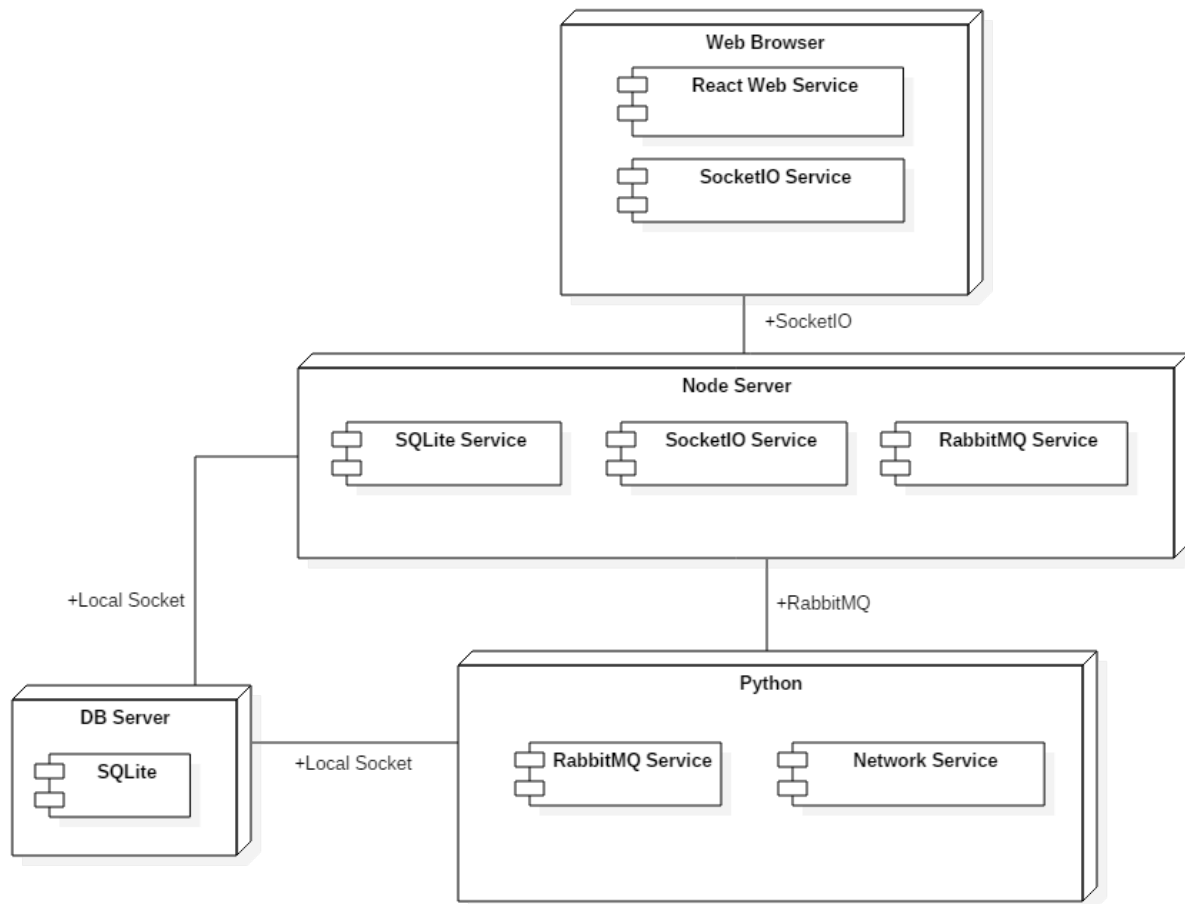
Python Module represents back-end layer. It is responsible for all back-end activities including networking, end-to-end encryption, receiving and transmitting data between users, tracking shared files, screen capturing.

Web Browser Module represents front-end layer. It is responsible for providing users a practical UI which they can interact with the program including managing chatting, file sharing, screen sharing.

Node Server module represents middle-ware layer. It is responsible for establishing proper connection between back-end and front-end layers.

DB Server is responsible for storing real time data which is required for both back-end and middle-ware layers at run-time.

TimeLine

Once the plan presented in this kick-off document is approved by the assistant, the supervisor and the coordinators, add a Gannt Chart representing the timeline (in the final version of the Kick-off   document).

Risk Assessment

In this section of the kick-off document, list (and briefly discuss) all foreseen risk items that (when realized) will be a major obstacle for successful completion of the project.

Risk #	Description	Possible Solution(s)
1	Tracking(Peer Discovery) may fail.	Extensive testing and optimizations can be applied.
2	Buffering may fail.	Manual input can be taken into consideration at run-time