Peer to Peer Messaging App

Software Requirements Specification Document (SRS).

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# SRS Document

## Introduction

### Purpose of this document

The purpose of this document is to outline the software requirements for the project this ensures that the software developers and stakeholders of this software solution understand what the customer requires the software to do, and what features it should have.

### Intended Audience and Use of this document

This document`s intended audience are the stakeholders and developers of this software solution. This document is intended to be used to define and clarify the software requirements and specification so that stakeholders and developers can have a clear understanding of the intended project outcome so that they can work towards creating a successful outcome.

### Purpose of this software solution

The purpose of the software solution outlined in this document is to provide a cheap, secure, and effective solution for communication between students and teachers. This software solution is intended to be used in a school environment to help facilitate communication between students and teachers, specifically information such as task due dates, class changes, and other school related topics.

### Scope

The scope outlines the software solution general aim broadly defining what the software solution should and should not do in this release.

#### In scope

In scope outline what the software solution should include.

* The ability to send alphanumeric messages between users
  + Specifically, teachers can message teachers, students. While Students are restricted to messaging teachers and are not allowed to message other students.
* Encryption
  + All data while in rest or transit must be securely encrypted so as to comply with IPP 4 / APP 11
* The network infrastructure should be minimal
  + This software solution must be able to be easily implemented without the need for servers or other expensive infrastructure.
* Define roles for users
  + Including easy role reassignment
  + Teachers and admin staff must be able to easily assign and reassign roles which students or other teachers can then use to direct their queries.
* See a contact list
  + Students and teachers must be able to see a contact list of all other users they can contact and the relevant roles. This is to make it as easy as possible for students and teachers to find the correct user to contact.
* Teachers will be prompted to validate the context of the message before sending
  + This is to ensure compliance with the Victorian government’s requirement for all communication between school staff and students to have a valid educational context (Victorian Goverment, 2023).

#### Out of scope

Out of scope outlines what the software solution should not include

* Sending images and other complex data types
  + Sending images would not be a necessary as the major use case for this software solution text answers to text question. With the little use images will see along with the complexity of implementing them it has been deemed unnecessary for this release.
* Group chats
  + As the main point of this software solution is one on one teacher student communication. Group chats would be an unnecessary feature making it unworthwhile to implement in this current release.
* Student to student messaging
  + This is out of scope as implementation would require complex systems to mitigate cyber bullying.
* Bots
  + This encompasses the use of automated response systems in responding to simple and repetitive query’s for example student asks what is the due date of x project, the bot would answer check teams or another platform where the answers can be found. This system would be beneficial in reducing the strain on teachers answering mundane question allowing them to focus on them more important ones. But due to its complexity it would be unfeasible to include in the first release of the software solution.
* Integration with Classroom Management Systems
  + This feature would allow student and teacher classes/roles and other important information to be automatically pulled from other school system. This would dramatically increase the quality of life for school administration.
* Multiplatform solutions
  + Due to the increased testing requirements that multiplatform development would result in This current release of the software solution will not be multiplatform.
* The ability to remember the last logged in user
  + This feature would be reasonably difficult to implement while not providing a significant benefit to the user. so ultimately has been deemed unnecessary for this current release.

### Constraints

#### Time and budget constraints

* Budget: $0
* Time: until 20 September 2024

#### Technical limitations constraints

* Developers must know Python, network programming

#### Hardware limitations constraints

* Requires internet access
* Must run-on low-end devices

#### Legal constraints

* School staff must have a valid educational context to contact students (Victorian Goverment, 2023)
  + Will implement a tick box when teachers send messages to validate the reason for contact.
* IPP 4 / APP 11 – data security
  + To abide by the 4th IPP data security all user data will be securely encrypted in all stages of transfer and storage.
* IPP 10 sensitive information
  + All sensitive information such as but not limited to private messages will be securely encrypted in all stages of transfer and storage.

#### Ethical constraints

* Cyber bulling
  + this is mitigated by the inability of students to message other students.

### Definitions and Acronyms

* Graphic user interface
  + GUI
* Peer to peer
  + P2P

## User needs

This section outlines a summary of the expected userbase for this software solution and their needs.

#### High ***school*** Student

As digital natives, high school students will be familiar with the modern interface design of messaging apps, and will therefore not require training documentation or tutorials. Students main use case of this software solution would be to ask teachers for clarification on due dates, task requirements, class changes along with many other queries. Therefore, the most important aspect for students is the ability to quickly and easily find the correct teacher for the query for example if a student wanted to change class they should be able to easily find which teacher to contact and be able to easily message them.

#### Teacher

Teachers due to the larger range of age and experience would have variable levels of expertise in messaging apps ranging from low to high levels of expertise this results in their need for a simple and intuitive user interface that can at the same time have complex feature for the more experienced to utilise. Teachers would mostly use this software solution to receive queries from students and either respond to them or find the student in person. Therefore, the most important feature for teachers is the ability to quickly and easily know if a student has messaged them as well as the ability to find relevant information about the student such as their student ID so as to most efficiently be able to look them up in the student database to find more relevant information that can help the teacher answer the query.

#### School Administrators

Due to School administrators’ roles of configuring and managing the school’s systems they will have a strong understanding of technology and typical school systems. Also due to this the school administrators will mostly be using the software solution in a much more technical way than the average user. These two factors mean that the school admin will require the ability for strong customization of the software solution and do not require simple tutorials. Yet they will require documentation on the more complex features.

#### Summary

In summary for the software solution to usefully fulfil the needs and expectation of the user base, it must be able be easily picked up by even the lowest technically adept, yet it must also be able to be controlled in depth by the more technically adept administrators. Final the software solution must provide a means for students and teachers to find out relevant information about each other.

## Solution Features and Requirements

This section outlines the feature and requirement of the final software solution.

### Technical requirements:

Operating system: Windows 10

CPU: intel I 5 10600k

RAM: 4GB

Storage: 30GB (including OS)

Network: 1 mb up, 1 mb down

Other: Does not require Python (compiled)

### Functional and non-functional requirements

Functional and non-functional requirements outline what features the software solution must include to be functional and what could be added to the software solution to improve the user experience.

#### Functional requirements

* Send messages
  + A messaging app must by definition have the ability to send messages.
  + Input:
    - Message to send
  + Sequence of operations:
    - Input message
    - Encrypt message
    - Send message
  + Output:
    - Sends message across peer to peer (p2p) network
* Receive messages
  + A messaging app must by definition have the ability to receive messages
  + Input:
    - message from the p2p network
  + Sequence of operations:
    - Receive message
    - Decrypt
    - Display message
  + Output:
    - Message displayed to user.
* Secure accounts
  + - It was identified during the analysis that the user base values the security of their messaging platform over anything else.
  + Input:
    - Username
    - Password
  + Sequence of operations:
    - Create account with username and password
    - Encrypt user data from now on
    - Login check if password is correct
    - If so unencrypt data for use
    - Logout save encrypted user data to file
  + Output:
    - Encrypted user data / Unencrypted user data
* End to end encryption
  + It was identified during the analysis that the user base places a large amount of value on the security of their messaging platform.
  + Input:
    - Message to send
  + Sequence of operations:

1. Input message
2. Encrypt message
3. Message received
4. Decrypt message
   * Output:
     + Encrypted messages

#### Non-functional

* Intuitive graphic user interface (GUI)
  + - During analysis it was identified that the user base values easy to use and intuitive user interface.
* Low cost
  + - During analysis it was identified that the final software solution being low cost was of extreme importance to the user base.
* Message context validation
  + A system that insures all student teacher messaging is solely for educational purposes. This would likely take the shape of a “network overseer” who could monitor student-teacher communication.
* Find correct teacher to communicate with
  + A search system that will allow students to easily find the correct teacher based on their communication needs
* Add extra info to displayed user profile
  + The ability to have your profile display info other just name such as external contact info and user id
* Network moderation
  + Accounts can be linked to a network moderator who can manage the accounts
  + Message logging
* Account types
  + The ability for network moderators to create different types of accounts for example students and teacher account types

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