

# CAS 703 G5 – System Requirements Specification

## 1 Introduction

### 1.1 Purpose

The project we proposed is to design an instant messaging smart phone application, which mainly supports the delivery of messages and multimedia between users in real time. This System Requirements Specification (SRS) aims to provide a document for describing overall system design, specifying functional and behavioral requirements for the proposed project. This document will be used throughout different stages of the project's life-cycle to help sharing the system's vision among main stakeholders, such as software architects, software engineers, project manager, etc. It will also facilitate the communication and overall project management and system development processes [1].

### 1.2 Scope

The proposed instant messaging app is named as QuickMessenger. The main purpose of this software is to help users efficiently communicate with each other privately or in a group by sending text and voice messages in real time with mobile phones. In addition, it can also support multimedia file sharing, which includes video, image, and document. This software is only designed for iOS and android platforms, and no other platforms such as Windows, iPadOS, MacOS, etc. will be supported in this system. In addition, the scope of this software doesn't include functionalities of group video/voice call, message self-destructing, and in-app purchase.

### 1.3 Definitions, Acronyms, and Abbreviations

***App*** - Application

***BE*** - Business Event

***DEP*** - Dependency

**OS** - Operating System

**SMS** - Short Message Service

**SRS** - System Requirements Specification

**VP** - Viewpoint

## **1.4 References**

[1] Silva, Alberto & Verelst, Jan & Mannaert, Herwig & Ferreira, David & Huysmans, Philip. (2014). Towards a System Requirements Specification Template that Minimizes Combinatorial Effects. Proceedings - 2014 9th International Conference on the Quality of Information and Communications Technology, QUATIC 2014. 124-129. 10.1109/QUATIC.2014.22.

## **1.5 Overview**

In this document, section 2 provides an overall description of the system to briefly discuss any general factors that affect the system and its requirements. In section 3, all specific functional requirements of the system are described in details. The contents of this section should be able to help software engineers to design and implement the system as required. Section 4 specifies all non-functional related requirements, which can provide more specifications regards to the system in terms of all various perspectives.

# **2 Overall Description**

## **2.1 Product Perspective**

The proposed project is an independent self-contained system so that there's no external system needs to be interfaced with. Therefore, this document only includes the internal interfaces and interactions between components inside the system.

## 2.2 Product Functions

To achieve the project objectives, our proposed instant messaging app QuickMessenger consists of following main functions

### Authorization

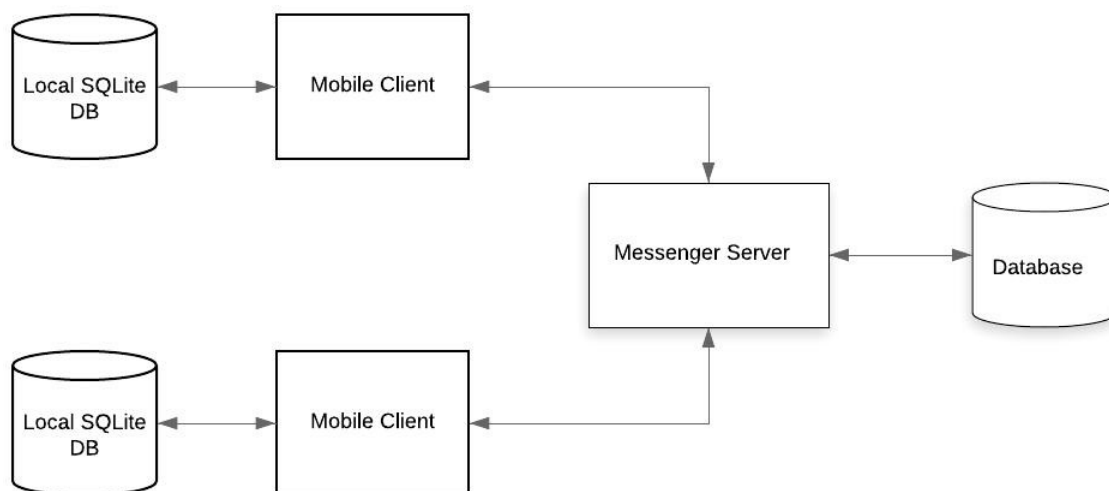
To use this app, user needs to register an account at first. For account registration, users need to sign up via phone number. This requires that the app client side should be able to read the confirmation SMS that was sent by the server side in response to the request.

### Importing Contacts

Once the user account is created, the app provides an option for the user that all contacts can be imported into messenger automatically. With this feature, users can easily see who else from their contact book is using the messenger so that they can message each other directly.

### Instant Messaging

This is the core function of the app. It provides support for users to send and receive text and voice messages in real time. All exchanged messages are handled by a central server and are stored by a server database. The following diagram shows the overall system structure.



### File Sharing

In addition to messaging services, this app also allows users to share multimedia files including images, videos, and documents.

### **Voice/Video Phone Call**

The app enables users to make calls to their contacts directly for immediate communication over the internet protocol.

### **Group Chat**

The app further allows users to connect with other users through the facilitation of group conversations, where they can also share multimedia files.

### **Push Notification**

Users can receive notifications when new messages are arrived. The goal of this function is to inform the users of any updates in order to bring them back to the conversations.

### **Encryption**

To prevent third party infiltration, it's necessary to add a robust encryption for protecting the data of users safe and secure.

## **2.3 User Characteristics**

The users of this application are general internet users, which means they may have a variety of ages, locations, educational levels, etc.

## **2.4 Constraints**

The following constraints may limit developers' options:

### **a) Deadline**

Depending on the deadline, we may choose hybrid or native approach in development. Also we have to decide which features need to be included if the deadline is close.

### **b) Approach of implementation**

There are two approaches for mobile client solution: Hybrid and Native solution

Hybrid solution is based on web browser and it is compatible with both iOS and Android. But it may not have some native features.

Native solution can fully use **OS** features. Since we need to develop two separate code bases, for iOS and Android, it is more time consuming.

## **2.5 Assumptions and Dependencies**

- a) The privacy (or personal data) protection regulations will not be changed in target countries in the foreseeable future.
- b) The governments' regulations on the content of messaging will not be changed in the foreseeable future.
- c) Future versions of Android and iOS will be backward compatible.

## **2.6 Apportioning of Requirements**

In the first stage, this application will be available only to English speaking users in North America.

Early releases will support the following features: authorization, contacts import, instant messaging, voice call, group chat, push notification, encryption.

Other features mentioned in Section 2.2 will be supported in the future versions.

## **3 Functional Requirements**

This section includes the functional requirements which are the principal activities of the mobile application. Functional requirements firstly organized by business events, then by viewpoints.

*BE1*. Download mobile application

*VP1.1* User

- i. User should be able to download the mobile application through the mobile application store.
- ii. User should not pay any fee for downloading the application. It is free to download.

## *BE2. User registration*

### *VP2.1 User*

- i. Users register to the system with their phone number.
- ii. Users can enter their name.
- iii. Users can select an avatar photo from phone gallery or take a new picture with the camera.

### *VP2.2 System*

- i. When a new user wants to register to the system, it checks the database for number. If the number isn't registered, system creates new user entity with his/her phone number.
- ii. If new user's number is already in database, mobile application shows "Registered user" error.
- iii. If users enter name, system updates users data in the database.
- iv. If users selects avatar photo, system updates users data in the database.

## *BE3. Adding new contacts*

### *VP3.1 User*

- i. User can add new contacts with other users' phone number. (*DEP BE2*)
- ii. User can import phone contacts into the application.

### *VP3.2 System*

- i. If the user imports the phone contact list, check only registered user and add them into user's contact list.

#### *BE4. Conversation start*

##### *VP4.1 User who started the conversation*

- i. Users can start a new conversation with their contacts. (*DEP* BE3)
- ii. Users can create a group conversation by more than one contact. Max group limit is 10. If the limit is reached, user cannot invite more people to the conversation. (*DEP* BE3)

##### *VP4.2 Users who are invited to the conversation*

- i. Users can see the new conversation in the conversation list.
- ii. Users can leave the conversation or group conversation.

#### *BE5. Searching conversations*

##### *VP5.1 User*

- i. Conversation list has search area on top and user can search conversations by contact names and group conversations by contact or group names. (*DEP* BE4)

#### *BE6. Sending a message*

##### *VP6.1 Message sender*

- i. User writes message and presses send. (*DEP* BE4)
- ii. User can see if the message received by the receiver.
- iii. User can see if the receiver read the message.

##### *VP6.2 Message receivers*

- i. If receivers have a connection, they get a notification about the message.

ii. If the receivers don't have a connection, they will get the notification and all sent messages when connection has established.

iii. If receivers received the messages, they can see all messages in the sender's or group conversation chat.

#### *VP6.3 System*

i. Creates the message, encrypts the message and forwards it to the receiver/receivers. Saves the message in the database for 30 days.

ii. If the sender's message received by all receivers' phone, inform the sender.

iii. If the sender's message read by all receivers, inform the sender.

#### *BE7. Sending files*

##### *VP7.1 Message sender*

i. User can attach files to the messages. Files can be of various formats e.g. audio, video, documents.

ii. User can see if the files received by the receiver.

iii. User can see if the receiver read the message.

##### *VP7.2 Message receivers*

i. If receivers have a connection, they get a notification about the file message.

ii. If the receivers don't have a connection, they will get the notification and all sent messages when connection has established.

iii. If receivers received the messages, they can see all file messages in the sender's or group conversation chat.

##### *VP7.3 System*

i. Saves files in the database, encrypts the file and forwards it to the receiver/receivers. Saves the file in the database for 30 days.



- ii. If the sender's file received by all receivers' phone, inform the sender.
- iii. If the sender's file message read by all receivers, inform the sender.

#### *BE8. Calling users*

##### *VP8.1 Caller*

- i. Caller selects the contact and calls. (*DEP BE3*)
- ii. Caller can see if the other user accepted the call or hanged up.

##### *VP8.2 User who called by caller*

- i. User's phone rings.
- ii. User can see who is the caller.

##### *VP8.3 System*

- i. Connect users' voice conversation.

#### *BE9. Manage user info*

##### *VP9.1 User*

- i. Users can see and change their name and phone information. (*DEP BE2*)
- ii. User can change their avatar photo. User can select a photo from the phone gallery or take a picture with the camera.

##### *VP9.2 System*

- i. If the user updated its information, update the database.

#### *BE10. Application customization*

##### *VP10.1 User*

- i. User can change the application language in the settings. (*DEP BE1*)
- ii. User can change message background image in the settings.

- iii. User can change message and call notification sounds in the settings.  
Phone message and call notification sound files used for that.

## **4 Non-Functional Requirements**

### **4.1 Look and Feel Requirements**

#### **4.1.1 Appearance Requirements**

LF1. Simple UI, Good contrast and colour features. Minimal

#### **4.1.2 Style Requirements**

LF1. Simplicity, Ergonomic with minimal waste of space

### **4.2 Usability and Humanity Requirements**

#### **4.2.1 Ease of Use Requirements**

UH1. Touch screen, responsiveness. User must be able to respond and write back quickly.

#### **4.2.2 Personalization and Requirements**

UH1. Personalisation for screen, font, language of choice.

#### **4.2.3 Learning Requirements**

UH1. Each user may use their own verbiage which may not be present in quick lookup language suggestion; allow ability to add the new verbiage.

#### **4.2.4 Understandability and Politeness Requirements**

UH1. Not applicable.

#### **4.2.5 Accessibility Requirements**

UH1. High contrast and low lighting viewability

UH2. Text to Speech for those who are visually impaired.

### **4.3 Performance Requirements**

#### **4.3.1 Speed and Latency Requirements**

PR1. Authentication protocol should be fast < 5ms

PR2. Decryption and encryption of text message should be no more than 5ms

#### **4.3.2 Safety-Critical Requirements**

PR1. Not applicable

#### **4.3.3 Precision or Accuracy Requirements**

PR1. Most close words selection should make sure of user history database as well as language dictionary of choice.

#### **4.3.4 Reliability and Availability Requirements**

PR1. Application must have high availability.

PR2. Any messages undelivered will be provided to the user upon first login.

#### **4.3.5 Robustness or Fault-Tolerance Requirements**

PR1. Back end server will have high availability with a load balancer setup to be able to handle high volume.

PR2. Servers need to be kept in separate locations for robustness.

#### **4.3.6 Capacity Requirements**

PR1. Servers should be able to withstand 99% utilisation without crashing.

PR2. Capacity planning will be performed with anticipated volume of users, traffic and content.

#### **4.3.7 Scalability or Extensibility Requirements**

PR1. Servers will be able to scale up in capacity and capability

PR2. Open source architecture will ensure extensibility

#### **4.3.8 Longevity Requirements**

PR1. Application architecture should reflect best in class of presently available technology and architectural framework.

PR2. Obsolescence will mandate a new version roll-out to meet the needs of the users.

PR3. Migration of user profiles and data will be supported.

### **4.4 Operational and Environmental Requirements**

#### **4.4.1 Expected Physical Environment**

OE1. Application will be installed in mobile platforms and subjected to unwarranted interactions demanded on any portable device.

#### **4.4.2 Requirements for Interfacing with Adjacent Systems**

OE1. Ability to send multimedia files as attachments.

OE2. Ability to interface via various services with other platforms e.g. IMO.

### **4.4.3 Productization Requirements**

OE1. Copyrighting of the trade mark and patents for any intellectual property needs to be registered across multiple legal geographical regions.

### **4.4.4 Release Requirements**

OE1. There will be a quarterly or semi-annual release of upgrades as needed.

OE2. Emergency fixes will be done as a priority as out of cycle maintenance.

## **4.5 Maintainability and Support Requirements**

### **4.5.1 Maintenance Requirements**

MS1. There should be minimal or no downtime which affects the users ability to communicate. Any version upgrades and

### **4.5.2 Supportability Requirements**

MS1. The application will support any changes resulting from any upgrades to the platform on which it has been certified.

### **4.5.3 Adaptability Requirements**

MS1. Application must be able to provide alternative avenues to open multi-media or language support if it is unable to provide one.

## **4.6 Security Requirements**

### **4.6.1 Access Requirements**

SR1. Ability to allow only the user to access the messages. Prevent unlawful access either via UI or backend by encrypting the data.

SR2. Unidentified users will not be allowed access in any form.

SR3. Ability to allow law enforcement to access the data.

#### **4.6.2 Integrity Requirements**

SR1. No message or data should be modifiable by either the administrator of the system or user of the system for audit and legal reasons.

#### **4.6.3 Privacy Requirements**

SR1. Privacy requirements shall be as per regulations.

SR2. Public Chat anonymity shall be preserved

SR3. Identify of a person shall not be visible or search able from a public name.

SR4. Chat server shall provide a secure server to hold personal data and if possible avoid storing chat history.

#### **4.6.4 Audit Requirements**

SR1. Accessibility audit of a user activity

SR2. Transaction and Error logs should be kept for performance and tracing purposes

#### **4.6.5 Immunity Requirements**

SR1. Clause within the application upon registration that the user data or text are the sole responsibility of the user and user alone. The application provider is not liable for any legal implication resulting in breaking of the law by the user.

### **4.7 Cultural and Political Requirements**

#### **4.7.1 Cultural Requirements**

CP1. Multilingual capabilities including emojis for respective cultural groups will generate positive feedback.

#### **4.7.2 Political Requirements**

CP1.

### **4.8 Legal Requirements**

#### **4.8.1 Compliance Requirements**

LR1. Entire system has to be designed with the ability to support legal requirements for the respective legal bodies that may apply.

#### **4.8.2 Standards Requirements**

LR1. Application development with adhere to the platform specific standards requirements in terms of authentication, security, and development frameworks.

## **A Division of Labour**

Include a Division of Labour sheet which indicates the contributions of each team member. This sheet must be signed by all team members.

1. Section 1 and 2.1 , 2.2 → Xiaodong Xu
2. Section 2.3 to 2.6 → Hong Sun
3. Section 3 → Baran Kaya
4. Section 4 → Sajid Rahim