

Covid-19 Track and Trace App
“Libertas”



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Software Requirements Specification

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1.0 Introduction

1.1 Purpose

This document is for the purpose of introducing the Covid-19 Track and Trace App known as “Libertas” extracted from the Latin word meaning “freedom”.



The purpose of this application is to protect our communities and aid the health service by interrupting the transmission of the Covid-19 virus. This application is a technological solution that is accessible to everyone and provides users with the ability to identify themselves as close contacts in real time and prevent further spread of this deadly virus. In this document, a detailed overview will be given of the system, outlining the functional requirements, system architecture, and user interface. A description of the non-functional requirements, constraints and assumptions will also be given.

1.2 Scope

“Libertas” is a secure mobile application that will notify users who are deemed close contacts of another user who has tested positive for the Covid-19 virus.

A close contact is defined as a user who is within a 2-metre radius of another user who has tested positive for Covid-19. The application will identify close contacts through the use of Bluetooth services.

A series of anonymous IDs are generated by the application and uploaded to a secure database. When an anonymous ID has been confirmed to have tested positive, each ID that was considered a close contact through Bluetooth will be alerted that he/she may have been exposed to the infectious virus and given a set of procedures to follow.

The system will leverage low Bluetooth Low Energy. When two users come sufficiently close to each other for long enough, their devices record each other’s anonymous IDs in local

memory. Anonymous IDs are generated from temporary exposure keys and change multiple times each hour.

Geolocation services should be enabled on the devices that the application runs on. Locations will be securely stored in a database under anonymous IDs. This is for the sole purpose of tracking clusters of positive Covid-19 results to identify “hotspots” to be marked on the application. These hotspots should be accurate to within 2km of identified clusters.

In the unfortunate circumstance where a user has received a positive Covid-19 test result, the responsibility is on the user to input their positive test results into the application. To do this, the HSE will send the user a unique code that they will enter into the tracker app. This information will be fed back to the database and close contacts will be alerted directly through their application.

The app will be free for download through both the Apple Store and the Google Play store for iOS and Android.

1.3 Definitions, Acronyms and Abbreviations

Term	Definition
User	The person who interacts with the mobile phone application
Bluetooth services	Short-range wireless interconnection of mobile phones, computers, and other electronic devices.
GPS	Global Positioning System
UI	User Interface
UX	User Experience
Geolocation Services	Use of location technologies such as GPS or IP addresses to identify and track the whereabouts of connected electronic devices

1.4 Overview

The next section of this SRS document, the Overall Description,

The rest of this SRS document will detail and the specific requirements of the document.

2.0 Overall Description

This section will illustrate an overall description of the Covid-19 Track and Trace app, “Libertas” where requirements such as Hardware, Identity, Proximity, Communication Motivations and Hotspots are met by this product.

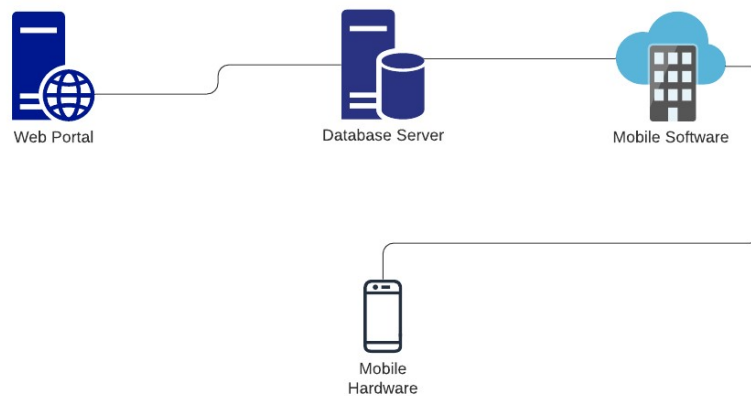
2.1 Product Perspective

This system is a unique, self-contained system. The uniqueness of this system is due to the unprecedented situation of this pandemic. This system will strictly comply with the principles of the General Data Protection Regulation (GDPR) as set out here; <https://gdpr.eu/>

The application will be available for download on both iOS and Android. Upon first login the user will be prompted to register an account and then login using their details. This information will be stored in a centralised secure database and will be linked to anonymous IDs.

This data-centric application will only be able to detect anonymous IDs that are within a 2-metre radius of another anonymous ID.

Geolocation services will need to be enabled on this application only for the purposes of identifying hotspots. Locations will be securely stored in the database under the anonymous IDs. This information will only be required when the anonymous user confirms through the application that he/she has had a positive Covid-19 test result. This ensures confidentiality and adherence to GDPR.



2.2 Product Functions

The “Libertas” application should be able to perform the following major functions:

Register/Login:

Upon opening the application, a user should be able to register or login to the app depending on if he/she has an account. User will be given an option to remember the credentials so further input at start-up is not necessary.

Logout:

When a user clicks logout, all personal data will be removed until the user logs back in using those credentials.

Display hotspots:

The application should be able to identify hotspots on the map within a 2km range of accuracy. The hotspot will be identified on the map by a highlighted red zone that will span across approximately 2km. The system will warn users who are travelling too close to these identified hotspots.

Present Statistics:

The app should be able to display the current number of positive cases, number of deaths and number of hospitalisations. The application should also present previous data of confirmed data neatly on a graph for convenience.

Current Health Message:

The application should prompt the user to select an option based on how they are feeling that day. If he/she is feeling unwell, display medical information based on health officials advise.

Input Positive Result:

The application should allow the user to input that he/she has tested positive for Covid-19. The user can only input this information through a unique code sent to them by the HSE for validity of data.

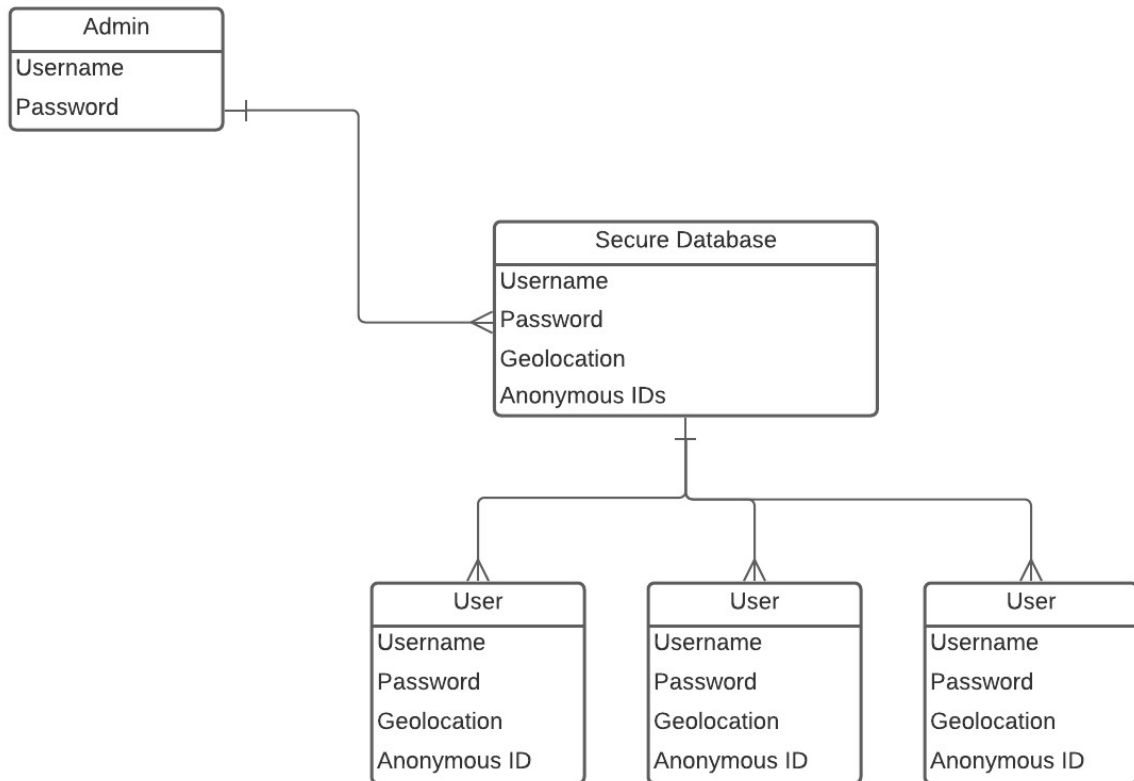
2.3 User Characteristics

There are only two main types of users of this application. The mobile application users and a small group of administrators. These two groups will interact with the system very differently.

The mobile application users are expected to be mobile literate as it will be necessary to navigate to the Apple Store or the Play Store to download the application. The user will be required to use menu screens and enable Bluetooth services. Although the UI should be very friendly and not require a deep understanding of devices to operate.

The small group of administrators are only required to ensure up to date Covid-19 information is displayed and there are no system faults. Besides this, the application should be relatively self-sufficient.

ER Diagram for Libertas



2.4 Constraints

One major constraint is that the system is completely reliant on the user reporting that he/she has tested positive for Covid-19. The application only recognises these users as anonymous IDs and cannot state that x or y is a positive case. This is the trade-off for having a system that is heavily compliant with GDPR regulations.

Although this system utilises Bluetooth Low Energy, it is still a requirement for Bluetooth services to be enabled while the application is running. This drains the user's battery and may be a deterrent for future users to engage with the application.

Strict GDPR regulations hinder the extent to which geolocation services can be utilised. Accuracy of hotspots are compromised as a result and are to be accurate to only a 2km radius.

2.5 Assumptions and Dependencies

An assumption of this app is that it will always be used on mobile phones. This can be either iOS or Android.

The mobile device should have enough performance and will be required to have at least 1 GB of RAM, if not the application may not run as intended or even at all.

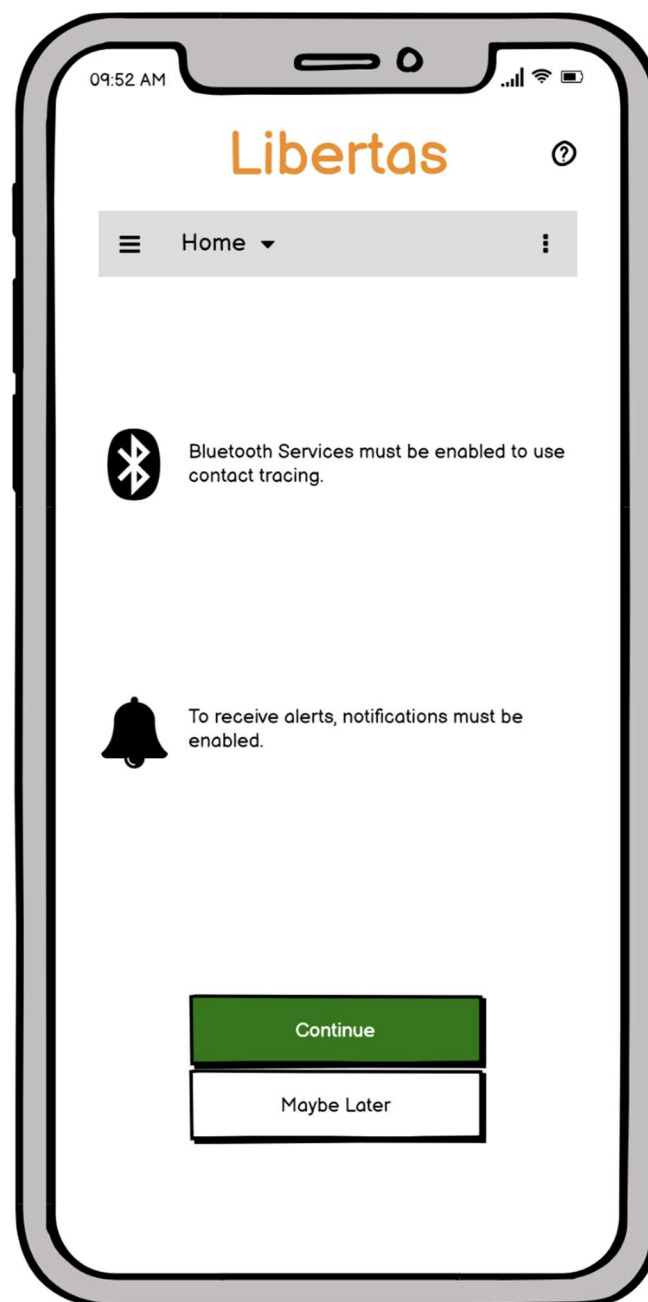
Another assumption is that the phone of user can support geolocation services. As the user must have been able to download the application from the store, an assumption is made that the phone has the capabilities to support geolocation services for the benefit of detecting hotspots.

3.0 Specific Requirements

This section will provide a more detailed view of the functional and quality requirements of the system.

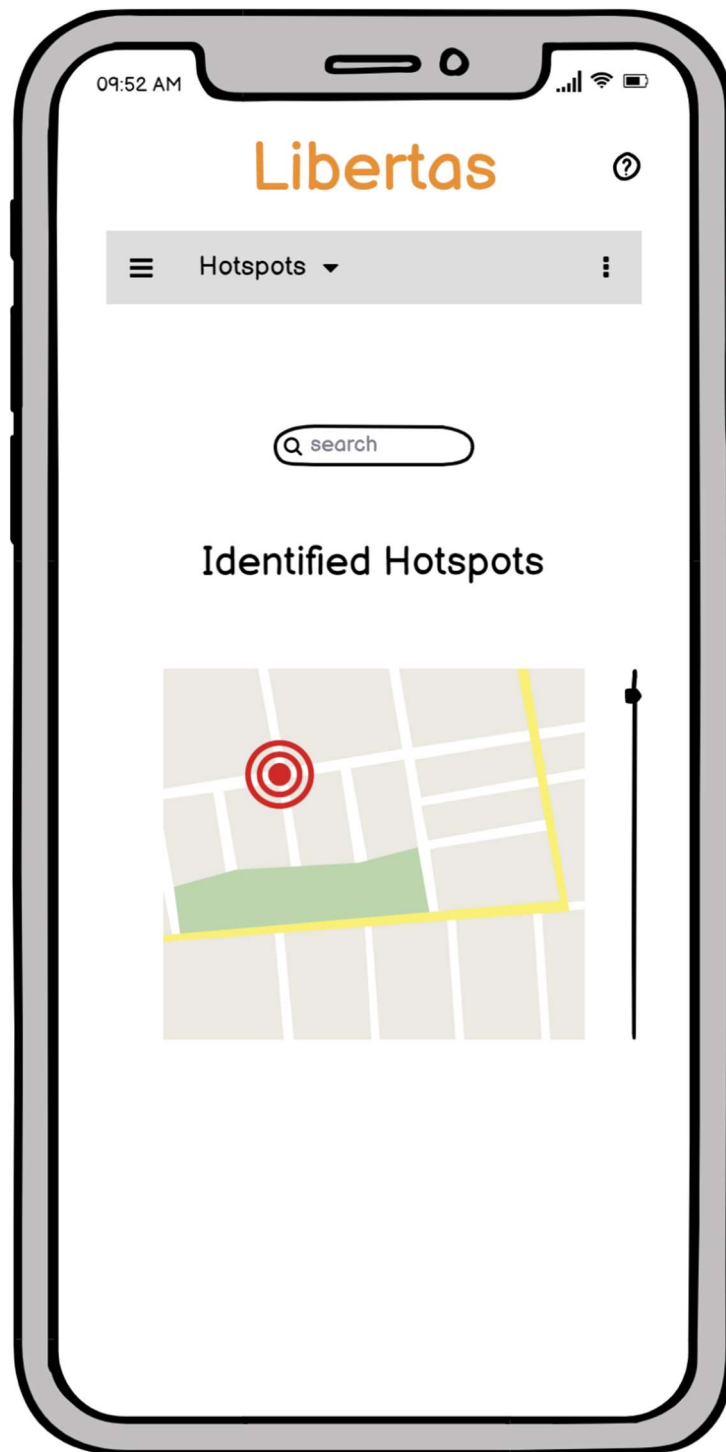
3.1 User Interfaces

A first-time user of the mobile application should be prompted to use both Bluetooth services and enable push notifications.



The user should then be redirected to the log-in page. If the user has not registered, they will be able to do that from the log in page.

The application will be able to display hotspots within a 2km radius through the use of Google Maps' API, while continuing to adhere to Google Maps' Platform Terms of Service.



Libertas should have a home page that displays stats and figures on the new cases/death toll. An option will be given to prompt the user to select how they are feeling on that day.

If the user has been confirmed as a close contact, an immediate alert notification will be sent from Libertas prompting the user to follow up for specific details.



3.2 Functional Requirements

ID: FR1

TITLE: Accessibility of the Application

DESC: A user should be able to download the mobile application through iOS or Android on mobile phone. The application should be free to download.

RAT: In order for a user to download the mobile application.

ID: FR2

TITLE: User registration

DESC: The user should be able to register for an account through the mobile application. The user must provide a username, email and password with an optional phone number field.

RAT: In order to register for the mobile application.

ID: FR3

TITLE: User-login

DESC: Given that a user has already registered, the user should be able to log in to the mobile application. The user has an option to store the credentials on the phone for a convenient way to log in, in the future.

RAT: In order to login using the registered credentials.

ID: FR4

TITLE: Retrieve Password

DESC: Given that a user has registered, then the user should be able to retrieve his/her password by e-mail.

RAT: In order for a user to retrieve his/her password.

ID: FR5

TITLE: Privacy

DESC: The application will generate anonymous IDs and store these IDs in a secure database.

RAT: In order to comply with GDPR regulations

ID: FR6

TITLE: Display Statistics

DESC: The application will pull statistics from the secure database and display them on the homepage. Statistics will include figures on new cases, deaths and hospitalizations.

RAT: In order to give a summary of the day for the user.

ID: FR7

TITLE: Recognise and Display Hotspots

DESC: The application should display hotspots using geolocation services. This will be accurate to within a radius of 2km.

RAT: In order to inform user of problem areas.

ID: FR8

TITLE: Input Positive Result

DESC: The application should allow the user to input a positive Covid-19 test result. It will prompt the user to enter a unique code sent to them by the HSE for confirmation.

RAT: In order for the user to confirm his/her test result.

ID: FR9

TITLE: Logout

DESC: The application should allow the user to logout. All personal data will be removed until the user logs back in using those credentials.

RAT: In order to allow the user to logout.

3.3 Performance Requirements

ID: PR1

TITLE: Navigation bar

DESC: The navigation bar featured should be prominent and easy to find for the user.

RAT: In order to for a user to find the navigation bar easily.

ID: PR2

TITLE: Usage of the map view

DESC: The results of the hotspot map should be user friendly and intuitive. It should be possible to scroll and move around the map.

RAT: In order for a user to navigate the map view easily.

ID: PR3

TITLE: Response Times

DESC: The application should be quick and efficient to navigate.

RAT: In order for increased usability.

ID: PR4

TITLE: Dependable

DESC: The application should not crash unexpectedly. If the user loses internet connection, when reconnected, uploading of data should proceed as normal.

RAT: In order for the application to reliant.

ID: PR5

TITLE: Memory Usage

DESC: The application should efficiently manage its operating system memory as to not demand a lot of RAM from the device.

RAT: In order for the application to operate effectively.

3.4 Logical Database Requirements

The user info, geolocation and anonymous IDs will be stored in a secure database. We will use cloud data storage services for this purpose.

3.5 Design Constraints

- Geolocation can only be used for the purpose of identifying hotspots due to GDPR.
- Relies on the user uploading a positive Covid-19 test result.
- The app should be as small a size as possible because storage on phones is important.

3.6 Software System Attributes

Reliability:

- The application must not crash or hang.

Adaptability:

- Any user running an up-to-date smartphone should be able to run the application.
- The application should comfortably work for both Android and iPhone users alike.
- There will be no learning curve as the application will be very intuitive.

Availability:

- The application is available through both the Play Store and Apple store for mobile devices.
- The app must be online and available to input new data 24/7.

Security:

- The application will process only the necessary data exclusively for the purpose of letting the user know if they have come into close contact with other infected users.
- Data will not be sold to large multinationals such as Apple or Google.
- Users will be notified what is happening to their data through a comprehensive private policy statement that will be clear and concise.