(Covid-19 Track and Trace App)

Software Requirements Specification

Document

Version: (1) **Date: (13/02/2021)**

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1. Introduction

1.1. Purpose

The purpose of this SRS is the development of a Covid-19 Track and Trace mobile app.
It has four identified user groups with two primary purposes to provide verified information on the disease to the public and assist health and government agencies form a response to the pandemic:

The General Public.

It shall provide them with verified information relating to covid-19. It shall also be a line of communication should a user be deemed a close contact to an infected person with covid-19. The user will choose if any data should be shared and used as a tool to assist the relevant authorities and response teams.

The HSE

NPHET

The Government

It shall act as a data gathering tool for the HSE as it tries to contain the spread of covid-19, to be used to develop an appropriate response plan.
The data collected will be a combination of personal data, special data and anonymous data.

1.2. Scope

Timeline-12 weeks

Budget-€850,000

The goal of this project is to have an optimal level of adoption. If 20% of the population downloads the app, we deem this project to be successful.

Deliverables

A contact track and trace mobile app compatible with all common mobile devices.
Data security and encryption.

Device communication to record time and proximity to aid the contact and trace feature. Users will be identified anonymously i.e. no personal data to be exchanged. It should only store data where the distance is less than 2meters and for longer than 15minutes as per public health recommendations.
Hotspot feature to show local hotspots and warn users if they approach too closely. Hotspot locations are to be determined by the HSE and NEPHET. The app should not collect data from contact tracing and use it in the designation of hotspots.
Supplementary and required documents: These are to provide transparency to the user and to answer any questions that may arise regarding their privacy and how their data is used and stored. All personal information shall by processed in accordance with GDPR.
Terms and conditions document.
Data Protection Information Notice.

1.3. Definitions, Acronyms, and Abbreviations.

App-application
HSE- Health Service Executive
NPHET- National Public Health Emergency Team
GDPR-General Data Protection Regulation
SRS-Software Requirement Specification
ATS- App Transport Security
TLS- Transport Layer Security

1.4. References

Mobile contact tracing apps in EU Member States
https://ec.europa.eu/info/live-work-travel-eu/coronavirus-response/travel-during-coronavirus-pandemic/mobile-contact-tracing-apps-eu-member-states_en

The EU GDPR website.
https://gdpr.eu/

electoral boundaries

http://boundarycommittee.ie/Maps_code.html

Android security

https://developer.android.com/training/articles/security-tips

Android Data security

https://developer.android.com/topic/security/data

Apple Network Connections

https://developer.apple.com/documentation/security/preventing_insecure_network_connections

Google maps API

https://cloud.google.com/maps-platform/maps?utm_source=google&utm_medium=cpc&utm_campaign=FY20-Q3-global-demandgen-displayonnetworkhouseads-cs-GMP_maps_contactsal_saf_v2&utm_content=text-ad-none-none-DEV_c-CRE_434785623326-ADGP_Hybrid%20%7C%20AW%20SEM%20%7C%20BKWS%20~%20Brand%20%7C%20EXA%20%7C%20Google%20Maps%20API-KWID_43700053663474825-kwd-335425467-userloc_1007877&utm_term=KW_google%20maps%20api-ST_google%20maps%20api&gclid=Cj0KCQiAyJOBBhDCARIsAJG2h5eFd89-BQI9bzdWQOjyamv6I4GubZOKsW2yYaq-iBdlH6_Tl9rfW1gaAlWYEALw_wcB

2.0 Overview

The SRS is broken up into three parts for ease of use.
Section two is aimed at end users and covers the following topics.
How will they interact with the app?
What other software or application systems are required?
Custom protocols to communicate between systems.
Memory constraints on their device?
What operating system it will work on?
What devices is the app compatible with?
What user characteristics will impact the development of the app.

Section three goes more in depth into the technical specifications and features of the app. It is written towards the software developers. It covers the below topics.
Specific requirements are detailed.
How the system is going to interact with other systems
Performance requirements
Logical database requirements
Design constraints
Software system attributes
How the system requirements are grouped

Section four details how changes can be implemented, and all requests should follow this procedure as outlined.

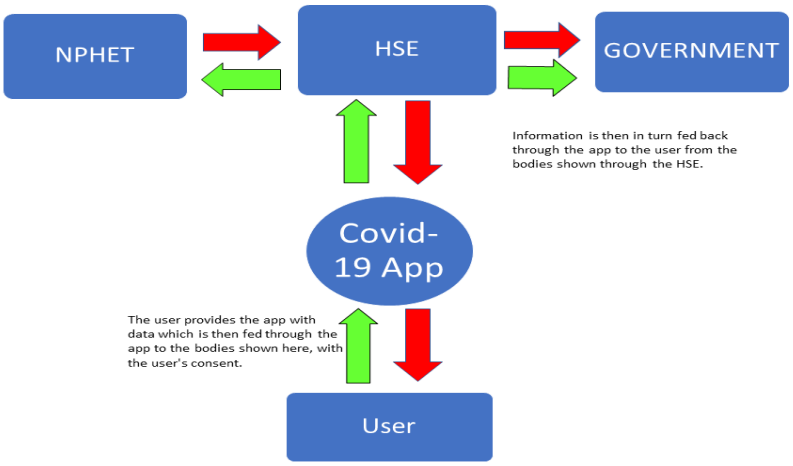
2.1 The Overall Description

This app is intended for use by the general public 16years and older. It needs to be largely adopted by the general public for it to be deemed a success, so trustworthiness and ease of use are crucial to the customer interface.

This system is to aid in contact tracing and communicating information to the public and providing useful data back to NPHET and the HSE. It will not be used to monitor people's movements and the data collected should not be used for this purpose. The user should have complete control over how and what data is collected and be fully informed of how the data is stored and used.
On download the user has the option to provide personal details but this step can be skipped. The user should be only identified by an anonymized user code when data is collected.
The app will have a user-friendly interface that shows relevant daily informative updates as provided by the HSE. The user has the option to interact with the app and provide how they are feeling daily i.e., are they displaying symptoms. This data is collected anonymously.
Should a person become infected they have the choice of receiving a code that will be input into the app, which will release a message to apps where there were was an exposure of longer than 15mins within a two-meter distance. This message will have no personal data attached and will be completely anonymous. This prompts the receiver to limit their movements and contact their GP/HSE for further advice.
The app also will provide a hotspot notification. This data will not be collected from the app but will be provided by NPHET and the HSE based on positive test results figures. They will deem whether an area is a hotspot or not and the app will relay that information to the user and provide an alert should they come within 250m of the specified area.

2.2 Product Perspective

Figure 1.1 Information flow Diagram.



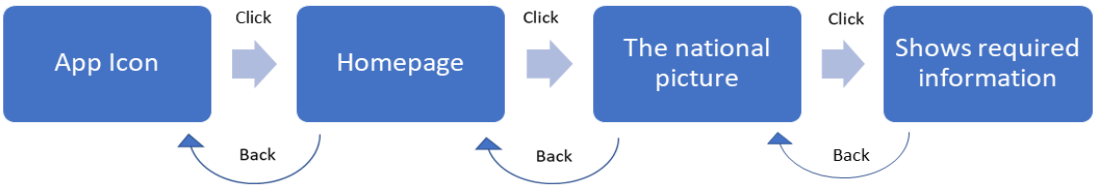
This diagram shows how the information will flow from user to the necessary bodies which will all happen through the HSE and a central database where the app can collect and deposit the required data.

2.3 System Interfaces

The app will have to communicate with a HSE database to pull the relevant information from and to display the most up to date information daily.
A map service to display the details on hotspot localities.

2.4 Interfaces

This app is intended to be as user friendly as possible.
A GUI will be the interface of choice for this app.
This user base as described in 2.3 means that the operation of the GUI interface should be streamlined with no more than 4 layers between them and the information they want. Information should be available with little effort on the part of the user.



2.5 Memory Constraints

Memory requirements should be kept as minimal as possible to negate the risk of people not downloading due to storage issues. Based on known data for 20 similar apps in the EU the app should be made to no more than 30MB. see appendix 1.

2.6 Product Functions

2.6.1 Data capturing page on first download.

It should be optional for the user to provide some all or none of the data requested.

2.6.2 Users shall be asked to give informed consent regarding data sharing permissions.

This will be done during set-up after initial download.

There should be a feature in settings to amend these permissions at any time.

Users shall be asked if they agree to the Terms and conditions and Data protection Policy they must select yes to finish setup.

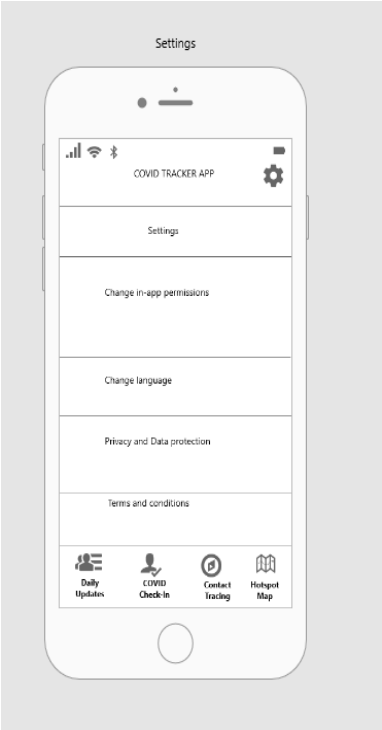
2.6.3 A settings feature.

Control in app permissions

Change the language

Store other deliverables data protection and terms and conditions.

Click the gear on the home page to go to settings



Change in app permissions click and lists all the permissions.

- Disable contact tracing.
- Remove personal data that you have already shared.
- Disable App metrics.

Change Language. Click and available languages will be displayed.

- English
- Irish
- Polish
- French

Click on Privacy and Data Protection or Terms and Conditions to bring up the information.

To return to the home page should be a back button.

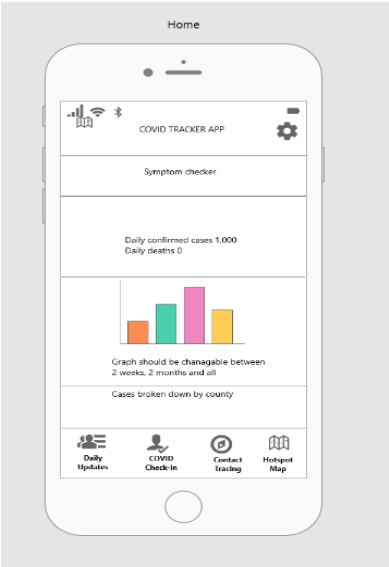
2.6.4 The homepage should be an informative page with the latest information available displayed in a user-friendly manner.

The user should be able to navigate from here to different parts of the app. The app should include information on:

A more in depth look at the latest figures broken down by county.

Total daily confirmed cases in the Republic of Ireland.

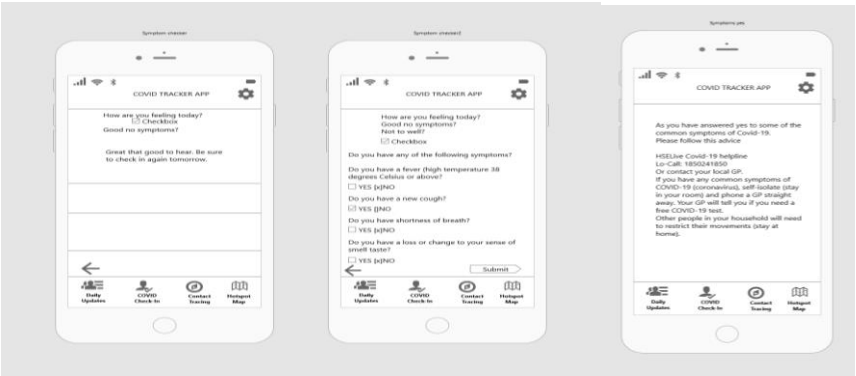
Total daily deaths in the Republic of Ireland



2.6.5 Symptom checker

Are you displaying symptoms Yes/No if no, no further action. If yes process is below.

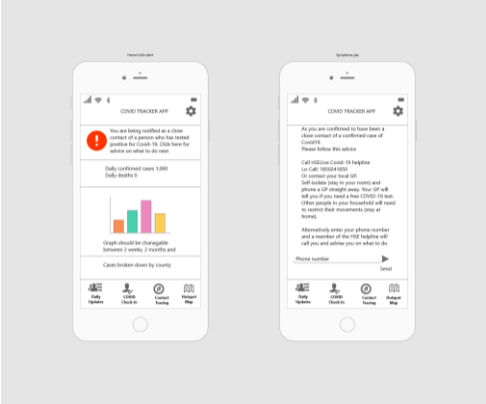
Advice if displaying symptoms.



2.6.6 Contact Tracing page

Sender of a close contact alert clicks contact tracing on menu bar and this page becomes available.

Receiver of a close contact alert.



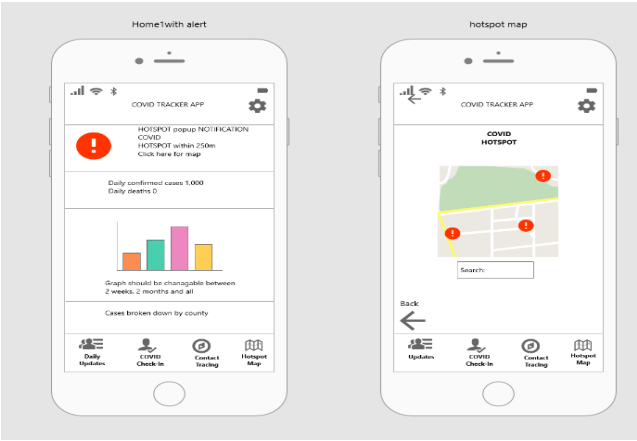
2.6.7 Hotspot push notifications

Will display information and send a warning should the user approach within 250m of a hotspot area.

The map will have a search feature so you can search to see if a particular area is a hotspot.

2.6.8 Map to display hotspots

The user shall be able to view a map of the Republic of Ireland with all the current hotspot areas marked on it.



2.7 User Characteristics

This app must appeal to a wide audience therefore it must be as simplistic in function as possible. It is geared to a demographic of 16years+ that have smartphones that have access to the google play or apple app stores. The users will be from every social, education, and technical tier.

2.8 Constraints

GDPR will play a vital role in how we share and store user's data. All systems designed and developed that will have access to any personal data need to comply with GDPR.
"Personal data — Personal data is any information that relates to an individual who can be directly or indirectly identified." (gdpr.eu accessed 05/02/2020).
The app must be able to communicate with other covid-19 apps to record time and proximity if they are within 2 meters of each other for 15minutes or longer. This needs to be done in an anonymous way with no personal data shared.

3. Specific Requirements

3.1 Functions

3.1.1 Data capturing page on first download.

3.1.1.1 It shall be optional for the user to provide some all or none of the data requested.
3.1.1.2 Users shall be asked to give informed consent regarding data sharing permissions. And informed that they may change these at any time from the settings menu.
3.1.1.3 This page shall request phone number, location (shall be geographical area not address so village, town, city name, county), age group(shall start at 16 and be in 10 year increments 16-25, 26-35, 36-45, 46-55,56-65, 66-75,76-85, 86+.

3.1.2 Information dashboard-Homepage.

3.1.2.1 It shall feature an interactive symptom checker:

3.1.2.2 It shall display the latest number of daily confirmed cases for the Republic of Ireland and the latest daily number of confirmed deaths.

3.1.2.3 It shall provide information on when confirmed cases were last updated by date. E.g., confirmed cases last updated: dd/mm/yyyy

3.1.2.4 The user shall be able to navigate from here to different parts of the app.

3.1.2.5 The app should include information on:

It shall have a graphical representation of cases:

3.1.2.5.1 Last 2 weeks

3.1.2.5.2 Last two months

3.1.2.5.3 All which is to be the previous 10 months confirmed case information.

3.1.3 Symptom checker:

3.1.3.1 Once the app is installed the user shall be able to submit health data daily via one click system. I feel well, I do not feel well.

3.1.3.1.1 I feel well completes your daily response and elicits a response great to hear.

3.1.3.1.2 I do not feel well response shall request more information. 4 further questions shall be asked: with a yes or no response recorded:

3.1.3.1.3 If the user answers yes to any of these, information shall be displayed on what to do next. A message displaying the HSE contact information.

3.1.4 A settings feature.

3.1.4.1 Control in app permissions

3.1.4.2 Change the language. The app shall be available in English, Irish, Polish and French with more languages in following updates.

3.1.4.3 Store other deliverables data protection and terms and conditions.

3.1.5 Confirmed cases by county.

3.1.5.1 A clickable button that brings the user to a new page with a tabular display of county and the latest confirmed figures available per county should

be displayed. All 26 counties in the Republic of Ireland shall be included in alphabetical order for ease of navigation.

3.1.5.2 Each county shall have a navigation feature to bring the user to more information on the county they have selected.

3.1.5.3 The county should be broken down into their electoral constituencies available at http://boundarycommittee.ie/Maps_code.html

3.1.5.4 Information should be broken down based on these areas with the following information included.

3.1.5.5 Confirmed cases per electoral constituencies.

3.1.5.5.1 Rate in 100k of population of specified county.

3.1.5.5.2 Area population

3.1.6 Hotspot notifications and warnings

3.1.6.1 An interactive map of the Republic of Ireland displaying an icon in areas where there are Covid-19 outbreaks.

3.1.6.2 Google maps API shall be used

3.1.6.3 There shall be a search feature whereby a user can search for a hotspot by location.

3.1.7 Track and Trace

3.1.7.1 The user shall have control as to whether this feature is active or not.

3.1.7.2 If the feature is active it shall record and store data locally on the device.

3.1.7.3 It shall only record and store data that has found the user was in contact with another user within 2 meters and for longer than 15 minutes.

3.1.7.4 The Track and Trace feature shall have a system where the user can send a message to everyone they have encountered by way of an anonymous message.

3.1.7.5 This feature shall only be activated by a user who has received a positive diagnosis and has been given a unique code by the HSE to activate this feature.

3.1.7.6 It shall only send a message to those who have been in contact with the user for longer than 15 minutes and within 2 meters.

3.1.7.7 The message should inform the other user that they are deemed a close contact and an advice message should be displayed as to what to do next.

You have been confirmed as a close contact of someone who has tested positive with Covid-19.
Please follow the below advice.
HSE Live Covid-19 helpline
Lo-Call: 1850241850
Or contact your local GP.
Self-isolate (stay in your room) and phone a GP straight away. Your GP will tell you if you need a free COVID-19 test.
Other people in your household will need to restrict their movements (stay at home).

Link to more HSE advice
https://www2.hse.ie/conditions/coronavirus/close-contact-and-casual-contact.html

3.1.7.8 There shall be an option once a user receives the confirmation message of being a close contact to provide their phone details and name to the HSE for a call back. The user does not have to use this function.

3.1.8 Hotspot push notifications

3.1.8.1 These shall be sent to a user if they are within 250 meters of a zone that has been deemed a covid-19 hotspot by the HSE.

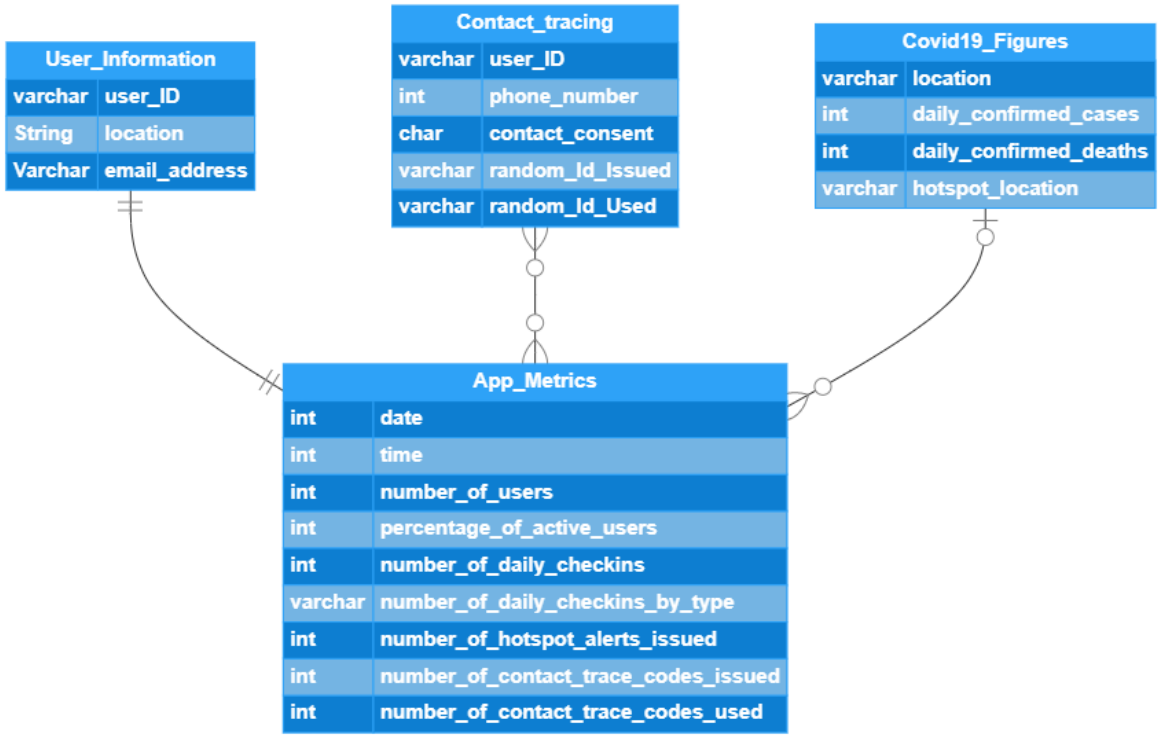
3.1.8.2 It shall be an alert with a sound and vibration feature.

3.1.8.3 The user shall be able to switch this feature off and on if the choose to.

3.1.8.4 The user shall be able to receive the alert without any sound or vibration if they choose.

3.2 Logical Database Requirements

ER Diagram for database.



All user information should be gathered with permission.

All users shall be identified by a unique user_ID.

User_Information

User_ID (Primary Key)

Location (can be null)

Email_address (can be null)

Contact_Tracing

User_ID (Primary Key)

Phone Number (can be null)

Contact consent (yes or no default no)

Random_id_issued (yes or no)
Random_Id_used (yes or no)

Covid19_Figures
Location primary key
Number of case by location
Number of deaths by location
Hotspot-location (yes or no) i.e does it meet the criteria set by the HSE to be considered a hotspot.

App_Metrics
Date (Primary Key)
Time (Primary Key)
number_of_users
percentage_of_active_users
number_of_daily_checkins
number_of_daily_checkins_by_type (no symptoms or symptoms)
number_of_hotspot_alerts_issued
number_of_contact_trace_codes_issued
number_of_contact_trace_codes_used

The Covid19_Figures will be the primary table for updating the app with the latest information regarding the number of case and deaths and also for updating the hotspot alerts and map to show the hotspots.

3.3 Design Constraints

Font choice, size and colour are very important and should be no smaller the 16pt. for body text.

The warning symbols placed on the map should be clear and should be indictive of a warning and very clear that it signifies a Covid-19 hotspot.

An Apple Mac computer running the latest version of macOS.

Xcode, which is the integrated development environment (IDE) for macOS, available as a free download from the Mac App Store.

An active Apple Developer account, which requires a $99 annual fee.

3.4 Standards Compliance

All data must be collected, processed and stored in line with GDPR.

3.5 Software System Attributes

3.5.1 Availability

The app should run on demand whenever the user opens the app. It shall run the track and trace feature even if the app is closed and the phone is locked so long as the user has enabled this feature at set up or later through the permissions feature in the app settings.
Push notifications will also still work even if app is shut and phone locked that can alert user to a potential hotspot.

3.5.2 Security

Security will vary depending on whether the app is built for iOS or Android. Android can be more susceptible to security breaches as it is open source. A link to Androids security best practices can be found in the reference section and should be applied to the Android version of the app.
For this project we shall include the Android security library in our application. The below dependency is required to use the library and shall be included in the development. A link is in the reference section to provide more information.

`build.gradle` file:

```
dependencies {
    implementation "androidx.security:security-crypto:1.0.0-rc04"

    // For Identity Credential APIs
    implementation "androidx.security:security-identity-
credential:1.0.0-alpha01"
}
```

(developer.android.com)

Apple iOS

The standard URL Loading System shall be used as this will enforce the use of ATS which improves privacy and data integrity. ATS blocks connections that fail to meet minimum security requirements.

Both Android and iOS have an App Sandbox feature which shall be used to contain the Covid-19 app and control how it interacts with another app or not at all.

3.5.3 Portability

Specify attributes of software that relate to the ease of porting the software to other host machines and/or operating systems. This may include:
100% as separate software need to be written for both Android users and iOS users.
App for iOS must be written in swift or objective C but swift is the official iOS language now. The software will only be portable between other apple devices.
100% of the app is host dependent depending on if the host is android or iOS.

4. Change Management Process

Any requested changes need to be submitted in writing and sent for approval with an updated cost benefit analysis done on the change. The change should be designated as particular category:

Design

Development

So that the relevant teams can be informed of the change and can provide input regarding the change.

Once these steps have been followed it can go to the product owner for approval and they can make an informed decision.

5. Document Approvals

Product owner: Joe Bloggs

Signature: Joe Bloggs Date:

_____ _____

6. Supporting Information

6.1 Appendices

For additional information purposes on memory constraints and how they were assessed based on similar applications.

Countries	App	Memory in MB
Austria	Stopp Corona App	13.8
Belgium	Coronalert	14.3
Croatia	Stop COVID-19	8

Cyprus	CovTracer	22.4
Czechia	eRouška	14.6
Denmark	Smittestop	45.7
Estonia	HOIA	3
Finland	Koronavilkku	4.2
France	TousAntiCovid	49.6
Germany	Corona-Warn-App	23.6
Ireland	COVID Tracker	28.5
Italy	Immuni	32.2
Latvia	Apturi Covid	6.4
Lithuania	Korona Stop LT	15.9
Malta	COVIDAlert	8.8
Netherlands	CoronaMelder	9.9
Poland	ProteGO Safe	39.1
Portugal	StayAway COVID	43.4
Slovenia	#OstaniZdrav	21.6
Spain	Radar Covid	9.1

(Europa.eu)

Memory in MB	
count	20.000000
mean	20.705000
std	14.531652
min	3.000000
25%	9.025000
50%	15.250000
75%	29.425000
max	49.600000