eHealth Network

**Interoperability guidelines for
approved contact tracing mobile applications
in the EU**

Adopted by consensus by the eHealth Network, Brussels, Belgium, 13 May 2020

I.   INTRODUCTION

I.1. Purpose

This document addresses the first follow-up action envisaged by the eHealth Network's 'Mobile applications to support contact tracing in the EU's fight against COVID-19, Common EU Toolbox for Member States Version 1.0' ('the Toolbox'), namely, 'developing further the interoperability framework' for mobile contact tracing apps.

Most Member States have launched or intend to launch an approved mobile contact tracing app designed to fulfil operational objectives that are specific to their national COVID-19 crisis management strategy. For example, some apps require almost all data processing and storage to take place on the device. Other apps would require more processing and storage on a backend server. Both approaches require implementation in such a way to prevent the possibility for identification of app users, whether infected, exposed or otherwise, unless that information has been voluntarily provided by the individuals in question.

Users should be able to rely on a single app independently of the region or Member State they are in at a certain moment.

Whatever the approach taken with approved apps, all Member States and the Commission consider that interoperability between these apps and between backend systems is essential for these tools to enable the tracing of cross-border infection chains. This is particularly important for cross-border workers and neighbouring countries. Ultimately, this effort will support the gradual lifting of border controls within the EU and the restoration of freedom of movement. These tools should be integrated with other tools contemplated in the COVID-19 contact tracing strategy of each Member State.

For the purposes of this document, interoperability refers to these apps being able to exchange the minimum information necessary so that individual app users, wherever they are located in the EU, are alerted if they have been in proximity, within a relevant period, with another user who has notified the app that he/she has tested positive for COVID-19. This alert and follow up should be in accordance with the procedures defined by public health authorities with potential privacy and security implications assessed and appropriate safeguards applied[1].

This document therefore proposes guidelines for cross-border interoperability of approved contact tracing mobile apps and associated procedures.

The interoperability guidelines are a living document and will be used as baseline for interoperability specifications to guide developers when designing and implement the apps and backend solutions.

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[1] This may relate to, for example, the use of identifiers to indicate the user's country and the rotation of Bluetooth beacon payload UUID every 15-20 minutes to prevent wireless tracking of the device (and its user).

I.2.   Overall process

The process here described depicts the general steps contemplated in contact proximity detection and exposure notification mechanisms based on mobile apps.

STEP	DESCRIPTION	OUTCOME
1. Enable user with necessary technology	When a user updates the mobile device operative system or/and install a contact tracing app	User equipped with mobile technology with the purpose of proximity contact detection and exposure notification
2. Proximity contact detection	When activated by the user, the mobile device technology detects proximity contacts with other app users and record encounter details	User mobile device detecting and collecting proximity encounters details
3. Infection confirmation	When an individual is informed, by the relevant authorities, about his/her positive COVID-19 test result	The app user will have the possibility of making available, to health authorities, information about relevant proximity encounters
4. Exposure risk calculation	When a proximity encounter exposure risk score is calculated	Identification of the proximity encounters with a relevant exposure risk score
5. Exposure alert and follow up	When a user gets an alert about possible exposure and possible follow up actions	User alerted for potential exposure and informed about possible follow up actions

I.3.   Background

According to the Toolbox:

> *"Infection transmission chains do not stop at national or regional borders. To collaborate and manage cross-border transmission chains, national health authorities should be technically able to exchange available information about individuals infected with and/or exposed to COVID-19. Tracing and warning apps should therefore follow common EU interoperability protocols so that the previous functionalities can be performed, and particularly safeguarding rights to privacy and data protection, regardless of where a device is in the EU. Such protocols should be created and provided to developers to ensure three key requirements:*
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> *1) the alignment of epidemiological criteria to define close contacts for a high risk exposure, following WHO and ECDC guidance[2] on the determinants of contact tracing, including the definition of close contact (distance and duration of exposure) and the period for which contacts are stored (for how long);*

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[2] ECDC, Contact tracing: public health management of persons, including healthcare workers, having had contact with COVID-19 cases in the European Union – second update, technical report, 8 April 2020, https://www.ecdc.europa.eu/sites/default/files/documents/Contact-tracing-Public-health-management-persons-including-healthcare-workers-having-had-contact-with-COVID-19-cases-in-the-European-Union–second-update_0.pdf.

2) contact tracing apps to register a user's proximity contacts with other users using different contact tracing apps (indicated as (1) in the diagram below); and

3) national authorities to exchange data on infection transmission chains by means of backend solutions, in order to interrupt cross-border transmission chains (indicated as (2) in the diagram)."
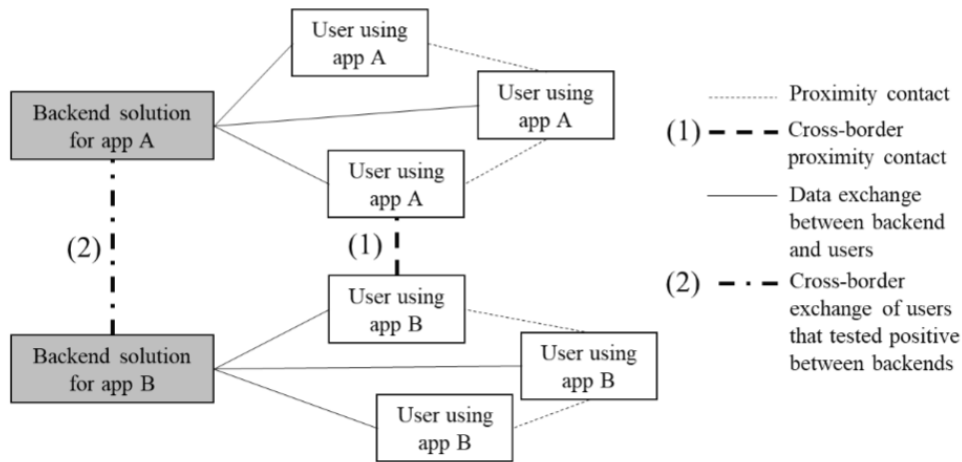
I.4. Definitions

In this document:

- **Interoperability** of contact tracing mobile apps and associated procedures means their ability to exchange between themselves the minimum information necessary for individual app users, wherever they are located in the EU, to be alerted, in accordance with the procedures defined by public health authorities, if they have been in proximity with another user who has notified the app that he/she has tested positively for COVID-19.

- **Epidemiological heuristics** means the measurements determined by the relevant national public health institutes for identifying a epidemiologically relevant "contact person" and for determining the level (typically 'high' or 'low') of a contact person's risk of exposure to the SARS-CoV-2 virus.

- **'App'** means a mobile application that supports contact tracing and is approved by Member States public health authorities.

- **Proximity detection** means the process whereby a contact tracing app detects proximity to a contact person according to the epidemiological heuristics.

- **Infection confirmation** means the process whereby a user confirm in their app via an official verification mechanism established by public health authorities that he/she is diagnosed with a current infection of COVID-19[3].

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[3] 'A contact of a COVID-19 case is any person who has had contact with a COVID-19 case within a timeframe ranging from 48 hours before the onset of symptoms of the case to 14 days after the onset of symptoms'; see ECDC Technical Report, 'Contact tracing: public health management of persons, including healthcare workers, having had contact with COVID-19 cases in the European Union' – second update 8 April 2020

- **Exposure risk calculation** means the assessment of the level of risk of exposure of a user to an infected user taking into account distance and duration of the contact.

- **Exposure alert** means the notification of exposed user.

- **Follow up** means actions triggered by an exposure notification.

- **Cross-border transmission chains** refers to cross-border exchange of relevant details of proximity contacts.

- **Infected user** means an app user who has been diagnosed with a current infection of COVID-19.

- **Exposed user** means a user who has been exposed to an infected user.

- **Backend server** means to the central service that supports the functioning of the contact tracing apps.

- **Roaming** means a user operating an app from one Member State in a different Member State.

II. COMMON PRINCIPLES

- Relevant public health authorities/regulated health institutions or competent authorities in Member States are accountable for the approved apps including data and backend servers;

- Interoperability across the EU should be guaranteed and complement Member States decisions to implement the apps appropriate to their circumstances;

- Member States should have flexibility in implementation of their apps, responding to evaluation of the effectiveness of the apps and the status of the pandemic.

III. INTEROPERABILITY GUIDELINES

This chapter provides a description of interoperability needs and highlight the main challenges associated.

III.1. Epidemiological heuristics

Heuristics are protocols applied to determine epidemiologically relevant proximity between two persons, as well as used to estimate the risk of exposure. They include *inter alia* distance, duration, time of exposure relative to onset of disease in the case, time since the proximity and definitions of different risk-levels of exposures.

Heuristics and parameters may evolve as knowledge is gathered on the disease. These heuristics may vary between Member States, but differences should not lead to inconsistencies in contact tracing in a cross-border scenario. ECDC guidance may help establishing a common baseline and help evaluate these over time as more evidence comes to light.

III.2. Proximity detection

Devices should regularly listen for and broadcast Bluetooth beacons. When a device is in proximity with another device, that other device beacon must be recorded and stored securely.

The Bluetooth beacon payload should include a privacy-preserving unique identifier and be interoperable between different approved apps.

III.3. Infection confirmation

If a roaming user is tested positive (by a public health authority or accredited testing provider), the competent authority should provide an interoperable and timely mechanism[4] to guarantee that the user can confirm his/her infection in his/her app.

To support the need for COVID-19 test results communication between national health authorities, a trusted and secure mechanism should be used to safeguard any personal information that may be exchanged.

Upon official confirmation of infection through a test result, apps should be able to provide relevant proximity encounters information.

III.4. Exposure risk calculation

Member States' public health authorities determine their method for calculating exposure risk on the basis of experience and technical evidence[5].

Solutions should therefore allow for the calculation of the risk of exposure to infected users, according to the epidemiological heuristics defined by the public health/competent authorities/intuitions responsible for the app.

Following the calculation of the risk of exposure, solutions should be able to alert its users that he/she was exposed to an infected user[6].

III.5. Exposure alert and follow-up

The user alert should inform him/her of possible exposure in an accessible form and include possible follow-up measures in the country where he/she is located at the time. The user should receive information in his/her own language. The user should also be able to seek assistance from authorities in his/her country.

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[4] Ideally it would need an input from both user and health authority.

[5] For example, a public health authority may collects data from the app on contacts detected and apply a filter to the data outside the app - without prejudice to technical feasibility and risk of device or network overload.

[6] To support this as a minimum, the app can use both an estimate of time the user has been in contact with someone who has tested positive for COVID-19 and the approximate distance between the users.

If a Member State's solution involves the public health authority contacting the user (e.g. by telephone), then roaming users in that Member State should be informed of how to contact the health authority of the host country.

III.6. Cross-border transmission chains

Solutions should allow Member States' servers to communicate and receive relevant keys between themselves using a trusted and secure mechanism.

Roaming users should upload their relevant proximity encounter information to the home country backend. The other Member State(s) should be informed about possible infected or exposed users[7].

III.7. Third countries

The above interoperability mechanisms should be made publicly available such that third countries can work to access them in whole or in part, subject to security requirements, particularly around the authenticity of test data.

III.8. Control and review

There should be a communication mechanism between Member States ensuring transparent and timely updates about changes in the system of each country.

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[7] For roaming users, the question of to which servers the relevant proximity contacts details should be sent will be further explored during technical discussions. Interoperability questions will also be explored in relation to how a users' app should behave after confirmed as COVID-19 positive and the possible need for a confirmation of infection free.

IV.   USER STORIES

The table below provides the user stories that are relevant for these interoperability guidelines. Each user story represents a specific interoperability requirement. It is independent of others, and can include features that are specific to each Member State.

Upon agreeing on these user stories, implementation options should be described to provide a common framework for interoperability.

R.Id	Requirement	Who (as a)	What (I want)	Why (So that)
1	Epidemiological heuristics	National public health authority	Be able to define the epidemiological heuristics (for time, distance, onset of symptoms)	I can detect proximity contacts and determine the risk of exposure.
2	Proximity detection	App user	(the app) to be able to detect and interpret proximity contacts with other app users, regardless of their country of origin and app, according to the epidemiological heuristics defined by the public health authority of my MS of origin or of the MS I am visiting.	I can verify if I have been exposed to an infected user.
3	Infection confirmation	App user	To be able to confirm in the app my positive infection diagnosis, independently of the Member State where I am tested positive	I can communicate to the public health authorities my relevant keys
4	Exposure risk calculation	App user or public health authority	(the app or server) to be able to calculate the risk of exposure to infected users, according to the epidemiological heuristics defined by the national public health authority,	I, as an app user, am alerted and public health authorities can alert other app users, of risk of exposure to infected users.
5	Exposure alert	App user or public health authority	(the app or server) to alert me/exposed user about the risk of exposure to infected users, even if I as an app user have travelled to a different MS or been in contact with an app user from a different MS who travelled to my home MS.	I am aware of the risk to my health and possibly start the follow-up procedure.
6	Exposure follow-up	App user	(the app) to inform me, in a language I can understand, about possible follow-up measures, according to local national public health authority	I can take the necessary measures to protect others and myself.

7a	Cross-border transmission chains	Public health authority	(the app or the server) to be able to communicate the relevant keys I am aware of, to public health authorities in other Member States,	Other Member States' (app or server) can perform exposure risk calculation and exposure alert.
7b	Cross-border transmission chains	Public health authority	(the app or the server) to be able to receive the relevant keys from public health authorities in other Member States,	(the app or the server) can perform exposure risk calculation and exposure alert.

V.   NEXT STEPS

On the basis of these guidelines, further technical details will be agreed to ensure the operationalisation of interoperability as soon as possible. This will be supported by structured discussions between the eHealth Network with the New Generation Internet community.

The Commission will set up a Wiki space (confluence page) also to engage with app developers.

An assessment of the value of data processed in the interoperability protocol will be included in general evaluation mechanism required by the Toolbox.