

**From:** s. 47F(1)  
**To:** s. 22(1)(a)(ii) s. 47F(1); s. 47F(1); s. 47F(1)  
**Cc:** s. 47F(1); [Paul Fletcher](#)  
**Subject:** Tracing App  
**Date:** Thursday, 26 March 2020 8:13:56 AM  
**Attachments:** [MOB-TheCOVID-19App-250320-2109.pdf](#)

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Team,

You've all offered to help with tracing app:

- s. 47F(1) Has offered a team to help out with this
- - heads some of our eng teams in Sydney. Across the WhatsApp stream of work
- s. 47F(1) - heading Eng on the TraceTogether stream
- Mathew - leading TraceTogether from govt
- Paul - minister leading TraceTogether

**Suggest s. 47F(1), Mathew get on a call this morning to work out next steps.**

Attached is our internal doc on what we have found so far.

s. 47F(1) and I are in an all day board meeting. Will check in during breaks.

Cheers,  
s. 47F(1)

# The COVID-19 App

Coronavirus is spreading fast and we can contribute to make everybody safer.

Singapore Government released an App already called TraceTogether that:

- Records your phone number
- Tracks all the people that you've been around using Bluetooth and NearBy APIs

In the case that somebody around you got the virus, this app will send a push to all the devices you've been around notifying of the situation.

## Background

Demo of the App <https://www.channelnewsasia.com/news/singapore/singapore-s-new-covid-19-contact-tracing-app-tracetgether-how-12562608>

The Source code is open according to this: <https://www.straitstimes.com/singapore/coronavirus-spore-government-to-make-its-contact-tracing-app-freely-available-to>

Google Play link: <https://play.google.com/store/apps/details?id=sg.gov.tech.bluetrace&hl=en>

App Store link: <https://apps.apple.com/us/app/tracetgether/id1498276074>

## What is TraceTogether and how does it work?

TraceTogether is a contact-tracing smartphone app that enables the Ministry of Health (MOH) to quickly track people who have been exposed to confirmed coronavirus cases.

**1** Users here can download the app on the Apple App Store or the Google Play Store.

**2** Users have to input their mobile phone number for MOH to be able to contact them quickly. The number is the only data collected by the Government through the app.

**3** During the initial set-up, users have to give their explicit consent to be able to use the app.

**4** Users will then have to enable push notifications and location permissions, and keep the Bluetooth function on their phones turned on.

**5** This is because the app uses short-distance Bluetooth signals that are exchanged between phones to detect other TraceTogether users in close proximity.

**6** Official contact tracers who call users will provide a code that users can match with a corresponding verification code on their app.

- Once authenticated, users will be given a PIN number that allows submission of logs when entered.
- Official contact tracers will not ask for personal financial details or transfer of money.

Sources: GOVTECH, MINISTRY OF HEALTH PHOTOS: GOVTECH STRAITS TIMES GRAPHIC

Video explanation: <https://youtu.be/buj8ZTRtJes>

Reading the 9 myths <https://www.tech.gov.sg/media/technews/geeky-myth-busting-facts-you-need-to-know-about-tracetgether>

What we can know by now is:

- The App does not have any type of location tracking
- The App will ask for Bluetooth and Storage permission
- There is no centralised storage of people that you've been in contact with
- The only thing the app stores in a centralised DB is the randomise ID and the phone number it belongs too
- The app will send a verification code (OTP) when you setup the app to guarantee that that is your phone number
- When the app is running on your phone, it will create a temporary ID, generated by encrypting the User ID with a private key that is held by MOH. The temporary ID is then exchanged with nearby phones, and renewed regularly, making it impossible for anyone to identify or link the temporary IDs to you. The temporary ID can only be decrypted by MOH, with MOH's privately-held key. Your phone will store the temporary IDs from nearby phones, together with information about the nearby phone's model, Bluetooth signal strength, and time. All this information is stored locally on your phone, and not sent to MOH, unless you are contact traced.
- When a TraceTogether user is a confirmed COVID-19 case and agrees to upload the data log in the TraceTogether app to MOH, MOH will decrypt the temporary IDs in the user's app using its privately-held key, and obtain a list of phone numbers from the uploaded data

ber will only have the information related to the Bluetooth signal strength and time information. That is all the information you will get from the user's app log. Based on the signal strength and time information, MOH will then determine which user is most likely in close proximity with the confirmed case.

If the app is uninstalled or the app's functionality disabled, all connection data collected on your phone will be lost. You can request that your mobile number and User ID to be removed from the server by sending an email to [support@tracetgether.gov.sg](mailto:support@tracetgether.gov.sg). We do not share all data collected by other TraceTogether phones about their interactions with you meaningfully, because that data is not associated with you.

When background activities cease, the TraceTogether app will prompt users to deactivate its functionality.

TraceTogether uses approximately 1 MB of data in a day, which is equivalent to the data used by watching 1 second of a high definition movie, and uses significantly less battery than phones that already have Bluetooth enabled.

## Steps to understand the possible requirements

### Answer

Thank you for your feedback. Unfortunately, on iOS, TraceTogether works best in the foreground, so that is what we recommend for optimal location, just the other TraceTogether users that are in the user's proximity at any given point.

**When you are in crowded places and not actively using your phone, we recommend that you foreground the TraceTogether app. If it's in your pocket (and are not using another app). When you need to use your other apps, just remember to switch back to TraceTogether.**

**In Power Saver Mode, TraceTogether dims the screen to minimize and conserve battery usage but stays in the foreground.**

To learn more, please read Apple Developer's documentation at: <https://developer.apple.com/library/archive/documentation/NetworkingWeb/Concepts/iOSApps/PerformingTasksWhileYourAppIsInTheBackground.html>

We are working on a solution for iOS users! Thank you for supporting TraceTogether!

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In Power Saver Mode, TraceTogether dims the screen to minimize and conserve battery usage but stays in the foreground so it can continue putting your mobile phone face down, or keeping it upside down if it's in your pocket. You can also click on the link on the app home

We appreciate you downloading the app and supporting community tracing efforts.

For +65 9999 9999, we're in the process of increasing our OTP capacity, please try again in a few hours. We appreciate your patience and support for Singapore (+65) mobile numbers.

Android	<p>This app has a really nice interface. However, I think different languages such as mandarin, malay and tamil should be added and the app should prompt users for their choice of language at the start. And also, I think it would be nice if the app could display something along the lines of "You're done setting up" as I was unsure whether I was done at first. But anyway this is a really nice app, keep it up and continue improving it !! :)</p>	
Android	<p>My bluetooth earphone or speaker is effected after installing this app. Every few minutes, my music will pause then play. This went on again and again until I uninstall this app. I would very much like to install this app to help but I cannot go without my music. Battery also drain extremely fast. I usually charge my phone once a day but after installation, I need to charge 2 to 3 times a day.</p>	

Android	Nice initiative. 5 stars ... eventhough it has some drawbacks, it helps the community. Observations : Tracing app is interrupting bluetooth based media devices. For ex: If I am watching a movie on my mobile using jabra evolve 75e, the movie audio gets muted every minute for 2-3 sec. We can not disable tracing when we are at home .	
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**From:** s. 47F(1)  
**To:** s. 47F(1); s. 47F(1); s. 47F(1); s. 22(1)(a)(ii) [homeaffairs.gov.au](mailto:homeaffairs.gov.au)  
**Subject:** Questions for Singapore  
**Date:** Friday, 27 March 2020 4:11:52 PM

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s. 47F(1)

s. 47G(1)(a)

Would you mind sharing this to the Singapore team and see if we can get an answer?

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Hello,

We're hoping you can answer a few questions we have about the Bluetooth implementation for the Trace Together apps.

Your code uses a single characteristic to read/write data over the bluetooth connection, whilst Apple suggests using 2. We were wondering if there was a specific reason for this? We are concerned about potent problems with using the same characteristic to both read and write (eg race conditions)

Could you please explain why the iOS app schedules scanning windows for only 10s every minute? We are looking at constantly scanning while the app is running. This is because we are unsure if the timer works properly in the background, and scheduling a timer in the background could be prone to problems (eg when the app is suspended). We are also concerned that we may miss connections due to this windowing.

Could you please explain why the Android app uses the mac address to debounce connections? We have been using a random id, as the MAC address rotates very often and we are concerned about making unnecessary connections.

Why was the iOS background state restoration commented out, were there issues with the implementation?

Thank you very much in advance

--

s. 47F(1)  
Sr. Team Lead, Jira Mobile



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Great! It sounds like you're on the right track!

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If you have any further questions or issues let me know.

Cheers,  
s. 47F(1)

On Mon, Mar 30, 2020 at 11:57 AM s. 47F(1) wrote:  
Hey s. 47F(1)

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Again, thanks so much for your help.

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You can perform the scan even without the app running if you use [BluetoothLeScanner.startScan](#) with the PendingIntent argument. This scan will require the narrow filter I spoke about earlier. The PendingIntent will be fired when results are found, make sure the startup path of your app is as small as possible (lazy initialise all the things).

The most reliable way to keep the advertising server up you will need a permanent foreground service. Note that different OEMs will have different approaches to how background and foreground tasks are cleaned up. You can ask the user to have your app removed from battery optimisation which will help.

Unfortunately while the phone is in doze mode it has to slow down the Bluetooth stack otherwise it would chew through the phone's battery very quickly.

With debugging specific errors I'll need a code example and a bug report (with HCI snoop logs on if you can). What I would recommend is to share as much code as you are able, and we can advise. The Bluetooth landscape is very complex at this time and there are pitfalls that aren't intuitive. I recommend using a library such as [bitgatt](#) or the Nordic semiconductor [android library](#).

Above everything, and it sounds like you're on the right track here already: Test, test, test.

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Cheers for the follow up.

Point 1 has been resolved, we are now in the Google Play store as a closed beta - thank you for that.

Point 2 has not been, let me reiterate that below:

**2. We have some bluetooth problems we wanted some guidance on.** s. 47F(1)

Here's the info from s. 47F(1):

**\*\*Covid Tracking App Requirements key requirements:\*\***

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As s. 47F(1) have sent, **we would love if we could organise a meeting** to tell you what we have, how it works and you could give us some feedback if there is something else we should try or do.. s. 47F(1)

Thank you so much for your time & help

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Things have changed quite a bit today. We've got a beta build on standby just to make sure we can test the release pipeline and test internally. However some problems remain. Hoping you could help us out.

We have 2 specific problems listed below as of now:

**1. Our beta store listing review is stalled, s. 22(1)(a)(ii) the government mobile lead needs help around expediting review**

Here is what s. 22(1)(a)(ii) who is the mobile lead on the government side - the Department of Home Affairs (<https://www.homeaffairs.gov.au/>) - has said:

The Australian Government Department of Home Affairs has uploaded a new mobile app to the Google Play Store in response to COVID-19. The timelines are very aggressive. The app is called CovidCare and this initial build will allow the development team to test the app further and rapidly iterate on it. The app has been in the "We're currently reviewing your app" state on the Google Play Console for a day with our management escalating the issue to Google with no response.

We would need some help getting a representative from Google to help us understand the status and help us get the app reviewed to publish our beta as soon as possible.

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Let me know availabilities and I can get the engineers on the vid call.

Kind Regards,

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Hey <sup>s. 47F(1)</sup>

Thanks for reaching out, looping in some of the people - <sup>s. 47F(1)</sup>

- from Atlassian leading this project. Asking that you consider this email confidential and covered by our NDA with Google.

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Hey s. 47F(1),

Thanks so much for your detailed response. The approaches you described are what we're using now. s. 47G(1)(a)

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Partnerships, Atlassian



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**To:** s. 47F(1)  
**Cc:** s. 47F(1); s. 47F(1); s. 47F(1); s. 47F(1); s. 47F(1) s. 22(1)(a)(ii)  
[homeaffairs.gov.au](mailto:homeaffairs.gov.au); s. 47F(1)  
**Subject:** Re: [Confidential NDA] Bluetooth assistance  
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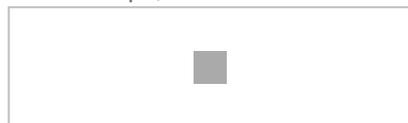
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Share accurate information on COVID-19 and spread messages of support to your community.

 [Here are some resources](#) that can help.



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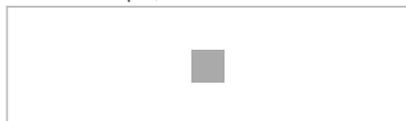
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Partnerships, Atlassian



**From:** s. 47F(1)  
**To:** s. 47F(1)  
**Cc:** s. 47F(1); s. 47F(1); s. 47F(1); s. 47F(1); s. 47F(1); s. 22(1)(a)(ii)@homeaffairs.gov.au; s. 47F(1)  
**Subject:** Re: [Confidential NDA] Bluetooth assistance  
**Date:** Monday, 30 March 2020 2:23:11 PM

Hi s. 47F(1)

Cheers for the follow up.

Point 1 has been resolved, we are now in the Google Play store as a closed beta - thank you for that.

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As s. 47F(1) have sent, **we would love if we could organise a meeting** to tell you what we have, how it works and you could give us some feedback if there is something else we should try or do.. s. 47F(1)

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**Subject:** Re: [Confidential NDA] Bluetooth assistance  
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Hey s. 47F(1)

How are you?

My name is s. 47F(1) work in Atlassian and we are helping the Australian Government to make an app like TraceTogether that the Singapore government released.

Luckily, after many political matters were solved the Australian Government got the source code and we are going to be able to push this new App really soon.

We would love if we could organise a meeting to tell you what we have, how it works and you could give us some feedback if there is something else we should try or do.

The reason why we are trying to talk to people in Apple and Google it is because the moment we released the app it will get millions of users in a matter of days.

So, if you could help us, that would be really appreciated by all the Aussies that you have met in your life and all the people this app will help ;)

Thanks!

On Sat, Mar 28, 2020 at 7:48 AM **s. 47F(1)** <[s.47f\(1\)@google.com](mailto:s.47f(1)@google.com)> wrote:  
Hi **s. 47F(1)** Nice to hear from you, hope you have been doing well!

I am CCing **s. 47F(1)**, since he knows a lot about Bluetooth and I know nothing. :)

On Thu, Mar 26, 2020 at 10:38 AM **s. 47F(1)** <[s.47f\(1\)@atlassian.com](mailto:s.47f(1)@atlassian.com)> wrote:

Hi **s. 47F(1)**

It's been a long time -- I hope that things are going well for you in these crazy times.

I have a quick question and I think / hope you can help.

Atlassian is the biggest tech company in Australia, so we've been asked to help the Australian government build an app to do contact tracking using bluetooth, similar to the one that Singapore has used to track / fight Covid. The app is opt-in, needs to be installed by lots of people to be successful, but it's worked well in Singapore.

We don't have any bluetooth expertise. Is there someone on the bluetooth team that would be interested in helping with this? We're just looking for consultation at this point.

Thanks,

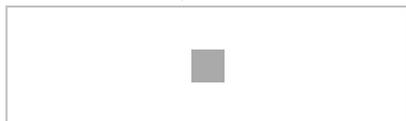
**s. 47F(1)**

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**s. 47F(1)**  
CISO, Atlassian  
**s. 47F(1)**

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**s. 47F(1)**  
Sr. Team Lead, Jira Mobile



From: s. 47F(1)  
 To: s. 47F(1) F(1)  
 Cc: s. 47F(1) [mathew.smorhun@homeaffairs.gov.au](mailto:mathew.smorhun@homeaffairs.gov.au); s. 47F(1) [s. 47F\(1\) @bca.com](mailto:s.47F(1)@bca.com); [paul@s. 22\(1\)\(a\)\(ii\).au](mailto:paul@s.22(1)(a)(ii).au); s. 47F(1)  
 Subject: Re: Tracing App source code  
 Date: Thursday, 26 March 2020 11:47:57 AM  
 Attachments: [image001.png](#)

s. 47G(1)(a)

s. 47F(1)

On Thu, Mar 26, 2020 at 11:13 AM s. 47F(1) [@amazon.com](mailto:s.47F(1)@amazon.com) wrote:

Hello s. 47F(1)

Thank you for the discussion around the problem statement.

**Problem Statement**

We know that iOS bluetooth is an issue and the effectiveness of this is going to play a crucial role in the success of the application.

**Ask**

s. 47G(1)(a)

We believe having un polluted view of the Singapore app knowledge and having a crack to see if any of your ideas are better or

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could enhance the Singapore solution.

### **Output**

As a test bed app for the bluetooth functionality. It would display the info on the screen of both devices when the handshake is attempted and any available info (strength of signal, the length of time connected, mac address and any other meta data).

The bluetooth code within this app should be built such that we could take it an plug it into the actual app but also so that we could drop the Singapore bluetooth code into this app for testing purposes. <sup>s. 47G(1)(a)</sup>

Cheers

 **S. 47F(1)**

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From:  [@atlassian.com](mailto:@atlassian.com)



**From:** s. 47F(1)  
**To:** s. 47F(1);  
[mathew.smorhun@homeaffairs.gov.au](mailto:mathew.smorhun@homeaffairs.gov.au); s. 47F(1)  
s. 47F(1) paul@s. 47F(1)  
**Subject:** Re: Tracing App source code  
**Date:** Thursday, 26 March 2020 11:14:43 AM  
**Attachments:** [image001.png](#)

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Hello s. 47F(1)

Thank you for the discussion around the problem statement.

### **Problem Statement**

We know that iOS bluetooth is an issue and the effectiveness of this is going to play a crucial role in the success of the application.

### **Ask**

s. 47G(1)(a)

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Cheers

s. 47F(1)

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**From:** s. 47F(1)  
**Date:** Thursday, 26 March 2020 at 10:23 am  
**To:** s. 47F(1) "s. 47F(1)", s. 47F(1)  
s. 47F(1) s. 47F(1) @bcgdv.com"s. 47F(1) @bcgdv.com>,  
s. 22(1)(a)(ii) @homeaffairs.gov.au"s. 22(1)(a)(ii) @homeaffairs.gov.au>,  
s. 47F(1)  
s. 47F(1) @bcg.com"s. 47F(1) @bcg.com>, s. 47F(1) @bcg.com"  
s. 47F(1) @bcg.com>, "pau s. 47F(1)  
<paul@ s. 47F(1) s. 47F(1) @atlassian.com>, s. 47F(1) "  
s. 47F(1)  
**Subject:** [EXTERNAL] Tracing App source code

**CAUTION:** This email originated from outside of the organization. Do not click links or open attachments unless you can confirm the sender and know the content is safe.

Hey everybody,

We are in desperate need of the source code to be able to start the process.

Can somebody point me to the right person to talk to?

Thanks!

s. 47F(1)