## How Facebook tracks users on Android

(even if you don't have a Facebook account...)

Frederike Kaltheuner

@F\_Kaltheuner

Christopher Weatherhead

@CJFWeatherhead

PRIVACY INTERNATIONAL

## Data brokers and credit scorers accused of GDPR breaches

Campaign group Privacy International files complaints and calls for EU investigation

**TECH • PRIVACY** 

#### Privacy Activists Take On Oracle and Equifax Over Shadowy Profiling

https://privacyinternational.org/campaigns/uncovering-hidden-data-ecosystem

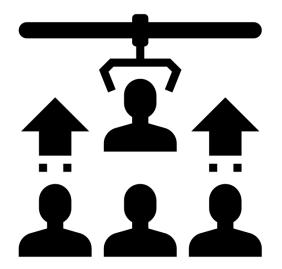
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# 42.55%

of free apps on the Google Play store could share data with Facebook\*

\* (Measuring third party tracker power across web and mobile: Reuben Binns, Jun Zhao, Max Van Kleek and Nigel Shadbolt 2018)

### Selection criteria



Created by Eucalyp from Noun Project Number of downloads

Potential sensitivity of the data the app handles

Utility type apps which could give insights into user behavior

#### The apps we analysed\* - (all between 10 and 500 million installs each)

Bible - Audio, Daily Verse, Study & Offline, Free BMI Calculator & Weight Loss Tracker Calorie Counter - MyFitnessPal Candy Crush Saga Clean Master - Antivirus, Cleaner & Booster Dropbox Duolingo: Learn Languages Free Family Locator - GPS Tracker (Formally Life360) HP ePrint Indeed Job Search Instant Heart Rate: HR Monitor & Pulse Checker KAYAK Flights, Hotels & Cars King James Bible (KJV) Free Muslim Pro - Prayer Times, Azan, Quran & Qibla My Talking Hank **Opera Browser** Period Tracker, My Calendar

Period Tracker Clue: Period & Ovulation Calculator Phone Tracker By Number Qibla Connect<sup>®</sup> Find Direction- Prayer, Azan, Quran Salatuk (Prayer time) صلاتك Security Master - Antivirus, VPN, AppLock, Booster Shazam Skater Bov Skyscanner - Cheap Flights, Hotels and Car Rental Speedtest by Ookla Spotify Music Super-Bright LED Flashlight The Weather Channel: Local Forecast & Weather Maps TripAdvisor Hotels Flights Restaurants Attractions Cleaner - Boost, Clean, Space Cleaner VK (vkontakte) WeChat Yelp

#### Setup for Analysis and Methodology

Nexus 5 running Android 8.1.0 (Oreo)

VirtualBox Virtual Machine running Debian Buster

MitMProxy 4.0.4

hostapd/dnsmasq/rtl8812au



Status Phone number, signal, etc.

Legal information

Model Nexus 5

Android version 8.1.0

Android security patch level 5 July 2018

Baseband version M8974A-2.0.50.2.26

Kernel version 3.4.0-g5ee46a9 (gcc version 4.8 (GCC) ) root@builder #1 Tue Jul 3 17:05:02 UTC 2018

## Over 61% of apps tested automatically transfer data to Facebook the moment a user opens the app

## Kayak Analysis

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SKIP

#### Welcome to KAYAK Sign in or register now to receive price updates, organise travel plans in one place and more



Continue with Facebook

£

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Continue with Google

Continue with email

Don't worry, we'll never share anything without your permission





```
Form data:
                                         format:
                                                                        ison
                                                                        android
                                         sdk:
                                         custom events file:
                                         [{" eventName":"fb sdk initialize"," eventName md5":"d470d22f237aee69843355edba5a8178,"" logTime":1543758287," ui":"unknown","
Examples 1
                                         implicitlyLogged":"1","core lib included":"1","login lib included":"1","share lib included":"1"}]
                                                                        CUSTOM APP EVENTS
                                         event:
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                                         advertiser tracking enabled: true
                                         installer package:
                                                                        com.android.vending
                                         anon id:
                                                                        XZ801b9f8d9395-4bbd-8396-83fe6ff66d38
Facebook SDK's default events data
                                         application tracking enabled:true
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                                         extinfo:
                                         5", "en GB", "GMT", "", 1080, 1776, "3.00", 4, 13, 8, "Europe\/London"]
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                                         tivity"," session id":"532f794b-64b3-4822-b16a-09fc92fb9bbf""fb mobile launch source":"Unclassified"}]
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                                         5", "en GB", "GMT", "", 1080, 1776, "3.00", 4, 13, 8, "Europe\/London"]
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                                         qnupActivity", "session id":"532f794b-64b3-4822-b16a-09fc92fb9bbf;" valueToSum":104, "fb mobile time between sessions!" session
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                                         5", "en GB", "GMT", "", 1080, 1776, "3.00", 4, 13, 8, "Europe\/London"]
                                         application package name:
                                                                        com.vkontakte.android
```

Some apps routinely send Facebook data that is **incredibly** detailed and sometimes sensitive

	format:	json					
	sdk:	android					
	custom_events:						
<b>Examples 2</b> Custom data being sent by developers	<pre>[{" eventName":"fb_mobile_content_view,""_eventName_md5":"533c6dea25f750eelfefcd943f2ldf1f,""_logTime":1543687983,"_ui":"unkno wn","_session_id":"96ac6dc9-d0d4-496f-85b6-0c75b86b2d23,""_valueToSum".663,"obfuscated_session_id":"H-5bA4a5Ta3jpwN4vbUHDHO-TF SxSSjPol1RAKo9WV0cKnDDBSknGfD4yjSAw6uik,""bookingWindow":"1","obfuscated_tracking_cookie?"JHRqu46001JsujWaiTV7hIdBHwc,"trave l_start:"12\/02\/2018","fb_currency":"GBP","brand":"kayak","destination_airport":"NRT","travel_end":"12\/05\/2018","content_t ype":"Flight","num_adults":"1","is_logged_in":"false","order_id":"DaGCAYLLPF","fb_content_id":"mult","origin_airport":"LGW","f b search string":"\/flights\/LGW-TYO\/2018-12-02\/2018-12-05\/f6f7f4e595ba8b61f070f6b81e7f69198%ser_score":"0"}] event:</pre>						
	<pre>installer package: anon id: application tracking enabled: extinfo: 5","en GB","GMT","",1080,1776, application_package_name:</pre>	<pre>com.android.vending XZdfd5f00f9271-4e82-a8ce-6ceald38b6d3 :true "[a2","com.kayak.android",1257,"69.1","8.1.0","Nexus ."3.00",4,13,8,"Europe\/London"] com.kayak.android</pre>					
	Form data:						
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	format:	ison					
	sdk:	android					
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	UNITY:	false					
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What about advertising data?	REQUEST_TIME:	1543936446.194					
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	AD_REPORTING_CONFIG_LAST_UPDATE						
	M_BANNER_KEY:	Y29tLmJpdHNtZWRpYS5hbmRyb21kLm11c2xpbXBybyBjb20uYW5kcm9pZC52ZW5kaW5n					
	SCREEN_HEIGHT:	592					
Muslim Pro	SDK_VERSION:	5.1.0					
	PROCESS:	<pre>{"process_name":"com.bitsmedia.android.muslimpro","is_ads_process":false,"client_supports":false)</pre>					
	SCREEN_WIDTH:	360					
	ID_SOURCE: SDK:	android					
	OSVERS:	8.1.0					
	CLIENT EVENTS:	0.1.0					
	OS:	Android					
	ANALOG:						
	AWALOG. {"charging":"1","available memory":"841449472","total memory":"1944141824","battery":"100.0","free space":"5983637504"}						
	PLACEMENT TYPE:	banner					
	ROOTED:	2					
	MODEL:	Nexus 5					
	HEIGHT:	50					
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	INSTALLER:	com.android.vending					
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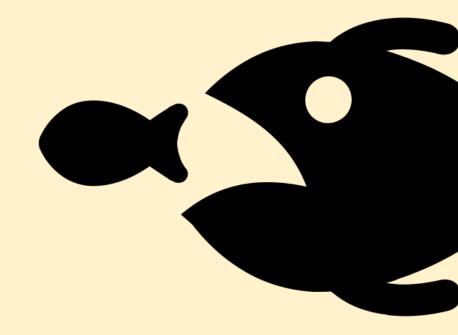
## This happens whether people have a Facebook account or not and regardless of login status

#### WHY DOES ANY OF THIS MATTER?



## "Qibla Connect" "Period Tracker Clue" "Indeed" "My Talking Tom"

Created by I Create Stuff from Noun Project



Created by Delwar Hossain from Noun Project

# 2,000,000,000+

combined installs

# WHY DO SO MANY APPS SHARE DATA WITH FB (THE SECOND THE APP OPENS)?



Created by I Putu Kharismayadi from Noun Project

# Facebook places the sole responsibility on apps...



Created by H Alberto Gongora from Noun Project "If you use our pixels or SDKs, you further represent and warrant that you have provided robust and sufficiently prominent notice to users regarding the Customer Data collection [...] In jurisdictions that require informed consent for storing and accessing cookies or other information on an end user's device (such as but not limited to the European Union), you must ensure, in a verifiable manner, that an end user provides the necessary consent before you use Facebook Business Tools to enable us to store and access cookies or other information on the end user's device." (emphasis added)

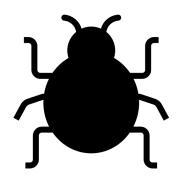
Facebook Business Tool Terms

### It's the default implementation of the SDK....

"When you use the Facebook SDK, some events in your app are automatically logged and collected for Facebook Analytics unless you disable automatic event logging."

Facebook Analytics Quickstart Guide for Android

### ...and developers have been filing bug reports about the SDK since May...



Created by anbileru adaleru from Noun Project

""When integrating the Facebook login SDK into android we realized, that when initializing the SDK a request is sent to the Graph API server, which includes an App-ID and an Advertising ID. Unfortunately this isn't compliant with the GDPR Guidelines, because the users haven't yet agreed to the privacy terms when starting the app. This is also the case , when the automatic events are deactivated. At the moment we have to avoid the problem with a workaround, which however leads to crashes. [...] Please help us as soon as possible, as otherwise we are not allowed or able to use the Facebook SDK to login into our Android app." " (July 24, 2018)

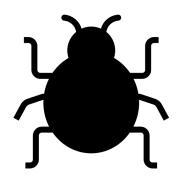
(Accessed: 1 December 2018).

## ... and Facebook released a feature that delays automatic event data sharing in June.

"Prior to our introduction of the "delay" option, developers had the ability to disable transmission of automatic event logging data, **except for a signal that the SDK had been initialized**. Following the June change to our SDK, we also removed the signal that the SDK was initialized for developers that disabled automatic event logging." (emphasis added).

Facebook via email to Privacy International, 28 December 2018

### ...and developers continued to file bug reports.



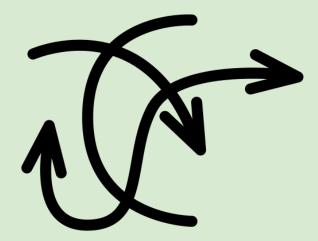
Created by anbileru adaleru from Noun Project

"The voluntary feature that we released on June 28, 2018 for the Android SDK worked as we described at the time of launch. Following the launch, we received feedback from developers and made changes to (1) expand the information that we did not collect during the delay period, and (2) make the delay functionality available in our Unity SDK, which is separate from the Android SDK." (emphasis added).

Facebook via email to Privacy International, 28 December 2018

#### **IS THIS EVEN LEGAL?**

#### responsibility



Created by Marie Van den Broeck from Noun Project

#### WHAT SHOULD ANDROID DEVELOPERS DO?

### Up your privacy game.



Created by Gregor Cresnar from Noun Project Comply with relevant laws

Don't transmit data that doesn't need to be transmitted (data minimisation)

Give people genuine choice!

••••

## **Rethink third-party** tracking.



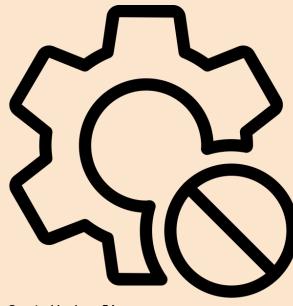
Third parties seek to place all legal responsibility on app developers and providers.

Use SDKs selectively - and in a matter that's transparent towards users.

Created by Smalllike from Noun Project

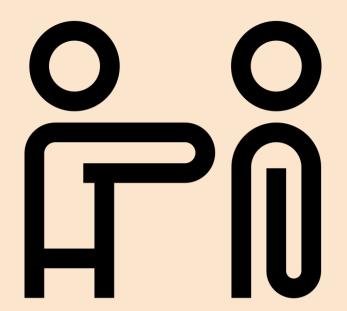
#### WHAT SHOULD FACEBOOK (AND GOOGLE) DO?

#### Privacy by design and by default

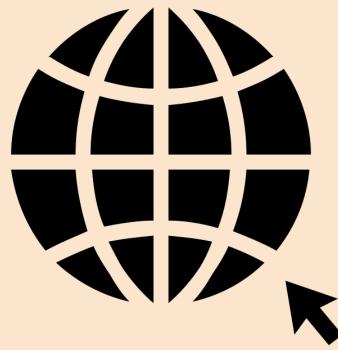


Created by icon 54 from Noun Project

#### "...but other companies also track people"



Created by Symbolon from Noun Project



Created by Aisyah from Noun Project

# We need to reclaim the internet

#### WHAT CAN YOU DO?

#### Well technically....

Device settings

(1) Opt out of ad personalization

(2) Reset the Google ad ID

European Interactive Digital Advertising Alliance

Offers cookie-based opt-outs......



Example 4	Advertising Personalization Enabled Opt-in, the		json android med", "_eventName_md5": "b883a259b3e22dcafeb6cd97872e5692,""_logTime": 1543790183, "_u 582dd9a-7d17-4b1e-8f2e-3eb88369c542,""origin_city_name": "London", "origin_iata": "L CUSTOM_APP_EVENTS 474364c6-e9cf-4971-8dd2-b1dc3c605450 true
What about with	(Default state)	<pre>installer package: anon id: application tracking enabled</pre>	com.android.vending XZ91d6983 <del>&amp;9</del> 80-4d1a-8e41-d6c21362b0b5 :true
		extinfo: 5","en GB","GMT","",1080,1776	<pre>"[a2","net.skyscanner.android.main",1811261925,"5.57","8.1.0","Nexus ,"3.00",4,13,6,"Europe\/London"]</pre>
personalisation		application_package_name:	net.skyscanner.android.main
disabled			
	Advertising	Form data: format: sdk:	json android
← Ads :	Personalization Disabled	ui":"unknown"," session id":"	ed","_eventName_md5":"b883a259b3e22dcafeb6cd97872e5692;""_logTime":1544574571," 7b0174ff-d21f-4877-9a71-64fbda0987e1;""origin_city_name":"London","origin_iata": },{"_eventName":"destination_selected";"_eventName_md5":"cd48f17164b8286eeb6fddd
Reset advertising ID		86eccc8ca","_logTime":1544574	580,ui":"unknown", "session_id":"7b0174ff-d21f-4877-9a71-64fbda0987e1,""destin tination iata":"TYOA", "destination name":"Tokyo"}, {"eventName":"flight search",
Opt out of Ads Personalisation Instruct apps not to use your advertising ID to build profiles or show you personalised ads.	Opt-out	74ff-d21f-4877-9a71-64fbda09 airport_from_city_name_fligh h":"LOND","date_from_flight_s earch":"","airport_to_city_na	b76694cc27dd453c90120,""_logTime":1544574582,"_ui":"unknown","_session_id":"7b01 87e1,""airport_from_iata_flight_search!"","airport_from_name_flight_search!""," t_search!"London","date_to_flight_search":2018-12-24","origin_iata_flight_searc search!"2018-12-17","airport_to_iata_flight_search!"","airport_to_name_flight_s mme_flight_search!"Tokyo","destination_iata_flight_search!"TYOA"}, {"_eventName"
Ads by Google		_id":"7b0174ff-d21f-4877-9a73 18-12-24","fb_description":"F.	3348442cc6a27032d2b4aa28b75a5d3;"_logTime":1544574582,"_ui":"unknown","_session 1-64fbda0987e1;"fb_destination_airport":"TYOA","fb_returning_departure_date":20 light","fb_content_type":"flight","fb_origin_airport":"LOND","fb_travel_class":"
Enable debug logging for ads Instruct apps to write ads debugging information (such as network traffic) to the system log.		event: advertiser id: advertiser tracking enabled: installer package:	com.android.vending
Your advertising ID: 474364c6-e9cf-4971-8dd2-b1dc3c605450		<pre>anon id: application tracking enabled extinfo: 5","en GB","GMT","",1080,1776 application package name:</pre>	<pre>XZ2625c992-f7b7+568-a4ab-6201af500733 :true</pre>

#### So you can't opt out but you can...

Block

Block graph.facebook.com using tools like AFWall+ or NetGuard

You can not install apps that use the Facebook SDK

#### Minimise

You could segregate your data

Reset your advertising ID and opt-out of ad-personalisation

#### ...but why should you have to?

#### Replicate our research!!



Created by BomSymbols from Noun Project

#### https://privacyinternational.org/appdata

#### https://privacyintyqcroe.onion/appdata

Join Us Donate Your Data Search
WHERE WE WORK WHAT WE DO TOPICS IMPACT ABOUT

#### Investigating Apps interactions with Facebook on Android

Privacy International has been investigating the proliferation of data tracking, brokerage and exchange between many tech companies, both as their primary business as well as value added services.

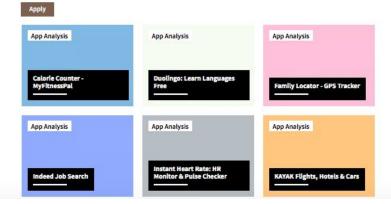
Facebook routinely tracks users, non-users and logged-out users outside its platform through Facebook Business Tools. App developers share data with Facebook through the Facebook Software Development Kit (SDK), a set of software development tools that help developers build apps for a specific operating system. Using the free and open source software tool called "mitmproxy", an interactive HTTPS proxy, Privacy International has analyzed the data that a number of Android apps transmit to Facebook through the Facebook SDK.

On this page, you will find the full report that PI have released covering this topic and all the relevant documentation of our analysis.

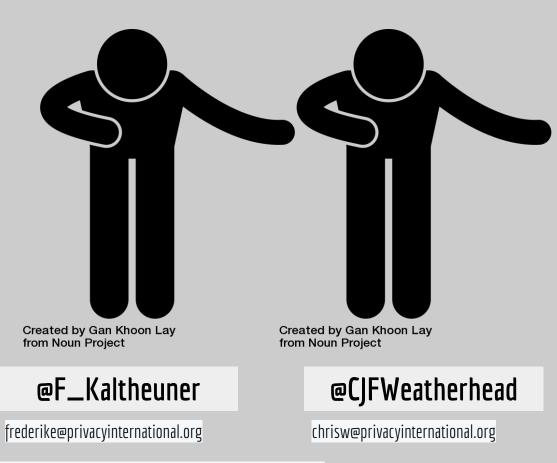
#### Search by App Name



The name can either be partial or full



# Questions?



Further questions: EDRi stand in the about:freedom assembly opposite the exploits bar