ICDDF 2019

Your Personal Surveillance Device:
How Your Smartphone Tracks Your Entire Life and What It Knows About You

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In the Cloud

- Account passwords and tokens
- Web and application passwords
- Messages (including iMessage)
- Health data (Apple Health, Google Fit)
- Payment data (Apple Pay)

- Call logs
- Emails and chats
- Wi-Fi passwords
- Documents, settings and databases
- Web browsing history, tabs, searches
- Pictures and videos
- Location history, routes and places

Apple and Google

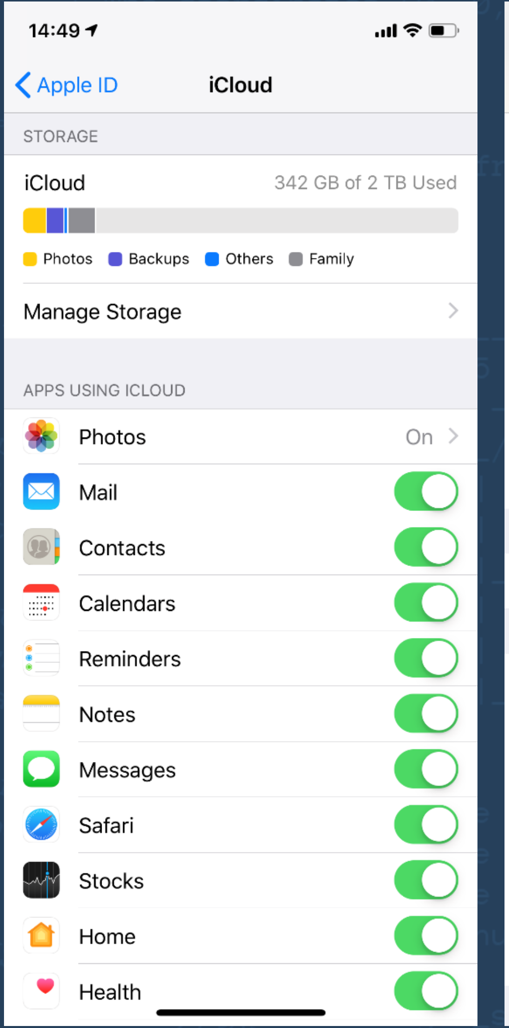
Both companies collect personal information

- Apple and Google have their own cloud services
- Apple iCloud, Google Drive
- Both companies collect, store and process huge amounts of data
- They are different in what is stored and how it's protected
- Both are GDPR compliant, yet…
- **They are very different in what they return to the law enforcement**

iCloud Data

Checklist #1: iOS settings

- Not all the categories are listed there (e.g. no call logs, mail signatures, black list, autocorrection dictionaries)
- Some options in fact require the *keychain* to be enabled (Health, Messages)
- Not obvious what is under “iCloud Drive” (and some data can be accessed by respective apps only, e.g. WhatsApp & Viber backups)



14:49

‹ Apple ID iCloud

STORAGE

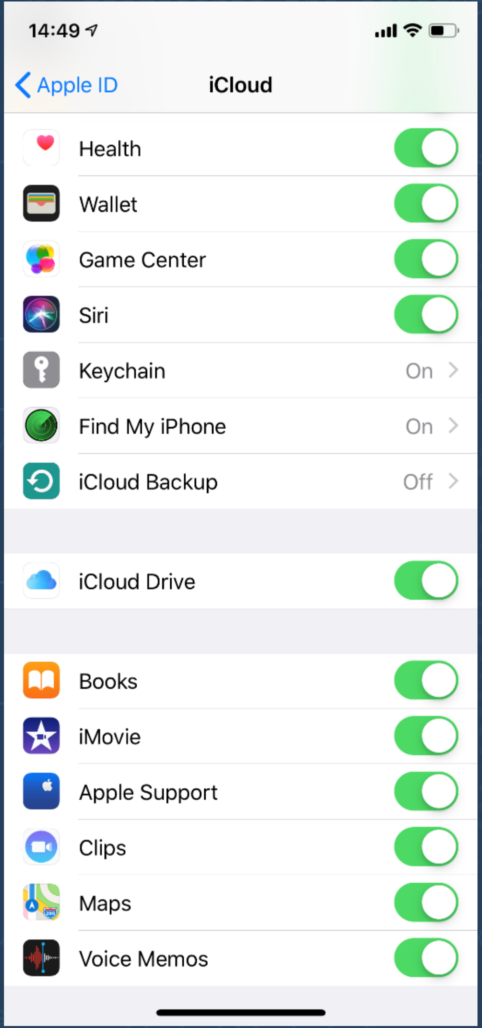
iCloud 342 GB of 2 TB Used

Photos Backups Others Family

Manage Storage ›

APPS USING ICLOUD

Photos	On ›
Mail	●
Contacts	●
Calendars	●
Reminders	●
Notes	●
Messages	●
Safari	●
Stocks	●
Home	●
Health	●



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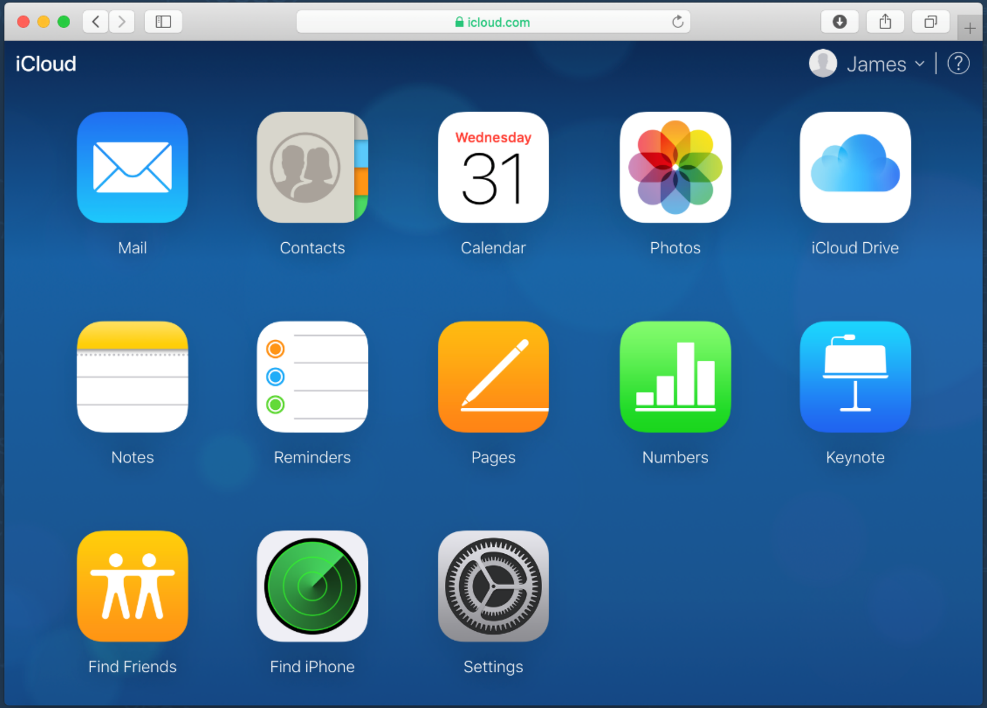
‹ Apple ID iCloud

Health	●
Wallet	●
Game Center	●
Siri	●
Keychain	On ›
Find My iPhone	On ›
iCloud Backup	Off ›
iCloud Drive	●
Books	●
iMovie	●
Apple Support	●
Clips	●
Maps	●
Voice Memos	●

iCloud Data

Checklist #2: icloud.com

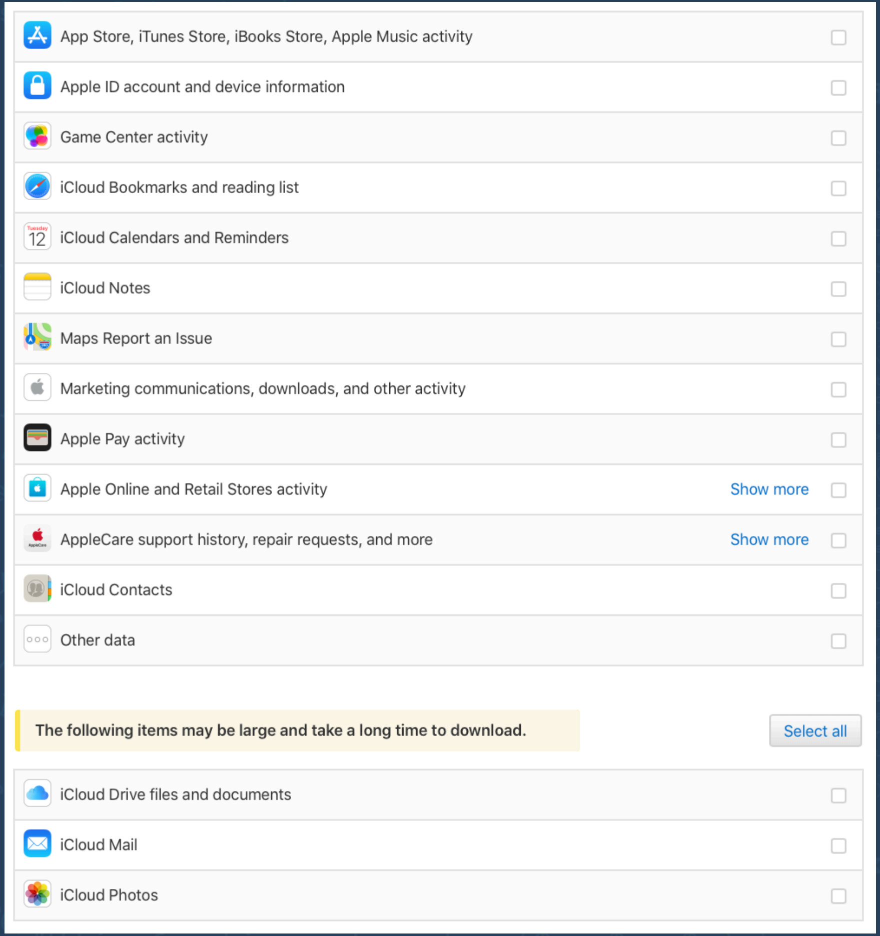
- Only basic data categories are available
- Immediate notification to the account owner (by email)
- Web browser approach (the token is saved in cookies)



iCloud Data

Checklist #3: privacy.apple.com

- Available (for now) in Europe, USA and some other countries
- Takes about a week to prepare data
- Multiple data formats (txt, csv, xml, json)
- Some “internal” Apple data is here (not available by other means)
- The most interesting is hidden under *Other data*



App Store, iTunes Store, iBooks Store, Apple Music activity □

Apple ID account and device information □

Game Center activity □

iCloud Bookmarks and reading list □

iCloud Calendars and Reminders □

iCloud Notes □

Maps Report an Issue □

Marketing communications, downloads, and other activity □

Apple Pay activity □

Apple Online and Retail Stores activity Show more □

AppleCare support history, repair requests, and more Show more □

iCloud Contacts □

Other data □

The following items may be large and take a long time to download. Select all

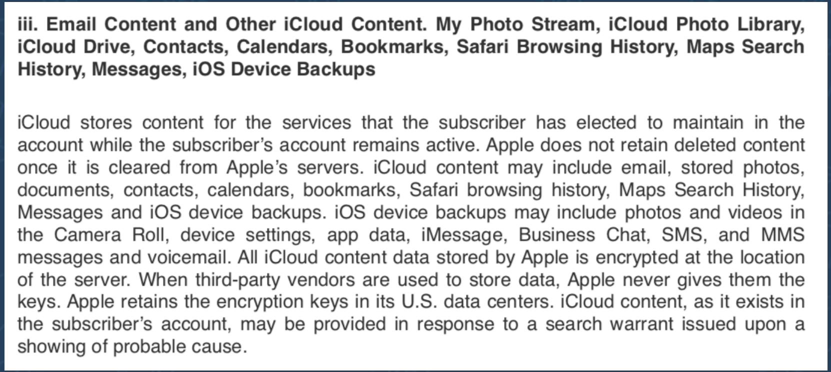
iCloud Drive files and documents □

iCloud Mail □

iCloud Photos □

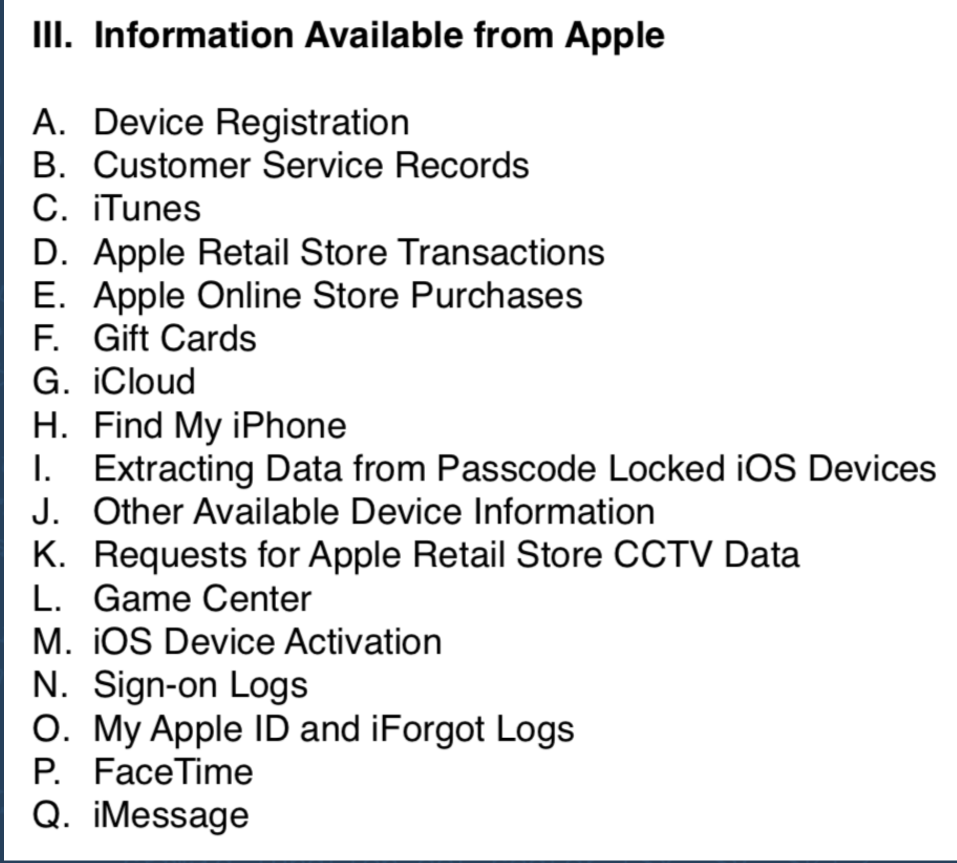
iCloud Security

Checklist #4: Gvt requests



iii. Email Content and Other iCloud Content. My Photo Stream, iCloud Photo Library, iCloud Drive, Contacts, Calendars, Bookmarks, Safari Browsing History, Maps Search History, Messages, iOS Device Backups

iCloud stores content for the services that the subscriber has elected to maintain in the account while the subscriber's account remains active. Apple does not retain deleted content once it is cleared from Apple's servers. iCloud content may include email, stored photos, documents, contacts, calendars, bookmarks, Safari browsing history, Maps Search History, Messages and iOS device backups. iOS device backups may include photos and videos in the Camera Roll, device settings, app data, iMessage, Business Chat, SMS, and MMS messages and voicemail. All iCloud content data stored by Apple is encrypted at the location of the server. When third-party vendors are used to store data, Apple never gives them the keys. Apple retains the encryption keys in its U.S. data centers. iCloud content, as it exists in the subscriber's account, may be provided in response to a search warrant issued upon a showing of probable cause.



III. Information Available from Apple

A. Device Registration
B. Customer Service Records
C. iTunes
D. Apple Retail Store Transactions
E. Apple Online Store Purchases
F. Gift Cards
G. iCloud
H. Find My iPhone
I. Extracting Data from Passcode Locked iOS Devices
J. Other Available Device Information
K. Requests for Apple Retail Store CCTV Data
L. Game Center
M. iOS Device Activation
N. Sign-on Logs
O. My Apple ID and iForgot Logs
P. FaceTime
Q. iMessage

Google Data

Google Account: What’s Inside

- User data
- All connected devices
- Android backups (Android 9: encrypted)
- **Many years worth of location history**
- Contacts, Calendars, Notes
- Email
- Call logs, Text Messages (SMS only)
- Photos, pictures, videos
- Hangouts conversations
- Google search history, YouTube search history
- Chrome
    - History, Bookmarks, Tabs, Page transitions
    - **Account passwords** and autofill data
- Device usage data and statistical information

Google Security

Little additional security

- Login, password and 2FA for most types of data
  - Even your passwords are not additionally protected
  - Not even Health data (Google Fit)
- Anyone with a login and password (and 2FA) can access (almost) all your data
- Google Takeout returns (almost) everything
  - In multiple data formats (txt, csv, xml, json)
- Android backups only encrypted in Android 9
  - That’s less than 1% of all devices (as of March 2019)

iCloud Backups

iCloud has complete backups

- App data (if developers allow backups)
- Photos (only if iCloud Photo Library is not enabled)
- Messages (if iCloud Messages not enabled)
- Passwords (Keychain): “this device only”
- Contacts, calendars, notes etc.
- Some apps maintain separate backups or synced data in iCloud

iCloud Backups

iCloud backups: reality

- **Backups count against the 5GB quota**
- **In real life, many users don't have backups (even if they are enabled)**
  - Because their iCloud storage is used up for pictures, synced data
  - Because there is that one app that wants to back up its entire data set (>5GB)
  - Because there are still backups from very old devices
  - Because they don't pay attention and don't care about backups

iCloud Backups

Extracting iCloud backups

- Login and password required
- 2FA required (if enabled) unless extracting from trusted Mac
- Alternative: tokens (before iOS 11.3.1+2FA)
- Some items are encrypted with “this device only” keys, cannot be decrypted

Android Backups

Google cloud backups are limited

Most data is synced rather than backed up

- Android 6.0: initial appearance
- Android 8.0: include SMS
- Android 9.0: encrypted with device passcode
- Device settings
- Application data (limited)
- SMS (since Android 8.0)
- Call logs

Android Backups

Google backups: reality

- Backups don’t count against Google Drive storage quota
- Created even if the user doesn’t pay attention
- Old backups expire in 60 days, purged from Google Drive
- WhatsApp backups don’t count against the quota either
    - These are encrypted though
    - But we can extract them

Android Backups

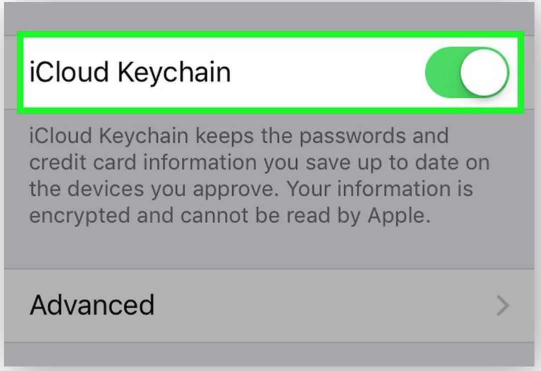
Extracting Android backups from Google Drive

- Login and password required
- 2FA if enabled
- Android 6.0 through 8.1: no encryption
- Android 9.0: encrypted with device passcode

iCloud: Passwords

iCloud Keychain

- Passwords, tokens and payment information synchronized through iCloud
- Apple does not provide any tools or APIs to access iCloud Keychain (only your app-specific data)
- Several different implementations
  - Passwords may or may not be stored in iCloud



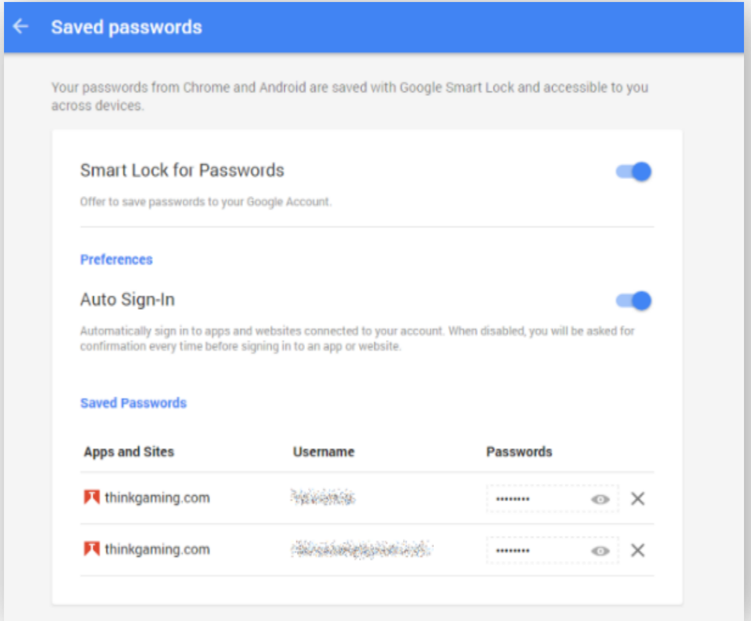
iCloud Keychain

iCloud Keychain keeps the passwords and credit card information you save up to date on the devices you approve. Your information is encrypted and cannot be read by Apple.

Google: Passwords

Chrome Passwords

- Account passwords synchronized through Google Drive
- Syncs with Android devices, Chrome on iOS, Windows, macOS
- No additional encryption
- Can be obtained with forensic software with login and password (and 2FA)
- Can be extracted from user’s computer (if Chrome is installed and user is signed in)



Saved passwords

Your passwords from Chrome and Android are saved with Google Smart Lock and accessible to you across devices.

Smart Lock for Passwords

Offer to save passwords to your Google Account.

Preferences

Auto Sign-In

Automatically sign in to apps and websites connected to your account. When disabled, you will be asked for confirmation every time before signing in to an app or website.

Saved Passwords

Apps and Sites	Username	Passwords
thinkgaming.com	[redacted]	••••••••
thinkgaming.com	[redacted]	••••••••

iCloud Messages

Messages in iCloud

- iOS 11.4 and newer may sync messages (iMessages, SMS) through iCloud
- Protection similar to iCloud Keychain
  - AES256 encryption, passcode required
- Apple ID, password and 2FA required
  - 2FA **not required** if acquiring from a trusted Mac
- Passcode or system password from an already enrolled device required

Google: SMS

Messages in Android backups

- Android does not sync messages
- Instead, SMS are backed up with device backups
  - Android 8 and newer (Pixel: Android 7.1 and newer)
  - No MMS backup
- Google Account credentials required to extract
  - Android 9: backups are encrypted; passcode required to extract SMS from backups

Location

Your Smartphone Tracks Your Location

- Precise
- Energy-efficient
- Constantly running unless explicitly disabled
- Sometimes running even if explicitly disabled https://www.bbc.com/news/technology-45183041 https://www.macrumors.com/2018/08/13/google-location-history-disabled-still-stores-data/

Location

Who Tracks Your Location?

- Google (iOS, Android, desktop – Chrome, Google services in any browser)
- Apple (iOS, macOS)
- Facebook (on all platforms)
- Countless third-party apps and services
  - Even if location is disabled
  - Yes, it is possible

Location

Why Google, Apple and FB track your Location?

- **To serve you better**
  - Google/Apple Maps, navigation
  - FB: local groups & events
  - Much more relevant search results
  - Find My Phone / Find My Device
  - Convenience: know how busy that restaurant is at this time of day or even **right now**
  - Indoor navigation (with beacons)

Location

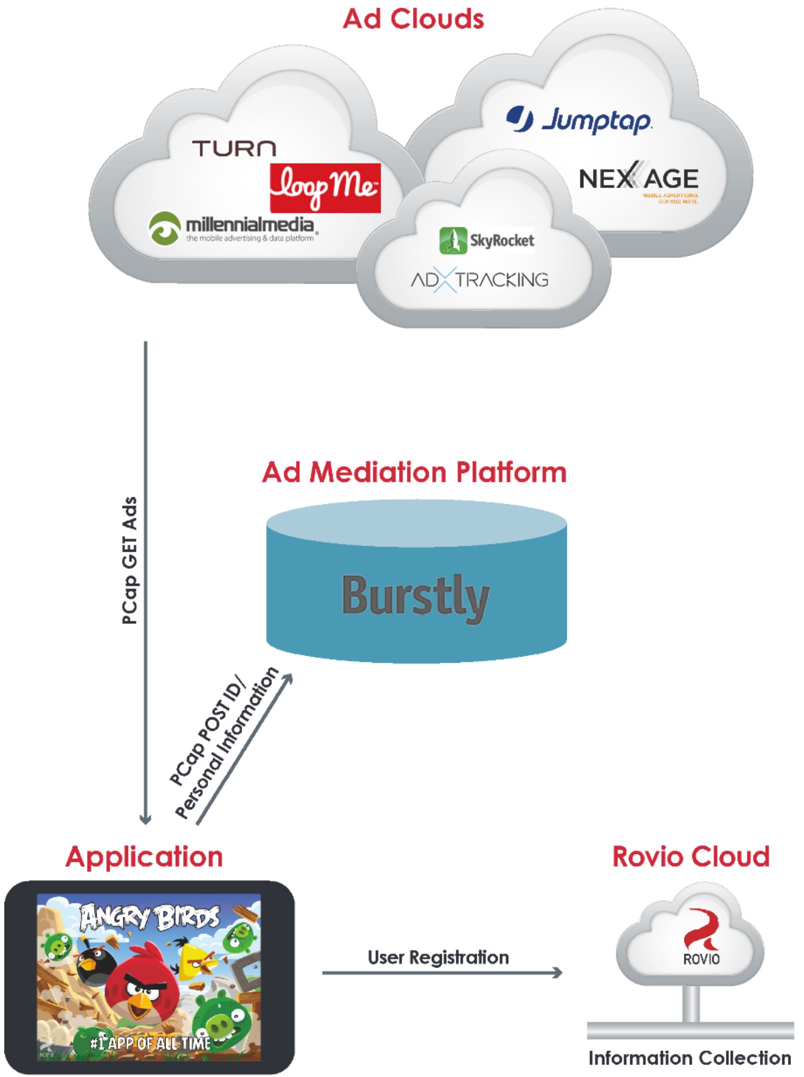
Why Google, Apple and FB track your Location?

- **To sell ads**
  - Google's main source of income
  - Location-based ads
  - Facebook: major advertisement network
- **To sell your data**
  - Apple & Google do not sell location data
  - Facebook does

Location

Third-Party Apps Tracking

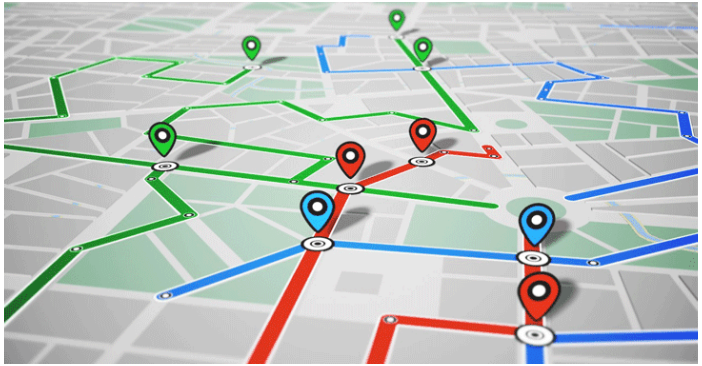
- **Collecting location, contacts, phone usage patterns and much more**
- To serve you better:
  - You really thought that game was free?
- To sell your data:
  - Multiple brokers buy this sort of data
  - Location data collected from everywhere
  - Including Wi-Fi networks and reverse BSSID lookup
  - Even IP address used as source of location data



Location

Where location data is stored?

- Physical devices (iOS, Android, Windows, macOS X, other systems)
- Apple iCloud
- Google account
- Third-party cloud accounts
  - Social networks
  - Health & fitness applications
  - Instant messengers
  - Dating apps
  - Taxi apps
  - PoI/travel apps



Location

How Apple Stores Location Data

- Location data is stored as:
  - Database records
  - PLIST values
  - JSON values
  - Mixed PLIST/JSON structures as database records
  - Log files (plain text)
- Where?
  - System databases (related to services/daemons)
  - Built-in apps data
  - Temporary/cached data
  - iCloud

Location

What Apple Collects

- Collected data depends on the source and storage
- These items are always present:
  - **Latitude**
  - **Longitude**
  - **Timestamp** (mainly in UNIX Epoch format)
  - We've seen location records without timestamps
  - We have seen location names/IDs without lat/lon
- These items may be additionally available:
  - **Altitude**
  - **Accuracy** – how accurate the measurement is (can be represented as a circle with a given radius)
  - **Confidence** – how confident the system is about the stated accuracy
  - **Min/Max latitude and longitude** – yet another representation of accuracy. Can be represented as a rectangular area
  - **Speed**
  - **Course** – represents angle of turns in degrees
  - **End Date** – date when device left location
  - **Address** – street address; can be stored as a string or as multiple items

Location

Routes

- Routes can be tracked on device or in the app
  - Can take speed, course, angle (magnetic compass) values into account
  - Routes stored on device
- Routes can be calculated in forensic software based on individual location records
  - Based on recorded locations
  - Can be calculated based on location records obtained from multiple sources (e.g. Maps, third-party apps, system logs etc.)

Location

iTunes Backups: Sources of Location Data

- *Local (iTunes) backups are a major source of evidence*
- *Backups contain location data (not as much as stored on physical device)*

- Apple Maps
- Calendar
- Media (EXIF)
- Wallet
- Multiple third-party apps data and cache
- Location cache
- Frequent / Significant Locations
- Locations cached during media files analysis
- Apple Pay locations

Location

Media (EXIF)

- Windows, macOS, iOS, Android
- Windows: File Properties > Details > GPS
- macOS: More Info > Latitude and Longitude
- Third-party software can map location data
- Forensic software extracts EXIF tags, parses location data, builds routes

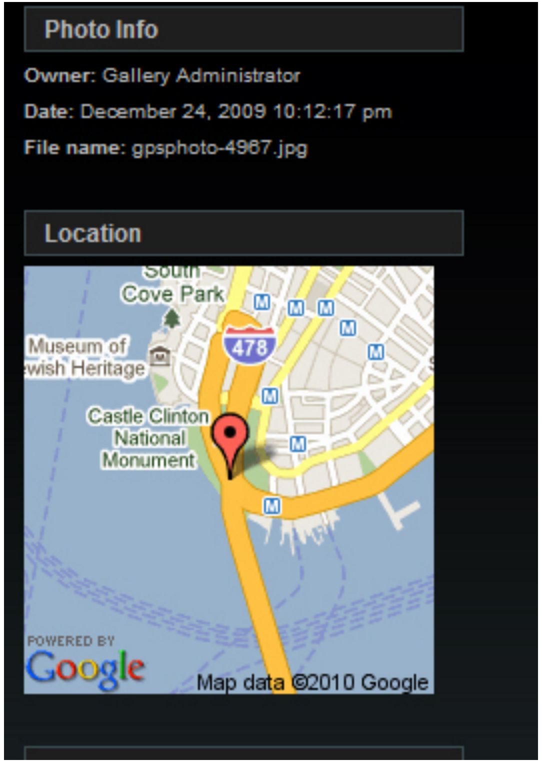


Photo Info

Owner: Gallery Administrator

Date: December 24, 2009 10:12:17 pm

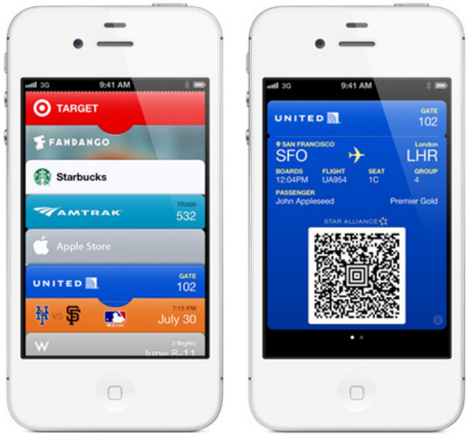
File name: gpsphoto-4967.jpg

Location

Location

Wallet

- Stored in folders:
- /HomeDomain/Library/Passes/Cards
- /HomeDomain/Library/Passes/BadUbiquitousPasses
- In .pkpass subfolders
- Look for pass.json files
- Some contain locations



```
{
  "description": "SOURCE to DESTINATION",
  "formatVersion": 1,
  "organizationName": "The Airlines",
  "relevantDate": "2013-02-20T20:40:00+01:00",
  "boardingPass": {
    "transitType": "PKTransitTypeAir"
  },
  "locations": [
    {
      "latitude": 12.11334800,
      "longitude": 13.56972200,
      "relevantText": "AirportName1"
    },
    {
      "latitude": 80.45861100,
      "longitude": 80.10611100,
      "relevantText": "AirportName2"
    }
  ]
}
```

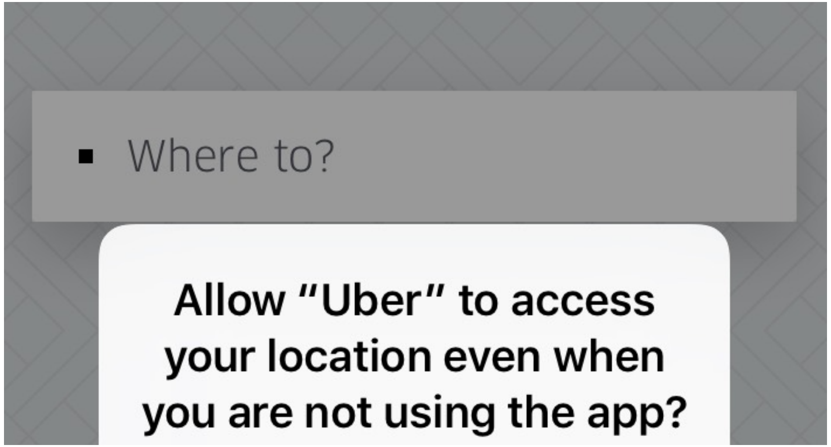
Location

Third-Party Apps

- Multiple third-party apps and games collect location data
  - Even when you are not using the app
- This data may or may not be available in iTunes backups
- Apps may also cache thousands location points

  /private/var/mobile/Containers/Data/Application/<UUID>/Library/Caches/

  <UUID>: unique app identifier on this device



▪ Where to?

Allow “Uber” to access your location even when you are not using the app?

```
{
   "jsonConformingObject":{
      "meta":{
         "location":{
            "course":-1,
            "city":"test",
            "speed":-1,
            "longitude":3.4,
            "gps_time_ms":1506351484216,
            "latitude":1.2,
            "horizontal_accuracy":65,
            "vertical_accuracy":10,
            "altitude":0.1
         }
      }
   }
}
```

Location

Additional Location Data Exclusive to Physical Extraction

- Physical acquisition extracts full image of the file system
- Gains access to many files not in the backup
  - System logs, cache and temporary files
  - Protected app data
  - Apps with backups disabled
- Automatic sync with iCloud (if iCloud sync is enabled in the Settings)
  - Scheduled sync
  - On device reboot
  - On account change

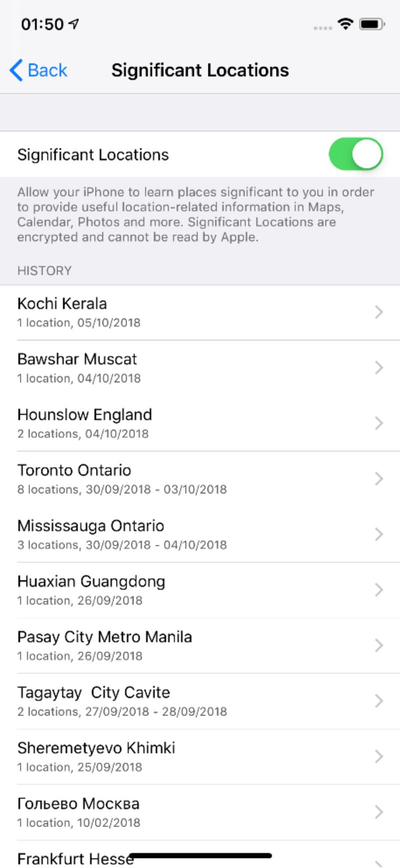
- Locations cache (3G/LTE, Wi-Fi)
- Frequent/Significant Locations
- Media file analysis cache
- Third-party cache
- Apple Pay locations

Location

Location Cache (Physical Extraction Only)

- Databases:
  - /private/var/root/Library/Caches/locationd/cache_encryptedA.db
  - /private/var/root/Library/Caches/locationd/cache_encryptedB.db
  - /private/var/mobile/Library/Caches/com.apple.routined/cache_encryptedA.db
  - /private/var/mobile/Library/Caches/com.apple.routined/cache_encryptedB.db
- Tables:
  - Latitude, Longitude, Altitude, Timestamp, HorizontalAccuracy, VerticalAccuracy, Speed, Course, Confidence
  - MinimumLatitude, MinimumLongitude, MaximumLatitude, MaximumLongitude

Significant locations



Significant Locations

Significant Locations

Allow your iPhone to learn places significant to you in order to provide useful location-related information in Maps, Calendar, Photos and more. Significant Locations are encrypted and cannot be read by Apple.

HISTORY

Kochi Kerala
1 location, 05/10/2018

Bawshar Muscat
1 location, 04/10/2018

Hounslow England
2 locations, 04/10/2018

Toronto Ontario
8 locations, 30/09/2018 - 03/10/2018

Mississauga Ontario
3 locations, 30/09/2018 - 04/10/2018

Huaxian Guangdong
1 location, 26/09/2018

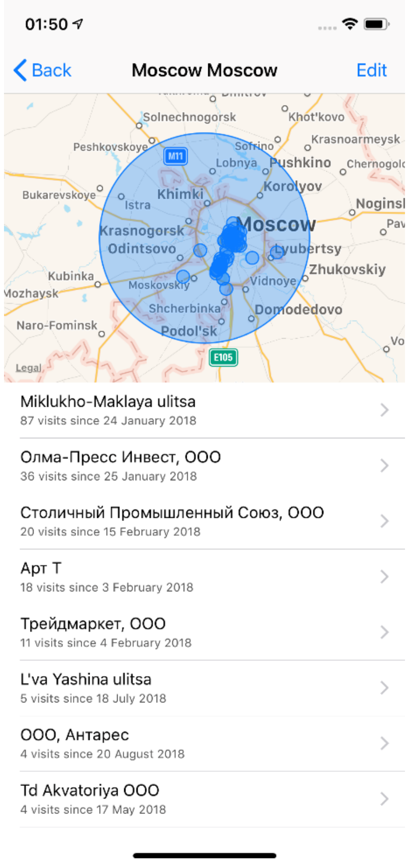
Pasay City Metro Manila
1 location, 26/09/2018

Tagaytay City Cavite
2 locations, 27/09/2018 - 28/09/2018

Sheremetyevo Khimki
1 location, 25/09/2018

Гольево Москва
1 location, 10/02/2018

Frankfurt Hesse



Moscow Moscow

Miklukho-Maklaya ulitsa
87 visits since 24 January 2018

Олма-Пресс Инвест, ООО
36 visits since 25 January 2018

Столичный Промышленный Союз, ООО
20 visits since 15 February 2018

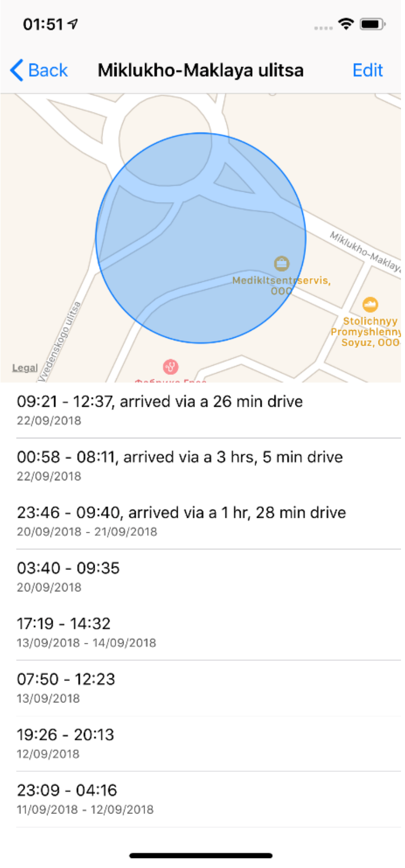
Арт Т
18 visits since 3 February 2018

Трейдмаркет, ООО
11 visits since 4 February 2018

L'va Yashina ulitsa
5 visits since 18 July 2018

ООО, Антарес
4 visits since 20 August 2018

Td Akvatoriya OOO
4 visits since 17 May 2018



Miklukho-Maklaya ulitsa

09:21 - 12:37, arrived via a 26 min drive
22/09/2018

00:58 - 08:11, arrived via a 3 hrs, 5 min drive
22/09/2018

23:46 - 09:40, arrived via a 1 hr, 28 min drive
20/09/2018 - 21/09/2018

03:40 - 09:35
20/09/2018

17:19 - 14:32
13/09/2018 - 14/09/2018

07:50 - 12:23
13/09/2018

19:26 - 20:13
12/09/2018

23:09 - 04:16
11/09/2018 - 12/09/2018

Location

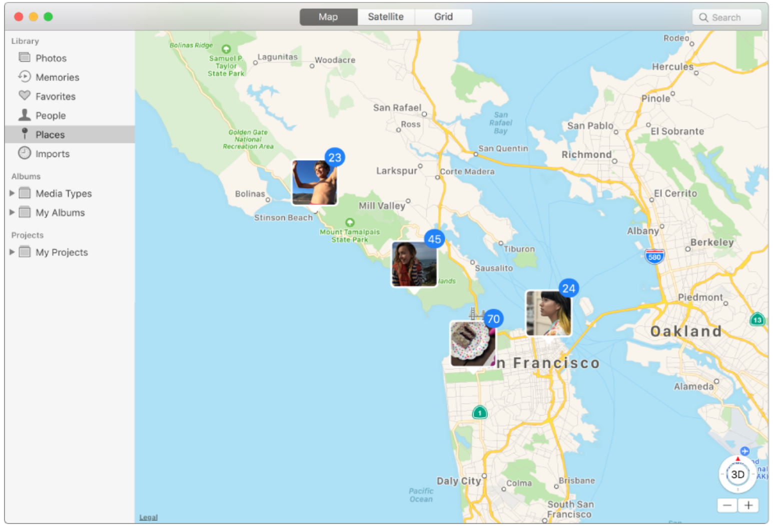
Synced Location Data (iCloud)

- System apps syncing location data via iCloud:
  - Apple Maps
  - Health
  - Calendar
  - Wallet
- Sensitive location data with direct sync:
  - Significant Locations: direct device-to-device sync only. Bypasses iCloud
- Wi-Fi connections
  - Reverse BSSID lookup reveals locations
  - Depending on the source, may not connect timestamps (first connect and last disconnect only)
  - Logs contain timestamps

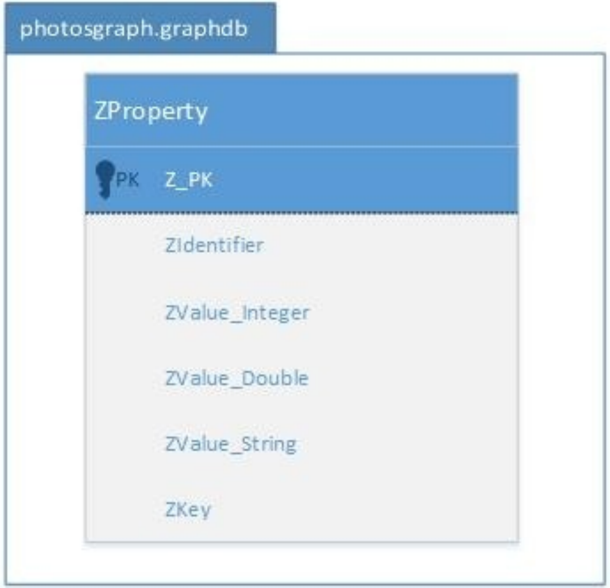
Location

Locations Cached When Analyzing Media Files

- **photoanalysisd** process analyses media files; assigns tags, discovers faces, extracts EXIF etc
- **photosgraph** maps extracted EXIF locations

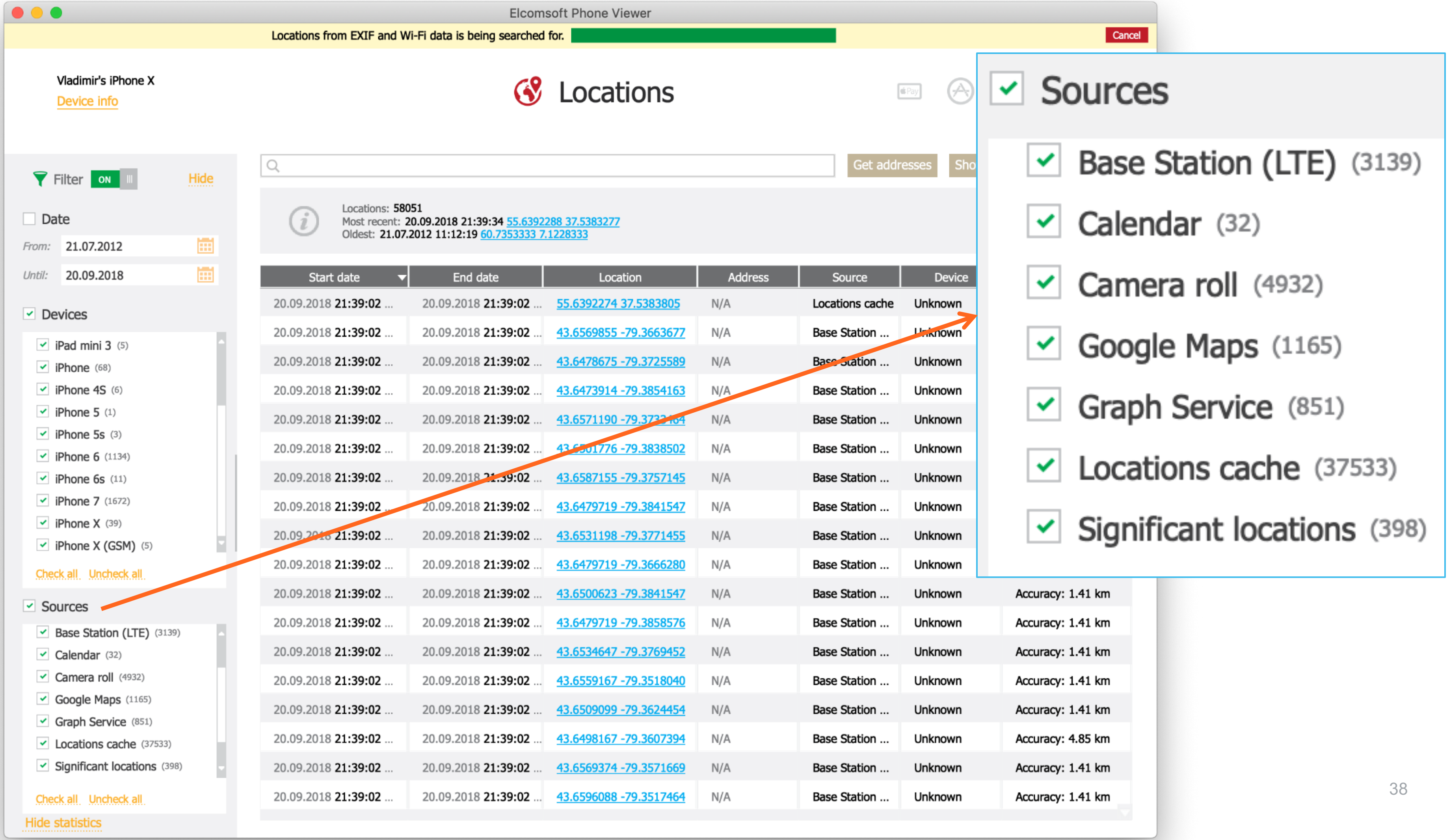


/private/var/mobile/Media/PhotoData/Caches/GraphService/PhotosGraph/photosgraph.graphdb



photosgraph.graphdb

ZProperty
PK Z_PK
ZIdentifier
ZValue_Integer
ZValue_Double
ZValue_String
ZKey



Elcomsoft Phone Viewer

Locations from EXIF and Wi-Fi data is being searched for. Cancel

Vladimir's iPhone X
Device info

Locations

Filter ON Hide

□ Date
From: 21.07.2012
Until: 20.09.2018

☑ Devices

- ☑ iPad mini 3 (5)
- ☑ iPhone (68)
- ☑ iPhone 4S (6)
- ☑ iPhone 5 (1)
- ☑ iPhone 5s (3)
- ☑ iPhone 6 (1134)
- ☑ iPhone 6s (11)
- ☑ iPhone 7 (1672)
- ☑ iPhone X (39)
- ☑ iPhone X (GSM) (5)

Check all Uncheck all

☑ Sources

- ☑ Base Station (LTE) (3139)
- ☑ Calendar (32)
- ☑ Camera roll (4932)
- ☑ Google Maps (1165)
- ☑ Graph Service (851)
- ☑ Locations cache (37533)
- ☑ Significant locations (398)

Check all Uncheck all

Hide statistics

Get addresses Sho

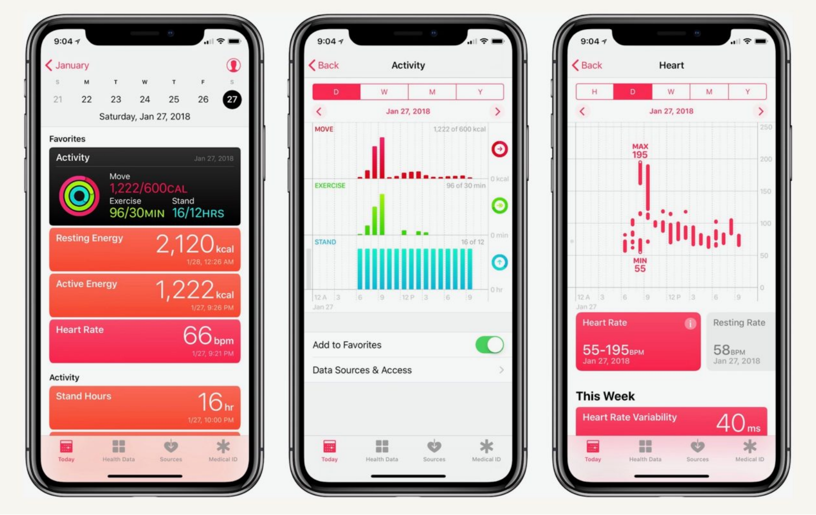
Locations: 58051
Most recent: 20.09.2018 21:39:34 55.6392288 37.5383277
Oldest: 21.07.2012 11:12:19 60.7353333 7.1228333

Start date	End date	Location	Address	Source	Device	
20.09.2018 21:39:02 ...	20.09.2018 21:39:02 ...	55.6392274 37.5383805	N/A	Locations cache	Unknown	
20.09.2018 21:39:02 ...	20.09.2018 21:39:02 ...	43.6569855 -79.3663677	N/A	Base Station ...	Unknown	
20.09.2018 21:39:02 ...	20.09.2018 21:39:02 ...	43.6478675 -79.3725589	N/A	Base Station ...	Unknown	
20.09.2018 21:39:02 ...	20.09.2018 21:39:02 ...	43.6473914 -79.3854163	N/A	Base Station ...	Unknown	
20.09.2018 21:39:02 ...	20.09.2018 21:39:02 ...	43.6571190 -79.3733464	N/A	Base Station ...	Unknown	
20.09.2018 21:39:02 ...	20.09.2018 21:39:02 ...	43.6501776 -79.3838502	N/A	Base Station ...	Unknown	
20.09.2018 21:39:02 ...	20.09.2018 21:39:02 ...	43.6587155 -79.3757145	N/A	Base Station ...	Unknown	
20.09.2018 21:39:02 ...	20.09.2018 21:39:02 ...	43.6479719 -79.3841547	N/A	Base Station ...	Unknown	
20.09.2018 21:39:02 ...	20.09.2018 21:39:02 ...	43.6531198 -79.3771455	N/A	Base Station ...	Unknown	
20.09.2018 21:39:02 ...	20.09.2018 21:39:02 ...	43.6479719 -79.3666280	N/A	Base Station ...	Unknown	
20.09.2018 21:39:02 ...	20.09.2018 21:39:02 ...	43.6500623 -79.3841547	N/A	Base Station ...	Unknown	Accuracy: 1.41 km
20.09.2018 21:39:02 ...	20.09.2018 21:39:02 ...	43.6479719 -79.3858576	N/A	Base Station ...	Unknown	Accuracy: 1.41 km
20.09.2018 21:39:02 ...	20.09.2018 21:39:02 ...	43.6534647 -79.3769452	N/A	Base Station ...	Unknown	Accuracy: 1.41 km
20.09.2018 21:39:02 ...	20.09.2018 21:39:02 ...	43.6559167 -79.3518040	N/A	Base Station ...	Unknown	Accuracy: 1.41 km
20.09.2018 21:39:02 ...	20.09.2018 21:39:02 ...	43.6509099 -79.3624454	N/A	Base Station ...	Unknown	Accuracy: 1.41 km
20.09.2018 21:39:02 ...	20.09.2018 21:39:02 ...	43.6498167 -79.3607394	N/A	Base Station ...	Unknown	Accuracy: 4.85 km
20.09.2018 21:39:02 ...	20.09.2018 21:39:02 ...	43.6569374 -79.3571669	N/A	Base Station ...	Unknown	Accuracy: 1.41 km
20.09.2018 21:39:02 ...	20.09.2018 21:39:02 ...	43.6596088 -79.3517464	N/A	Base Station ...	Unknown	Accuracy: 1.41 km

☑ Sources

- ☑ Base Station (LTE) (3139)
- ☑ Calendar (32)
- ☑ Camera roll (4932)
- ☑ Google Maps (1165)
- ☑ Graph Service (851)
- ☑ Locations cache (37533)
- ☑ Significant locations (398)

Apple Health



- **Activity** – how much you move
- **Nutrition** – breakdown of your diet
- **Sleep** –your sleep habits
- **Mindfulness**

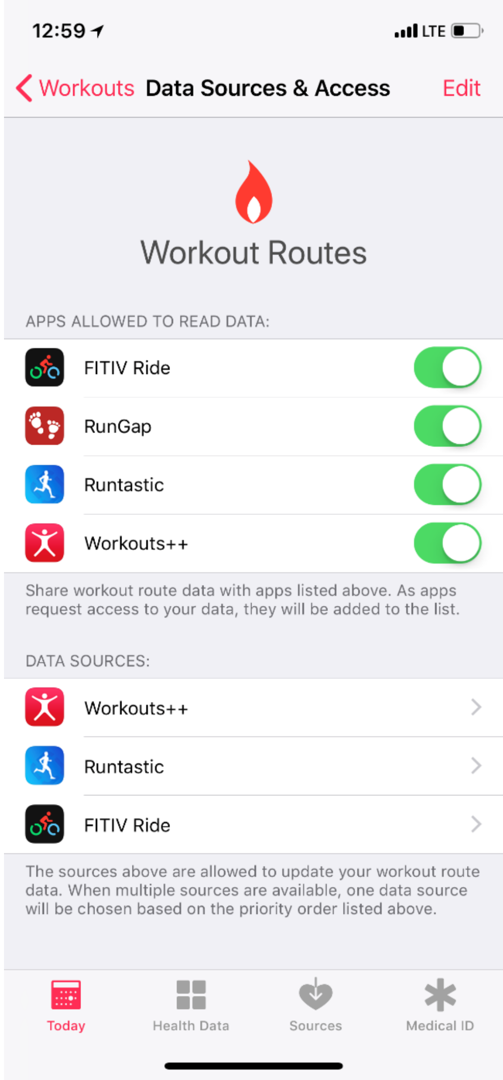
Additional data categories

- **Body Measurements** – height and weight
- **Health Records** - CDA + Health Records
- **Heart** – blood pressure, heart rate
- **Reproductive Health** – sexual activity and menstruation cycles
- **Results** – various medical test results (e.g. sugar level)
- **Vitals** – blood pressure, body temperature, heart rate, breathing rate
- **Medical ID** – essential medical data

Apple Health

Where Apple Health Gets Data From

- Data received from HealthKit devices (iPhone, Apple Watch, compatible fitness trackers etc.)
    - Automatic data submission
    - Pulse, blood pressure
    - Data for Mindfulness, Heart and Activity
    - Apple Watch collects Sleep data; **no automatic mode** (third-party apps can be used)
- Third-party apps (Nike+, Strava, Workouts++)
    - All data categories supported
    - Each data category has a list of “Recommended” third-party apps for collecting that type of data
    - Third-party apps must be activated in categories tracked in Health > Sources



Workout Routes

APPS ALLOWED TO READ DATA:

- FITIV Ride ●
- RunGap ●
- Runtastic ●
- Workouts++ ●

Share workout route data with apps listed above. As apps request access to your data, they will be added to the list.

DATA SOURCES:

- Workouts++
- Runtastic
- FITIV Ride

The sources above are allowed to update your workout route data. When multiple sources are available, one data source will be chosen based on the priority order listed above.

Apple Health

Accessing Apple Health Data

- Export from Health app (XML)
- Local backup (encrypted only)
- File system acquisition (requires jailbreaking)
- GDPR request
- Government/LE request
- Cloud extraction

Apple Health

Extracting Apple Health Data: The Easy Way

- Apple Health is available via logical acquisition
- **No Apple Health data in unencrypted backups!**
  - Unlike keychain, which is still present in unencrypted backups, protected with a hardware key
- Set a known password before making a backup
- Make local backup with iTunes
- Decrypt backup, access Apple Health data
- View with forensic software (or analyse databases manually)

Apple Health

Extracting Apple Health Data: The Complex Way

- Apple Health is available via file system acquisition
- **Jailbreak required**
    - At this time, jailbreak is available for all versions of iOS from 8 to 12.1.2
- Jailbreak, use ssh (or forensic software)
- Obtain TAR image
- View with forensic software (or analyse databases manually)
- *Needed only if the backup if password-protected*

Apple Health

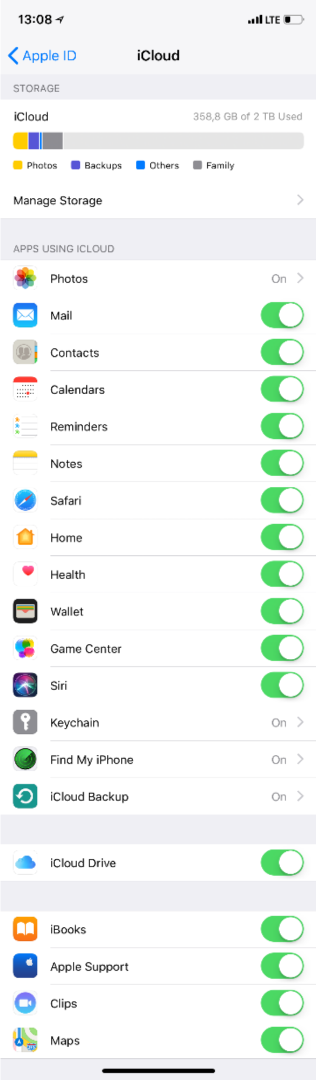
Extracting Apple Health Data: GDPR

- EU users can access their Health data by pulling a GDPR request
- Registering GDPR request: **privacy.apple.com**
- **Apple ID, password, 2FA required**
- Takes up to 7 days to receive the data
- Multiple binary and text formats

Apple Health

Apple Health and Cloud

- Native Apple Health data is synced with iCloud to all registered devices
- Third-party apps operate through HealthKit
- Some third-party app data is not shared with Apple Health
- Certain apps use proprietary cloud sync (Strava, Endomondo)
- **Medical ID** data is unique per device and **does not sync**
- **CDA records** do not sync (to the best of our knowledge)



13:08 LTE

Apple ID iCloud

STORAGE

iCloud 358,8 GB of 2 TB Used

Photos Backups Others Family

Manage Storage

APPS USING ICLOUD

Photos On
Mail ☑
Contacts ☑
Calendars ☑
Reminders ☑
Notes ☑
Safari ☑
Home ☑
Health ☑
Wallet ☑
Game Center ☑
Siri ☑
Keychain On
Find My iPhone On
iCloud Backup On

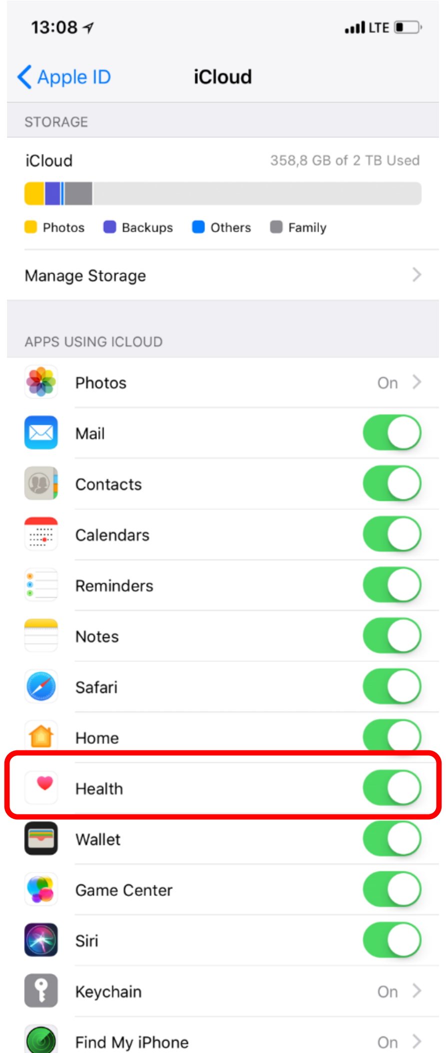
iCloud Drive ☑

iBooks ☑
Apple Support ☑
Clips ☑
Maps ☑

Apple Health

Apple Health and iCloud

- Apple Health data **can** be obtained from iCloud
- May contain significantly more information compared to what is available on device
- Technically, Apple Health belongs to “synced data” as opposed to “cloud backups”
  - This results in significantly more reliable extraction
  - Loose expiration rules of iCloud tokens compared to backups



13:08 LTE

< Apple ID iCloud

STORAGE

iCloud 358,8 GB of 2 TB Used

🟨 Photos 🟪 Backups 🟦 Others ⬜ Family

Manage Storage >

APPS USING ICLOUD

Photos On >

Mail ☑

Contacts ☑

Calendars ☑

Reminders ☑

Notes ☑

Safari ☑

Home ☑

Health ☑

Wallet ☑

Game Center ☑

Siri ☑

Keychain On >

Find My iPhone On >

Apple Health

Accessing Health Data in iCloud

We can download **synced data**, which includes Apple Health

What can go wrong:

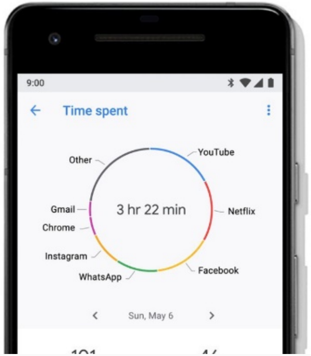
- Two-factor authentication may be an issue
- Access to secondary authentication factor is required (unless using authentication token)
- Starting with iOS 12, Health data might be additionally encrypted (just like Messages)

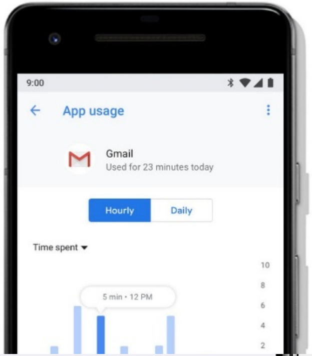
Sign in to iCloud
Apple ID
Password
Keep me signed in
Forgot Apple ID or password?
Don't have an Apple ID? Create yours now.

Usage Data: Apple

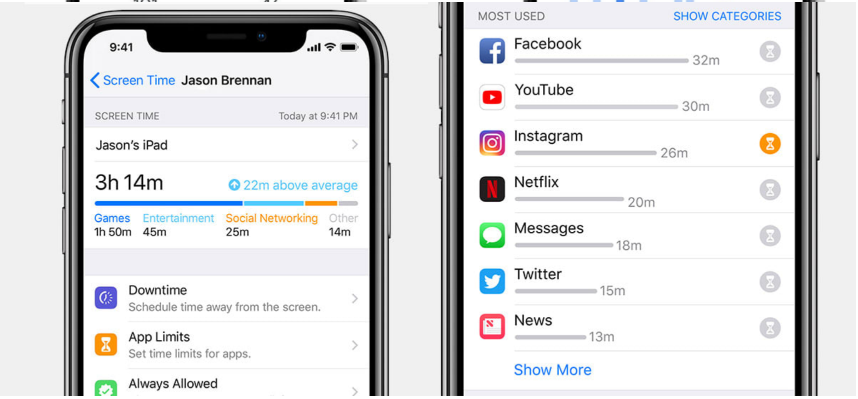
Your Smartphone Knows More About Your Life

- Both Apple and Google introduced user-accessible usage stats
- Details application usage and categories
- Time spent in Games, Entertainment, Social Networking and other activities
- Daily, hourly and weekly statistics





Gmail
Used for 23 minutes today



Jason Brennan

SCREEN TIME Today at 9:41 PM

Jason's iPad

3h 14m ⬆ 22m above average

Games	Entertainment	Social Networking	Other
1h 50m	45m	25m	14m

Downtime
Schedule time away from the screen.

App Limits
Set time limits for apps.

Always Allowed

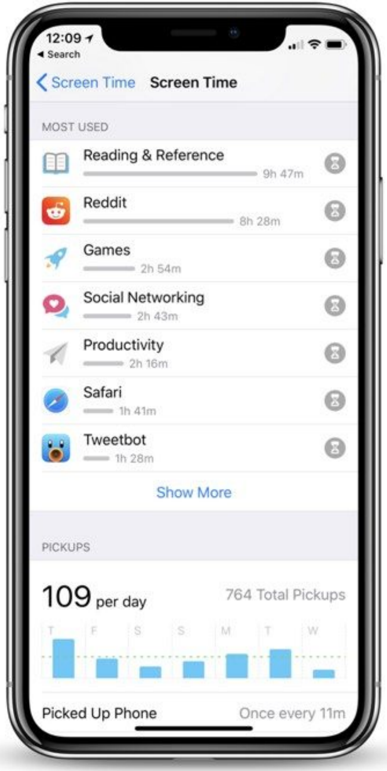
MOST USED

Facebook	32m
YouTube	30m
Instagram	26m
Netflix	20m
Messages	18m
Twitter	15m
News	13m

Usage Data: Apple

iOS 12 Screen Time: Statistics

- Daily and weekly reports
- Per category statistics and enforceable time limits
- Per app tracking
- Track how many times you picked up your phone



12:09
◂ Search

‹ Screen Time Screen Time

MOST USED

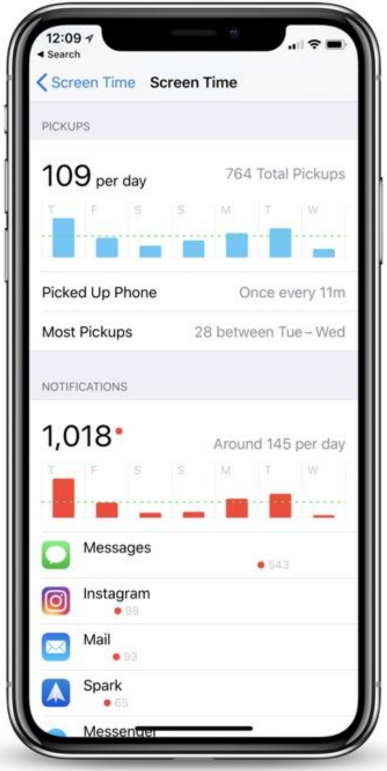
Reading & Reference	9h 47m
Reddit	8h 28m
Games	2h 54m
Social Networking	2h 43m
Productivity	2h 16m
Safari	1h 41m
Tweetbot	1h 28m

Show More

PICKUPS

109 per day 764 Total Pickups

Picked Up Phone Once every 11m



12:09
◂ Search

‹ Screen Time Screen Time

PICKUPS

109 per day 764 Total Pickups

Picked Up Phone	Once every 11m
Most Pickups	28 between Tue – Wed

NOTIFICATIONS

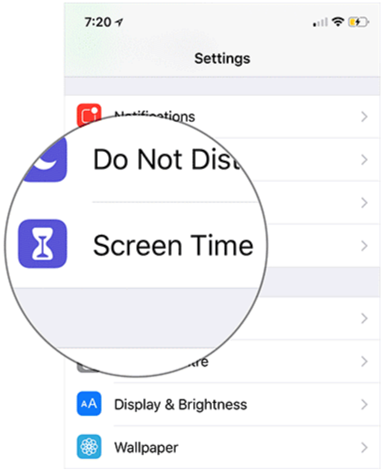
1,018 Around 145 per day

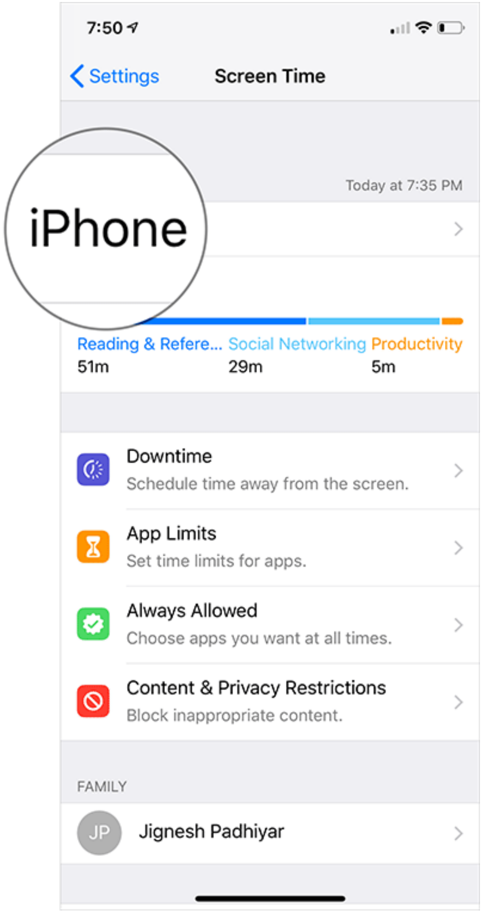
Messages	543
Instagram	98
Mail	93
Spark	65
Messenger	

Usage Data: Apple

iOS 12 Screen Time: Restrictions

- Track or restrict time spent on Gaming, Entertainment, Social Networking, Reading & Reference and other activities
- Track and restrict individual applications
- Set downtime and app limits
- Content and privacy restrictions
- Screen Time Passcode

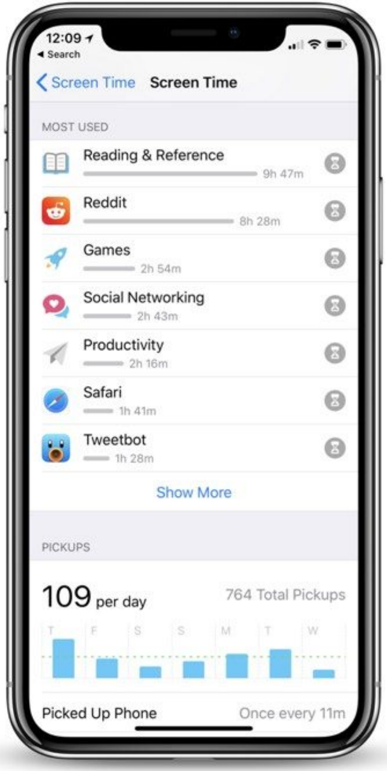




Usage Data: Apple

iOS 12 Screen Time: Statistics

- Daily and weekly reports
- Per category statistics and enforceable time limits
- Per app tracking
- Track how many times you picked up your phone



12:09
◂ Search

< Screen Time Screen Time

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Show More

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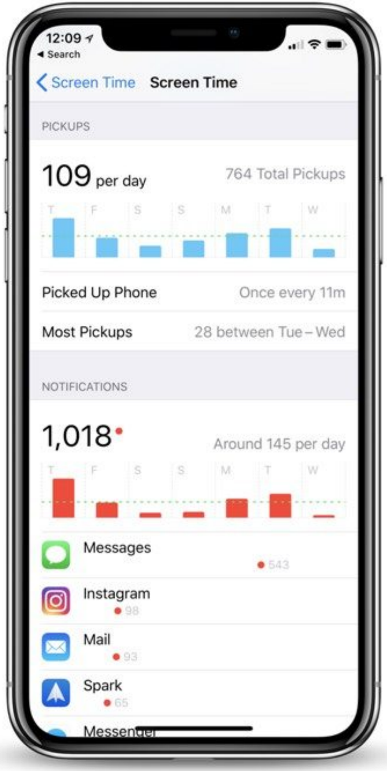

12:09
◂ Search

< Screen Time Screen Time

PICKUPS

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Picked Up Phone Once every 11m

Most Pickups 28 between Tue – Wed

NOTIFICATIONS

1,018 Around 145 per day

Messages	543
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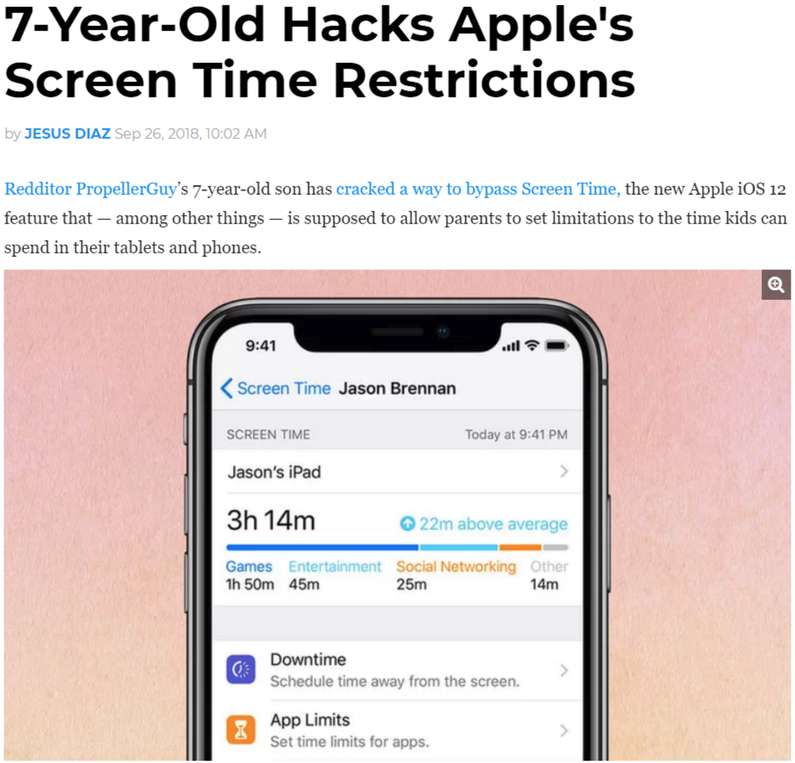
Spark	65
Messenger	

Usage Data: Apple

iOS 12 Screen Time: iCloud Sync

- See how you use apps across multiple devices
- Downtime and App Limits sync through iCloud
- Restrictions and limits automatically applied to all devices
- Usage data syncs to all devices on the same Apple ID
  - So that you can’t cheat the system
  - Unless you’re 7 years old



7-Year-Old Hacks Apple's Screen Time Restrictions

by **JESUS DIAZ** Sep 26, 2018, 10:02 AM

Redditor PropellerGuy’s 7-year-old son has cracked a way to bypass Screen Time, the new Apple iOS 12 feature that — among other things — is supposed to allow parents to set limitations to the time kids can spend in their tablets and phones.

9:41

< Screen Time Jason Brennan

SCREEN TIME Today at 9:41 PM

Jason’s iPad

3h 14m 22m above average

Games	Entertainment	Social Networking	Other
1h 50m	45m	25m	14m

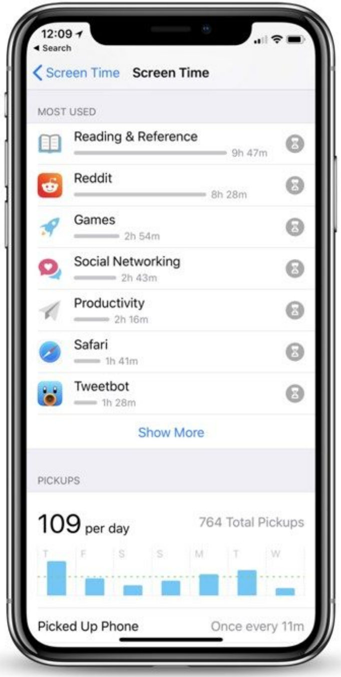
Downtime
Schedule time away from the screen.

App Limits
Set time limits for apps.

Usage Data: Apple

iOS 12 Screen Time: Conclusion

- **Apple knows how you use your devices in great detail**
- **They store it on their servers:**
- Statistics and reporting
  - With iCloud sync
- Loosely enforceable restrictions
  - With iCloud sync



12:09

Search

Screen Time | Screen Time

MOST USED

Reading & Reference	9h 47m
Reddit	8h 28m
Games	2h 54m
Social Networking	2h 43m
Productivity	2h 16m
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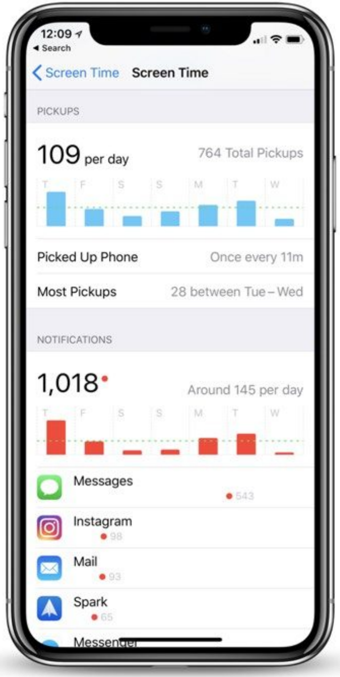
Show More

PICKUPS

109 per day — 764 Total Pickups

Picked Up Phone — Once every 11m



12:09

Search

Screen Time | Screen Time

PICKUPS

109 per day — 764 Total Pickups

Picked Up Phone — Once every 11m

Most Pickups — 28 between Tue – Wed

NOTIFICATIONS

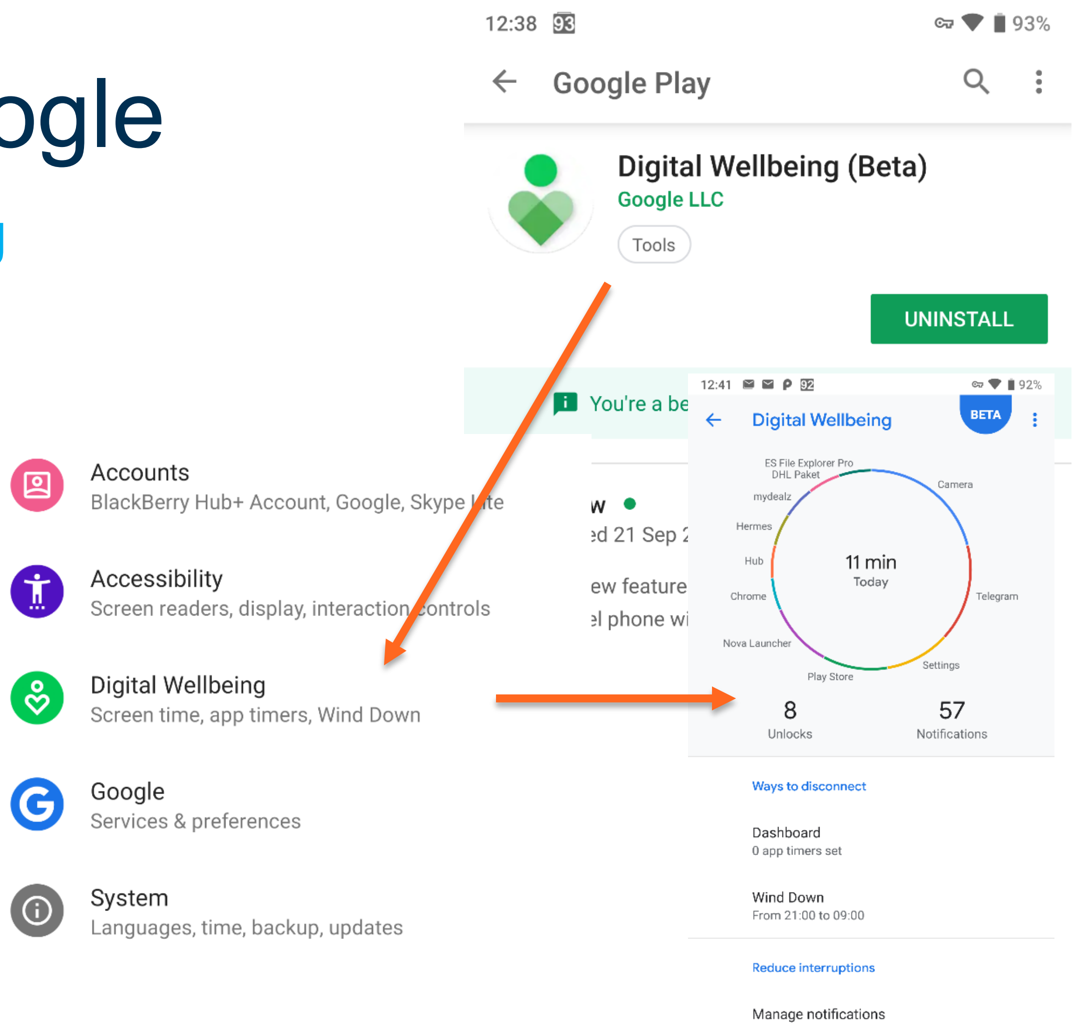
1,018 — Around 145 per day

Messages	543
Instagram	98
Mail	93
Spark	65
Messenger	

Usage Data: Google

Google: Digital Wellbeing

- Available in Android Pie
- Currently in beta, only on Pixels
- Must be downloaded from Google Play
- Accessible via Settings
- Daily overview
  - Unlocks
  - Notifications
  - Pie chart: app usage time



Accounts
BlackBerry Hub+ Account, Google, Skype Lite

Accessibility
Screen readers, display, interaction controls

Digital Wellbeing
Screen time, app timers, Wind Down

Google
Services & preferences

System
Languages, time, backup, updates

12:38 93 93%

Google Play

Digital Wellbeing (Beta)
Google LLC
Tools

UNINSTALL

You're a be

w ●
ed 21 Sep 2
ew feature
el phone wi

12:41 92 92%

Digital Wellbeing BETA

8 Unlocks

57 Notifications

Ways to disconnect

Dashboard
0 app timers set

Wind Down
From 21:00 to 09:00

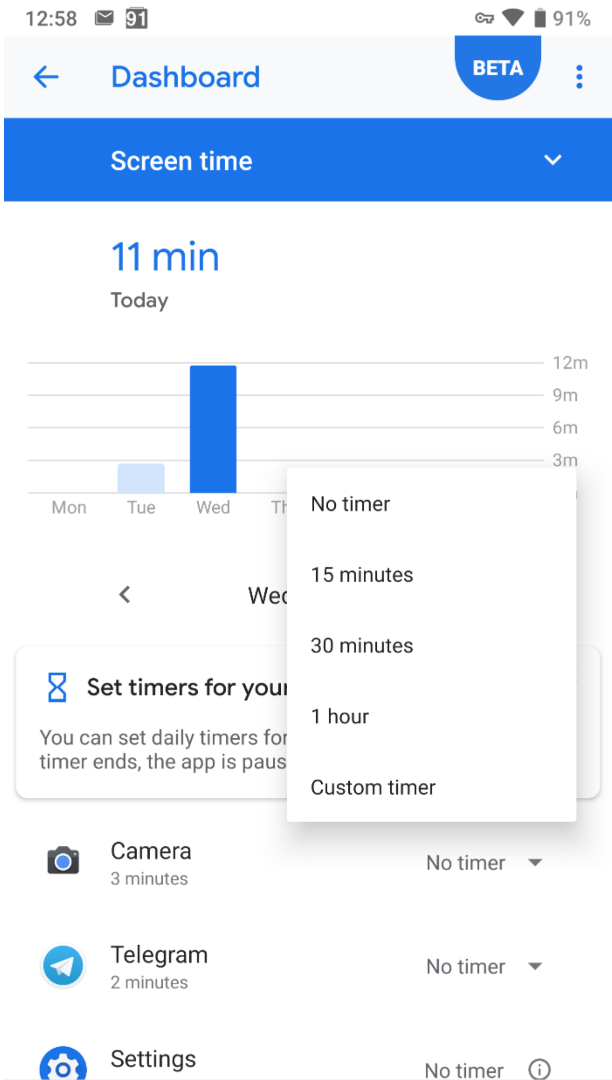
Reduce interruptions

Manage notifications

Usage Data: Google

Digital Wellbeing: What's Reported

- **Per app screen time**
  - How much time you spent in each app
- Daily reports
- Custom timers
  - Per app only
  - No categories!
  - Enforced on this device only
  - No cloud sync!



Set timers for your

You can set daily timers for
timer ends, the app is paus

Camera
3 minutes
No timer

Telegram
2 minutes
No timer

Settings
No timer

Usage Data: Apple vs. Google

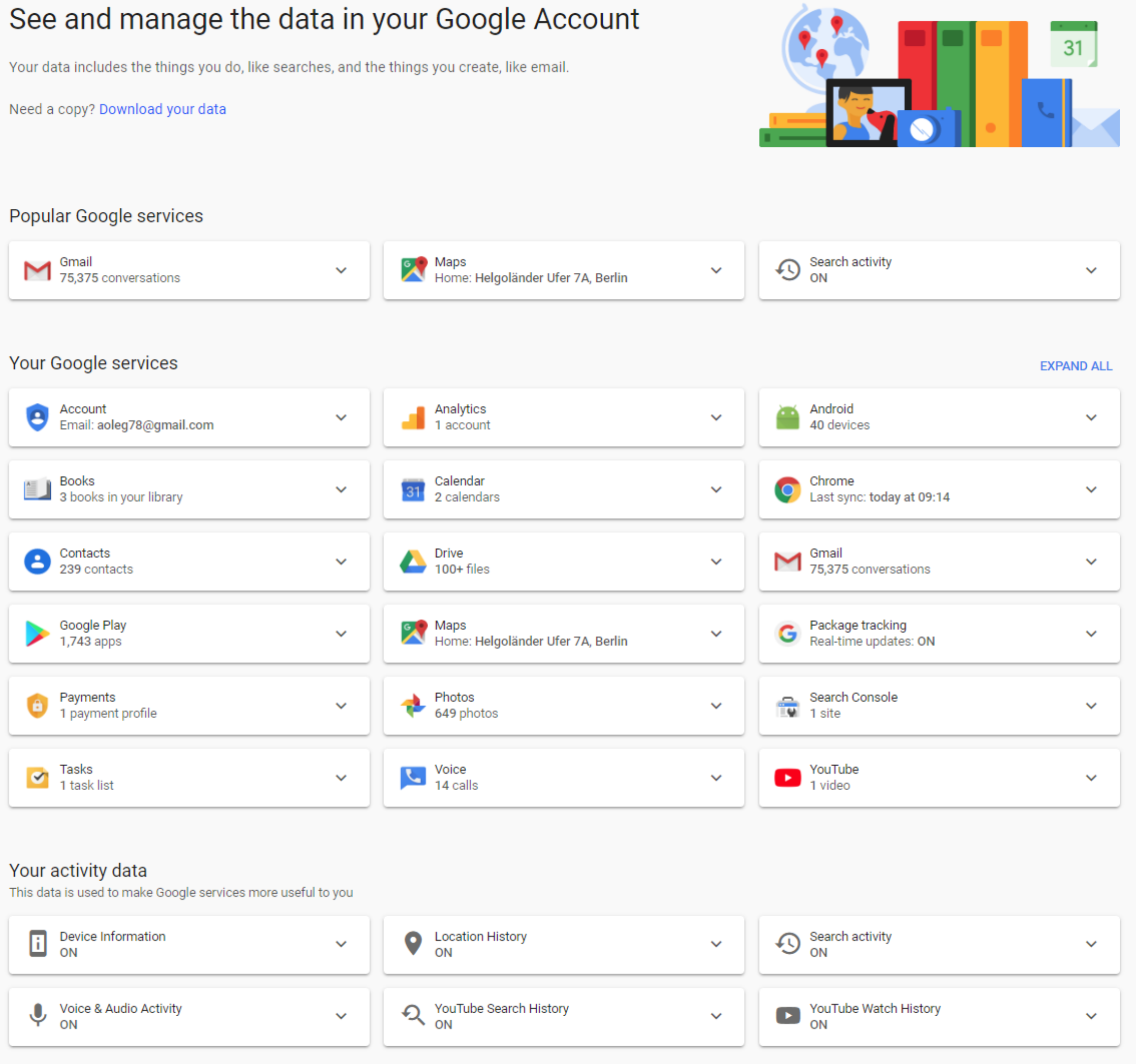
Apple Screen Time vs. Google Digital Wellbeing

- **Apple Screen Time**
  - Per app and per category statistics
  - Daily and weekly reports
  - iCloud sync to all user’s devices
    - Both usage and restrictions
  - Downtime
  - Notification stats
  - Restrictions passcode

- **Google Digital Wellbeing**
  - Per app statistics only
  - Daily reports
  - No sync with Google Account
    - Nothing gets synced
  - No restrictions passcode
  - Statistics on number of notifications

Google Dashboard

- Apple syncs Screen Time
- Google does not sync Digital Wellbeing
    - Android 9 runs in less than 0.1% of devices anyway
- Does Google know less about its users?
- *No!*
- **Google Dashboard** has significantly more information than Screen Time and Digital Wellbeing combined



See and manage the data in your Google Account

Your data includes the things you do, like searches, and the things you create, like email.

Need a copy? Download your data

Popular Google services

Gmail
75,375 conversations

Maps
Home: Helgoländer Ufer 7A, Berlin

Search activity
ON

Your Google services

EXPAND ALL

Account
Email: aoleg78@gmail.com

Analytics
1 account

Android
40 devices

Books
3 books in your library

Calendar
2 calendars

Chrome
Last sync: today at 09:14

Contacts
239 contacts

Drive
100+ files

Gmail
75,375 conversations

Google Play
1,743 apps

Maps
Home: Helgoländer Ufer 7A, Berlin

Package tracking
Real-time updates: ON

Payments
1 payment profile

Photos
649 photos

Search Console
1 site

Tasks
1 task list

Voice
14 calls

YouTube
1 video

Your activity data

This data is used to make Google services more useful to you

Device Information
ON

Location History
ON

Search activity
ON

Voice & Audio Activity
ON

YouTube Search History
ON

YouTube Watch History
ON

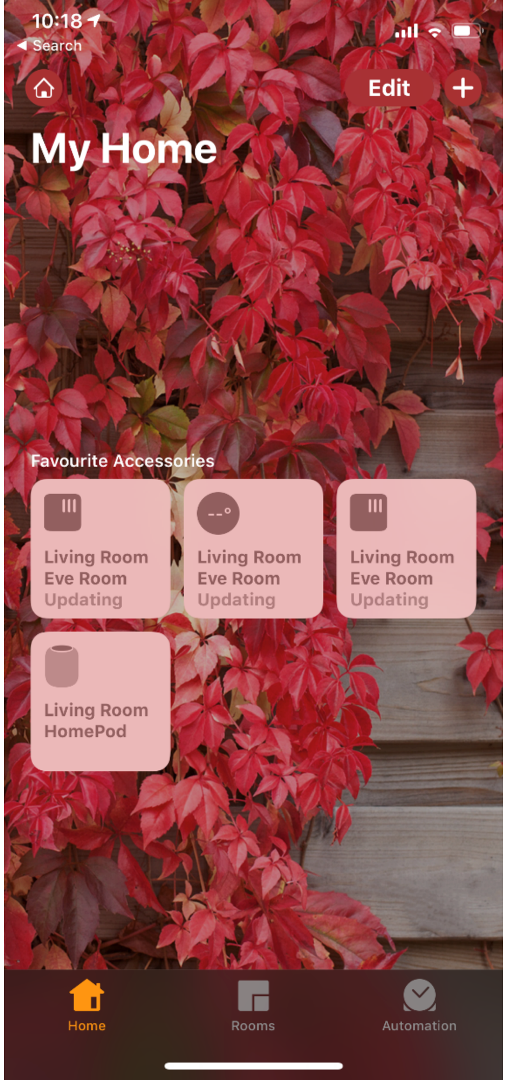
The Future Is…

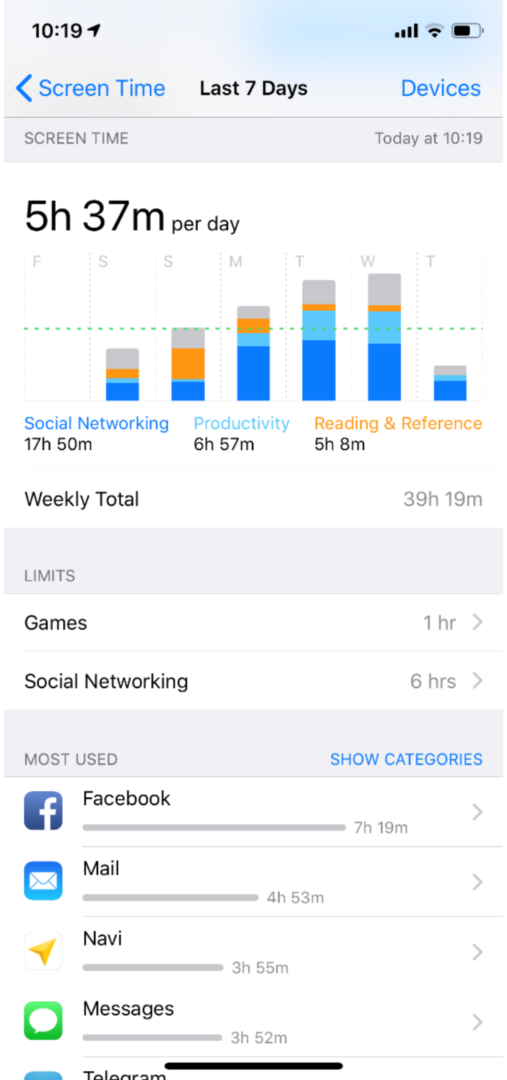
iCloud: what’s next?

More synced data in iCloud

- Home data (HomePod, various sensors, lights, thermostats etc)
- Screen Time (app usage; previously available via full file system acquisition only)
- Voice memos
- Weather & Stocks

Remember Celebgate? ;)





< Screen Time | Last 7 Days | Devices

SCREEN TIME — Today at 10:19

5h 37m per day

Social Networking 17h 50m
Productivity 6h 57m
Reading & Reference 5h 8m

Weekly Total 39h 19m

LIMITS

Games 1 hr >

Social Networking 6 hrs >

MOST USED — SHOW CATEGORIES

Facebook 7h 19m >

Mail 4h 53m >

Navi 3h 55m >

Messages 3h 52m >

Telegram

Smartphone Privacy

Google Android

- Android collects significantly more data than iOS
- Google collects significantly more information than Apple
- These statements are not equivalent
  - Android ecosystem is seemingly built for tracking
  - Every other app in Google Play store tracks your location
  - Even with Location disabled
  - Even without Location permission
- All Android apps have Internet access
  - No special permission is needed
  - IP address determines approximate location
  - Allows scanning nearby Wi-Fi networks

Smartphone Privacy

Google Android

- All Android apps can access BSSID of currently connected Wi-Fi, and
- All Android apps can scan nearby Wi-Fi access points
  - Single BSSID reverse lookup determines current location within 20m radius
  - Triangulating multiple BSSID’s reveals precise location
  - Multiple free and commercial Wi-Fi Geo-Location databases exist
  - openwlanmap.org

Smartphone Privacy

Google: Sources of Location Data

- Location History: Takeout, cloud extraction, online interface
  - Extremely comprehensive
  - **Stored in the cloud (Google Account)**
  - Cloud contains more information than device

Smartphone Privacy

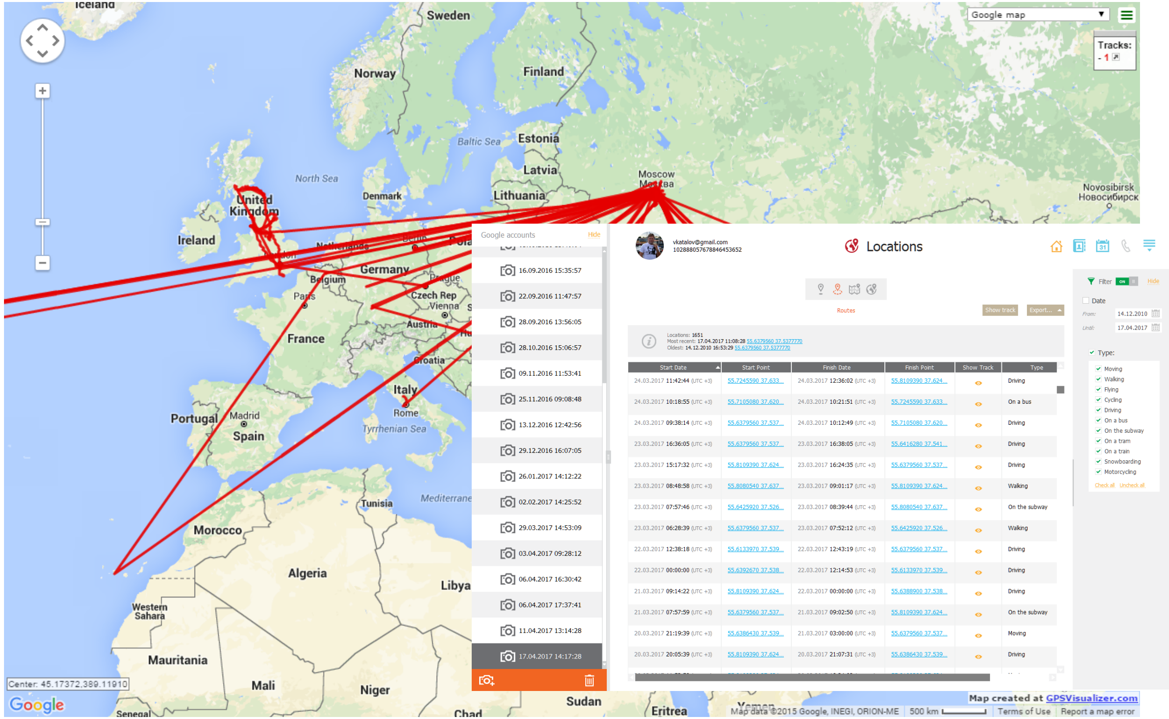
Google: Sources of Location Data

- Google Maps and My Places
- Photos: local (extract from device), Takeout (Google Photos)
- System logs: local (root required)
- App data: local (root required), cloud backups (limited)
- Google Fit data (can be exported via Takeout)
- WearOS and third-party wearables
- Samsung Health, Xiaomi/Huawei, FitBit/Garmin maintain their own cloud services

Smartphone Privacy

Google Location History

- Multiple data points
- Many years worth of data (you will be surprised)
- Collected from all devices on the same Google Account
- Android, iOS, Windows, Mac
- Google services in all Web browsers (if signed in)
- Location + date & time)



16.09.2016 15:35:57
22.09.2016 11:47:57
28.09.2016 13:56:05
28.10.2016 15:06:57
09.11.2016 11:53:41
25.11.2016 09:08:48
13.12.2016 12:42:56
29.12.2016 16:07:05
26.01.2017 14:12:22
02.02.2017 14:25:52
29.03.2017 14:53:09
03.04.2017 09:28:12
06.04.2017 16:30:42
06.04.2017 17:37:41
11.04.2017 13:14:28
17.04.2017 14:17:28

vkatalov@gmail.com
102888057678846453652

Locations

Locations: 1651
Most recent: 17.04.2017 11:08:28 55.6379560 37.5377770
Oldest: 14.12.2010 16:53:29 55.6379560 37.5377770

Start Date	Start Point	Finish Date	Finish Point	Show Track	Type
24.03.2017 11:42:44 (UTC +3)	55.7245590 37.633...	24.03.2017 12:36:02 (UTC +3)	55.8109390 37.624...	👁	Driving
24.03.2017 10:18:55 (UTC +3)	55.7105080 37.620...	24.03.2017 10:21:51 (UTC +3)	55.7245590 37.633...	👁	On a bus
24.03.2017 09:38:14 (UTC +3)	55.6379560 37.537...	24.03.2017 10:12:49 (UTC +3)	55.7105080 37.620...	👁	Driving
23.03.2017 16:36:05 (UTC +3)	55.6379560 37.537...	23.03.2017 16:38:05 (UTC +3)	55.6416280 37.541...	👁	Driving
23.03.2017 15:17:32 (UTC +3)	55.8109390 37.624...	23.03.2017 16:24:35 (UTC +3)	55.6379560 37.537...	👁	Driving
23.03.2017 08:48:58 (UTC +3)	55.8080540 37.637...	23.03.2017 09:01:17 (UTC +3)	55.8109390 37.624...	👁	Walking
23.03.2017 07:57:46 (UTC +3)	55.6425920 37.526...	23.03.2017 08:39:44 (UTC +3)	55.8080540 37.637...	👁	On the subway
23.03.2017 06:28:39 (UTC +3)	55.6379560 37.537...	23.03.2017 07:52:12 (UTC +3)	55.6425920 37.526...	👁	Walking
22.03.2017 12:38:18 (UTC +3)	55.6133970 37.539...	22.03.2017 12:43:19 (UTC +3)	55.6379560 37.537...	👁	Driving
22.03.2017 00:00:00 (UTC +3)	55.6392670 37.538...	22.03.2017 12:14:53 (UTC +3)	55.6133970 37.539...	👁	Driving
21.03.2017 09:14:22 (UTC +3)	55.8109390 37.624...	22.03.2017 00:00:00 (UTC +3)	55.6388900 37.538...	👁	Driving
21.03.2017 07:57:59 (UTC +3)	55.6379560 37.537...	21.03.2017 09:02:50 (UTC +3)	55.8109390 37.624...	👁	On the subway
20.03.2017 21:19:39 (UTC +3)	55.6386430 37.539...	21.03.2017 03:00:00 (UTC +3)	55.6379560 37.537...	👁	Moving
20.03.2017 20:05:39 (UTC +3)	55.8109390 37.624...	20.03.2017 21:07:31 (UTC +3)	55.6386430 37.539...	👁	Driving

□ Date
From: 14.12.2010
Until: 17.04.2017

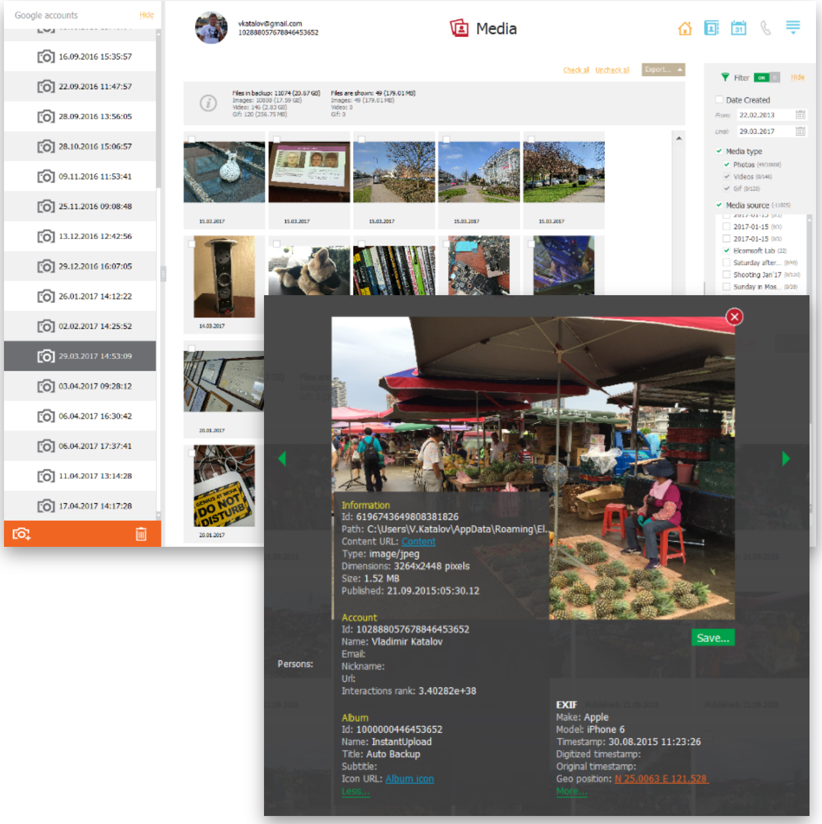
☑ Type:
- ☑ Moving
- ☑ Walking
- ☑ Flying
- ☑ Cycling
- ☑ Driving
- ☑ On a bus
- ☑ On the subway
- ☑ On a tram
- ☑ On a train
- ☑ Snowboarding
- ☑ Motorcycling

Check all Uncheck all

Smartphone Privacy

Media

- Photos from all user’s devices can be uploaded to Google Photos
- Google Photos **not the same as** Google Drive!
- Location data via EXIF



16.09.2016 15:35:57
22.09.2016 11:47:57
28.09.2016 13:56:05
28.10.2016 15:06:57
09.11.2016 11:53:41
25.11.2016 09:08:48
13.12.2016 12:42:56
29.12.2016 16:07:05
26.01.2017 14:12:22
02.02.2017 14:25:52
29.03.2017 14:53:09
03.04.2017 09:28:12
06.04.2017 16:30:42
06.04.2017 17:37:41
11.04.2017 13:14:28
17.04.2017 14:17:28

vkatalov@gmail.com
102888057678846453652

Files in backup: 11074 (20.67 GB)
Images: 10808 (17.59 GB)
Video: 146 (2.83 GB)
Gif: 120 (256.75 MB)

Files are shown: 49 (179.01 MB)
Images: 49 (179.01 MB)
Video: 0
Gif: 0

□ Date Created
From: 22.02.2013
Until: 29.03.2017

✓ Media type
✓ Photos (49/10808)
✓ Videos (0/146)
✓ Gif (0/120)

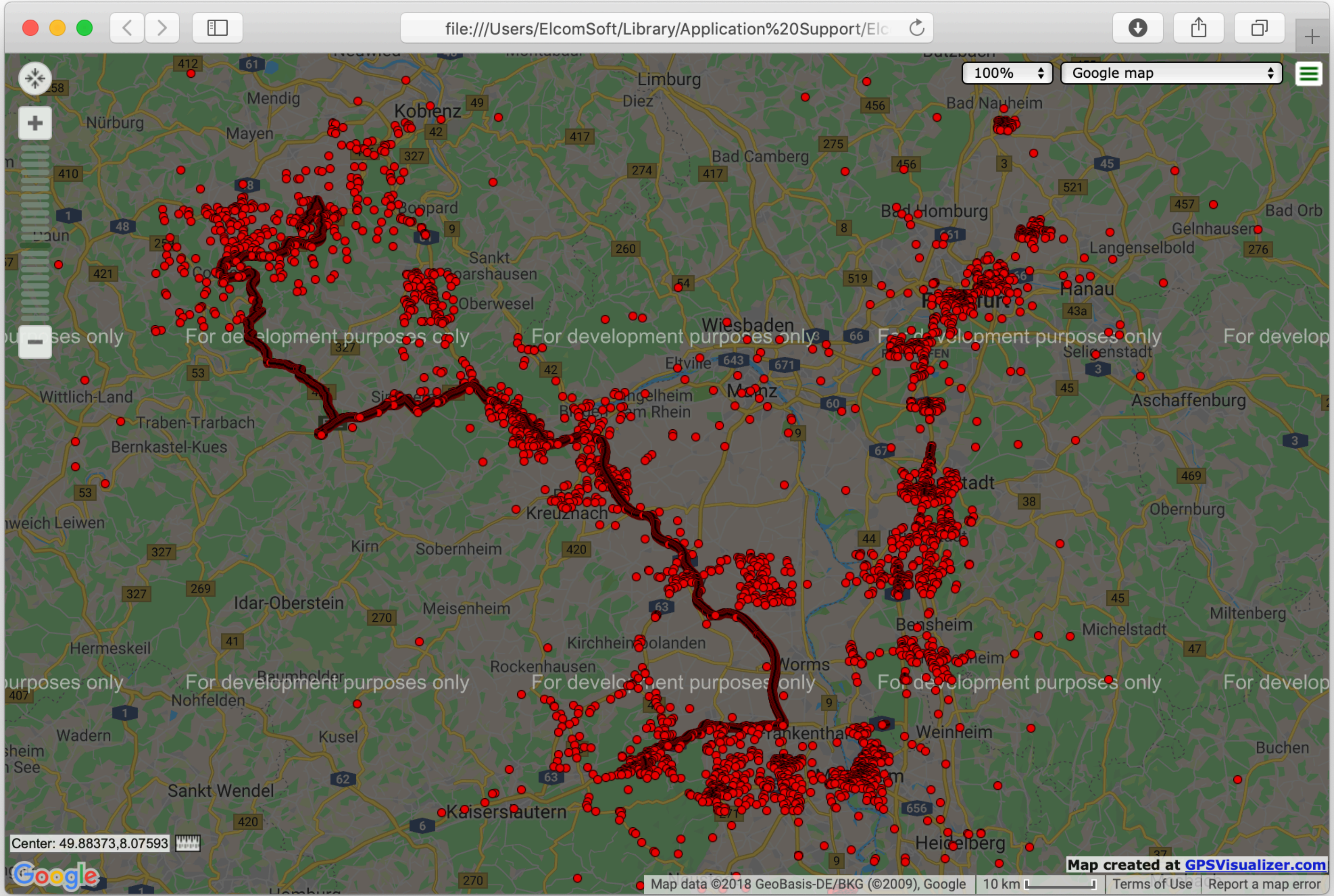
✓ Media source (-11025)
□ 2017-01-15 (0/1)
□ 2017-01-15 (0/1)
✓ Elcomsoft Lab (22)
□ Saturday after... (0/40)
□ Shooting Jan'17 (0/120)
□ Sunday in Mos... (0/39)

Information
Id: 6196743649808381826
Path: C:\Users\V.Katalov\AppData\Roaming\El..
Content URL: Content
Type: image/jpeg
Dimensions: 3264x2448 pixels
Size: 1.52 MB
Published: 21.09.2015:05:30.12

Account
Id: 102888057678846453652
Name: Vladimir Katalov
Email:
Nickname:
Url:
Interactions rank: 3.40282e+38

Album
Id: 1000000446453652
Name: InstantUpload
Title: Auto Backup
Subtitle:
Icon URL: Album icon

EXIF
Make: Apple
Model: iPhone 6
Timestamp: 30.08.2015 11:23:26
Digitized timestamp:
Original timestamp:
Geo position: N 25.0063 E 121.528


file:///Users/ElcomSoft/Library/Application%20Support/Elc
100%
Google map
For development purposes only
Koblenz
Limburg
Diez
Bad Nauheim
Mendig
Mayen
Nürburg
Bad Camberg
Boppard
Bad Homburg
Bad Orb
Gelnhausen
Langenselbold
Sankt Goarshausen
Oberwesel
Hanau
Wiesbaden
Eltville
Mainz
Seligenstadt
Aschaffenburg
Wittlich-Land
Traben-Trarbach
Bernkastel-Kues
Ingelheim
Bingen am Rhein
Kreuznach
Obernburg
Kirn
Sobernheim
Idar-Oberstein
Meisenheim
Bensheim
Michelstadt
Miltenberg
Hermeskeil
Kirchheimbolanden
Rockenhausen
Worms
Baumholder
Nohfelden
Wadern
Kusel
Frankenthal
Weinheim
Buchen
Sankt Wendel
Kaiserslautern
Heidelberg
Center: 49.88373,8.07593
Map created at GPSVisualizer.com
Map data ©2018 GeoBasis-DE/BKG (©2009), Google
10 km
Terms of Use
Report a map error

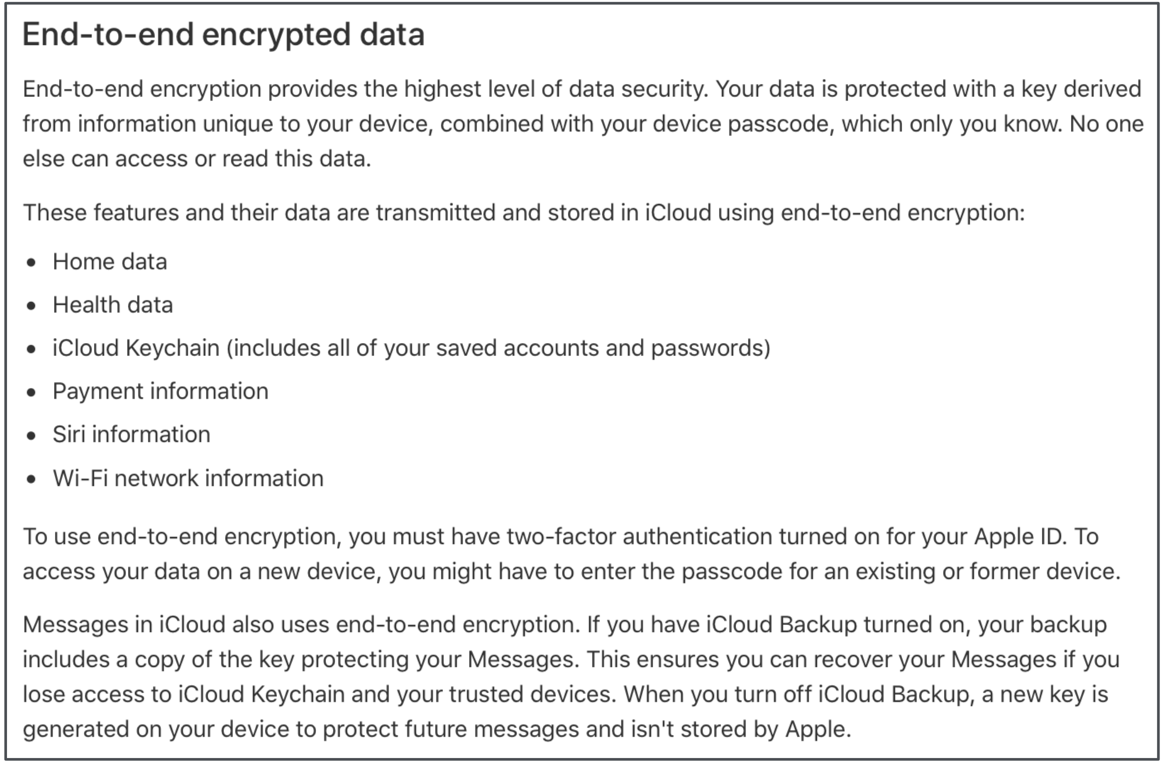
Smartphone Privacy

Where to get the data from?

- Device (local backup)
- Device (cloud backup) // credentials required!
- Device (physical acquisition) // requires jailbreaking/rooting
- Device data synced with desktop
- Cloud (synced data) // credentials required!
- Cloud (location services like Apple Find My Phone, Apple Find Friends. Google Find My Device) // credentials required!
- Third-party [cloud] services // credentials required!

Apple Data Protection

iCloud security overview (HT202303)



End-to-end encrypted data

End-to-end encryption provides the highest level of data security. Your data is protected with a key derived from information unique to your device, combined with your device passcode, which only you know. No one else can access or read this data.

These features and their data are transmitted and stored in iCloud using end-to-end encryption:

- Home data
- Health data
- iCloud Keychain (includes all of your saved accounts and passwords)
- Payment information
- Siri information
- Wi-Fi network information

To use end-to-end encryption, you must have two-factor authentication turned on for your Apple ID. To access your data on a new device, you might have to enter the passcode for an existing or former device.

Messages in iCloud also uses end-to-end encryption. If you have iCloud Backup turned on, your backup includes a copy of the key protecting your Messages. This ensures you can recover your Messages if you lose access to iCloud Keychain and your trusted devices. When you turn off iCloud Backup, a new key is generated on your device to protect future messages and isn't stored by Apple.

Reality

- *Home data: have not checked yet, but seems that not*
- *Health: not always (only if all devices on the account use macOS 11.4 / iOS 12)*
- *iCloud Keychain: yes*
- *Payment information: yes*
- *Siri information: yes*
- *Wi-Fi network information: password only*

Still, most of that data can be downloaded and decrypted with proper credentials

Apple and Law Enforcement

How Apple Serves LE Requests

- Law enforcement can obtain evidence via government information requests
- **The process is fully transparent** (by extent allowable by law)
- Annual stats published and available to general public:

  https://www.apple.com/legal/privacy/transparency/requests-2017-H2-en.pdf
- Guidelines:

  https://www.apple.com/privacy/docs/legal-process-guidelines-us.pdf

  https://www.apple.com/legal/privacy/law-enforcement-guidelines-outside-us.pdf

Apple and Law Enforcement

How LE Requests Work

- **Account Preservation Request** followed by **Account Information Request**
- All requests are handled in compliance with Apple’s privacy policy
- Serving government requests, Apple provides information in a proprietary format
- Investigators receive encrypted information. Decryption key is provided, but no tools to decrypt data
- The decryption process is complicated
- Many experts use third-party tools or services such as Kleopatra, GPG, Cellebrite, or BlackBag

Apple and Law Enforcement

LE Requests: Pros and Contras

- Government requests don’t need the user’s authentication credentials
- If login and password unavailable, a government request may be the only way to obtain information
- Authentication credentials aside, government requests have many significant drawbacks compared to in-house cloud acquisition

Apple and Law Enforcement

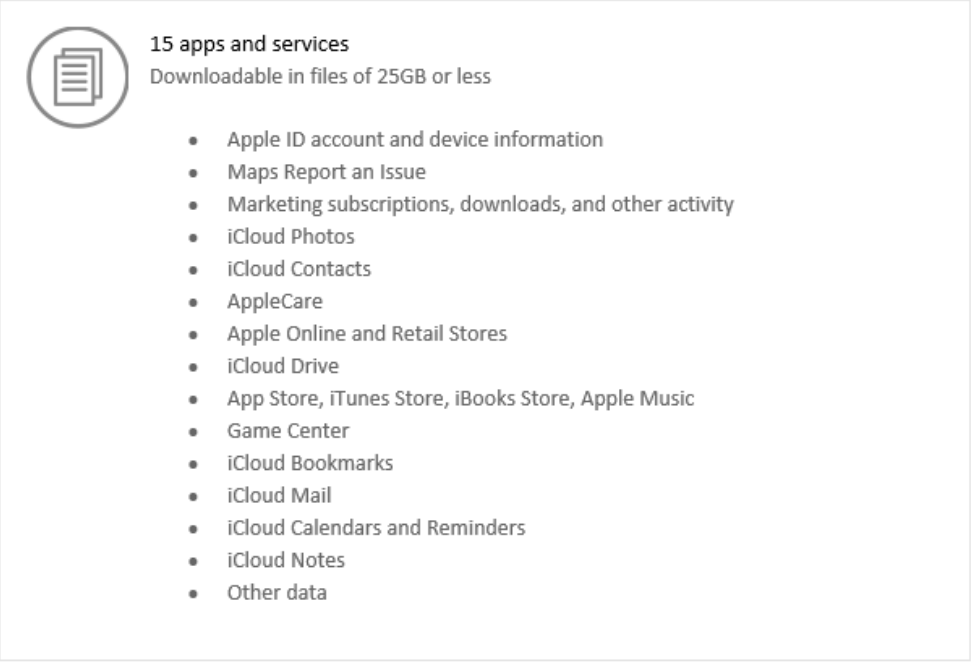
The Ugly Side of LE Requests

- Lots of legal paperwork
- **Account Preservation Request** must be submitted ahead of acquisition
- The process is lengthy
  - Up to two months
- Apple provides data in binary format, encrypted
  - Decryption key is provided, but no decryption tools
  - Third-party tools and services add extra costs and delays
- Apple will NOT deliver **messages** or **passwords** (iCloud Keychain)
  - Additional encryption with a different encryption key

Apple and GDPR

What is available…

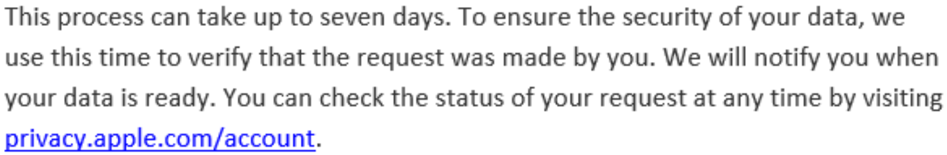
- All major data is there
- Pictures included
- Browsing history, files, iCloud Mail
- 7 days to process request
- Delivers snapshot taken on Day 1 of the request



15 apps and services

Downloadable in files of 25GB or less

- Apple ID account and device information
- Maps Report an Issue
- Marketing subscriptions, downloads, and other activity
- iCloud Photos
- iCloud Contacts
- AppleCare
- Apple Online and Retail Stores
- iCloud Drive
- App Store, iTunes Store, iBooks Store, Apple Music
- Game Center
- iCloud Bookmarks
- iCloud Mail
- iCloud Calendars and Reminders
- iCloud Notes
- Other data

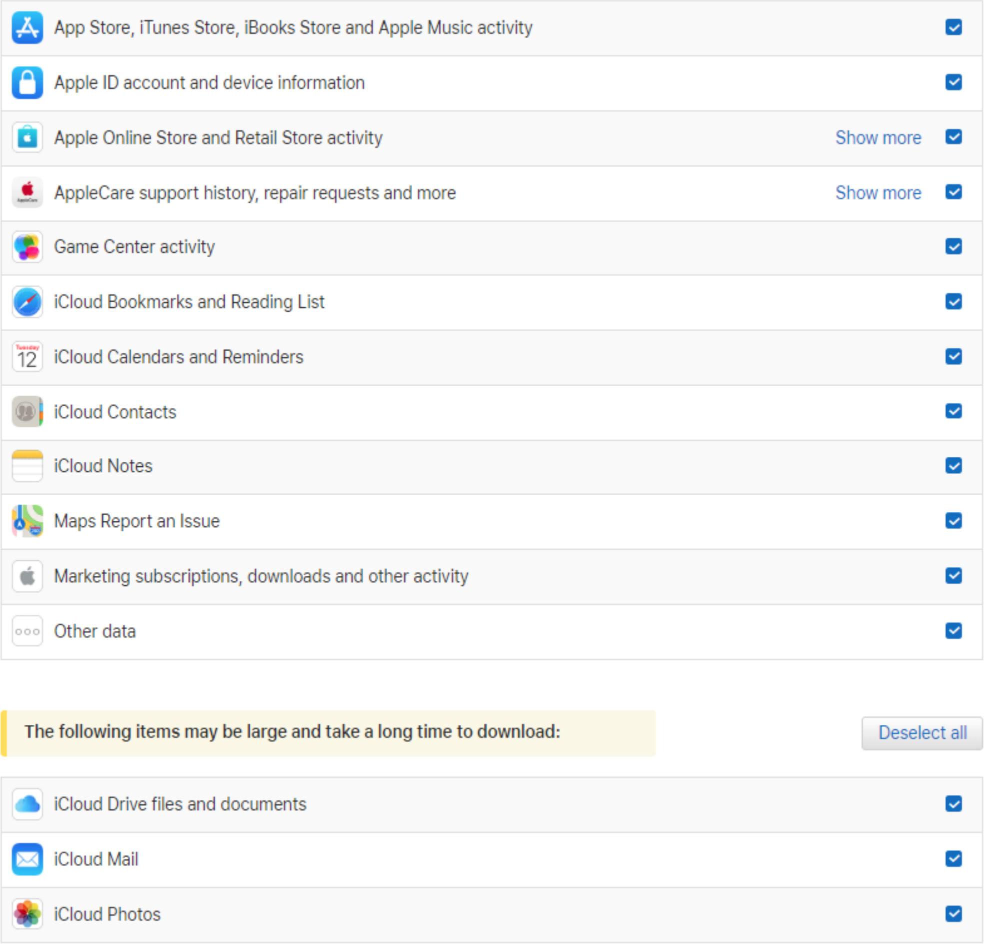


This process can take up to seven days. To ensure the security of your data, we use this time to verify that the request was made by you. We will notify you when your data is ready. You can check the status of your request at any time by visiting privacy.apple.com/account.

Apple and GDPR

And what Is not

- **Certain things are missing**
- **Apple Pay** – never synced with iCloud
- **Screen Time**
- **Messages** – additional encryption
  - We can decrypt it
- **Passwords** – iCloud Keychain has additional encryption
  - We can decrypt it
- **Health** – extra encryption, requires passcode
  - We can decrypt it



App Store, iTunes Store, iBooks Store and Apple Music activity ☑

Apple ID account and device information ☑

Apple Online Store and Retail Store activity Show more ☑

AppleCare support history, repair requests and more Show more ☑

Game Center activity ☑

iCloud Bookmarks and Reading List ☑

iCloud Calendars and Reminders ☑

iCloud Contacts ☑

iCloud Notes ☑

Maps Report an Issue ☑

Marketing subscriptions, downloads and other activity ☑

Other data ☑

The following items may be large and take a long time to download:

Deselect all

iCloud Drive files and documents ☑

iCloud Mail ☑

iCloud Photos ☑

Smartphone Privacy

Vladimir Katalov, ElcomSoft

Questions?