



Google's Advertising and Data Dominance

Key takeaways:

- The Internet is now mobile – the mobile Internet is proprietary, not open
- Google's business is to collect personal, sensitive data at massive scale to sell advertising
- It's not about the algorithms, it's about the data
- Android is a data collection "service," not a mobile OS
- Google controls the advertising ecosystem through its dominant "ad tech" stack
- Consumers are not only the "product" on the Internet, consumers subsidize Google's data collection
- Privacy and competition converge with comingled privacy policies and terms of service

Google wants regulators to see the **small picture**

Google

"The Internet is open"

"Competition is one click away"

"Consumers have choice"

"New features and innovations"

Allegations of abuses in market segment X (e.g., comparison shopping, app bundling)

The Big Picture is more relevant

- Google is an advertising company
- Data drives advertising
- Three monopoly data sources: Search, DoubleClick, Android
- Privacy compliance does not provide safe harbour from antitrust enforcement
- Google has unmatched depth and breadth of data
- Google uses its size and dominance across various apps and services to increase its data advantage
- Google is already dominant in the “ad tech” stack
- Publishers, content owners can never match the data collected by Google and are increasingly dependent upon Google’s “ad tech”
- Consumer data, collected at massive scale, is Google’s currency

Consumers are **paying too much** for “free” services



- The **amount** of consumer data taken by Google now **vastly exceeds** the value of the “free” services offered in return.
- The **amount of data** taken by Google has **grown exponentially** while the value of its “free” services has **improved only incrementally**.
- The **monetary value** of consumer data is now untethered from the **monetary value** of Google’s “free” services, which often have a marginal cost of zero.

“Free” Services?

The mobile Internet is **technically constrained**



- LESS BANDWIDTH
- SMALLER USER INTERFACE
- NO KEYBOARD OR MOUSE

The mobile Internet is "app-based"



- APPS REPLACE BROWSER
- MANAGE BANDWIDTH
- MANAGE USER INTERFACE
- MANAGE MEMORY AND COMPUTE



The mobile Internet is **proprietary, not open**

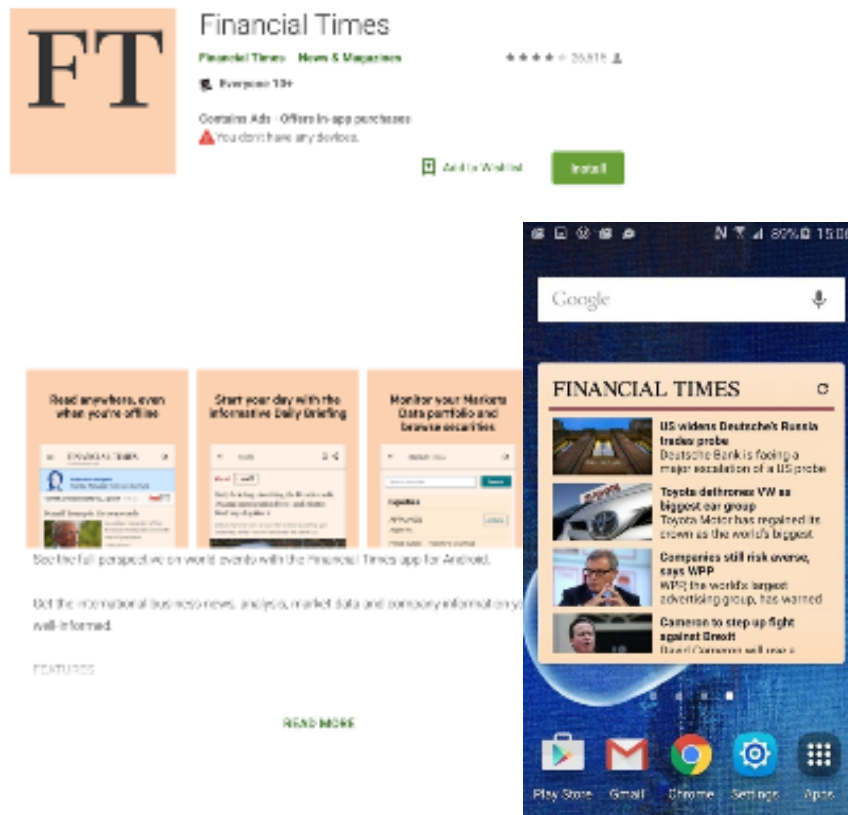


- COMMUNITY-LED
- OPEN STANDARDS-BASED
- PERMISSIONLESS INNOVATION



- GOOGLE CONTROLLED ECOSYSTEM
- PROPRIETARY APIS
- ACCESS VIA THE PLAY STORE
- GOVERNED BY TERMS OF SERVICE AND PRIVACY POLICIES

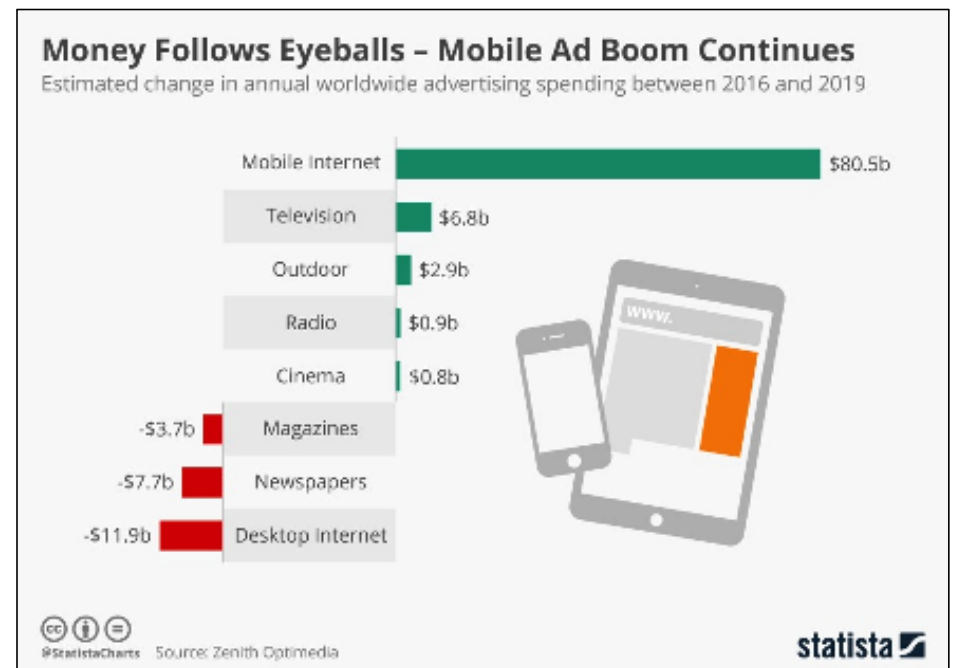
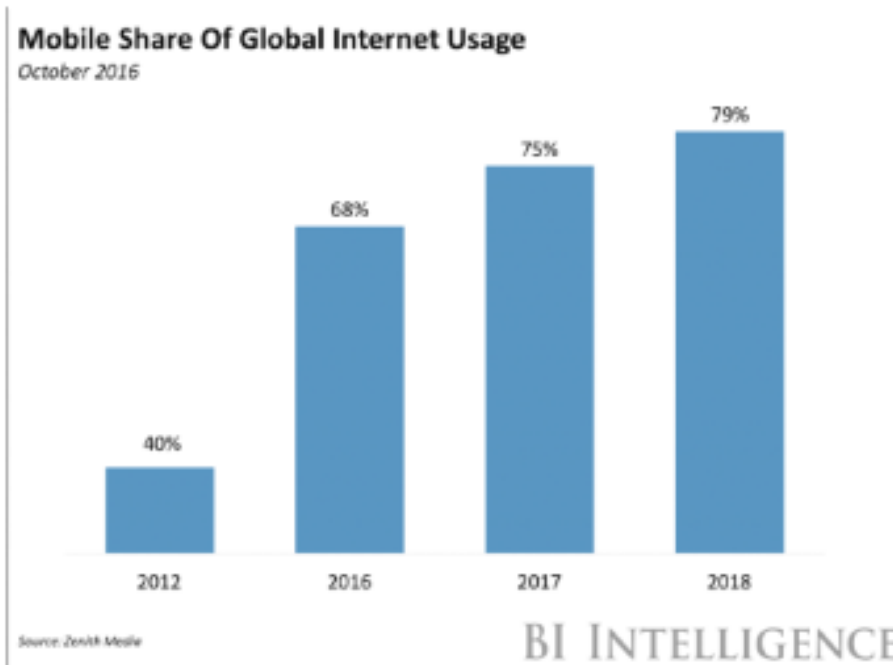
As a result, in mobile, **Google is in control**



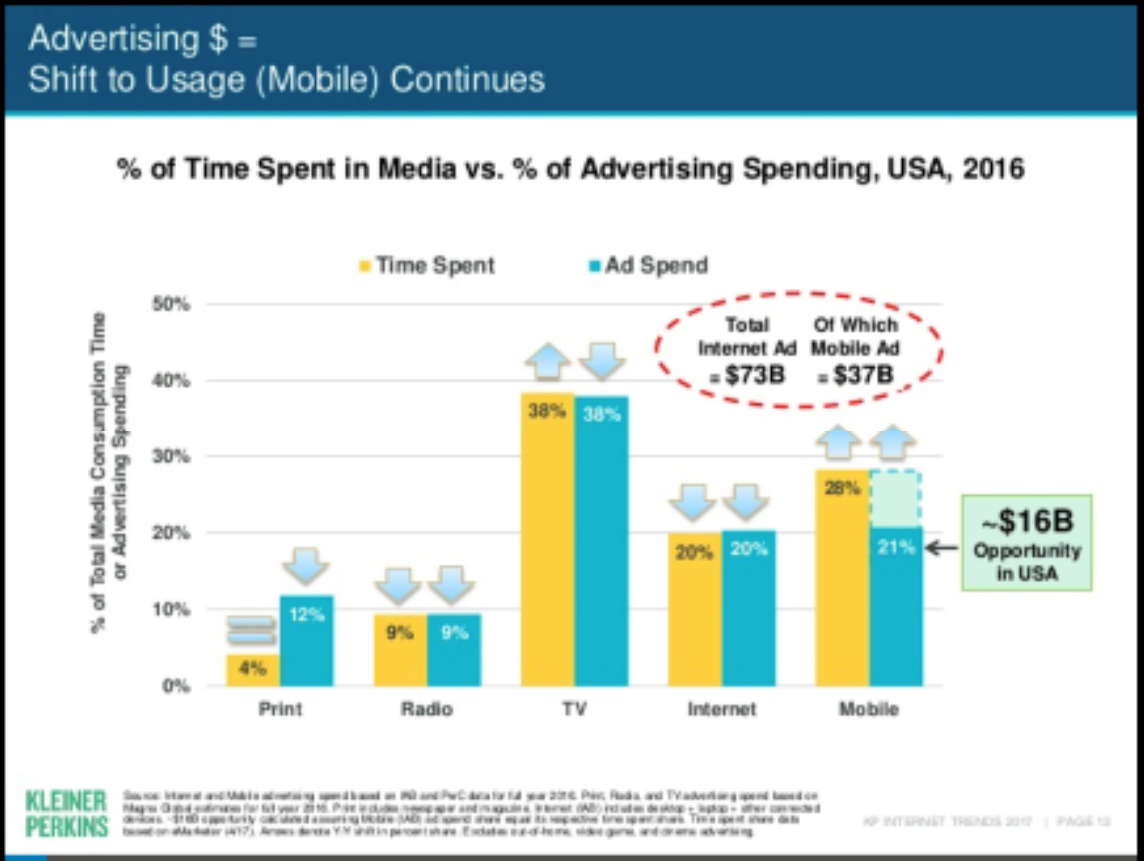
- Google's Privacy Policy
- Google's Developer Agreements
- Google's Proprietary APIs
- Google's "Store" Policies
- Google's Terms of Service
- Google's Design Guidelines



Ads follow shift to mobile



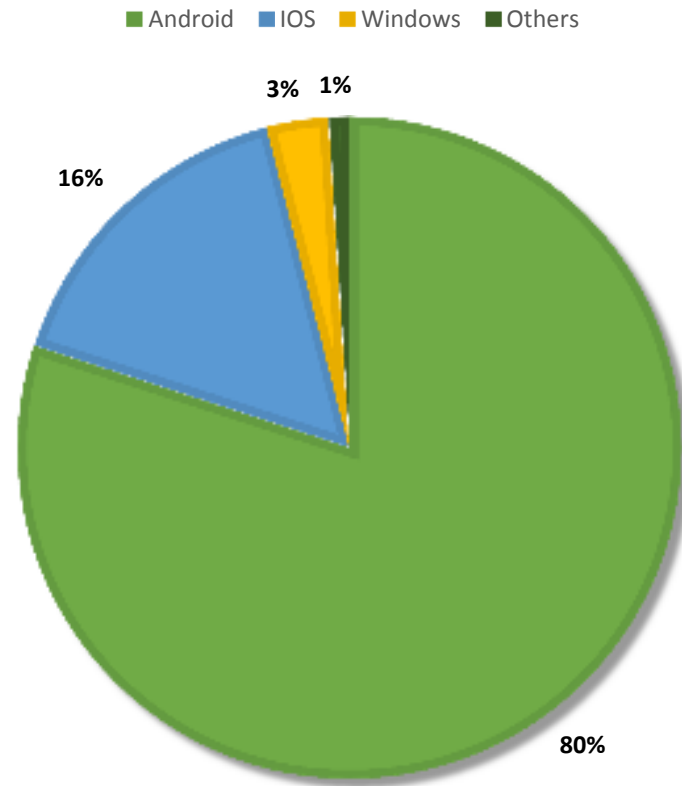
Advertising continues to shift to mobile



Web 4.0: The mobile Internet is proprietary



GLOBAL OPERATING SYSTEMS MARKET SHARE



Ad tech: The Google monopoly nobody saw coming

- Advertising is critical for publishing and the delivery of content
- “Matching” buyers and sellers in a scale electronic marketplace
- Advertising includes text ads / display ads (including video)
- Advertising appears in search results / displayed on websites / social media feeds / video
- **How they are selected to be served to users:** varying degrees of targeting (from categories of recipients to specific individuals) based on *data*
 - Generally, the better targeted the ad, the greater the chance of conversions (sales)
 - Data underlies ad targeting – but not all data is the same: search and location data allow for specific contextual advertising

About online advertising: players (simplified)

Buy Side:

Advertisers / Agencies
wanting to place online ads



Sell Side:

Publishers, app developers
selling ad space



In between Sell & Buy

Intermediaries offering cloud
software and services
to buyers and sellers (ad-tech)



Consumers

from whom data is
extracted, and to whom
the ads are shown

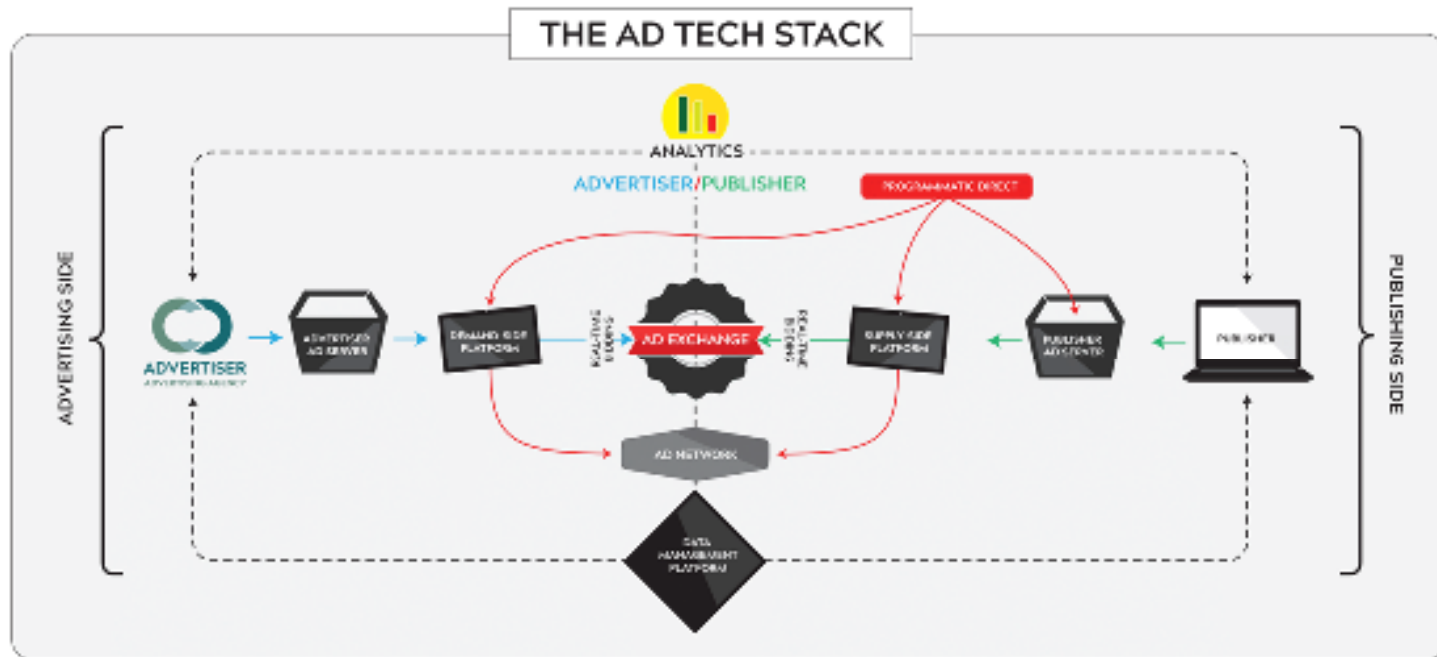


Online advertising intermediation (simplified)

Buy Side:
Advertisers/
Ad agencies



...



Sell Side:
Publishers,
app developers



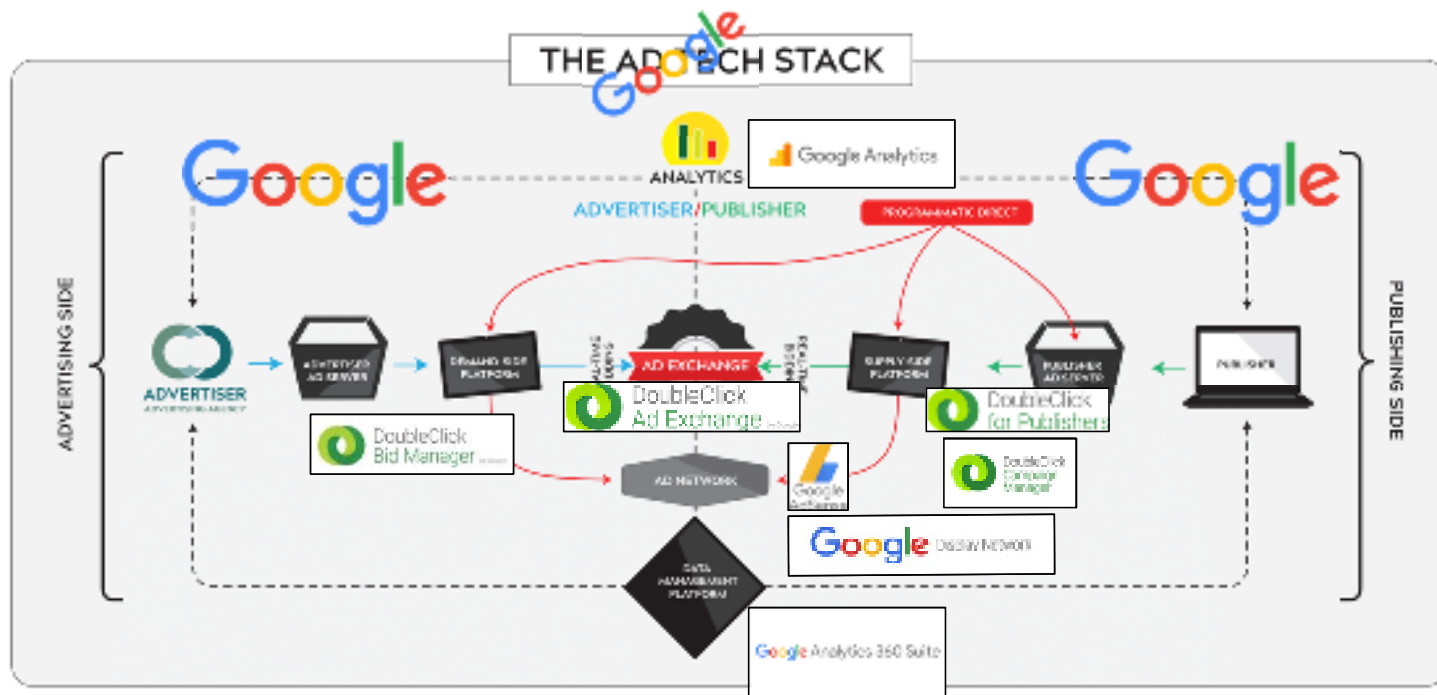
...

Google is omnipresent throughout the ad-tech value chain

Buy Side:
Advertisers/
Ad agencies



...

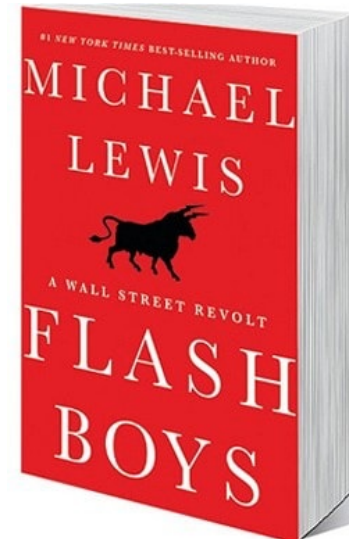


Sell Side:
Publishers,
app developers



...

Google Ad Tech: Where Mad Men meets Flash Boys



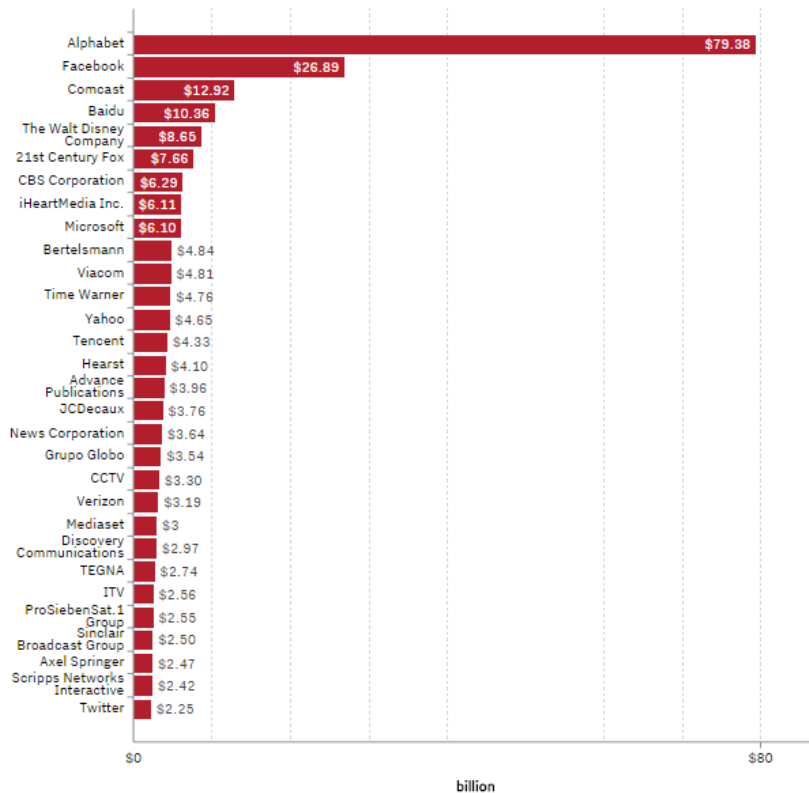
- **Programmatic**
- **Real Time Bidding**
- **Low-latency**
- **Millisecond auctions**

“Since AdWords and DBM run on servers in the same data centers as Ad Exchange, they can respond faster to Ad Exchange bid requests compared to other exchange requests. There are no network latency or timeout issues between either AdWords or DBM and Ad Exchange, which means publishers on Ad Exchange always receive bids from AdWords and DBM advertisers.”

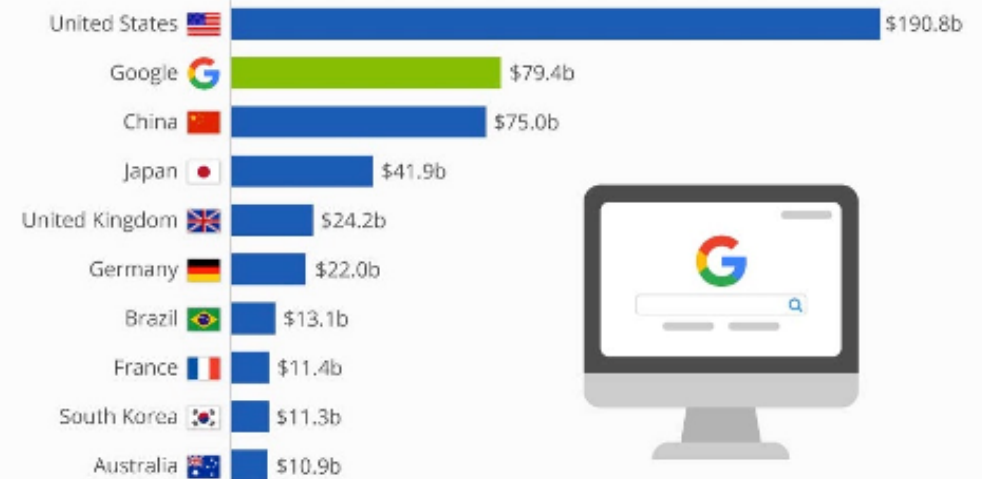
The **Google** Tech Stack

Google dominates online advertising

Top 30 companies by global ad revenue across media



Google's advertising revenue compared to total ad spend in the largest ad markets 2016



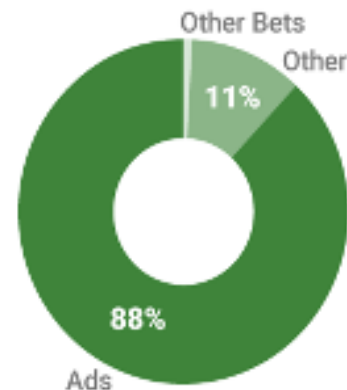
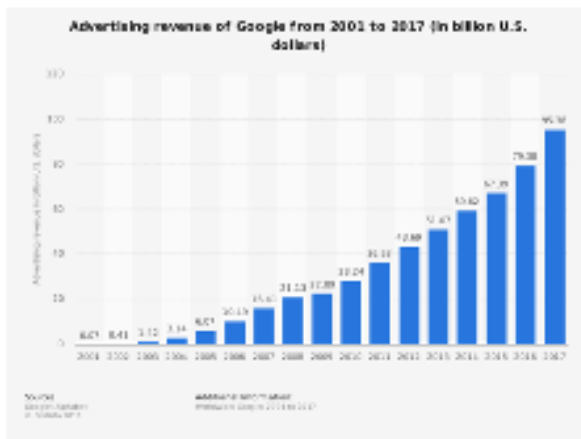
Google commands triple the advertising revenue of the company in the second spot

Google is an advertising company, not a technology company

Google total revenue grew to **USD 95.38 billion** in 2017

88 percent of those revenues were advertising revenues

Google is the **largest global advertising company**, by far



Google Revenue Sources



It's all about the data

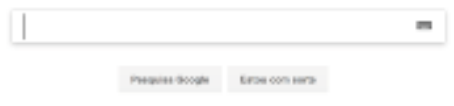
Google generates advertising revenue through collecting and combining

GOOGLE SEARCHES	BROWSING COOKIES	EMAILS	VIDEOS	SOCIAL NETWORK MAPS SEARCHES	WAZE NAVIGATION LOCATION
WEB BROWSING COOKIES	EMAILS	VIDEOS	SOCIAL NETWORK MAPS SEARCHES	WAZE NAVIGATION LOCATION	APP USE
GOOGLE SEARCHES	WEB BROWSING COOKIES	EMAILS	VIDEOS	SOCIAL NETWORK MAPS SEARCHES	WAZE NAVIGATION LOCATION
GOOGLE SEARCHES	WEB BROWSING COOKIES	EMAILS	VIDEOS	SOCIAL NETWORK MAPS SEARCHES	WAZE NAVIGATION LOCATION
GOOGLE SEARCHES	WEB BROWSING COOKIES	EMAILS	VIDEOS	SOCIAL NETWORK MAPS SEARCHES	WAZE NAVIGATION LOCATION
GOOGLE SEARCHES	WEB BROWSING COOKIES	EMAILS	VIDEOS	SOCIAL NETWORK MAPS SEARCHES	WAZE NAVIGATION LOCATION
GOOGLE SEARCHES	WEB BROWSING COOKIES	EMAILS	VIDEOS	SOCIAL NETWORK MAPS SEARCHES	WAZE NAVIGATION LOCATION
GOOGLE SEARCHES	WEB BROWSING COOKIES	EMAILS	VIDEOS	SOCIAL NETWORK MAPS SEARCHES	WAZE NAVIGATION LOCATION
GOOGLE SEARCHES	WEB BROWSING COOKIES	EMAILS	VIDEOS	SOCIAL NETWORK MAPS SEARCHES	WAZE NAVIGATION LOCATION
GOOGLE SEARCHES	WEB BROWSING COOKIES	EMAILS	VIDEOS	SOCIAL NETWORK MAPS SEARCHES	WAZE NAVIGATION LOCATION

More data, more advertising revenue – this motive underlies its anticompetitive behaviour



Google Search, Maps, Gmail, YouTube, Play, Chrome, Android each have a billion+ users



Google Cloud Platform



Google has so much data ...



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Google will no longer read your emails to tailor ads

by Selena Larson @selenal Larson

June 23, 2017 5:21 PM ET



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- advertising
- Gmail
- Google
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- Popular Posts

Google now has all the data it needs, will stop scanning Gmail inboxes for ad personalization

Posted Jun 23, 2017 by [Frederic Lardinois \(@frednic\)](#)

Consumer data is Google's product

Google is a data refinery

- ❑ 4.5 billion searches each day.
- ❑ More than 1 billion monthly active Gmail users.
- ❑ 2 billion monthly active Android phones.
- ❑ YouTube's one billion users watch one billion hours a day.
- ❑ Google Maps' users navigate more than one billion kilometers a day.
- ❑ Google Drive's 800 million-plus users upload three billion objects a day.



Data is monetized through digital advertising.

It's not about algorithms ... it's about the scale of the data

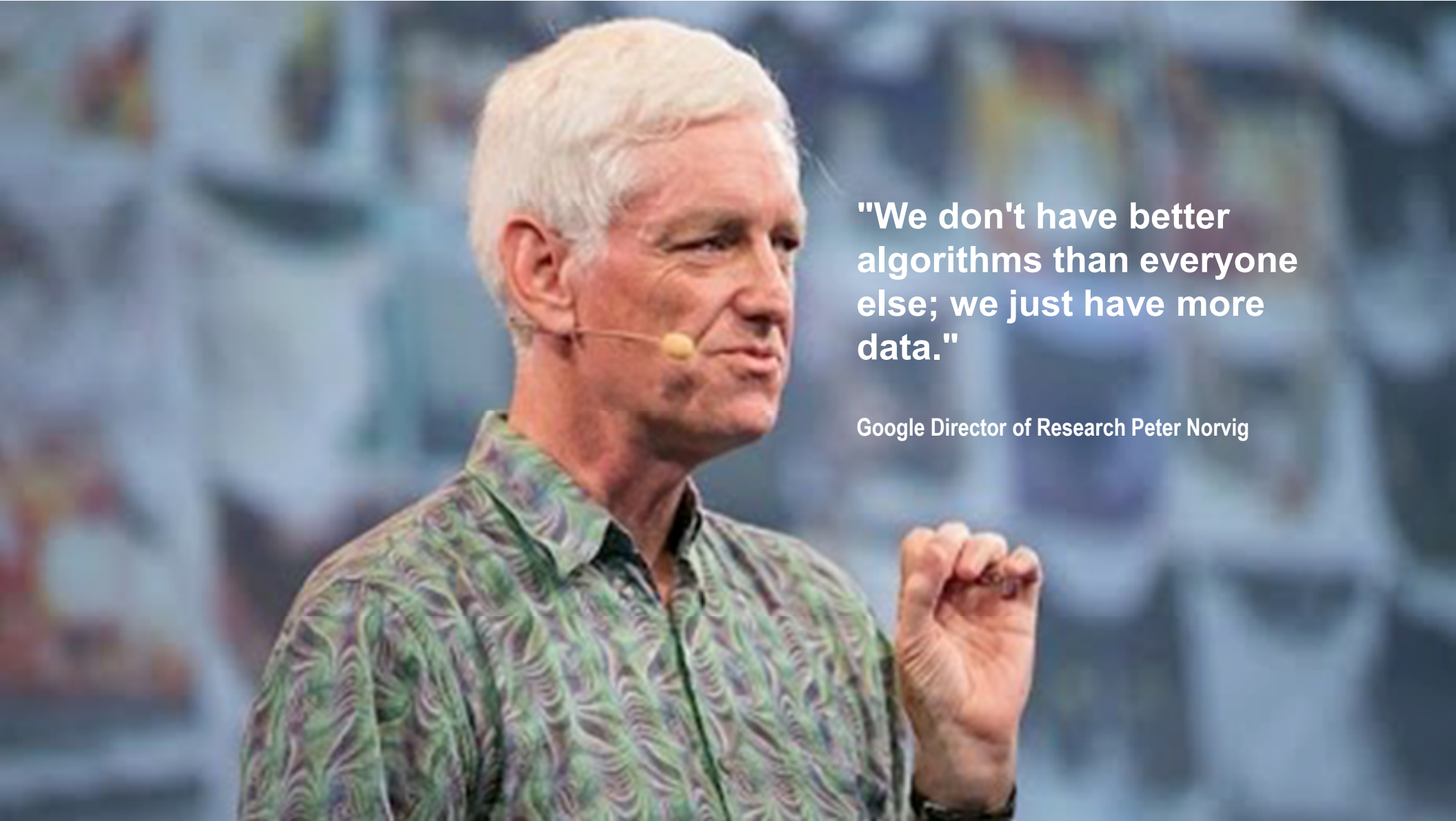
The algorithms at the heart of key Internet ad technologies are a form of machine learning

Learning happens through the processing of large volumes of data

The best algorithms cannot achieve good results if they have insufficient data to learn and improve on their results

The best ad targeting is reliant on mass quantities of data, not algorithms

$$\begin{aligned} P_{0,1}(81) &= \frac{(x_1 - x)P_{0,0}(x) + (x - x_0)P_{1,1}(x)}{x_1 - x_0} \\ &= \frac{(64 - 81)(.25) + (81 - 16)(.125)}{64 - 16} \\ &= \frac{-4.25 + .8.125}{48} \\ &\approx .080729 \end{aligned}$$



"We don't have better algorithms than everyone else; we just have more data."

Google Director of Research Peter Norvig

**“We don’t need you to type at all.
We know where you are.
We know where you have been.
We can more or less know what you
are thinking.”**

Former Google Executive Chairman, Eric Schmidt



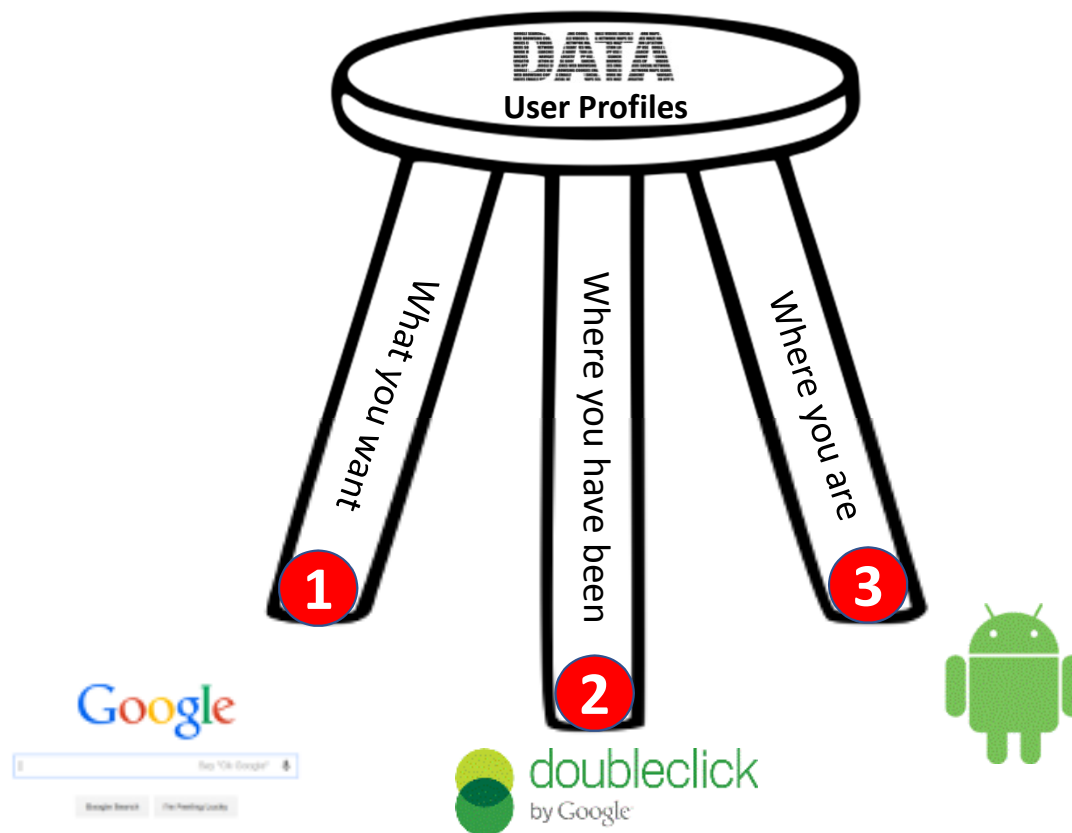
Data matters ... a lot

A photograph of Eric Schmidt, Google CEO, speaking at a conference. He is wearing glasses and a suit, and is holding a smartphone in his right hand. The background is a blue-lit stage.

"I think big data is so powerful that nation states will fight over how much data matters" ... "He who has the data can do the analytics and the algorithms"

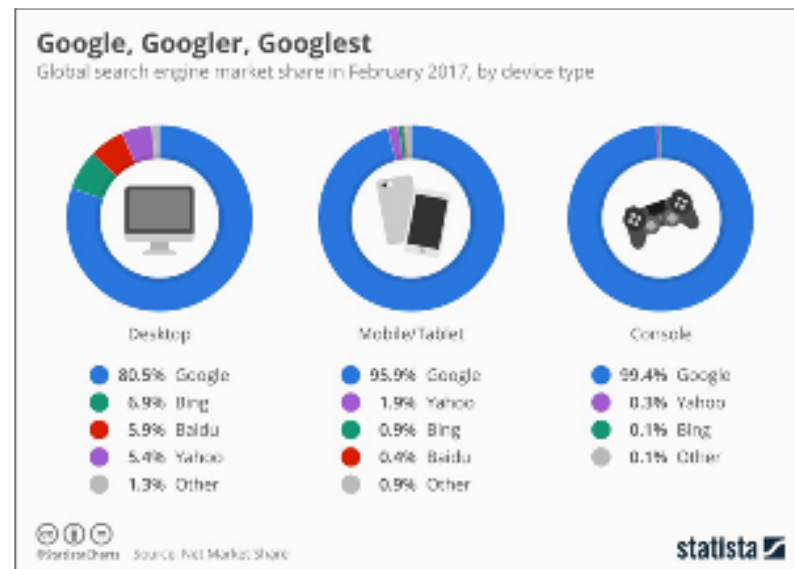
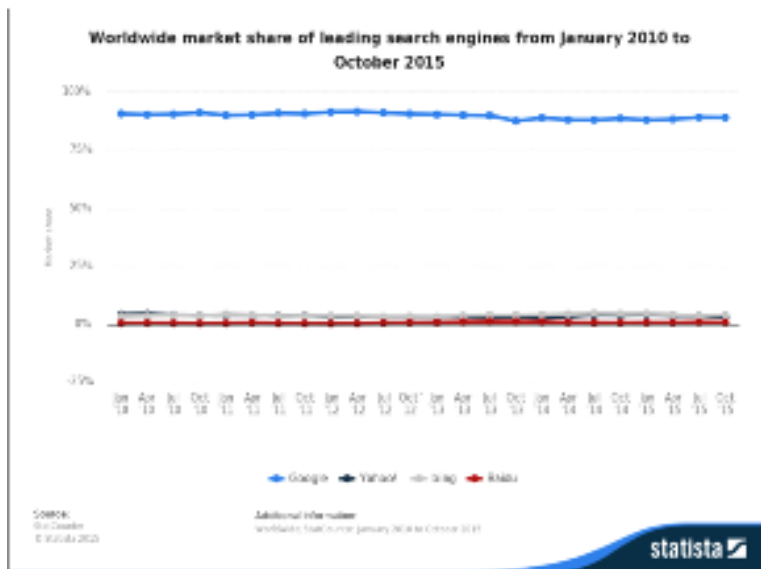
Google CEO, Eric Schmidt, March 8, 2017

Google's advertising business is driven by three monopolies



Google dominates search

1



Over 4 billion search queries **per day**
2 trillion searches **annually**

"cheap lawnmower models"

"funny cat videos"

**Data on all of your search queries
on Google Search, and your clicked
search results**

"post office opening hours"

"spice gift price"

"cafe du nord address"

"how to deal with depression"

"personal computer store nearby"

"job search web sites"

"pavlova recipe"

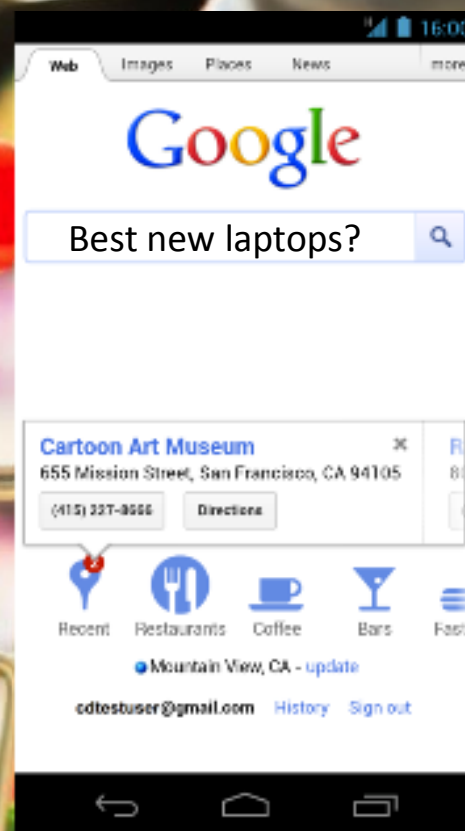
"information on ISIS"

"down town beauty salons"

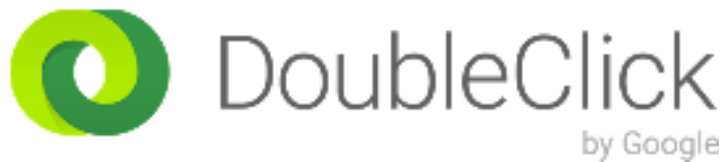
"Toe fungus remedies"

"investina for dummies book"

Search data is specific, contextual. What you are looking to buy, and where you are considering buying it



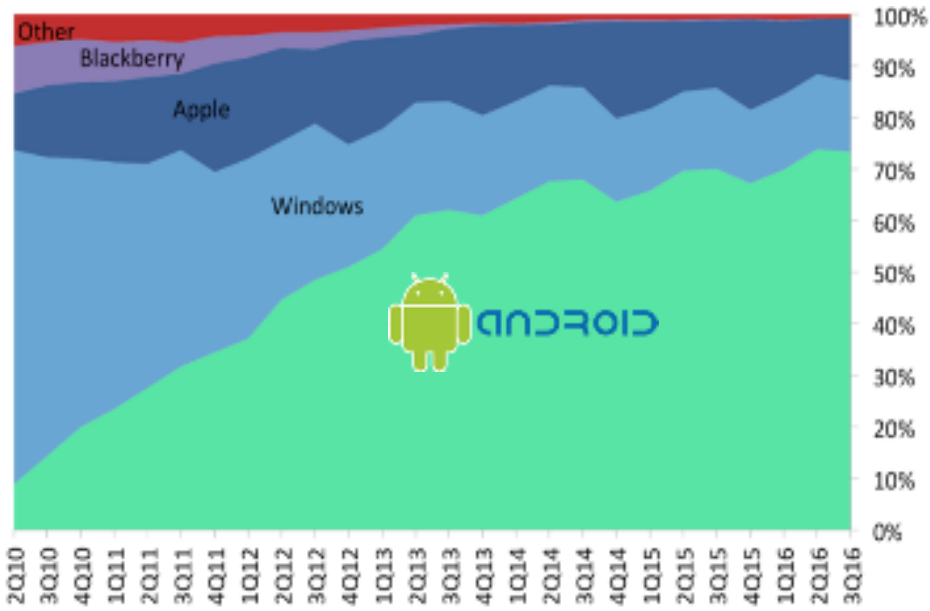
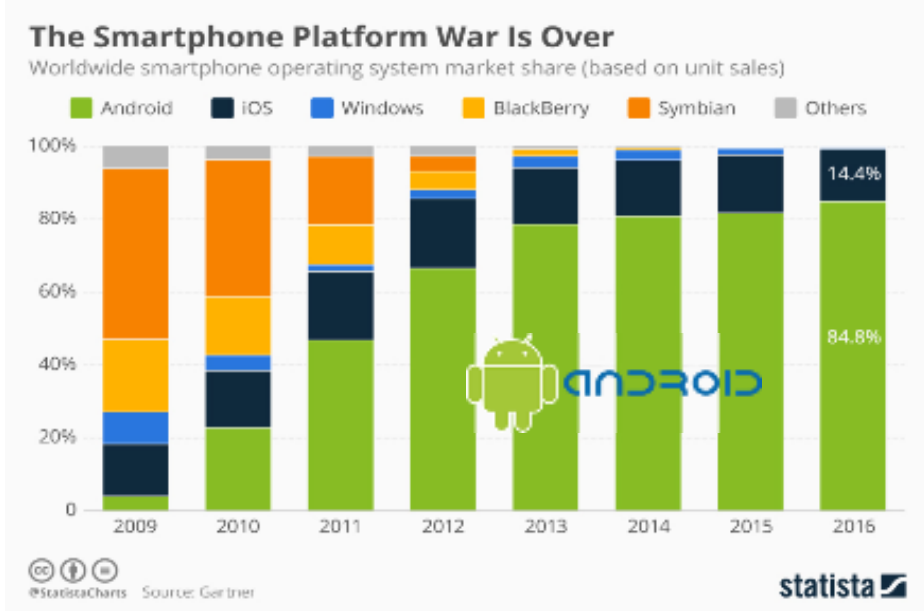
DoubleClick cookies generate data on the web sites you visited....more than 2 million web sites



As world shifts to mobile, Google Android dominates the mobile platform

Android is by far the largest OS platform for smartphones

Android is even by far the largest platform for all computing



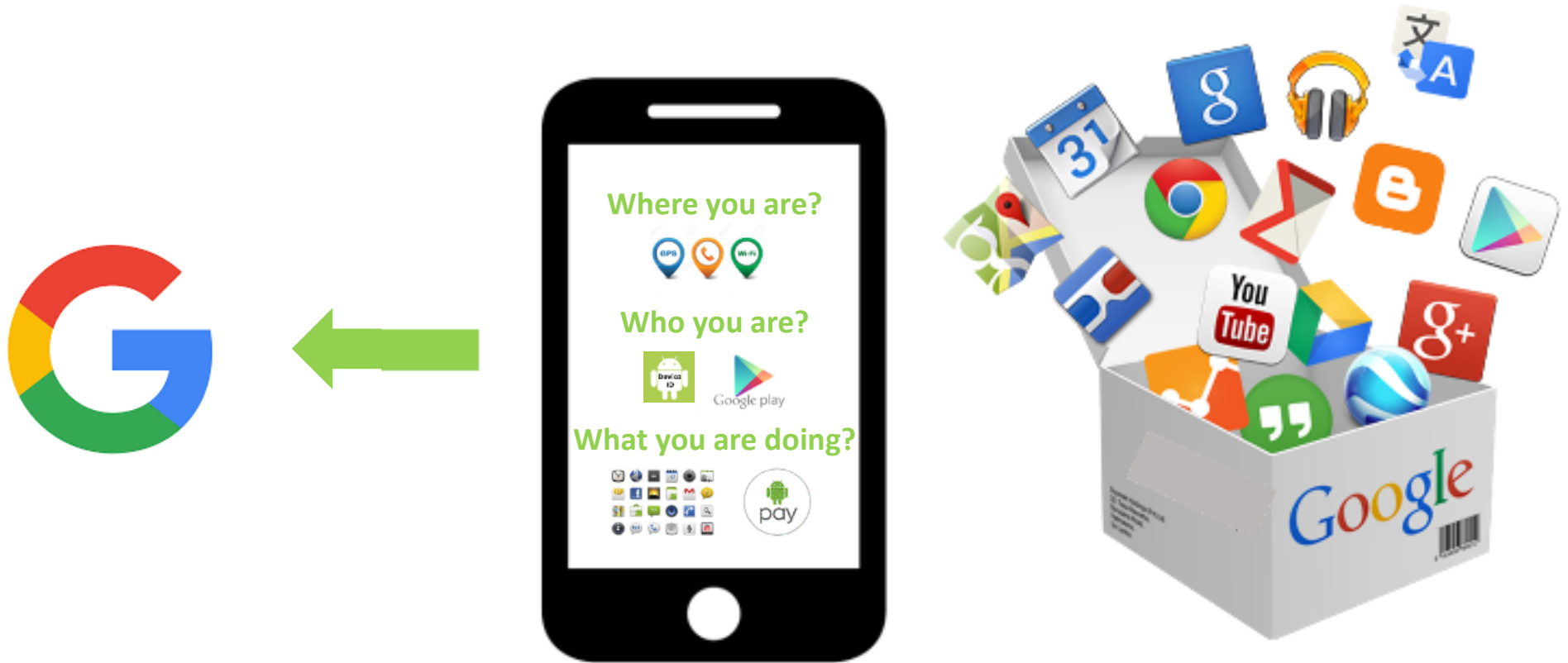
Google “closes the loop”

- Google can now “reach the same user across devices, apps, and sites.”
- Can report within 99% accuracy whether a customer visited a physical store.



“With the power of Google Maps technology, we have access to the exact dimensions of over 200 million stores globally to deliver 99% accuracy in reported visits. Only Google can deliver this level of precision and scale.”

Android is a data collection platform



Location | Device ID | Google Play ID

Location data is **particularly valuable** for advertising

Like search, location data can allow **customization of advertising at an individual level**

Google constantly collects **vast swaths of data on all of its users locations and their activities, 24/7** – through tracking via enabled location services and also via more surreptitious means, through WiFi mapping, Bluetooth beacons, and cell tower communications



Location is the next search, except it is not Google's to take

For example, what entitles Google to collect GPS pings **when no GPS-aware apps are running?**

Google does not own, supply, or build GPS technology

Google does not pay for GPS chips in mobile devices

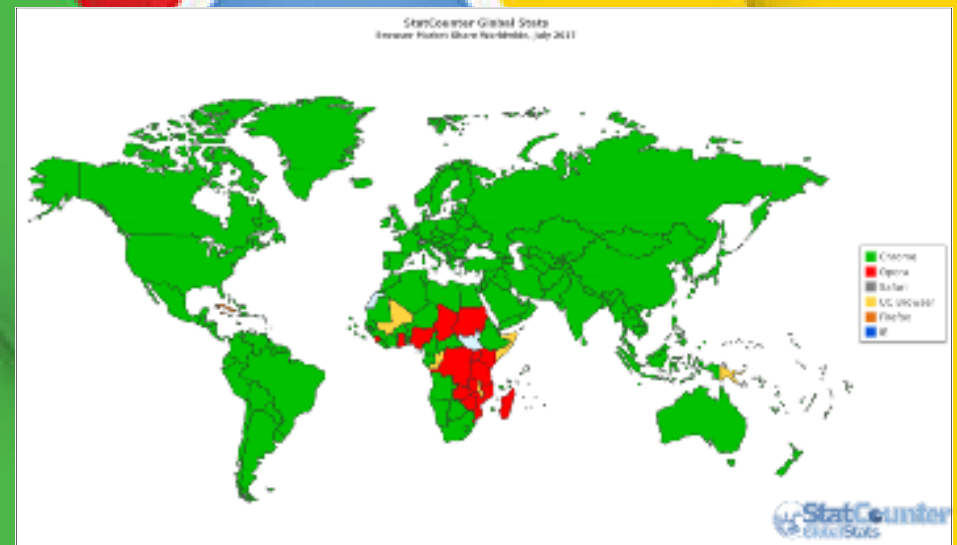
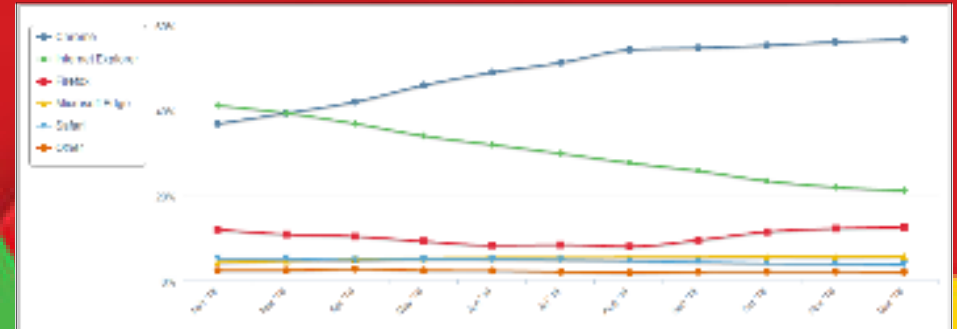
Global Positioning Satellite technology is independently supplied and does not rely on the Android operating system



GPS location information is valuable to the user
... why does Google Android take it for free?

By the way, Google also dominates **web browsers**

chrome





Male born in 1978 who visits football web sites

...who has searched for and purchased football jerseys online

...and watches online videos of FC Barcelona

...and has been at football stadiums during League games

...and likes travel

User profile

... And is currently "in vehicle" on his way to a football game



Putting it all together: Google's services collect data at scale for advertising

Android Data Collection

How did we get here?

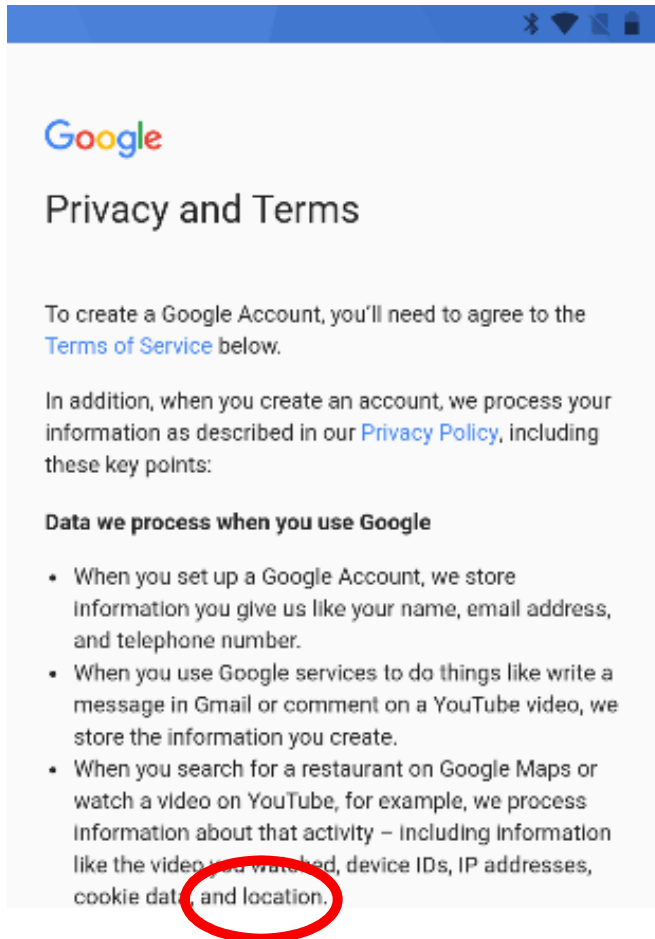
Data collection: vastly more than needed – user is the product, benefit accrues to Google

- **No relationship** between user data collected and what user is actually doing on the mobile device
- Data is personally identifiable
- Benefit of the data collection **only accrues to Google**
- Data “minimization” has virtually **no meaning** in Android
- App Metadata collection is **asynchronous**
- Historical data (when device is not online) is recorded, cached, and sent to Google servers when phone connects to Internet.

Consumers **pay** for data collection only to have ads sold back to them based on the **same data**

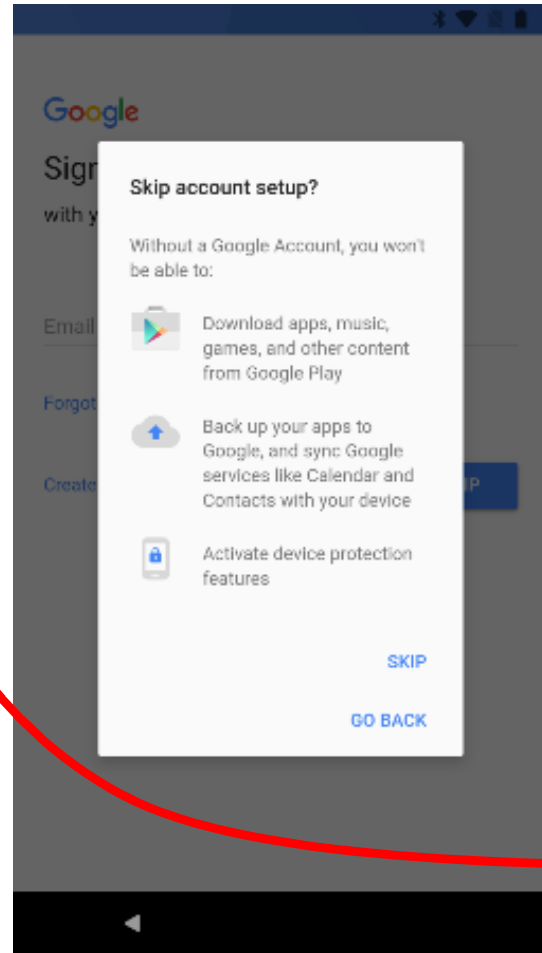
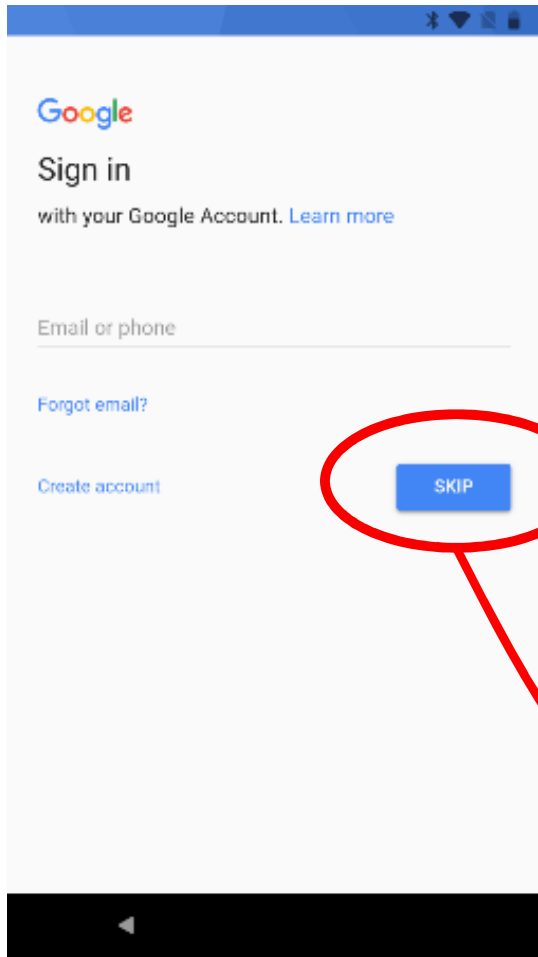
**“Opt-in” and
disclosures?**

Are location disclosures adequate?



Disclosures have no relation to the quantity and quality of information collected

Android Smartphone Setup Screenshot



Smartphone Setup

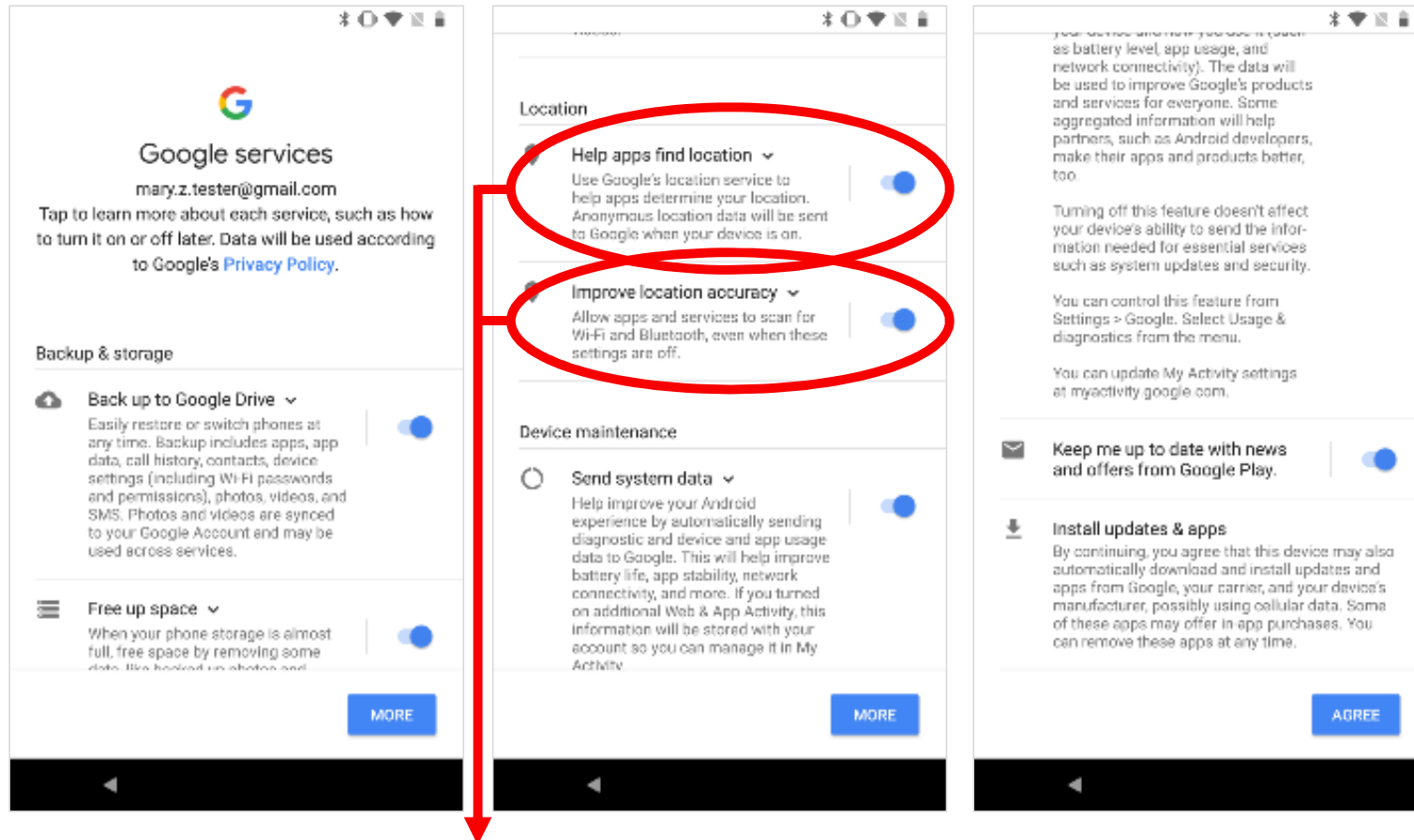
Google's description of its services makes no mention of...

- Advertising
- Location tracking
- Activity monitoring

...or any data collection at all.

“Skip” is not opting out

No opt-in: Android **defaults** to collecting location data

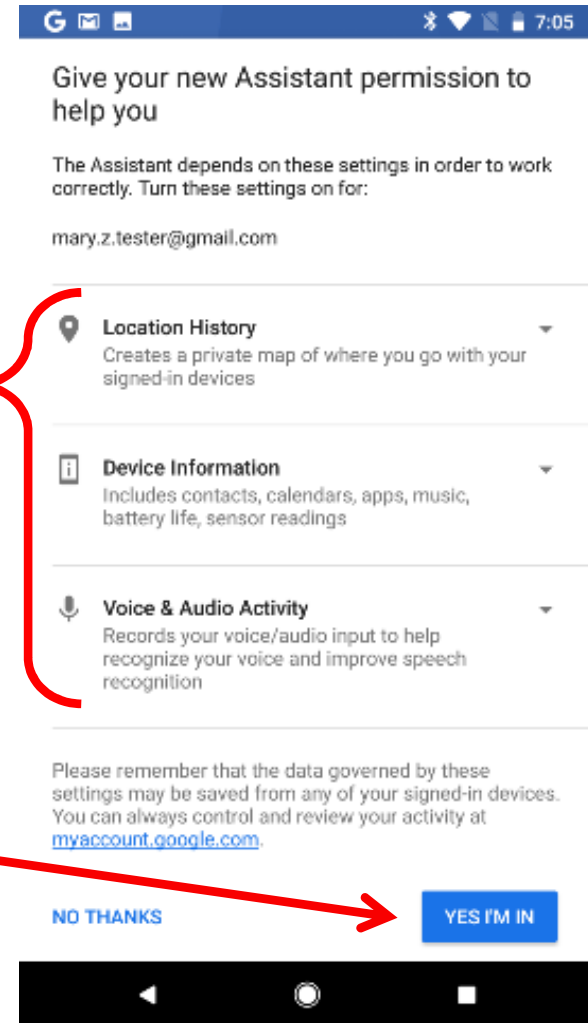


Google location services and scanning and enabled by default – to disable them, users must toggle a switch to opt-out

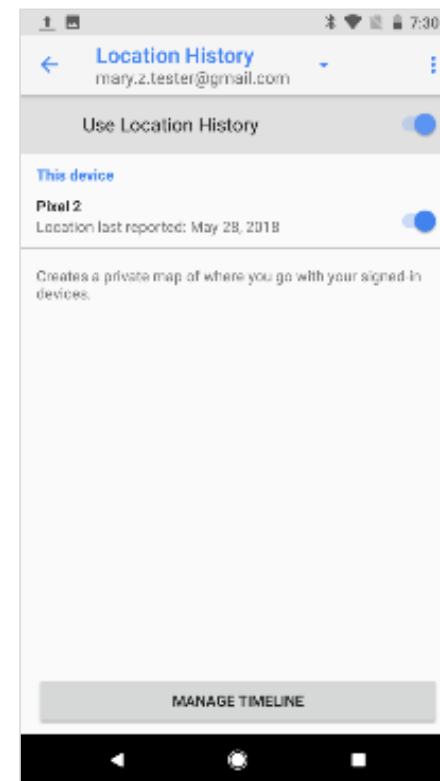
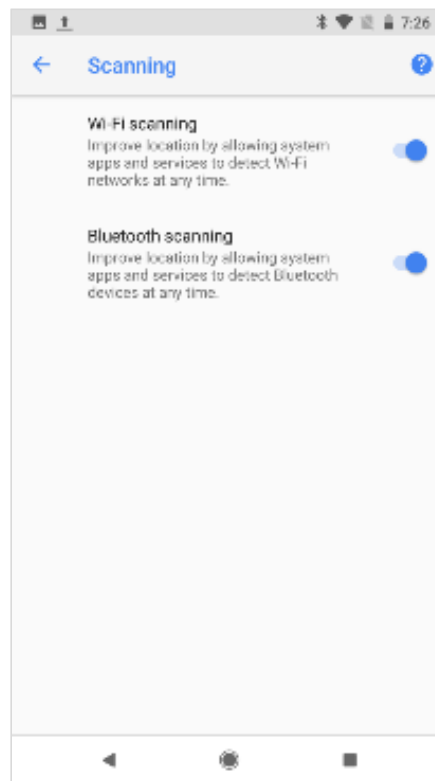
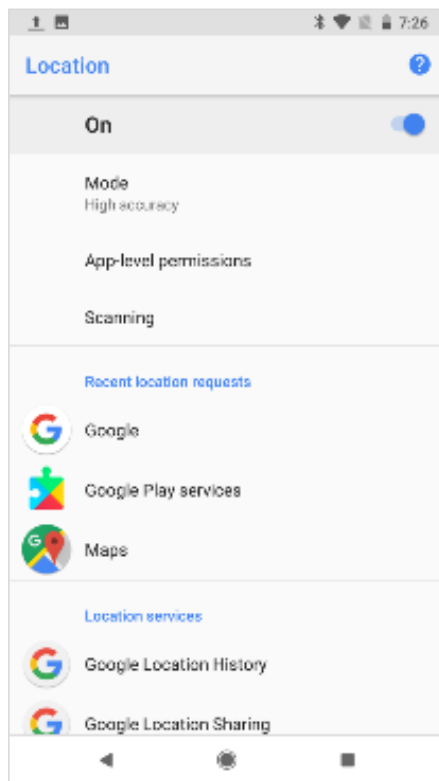
This is **not** opt-in

Three categories of user data captured in one click.

Using the word “in”
doesn’t make it opt in.

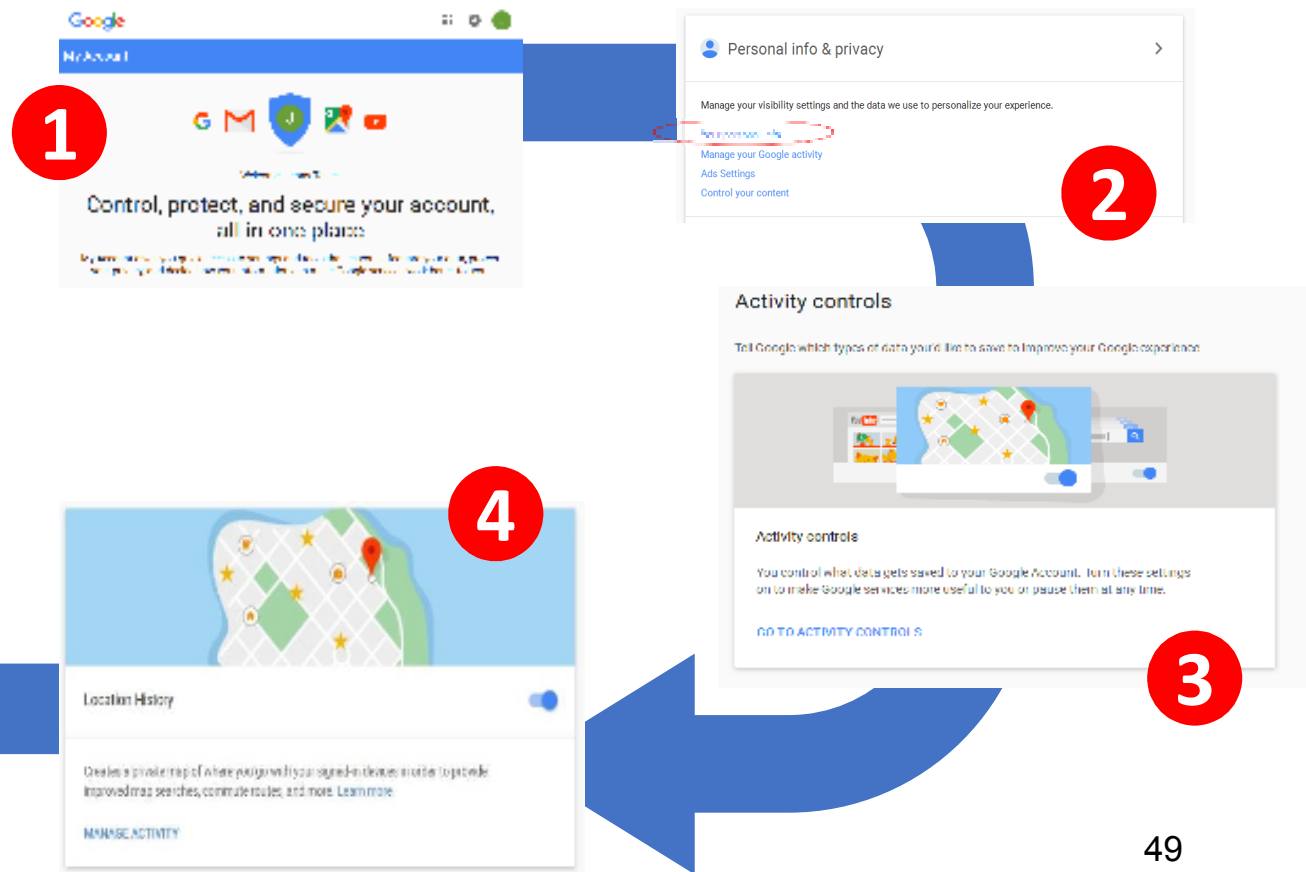


User Location Settings After Setup



Google **purposely** makes it difficult for consumers to control location sharing

- Google's site claims a one-stop-shop for privacy protection
- Lots of switches, toggles, and many additional details...



Locations Map

Timeline

2018 May 11

Sydney and Australian Capital Territory

Friday, May 11, 2018

2.5 mi 2h 59m
 1.6 mi 53m

The Westin Sydney ? 8:25 AM

1 Martin Pl, Sydney NSW 2000, Australia

YES
 NO
 OTHER

Sydney and Australian Capital Territory
 May 3 - 12, 2018

03	Thursday May 2018	04	Friday May 2018	05	Saturday May 2018	06	Sunday May 2018	07	Monday May 2018	08	Tuesday May 2018
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http://192.168...tatic/main.html x +

192.168.88.80:8008/static/main.html 110% Search

Most Visited Presentation Science Project

Samsung Galaxy B

Locations map

1	Test start time	2018-05-12 00:30:01
1	Test elapsed time	0:10:13.344663
16	# reported locations	403
16	# reported activities	340
3	# unique wifi SSIDs	1632
3	# unique BLE beacons	13
3	# beacon readings	38
3	# barometric readings	713
3	# of conversations	59
3	# of transactions	168
1	raw bits upstream	544.67 KB
1	raw bits downstream	418.45 KB
3	full bits upstream	1.33 MB
3	full bits downstream	491.10 KB
2	# files with id info	1
2	# files with ad info	16
2	# files with loc info	3
2	# files with cell info	1
18	# files with phone info	53
55	---	360

	Google	Total
TCP-80 < ec2-52-48-182-233.eu-west-1.compute.amazonaws.com	103	192.168.89.116
TCP-80 < ec2-52-48-182-233.eu-west-1.compute.amazonaws.com	103	192.168.89.116
TCP-80 < ec2-52-48-182-233.eu-west-1.compute.amazonaws.com	52	192.168.89.116
TCP-80 -> ec2-52-48-182-233.eu-west-1.compute.amazonaws.com	178	192.168.89.116
TCP-80 -> ec2-52-48-182-233.eu-west-1.compute.amazonaws.com	64	192.168.89.116
TCP-80 -> ec2-52-48-182-233.eu-west-1.compute.amazonaws.com	52	192.168.89.116
TCP-80 -> ec2-52-48-182-233.eu-west-1.compute.amazonaws.com	52	192.168.89.116
TCP-80 < ec2-52-48-182-233.eu-west-1.compute.amazonaws.com	538	192.168.89.116
TCP-80 < ec2-52-48-182-233.eu-west-1.compute.amazonaws.com	538	192.168.89.116
TCP-80 < ec2-52-48-182-233.eu-west-1.compute.amazonaws.com	1486	192.168.89.116

52

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192.168.88.80:8008/static/main.html 110% Search

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Samsung Galaxy B

Locations map

Test start time	2018-05-12 00:30:01
Test elapsed time	0:08:07.755745
# reported locations	403
# reported activities	340
# unique wifi SSIDs	1632
# unique BLE beacons	13
# beacon readings	38
# barometric readings	713
Google	Total
# of conversations	59 126
# of transactions	168 236
raw bits upstream	544.67 KB 706.69 KB
raw bits downstream	418.45 KB 420.85 KB
full bits upstream	1.33 MB 1.49 MB
	491.10 KB 493.69 KB

DA:7F:F4:53:95:62 - 0 2 OUI14319604 not registre		
DF:BC:2D:D4:D0:23 - 0 1 OUI14662701 not registre		
C4:8E:8F:3B:B1:F8 - 0 4 OUI12881551 not registre	1	1
FF:85:DA:1B:30:0A - 0 1 OUI16745946 not registre	16	16
D8:81:A3:70:28:4B - 0 1 OUI14188963 not registre	3	3
2C:6F:C9:2A:69:EE - 0 2 OUI2912201 not registre		
E1:DB:31:15:82:EF - 0 1 OUI14801713 not registre	1	1
CA:0B:FB:1C:10:D0 - 0 1 OUI13241339 not registre	53	55
CE:C5:C2:FB:DA:F8 - 0 1 OUI13551042 not registre		
6B:AF:AE:D8:19:52 - 0 17 OUI7057326 not registre		
0C:F3:EE:0C:29:F6 - 0 4 EM Microelectronic		
DE:79:93:23:BF:B8 - 0 1 OUI14580115 not registre		
D6:42:AA:43:20:BE - 0 2 OUI14041770 not registre		
TCP-80 -> ec2-52-48-182-233.eu-west-1.compute.amazonaws.com	52	192.168.89.116
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TCP-80 -> ec2-52-48-182-233.eu-west-1.compute.amazonaws.com	58	192.168.89.116
TCP-80 -> ec2-52-48-182-233.eu-west-1.compute.amazonaws.com	52	192.168.89.116
TCP-80 -> ec2-52-48-182-233.eu-west-1.compute.amazonaws.com	196	192.168.89.116

53

192.168.88.80:8008/conv/20180509T015837Z-192.168.89.116,54201-172.217.0.42,443.log?dev=116&type=bt 168.89.116

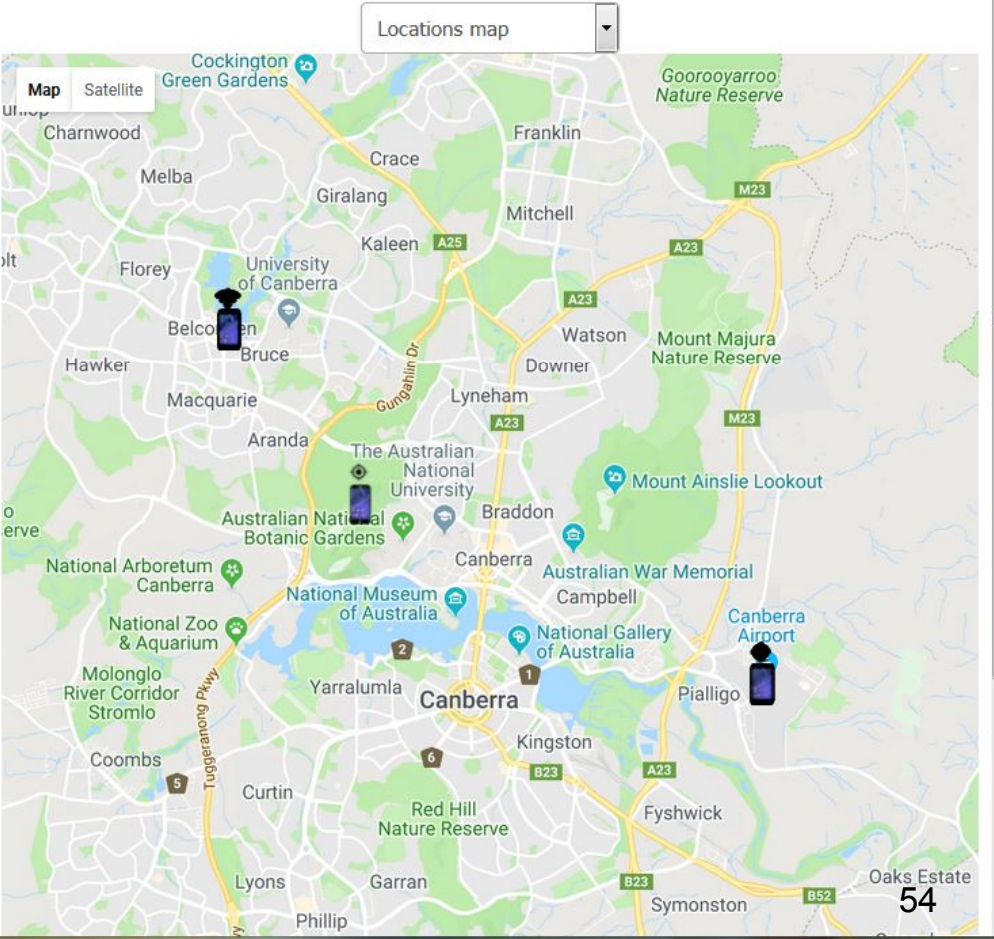
Tucker A



Test start time 2018-05-12 00:30:01
 Test elapsed time 0:05:53.868310
 # reported locations 128
 # reported activities 170
 # unique wifi SSIDs 628
 # unique BLE beacons 1
 # beacon readings 21
 # barometric readings 245

	Google	Total
# of conversations	97	103
# of transactions	282	290
raw bits upstream	1.20 MB	1.20 MB
raw bits downstream	807.76 KB	924.99 KB
full bits upstream	1.28 MB	1.28 MB
	847.63 KB	965.08 KB

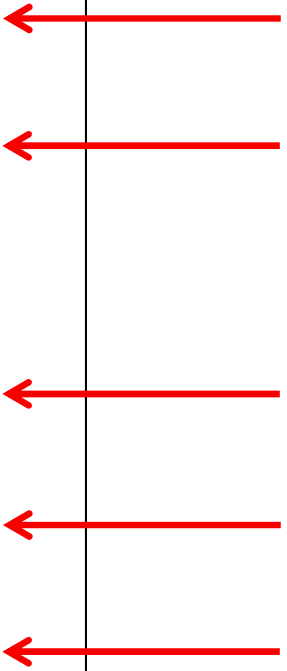
# files with id info	45	45
# files with ad info	18	18
# files with loc info	7	7
# files with cell info	2	2
# files with phone info	0	0
TCP-5228 -> oq-in-f188.1e100.net 60 192.168.89.118 --- 20 ---		
TCP-5228 -> oq-in-f188.1e100.net 60 192.168.89.118		
TCP-5228 -> oq-in-f188.1e100.net 60 192.168.89.118		
TCP-5228 -> oq-in-f188.1e100.net 60 192.168.89.118		
TCP-443 -> dfw28s02-in-f4.1e100.net 52 192.168.89.118		
TCP-443 -> dfw28s02-in-f4.1e100.net 52 192.168.89.118		
TCP-443 -> dfw28s02-in-f4.1e100.net 52 192.168.89.118		
TCP-443 -> dfw28s02-in-f4.1e100.net 59 192.168.89.118		
TCP-443 -> dfw28s02-in-f4.1e100.net 61 192.168.89.118		



Activity Reading

Google knows where you are and what you are doing

```
"activities": [  
  {  
    "confidence": 46,  
    "type": "inVehicle"  
  },  
  {  
    "confidence": 25,  
    "type": "still"  
  },  
  {  
    "confidence": 23,  
    "type": "unknown"  
  },  
  {  
    "confidence": 5,  
    "type": "onFoot"  
  },  
  {  
    "confidence": 5,  
    "type": "walking"  
  },  
  {  
    "confidence": 2,  
    "type": "onBicycle"  
  }  
],  
"timestampMs": 1491421496062
```



localhost:8008/str ... localhost:8008/com ... localhost:8008/com ...

localhost:8008/com/20180212T202342Z-192.168.89.113%2C4266-172.217.12.234%2C443.log?dev=113&type=bt

20180212 1202342Z-192.168.89.113,4266-172.217.12.234,443.kg

192.168.89.113
172.217.12.234

88 088906 -76.4977892
33 0020895 -77.0344178
88 0009474 -77.0344907
33 0888893 -76.8985738
88 0009428 -77.0345714
33 0020884 -77.0344271
33 0009637 -77.0345078
88 0009025 -77.0344891
88 0009673 -77.0344359
33 0020913 -77.0344213
88 0794289 -76.4837091
33 0001789 -76.4841439
88 0009734 -76.8980013
88 0120077 -77.0324424
33 0003825 -76.4811557
88 0178988 -76.9721026

8c0d 863c 20
8c0d 8032 74
9c1c 12 17 02 11
f0c8 835e 00
e4 5b5e 41 e0 a2
f0c8 ac17 e0
e4 5b5e 41 e0 a2
f0c8 ac17 e0
0d 211c 0d 04 00
10 0501 2e 0e 20
0d 2005 72 58 80
e4 5b5e 41 e0 a2
8c0d 80 33 0e
10 0501 2e 0e 22
e4 5b5e 41 e0 a2
d8 87ba e0 89 53
9c1c 12 17 02 11
e4 8f13 42 a3 70
f0c8 ac21 00
e4 5b5e 41 e0 a2
71 e2 88 d8 e3
8d ac 9d 41 70 00
10 0501 2e 0e 23
f0c8 835e 02
44 f6e7 d9 41 70
04 1 731 71 58 94
f0c8 835e 01
8c0d 80 3c 5c
8c0d 09 14 97

50 31E2 8759 80 - 0 3
33 90C3 13 48 42 - 5 0
4F 48 3D AC 00 E9 - 0 1
70 00 C3 DA - 0 1
78 01 58 86 - 0 1
33 90 C3 13 48 42 - 5 0 7

```

{
  "activities": [
    {
      "confidence": 100,
      "type": "waiting@vehicle"
    }
  ],
  "timestamps": 1518457134536
},
{
  "activities": [
    {
      "confidence": 91,
      "type": "onFoot"
    },
    {
      "confidence": 91,
      "type": "walking"
    },
    {
      "confidence": 6,
      "type": "onBicycle"
    },
    {
      "confidence": 2,
      "type": "unknown"
    },
    {
      "confidence": 1,
      "type": "running"
    }
  ],
  "timestamps": 1518457134534
},
{
  "activities": [
    {
      "confidence": 31,
      "type": "onFoot"
    },
    {
      "confidence": 31,
      "type": "walking"
    },
    {
      "confidence": 25,
      "type": "onBicycle"
    },
    {
      "confidence": 22,
      "type": "unknown"
    },
    {
      "confidence": 7,
      "type": "inVehicle"
    },
    {
      "confidence": 7,
      "type": "onBicycle"
    }
  ]
}

```

base/192.168.1.106/main.html | base/192.168.1.106/dependencies

192.168.1.106:8080 (view of main.html) 100%

Mod Voted Presentation Source Project

Tucker A

Activities list

Test start time	2018-05-12 00:30:01		
Test elapsed time	0 22 13.333163		
# reported locations	120		
# reported activities	170		
# unique wifi SSIDs	620		
# unique BLE beacons	1		
# beacon readings	21		
# barometric readings	245		
		Google	Total
# of conversations	97		103
# of transactions	282		290
raw bits upstream	1.20 MB		1.20 MB
raw bits downstream	807.76 KB		921.99 KB
full bits upstream	1.28 MB		1.28 MB
full bits downstream	817.03 KB		935.08 KB
# files with id info	45		45
# files with ad info	10		10
# files with loc info	7		7
# files with call info	2		2
# files with phone info	0		0

20.40.03 sensorData - barometerData	pressure(IpaL3, 920120)
20.48.04 api/Metadatas - wifiScans	n/a/00:04:FD:F4:F2:27-78 2447
20.50.04 activities - onFoot	onFoot: 88%
20.50.04 sensorData - barometerData	pressure(IpaL3, 920172)
20.50.07 api/Metadatas - wifiScans	n/a/00:17:CE:ED:LL:BB-91 2457
20.51.46 sensorData - barometerData	pressure(HpaFS, 929180)
20.52.05 api/Metadatas - cell-wifi-gps	notInDatabase-timedOutOnScan-none
20.52.05 api/Metadatas - cell-wifi-gps	notInDatabase-timedOutOnScan-none
20.54.07 activities - onFoot	onFoot: 89%
20.54.08 sensorData - barometerData	pressure(IpaL3, 920301)
20.54.09 api/Metadatas - bleScans	n/a
20.54.10 api/Metadatas - wifiScans	n/a
20.55.47 sensorData - barometerData	pressure(IpaL3, 920179)
20.55.10 api/Metadatas - cell-wifi-gps	notInDatabase-notInDatabase-none
20.56.10 api/Metadatas - cell-wifi-gps	notInDatabase-notInDatabase-none
20.58.18 activities - unknown	unknown: 81%
20.58.18 sensorData - barometerData	pressure(IpaL3, 922640)
20.58.14 api/Metadatas - wifiScans	n/a/00:17:C9:F0:FF:88-86 2457
20.58.26 activities - onFoot	onFoot: 82%
21.00.02 sensorData - barometerData	pressure(IpaL3, 926420)
21.00.14 api/Metadatas - cell-wifi-gps	notInDatabase-timedOutOnScan-none
21.00.14 api/Metadatas - cell-wifi-gps	notInDatabase-timedOutOnScan-none
21.01.09 activities - unknown	unknown: 40%
21.01.14 activities - inVehicle	inVehicle: 42%
21.02.18 sensorData - barometerData	pressure(HpaFS, 981782)
21.02.18 activities - biking	biking: 100%
21.02.19 api/Metadatas - wifiScans	n/a
21.02.28 activities - inVehicle	inVehicle: 86%
21.04.05 sensorData - barometerData	pressure(IpaL3, 930567)
21.04.07 api/Metadatas - bleScans	n/a

Windows Explorer

Barometric Pressure

Google collects barometric pressure data to determine a users altitude

Every few minutes a pressure reading is recorded, which can help determine users' vertical location.

```
"sensorData": {  
  "barometerData": [  
    {  
      "timestampMs": 1493744203972,  
      "pressureHpaE3": 1002775  
    },  
    {  
      "timestampMs": 1493744130004,  
      "pressureHpaE3": 1002820  
    },  
    {  
      "timestampMs": 1493743946013,  
      "pressureHpaE3": 1002845  
    },  
    {  
      "timestampMs": 1493743884902,  
      "pressureHpaE3": 1002842  
    },  
    {  
      "timestampMs": 1493743768875,  
      "pressureHpaE3": 1002878  
    },  
    {  
      "timestampMs": 1493743394019,  
      "pressureHpaE3": 1002917  
    },  
    {  
      "timestampMs": 1493743332926,  
      "pressureHpaE3": 1002946  
    },  
    {  
      "timestampMs": 1493742961982,  
      "pressureHpaE3": 1003015  
    },  
    {  
      "timestampMs": 1493742859054,  
      "pressureHpaE3": 1003073  
    }  
  ]  
}
```


WiFi Scan

”Crowd sourced” WiFi mapping

- Every WiFi unique ID and base station signal strength is collected by 2 billion mobile devices circling the globe and secretly updating Google’s massive Wi-Fi database.
- Every mobile device constantly broadcasting WiFi base stations, MAC ID and signal strength.
- This creates a digital map over which Google can superimpose every Android user’s location



```
"readingInfo": {
  "source": "wifi",
  "batteryCondition": {
    "scale": 100,
    "voltage": 4262,
    "charging": "notCharging",
    "level": 91
  },
  "wifiScans": [
    {
      "wifiAuthType": "wpaPsk",
      "mac": 211476257487868,
      "strength": -49,
      "isConnected": true
    },
    {
      "mac": 22615190907594,
      "strength": -41
    },
    {
      "mac": 75243883415846,
      "strength": -45
    },
    {
      "mac": 9674020702577,
      "strength": -52
    },
    {
      "mac": 1094288286113,
      "strength": -64
    },
    {
      "mac": 1094288286112,
      "strength": -66
    }
  ]
}
```

Google can finely target ads because billions of Android users are mapping other consumers' WiFi access points

- Google collects all “publicly broadcast” Wi-Fi access points - there is no such thing as “privately broadcast” Wi-Fi.
- Wi-Fi base station set up procedures make no mention of this data collection.
- Most users do not understand Google’s procedure for opting out of Google’s Wi-Fi base stations collection. Whether they are Google users or not, their Wi-Fi base station gets mapped anyway.

Follow general steps for many access points

1. Make a physical connection between your access point and your computer with an Ethernet cable.
2. Find the default gateway of your connection:
 - On Windows, type "ipconfig" into the command prompt (on the Start menu).
 - On Mac OS, type "ifconfig" into the command prompt.
 - On Linux, type "ifconfig" into the command prompt.
3. After you have the default gateway (it looks like 192.168.0.1), type it into the address bar of your web browser, like Chrome or Firefox. This step will take you to the control panel for your access point.
4. If asked to sign to your access point that came with your access point.

After you've changed your SSID, re-ess step from any devices using Wi-Fi, like use the same password.

Was this article helpful?

YES

NO

Control access point inclusion in Google's Location services

To improve Location services, Google uses publicly broadcast Wi-Fi data from wireless access points and GPS, cell tower, and sensor data. Only publicly broadcast Wi-Fi information is used to estimate the location of a device.

To help apps like Google Maps work better, you can let Google's Location services use your Wi-Fi access point.

[How do I opt out of Google Location services?](#)

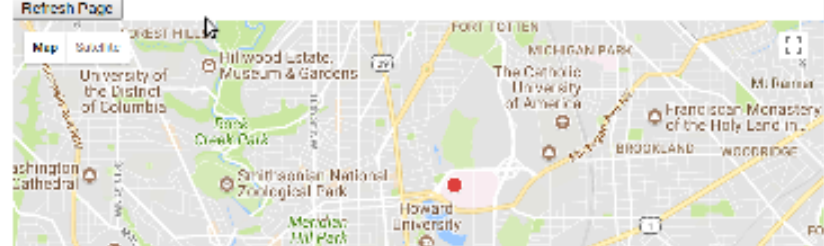
To opt out, change the SSID (name) of your Wi-Fi access point (your wireless network name) so that it ends with "_nomap". For example, if your SSID is "12345," you would change it to "12345_nomap."

```

38.879897L 77.007761S
30.076036W -77.016518W

wifi:03:5e:04:
08:07:ba:a8:d9:53
wifi:03:5e:04:
c0:46:9a:3d:cc:00
wifi:03:5e:04:
3c:a8:2ad:5dd:04
wifi:03:5e:04:
c0:21:b7:b0:b4:c0
10:05:01:2e:04:20
88:cc:96:41:70:00
41:95:9a:41:09:05
8c:c6:96:3a:5e
10:05:01:2e:04:22
8c:0f:0c:75:0a
wifi:03:5e:04:
74:85:2a:b6:85:03
d8:97:ba:a8:d9:53
08:07:ba:a8:d9:52
08:ad:41:01:b1:06
fc:c8:83:5e:01
d8:97:ba:a8:d9:2e
fc:c8:8a:17:c1
wifi:03:5e:04:
c4:95:6e:41:87:ad
wifi:03:5e:04:
c4:0f:13:43:d8:78
wifi:03:5e:04:
44:9e:c5:42:41:26
41:17:01:71:00:04
8c:c6:96:3c:5e
wifi:03:5e:04:
8c:c6:96:14:97
54:13:79:80:81:24 0:28

device=1011:07
mode=68142
imageurl=SonyX0114X0114Z-7.1.1045.U.S.7.10/29/01/0180/sony-misc-info-keys
  
```



```

{"timestamp": 1515429621767,
  "wifiScans": [
    {
      "time": 1515429621767,
      "strength": 48,
      "frequencyMhz": 2462
    },
    {
      "mac": "9674917712688",
      "strength": -49,
      "frequencyMhz": 2462
    },
    {
      "time": 1781980676582708,
      "strength": 58,
      "frequencyMhz": 2437
    },
    {
      "mac": "1894288283585",
      "strength": -69,
      "frequencyMhz": 2437
    },
    {
      "time": 1781980645412,
      "strength": 70,
      "frequencyMhz": 2462
    },
    {
      "mac": "17613680545314",
      "strength": -70,
      "frequencyMhz": 2462
    },
    {
      "time": 1781980645415,
      "strength": 73,
      "frequencyMhz": 2462
    },
    {
      "mac": "66692071693425",
      "strength": -75,
      "frequencyMhz": 2437
    },
    {
      "time": 1515429621767,
      "strength": 80,
      "frequencyMhz": 2437
    },
    {
      "mac": "9674920762576",
      "strength": -80,
      "frequencyMhz": 2437
    },
    {
      "time": 1515429621767,
      "strength": 80,
      "frequencyMhz": 2437
    }
  ]
}
  
```

Bluetooth Scan

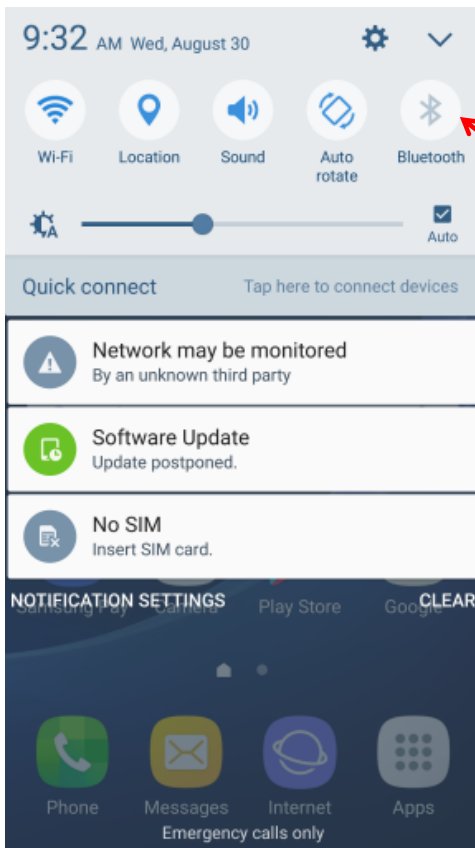
Google also **collects** bluetooth beacon information ...



```
20170724T183130Z-192.168.89.103,49399-172.217.4.170,443.json
Q- Find <> Done Replace
{
  "rate": {
    "bleRate": {
      "maxDelayMs": 600000,
      "strategy": "locationAwareDefault",
      "minDelayMs": 300000,
      "activeTimeMs": 2000, [
      "bluetoothEnabled": false
    ]
  },
  "timestampMs": 1500920163866
},
{
  "timestampMs": 1500919926761,
  "bleScanReport": {
    "bleScans": [
      {
        "type": "type1",
        "mac": "103537069952442",
        "cssIDbn": "-B9",
        "txPowerQbm": "-65",
        "id": "nrNT0n25Ue3ELrw0810p0A0AAA="
      }
    ]
  },
  "timestampMs": 1500919926421,
  "bleScanReport": {
    "bleScans": [
      {
        "type": "type1",
        "mac": "103537069952442",
        "cssIDbn": "-B0",
        "txPowerQbm": "-65",
        "id": "nrNT0n25Ue3ELrw0810p0A0AAA="
      }
    ]
  },
  "timestampMs": 1500919926206,
  "bleScanReport": {

```











... even if a user disables Bluetooth



```
20170724T183130Z-192.168.89.103,49399-172.217.4.170,443.json
Q- Find <> Done Replace
{
  "rate": {
    "bleRate": {
      "maxDelayMs": 600000,
      "strategy": "locationAwareDefault",
      "minDelayMs": 300000,
      "activeTimeMs": 2000, [
        "bluetoothEnabled": false
      ]
    },
    "timestampMs": 1500920163866
  },
  {
    "timestampMs": 1500919926761,
    "bleScanReport": {
      "bleScans": [
        {
          "type": "type1",
          "mac": "103537069952442",
          "cssIDbn": "-89",
          "txPowerDBm": "-65",
          "id": "nrNT0n25Ue3ELrw0810p0A0AAA="
        }
      ]
    }
  },
  {
    "timestampMs": 1500919926421,
    "bleScanReport": {
      "bleScans": [
        {
          "type": "type1",
          "mac": "103537069952442",
          "cssIDbn": "-90",
          "txPowerDBm": "-65",
          "id": "nrNT0n25Ue3ELrw0810p0A0AAA="
        }
      ]
    }
  },
  {
    "timestampMs": 1500919926206,
    "bleScanReport": {

```


Second by second recording

-  7
-  58
-  9
-  9
- 
-  2
-  2
-  52
-  210
-  1

Test start time	2018-05-31 09:35:32
Test elapsed time	0:01:46.289670
# reported locations	302
# reported activities	472
# unique wifi SSIDs	1634
# unique BLE beacons	5
# beacon readings	86
# barometric readings	760
Google	
# of conversations	228
# of transactions	741
raw bits upstream	1.46 MB
raw bits downstream	6.87 MB
full bits upstream	2.84 MB
full bits downstream	6.53 MB
# files with id info	7
# files with ad info	58
# files with loc info	9
# files with cell info	0
# files with phone info	204

Time	Activity	Details
03:58:40	activities - inVehicle	inVehicle: 82%
03:58:48	locationReadings - gps	50.8556698,4.3573356 +46
03:58:50	apiMetadata - rate	burst - Now Vehicle Exit (null)
03:59:53	activities - tilting	tilting: 100%
03:59:54	activities - inVehicle	inVehicle: 37%
03:59:57	activities - tilting	tilting: 100%
04:00:00	activities - inVehicle	inVehicle: 35%
04:00:06	activities - unknown	unknown: 31%
04:00:17	activities - onFoot	onFoot: 52%
04:00:21	activities - onFoot	onFoot: 88%
04:00:21	activities - exitingVehicle	exitingVehicle: 100%
04:00:24	apiMetadata - wifiScans	n/a00:A0:57:18:4B:CA -75 2417 9C:97:26:DF:54:31 -88 2427 AC:84:C9:65:FE:A2 -90 2427 30:D3:2D:7C:97:D9 -90
04:00:25	apiMetadata - rate	burst - Now Vehicle Exit (null)
04:00:30	locationReadings - gps	50.8550315,4.359125 +117
04:00:37	apiMetadata - rate	burst - Now Vehicle Exit (null)
04:00:39	locationReadings - gps	50.8530502,4.3591061 +120
04:00:39	apiMetadata - rate	burst - Now Vehicle Exit (null)
04:00:45	apiMetadata - wifiScans	n/a30:17:C3:9D:91:01 -79 2457 30:17:C3:9D:91:02 -79 2457 30:17:C3:9D:91:05 -79 2457 30:17:C3:9D:91:06 -80 1
04:00:54	sensorData - barometerData	pressureIpsL3: 1013443
04:01:04	apiMetadata - wifiScans	n/a30:17:C3:9D:90:C1 -72 2452 30:17:C3:9D:90:C2 -72 2452 30:17:C3:9D:90:C3 -72 2452 30:17:C3:9D:90:C4 -72
04:02:22	apiMetadata - rate	burst - Now Vehicle Exit (null)
04:03:10	apiMetadata - wifiScans	n/a30:17:C3:9D:90:21 -72 2412 30:17:C3:9D:90:22 -72 2412 30:17:C3:9D:90:23 -72 2417 30:17:C3:9D:90:24 -72 2
04:03:10	sensorData - barometerData	pressureIpsL3: 1013088
04:04:12	activities - still	still: 80%
04:05:13	apiMetadata - wifiScans	n/a30:17:C3:9D:90:C2 -87 2457 30:17:C3:9D:90:C5 -87 2457 30:17:C3:9D:90:C1 -89 2457 30:17:C3:9D:90:C3 -89
04:05:32	sensorData - barometerData	pressureIpsL3: 1012871
04:05:34	apiMetadata - bleScans	n/a
04:06:39	sensorData - barometerData	pressureIpsL3: 1012767
04:07:16	activities - still	still: 43%
04:07:17	apiMetadata - wifiScans	n/a30:17:C3:9D:90:C1 -89 2457 30:17:C3:9D:90:C2 -89 2457 30:17:C3:9D:90:C3 -89 2457 30:17:C3:9D:90:C4 -89
04:09:17	apiMetadata - wifiScans	n/a30:17:C3:9D:90:C4 -71 2452 30:17:C3:9D:90:C5 -71 2452 30:17:C3:9D:90:C6 -71 2452 30:17:C3:9D:90:C7 -71
04:09:17	sensorData - barometerData	pressureIpsL3: 1012715
04:10:39	sensorData - barometerData	pressureIpsL3: 1012678
04:10:40	activities - unknown	unknown: 31%
04:11:19	apiMetadata - wifiScans	n/a30:17:C3:9D:90:C4 -71 2452 30:17:C3:9D:90:C5 -71 2452 30:17:C3:9D:90:C7 -71 2452 30:17:C3:9D:90:24 -72
04:13:20	apiMetadata - wifiScans	n/a30:17:C3:9D:90:21 -74 2417 30:17:C3:9D:90:22 -74 2417 30:17:C3:9D:90:23 -74 2417 30:17:C3:9D:90:24 -74 2
04:13:41	sensorData - barometerData	pressureIpsL3: 1012650
04:13:42	activities - still	still: 57%
04:15:13	activities - tilting	tilting: 100%

Activities list

Linking Datasets

Google links unique ID data – not anonymous

- Google includes Android ID, phone hardware identification (IMEI), and other user-specific data in the logs it sends to Google servers

```
[req_data content="raw" encode="gzip"]
{
  "02": 4291696000523071775,
  "03": "1-44f2bcbde5e060629ebe50a2ca1b06fc96194d9f",
  "13": 1126800171803532388,
  "12": "America/New_York",
  "06": {
    "12": 1398103918
  },
  "07": 15292005536527666516,
  "04": {
    "02": 1516214245263,
    "01": {
      "02": "qcom",
      "03": "samsung",
      "13": "heroqlteue",
      "01": "samsung/heroqlteue/heroqlteue:7.0/NRD06M/G930UUEU4BQE",
      "06": "android-samsung",
      "07": 1494842706,
      "04": "G930UUEU4BQE2",
      "05": "G930UUEU4BQE2",
      "19": "2017-05-01",
      "08": 11951448,
      "09": "heroqlteue",
      "12": "samsung",
      "14": 1,
      "11": "SM-G930U",
      "15": {
        "02": "es-android-samsung",
        "01": 9
      },
      "18": 24
    },
    "06": "310410",
    "14": 2,
    "18": 1,
    "00": "wifi:",
    "09": 0,
    "15": {
      "02": 1,
      "03": "unspecified",
      "01": 8,
      "04": {},
      "05": 0
    }
  },
  "10": "358512071494142",
  "19": "wifi",
}
```

June 2016: Google “updates” Terms of Service

future  **THE CITIZENS GUIDE TO THE FUTURE** | OCT. 21 2016 4:55 PM

Google Changed a Major Privacy Policy Four Months Ago, and No One Really Noticed

By Suzanne Moriyak   

For almost 10 years, Google promised to protect users' privacy from advertisers by keeping personally identifiable information about its users, gleaned from Gmail accounts and other Google services, separate from its subsidiary. But the company quietly updated its privacy policy in June to say that users' activities on other sites "may be associated with your personal information," **ProPublica reported Friday**. Google's previous privacy policy, which is literally crossed through in front of its new one in Google's new **privacy policy**, had pledged to "not combine DoubleClick cookie information with personally identifiable information" without users' consent.

Our automated systems analyze your content (including emails) to provide you personally relevant product features, such as customized search results, tailored advertising, and spam and malware detection.

We may combine personal information from one service with information, including personal information, from other Google services – for example to make it easier to share things with people you know. ~~We will not combine DoubleClick cookie information with personally identifiable information unless we have your opt-in consent.~~ Depending on your account settings, your activity on other sites and apps may be associated with your personal information in order to improve Google's services and the ads delivered by Google.

We will ask for your consent before using information for a purpose other than those that are set out in this Privacy Policy.

Google

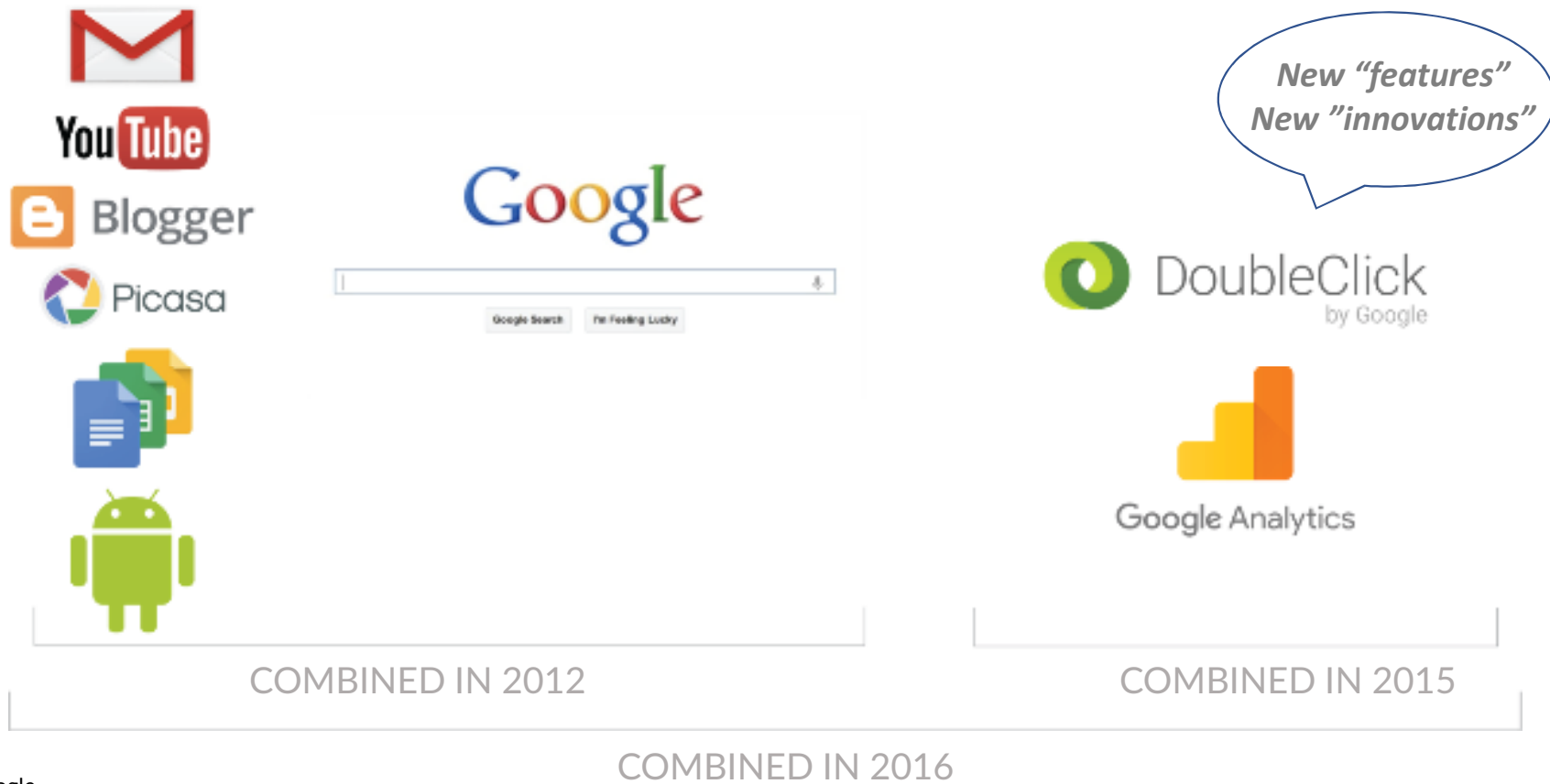
All data can now be combined

The sentence that changed the Internet economy

We may combine personal information from one service with information, including personal information, from other Google services – for example to make it easier to share things with people you know. ~~We will not combine DoubleClick cookie information with personally identifiable information unless we have your opt-in consent.~~ Depending on your account settings, your activity on other sites and apps may be associated with your personal information in order to improve Google's services and the ads delivered by Google.



Combination of Google's vast data sources enables it to create **unrivaled superprofiles for ad targeting**



Superprofiles vs. ...



FOX's prime-time line-up is intended to appeal primarily to target audiences of 18 to 49-year old adults, the demographic group that advertisers seek to reach most often, with an emphasis on the 18 to 34-year old adult demographic coveted by advertisers.

Privacy "policy" has no practical import for consumers

- 24 Changes since 1999
- 10 Changes in the last three years.
- 3 Changes last year alone!

Google Privacy & Terms

Changes

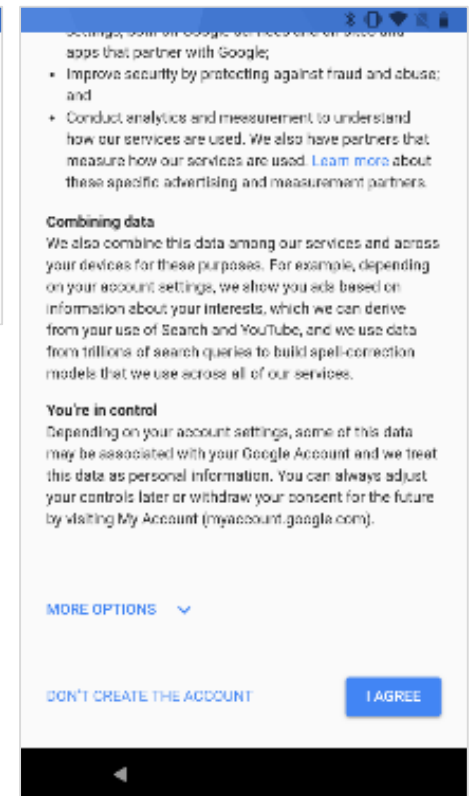
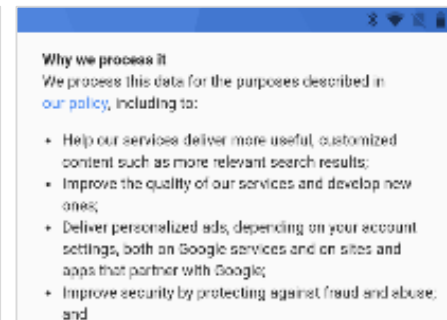
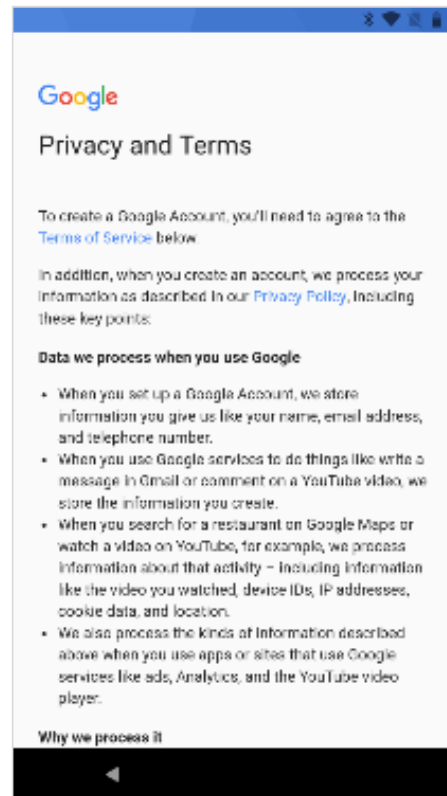
Our Privacy Policy may change from time to time.

June 9, 1999
September 20, 1999
January 4, 2001
July 1, 2004
October 14, 2005
August 7, 2008
January 27, 2009
March 11, 2009
October 3, 2010
October 20, 2011
March 1, 2012
July 27, 2012
June 24, 2013
December 20, 2013
March 31, 2014
December 19, 2014
February 25, 2015
May 1, 2015
June 5, 2015
June 30, 2015
August 19, 2015
March 25, 2016
June 28, 2016
September 29, 2016

For new users, Google's "terms" policy applied by default

Google's Terms of Service are an all or nothing proposition for new users.

Users "choices" are to agree or to cancel the new account – no granularity in the terms of use



Declining the terms of service is not an option: it's an all or nothing choice

1. Introduction

Applicable Terms. Thanks for using Google Play. Google Play is a service provided by Google Inc. ("Google", "we" or "us"), located at 1600 Amphitheatre Parkway, Mountain View California 94043, USA, and is subject to the [Google Terms of Service \("Google ToS"\)](#). Google Play is a "Service" as defined in the Google ToS, and these Google Play Terms of Service are additional terms which apply to the use of Google Play. Your use of Google Play and the apps (including Android Instant Apps), games, music, movies, books, magazines, or other digital content or services (referred to as "Content") available through it is subject to these Google Play Terms of Service and the Google ToS (which together we refer to as the "Terms").

If there is any conflict between the Google Play Terms of Service and the Google ToS, the Google Play Terms of Service shall prevail.

Your use of the Google Play store requires that you agree to the following terms. Please read them carefully. If you do not understand the Terms, or do not accept any part of them, then you should not use the Google Play store. Some products and features may be not available in all countries. Please see the [Google Play Help Center](#) for more information.

Information about You. In order to access certain services or Content on Google Play, you may be required to provide information about yourself such as your name, address, and billing details. The information we collect, including information obtained from third parties, is shared between Google and its group companies to operate the Service. Google's [privacy policies](#) explain how we treat your personal data and protect your privacy when using Google Play. Any such information you provide to Google must always be accurate, correct and up to date. Google may need to provide your personal information, such as your name and email address, to Providers for the purposes of processing your transactions and/or provisioning Content to you. Google has agreed with Providers that they will use this information in accordance with their privacy policies.

Device information • Log information • IP Address server logs • Unique device identifiers • Search queries • Location • Cookies • Personal information stored locally • Information about visits to multiple sites • Nearby devices • Telephone logs ...

Google has a monopoly on **this ...**



And this ...

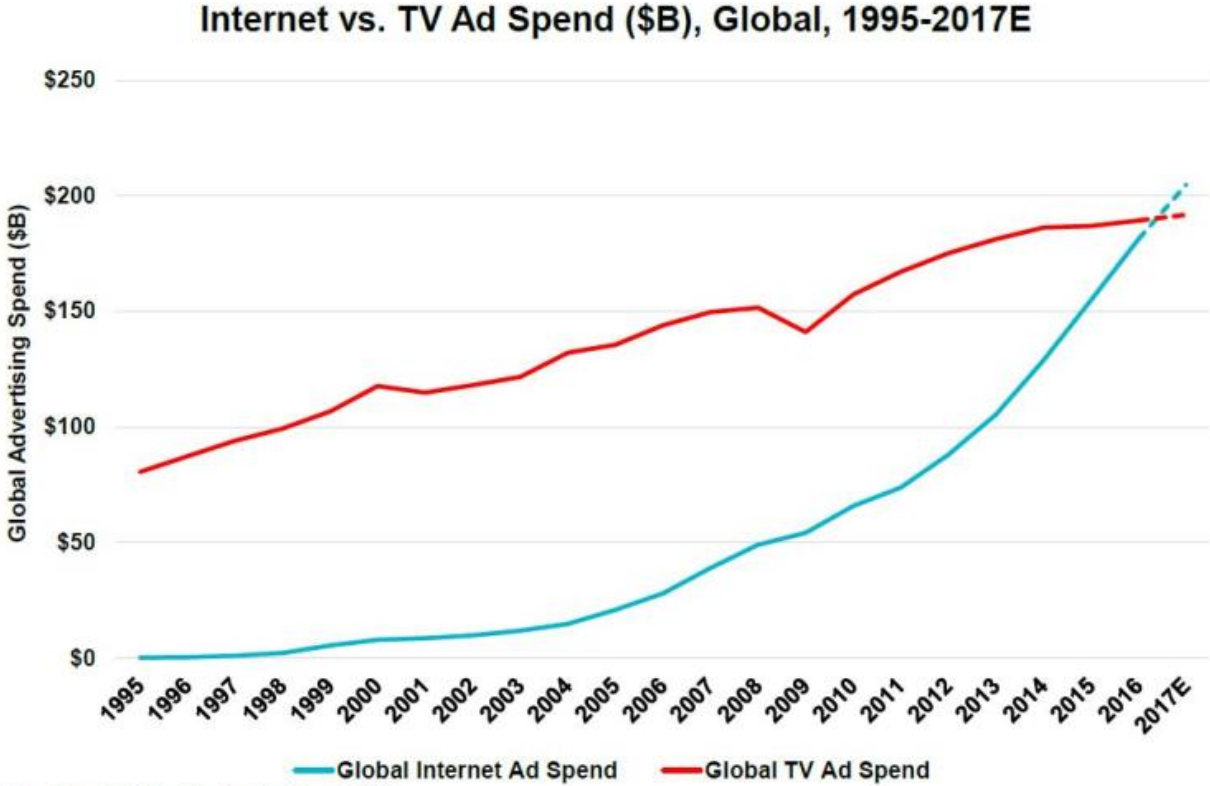


The "third screen" is next



PHILIPS SONY

Television is Google's last growth ad market



TVs are becoming “app-based”



THE WALL STREET JOURNAL

YouTube Tops 1 Billion Hours of Video a Day, on Pace to Eclipse TV

Google unit posts 10-fold increase in viewership since 2012, boosted by algorithms personalizing user lineups



Cost of YouTube content to Google: \$0
Advertising Revenue 2020: \$27.4 Billion (+21%)

Last year, YouTube ad revenues represented a relatively small portion of Google's total ad revenues, according to a report by stock analysis company [Amigo Bulls](#), compared with revenue derived from Google web search. While YouTube grossed \$8.5 billion in 2015, according to Sheridan's report, Google websites reportedly grossed \$52.4 billion.

However, Sheridan believes YouTube could very well be central to Google's next phase of growth. He anticipates YouTube will continue to **grow at 21% for the next four years, and that by 2020, the site will have generated \$27.4 billion** in revenues. This is comparable to Facebook's revenue estimates for 2016, which are currently pegged at \$25.6 billion.

Declining the terms of service is not an option: it's an all or nothing choice

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Can I use my Sony Android TV without agreeing to Google's Terms of Service and Privacy Policy?

[Print This Page](#)

Article ID : 113926
Last Modified : 18-05-2015

Answer

No, to use your Sony Android TV, you must consent to Google's Terms of Service and Privacy Policy.

You must click **CONTINUE** on the Google's Terms of Service and Privacy Policy screen when [setting up the Sony Android TV for the first time](#).

A large billboard is shown against a blue sky with white clouds. The billboard has a white face and a dark border. It is supported by a metal structure with several lights on top. The text on the billboard is arranged in three paragraphs, each starting with a bolded word.

The **greater** Google's **data scale and diversity** advantage, the more it can target ads, the more valuable its ads are, and the more it can generate ad revenue, selling ads and associated services

Augmenting its data scale and diversity advantage insulates Google from competition in advertising and other services, increases its market shares and profitability.

Google's control of *both the data and the ad tech market* puts publishers at a persistent and structural disadvantage.