

Cybercrime, Cyberterrorism, and Cyberwar

Commercial surveillance

Juan Tapiador
uc3m

“Surveillance is the business model of the Internet”

—*Bruce Schneier*

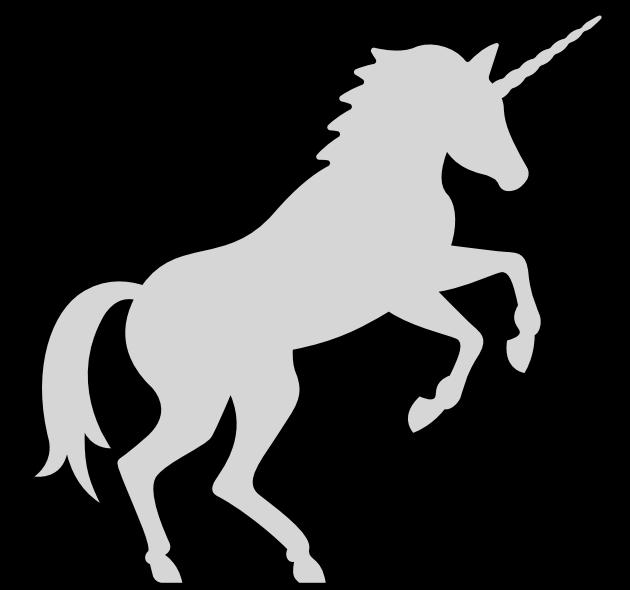


The Electronic Eye

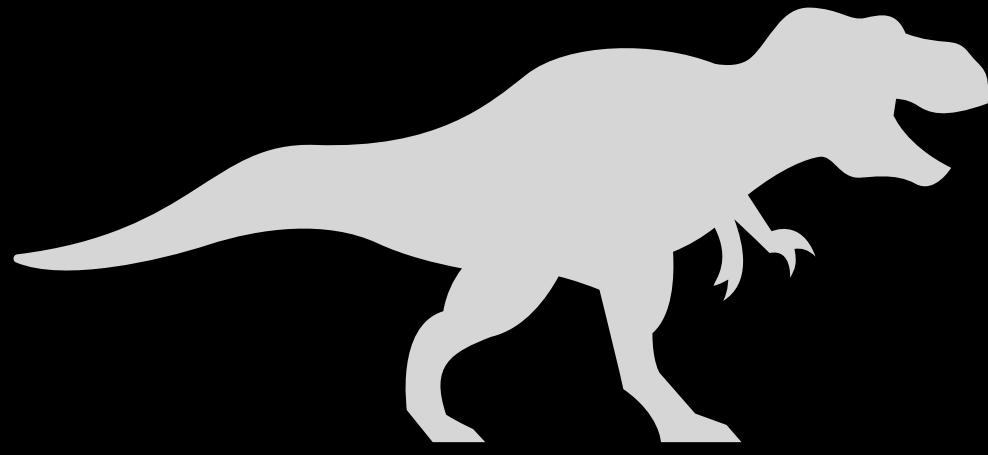
THE RISE OF SURVEILLANCE SOCIETY

DAVID LYON

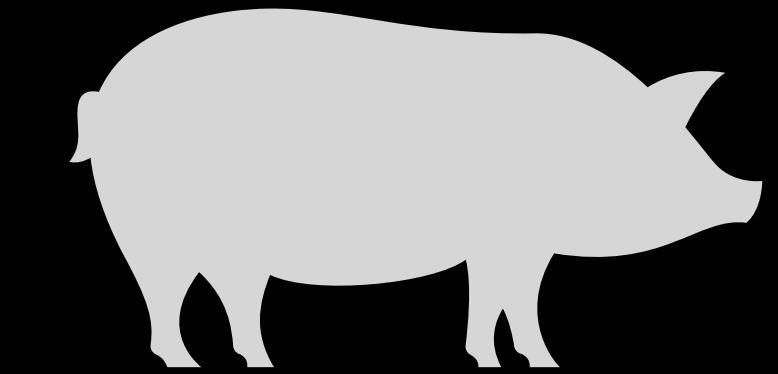
ECOSYSTEM



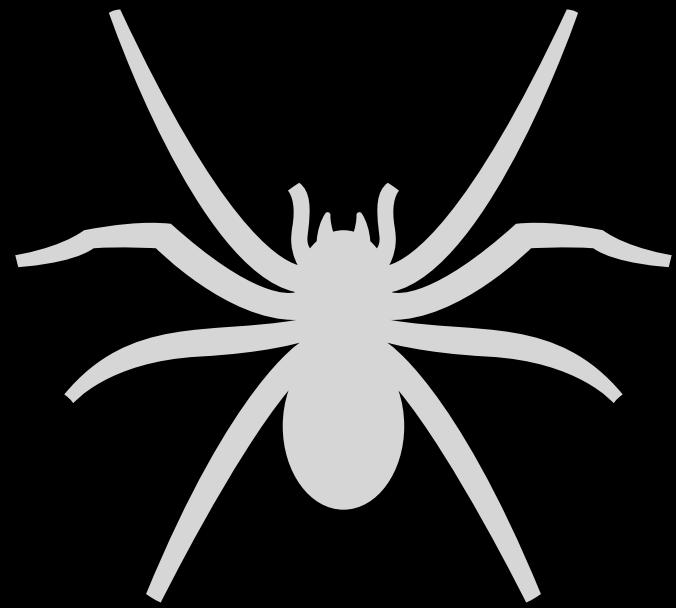
Data



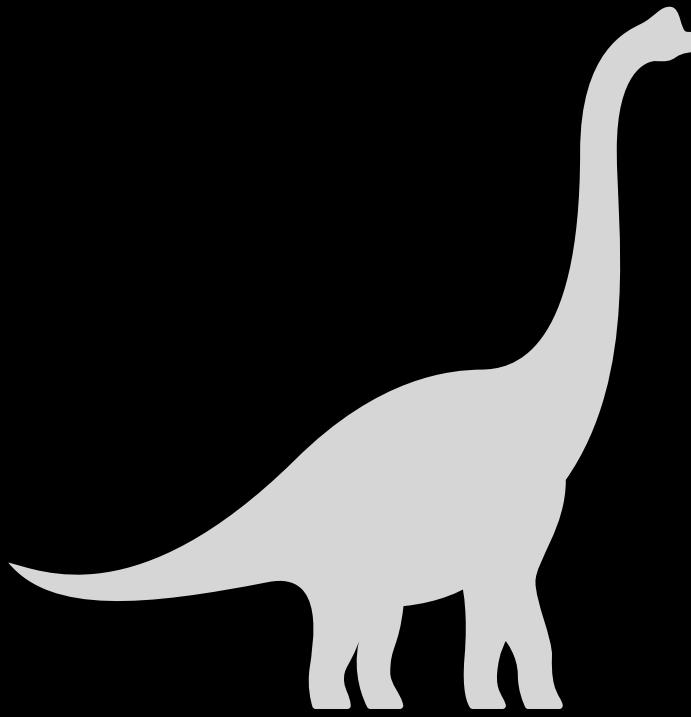
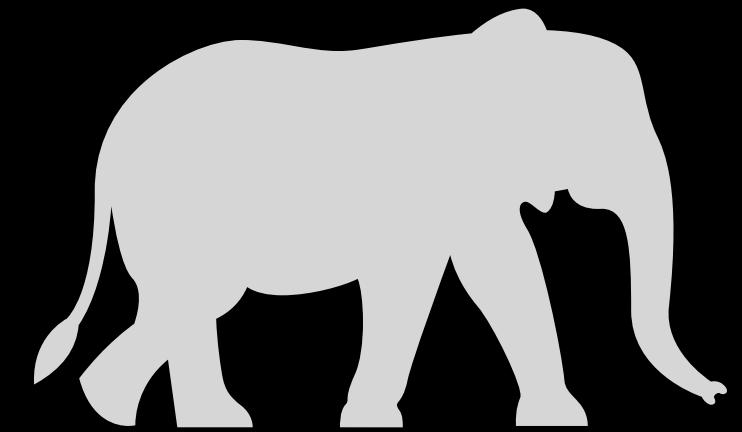
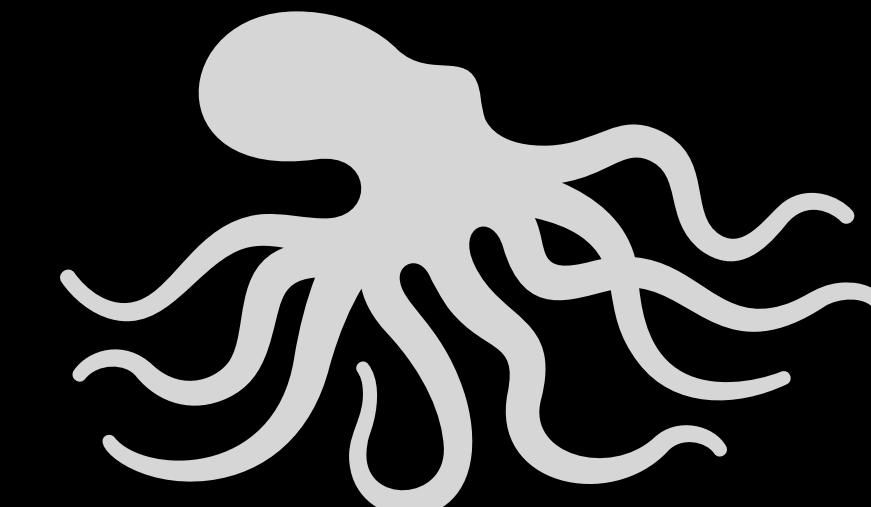
Trackers



Data brokers



Search Engines Social Networks Advertisement Smartphones



I've got an ad for you

A brief history of Internet advertisement and
the technology behind and ad

The body of the message -- Date: 1 May 1978 1233-EDT

DIGITAL WILL BE GIVING A PRODUCT PRESENTATION OF THE NEWEST MEMBERS OF THE DECSYSTEM-20 FAMILY; THE DECSYSTEM-2020, 2020T, 2060, AND 2060T. THE DECSYSTEM-20 FAMILY OF COMPUTERS HAS EVOLVED FROM THE TENEX OPERATING SYSTEM AND THE DECSYSTEM-10 <PDP-10> COMPUTER ARCHITECTURE. BOTH THE DECSYSTEM-2060T AND 2020T OFFER FULL ARPANET SUPPORT UNDER THE TOPS-20 OPERATING SYSTEM. THE DECSYSTEM-2060 IS AN UPWARD EXTENSION OF THE CURRENT DECSYSTEM 2040 AND 2050 FAMILY. THE DECSYSTEM-2020 IS A NEW LOW END MEMBER OF THE DECSYSTEM-20 FAMILY AND FULLY SOFTWARE COMPATIBLE WITH ALL OF THE OTHER DECSYSTEM-20 MODELS.

WE INVITE YOU TO COME SEE THE 2020 AND HEAR ABOUT THE DECSYSTEM-20 FAMILY AT THE TWO PRODUCT PRESENTATIONS WE WILL BE GIVING IN CALIFORNIA THIS MONTH. THE LOCATIONS WILL BE:

TUESDAY, MAY 9, 1978 - 2 PM
HYATT HOUSE (NEAR THE L.A. AIRPORT)
LOS ANGELES, CA

THURSDAY, MAY 11, 1978 - 2 PM
DUNFEY'S ROYAL COACH
SAN MATEO, CA
(4 MILES SOUTH OF S.F. AIRPORT AT BAYSHORE, RT 101 AND RT 92)

A 2020 WILL BE THERE FOR YOU TO VIEW. ALSO TERMINALS ON-LINE TO OTHER DECSYSTEM-20 SYSTEMS THROUGH THE ARPANET. IF YOU ARE UNABLE TO ATTEND, PLEASE FEEL FREE TO CONTACT THE NEAREST DEC OFFICE FOR MORE INFORMATION ABOUT THE EXCITING DECSYSTEM-20 FAMILY.

And then ads came to the web

HAPPY BIRTHDAY, DIGITAL ADVERTISING!

The Banner Campaign that Started a \$24 billion Business, and Got a 78% Click-through Rate

By [Frank D'Angelo](#). Published on October 26, 2009.

Oct. 27 marks the 15th anniversary of the industry's first banner display ads, which appeared on Hotwired.com. To the many of you



Online advertisement by the numbers

66%
of all business

Only in the US
83 billion dollars
in 2017

Source: eMarketer

SOCIAL NETWORKS

86%

STATIC ADVERTISEMENTS

80%

SEARCHES

66%

Source: *The Manifest 2018 Online Advertising Survey*



chiefmartec.com Marketing Technology Landscape (“Martech 5000”)

April 2019

Advertising & Promotion

Mobile Marketing



Mobile Apps



Content & Experience

Interactive Content



Social & Relationships

Call Analytics & Management



ABM



Commerce & Sales



Retail, Proximity & IoT Marketing



Data



Management



Display & Programmatic Advertising



Content Marketing



Optimization, Personalization & Testing



Social Media Marketing & Monitoring



Sales Automation, Enablement & Intelligence



Mobile & Web Analytics



Collaboration



Search & Social Advertising



DAM & MRM



SEO



Community & Reviews



Conversational Marketing & Chat



Native/Content Advertising



Marketing Automation & Campaign/Lead Management



Customer Experience, Service & Success



Affiliate Marketing & Management



Ecommerce Marketing



Video Advertising



PR



CMS & Web Experience Management



Customer Data Platform



Ecommerce Platforms & Carts



2011

Marketing Technology Landscape



2012

~150

~350

~1,000

~2,000

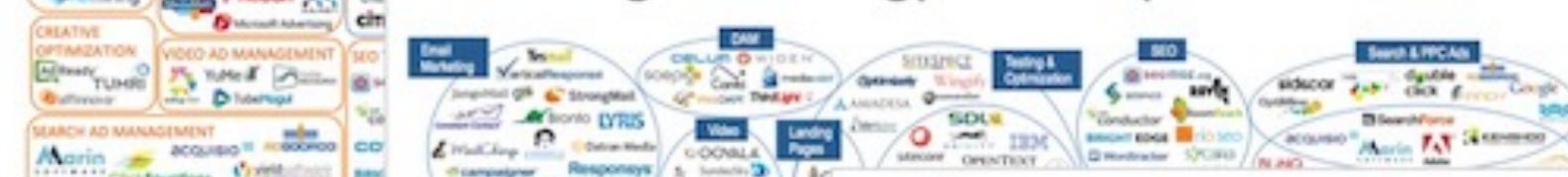
~3,500

~5,000

~6,800

Marketing Technology Landscape

September 2012



2014

2015

2016

2017

2018

2019

Marketing Technology Landscape

January 2014

Marketing Technology Landscape

January 2015

Marketing Technology Landscape

March 2016

Marketing Technology Landscape ("Martech 5000")

May 2017

Marketing Technology Landscape ("Martech 5000")

April 2018

Marketing Technology Landscape ("Martech 5000")

April 2019

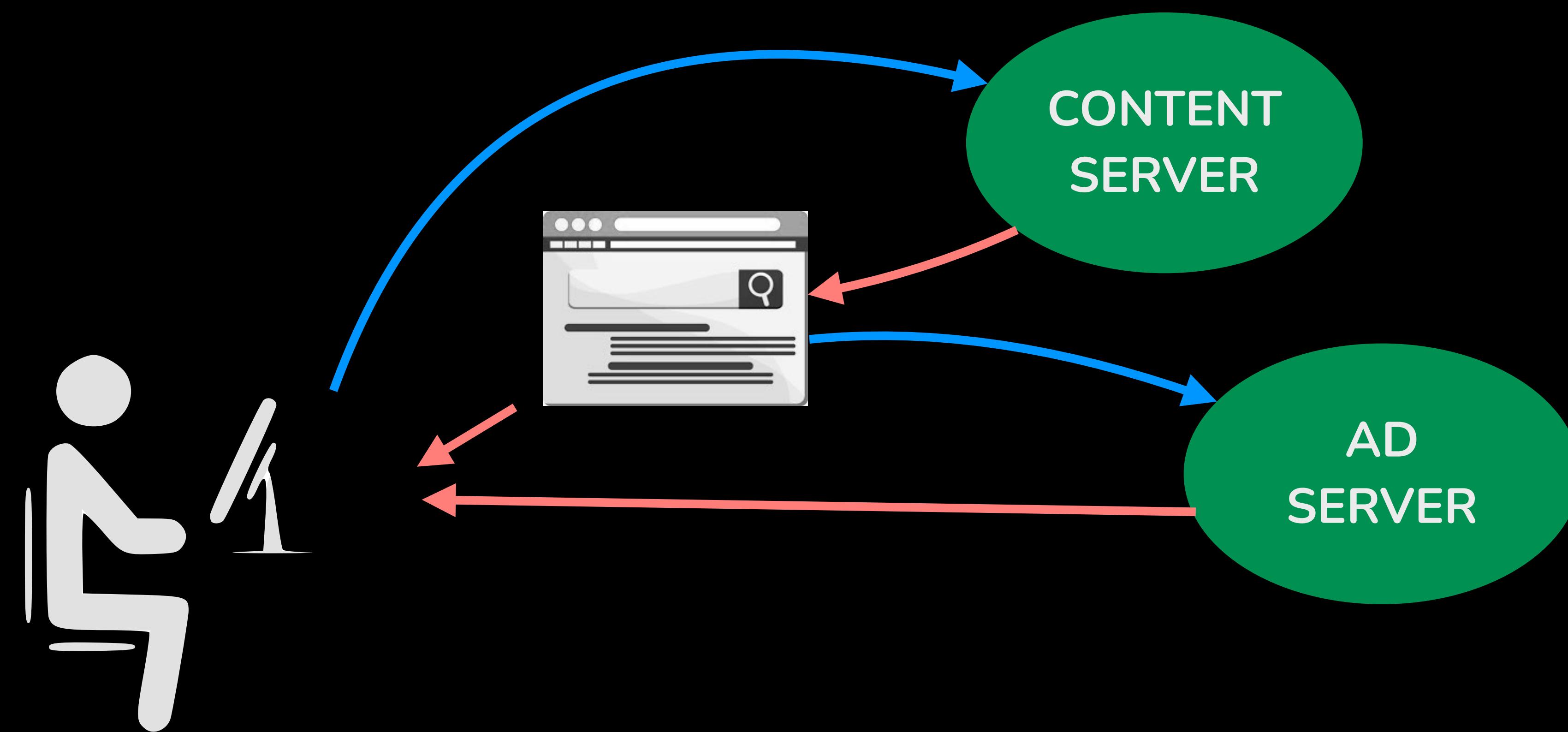
7,040

Risks

- No transparency
- Intrusive profiling
- Illusion of content
- Lack of user awareness
- Data breaches
- Potential for discrimination
- Identity theft
- Ad fraud
- Surveillance capitalism
- Manipulation

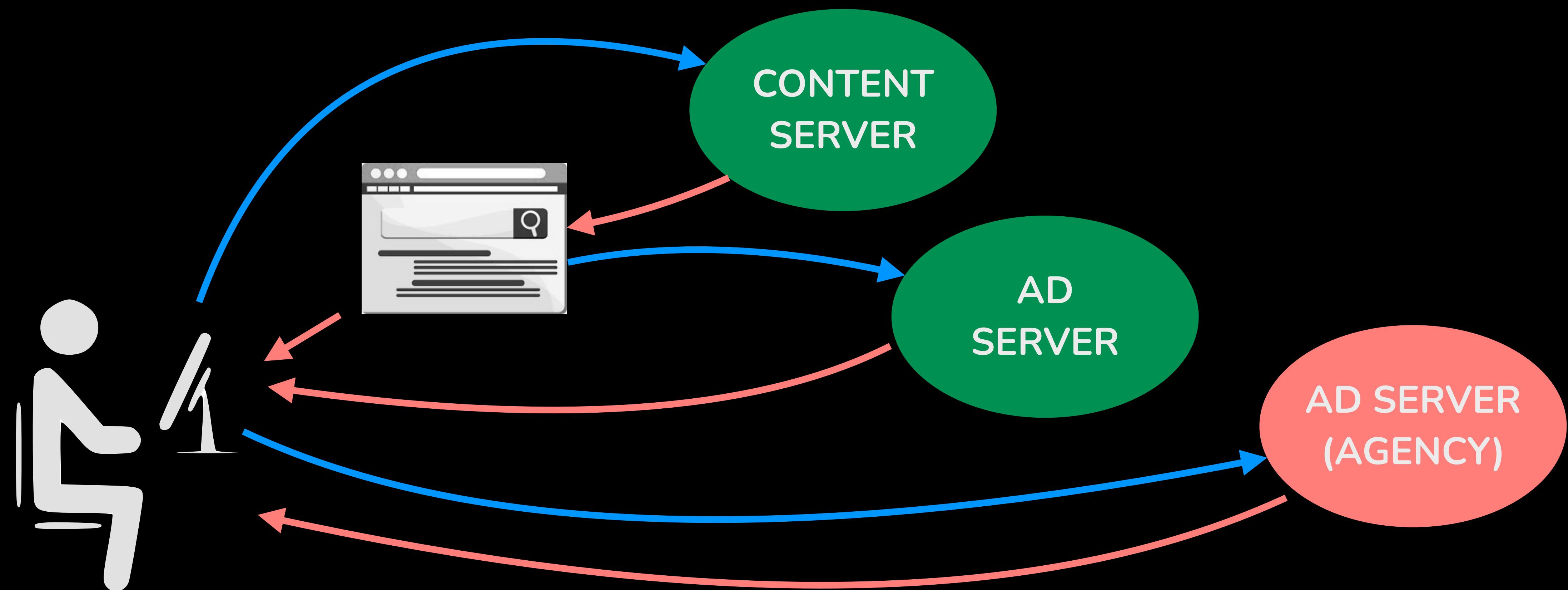
Internet advertisement

adtech - first generation



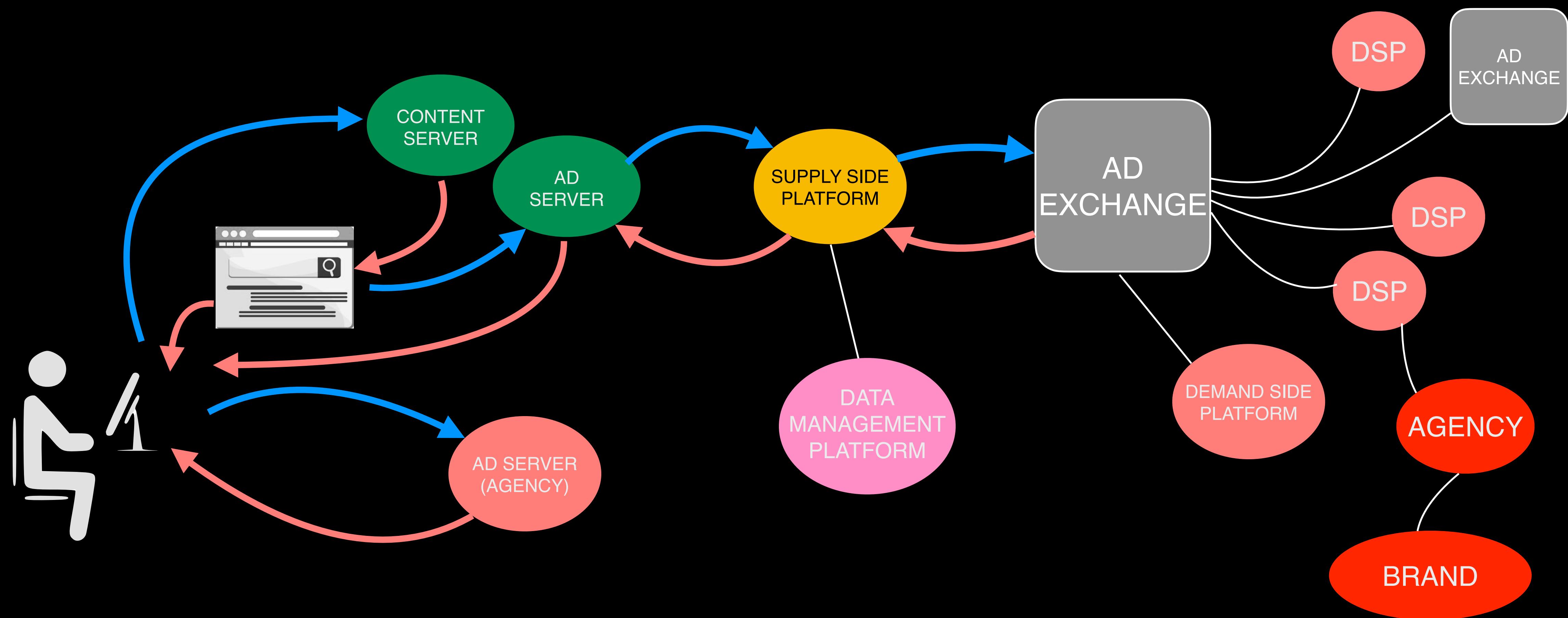
Internet advertisement

adtech - second generation

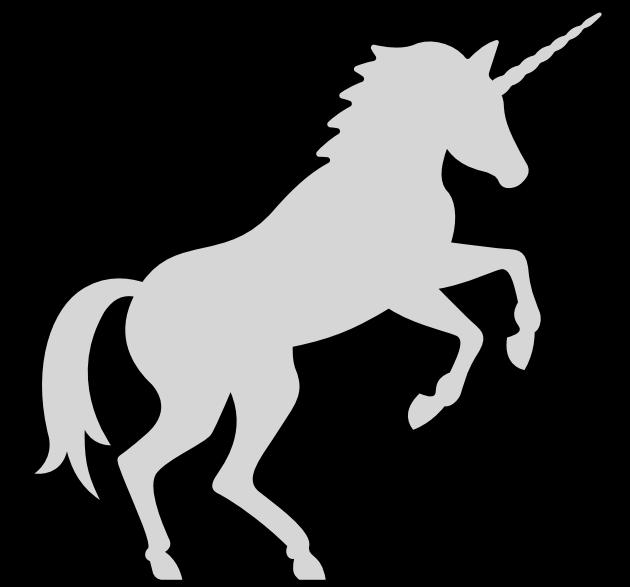


Internet advertisement

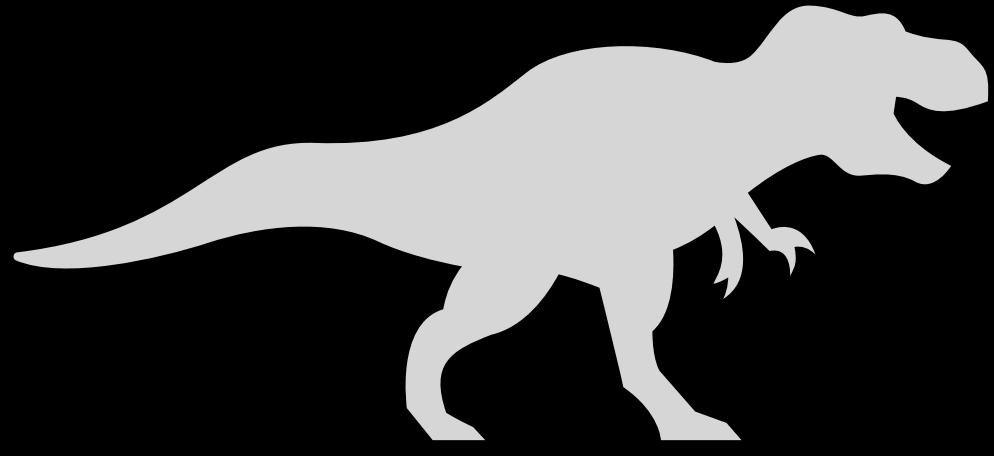
adtech - third generation (RTB, header bidding)



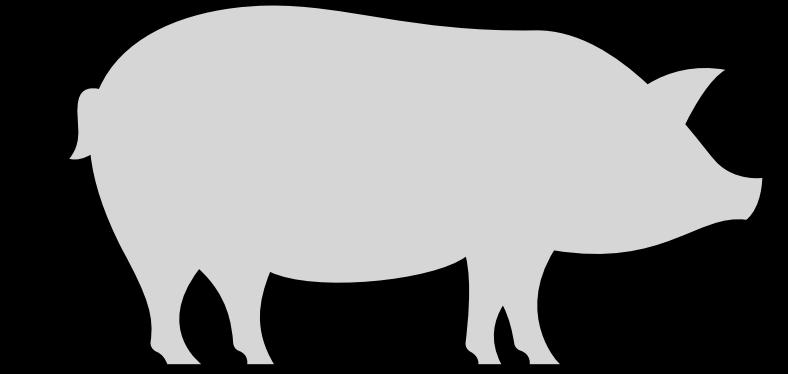
ECOSYSTEM



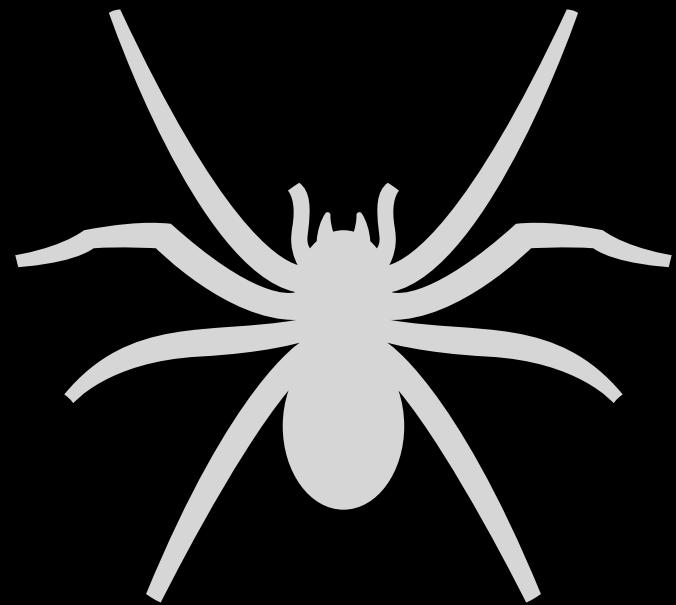
Data



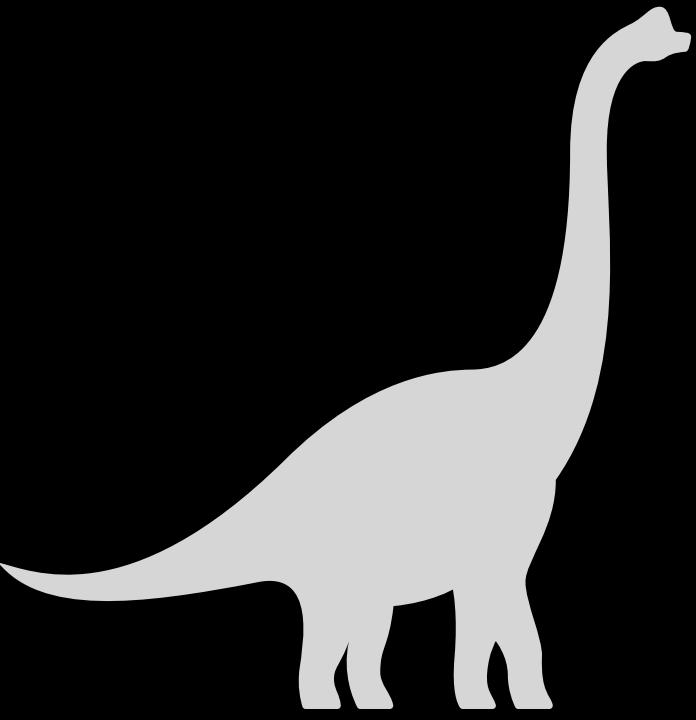
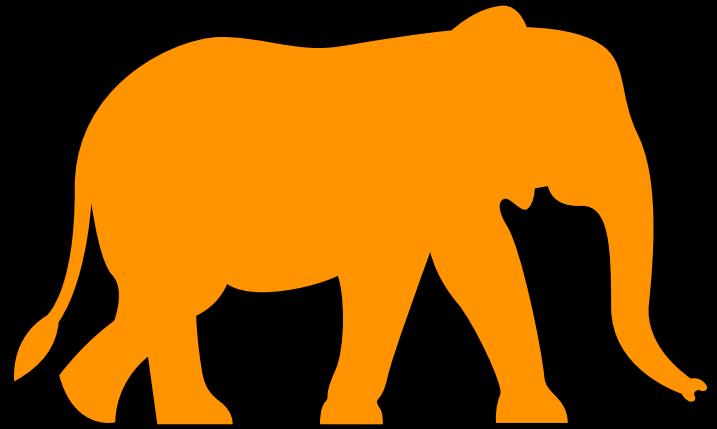
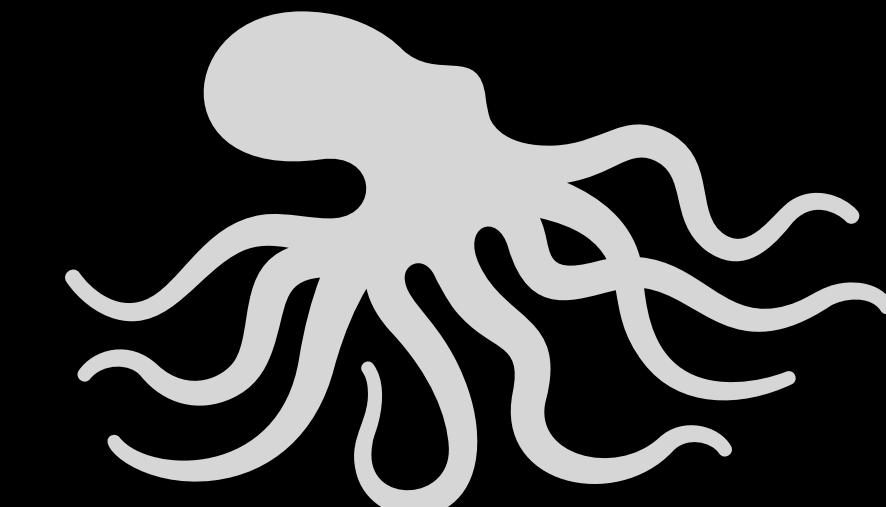
Trackers



Data brokers



Search Engines Social Networks **Advertisement** Smartphones



I'm feeling lucky

How search engines became digital marketing's best friends

Google

máster ciberseguridad

X

[Todo](#) [Noticias](#) [Imágenes](#) [Vídeos](#) [Shopping](#) [Más](#) [Configuración](#) [Herramientas](#)

Aproximadamente 358.000 resultados (0,45 segundos)

[www.cybereop.com](#) › Formación

RANKING 🥇 MEJORES MASTERS EN CIBERSEGURIDAD y ...

Listado con el **RANKING MEJORES MASTERS EN CIBERSEGURIDAD** que se imparten en España ✨ Estás buscando un buen Master de CiberSeguridad ...

[www.imf-formacion.com](#) › Masters Profesionales

🥇 Máster en Ciberseguridad Online • Deloitte IMF

Master en Ciberseguridad por la Universidad Nebrija. Máster en Ciberseguridad por IMF Business School. Título por CyberSOC Deloitte. Tanto ...

16 jun. 2020 - 16 mar. 2021 [Master en ...](#)

[www.uc3m.es](#) › master › ciberseguridad

Máster Universitario en Ciberseguridad | UC3M

El plan de estudios del **Máster en Ciberseguridad** brinda dos perfiles de egresados distintos que se ofrecen mediante dos itinerarios de asignaturas optativas, ...

[www.incibe.es](#) › paginas › talento › catalogos-formacion

[PDF](#)

Másteres en ciberseguridad en España - Incibe

Máster en Ciberseguridad. Campus Internacional de Ciberseguridad -. Universidad Católica de Murcia (UCAM) -. Telefónica / ElevenPaths. Valladolid. Online.

[www.campusciberseguridad.com](#) › masters › master-en-...

Máster en Ciberseguridad en colaboración con Telefónica

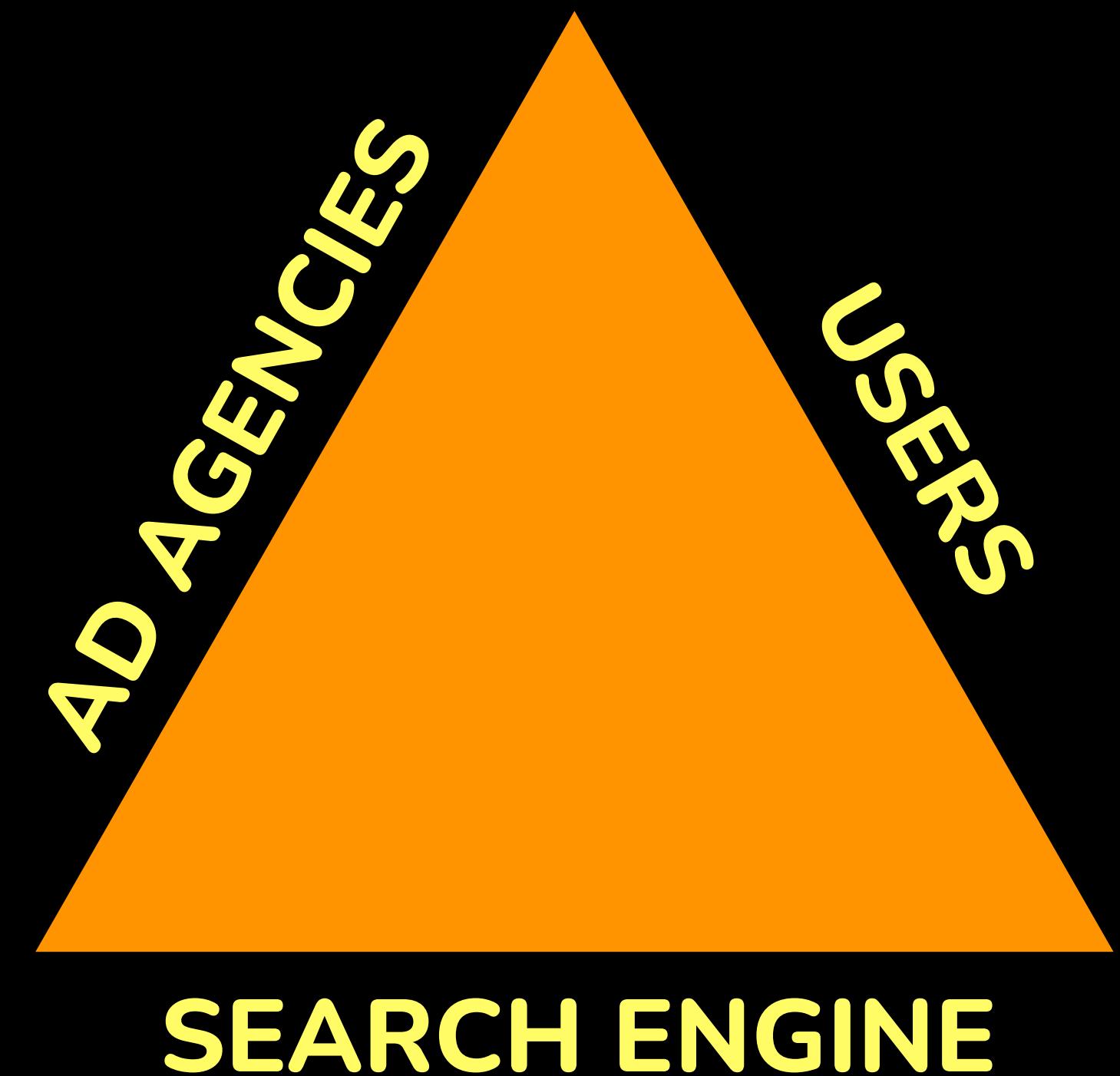
Nuestro **Máster en Ciberseguridad**, realizado en colaboración con Telefónica, aborda todos los aspectos esenciales del mundo de la ciberseguridad y te ...

Sponsored searches

Ad and searches

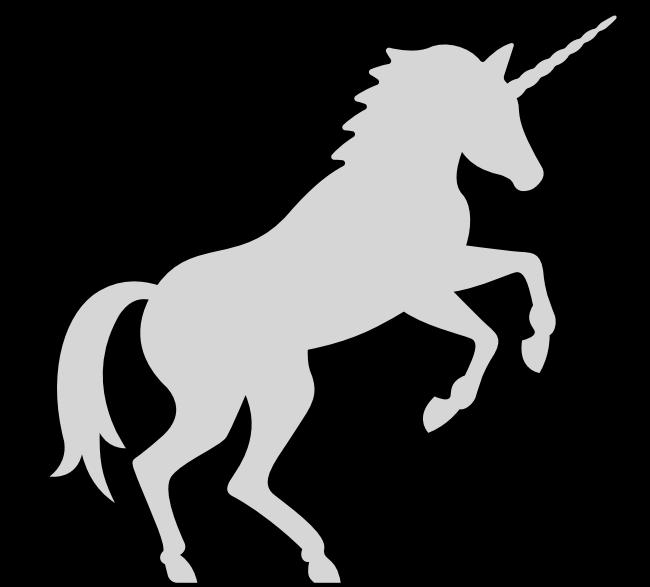
Paid search results

*¿How to target
valuable users with
the right ad?*

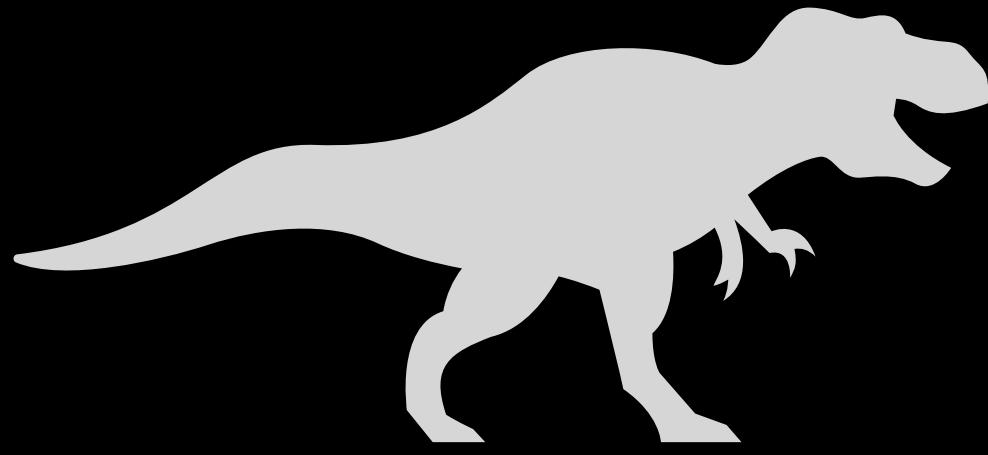


*¿What do they seek?
¿Where do they go?
¿What do they do there?*

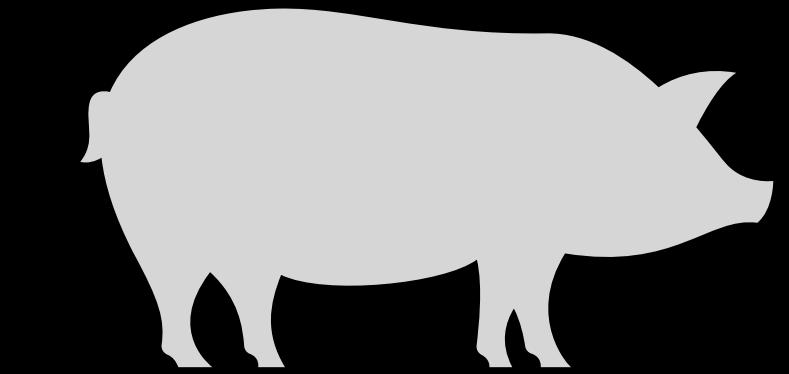
ECOSYSTEM



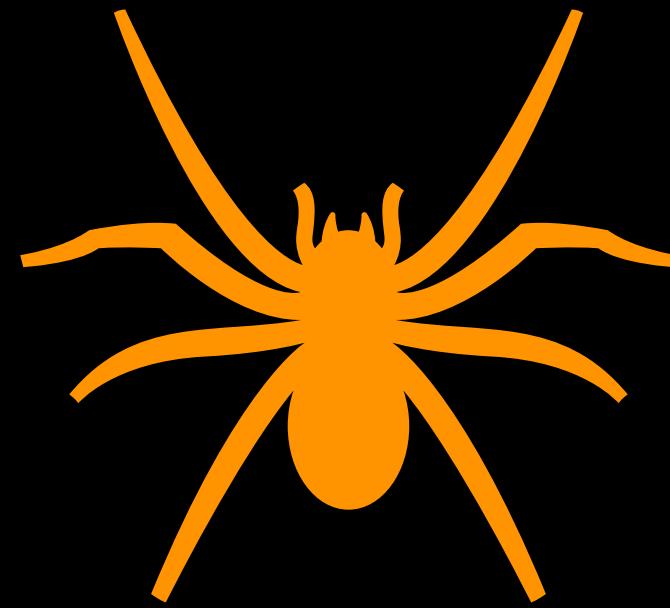
Data



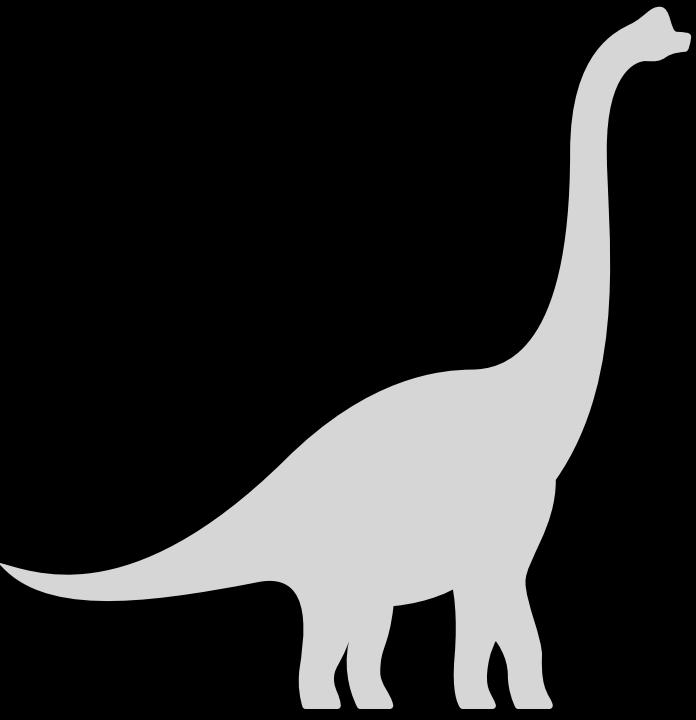
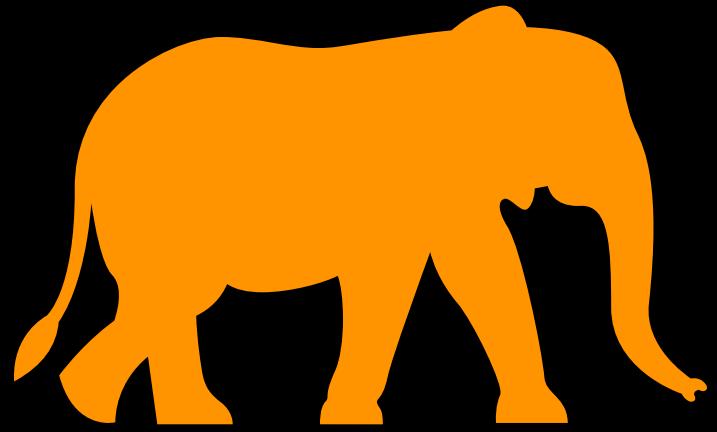
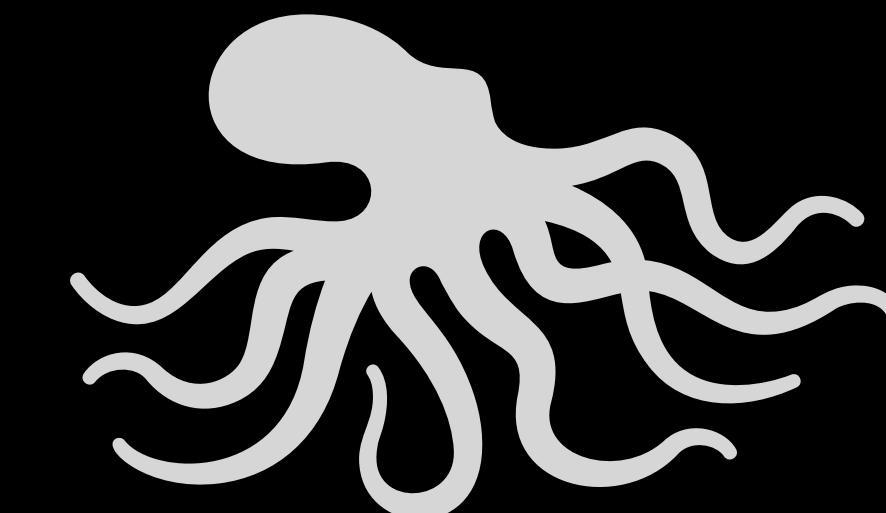
Trackers



Data brokers



Search Engines Social Networks Advertisement Smartphones



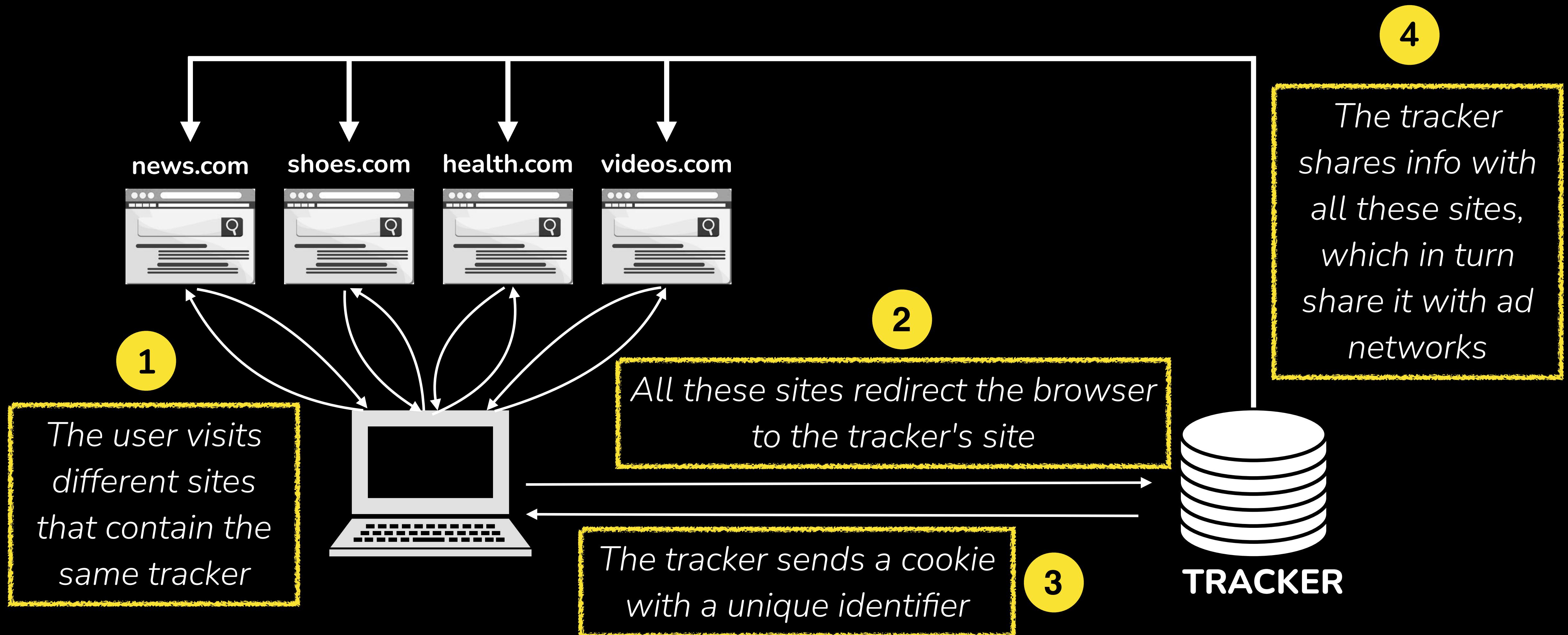
Cookies, fingerprints and breadcrumbs

Who tracks you, why they do it, and why this is a problem

What is a tracker?

Company that observes and tracks your behavior while you surf the web or use a device and collects information about you

Basic web tracking



Why do trackers exist?



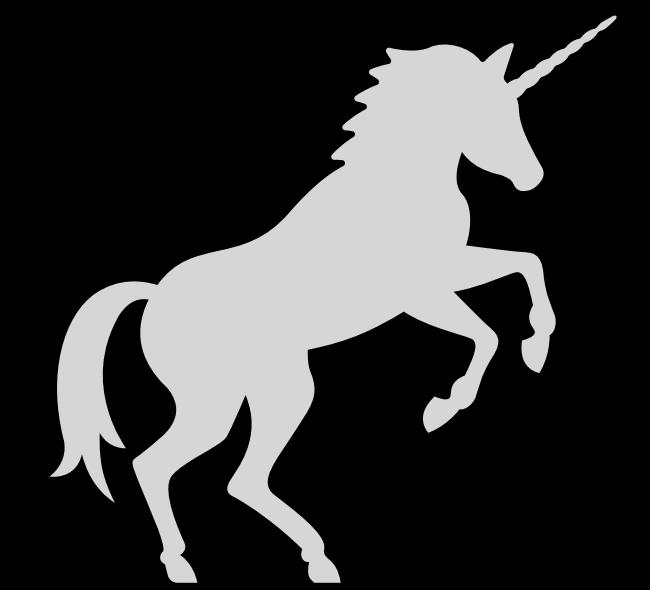
- Recommendations
- Advertisement
- Social networks
- Analytics/telemetry
- Click conversion

Blacklight

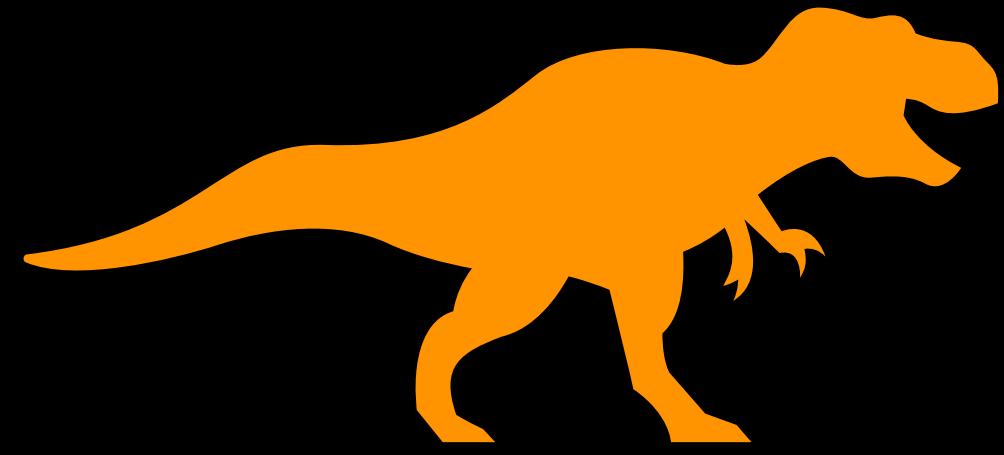
Browser fingerprinting



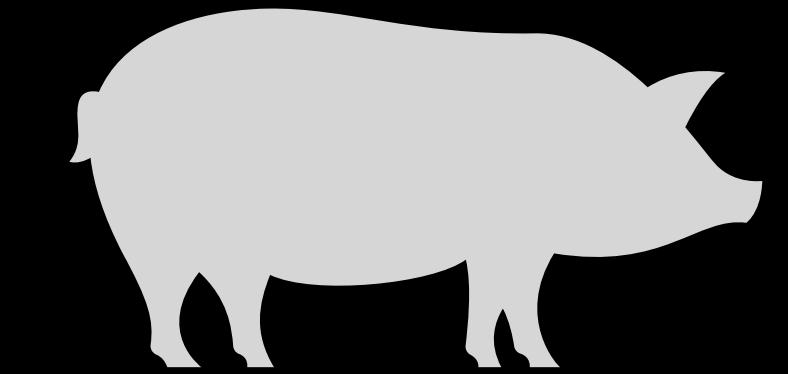
ECOSYSTEM



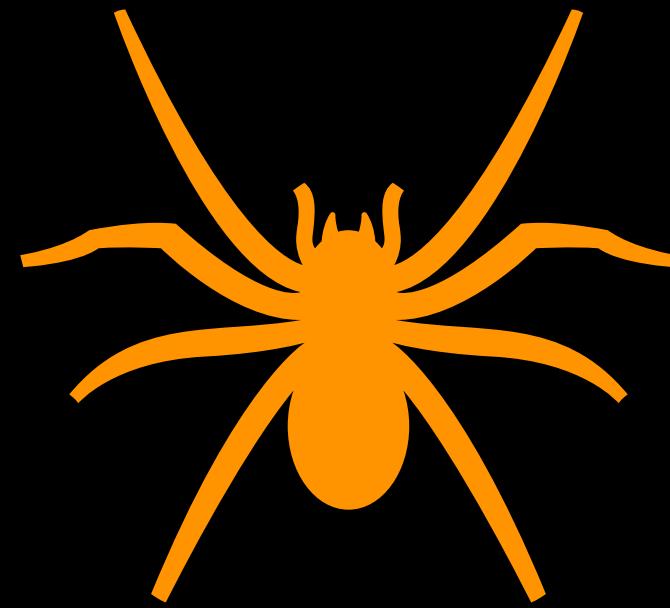
Data



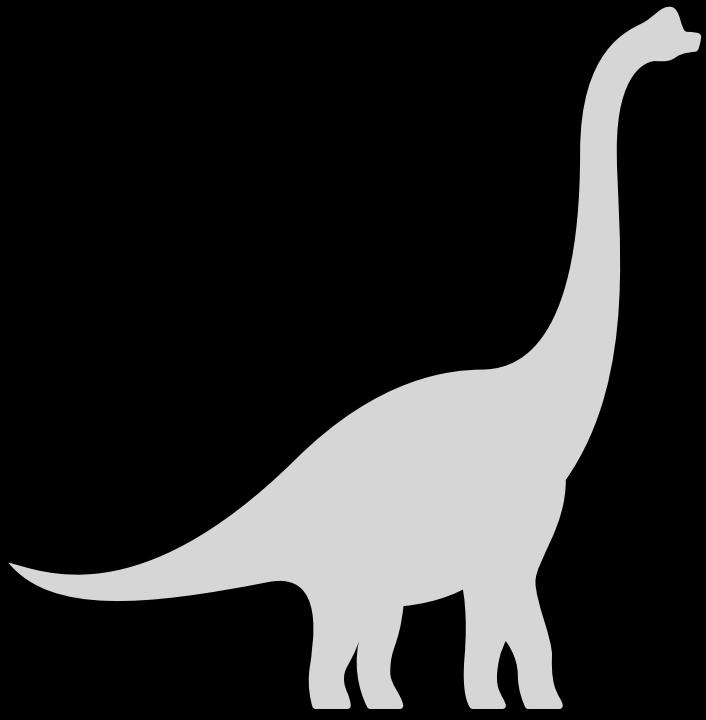
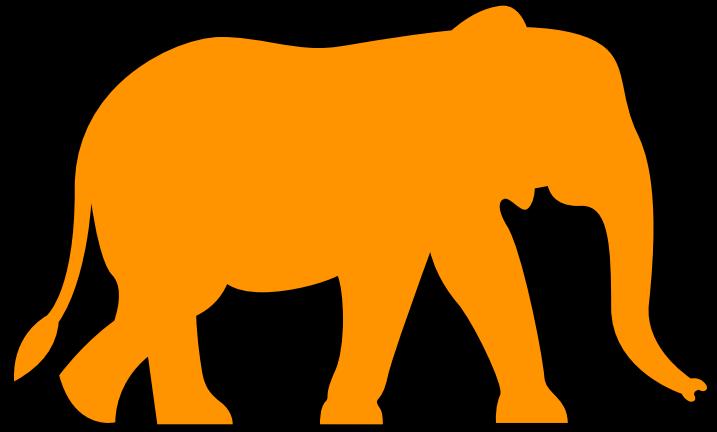
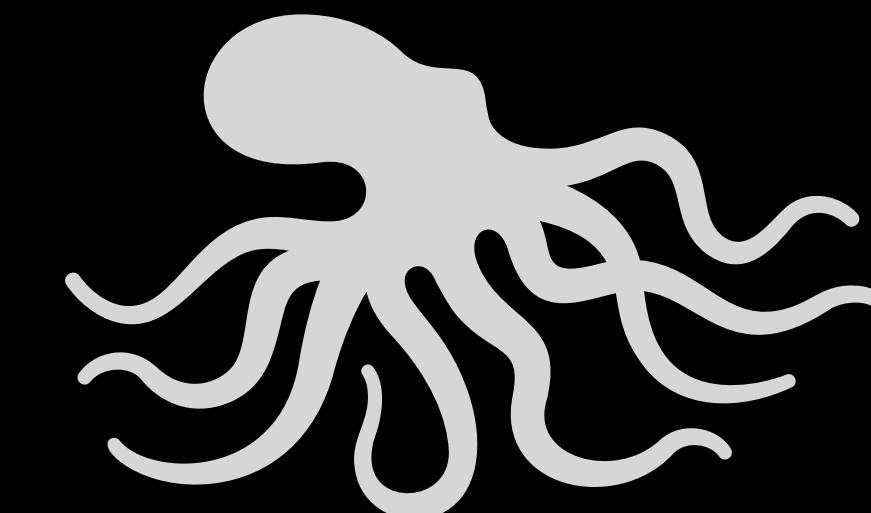
Trackers



Data brokers



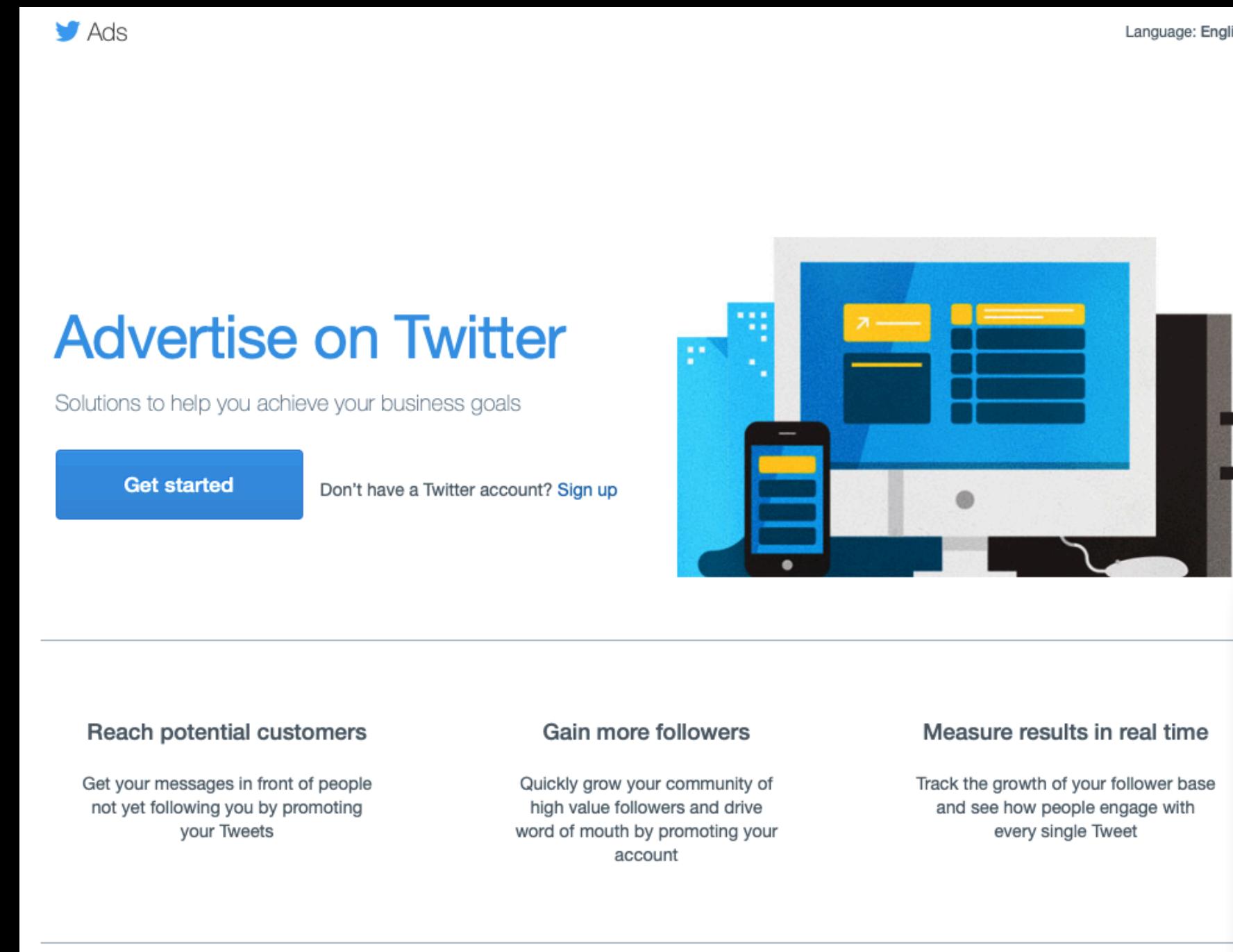
Search Engines Social Networks Advertisement Smartphones

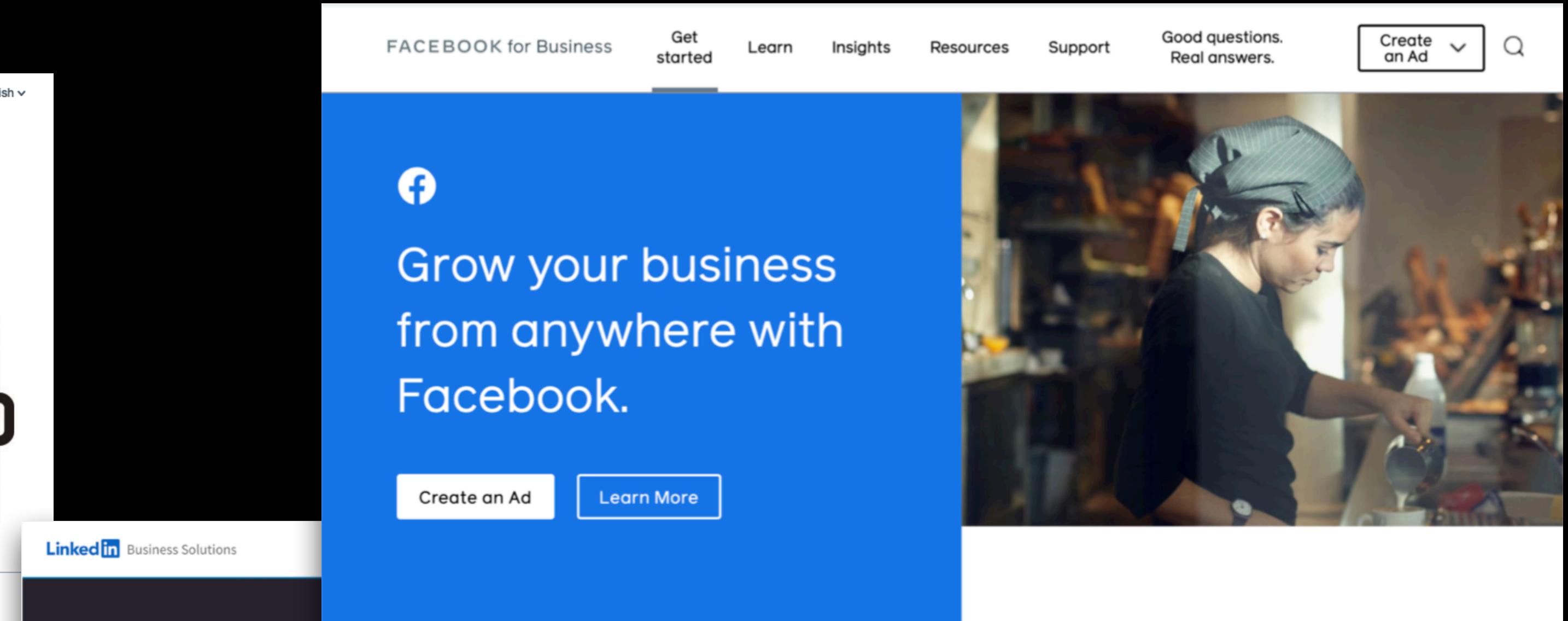


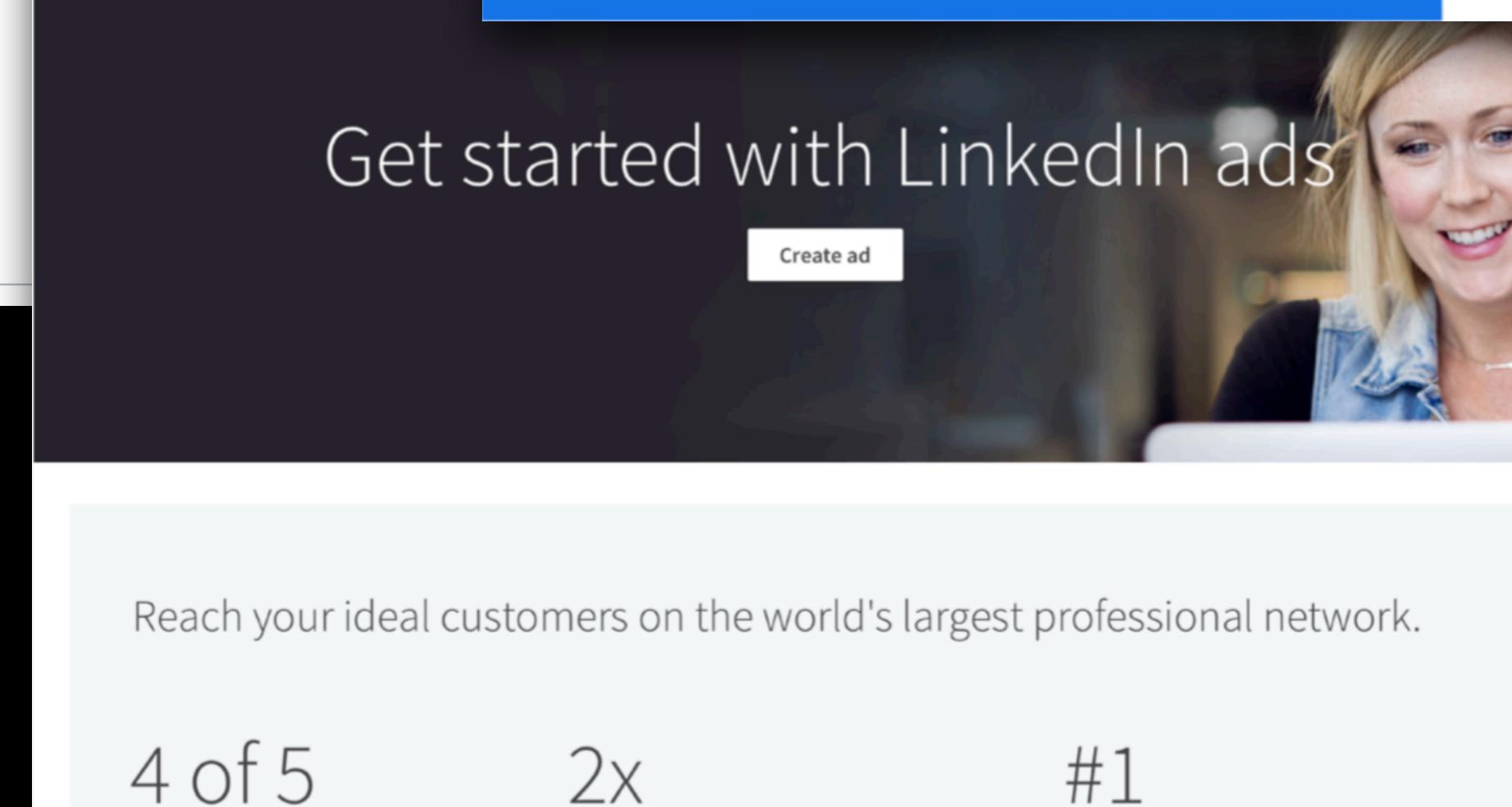
Social networks and smartphones

A perfect machine for surveillance and influence at a global scale

Social networks, ad networks

The Twitter Ads homepage features a large blue header with the text "Advertise on Twitter". Below it, there's a section titled "Solutions to help you achieve your business goals" with a "Get started" button and a "Don't have a Twitter account? Sign up" link. A central image shows a smartphone, a laptop, and a desktop computer displaying a dashboard. At the bottom, there are three sections: "Reach potential customers", "Gain more followers", and "Measure results in real time". Each section has a brief description and a small icon.

The Facebook for Business homepage has a blue header with the text "FACEBOOK for Business" and a "Get started" button. It also includes links for "Learn", "Insights", "Resources", and "Support". A banner on the right says "Good questions. Real answers." with a "Create an Ad" button and a search icon. Below the banner, there's a photo of a woman working in a kitchen. The main content area features the Facebook logo and the text "Grow your business from anywhere with Facebook." with "Create an Ad" and "Learn More" buttons.

The LinkedIn Business Solutions homepage has a dark header with the LinkedIn logo and the text "Business Solutions". Below it, there's a large image of a smiling woman looking at a laptop screen. A "Create ad" button is visible. The main text reads "Get started with LinkedIn ads". At the bottom, there's a section with the text "Reach your ideal customers on the world's largest professional network." and a "#1" badge.

Social networks

Understanding what they are in an ad

The New York Times

TECH FIX

I Downloaded the Information That Facebook Has on Me. Yikes.

By Brian X. Chen

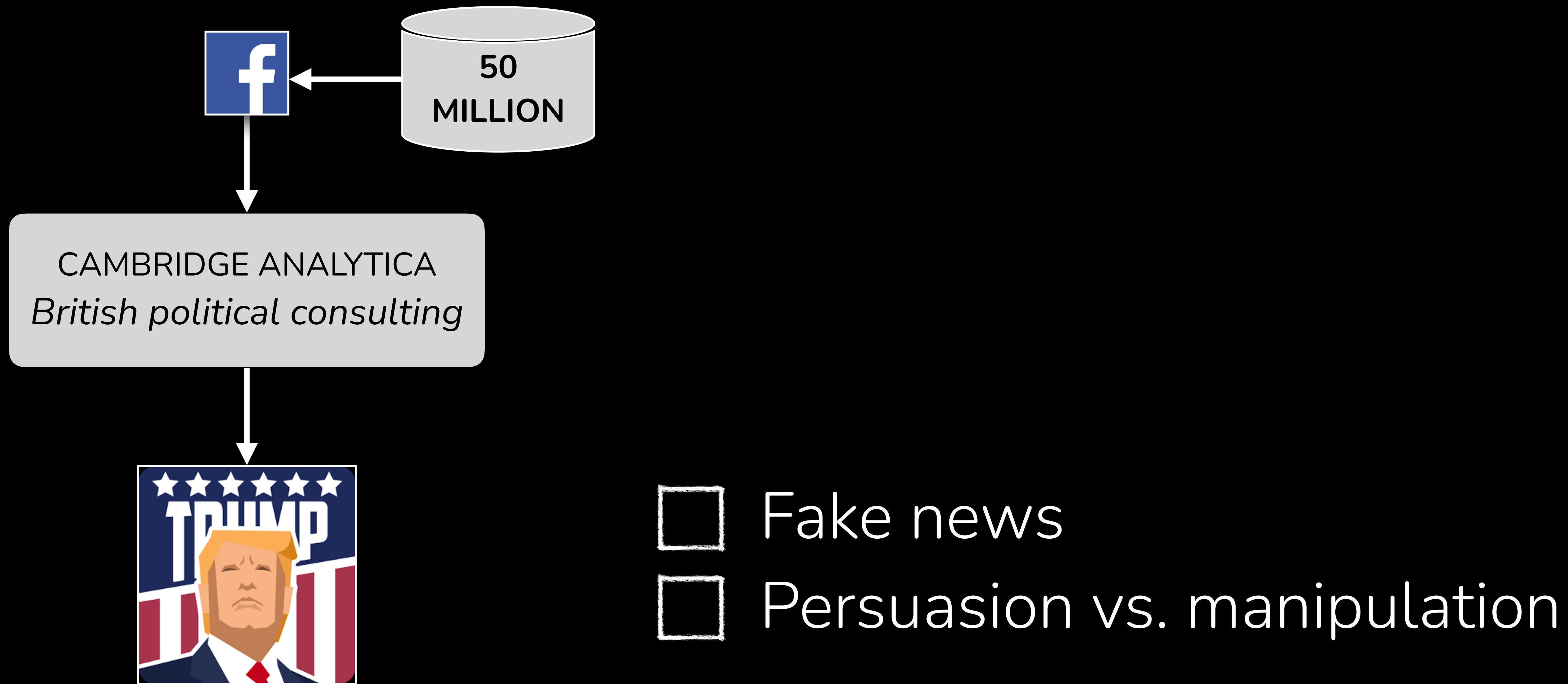
April 11, 2018

f t m r 425

A screenshot of a New York Times article. The title is "I Downloaded the Information That Facebook Has on Me. Yikes." by Brian X. Chen, published on April 11, 2018. The article includes social sharing icons for Facebook, Twitter, and LinkedIn, along with a count of 425 shares.

Target anyone who lives in Philadelphia, studies philosophy in college, is 21, has bought a blue T-shirt in the past year, is neurotic, makes less than \$28,000 a year, is likely to buy a minivan in the next six months, is interested in camping and whose interests align with those of African-Americans. Plus, anyone on Facebook who is similar to them.

Social networks



It's 2007. Apple reinvents itself once again

... and they change the world dramatically



Google follows immediately



Google Mobility Services

GMAIL

MAPS

PLAY STORE

SEARCH

...

...

2018

2.5 billion devices in 140 countries

Smartphones. A phone?

Sensors

Location
Movements
Audio/Video



Trackers

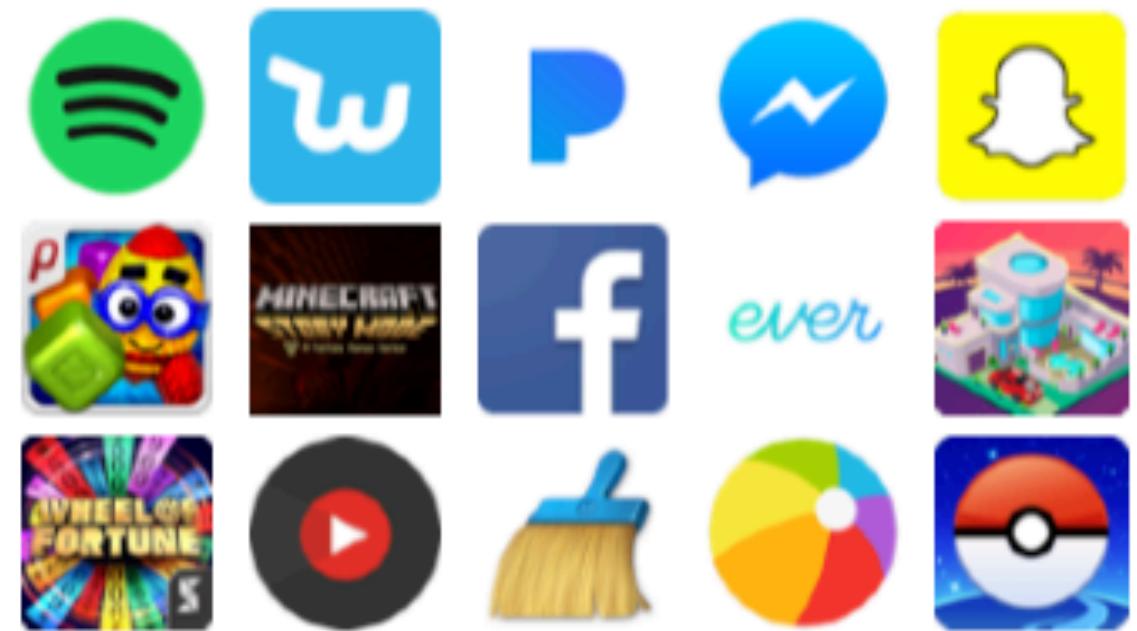
Apps



Use

Everywhere & 24/7
Social interaction
Interaction with the
physical world (IoT)

Data dissemination in the mobile ecosystem

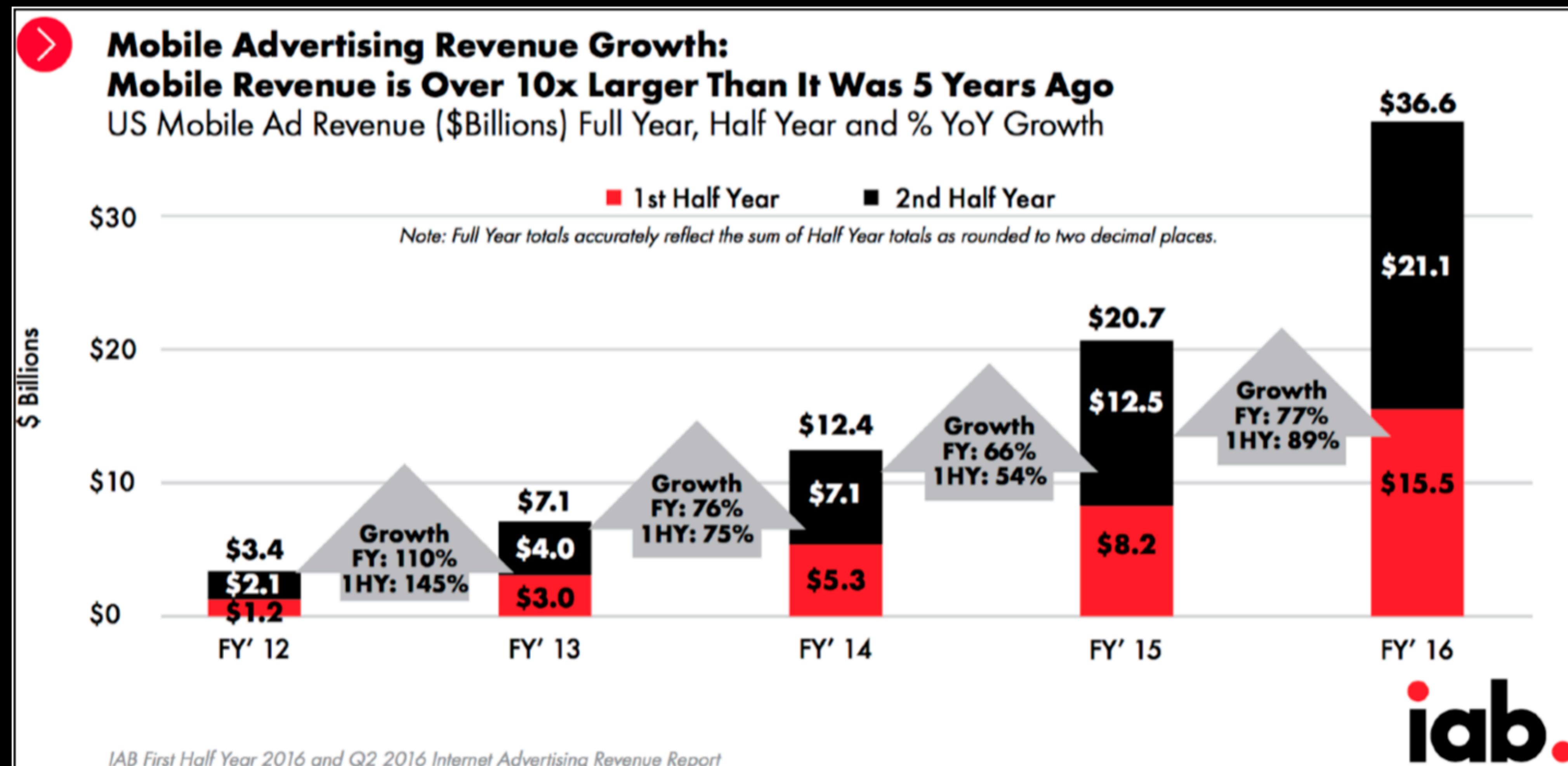


App developers



3rd-party ATS

Data dissemination in the mobile ecosystem



SDK categories

Development
*Android Support,
Unity3d*

Network
OK HTTP

Database
ORMLite, Firebase

Crypto
*Jasypt, Bouncy
Castle*

Browser
Chromium

Push Notifications
Consumer engagement
airPush, JPush

Online Payments
AliPay

Maps
*Google Maps,
MapsForge*

Social Networks
Facebook, Twitter

Analytics
Firebase, Flurry

Advertisement
*Google AdMob,
Unity3d*

Measure user-interactions on any platform.

Set up Google Analytics



Websites and web apps

Measure user interaction with websites or web apps.

[gtag.js](#) [analytics.js](#) [AMP HTML](#)

[App+Web properties \(beta\)](#)



Mobile apps

Measure user interaction with mobile apps.

[Android](#) [iOS](#)



Internet connected devices

Measure user interaction in any environment.

[Measurement Protocol](#)

[Android SDK](#)[Component SDKs](#)[Getting Started](#)[Calling the Graph API](#)[FAQ & Troubleshooting](#)[Changelog](#)[Upgrade Guide](#)[Devices](#)[Reference](#)[Reference \(Old Docs\)](#)[Downloads](#)[Deprecated](#)

Facebook SDK for Android

Helps you build engaging social apps and get more installs.

[View SDKs](#)

Version 5.4.0

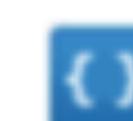
See [Change Log](#) or [Upgrade Guide](#) for more information. Includes Account Kit and Facebook packages. Requires Android API 15.

[Get Started](#)

Basic guide for Android

[SDK Reference Docs](#)

Reference Docs and sample code

[View Source](#)

View code and samples on Github

[On This Page](#)[Component SDKs](#)[In Android SDK](#)[Related SDKs](#)[Other Resources](#)



unity

Products

Solutions

Made with Unity

Learn

Support & Services

Community

Get started



Unity for all

Start bringing your vision to life today. Unity's real-time 3D development platform empowers you with all you need to create, operate, and monetize.

[Get started](#)[Learn more](#)

Games

Automotive,

Film, Animation &

Architecture,

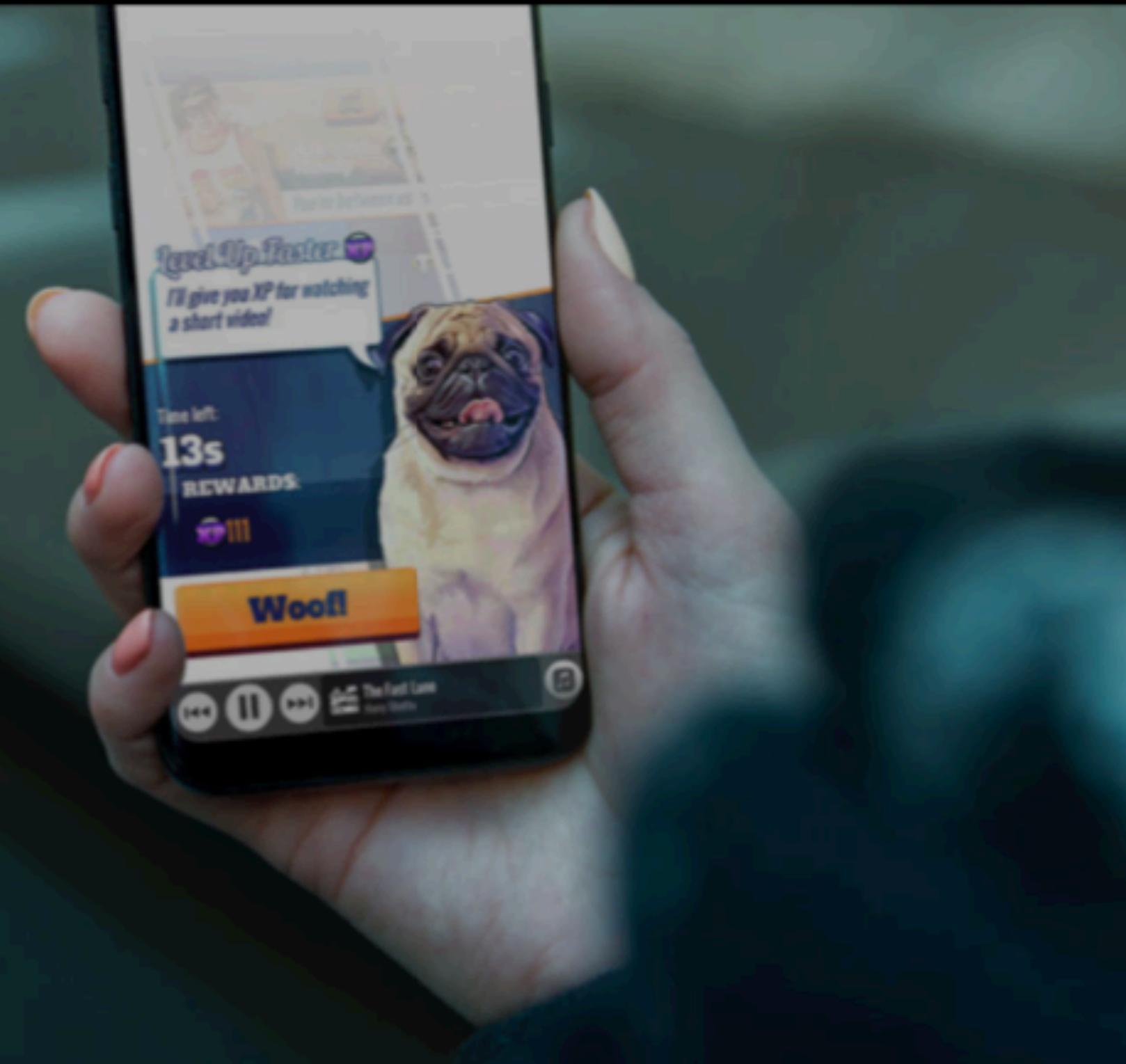
Unity for

Start bringing your vision to life with the tools you need to create, operate, and monetize.

[Get started](#)[Learn](#)

Unity Ads

Integrate relevant ads natively into your game experience while maximizing revenue.

[Start monetizing now](#)

Preinstalled surveillance

The screenshot shows the header of the EL PAÍS website with the logo and a navigation bar. Below the header is a large photograph of two men standing in a modern building's covered walkway. Underneath the photo is a caption in Spanish. At the bottom of the screenshot is the beginning of the article's text.

EL PAÍS
EL PERIÓDICO GLOBAL

SOCIEDAD ECONOMÍA CIENCIA TECNOLOGÍA CULTURA GENTE DEPORTES TELEVISIÓN VÍDEO

» en la ciudad holandesa de Utrecht »


Tapiador (izquierda) y Vallina-Rodríguez, directores de la investigación del software en los móviles Android. [KIKE PARA](#)

Cómo te vigilan los móviles Android sin que lo sepas

JORDI PÉREZ COLOMÉ
Un estudio dirigido por dos académicos españoles de más de 1.700 dispositivos de 214 fabricantes descubre los sofisticados modos de rastreo del software

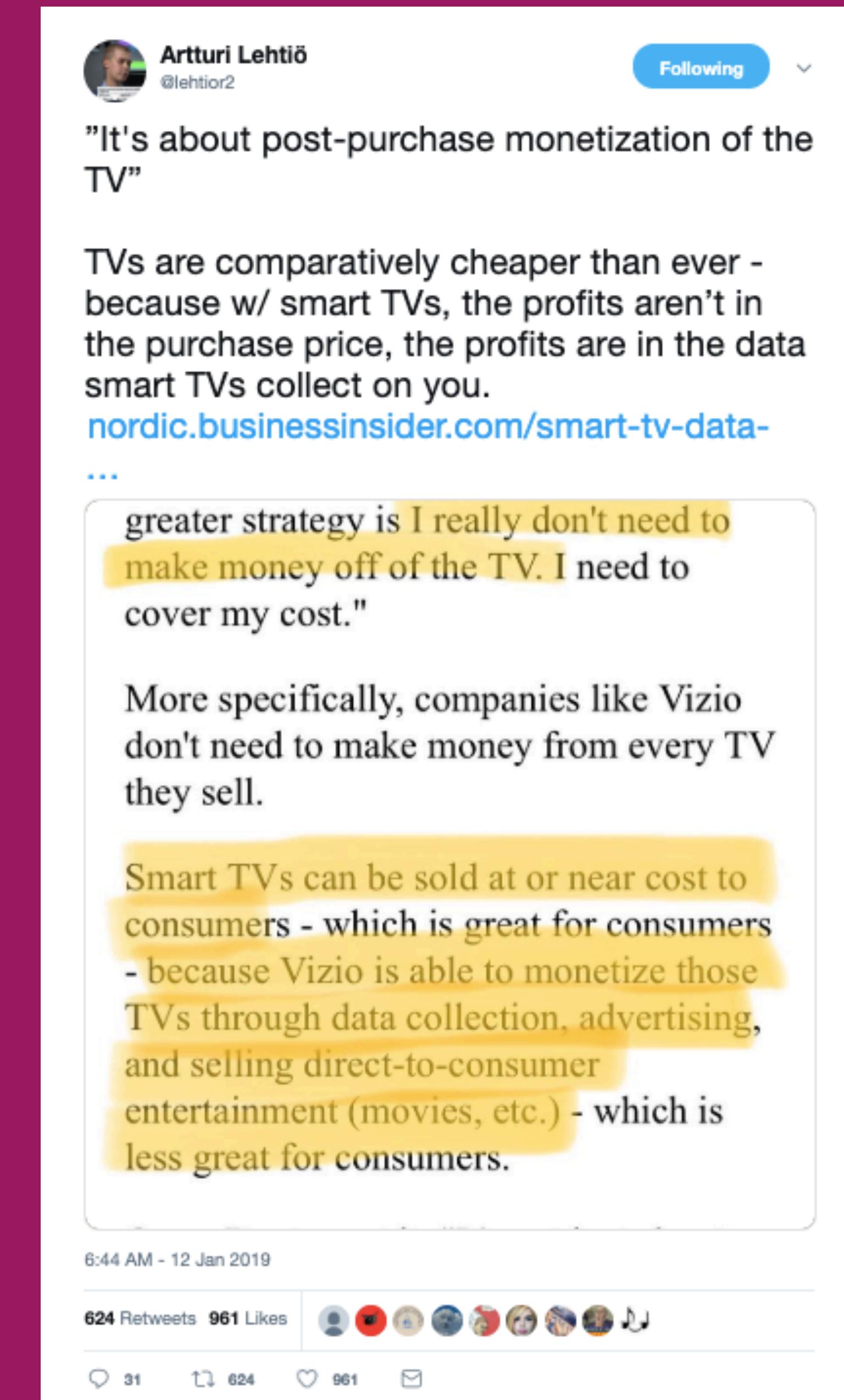
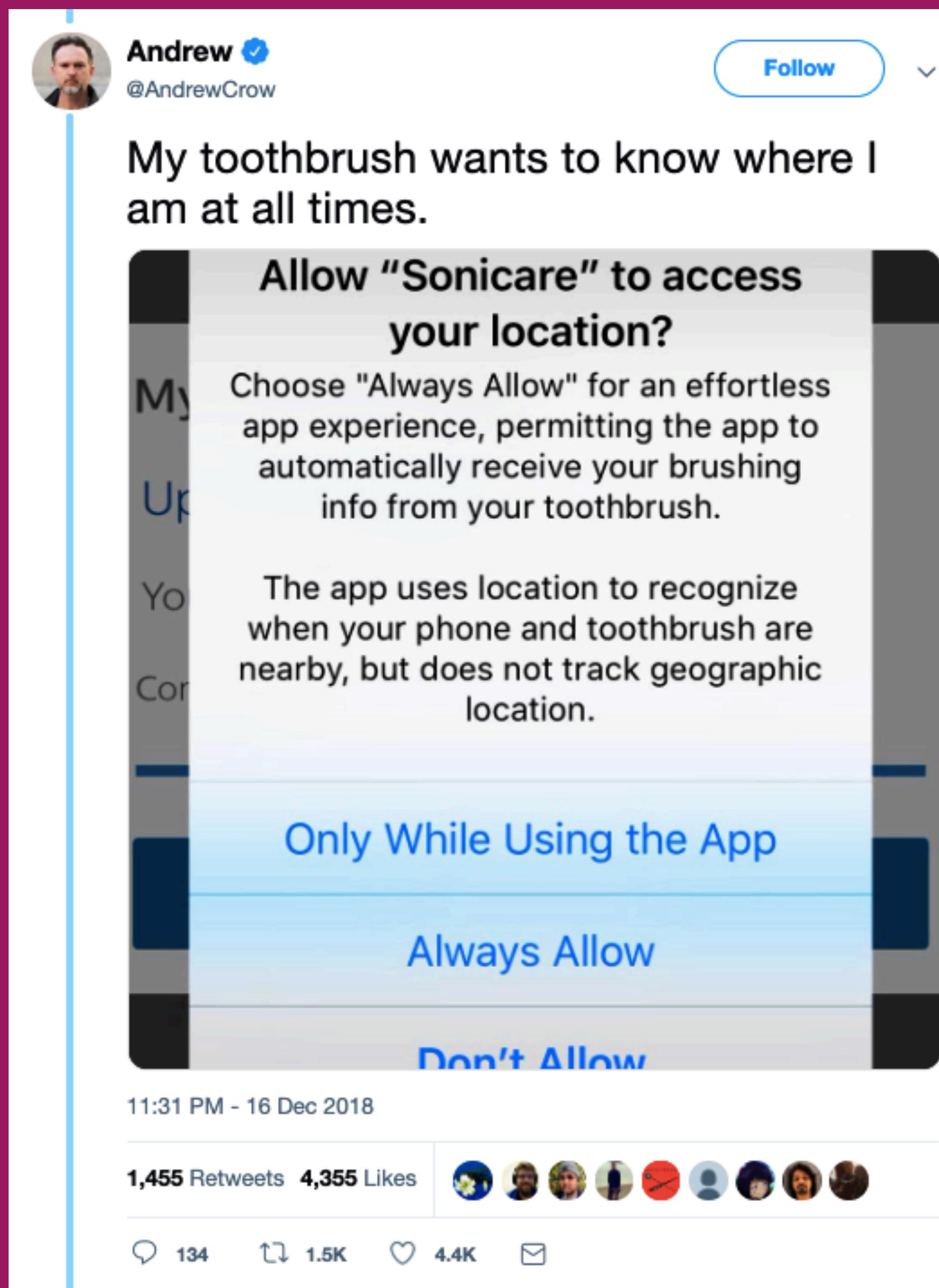
The screenshot shows a news article from CNIL. It features a large title, the date (23 January 2020), the organization (CNIL), and a navigation bar with links to compliance tools, data protection topics, and the CNIL's Twitter account.

Inria and the CNIL award the 2019 Privacy Protection prize to a European research team

23 January 2020
CNIL.

MY COMPLIANCE TOOLS | DATA PROTECTION | TOPICS | THE CNIL | [Q](#) 







George Kedenburg III

@GK3

Follow

i just had to download a software update for my shoes which are now getting a charge on their USB-C wireless charging mat

we're living in the future!!!

Software Update

Restarting Your Shoes

This may take up to 60 seconds.



10:19 AM - 17 Feb 2019 from San Francisco, CA

1,258 Retweets 3,547 Likes



Nike

334

1.3K

3.5K



Privacy Matters

@PrivacyMatters

Following

Replying to @GK3 @Nike

Nice bit of tracking in that app too



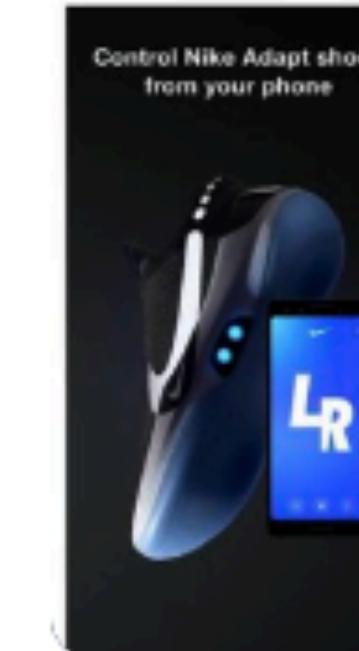
Nike, Inc. Health & Fitness

3 PEGI 3

★★★★★ 35

Install

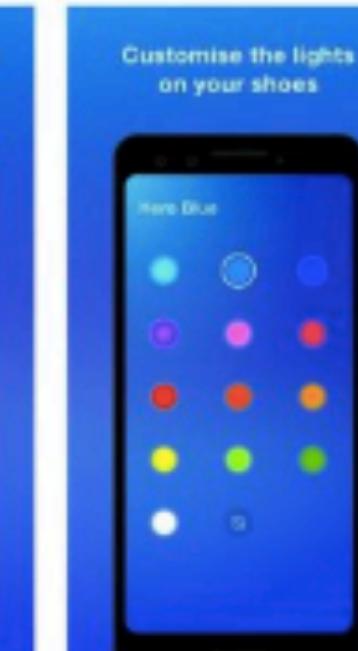
Add to wishlist



Control Nike Adapt shoes from your phone



Quickly fine-tune the fit for each foot



Customise the lights on your shoes

We have found code signature of the following trackers in the application:

- Facebook Analytics
- Facebook Login
- Facebook Places
- Facebook Share
- Gigya
- New Relic
- Segment

A tracker is a piece of software meant to collect data about you or your usages. We do not guarantee the exhaustiveness of this list.

reports.exodus-privacy.eu.org

exodus v1.2

7
trackers

Nike
Adapt

Version: 1.0.1
Creator: Nike, Inc.
Downloads: 1,000+
downloads

12
permissions

11:28 AM - 18 Feb 2019

15 Likes



2

15

15

15

HE KNOWS WHEN YOU ARE SLEEPING... —

You snooze, you lose: Insurers make the old adage literally true

Why insurers spy on sleep apnea sufferers via connected CPAP machines.

MARSHALL ALLEN, PROPUBLICA - 11/21/2018, 4:25 PM

Experts who study healthcare costs say insurers' CPAP strategies are part of the industry's playbook of shifting the costs of widely used therapies, devices, and tests to unsuspecting patients.

"The doctors and providers are not in control of medicine anymore," said Harry Lawrence, owner of Advanced Oxy-Med Services, a New York company that provides CPAP supplies. "It's strictly the insurance companies. They call the shots."

ars Ars Technica 
@arstechnica

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You snooze, you lose: Insurers make the old adage literally true



You snooze, you lose: Insurers make the old adage literally true

Why insurers spy on sleep apnea sufferers via connected CPAP machines.

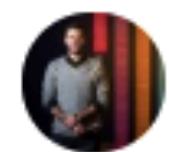
arstechnica.com

7:29 AM - 21 Nov 2018

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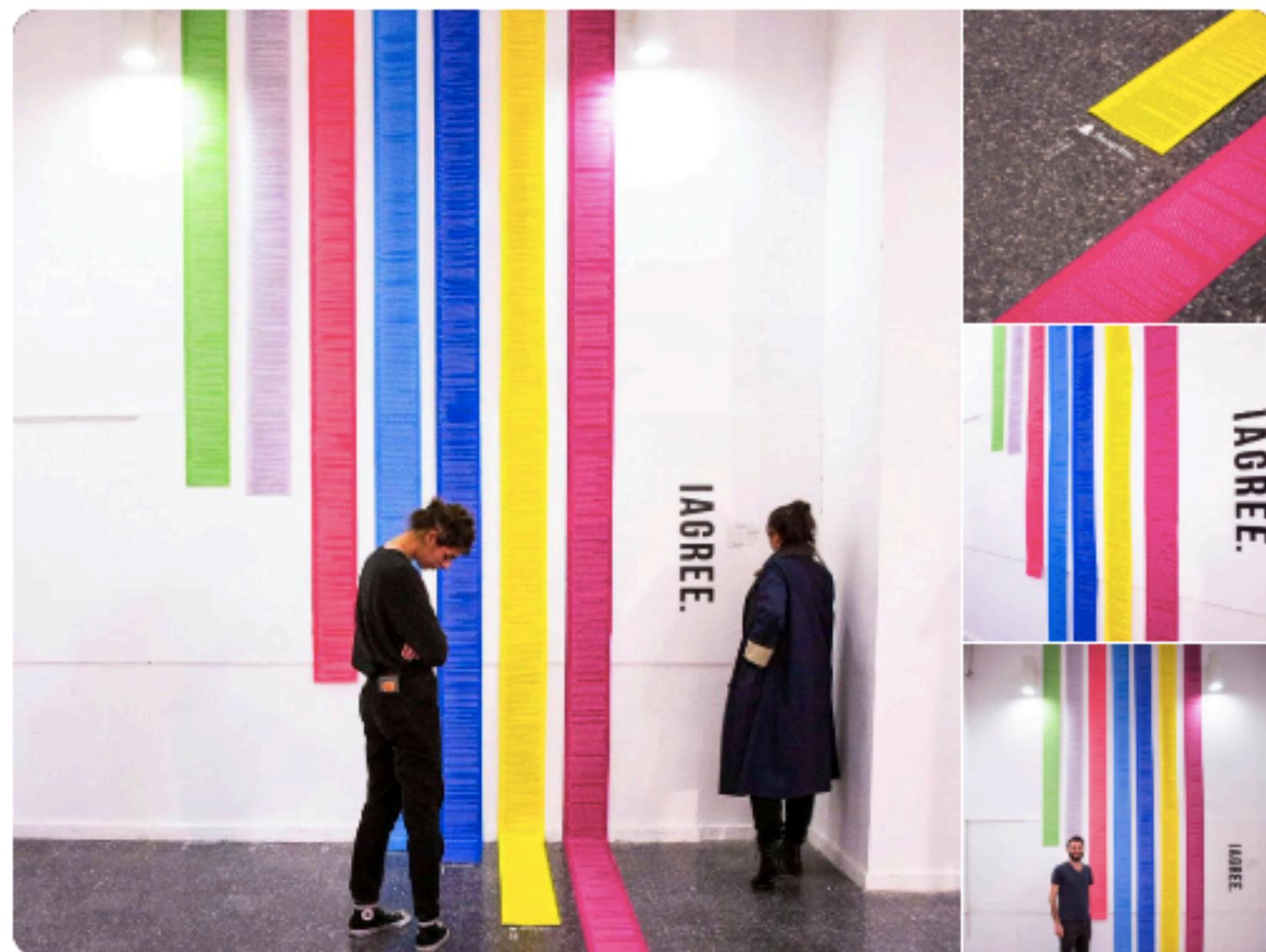


Dima Yarovinsky
@dimitryarov

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Replying to @hailmika @pop_stefanija

Hey all! thanks for your comments, it's really flattering.
Attaching more photos from the same project as it was presented in the Bezalel art and design academy.



8:17 AM - 5 May 2018

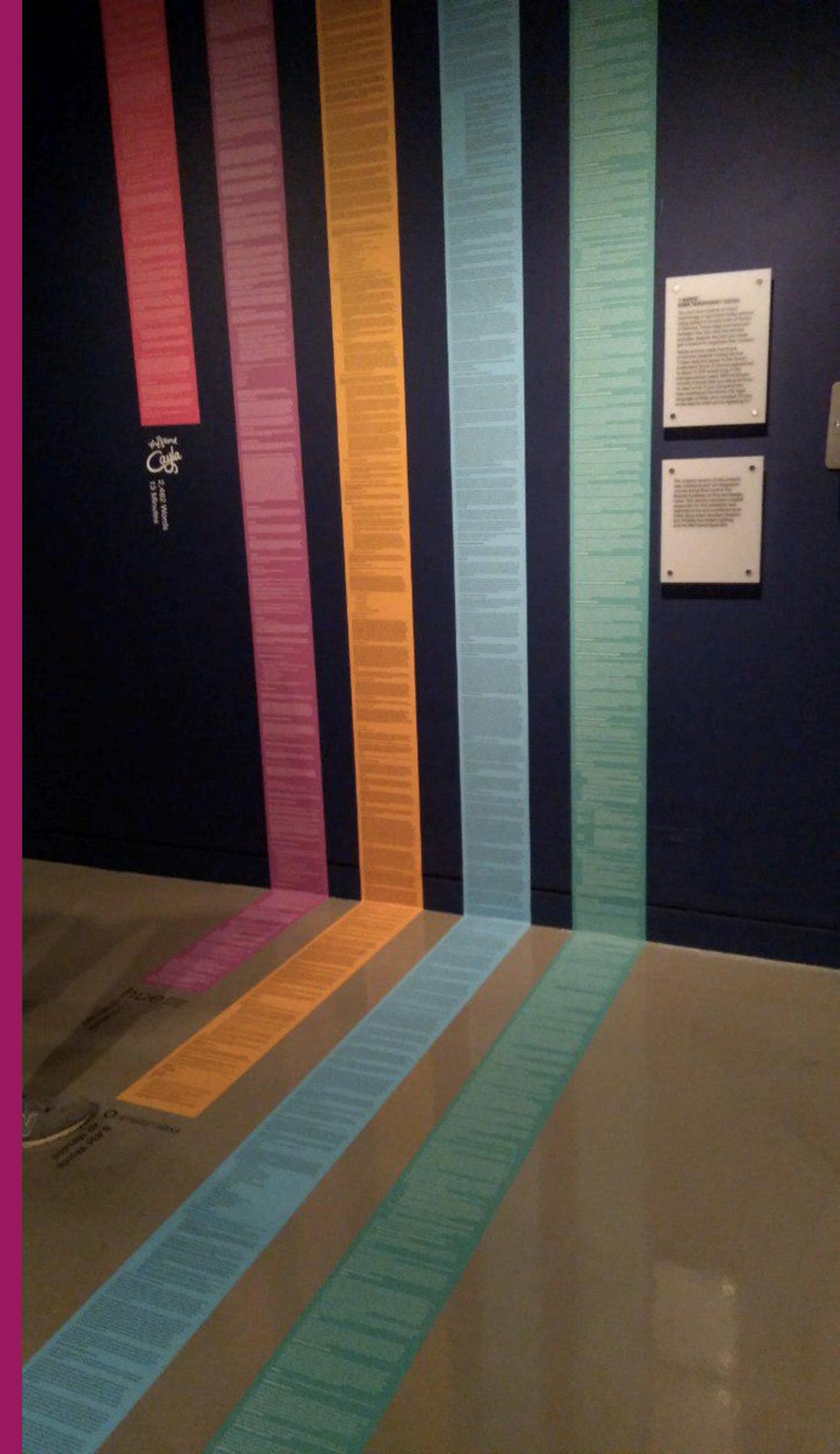
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28

719

1.6K



LIVE SMARTER

How to Prevent Your Alexa Device From Recording Your Private Conversations

BY EMILY PESKO

DECEMBER 20, 2018

The surest preventative measure you can take is to deny Alexa access to your contacts when you first set up your device. If you've already enabled access, you can call Amazon's customer service department at 877-375-9365 and have them remove the service. Sure, this process is "clunky" and takes about 10 minutes to complete, according to [Lifehacker](#), but it gets the job done. You won't be able to make calls or send texts as quickly, but you'll have some peace of mind knowing that your contacts won't be forced to listen to your conversation about [hardwood floors](#).

When in doubt, you can manually turn off the Echo's microphone at any time. Just press the microphone button on the device to ensure you won't be heard or recorded during particularly sensitive conversations. And if you're going to use your device often, be sure to keep the volume turned up high enough that you can hear it. That way, when Alexa asks to confirm your expletive-laden message to grandma, you can catch it before it's too late.

MF Mental Floss 
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How to Prevent Your Alexa Device From Recording Your Private Conversations—
bit.ly/2S8JWvS



12:53 PM - 22 Dec 2018

139 Retweets 308 Likes



181 139 308

It's also a good idea to change Alexa's "wake word," which prompts the device to start heeding your command. Unfortunately, Amazon doesn't let you choose your own wake word—so you won't be able to switch it to *supercalifragilistic*—but you can switch it to *Computer*, *Amazon*, or *Echo*. [USA Today](#) recommends trying out different options to see which one is less likely to be confused for another word in your household. Just call out, "Alexa, change the wake word," or follow [these steps](#) to change it in the Alexa app.

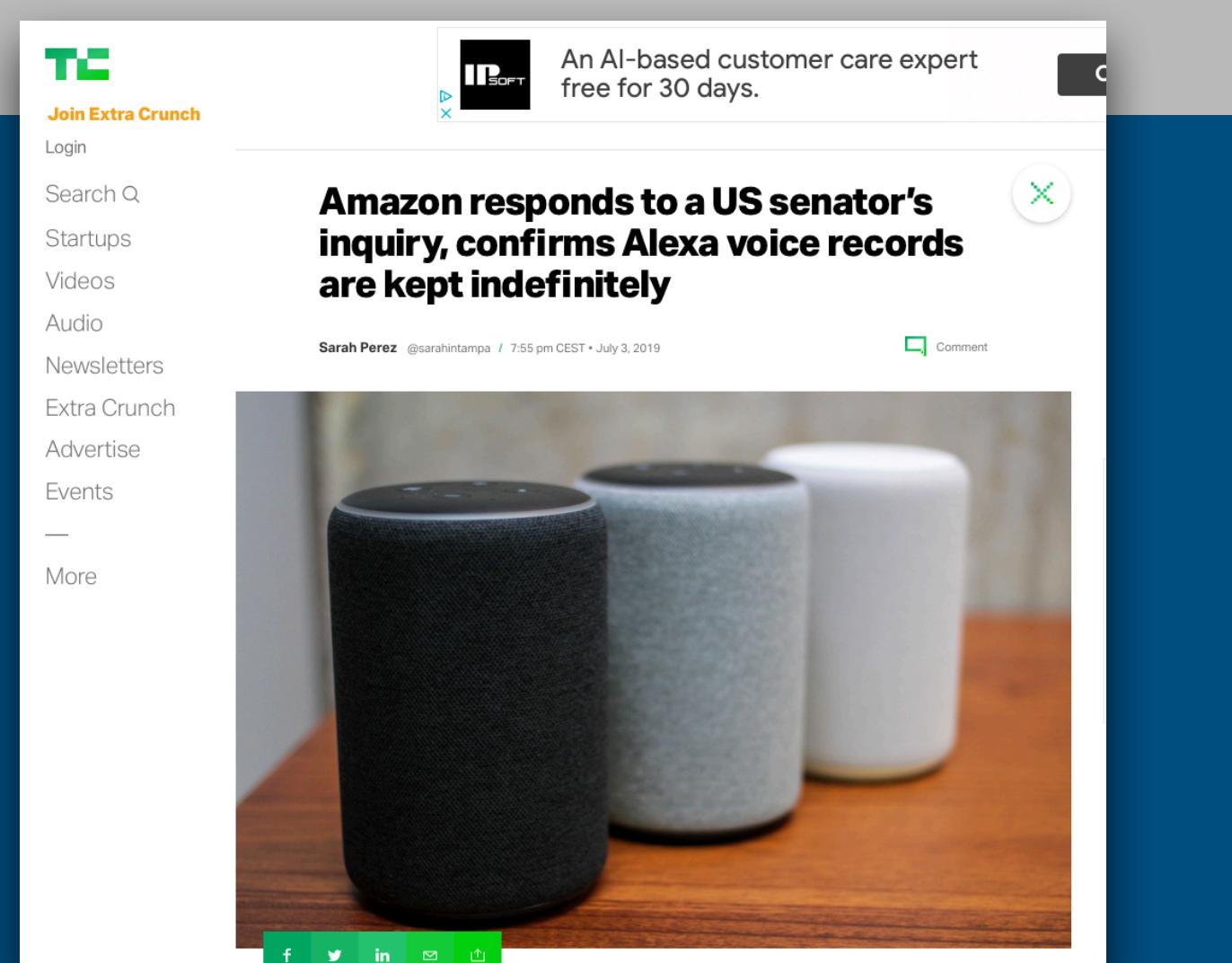
Technology

Amazon Workers Are Listening to What You Tell Alexa

A global team reviews audio clips in an effort to help the voice-activated assistant respond to commands.

By [Matt Day](#), [Giles Turner](#), and [Natalia Drozdiak](#)

11 April 2019, 00:34 CEST



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An AI-based customer care expert free for 30 days.

Amazon responds to a US senator's inquiry, confirms Alexa voice records are kept indefinitely

Sarah Perez @sarahintampa / 7:55 pm CEST • July 3, 2019

f t in e



Privacy Matters
@PrivacyMatters

Following

Amazon "employs 1000s of people around the world to listen to voice recordings captured in Echo owners' homes & offices .. in an effort to eliminate gaps in Alexa's understanding of human speech and help it better respond to commands."



Amazon Workers Are Listening to What You Tell Alexa

A global team reviews audio clips in an effort to help the voice-activated assistant respond to commands.

bloomberg.com

2:23 AM - 11 Apr 2019

108 Retweets 98 Likes





PrivacyDigest
@PrivacyDigest

Following

Amazon Is Working on a Device That Can Read Human Emotions - Bloomberg

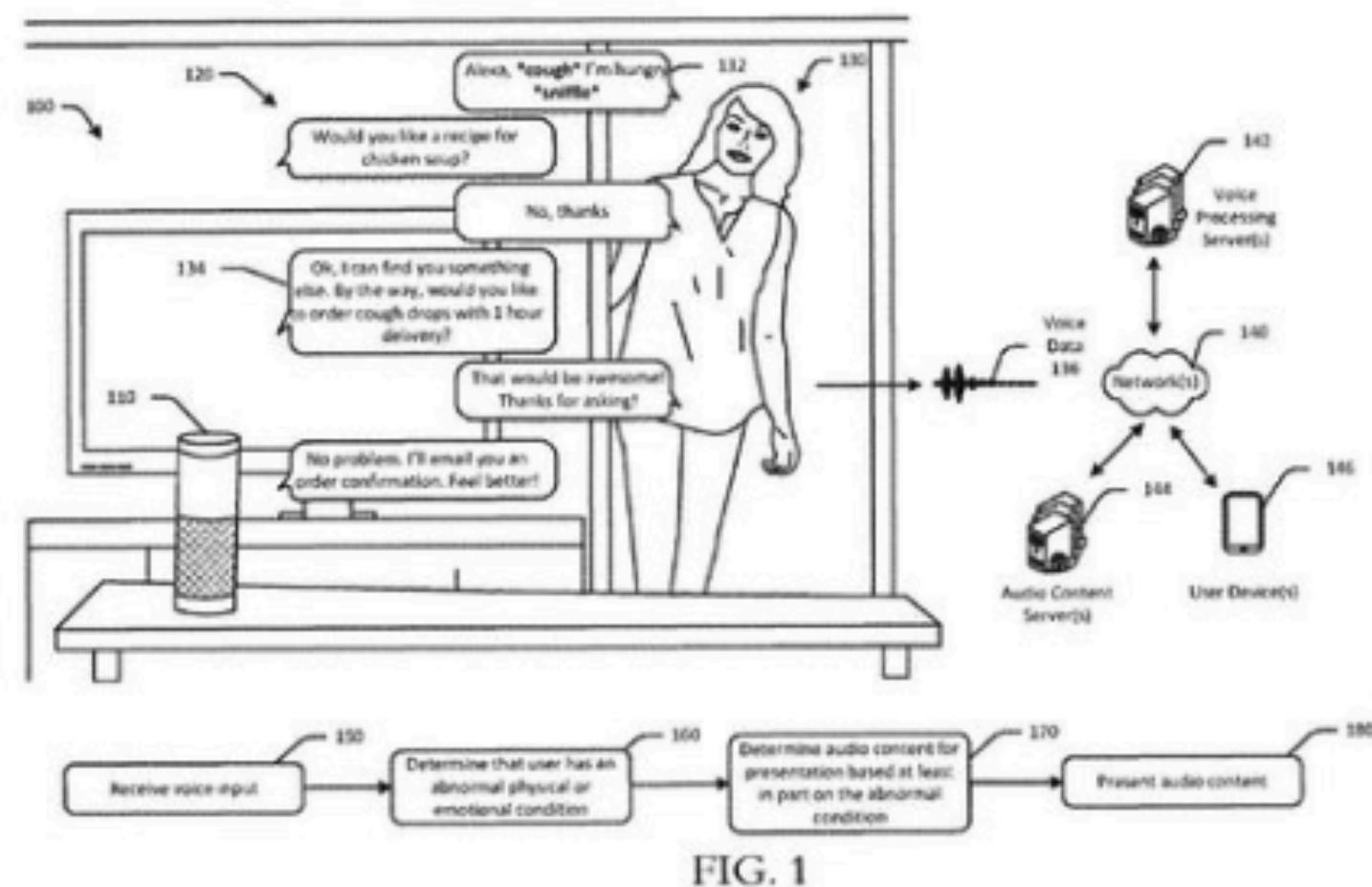


FIG. 1

Amazon Is Working on a Wearable Device That Reads Human Emotions

Amazon.com Inc. is developing a voice-activated wearable device that can recognize human emotions.

bloomberg.com

5:19 AM - 23 May 2019



1



The wrist-worn gadget is described as a health and wellness product in internal documents reviewed by Bloomberg. It's a collaboration between Lab126, the hardware development group behind Amazon's Fire phone and Echo smart speaker, and the Alexa voice software team.

A U.S. patent filed in 2017 describes a system in which voice software uses analysis of vocal patterns to determine how a user is feeling, discerning among “joy, anger, sorrow, sadness, fear, disgust, boredom, stress, or other emotional states.” The patent, made public last year, suggests Amazon could use knowledge of a user’s emotions to recommend products or otherwise tailor responses.

Amazon declined to comment.

Comcast is reportedly developing a device that would track your bathroom habits

This probably isn't a company anyone wants to be sharing their vitals with.

By [Chris Welch](#) | [@chriswelch](#) | May 21, 2019, 3:23pm EDT

"The device will monitor people's basic health metrics using ambient sensors, with a focus on whether someone is making frequent trips to the bathroom or spending more time than usual in bed," CNBC's report says. "Comcast is also building tools for detecting falls, which are common and potentially fatal for seniors."



davrola
@davrola

[Follow](#)

Comcast developing smart speaker to track your bathroom habits: Having one of the most powerful telecom empires in the world tracking your health and lifestyle has an unsettling, dystopian ring to it.



Comcast is reportedly developing a smart speaker that would track your bat...

This probably isn't a company anyone wants to be sharing their vitals with
theverge.com

4:28 AM - 22 May 2019

1 Retweet





THE PRIVACY PROJECT

Companies and governments are gaining new powers to follow people across the internet and around the world, and even to peer into their genomes. The benefits of such advances have been apparent for years; the costs — in anonymity, even autonomy — are now becoming clearer. The boundaries of privacy are in dispute, and its future is in doubt. Citizens, politicians and business leaders are asking if societies are making the wisest tradeoffs. The Times is embarking on this monthslong project to explore the technology and where it's taking us, and to convene debate about how it can best help realize human potential.

 Privacy Project 
@PrivacyProject

Following

Your driving habits — how fast you drive, how hard you brake, whether you always use your seatbelt — could be valuable to insurance companies. But while you can turn off location data on your phone, there's no opt-out feature for your car.



Opinion | Your Car Knows When You Gain Weight
Vehicles collect a lot of unusual data. But who owns it?
nytimes.com

4:00 AM - 20 May 2019

74 Retweets 90 Likes



What Do They Know, and
How Do They Know It?

DEBATE

What Should Be Done About This?

ACTION

What Can I Do?



 Privacy Project 
@PrivacyProject

Following

Today's cars are equipped with an always-on wireless transmitter that constantly sends vehicle performance and maintenance data to the manufacturer. Modern cars collect as much as 25 gigabytes of data per hour.



Opinion | Your Car Knows When You Gain Weight
Vehicles collect a lot of unusual data. But who owns it?
nytimes.com

1:00 PM - 20 May 2019

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2 15 20

best help realize human potential.



IDEAS

Does Privacy Matter?

BASICS

What Do They Know, and How Do They Know It?

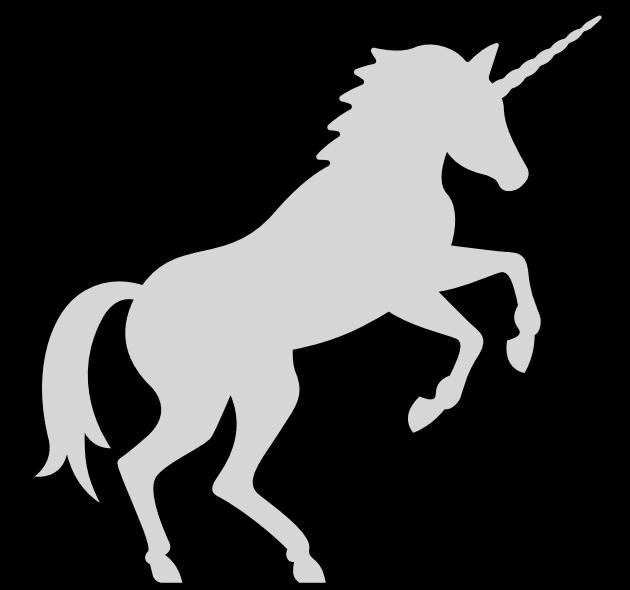
DEBATE

What Should Be Done About This?

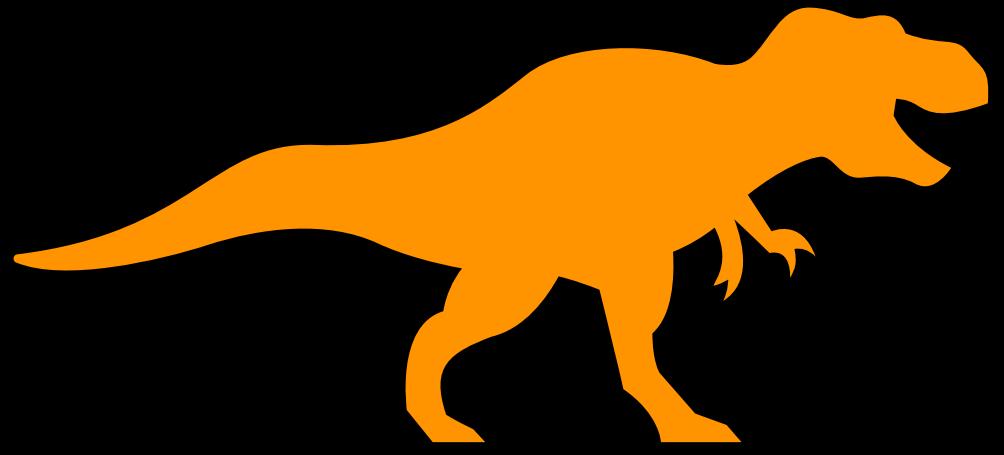
ACTION

What Can I Do?

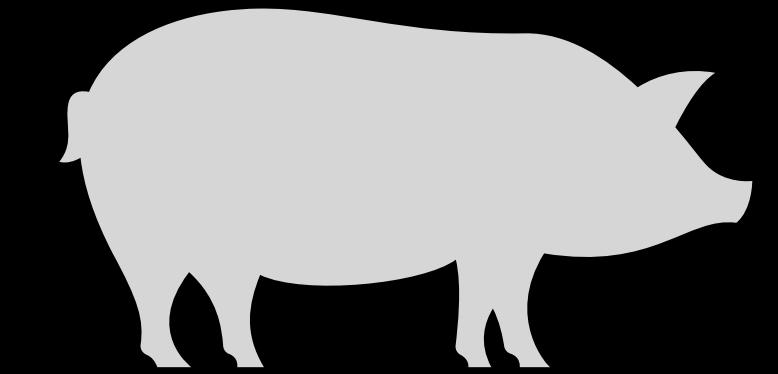
ECOSYSTEM



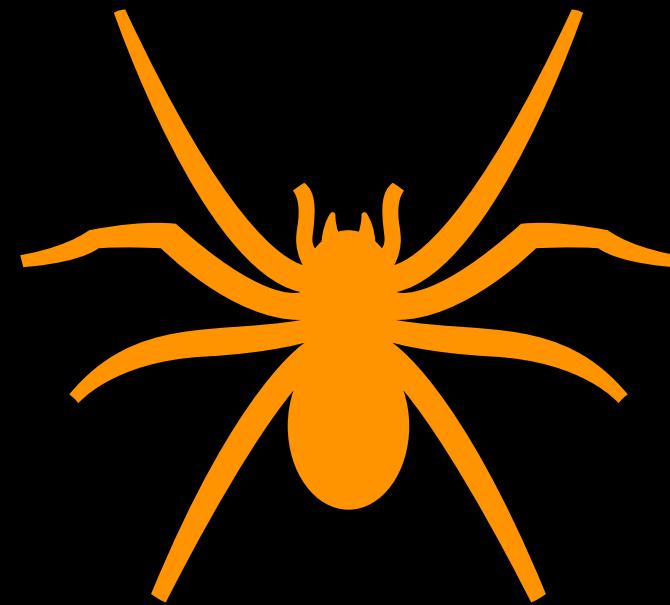
Data



Trackers



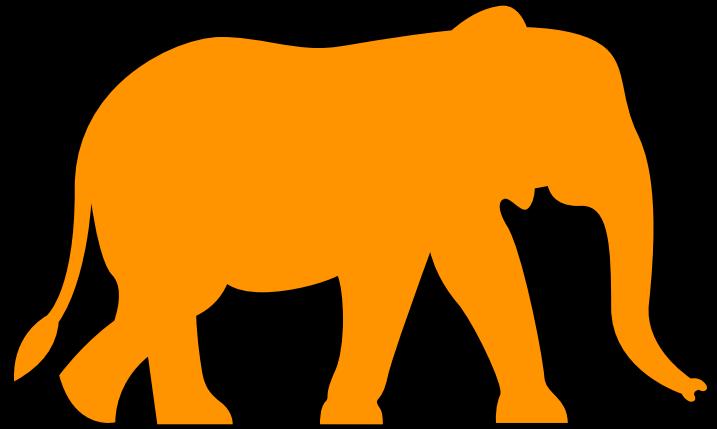
Data brokers



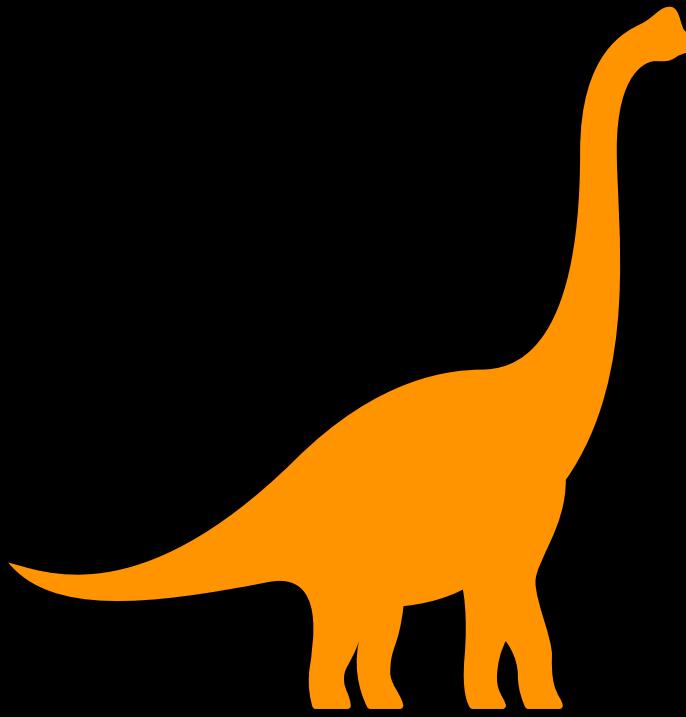
Search Engines



Social Networks



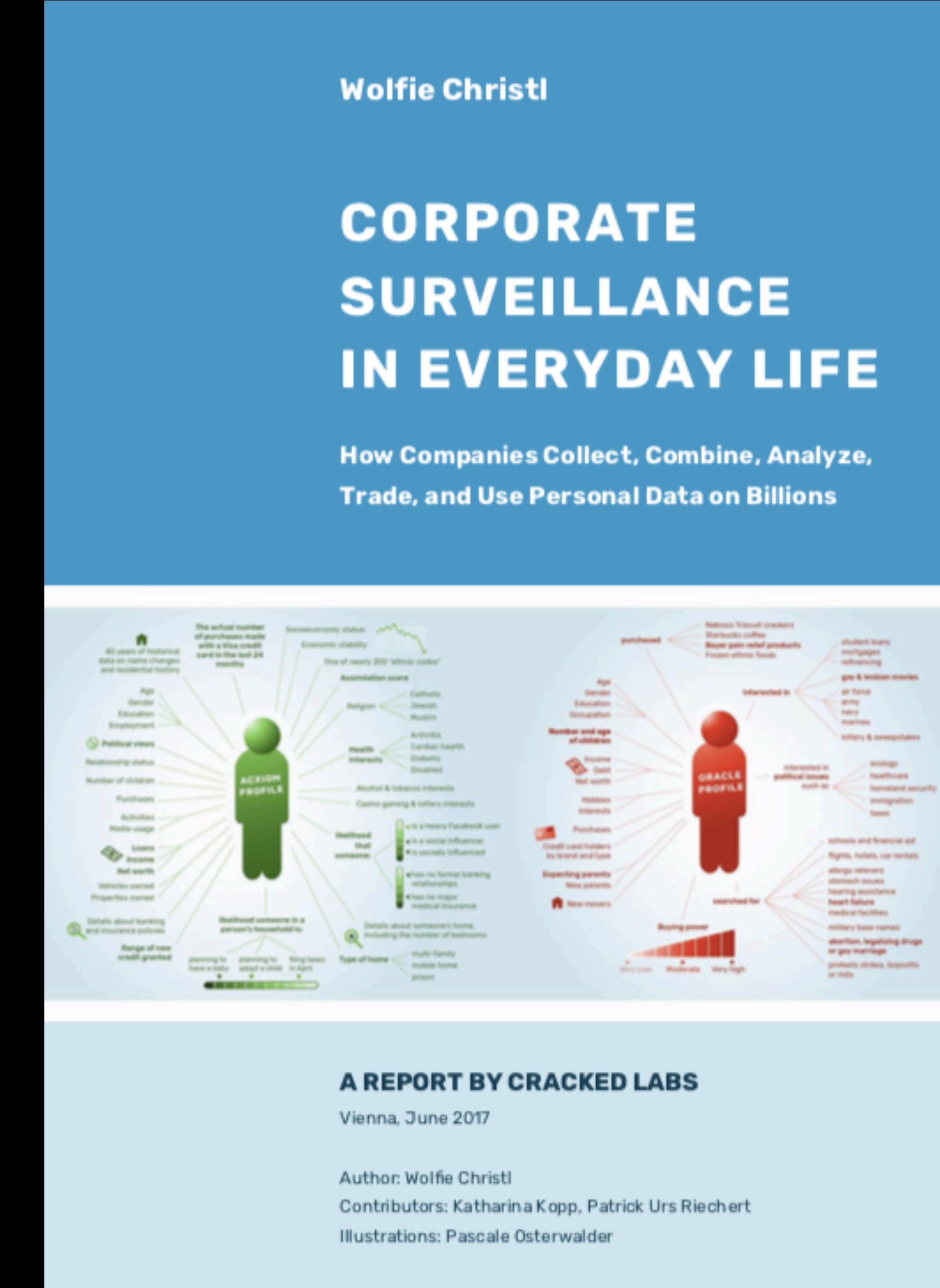
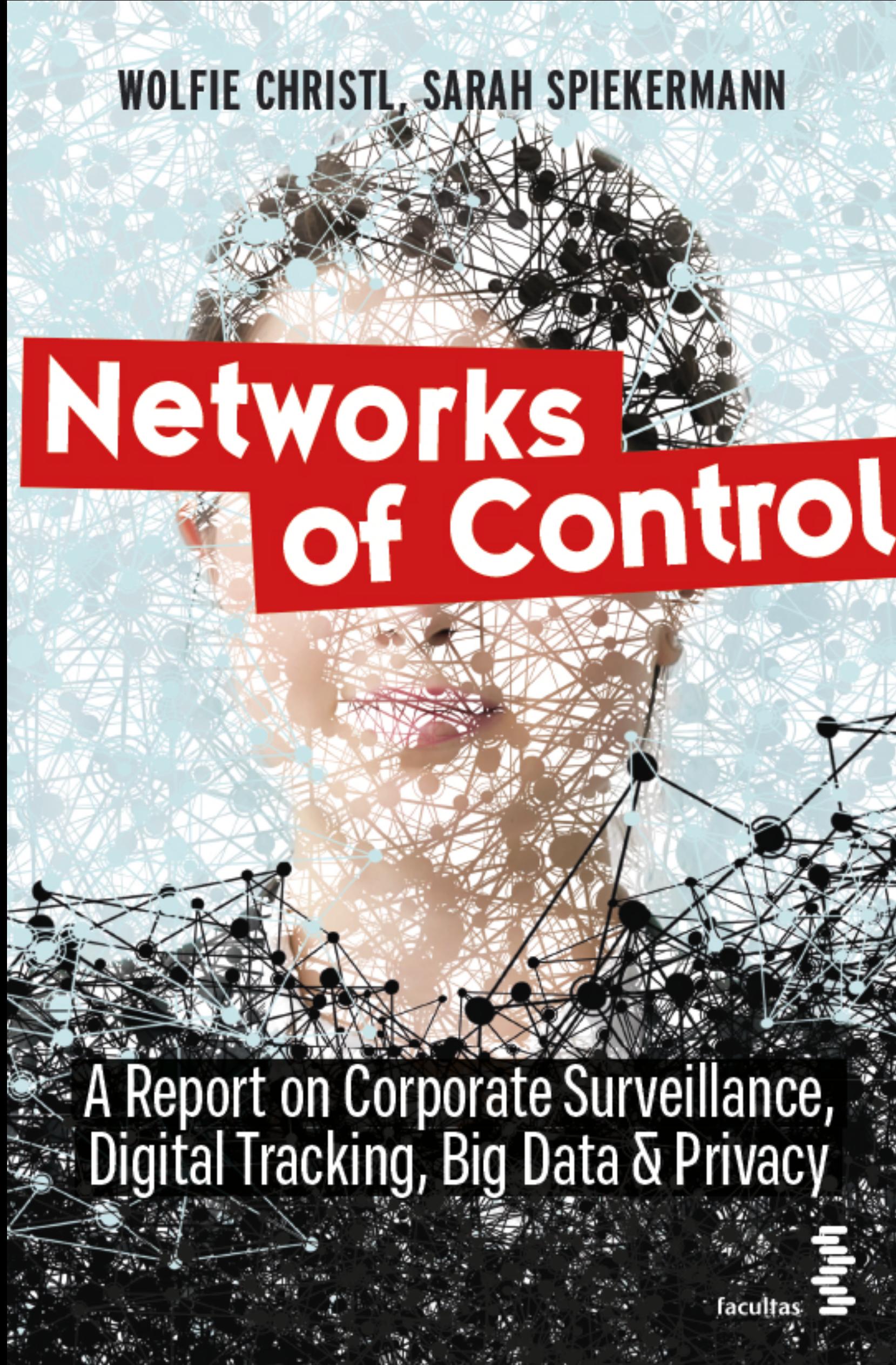
Advertisement



Smartphones

Data brokers

Classifying people since 1969.
Now like pros.



COMMERCIAL DIGITAL TRACKING AND PROFILING LANDSCAPE

In recent years, most industries have joined today's pervasive personal data ecosystems

TELCO/MEDIA

Verizon AOL, Yahoo
Comcast NBC Universal
AT&T TimeWarner

MEDIA AND PUBLISHING

Online Publishers
Video Apps
Websites Games
Music
Walt Disney
CBS
Viacom
Bertelsmann
Asahi Shimbun
News Corp
Grupo Globo

RETAIL, CONSUMER GOODS AND SERVICES

Online Shops
Retail Grocery Pharmacies
Automotive Brands Mail Order
Travel & Hospitality

TELECOM, DEVICE, AND SERVICE PROVIDERS

Airtel ISPs
Mobile Carriers Telenor
Telefónica China Mobile
Samsung Wearables Smart Home
IoT Connected Car

CONSUMER DATA AND ANALYTICS INDUSTRY

CUSTOMER MANAGEMENT

Personalization
MailChimp Call Center
Predictive Marketing
CRM Loyalty Programs

MARKETING DATA

Database Services
WPP List Rental
Axiom Lead Generation

ADVERTISING TECHNOLOGY

SSPs Rocket Fuel
Ad Networks Nielsen Turn
Cross-device tracking

RISK DATA

Experian Tenant screening
TransUnion Equifax
Background Checks

ID Analytics

Epsilon Data Append
Segmentation Agencies

GOVERNMENT SURVEILLANCE

Politics Utilities & Energy
Science Advocacy Education
Law Enforcement Welfare Housing
Employment Healthcare

DATA INTEGRATION AND IDENTITY MATCHING

SAS MDM Auth
FICO IBM Identity Verification
Palantir Fraud Detection

BUSINESS IT

Microsoft Managed Services
Deloitte
McKinsey
Accenture

FINANCIAL SERVICES

SAS Health & Insurance Analytics
FICO Cyber Security
Palantir Credit Scoring

GOVERNMENT SURVEILLANCE

LexisNexis

GOVERNMENT SURVEILLANCE

Government Surveillance

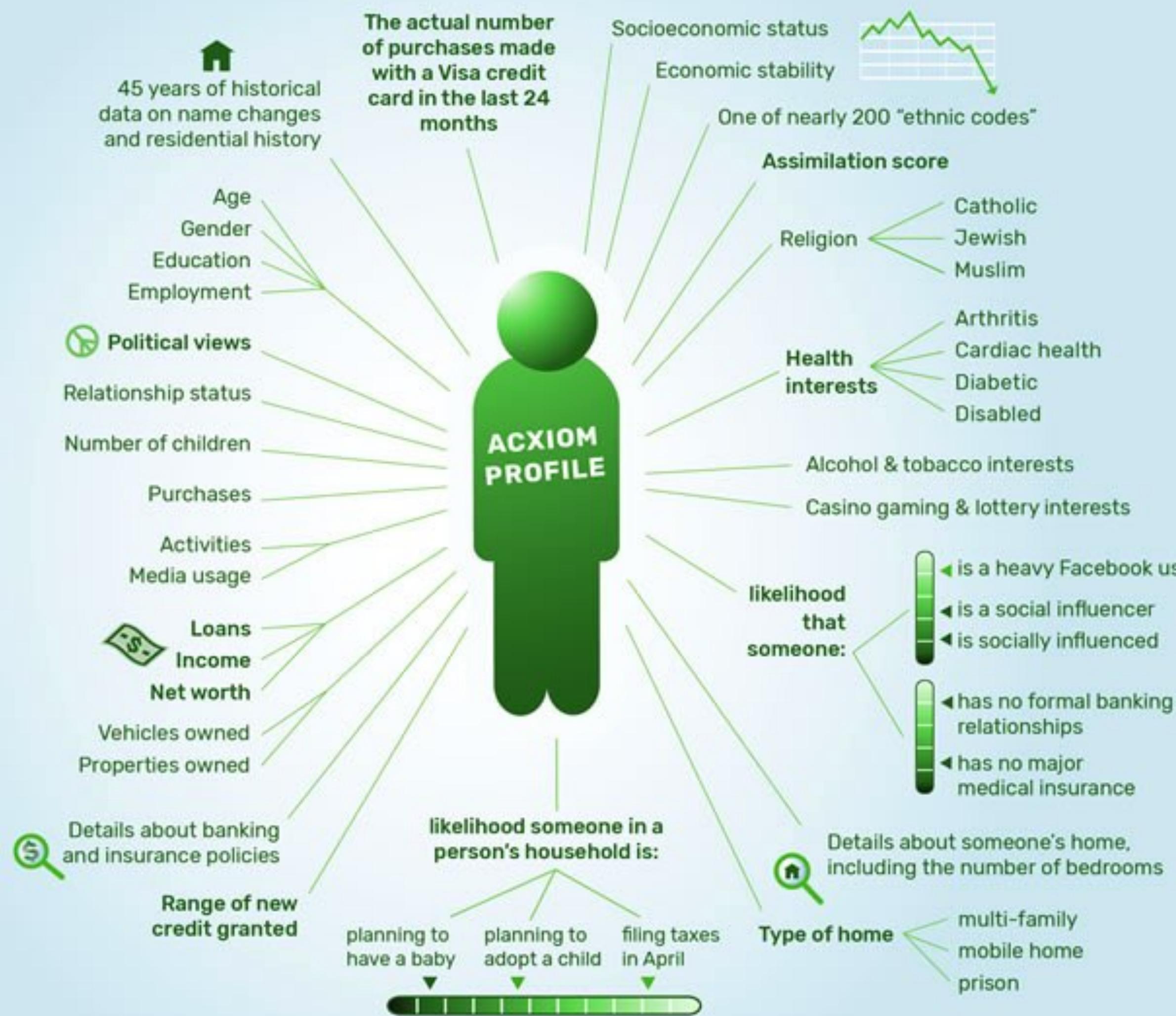
GOVERNMENT SURVEILLANCE

Profiles

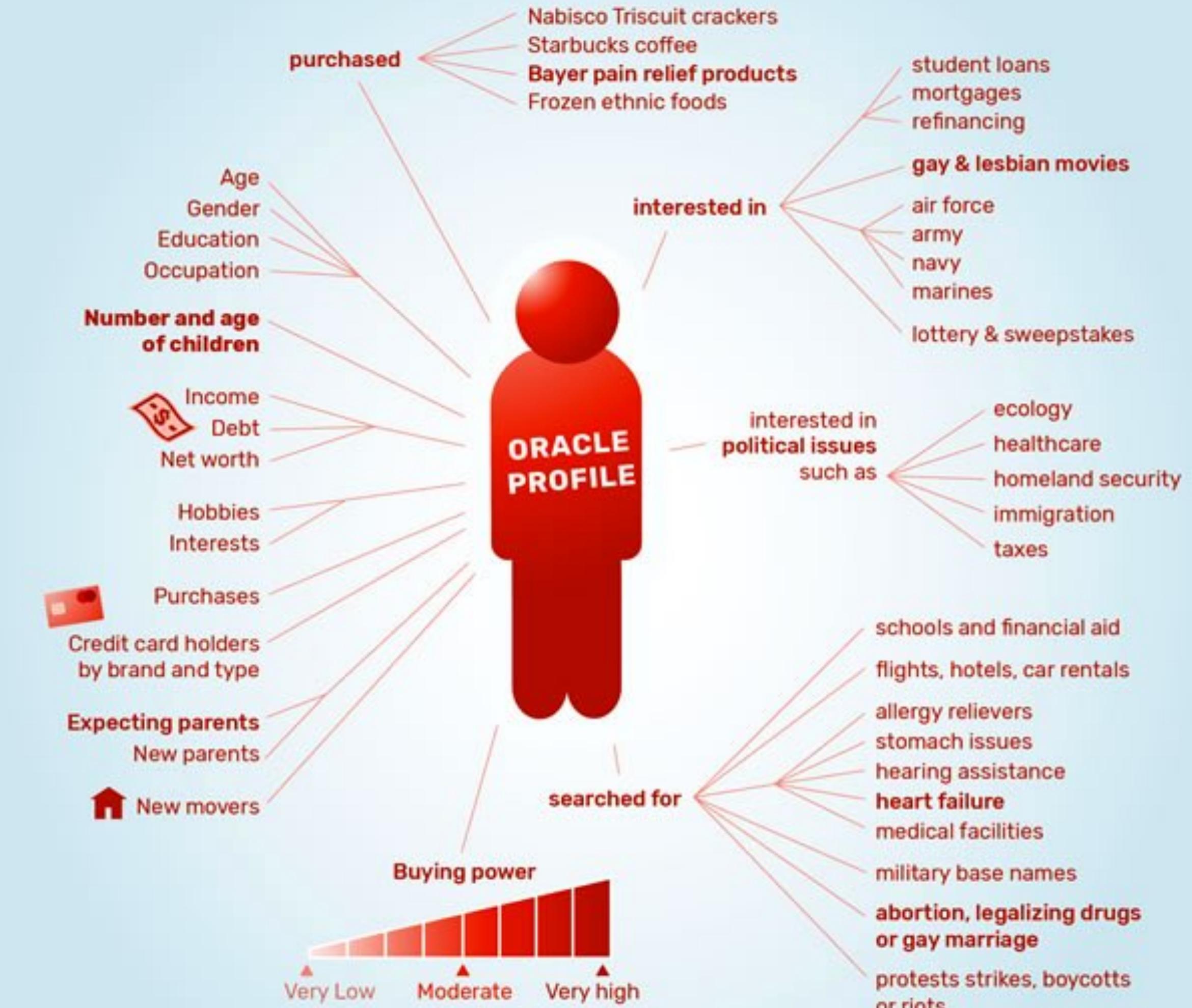
Large Online Platforms			
Facebook	has profiles on	1.9 billion	Facebook users
		1.2 billion	Whatsapp users
		600 million	Instagram users
Google	has profiles on	2 billion	Android users
		1+ billion	Gmail users
		1+ billion	YouTube users
Apple	has profiles on	1 billion	iOS users
Credit Reporting Agencies			
Experian	has credit data on	918 million	people
	marketing data on	700 million	people
	„insights“ on	2.3 billion	people
Equifax	has data on	820 million	people
		1 billion	devices
TransUnion	has data on	1 billion	people
Consumer Data Brokers			
Acxiom	has data on	700 million	people
		1 billion	cookies and mobile devices
	it manages	3.7 billion	consumer profiles for clients
Oracle	has data on	1 billion	mobile users
		1.9 billion	website visitors
	provides access to	5 billion	“unique” consumer IDs

DATA BROKERS HAVE EXTENSIVE PROFILE INFORMATION ON ENTIRE POPULATIONS

Examples of data on consumers provided by Acxiom and Oracle



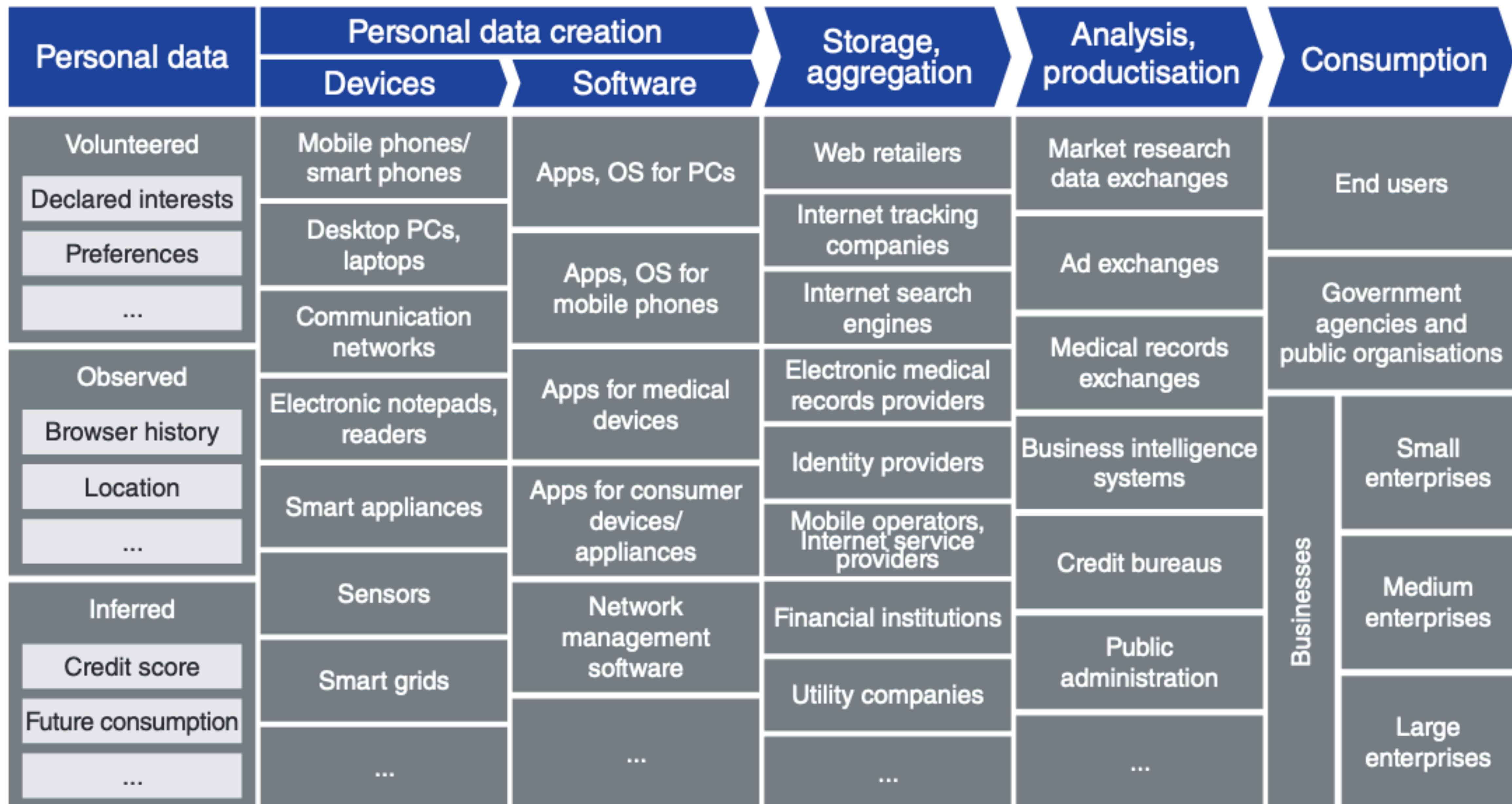
Acxiom provides up to 3,000 attributes and scores on 700 million people in the US, Europe, and other regions.



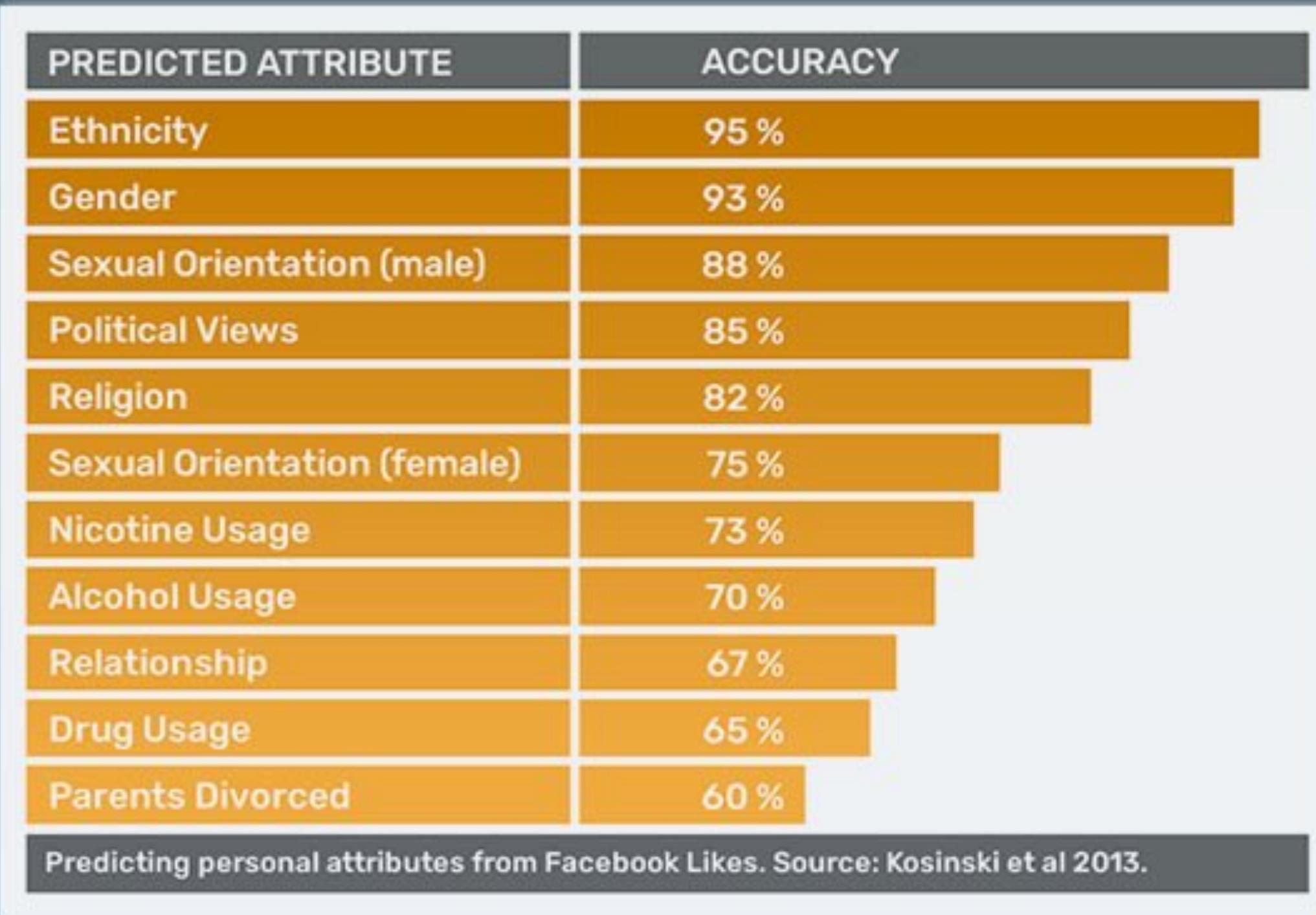
Oracle sorts people into thousands of categories and provides over 30,000 attributes on 2 billion consumer profiles

Regulatory environment

Communication standards



PREDICTING PERSONAL ATTRIBUTES FROM FACEBOOK LIKES



PREDICTING CHARACTER TRAITS FROM PHONE CALL RECORDS AND APP USAGE

Source: Chittaranjan et al, 2011



RECOGNIZING EMOTIONS FROM THE RHYTHM OF KEYBOARD TYPING PATTERNS

Source: Epp et al, 2011



pipl



INTEGRITY

A Division of Aristotle

'id:analytics

A LexisNexis® Risk Solutions Company

emailage®

A LexisNexis® Risk Solutions Company

A SINGLE COMPANY...

...THAT WANTS TO FIND, ASSESS, ADDRESS, SORT, AND MANAGE CUSTOMERS (e.g. a retailer, bank insurer, airline or telecom firm)

Customer and Prospects Database



Website and Online Shop



Mobile App



Social Media Site



Emails and Direct Mail sent to Customers



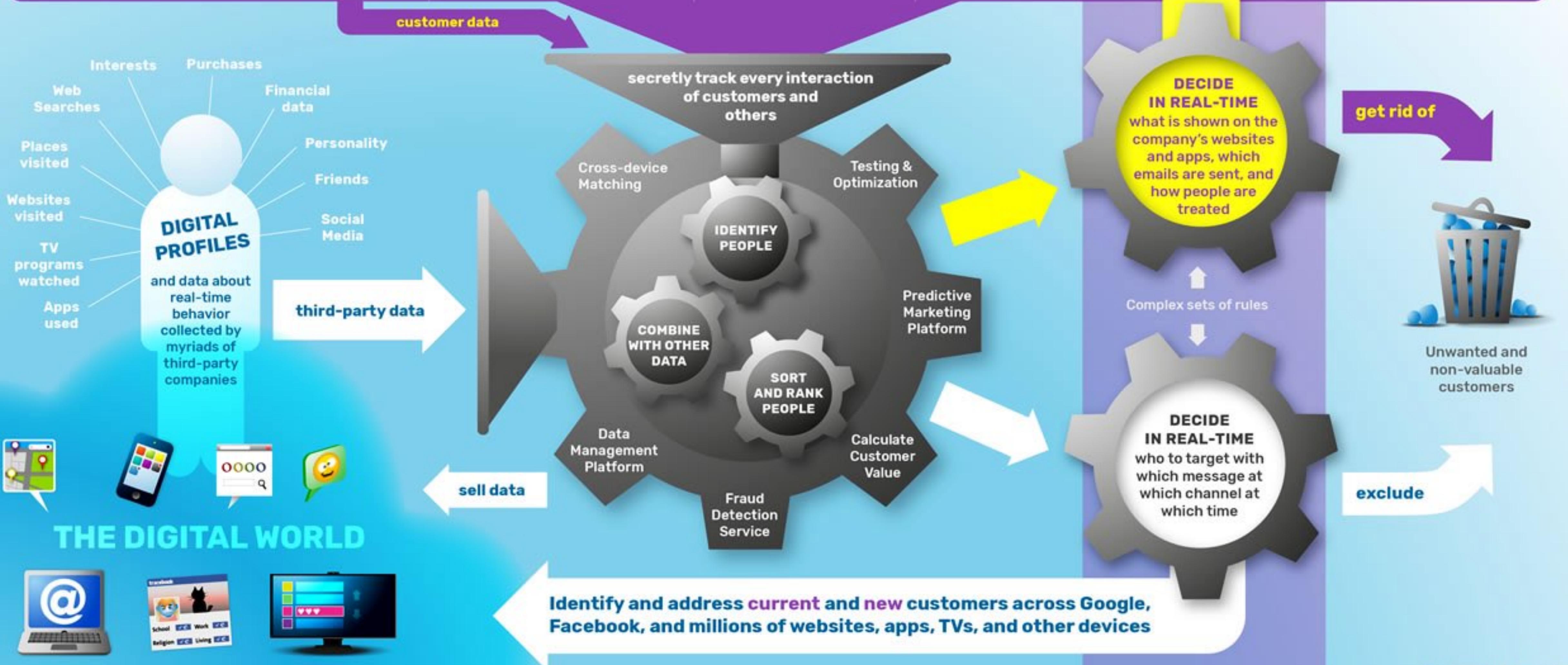
Call Center Store



personalize

Personalize contents, offers, choices, and options available to consumers. Nudge them to:

- > buy more expensive products
- > buy complementary products
- > identify and prevent the loss of valuable customers



Ad transparency

Why am I seeing this ad?

One reason you're seeing this ad is that AEGEAN AIRLINES wants to reach people with RELATIONSHIP STATUS "ENGAGED" on their Facebook profiles.

One reason why you're seeing this ad is that CDU SAARBRUCKEN '' -SCHEIDT wants to reach people WHO WERE RECENTLY NEAR THEIR BUSINESS. This is based on information from your Facebook profile and your mobile device

One reason you're seeing this ad is that CANAL FRANCE wants to reach people who are part of an audience created based on data provided by ACXIOM. Facebook works with data providers to help businesses find the right audiences for their ads.

Investigating Ad Transparency Mechanisms in Social Media: A Case Study of Facebook’s Explanations

Athanasis Andreou[§], Giridhari Venkatadri[†], Oana Goga^{*}, Krishna P. Gummadi[‡], Patrick Loiseau^{*‡}, Alan Mislove[†]

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Abstract—Targeted advertising has been subject to many privacy complaints from both users and policy makers. Despite this attention, users still have little understanding of what data the advertising platforms have about them and why they are shown particular ads. To address such concerns, Facebook recently introduced two transparency mechanisms: a “Why am I seeing this?” button that provides users with an explanation of why they were shown a particular ad (ad explanations), and an Ad Preferences Page that provides users with a list of attributes Facebook has inferred about them and how (data explanations).

In this paper, we investigate the level of transparency provided by these two mechanisms. We first define a number of key properties of explanations and then evaluate empirically whether Facebook’s explanations satisfy them. For our experiments, we develop a browser extension that collects the ads users receive every time they browse Facebook, their respective explanations, and the attributes listed on the Ad Preferences Page; we then use controlled experiments where we create our own ad campaigns and target the users that installed our extension. Our results show that ad explanations are often *incomplete* and sometimes *misleading* while data explanations are often *incomplete* and *vague*. Taken together, our findings have significant implications for users, policy makers, and regulators as social media advertising services mature.

I. INTRODUCTION

In recent years, targeted advertising has become the source of a growing number of privacy concerns for internet users

example, the General Data Protection Regulation (GDPR) of the EU establishes a “right to explanations” [9], [26], and the Loi pour une République Numérique of France strengthens the transparency requirements for digital platforms [10].

While many prior studies have focused on bringing transparency to targeted advertising on the web [17], [34], [30], [31], [20], [36], [43], few studies (if any) have focused on social media advertising. Targeting ads on social media differs from traditional ad targeting in multiple important ways: *First*, social media platforms such as Facebook have access to much richer data sources than traditional advertising companies such as DoubleClick (e.g., Facebook has information about the content people are posting, their self-reported demographics, the identities of their friends, web browsing traces, etc). *Second*, social media platforms know detailed personally-identifiable information (PII) of users, and they often allow advertisers to target users based on this information. In comparison, traditional advertisers often only track user browsing behaviors via opaque cookies. As social media sites are now the de-facto portal to the web for many users, bringing transparency to social media advertising is a significant concern.

In response to users’ and regulators’ concerns, social media platforms recently started offering transparency mechanisms. In particular, Facebook was the first to do so by introducing two features. *First*, Facebook introduced a “Why am I seeing this?” button that provides users with an explanation of why they were shown a particular ad (ad explanations), and *Second*, Facebook introduced an Ad Preferences Page that provides users with a list of attributes Facebook has inferred about them and how (data explanations).

NDSS 2018

Transparency in
Facebook

TABLE II: Sample of targeting attributes offered by Facebook and four data broker partners: Acxiom, DLX, Experian, and Epsilon. Also shown is the category and corresponding audience reach (number of users).

Source	Category	Reach	Targeting attributes
Facebook	(D) Politics (U.S.)	179M	Likely To Engage in Politics (Conservative), Likely To Engage in Politics (Liberal), Likely To Engage in Politics (Moderate), U.S. Politics (Conservative), U.S. Politics (Liberal), U.S. Politics (Moderate), U.S. Politics (Very Conservative), U.S. Politics (Very Liberal)
Facebook	(I) Family and relationships	138M	Dating, Family, Fatherhood, Friendship, Marriage, Motherhood, Parenting, Weddings
Facebook	(B) Consumer classification/India	3100	(A) Affinity for High Value Goods/India, (A+B) Affinity for Mid-High Value Goods/India
Facebook	(D) Parents/All Parents	59M	(0-12 months) New Parents, (01-02 Years) Parents with Toddlers, (03-05 Years) Parents with Preschoolers, (06-08 Years) Parents with Early School Age Children, (08-12 Years) Parents with Preteens, (13-18 Years) Parents with Teenagers, (18-26 Years) Parents with Adult Children, Expectant parents, Parents (All)
Acxiom	(B) Charitable donations	75M	Animal welfare, Arts and cultural, Environmental and wildlife, Health, Political
Acxiom	(B) Financial/Spending methods	140M	1 Line of Credit, 2 Lines of Credit, 3, Active credit card user, Any card type, Bank cards, Gas, department and retail store cards, High-end department store cards, Premium credit cards, Primarily cash, Primarily credit cards, Travel and entertainment cards
Acxiom	(B) Purchase behavior/Store types	34M	High-end retail, Low-end department store
Acxiom	(B) Residential profiles	5M	Recent homebuyer, Recent mortgage borrower
Acxiom	(D) Financial/Net Worth/Liquid assets	74M	\$1-\$24,999, \$25,000-\$49,999, \$50,000-\$99,999, \$500K-\$1M, \$100K-\$249K, \$250K-\$499K, \$1M-\$2M, \$2M-\$3M, \$3M+ ,
DLX	(B) Automotive/New vehicle buyers (Near market)/Style	102M	Crossover, Economy/compact, Full-size SUV, Full-size sedan, Hybrid/alternative fuel, Luxury SUV, Luxury sedan, Midsize car, Minivan, Pickup truck, Small/midsize SUV, Sports car/convertible
DLX	(B) Purchase behavior/Health and beauty	90M	Allergy relief, Antiperspirants and deodorants, Cosmetics, Cough and cold relief, Fragrance, Hair care, Health and wellness buyers, Men's grooming, Oral care, Over-the-counter medication, Pain relief, Skin care, Sun care, Vitamins
DLX	(B) Automotive/Owners/Vehicle age	95M	0/1 year old, 2 years old, 3 years old, 4/5 years old, 6/10 years old, 11/15 years old, 16/20 years old, Over 20 years old
Experian	(D) Home/Home Ownership	26M	First time homebuyer
Experian	(B) Residential profiles	5M	New mover
Epsilon	(B) Residential profiles	3M	Likely to move
Epsilon	(B) Charitable donations	34M	All charitable donations, Cancer Causes, Children's Causes, Veterans

COMMUNISM
ISLAM
QURAN
SUICIDE PREVENTION
SOCIALISM
JUDAISM
HOMOSEXUALITY
ALTERNATIVE MEDICINE
CHRITIANITY
ILLEGAL IMMIGRATION
ONCOLOGY
LGBT COMMUNITY
GENDER IDENTITY
REPRODUCTIVE HEALTH
BIBLE
PREGNANCY
NATIONALISM
VEGANISM
BUDDHISM
FEMINISM
UNION

Facebook Use of Sensitive Data for Advertising in Europe

José González Cabañas
Universidad Carlos III de Madrid
jgcabana@it.uc3m.es

ABSTRACT

The upcoming European General Data Protection Regulation (GDPR) prohibits the processing and exploitation of some categories of personal data (health, political orientation, sexual preferences, religious beliefs, ethnic origin, etc.) due to the obvious privacy risks that may be derived from a malicious use of such type of information. These categories are referred to as sensitive personal data. Facebook has been recently fined €1.2M in Spain for collecting, storing and processing sensitive personal data for advertising purposes. This paper quantifies the portion of Facebook users in the European Union (EU) who are labeled with interests linked to sensitive personal data. The results of our study reveal that Facebook labels 73% EU users with sensitive interests. This corresponds to 40% of the overall EU population. We also estimate that a malicious third-party could unveil the identity

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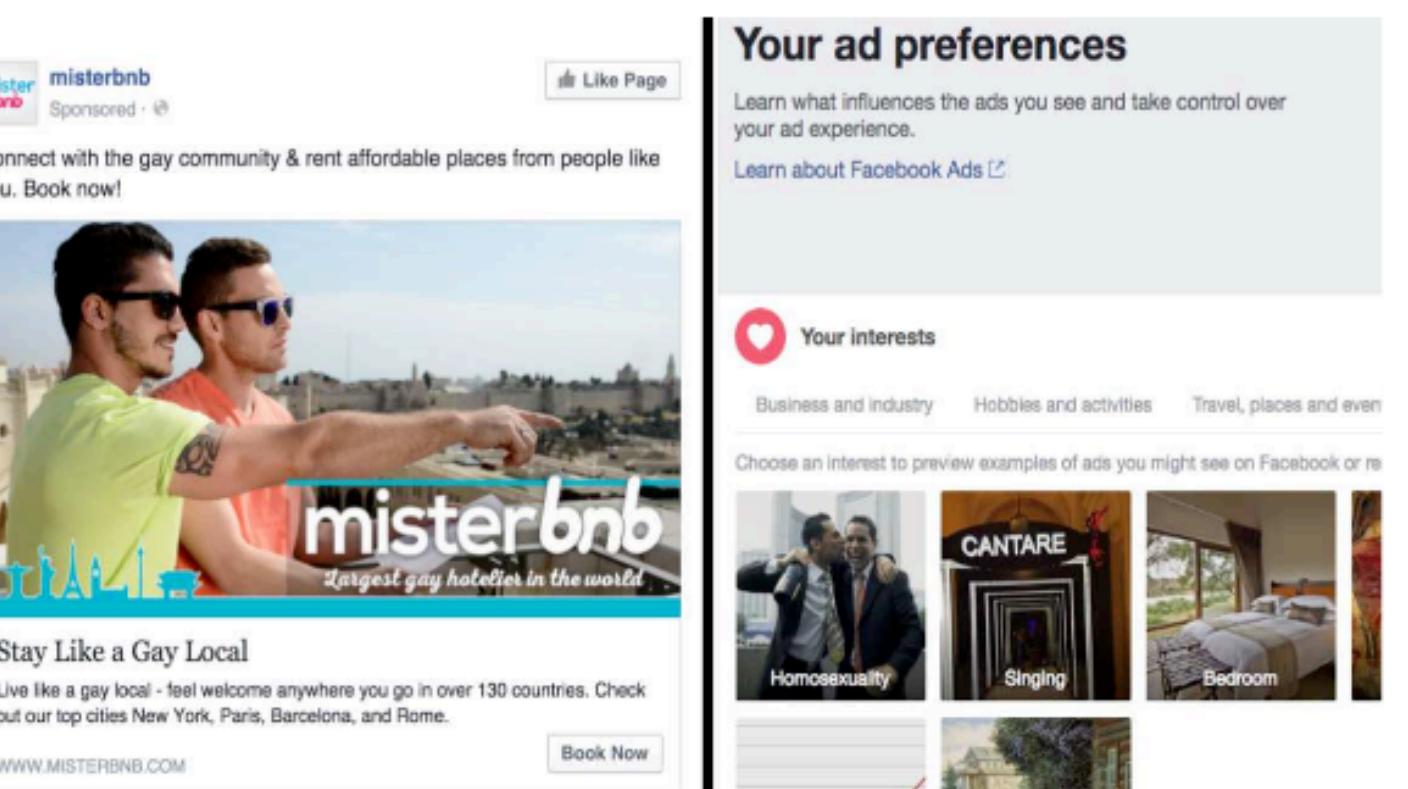


Figure 1. Snapshot of an ad received by one of the authors papers & ad preference list showing that FB have inferred this person was interested in *Homosexuality*.

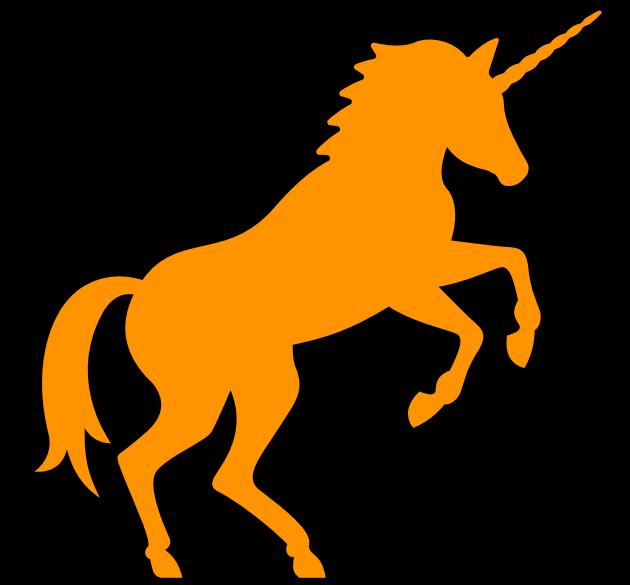
INFORMATION
WANTS TO BE
FREE



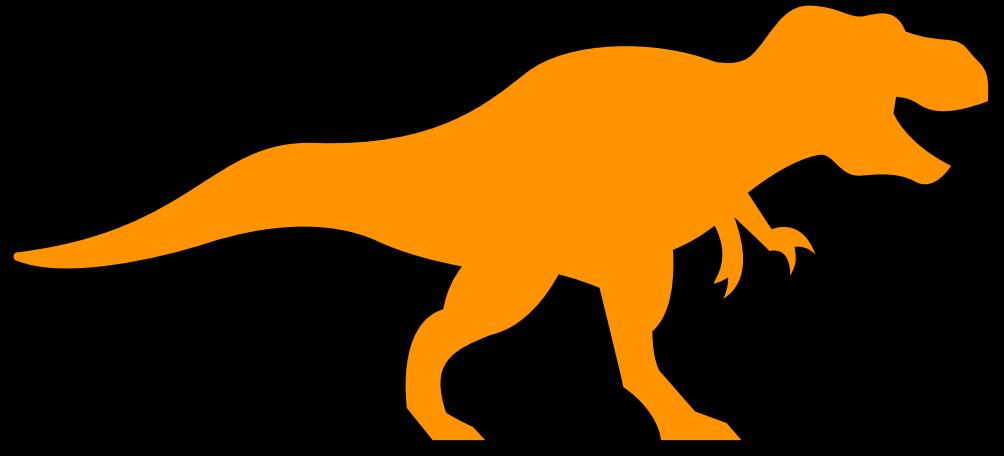
information is beautiful

CYBERPUNK ETHIC

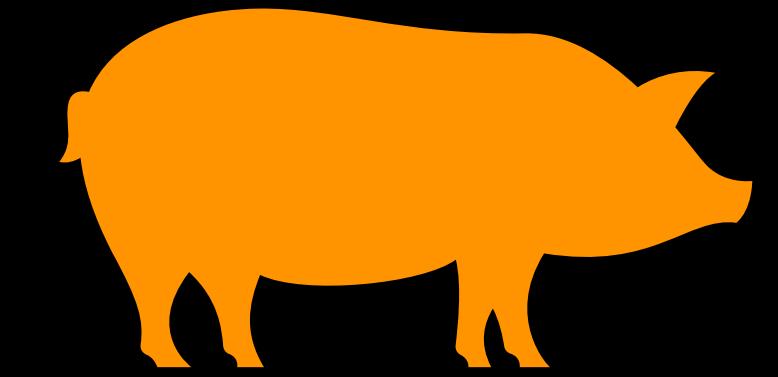
ECOSYSTEM



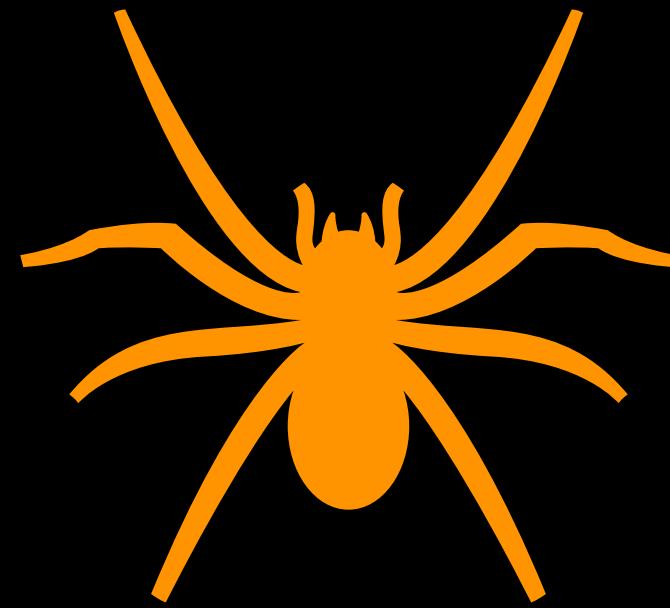
Data



Trackers



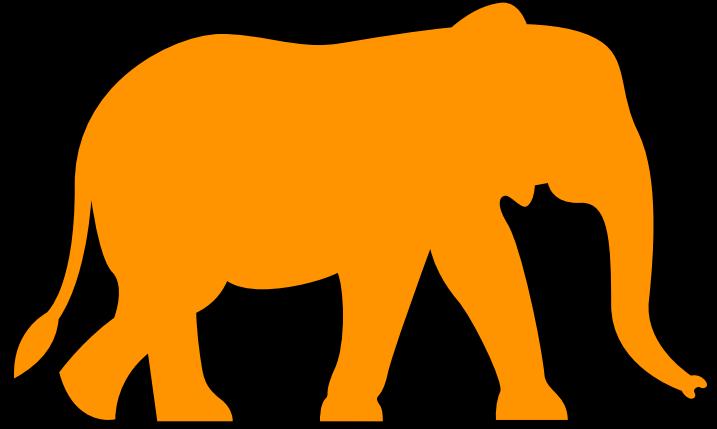
Data brokers



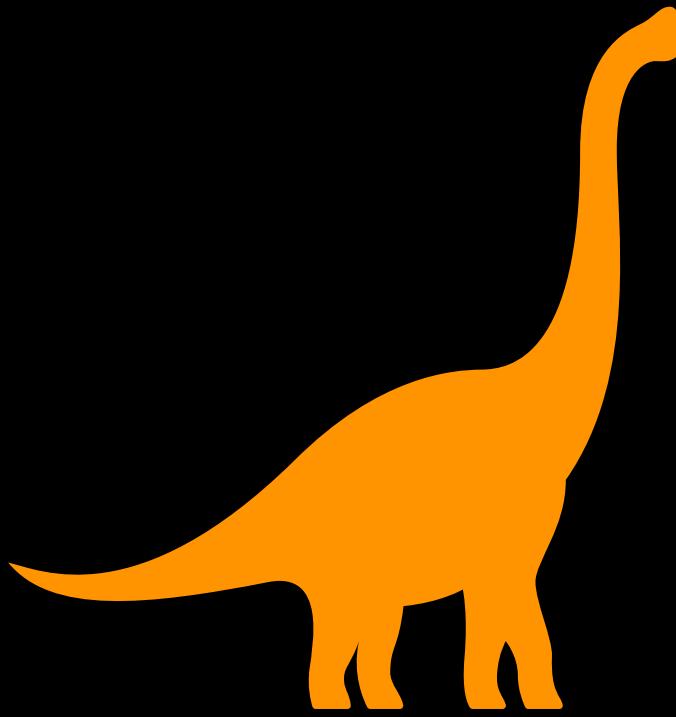
Search Engines



Social Networks



Advertisement



Smartphones

Conclusions

And now what?

The future is private.



Martin Moschek
@MartinMoschek

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Mark Zuckerberg: "The future is private."
Sundar Pichai: "The present is private."
[#GoogleIO #F8](https://tcrn.ch/2WCI0xY)



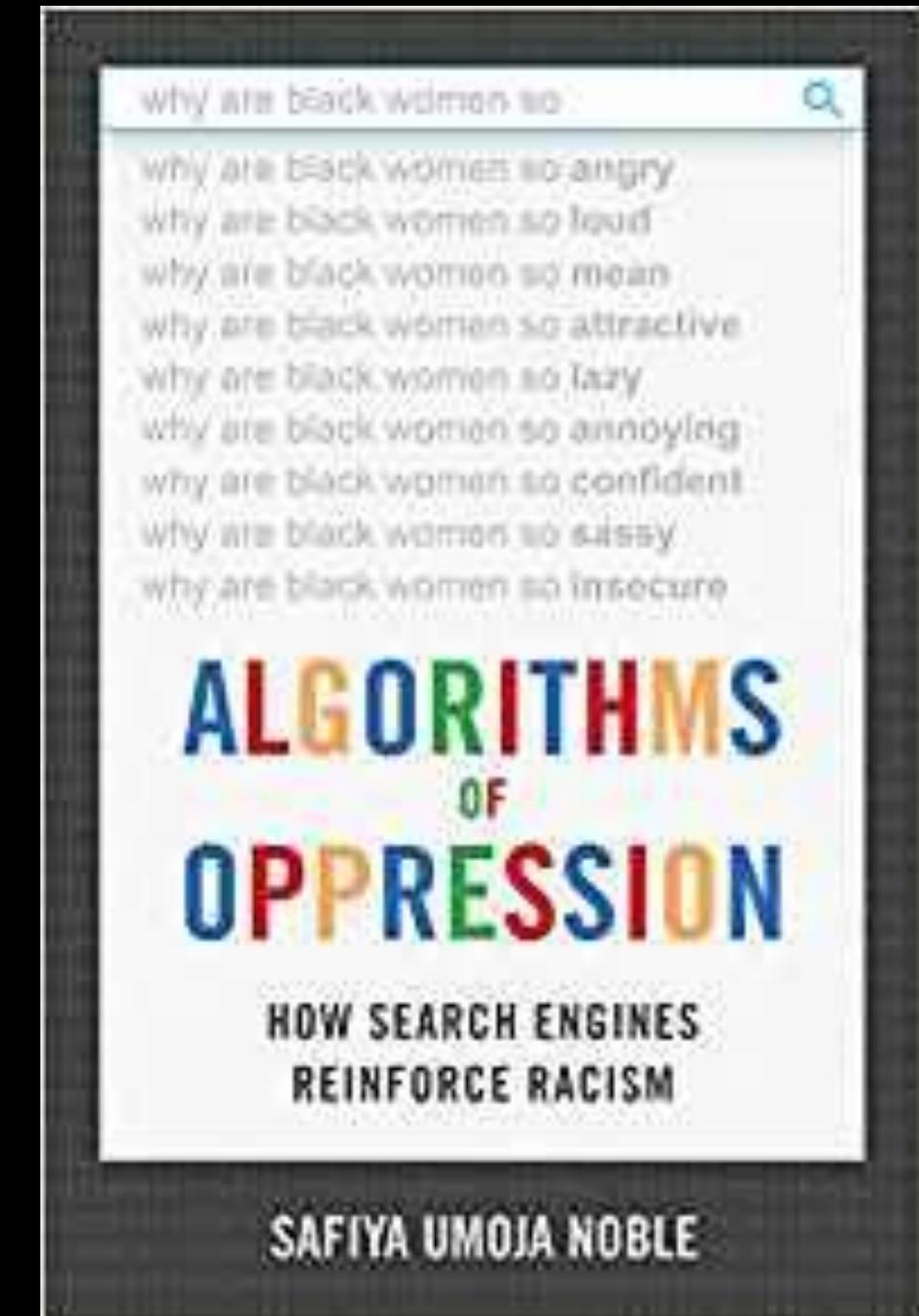
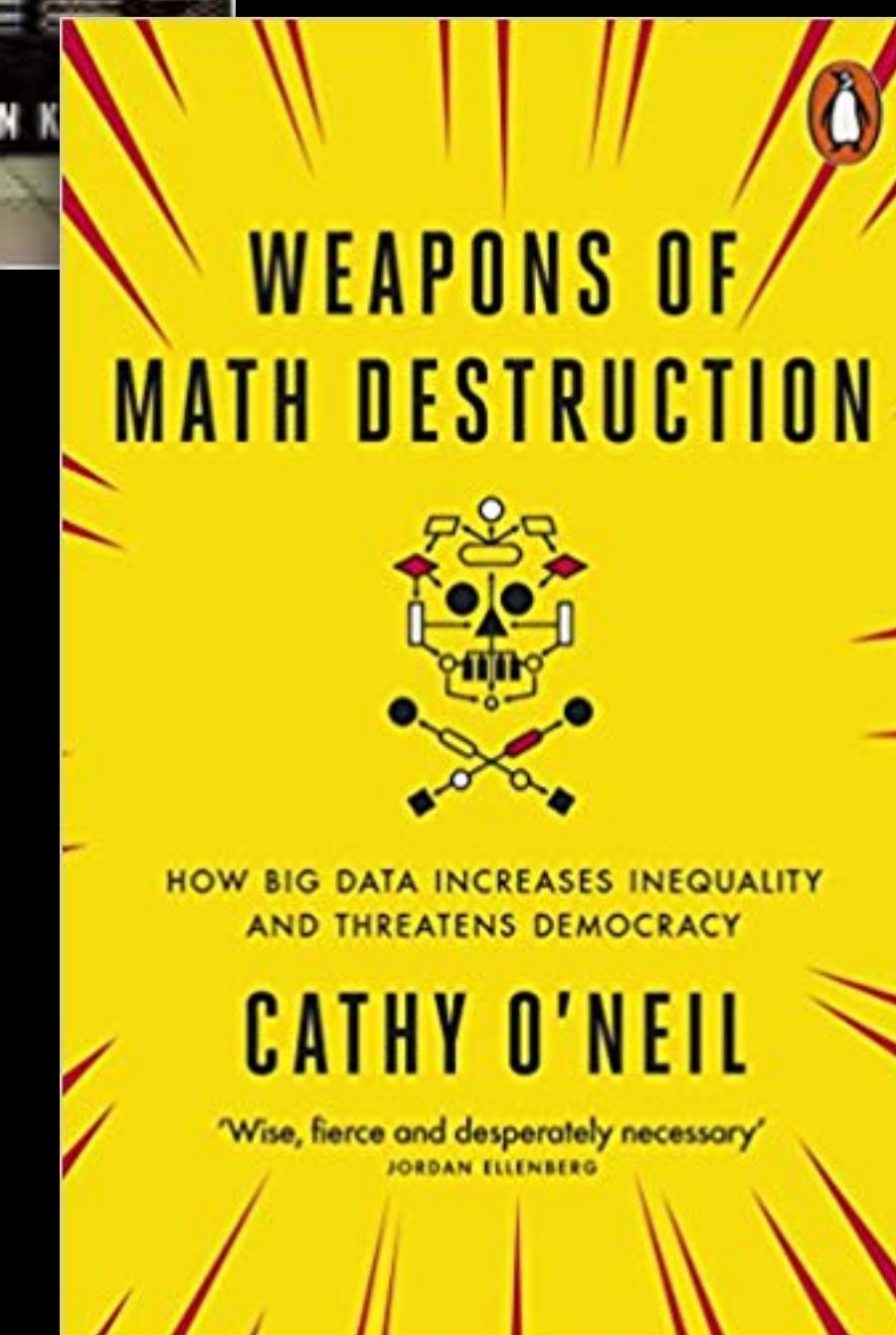
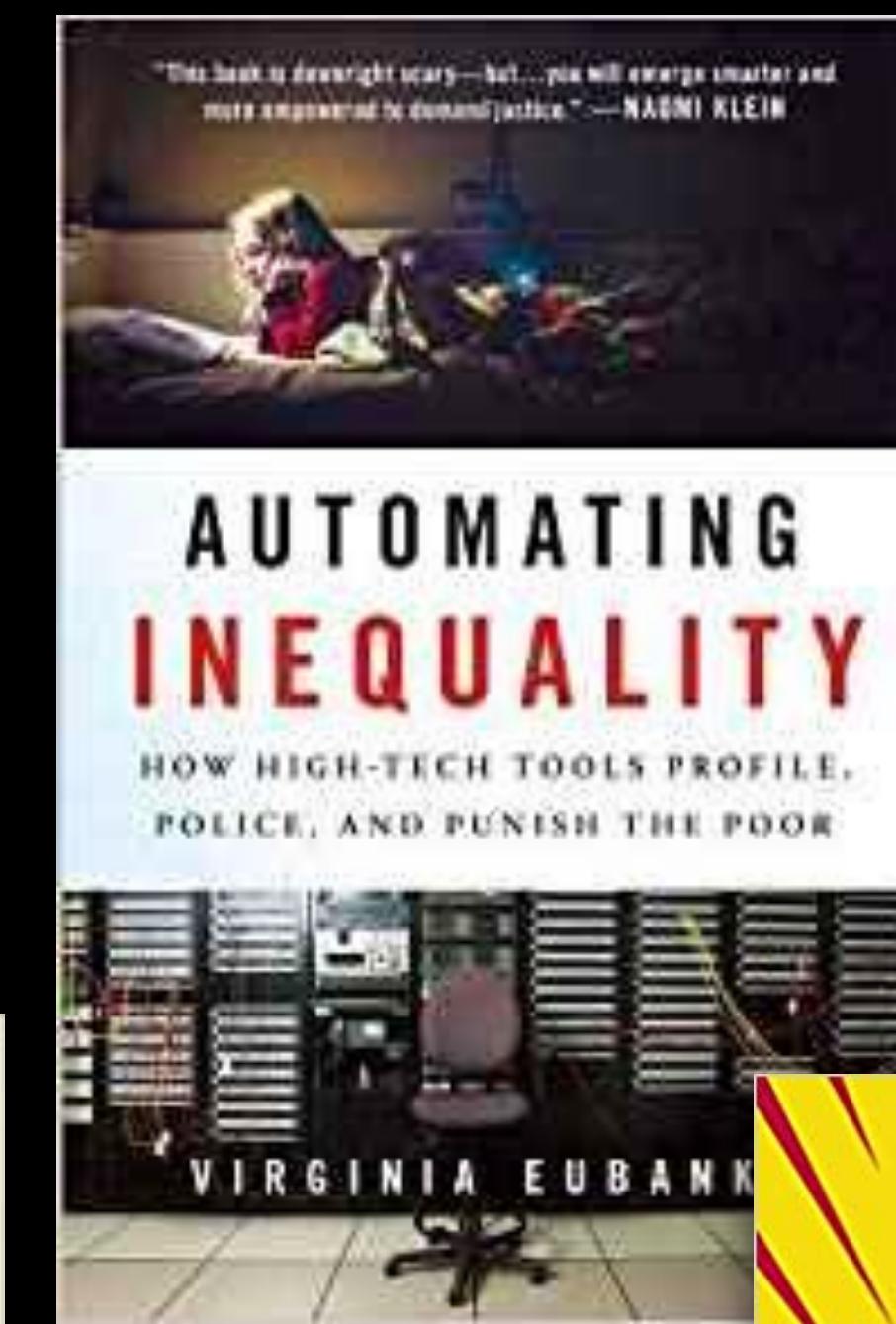
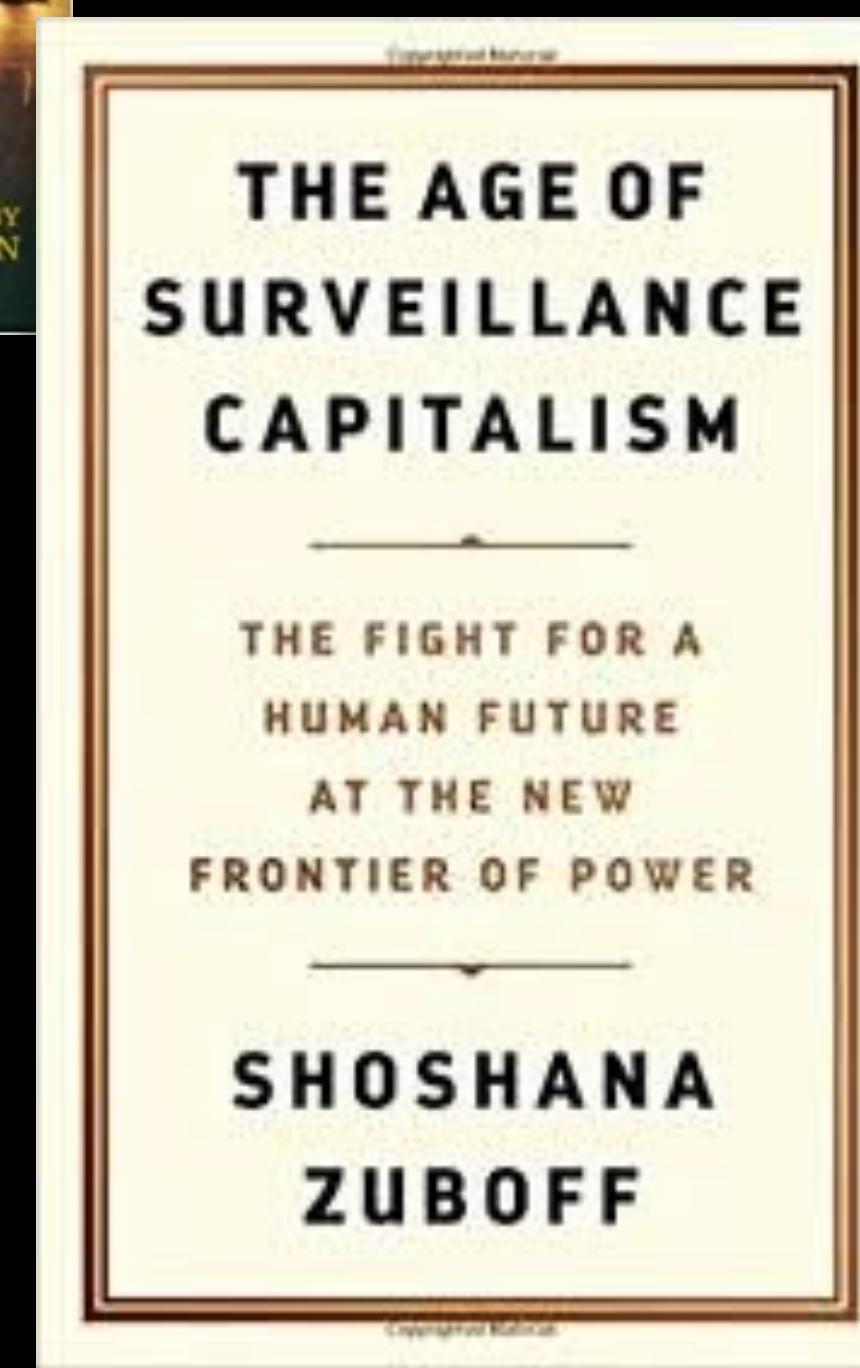
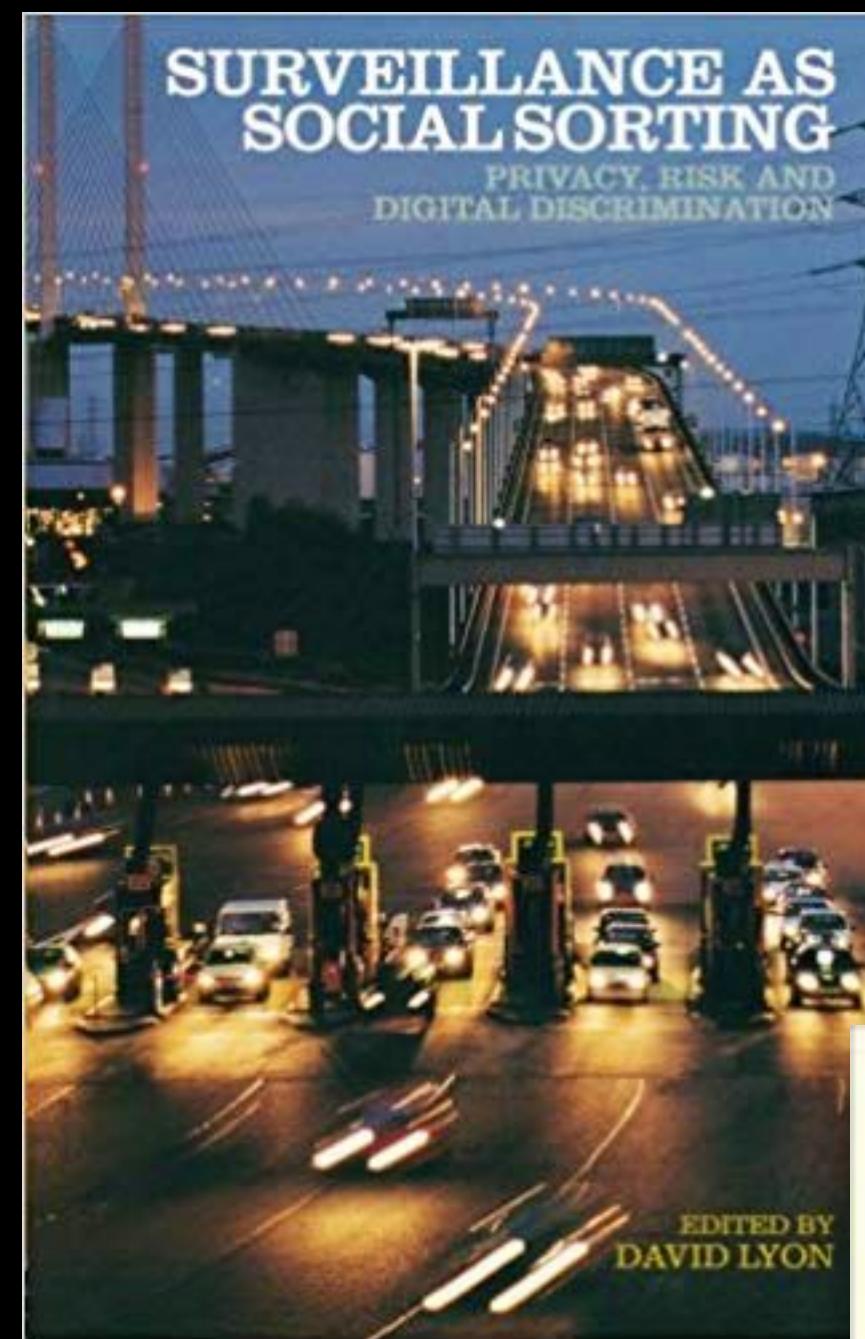
11:45 PM - 16 May 2019

2 Likes



2





RTB is fundamentally illegal



"Personal profiles are created, used and shared at an unprecedented scale, without user awareness nor consent"

“Our freedom is built upon what
others ignore of our lives”

—Alexandr Solzhenitsyn