Alberto Cammozzo

Frontiers of digital citizenship
Technologies, Security and **Privacy**

University of Padova

Corso di laurea magistrale in Studi Europei
Second cycle degree in European Studies

Diritti Fondamentali e Cittadinanza Europea
Fundamental Rights And European Citizenship
2014/2015

Jun 4, 2015

1/ Technologies, Security and **Privacy:**
big data and web profiling
government surveillance
(activities in the public sphere citizens can directly affect)

2/ Technologies, Security and **Democracy:**
Censorship, Espionage
and Cyberwarfare
(activities we are less aware of/ involved in)

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commercial personal data collection
+ government surveillance

Public surveillance

What is Privacy?
What's its impact on Democracy?

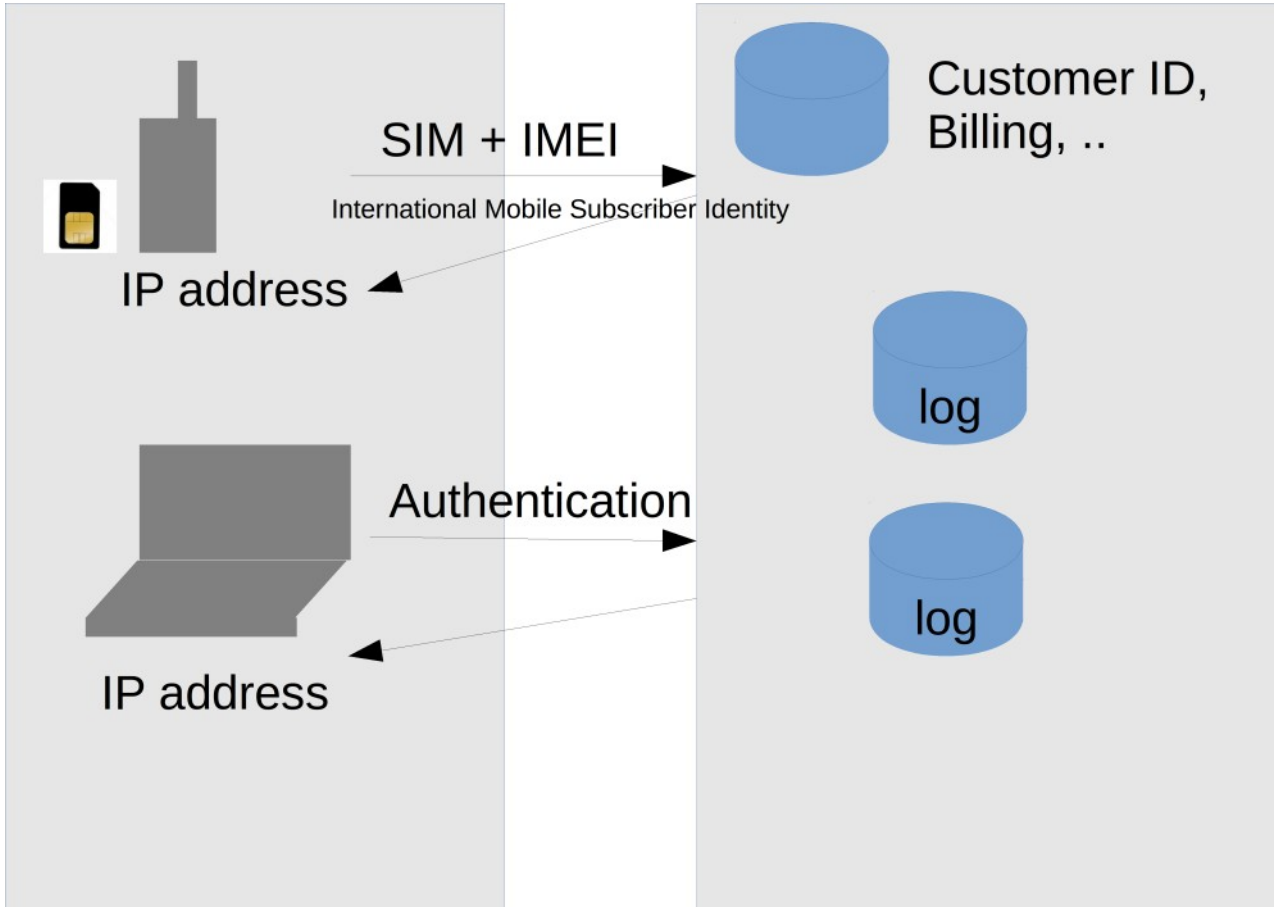
A – Web navigation

What happens behind your browser?

Smartphone,
Tablet + SIM

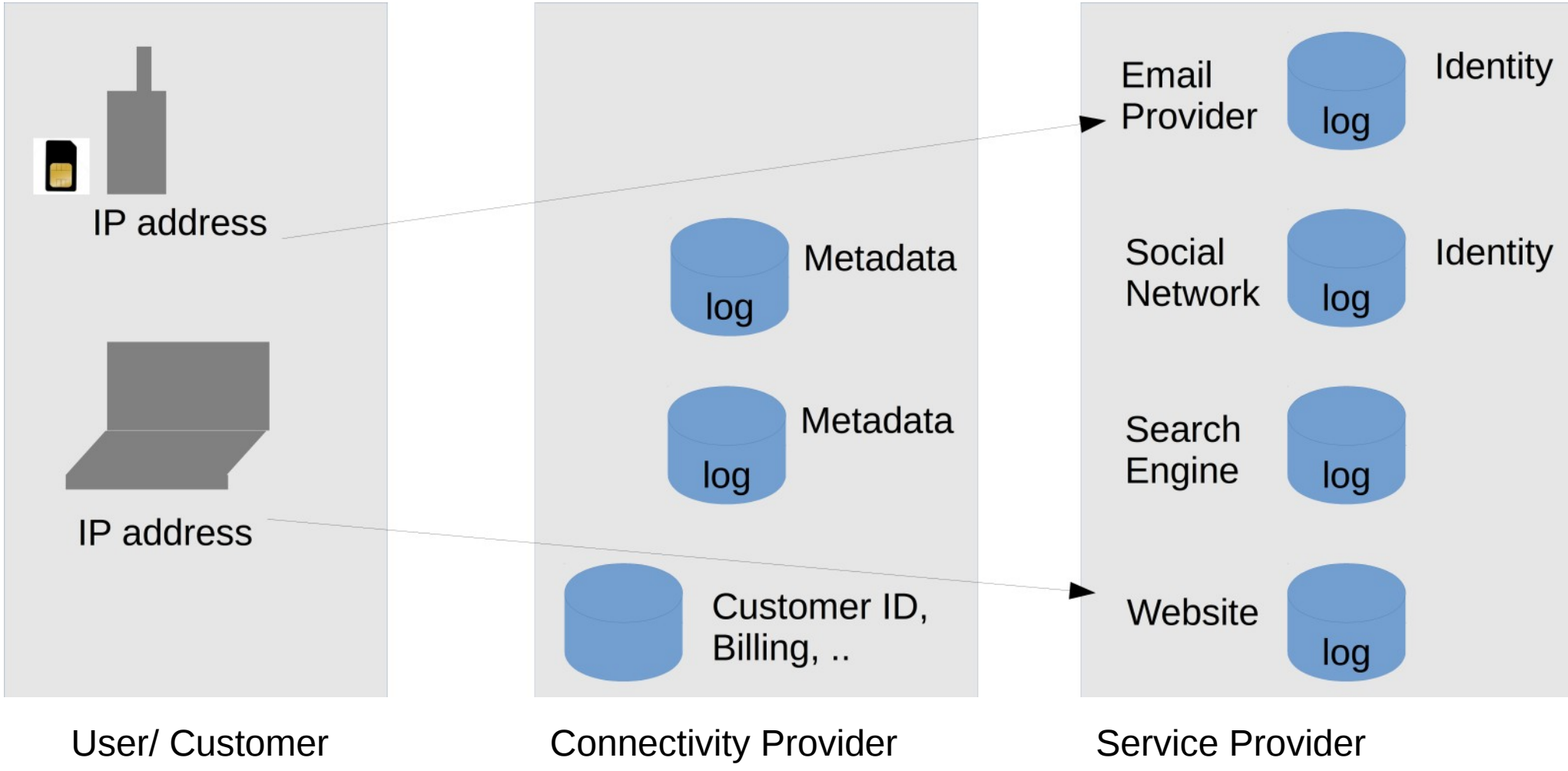
Laptop

User/ Customer

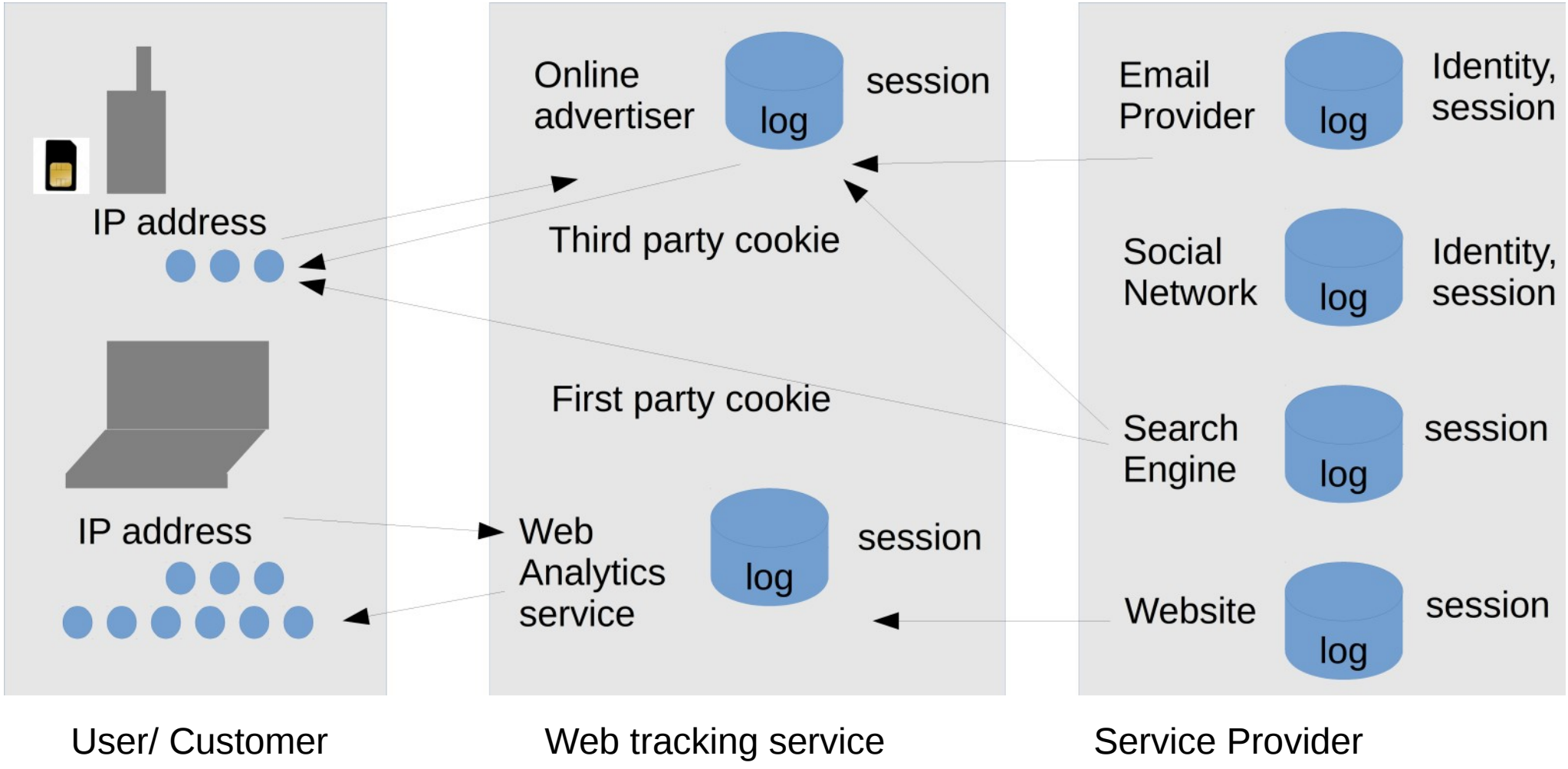


User/ Customer

Connectivity Provider


IP address
IP address
Metadata
log
Metadata
log
Customer ID,
Billing, ..
Email
Provider
log
Identity
Social
Network
log
Identity
Search
Engine
log
Website
log
User/ Customer
Connectivity Provider
Service Provider

IP address
cookie
“dfc28309-f030-4b31-8b59-d52bb51cf1f4”
IP address
Email Provider
log
Identity
Social Network
log
Identity, session
Search Engine
log
Website
log
User/ Customer
Service Provider


IP address
IP address
Online advertiser
log
session
Third party cookie
First party cookie
Web Analytics service
log
session
Email Provider
log
Identity, session
Social Network
log
Identity, session
Search Engine
log
session
Website
log
session
User/ Customer
Web tracking service
Service Provider

Web visitor tracking technology

– automatic logon
– session tracking
– persistent user information (preferences)

Why tracking?

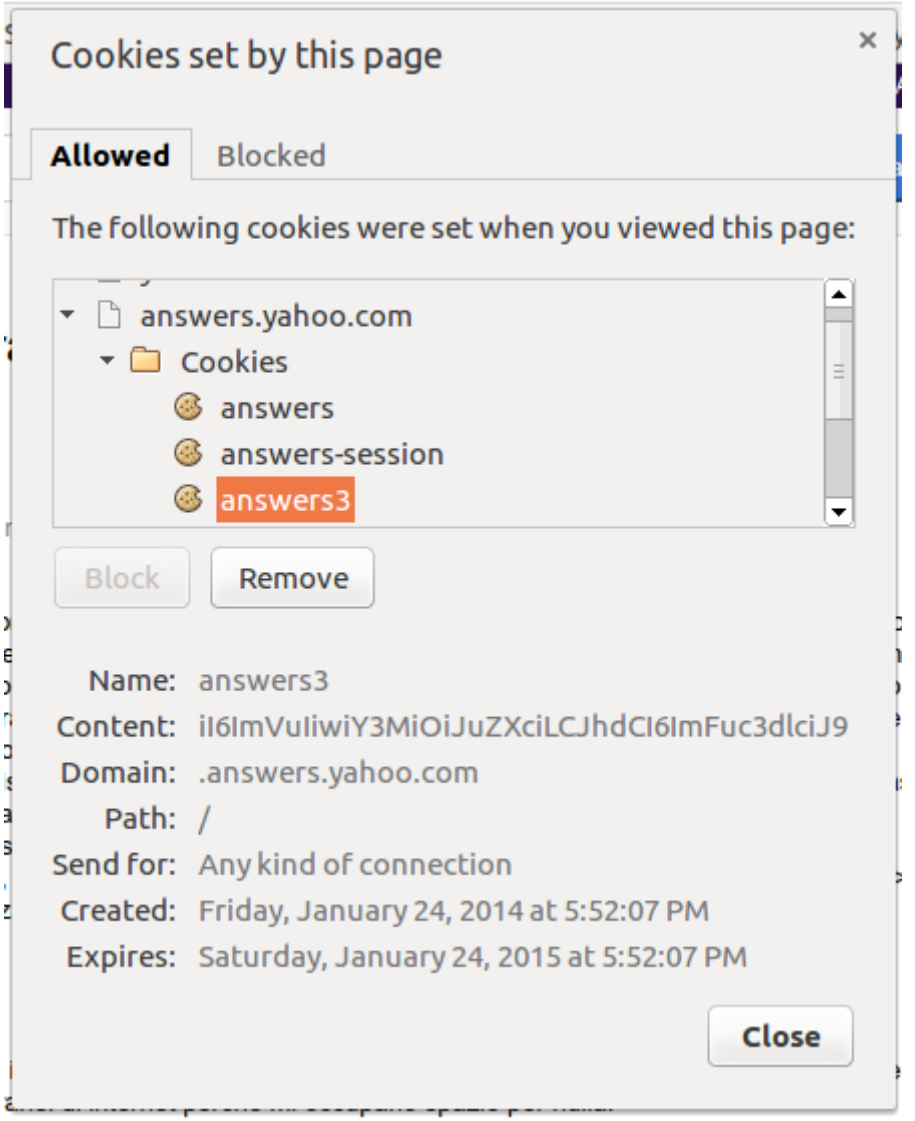
Users profiling
Advertisement
Market analysis
Web analytics
Web crawling

/cookie/

Directive 2009/136/EC

– Session (erased when browser is closed)
– Persistent (max 1y)

– First party (same domain as visited page)
– Third party (outside first party domain)



Other techniques

Flash Cookies (Local shared objects – LSOs)

JavaScript tags

HTTP referral codes

Browser fingerprinting

Web bug, web beacon, tracking bug, page tag, +email

tracking pixel, pixel tag, 1×1 gif, clear gif

Unique Identifier Header (Verizon)

How to protect yourself

Do Not Track ON
Clear cookies

Email: no HTML
Browsers: use ad-hoc plugins

Why Bother?

1/ Persistence beyond single sessions

2/ Cross-site tracking from third-party cookies

Small demo

We'll use the *Lightbeam* browser plugin to see which sites are targeted during a web session

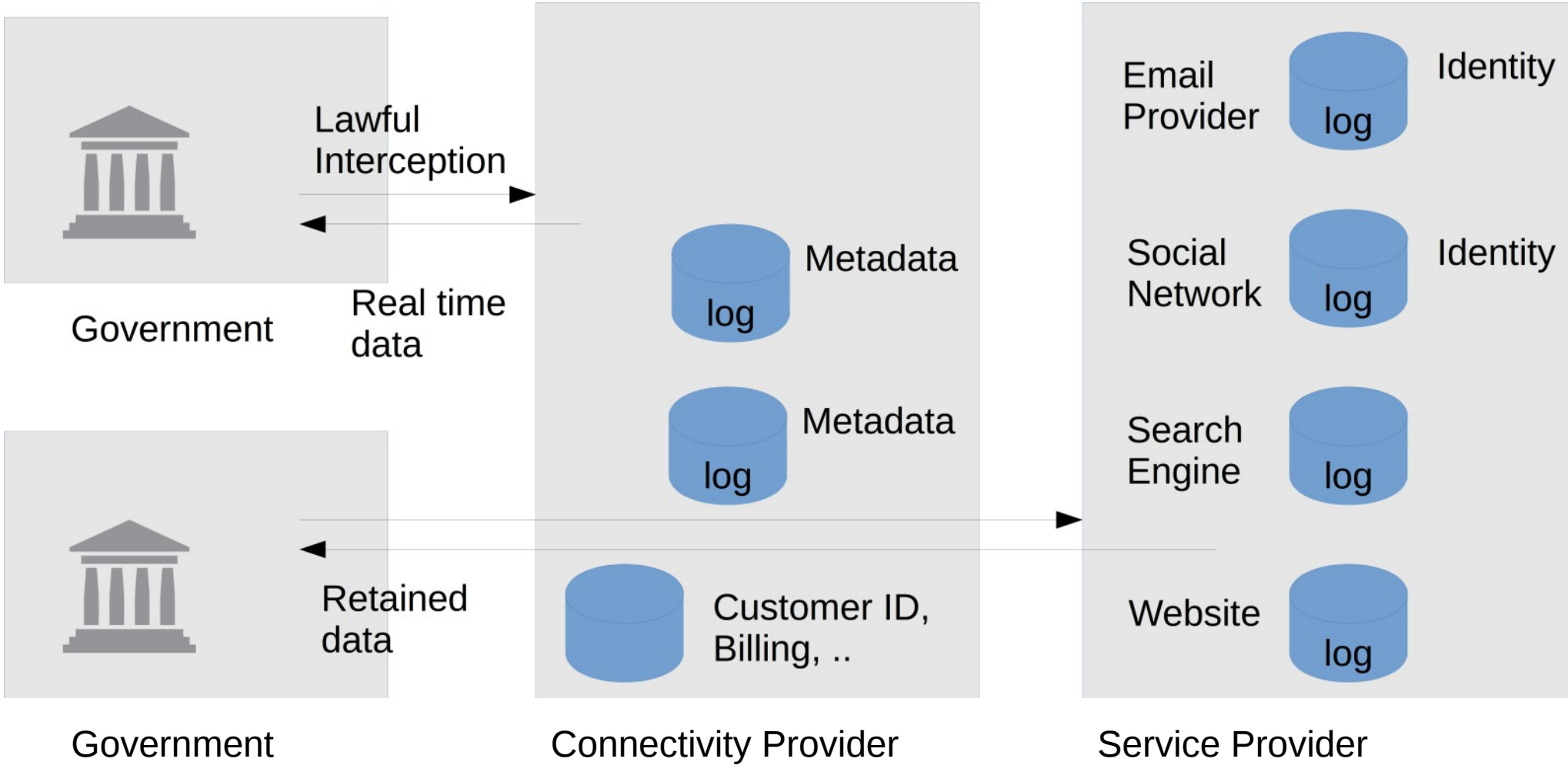
With and without the *Ghostery* browser plugin

Project Tracking Media Websites tracking

https://trackography.org

https://myshadow.org/trace-my-shadow

Government
Lawful interception and Data retention


Lawful
Interception
Real time
data
Government
Metadata
log
Metadata
log
Retained
data
Customer ID,
Billing, ..
Email
Provider
log
Identity
Social
Network
log
Identity
Search
Engine
log
Website
log
Government
Connectivity Provider
Service Provider

DIRECTIVE **2006/24/EC**

Telco Operators had to keep all metadata for each call or email access, including user location, for 6-24 month.

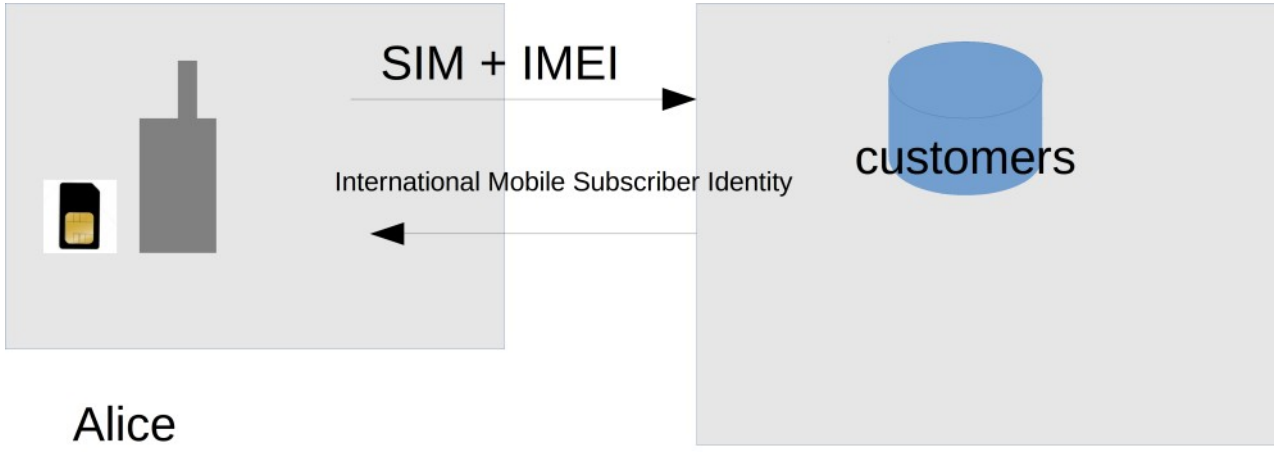
declared **invalid** by ECJ

(C-293/12 and C-594/12)

«interferes in a particularly serious manner with the **fundamental rights** to respect for private life and to the **protection of personal data**», «EU legislature has exceeded the limits imposed by compliance with the **principle of proportionality**»

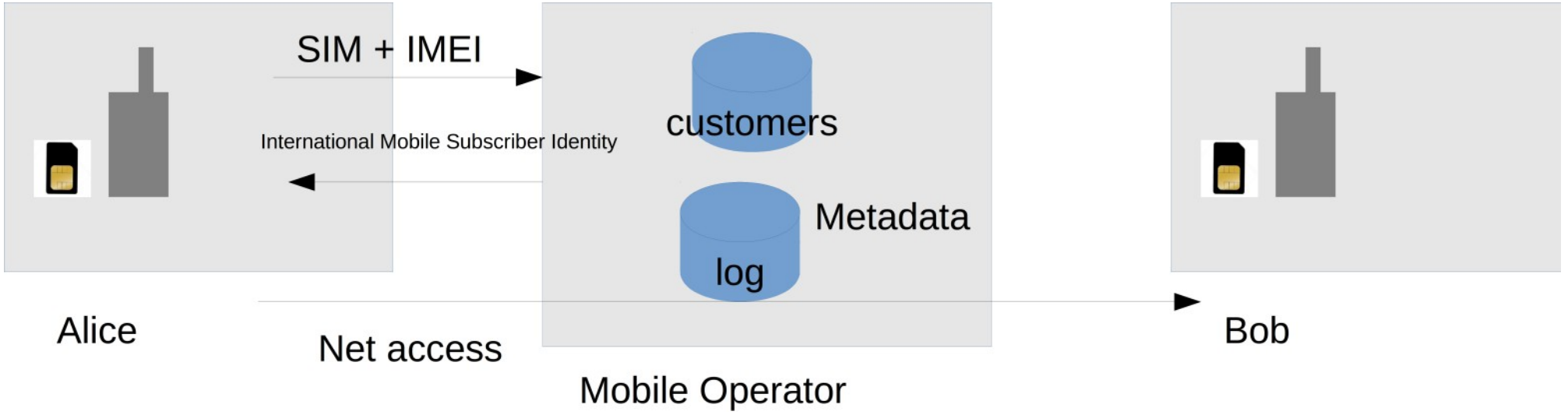
B – Mobile phone tracking

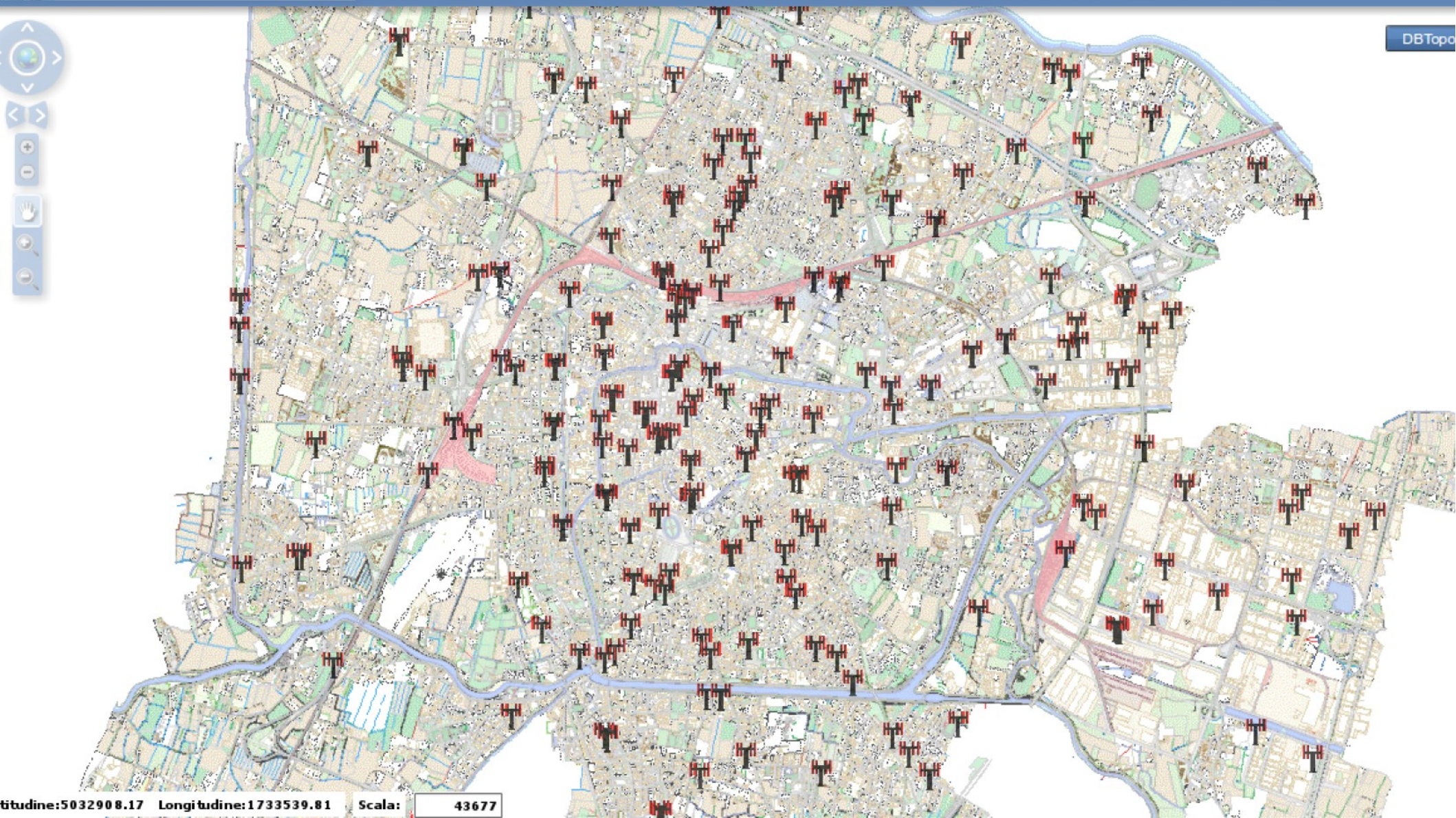
What happens when you switch your **phone** on?

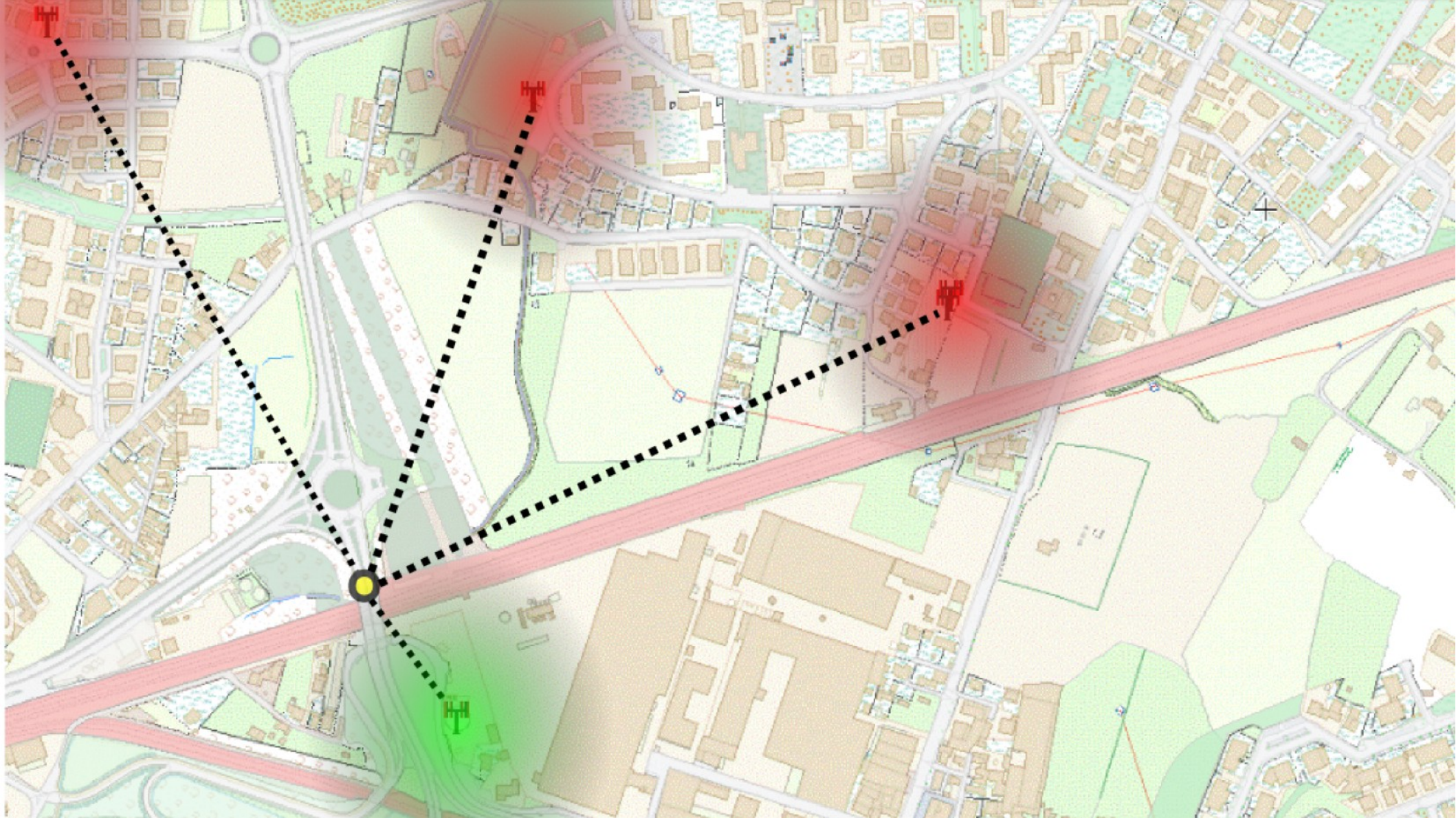


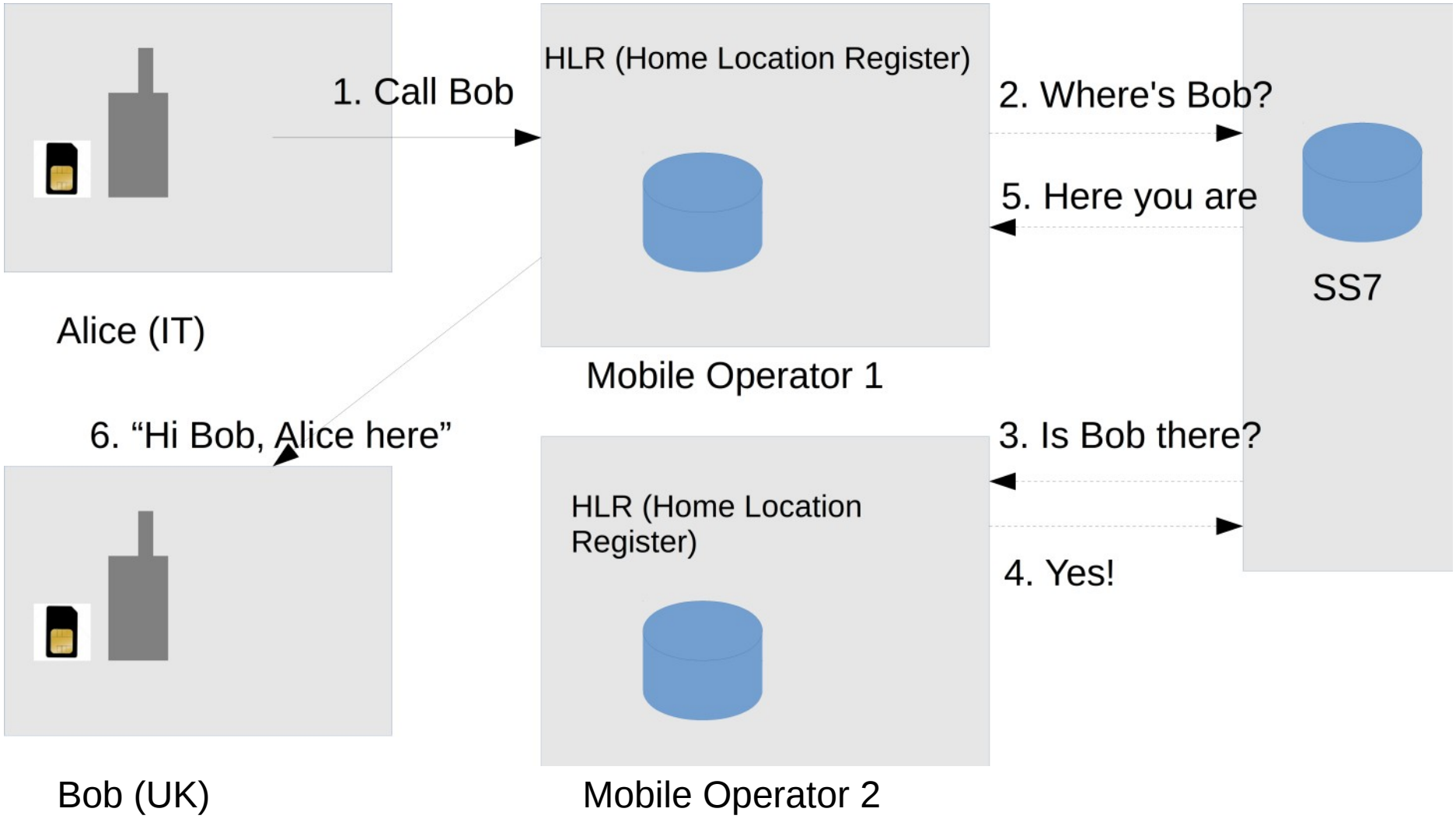
Alice

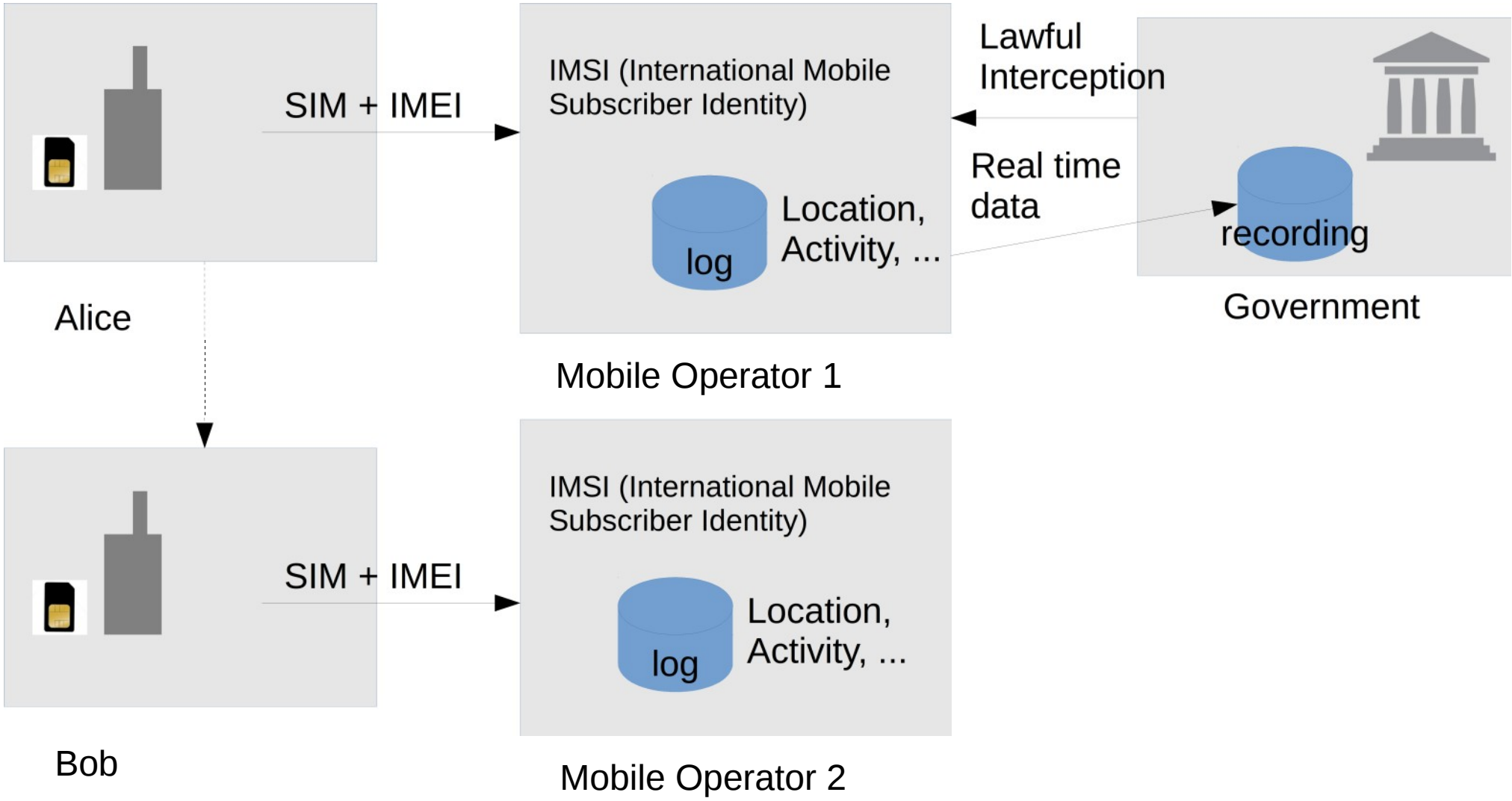
Mobile Operator


SIM + IMEI
International Mobile Subscriber Identity
customers
Metadata
log
Alice
Net access
Mobile Operator
Bob


DBTopo
itudine:5032908.17 Longitudine:1733539.81 Scala: 43677




1. Call Bob
HLR (Home Location Register)
2. Where's Bob?
5. Here you are
SS7
Alice (IT)
Mobile Operator 1
6. “Hi Bob, Alice here”
3. Is Bob there?
HLR (Home Location Register)
4. Yes!
Bob (UK)
Mobile Operator 2

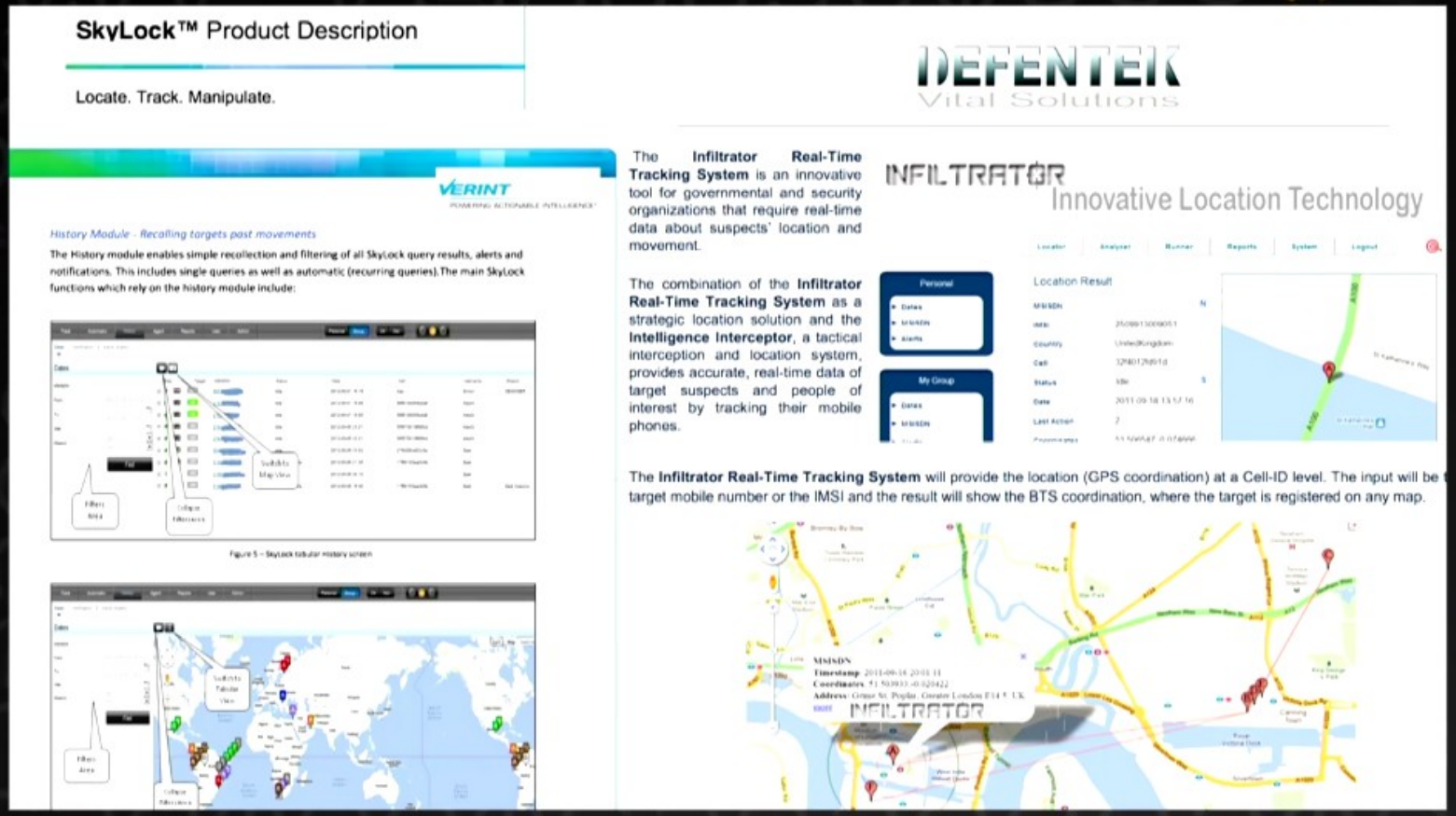

SIM + IMEI
IMSI (International Mobile Subscriber Identity)
Lawful Interception
Real time data
log
Location, Activity, ...
recording
Government
Alice
Mobile Operator 1
SIM + IMEI
IMSI (International Mobile Subscriber Identity)
log
Location, Activity, ...
Bob
Mobile Operator 2

SS7: Locate. Track. Manipulate.
You have a tracking device in your pocket

Tobias Engel

Chaos Computer Club Congress 2014

Companies are now **selling the ability to track your phone number** wherever you go. With a precision of up to 50 meters, detailed movement profiles can be compiled by somebody from the other side of the world without you ever knowing about it. But that is just the tip of the iceberg.


SkyLock™ Product Description
Locate. Track. Manipulate.
DEFENTEK
Vital Solutions
VERINT
History Module - Recalling targets past movements
The History module enables simple recollection and filtering of all SkyLock query results, alerts and notifications. This includes single queries as well as automatic (recurring queries). The main SkyLock functions which rely on the history module include:
Figure 5 – SkyLock tabular history screen
The Infiltrator Real-Time Tracking System is an innovative tool for governmental and security organizations that require real-time data about suspects' location and movement.
The combination of the Infiltrator Real-Time Tracking System as a strategic location solution and the Intelligence Interceptor, a tactical interception and location system, provides accurate, real-time data of target suspects and people of interest by tracking their mobile phones.
INFILTRATOR
Innovative Location Technology
Personal
My Group
Location Result
The Infiltrator Real-Time Tracking System will provide the location (GPS coordination) at a Cell-ID level. The input will be t
target mobile number or the IMSI and the result will show the BTS coordination, where the target is registered on any map.
INFILTRATOR

a new dawn

Signalling System #7 today

- Getting access is easier than ever
  - Can be bought from telcos or roaming hubs for a few hundred euros a month
  - Usually (not always), roaming agreements with other networks are needed, but some telcos are reselling their roaming agreements
  - Some network operators leave their equipment unsecured on the internet
  - Femtocells are part of the core network and have been shown to be hackable

a new dawn

Move In On Target

Accurately locate, intercept, and control GSM and 3G (UMTS) target mobile phones using an active solution

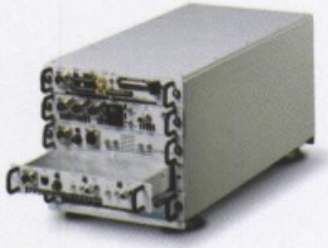
ENGAGE GI2

Highlights

- Accurately locate target using dedicated homing device without disabling target's ability to communicate
- Extract target's mobile phone GPS coordinates on both GSM and UMTS (3G) networks
- Listen to, read, edit, and reroute incoming and outgoing calls and text messages (A5/1 and A5/3 encryption)
- Remotely activate a mobile phone's microphone
- Identify the presence of target mobile phones
- Block cellular communications to neutralize IEDs and more

ENGAGE GI2-M™ Trolley Case

All-in-one portable solution for rapid deployment



ENGAGE GI2 -R™ Rack Mount

Modular units for fixed insta in vehicles and buildings

ENGAGE GI2-C™

https://www.techdirt.com/blog/wireless/articles/20131211/18183825538/us-israeli-security-company-selling-mobile-phone-surveillance-products-to-agencies-around-world.shtml
https://s3.amazonaws.com/s3.documentcloud.org/documents/885760/1278-verint-product-list-engage-gi2-engage-pi2.pdf

Commercial Tracking Providers

- Several commercial providers offer cell-level tracking as service, claim coverage of about 70% of ***worldwide*** mobile subscribers (with some restrictions...)
- Only the MSISDN (phone number) is required to locate a subscriber

communication service providers' collaboration.

- A fully committed solution with a predicted hit rate of 70% and above
- No need for software or hardware changes neither in the network core

The **Infiltrator Real-Time Tracking System** is an innovative tool for governmental and security organizations that require real-time data about suspects' location and movement.

operational.

- The system will not present the location of Israeli subscribers in Israel, and USA subscribers worldwide (country code 972 and 1).
- Target's Location will be based on the target's MSISDN (public mobile number). In most case

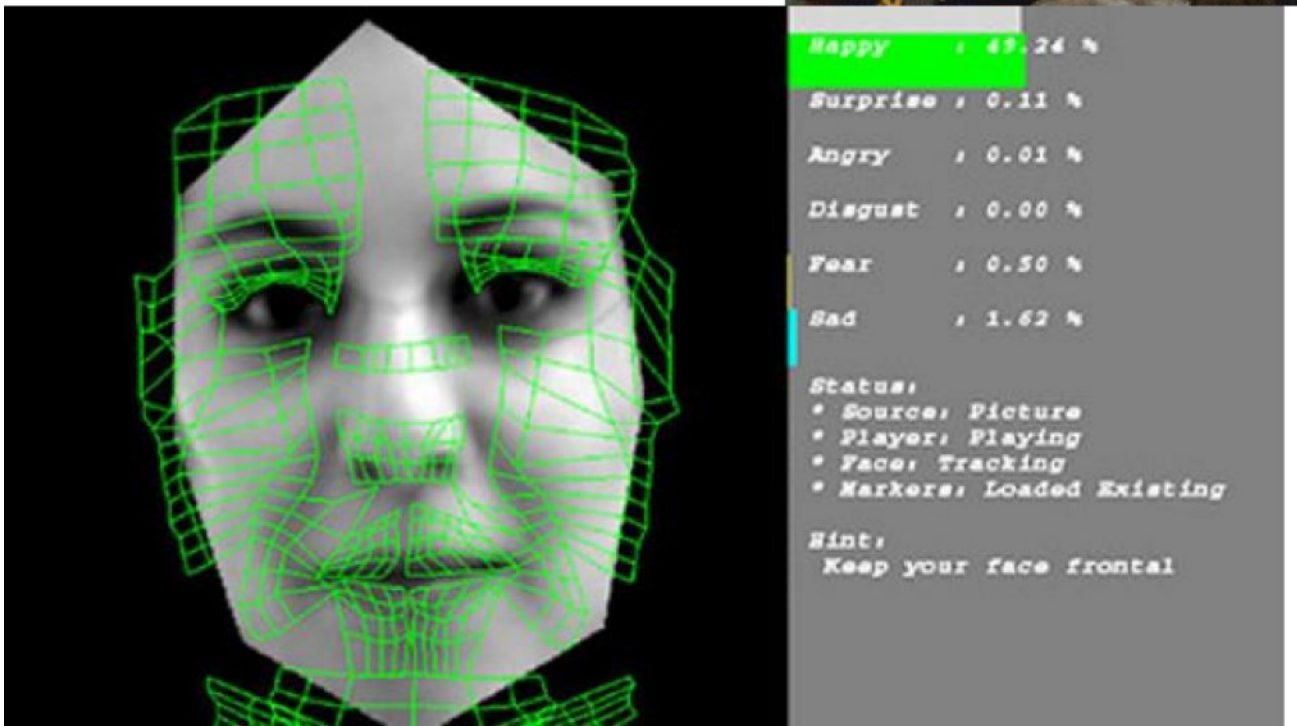
C – Biometrics

What happens when
you upload a **personal picture**?

+ geotag
Email
Provider
Social
Network
Search
Engine
Website
User/ Customer
Service Provider

Face
Recognition
+ Identity
Social
Network
Face
Recognition
Search
Engine
Face
Recognition
Website
User/ Customer
Service Provider

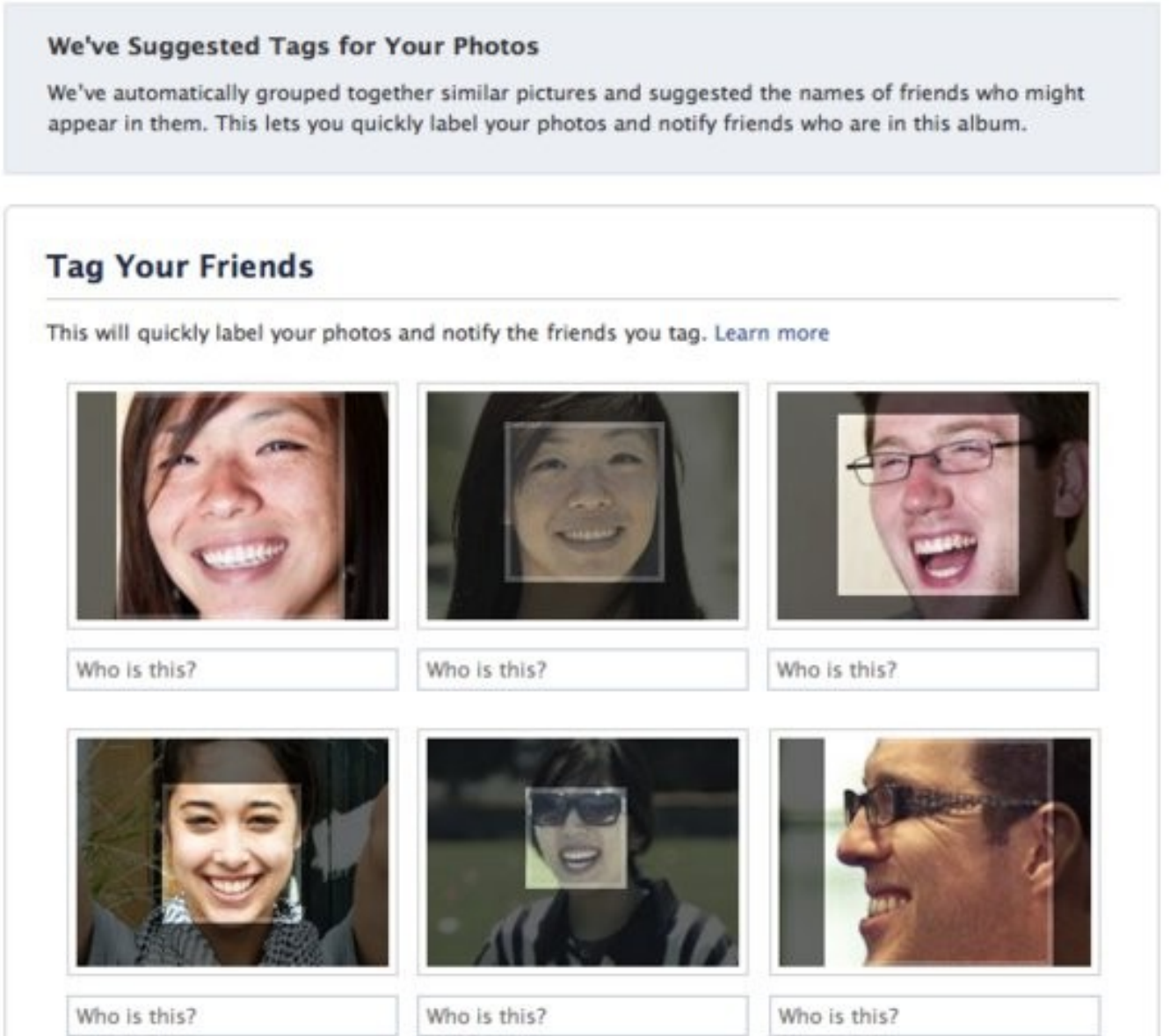
Ben - Guest
Tom - VIP
Peter - Staff
Ryan - Suspect
Lee - Guest
Kim - Staff
Sarah - Shoplifter


Happy : 49.24 %
Surprise : 0.11 %
Angry : 0.01 %
Disgust : 0.00 %
Fear : 0.50 %
Sad : 1.62 %
Status:
* Source: Picture
* Player: Playing
* Face: Tracking
* Markers: Loaded Existing
Hint:
Keep your face frontal

FR usage

- *Law enforcement*
- *Passenger & Border processing*
- *Disaster victim identification*
- *Voting systems*
- *Time attendance*
- *Computer systems biometric authentication*
- *Vending machines*
- *…*

FR in SNs


We've Suggested Tags for Your Photos
We've automatically grouped together similar pictures and suggested the names of friends who might appear in them. This lets you quickly label your photos and notify friends who are in this album.
Tag Your Friends
This will quickly label your photos and notify the friends you tag. Learn more
Who is this?
Who is this?
Who is this?
Who is this?
Who is this?
Who is this?

Baidu 图片 识图

粘贴图片网址 | 从本地上传

识图一下

提示：您也可以把图片拖到这里

人脸搜索 脸部特写 完整图片

第2页

第3页

第5页

第6页

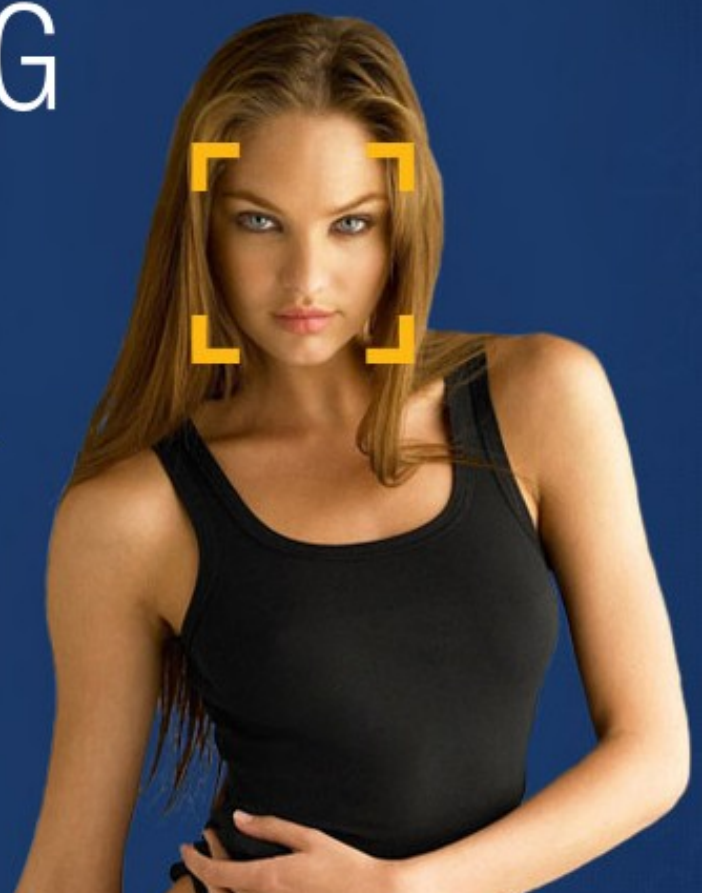
第7页

SCRAMBLE FACE

LOGIN

Each scan report costs $75 US

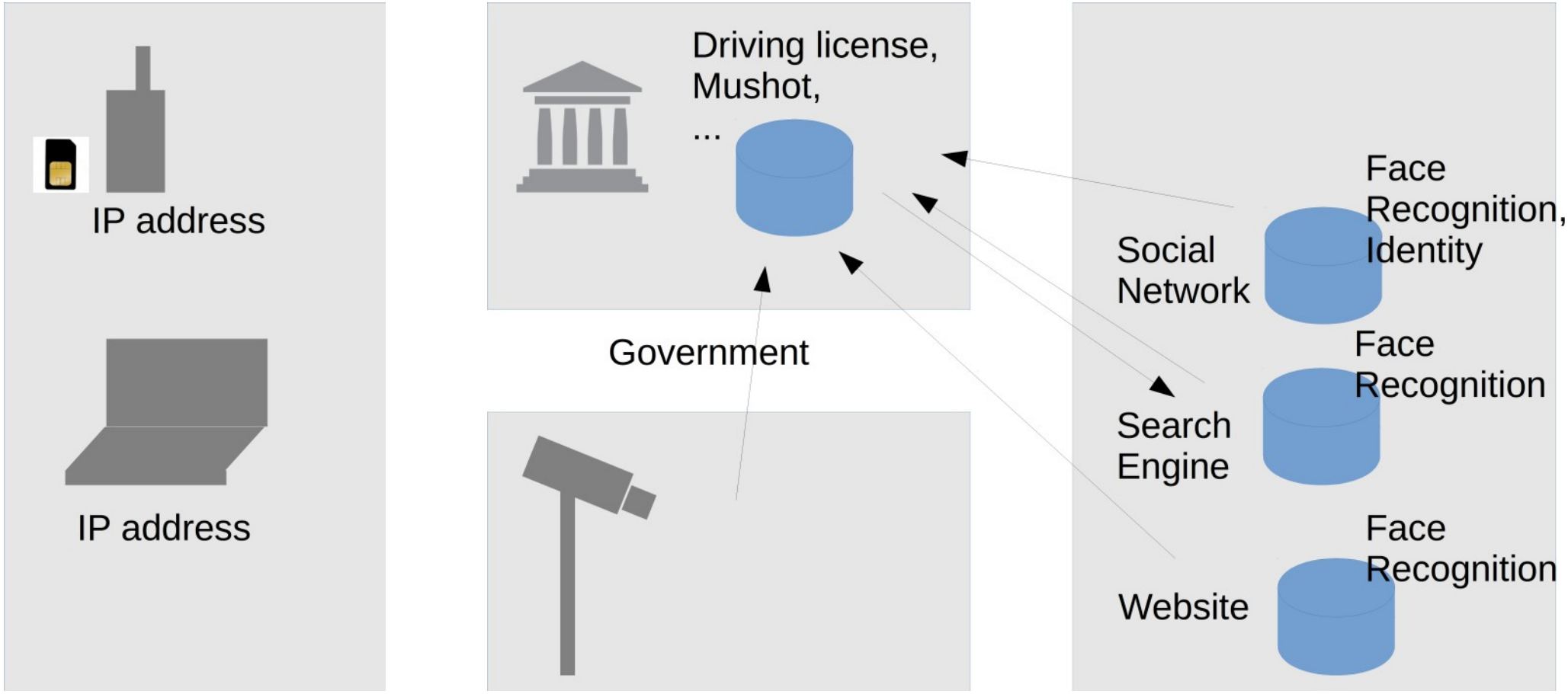
FIND PICTURES ONLINE USING FACE RECOGNITION TECHNOLOGY



Your child – Protect your child. Remove unwanted pictures of them online.

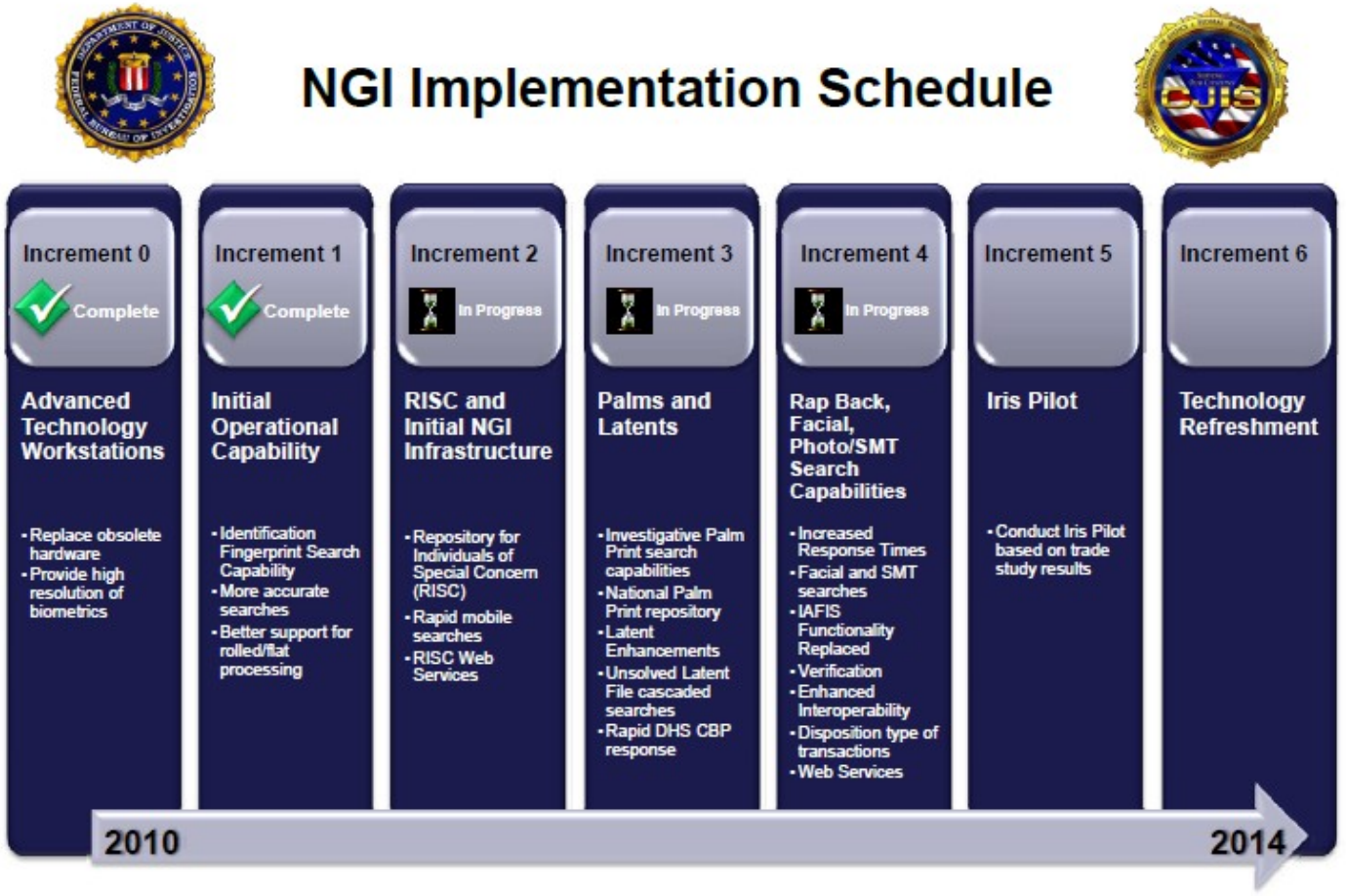
Yourself – Locate and delete pictures that you do not want online. Keep your privacy in check.

Significant other – Are you curious where pictures of your significant other are online?


IP address
IP address
Driving license,
Mushot,
...
Government
Face
Recognition,
Identity
Social
Network
Face
Recognition
Search
Engine
Face
Recognition
Website
User/ Customer
Surveillance Cams
Web Service Provider

FBI Next Generation Identification

NGI searchable database includes «facial imaging, scars, marks, and tattoos» and has «room to accommodate future biometric technologies (i.e., voice, gait, etc.) as they become available and prove reliable»



60
MINUTES

Face recognition technology fails to find UK rioters

› 18 August 2011 by **Niall Firth**
› Magazine issue 2826. **Subscribe and save**
› For similar stories, visit the **Crime and Forensics** Topic Guide

THE response was as aggressive and swift as the riots themselves. Within a few hours of the worst of last week's looting across London and other English cities, attempts were being made to use CCTV footage to track down the individuals who had plundered shops and destroyed buildings.

But those raised on a diet of TV police dramas who expected crack law enforcement teams to simply plug the footage into a computer and then print out a list of suspects are going to be disappointed. The poor quality of most CCTV footage makes it almost impossible to trust standard automated facial recognition techniques.

One of the most common methods used to help identify an individual from camera footage is photoanthropometry, which uses "proportionality indices" to compare a picture of a suspect on a police database, say, with a CCTV image. Key points on a person's face - such as the chin, edge of the nose, or centre of the top lip - are marked and the distance between them measured. Someone experienced with this technique can then judge whether the two faces match.

Reuben Moreton from the London Metropolitan Police's Digital and Electronic Forensic Service tested the techniques on poor quality, low-resolution footage of 13 volunteers. It produced "chaotic, inconsistent results" (*Forensic Science*, DOI: 10.1016/j.forsciint.2011.06.023). The lack of facial detail reduced the precision of the PI measurements so that individuals with similar PIs could easily be confused with one another.

Imperfect CCTV and poor- quality images can easily thwart more advanced, automated techniques too, says Lyndon Smith at the Machine Vision Laboratory of the University of the West of England, Bristol, UK.

Police want to identify these men
Metropolitan Police/AP/PA)

More Latest news

› Ready for a smellfie? Pho
the smellscape of a city

17:43 29 Ma
From fragr
stinking se
nicest-sme
around tov
geotagged

Metropolitan Police's photostream

pro

Sets | Galleries | Tags | People | Archives | Favorites | Profile

westnorwoodimage5

WestNorwood.Image 5: An image of a male joining the group wearing a blue Nike hooded top and red face scarf.

Some rights reserved
Uploaded on Aug 9, 2011
0 comments

westnorwoodimage4

WestNorwood.Image 4:

Some rights reserved
Uploaded on Aug 9, 2011
0 comments

westnorwoodimage3

westnorwoodimage2

«You have **zero privacy** anyway.
Get over it. »

Scott McNealy,
Sun Microsystems, 1999

Really?
Should we?

Thank you!

Questions?

alberto @ cammozzo.com
http://cammozzo.com
Twitter: tagMeNot