

oueees-201606

Part 3: IoT security and privacy

Kenji Rikitake

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School of Engineering Science
Osaka University

Toyonaka, Osaka, Japan

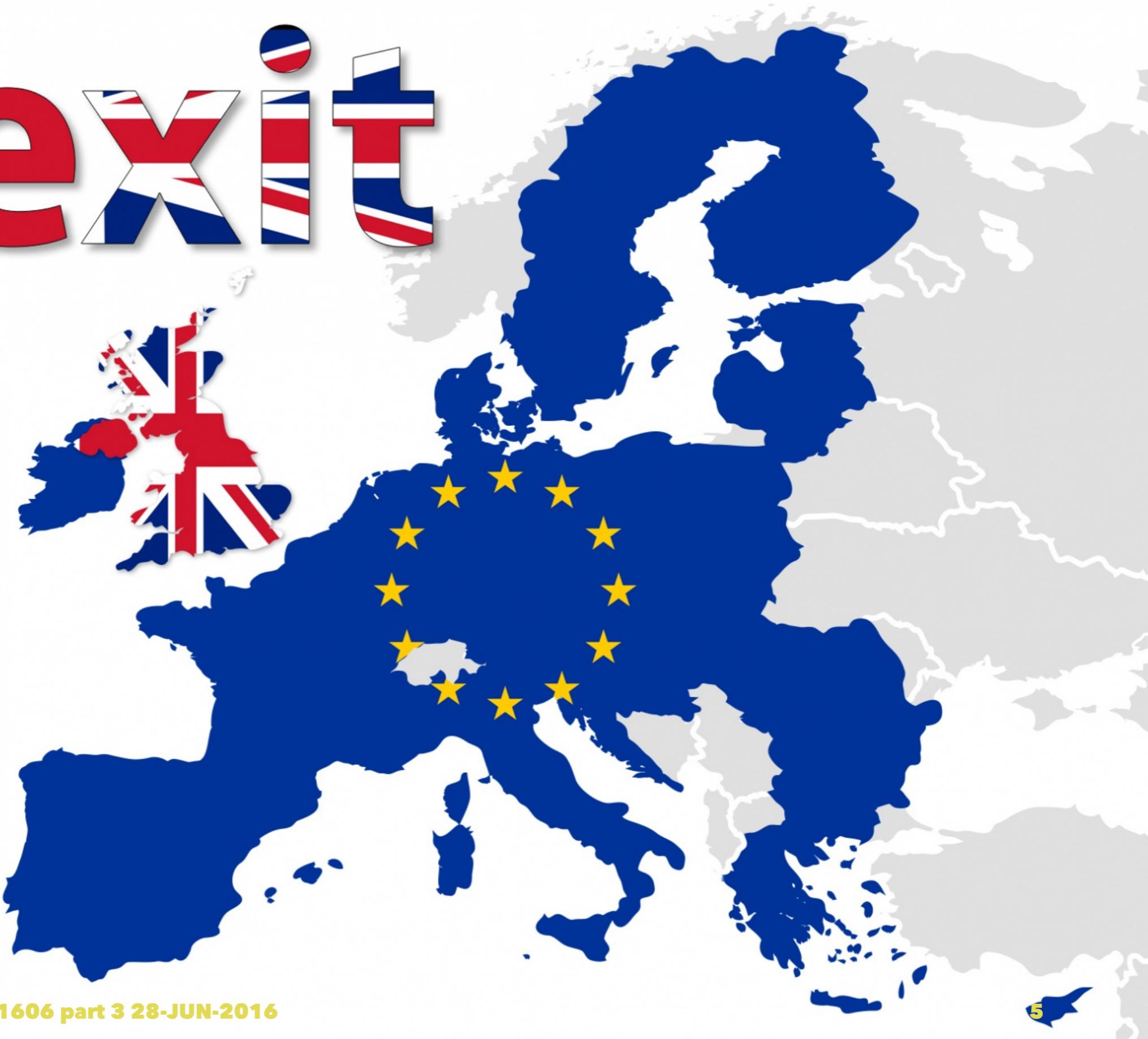
@jj1bdx

Lecture notes on GitHub

- <https://github.com/jj1bdx/ouees-201606-public/>
- Don't forget to *check out the issues!*

**Before the main
topics, let's talk
about a current
issue**

Brexit



Brexit's aftermath

- **One more layer of political barriers**
- *More strict immigration control*
- Hampers Europe's financial, research and academic sectors, based on *free movement of people and ideas*
- May cause backlash on telecom sectors, e.g., mobility across the borders

Why UK matters

- Computers - Alan Turing
- Leading nation of English language
- **Raspberry Pi**
- Extremely sophisticated *surveillance networks*, domestic and worldwide
- Multi-ethnic inside: Wales, Scotland, Northern Ireland, and many immigrants

And why UK really matters?



**UK is a mass
surveillance
nation**



And Japan is too

壁に耳あり 障子に目あり

Mass surveillance

- Government/major organizations watch *all* the members *always*
- Considered as **serious human right abuse**
- An UK example: closed-circuit television (CCTV) = *surveillance cameras* all around the nation (~1.85 million¹ nationwide in UK)

¹ https://en.wikipedia.org/wiki/Mass_surveillance_in_the_United_Kingdom#Number_of_cameras

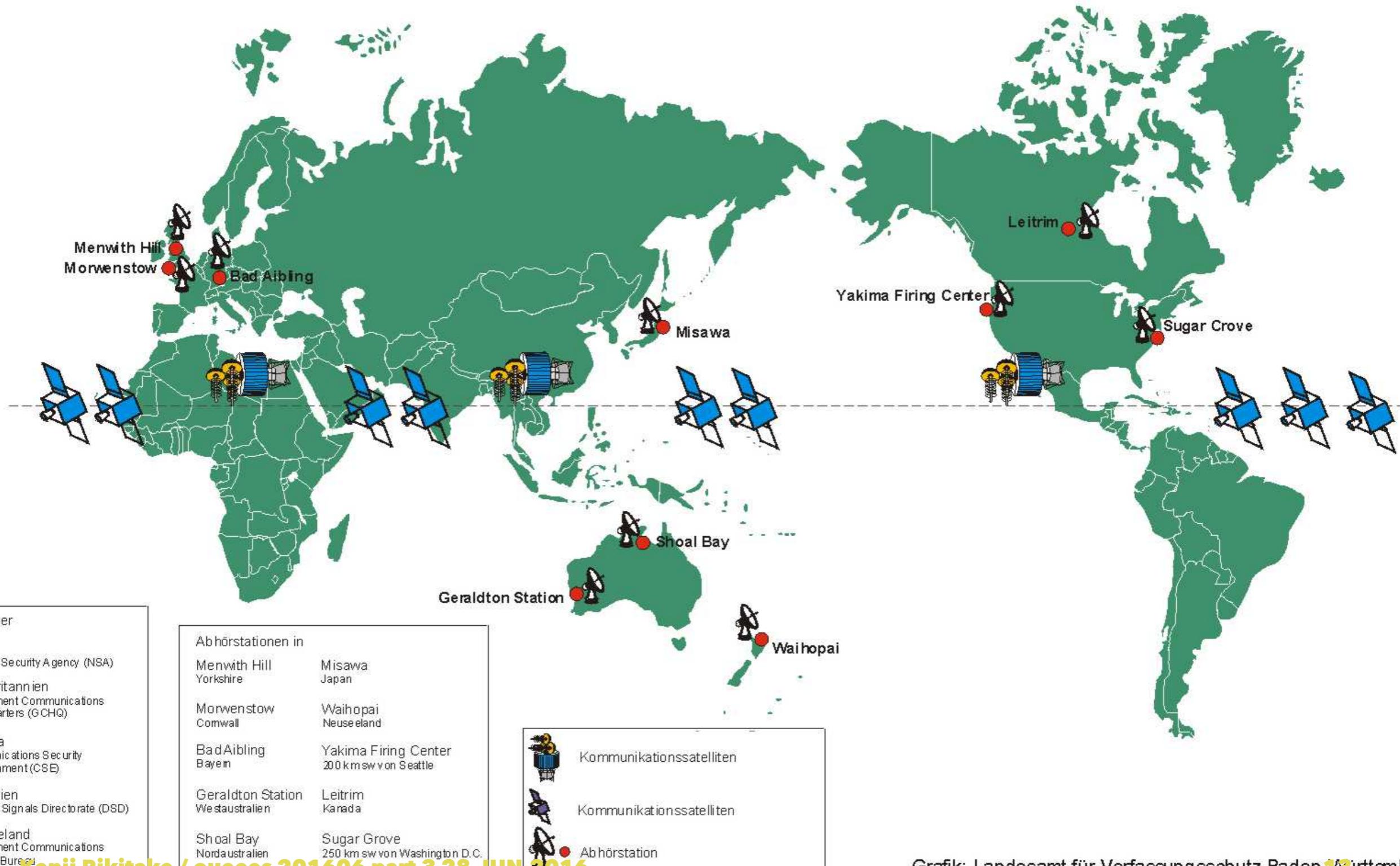
**International network of surveillance
established since 1971:**

ECHELON

**United States of America
United Kingdom
Canada
Australia
New Zealand**

Globales elektronisches Aufklärungssystem Echelon

Echelon hört ungefiltert den gesamten eMail-, Telefon-, Fax- und Telexverkehr ab, der weltweit über Satelliten weitergeleitet wird.



OFF AIR

Edward Snowden Disclosed NSA documents in 2013

HD

Edward



International Students For Liberty Conferenc...

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OFF AIR



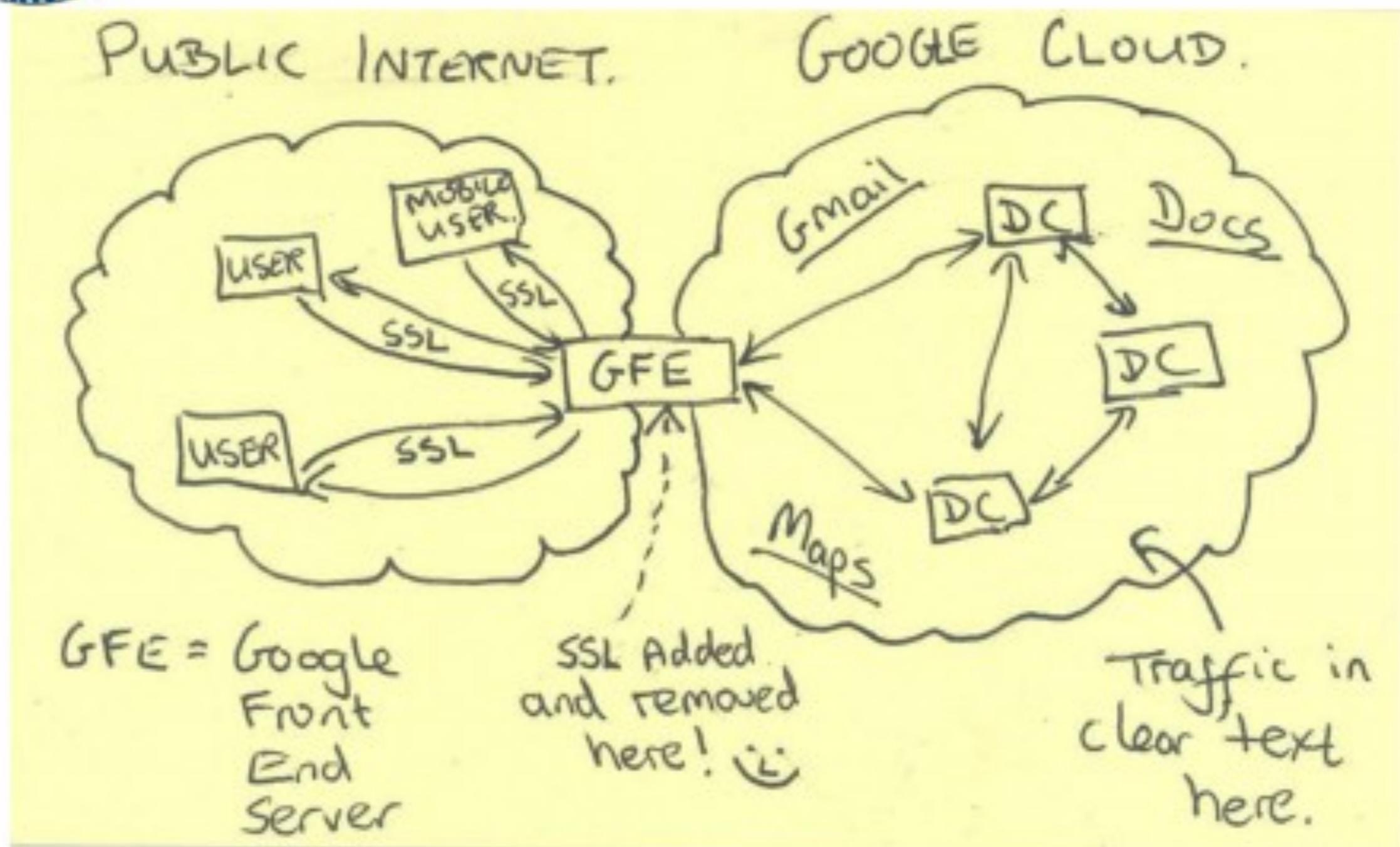
What Snowden revealed

- Global surveillance programs²
 - USA: PRISM
 - UK: MUSCULAR
 - Germany: Project 6
 - France: Lustre
- Major players: US NSA, UK GCHQ
- ... and many ISPs cooperate

² [https://en.wikipedia.org/wiki/Global_surveillance_disclosures_\(2013%E2%80%93present\)](https://en.wikipedia.org/wiki/Global_surveillance_disclosures_(2013%E2%80%93present))



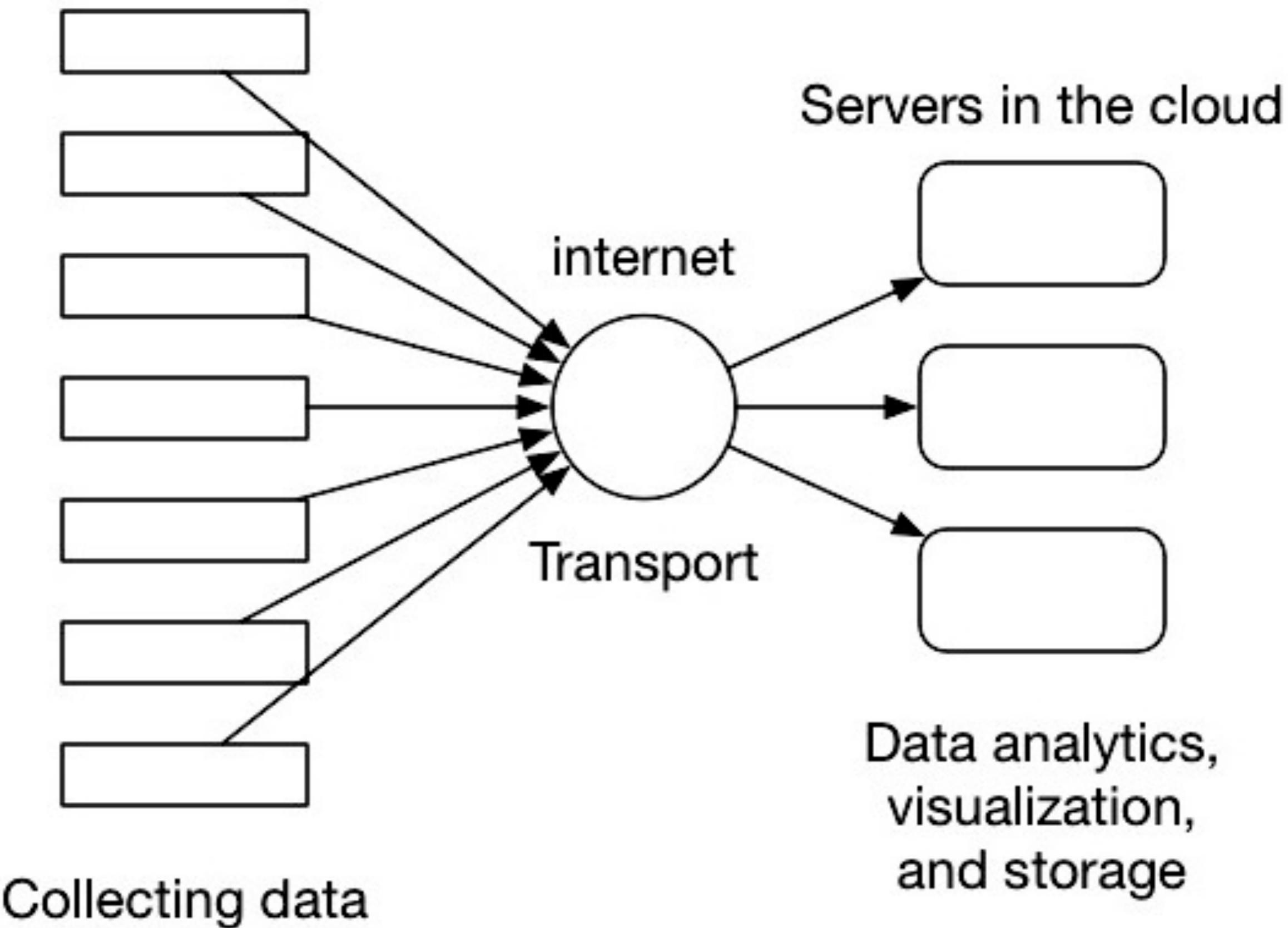
Current Efforts - Google



More examples of surveillance

- Tracking location (via GPS)
- Secretly recording private conversations
- Secretly recording private videos
- Stealing identities through software
- Activity tracking via the operating systems
- Monitoring cell phone conversations

“Things” or devices



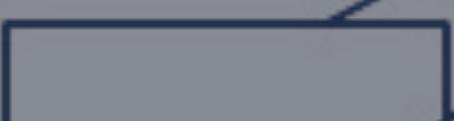
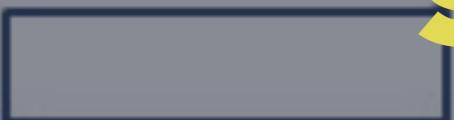
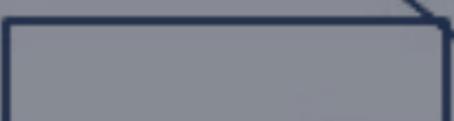
Collecting data

Servers in the cloud

Transport

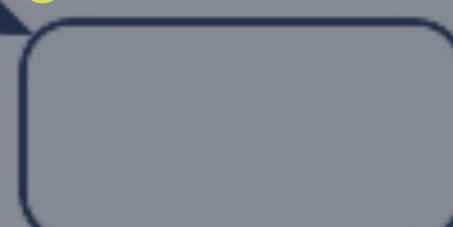
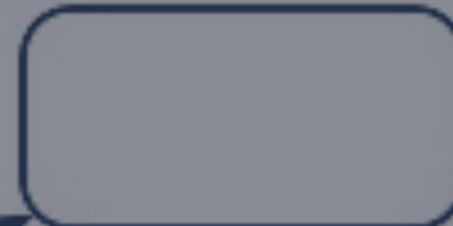
Data analytics,
visualization,
and storage

“Things” or devices



internet

Servers in the cloud



Transport

Collecting data

**Primary use of IoT =
surveillance?**

Data analytics,
visualization,
and storage

**Ethical
questions: do
you want to be
always
monitored? Do
you want to
keep other
people under
surveillance?**



NOTICE

You are under CCTV Surveillance

More practical questions:

Do you really need to monitor?

Do you really need to know what people are doing?

Can you convince the monitored people for what you do?

Broader IoT Security: preventing abuse (for surveillance)

Privacy protection

- Access control to prevent accidental revelation of obtained data
- End-to-end cryptography: preventing MITM attacks or wiretapping
- Not collecting the data you don't need to know; or even discarding them
- **Data can be used for something completely unintended at the beginning**

**You control
*your data***

Your data is yourself

- Biometrics: fingerprints, blood cells, skin tissues, face, weight, height, retina patterns
- Credit history: bank account, credit card payment, CO-OP meal card payment
- Purchasing history: books, music, videos
- Publications: blog, SNS records (*both public and private*), chat conversations

Traffic analysis

- Collective analysis: big data science
- **Targeted analysis: monitoring conversation of specific two or more people**
- **Surveillance**: completely passive, you will never know who chases after you
- **IoT** to analyze personal/private activities

Question: what will happen if IoT becomes pervasive in our world?

Think about the following points:

- How precise your activities will be monitored?
- Can machines *predict* how you will move or act?
- What will the next step from global mass surveillance be?

Credits for photos and diagrams

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