

# **oueees-201606**

## **Part 3: IoT security and privacy**

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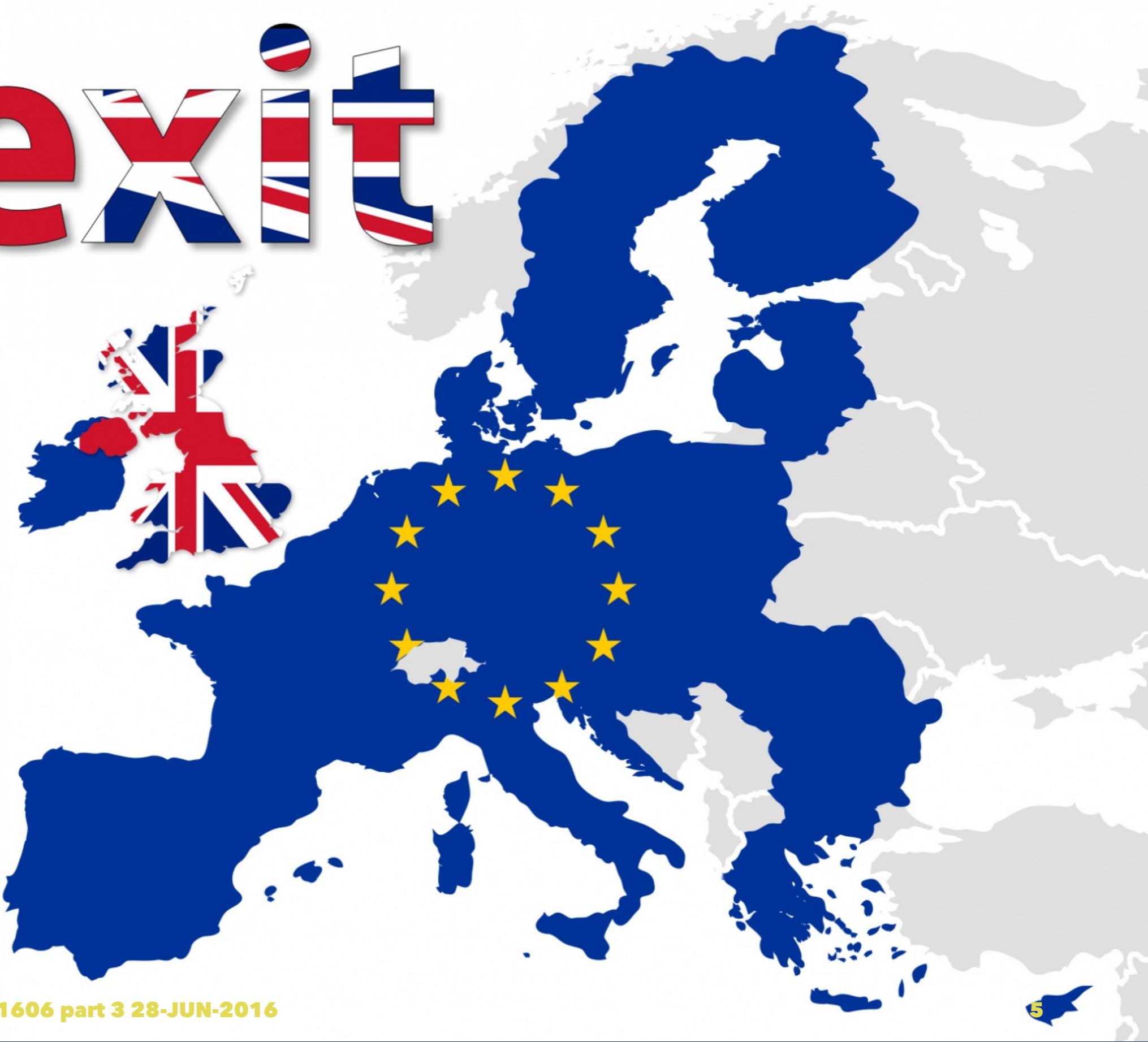
@jj1bdx

# 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 million<sup>1</sup> nationwide in UK)

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<sup>1</sup> [https://en.wikipedia.org/wiki/Mass\\_surveillance\\_in\\_the\\_United\\_Kingdom#Number\\_of\\_cameras](https://en.wikipedia.org/wiki/Mass_surveillance_in_the_United_Kingdom#Number_of_cameras)

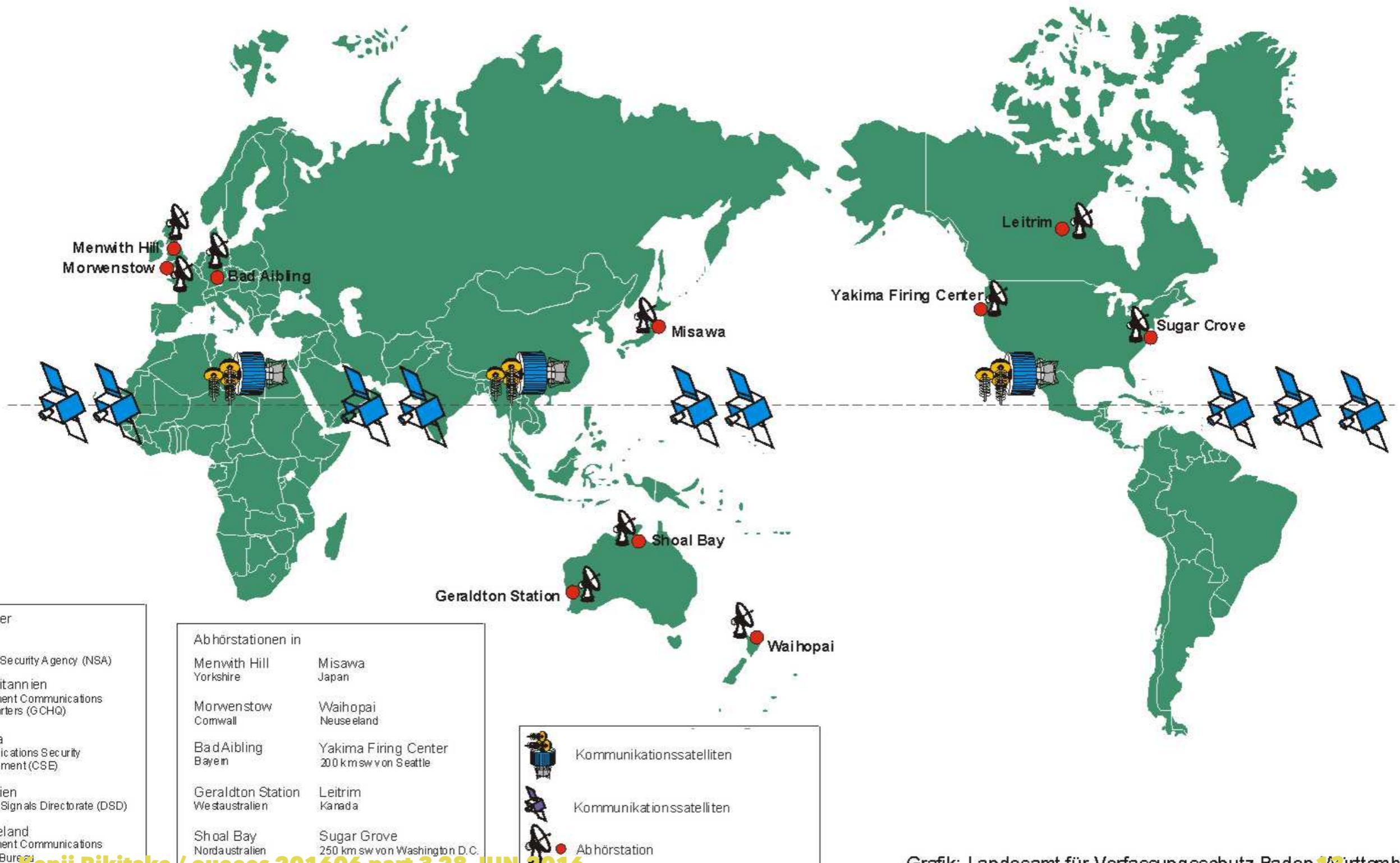
**International network of surveillance  
established since 1971:**

# **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

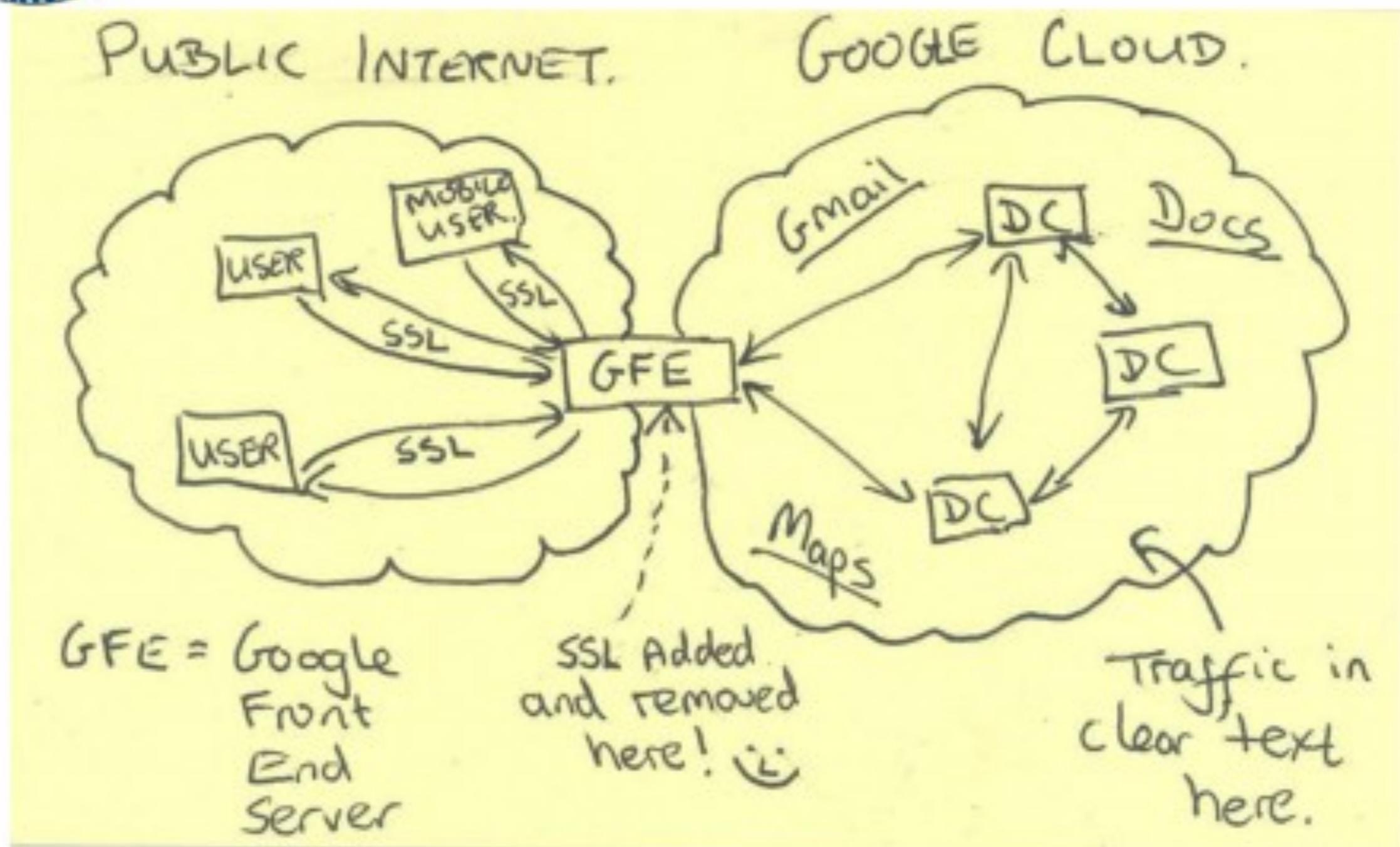
- Global surveillance programs<sup>2</sup>
  - USA: PRISM
  - UK: MUSCULAR
  - Germany: Project 6
  - France: Lustre
- Major players: US NSA, UK GCHQ
- ... and many ISPs cooperate

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<sup>2</sup> [https://en.wikipedia.org/wiki/Global\\_surveillance\\_disclosures\\_\(2013%E2%80%93present\)](https://en.wikipedia.org/wiki/Global_surveillance_disclosures_(2013%E2%80%93present))



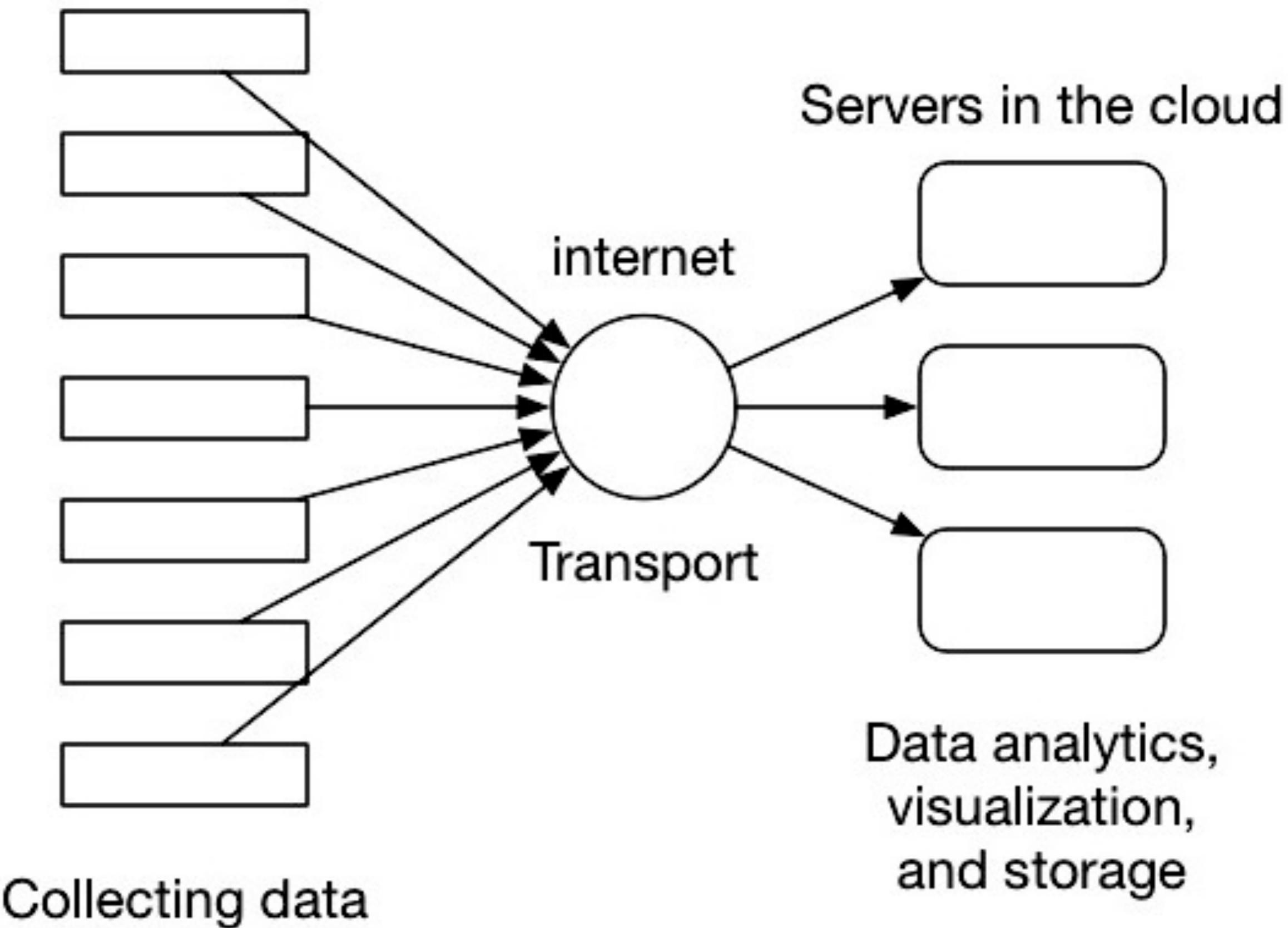
# Current Efforts - Google



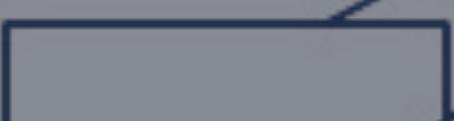
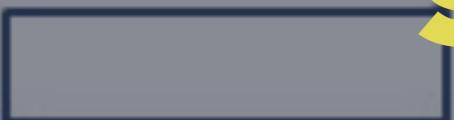
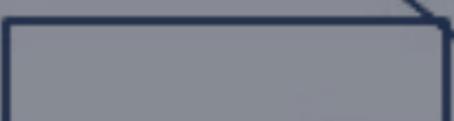
# More examples of surveillance

- 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

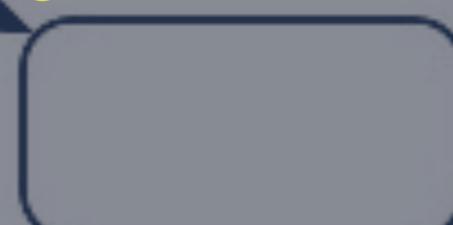
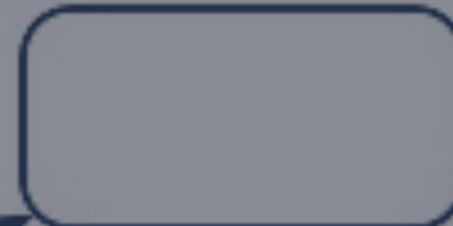


“Things” or devices



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 completed 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?

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