oueees-201606
Part 3: IoT
security and privacy

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28-JUN-2016
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Lecture notes on GitHub

- https://github.com/jj1bdx/oueees-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


防犯カメラ作動中
Security camera in operation
防犯カメラ作動中
Security camera in operation
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[1] 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:

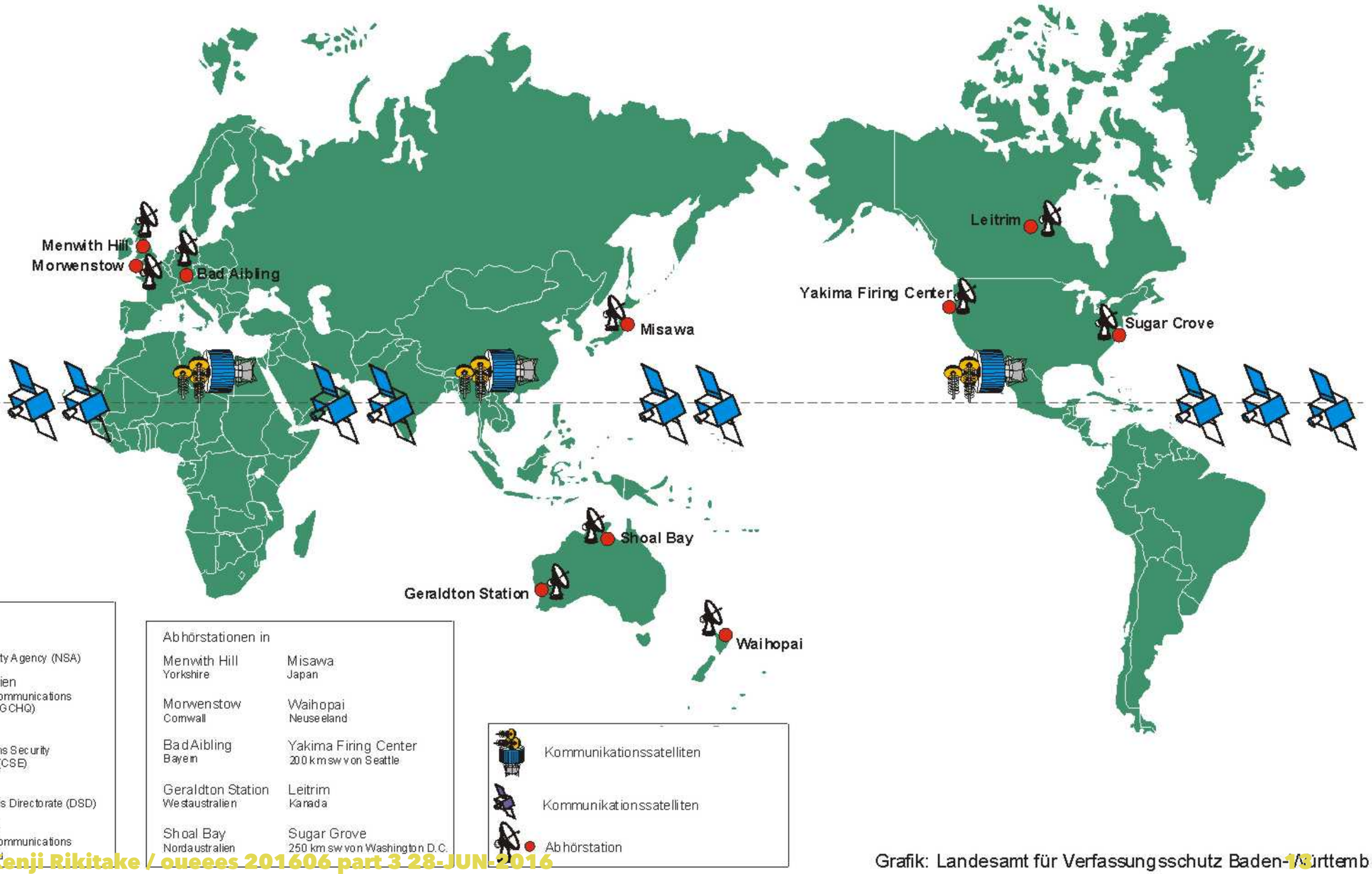
ECHELON

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.



Betreiber

USA
National Security Agency (NSA)

Großbritannien
Government Communications Headquarters (GCHQ)

Kanada
Communications Security Establishment (CSE)

Australien
Defence Signals Directorate (DSD)

Neuseeland
Government Communications Security Bureau

Abhörstationen in

Menwith Hill Yorkshire	Misawa Japan
Morwenstow Cornwall	Waihopai Neuseeland
Bad Aibling Bayern	Yakima Firing Center 200 km sw von Seattle
Geraldton Station Westaustralien	Leitrim Kanada
Shoal Bay Nordaustralien	Sugar Grove 250 km sw von Washington D.C.

Kommunikationssatelliten

Kommunikationssatelliten

Abhörstation

Grafik: Landesamt für Verfassungsschutz Baden-Württemberg

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Edward Snowden
Disclosed NSA documents in 2013

What Snowden revealed

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

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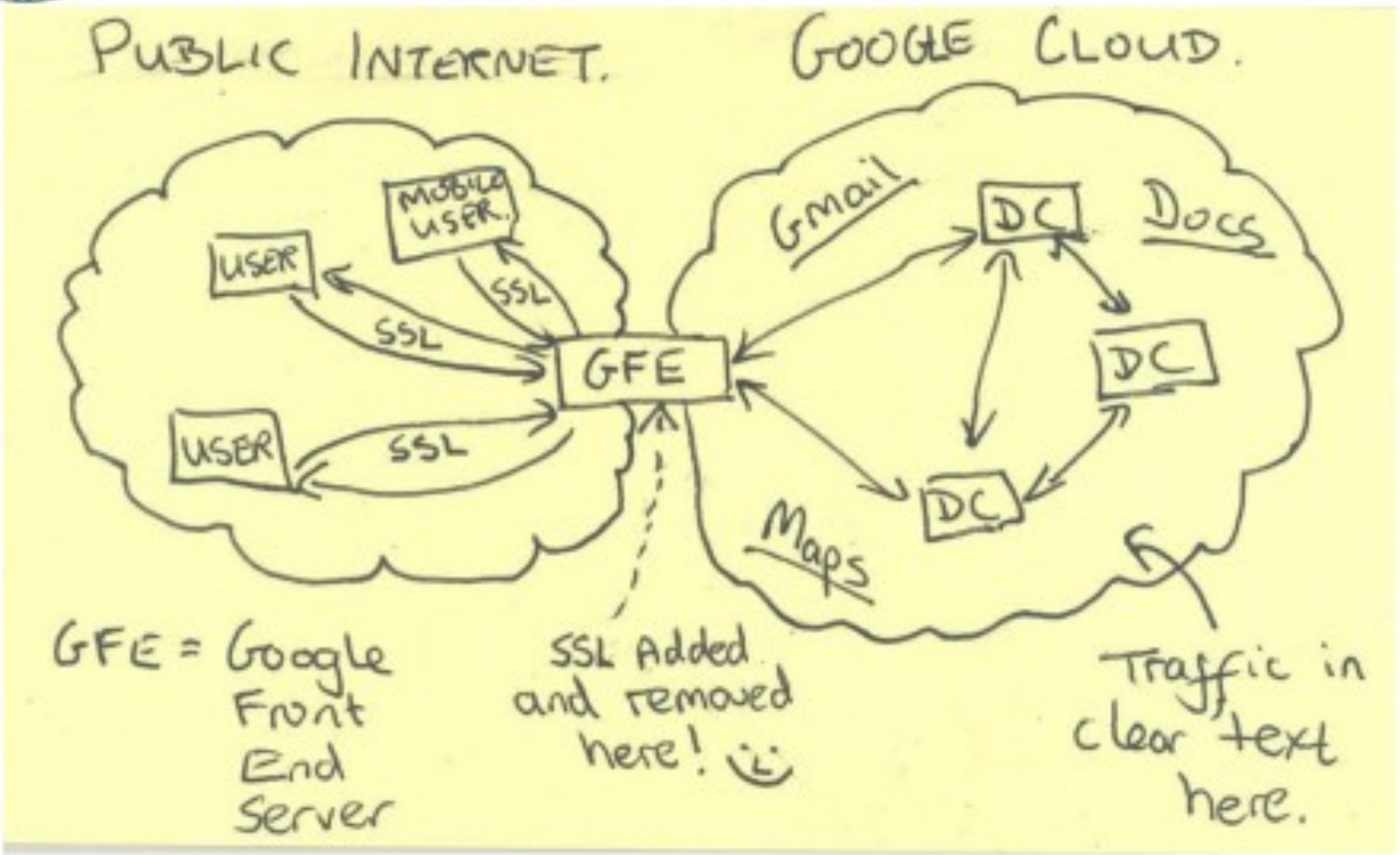
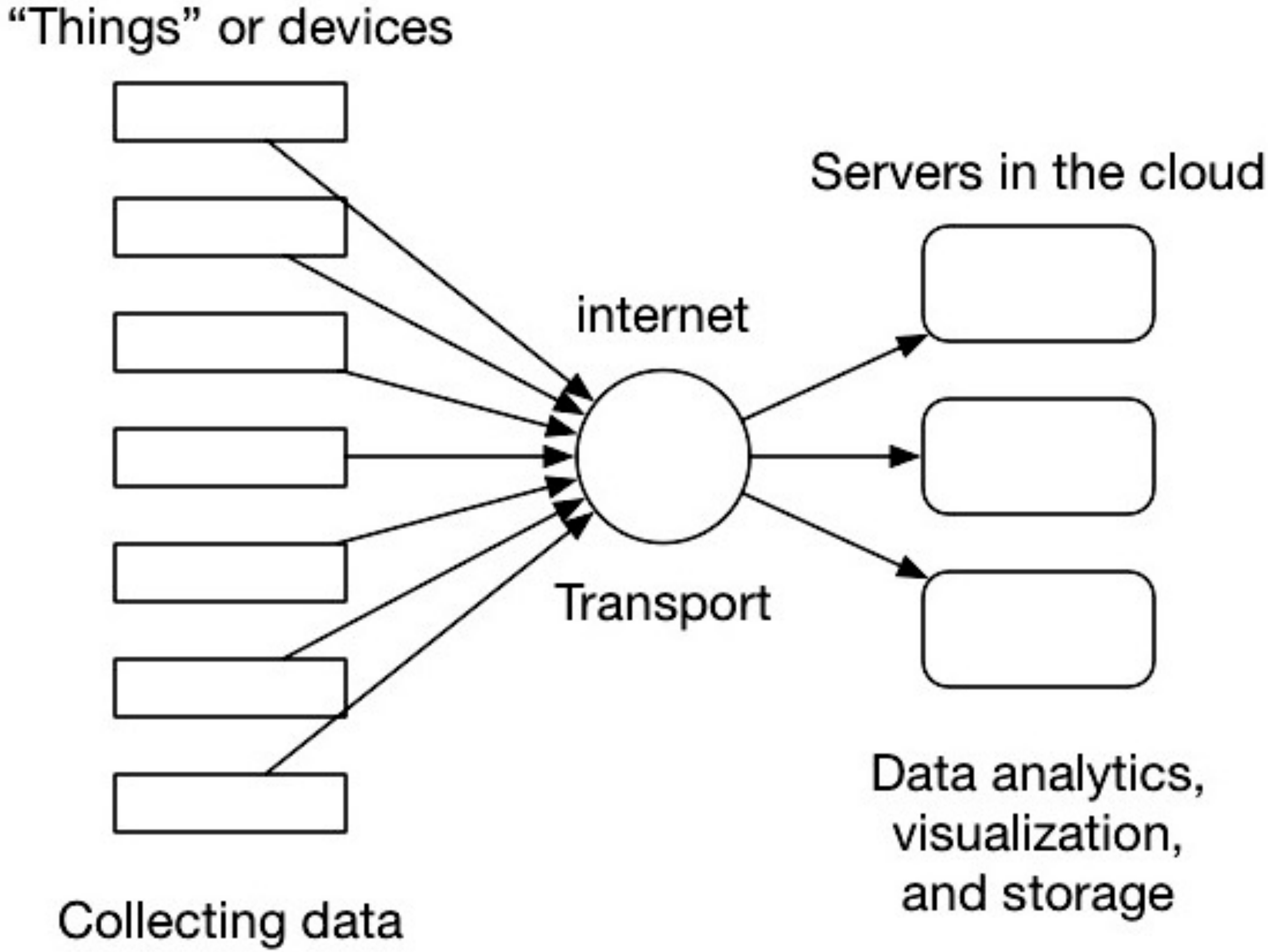
[2] https://en.wikipedia.org/wiki/Global*surveillance*disclosures_(2013%E2%80%93present)

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



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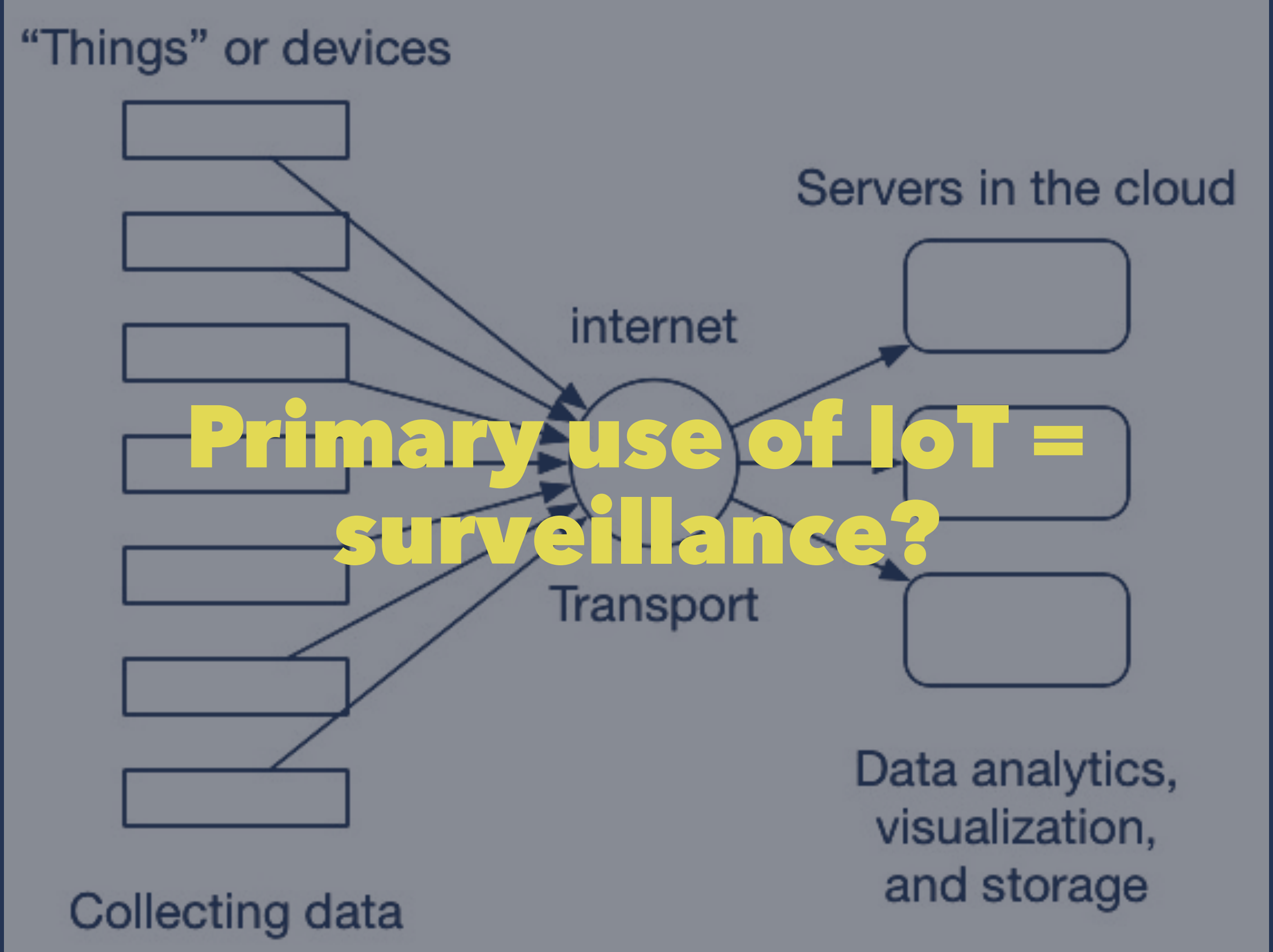

Primary use of IoT = surveillance?

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