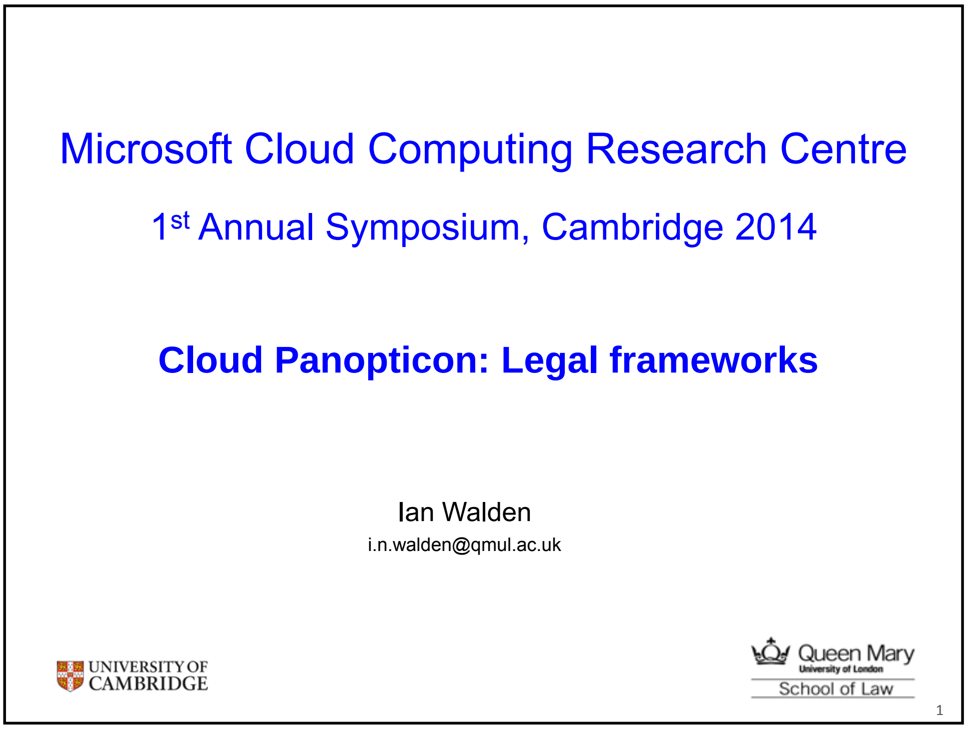

Microsoft Cloud Computing Research Centre

1st Annual Symposium, Cambridge 2014

Cloud Panopticon: Legal frameworks

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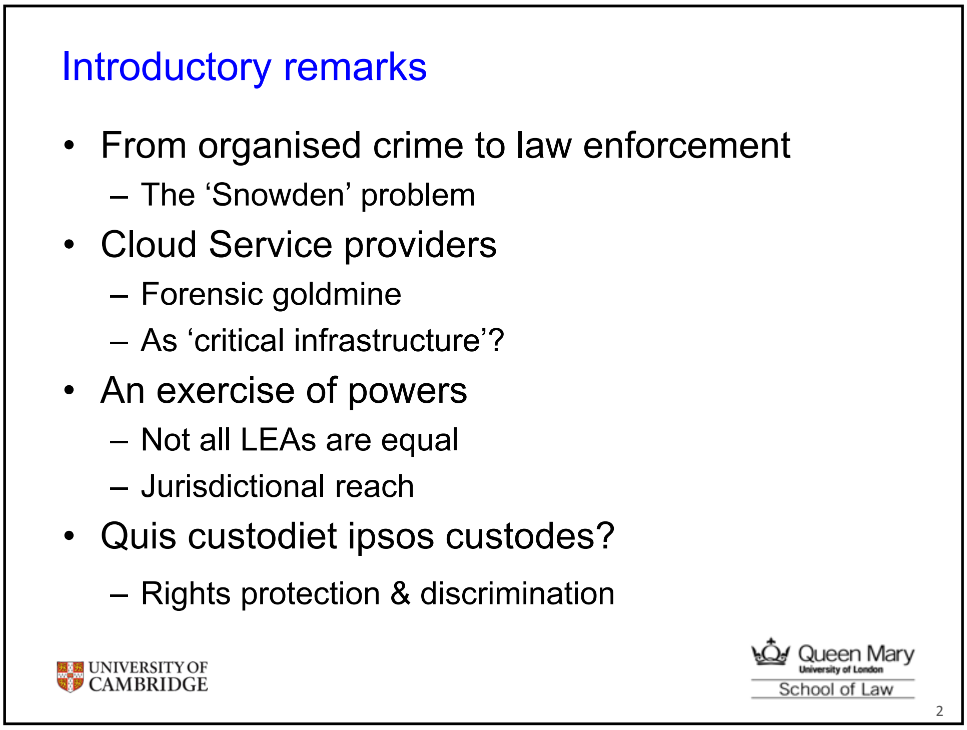

Introductory remarks

- From organised crime to law enforcement
  - The ‘Snowden’ problem
- Cloud Service providers
  - Forensic goldmine
  - As ‘critical infrastructure’?
- An exercise of powers
  - Not all LEAs are equal
  - Jurisdictional reach
- Quis custodiet ipsos custodes?
  - Rights protection & discrimination

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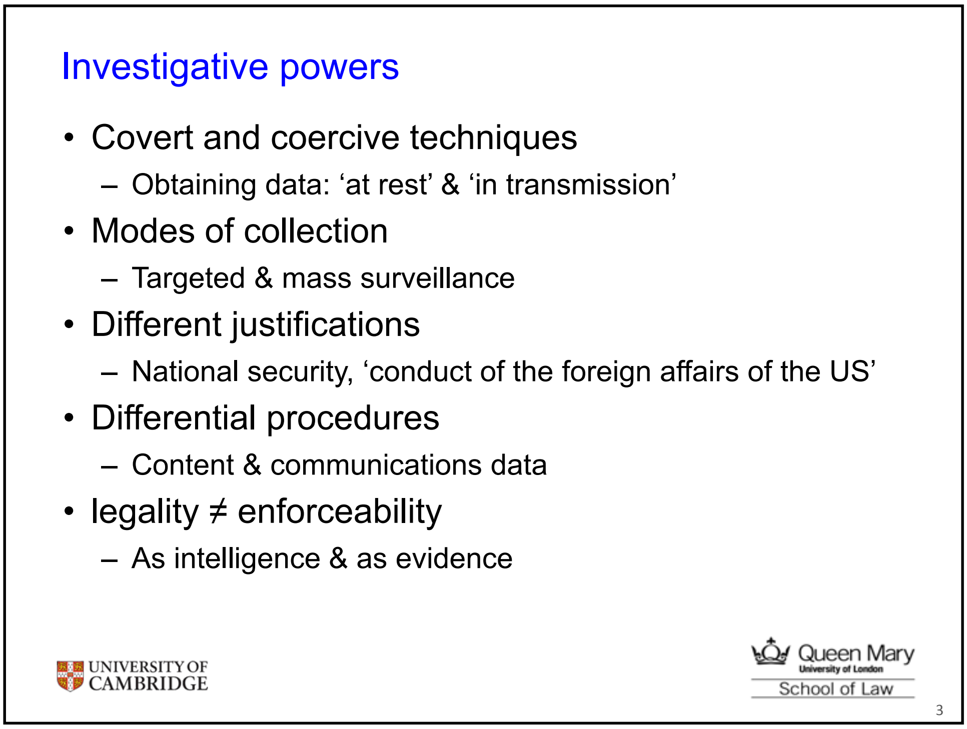
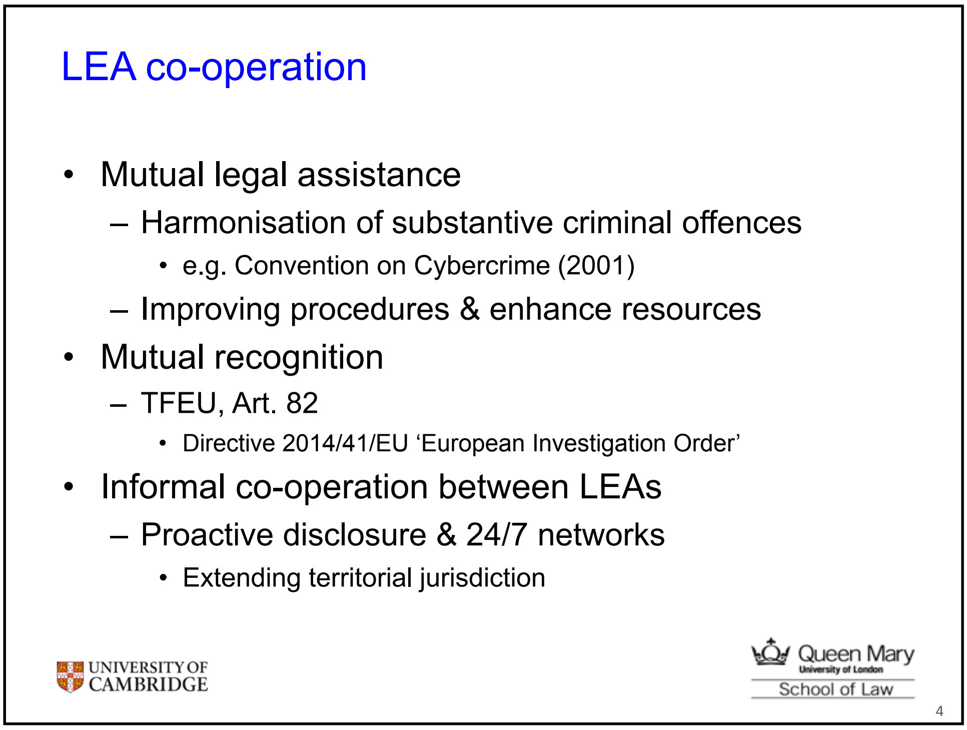


Investigative powers

- Covert and coercive techniques
  - Obtaining data: ‘at rest’ & ‘in transmission’
- Modes of collection
  - Targeted & mass surveillance
- Different justifications
  - National security, ‘conduct of the foreign affairs of the US’
- Differential procedures
  - Content & communications data
- legality ≠ enforceability
  - As intelligence & as evidence



LEA co-operation

- Mutual legal assistance
  - Harmonisation of substantive criminal offences
    - e.g. Convention on Cybercrime (2001)
  - Improving procedures & enhance resources
- Mutual recognition
  - TFEU, Art. 82
    - Directive 2014/41/EU ‘European Investigation Order’
- Informal co-operation between LEAs
  - Proactive disclosure & 24/7 networks
    - Extending territorial jurisdiction

Dealing with law enforcement

- Obligations to assist
  - Capture data: ‘LI capability’
  - Retain data
  - Decrypt protected data
  - Disclose data
- Voluntary assistance
  - National
    - Immunity from liability
  - International
    - “obtains the lawful and voluntary consent of the person who has lawful authority to disclose the data..” (Cybercrime Convention, Art. 32b)

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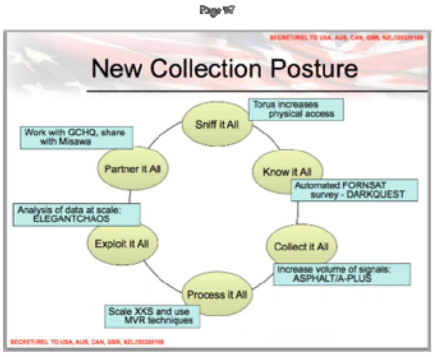
Not dealing with law enforcement

- Engage directly with the material sought
  - ‘Publicly available’
  - NSA’s ‘Tailored Access Operations’
- Unmediated access
  - Black boxes
- LEA Co-operation
  - ‘Five Eyes’


Page 97
SECRET//REL TO USA, AUS, CAN, GBR, NZL//20320108
New Collection Posture
Sniff it All
Torus increases physical access
Know it All
Automated FORNSAT survey - DARKQUEST
Collect it All
Increase volume of signals: ASPHALT/A-PLUS
Process it All
Scale XKS and use MVR techniques
Exploit it All
Analysis of data at scale: ELEGANTCHAOS
Partner it All
Work with GCHQ, share with Misawa
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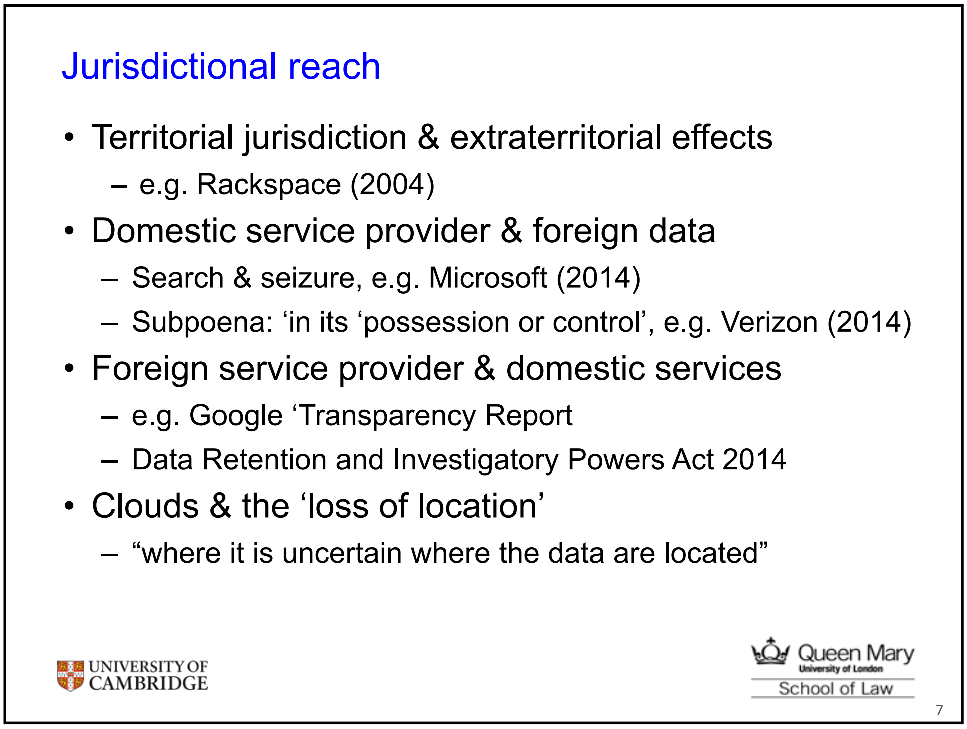
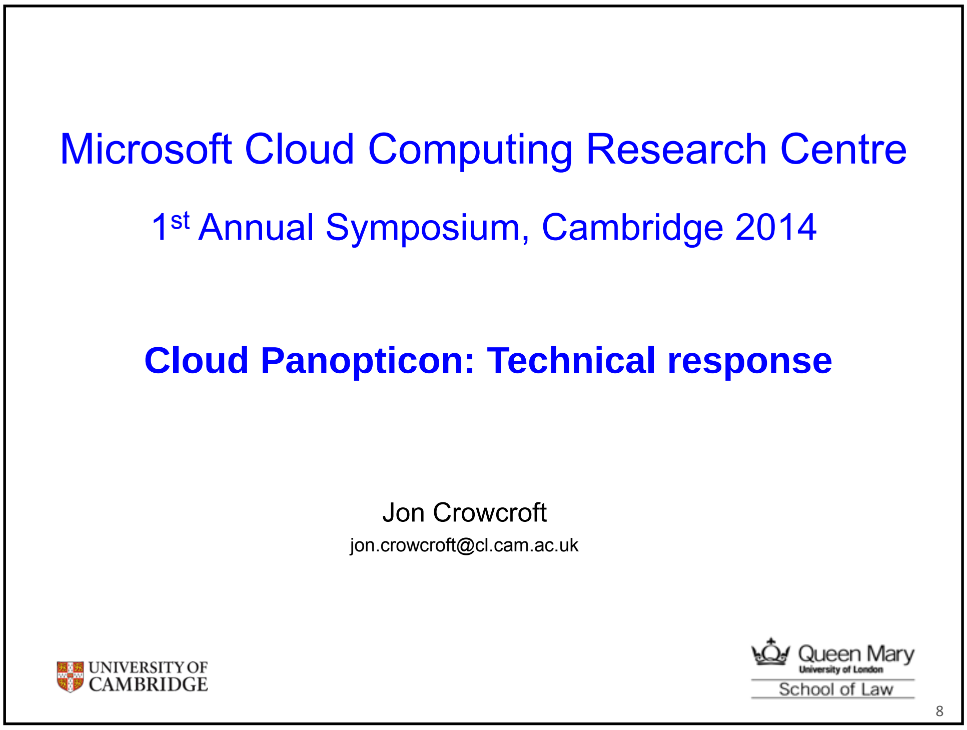


Jurisdictional reach

- Territorial jurisdiction & extraterritorial effects
  - e.g. Rackspace (2004)
- Domestic service provider & foreign data
  - Search & seizure, e.g. Microsoft (2014)
  - Subpoena: ‘in its ‘possession or control’, e.g. Verizon (2014)
- Foreign service provider & domestic services
  - e.g. Google ‘Transparency Report
  - Data Retention and Investigatory Powers Act 2014
- Clouds & the ‘loss of location’
  - “where it is uncertain where the data are located”



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Cloud Panopticon: Technical response

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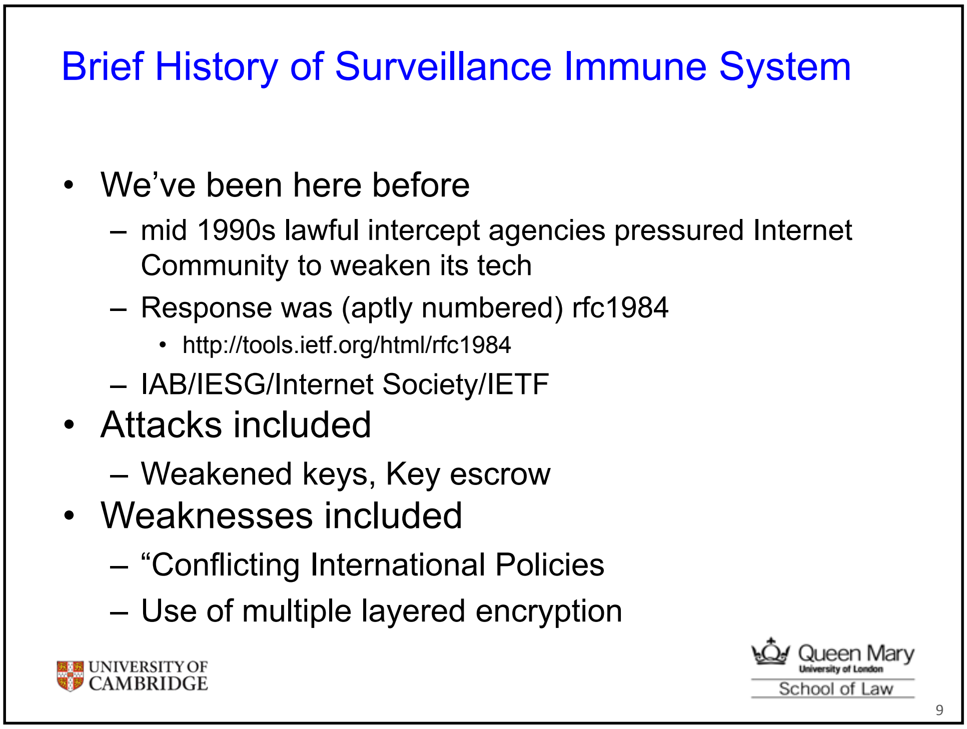
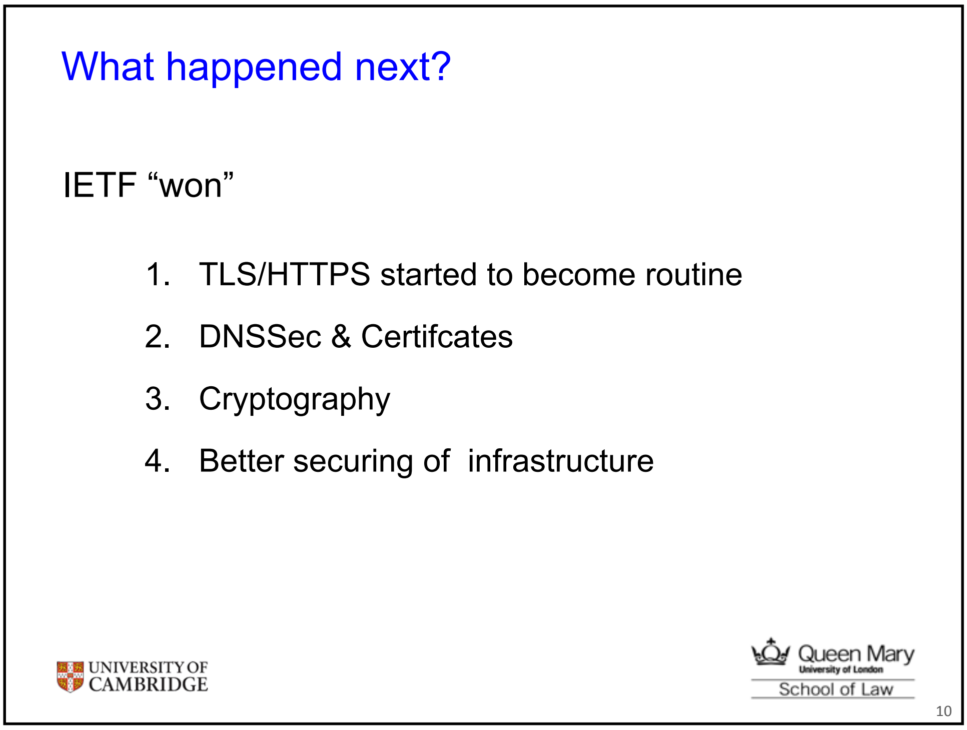


Brief History of Surveillance Immune System

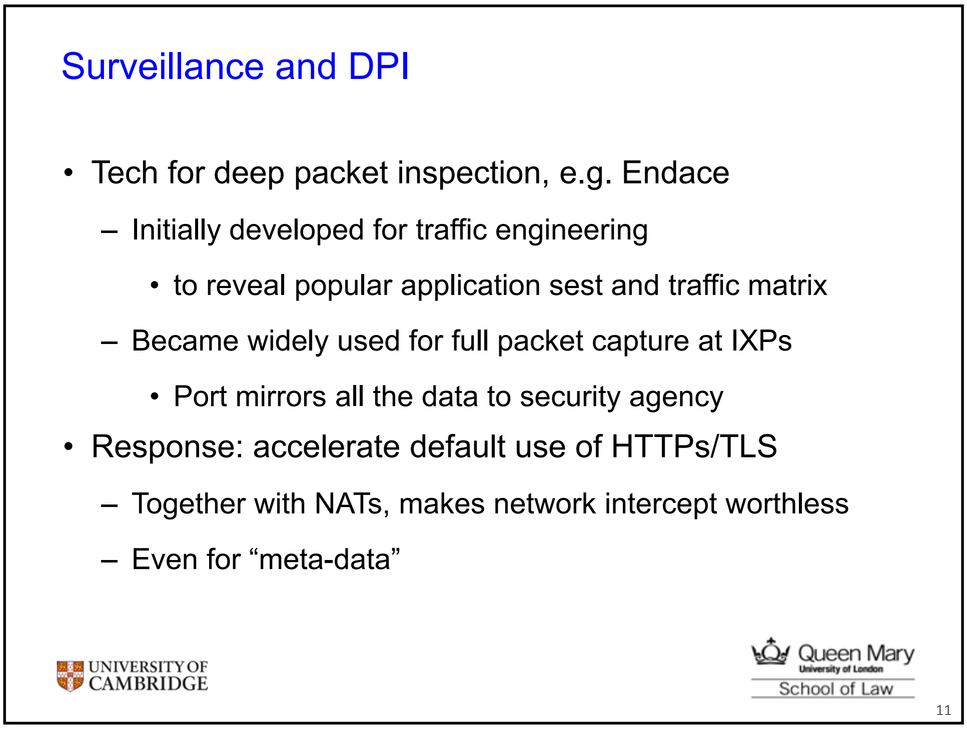
- We’ve been here before
  - mid 1990s lawful intercept agencies pressured Internet Community to weaken its tech
  - Response was (aptly numbered) rfc1984
    - http://tools.ietf.org/html/rfc1984
  - IAB/IESG/Internet Society/IETF
- Attacks included
  - Weakened keys, Key escrow
- Weaknesses included
  - “Conflicting International Policies
  - Use of multiple layered encryption



What happened next?

IETF “won”

1. TLS/HTTPS started to become routine
2. DNSSec & Certifcates
3. Cryptography
4. Better securing of infrastructure



Surveillance and DPI

- Tech for deep packet inspection, e.g. Endace
  - Initially developed for traffic engineering
    - to reveal popular application sest and traffic matrix
  - Became widely used for full packet capture at IXPs
    - Port mirrors all the data to security agency
- Response: accelerate default use of HTTPs/TLS
  - Together with NATs, makes network intercept worthless
  - Even for “meta-data”

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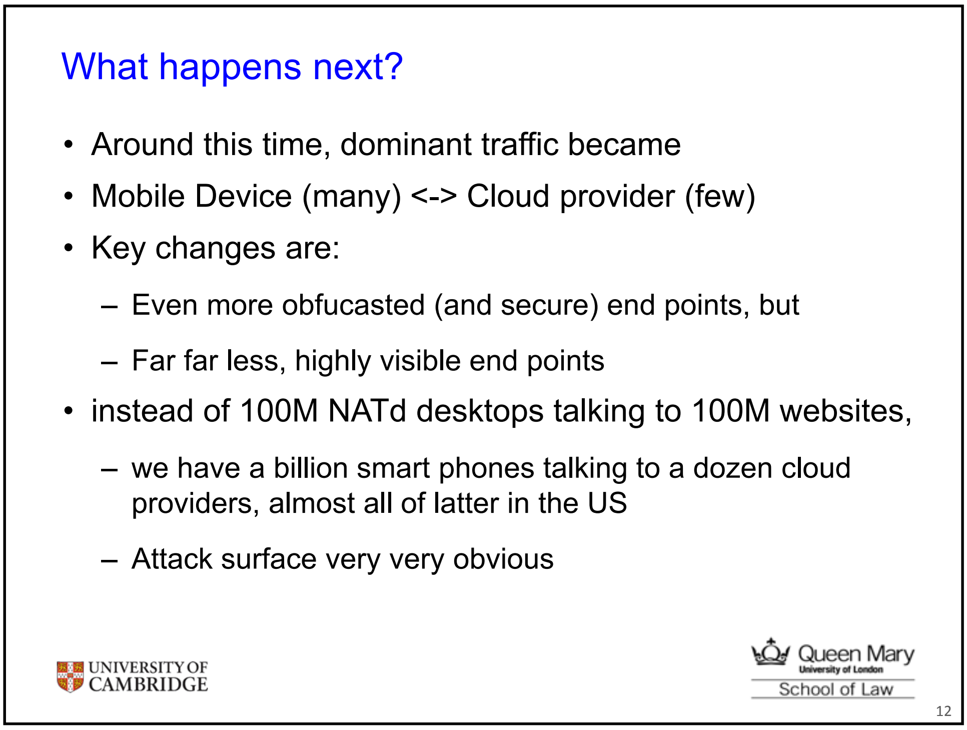

What happens next?

- Around this time, dominant traffic became
- Mobile Device (many) <-> Cloud provider (few)
- Key changes are:
  - Even more obfucasted (and secure) end points, but
  - Far far less, highly visible end points
- instead of 100M NATd desktops talking to 100M websites,
  - we have a billion smart phones talking to a dozen cloud providers, almost all of latter in the US
  - Attack surface very very obvious

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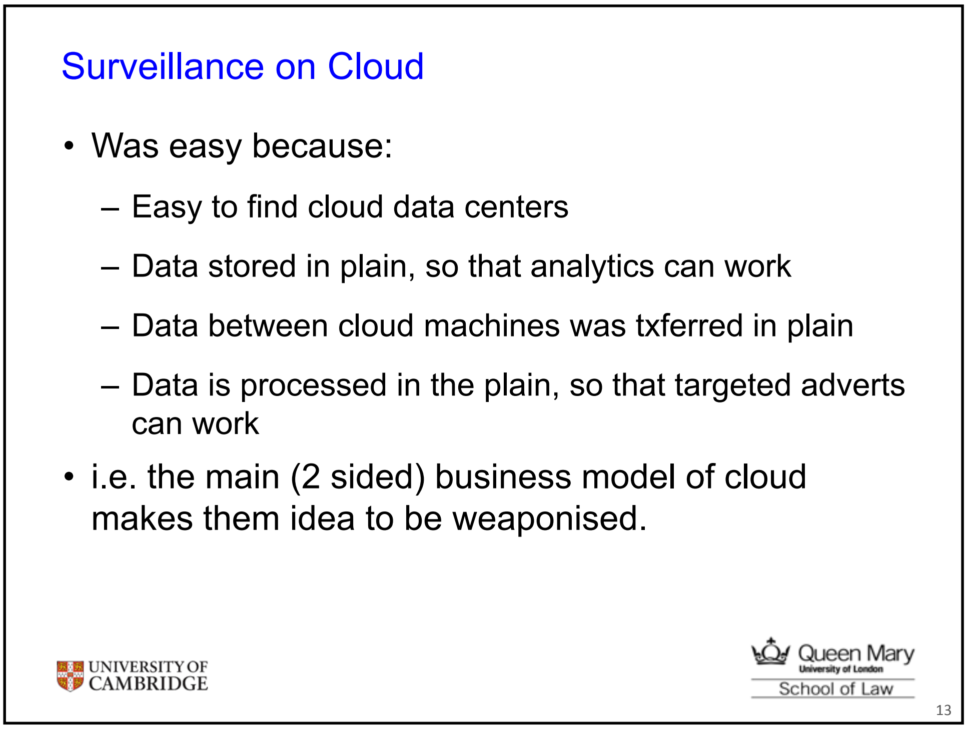
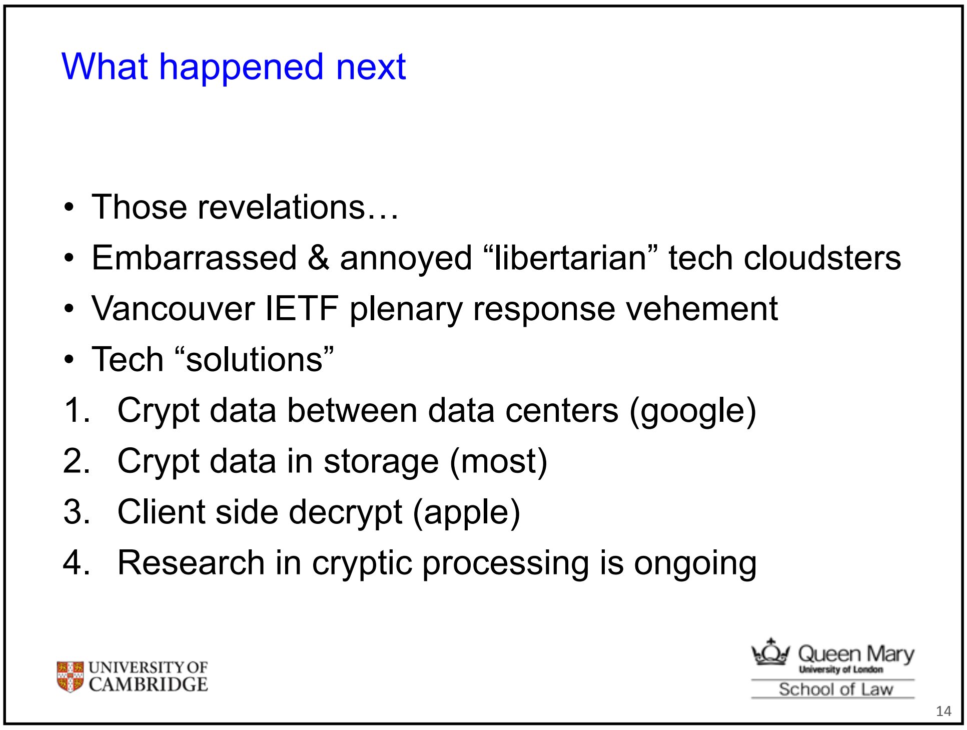


Surveillance on Cloud

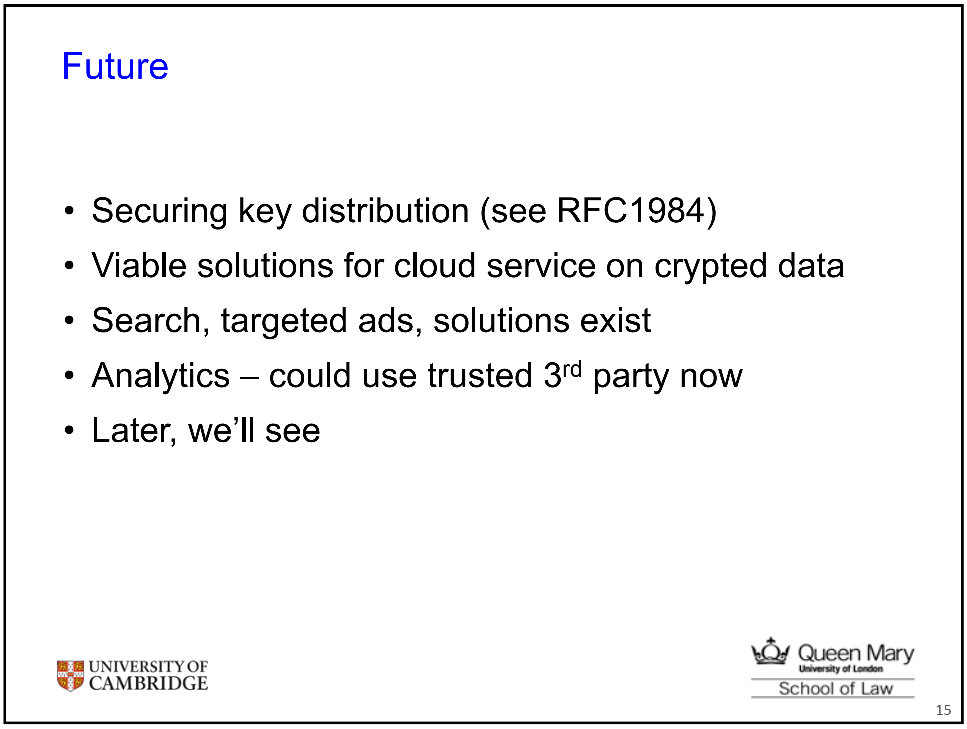
- Was easy because:
  - – Easy to find cloud data centers
  - – Data stored in plain, so that analytics can work
  - – Data between cloud machines was txferred in plain
  - – Data is processed in the plain, so that targeted adverts can work
- i.e. the main (2 sided) business model of cloud makes them idea to be weaponised.



What happened next

- Those revelations…
- Embarrassed & annoyed “libertarian” tech cloudsters
- Vancouver IETF plenary response vehement
- Tech “solutions”

1. Crypt data between data centers (google)
2. Crypt data in storage (most)
3. Client side decrypt (apple)
4. Research in cryptic processing is ongoing



Future

- Securing key distribution (see RFC1984)
- Viable solutions for cloud service on crypted data
- Search, targeted ads, solutions exist
- Analytics – could use trusted 3rd party now
- Later, we'll see

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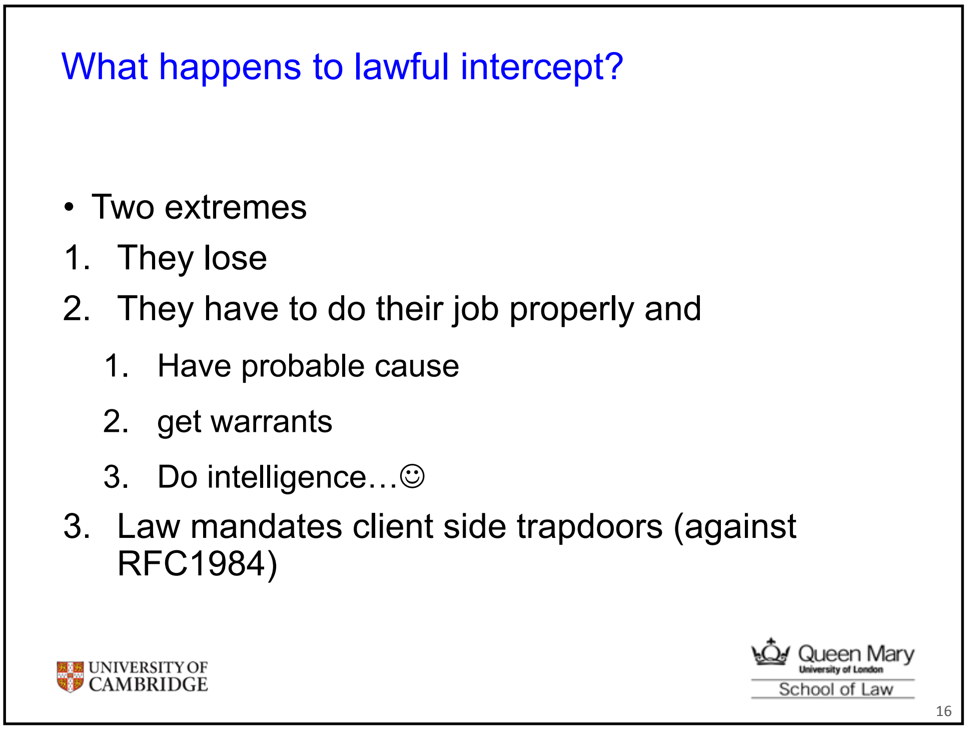

What happens to lawful intercept?

- Two extremes

1. They lose
2. They have to do their job properly and
   1. Have probable cause
   2. get warrants
   3. Do intelligence…☺
3. Law mandates client side trapdoors (against RFC1984)

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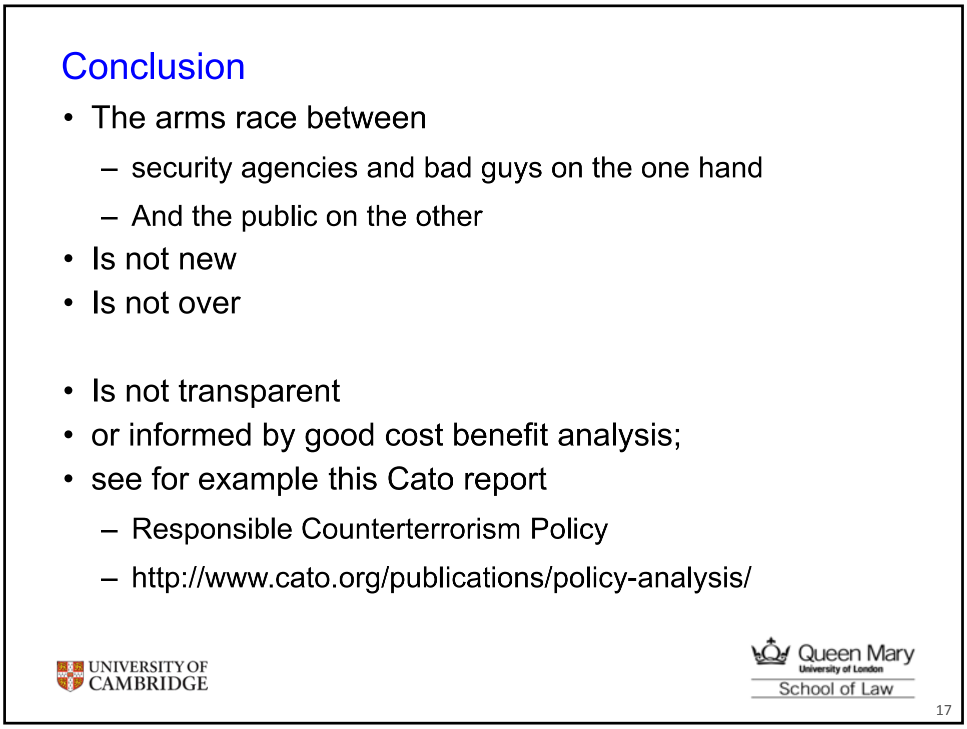

Conclusion

- The arms race between
  - security agencies and bad guys on the one hand
  - And the public on the other
- Is not new
- Is not over

- Is not transparent
- or informed by good cost benefit analysis;
- see for example this Cato report
  - Responsible Counterterrorism Policy
  - http://www.cato.org/publications/policy-analysis/

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