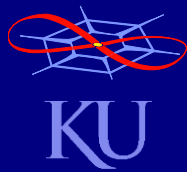# The Mobile Internet Sucks
The IoT will be *Much Worse*

James P.G. Sterbenz*†‡§

司徒傑莫　Джеймс Ф.Г. Штербэнз　송재윤

*Department of Electrical Engineering & Computer Science
Information Technology & Telecommunications Research Center
The University of Kansas
†School of Computing and Communications, Infolab 21
Lancaster University
‡The Hong Kong Polytechnic University
§The Chinese Academy of Sciences

http://www.ittc.ku.edu/~jpgs
http://wiki.ittc.ku.edu/resilinets
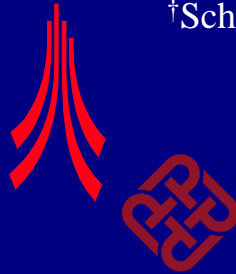
Mobile Internet Sucks; IoT Suckier
Abstract

As is typical with technology in general, and the Internet in particular, we are racing to deploy technology we do not yet understand. The usual issues of usability, security, privacy, resilience, survivability, controllability, accountability, and manageability will have to be poorly hacked later, after it is far too late to properly design them into the architecture.

The consequences of this will be even more severe for the IoT than for the increasingly ubiquitous conventional Internet: botnets running from light bulbs; pipes frozen and doors unlocked in peoples' homes; large-scale accidents and deaths in connected smart vehicles. This should be no surprise; there has *never* been a properly secure consumer computing platform, as the business model favours low cost and glitzy features over long-term security and usability.

This, however, is the future towards which we are racing with no brakes. Be afraid. Very afraid. And while I do have IoT lights on my front porch and deck, I will never have an Internet-attached door lock nor thermostat (without parallel mechanical backup as I do now for my non-networked but programmable thermostat).

KU ITTC

Where is Kansas?
Geography Lesson

Seattle

Portland

Minneapolis

Milwaukee

Chicago

Detroit

Cleveland

Boston

New York

Philadelphia

Washington DC

Salt Lake City

San Francisco

Denver

Kansas City

OZ

KU – Lawrence

KANSAS

St Louis

Las Vegas

San Diego
Los Angeles

Phoenix

Atlanta

Dallas

New Orleans

Houston

Miami

北京

서울

東京

臺北市

香港

München

UK? Zürich

Oslo Wien

Россия

Singapore/Singapura/新加坡 / சிங்கப்பூர்

Mobile Internet Sucks; IoT Suckier
Introductory Quote

- Just because you can…

Mobile Internet Sucks; IoT Suckier
Introductory Quote

- Just because you can…
  …doesn't mean you *should*

Mobile Internet Sucks; IoT Suckier
Outline

- The Internet of mobile devices sucks
- The IoT will be much worse!

Location-Aware Internet Sucks
Examples

- United Web page somehow decided I'm Japanese
  - in Firefox I'm forced to Japanese page until I log in
  - only then does my en profile preference kick in
  - "remember me" is a joke as timeout is so short
    - I don't think I can change this
    - even though I stay logged in indefinitely
- Google assumes you want the local language
  - forces to `google.<cctld>`
  - sometimes easy to switch to google.com; sometimes not
  - doesn't seem to recognise my en/uk profile cookies
  - fortunately DuckDuckGo is my primary search engine

Mobile Internet Sucks
Worse

- Even less control
  - nearly closed platforms
  - app developers don't care about user customisation

Mobile Internet Sucks
Examples

- LI request from colleague
  - I click the "accept" link in the email
  - confirm that I want Firefox to open
  - LI forces redirect to Google Play store
    - giving me no option to use Web interface
  - No, LI I will not install your stupid app!
- FB mobile app has limited functionality
  - can't promote group visitor post to main timeline
  - FB Web interface also forces to app
  - finally figure out how to cut-paste-publish link as admin

Airborne Internet Sucks
Examples

- ### United Internet access sucks
  - 3.5 of my last 747 transpac segments didn't work
  - ORD $\rightarrow$ HKG 777 worked; HKG $\rightarrow$ SIN didn't
    - crew doesn't even understand the difference between
      - 802.11 base station up (it was)
      - `unitedwifi.com` proxy (was down)
      - satellite link
    - crew *and* pilot said it had to do with our air space
      - it didn't
  - I was given apology cards
    - that were supposed to give me some miles for disappointment
    - UA Web site was incapable of processing them

Location Services and Balkanisation
Problems

- Location-based services can be helpful
  - e.g. place you on a map
- But the are increasingly abused: Balkanization
  - Hulu restricted to US
  - Youtube videos restricted by country
  - iPlayer restricted to UK
    - can't even download unless logged in to ~~UK~~England app store
    - I'm even willing to *pay* for access!
- Incompetent app design makes override difficult
  - I'm looking at you, G, A, MS, FB, A, …

The IoSh*#
Lede

- But wait! It gets worse...

The IoT
Is Much Worse

- Even *less* control
  - many embedded platforms in everything
  - much more chaos than current several mobile platforms
  - little or no user visibility or management

The IoT
Is Much Worse

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- "Things" attached to the Internet
  - even if needn't be
  - massive increase in data mining of users
    - why does your flashlight app need fine-grained location info?
  - the Ambient Loo will post your toilet logs online
    - directly to FB with pics!
    - unless you figure out how to *disable* that default, if you can

The IoT
Examples$_1$

- Internet attached thermostat
  - e.g. Nest (*already* cracked)
- So now someone can crack into your house
  - freeze and burst your pipes in the winter
- My resilient backup on the furnace
  - thermocouple bolted to side of furnace in basement
  - wired in parallel; set to 50°F / 10°C
- I will never have an Internet-attached Door lock
  - if you want to crack my ZigBee/801.15.4 net…
    … have fun and change the colour of my porch & deck lights
  - I've no idea what is running on my smart light bulbs or hub

The IoT
Examples$_2$

- Internet attached thermostat

- Internet-attached Door lock
  - cracker will open doors burgle house
  - I will *never* have one
    - "never say never" does not apply here, I mean *never*

- I have no visibility on what is running on my IoT hub
  - and therefore will not give it access to any critical systems
  - however, if you want to crack my ZigBee/801.15.4 net…
    … have fun and change the colour of my porch & deck lights

The Internet Fridge
A Slightly Updated (20-Year Old) Scenario

- All food has RFID tags
  - fridge senses when item used up
- Fridge has imaging cameras
  - senses when milk low
  - certainly doesn't image you and family
- Orders in advance for delivery

The Internet Fridge
A Slightly Updated (20-Year Old) Scenario

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  - certainly doesn't image you and family
- Orders in advance for delivery
- Drone delivers new item
  - unlocks Internet-attached door lock (what could possibly go wrong?)
- Deposits item in fridge

AMAZON DELIVERY DRONES

SKEET SHOOTING WITH PRIZES

Smart Vehicles
A Dark Prediction

- No consumer platform *ever* deployed
  - is secure, private, and resilient
- Driverless vehicles will be no different
- Cracker will choose a common platform
  - find an exploit and load malware
  - during rush hour (18:30 EST; 15:30 PST)
  - hard accelerate, disable brakes, lock steering
    - I'm sure there will be a manual safety override…
    - …that will be software controlled and also disabled
  - many thousands of people will die in less than 10 minutes

Mobile Internet Sucks; IoT Suckier
Summary

- Hämed said this should be *more* than a rant

Mobile Internet Sucks; IoT Suckier
Opportunities?

- Lot's of research needs to be done
  …and funded
  - assuming any funding sources are left

Mobile Internet Sucks; IoT Suckier
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- But as usual, it will probably be too late
  - IoT will be badly deployed
    - insecure
    - unmanageable
    - …

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  - IoT will be badly deployed
    - insecure
    - unmanageable
    - …
- Cosener's 2020:
  - how to fix Internet of Rubbish we've deployed

Acknowledgements

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