

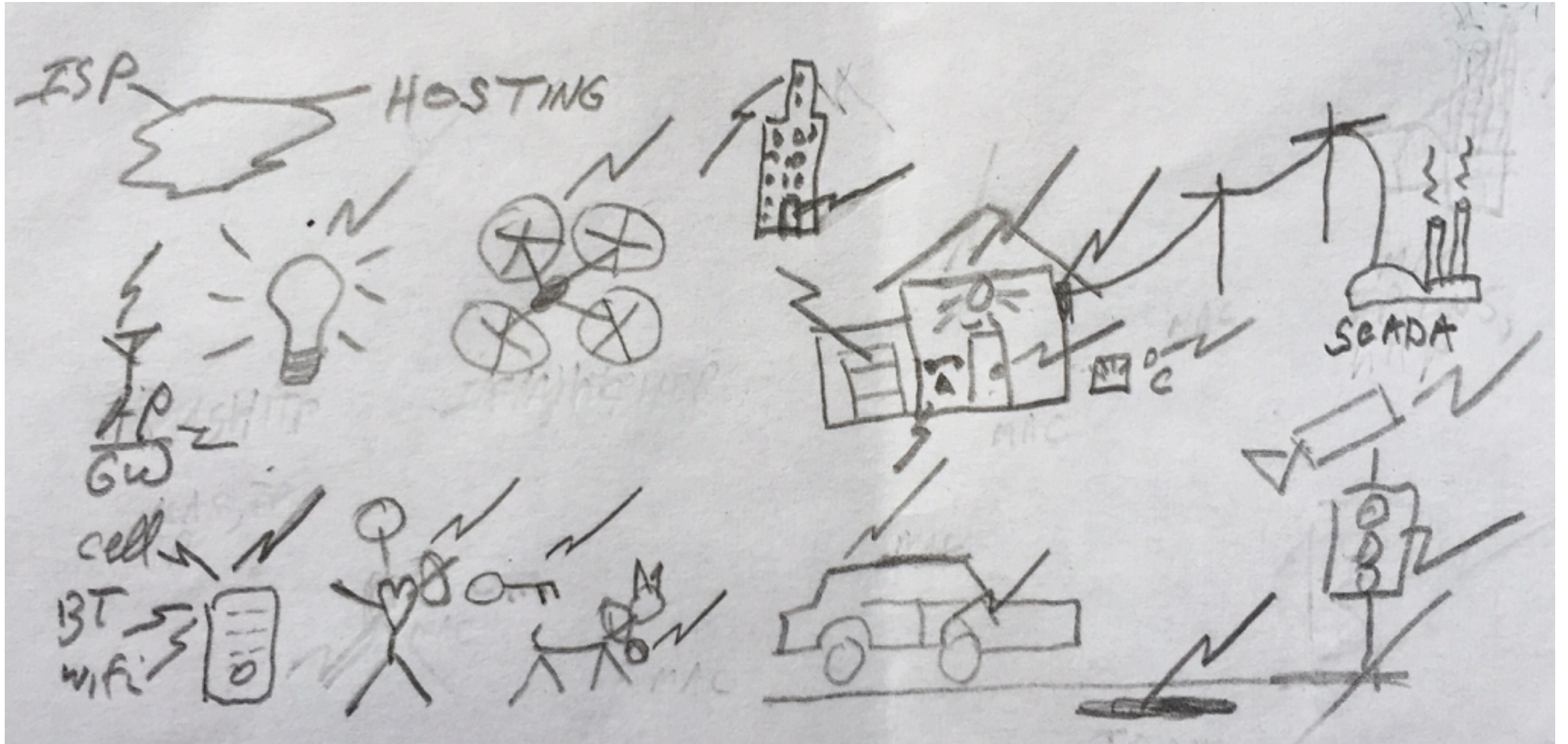
What's all this I hear about the Internet of Things?

(A recent visit to CES in Las Vegas)

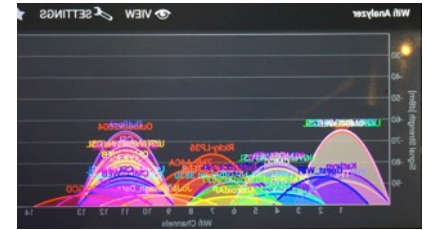


- BS or Not BS?
- Does it matter?
- Where do “WE” fit in?

A picture is worth 1001 words (but I am no artist)



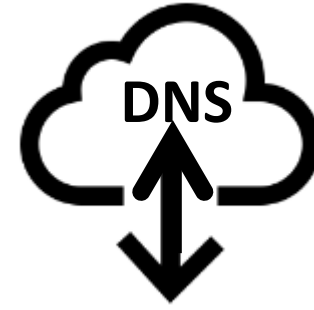
Numbers, Identifiers, Protocols



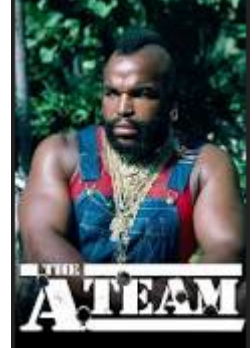
- Spectrum ..13.56MHz, 900MHz, 2.4/5GHz, 24GHz... (GOVTs/ITU)
- Modulation, Media Access Control, e.g. bluetooth, wifi, zigbee,.. (IG/IEEE)
- MAC addresses, e.g., 00:20:68:XX:XX:XX/ISDYNE (IEEE)
- Other numbers: ports: 80/HTTP, 161/SNMP, OID/PEN: 1.3.6.1.4.1.2011/Huawei (IETF/ICANN)
- IPv4, IPv6: 199.7.83.42, 2001:500:9f::42 (RIR/ICANN)
- ASN: AS2706/Wharf TT... (RIR/ICANN)
- Domain Names: www.co.tt ... (ICANN)
- HTTP, SMTP, SIP, XMPP, RTP, app specific... (IETF/ITU/IG)
- Security: SSL/TLS, RSA, ECC, AES, ... (Academia/IG/IETF/GOVTs)

- Obviously we need domain names to lay claim to our presence on the Internet
- ...and to provide a mechanism for customers to locate our services
- But where might domain names fit in the IoT discussion?

DNS: The first Cloud service?



- DNS has been part of the Internet since 1983
- Faithfully managed by 100s of operators and 1000s of entities
- Already built into software
- Currently mostly one way from static DNS servers to clients
- Why not both ways?

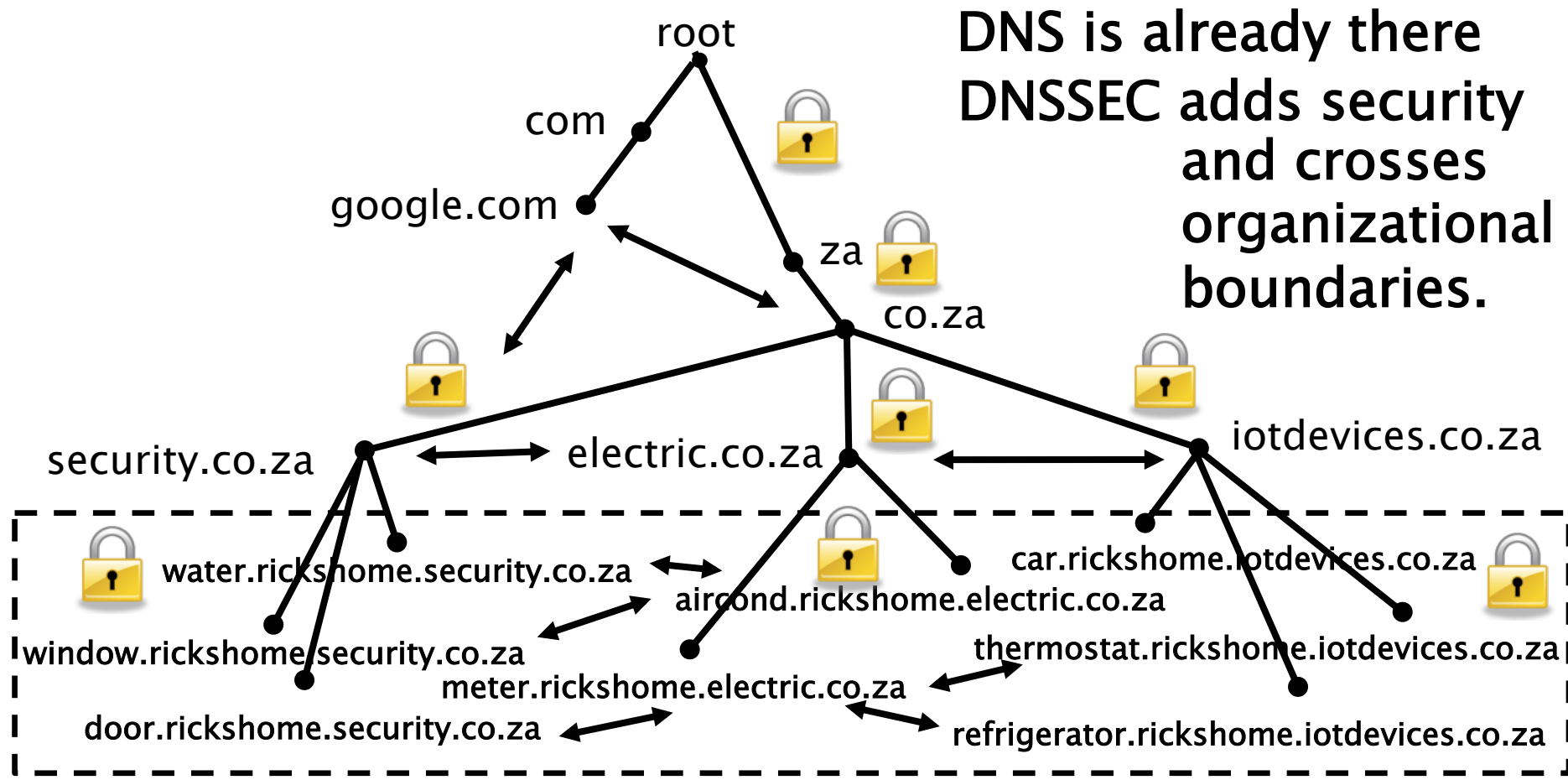


- Sure, this “channel” is slow but most IoT applications are low data rate (e.g., door open, door closed)
- Examples of DNS data channel use:
 - Botnet command and control
 - Internet accesses over DNS (e.g., iodine)
 - Web analytics
- Caching delays can be controlled or eliminated
- Relatively easy to write/modify nameserver to act on specific queries, e.g.,
 - set-light-on-<changing-string>.my.iot.domain
 - get-alarm-state-<changing-string>.my.iot.domain

DNSSEC: Solution to IoT's Security Headache?

- Security is a well known missing piece for IoT
- Many IoT applications have physical safety implications
- DNS with DNSSEC can solve this problem
- Examples:
 - DANE: publish public keys in the DNS. End user validates using DNSSEC.
 - SmartGrid
- Result: a secure, global, cross-organizational, trans-national communication channel between devices

A thought: Scalable Security for IoT



Animated slide

Lets take advantage of the hard won experience and cooperative environment to develop the solutions for “tomorrow’s” IoT!



Ideas ?

- Domain Names as a ubiquitous, scalable, decentralized (cloud) communication channel for IoT infrastructure
- Locked down with DNSSEC to secure the channel and bootstrap application specific security mechanisms