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

DNS is already there
DNSSEC adds security and crosses organizational boundaries.
Let's 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