Near-field networks

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The edge is changing

Traditional Internet

Sensor networks

Next gen Internet
- NFC-bluetooth/IR
- 100 M homes
- Home networks
- 802.11

2 B Cellphones

1 B vehicles

5 B RFID tags

Several Wireless ecosystems

100 M homes

Multi-homed wireless end-nodes

Single-homed wired end-nodes
Automatic check-in

- Sim(smart)card in cell phone as RFID tag
  - Program your room number/key onto simcard (OTA)
- Place phone in front of your room
  - Use for activation/authentication

- Cell phone as RIFD reader
  - Collect local data
  - Data “flies” – cache & carry
- 2 Billion readers, 2 billion tags!!!

Assurance, security, privacy
If door does not open, who do you call? Cant afford human RTT
Data Synch (@home)

• GPRS/bluetooth/802.11

How to manage, diagnose, configure settings?
If sensor is not working who do you call? Can't afford human RTT
What’s different

• Traffic generated by humans
• Traffic models [erlang, poisson]
• 2 to 3 end nodes/10 feet$^3$
• Simple, unique, End-point naming
• Information transfer

• Traffic generated by phones/tags/sensors/vehicles
• Traffic models different
• 10 to 100 end nodes / 10 feet$^3$
• Multiple end-point naming based on location, intentional, logical, physical, etc
• Actuations/decision making
Characteristics

• Small world, close encounter, closed-loop networks
  – $S \leftrightarrow D \ O(1)$ and wireless
  – Store & forward
• Need not manage BGP
• Device/end-node management
Problems

• Manageability architecture
  – Include end-nodes as network elements
  – Expose end-node capability, manage device

• Opportunistic protocols
  – Discovery, trust before exchange
  – Naming, confidence, security

• Diagnosability, configurability, trustability
  – Support for remote diagnosis, root cause
  – Human rtt vs packet rtt
Manageability architecture

- Knobs for M,D,T,C at network and device
- Excitement is at the edge \( \rightarrow \) manage the edge

Support for store and forward, SN&DMP, support for root cause, IP trust
User benefits

- Towards easily (remotely) managed near-field networks
- Human cycles reduced, Less futz
- Information assurance