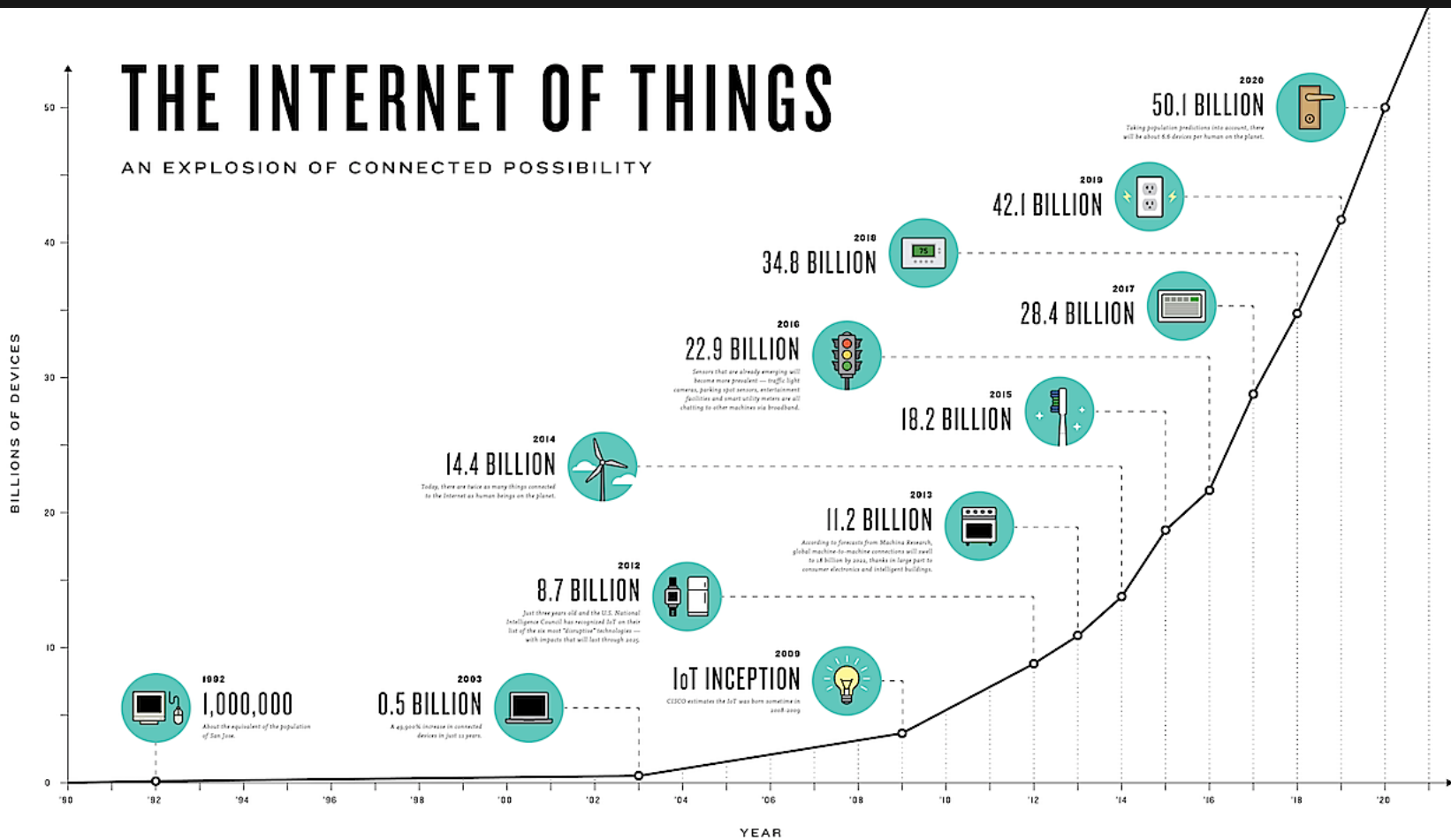


“Houston WE have a Problem”

Geoff Mulligan

THE INTERNET OF THINGS

AN EXPLOSION OF CONNECTED POSSIBILITY



STOP

No more protocols
No more data formats
Pick something

Stop thinking the CLOUD will solve it

**“Premature optimization is
the root of all evil”**

– Donald Knuth

IoT SDOs and alliances landscape

(after comments of marco + juergen + jochen + nigel rix, Thomas Paral + Levent)



Source: Modified from an initial contribution from Huawei

START

Focus on interoperability
Design for Privacy
Engineer Security
Think about life-cycle management

IoT Challenges

Technical

- Definition of Things
- Complexity
- Communication Paradigms
- Data Schema
- The Software Platform

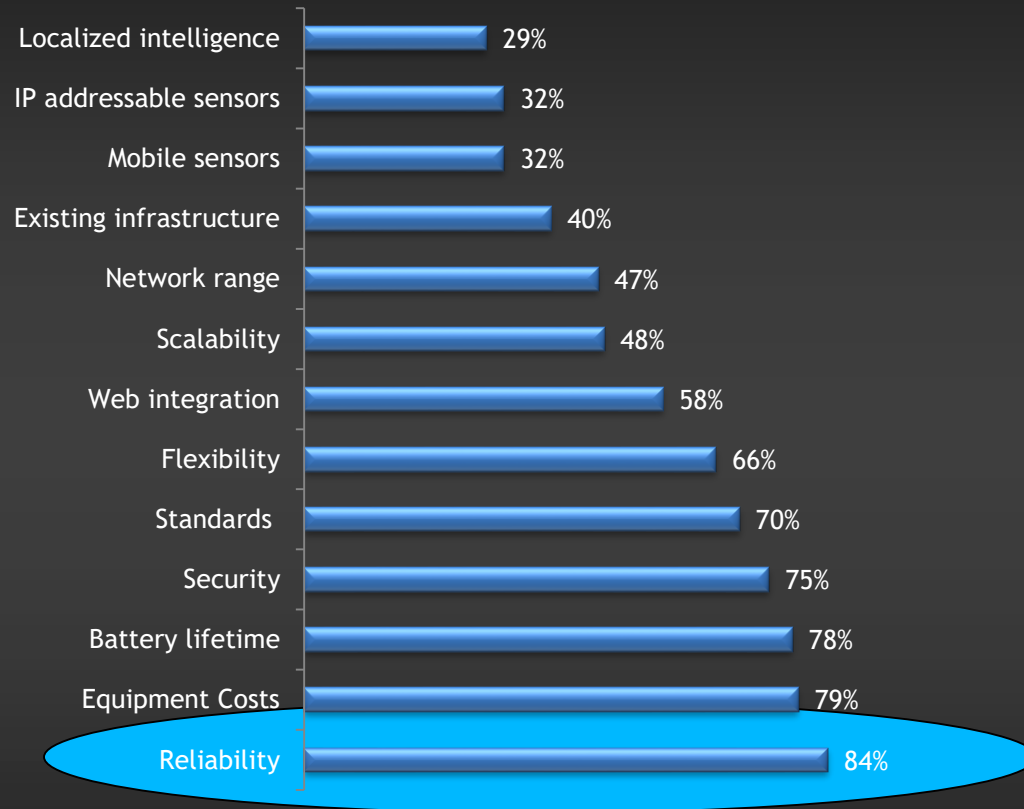
Business

- Silos vs. Horizontal
- The Revenue Challenge
 - Per device
 - Connectivity
 - Data
- The Value Chain
- New Biz Model s

Societal

- Privacy
- Data Ownership
- Security
- Easiness of Use
- Social Cooperation

IoT Adoption Considerations



n=106

Source: ON World

Open Standards for the IoT

Conventional wisdom was
we needed special purpose protocols
IP was for (PCs)++

IP was considered:

- Too complex
- Too much code
- Too much memory
- Too large headers
- Gateway are easy

All
Wrong

Why Use IP

- Already used in legacy systems
 - Established naming and addressing
- Proven to scale
- Support for multiple network technologies
- No need for translation gateways
- Established security mechanisms
- Available existing resources
 - Protocols, knowledge, tools

Don't Reinvent the wheel

Why use IPv6

- Great big address space (IPv6 vs IPv4)
 - *One V4 net per microsecond = 251 Trillion years*
- Stateless Address Auto-Configuration
 - DHCP not required
- NAT not required
- Preserve end-to-end connectivity
- Stateless header compression
- No Gateways

6Lowpan is a mechanism
to fit IPv6 into small data frames
and
improve transmission efficiency

LPWANs NETWORKS



low cost



long range



low power



secure

LPWAN Tradeoffs

Low Power Wide Area Networks


Low Power

PICK TWO

High Speed

Long Distance

LPWAN Landscape

- LoRa
 - Sigfox
 - Ingenu
 - Weightless
 - LTE CAT1 / LTE CATM / NB-IoT
 - 802.15.4(g) / WiSun
 - 802.11ah
- 

LoRa Alliance

- Open Specification
 - LoRaWAN 1.0.2 / LoRaWAN 1.1
- Open Standards
- Certification
- LoRa Radio – Wideband Adaptive Data Rate
 - LOnG RAnge
 - Multiple Chip sources
- 3 Device Classes
 - Class A – Battery Sensors
 - Class B – Battery Actuators
 - Class C – Mains Powered

Open Business Model

Privacy and Security



Security is a technology ~ Privacy is a policy

Encryption vs Security

Encryption is just one part of the chain

SSL misconception

Applying the proper level of Security



Big Challenges

Who Owns the Data

Identity Management

Privacy

Security

Life-Cycle Management

HAROMONIZATION

Questions



Thank You

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