Secure, Efficient, and Open Standard Internet of Things

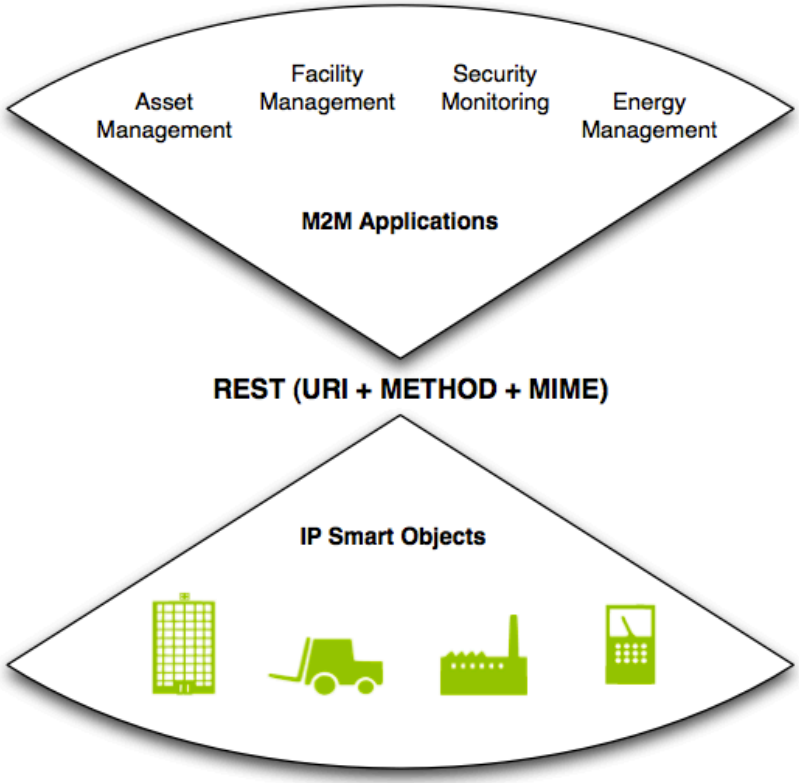
Zach Shelby
Director of Technology, IoT

What is the Internet of Things?

Services

The Web

Things

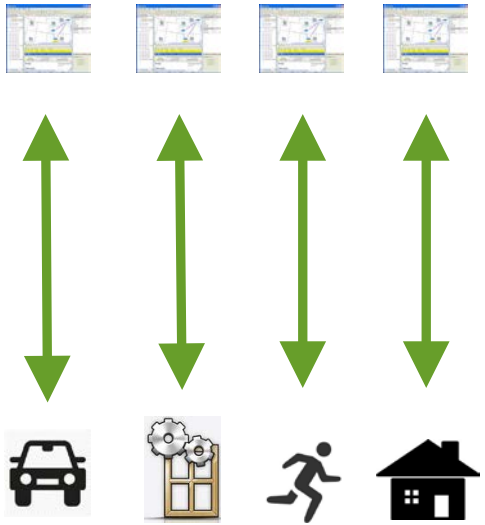


Big Data

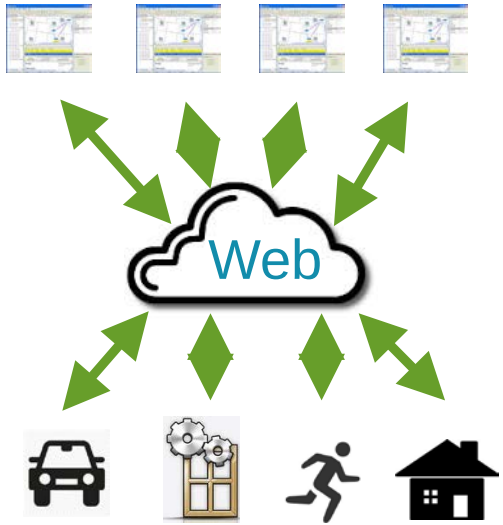
Little Data

The Architecture for the Digital World® ARM®

M2M



Internet of Things

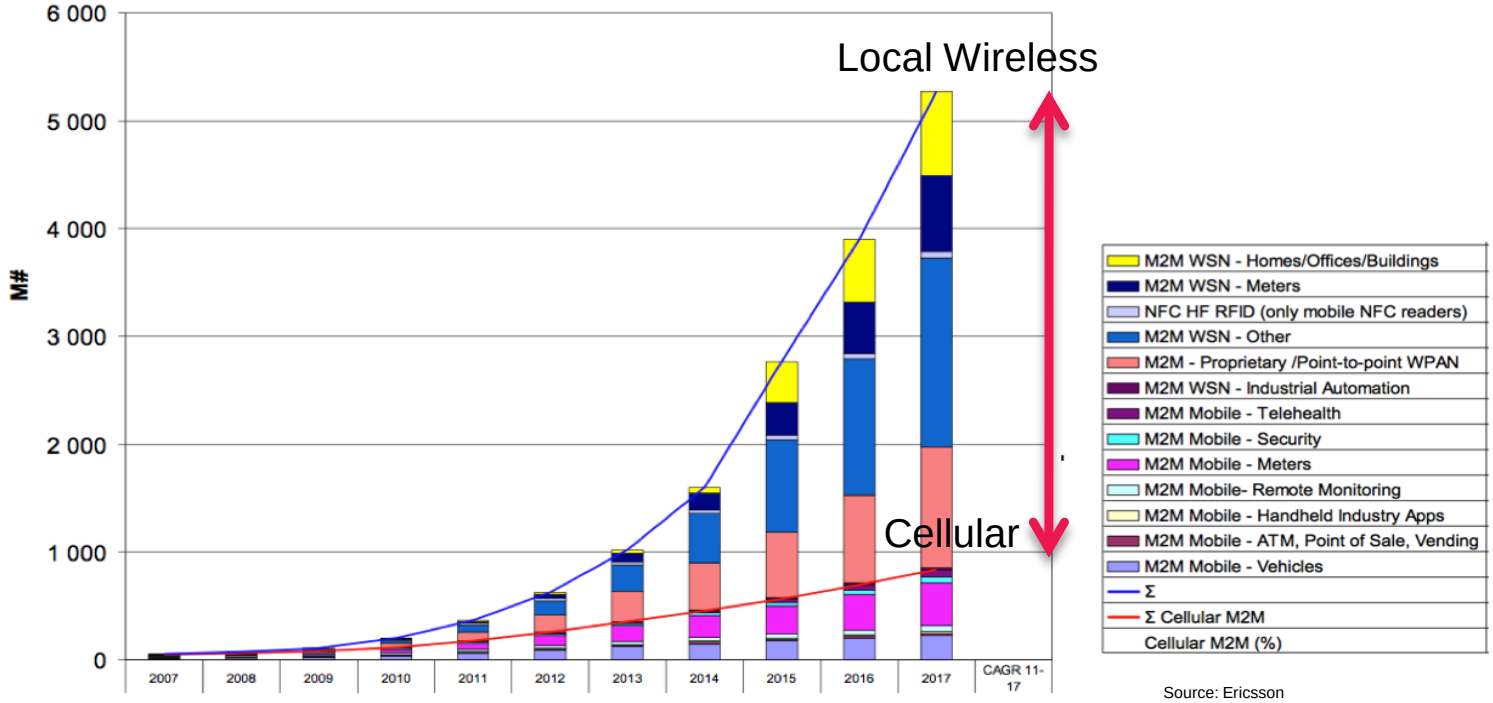


Big Data

Little Data

The Architecture for the Digital World® ARM®

The Business Case for End-to-End Communication



Source: Ericsson

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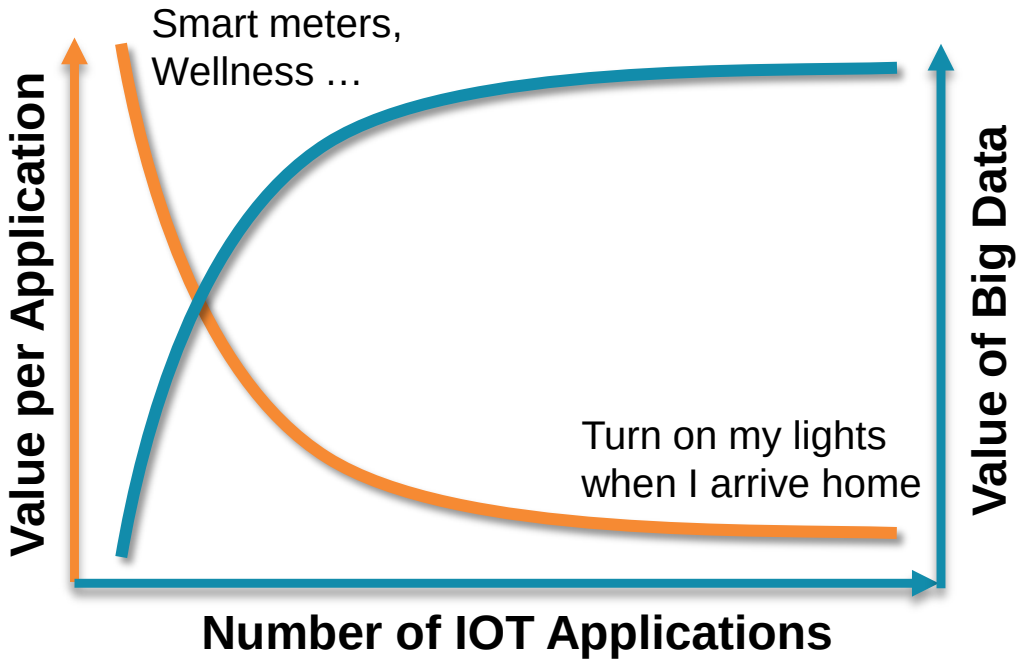
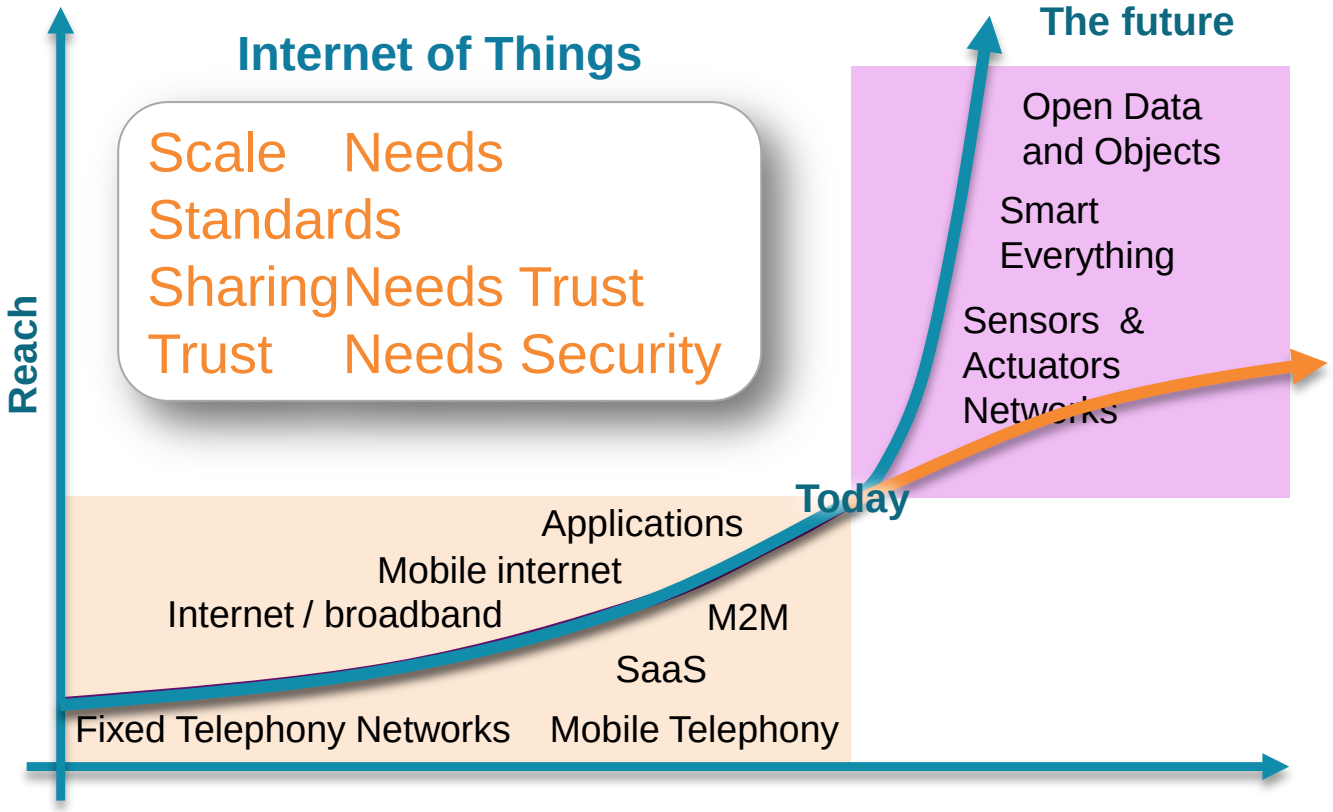
The Long Tail Drives Big Data Value

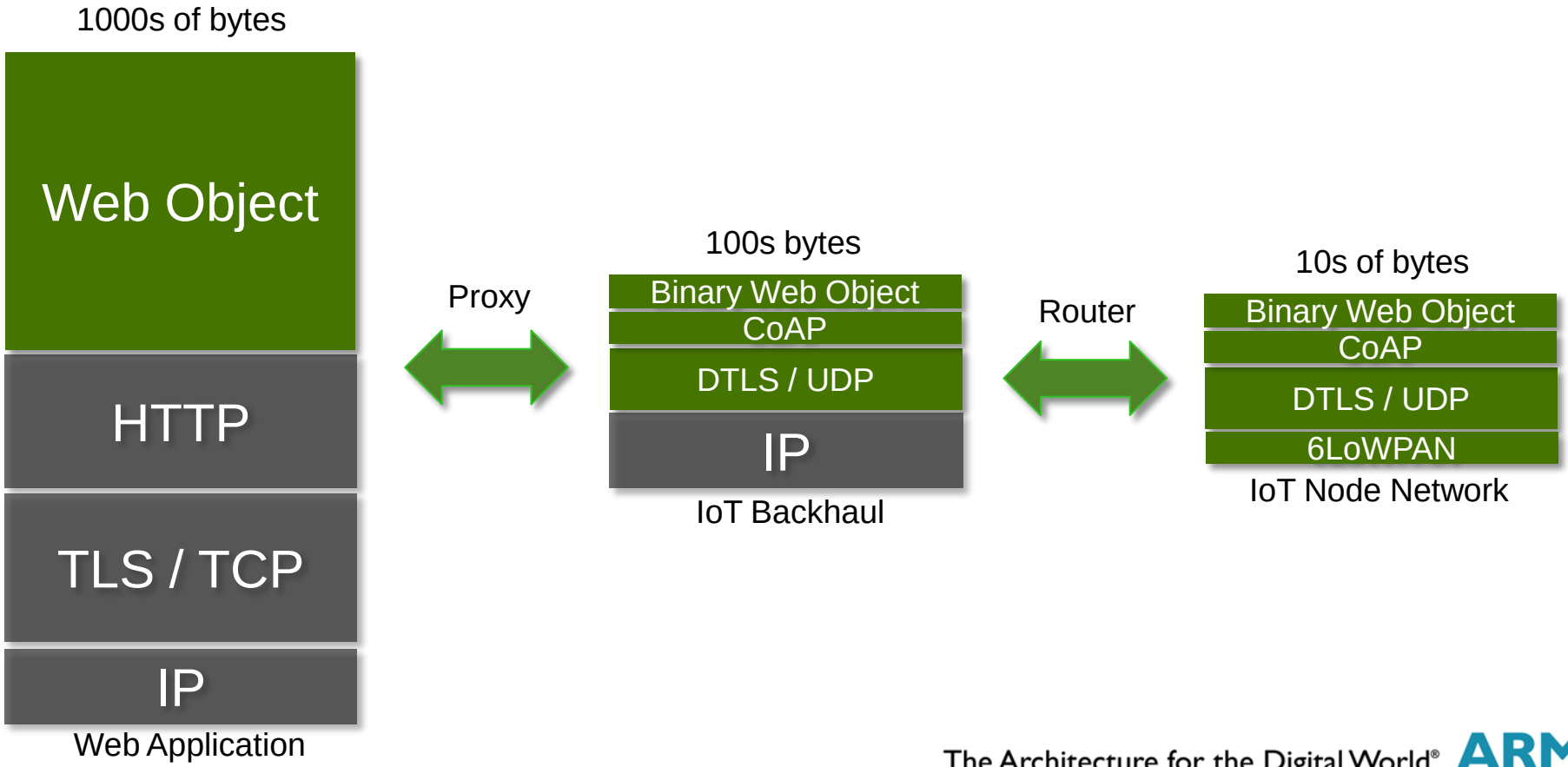


When did I buy it?
Where did I buy it?
When do I use it?
Where do I use it?
What do I do with it?
Who do I use it with?
Who did I tell about it?

Big Data Starts with Little Data



From Web Applications to IoT Nodes



Key Standardization Activities

- IETF
  - IPv6 and 6LoWPAN networking
  - Web of Things (REST for IoT, CoAP, Resource Directory etc.)
  - Security (DTLS, TLS, Cipher suites)

- OMA / IPSO Alliance
  - OMA Lightweight Device Management (Based on CoAP)
  - IPSO Web Objects

- ZigBee
  - ZigBee IP - An open-standard 6LoWPAN stack for Home Area Networks
  - ZigBee IP NAN – 6LoWPAN stack for Sub-GHz large area applications

- OneM2M
  - Ongoing work on M2M system standardization (CoAP, HTTP binding)

The Architecture of the Right Choice ARM

Growing the IoT Market

- ARM is dedicated to a standards-based IoT with billions of IP and Web based devices

- Sensinode was a pioneer in creating and deploying these key IoT open standards
- Sensinode software enables efficient and secure communication from device to cloud
- 6LoWPAN, ZigBee IP CoAP, TLS, OMA Lightweight etc.

sensinode

ARM SENSINODE
IoT Technology

ARM Spans Sensors to Servers

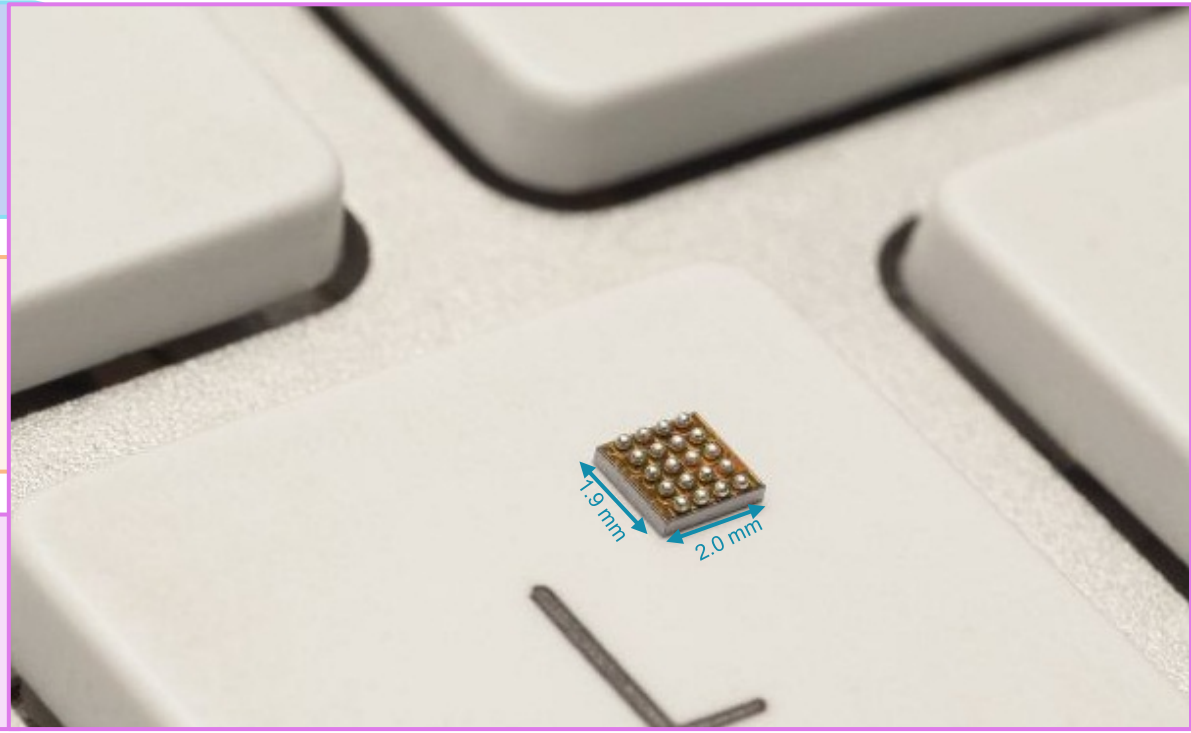
Infrastructure
Servers, network infrastructure

ARM Cortex-A processors

Mobile computing and Gateways
Cellular modems, SBCs
ARM Cortex-R & Cortex-A

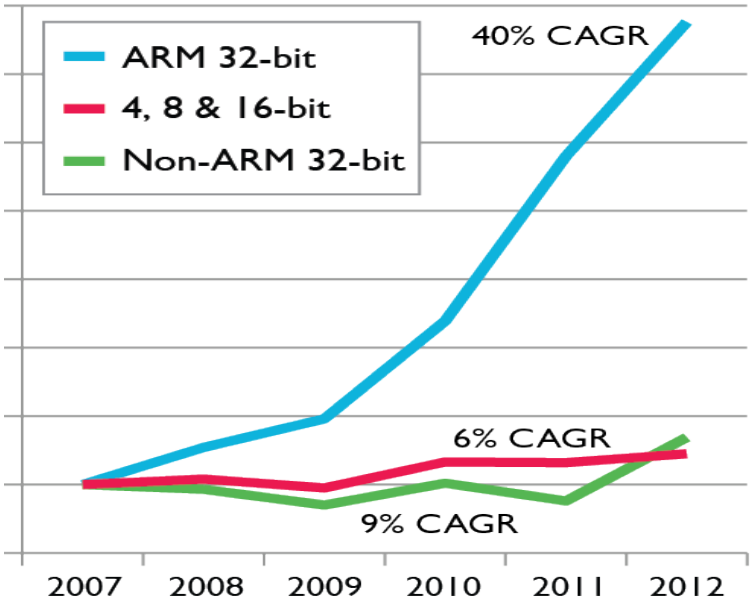
Sensor nodes
MCUs, sensors, low power wireless

ARM Cortex-M



ARM in Embedded

Relative growth in MCU & smartcard



8.7 billion

ARM Cortex-M devices shipped in 2012
by leading semiconductor companies

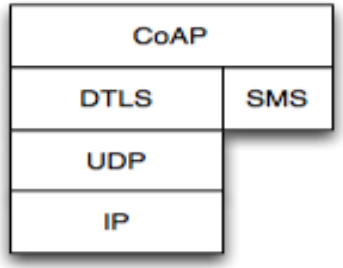
MCUs | radios | sensors

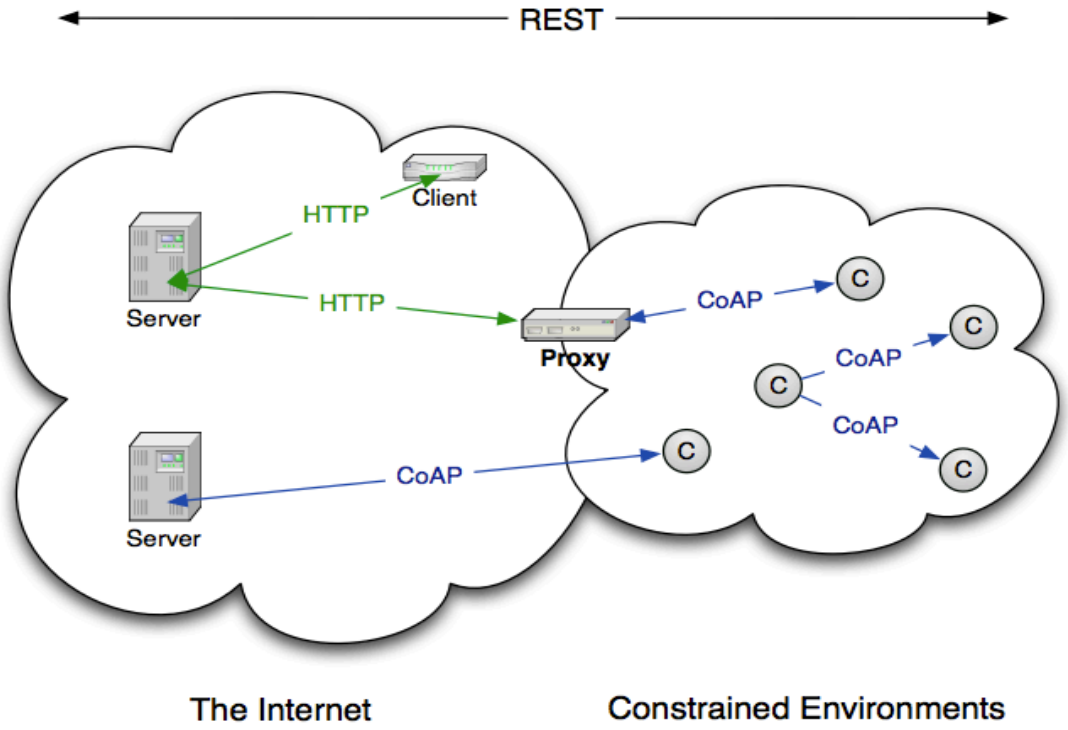
32-bit intelligence starting at $0.50

Partnership Model Drives Innovation

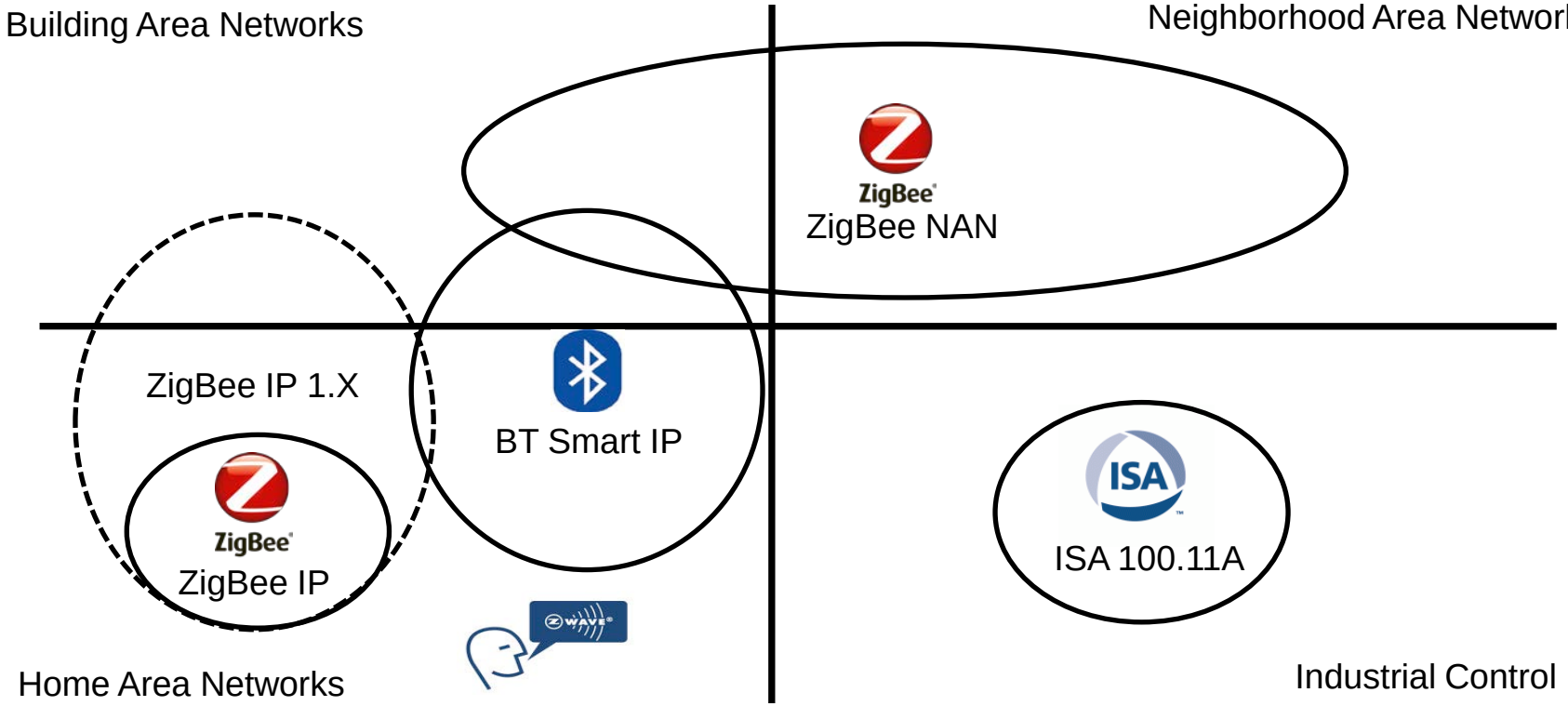
CoAP: The Web of Things Protocol

- Compact 4-byte Header
- UDP, SMS, (TCP)
- DTLS Security
- Subscription
- Discovery





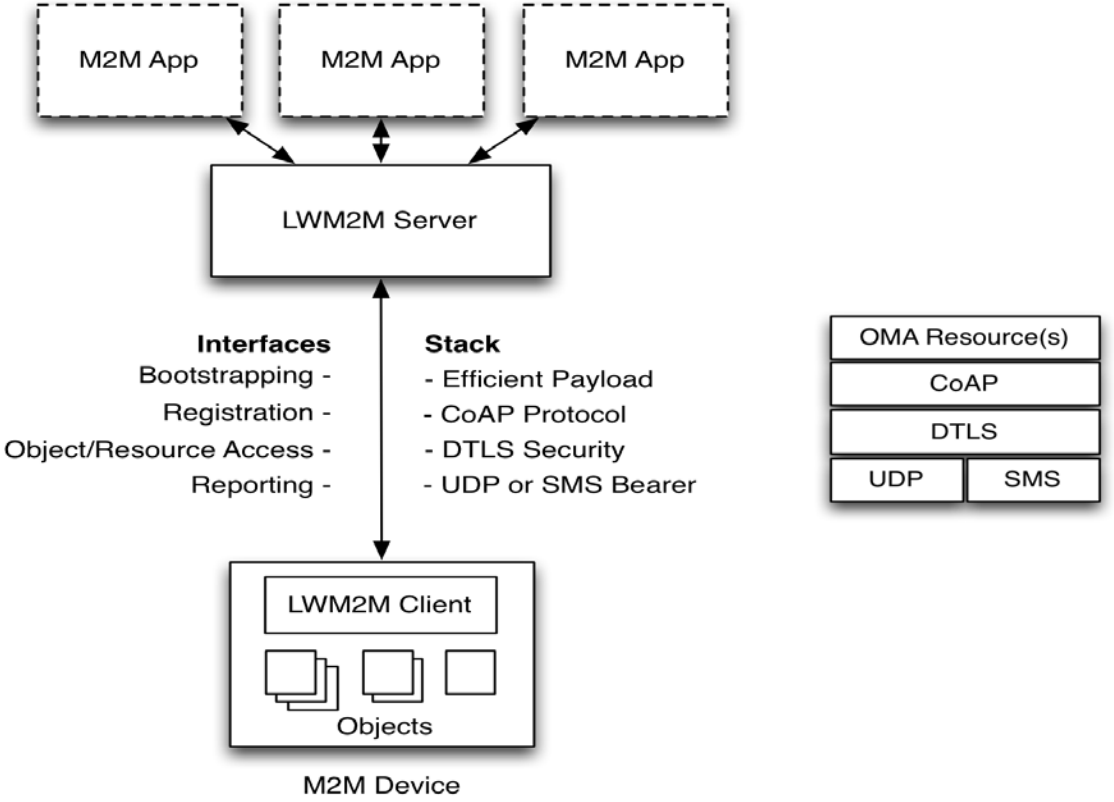
The 6LoWPAN Compass



IPSO Web Objects

- We need **semantics** to build a Web of Things
- IPSO defines Web Object guidelines (join us!)
- IPSO Application Framework published in 2012
- New IPSO Web Objects will be published soon!
  - Compatible with OMA Lightweight, CoAP and HTTP
  - General purpose IO
  - General sensors, Temperature, Light, Humidity, Actuators
  - Light control, Power control, Set Points
- Great roadmap of Objects for the future including
  - Smart Cities
  - Connected Home

OMA Lightweight M2M



oma Open Mobile Alliance

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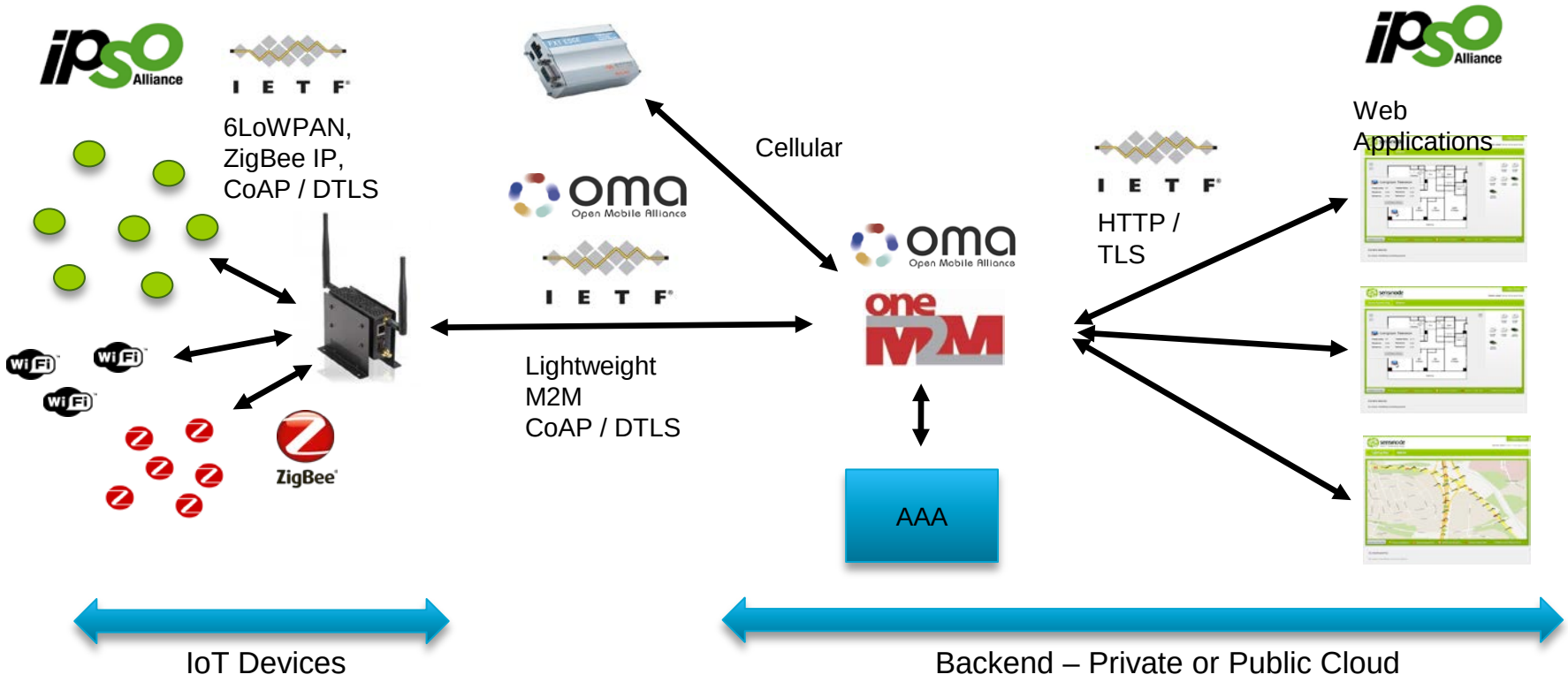
How to Build a Web of Things?



IoT Products from Device to Cloud

ARM SENSINODE
IoT Technology

freescale

Java ME

NanoService

Java Embedded Suite

NanoService

NSP Edge

Complex Event Processing

Freescale K70

LWM2M:
CoAP

NanoService

Native Device (mBed)

Freescale i.MX

LWM2M:
CoAP / eDTLS

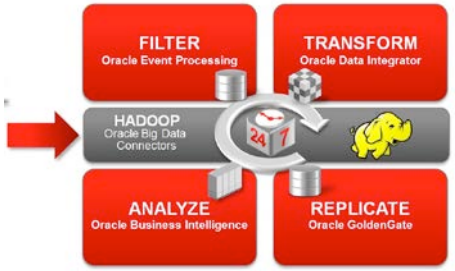
NanoService Platform

Java EE

Authentication

Identity Management

Big Data

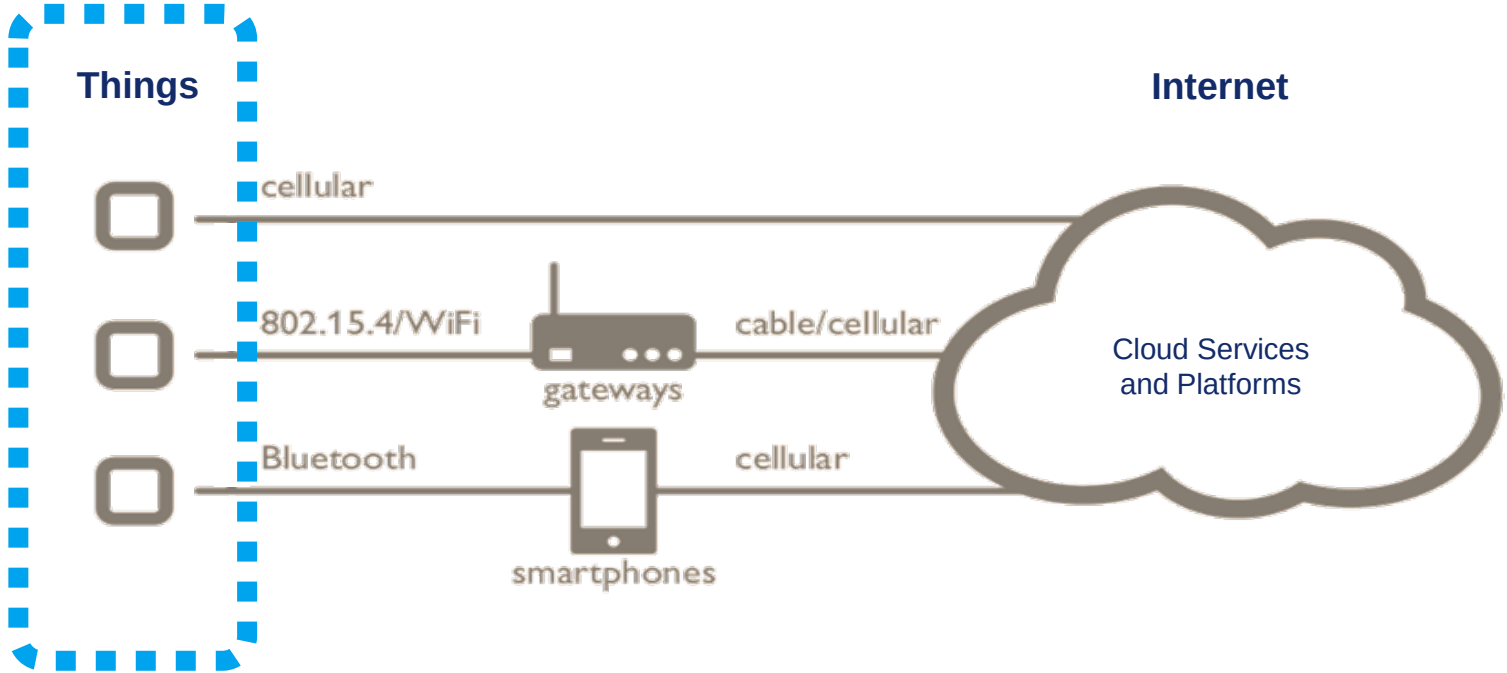


Embedded Devices

Gateway

Backend – Private or Public Cloud

Connecting Cortex-M to the Cloud



ARM® MBED™
IoT Development Platform

Summary

- The Internet of Things is the next evolution of Web
- Market growth driven by standards and time-to-market
- Standards, trust and security!
- Big Data starts with Little Data!