Smart Systems Summit - Day 1
Building the Smart City with IoT

Pilgrim Beart, Founder Director
1 Oct 2014

Deloitte. Technology Fast50 UK 2013

“50 billion connected devices” (Ericsson)

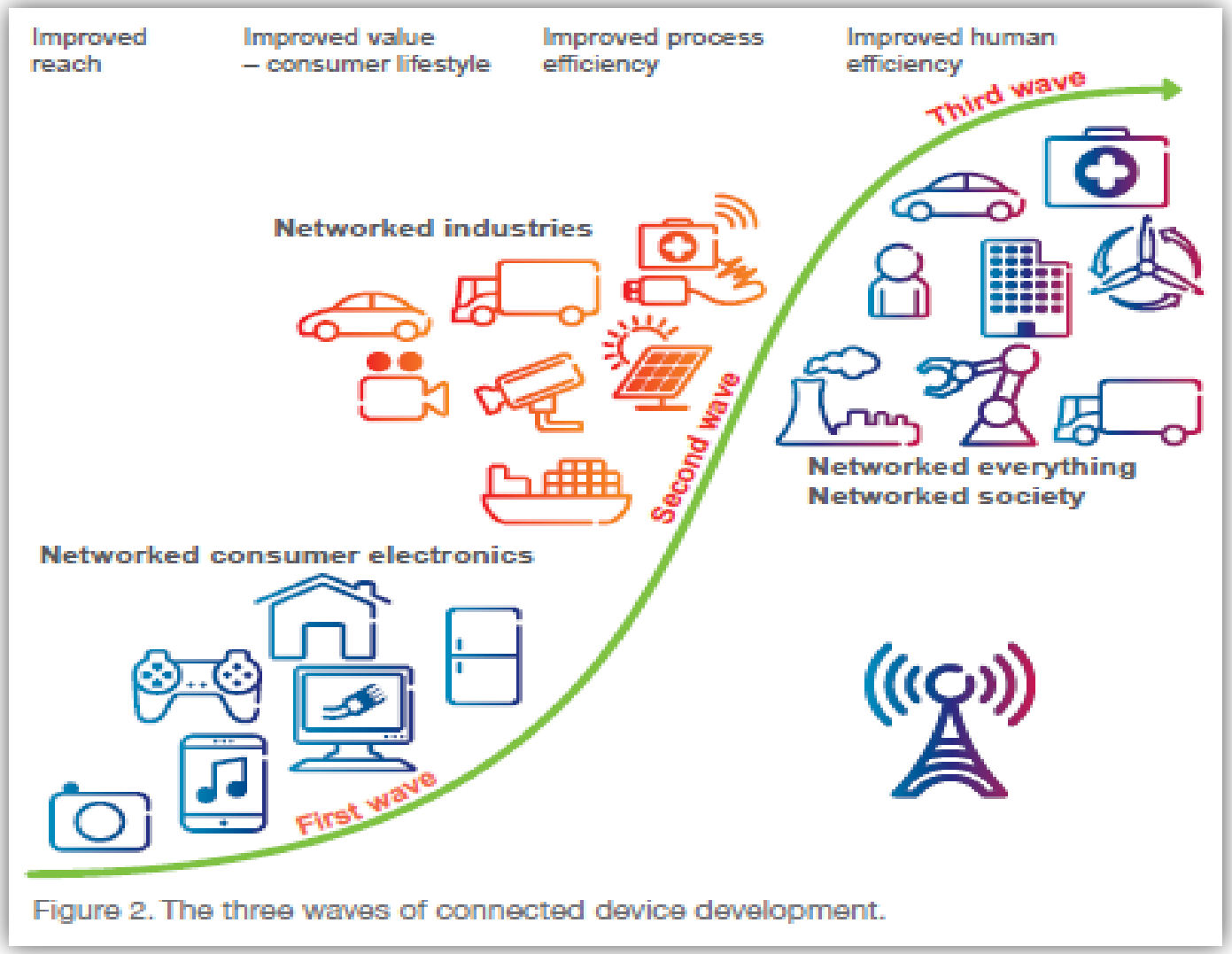


Figure 2. The three waves of connected device development.

My background - AlertMe

Modular services that are extendible, avoiding applications in siloes – delivering across a wide range of devices, communication protocols and sectors

Energy Controls

'Hive'

Control your heating/hot water remotely, predict schedule based cost and link occupancy for intelligent scheduling

Home Automation

'Iris'

A modular set of home automation services, user configurable rules and messaging options e.g. alarm/sensor notification , event triggered recording

Energy Analytics

'Smart Energy Report'

Data analytics for energy consumption trends by category, normative comparisons and tips/ advice to save money extending to occupancy based scheduling

Getting to Scale

AlertMe provides a unifying, intelligent and open ecosystem for monitoring , control and automation

Connects an ecosystem of devices

Agnostic, 'talks to everyone and everything' through API integration.

Intelligence

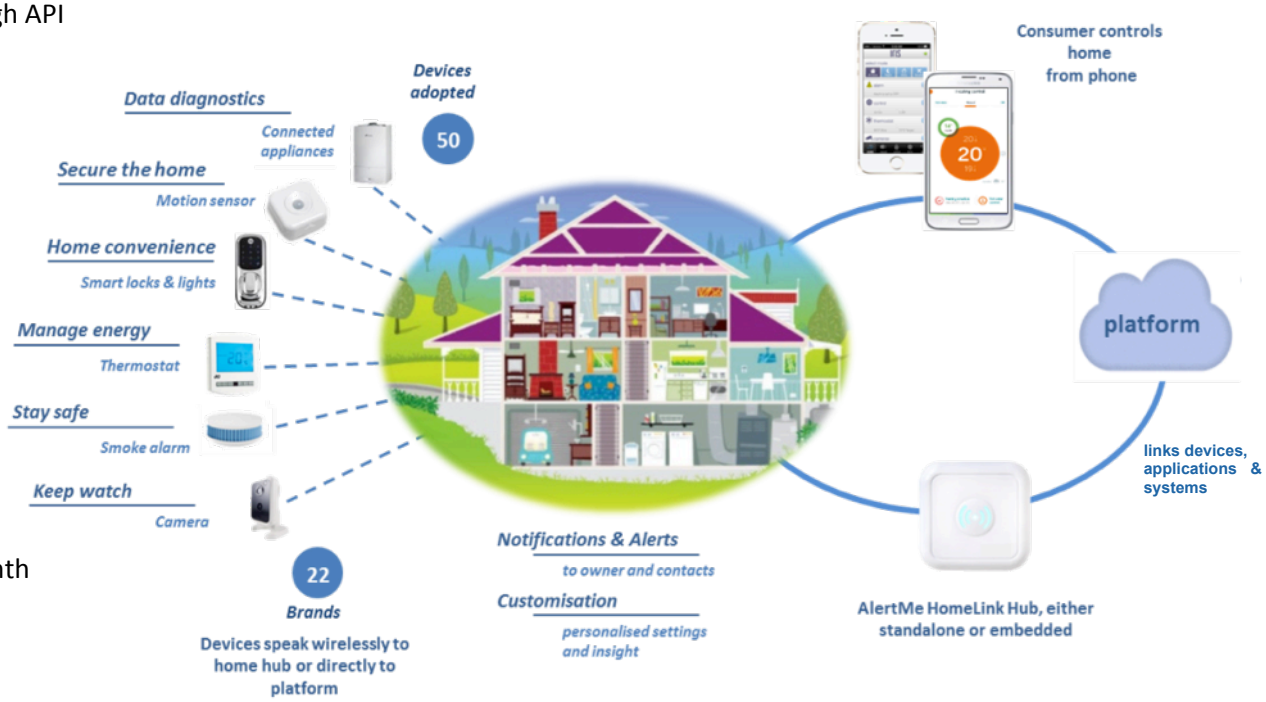
Data analytics with unique IP and patents

Deployed at scale

500k homes
350k live devices
7.5bn data points/month

Evolved

Next generation Omnia™ platform built on 5 years experience of mass market deployment
Intelligence, Scale and Openness

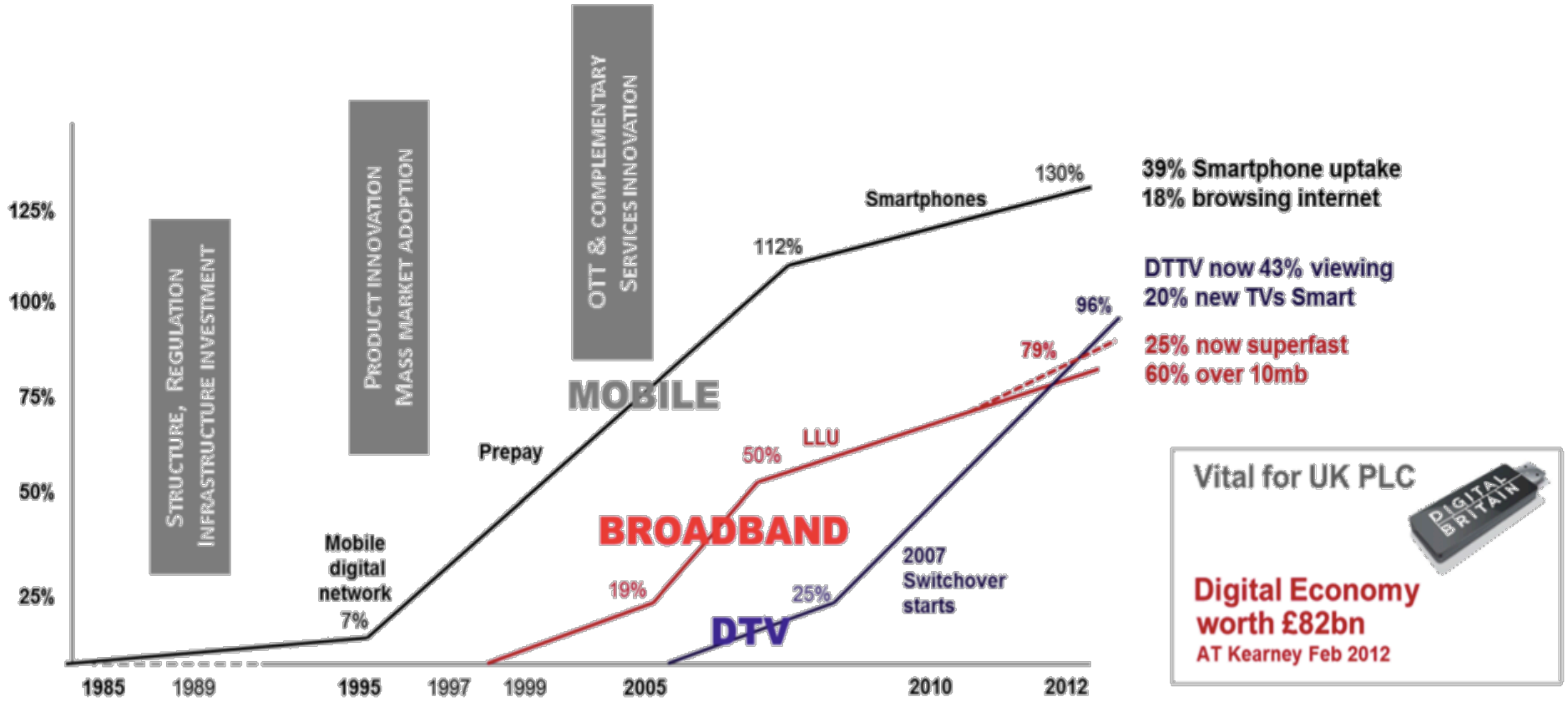


500k	7.5bn	350k	17
Homes	sensor reads per month	Devices connected	Patents granted

Connected Home vs. Smart City

1. Homes are a big part of City (energy, time, money)
2. Extrapolate our experiences of scaling an IoT homes offering to Smart Cities:
   - It's about the people (not the tech)
     - Simplicity, UX
   - Everyone's different
     - Homes
     - Cities
   - No home is an island
     - Nor any city

Analogy: the telco boom



Inflection point caused by catalysts, creating a more vibrant digital economy

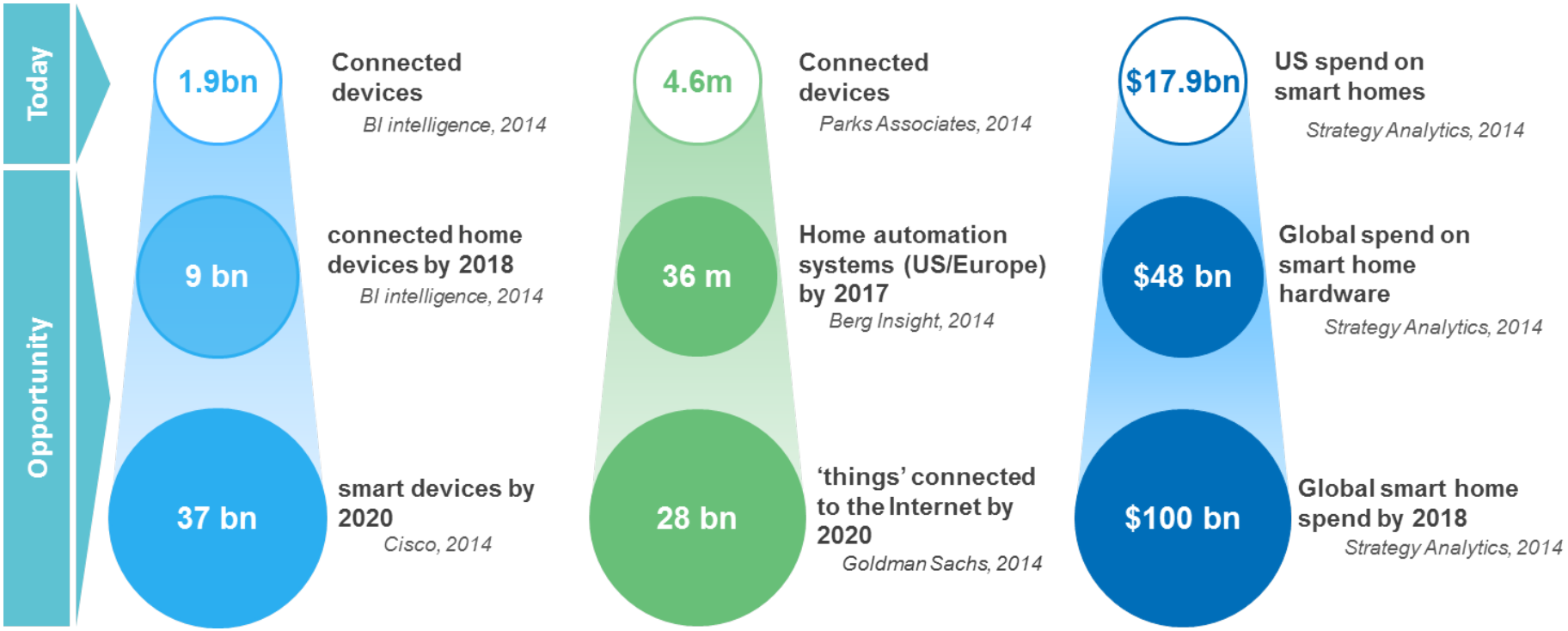
Innovation in technology and customer propositions

DTV more top-down regulation } Boosted both hardware

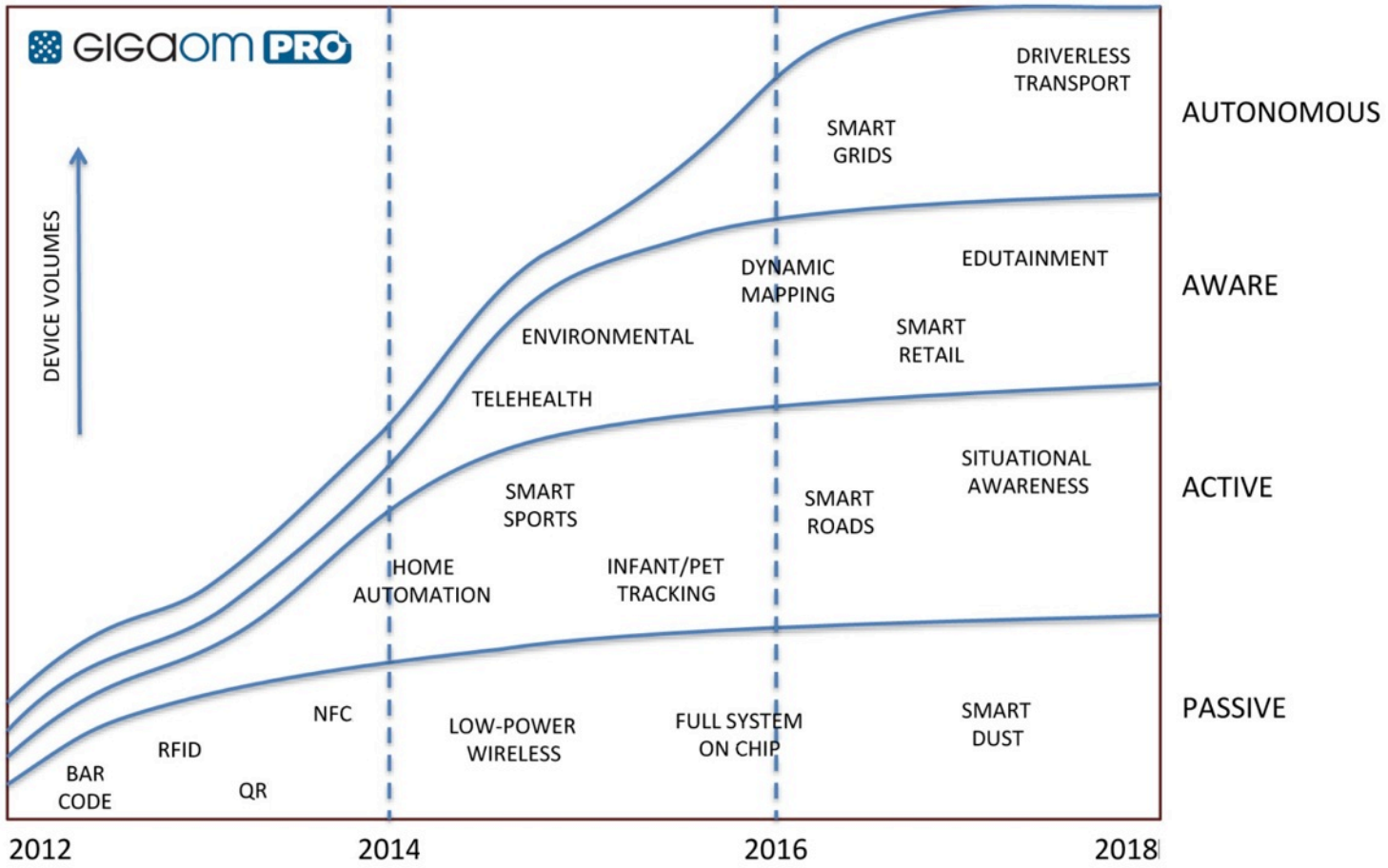
Broadband regulation on openness } and content markets

Significant Market Potential

The rapid adoption of smartphones and proliferation of affordable connected devices is bringing the market to an inflection point–invoking the next stage of the Internet



Trend towards automation



Key:

Passive things are in some way remotely identifiable and connectable but relatively dumb.

Active things can exchange sensory data, control information, and gain a level of interaction. This is where home automation begins.

Aware things can process data and take action in response to events. This includes doors and windows, driverless trains, and electrical appliances.

Autonomous things can make decisions based on built-in rules running locally or remotely. As well as intelligent thermostats and smart grids, examples include self-driving cars.

The inflection point

- You only need the first reason to connect
  - All the other benefits then ride on that
  - Energy, Home, Office, Industry, Agriculture, Smart City
- Smart City:
  - Lamps, bins, parking, air quality
  - Citizens, homes, offices, energy, etc.
- But implementers still focussed on their immediate problem
  - Spend 80% of time on infrastructure. Should spend it on domain knowledge.
  - So nothing works with anything else
  - So no ecosystem & they become the bottleneck
- Building a Smart City on closed platforms = Bad Idea
  - Lock-in. Fragility. Lack of re-use.
  - Commissioners must insist on openness
    - i.e. standards/principles for connectivity & data storage

Consolidation starting

- Markets starting to inflect, openness becoming essential
- No lack of standards - but lack of consensus.
  - And it's the **Internet** of Things
  - Debate moving on from "It's ZigBee/Bluetooth"
- HyperCat
  - Collaboration. "Learning by doing".
- AllSeen, Thread
- Apple & Google
- B.Y.O.D.

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Smart Systems Summit - Day 2
Building the Internet of Things: Bottom-up!

Pilgrim Beart, Founder Director
2 Oct 2014

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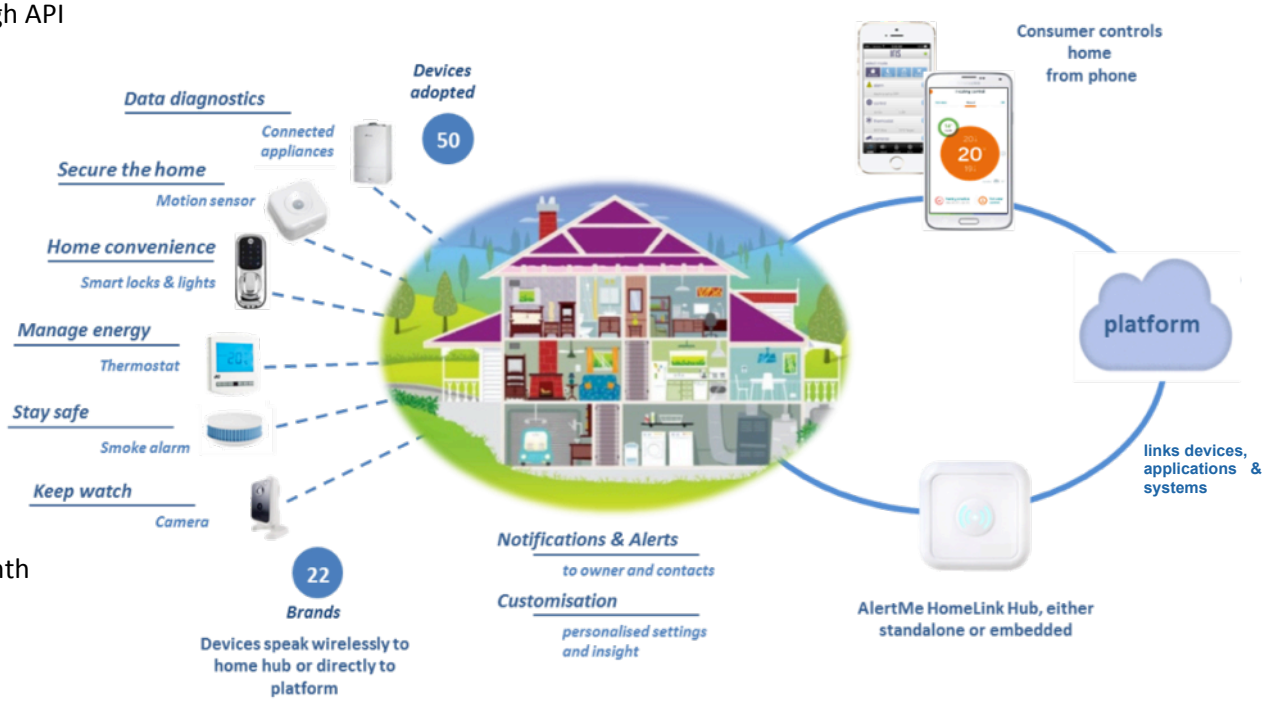

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It's messy out there in the real world

- Many standards, many players
- Real world is hard to deal with
  - Harder than virtual world of SmartPhone apps
- IoT is building itself, bottom-up, emergently
  - Not top-down central planning like GSM
  - Collaboration
- Services want to commoditise products. And vice versa.
  - But a bigger market is better for both.
- Successful ecosystem requires interoperability
  - Individual engineers often don't choose interop.
  - Instead they choose the best tool for the job immediately to hand.
  - And if they all choose the same thing, that's when interoperability happens

Scaling up

1. Make it work
   - For every 1 way it can work, there are 100 ways it can not work
2. Make it scale.
   - Resilience. Making a reliable whole out of unreliable parts.
   - Scale in multiple directions (users, device-types, applications, channel partners)
3. Make it scale cost-effectively
   - Minimise human intervention
   - Process. Automated device adoption (canonical forms)
   - Be able to delegate or automate everything (openness)

- Even simple questions like “is it working?” (to meet an SLA) become non-trivial.
  - Because of the number of moving parts.
- A well-architected platform releases potential to add value in software
  - Synthetic devices
  - Sensor fusion

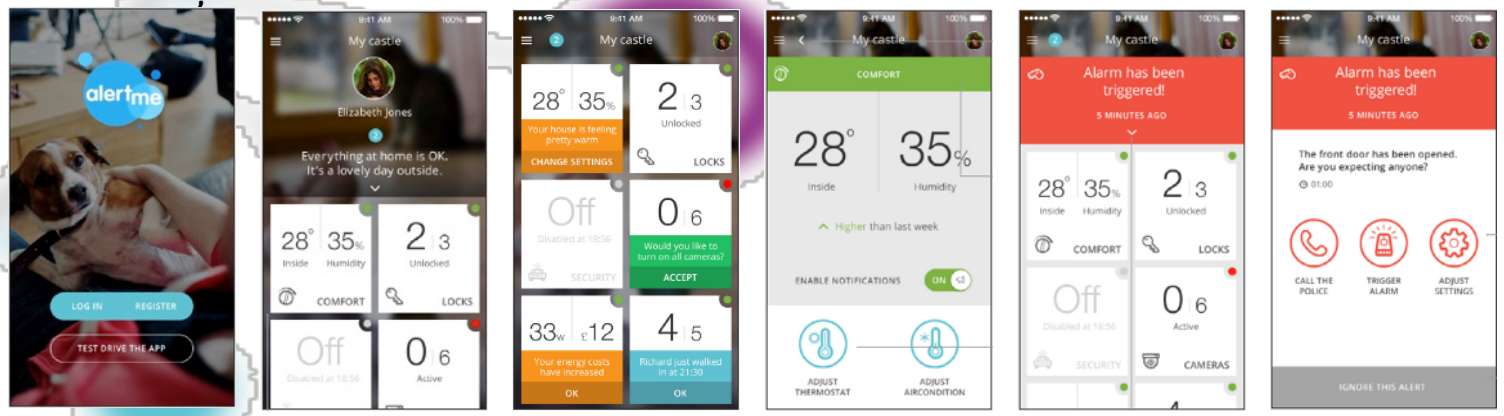
Engineering Best Practice

5 years 'real world' deployment experience informing architectural and operational principles of SCALABILITY, AVAILABILITY, MAINTAINABILITY AND INTEROPERABILITY

- Distributed Service Orientated Architecture , supported by best practice CI/CD test and regression framework and a well formed and versioned API set together with SDK for openness

The 'Uniqueness' Factors

- **Portability**: to run software in the cloud, on the hub or in other CPE
- **Device adoption:** standardising device and network protocol adoption
- **Synthetic Devices:** combining hardware devices and disaggregated device data in software
- **Sensor Data Fusion:** using data from multiple sensors & external data for 'sentient



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