Lessons from the Connected Home
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8th Smart Homes 2014
Cambridge
http://www.hvm-uk.com
3rd November 2014

- AlertMe update
- Omnia
  - Result of 8 years' Connected Home learning
  - Focus on Energy applications (£30bn)
- Thoughts to seed discussion over dinner

AlertMe: leading connected home technology company

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.
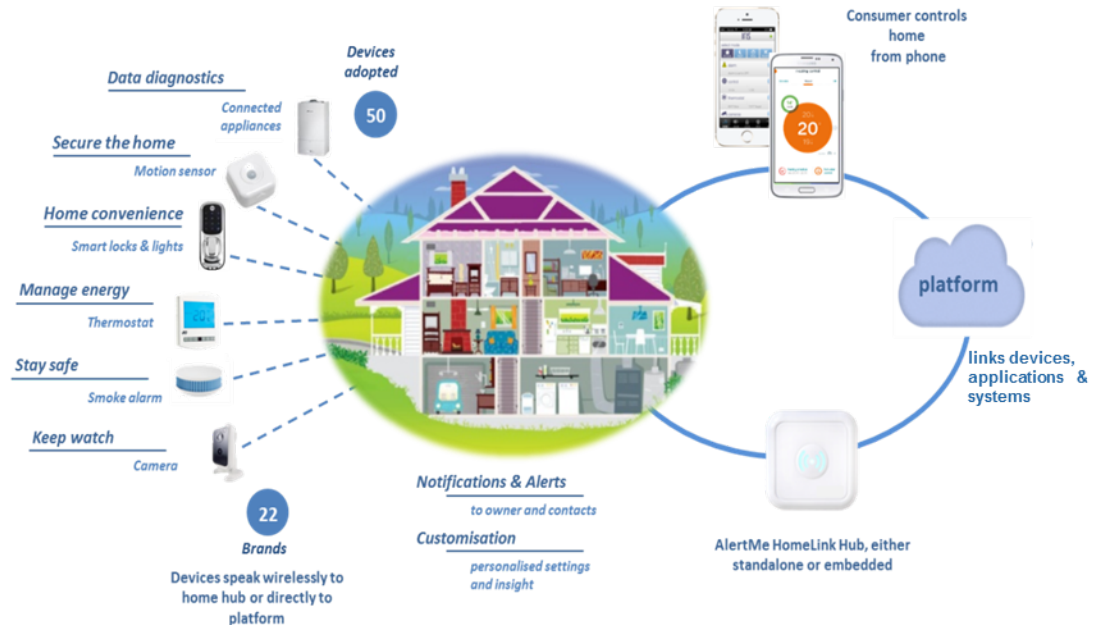
Intelligence

Data analytics beyond physical graphing to provide intelligence through unique IP and patents

Deployed at scale

500k homes
7.5bn data points/month

Evolved

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

Consumer controls home from phone

Data diagnostics

Devices adopted

50

Connected appliances

Secure the home

Motion sensor

Home convenience

Smart locks & lights

Manage energy

Thermostat

Stay safe

Smoke alarm

Keep watch

Camera

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Brands

Devices speak wirelessly to home hub or directly to platform

Notifications & Alerts
to owner and contacts

Customisation
personalised settings and insight

platform

links devices, applications & systems

AlertMe HomeLink Hub, either standalone or embedded

Platform to deliver millions of 'smart' homes

The connected home is about 'things' and collections of software that need to interoperate and work together harmoniously – at huge scale. We provide relevant and intelligent services, and manage the complexity and fragmentation of smart technologies to make it invisible to the end user – it needs to 'just work' seamlessly.

We manage the complexity to preserve user experience

For the IoT,
"talk therapy won't scale"
Support.com

1. **Curating a coherent and intelligent mass consumer application**

   - *Avoids 'clashing', extends beyond simple controls to intelligent automation*

2. **Creating a scalable and resilient service – 'brain in the home _and_ cloud'**

   - *Portable Logic - hub software can run locally (hub or CPE) and in the cloud for hubless devices*

3. **Openness to realise the network effects of new devices, applications and innovation**

   - *Open APIs to partner UI development, 3rd party devices & developer*

Secure Home

Stay Safe

Control Heating

Home Control

Manage Energy

Keep Watch

Data Insight

Products currently deployed

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

Key learnings

The connected home is not new – but is now undergoing significant technology and market development

Market moving from single device to multiple applications – from product to platform
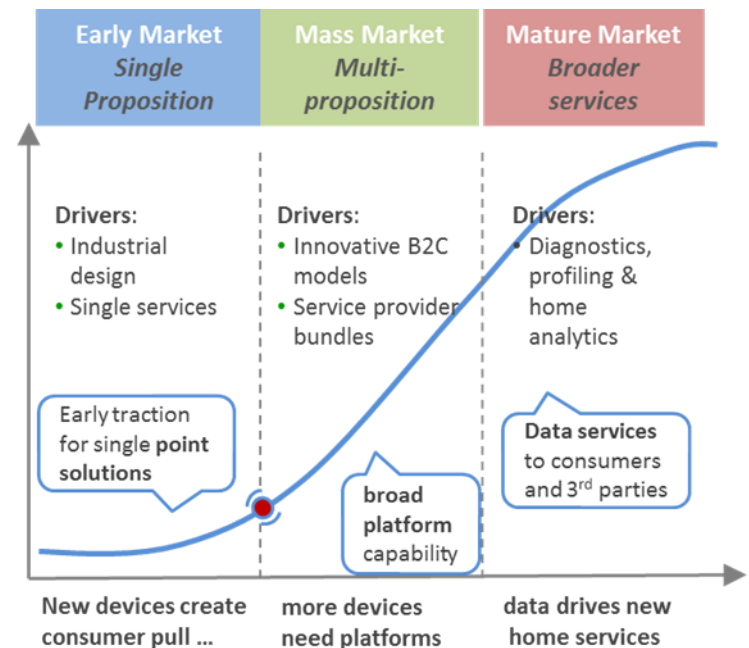
- Early market success – single point devices
  - highly user-friendly niche applications
- Today simple platforms for a home ecosystem
  - simple rules based automation
- From remote control, interoperability, extending to intelligence

Openness drives innovation and customer experience is critical

- Solve the complexity and open from a solid base

Communications standards still evolving

- Early systems - single standards : new platforms - multi-protocol
- Multiple/competing standards
- Platforms need to manage standards dynamically

Early Market — Single Proposition | Mass Market — Multi-proposition | Mature Market — Broader services

Drivers:
- Industrial design
- Single services

Drivers:
- Innovative B2C models
- Service provider bundles

Drivers:
- Diagnostics, profiling & home analytics

Early traction for single point solutions

broad platform capability

Data services to consumers and 3rd parties

New devices create consumer pull … | more devices need platforms | data drives new home services

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Introduction to Omnia™

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
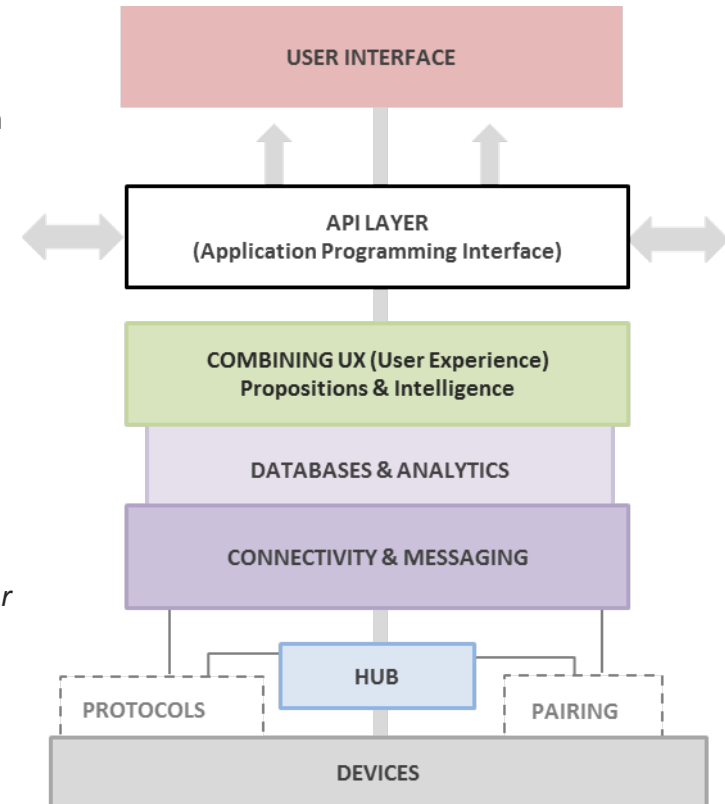
The 'Uniqueness' Factors

- **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 and external data for sentient awareness

Omnia™ architecture
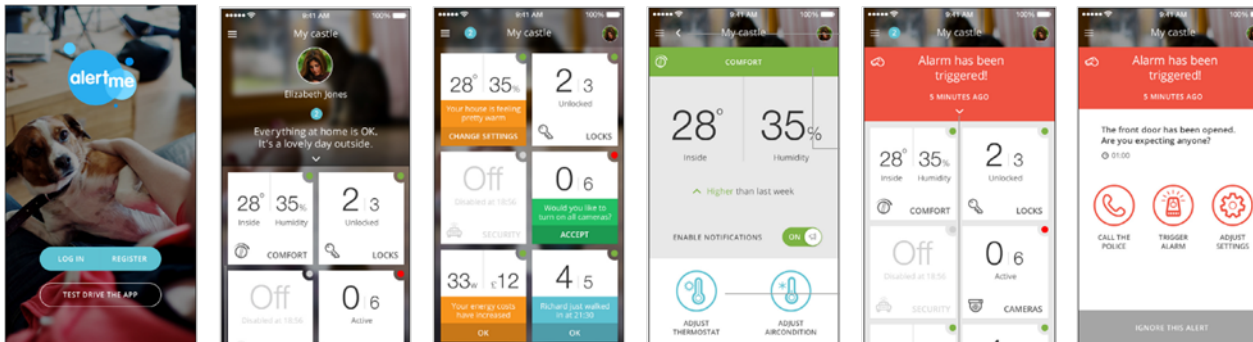
Architectural Layers:

- **Devices & Protocols**: managing device adoption
  - **Network and Device Abstraction**: Simplifies characterisation and adoption of devices, standardises communication with device types

- **AlertMe Platform**: common, portable logic between hub and cloud: messaging, applications, intelligence and services
  - **Connectivity:** Maintains connection
  - **Messaging:** captures and routes device messages at huge scale
  - **Synthetic Devices:** Combines devices, schedules and rules
  - **API layer:** supports mobile and web UIs, 3rd party systems and developers

- **Databases & Analytics**: SQL and NoSQL plus patented data analytics
  - *Data & controls for intelligence/improved confidence based on multi-sensor data aggregation*

- **User Interface:** presenting to devices

USER INTERFACE

API LAYER
(Application Programming Interface)

COMBINING UX (User Experience)
Propositions & Intelligence

DATABASES & ANALYTICS

CONNECTIVITY & MESSAGING

HUB

PROTOCOLS

PAIRING

DEVICES

'Brain in the home' and 'brain in the cloud'

Homogeneous java runtime environment across hub and cloud allowing full flexibility of software and intelligence deployment

- Distributed intelligence and co-ordination between both the home and the cloud

- Consistent use of the Java language for hub, cloud service and abstraction of networks and devices

- Consistent treatment for hub-based or hubless devices
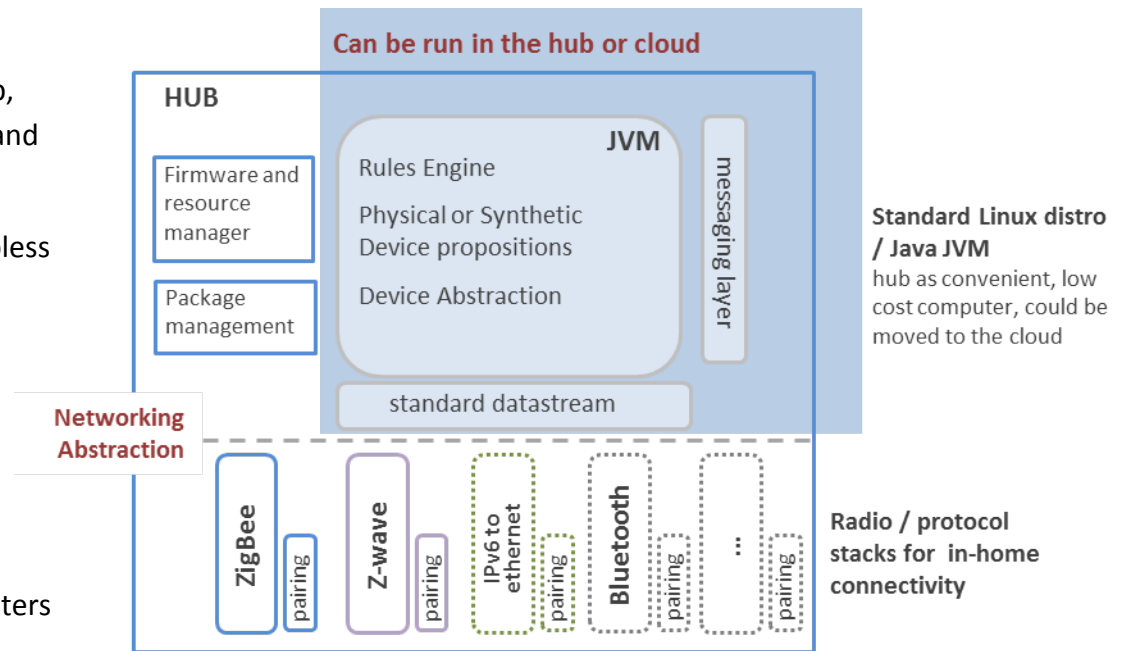
AlertMe's hub software can also **run virtually inside other CPE**, for example on 3rd party routers and set-top-boxes

Uniqueness – Device Adoption

Device & Network Abstraction makes device adoption extremely scalable

- **Allows deployment of device types independent of brand or communications protocol**
- **Highly user friendly SDKs**
- **Flexibility for today's multi-protocol environment and future standards**

Device Abstraction

- Simplifies device adoption and communication with the platform

- Standardises device description into 'Canonical Forms'

- Simplifies combining devices into compelling propositions

Network Abstraction

- Abstracts variations caused by network access technologies and their integrated protocol definitions

- Simplifies management of combinations of devices and the adoption of a new device or network protocol

Device Abstraction

Creates standard devices
- consistent behaviours

Network Abstraction

Protocol specifics & pairing

**Realising the full benefit of device abstraction to create 'a complex device in software'**

A synthetic device

- A device in software that is made up of other devices (either synthetic or physical) and the functional decomposition of complex hardware into its' respective components
- Treated as any other device – rapidly expands new propositions without adding new devices

The synthetic device is made up of:

- **Producer Devices :** devices that produce the event for the synthetic device
- **Consumer Devices:** devices that consume the events to perform a particular action
- **Event Logic:** the method/rule which says what should be done when a particular event occurs on the producer devices
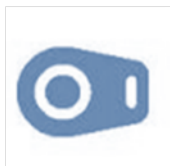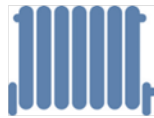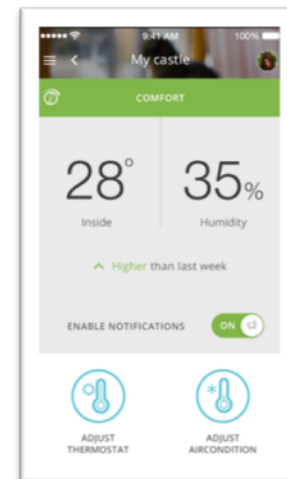

presence   +   *intelligence*   +   *'heat'*   +   )((((=   *climate control automated comfort*

Energy analytics deployed at scale

- Proprietary algorithms use explicit and implicit profiling to create personalised near real-time energy reports

Beyond the physical graph: to intelligent automation

- Learning algorithms for energy controls and automation

- Home occupancy detection model using patented Bayesian method, used for e.g. intelligent heating

Relevant applications for the enterprise market:

- home insurance analytics
- appliance interaction analytics
- appliance remote diagnostics

Intelligent Personal Assistant for the Home
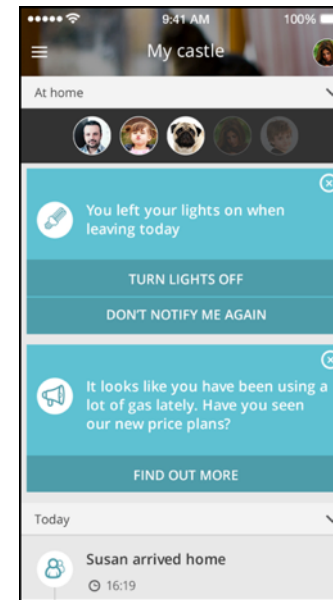
Manages the home automatically – learns how you live.

Keep's you posted on the important stuff – context, confidence, relevance & priority aware.

Tracks the 'noise' – should you need it and for dynamic profile building.

|	Cell phone location	Occupancy driven heating control	Auto-off	Data disaggregation
Selected Patents	*"Utilizing cell phone location for occupancy determination and home energy control"*	*"Electronic control units for central heating systems"* thermostat scheduling	*"Monitoring and automatically switching off electrical appliances when no one is present"*	*"Method of identifying the operation of a power consuming device from an aggregate power series"*

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1. Be honest – we're at the start of a journey
   – B2C
2. Be open
   – Tech helps those who help it most
3. "Humans don't scale"
   – Code to add devices and apps, ops support
4. "Making it simple" is hard
   – And it's <u>the</u> job
5. IoT UX is different
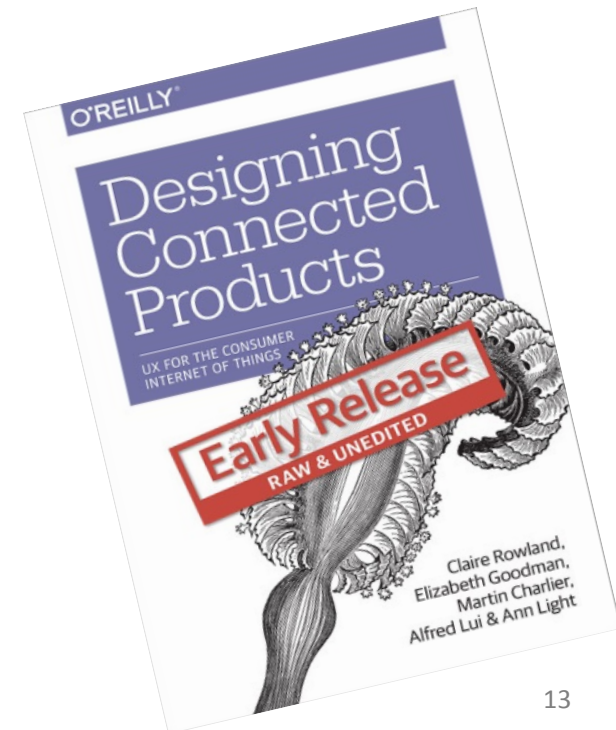
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