



## Working towards the smarter home

Whether they - or we - like it or not, the Smart Home vision is about to come knocking on many people's front doors over the coming years, writes M2M Now's Alun Lewis. In some cases, it will be as a result of definite decision by the home owner to get connected, attracted by advertising that promises to turn their smartphone or tablet into a means of controlling their home remotely, checking its security status or turning heating on or off. In others, the process will be a little more involuntary, initiated by utilities installing smart meters or insurance companies promising lower premiums. Alternatively, driven by changes in demographics in developed countries, many projects are currently underway to see how 'Ageing in Place' principles can be applied, using technology to assist the elderly remain independent - but safe - for as long as possible.



**Erret Kroeter,**  
Bluetooth SIG

Whatever the reasons, its potential looks huge. Work by **Frost & Sullivan's** Visionary Innovation team suggests that the wider Connected Living market will be worth US\$730 billion by 2020. The global Connected Home market, combining products and services, will be worth US\$230 billion by this time, representing both products and services.

Frost & Sullivan has also carried out consumer surveys, looking at current European market perceptions of this space. Key amongst these was the fact that cost is central, but that while there's inertia, there's also evidence that consumers will invest in solutions with tangible benefits, such as reduced energy consumption or enhanced levels of security. In terms of the all-important user interface, smartphones are the favoured control method for connected home solutions with around 60% of respondents opting for this interface, while almost 10% state a preference for wearables. Energy providers are seen as the leading innovators in this space by nearly 40% of respondents and, through their partnering with innovative vendors such as Nest and Hive, some of these firms are developing a position of 'innovation through association'.

Even the most superficial look at the Smart Home space reveals a - even to the expert - potentially bewildering range of technology options, business strategies and different players in the value chain to engage with. Whether these involve the underlying communications technologies; the protocols, platforms and applications that control and integrate things; or the all-important user interface that simplifies the underlying complexity, we can't say that we're not spoiled for choice.

That said, there are huge security implications inherent in opening doors - digital or otherwise - into our homes. There have already been a number of high-profile hacks, such as of baby monitors, and it's always possible that the Smart Homes market could be killed by security issues. It might become a race to the bottom on price for these devices and the typical mass-market shopper in the aisles of their local superstore won't have security at the front of their mind.

### Home: a place where people - and devices - can talk

If we take connectivity first, there's the usual ►

***Even the most superficial look at the Smart Home space reveals a – even to the expert – potentially bewildering range of technology options, business strategies and different players in the value chain to engage with***

acronym soup to wade through. As ever, each of the technologies on offer has a different heritage and some have already been evolving in recent years to adapt better to the connected world of things. Erret Kroeter, VP marketing for the **Bluetooth SIG**, highlights the recent evolutions of that technology: “In 2010, the community launched **Bluetooth Smart**, optimised for power efficiency and capable of running for one year on a battery and with a new and flexible apps development environment – that’s helped the recent explosion in wearable devices. The SIG then announced at the start of this year that work’s begun on enhancing Smart with Mesh capabilities to give consumers access to Bluetooth-enabled smart locks, lights, HVAC systems, and appliances.”

The potential of Bluetooth Smart Mesh is also emphasised by Eric Miller, CEO, **Avi-on Labs**: “This offers a price point, performance and ease of use never before seen in the residential and commercial lighting controls market. It has the potential for simple setup, requires no centralised gateway, and can be operated from most current smartphones and tablets. We have, we believe, the first line of Bluetooth Mesh products to reach mainstream retail. This consumer-focused approach may finally lay the foundation of widespread adoption and use that has been missing in the industry so far.”

But other options exist, as Dr Berenice Mann, marketing manager, **AMIHO Technology** explains, “For connectivity of sensors, appliances, cameras and so on, cost impact must be minimal and realistically this limits the options. To gain worldwide sales global standards are needed and this probably means the 2.4 GHz used in Bluetooth and Wi-Fi. However power consumption must be kept low – and Wi-Fi is power hungry and unreliable. Bluetooth is cheap and efficient and offers a convenient gateway being available on most Smartphones which gives a familiar and simple user-interface, though Bluetooth’s range is short.”

She continues, “One third option for gateways

uses the Smart Energy networks already being rolled out. Once this is in existence, longer range wireless technology such as Wireless Meter-Bus – the standard for Smart Metering in most of the EU – can potentially be extended to use other devices on the network. Wireless Meter-Bus operates in the range below 1GHz, is designed to be low power and will already soon exist in the majority of European homes.”

### **Standards for working together**

There are of course also other important standards such as **ZigBee** and **Z-Wave** – each with its own Alliance and passionate supporters and investors. Mitch Klein, executive director of the **Z-Wave Alliance** comments: “There are currently over 1350 interoperable Z-Wave products available in the market, around 35 million Z-Wave-connected devices worldwide, and it’s actively supported by over 325 manufacturers and service providers throughout the world. You’ll find it extensively used in both residential as well as business environments, and is supported by **ADT, Alarm.com, AT&T, DSC, GE/Interlogics, Honeywell, Lowes, Verizon, Vivint**, and many others. While it already has a high level of security, we’re currently engaged in enhancing that still further. One important security related point is that these devices don’t need outside connectivity to work amongst themselves. We’re also keen to grow adoption amongst smaller companies and have monthly product concept competitions where the winners get a free Z-Wave development kit.”

One complementary perspective on interoperability comes from Scott Lofgren, president of the **UPnP Forum**: “A key requirement of successful mass-deployed technologies is that they’re easy for customers to use – and that involves harmonisation between growing numbers of vertical segments. Many IoT projects were built vertically with little or no consideration for interoperability with products from other verticals or vendors, leading to fragmentation of the market and limiting consumer choice. To address the vertical challenge, manufacturers need to agree on a limited number of open standards with ►



**Eric Miller,**  
Avi-on Labs



**Dr Berenice Mann,**  
AMIHO Technology



**Mitch Klein,**  
Z-Wave Alliance



**Michael Barkway,**  
TTP

UPnP being one that's vendor-neutral and provides a foundation to complement a variety of management gateways and device control scenarios."

**Choosing the right technology mix**

A summary of the current confusion comes from Cees Links, CEO of **GreenPeak Technologies**. "Device makers don't know which technology they should embrace. Should they accept the expense and complexity of creating products that support a variety of different platforms or should they wait to see which one is the winner? Technology solutions like **Apple's HomeKit**, **Intel** and its **Open Internet Consortium**, **Qualcomm's AllJoyn** and others are battling amongst each other while at the same time, existing wireless communication standards like Bluetooth, WiFi, ZigBee and other 802.15.4 based radio technologies are also squabbling, trying to take over each other's networking territory."



**Cees Links,**  
CEO, GreenPeak Technologies

Links asks, "When are the big players going to realize that pursuing 'a winner take all' scenario is not the best way to proceed, and instead, that they need to come to mutual agreement that benefits all the players, as well as the device makers, the service providers, and most importantly of all, the end users?"



**Scott Lofgren,**  
UPnP Forum

This strategic uncertainty is also echoed by Michael Barkway, consultant, **TTP**: "Wireless technologies most often use a hub and spoke model but sharing a hub that's already there may not be the perfect match. Almost every home has a WiFi network, but getting access to this means a complex association process and it's really difficult to make that user friendly for small devices. WiFi guzzles power too, which is a big problem for battery-powered sensors. Zigbee, Bluetooth and Z-Wave provide 'standardised' means of connecting devices, and operate at much lower power levels, but it's less likely that there's a usable hub in the home. The product proposition therefore needs to include one, which adds cost to products and risks inviting your competitors in. It's for this reason that several proprietary networks have emerged - with the cost of another hublet built in, it's tempting to try to shave cost and exclude competitors by making everything custom."



**Benoit Joly,**  
Technicolor Connected Home

Barkway adds, "Against this backdrop, **Google's Onhub** could offer much-needed compatibility, but herein lies a different risk for product developers - what is Google's intent for the rich

set of data that's available inside the home? Unless this is done with great altruism, it could either mean that consumers are turned-off by privacy concerns or that potential future revenue streams bypass product developers."

**Who to join forces with ?**

As we move up the value stack, these issues start to become critical. Benoit Joly, SVP Smart Home at **Technicolor**, says, "Companies looking to integrate their products into the smart home environment have several options depending on their strategy. They can develop their own ecosystem to control everything - devices connect to their company's cloud, they use a chosen communication technology, a specific communications protocol and so on. This may give fast time to market and keep customers captive. The problem is that no consumers choose a single brand for every product. Proprietary software also involves increased development costs, reduces flexibility and limits future use cases to this single company. The second option involves joining a closed ecosystem such as Apple, Google or **Samsung** which is a better guarantee of future proofing. But license fees could limit deployments, or involve a high hardware bill to be compliant. Additionally, these giants will want to collect and monetise usage data they see as theirs - and not yours."

"There is however", Joly adds, "a third solution. There are a couple of organisations that exist to enable interoperability and offer an alternative to closed ecosystems. Technicolor, for example, is a premier member of and contributor to the **Allseen Alliance**, a collaborative project at the **Linux Foundation** that enables the widespread adoption of billions of devices through the open AllJoyn framework and its thriving technical community. We contributed to the framework by providing our **Geo** technology, and our **ize** smart home solution is based on this. The principle is very simple : A single protocol allows products and apps to expose their capabilities and interact with other devices and apps. Exposing these capabilities leverages third party developer creativity to deliver unexpected and innovative use cases for things we may not have thought of yet."

Another offering in this context comes from **QIVICON**, an alliance of leading businesses initiated by **Deutsche Telekom** (DT) to take the Smart Home forward. It is a cross-vendor platform, which means that consumers can combine the solutions of several providers and ▶

## ***A single protocol allows products and apps to expose their capabilities and interact with other devices and apps***

already has over 30 partner companies, including **EnBW, Vattenfall, RheinEnergie, Miele, Kärcher, Junkers, Sonos, Osram, Philips,** and **Samsung.**

Holger Knopke, VP of DT's Connected Homes explains: "Consumers need a broadband connection and a control device such as a smartphone, a tablet, or a PC. They then need a QIVICON Home Base, compatible components and a partner company's app in order to control the devices. The QIVICON Home Base receives orders via the app and sends them wirelessly to Smart Home devices such as the central heating thermostat, camera, washing machine or lighting. Partners can formulate their own business model, address their own customer groups, and in all other respects operate entirely independently in the market. Since summer 2015 the Austrian **eww Group** has been the first international partner to use this to offer its end customers a Smart Home system with its own brand name. "

As if all this wasn't a daunting enough environment to enter, there's then also the hugely important issue of interface design, essential to make all these connected devices as easy to use as possible if 'ordinary' people are to happily coexist with - to us now - extraordinary living spaces. Anyone of a certain age will remember the old joke of the 1980s and 1990s - "How do you tell if there isn't a teenager in a household? - The clock

on the video recorder is still blinking at zero."

Luigi Mantellassi, CMO of innovative interface platform company **dizmo Inc.**, formed specifically to address the problem of orchestrating human control of multiple complex devices and services through intuitive screens and interactions, sets the scene: "Linking the physical world and the digital world in a consumer's mind isn't easy. It's not just about overlaying old technologies or concepts like files and databases that people might already be familiar with, or simply making a move to touchscreens. If we carry on the way we have done in the past, we'll end up with domestic controls that are more reminiscent of an aeroplane cockpit than something that people want to share their intimate lives with. We've been working closely with academia to better understand the human factors needed to create from scratch what's effectively a 'white space' that can be populated with 'objects' in any way that a developer wants, but in ergonomically and cognitively elegant ways."

Given the complexity of the whole connected home - and its inevitable potential for going wrong - perhaps we'll soon see a whole new generation of horror films where it's the gateway that's haunted and no longer the house - so enter the digital poltergeist and, even perhaps, the digital exorcist! ■



**Holger Knopke,**  
Deutsche Telekom



**Luigi Mantellassi,**  
dizmo



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Frost & Sullivan - Top recommendations for firms seeking to gain a share of the Smart Home spoils:

**Focus on your core:** Concentrate on your specific expertise and offer single service solutions. For now, customers prefer professionally installed solutions. While demand for integrated solutions is expected to grow, the current situation demands experts in each area to demonstrate the value of their solutions.

**Education is essential:** Education about the benefits of specific solutions is still required, most notably about home healthcare solutions where interest is low among the demographic that would benefit most. Simplicity is essential; plug and play is the key, despite convenience not being an important issue now.

**Look to the cloud:** The penetration of cloud services is low and there's a potential market to develop this beyond the current entertainment offerings. However, in order to exploit other smart home areas - particularly surveillance - perceptions need to change and security concerns need to be overcome.

**Help consumers over the tipping point:** Adoption has been slow due to high costs and limited benefit awareness. As respondents are generally happy to pay monthly, service providers can offer initially free installation and hardware, supported by monthly payments.

**Plan for the future:** Although demand for integrated solutions is weak today, this will change. When smart home solutions are more commonplace, consumers will want to bring them together to derive greater value and improve usability and an open approach to smart home development will pay dividends by allowing functionalities to be augmented over time. Collaboration and ecosystem development will be key.