A Guide to ZigBee Device Developers for the Smart Connected Home

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For decades, technology experts and home automation enthusiasts have been talking about and promising the emergence of the smart, connected home. They have foretold a home connected by multitude of sensors, monitoring applications such as HVAC, home security, and even the health of the inhabitants, and all controlled remotely over the web via a smartphone or a tablet. The individual components, the sensors and the actuators, have been available for many years. The big problem was that they didn't talk to each other – there was no universal communication protocol that would enable them to easily be monitored and controlled from a single locus.

Over the last decade, the primary impetus for connected homes has been home system integrators and enthusiastic do–it-yourselfers. However, now that ZigBee has emerged as the dominant communications technology for smart home applications – the glue so to speak – there has been an amazing growth of interest in ZigBee.

Most of the world's cable and satellite operators, led by giant Comcast, are in the process of rolling out smart home networks that use the cable companies' set top box – the new home control box – as the centerpiece of the new connected home. The home's various sensors use ZigBee to connect the home control box which then in turn, connects to the internet, allowing web controlled devices to access and control the sensors and smart devices in the home.

Once the home control box is in place, connecting a few basic services – then it is easy for the home owner to purchase and install additional add-on ZigBee devices and sensors. Just like with WiFi networks and devices, these ZigBee devices all talk the same language and can easily connect without requiring any special networking expertise.

ZigBee's successful standardization – in concert with its adoption and rapid roll out by many of the world's top cable and service operators, provides an excellent market opportunity for device developers who want to get into the smart, connected home marketplace.

So what exactly is ZigBee?

The ZigBee Alliance is an organization with more than 400 (paying and contributing) members that maintains and publishes the ZigBee standard for wireless communication for a wide variety of application domains (home/consumer, smart energy/grid, building automation, retail automation, and several others). All these ZigBee protocols have one element in common – they all use the same underlying radio technology, the same 2.4-GHz frequency band worldwide and comply with worldwide radio certification rules.

There are many similarities between the ZigBee Alliance (addressing sense and control networks) with the WiFi Alliance (addressing high speed content sharing and distribution networks). Both standards follow the ISO layered model and are based on open IEEE standards (defining the bottom two layers of the model). Both WiFi and ZigBee offer similar ranges and the ability to transmit through furniture, walls and floors. Both use the 2.4 GHz spectrum. The main difference between the two is that WiFi is building on the IETF for the network layers (TCP/IPv4/v6), where the ZigBee Alliance has taken the responsibility for standardization of the upper layers, up to the application level.

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