



## Will RF4CE be the Killer App for ZigBee?

Recently the RF4CE Alliance got themselves adopted by the ZigBee Alliance, a clear example of a win-win situation. For the RF4CE Alliance it means an immediate broad adoption in the consumer electronics industry, while avoiding the cost of setting up a "marketing machine" to achieve this.

For the ZigBee Alliance this is a brilliant move into a direction that will make it flourish. For the consumer electronics market, and in particular for the end-customers, this adoption is a clear stake in the ground that opens up opportunities for a wide range of new and interesting applications.

In 1999, the ZigBee Alliance was spun off from the IEEE 802.11 organization (maybe better known as the Wi-Fi Alliance). The original goal was to establish and promote ZigBee as a simpler equivalent of Wi-Fi targeted for smaller embedded microprocessors.

What made Wi-Fi so successful was a straight forward and easy to understand application focus (getting laptops on the Internet) combined with a clear technology environment (PCMCIA-bus, TCP/IP, etc.). In contrast, after a quick start, ZigBee development started to sputter as it was "too much for too many" and almost became "nothing for nobody".

The reason was that the application space that ZigBee tried to cover was too diverse, from homes, to buildings, to industrial, to energy management, etc. The problem it created was twofold: too many diverging requirements leading to compromises just not good enough for most applications, plus just too many different and diverse microprocessor platforms. Add to this the usual layer of company special interests and organizational politics and it is clear that progress in standardization is an easy victim.

Two examples of these compromises were reliability and energy consumption. Many industrial applications need a very high level of reliability while other applications could live with "normal" reliability but need extreme low power consumption, so low that reliability was secondary.

The consequence was that ZigBee was not perceived as reliable enough and ISA (the industrial standardization body) started to develop its own standard for industrial applications. On the other hand, ZigBee technology consumed too much power for energy harvesting applications and start-ups like Zensys and EnOcean started to develop their own proprietary low power "standards" for home and building automation.

Then out of left field, the application solution arrived. Consumer Electronics and remote controls.





Televisions are becoming more and more wireless, separating the screen from the set top box, allowing for multiple screens in different rooms, all wirelessly connecting to a single point of entry in the home, the set top box (interesting name when thinking about it), that can now disappear into the closet.

But most TVs still required a remote control that used infra-red technology out of the late century 70-ties and needing line of sight with the set top box (or the screen). So, it was logical that remote controls would start to move into radio technology instead (like wireless phones and wireless Internet). But interestingly, over the last few years, the leading television manufacturers (Samsung, Sony, Panasonic and Philips) had really started to dislike the lack of an infra-red standard communication standard and had decided to establish one for radio based remote controls: RF4CE (announced in mid-2008).

For the consumer electronics companies, another important advantage is that standardized remote controls can also support other home applications as well (like switching on/off or dimming the lights, opening the curtains, locking the doors, adjusting the heating or the air-conditioning). However – this would require many other companies to “buy-in” to the technology and whoever has ever been involved in the standardization process understands how difficult that can be. Therefore becoming a member of the ZigBee family is an effective and inexpensive way to achieve adoption.

This is a great move for ZigBee as well, as the home and building automation market is highly fragmented, with many small regional players that are geographically dispersed. Real solutions to any standardization proposal require critical mass, which is hard to achieve and often takes a long time. The consumer electronics companies are bringing in that mass (just realize the number of remote controls in your home and compare it with for instance the number of cell phones). By taking the initiative to adopt RF4CE the discussion is immediately over: ZigBee RF4CE is the standard for home automation and by sheer mass adoption it will be for building automation as well.

There is something else very interesting: the timing of the move. RF4CE is solving an immediate problem for the consumer electronics companies, but RF4CE is still relatively flexible at the network integration level for becoming embedded with the overall ZigBee architecture. This leaves ZigBee a few interesting problems to solve without holding back on starting to generate critical mass almost immediately. Also this RF4CE is an excellent platform for the so-called battery-less applications (using energy harvesting), because of the simplicity of the application field that it is addressing.

So, whoever would think that ZigBee would have to be written-off as only usable for some specific applications (like meter reading), needs to think again...

ZigBee has the opportunity to become the home and building automation network standard with a tremendous volume drive behind it that will help ZigBee – maybe with the necessary adaptations – to invade other application fields as well.

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