



ZigBee RF4CE and Bluetooth Low Energy

George Santayana, a last century philosopher figured it out already: "He who does not learn from history is doomed to repeat it." This quotation jumped in my mind reading about some recent positioning of Bluetooth Low Energy.

Let's go back in history. When in the late 90's Bluetooth was announced it was stated that this was going to be the death of IEEE 802.11 wireless LAN's... for the simple reason that Bluetooth was going to be everywhere and solve it all... At that time people were clueless about the difference between on one side a LAN (Local Area Network) with a range up to say 30-50 m indoor (e.g. covering a house) and on the other side a PAN (Peripheral Area Network) with a range up to say 5-10m perimeter (e.g. the space around a laptop, or around a phone). As we know today, LAN's (wired: Ethernet and wireless: IEEE802.11/Wi-Fi) and PAN's (wired: USB and wireless: Bluetooth) cover different application spaces: with your laptop (or smart-phone) you go via the access router on the Internet (LAN) – somewhere in the house; with your Bluetooth headset, you connect to your phone (or smart-phone) – somewhere in your pocket or on your desk. People nowadays have a good understanding of the difference between LAN's (Wi-Fi) and PAN's (Bluetooth) and both laptops as well as smart phones nowadays have both Wi-Fi and Bluetooth on board to support both application spaces.

Let's fast forward now in time to some newer and more recent developments:

1. For IEEE 802.11/Wi-Fi a low power version has been defined for embedded MCU's, called IEEE 802.15.4/ZigBee, especially focused on low power sense-and-control networks (LAN's) – and in particular for example ZigBee RF4CE (www.zigbee.org/rf4ce) for remote controls for the consumer industry covering the whole house and as a platform for other applications like energy management, light controls and others.
2. For Bluetooth also a low power version Bluetooth Low Energy (LE) has been defined, a clear low power PAN technology for connecting for instance your watch or heart rate meter (sensor) to your phone, e.g. to communicate alerts, or, to be able to push a button on your watch to have your phone beeping to find out where you left it in your room! Or in the reverse way: to have you watch beeping if you walk away too far from your phone!

So far, so good, everybody happy.

But then unfortunately the history (of Bluetooth being pitched against Wi-Fi) starts to repeat itself, as there are people making statements that Bluetooth LE will be capable of doing LAN functions – by for instance positioning Bluetooth LE as a suitable technology for Remote Controls. The judgment (again) is blurred to recognize the difference between PAN's and LAN's and it is forgotten how some years ago Bluetooth was oversold in the early years after its announcement.





Yes, it is possible to implement Remote Controls with Bluetooth LE in the same way as it possible to outfit your house or a hotspot with a Bluetooth access point. Probably it may be even technically possible to use USB to replace Ethernet. But everything that is technically possible is that also commercially desirable?

Going back in history the most important reason for Bluetooth not to penetrate LAN space was the fact that it was more a point-to-point technology than a networking technology, with a focus on low cost and performance. Actually, the step to higher speed (Bluetooth 3.0) is a logical one and one that is long past-due (maybe because of all the UWB hanging in the air?). In the PAN space higher speeds are implemented on cable and therefore wireless following this is easy to comprehend.

Admitted, one can defend the positioning of Bluetooth LE for Remote Controls because remote control devices have a sort of point to point characteristic. But that is clearly not the space that the founders of RF4CE (Sony, Philips, Panasonic and Samsung) want to be boxed into. They want to see remote controls as platform for other applications as well. Therefore the choice of the RF4CE alliance for a worldwide LAN standard (IEEE 802.15.4) that can cover the house and that can do many more things than just zapping channels.

This is the reason that the quotation "doomed to repeat it" jumped in my mind reading about the great capabilities of Bluetooth LE for sense- and control networks. But probably most important is that the history of Bluetooth and Wi-Fi has taught us that artificial controversies will be quickly outsmarted by people that use the technology where they see it appropriate and fit.

Do you have comments or suggestions? I appreciate your feedback!

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