

Whither the Internet of Things?

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The Internet of Things – IoT – it's a phrase we hear more and more, often hyped, often discussed seriously in the context of cloud computing but definitely a buzz phrase. Put simply, it is the connection of "smart" (and otherwise) devices, washing machines, refrigerators, scanners and printers, health monitoring devices, environmental sensors, earthquake and tsunami early warning systems, and much more to the Internet so that they can provide a service as a whole, being accessed, calibrated and controlled remotely from a browser window or mobile device.

The concept behind the Internet of Things is succinctly encapsulated in the phrase "[ubiquitous computing](#)" coined by the late Mark Weiser in 1988. Weiser was a chief scientist at Xerox PARC until his untimely death at the age of just 47 years in April 1999. One has to wonder about his legacy, isn't it about time the IoT came of age?

Salvatore Sorce and Antonio Gentile of the Università degli Studi di Palermo, Italy, have been longing for an IoT for many years and wondering why they as computer engineers are not yet benefiting from its substantial promise. They believe there are three perspectives that have to be taken on the concept – interaction media, device integration and applications – to explain the time lag between Weiser's original postulate and the realization of its potential.

Weiser originally said, "The most profound technologies are those that disappear. They weave themselves into the fabric of everyday life until they are indistinguishable from it." Which in one sense was pre-empted by Arthur C Clarke's third law of prediction: "Any sufficiently advanced

technology is indistinguishable from magic." We don't, of course, need anything supernatural or mystical to bring about ubiquitous computing we just need dedication to the cause, killer apps and a way to bring it all together. But, it is this combination that we have not seen.

Sorce and Gentile have reviewed the state-of-the-art in ubiquitous computing, the Internet of Things. There is a lot of effort being expended in developing technologies. Unfortunately, there remain significant obstacles even with advances in connectivity: connecting the existing [cell phone networks](#) to power line networks, the internet and smart phones themselves to allow users whether domestic, academic or industrial to access an interface to use the "things" transparently is not yet possible. When they talk about a standardized, universal connector and yet all manufacturers make them different sizes and to different specifications (take phone chargers, headphone jacks and USB itself as the prime and obvious domestic examples) it perhaps becomes obvious on one level why we don't have a simple interface that tells the washing machine in your apartment to delay the noisy spin cycle until after you've finished watching your movie stream, for instance, and adds washing powder to the online supermarket order without disturbing you when you're showering later.

There are surely killer apps of that sort waiting to happen once the connectivity is possible and I am sure this naive example has scenarios of much greater significance and impact in everyday's life. When we start to hear about something a little more worthwhile than a shopping-enabled refrigerator, perhaps we will then also hear about Weiser's ubiquitous legacy becoming a real thing.

More information: Sorce, S. and Gentile, A. (2014) 'Internet of things: why we are not there yet', *Int. J. Ad Hoc and Ubiquitous Computing*, Vol. 16, No. 4, pp.232–239.

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