

by Lara Srivastava

# The Internet of Things and the Age of Spime

## A unique vision

The Internet of Things as it has become known refers to a vision of an Internet in which not only is anyone connected, anywhere and anytime, but so too is anything. It was back in 2005 that I chose the Internet of Things (IoT) as the topic of a publication I edited for the ITU, part of the ITU *Internet Reports* series. This report identified four key technological enablers underlying this vision: the tagging of things through auto ID technologies like RFID, sensing things through sensors and actuators, shrinking things through developments in miniaturization and thinking things through increasingly embedded processing power. In an Internet of Things environment, previously disparate devices, networks and everyday things come together in a converged form, providing a ubiquitous communication experience for the user. The IoT is a high-level concept that has taken the original universality of the Internet to its logical conclusion.

Although the Internet of Things is still an embryonic market, it is based on developments and techniques that have been around for some time. Radio and radar technology have been used for decades – in WW2, an early form of RFID (radio frequency identification) helped identify friend or foe (IFF) aircrafts. As for sensors, past generations have also been known to use them, from thermometers to fire alarms. They have just been getting smaller and more sophisticated with time. And, as Moore's Law predicted, we

have been working over the last few decades at making information processing more efficient and more easily embeddable.

What is relatively more recent is the host of new applications based on sensors and identification technologies. These are giving rise to a network of things, e.g. embedded intelligence in smart cities, homes and transportation systems; real-time home or medical monitoring; augmented reality environments and so on. In general terms, the IoT vision of the future is one of the interlinking of systems that have previously been isolated - the merging of disparate data sets and unconnected objects to transform our expanding and ever chaotic sea of bits and bytes into usable information and knowledge.

## The marginalization of space and time

The development of electronic communications is the consequence of an age-old human desire to control space and time. Innovations that collapse the constraints of space help us become closer to friends, family and business partners around the world. Innovations that marginalize time allow for greater multi-tasking and efficiency. The growing application of real-time identification technologies and sensors adds to this the promise of a global network of interconnected physical objects that will further enable us to control our environments temporally and spatially. They will also enable generations of individuals to add on their perspectives and their notions

of reality on data, objects and environments. Just as the web first developed with associations, categorizations and hierarchies of data created to be searchable by you and me, in an Internet or Web of Things, things will be endowed with their own history, identity, and personality.

We have seen over the last few decades an explosion in the availability of data worldwide. The earth's natural systems, human systems, constructions and artefacts have always generated an enormous amount of data, but we have not until now been able to capture that data. An Internet of Things will enable us to better access, connect, understand, categorize and interact with what surrounds us. There will be new random but serendipitous associations between objects, and between people and objects, creating new forms of interaction and new sets of queries and responses.

In this respect, objects will no longer be seen to be, in Marshall McLuhan's words, "neutral or passive, but an active logos or utterance of the human mind or body that transforms the user and his ground." (Marshall McLuhan, *Laws of Media*). The user-generated and localization layer placed on these self-aware objects will make them into fully participative and collaborative members of the network. They would be capable of remembering, blogging and self-organizing. User-generated content will thus merge with thing-generated content, creating a semantic and intelligent environment that can

identify patterns to help us understand and utilize our increasingly vast and unstructured data landscape. These objects have a name: "spime" (a neologism combining the words space and time). Bruce Sterling was the first to baptize them in 2004 and summarized the phenomenon as follows: "In the future, an object's life begins on a graphics screen. It is born digital. Its design specs accompany it throughout its life. It is inseparable from that original digital blueprint, which rules the material world".

The legal and regulatory implications of spime are significant but as of yet insufficiently explored. The underlying problematic is one of boundaries: boundaries between public and private, commercial and non-commercial, ownership and use. As McLuhan has pointed out, electronic media did not only extend a single and specific human sense, as can be said of print media (with the eye), but rather all of our physical senses at the same time, i.e. our entire nervous system: "the wheel is an extension of the foot, the book is an extension of the eye, clothing, an extension of the skin, electric circuitry, an extension of the central nervous system" (Marshall McLuhan, *The Medium is The Message*). The electronically induced technological extensions of our nervous systems, spimes, are submerging us in a never-ending pool of bits and bytes. Our human nervous system has been "extroverted" of sorts and so too has the nervous system of our planet and all the things within it.

### Not without concerns

Spime and the Internet of Things, while bringing about new challenges of their own, will nonetheless inherit drawbacks of the current Internet but on an infinitely larger and invisible scale. Privacy is perhaps one of the most important issues in this regard. In general, privacy principles in and of themselves may be sound, as might legislation be, but the rapid development and ubiquity of technology can make the application, and more importantly, the enforcement of these rules and legislation a harrowing process.

The privacy question arises from a number of factors, but perhaps the most important one is the fragmentation of identity online. The same person may maintain separate identities on *Twitter*, *Facebook*, *Wikipedia*, *Flickr*, *Second Life*, *LinkedIn*, *Google chat*, *Skype*, and so on: different identities for different contexts and services. This is not always intentional and not always imprudent: we sometimes need to keep different contexts separate. But the separation also creates practical difficulties for users (e.g. password overload, security breaches, management problems, inefficiency). And although multiple appearances on the net may enhance identities, they can also distract and detract from them. The online fragmentation of identity is one of the biggest challenges to the realization of the full potential of

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