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There's No Quick Path to the Internet of Things

By Thomas H. Davenport

I'm working on an article about the Internet of Things (IoT) with Sanjay Sarma, an MIT professor who was head of the MIT Auto-ID Center. This is the organization that worked with a variety of companies to develop radio frequency identification (RFID) standards and the Electronic Product Code. There are now Auto-ID Centers at several research universities around the world, and the whole effort has been a great example of collaboration between businesses and academics. It is also arguably the first example of an IoT application. In fact, Sarma thinks that the IoT term was first used by his MIT Auto-ID Center co-founder, Kevin Ashton, in 1999.

I was only dimly aware of the history of RFID standards, but I knew they had taken a while to develop. I thought that the time required for this initiative might suggest a timeframe for IoT development, so I asked Sarma how long it took in the case of RFID. "About fifteen years," he replied.

This seemed potentially quite depressing, so I asked him if he thought it would take as long for other IoT standards. He said that he thought cloud computing had the potential to make the development of IoT applications much more rapid. Because data formats can be manipulated in the cloud, companies don't have to agree beforehand on every detail of a data standard before they can share data. In effect, the cloud can play a translation function among different organizations.

So how long might it take for the IoT to take off? Let's step back a second and understand what it takes to make the IoT work. In almost every IoT domain, multiple companies will need to get involved. One sensor type from one company just won't do the job. Instead of thinking about IoT projects at the company level, you need to think about an ecosystem of collaborative partners.

Say, for example, that you'd like to develop an IoT application involving predictive automobile maintenance. In other words, you'd like to identify when a car's alternator or air conditioner is just beginning to have a problem so you can service it before it breaks. Sounds like a fantastic idea, but think of the complexities. Almost every sensor in an automobile captures data in a different format. OBD-II, the U.S. government format for automobile data collection, only collects and transmits a small fraction of the available sensor data in a car. Different manufacturers of cars implement OBD-II differently. And different manufacturers, of course, use different types of alternators and air conditioners. Most even use different types across different models.

So if you want to get your application off the ground, you have several choices for how to integrate the necessary data:

- You can try to get all automobile and component manufacturers to agree about data standards and how they will be captured and transmitted so that you can grab the well-formatted IoT data and act on it. This is where the 15-year time horizon comes in. It would probably take that long to get everybody together, have all the requisite meetings, overcome the natural desire to have proprietary information, and conquer all the politics. The development of the Electronic Data Interchange standard, which was pioneered in the automobile industry, took more than a decade—and it was much less technically complex than the IoT.
- You could wait for the government to declare a more complete and up-to-date version of the OBD-II standard (I propose the clever name “OBD-III”) that would incorporate a wide variety of automobile sensor data. That might even take longer than fifteen years, because there are even more political issues involved. If OBD-III does ever come around, it will probably be a bit of a “lowest common denominator” standard, as was OBD-II.
- You could hope that a big vendor like Apple Inc. or Google Inc. jumps into the area and starts work on a data standard and app platform. This is what Apple has done in the health area with its HealthKit. That whole process might take only three or four years, but you never know if a particular vendor’s approach will take off. You also run the risk that a big vendor like Apple or Google will develop and sell all the good applications itself.
- You or an intermediary third party could develop a cloud-based platform for gathering, translating, and integrating all the information, and you could buy it from them. Sarma’s Field Intelligence Lab at MIT is trying this approach with a standard called CloudThink. In fitness devices, RunKeeper is playing this role. In health devices and activity trackers, HumanAPI is taking this tack. The only problem is that in important business domains, there are likely to be multiple intermediaries. As with the big vendor model, you don’t want to choose one that doesn’t take off. Developing the intermediary platform might only take a couple of years, but figuring out whether it will be successful might take longer.

In short, each choice has its challenges, and taking the only approach that has proven successful in the past would take a very long time. We all should hope that there are some other alternatives that work, or we will probably forget about the Internet of Things before we see many benefits from it.