The Internet of Things and the issue of IP rights (part one)

by John F. O'Rourke and Patrick Soon

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Introduction

What exactly is the Internet of Things? Basically, this is the idea of everyday objects being embedded with technology that enables them to sense and communicate. And when such objects are able to represent themselves digitally on the Internet, they can be controlled from anywhere! Over 10 billion products — mobile devices, appliances, machines, etc. — are now connected online. This means that there are already more *things* connected to the internet than there are people on the planet. Further, this number is expected to triple to 30 billion by the year 2020. And according to Cisco chief executive John Chambers, this interconnectivity of products, people and places translates into an emerging $14.4 trillion global market. Perhaps this is why Cisco prefers the term "The Internet of *Everything*." However, the issue of intellectual property rights, particularly the desire of industry leaders to protect their patents and trade secrets, may impede the progress toward the goal of a seamless, interoperable digital system.

Background

The origin of the Internet of Things can be traced back to a common Coke Machine at Carnegie-Mellon University (CMU). In the early 1980s, students in CMU's Computer Science Department got tired of walking all the way to a distant vending machine only to find that their favorite soda was either warm or out of stock. In this archived exchange, Dave Nichols describes how he and several other programmers solved this problem by installing micro-switches and then connecting the machine to the Internet. In this way, students and professors were able to monitor the supply and temperature of their preferred beverages from their offices. Thus, it can be argued that the Internet of Things was started by some rather lazy students who simply got tired of running out of cold drinks. The actual term "The Internet of Things" was not coined, however, until years later. Kevin Ashton of the Massachusetts Institute of Technology (MIT) used this phrase as the title of a presentation he made to Procter and Gamble in 1999. Ashton explained his take on the concept in this way: "...people have limited time, attention and accuracy — all of which means they are not very good at capturing data about things in the real world. If we had computers that knew everything there was to know about things — using data they gathered without any help from us — we would be able to

track and count everything and greatly reduce waste, loss and cost. We would know when things needed replacing, repairing or recalling and whether they were fresh or past their best."
In many respects, Ashton's idea has already become a reality. Retailers and supermarkets now commonly use unique identifiers (bar codes, RFIDs, QR codes, etc.) to maintain precise product levels and adjust selection based on customer shopping habits. But contemporarily, the term "The Internet of Things" encompasses much more than product identification and inventory control. Modernly, this concept focuses on the ability of things to exchange information systematically, to adjust automatically, or to be controlled remotely. The innovations listed below may serve to illustrate this idea:

1. Echelon's Smart Street Lighting allows a city to easily set the on/off times or dimming levels of individual or groups of lights for different times, days, seasons, or weather conditions. Cities using this system reduce their street lighting energy use by an average of 30 percent.
2. The Nest Thermostat, by Nest Labs, monitors the activity in a home and real-time weather forecasts to automatically adjust the temperature, and it can learn to program itself to more energy-efficient settings — saving homeowners up to 30 percent on their energy bills. This thermostat can also be manually adjusted remotely with an app. Google recently purchased Nest Labs, the maker of this device, for $3.1 billion.
3. The NUVANT Mobile Cardiac Telemetry (MCT), by Corventis, provides continuous remote monitoring of cardiac abnormalities in mobile patients. Physicians are thereby able to detect heart problems in a timely way without disrupting their patients' normal lives.
4. Mimo, by Rest Devices, is a baby monitor that is designed to help prevent SIDS. It is a cotton kimono fitted with non-contact machine washable sensors that can provide real-time measurements of a baby's respiration, skin temperature, body position, and activity level. Parents are alerted if anything is amiss, no matter where they are.
5. Zip Car, a self-service "car sharing" company does not maintain a rental office. Instead, its vehicles are parked in conveniently located parking spaces all over town. Customers simply use a smartphone to find the nearest car and reserve it. Once the reservation has been made, the customer can unlock the vehicle's doors by waving their membership card in front of the windshield. The keys will already be in the ignition. This company was purchased in March 2013 by Avis for about $500 million.

Looking ahead

The Internet of Things is clearly still in its infancy. A society where self-driving vehicles, stoplights, service stations and parking garages all work together to eliminate traffic jams is still a long way off. Most of the objects that are connecting online continue to use independent proprietary standards that restrict or prevent them from being able to interact with each other. A Zip Car, for example, cannot tell an Echelon Street Light to brighten up when a driver is sleepy, nor can a Mimo baby monitor tell a Nest Thermostat to turn up the heat when an infant is too cold. Thus, what we are really witnessing, at least so far, is a growing number of isolated *Intranets* of Things, not the development of a unified Internet of Things. If complete interoperability is to ever be achieved — where everything is interconnected as a sort of digital nervous system — then manufacturers, high-tech companies and internet providers will all have to work together. But, if history is any indication, such cooperation will be very difficult to achieve. Part two of this article will discuss the specific intellectual property issues that may impede progress toward a true Internet of Things.

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