

White Paper: The Internet of Things

Everything, connected all the time

Introduction

You may have heard the phrase The Internet of Things (IoT) in the news. What does it actually mean? Do you need to worry or even care about it? Will it improve or change the way you use technology at all, at home or at work? This White Paper gives a brief introduction – in non-technical terms - to what impact the unavoidable rise and rise of the IoT may have on your daily life.

What is it?

A concept whose realization is inevitable. The idea that every device you own, from a watch to a car to a Hoover to lawn mower, will be able to access the internet whenever and wherever it wants to. Everything you own, always online, and able to talk to one another – and you – to make them more efficient and useful. This movement, combined with ever more sophisticated [Artificial Intelligence](#) (AI) in software, means your devices will operate with a greater degree of autonomy.

Does this mark the end of humankind?

Some might think so. There was a [recent example](#) of an internet-connected “smart thermostat” mistakenly powering off heating and air conditioning systems because of a software bug. Others might find a tracking device [given to children](#) to wear so their parents can see their whereabouts in real-time disturbing. On the other hand, that same device allows parents to set areas where the child can safely play in and only be alerted should they wander outside those zones – and it enables the child to call for emergency help at the click of a button, providing the search party with an instant known location accurate to within a few feet.

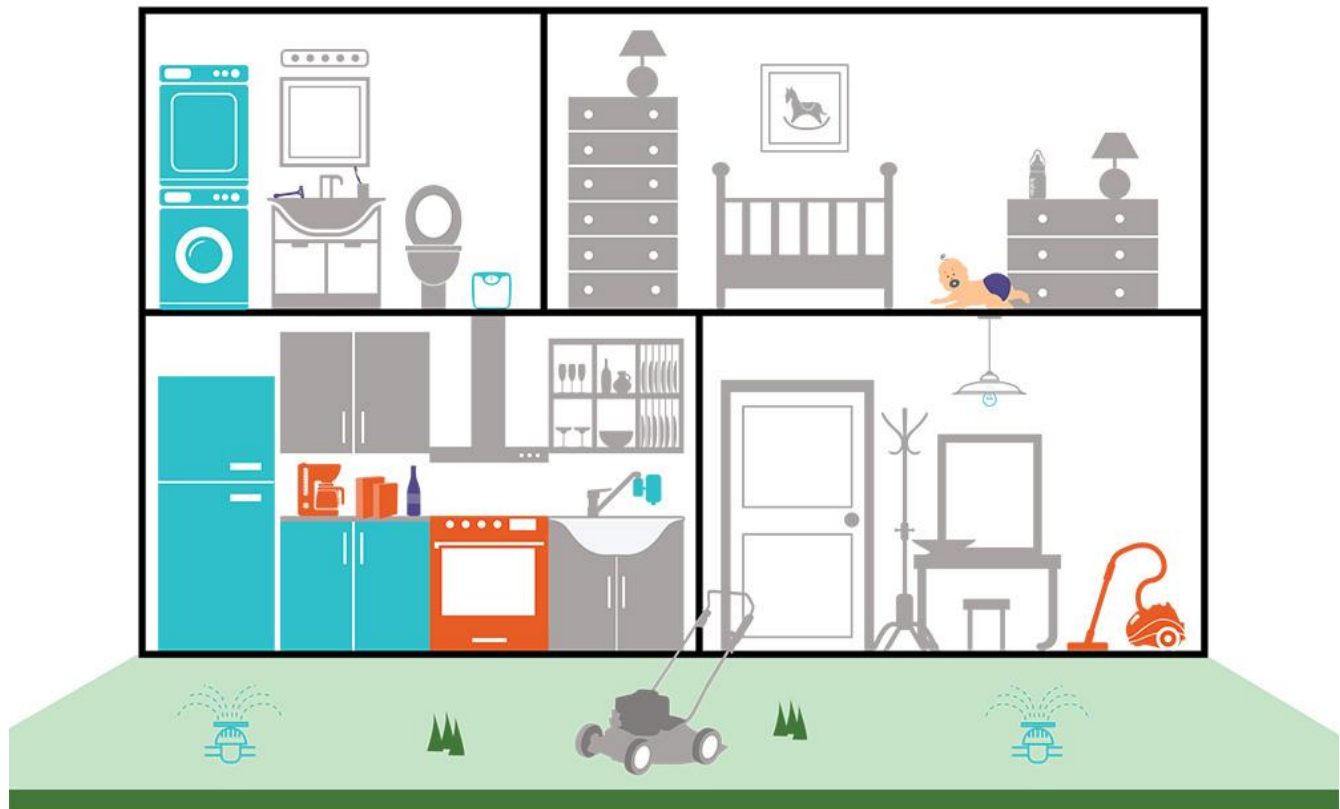
Practical Applications

The benefits we can achieve from an Internet of Things are endless. Here is a great example from [Wired Magazine](#): In 2007, a bridge collapsed in Minnesota, killing many people, because of steel plates that were inadequate to handle the bridge’s load. When we rebuild bridges, we can use *smart cement*: cement equipped with sensors to monitor stresses, cracks, and warping. This is cement that alerts us to fix problems before they cause a catastrophe. And these technologies aren’t limited to the bridge’s structure. If there’s ice on the bridge, the same sensors in the concrete will detect it and communicate the information via the wireless internet to your car. Once your car knows there’s a hazard ahead, it will instruct the driver to slow down, and if the driver doesn’t, then the car will slow down for him. This is just one of the ways that sensor-to-machine and machine-to-machine communication can take place. Sensors on the bridge connect to machines in the car: we turn







information into action via the Internet of Things. The same may apply in our homes as this infographic from affinova explains; consumable related goods could really benefit from becoming intelligent, apparently:

THE HOME OF THE FUTURE:

MOST & LEAST WANTED "SMART" PRODUCTS, ACCORDING TO CONSUMERS



MOST WANTED

-  **Refrigerator** - Enables remote viewing of its contents and recommends recipes based on stored items
-  **Light bulb** - Turns off when no one is nearby and can be remotely activated
-  **Sprinkler system** - Monitors weather over time and determines when to turn on and shut off
-  **Scale** - Aggregates data from other devices and provides a constantly updated personal health plan
-  **Tap water filter** - Automatically shuts off when nothing is in the sink and tracks water usage from all connected faucets and shower heads
-  **Laundry washer and dryer** - Sends an alert when the cycle is done and can be remotely activated

SOMEWHAT WANTED

-  **Coffee maker** - Syncs to an alarm clock
-  **Oven** - Detects when food is done and sends a mobile alert
-  **Vacuum** - Cleans without human involvement and can be remotely activated
-  **Packaged food** - Sends an alert when the item is on sale and displays nutrition information for a specific amount of food determined by the user

LEAST WANTED

-  **Razor** - Sends an alert when the blade needs to be replaced
-  **Baby diaper** - Sends an alert when the diaper needs to be changed
-  **Toothbrush** - Tracks brushing habits and sends data to the user's dentist
-  **Wine bottle** - Sends an alert when the wine's flavor is best and, once opened, indicates when it's no longer good to drink

What about security – hackers and all that?

As we benefit from the convenience of autonomy, so the stakes are raised should something go wrong. A malicious attack on the theoretical sensor system in our example above could have disabled them, meaning they did not warn the driver who, relying on such technology, did not adjust his driving and slid straight into a crash.

Thankfully, most of these sorts of systems are usually localized and not publically accessible. Furthermore, there is very little gain to be had by a hacker telling your fridge to remind you to pick up milk on the way home for the 20th time that day. It does however underline the need to retain a degree of control or the ability to override “the machines” to avoid the [end of days](#).

Our Conclusions

The Internet of Things is already here, and will continue to expand exponentially. The relentless progress in technology – both physical hardware and virtual software – will bring enormous time saving, safety improving and energy efficient new approaches to most people’s day to day lives.

Whilst we usher in this new era with generally open arms, it is also up to us as employees, consumers and customers to not let go of our understanding of what is actually going on around us. We need to maintain awareness and control, and continue to fight for our data privacy, as we enjoy the seemingly endless fountain of wonderful technological advances.

If you would like to discuss this topic with us further and how it might benefit or hinder your organisation, please do not hesitate to get in touch

Further Reading

Internet of Things EU Think Tank - <http://www.theinternetofthings.eu>

Great article with lots of stats on the growth of online devices - <http://www.i-scoop.eu/internet-of-things>

Guardian Online collection of any recent IoT stories - <http://www.theguardian.com/technology/internet-of-things>