



The impact of the IoT

About the IoT and the impact on consumers

The IoT is creating a new world, a quantifiable and measurable world, where people and business can manage their assets in better informed ways, able to make timely and correct decisions of what they want or need to do. This new connected world will offer fundamental changes to society and to consumers in society. The rise of the IoT will create many practical improvements in our world, leading to more comfort and lower energy cost, better security, more convenience, enabling senior citizens to live at home longer, etc.

The IoT in tree categories

The IoT can be split in three categories: (1) the wearables, (2) the smart home devices and (3) the M2M devices.

The first two categories are the most important for consumers. The wearables are the devices that people carry with them, and that usually connect via Bluetooth to the smart phone, and from there to the internet. It includes things like smart watches, fitness bands, step counters and devices to help people to live more “mindful” – making them aware of how well they sleep, how much they move around, monitoring their vital signs, etc.

The smart home devices are also part of the IoT and usually connect via ZigBee and the home router to the internet. They include all the devices in the home, from lights and light switches to motion sensors, thermostats, door locks, automated curtains, sun shades, etc. The smart phone also plays a role in the smart home – functioning as an online dashboard and control device for the smart home’s various devices and appliances.

The third category M2M devices (Machine to Machine) describes IoT systems in, where devices are directly connected to the cellular network, like cars being able to report where they are (in case of an accident or theft), or when a vending machine calls when it is about to run out of stuff.

The IoT is already big, but will get much more pervasive, just like the internet of people today has become pervasive.

Intriguing types of IoT devices designed to make consumers lives easier

The trending applications at this moment are fitness bands that track how active people are, how well they sleep, etc. It quantifies a person, and objectively communicates how healthy a person is actually living, (not subjectively how healthy a person thinks she/he lives). It is a typical example of quantifying a person, providing (bio-) feedback and enables the person to be coached to live a healthier lifestyle, as well as to understand longer term trends, etc. This is just a small, but typical example of how the IoT can help people – it has all the ingredients of a typical consumer IoT application, but also serves as a very good prototype of what other smart home application will be able to do for the consumer: quantify our lives, measure how we are using our resources (e.g. consume energy), how safe we live, etc. and provide us feedback to change and improve.



The Green Case



The most interesting possibilities for up-and-coming IoT devices

The so-called white goods - heaters, air-conditioners, washing machines, dryers, dish washers, refrigerators - have a great deal of potential as IoT systems. These devices can be easily connected to the internet, be enabled to be remotely controlled, allowing for maintenance control (when does a filter need to be changed), when are they using more energy than desired, to turn them on/off remotely, etc. The problem that we are facing is a sort of chicken/egg problem. It does not make sense to build a cloud based control structure for just a refrigerator. But if that infra-structure would exist, then easily new equipment can be connected at small incremental cost, and provide value for the consumer. We are slowly approaching the tipping point, but once there, people will no longer buy devices that are not connected to the internet.

The IoT is already here ... and accelerating

Today, appliances, home security, and home automation are some of the most hyped IoT devices. However, we are close to a point where IoT sensors and capabilities will be commonplace on the majority of appliances and large home electronics.

People have thermostats, weather stations, smart lighting, security, electronic door-locks. However, today many of these applications are not interconnected. They are connected – but not to each other.

The weather station does not provide information to the thermostat about the climate outside. The security system is not connected to the electronic door locks - not automatically locking the forgotten back door when it appears that nobody is in the home. But in the future all these systems will be interconnected, provide information to each other, and react accordingly. We are currently in an emerging state of the IoT, with individual vertical applications that operate as islands, and serve independent applications (like security alarms, door locking, etc.) – and that are already IoT. But the real IoT will emerge when these applications cooperate, working together, and begin to use each other's "awareness". That is when the true IoT avalanche will start.

The IoT in our everyday life

We can come up with many examples on how well can IoT currently automate tasks, such as smart home features, or provide lifestyle improvements, such as a fridge that orders groceries or a shirt that captures your heart rate. But how will this impact our life?

In the near future, IoT devices will start to play an essential role in our lives. A fridge ordering groceries is the always quoted funny example – and somewhat misrepresented. Via the market loyalty card, my retailer already knows my family's weekly consumption in detail, and would be able to regularly deliver it to our doormat – not needing a smart fridge for it. But a smart fridge could measure its energy consumption, and tell me that it needs to be defrosted, or needs maintenance/replacement, because it is using 40% more energy than is necessary.

Actually, the IoT is more a solution of the need to live more quantified, more measurable and analyzable lives. Compared to 100 years ago, companies are way more quantified and efficient now – automation has streamlined processes, made them produce less waste, save cost, etc. The IoT will enable our personal lives to be quantified, our homes to be quantified – and because of that, we will live more safely, more comfortably and longer, at lower cost. The IoT will enable people to be more efficient.

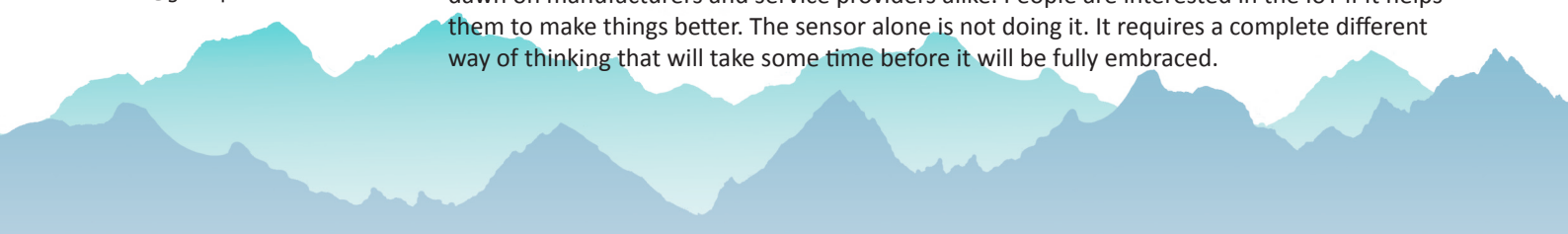
Manufacturers can improve support for IoT automation & remote access tools

The real key component of the IoT, whether wearables or the smart home, is the application, not the sensor. Connecting the sensors is difficult, but extracting information from data is the essence. Useful information extracted from the data that can coach people in reaffirming what goes right, alerting or taking action if something goes wrong, and using data analytics to compare situations, coaching and feedback to help improving things. This is slowly starting to dawn on manufacturers and service providers alike. People are interested in the IoT if it helps them to make things better. The sensor alone is not doing it. It requires a complete different way of thinking that will take some time before it will be fully embraced.

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► www.greenpeak.com

► info@greenpeak.com





IoT's privacy, security and regulation concerns

Privacy and security are key, together with data ownership. Note, these are not IoT issues, these are general internet issues. Even though these issues already exist today for the internet of people, the industry and the governmental bodies are just slowly starting to recognize these issues and take action. The exploding IoT makes these issues more explicit and accelerates the requirements to take these actions. Unfortunately, they are not very well understood yet, and it probably will take quite some more time before proper classification and handling of all these issues are put in place.

Here is a good metaphor comparing the growth of the IoT with the growth of the automobile industry. Imagine the first cars hitting the road – there were no real roads, and no road signs. There were no rules. Pedestrians don't know enough to get out of the road. Drivers didn't know how to take turns at an intersection. Drivers and bystanders did not understand the risks and liabilities, not even thinking about having general insurances in place.

We are at a similar stage with the internet today. There is no real legislation in place, and all people of all ages, without any training, can get on the Internet-Bahn. We can expect some crashes.

Just like it took decades before this all was in place around automobiles, it will take quite some time before this is all in place around the internet. People are questioning whether we need rules, training, legislation, enforcement, etc. to use the IoT and the Internet. It is just starting to dawn to many that something might be needed.

The difficulty in securing IoT devices is that in general they do not have a keyboard and a screen. So how do you set them up and configure them? How do you set up security? It may sound trivial but the today's Internet of People is a great deal simpler than the internet of things, because the way people interact and interface with their devices is very well understood.

But how do you set up and configure your refrigerator to talk with the internet, a lamp, or even a light switch? How can you make this process easy but at the same time safe? Today there are many kinds of models under development to make this process simple and secure, including using smart phones, RFID or QR codes, etc. but at this moment there are as many methods as there are device makers. The industry still has a long way to go...

The IoT will extend compatibility with existing connected devices, such as smart phones and PCs, since compatibility is already built into the system. IoT systems connect via the router to the internet and the cloud. Smart phones, tablets, etc. can already be used as cloud "windows". When IoT evolves from reading sensors into data analytics and coaching people, providing feedback, sending alerts, etc. it will embrace existing connected devices and technologies in natural ways.

A house of cards?

Is there a possibility that the complexity of the IoT devices could become "A house of cards," where it's too confusing or segmented for consumers to utilize?

No. It will take time, but the problems that we may be facing today will be resolved. These are not fundamental problems, these are problems that have to do with complexity that needs to be broken down in "digestible modules" that can be resolved, implemented and connected. This is similar to what occurred with WiFi. When WiFi networking first appeared, it was quite complex and difficult to configure. However, after some development, WiFi today is now easy. Plug it in and press a few buttons and you are connected. You no longer need an engineering degree to set up a WiFi network! This ease of installation will apply to IoT devices and networks as well.

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▶ www.greenpeak.com

▶ info@greenpeak.com





Concluding - Will the IoT change the world for consumers?

The IoT will change the world in an even more profound way than the internet has done so far. If we ask our children how the world existed before internet, they are speechless. They have no comprehension of how people can communicate without the common place tools we have today. The same will happen with the IoT.

In a decade from now, we will be so dependent on the knowledge derived from continuous stream of data our wearables and our smart homes are producing, that we will have no idea how we managed the world and our lives without them.

It will make a positive change in our lives. We will be able to make better informed, more accurate and more timely decisions; decisions that will make our lives better, and at the same time, will save us money.

Do you have comments or suggestions? I appreciate your feedback!

▶ cees.links@greenpeak.com

GreenPeak Technologies

▶ www.greenpeak.com

▶ info@greenpeak.com

