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# IoT Platforms

for  
**dummies**®

Build a scalable  
IoT solution

7 things to check  
on your IoT platform

Keep IoT Simple



**Blai Carandell**  
**Marc Pous**

# IoT Platform for dummies

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## About the Authors

Marc Pous and Blai Carandell are two entrepreneurs based in Barcelona, working on several IoT projects in Spain and Europe.

Marc is currently the CEO and co-founder of [thethings.io](http://thethings.io), the most simple enterprise IoT platform. He is also responsible for managing the IoT communities in [Barcelona](#) and Munich, organizing meetups and inviting up-and-coming startups to pitch their products. Furthermore, he is responsible for co-organizing the international event IoT Stars during the Mobile World Congress at Barcelona. He used to create IoT products as a hobby, from connected sofa for a music festival, beer mugs in Munich's Oktoberfest to Christmas lights that light up when you tweet [@thethingsIO](#). His advocacy efforts for the Internet of Things and his stature (6,9 feet) has earned him the nickname IoT Giant. You can follow and ping him at his Twitter account [@gy4nt](#) and on [@thethingsIO](#).

Blai is now currently leading an innovation consultancy firm, [Noba Ventures](#), focused on strategy prototyping. He advises large companies building innovative projects and startups - including many IoT products,- in learning where their value lies as quickly and efficiently as possible through prototyping. Previously, he was involved in Ôasys, a company responsible for making a connected device to measure water usage in the home. The company raised over \$500K from AGBAR group, a water provider present in 24 countries. Ôasys was amongst the first 10 startups that underwent an acceleration process in the IoT Startupbootcamp program, recognized as Europe's best accelerator. He is passionate about music, creativity and its effects on technology, and writes about it in his personal blog. You can follow and ping him at his Twitter account [@BlaiCarandell](#).

## Foreword

If you have opened up this book we take it that you are a modern-day magician looking for the right tools to make sure magic gets infused into the world around us. We can call you a “tech-geek” or an entrepreneur. Either that, or you are a lost and confused Harry Potter fan thinking that J.K. Rowling has adopted a new pseudonym. No matter who or what you are, we believe that you should be as excited as us with the prospects of the Internet of Things.

The Internet of Things, or IoT, is a broad concept that promises new means of achieving the potential of human imagination. While enchanted quills that write what you dictate, flying carpets and magic wands that lift objects were once left to children’s stories, it is very possible that we will see adults talking about it very soon. Industry will become more efficient as manufacturing-line appliances agree on batches of production. Machines will be able to perform surgery on you with the most up-to-date procedures available. Self-driving vehicles will insure safer roads, and, on a more day-to-day note, your washer and dryer will treat your clothes exactly like the manufacturer suggests. Oh, the magic.

But in order for things to come to live and operate in such a seamless and secure way, you need the right building blocks. Hidden inside your devices, there are numerous virtual pulleys and gears that keep it doing what it should do. Of course, there are the usual computer chips and power supply. The hardware. This in turn needs to connect somewhere, to give and receive “orders”. And what greases this whole process up is an Internet of Things Cloud Platform. The IoT platform.

This IoT Platform is like a hidden orchestra director. The organizer that keeps the pipes running smoothly. It is a layer that sits underneath the surface. Such a layer shares the same traits in all IoT devices. Regardless if your device is a plant sensor or an Internet connected washing machine, the same platform can be used. It is like the steel beams that make up the structure of a building - it really doesn’t make any sense to produce your own steel as there are a great deal of steel mills that have a competitive advantage over you.

However, as with steel beams, not all platforms are created equal. Choosing one can prove to be confusing. Therefore, we are providing you with this report to be used as a sort of “checklist” to make sure you pick the best among the rest. In the next few pages we will go over seven different traits to look out for, so that you can focus on designing magic rather than remaking your steel structure.



# Chapter One: Infusing your magic into “things”

## The Product Cycle of an Internet of Things Device

Today is the best day to make a connected product. Seriously! Never before in the history of mankind has it been easier to build a prototype, design the mechanics of a product, manufacture it anywhere and sell millions of units through crowdfunding campaigns, pre-sales or direct channels. And the good news is that tomorrow will be even easier.

With the introduction of the Web in the 1990s, smaller companies and entrepreneurs were able to achieve the same success as bigger companies with smaller teams. The same phenomenon happened when mobile platforms were opened to developers. And in the same way that the web and mobile platforms were revolutionary and disruptive, the Internet of Things is the next bottom-up technology that is going to change the technology scenario.

Nevertheless, a typical product cycle of an Internet of Things device - or any device for that matter -, goes through a number of stages. The road through hardware development is plagued with challenges and drawbacks. So, do not compare web or mobile (software) development with hardware development, and neither IoT platform development.

To build an Internet of Things solutions you should go from the idea stage to a prototype. Prototyping is key to understand if people love your idea and if they would pay for it. Once you have convinced first clients and (probably) investors, it's time to jump towards the electronic and mechanical design of your product. This stage is really important. During the prototyping stage maybe you can use 3D printing, Arduinos or you name-it. However, on the electronic design you will need to choose the right micro-controllers chipsets, communication modules, antennas, among other dozens of different components that will define the size of your product.

Once you defined the micro-controllers, modules, etc. it's time to start with the embedded programming to start generating data. Here it's important to have defined the right IoT platform as a partner to start testing your firsts units. When everything starts to roll-out you should be ready for the pre-series, certifications, and more stages that you still need to overtake. Ah! and the mobile application if needed with a beautiful user experience.

For instance, you will need a team of superheroes working with you. If not, our suggestion is to find the right partners and start doing what you do best. [We love the concept of KISS. Keep IoT Simple, Stupid.](#)

### Why you should stick to what you do best

When building a device connected to the Internet, like a smartphone-controlled appliance, the last thing you should be doing is investing resources and efforts on the wrong areas. Building an IoT platform when there are many excellent options available is one of these costly decisions. But with the complexity of the technology, it is often hard to know if you are choosing the best solution for you and your team.

## 1. Focus

Making things that people love is no easy task. While it is difficult to determine why some projects fail and others succeed, the latter always share a common trait: focus. There are only a certain number of core issues you can deal with, and it is always best to target those that make you stand out from your competitors. Designing, making and producing the hardware. Building the mobile app. Adding your special sauce that makes it do something nobody else could. Marketing your product and raising awareness. There is just enough work to go around.

In the early days of Ôasys, this is exactly what the picture looked like. They had received an investment and had enough money to explore different routes. The team had a strong technical background. These factors can turn into the biggest obstacle, as overconfidence quickly leads into a barrier for sound business practices.

A team of freelance developers started creating an APP that would link to the Ôasys device. The water meter - already in place - also had to connect to both in order to send real-time data. This of course was not possible without an IoT platform driving and “translating” the traffic. The signal that the water meter sends in GSM (a protocol for that has to be defined) and was [sending data via HTTPS to the backend](#).

Building your own IoT platform is not one of those issues. It requires a high intensity of resources and headaches, and at best, you will end up creating an IoT platform that is just as good as a specialized provider. While a plant sensor and a self-driving drone appear different from the outside, the software layers that keeps them operating is pretty much the same.

Customers will love you for creating a great product that nobody could envision better and designing it in a way that no one else could. So concentrate on that and leave the rest to someone else.

## 2. Speed

It's cold out there. As original as an idea may sound, if it is good, somebody else has probably thought of it. Product development is now based around the hypothesis that the faster you can iterate your idea, the faster you can end up finding something people want to buy. Most importantly, before the competition gets there. This is true in a startup's early stages, but also true for an established company looking to keep ahead.

Again, focusing your resources on the back-end platform will not give you a competitive edge. Instead, it will deprive you from hitting the right spot of your idea and design before somebody else does.

### 3. Resources

No matter if you are an early-stage startup or a consolidated company, a project is always constrained by the same three factors: time, money and talent. Having these three resources centered on the wrong issues will ensure failure. Hence, forget investing them on an IoT platform that a specialized provider can offer.

- What happens if your backend developer leave the company?
- Variable cost vs fix cost (servers, people, ...)

### 4. Reliability

Devote your best talent, money and time to create your own back-end platform and you will create something great. But hardly better than that of a company whose entire team is devoted to the building and maintenance of an IoT platform.

The IoT platforms are complex architectures where one minimum wrong component could signify disaster in your company. Make sure the people building it are solely devoted to it.

### 5. Security

Customers will judge you based on how your product looks, feels, performs and how it provides value. But they will crush you if word gets out that their personal data is not secured. This critical element, often overlooked in a project's early stages could result in major headaches down the road.

And not only customers, the [retailers are getting annoyed by IoT companies](#) who are by-passing them thanks to their IoT solutions. If you are selling your IoT products through retailers, check with them what type of security and privacy level are they comfortable with.

Even more important is the fact that threats are constantly being updated, and so should your IoT platform. That is a task best left to the experts.

## Chapter Two: Choosing your magic wand

### Make sure it is designed for your business

Getting the technology right will ensure that you have a working product. Getting the business right, will ensure you have a product that people want to buy. As you can imagine, getting the latter right first will ensure you actually have a business. Check the [IoT canvas model](#) we created for that.

For this reason, it is very important that your IoT platform provider understands your business. At different stages of your product development you will have different needs. When you are at the early prototyping phase, speed will be a factor. So ask yourself this:

- ☐ Does the IoT platform have easy to connect to your mobile app?
- ☐ Is the IoT platform supported by the selected communication protocol?
- ☐ Is there a community built up around it that can offer assistance or solve typical beginner problems?

Once you have detected interest in your device, you might want to target other customer segments. You will probably start perfecting your mobile app or dashboards. You might want your device to interact with other devices (home, industry, among others). These segments might use different devices to connect (Android, iOS, Alexa, etc.). The goal at this stage is not so much speed but the versatility of your provider. The following questions should arise:

- ☐ Is it platform agnostic?
- ☐ Is it hardware agnostic?
- ☐ Can it “speak the language” of other IoT devices?

Having validated the interest in your device and detected customer segments, your next goal should be to scale up. Here, reliability and security should be your focus. Ask yourself this:

- ☐ Is there a team in charge of maintenance?
- ☐ Do they have tried and true tests for large scale customers?
- ☐ Do they offer 24h assistance?

In short, make sure your platform can not only assist you in all stages, but actually be able to scale up to the next one. You do not want to be constantly investing time to look for a new partner.

### Make sure it can actually get the job done

This may sound trivial, but it is vital. Can it actually connect the thing? You will want to look out for the following:

- ☐ Can it handle all needed protocols?
- ☐ Will it reach the Internet?
- ☐ Does it understand the newest payload codification?
- ☐ Does it enable the creation of new service integrations or features?

Devices “speak” in different signals. The most common - and probably those that you are most familiar with are: [LoRa](#), WiFi, GSM, [USSD](#), LTE-M1, NB-IoT, [Sigfox](#) and more. Your platform should be able to speak in all the technologies that your business talks.

## Make sure you can build a cool app

“Connected Things” are not complete without their mobile app in some of the Internet of Things use cases. This requires your IoT platform to also support a multitude of features, APIs and more requirements. You will want to make sure that the same IoT platform you use for your devices can also perform well as a back-end platform for your APPs, or you will end up having to connect different platforms from different providers.

## Make sure it has the right perks to boost your business

Metrics are the secret ingredient for success. Customers will not directly tell you what they want, you will have to find out for yourself. You will want to track what your users are doing and how. However, when it comes to data, it is not only about the quantity but about the quality.

Seeing what cohorts of users are doing using your device will help you gain insights that simple tracking will not. Great analytics help you visualize your income funnel, which is an crucial when detecting where your product can improve. You will have to define your own KPIs according to what it is your project does. Not all platforms are able to cater to your specific needs.

Hence, it is important that your platform can offer real time data and the right metrics. Enquire your provider about the type of analytics they have to offer:

- ☐ What KPIs does it track?
- ☐ What tools does it have?

## Make sure it can speak to everyone and everything

One of the most exciting prospects of IoT is interoperability. This refers to the possibility of different devices interacting to reach their full potential. Imagine a washing machine that lets the lights on the house know when its cycle will begin and end to save up on energy.

However, if the history of protocols has taught us anything, it is that opposing interests will not lead to a standard in the industry. We have different Operating Systems, different versions, incompatibilities.

Hence, achieving interoperability in such a fragmented field is extremely challenging. Think of a good IoT platform as a translator, that can speak the language of all devices, and can do it quickly. To make sure that you capture the full potential of IoT, make sure to ask for interoperability capabilities before you make your decision.

## Make sure you will always be supported

Every device has specific needs and will need to focus around certain areas. To improve your experience using an IoT platform make sure you will be supported when needed by the right people. Sometimes your company will need technical assistance, in other occasions it will need business model suggestions and more. Don't hesitate to request what knowledges your IoT platform provider can bring to your company. Think on the IoT platform provider as a partner, not just a provider. With that in mind you will be successful.

## Chapter Three: The focus of value and the Internet of Things

Success on IoT is not easy journey. As you saw too many stages are needed to reach success. Even sales and marketing need to excel. Once we met one of these successful IoT companies on the connected home. We met because they were struggling with their success. The IoT platform was not dimensioned with their current needs (thousands of connected devices), it was clear that the MVP (minimum viable product) they built at the beginning arrived at its last days.

They needed to buy or build an IoT platform. That was a difficult decision. And it was a complex decision for the CTO and the CEO. To build a new IoT platform meant to deal with angry customers and bad reviews probably during the next 6-12 months of development. To use an existing IoT platform probably would end their current issues in 1-3 months. Nevertheless they chose to build a new one. Currently this company does not exist anymore but they had two different IoT platforms for two products they had on the market.

The intention of this report is not only to provide the reader with tools to make a wise decision on integrating with the right IoT platform, but to drive the focus on value creation. There is a common misconception in new connected device projects that the Internet of Things is about connectivity. It is definitely an underlying virtue, but it is not what this new technology wave is about. Innovation is about satisfying real needs and problems, and the makers in the Internet of Things must keep this in mind.

Let's imagine a startup that is creating a light-bulb that can be turned on and off from your mobile phone. This system will require an IoT platform that receives the signal from the phone and sends it to the light-bulb. That needs to happen from home, from your office or even using the Alexa. This IoT platform is complex, so instead of investing resources in building their own, the CEO chooses wisely to look for a provider on the market. She finds a mind-boggling amount of choices available, both IoT-specific and non-specific platforms. The CEO knows that adapting to the platform has a cost and cannot spend her developer's time setting up the light-bulb with different providers. She can read this report and know what to look for when making her decision.

Now, let's imagine a project manager of a company that manufactures a washing machine that is controlled with the mobile phone. He knows that he could do so much more with it. The appliance could download washing programs from the clothes manufacturer. It could interact with other appliances to save up energy. However, budget is tight and he has to deliver results quickly. So instead of looking for the money and developers to make his platform "interoperable" and to be able to "understand" the language of other IoT devices, he decides to get rid of the old platform and look for a new one. He searches some information on the internet and comes across this report which will help him base his decision to find a more sophisticated solution.

By reading up on what to look out for when making your decisions, you will be able to understand the full scope of the Internet of Things. This report is not only an aid to decide what platform to look for, but also an outline of what such an IoT platform can do for you and your company.

This report is written in a way that goes straight to the point and helps you to make decisions related to your business. This decision is on what provider you should look to connect your next IoT devices. And remember Keep IoT simple, Stupid!

## How can we make you more successful with IoT?

Making an IoT product is tough and we want to see you succeed.

What was the most valuable thing you learned from reading this ebook? Let us know by filling out [this short survey](#) and we'll respond.

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