

WHITEPAPER

INTERNET OF THINGS IN CONSTRUCTION

5 FREQUENTLY ASKED QUESTIONS



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INTERNET OF THINGS

What is it and what can construction companies do with it?

The term Internet of Things has become increasingly popular over the last few years, although it has actually existed for a long time, i.e., going back many years. It is probably one of the most talked about technological developments in the construction industry at the moment. But how far away are we from actually using and benefiting from the Internet of Things in construction? How complex is it and what can you do with it? Or perhaps how do you get ready for it if the Internet of Things is to change the industry considerably in the coming years?

We live in times of constant change driven by technology. Houses are becoming smarter. Thermostats for maintaining an ideal home temperature can be seen in almost every home. Doorbells with camera that notify you about every detected movement close to your house are becoming the norm.

But what can the Internet of Things do for your company? For example, how can IoT enable you to work more efficiently, incur lower costs, generate more sales and/or strengthen your competitive position?

We aim to answer the most frequently asked questions and have made a step-by-step plan that will help you make the most of using IoT.

Do you still have questions after reading this whitepaper? Contact us and we will be happy to help.

FREQUENTLY ASKED QUESTION 1

What is IoT?

The Internet of Things (IoT) refers to machines and devices that communicate with each other via the Internet. It means any hardware that possesses a “digital pulse” enabling it to communicate with the outside world.

REMOTE INSIGHT

Let’s take, for example, a central heating boiler or heat pump. With sensors they measure certain aspects of the operation of the device such as a number of operating hours, water level and heat production. What these sensors measure is communicated to your computer via the Internet on which they are both connected. Therefore, you can track the performance of the device remotely.

ALWAYS UP-TO-DATE INFORMATION

IoT can also play an important role in the prefabrication of pipe systems. Prefab sets are now identified on the basis of fixed numbers and drawings. However, that is static information. If something changes during the construction process, the specialist subcontractor is not made aware immediately. That would be different with the application of IoT. By making a link between the BIM file and chips on the piping system, the most up-to-date information is easily accessible by simply scanning those chips. If something changes, the on-site team is notified straight away.

This is just an example and such an application is possible for other materials that are used during the construction and/or installation process. For example, having an instant update on what materials are already available at the construction site.

Thus, time and cost savings can be achieved by vastly reducing a lot of unnecessary driving back and forth.

NEVER LOSE ANYTHING AGAIN

Another example where IoT comes handy is linked to installing and maintaining sensor devices. Connected via network, sensors indicate performance, usage and wear-and-tear. This is how specialist subcontractors receive an overview of all important data, can plan preventative maintenance and know exactly what part must be replaced.

Fun fact:

Because IoT is now so widely discussed, the impression may be that it is a relatively new development. But that’s not true. Machines have been able to “talk” to one another via networks for some time now. Loads on ships and trucks have been tracked since 1990s. Smart ATMs have even been around since 1974.

What is new is that it is now developing very quickly. The technology is becoming more accessible and the costs are therefore lower. At the time, cabling was needed for those smart ATMs. Now they benefit from much smaller and cheaper sensors. Moreover, many more networks are available.

There are a number of special IoT networks that make the transmission of short messages with using Low Power local networks and communication devices. This is necessary because sensors work mainly on batteries that need to last a long time. This is what IoT networks are designed for and it makes it easy to send data from those sensors.

FREQUENTLY ASKED QUESTION 2

Why apply IoT in the construction industry?

There can be various reasons for applying IoT.

TO WORK MORE EFFICIENTLY

Think about how much more work you can do if you gain remote insight into the operation of devices. In the event of a breakdown, you already know what is going on and the engineer with the right expertise and materials can be assigned to do the job.

Furthermore, you will no longer be surprised by breakdowns as you will see them trending up or down via the information that the device sensors send. This makes it a lot easier to plan staff so that you can fully optimise the use of resources.

LESS COSTS, MORE SALES

It is also possible to work per region via the information that the devices send to you. Your technician will have information on what needs to be fixed, what parts are required and be able to prioritise work that is closer to them rather than be on the road.

IMPROVE RELATIONSHIPS WITH CLIENTS

A reason to apply IoT may also be that you want to strengthen relationships with your clients. When you have the information about parts or devices deteriorating and not performing, you can carry out preventative maintenance to avoid down times for your customers. Of course, a field engineer who comes timely with the right tools and solves a problem leaves a good impression and promotes good customer relations. That is a far more positive experience than an engineer who comes again and again trying to fix the problem.

STRENGTHEN YOUR COMPETITIVE POSITION

And what do you think of the insight that the customer gets in the service you deliver?

Now your engineers may generally visit customers once every 6 months to replace the air filter, for example. However, that frequency may not be necessarily required. If a building is located in a nature reserve, then perhaps it can be done less often than if the building is located close to a highway. Furthermore, your customer might wonder what you have changed looking at the half-year invoice. Using IoT you can send an invoice with data that shows that the air filter actually had to be replaced.



FREQUENTLY ASKED QUESTION 3

What can the application of IoT yield (financially)?

We already answered this question above:

- working more efficiently reduces your admin and travel costs,
- better relationships with your clients will save you money,
- new earnings models increase your revenue streams,
- strong competitive advantage gives you money.

Still concerned? Applying IoT requires an investment but do you generate more revenue if you carry out preventative and planned maintenance rather than once every 6 months?

To answer these questions, we would like to give you the example of a number of material services. What can construction industry learn from applying IoT in other industries?

WHAT INSIGHTS DO I NEED?

IoT has everything to do with measuring and to measure things you need sensors or chips. The material service from this example found out that all the machines it used already had sensors. Based on the insights they wanted to obtain, the company determined which data from these sensors was needed for the purpose. In their case it came down to location, oil level and the number of operating hours.

Practical example

Let's talk about safety at the construction site for a bit. With IoT it is now possible to have real-time visibility into who is working where regardless of the construction site size. For example, if someone leaves a gate open, you immediately know who has been there and who you should talk to about it. Sensors in clothing, helmets or special glasses can perform measurements that sends the employee or manager a report in case of unsafe situations.

Furthermore, hazardous substances and/or dangerous noise levels can pose a risk to employees. Measuring exposure to harmful substances in the workplace is usually time consuming. Unfortunately, possible harmful effects are often identified afterwards when damage may have already been done. With the Internet of Things, a system can measure the dangers in real-time via personally worn sensors. The data is sent via the sensors to a cloud platform, where that data is analysed, aggregated, filtered and alerts triggered using pre-set rules when there is a threat.

SAVING TIME

The need to know the exact location of machines came about because engineers had to regularly look for a machine in the event of a breakdown. The machine was then used by a customer somewhere along the highway, but where exactly was always the question. That search of course took a lot of valuable time. Now, with the deployment of IoT, equipment service always knows exactly where the machines are and the engineer no longer has to look for them.

SECURITY

IoT sensors, using their in-built GPS, allow you as a business to locate and verify that equipment, such as Plant, is where it's supposed to be, at all times. This will help with theft or mis-use of equipment in unauthorised locations

SCHEDULING TECHNICIANS BETTER

Getting an error code when oil or fuel level was too low in an on-site storage tank, was a wish because then service can prevent breakdowns. As a result, customers do not experience any downtime and the equipment service can better plan the deployment of engineers.

NEW EARNINGS MODEL

Accurately recording the number of operating hours is quite important. On the one hand, the equipment rental company can charge running hours instead of the period that it rents the machine (the number of weeks or months). The business would also know exactly when maintenance is required.

On the other hand, it can give clients insight into the use of the machines. It often happened that a customer rented a machine for a longer period of time, but that machine was not used at all for much of that time. Therefore, the customer paid for the rental of the plant more than they should have.

MORE OR LESS SALES?

Is this last example loss of revenue? After all, the plant hire company could have left the customer in the dark and simply sent an invoice for the weeks or months that the customer rented the plant for regardless of the number of operating hours. Yes, that's possible.

By giving the customer an insight into the number of operating hours and pointing out to them that plant is not being used but paid for, the plant hire company builds a strong relationship with customers. In addition, if the customer return is sooner, the equipment rental business can rent the plant to another customer and increase revenue. Hence, it actually generates more revenue and a growing happier customer base.

COST-BENEFIT ANALYSIS

It takes time to set up such an IoT process and make it work properly. It requires both workforce capacity and the right partners. We will return to this in our step-by-step plan, but it goes without saying that you make a cost-benefit analysis before working with IoT. After all, you do that with every investment decision. If a certain IoT bet yields you less in the long run than it costs, then it is probably not worth the investment.



FREQUENTLY ASKED QUESTION 4

What do you need in order to benefit from IoT?

Let's get insight into both the practical and the strategic side of IoT.

PRACTICAL: SENSORS AND/OR AN IOT DEVICE

In practical terms, you need data and devices (sensors or chips) to retrieve that data. Sometimes you can arrange that yourself. Let's take a look again at our customer who has a number of performance contracts in healthcare. This customer developed an IoT device with a few sensors to take the measurements important for contract compliance.

Often, however, you are dependent on your supplier for obtaining data such as the service company from the example above, which depends on its suppliers for the placement of sensors.

The expectation is that these steps will be made quickly and businesses figure out relatively easily who they can partner with. The equipment service, for example, already selects its machine suppliers for this. Suppliers who do not want to work with (certain) sensors or who do not make data available will no longer enter this equipment service. This development is also envisaged for suppliers of central heating boilers and other appliances. You can imagine how much impact that can have on companies. Both on suppliers and on installation companies that do not respond quickly enough.

ICT AND IOT KNOWLEDGE IS ESSENTIAL

What you also need in practical terms are people with affinity in IT and a specialised IoT partner to get the insights from the data you are looking for.

Why the latter? If we go back to the example about the service company: every supplier uses different sensors and different code language. The service company needs a specialised IoT partner who can translate the data into readable and recognisable information.



What about privacy, security and legislation?

An important question to ask when working with IoT is how to deal with privacy and security. Legislation nowadays pays more and more attention to safety in the development of software. It now always meets the latest state of the art. But you also know, that technology is developing at lightning speed and hackers are just as smart as the developers. So be aware of which data you are going to work on, certainly with a view to privacy. Can you trace something from the data to an individual. These are things to constantly think about and to discuss with all parties involved.

INDUSTRY AND PROCESS KNOWLEDGE GO HAND IN HAND

We come into the picture when you need to link that information with the ERP system and thus you link , for example, the contract agreements with the customer. After all, it contains the agreed operating hours or that you do not supply a boiler to the customer but heat. ERP software that can make such a connection with IoT is therefore also a must.

In addition, an ERP system is often dependent on input by people, and therefore actually very static. With IoT you can make the ERP process dynamic and flexible - due to the large amount of data that is processed in the ERP system in a short time.

IT STARTS WITH A BUSINESS CASE

Before you start arranging all the practical things that you need, it is important to think about your strategy. Because what you need to apply IoT starts with a vision of where you want to go with your company and what role IoT can play in this. Do you want to work more efficiently, make better use of your skilled workers and perhaps also offer more enjoyable work, strengthen relationships with your clients, apply new revenue models? These can all be reasons to see where IoT can add something for your company. Therefore, step 1 is always -build a business case for the application of IoT (more on this in our step-by-step plan).



FREQUENTLY ASKED QUESTION 5

How do you approach it? (Our step-by-step plan)

STEP 1

REVIEW YOUR EXISTING PROCESSES AND RESEARCH WHERE IOT CAN ADD VALUE

Step 1 has everything to do with the strategic vision of your company. Where do you want to go? For which “problems” are you looking to find a solution now and in the future? With which services can you bring more benefits to the customer so they can gain a competitive advantage?

Take the current problems of the labour market. It is becoming increasingly difficult to find good, technically trained staff. Can IoT contribute to more efficient processes for your company enabling you to do more work with the same number of engineers? For example, as you gain more insight into the operation of devices and you already know what is going on in the event of a breakdown, the engineer goes to the job prepared with the right tools and materials? As a result, disruption is minimised, engineers are assigned based on location and expertise and planning is improved.

IoT deployment, therefore, does not start with “We have data, we need to do something with it.” IoT starts with: “What can I do to make my business stronger and more efficient?” So always first look at your existing processes and research where IoT has added value.

STEP 2

DO A COST-BENEFIT ANALYSIS AND BUILD A BUSINESS CASE

Step 2 is about determining whether the application of IoT you have in mind is a smart investment. What does it cost to get this IoT process working properly and what does it deliver? For example, is the data easily available?

And if you can obtain that data, what form does it come in? Is it much different data with even more different codes or is it difficult to define? How complicated is it to gain insights from the data that really benefits you? And what do those insights provide for you then? Do you save costs, generate more revenue, can you use more revenue models to bind you and other customers?

In short: do a cost-benefit analysis and build a business case for each specific application of IoT that you have in mind.

STEP 3

GET SUPPORT FROM EXTERNAL IOT SPECIALISTS

We call it step 3 here, but this could just as well be step 1 or 2: get an external IoT specialist. You already need internal IT knowledge from step 1, but external IoT knowledge cannot be missed either. Internet of Things is about huge amounts of data, you need special IoT platforms for that. Moreover, you most likely need a partner to translate the data into useful insights.

Important note: select a partner who knows your industry and your processes. Only such a partner can properly think about which data is actually relevant and useful to you and what insights you need to get from it to make your business case a success. The same applies to your ERP supplier, which you can best involve early in the process to investigate how simple or complex it is to make the required links.

STEP 4

START COLLECTING RELEVANT DATA

Now, if everything is right, you are ready to collect and interpret data. That will certainly not immediately go smoothly. We always see a trial and error process among our customers who get to work with it. But once it goes well, it brings a lot to your company.

STEP 5

LEARN, IMPROVE AND OPTIMISE

Using the Internet of Things is a continuous process of learning, improving and optimising. You will see that it is becoming more and more useful, that it will work better for you and that it may even provide insights that you had not anticipated, but with which your company generates new streams of revenue.

CONCLUSION

That said: IoT is not something you add to it. It requires a well-considered application, you have to free people for it, hire specialists and have the courage and faith in it. And then you do not have a result the following week, because it is an investment that only pays for itself in the longer term. The art is therefore to start on a small scale and pick the low-hanging fruit. Once IoT is up and running and it becomes visible to the entire industry what it can offer, the rest will go too. It will lead to completely new business models, different types of competition, new solutions, smart new applications.



About the author

Paul Broderick | Paul has developed a keen eye for seeing specific customer requirements and recommending solutions to deliver business benefits and returns-on-investment. In the last three years Paul has focused this experience and knowledge specifically on the Construction industry, where digitisation is now the hot topic in IT, which has evolved and matured to become most relevant in today's construction industry.

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