

IT Project: Internet of Things

An in-depth look at the opportunities and challenges presented by the internet of things (IoT)



In this e-guide

- My first IoT project: A guide for businesses
- IoT in the enterprise - a pragmatic approach
- British breakthrough for IoT-based business applications this year
- Case study: Facilities firm ISS picks IBM Watson IoT to manage client sites
- Case study: Hexagon turns to Salesforce IoT Cloud to smarten up robots
- Case study: MTR Crossrail overcomes tech hurdles to roll out beacons

In this e-guide:

The internet of things, or IoT, is moving from far-fetched to reality in 2016, and more and more enterprises are taking a serious look at how they can capitalise on this to improve their processes. In this e-guide Rene Millman explores how businesses can get the most out of their IoT projects, looking in-depth at planning, implementation, and the risks and rewards of the IoT. We also examine some early-stage use cases for IoT solutions with a look at how robotics firm **Hexagon is using Salesforce's IoT cloud to tune components to** environmental factors, and how Danish facilities management business ISS is using IBM Watson IoT to run hundreds of client sites on a worldwide basis. Meanwhile, analyst Rob Bamforth from Quocirca argues for a pragmatic approach to the IoT in the enterprise, and says it is important for businesses to take a broad, long term view of how this fast-moving and innovative technology fits within their digital strategy.

Alex Scroxton, Networking Editor

In this e-guide

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- British breakthrough for IoT-based business applications this year
- Case study: Facilities firm ISS picks IBM Watson IoT to manage client sites
- Case study: Hexagon turns to Salesforce IoT Cloud to smarten up robots
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■ My first IoT project: A guide for businesses

Rene Millman, Guest Contributor

According to Gartner, there will be 21 billion things connected to the internet by 2020. ABI Research found that there were 16 billion active connected devices last year. The [internet of things](#) (IoT) is already mixing things up and will have many implications for business in the future.

If your enterprise is embarking on an IoT project, it needs to be well prepared to meet the challenges and opportunities that ensue.

But why should an enterprise embark on an IoT project? Ian Hughes, IoT analyst at [451 Research](#), says one of the drivers is that IoT enables the industrial trend towards everything being a service, rather than a product.

“Another driver is that IoT shows innovation to shareholders and customers. The key inhibitor is that the nature of the widespread coverage from device to data is not the natural place many enterprises reside,” he says.

Clive Longbottom, service director of business process analysis at research outfit [Quocirca](#), says there are many reasons to undertake an IoT project.

In this e-guide

- My first IoT project: A guide for businesses
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- British breakthrough for IoT-based business applications this year
- Case study: Facilities firm ISS picks IBM Watson IoT to manage client sites
- Case study: Hexagon turns to Salesforce IoT Cloud to smarten up robots
- Case study: MTR Crossrail overcomes tech hurdles to roll out beacons

“Let’s start with one – a more intelligent building. By pulling together surveillance, heating, cooling, lighting, hot desking and so on, energy savings can be maximised through only applying heating or cooling where it is **needed,” he says.**

Actions can be taken when anomalies are seen, for example in the movement of people, so that a pass card can be instantly revoked, trapping a person in a certain area, or applying geofencing so that they have to take a certain route – directly to security guards, do not pass go.

In supply chains, being able to track items from order through manufacturing and then through [logistics](#) (and making changes at any stage, for example, **‘please deliver these now to Manchester rather than Sheffield’**) means that drivers will be more [effective and efficient](#), and generate cost savings, says Longbottom.

Planning is key

When it comes to developing an enterprise IoT projects, there is a lot to consider. According to Longbottom, the first thing is to plan.

“The idea of an IoT is not to connect everything to everything else – it is to gain the right information at the right time and place for decisions to be made. This is a crucial difference, as connecting everything to everything

In this e-guide

- My first IoT project: A guide for businesses
- IoT in the enterprise - a pragmatic approach
- British breakthrough for IoT-based business applications this year
- Case study: Facilities firm ISS picks IBM Watson IoT to manage client sites
- Case study: Hexagon turns to Salesforce IoT Cloud to smarten up robots
- Case study: MTR Crossrail overcomes tech hurdles to roll out beacons

else will swamp not only a local network but the global internet,” says Longbottom.

He adds that filtering needs to be done as close to the device as possible so that data volumes are minimised. Another aspect that an organisation should be looking at is [maintaining investments](#).

“Just because the IoT sounds like a good idea does not mean that the gazillion devices already on the production line, running smart buildings, security, and so on, have to be replaced – by using the right architecture, they can continue to be used,” says Longbottom.

Implementation

Hughes said planning for an IoT project should not be any different from any **other project**. **“Pilot projects are to understand the flow of data** and an incremental agile approach work. Partnerships are needed with many smaller vendors of platforms and devices, which introduces a management **complexity,” says analyst Hughes.**

However, Longbottom adds that implementation of an IoT project will be different. **“IT is not playing with just IT: the devices could come from Honeywell, GE, Rockwell, Siemens – companies that may well have had little to do with it before,” says Longbottom.**

In this e-guide

- My first IoT project: A guide for businesses
- IoT in the enterprise - a pragmatic approach
- British breakthrough for IoT-based business applications this year
- Case study: Facilities firm ISS picks IBM Watson IoT to manage client sites
- Case study: Hexagon turns to Salesforce IoT Cloud to smarten up robots
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“They will be installed, provisioned and managed by people who may well see IT as disconnected from the real business while seeing themselves as **the crucial engine room of it,”** he adds.

He says [tiger teams](#) will be required and the project must be driven by desired outcomes, not by technical elegance.

“Always ask ‘**why are we doing this? What will we do with the data? What will the end result be?**’. Make sure that anything done is not a case of going down a cul-de-sac. There will be lots of changes ahead, and whatever is put **in place must be able to deal with these changes.**”

If you consider an IoT project to consist of hardware devices and sensors, network and communications, data collection and analytics, then those **categories can be mapped to an enterprise’s core skills, though not all enterprises have all of those at once,** according to Hughes.

When embarking on IoT projects, enterprises should set-up a team of people who have the [knowledge and skills](#) to deliver results from the IoT project.

“**The skills should complement each other and the roles should vary from technical people, who understand the data and subject matter, to business and strategy experts. This team should be able to focus on delivering results, so management support is necessary right from the beginning,**” says

In this e-guide

- My first IoT project: A guide for businesses
- IoT in the enterprise - a pragmatic approach
- British breakthrough for IoT-based business applications this year
- Case study: Facilities firm ISS picks IBM Watson IoT to manage client sites
- Case study: Hexagon turns to Salesforce IoT Cloud to smarten up robots
- Case study: MTR Crossrail overcomes tech hurdles to roll out beacons

Jouni Leskinen, partner and director of research and development at Finnish data analytics specialist Avarea.

Once the team has been established, it should consider how the project is aligned with **the company's mission, vision and strategy, and identify a [real world business case](#)** based on that.

“To get practical results, theories should be turned into practice by making a proof of concept or prototype. This is also a great way to learn about delivering results from IoT that prove the business value. Roll-out happens by gaining small wins with scoped business areas and business units, then **scaling it out to other parts of the company,”** says Leskinen.

Small, fast wins

Using IoT and analytics often requires changes to the company culture. That can be achieved by proving the value of IoT through small, fast wins that demonstrate business value, and by showing how the new way is better than the old way and communicating that to the whole organisation.

“If the business case is to develop new products or services that customers are willing to pay for then it's very useful to find a pilot customer who is involved in the proof of concept and development process,” says Leskinen.

In this e-guide

- My first IoT project: A guide for businesses
- IoT in the enterprise - a pragmatic approach
- British breakthrough for IoT-based business applications this year
- Case study: Facilities firm ISS picks IBM Watson IoT to manage client sites
- Case study: Hexagon turns to Salesforce IoT Cloud to smarten up robots
- Case study: MTR Crossrail overcomes tech hurdles to roll out beacons

He says it is also important to have a business case that's aligned with company's vision, mission and strategy and to prove the value early on by doing a proof of concept in a tightly-scoped area.

“Management should be engaged as early as possible in order to get the resources and support to the project. Engaging customers should prove the value of IoT too, as well as establishing if the customer is willing to pay for the product or service that the business case is about,” he says.

Risks and rewards

Some of the issues associated with IoT involve privacy and security, both of which can be minimised with standardisations and security best practices (both built-in and at the same time enforced by organisations), according to Catalin Cosoi, chief security strategist at [Bitdefender](#).

“IoT ubiquity will not only mean placing more security controls in place but also including them in the [security lifecycle](#) of the company. While the rewards of supporting IoT in organisations have yet to be fully explored, companies cannot afford to be ill-prepared for full-blown IoT market penetration within the coming years,” he says.

There is also a risk that in developing an IoT project that a firm simply deploys technology for its own sake.

In this e-guide

- My first IoT project: A guide for businesses
- IoT in the enterprise - a pragmatic approach
- British breakthrough for IoT-based business applications this year
- Case study: Facilities firm ISS picks IBM Watson IoT to manage client sites
- Case study: Hexagon turns to Salesforce IoT Cloud to smarten up robots
- Case study: MTR Crossrail overcomes tech hurdles to roll out beacons

You need to be careful about “getting carried away with the hype without researching how people will use your product, or having a clear idea of why **it exists**”, says **Nick Thompson**, creative technology director at design services provider Foolproof.

Watch out for the hype

This is echoed by Matt Clarke, CTO at digital agency Amaze. He says it is all too easy to caught up in the excitement of IoT without stopping to consider how to really unlock its true potential.

“Those who approach it as a gimmick or with a short-term mentality without creating a strategy around how it can really add value will ultimately fail. Just getting products to turn off remotely, for example, will not cut it. There needs to be real innovation and use,” he says.

Thompson warns that another risk is that business may simply do nothing **and not act on their ideas.** **“The companies who have successfully cracked the IoT have taken huge risks to become market leaders,”** he says.

However, the rewards of a successful IoT project for an enterprise are potentially huge: cost savings, new income streams, efficient business processes and happier customers.

In this e-guide

- My first IoT project: A guide for businesses
- IoT in the enterprise - a pragmatic approach
- British breakthrough for IoT-based business applications this year
- Case study: Facilities firm ISS picks IBM Watson IoT to manage client sites
- Case study: Hexagon turns to Salesforce IoT Cloud to smarten up robots
- Case study: MTR Crossrail overcomes tech hurdles to roll out beacons

Craig McNeil, global IoT practice lead at Accenture Mobility says IoT can transform not only operations for enhanced productivity and increased efficiency, but also business models and [potentially entire markets](#).

“Product-to-service transitions will become a viable strategic choice for all industries thanks to the proliferation of the IoT, platforms and the new ecosystems and partnerships they encourage. This will allow traditional products companies to transform their approach to revenue generation by trying something new,” he says.

“Open IoT platforms can help to minimise risk, speed time to market and encourage increased experimentation for enterprises by enabling ‘fast fails’ for any IoT projects.”

This will set the scene for the coming years where IoT will become genuinely integral to everyday enterprise operations, in ways that will differ for each **business and haven’t necessarily been identified yet.**

➤ Next article

In this e-guide

- My first IoT project: A guide for businesses
- IoT in the enterprise - a pragmatic approach
- British breakthrough for IoT-based business applications this year
- Case study: Facilities firm ISS picks IBM Watson IoT to manage client sites
- Case study: Hexagon turns to Salesforce IoT Cloud to smarten up robots
- Case study: MTR Crossrail overcomes tech hurdles to roll out beacons

IoT in the enterprise - a pragmatic approach

Rob Bamforth, Guest Contributor

There is a degree of hype surrounding the internet of things (IoT) with many wild ideas reminiscent of ideas for internet businesses during the dot com boom. Despite this, the combination of exuberant innovation and pragmatism is already paying off with some practical and tangible business benefits. However, it is important for businesses not to solely focus on the **shiny nature of 'things' but to take a broader view with their digital connected strategy.**

A recent event, hosted by Mitie, in conjunction with Samsung and TBS Mobility, brought together many important aspects that underpin how IoT technology and wearable devices could have a significant impact on businesses.

WIRED magazine gave presentation of current innovation in this area, which explored the potential for dramatic impact, especially for consumers. Only a couple of years ago many of the ideas would have seemed fanciful and far-fetched. All were based on current concepts ranging from working prototypes to customer ready products.

In this e-guide

- My first IoT project: A guide for businesses
- IoT in the enterprise - a pragmatic approach
- British breakthrough for IoT-based business applications this year
- Case study: Facilities firm ISS picks IBM Watson IoT to manage client sites
- Case study: Hexagon turns to Salesforce IoT Cloud to smarten up robots
- Case study: MTR Crossrail overcomes tech hurdles to roll out beacons

From 'consumerisation' to industrialisation

Consumerisation is important as it lays the groundwork for increased acceptance of technology in both the home and workplace. Recent Quocirca research of UK company attitudes to IoT and wearable devices (["The many guises of IoT"](#) report) has noted a growing appetite for the use of these technologies, especially if both line of business and IT are working together.

This is something that Mitie has addressed with the application of IoT and wearable devices to aid facilities management tasks. Many of the activities involved in managing, securing and cleaning workplaces and facilities may seem straightforward. They may not appear to be obvious contenders for the use of novel technology, but there are opportunities to streamline processes.

The simple repetitive task of cleaning toilet facilities is one area being addressed and has already provided interesting results. Most people will be familiar with the signed sheets outside on the wall indicating when a facility was last cleaned, usually once per hour. But this routine approach to maintenance ignores actual usage of facilities and consequent requirements.

By use of a simple sensor monitoring **'traffic' levels**, Mitie has gained an understanding of usage patterns. In the past this sort of checking might

In this e-guide

- My first IoT project: A guide for businesses
- IoT in the enterprise - a pragmatic approach
- British breakthrough for IoT-based business applications this year
- Case study: Facilities firm ISS picks IBM Watson IoT to manage client sites
- Case study: Hexagon turns to Salesforce IoT Cloud to smarten up robots
- Case study: MTR Crossrail overcomes tech hurdles to roll out beacons

have been conducted periodically and analysed after the event to establish new working routines. Now the data can be acted upon immediately and dynamically; if the facilities have not been used, then no work is required, but if usage suddenly rises (perhaps a large meeting or event), a message is sent directly to an operative to act.

The combination of IoT with the use of devices worn by the operatives – in this case Samsung smartwatches – means that the messaging technology does not get in the way or encumber the worker. Added to this the organisation does not have to provide what would once have been much more expensive IT to its workforce. The process has been streamlined, but service levels are also improved.

Incremental investment

The idea does not need to stop there. With some external data sources and analytics, a more predictive approach could be taken. Additional sensors could be added to check the use of soap from soap dispensers and toilet paper so that intelligent replenishment schemes could be put in place. It might seem unimportant to those not directly involved, but like other areas where processes can be semi-automated, real efficiency savings can be made. In low margin services where much of the cost is people, such as facilities management, efficiency makes a big difference.

In this e-guide

- My first IoT project: A guide for businesses

- IoT in the enterprise - a pragmatic approach

- British breakthrough for IoT-based business applications this year

- Case study: Facilities firm ISS picks IBM Watson IoT to manage client sites

- Case study: Hexagon turns to Salesforce IoT Cloud to smarten up robots

- Case study: MTR Crossrail overcomes tech hurdles to roll out beacons

The investment cost has not been significantly high either and this indicates a great way to apply innovative technology to improve a business process:

- First, identify a business problem that could benefit from incremental improvement by gathering more data or applying some level of automation.
- Next, look to technologies that are becoming commoditised by consumerisation so that employee acceptance can be readily achieved and propositions can be tested quickly and deployed relatively cheaply.
- Finally, measure and analyse the return to plot next steps. It might require more investment or enhancement, or even for the current concept approach to just be made more robust. However, if the returns are already demonstrable and the decisions about the next level of investment are based on valid experimentation, then the next small leap is not in the dark.

With current levels of innovation it is clear that there will be many new IoT technologies and concepts over the coming years, but businesses do not need wait. There are plenty of smart devices and sensors available to use today, and costs have already been driven down to levels that make **enterprise applications worthwhile. It doesn't require special IoT magic or**

In this e-guide

- My first IoT project: A guide for businesses
- IoT in the enterprise - a pragmatic approach
- British breakthrough for IoT-based business applications this year
- Case study: Facilities firm ISS picks IBM Watson IoT to manage client sites
- Case study: Hexagon turns to Salesforce IoT Cloud to smarten up robots
- Case study: MTR Crossrail overcomes tech hurdles to roll out beacons

even a CloTO (Chief IoT Officer), just a bit of business led thought combined with smart IT application of what's already available.

➤ Next article

In this e-guide

- My first IoT project: A guide for businesses
- IoT in the enterprise - a pragmatic approach
- British breakthrough for IoT-based business applications this year
- Case study: Facilities firm ISS picks IBM Watson IoT to manage client sites
- Case study: Hexagon turns to Salesforce IoT Cloud to smarten up robots
- Case study: MTR Crossrail overcomes tech hurdles to roll out beacons

British breakthrough for IoT- based business applications this year

Cath Everett, Guest Contributor

This will be the year that [internet of things \(IoT\)](#) technology really moves into the mainstream. Or so says analyst firm Gartner.

An IoT [survey that the researcher conducted at the end of 2015](#) revealed that 29% of large companies were already using IoT-based products and another 14% planned to implement them over the next 12 months, bringing the total of new adopters to nearly half the potential market.

An additional two out of five said they intended to go down this route after 2016, although a significant 38% have no plans for the technology at all. The researchers interviewed 465 IT and business professionals around the world **belonging to Gartner's Research Circle club.**

The keenest adopters were companies in asset-rich heavy industries such as utilities, oil and gas, and manufacturing. The researcher estimated that around 56% of players in these industries would have bitten the IoT bullet by the end of this year compared with just over a third in the service sector.

In this e-guide

- My first IoT project: A guide for businesses
- IoT in the enterprise - a pragmatic approach
- British breakthrough for IoT-based business applications this year
- Case study: Facilities firm ISS picks IBM Watson IoT to manage client sites
- Case study: Hexagon turns to Salesforce IoT Cloud to smarten up robots
- Case study: MTR Crossrail overcomes tech hurdles to roll out beacons

Shift in progress

But while the emphasis to date has been on making internal operational improvements and saving money rather than improving the customer **experience or boosting revenues, a “marked shift” is now apparently taking place.**

Jim Tully, vice president and distinguished analyst at the firm, expects the number of customer-focused initiatives to double from 18% to 34% over the **next 12 months. “In effect, IoT programmes and processes will become competitive marketplace weapons starting in 2016,” he says.**

As a result, the wide range of use cases across nearly all industries will **mean that “2016 will be a very big year for IoT adoption”. The most significant challenge will be how to demonstrate return on investment in order to justify large roll-outs.**

Reality on the ground

So are **Gartner’s findings being borne out in reality so far this year?** According to Martin Garner, senior vice president of market research firm [CCS Insight](#), it is hard to generalise because growth is so sector-specific.

But he adds: “We are at the start of a very big thing here.” He believes IoT is something similar in stature and importance to the development of the electricity market in the early 1900s. Interestingly, though, he adds that

In this e-guide

- My first IoT project: A guide for businesses
- IoT in the enterprise - a pragmatic approach
- British breakthrough for IoT-based business applications this year
- Case study: Facilities firm ISS picks IBM Watson IoT to manage client sites
- Case study: Hexagon turns to Salesforce IoT Cloud to smarten up robots
- Case study: MTR Crossrail overcomes tech hurdles to roll out beacons

many organisations, particularly in the consumer space, are not buying into **the term 'IoT' but rather into the idea of digitising the business.**

Robin Duke-Woolley, chief executive of [Beecham Research](#), agrees. He too believes that different applications are taking off at different rates because of the very different requirements and awareness of the opportunities in different markets. In his view, it is the transport sector, which includes logistic supply, fleet management and telematics, that is the most enthusiastic because it has found the deployment of new technology easy to cost-justify.

Utilities and healthcare

Adoption in the utilities market has slowed lately because of the high level of investment required in infrastructure such as smart meters and smart grids. Healthcare, on the other hand, is a mixed bag, with the remote monitoring of assets in hospitals being the most popular choice.

“Growth rates have been fairly consistent over the last 10 years or so and I do expect them to rise, but not astronomically,” Duke-Woolley says. “So when people talk about [50 billion connected devices by 2020](#), I don’t think it’ll happen – it’s more likely to be five to 10 billion.”

In this e-guide

- My first IoT project: A guide for businesses
- IoT in the enterprise - a pragmatic approach
- British breakthrough for IoT-based business applications this year
- Case study: Facilities firm ISS picks IBM Watson IoT to manage client sites
- Case study: Hexagon turns to Salesforce IoT Cloud to smarten up robots
- Case study: MTR Crossrail overcomes tech hurdles to roll out beacons

This is not least because organisations have to work out what they want to use the technology for, to justify it, trial it and then roll out it out more widely, which all takes time, he adds.

Interestingly, however, the **UK did start seeing a “groundswell” of interest in IoT** among venture capitalists (VCs) during 2015. Caroline Gorski, head of IoT at [Digital Catapult](#), which is focused on driving growth in the UK digital economy, says VCs began thinking of IOT as a separate category to **“technology” for the first time last year.**

Barriers to adoption

The Catapult centres are a network of about 15 organisations established by Innovate UK, a government agency set up to promote innovation. Each specialises in a different technological area and their role is to act as a bridge to help academic researchers turn their ideas into commercial reality before replicating their insights elsewhere.

As for IoT specifically, last year’s [Tech City report](#) indicated that the technology accounts for less than 1% of the activity and workers employed in the tech sector overall. But the “enormous amount of hype” is whetting the appetite of VCs on the look-out for “disruptive players” and “game-changers”, Gorski says.

In this e-guide

- My first IoT project: A guide for businesses
- IoT in the enterprise - a pragmatic approach
- British breakthrough for IoT-based business applications this year
- Case study: Facilities firm ISS picks IBM Watson IoT to manage client sites
- Case study: Hexagon turns to Salesforce IoT Cloud to smarten up robots
- Case study: MTR Crossrail overcomes tech hurdles to roll out beacons

At the research level, some 135 projects have gained about £120m in funding over the last year, with focus areas including healthcare, security and privacy, and energy in the field of smart utilities management.

Risky, expensive and confusing

But the market is still facing some major barriers that will need to be overcome before it can really take off. Garner believes that for many organisations, IoT is simply too high-risk, too expensive and too confusing, and they plan to wait until things settle down and become clearer.

Confusion is being caused by a lack of standards despite the proliferation of technology, and a widespread shortage of data scientists is also not helping matters much either.

“Not enough people get what it’s about, its potential and how to tackle it, and the suppliers don’t make it any easier with their focus on technology rather than business issues,” says Garner. “So there are still significant barriers to adoption in many industries and the effect will be to slow things down.”

Gorski has reservations too, although she believes momentum is gathering. **“A lot of it is about unlocking partnerships and bringing stakeholders together to address challenges, and find ways forward in important areas such as how to share data securely,” she says. “But there are also unanswered questions about who owns the data and how you use it to**

In this e-guide

- My first IoT project: A guide for businesses
- IoT in the enterprise - a pragmatic approach
- British breakthrough for IoT-based business applications this year
- Case study: Facilities firm ISS picks IBM Watson IoT to manage client sites
- Case study: Hexagon turns to Salesforce IoT Cloud to smarten up robots
- Case study: MTR Crossrail overcomes tech hurdles to roll out beacons

deliver services, so privacy matters will have to be addressed before we see **any huge transformation.**”

Case study: British Gas Connected Homes

“Why we decided to move into the IoT space was to differentiate our products and create added value in a very competitive commodity market,” says James Beltcher, head of product for [British Gas Connected Homes](#). “The issue is that energy is energy, so it was about doing more to ensure a great customer experience.”

As a result, one trap that the [Connected Homes](#) team has been careful not to fall into, he says, is pitching its [Hive Active heating](#) system, which can be controlled via a remote mobile device, as an IoT-enabled product. The same applies to the rest of its IoT-based offerings, which include Hive Active plugs, window and door sensors as well as BoilerIQ.

An add-on to **British Gas’s Homecare boiler insurance policy**, BoilerIQ was launched at the end of March. Its goal is to detect problems with domestic boilers as they happen so that engineers are aware of what the fault is and can be sent out to remedy the situation as soon as possible.

In this e-guide

- My first IoT project: A guide for businesses
- IoT in the enterprise - a pragmatic approach
- British breakthrough for IoT-based business applications this year
- Case study: Facilities firm ISS picks IBM Watson IoT to manage client sites
- Case study: Hexagon turns to Salesforce IoT Cloud to smarten up robots
- Case study: MTR Crossrail overcomes tech hurdles to roll out beacons

But, says Beltcher: “We don’t pitch BoilerIQ as an IoT product, although it’s IoT-enabled and uses IoT at its heart. It’s the early adopter space that trawl the internet for new technical products like that, but the wider UK public just care about the benefits, irrespective of how they’re delivered.”

Nonetheless, he believes the IT industry “has yet to work that one out” as the market still tends to be dominated by software engineers “who focus on product features rather than consumer benefits”.

Moving quickly

Another key learning gleaned from three years of experience with Hive, meanwhile, is that in an IoT-enabled world it is vital to tap customer insights quickly to keep on top of their requirements and remain competitive.

This insight has led Connected Homes to move away from undertaking “long-scale qualitative research” using mechanisms such as focus groups. Instead, it prefers to talk to customers directly and even “bring people in off the streets” to access feedback more swiftly.

But the organisation has also learned that “information in the boiler service manual may not necessarily provide the most effective resolution to an issue”. This is because the huge amount of data generated from boilers enabled with IoT sensors – each one transmits data four times a second –

In this e-guide

- My first IoT project: A guide for businesses
- IoT in the enterprise - a pragmatic approach
- British breakthrough for IoT-based business applications this year
- Case study: Facilities firm ISS picks IBM Watson IoT to manage client sites
- Case study: Hexagon turns to Salesforce IoT Cloud to smarten up robots
- Case study: MTR Crossrail overcomes tech hurdles to roll out beacons

makes it possible to spot previously unseen patterns that could indicate future breakdowns.

Boilers that never break down

Beltcher says: “We’ve got insufficient numbers at the moment to build an engine sensitive enough to identify symptoms of potential failures. These are very small symptoms that customers wouldn’t even notice yet, but they’d give us a degree of certainty that part x would fail in three to six months.”

Such certainty would mean the organisation had a “three-month window to make an intervention and ensure that customers never experience a breakdown”. It’s a move that would make a huge difference in customer service terms.

Getting it right, though, Beltcher says, will be both an internal IT “architecture challenge” (due to the sheer amount of data to be dealt with) as well as a process issue. “Making internal change to respond to situations proactively would not be insignificant as we’re a very large organisation. But we will if we can see the benefits both to our customers and ourselves.”

In this e-guide

- My first IoT project: A guide for businesses
- IoT in the enterprise - a pragmatic approach
- British breakthrough for IoT-based business applications this year
- Case study: Facilities firm ISS picks IBM Watson IoT to manage client sites
- Case study: Hexagon turns to Salesforce IoT Cloud to smarten up robots
- Case study: MTR Crossrail overcomes tech hurdles to roll out beacons

Case study: MHS Homes

IoT technology could revolutionise how housing associations manage their buildings, freeing staff up from time-consuming manual tasks to undertake more proactive maintenance, says Gary Clark, operations director at [MHS Homes](#).

MHS is the largest independent landlord in Kent and, along with a small number of other housing providers, joined the [Connected Homes Consortium](#) last year to trial potentially useful new technology.

“The housing sector has in the past sometimes taken a relatively traditional approach to technology, but working with the consortium has really opened our eyes to its potential,” Clark says.

MHS has been involved in three pilot projects this year. The first used drones to conduct surveys of tower blocks where roof access is tricky and it would be expensive to erect scaffolding.

The second involved introducing Blue Maestro sensors into buildings to establish whether any damp and mould issues were the result of structural issues or customer behaviour.

In this e-guide

- My first IoT project: A guide for businesses
- IoT in the enterprise - a pragmatic approach
- British breakthrough for IoT-based business applications this year
- Case study: Facilities firm ISS picks IBM Watson IoT to manage client sites
- Case study: Hexagon turns to Salesforce IoT Cloud to smarten up robots
- Case study: MTR Crossrail overcomes tech hurdles to roll out beacons

The third entailed trialling [Cloudview's cloud-based IoT-based CCTV system](#) at its Saxon Shore site in Gillingham to see what potential benefits the technology could offer over traditional fixed cameras.

Internet-integrated CCTV

Connecting the existing CCTV system to the internet meant retrofitting a network adapter. This adapter uses a broadband or Wi-Fi connection to record whether movement takes place and to store footage in the cloud. This footage can then be viewed in real-time from smartphones, tablets and PCs, and downloaded to provide evidence to the police, if required.

According to Clark, the IoT-enabled cameras demonstrated a number of immediate advantages over traditional ones. For example, most CCTV systems today record data on an onsite digital video recorder, making a site visit necessary to view and download footage or check that cameras are working properly.

Providing a live feed that can be accessed anywhere not only saves time, it also means that housing officers can respond to incidents as and when they happen.

A further benefit is that the cameras can be used to zoom in on potential problems, such as specialist light fittings that have broken. A still can then

In this e-guide

- My first IoT project: A guide for businesses
- IoT in the enterprise - a pragmatic approach
- British breakthrough for IoT-based business applications this year
- Case study: Facilities firm ISS picks IBM Watson IoT to manage client sites
- Case study: Hexagon turns to Salesforce IoT Cloud to smarten up robots
- Case study: MTR Crossrail overcomes tech hurdles to roll out beacons

be taken and sent to the supplier so repairs can take place as soon as possible, thus saving time in the process.

Another time saver is that the system issues an automatic alert if something goes wrong with one of the cameras, ensuring not only quick fixes, but also saving wasted journeys to retrieve non-existent footage.

Resource efficiency

“As with most housing associations, there’s a heavy focus on value for money and efficiency as traditional models of property management are quite HR-intensive, which is by nature costly – although essential,” Clark says. “So there’s a place for technology like this to help us become more proactive and allocate resources more efficiently.”

This, in turn, means that IoT-based systems could have **“quite a dramatic impact on how we manage buildings”**, he adds. Because such technology is relatively inexpensive and can help solve obvious problems, he does not expect it to take long to move into the mainstream.

“As a fundamental idea, it works, so I’ve got high hopes for products like this,” he says.

➤ [Next article](#)

In this e-guide

- My first IoT project: A guide for businesses
- IoT in the enterprise - a pragmatic approach
- British breakthrough for IoT-based business applications this year
- Case study: Facilities firm ISS picks IBM Watson IoT to manage client sites
- Case study: Hexagon turns to Salesforce IoT Cloud to smarten up robots
- Case study: MTR Crossrail overcomes tech hurdles to roll out beacons

Case study: Facilities firm ISS picks IBM Watson IoT to manage client sites

Alex Scroxton, Networking Editor

Danish facilities management and office services provider [ISS](#) is to embark on a major transformation project across its global customer base by implementing [IBM Watson IoT](#) (internet of things) to manage 25,000 client buildings.

ISS specialises in building maintenance, janitorial services, office supplies, building security, facilities management, catering services, and so on, and is **one of the world's largest private employers, serving a client list that includes Nordea, Novartis and [Rolls-Royce](#).**

According to ISS chief operating officer Martin Gaam, the building services sector has spent a number of years moving away from input-based contracts – for example, providing x meals per day in a factory canteen – towards outcome-based contracts. The advent of the [IoT](#), he said, helped advance that shift in his business model.

“Sensor technology makes us better at making services available to clients and their end-users on demand,” said Gaam. **“It means we deploy our**

In this e-guide

- My first IoT project: A guide for businesses
- IoT in the enterprise - a pragmatic approach
- British breakthrough for IoT-based business applications this year
- Case study: Facilities firm ISS picks IBM Watson IoT to manage client sites
- Case study: Hexagon turns to Salesforce IoT Cloud to smarten up robots
- Case study: MTR Crossrail overcomes tech hurdles to roll out beacons

services where they are needed and our people are not wasted doing things **that are not visible or adding value.**”

Working with IBM, ISS will use Watson IoT to integrate and analyse data from millions of sensors placed around the buildings it manages. This data will be uploaded onto the Watson IoT cloud platform, where cognitive computing technology will be used to help ISS better understand how people use buildings and optimise its services in response.

ISS has already been trialling the technology at its Copenhagen headquarters, and Gaam said it had already been able to realise a number of efficiencies by determining where and when support staff were needed, and helping to manage the day-to-day office lives of the employees who depend on them.

For example, if people jump into an empty meeting room without having previously booked it, sensors in the room can detect that they are there, adjust their calendars and retroactively book the meeting room to ensure they are not disturbed. The system can also message service staff to bring snacks and coffee if wanted, and cleaners to come in afterwards.

Elsewhere, sensors placed on plate dispensers in the ISS canteen can tell kitchen staff how many people are likely to still turn up to eat during a lunch service, enabling them to prepare the right amount of food and avoid waste.

In this e-guide

- My first IoT project: A guide for businesses
- IoT in the enterprise - a pragmatic approach
- British breakthrough for IoT-based business applications this year
- Case study: Facilities firm ISS picks IBM Watson IoT to manage client sites
- Case study: Hexagon turns to Salesforce IoT Cloud to smarten up robots
- Case study: MTR Crossrail overcomes tech hurdles to roll out beacons

Nils van der Zijl, IBM Watson IoT Europe business unit executive, said the relationship covered not only the IoT, but would encompass a major services wrap from IBM, and use of [its facilities management software platform Tririga](#).

“We have a solid plan and partnership,” said van der Zijl. **“In the coming six months, we will be working on a defined blueprint to create a model of how to best deploy this across ISS’s clients.”**

“The rollout is starting in January 2017 and, over 24 months, we will deploy these solutions across 2,000 clients. IBM’s services organisation will be a critical part of the deployment, working with ISS’s local teams from across the globe.”

ISS CEO Jeff Gravenhorst added: **“With a dashboard overview of key building metrics displayed on mobile devices, facility managers will benefit from an integrated, real-time view of the services and supplies within their buildings, enabling them to adopt a more proactive, flexible and responsive approach to building management and customised service delivery.”**

“Putting real-time data into the hands of service staff will help to foster more attentive and service-minded employees, supporting our customers in achieving their priorities. Putting a ‘human touch’ in buildings helps to increase employee productivity, decrease absenteeism and makes a better impression on visitors.”

In this e-guide

- My first IoT project: A guide for businesses
- IoT in the enterprise - a pragmatic approach
- British breakthrough for IoT-based business applications this year
- Case study: Facilities firm ISS picks IBM Watson IoT to manage client sites
- Case study: Hexagon turns to Salesforce IoT Cloud to smarten up robots
- Case study: MTR Crossrail overcomes tech hurdles to roll out beacons

Case study: Hexagon turns to Salesforce IoT Cloud to smarten up robots

Madeline Bennett, Guest Contributor

When Salesforce was looking for customers to pilot its internet of things [\(IoT\) Cloud, unveiled by the software-as-a-service firm in September 2015](#), US-based Hexagon Manufacturing Intelligence was happy to oblige.

Hexagon designs sensors and software that go into spaceships, aircraft and industrial robots. Sectors as diverse as construction, engineering, aerospace, automotive and medical rely on Hexagon to help ensure that parts for anything from medical devices to aircraft fit together accurately. **Hexagon's business is monitoring these sensors, making it a prime candidate for the IoT.**

Hexagon initially took a cautious approach to the IoT phenomenon, because of the hype surrounding it.

Milan Kocic, business development manager for user experience and **innovation at Hexagon Manufacturing Intelligence, says: "There is a truth behind the hype. Making sure you do the right things is more important than going headlong and trying to do everything at once. We looked at what is of particular importance to us."**

In this e-guide

- My first IoT project: A guide for businesses
- IoT in the enterprise - a pragmatic approach
- British breakthrough for IoT-based business applications this year
- Case study: Facilities firm ISS picks IBM Watson IoT to manage client sites
- Case study: Hexagon turns to Salesforce IoT Cloud to smarten up robots
- Case study: MTR Crossrail overcomes tech hurdles to roll out beacons

Before embarking on the IoT project, Hexagon carried out extensive user research, looking at how its customers were operating. An environmental issue was common among every customer.

“Our robots typically are highly susceptible to environmental changes. In the environments they operate in, it’s not so much the temperature, but the temperature changes over a certain time that affects accuracy. They’re also susceptible to vibration, and if someone crashes the robots we have to know about it because it could cause damage internally,” Kocic says.

“Today our customers use notebooks or temperature read-outs to monitor these changes, and technically speaking they’re meaningless because they just tell them the temperature at the time. We asked the customers: if we were to create a product that could improve this, what would you do? And they said they’d buy one.”

Raspberry robots

Emboldened, Hexagon bought a Raspberry Pi kit with sensors from technology start-ups site [SparkFund](#). The firm rigged up some robots using the Pi kit and demonstrated their ability to collect environmental data. The IoT project was born out of that. This led to Kocic and his team thinking about what they could do with the data collected. Hexagon was already a Salesforce customer, using Sales Cloud for its core customer relationship management and [Pardot for marketing automation](#). At around the same

In this e-guide

- My first IoT project: A guide for businesses
- IoT in the enterprise - a pragmatic approach
- British breakthrough for IoT-based business applications this year
- Case study: Facilities firm ISS picks IBM Watson IoT to manage client sites
- Case study: Hexagon turns to Salesforce IoT Cloud to smarten up robots
- Case study: MTR Crossrail overcomes tech hurdles to roll out beacons

time, Hexagon was rolling out field service management software from Salesforce partner ServiceMax; meanwhile, Salesforce was taking early steps in the IoT arena with [Lightning](#). By coincidence, Kocic happened to be related to somebody who works at Salesforce.

“He was one of the lead developers on the Lightning team, and we started talking. He was very into IoT stuff, so we started looking into whether is there any correlation,” Kocic adds.

This had led to Hexagon demoing one of its robots with integration into Salesforce at Dreamforce 2014, showing how it could run the machine via a mobile app and trigger events. IoT Cloud did not exist at the time, so Hexagon just used the Salesforce development platform and a couple of custom scripts to create the demo robot.

Salesforce’s interest was based on wanting to get into manufacturing.

During the show, Salesforce approached Hexagon and revealed the initial concept of the IoT Cloud, aimed at letting firms connect data from the IoT with customer information.

This sparked Kocic’s interest. “We have a device called [MMS Pulse](#) (pictured), which contains sensors for monitoring the environment. When an event happens it goes to the Salesforce cloud and essentially triggers and creates an internal alert in our Salesforce instance. Then we can either

In this e-guide

- My first IoT project: A guide for businesses
- IoT in the enterprise - a pragmatic approach
- British breakthrough for IoT-based business applications this year
- Case study: Facilities firm ISS picks IBM Watson IoT to manage client sites
- Case study: Hexagon turns to Salesforce IoT Cloud to smarten up robots
- Case study: MTR Crossrail overcomes tech hurdles to roll out beacons

ignore it, react to it, keep it as a record, or send some sort of automation response to the customer.

“It is IFTT [if this then that]. We created several Salesforce orchestrations that allow us to create automated responses based on some kind of input from the field.”

Hexagon is currently running IoT Cloud in a test environment, using the MMS Pulse monitoring device that the firm released in late December 2015, connecting them back to the factory and monitoring the data.

“Right now we’re in the midst of integrating the whole IoT Cloud piece into the internal Salesforce. We’re developing into our own internal sandbox to make sure everything works. At some point, whenever anybody says IoT Cloud is live, we just flip the switch and then it goes into the actual instance of Salesforce,” Kocic says.

Hip and knee joints

One of the first Hexagon customers to take up Pulse was Zimmer Biomet, a manufacturer of orthopedic hip and knee joints, which is also a Salesforce customer. Hexagon is working with Zimmer to identify the data it wants, to see if the firms could connect the two instances of Salesforce. However, Kocic maintains that most customers will not be joint Salesforce customers, and nor will they have to be.

In this e-guide

- My first IoT project: A guide for businesses
- IoT in the enterprise - a pragmatic approach
- British breakthrough for IoT-based business applications this year
- Case study: Facilities firm ISS picks IBM Watson IoT to manage client sites
- Case study: Hexagon turns to Salesforce IoT Cloud to smarten up robots
- Case study: MTR Crossrail overcomes tech hurdles to roll out beacons

“I’m sure Salesforce will hope that they are customers at some point, but for us, for our needs, that is not a necessity,” he says.

“Once we gather a lot of data, we can become more predictive in nature, but right now everything we do is very reactive. A machine works, a machine breaks, somebody calls us, they wait, we show up, we order a part. Most manufacturing companies would like to avoid this.”

One area where Kocic would like to see improvements specifically with IoT Cloud is in analytics. While Hexagon is not looking for anything too advanced, it would like to be able to extract more valuable information from the data collected.

“Take an OEM like Ford. It has hundreds of plants, and right now if we were connecting all those hundreds of plants I’m just getting a lump bunch of data and I have to figure out what the stuff is,” he says.

“We would like for them to allow us to say, ‘give me North America, give me Flint, give me Detroit’, wherever the plants are, ‘and let me zero in where the actual problems are occurring, versus getting the generic, global stuff’.

Global stuff is not unimportant, but in our world we would like to get much more granular, to get where the actual problems are and where they're **leading from.”**

In this e-guide

- My first IoT project: A guide for businesses
- IoT in the enterprise - a pragmatic approach
- British breakthrough for IoT-based business applications this year
- Case study: Facilities firm ISS picks IBM Watson IoT to manage client sites
- Case study: Hexagon turns to Salesforce IoT Cloud to smarten up robots
- Case study: MTR Crossrail overcomes tech hurdles to roll out beacons

Salesforce is working on these analytics tools, says Kocic. **“And everything else we’ve encountered has been relatively simple to implement. Usually when you do this kind of implementation, it requires 10 guys and six months. I have literally one guy who’s done most of the work, and it hasn’t taken us too long to integrate the data.”**

Hexagon is not currently being charged for its use of IoT Cloud as it is a beta product. IoT Cloud is set to be launched later in 2016, with pricing to be announced at the time. Salesforce is using the project as a test case to help decide on charging models for its own customers.

Hexagon, meanwhile, plans to charge its customers a one-off fee for hardware and, once IoT Cloud is running, the firm will switch users to a subscription model charged at around \$100 per month per machine for servicing and monitoring.

Although Hexagon is ploughing ahead with its IoT developments, Kocic advised other businesses to expect a slow process for any projects.

“Everything takes much, much longer than you think. It’s been my experience with development in general, but based on the hype of IoT, it seemed at the time that everybody was way ahead of where things actually are. As we’re getting deeper and deeper into it, we seem to be realising that we’re still at the infancy in many different ways.”

In this e-guide

- My first IoT project: A guide for businesses
- IoT in the enterprise - a pragmatic approach
- British breakthrough for IoT-based business applications this year
- Case study: Facilities firm ISS picks IBM Watson IoT to manage client sites
- Case study: Hexagon turns to Salesforce IoT Cloud to smarten up robots
- Case study: MTR Crossrail overcomes tech hurdles to roll out beacons

As a result of the disparity between IoT hype and reality, Hexagon lowered its expectations and adopted a slower rollout schedule.

“We’ve taken a slightly more cautious approach. I thought we would be further ahead than we are now,” Kocic adds.

He says this is partly down to manufacturers’ ingrained fears of connecting everything. Even once firms have accepted the need for widespread connection to obtain the real benefits of IoT technology, there is a lingering concern about security. For that reason, Hexagon is looking to expand and adapt its technical team to tackle security issues.

“I need somebody who knows how to secure data, how to secure connections, and your typical development resources are not of that kind,” Kocic says.

“So we are forced to go externally and find some expertise to help us with that. We have a whole development team in Switzerland that is working on a much larger, technical solution for us, which Pulse will be part of – those guys, together with **us are trying to figure out some of these things we didn’t think about initially.** We had a vague idea, but never really got into it as **deeply as we are going to have to.”**

➤ [Next article](#)

In this e-guide

- My first IoT project: A guide for businesses
- IoT in the enterprise - a pragmatic approach
- British breakthrough for IoT-based business applications this year
- Case study: Facilities firm ISS picks IBM Watson IoT to manage client sites
- Case study: Hexagon turns to Salesforce IoT Cloud to smarten up robots
- Case study: MTR Crossrail overcomes tech hurdles to roll out beacons

Case study: MTR Crossrail overcomes tech hurdles to roll out beacons

Cliff Saran, Managing Editor

MTR Crossrail is rolling out beacons across its network to provide station **auditing and as a driver aide, in what is believed to be one of Europe's** biggest deployments of the low-powered wireless technology.

The railway operator wanted to explore ways to use the technology to help it deliver a highly efficient rail service.

In 2014, Transport for London awarded MTR the contract to run the new Crossrail services connecting Reading and Heathrow in the west with Shenfield and Abbey Wood in the east.

Oliver Bratton, operations director, European Business at MTR Corporation, **said: "A key part of our bid focused on driving efficiencies with mobile. Our aim is to set the benchmark for passenger experience on European metro services and achieve internationally recognised high standards of safety, reliability, quality and customer service."**

Three years ago, MTR Crossrail began looking at the potential of using beacons on its rail network.

In this e-guide

- My first IoT project: A guide for businesses
- IoT in the enterprise - a pragmatic approach
- British breakthrough for IoT-based business applications this year
- Case study: Facilities firm ISS picks IBM Watson IoT to manage client sites
- Case study: Hexagon turns to Salesforce IoT Cloud to smarten up robots
- Case study: MTR Crossrail overcomes tech hurdles to roll out beacons

Working in partnership with [Mubaloo Innovation Lab](#), it deployed a number of beacon-based applications. Over the next three years, Mubaloo will deploy beacons across all 40 stations on the 118km Elizabeth Line.

Mark Daniels, head of IT and business transformation at MTR Crossrail, said: **“We want to be innovative in auditing our train stations.”**

Daniels said that with beacons across the station network, the operator can deploy an electronic audit app running on iPads, which provides a dashboard with a heat map to show where an audits has been done, and which stations have completed their audits.

“We can now go do real-time audits,” he added.

Beacons are also being installed in drivers’ cabs. They will be used to reduce the need for driver input, helping drivers to navigate around a Driver Advisory app.

According to Mubaloo, the beacons will help to deliver greater safety for drivers by reducing distractions and improve overall efficiency by optimising the network.

The technical challenge for MTR was how to enable beacons in close **proximity to each other work effectively, said Daniels.** **“There was a lot of hard work and firmware updates to determine what was causing the problem,” he said.**

In this e-guide

- My first IoT project: A guide for businesses
- IoT in the enterprise - a pragmatic approach
- British breakthrough for IoT-based business applications this year
- Case study: Facilities firm ISS picks IBM Watson IoT to manage client sites
- Case study: Hexagon turns to Salesforce IoT Cloud to smarten up robots
- Case study: MTR Crossrail overcomes tech hurdles to roll out beacons

But once the company had determined the correct firmware to install, it could roll out the beacons without the risk of interference. Daniels said beacons would be rolled out to Canary Wharf, Paddington and other stations.

Next article

In this e-guide

- My first IoT project: A guide for businesses
- IoT in the enterprise - a pragmatic approach
- British breakthrough for IoT-based business applications this year
- Case study: Facilities firm ISS picks IBM Watson IoT to manage client sites
- Case study: Hexagon turns to Salesforce IoT Cloud to smarten up robots
- Case study: MTR Crossrail overcomes tech hurdles to roll out beacons

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