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Breadcrumb

Insight navigation

- [Latest insights](#)
- [Latest news](#)
- [Articles](#)
- [Case studies](#)

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How to make the most of the smart home revolution

Alex Bookless, Technical Director, and Andrew Blance, Data Scientist and innovator, discuss how to begin your IoT journey.

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Over the years, the potential of internet of things (IoT) devices to help housing associations improve their service has been becoming clearer. From improving a property's sustainability, reducing housing maintenance costs through proactive maintenance, and improving safety and security as the technology continues to advance, and the barrier to entry gets lower, it's clear that the deployment of IoT devices has a lot of real, practical, and value-adding use-cases.

Getting to the position where housing associations can enable tenants to budget more efficiently using data from IoT devices, like monitoring a boiler to predict when it will break, requires a journey. Ultimately, the goal is to use IoT so tenants can take control of, and make more informed decisions about, their homes.

The reality

Ignoring the hype surrounding data, IoT devices, and digital twins, in reality it is difficult to launch initiatives using this technology. A digital twin of your assets, backed with real data to aid decision-making through IoT devices in all properties is an admirable goal, but much further away than many realise, and an enormous undertaking.

These systems are advanced, expensive, sometimes incompatible with current systems, and require a lot of effort to build. But although these are long-term goals, that's not to say we can't begin making progress today – but how do we get there?

Small rollouts of IoT devices targeting specific problems are a great place to start as many industries can be nervous about beginning large-scale deployments of new and untested technologies. Choosing one challenge you believe technology can solve in a small set of homes, is a great way to prove the concept of IoT devices, and begin to make a case for a larger rollout, eventually feeding into a digital twin.

An example could be rolling out temperature and humidity sensors to a block of flats in order to understand if mould will grow inside them. It is then possible to use this data to make decisions about how best to intervene and help the tenant.

Software and hardware considerations

We are on a journey to learn more about IoT devices and the challenges of deploying them. Hardware and software rollouts of devices across many buildings pose many issues: how can I remotely manage all these devices? How can I parse all this data? And how can I make a decision from this?

These technical challenges exist alongside the issues associated with how tenants will react to having devices placed in their homes: who 'owns' the information gathered by IoT devices? How is it secured? What is it used for? What happens is it breaks?

Choosing hardware that is appropriate upfront is essential, and these are some considerations we have had to make, and lessons learned the hard way:

- While devices like Raspberry Pi's seem like a great entry point, they exist primarily as dev units. Developing a Raspberry Pi or an Arduino into something you can guarantee will be safe, secure and professional is hard. The gap between a production-ready unit and the dev kit is much greater than some imagine so picking devices from a hardware manufacturer, instead of building in-house, is strongly recommended.
- A useful option for sourcing hardware is partnering with research groups or universities. Similar to housing associations, there is significant interest across academia to see how IoT devices can be safely deployed, and many of these groups are extremely excited to be involved with industrial partnerships for real world insight.
- Many issues tenants might have when installing IoT devices in their homes, such as connecting to wifi, changing batteries, gathering data, can be solved with technology. We see this in other industries such as manufacturing, where the ideal device is wireless and battery-powered, therefore causing as little disruption as possible, ideally none at all. We are fond of Monnit devices – cheap IoT sensors that communicate data to the cloud over 3G, are all wireless, and have huge battery lives.
- Battery life is an extremely important consideration; the difference between three- and 12-month battery life is financially enormous. Often, by the time an engineering team has changed a sensor battery once, all its financial benefits have been counteracted.

As hesitance to adopt new technology is normal and can cause barriers to progress, it can be removed by having sensors tenants have no interaction with.

The chosen software stack is important too with many options available.

- The lightest touch option will always be proprietary software that might come alongside the hardware you have purchased. Many sensor manufacturers also produce a cloud platform, that you can access as-a-service, to use to view and interact with your data, e.g. Monnit's iMonnit cloud platform.

- Microsoft develops Azure IoT Hub, a platform to register devices enabling you to monitor their health and receive their data, which in turn can then be pushed into other systems you run. IoT Hub is a powerful industry-standard of looking after a fleet of IoT devices.

- Capturing data in IoT Hub allows access Microsoft's set of tools to handle streaming data. Whole articles could be written about this pipeline, but Azure Functions and Streaming Analytics can parse and analyse your data in real time, and these insights can then be pushed into any current Bi solutions that you have (such as Power Bi). Handing data 'outside' in this way enables it to be mixed with other information you have such as maintenance jobs and costs and tenant satisfaction. By not having each piece of information siloed, you will get far greater insight from it.

The end

By focusing on the benefits for tenants, giving them no responsibility but incentivizing usage, fear and resistance to the technological unknown can be overcome, and associations can make the most of the opportunities IoT offers.

Small rollouts to prove the concept of IoT sensors can be a powerful way to show their value. Targeting common issues like damp and mould can have a direct and hugely beneficial impact on the tenant and the housing association. Modern devices provide cheap and reliable ways of gathering data, and mixing this with Microsoft's tech stack provides a trustworthy base to make data-driven decisions.

The smart home revolution is here, and housing associations have a significant opportunity to embrace this technology in a way that requires little tenant input, but can ultimately help them as much as meeting the housing associations' own needs. It might be an adventure to accomplish this, but it will be worth it in the end.

To find out more about how we're supporting the social housing sector, as well as how we're innovating across all industries, get in touch at info@waterstons.com.

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