Developing an intelligent leak management system

Case study: Leak management

Halving leakage rates by 2050 by connecting smart monitors across IoT networks

Business challenge

Ofwat, the water regulator in England and Wales, is setting more stringent leakage targets for water companies than ever before. The sector is expected to cut leakage by 16% during the 2020-25 regulatory period, rising to 50% by 2050 compared to 2017/18 leakage levels. This comes at a time when extreme dry weather caused by climate change increases leak rates due to ground movement.

We're positioning ourself as a trusted partner of the water companies, committed to providing the predictive maintenance technologies required to hit Ofwat's leakage targets. We're determined to help build a smart water network across England and Wales using Internet of Things (IoT) connectivity.

Digital opportunity

Many leaks never show up on the ground surface, so it's a round-the-clock challenge to find and fix them. Much of the time, this involves the water engineers using more traditional labour intensive techniques to locate leakage before digging holes to resolve it. The use of IoT technology will allow leaks to be accurately and remotely identified earlier than usual, resulting in reduced leakage and fewer holes in the road.
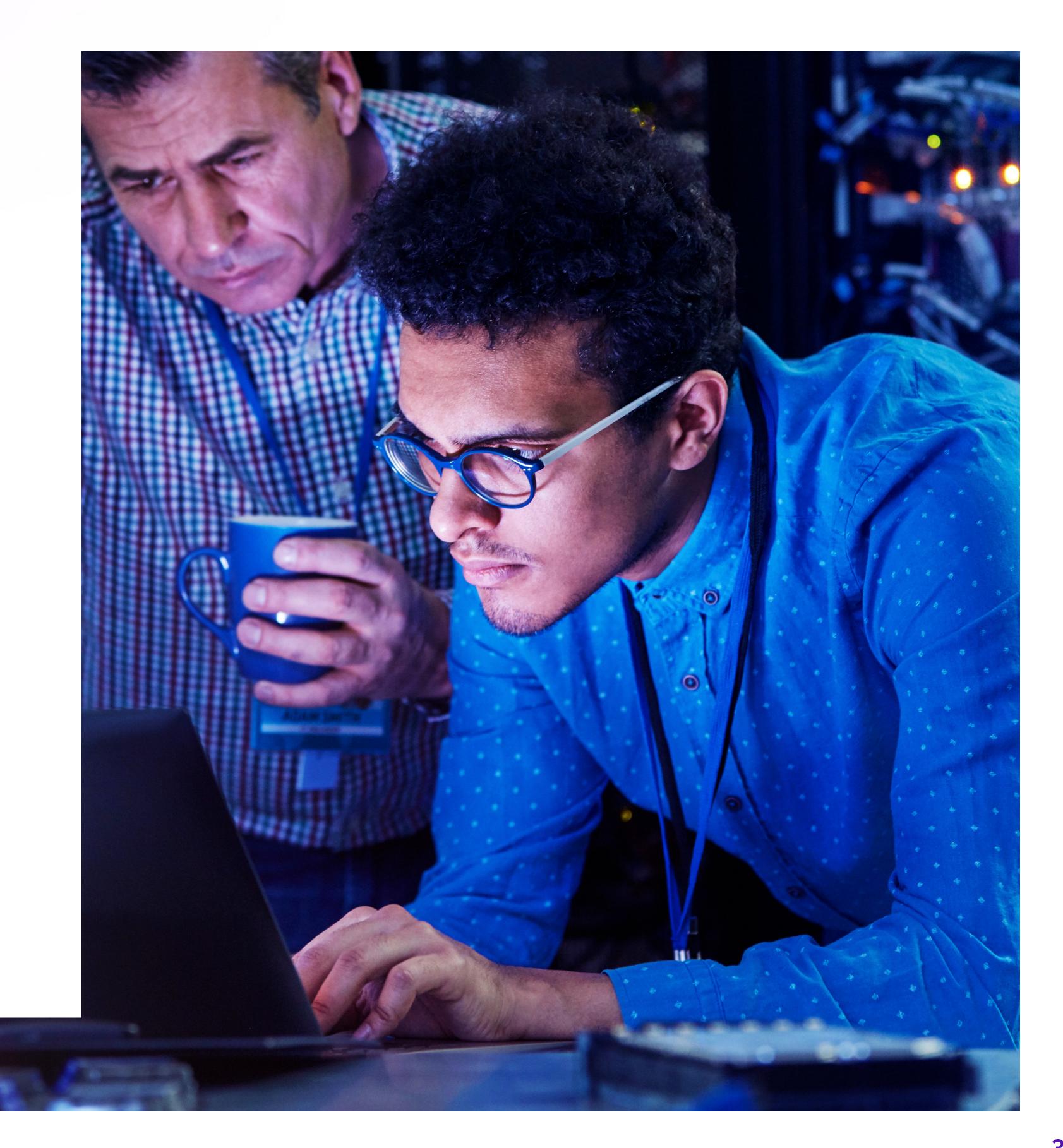
We see an opportunity to network the smart monitors already possessed by the water companies – as well as help them develop new monitors. These battery-powered devices don't require the constant, high-speed connectivity provided by 5G networks. Instead they need periodic connectivity across a wide area. We can help the water companies by deploying its LPWAN (Low Power Wide area network) IoT solution to provide efficient and effective connectivity.

We propose networking the water sector's acoustic loggers and smart meters to help detect leaks. Acoustic loggers are small, palm-sized sensors which are installed on the water pipes. They're sensitive enough to detect the early stages of a leak and set off an alarm. Smart meters also help to detect leakage through the logging of anomalously high readings.

Key to the success of a smart water network is the development of a data visualisation platform. An intelligent platform will capture data from multiple sensors, integrate it, cross-reference it, analyse it and apply business rules to it. Not only will the platform pinpoint leaks early, but it will present appropriate data that allow the water company to proactively investigate if a leak is evident which requires repair, autonomously invoke an action within the water asset infrastructure based upon the data rules the AI engine has been given or learnt.

Our vision at BT is to turn a hydraulically-managed water infrastructure into an intelligent system through the networking of IoT sensors. We aim to build a data mechanism that can make its own decisions using artificial intelligence to invoke autonomous actions where appropriate.

Sheffield pilot

We're partnering with Yorkshire Water to develop a trial smart water network in Sheffield. It's the largest IoT project in the UK water sector. The cellular masts and base stations are projected to network data from a total of 4000 acoustic loggers, water pressure monitors and flow monitors.

We're collaborating with Gutermann, Technolog and Honeywell on this project.

Our tech advantage

Unlike our competitors, our IoT LPWAN (Internet of Things Low Power Wide area network) infrastructure of masts and base stations extends widely across England and Wales. We plug the few gaps in our network coverage with open-standard LoRaWAN technology, used frequently by government and industry in the UK. LoRaWAN offers a flexibility and long-term cost effectiveness not provided by closed-standard proprietary network and a rapidly growing large ecosystem of devices.

We have 13,000 people working on innovation across the UK. Our IoT technology has the potential to deliver significant improvements in data quality and battery life for water companies.

Results

Our partnership with Yorkshire Water on the smart water network pilot in Sheffield earned an Innovation Award from the trade magazine 'Utility Week' in 2020. Sarah Walker, director for BT's Enterprise business in the North of England, said: "The pilot deployment of IoT signals a move to a more data-driven world enabling millions of connected devices to send and receive data, transforming the way we live and work in the future."

"We recognise that we need to play our part in regional development where we can – perhaps even more so than ever in these challenging times. It's great that through this innovation pilot we've been able to accelerate the introduction of NB-IoT (Narrowband Internet of Things) to the area in Sheffield. NB-IoT has the potential to provide greater access for local businesses to take advantage of the advancement in IoT technology, which can only be a good thing for economic growth in the region."

Nevil Muncaster,
Chief Strategy & Regulation Officer, YWS

We're confident our smart water technology will revolutionise the way leaks and interruptions to water supply are managed in the future. We plan to help other water companies hit their Ofwat leakage targets over the current regulatory period and beyond.

To find out more about the digital opportunities identified in the water sector, please contact:

Rob Holmes: rob.holmes@bt.com