












# Device Management survey 2016

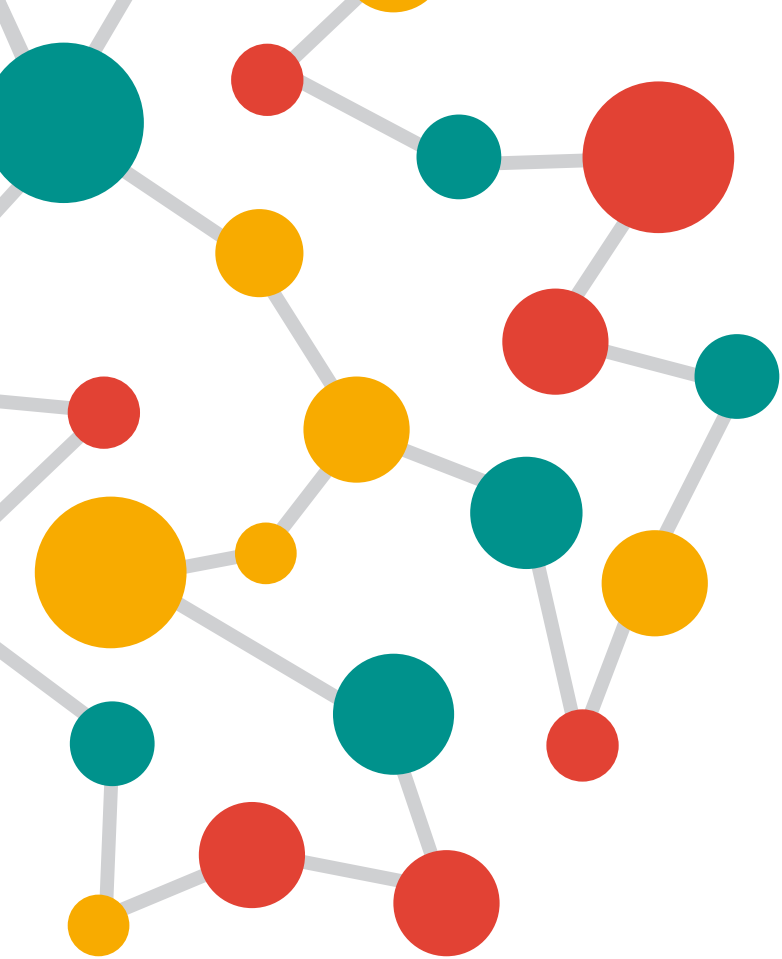
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## Introduction

This survey collected information from companies who are taking connected products to market. The companies covered many different industry sectors (“verticals”), and [the survey] explored their stage of growth and some of the challenges that they were experiencing or anticipated associated with that growth.

The survey started by establishing the overall nature of the company and its connected product(s), then explored the present and future number of connected devices deployed into the field, and then dug deeper into operational challenges.



# The participants

A total of 54 individuals participated in the survey.

## Respondent Title

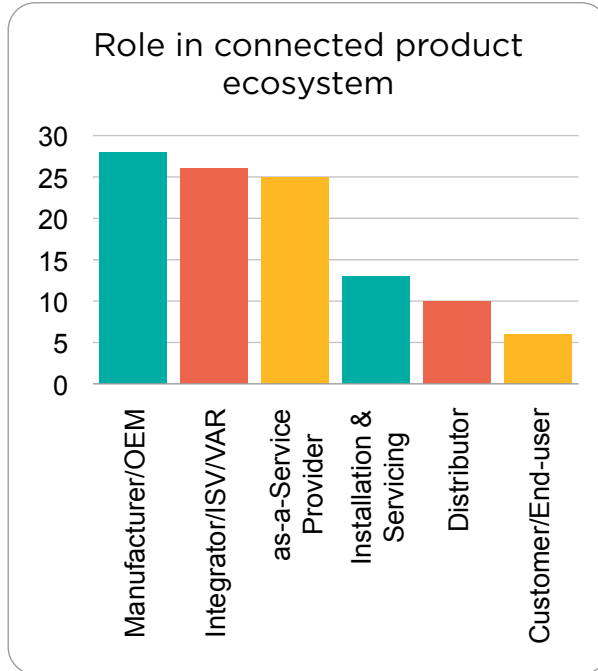
Respondents held primarily CxO roles in these companies:

<b>CEO</b>	<b>28%</b>
<b>CTO</b>	<b>20%</b>
<b>Business Development</b>	<b>7%</b>
<b>Other (mainly Director-level)</b>	<b>44%</b>



## Value-chain role

The chart shows that the companies occupy various stages in the connected device value chain (this was a multiple-choice question):



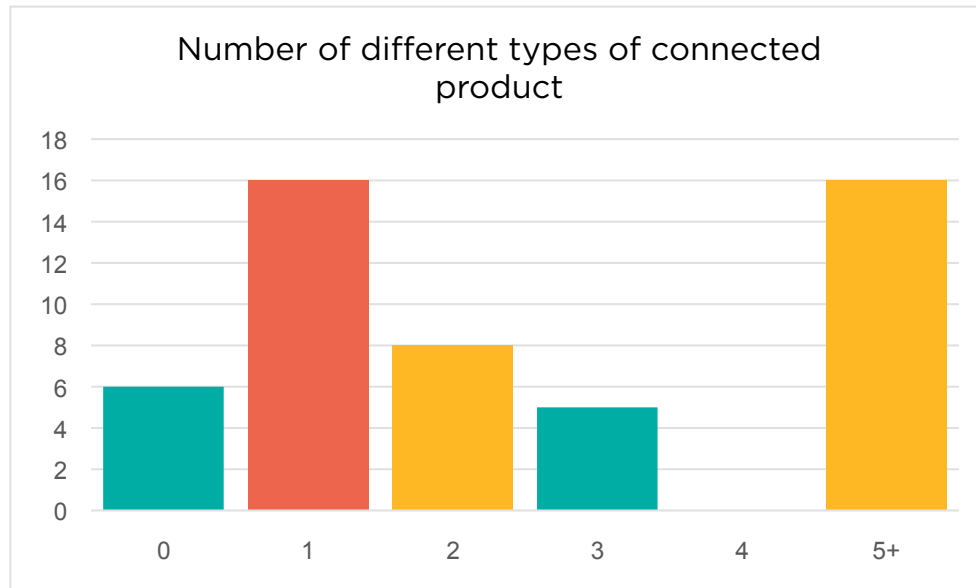
## Vertical

The connected products delivered by the companies included some generic horizontal IoT solutions and also many different vertical sectors including:

- Environmental monitoring
- Elderly care/Wellness
- Smart Home
- Energy management
- Industrial monitoring
- Refrigeration
- Retail
- Public services
- Smart City

## Maturity

As shown in the chart below, some respondent companies had yet to deploy any devices into the field, whereas others have already deployed five or more types of connected device.



## Survey Terms

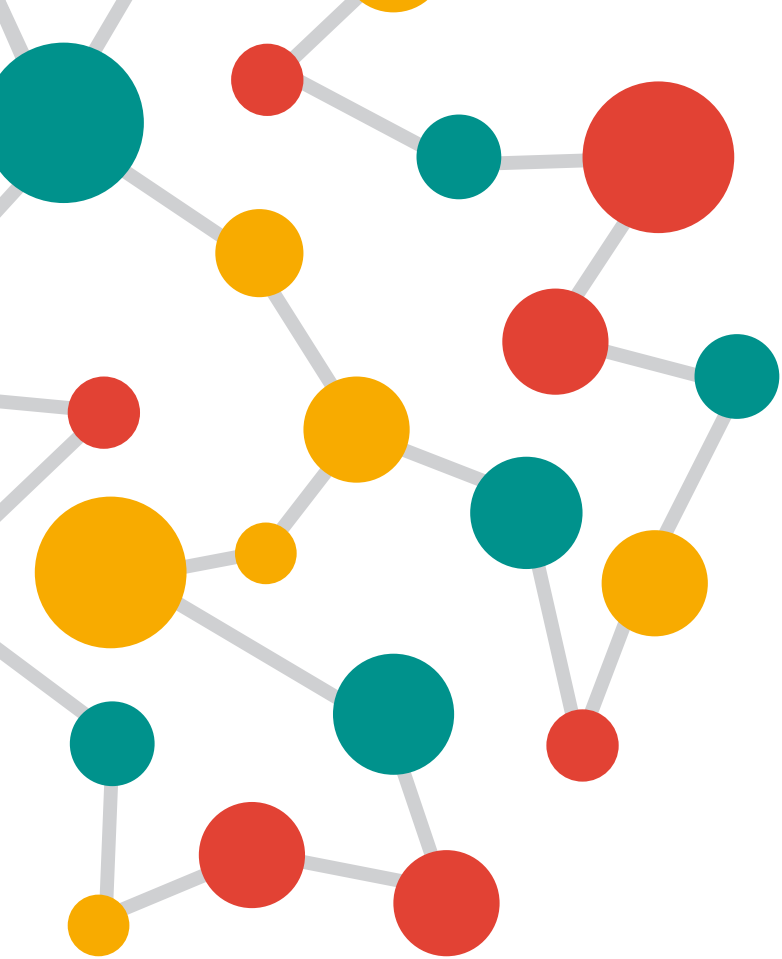
The survey contained 62 questions and ran from 24 August to 9 November 2015, with entry open to all companies bringing connected products to the market, i.e. “IoT” companies. A £100 prize was allocated at random to one participant as a “thank you”.

## What users say

Cees Links, veteran of the world of connected devices and currently CEO of GreenPeak Technologies commented:

“It sometimes surprises me how many device companies don't even know how many of their devices have been deployed, let alone how many are working. As the IoT matures, users' expectations of service quality are rapidly increasing, and you really have to keep on top of this stuff. When it comes to the smart home we expect all devices to be connected and providing useful information for owners and manufacturers on usage, diagnostics, need for refurbishment and replacement.”





## Business Model

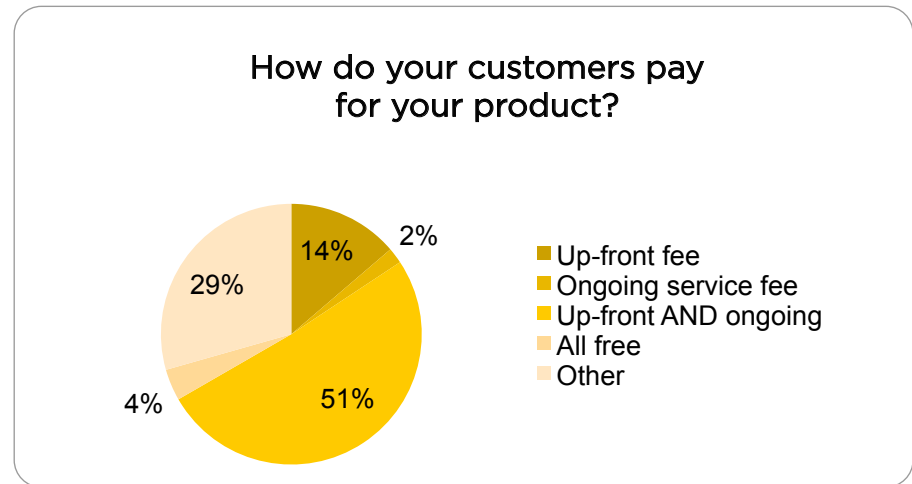
IoT is part of a shift from product-centric business models to service-centric ones, i.e. from an up-front one-off charge to own a product, to an ongoing pay-as-you-use fee (e.g. monthly). Clearly service does cost something to provide, and there are many potential benefits from it.



## Business Model (continued)

A perhaps surprising finding was that only a tiny proportion of companies surveyed currently sell through a pure service model, with 51% charging both an up-front fee and an ongoing service fee.

(the “other” category covers mainly companies who either have not yet decided on their business model, or are in the process of changing it).



## What users say

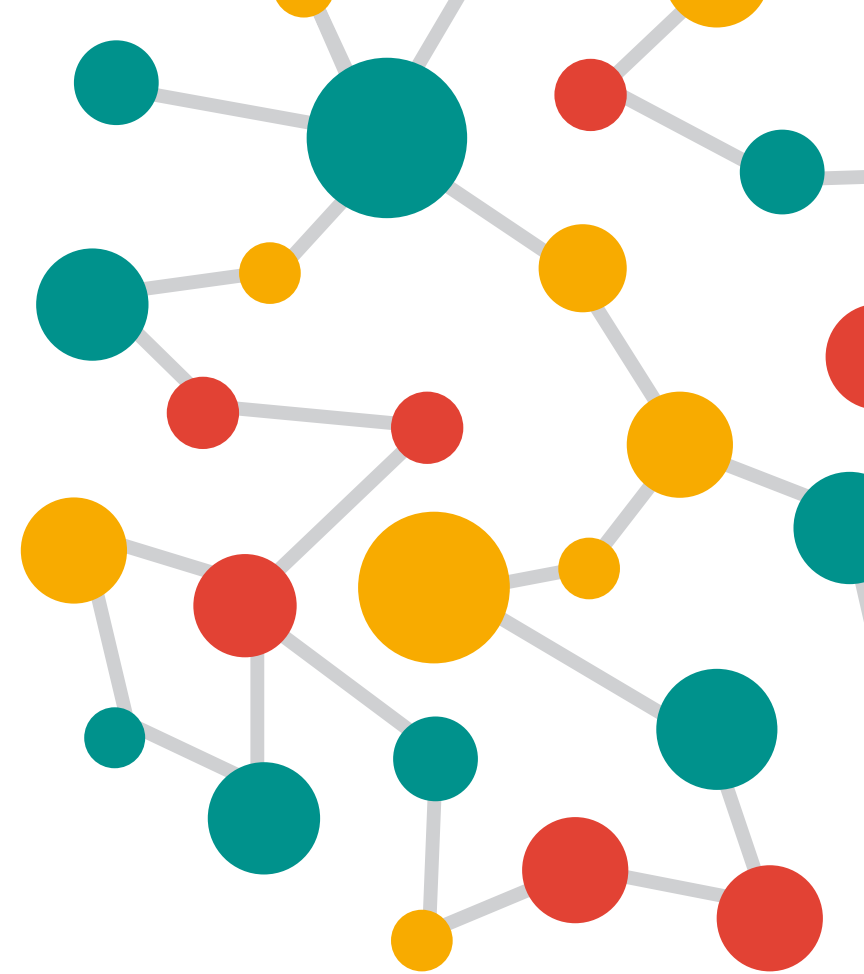
Pete Easey, Founder and CTO of Crowdlytics, providers of the next dimension of water management said:

“It’s remarkable how many of the companies surveyed are still trying to manage their device estate manually - and how many believe that they might be in trouble in the next 12 months as a result. Having managed large estates of remote devices automated device management is essential in reducing operational costs.”



## Deployment and Growth

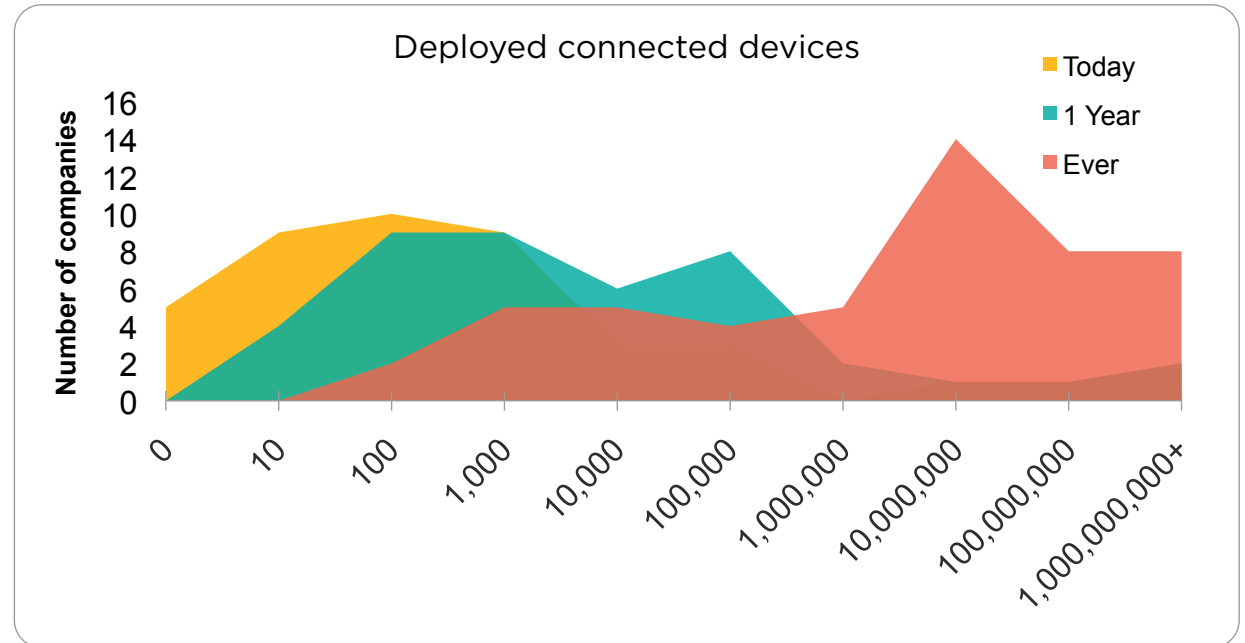
Deployment numbers can be very commercially-sensitive, and so to protect confidentiality we asked respondents for their deployment numbers only to within the nearest order of magnitude (10,100,1000 etc.), which encouraged 85% of respondent companies to contribute their deployment numbers to the survey.



## Deployment and Growth (continued)

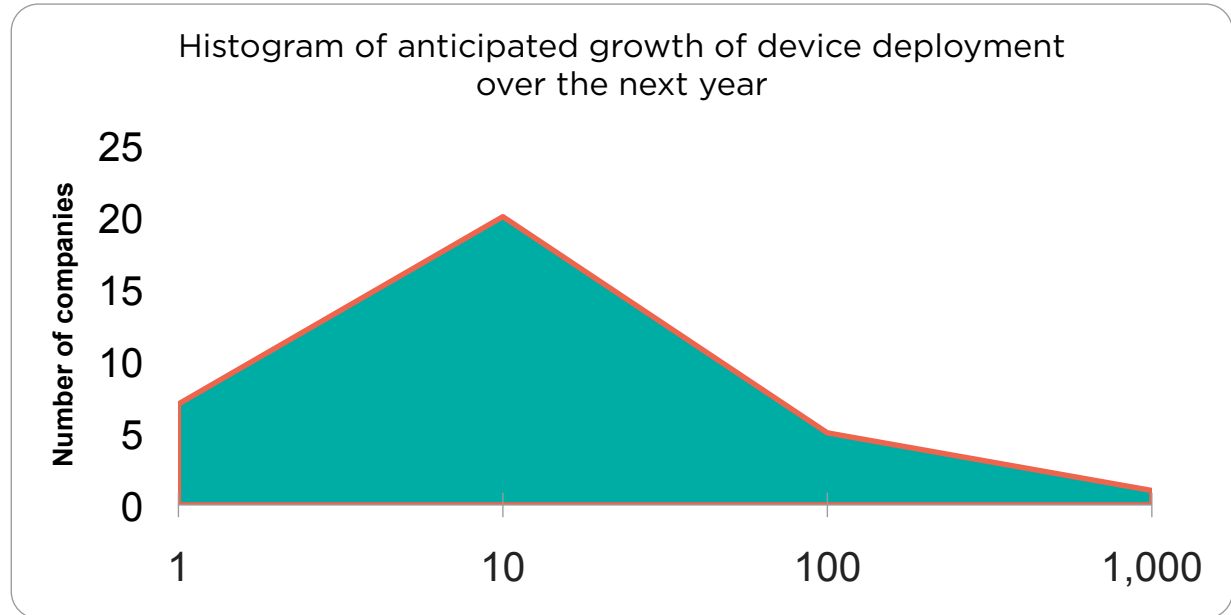
The number of devices deployed today (yellow in the chart below) varies widely, with 74% of respondents having only deployed 1000 devices or less to the field, and 9% having deployed a million or more. What is particularly interesting is the way that respondents expected these numbers to grow, with the number in a year's time (green on the chart) growing substantially.

As shown in the red section, the ultimate market size is estimated to be large for many companies, with 70% of companies predicting an eventual market size of at least millions of devices, and 15% predicting that their device count will reach the billions.



## Deployment and Growth (continued)

These year-on-year growth numbers can also be seen in the histogram of relative year-on-year growth of each company below, with a significant majority of companies (61%) believing they'll see 10x growth of deployed devices over the next year (to the nearest order of magnitude).



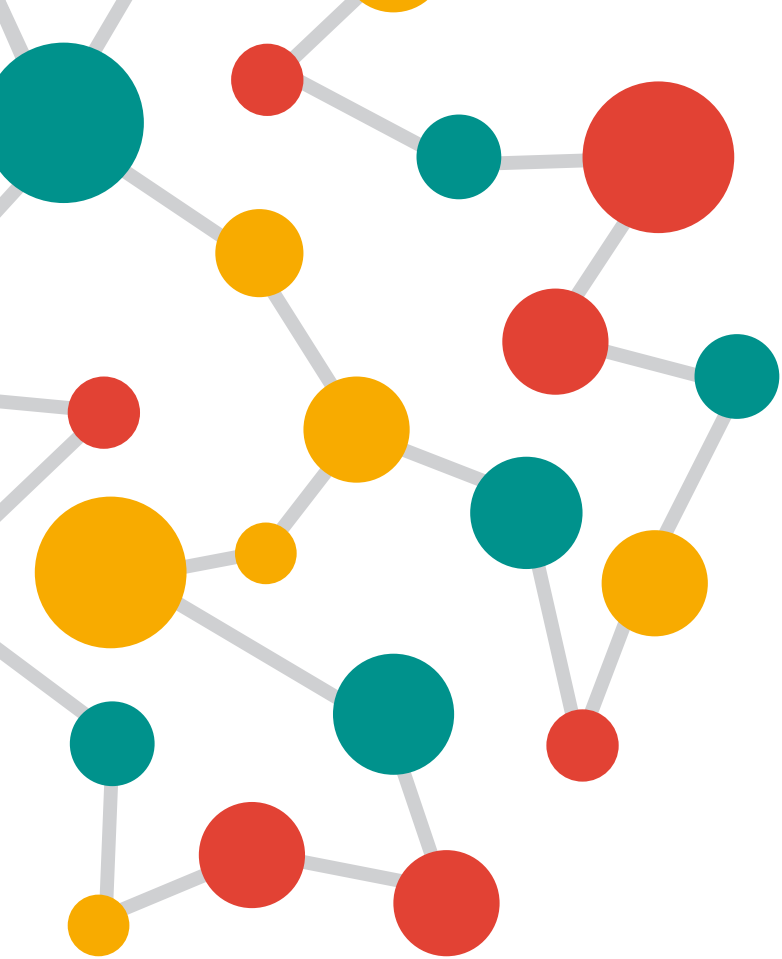
## What users say

Colin Chapman, CTO of smart commercial refrigeration specialists

Elstat said:

“ It’s important to maintain our leadership in the smart refrigeration market – simply put this means connectivity which gives us the opportunity to collect sales data and insights remotely. At scale, the management of those connected devices has to be automatic, in order to be cost effective. ”





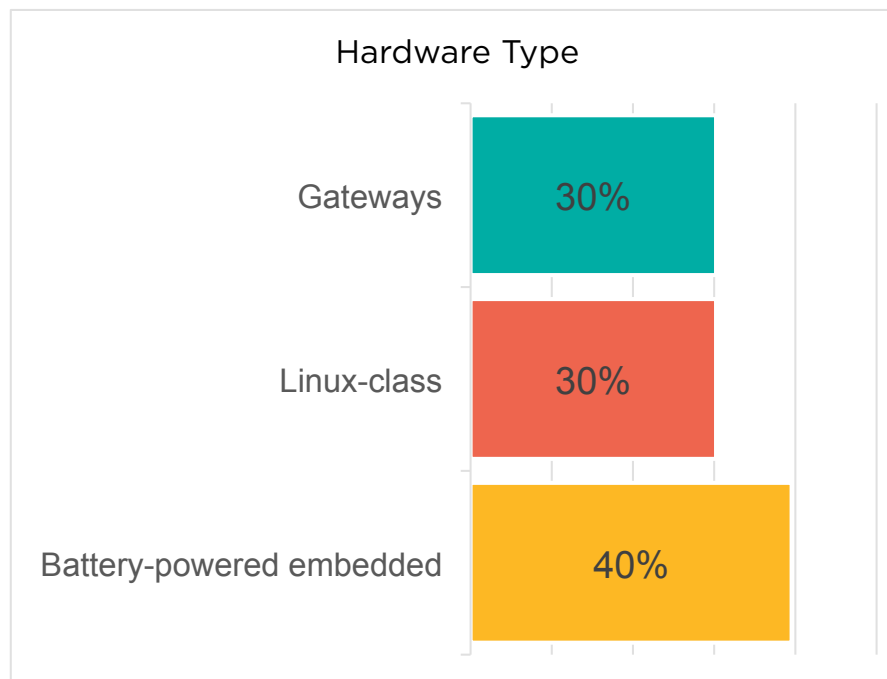
## Types of device

Respondents were asked to class their connected devices into one of three possible types:

- Battery-powered embedded (e.g. ARM M-series)
- Mains-powered Linux-class (e.g. ARM A-series, Raspberry Pi, Beaglebone etc.)
- Gateways (devices that talk to other sub-devices)

## Types of device (continued)

Each of these types of device has significantly different characteristics to manage. It may be that most “Gateway” devices are Linux-class.





## What users say

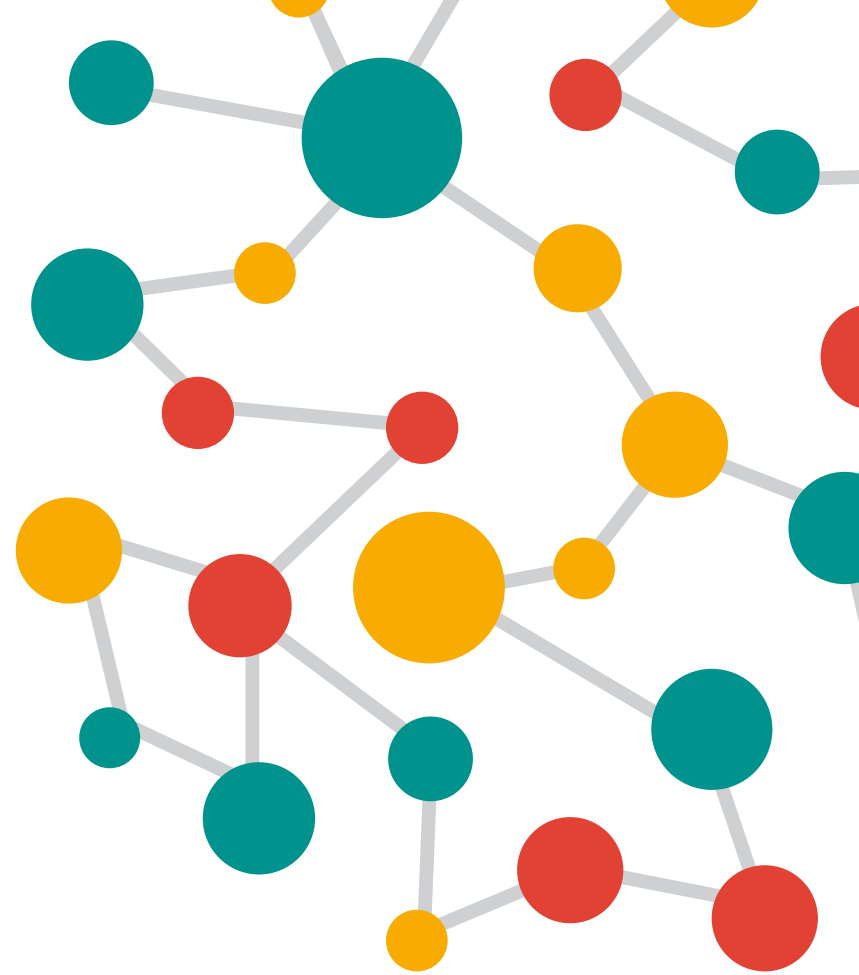
Chris Wright, CTO of Moixa, a business deploying a solar energy storage product said:

“ The answer to device management is automation, we need to be connected for multiple reasons including remote management, demand response and performance reporting; and if the product isn't working or has lost connection, then we can't bill. ”



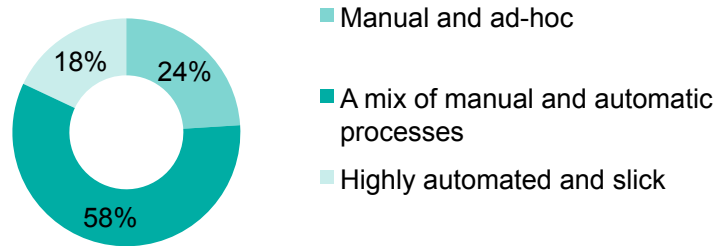
## How devices are managed today

The survey then explored the ways in which companies manage their connected products in the field. In particular, what processes are used to do this? 82% of companies said that their processes involved at least some manual component, with only 18% claiming that their processes were “highly automated and slick”.

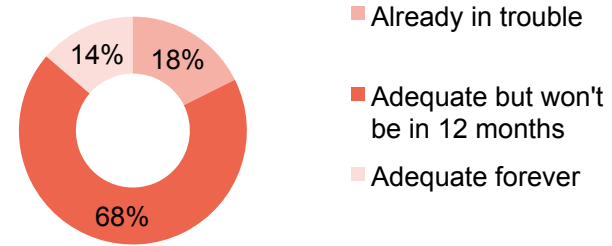


## How devices are managed today (continued)

How devices are currently managed



Experiences managing devices



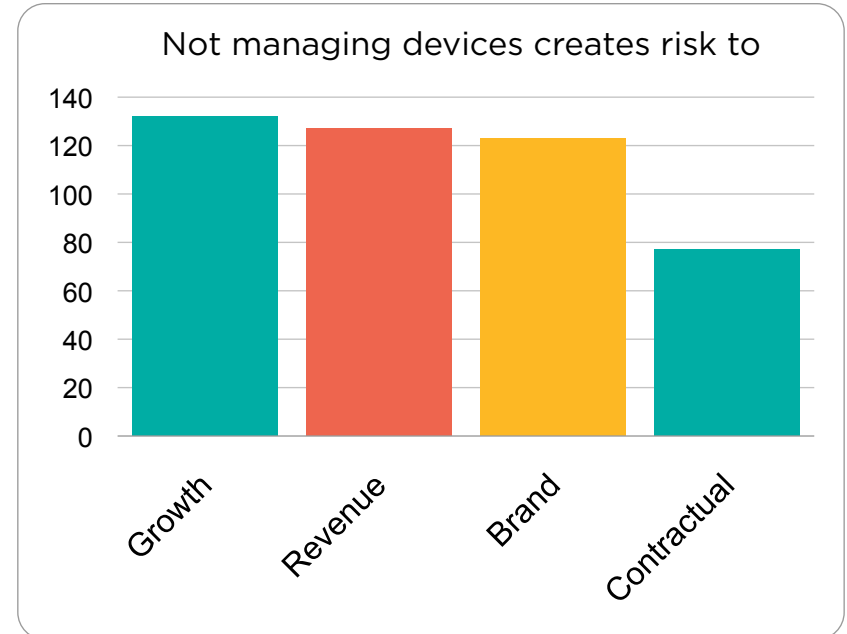
There is strong correlation (which we might assume is causative) between the above and the experiences that companies have in managing their connected devices in the field, with 18% already in trouble and a remarkable 86% either already in trouble or likely to be within 12 months.

## How devices are managed today (continued)

There can be many consequences of not managing devices properly. The survey gave four choices, and asked respondents to “force rank” them, i.e. they had to choose one consequence as the most serious, one as the least serious, with the others falling in-between. The findings are that “risk to growth” is seen as the worst consequence, and “contractual” issues the least.

When prompted for other negative consequences outside of these categories, responses included (verbatim):

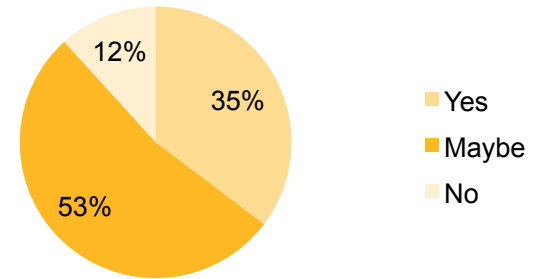
- Hassle and pain in the butt
- Giving away a market-leading position, loss of thought leadership
- Cost of operations, support load
- We report critical data - bad management would be disastrous

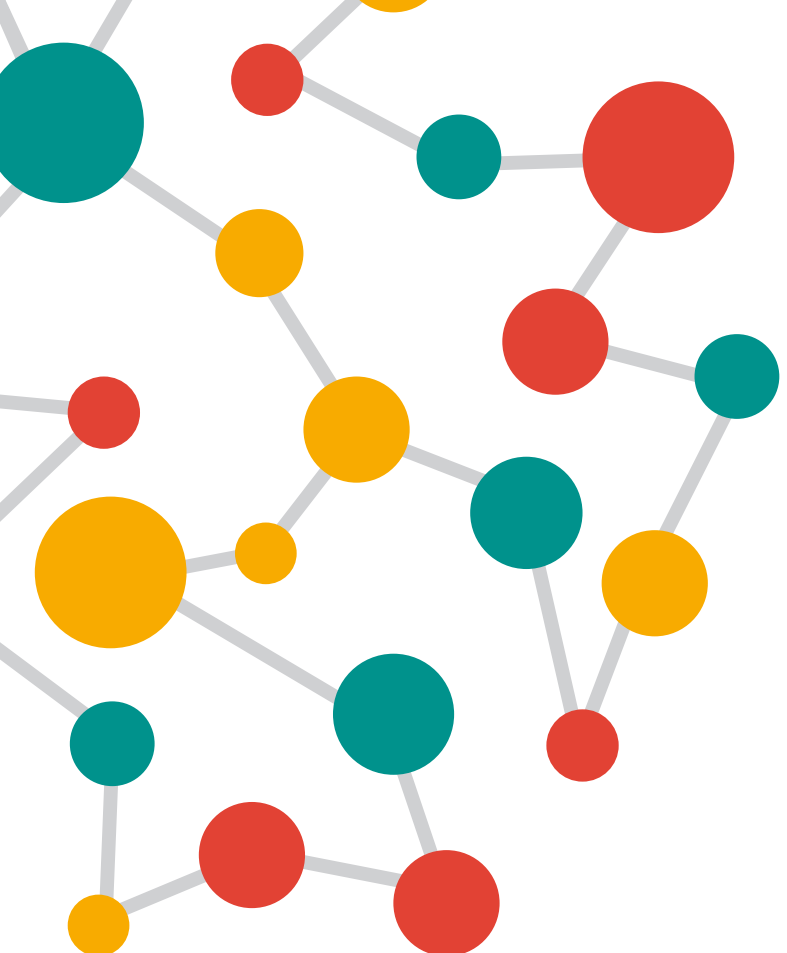


## How devices are managed today (continued)

The survey then asked participants whether they would consider using a third-party service to help manage devices, rather than building it all in-house, and a significant majority of 88% said that they would at least consider it.

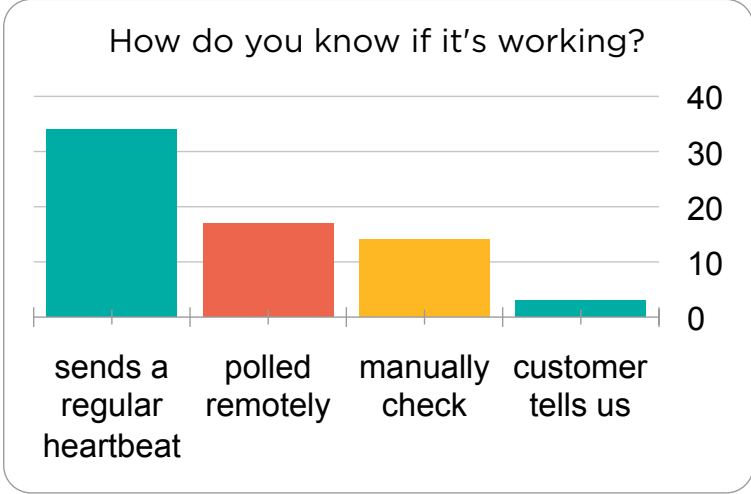
Would you consider using 3rd-party Device Management?





# Device Monitoring

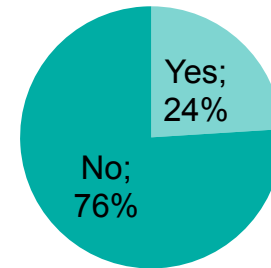
Companies use various mechanisms for detecting when devices are not operating properly in the field, and by far the most popular is for the device to send out a regular “heartbeat” to indicate that all is OK and report its status.



## Device Monitoring (continued)

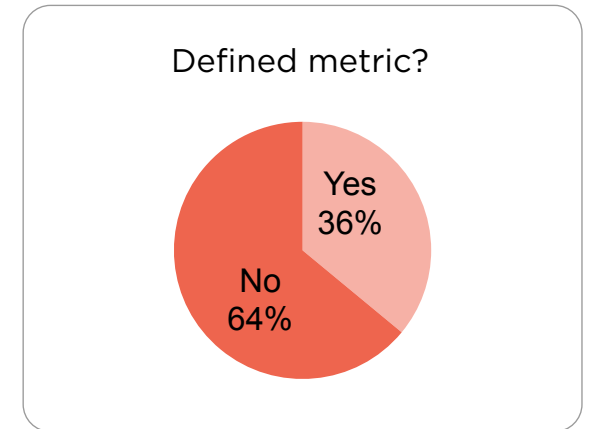
Even the question “is it working?” can be complicated, with of companies saying that it’s not a trivial question (presumably there are multiple states between ‘everything working A-OK’ and ‘device completely broken’).

Is “is device working?” a simple question



## Device Monitoring (continued)

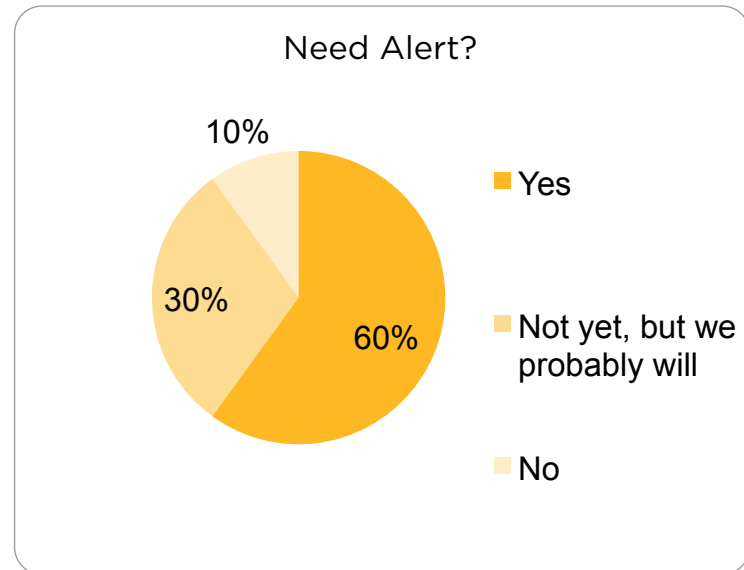
As companies with connected products mature, and particularly once they have customers who are relying on a significant number of devices from them, perhaps for mission-critical purposes, the question of the “SLA” arises – the Service Level Agreement. This is where tricky questions get defined in black-and-white, such as defining what “working” actually means, and what uptime is expected. Only 36% of companies have defined a clear metric for device functionality (to themselves or their customers).





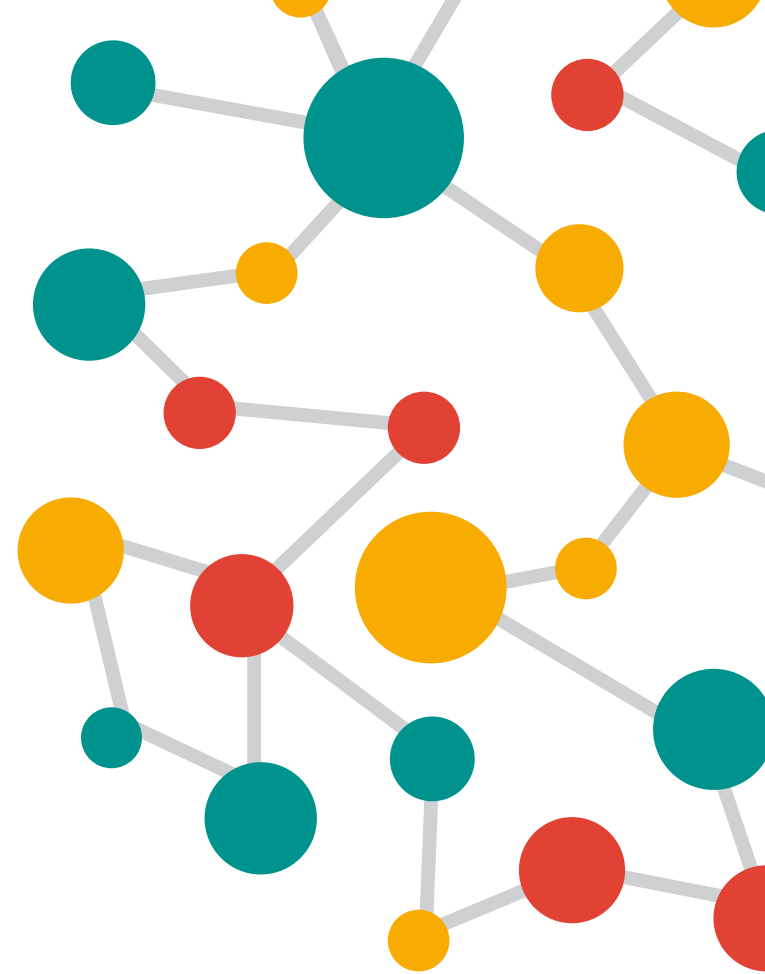
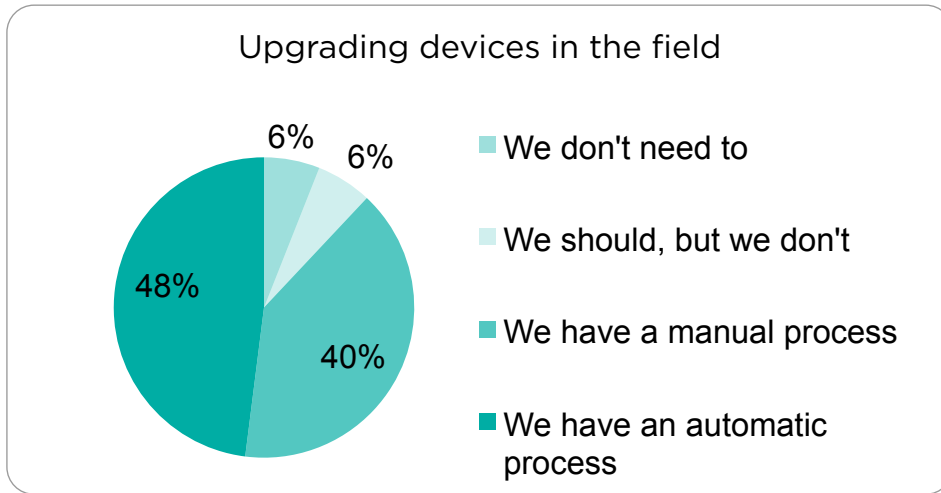
## Device Monitoring (continued)

Of course, when something does go wrong, sometimes humans are needed to sort it out, and it's important to quickly bring the problem to their attention. 90% of respondents said that they either needed alerts now, or probably would in the future.



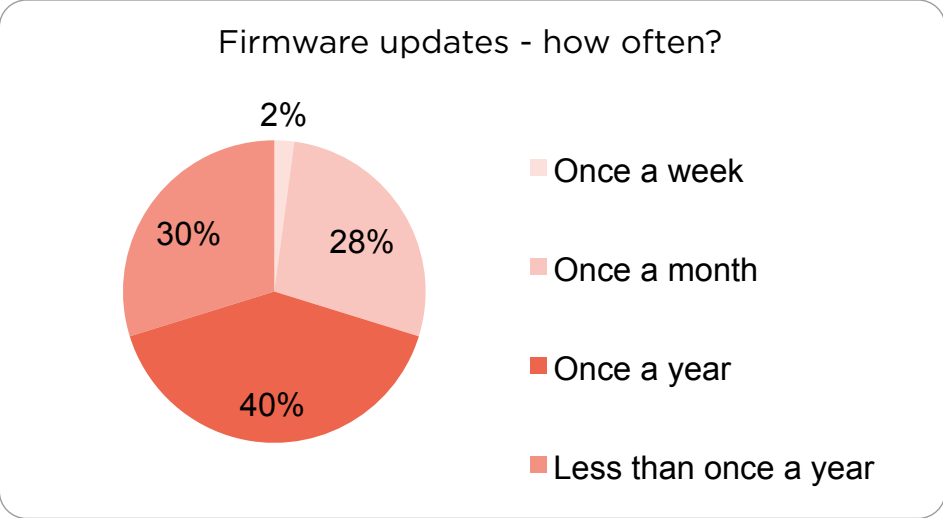
# Device Lifecycle

A connected device might need significant “care-and-feeding” during its lifecycle, as it is installed, used, updated and eventually decommissioned. The survey explored various aspects of this, asking firstly whether companies actually do upgrade the code in their devices in the field, and if so whether this is done manually or automatically:



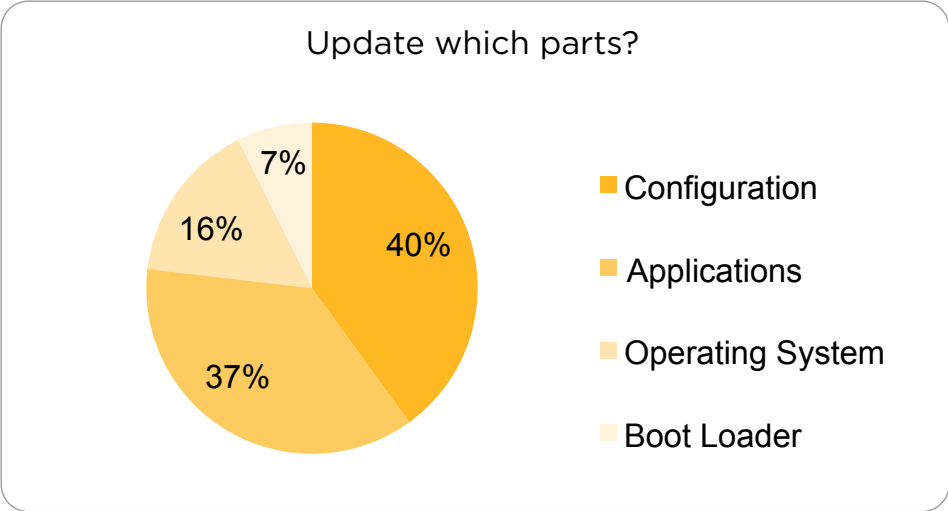
## Device Lifecycle (continued)

When asked how often devices were updated in the field, respondents gave a wide distribution, with a small number upgrading weekly and many upgrading only roughly once a month or once a year. This variation is probably driven by many factors – not least that battery-powered devices must not be upgraded too often, as upgrading can significantly shorten battery life due to the large amount of communications necessary.



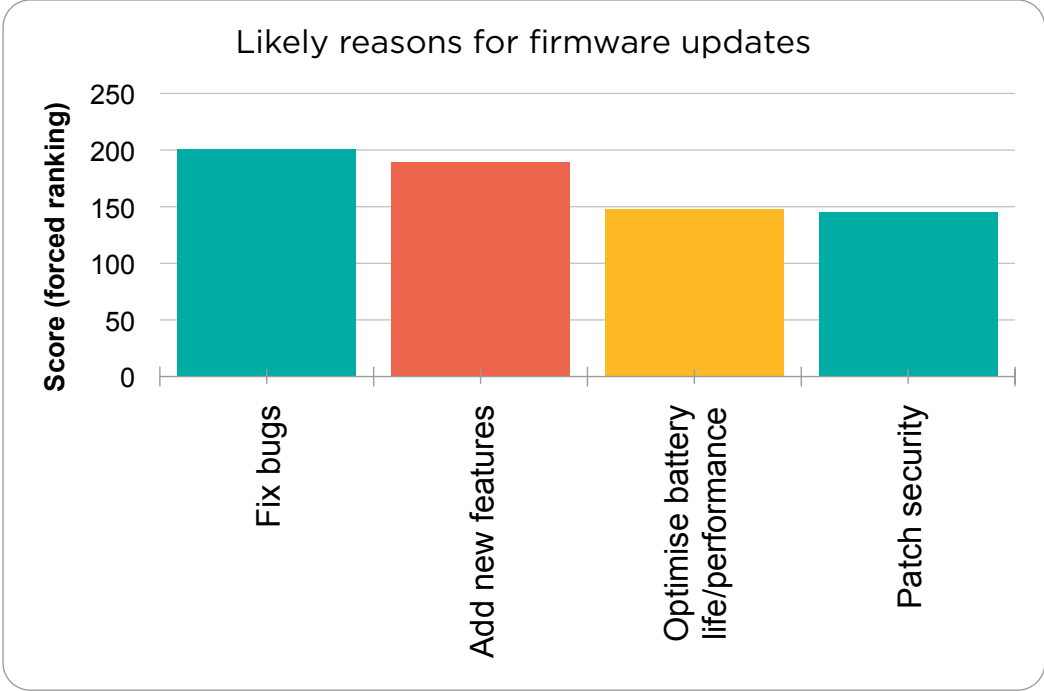
## Device Lifecycle (continued)

When a device is upgraded, there are various parts that might be upgraded, ranging from the high-level device configuration, to the application running on the device, to the underlying operating system, and finally to the boot loader which sits underneath everything and ensures that the device can never be “bricked”. Perhaps unsurprisingly, the further down the stack of functionality, the less often parts are upgraded, probably indicating increasing maturity.



## Device Lifecycle (continued)

Participants were offered four key reasons for upgrading, ranging from fixing functional bugs, adding new features (a big advantage of a connected product), optimising battery life or other performance, and finally (but very importantly) patching security.



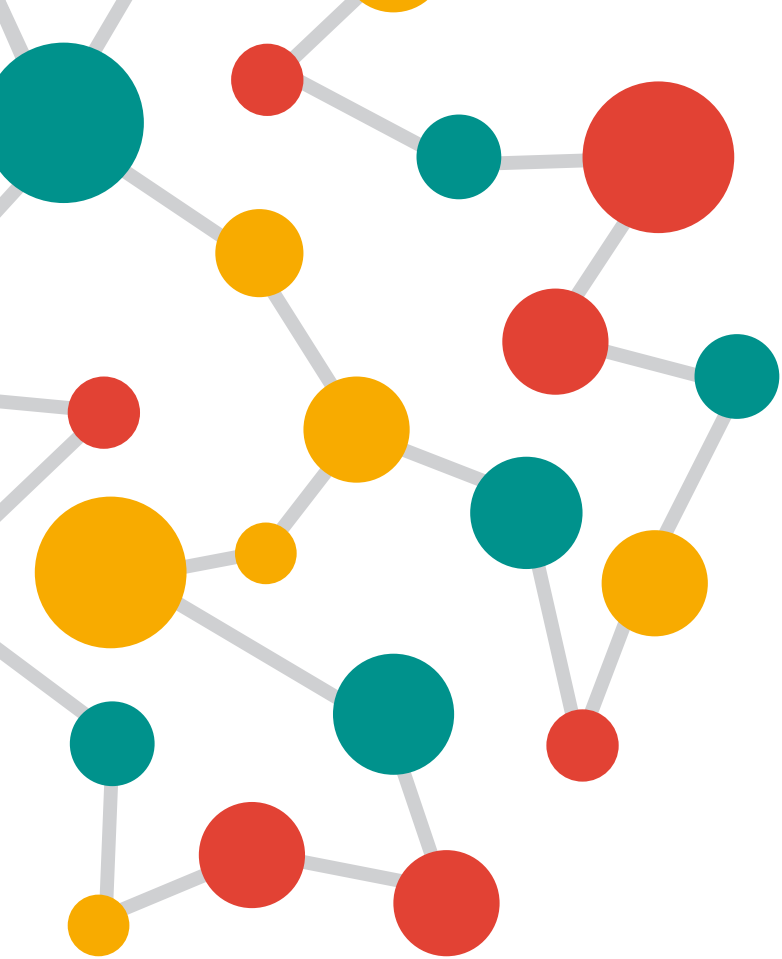
## What users say

Toby Coleman of demand response aggregator Open Energi said:



It's interesting that most survey respondents agreed with us that the biggest risk of not getting device management right is the risk to growth. Our business model is based on aggregating flexible energy demand from very large numbers of connected devices; having an accurate picture of how those devices are performing and simplifying how we connect and exchange information between multiple control systems and processes is a vital part of scaling our business and maximizing the value of the flexible energy demand we're tapping into.





## About DevicePilot

DevicePilot makes managing your connected products easy, giving you a clear picture of the user-experience right now across your whole device estate, and allowing you to diagnose problems and manage your devices proactively. DevicePilot draws on the considerable experience of its founders in deploying connected devices to 1 million+ end customers in product areas as diverse as Mobile Phones, Connected Home and IPTV. Further information and more White Papers at [www.devicepilot.com](http://www.devicepilot.com)



devicepilot



The DevicePilot team is busy developing and refining the product and loves to receive feedback. If you have hundreds or thousands of connected devices and are wondering how you're going to manage them as the number grows, then get in touch today for a free discussion of what device management is and how it can help you.

For more information, please contact  
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