



# Done right, the IoT needn't be rocket science

by Garry Rank, senior software consultant, 42 Technology

The 'Internet of Things' (IoT) revolution, where billions of everyday devices can be connected to the Internet, is opening up a whole new world of opportunities and challenges for companies and consumers.

For the first time, affordable remote monitoring of real-time data will allow manufacturers to build closer relationships with their customers by tracking both delivery logistics and actual product usage, while also more efficiently monitoring and managing their own in-house assets.

Meanwhile for consumers, the connected home promises to bring almost effortless restocking of our kitchens, better security, video doorbells, intelligent fire safety and optimal energy efficiency, as well as enabling patients to manage their medical conditions at home.

But according to Gartner's hype cycle illustrated on this page, after the 'peak of inflated expectations' comes the 'trough of disillusionment.' And it is here that the technical challenges associated with a technology really present themselves.

From our own experience in developing a wide range of connected devices for healthcare, consumer, energy and industrial markets, 42 Technology has identified five key aspects that are critical for any new product development

Power – today's wirelessly connected devices can be made to run for years on a single battery through use of a low powered sleep mode between tasks, effective data transmission optimisation, and the right balance between on-board and in-the-cloud data processing. Every device design choice that is made affects battery life to some extent.

Privacy and Data Security – collecting information about people's location,

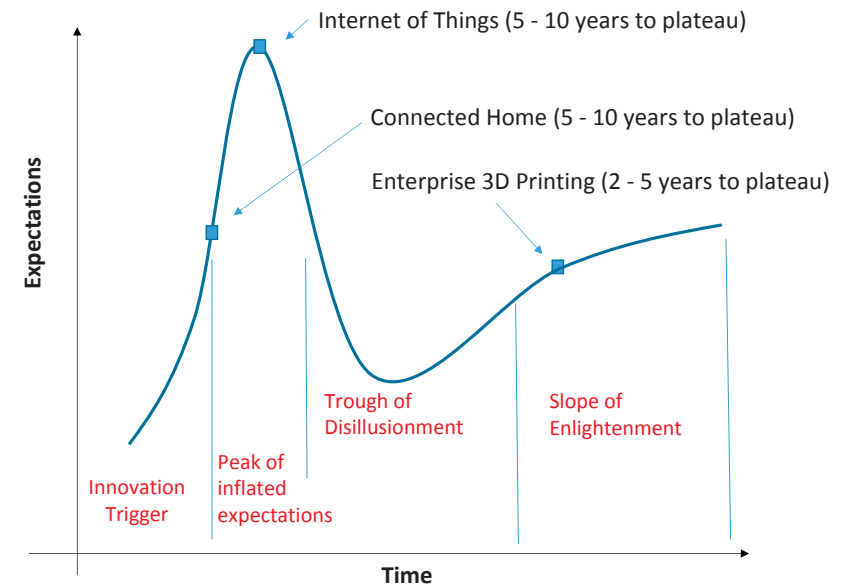


behaviour or their health raises privacy and information security concerns. Security done properly might make for slightly less convenient deployment, uses more on board computation (did we mention battery life?) and requires a well thought out support infrastructure that needs to be reviewed and updated continuously. But security not done properly may lead to bankruptcy and prosecution.

Communications – the data hop from the low powered device to the cloud might be achieved through a dedicated hub, a mobile phone or even a home Wi-Fi router, yet the most popular mode may need to change within your product's lifetime. Furthermore, as devices get cheaper, numbers rise and wireless networks become more crowded, it may become even harder to rapidly connect to the device of choice. Increasing the frequency of broadcasting might make a device more readily visible but it also shortens battery life.

Platform choice – with lower cost hardware and development starter kits

Gartner Hype Cycle – July 2015



becoming more widely available from various microprocessor vendors, the barrier to initial device prototyping is reduced, while numerous global players vie to offer 'the perfect development platform' (for example, Apple's HomeKit and Google's Brillo/Weave). Such choices must be made carefully based on the target markets and the requirements of the whole integrated system. And, of course, 'bleeding edge' technology is traditionally poorly documented when it first appears, which will delight your software engineers.

Sensor design – IoT devices are usually expected to be cheap (limiting the scope for accurate calibration at manufacture), yet must retain full functionality over long periods and deal with the challenges of temperature, dust, humidity and shock.

Devices may need to self-test, self-fault-find, and be fool-proof in use if the total cost of ownership in the business plan is to be achieved.

Because of the interconnectedness of so many factors, it's clearly important to have a good overall system design right from the start. But if done right, the IoT really needn't be rocket science.

As the author Kevin Kelly wrote: "The way to build a complex system that works is to build it from very simple systems that work."

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