IoT service providers harness the power of consumer eSIM to drive simplified, resilient, secure, global and flexible IoT connectivity

Embedded SIM (eSIM) provides an efficient means for IoT organisations to achieve resilient global connectivity at the same time as streamlining device manufacturing and simplifying deployments. Much of the focus has been on utilising eSIMs that have been designed for M2M use cases but, by harnessing consumer eSIM functionality, more flexibility and enhanced connectivity management capabilities are enabled especially for massive IoT deployments. This approach, which has been formalised in new Thales Adaptive Connect solution, accelerates time-to-market, saves cost and strengthens security, Stephane Quetglas, the director of marketing for embedded products at Thales, tells George Malim, the managing editor of IoT Now

George Malim: Do you think it's fair to blame cellular connectivity for the delayed deployment of massive IoT?

Stephane Quetglas: Cellular introduces significant differences in comparison to other connectivity technologies; that can hold back some players but in reality there is great potential. There are multiple aspects to cellular adoption and different organisations experience these in different ways. Companies that are used to Wi-Fi, for example, think it is difficult to embrace cellular connectivity because it is new to them.

Others find the need to have a subscription with a mobile network operator and having to have a service contract an obstruction. Even those that are comfortable with both these aspects still need to insert a physical SIM into a device that has been manufactured elsewhere and the cost of doing this locally can make IoT use cases unviable.

A solution to this problem is roaming so a global SIM can be inserted at the place of manufacture and the device can then roam when it is deployed. Roaming works for consumers when they travel but it's often expensive and this is a problem for IoT because the cost can be too high for a given use case.

GM: Is cellular difficult for IoT deployments because it was designed for consumer communications?

SQ: No, in fact the technology itself is ideally suited for both IoT and consumer markets but in some new use cases such as the massive IoT market you have simpler devices. A smart water meter that you want to connect in order to remotely collect water consumption data is a far simpler device, costs less and runs for a long time, often ten years, on a battery without recharging. If you wanted to use this in the same way as a ▶

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smartphone, you'd need to charge the battery every day and this is the reason why low power wide area (LPWA) networks exist and power saving technologies have been developed. Cellular connectivity plays its part here with LTE-M and NB-IoT designed specifically for IoT.

The cellular industry has also put forward embedded SIMs (eSIM) for the past ten years to bring flexibility to the marketplace. You can use an eSIM to avoid relying on roaming because it means you can change your subscription to a mobile operator network at any time.

This technology is fantastic in terms of the flexibility it delivers to IoT. It was developed first for M2M applications and its most successful use case to date is in the automotive sector in terms of adoption. Another area of wide eSIM adoption is in consumer electronics with smartphones and smart watches.

The technologies used are similar but not exactly the same because the M2M eSIM has been designed to enable remote management of unattended devices while consumer applications rely on the end user to download the mobile subscription.

Now, the next step for the industry is to use eSIM to specifically address massive IoT deployments.

GM: So, what do the companies that deliver IoT services and applications really need?

SQ: If you look at the new enterprises that are introducing IoT – the IoT service providers – they need a system that is simple. Some companies have low experience of cellular technologies and are not able to invest a lot of time and money in understanding connectivity. They want to focus on their offerings and their business models, not to become cellular experts.

Flexibility is also important because companies want a choice in terms of connectivity. It could be, for example, that a company has connectivity provided by a certain mobile operator in France while, in the US, it uses another operator. From a device manufacturing process perspective, you would need to manufacture a device that is specific to France and a device that is specific to the US. You would then have to manage new product references and stock-keeping unit (SKU) numbers. That's a challenge to achieve and it's hard for companies to predict what volumes of which country-specific device they need. They could end up with huge demand in France but a warehouse full of devices configured for the US market. Having one SKU for all markets is far easier and cost-effective. It's ideal to have a single SKU in order to simplify manufacturing and logistics.

Companies need flexibility that allows them to pick the right connectivity and avoid roaming charges and be very lean in terms of manufacture.

GM: Where does this leave the connectivity service providers?

SQ: The mobile operators and connectivity service providers that specialise in IoT could miss an opportunity if they are not able to provide global and resilient connectivity to IoT service providers. They want to serve their customers with connectivity which makes use of roaming agreements. Indeed, these take a lot of effort to set up and operate and are subject to change.

For mobile operators and connectivity service providers being able to complement or avoid roaming agreements is also a very interesting proposition: it allows them to become more agile and true enablers of massive IoT. They can use eSIM to help reach this goal and provide fast time to market globally for their customers. ▶

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GM: You've recently launched Thales Adaptive Connect. How does this help?

SQ: Adaptive Connect is really about providing this flexibility and a very fast way of connecting devices with the best connectivity service available. Most of the time this is local connectivity where the device is deployed. Adaptive Connect relies on the consumer-oriented eSIM technology that is usually applied to smartphones with an end user but instead this is for unattended IoT devices.

The innovation here is to adapt the consumer eSIM technology so IoT service providers get a simple way to get proper connectivity for their devices by utilising the existing eSIM infrastructure deployed for consumer devices while keeping the M2M capability of remotely managing unattended devices. Thales Adaptive Connect enables you to get the best local connectivity for your IoT devices in a very simple manner: the device equipped with our eSIM is managed via rules defined by the IoT service provider which enable it to use the best-suited connectivity profile depending on its location. In terms of achieving resilience, Adaptive Connect makes very easy to maintain an always-on connectivity for ▶

Stephane Quetglas
Thales

In IoT, eSIM brings the flexibility that is really needed

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fleets of devices. Where connectivity with a device is lost, the typical solution is a costly, on-site intervention.

With Adaptive Connect, when there are conditions on the device side that are causing problems such as loss of connectivity, the eSIM contacts the Adaptive Connect server for instructions. For example, if a device in the US lost connection with a given operator, it could then download a profile from another local US operator with better coverage, using Adaptive Connect's fallback bootstrap connectivity.

Our business model is subscription-based because IoT devices may need to be managed at any time in their lifecycle. Note that we don't sell operator connectivity in this solution, we provide a temporary bootstrap connectivity service.

GM: How do you see eSIM adoption progressing and what impact will this have on future IoT?

SQ: eSIM itself is standardised and our belief is that is key to bring scalability and security required by IoT. Thales Adaptive Connect is an innovative offering that is ahead of the standards but similarly to eSIM it is meant to become standardised. This process is taking place within **GSMA**: we believe this type of solution is what IoT needs to ensure it is a massive success.

Once the standard is ready we'll make sure our solution is compliant. To achieve this we are using our experience to finalise standards work at the GSMA and drive the industry forward.

In IoT, eSIM brings the flexibility that is really needed. We see eSIM adoption growing but there are several inputs still needed. First the Adaptive Connect approach is a requirement for simple management of massive IoT deployments and second, in more traditional verticals where eSIM is well-adopted already, we will see further growth. For example, an early eSIM market was to enable emergency calling in cars with eCall regulation. Now that has expanded to connectivity for entertainment.

Thales Adaptive Connect is available commercially and mobile network operators such as **Globalgig** have made live deployments. It's clear to see the industry is interested.

The eSIMs initially designed for M2M use cases are still being used and will continue but this is more about enabling a broader portfolio of eSIM solutions that can adapt to the needs of specific verticals. In IoT there is no one-size-fits-all solution and Adaptive Connect specifically accommodates this.