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SGP.32 has the power to transform IoT business cases with frictionless flexibility at scale

Andreas Morawietz is the global head of the eSIM & Solutions Portfolio at Giesecke+Devrient (G+D). With more than 24 years at G+D, he has held pivotal management positions, including leading global product management for eSIM technology and driving the company's product marketing initiatives. Since 2009, Morawietz has been a leading advocate for eSIM technology, playing a crucial role in advancing its adoption across machine-to-machine (M2M), Internet of Things (IoT) and the consumer markets. His work has been central to commercial remote eSIM management projects worldwide, strengthening G+D's position as a trusted partner to enterprises embracing digital transformation.

As SGP.32, the new made-for-IoT eSIM management specification, launches, George Malim, the managing editor of IoT Now, spoke to Morawietz to understand its likely impact and assess how transformational the specification will be for IoT devices and use cases ▶

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George Malim: What's so important about SGP.32 - what does it enable for IoT devices and why is it better than SGP.02?

Andreas Morawietz: It's important to understand the history of innovation in embedded SIM (eSIM) management. Back in 2014, the M2M industry was working with SGP.02, a specification designed for a reasonable volume of M2M devices. This was developed to address well-controlled ecosystems such as smart metering or automotive, which involved lots of testing during design phases and therefore a longer lifecycle before a device came to market.

Devices used technologies including SMS as a communications channel to talk to the embedded universal integrated circuit card (eUICC) and data flows were limited to basic scheduled communications. Since then, the needs of IoT devices have become far more complex with widely varying data communication requirements. In addition, the velocity of IoT is far greater with devices needing to come to market rapidly and that well-controlled ecosystem fragmenting into a much faster development landscape.

In IoT, a clear need for a new specification to address different devices has emerged. We've seen that bypass the consumer specification SGP.22 from a volume perspective, with IoT expected to involve many more connected devices than consumer cellular. The GSMA therefore decided to look at what we can learn from SGP.22 for the much larger volume specification of SGP.32. Flexibility, simplicity and ease of use are priorities.

SGP.32 is so important because it provides a different approach, which is IoT device-centric. It starts with the devices, which are sometimes constrained – they can be network-constrained, power-constrained or user interface-constrained by intention – and the specification needs to accommodate this. Next, we needed a modern architecture that is more fitting for 5G than SGP.02, which was based on SMS or M2M communications protocols.

SGP.32 encompasses protocols for processing such as message queueing telemetry transport (MQTT), lightweight M2M (LwM2M), constrained application protocol (CoAP) and HTTP. These channels are established in IoT and the new specification works with them, which fits the needs of IoT.

A final aspect, which is especially important for G+D, is security. It's essential for everything we do in IoT and we see a much bigger challenge here than in consumer markets because IoT involves unmanned devices often in remote locations. There's nobody in front of the device to see an indicator, realise that something is going wrong or directly trigger a countermeasure.

SGP.32, with all these aspects in mind, modernises and adapts earlier specifications. Its development has involved listening to the needs of IoT solutions developers so a much more scalable solution can be created – with improved flexibility, ease of management and security.

GM: How does G+D see organisations adapting from force-fitting the SGP.22 consumer specification to their IoT devices to adopting SGP.32 as a made-for-IoT alternative? What new processes and management burdens need to be addressed to close the loop and enable frictionless eSIM activation?

AM: One of the industry norms is to embed a SIM into a device. In the consumer space, eSIM was delivered to the market as a standard in devices such as smartphones, notably with support from Apple and others. In IoT, a smart meter, for example, comes with a SIM embedded into the device, and it needs to be in the market for a very long period of time, withstanding extremes of heat and vibration. In theory and practice, nobody ▶

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should need to visit that device during its lifetime, so the specification needs to reflect that type of use case.

However, the IoT market is not black or white, it's not IoT or consumer and many apps are in the grey zone in between. An example of this is an automotive use case. The connection in a car has two halves. One is for the consumer to enable it to connect and utilise services such as infotainment or navigation. The other is vehicle-centric and enables the car for safety communications (such as eCall) or to communicate with the manufacturer and dealer to optimise maintenance and perform updates.

The challenge is how to manage that optimally and deliver value both from a consumer perspective and for the IoT application. IoT, compared to consumer eSIM management, is different because a user can provide consent which can trigger an eSIM management event. IoT devices need to be managed without friction and critically, this needs to happen remotely with no physical interaction.

In SGP.22, G+D has provided its managing-DP+ to IoT players, which allows devices to be managed remotely (but in the context of SGP.22). We have brought these learnings in SM-DP+ to the GSMA working groups to define the SGP.32 specifications to enable remote management in the IoT context. One of the learnings is the need for the eSIM IoT Remote Manager (eIM) in an independent new service in addition to the SM-DP+. The ownership of the eIM is targeted at IoT OEMs or IoT service providers but can also be provided by connectivity service providers (CSPs) or MNOs.

This enables the device to interact with two key components: the SM-DP+ from the SGP.22 specification and, on the other hand, the eIM which fits the needs of the IoT industry. The eIM, in my view, closes the gap for remote management capability within IoT ecosystems.

With SGP.32, there is the capability for different players to own the eIM which is the trigger mechanism so they can acquire a new profile. We're combining a new process of management with eIM and fully utilising the security and processes of SGP.22. A well-defined API can seamlessly integrate the eIM into an existing legacy infrastructure of IoT players or service managers or use case owners, such as connectivity or device management services. Therefore, the eIM can integrate into the existing infrastructure of IoT players.

Beyond the SM-DP+ and the eIM, a third element is the software component at the device edge. This is the IoT profile assistant (IPA) and it can be deployed either on the device application layer (IPAd) or embedded into the OS of the eUICC (IPAe).

Each approach has advantages. The IPAe is suitable for low-end IoT constrained devices which have the lowest frequency of eSIM management events. The IPAd is normally designed for mid to high-end IoT devices which are non-stationary, such as trackers or vehicles. The remote connectivity management capability of IPAd driven devices allows for the active management of devices in the field to optimise cost, fulfil regulatory requirements or follow the use case demand.

GM: What trends are you seeing in relation to SGP.32? It's one thing to have a specification but another for it to be adopted and the benefits realised so how do you see the market maturing? ▶

AM: The benefit of SGP.32 is that both the GSMA specification and the services to enable it are available. By intensive testing, we have proved that the specification is ready so there's no need for IoT developers and designers to wait any longer. The work G+D has been involved in has encompassed writing the specification in parallel with building and developing the software and assessing early proof points to prove the specification we've defined fits the needs of the IoT industry.

Now, SGP.32 is really in the adoption phase among device makers, utilities and the industrial segment. When you think back to SGP.02, it was the automotive industry that understood the value of SGP.02 for its business model. Again, the automotive industry has been closely looking at SGP.32 for some time. Already, the first automotive manufacturers have adopted the technology and are integrating it into the next generation of products.

We also expect to see significant growth, especially from logistics, smart meter and automation companies. In the 6-18 month range, we will see deployments at industrial scale, not just in terms of companies adopting the specification but in terms of products shipping that utilise it. At G+D, we are already seeing many PoCs, MVPs, RFPs and RFQs and the volume of interest we are seeing in the energy and power markets suggests this kind of technology is enormously important.

Across the board, the standardised approach means it can be 10-12 weeks for an OEM to have a device designed, tested and ready to go to market. That's a substantial acceleration and simplification. SGP.32 helps to integrate connectivity management into new IoT device communications capabilities with new hardware, firmware and contractual frameworks.

It's not just a technical question that SGP.32 addresses, it's about integration and ensuring the whole ecosystem is ready. We're fully confident that this is the way to go to create a future-proof, frictionless, zero-touch solution.

GM: How does SGP.32 fit into the wider IoT ecosystem?

AM: When you look at the IoT industry, it has become a massive volume sector so cost is definitely an issue and cost optimisation is essential. To be in a position to say that with SGP.32, a device can have one variant to address the global market is a huge benefit for reducing total cost of ownership (TCO). This is really important to many IoT deployments, and we see this reduction enabling new IoT use cases on a wider scale.

I believe SGP.32 provides a strategic opportunity for OEMs and IoT service providers to position themselves in the overall value chain. The current value chain has a very sequential approach with modules, device and application development, on-demand manufacturing and software customisation driving handover of products between different providers. Connectivity management allows different players to add additional value to the product and that opens up opportunities to simplify and create new offerings. IoT will fly if it reduces complexity, so making a highly standardised way for all the players involved enables scalability to increase massively.

GM: How does G+D help to prepare for eSIM management in IoT?

AM: Our role here has multiple aspects, as we are the trusted and experienced partner for MNOs and the IoT industry. For many years we have been operating eSIM management services for MNOs around the globe. To date, we've delivered more than 500 million eSIM profiles and have strong relationships with a large number of OEMs, IoT service providers and MNOs.

Take that as a proof point that G+D is the most experienced player in the market to deliver eSIM profiles in a highly reliable and secure way to a wide variety of devices. Addressing and understanding the needs of different industries such as telecommunications and IoT has led us to create our AirOn360 product family. Within this seamless interworking family, we offer DP+ or eIM as a service, not only for customers directly but as a highly standardised, cloud-based eIM solution that is ready to cope with the highest volumes.

We focus on making eSIM management simple so the different IoT verticals can become eSIM enabled. For example, we hand over our IPAd reference code to customers so they can speed up the time to market for new devices. This makes it much easier for developers and we support them as an experienced partner on their journey.

Another important service required for IoT deployments is managing devices as well as managing connectivity along the full life cycle of devices. Our connectivity management platform, IoT Suite, offers a leading connectivity management service which seamlessly interacts with an eIM or legacy eSIM management services. This gives IoT players access to an intelligent device and connectivity management service with a single pane of glass for all devices. The AirOn360 family offering includes certified eUICCs, IPAd reference code, the eIM, Discovery service (DS), the IoT Suite and a large number of deployed AirOn360 RSP (DP+) services for MNOs, which allows IoT companies to be confident that they can download a profile from whichever MNO they choose.

IoT has strongly focused on SGP.32 but when we look a bit further ahead, the next step is to load the connectivity profile at the point of manufacture. This is covered in another GSMA specification (SGP.42), which is currently being defined. A key part of that is in-factory profile provisioning (IFPP) and this is where we see a really big need to seamlessly load connectivity in manufacturing environments into devices that are then shipped to the outside world. These devices will use SGP.32 technology to manage connectivity on the fly for the full device lifecycle. The telecommunications and IoT industry is at a very important point in time, as services based on SGP.32 play an essential role in enabling large scale IoT cellular connectivity from the cradle to the grave. And the best part - it just works. ■

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