KORE

Unlocking the Hidden Value of eSIM: Emerging Use Cases

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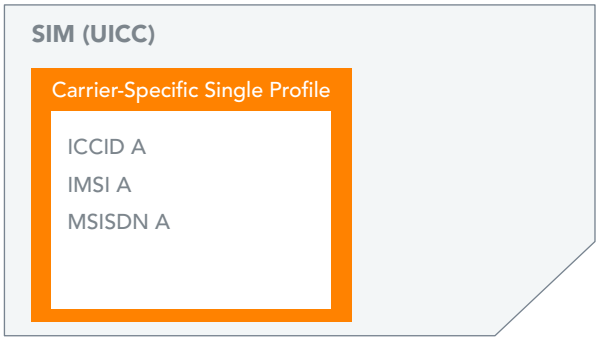
A Brief Introduction to eSIM Technologies

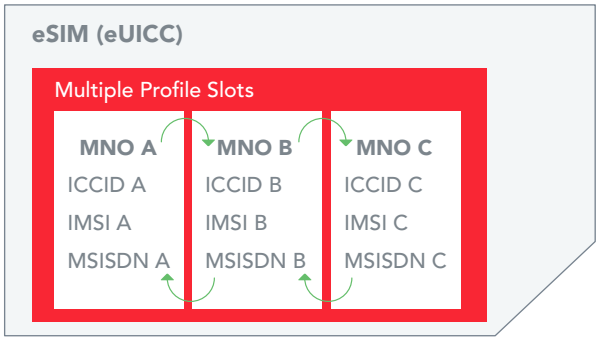
IoT and M2M devices leveraging cellular technologies have traditionally relied on SIM (Subscriber Identity Module) cards, which contain unique information that identify the device to a specific carrier network, facilitating connectivity and data transfer. The challenges lie in the fact that SIM cards essentially lock users into a single carrier network and technology, making it highly inefficient and expensive to change carriers, upgrade to new cellular technologies, or manage complex global deployments. As a result, an increasing number of IoT providers are seeking eSIM technologies.

An eSIM is a hardware-based SIM that alleviates the aforementioned challenges by essentially acting as a single SIM card that is universally compatible with any cellular carrier or technology (2G, 3G, LTE, NB-IoT, etc.), and can support multiple carrier profiles at one time. eSIM technologies enable users to remotely switch from one carrier profile to another via a series of Over-the-Air (OTA) commands sent to the device, as opposed to removing and swapping the physical SIM card. With all provisioning processes managed remotely, the eSIM enables future-proofed IoT deployments while also simplifying logistical processes with a single SKU for multiple services.

In 2016, GSMA released its final eSIM specifications to the IoT market to deliver providers with a standardized approach intended to increase adoption and encourage interoperability. Since then, operators and other IoT solution providers have been developing and introducing their eSIM offerings, and it is expected that by 2020, close to 1 billion mobile and IoT devices will be shipped with eSIM technologies each year[1].

Traditional SIMs	eSIMs
Carrier specific & contains only one carrier profile	Operator or OEM specific but can support multiple carrier profiles
Carrier profile cannot be replaced remotely	Remote download & management of additional carrier profiles
Physical SIM swap is required to change network carriers	Eliminates physical SIM swaps. Over the air profile management.
Different SIM for each carrier	One SIM for multiple carriers





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Key eSIM Use Cases for IoT

The use case that is most commonly associated with eSIM technologies is the "active switching" use case, which enables an IoT device to intelligently and automatically switch to the optimal carrier profile based on connectivity costs, coverage, or other pre-determined rules. While this is certainly a beneficial offering for IoT providers, especially those with mobile deployments that travel across multiple regions, the market is still very immature for this type of solution as many cellular carriers are hesitant to surrender roaming revenues to local operators.

With that said, there are two significant, lesser-known IoT eSIM use cases that are currently being effectively implemented to further simplify the complexity of IoT and foster continued growth and scalability:

1. Insurance Model

Challenge: The IoT connectivity marketplace, which itself is still in its infancy, is rapidly evolving to cater to emerging technologies, consumer demands, and dynamic competitive pressures. With a cellular connectivity landscape that is subject to continuous change, there are a number of reasons why an IoT solution provider may want to change cellular providers:

- Retiring Technologies – Many traditional M2M/IoT solutions relied on 2G and 3G network technologies to support data transfer due to their low cost and high availability. However, these legacy technologies are increasingly being shut-down as carriers re-farm their spectrum to cater to consumer demand for high-speed LTE connectivity.
- Rate Plan Structure and Cost – Long-term carrier contracts often lock organizations into a specific pricing agreement with limited data plan options. As connectivity becomes a more commoditized offering with new, competitive players entering the space with IoT-optimized rate plans, businesses may benefit from switching providers.
- Coverage - Cellular carriers rely on roaming agreements with other carriers to enhance their geographic reach, but these roaming agreements change often and there is constant risk of restricted roaming capabilities. Also, many IoT providers launch their solutions in a limited region, but have growing coverage requirements as their deployment scales and expands.

There were 4 million connected devices using AT&T's 2G network before it was shut down. AT&T stated they were able to migrate approximately half of those connections, but the status of the remaining 2 million is unknown[2].

With that said, most IoT solutions are designed for longevity, with lifecycles intended to last up to 10 years or longer in certain industries. Often times, the devices supporting these solutions are also geographically dispersed, or embedded in complex pieces of equipment and other systems which can make them difficult to access. Should an organization find itself in any of the aforementioned situations resulting in the need to switch connectivity providers or upgrade legacy technologies, they must send technicians to physically execute the SIM swap. The resulting process can be extremely costly and complex, resulting in deteriorated returns on IoT investments.

Solution: eSIM technologies can support nearly any carrier profile and any cellular technology, and empowers organizations to configure the device connectivity profile remotely, thus eliminating the need for truck-rolls and field technician deployments. Leveraging an eSIM approach for this use case delivers considerable business benefits including:

- Mitigated Operational Risks – Enables organizations to alleviate challenges associated with unforeseen network shutdowns or technology changes, thus minimizing total cost of ownership of connected devices.
- Competitive Flexibility – Gives organizations the flexibility needed to efficiently engage with more effective cellular carriers or other connectivity providers to take advantage of more competitive offerings.
- Geographic Scalability – Provides a scalable platform for IoT providers to engage new connectivity providers to enhance their geographic coverage, expand their deployment footprint, and ultimately reach new markets.

2. OEM Model

Challenge: Many manufacturers of heavy machinery, construction equipment, or vehicles, among other connected assets, have global operations and distribute their products to many different geographic regions. When preparing these devices for shipment, provisioning them to the appropriate cellular network can present a number of business challenges:

- Unknown Asset Destination – During the manufacturing process, it is often unknown which specific region the equipment will be initially deployed to, making it difficult to determine which carrier network it should be provisioned to. Adding to the problem, connected equipment is often moved to and operated in multiple regions throughout its lifecycle.
- **Complex Logistical Processes** – Purchasing, stocking, and managing SIM card inventory for the various cellular carriers needed to meet global deployment requirements – and ensuring the right SIMs are installed in the right devices – can become extremely complex to manage, demanding multiple resources and creating opportunity for error.
- Regulatory Compliance – Some countries, such as Brazil and India, have strict government-mandated restrictions that do not allow permanent roaming, meaning that deploying services into these countries requires the use of a local network.

Solution: With an eSIM solution, global manufacturers can use a single SKU eSIM with all of their connected devices, regardless of where they will be deployed. Once the device arrives at its destination, it can be remotely provisioned to the appropriate carrier profile based on its location. Should the equipment move to a new location, it can be re-provisioned to the optimal carrier profile for that specific region. Leveraging an eSIM solution in this use case enables benefits such as:

- Optimized Network Connectivity – Enables organizations to remotely provision devices based on their exact location to ensure they are connected to the optimal regional network, and are in compliance with in-country regulatory policies.
- Streamlined Operations – Simplifies procurement, inventory management, manufacturing, and logistics processes associated with multiple SIM card requirements by providing organizations with a single SKU eSIM compatible with all necessary regional networks.
- Enhanced Control – Provides organizations with standardized connectivity services that are centrally managed across all geographic regions, enabling heightened control over which networks are leveraged where, thus optimizing network availability while reducing costs.

OEM-based IoT applications are expected to have the highest and fasted growing number of new eSIM connections annually[4].

eSIM in Action

Stedin is a large regional grid operator in the Netherlands that is responsible for delivering electricity and gas services to more than 2.2 million commercial and residential properties. Stedin leverages IoT-enabled smart metering solutions for Automatic Meter Reading (AMR) and smart grid purposes to scale their operations, increase efficiencies, improve quality of service, and more effectively allocate internal resources.

Stedin's smart meter devices are typically deployed for long periods of time, with some designed to be in the field for up to fifteen years. This lengthy lifecycle put Stedin at risk of cellular technology changes or commercial disagreements that would give rise to their need to change networks or connectivity providers during the device lifetime. Given the high cost of a smart meter or SIM replacement, the organization required a connectivity solution that would eliminate technology and carrier "lock-in" without having to physically change the SIM or replace the device. In addition, the Stedin smart metering solution needed to be compliant with Dutch Smart Metering standards and emerging telecom legislation for the utilities sector.

To alleviate these challenges, KORE worked with Stedin to deliver a multi-faceted advanced connectivity eSIM solution. KORE provided a carrier-independent OTA platform that guaranteed the ability to fully transfer services without physical SIM swaps, facilitated by eSIM technology. The OTA platform was configured with a Stedin-specific carrier profile enabling Stedin to host its own specific IMSI range to essentially act as an independent carrier to meet regulatory compliance, provide greater support for large scale roll-outs, enhance SIM management capabilities, and ultimately protect the longevity of their connected meters.

Next Steps: Is eSIM Right for Your Business?

With the right eSIM solution in place, nearly any organization with an IoT deployment can benefit from this innovative technology. With that said, some businesses have a more urgent need for eSIM than others – if your answer is "yes" to any of the following questions, you may be one of those businesses:

- Do you have a large (1,000+ units) IoT deployment or are you in the process of scaling up a smaller deployment?
- Do you anticipate your IoT devices to be in the field for a long time (5+ years)?
- Is it difficult to physically access your IoT devices?
- Are you deploying IoT solutions in multiple geographic regions?
- Are your IoT devices mobile, and do they travel across multiple geographic regions?
- Are you currently managing SIM cards and connectivity from multiple carriers?
- Are you incurring significant roaming costs?
- Are you paying above the market rate for connectivity based on legacy contracts?
- Do you have plans to upgrade your IoT devices to a new cellular technology?
- Is your current connectivity provider underperforming in terms of uptime and coverage?

As referenced above, it is likely that your business can benefit from eSIM technologies if you have an IoT solution in operation or if you are seeking to deploy one. With that said, the eSIM market is continuously developing and solutions vary greatly among providers, with some focused exclusively on varied elements of an eSIM solution (i.e. OTA platforms, eUICC hardware, or connectivity services) and some focused on delivering comprehensive, turnkey offerings. Regardless of which option is the best fit for your business, it is critical to engage a trusted partner that can guide you through the complexity of the IoT eSIM ecosystem to ensure maximized returns on eSIM investments.

About KORE

KORE is a pioneer, leader, and trusted advisor delivering transformative business performance. We empower organizations of all sizes to improve operational and business results by simplifying the complexity of IoT. Our deep IoT knowledge and experience, global reach, purpose-built solutions, and deployment agility accelerate and materially impact our customers' business outcomes.

For more information, reach out to KORE to learn how we can simplify the complexity of IoT for your business.

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