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Automative eSIM Whitepaper

May 2019

Abstract

In the future, everyone and everything around us will be connected with a wireless connection. Connected cars, smart homes, smart cities and a whole range of connected consumer electronics and household appliances. Many of these will be connected wirelessly and intelligently, communicating and interacting with each other. The promise of "Connected Car" is very exiting for drivers, mobile operators, solution providers and automakers. They should work together to deliver a range of designs and related mobile services which will simplify and enhance the in-car mobile connected experience for both drivers and passengers alike. Core to this experience is the development of an all new flexible installation and over the air provisioning and management process for embedded SIMs.

Embedded SIM will simplify the Car Connectivity

eSIM – Managing Non-Core Technology

New technology is proving transformational to the automotive sector and these changes are both rapid and disruptive. A key component of this transformation is centred around connected vehicles and the associated opportunities and risks. The ability of a vehicle to connect with the outside world will undoubtedly enhance the driver and passenger experience, as well as creating new service opportunities. Automotive manufacturers, insurance companies and telematics providers all have a vested interest in the types of benefits of a vehicle that can optimize aspects of its own operation and maintenance, provide next generation infotainment services, with additional safety and security as well as adding additional value to the vehicle owner.

The transformation also goes for the growing number of connected car applications such as vehicle management, navigation, route optimisation, in-car entertainment, emergency call services and connected insurance.

The best technology and service processes should be invisible to the user, especially when it comes to mobile connectivity and provisioning. Mobile operators, automakers and other key organisations in the automotive supply chain have, in the past, tried to handle this challenge on a case-by-case and device-by-device basis. The result has sometimes delivered a confusing and inconsistent user experience for the average consumer. It is now recognised that by embedding a mobile connection within the vehicle design and manufacture, the driver and passengers will enjoy a more consistent experience as all the connected services are more easily controlled and securely work together. For instance an emergency call system built into a vehicle is more likely to work in the case of an accident than one that depends on the connection through a tethered smart phone in the vehicle.

The lifespan of a vehicle far exceeds the normal commercial term of a communications connectivity contract. Once deployed within the car traditional SIM cards are difficult to replace. Embedded SIM technology (eSIM), that allows changing mobile communications service providers "over the air", is one way to overcome this.

eSIM Evolution – Industry specification for car connectivity

Recent announcements however have mostly focused on consumer applications, drastically modifying the main conclusion of our previous white paper. Operators are no longer unwilling to deploy embedded SIMs in smartphones. Some MNOs would weigh opportunities to partner with device manufacturers to launch and sell smartphones with embedded SIMs. The impact on the mobile market will be significant as smartphone shipments (about 1 billion units in 2016) greatly exceed sales of M2M and connected object (Internet of Things, IoT) shipments (about 50 million units in 2016).

eSIM is a significant development for the automotive industry, to deliver the independence from the mobile network operator required over a vehicles' long lifespan. eSIM and Remote SIM provisioning gives an automotive manufacturer the ability to change to a different mobile access supplier and thus address the problem of potential network lock-in. This ability to change a SIM profile over the air and to remotely configure the connectivity, depending on where the device is eventually, sold provides additional flexibility to the manufacturer.

Whilst this does open new commercial options, it is also dependent on the connectivity access provider supporting eSIM and also having an eSIM platform that is interconnected with other networks, thereby allowing a profile to be switched between networks.

Illustrative: Connected cars annual sales by technology (in million units)
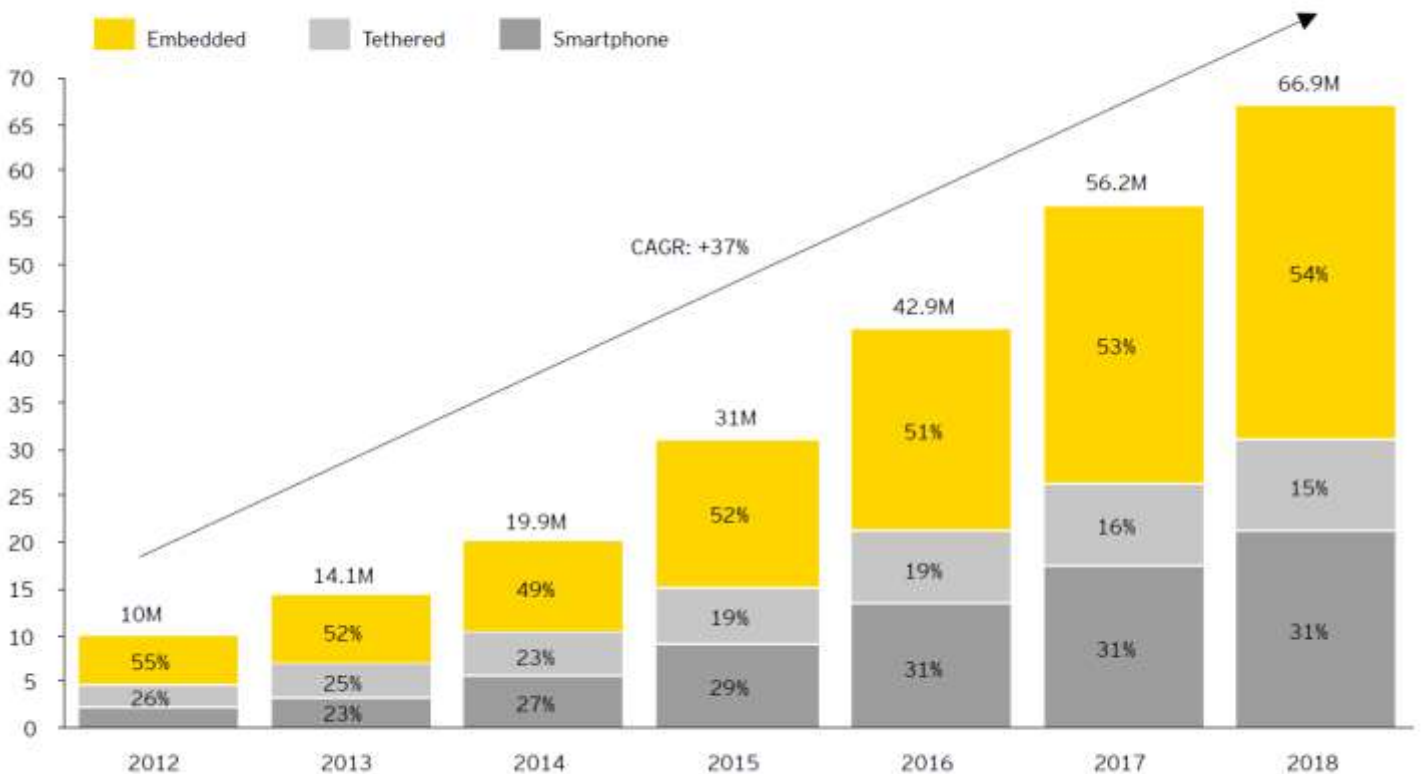
Source: GSMA

The Embedded SIM specification specifies the roles of the Embedded SIM "Subscription Manager-Data Preparation" and "Subscription Manager-Secure Routing" network elements that will provide the underlying flexibility required by the mobile network operators and the auto industry. This will allow automakers to change operator (and related tariff, if there is one) within their contract terms, without physically having to access the SIM (very important for automotive applications, for example, where the SIM is generally soldered or inaccessible).

Importantly, for all parties concerned, this new SIM capability will last at least the next 20 years. This means automakers can safely plan and account for the Embedded SIM module as a critical part of their design and related manufacturing and tooling investments.

Adoption of embedded connectivity? What about security?

Adoption of embedded SIMs now appears a credible scenario in automotive markets since some automotive manufacturers are now willing to launch autonomous cars and some mobile network operators are willing to participate in these commercial launches.

As automobiles move towards more autonomous capabilities, the stakes will raise in regards to security. Even if cars are not entirely driverless, the functions will become increasingly dependent on applications, connectivity, and sensors. Vehicle-to-vehicle (V2V) and Vehicle-to-Infrastructure (V2I) allow the car to communicate with other cars and infrastructure such as traffic lights. Vehicle speed adjustments, telematics, and AI voice recognition and interfaces will become common features.

The rapid increase of these technologies inevitably creates the risk of hackers gaining access and control to the essential functions and features of those cars and utilizing information on drivers' habits for commercial purposes without the drivers' knowledge
or consent.

One and most common concern for customers is to be monitored by other people or institutions. Automotive manufacturers can be stayed in the case of paying penalties, if the vehicles are hacked. In this case of situation, it is possible to lose fame.
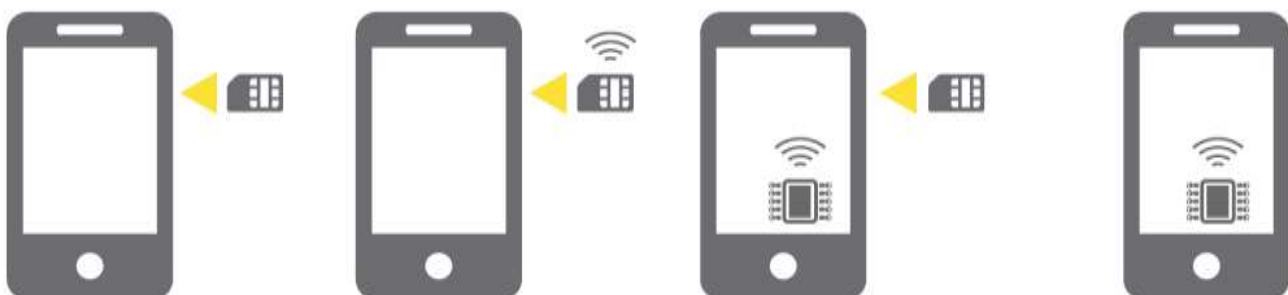
# Metamorfoz - Smart Car Management

End to End Connectivity Solution with Metamorfoz eSIM Management Platform

Metamorfoz has been at the forefront of automotive-grade eSIM solutions for more than a decade, offering a suite of market-proven M2M modules, eCall technology,Machine Identification Modules (MIM) and remote provisioning services that are specifically geared to meet the industry's strict requirements. Latest connectivity technologies like LTE offer a leap forward in terms of enhanced capabilities but it also presents challenges and complexities that require engineering know-how and a partnership approach to meet performance, design and security benchmarks specific to an automotive environment.

Embedding SIMs into connected cars during production is necessary to ensure a robust platform for connectivity across the entire lifetime of a vehicle. However, without a way of managing them remotely, manufacturers face significant logistical challenges. They would either need to stock multiple types of local SIM cards for multiple operators, or install a standardized SIM from a single provider that could incur substantial roaming charges. Deploying local eSIM profiles to updateable, embedded SIM cards over-the-air via eSIM Management dramatically simplifies flexible connectivity management that meets the needs of the automotive manufacturers.

Metamorfoz's full spectrum eSIM Management over-the-air provisioning technology gives car manufacturers the freedom to focus on advancing leading-edge automotive design and technology. And as wireless technology needs expand, OEMs and automakers can rely on Metamorfoz's proven expertise for next generation features.

Remote SIM Provisioning for M2M utilises a server driven (push model) to provision and remotely manage operator Profiles. The solution is organised around 3 elements: the SM-DP (Subscription Manager - Data Preparation), the SM-SR (Subscription Manager - Secure Routing) and the eUICC. The diagram below is the high-level representation of the M2M main system elements. Beyond common SIM functions, such as SIM Toolkit6 and Bearer Independent Protocol (BIP7) support, the M2M solution does not impose additional requirements on M2M devices to enable usage of eUICCs.

M2M Architecture
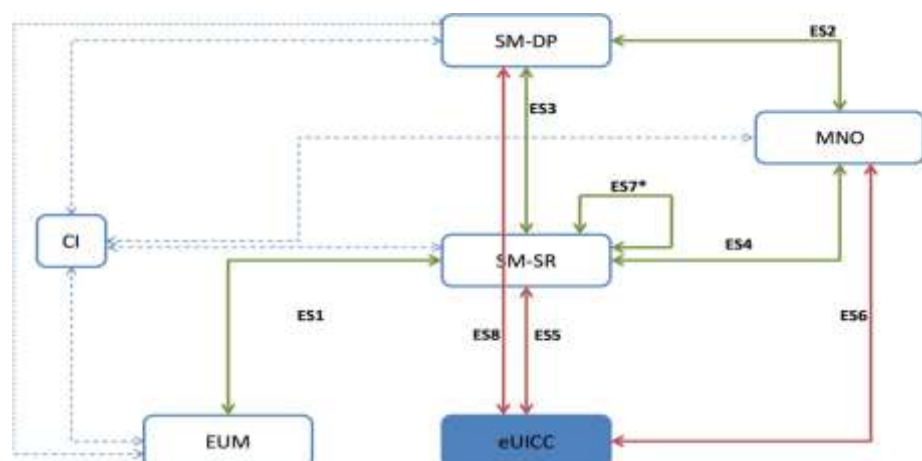
Opportunities For Automakers

Opportunities for automaker and Metamorfoz to work together

Metamorfoz has deployed its OTA solution in many Mobile Operators that has traditional strengths in the supply of connectivity, network usage data, secure "over the air" provisioning services and availability of near real time CRM information. This allied with the automakers' keen understanding of customer desires packaged as great designs, will deliver a useful and profitable fusion of services. For example:

- The car manufacturers can manage the connection problem in different countries with the embedded sim cards that they put in the vehicles they produce, by remotely installing the mobile operator's profile using Metamorfoz eSIM management platform.
- An automaker could include the initial customer lifetime mobile data cost in the retail price of the car for core services like eCall, stolen car tracking and in-vehicle diagnostics.
- A passenger could use directly for other entertainment or information services through their own hand-held device but use the improved connectivity of the Embedded SIM.
- An automaker could collect vehicle specific IoT sensor data like car engine heat, balance, road info etc. and improve car components for diagnostic issues.
- An automaker could work with a mobile operator to set up joint or outsourced service centres using vehicle data sent directly from a car to the centre, on a Machine to Machine (M2M) basis.

Not every technical evolution is disruptive - the more significant are eruptive!

We are only at the very beginning of what the automaker and mobile industry can achieve after adopting the Embedded SIM:

- A significant growth in customer led mobile applications and service design for the auto industry.
- The development of new industries and service models.
- Improved margins and profits from satisfied and safer business customers.

To make the most of this growth opportunity, automakers and auto industry supply chain executives should look to partner with their local eSIM management platform supplier and work with their teams.

Further information is available from Metamorfoz:
www.metamorfoz.com.tr

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