Over-The-Air updates of billions of IoT devices in the 5G and IoT era

CONNECTIVITY

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Imagine SIMs as mini computers inside mobile devices. They host **essential credentials and configuration files** that allow devices to run smoothly, both in terms of security and connectivity. This is why **Over-The-Air (OTA) platforms** have played such an important role in the telecom industry for the past 20 years. Mobile operators have actually been using this technology since the 2G era.

As we enter the 5G era, we're witnessing incredible **Internet of Things (IoT) growth**, where billions of new IoT devices will be connected. In this exciting new connectivity and innovation age, **one constant remains: the need for OTA updates**. While the OTA technology itself remains more or less unchanged, the sheer number of connected devices fuels the demand for a high performing IoT OTA platform and expands its use cases.

Scalability and adaptability of the OTA platform

The 5G landscape ushers in **a wave of new secure elements** alongside the classic SIM, including the Machine-to-Machine SIM (M2M SIM) and embedded SIM (eSIM), all now able to connect to 5G networks. In order to be able to update these different types of secure elements, the **5G Over-The-Air platform** has also evolved.

In the past, mobile operators sent updates to individual devices via SMS. But with all the different types of IoT devices, **new updating methods are necessary**. A connected generator, for example, may not be able to receive an SMS, so the IoT OTA platform relies on data connectivity to send **updates via the HTTP channel**. Similarly, an electricity meter doesn't have a mobile number (MSISDN), so the OTA platform once again adapts to the specific IoT need and sends **OTA updates using the device IMSI**. In other use cases, IoT devices are often connection-less, or offline for long periods of time—a connected container traveling the world on the open seas, for example. The IoT OTA platform is able to **detect when these devices re-attach to the network coverage area** and send updates accordingly.

Finally, with the explosion of IoT devices, end-of-life policies for communicating devices will become a major new challenge. Many of these IoT devices—such as smart meters or infrastructure equipment in smart cities—will try to connect to corresponding network providers even though they have been unsubscribed from the service. Multiplied by the thousands, this will create **unnecessary stress on networks**. With the IoT OTA platform, this continuous connectivity communication can be **limited to the bare minimum** or even completely switched off.

New OTA applications in the 5G and IoT era

On top of adapting services to IoT device specifications, the IoT OTA platform makes new applications possible as well. One key development is the GSMA IoT SAFE applet that is meant to **provide end-to-end protection of all bi-directional communications** with IoT devices (Device-to-Cloud but also Device-to Device). The OTA platform also allows mobile operators or Original Equipment Manufacturers (OEMs) to **monitor the quality of the customer service**. This means monitoring the network access technology, the coverage quality, the data accessibility, the time to attach, the cause of any dropped calls or any problems accessing the network. Mobile operators can use this data source for the maintenance of their network elements or to **reconfigure SIMs Over-The-Air**. Regulators may also rely on this data to ensure that operators meet the minimum coverage requirements to maintain their license.

The OTA platform is also transforming to **answer new connectivity challenges**. For example, many countries are trying to ensure the best and always-on connectivity for their emergency services. This is done through the update of priority class and radio policy files which, once again, can be updated via OTA. Several mission-critical industries (air and land transportation, military, police, for example) are also building their LTE/5G Private Networks with their own SIM, Multi-IMSI or eSIM cards. Here, OTA updates can also help **reconfigure these in real-time** so that the connected devices will always attach to the best network.

As the 5G and IoT era unleash a variety of devices throughout the world, deep understanding of SIM technology and **best-in-class OTA platforms** will be essential enablers to continue to adapt to the connectivity challenges of today and tomorrow.