Solving network optimization challenges caused by unsubscribed IoT devices

CONNECTIVITY

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As IoT devices continue to proliferate in our hyper connected world, securely managing the entire connectivity life cycle has become crucial. This includes keeping SIM parameters up-to-date as well as managing the end-of-life of millions of devices. The latter represents a major new challenge for MNOs in terms of network optimization and connectivity security. And from the perspective of their enterprise customers, effective end-of-life management can positively impact energy consumption. This is where the over-the-air (OTA) platform comes into play.

Eliminating unnecessary network congestion

When an OEM or an enterprise using IoT devices ends a service, they need to deactivate entire fleets of devices—smart meters, devices scattered throughout a smart city or entire factories, for example. Given the scope of these projects, **a fleet of devices can number in the thousands, if not millions**, and is often spread apart and difficult to access. Physically deactivating the connectivity of each device would be a very time consuming, costly and often even impossible endeavor.

While MNOs have the means to remotely subscribe and unsubscribe these devices from their network relatively easily, as long as these **unsubscribed devices** have access to a power source they **are still active**. Imagine a cargo ship in the middle of the ocean each IoT device on board is equipped with an internal timer that is programmed to reconnect to a network when back in range. Stationary devices on the other hand are programmed to reconnect periodically in order to save energy. In both these cases, even if the IoT device is unsubscribed, as long as it still has power it will **continue to regularly send connection requests to the network**. When we consider that these individual requests are repetitive, unending and multiplied by the millions of unsubscribed devices, **network congestion** and **unnecessary power consumption** are inevitable.

When bandwidth is overwhelmed by these connection requests, it can be detrimental to other critical services. Low bandwidth can impede emergency calls, derail a manufacturing production line or stop updates from being sent to streetlights in a smart city, for example. These problems can yield significant consequences so massive that the global market demand for network optimization is expected to exceed $1.5bn by 2032[1].

Network optimization using the OTA platform

As the sheer volume of IoT devices explodes, MNOs will need powerful tools to optimize resources in order to **maintain sufficient bandwidth for existing and new IoT use cases**. Concretely, the only way to reduce network congestion generated by unsubscribed devices is to kill the International Mobile Subscriber Identity (IMSI) using the over-the-air (OTA) platform.

But killing the IMSI, which is unique to each device and allows MNOs to identify and communicate with individual devices, is a very delicate matter. For starters, while it relieves network congestion, **killing the IMSI is definitive**, meaning that there is no way to reconnect the device remotely. Also, over-the-air updates are so powerful that an MNO can launch a campaign to **kill an entire fleet of devices with a single click**. When intended, it saves an incredible amount of time and yields several benefits for both the MNO and their IoT device customers. However, when unintended—whether by error or a malicious act—it can be detrimental in terms of cost and reputation for both for the MNO and for their IoT customers.

Harnessing the power of over-the-air updates

Given the finality of this process, over-the-air updates effectively help MNOs and their enterprise customers **alleviate network congestion and save energy** by deactivating unsubscribed devices. With less congestion, MNOs can maintain the level of bandwidth necessary to **meet their service level agreement** with their current IoT customers—a major factor in customer loyalty. At the same time, by shutting down fleets of devices, MNOs can **help their customers be more sustainable**. Afterall, even low powered devices, when multiplied by hundreds or thousands over a long period of time, can consume a significant amount of energy. MNOs themselves are also able to reduce energy consumption and **effectively reallocate resources** once congestion is cleared up.

While killing the IMSI is the “ultimate” over-the-air update on a SIM, it is not the only operation that **necessitates safeguards** against human error or intentional tampering. If managed incorrectly, **other operations** can also be detrimental to an MNO’s brand and reputation. For example, simply updating the MNO brand displayed by SIMs on screen-equipped devices **can be very critical**—for example publishing a typo or a bad joke.

When sweeping or permanent changes like these are made possible, it is essential to put the right safeguards in place. And while several people within the MNO team may be involved in managing an OTA platform campaign for maintenance or updates, **only a few key individuals**—one or two maximum—should be able to **authorize sensitive operations**. If an action or update is flagged as “sensitive” by this inner circle of decision makers, it cannot be executed without their express approval.

Clearly, IoT devices represent a **paradigm shift** for MNOs, who now manage a huge volume of unsupervised devices and the network optimization challenges that follow—as opposed to consumer devices which no longer attempt to connect once unsubscribed. As IoT keeps growing, the over-the-air updates will not only **help keep device connectivity parameters up-to-date** to ensure security and quality of service, but they will also help MNOs **manage IoT device end-of-life swiftly and properly** when devices need to be deactivated—eliminating network congestion costs. Today, the OTA platform is one of many powerful tools used for network optimization, including Artificial intelligence, predictive analytics, and automation technologies.

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[1] Network Optimization Market Outlook (2022-2032), Market Insights

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