



The SIM turns 30

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Giesecke+Devrient

30 years ago, Giesecke+Devrient (G+D) delivered the world's first commercial SIM card to a telecommunications company in Finland. At the time, hardly anyone could have imagined the success this smart card would achieve. But growth did not stop there – further innovations are on the horizon and the success story will continue. The IoT sector in particular is rapidly driving the SIM evolution.

The SIM card connects the world and stores data securely – this fundamental basis has not changed in the last 30 years, even though the range of functions has grown significantly. The SIM remains a unique solution, consisting of a microprocessor chip and an operating system which provides secure access to the mobile network.

The basic technologies of the SIM card were developed well before the market launch: G+D played a decisive role in this, filing for the first patent for smart cards as in 1968. In 1989, plug-in and exchangeable SIM cards were finally defined and standardized – again with G+D playing a major role. The company delivered the first commercial SIM card in 1991 to the Finnish GSM operator Elisa (then Radiolinja), about the size of a credit card from which the appropriate plug-in could be broken out, depending on the dimension of the SIM slot in the device. Another important milestone came at the end of the 1990s with the publication of the SIM Toolkit standard, which further enabled implementing applications for mobile banking or information services. SIM card development progressed to offer even smaller card sizes – from micro to nano SIM cards.

2012 was a game-changing year with the introduction of eSIM technology. The ability to simply download the SIM profile to the device opens up completely new possibilities for digitization and logistics optimization. A generic SIM module, the so-called eUICC (Embedded Universal Integrated Circuit Card), is permanently installed in the device as a chip. Personalization happens remotely by providing the data of network operators via mobile communications or WLAN. More and more manufacturers of smartphones, tablets and smartwatches are now equipping their devices with eSIM technology.

Even now, development is moving forward: G+D is working on new solutions, especially in the rapidly growing Internet of Things (IoT) application area. To ensure that the huge number of devices in the IoT area – also referred to as "Massive IoT" – can be used successfully, three core properties are crucial: data authenticity, data protection, and system security. Currently, there are no ways around eSIMs or eUICCs. They fulfill all the necessary business-critical criteria, from remote administration to ensuring the integrity of all devices and transmitted data.

In parallel, eSIM technology is continuing to evolve in the field of iUICCs (Integrated Universal Integrated Circuit Cards), also known as integrated SIMs. For G+D, such integrated SIMs represent an important research and development focus. The iUICC is a tamper-resistant element (TRE) within a SoC (system-on-a-chip). That way, the

SIM is no longer a dedicated hardware module, but an isolated hardware component combined with a baseband chipset to form a single connectivity module. As the latest SIM evolution, the iUICC offers huge potential and numerous benefits for the IoT industry. Due to its small footprint and low power consumption, it is a promising all-in-one connectivity solution, especially for Low Power Wide Area Networks (LPWAN), which are synonymous with wide reach, low energy burning and manageable operating costs.

Integrated SIMs are likely to be used initially only in niche applications, primarily in small, simple IoT devices. Widespread use is not expected for several years, but G+D will continue to actively drive this development with solutions.

"G+D has played a crucial role in SIM cards in terms of development, technology and management. We have always believed in the high potential of the SIM, and developments have proven us right. Applications that seemed unthinkable just a few years ago – such as digital car keys or connected driving – are now a reality. And development isn't stopping. Particularly in the IoT sector, SIM technology will continue its path to success unabated, and with technological support from G+D," emphasizes Carsten Ahrens, CEO Mobile Security at G+D.

About Giesecke+Devrient

Giesecke+Devrient (G+D) is a global security technology group headquartered in Munich. As a partner to organizations with highest demands, G+D engineers trust and secures essential values with its solutions. The company's innovative technology protects physical and digital payments, the connectivity of people and machines, the identity of people and objects, as well as digital infrastructures and confidential data. G+D was founded in 1852. In the fiscal year 2020, the company generated a turnover of 2.31 billion euros with around 11,500 employees. G+D is represented by 74 subsidiaries and joint ventures in 32 countries. Further information: www.gi-de.com.