nuSIM FAQ

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Market & Ecosystem

What are the specific market drivers for nuSIM?

In a low cost IoT market, such as NB-IoT, it's all about costs, battery efficiency and simplicity along the value chain. Since the SIM is a mandatory element of cellular connectivity, it has an impact that can be optimized. With nuSIM we are able to improve all relevant parameters and therefore help the IoT market to reach its potential.

Why does the M2M eSIM solution not fit the market need?

M2M eSIM is a relatively complex solution and not really suited to work in a cost-sensitive context. Moreover, technical constraints in NB-IoT like very limited bandwidth, scarce battery power and missing SMS support are major blocking points.

How is nuSIM different from eSIM and iSIM?

Let's distinguish eSIM (= embedded SIM) and iSIM (= integrated SIM).

Despite a potential misunderstanding, an eSIM is still a separate component within a device. It is however fixed (soldered) to the device and no longer removable, thus "embedded". An eSIM is associated with typical management features, such as over-the-air subscription download and subscription switching.

eSIM does however not help for low-cost IoT as it is generally too complex, too expensive and not really adapted to particular use-cases where cost-efficiency and simplicity are paramount. Therefore, DT is taking the next logical step by moving the SIM into the baseband chip. Two separate components become one and we get an iSIM, an integrated SIM. Consequently, nuSIM is an iSIM.

Besides the physical form, are there functional differences to eSIM?

The integrated nuSIM has been optimized for mobile IoT use cases where cost efficiency is paramount and frequent change of subscriptions is not a requirement. Therefore, typical eSIM features like multiple profile support, profile switching, etc. are not supported. Also, nuSIM profiles are much smaller, below 500 bytes.

Why did you chose a proprietary solution?

Simply because there is no standardized SIM solution available that would work with the needs and constraints of the emerging low-cost segment. Standards organizations are also not necessarily famous for the simplicity of their results and the speed of achieving them, both are crucial aspects for us.

What is special about the nuSIM approach?

nuSIM is optimized for NB-IoT, i.e. any SIM functionality which is not essential in this context, was removed. This applies e.g. to SIM OTA access, SIM Toolkit, Java Card support and many elements of the SIM file system, which are simply not needed. This leads to a rather low hardware and software footprint and very simple profiles, and functional requirements on the device are reduced accordingly. Furthermore, nuSIM is an approach where many industry players work together to establish the core of an open ecosystem, competition and freedom of choice included.

What are the main benefits along the value chain?

Chip makers have a chance to bring added value to their components, answering a clear market demand. Module maker's products may become smaller and more power efficient. They can even partner directly with MNOs to load subscriptions already at their stage. For the devices makers, the absence of a physical SIM will remove all related logistics, stock keeping and handling efforts and the end customer will benefit from a worry-free experience when the new device works out-of-the box.

Can you give an estimation for the cost savings that nuSIM will bring?

The Total Cost of Ownership (TCO) for a classical SIM component is usually around 1$ per device for SIM hardware, related logistics and handling during device production. The TCO are even higher, when eSIM comes into play. With nuSIM, we expect the remaining costs to be only a fraction of that, certainly subject to scaling effects. With expected module costs for NB-IoT below the 5$ threshold and trending downwards, the saving potential is significant.

Are you talking to other partners?

Of course. nuSIM has been announced in 2019 with 12 partners and one year later this number has increased to 22 and is still growing. Other interested companies are very welcome to join.

Which operators will be joining?

All operators in the DT group will be offering the nuSIM solution. After going public we received many inquiries from operators around the world. So far, Com4 from Norway has explicitly joined the ecosystem and more MNOs are close to a decision. Further operators are more than welcome to join on the basis of our open

specification. We suggest they contact us directly or talk to the named partners. The partners are free to offer nuSIM in their own responsibility, without DT in the loop.

How is interoperability maintained across the growing ecosystem?

There is a compact set of specifications mainly around the interface for profile loading. This governs that any nuSIM profile from any eligible Data Preparator can be loaded onto any nuSIM chip. Furthermore, COMPRION, a well-known provider of SIM and eSIM test systems, has developed a test suite for nuSIM, which helps the partners to test the nuSIM functionalities and ensure interoperability.

Which segments will see the most take-up?

Definitely the low cost IoT market, wherever devices are required to be simple, cheap, small and battery efficient, such as NB-IoT trackers or smoke detectors, where the end-user will not select or change the operator and services are supposed to work out-of-the-box with maximum simplicity.

When will nuSIM products become commercially available?

All our partners are working to make nuSIM a reality on their individual roadmaps. Several prototype implementations are available and the partners are now going through security certification. We expect the first nuSIM chips and modules to be commercially available in H2 2020.

Technical

Is nuSIM designed for NB-IoT only, or can it also be used for other radio access types?

In principle, nuSIM can be used for any RAT type. However, it is important to consider that the SIM functionality has been stripped-down to make the nuSIM profile really simple and small. With the current nuSIM profile, the device could register in a 2G/3G/LTE network but some optional features would be missing (e.g. SMS). Such features could be added to the nuSIM profile if required, but would make the profile larger and the implementation on the device side more complex.

How does the operator's subscription get into a nuSIM?

Like for eSIM, the operator details are loaded to the chip in form of a small encrypted file, called a profile. However, unlike for eSIM, this is typically done at the time of module or device manufacturing. Afterwards, the device is immediately ready for service.

What is the typical provisioning flow?

The loading of profiles to the chips at the module or device manufacturer is supported by the nuSIM Loader Application (LA), a dedicated software tool to obtain, store and load nuSIM profiles in quantities suitable for large-scale productions. The LA requests a quantity of profiles from the Data Preparator (DP), the entity in the ecosystem that has created the profiles on behalf of a mobile operator. The DP then encrypts the profiles and sends them to the LA, where they are stored until they are loaded to the chips at an independent point in time. Only in the chip, the profiles are decrypted and the contents installed. The entire process is secured by state-of-the-art cryptographic means, similar to those applied for eSIM profile download.

Are there specific tools to be put in place for nuSIM profile loading?

The entity doing the profile loading, typically the module or device manufacturer, has to install the nuSIM Loader Application (LA). Deutsche Telekom is providing an open source reference implementation for the LA free of charge. Interested parties can further develop, integrate and market this tool under their own brand.

What is the role of the nuSIM Data Preparator?

Very much like for eSIM, the Data Preparator (DP), on behalf of an operator, creates the nuSIM profiles and stores them ready for request by the loading entity. If a request is received, the profiles are specifically encrypted and transferred to the requesting Loader Application. This process reuses some functional elements from the eSIM context, as defined by the GSMA. Therefore any eSIM SMDP(+) can relatively easy assume the role of the DP for nuSIM. We will be happy to discuss this with interested parties.

Does nuSIM support remote SIM provisioning?

Yes, indeed nuSIM allows to receive a profile at any stage of the life-cycle. If a profile is already loaded, then the new profile simply replaces (overwrites) the existing one. This can happen in the field, e.g. by using existing firmware update (FOTA) or device management (DM) protocols, where a 500-Byte encrypted nuSIM profile would be part of the FOTA package or represent a DM object. It is up to the device/module/chip makers to support this optional feature.

Is the entire solution secure?

Security of the integrated nuSIM will be proven through an independent evaluation scheme similar to CC (Common Criteria). Profile provisioning involves full end-to-end encryption and certified data preparators (DPs).

Miscellaneous

What does "nu" in nuSIM stand for?

Nu is an alternative spelling for "New". The Urban Dictionary also gives the following definition: "Nu, in its more specialized meaning, denotes the re-envisioning of some art."