Acceleronix

Accelerate IoT

When to choose vSIM for your IoT connectivity

Table of contents

Introduction	3
What is a soft SIM?	4
What the Acceleronix vSIM provides	5
vSIM's secure characteristics	6
Operational simplicity	7
Use case examples	8
Conclusion	9

© 2024 Acceleronix. All Rights Reserved.

Introduction

A revolution in subscriber identity module (SIM) cards has been triggered by the arrival of embedded (eSIM), integrated (iSIM) and soft SIM.

Traction is already gathering pace and Counterpoint Research project there will be six billion SIMs – all the new SIM form factors combined – shipped over the next five years.[1] Much of this will be dominated by eSIM and iSIM, but adoption of soft SIM is also gaining pace. This technology offers compelling advantages for a wide range of deployment scenarios.

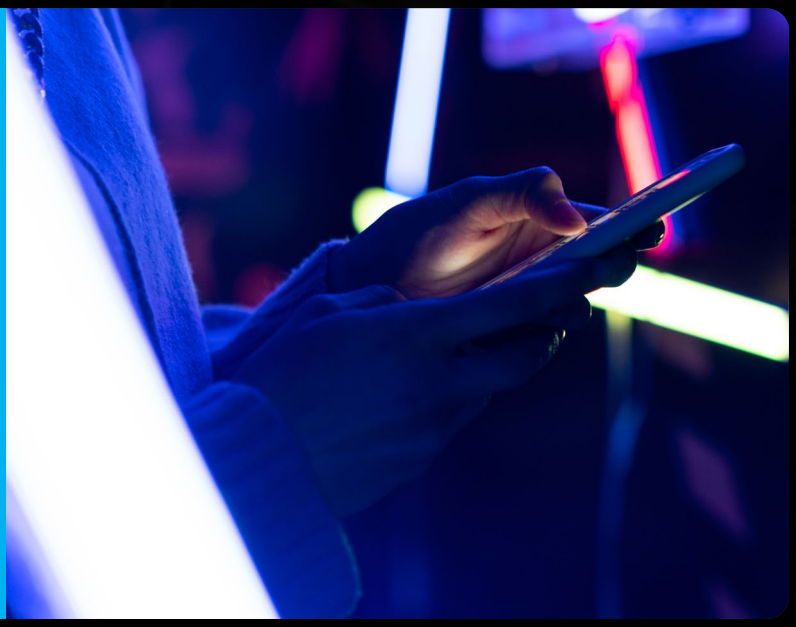
Analyst firm IoT Analytics expects eSIM and iSIM technology to further increase its penetration in the cellular IoT market.

The market is still dominated by a combination of physical SIM cards and soft SIM, with a combined market share of approximately 67%.[2]

The firm describes soft SIM as software-based universal integrated circuit cards (UICCs) in a trusted execution environment.

This new white paper explains the potential benefits of soft SIM and introduces virtual SIM (vSIM), Acceleronix's soft SIM offering.

The market is still dominated by a combination of physical SIM cards and soft SIM, with a combined market share of approximately 67%.



© 2024 Acceleronix. All Rights Reserved.

What is a soft SIM?

GSMA Intelligence defines a soft SIM as "a collection of software applications and data that performs all the functionality of a SIM card but does not reside in any kind of secure data storage or use a secure processor. Instead, it is stored in the memory and processor(s) of the communications device itself – there is no hardware." [3]

Soft SIM therefore has no physical component, it is simply downloaded securely from the cloud and delivers the same functionality as any other SIM form factor.

Critics of the concept will state that soft SIMs are not secure because they do not comply with GSMA standards, but that is because no such standards exist in relation to soft SIMs. Concerns are mitigated through the measures taken to ensure secure operation of the Acceleronix vSIM offering, explained later in this paper. Importantly, soft SIMs follow GSMA guidelines for SIM operational behavior, which ensures they operate identically to a regular SIM both in terms of the functionality they provide and the security of the SIM and SIM data.

Soft SIM therefore has no physical component, it is simply downloaded securely from the cloud and delivers the same functionality as any other SIM form factor.

1 https://www.counterpointresearch.com/insights/esim-devices-hyper-growth/
2 https://iot-analytics.com/isim-esim-market/
3 https://data.gsmaintelligence.com/api-web/v2/research-file-download?id=28999708&file=The%20future%20of%20the%20SIM%20potential%20market%20and%20technology%20implications%20for%20the%20mobile%20ecosystem.pdf

© 2024 Acceleronix. All Rights Reserved.

What the Acceleronix vSIM provides

vSIM is Acceleronix's proprietary solution for delivering a soft SIM solution to its customers. It provides significant advantages over standalone soft SIM offerings because the SIM details are completely software-based within the customer's Acceleronix module. This ability to provide vSIMs alongside its comprehensive range of modules helps differentiate Acceleronix and amplifies the general benefits of soft SIM in Acceleronix's vSIM solution.

Key benefits include the potential to reduce the overall size of a device. The vSIM requires no board space beyond what is needed for the module and therefore can help reduce bill of materials (BOM) costs and manufacturing expenses as well as the overall form factor of a device. Components such as SIM cards and SIM trays and connectors can be eliminated from device designs. In addition, a smaller or lighter final product that potentially consumes less power is a further advantage for many IoT use cases.

The cost savings continue because there is no requirement to purchase or install a SIM – the vSIM is already in the module. Substantial savings are made by not needing to configure devices when they are deployed. And, for devices with long lifespans, eliminating the need to replace SIMs when changing connectivity provider removes device maintenance costs. This is a feature of eSIM and iSIM, but vSIM takes the functionality into the module, enabling over-the-air upgrades and changes.

Further advantages include enhanced robustness. There is no physical SIM to consider that may be affected by external conditions. Performance is instead based on the tolerances of the Acceleronix module itself. This is a significant benefit given the susceptibility of plastic SIMs to moisture or dust ingress and the possibility of SIM card theft or misuse. In addition, because the vSIM is software embedded in the module, there are no soldered connections that can break or degrade.

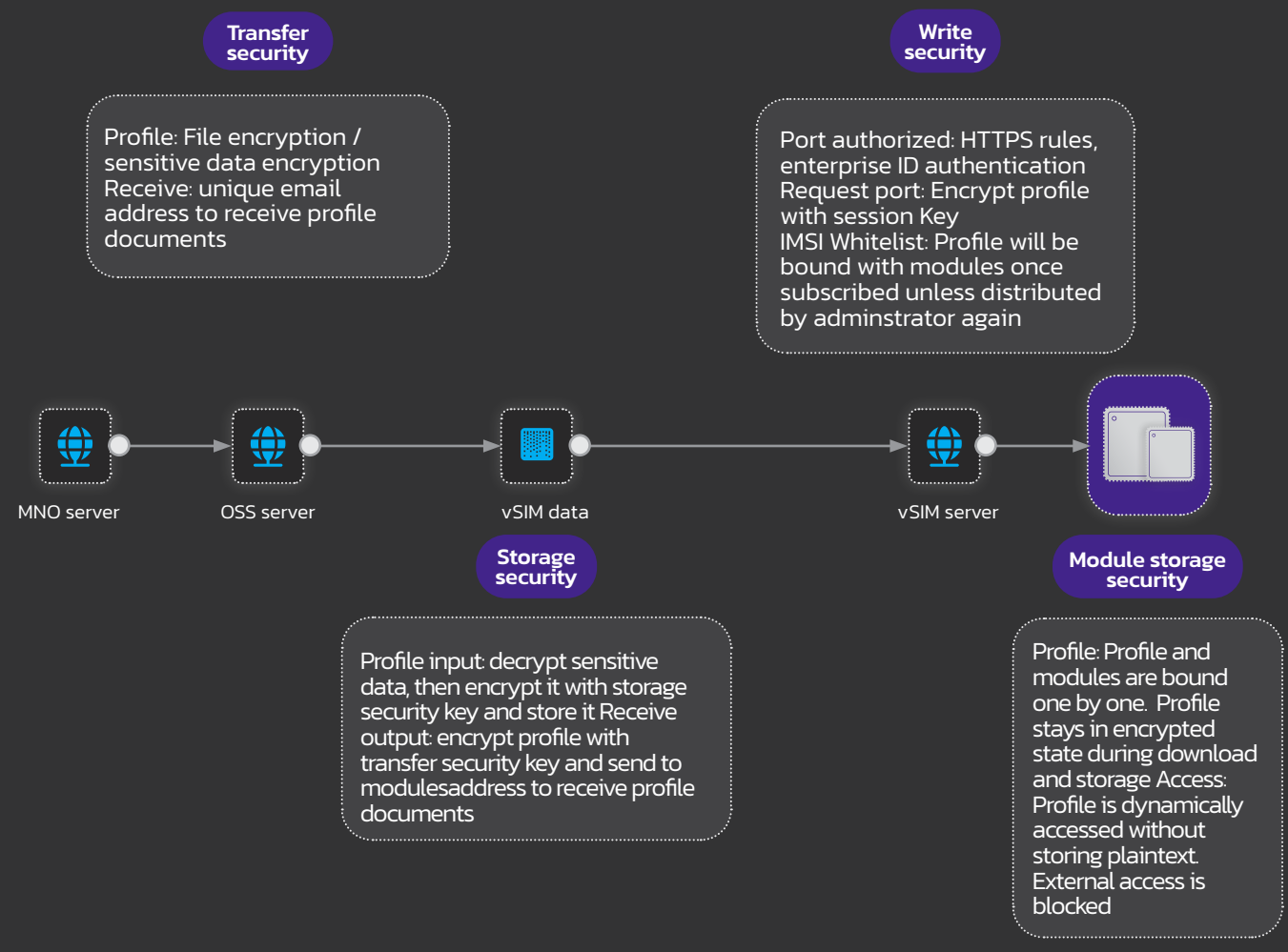
© 2024 Acceleronix. All Rights Reserved.

vSIM's secure characteristics

vSIM deployment and management is secure because the SIM credentials reside in the Acceleronix module, rather than the secure enclave that an iSIM would be kept in. All the communication and the required storage are encrypted and security certificates are also applied for communication between systems. This results in an environment that is secured in multiple ways so organizations can be confident that the high levels of security in GSMA-compliant SIM form factors is replicated in vSIM.

Acceleronix takes standardization seriously, but it is not possible for the GSMA to certify soft SIM because soft SIM itself is not universally standardized. Users can rest assured, however, that equivalent efforts have been made to secure vSIM and vSIM has been created following GSMA guidelines for SIM security.

Figure 1: the secure vSIM landscape

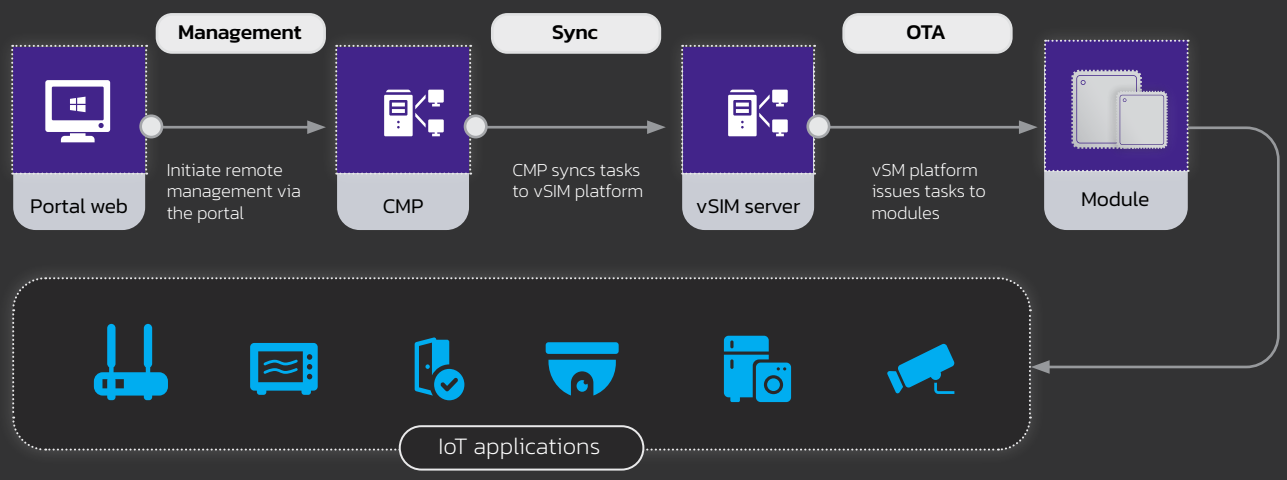


© 2024 Acceleronix. All Rights Reserved.

Operational simplicity

The promise of soft SIM in general and the Acceleronix vSIM in particular is massively enhanced by ease of operation augmented by connectivity flexibility. Customers have connectivity-enabled modules of their choice from the Acceleronix portfolio delivered to them for new devices, or they could have connectivity provided with the vSIM delivered as an over-the-air upgrade to a module that is already deployed. A substantial benefit here is that developers can keep utilizing modules they have developed their devices around with no impact on other device attributes and capabilities.

Figure 2: Simple vSIM management



Customers can choose to enable vSIM on almost all Acceleronix modules except where memory limitations prevent the addition of the vSIM. This enablement via firmware upgrade opens the potential for Acceleronix customers to move their existing connectivity estate and devices to Acceleronix Connectivity Services. A local profile can be enabled or disabled utilizing AT commands.

In addition, when the device international mobile equipment identity (IMEI) number is bound to the profile, a parameter, called unique identifier (UID) is generated. Only one profile can bind with just one UID and the UID can only be changed or rebound following a request to Acceleronix. In this process, Acceleronix is the administrator which helps to ensure the integrity of the identifier.

The vSIM can hold up to ten profiles locally, depending on the individual profile sizes and the available space. However, maintaining multiple profiles could result in the introduction of additional recurring costs, so customers should seek guidance from Acceleronix if they have multi-profile requirements.

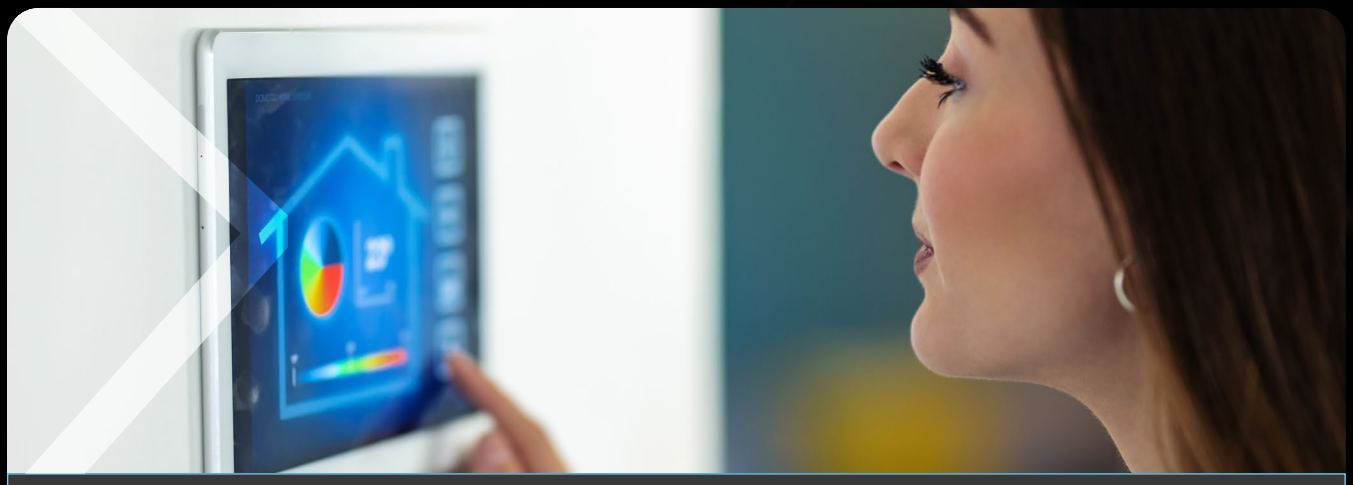
© 2024 Acceleronix. All Rights Reserved.

Use case examples

vSIM use cases are essentially limitless in the cellular IoT connectivity context because the technology has no impact on factors such as coverage or throughput.

This has been demonstrated by Acceleronix with vSIM use cases on many popular Quectel modules, such as the EG915U and BG95-M5. Successful demonstrations include smart home monitoring, tracking for the smart city and medical support for elderly care.

The demo board used to enable these example use cases includes temperature and humidity sensors, an ambient light sensor and a heart rate and oximeter sensor. Additional sensors such as oxygen or gesture sensors can be added and users can access features such as the service dashboard, SIM management, rule management and reporting functions. This showcases the flexibility of vSIM and how it can be utilized to enable cellular connectivity across the entire breadth of IoT.



vSIM use cases are essentially limitless in the cellular IoT connectivity context because the technology has no impact on factors such as coverage or throughput.

© 2024 Acceleronix. All Rights Reserved.

Conclusion

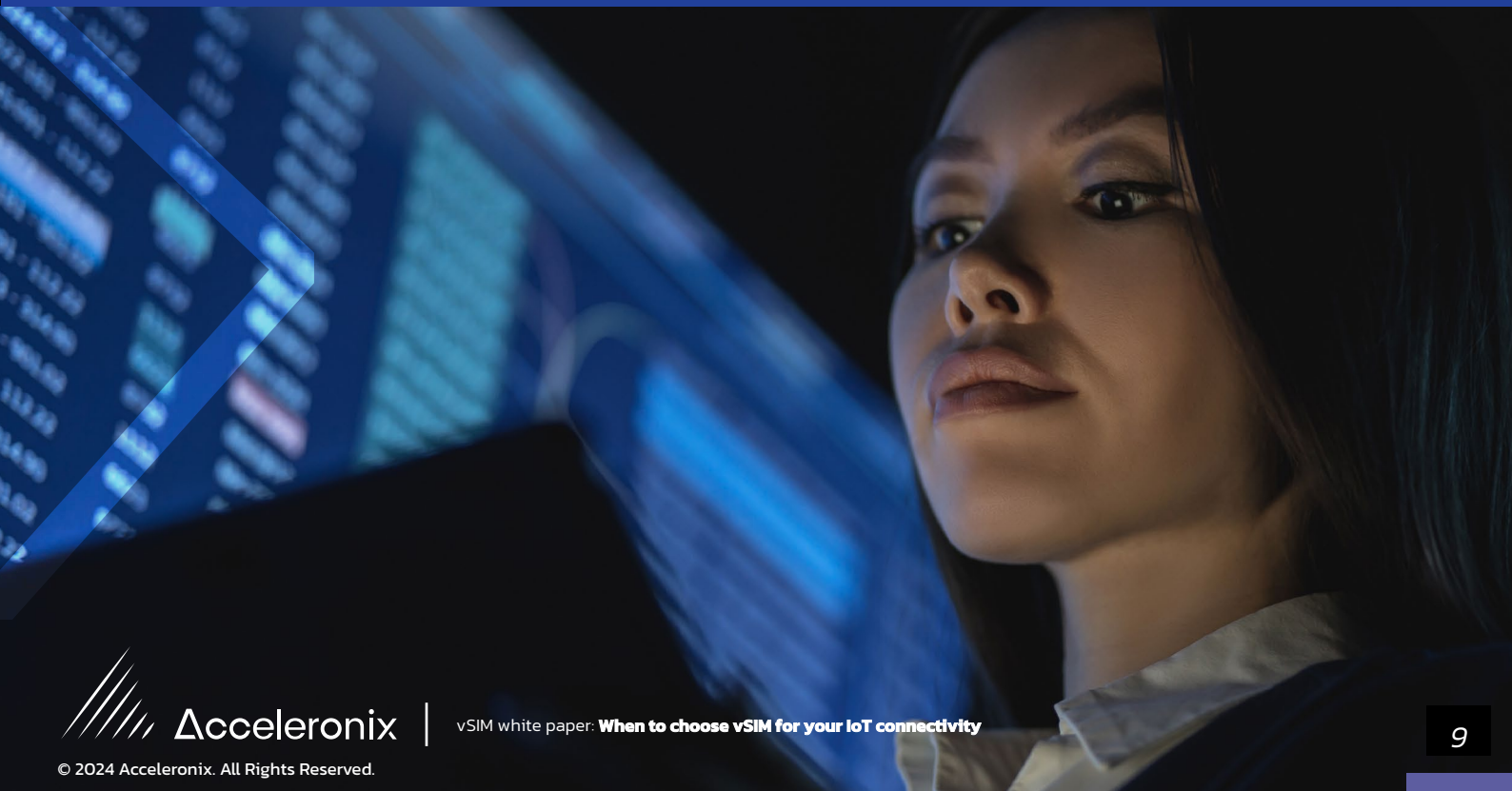
vSIM is not the SIM solution for every use case, but for organizations looking to simplify device design, reduce the number of components and their cost, and to gain unparalleled flexibility, vSIM has substantial advantages. For businesses that want the ability to change network providers during the lifespan of deployments or to add connectivity to their already-installed base of favourite modules, vSIM provides a simple method of upgrading firmware over-the-air to achieve these aims.

Available outside of North America, Acceleronix vSIM provides a highly secure SIM that adopts industry-standard practices, even in the absence of soft SIM specific certifications.

For many deployment scenarios, this level of security is more than adequate and the benefits of having no physical SIM to manage, the ability to free up space in the device, the capability to switch profiles at any time and Acceleronix's convenient and attractive remote control management interfaces, far outweigh perceived limitations of the technology.

With a growing number of organizations turning to soft SIMs and vSIM in particular, the technology is gaining traction and being deployed by more and more businesses as they seek to deploy secure, global cellular connectivity without the inconveniences of traditional SIM cards and the deployment complexity of iSIM and eSIM.

To learn more about vSIM, please visit Acceleronix.io



© 2024 Acceleronix. All Rights Reserved.

Accelerate IoT

- IoT modules
- Connectivity
- Devices
- Platform & software

Acceleronix
Accelerate IoT

Acceleronix
Haaksbergweg 75
Amsterdam
1101VR NL

acceleronix.io
/acceleronix

© 2024 Acceleronix. All Rights Reserved.