



**WHY ENTERPRISES ARE  
CHOOSING eSIM FOR SIMPLE  
AND FLEXIBLE GLOBAL IoT  
CONNECTIVITY**





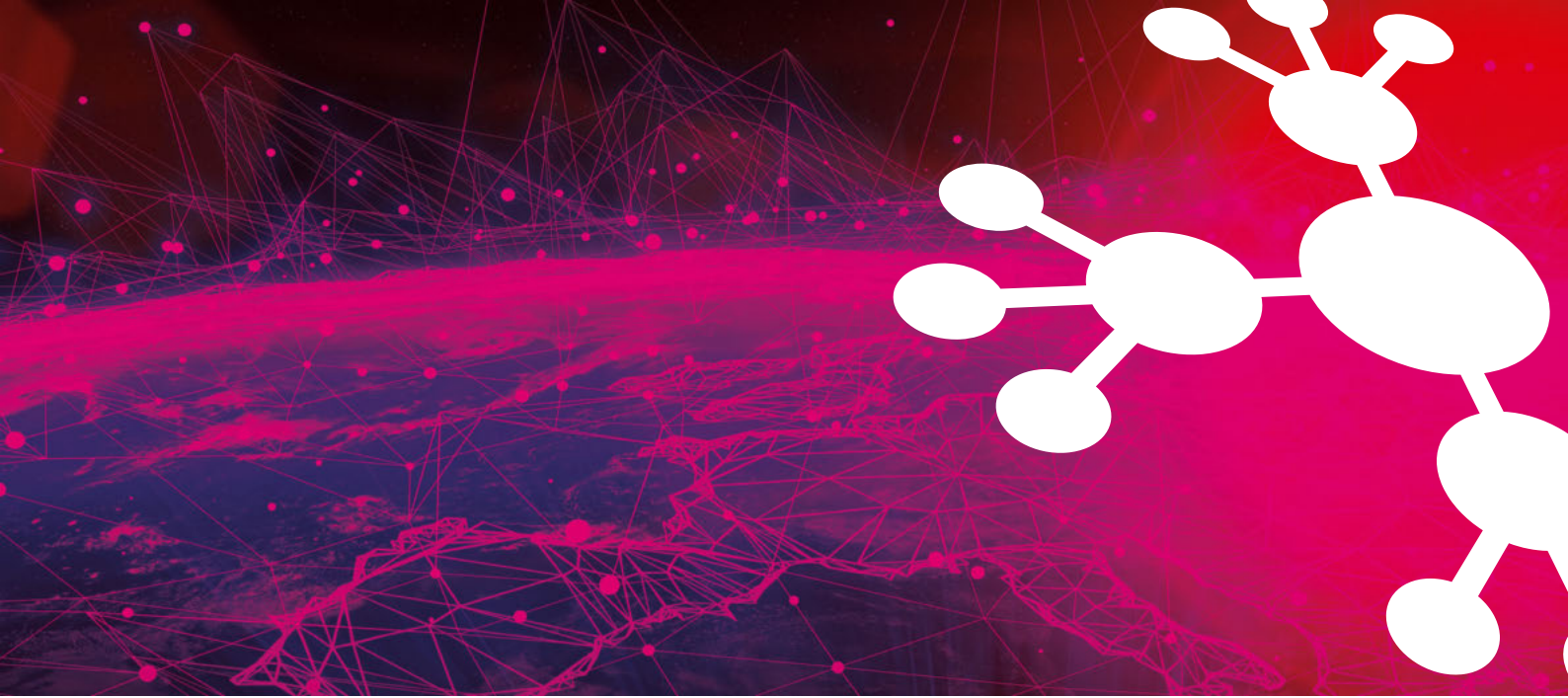
## INTRODUCTION

As the number of connected devices rises from around 700 million today<sup>1</sup> to an estimated ten billion by 2030, it's clear that the pace of evolution in cellular connections is poised to accelerate radically. Current IoT connectivity is composed of 2G, 3G and 4G cellular networks and low power wide area networks (LPWANs). This base will be added to by newer technologies that enable devices to connect without needing their own power supplies.

The technologies here, narrowband IoT (NB-IoT) and LTE-M, will enable vast numbers of use cases across connected agriculture, smart metering, environmental control and the servitisation of product manufacturing businesses. This phase, running from now until at least 2025, will see the number of cellular connections grow to 3.1 billion<sup>2</sup>.

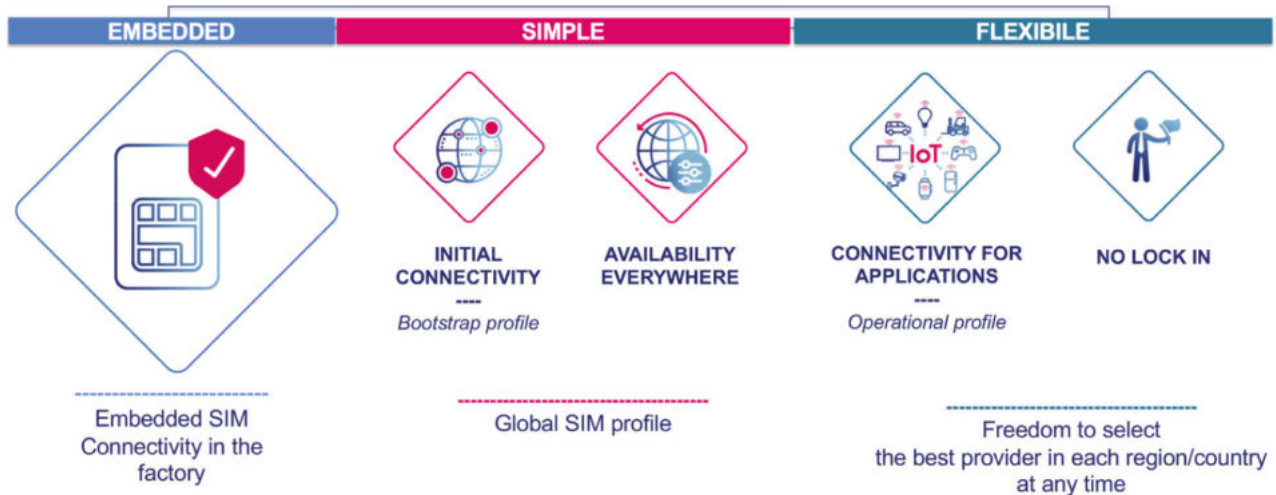
However, this quadrupling of the number of connections over the next five years, only demonstrates the sheer scale of growth. It does not represent an end state. Even steeper acceleration will come in the following five years as 5G and massive IoT become mainstream and the number of connections exceeds 10 billion by 2030. This era will see smart cities, logistics and advanced automotive applications become routine and the sheer volume of connections means today's approaches to connecting devices will be inefficient and impractical. Instead of millions of devices, there will be billions, and so the traditional SIM card that is slotted into a device when deployed will not be sustainable for many IoT business cases.

1 Source: GSMA  
2 Source: GSMA



## eSIM

A Fundamental Role in Massive and Global IoT deployments



### Where the SIMilarity ends

It's vital to have embedded connectivity that is installed during device manufacture in order to enable the scalability required for many new applications in areas such as Internet of Things, smart cities, Industry 4.0, smart transport and more. These will involve billions of devices and so the installation of physical SIMs at the deployment site and manual management is simply unsustainable. Of equal importance, eSIM capability must make remote upgrades and switching between operators possible during the lifetime of the device.

It is important to carefully define an eSIM because some confusion exists in the market place and the term is often used to conflate embedded SIMs and embedded universal integrated circuit cards (eUICCs). Fundamentally, an eSIM is a global specification by GSMA for a programmable SIM card that is embedded directly into a device. An eSIM can be provisioned remotely and an enterprise customer or end users can add or remove operators without the need to physically swap a SIM from a device. However, not all embedded SIMs are eSIMs which is where the potential for confusion lies.

Companies want to send all sorts of devices – from street lighting for smart cities to washing machines for smart homes – out into the global market place in ways that require minimal configuration, ensure optimal connectivity and balance this with competitive cost.



Requiring customers or local business units to not only configure devices in each market, but also commercially select and technically integrate connectivity providers, is complex and time-consuming. It is also more costly than enabling economies of scale via a global connectivity provider who can deliver connectivity across the globe, connecting to the best available provider regardless of location.

Original equipment manufacturers (OEMs) are focused on transforming their own business models and global connectivity selection is an additional, non-core burden and limitation. Think, for example, of a washing machine manufacturer or a maker of excavators. They are busy working out how to move from the business of selling washing machines or diggers to the business of selling loads of laundry washed or a number of operational mining hours as a service. On top of this, they're looking to build new, value-added, connected applications for their customers.

These OEMs know that each machine will leave its place of manufacture and can be deployed anywhere in the world. So, it's obvious they will not look to agree individual connectivity deals with hundreds of operators, and implement that number of local technical integrations, to allow the provisioning of their services, the billing of their applications and for their customer care to have the right support tools. It's equally evident that a Chinese air conditioning OEM isn't an expert in the relative merits of operator A versus operator B in Argentina, for example, and therefore can't readily select the best coverage in that market.

OEMs want simplicity and flexibility in their global connectivity. But achieving simplicity is actually quite complex. OEMs want the capability to embed connectivity capability into their hardware at the point of manufacture, thereby removing the need for localised physical configuration in the market in which the device is deployed. They need the simplicity of a single global SIM profile to enable the device to connect everywhere for the initial connectivity first time the device turns on: in the telecom industry, this global SIM profile is called the bootstrap profile.

In terms of flexibility, OEMs need the freedom to select the best connectivity provider in each region or country at any time to support the connected application on their devices. Signing a global agreement with a provider may not enable this because the provider might have its own network or partner in a particular country that does not provide the best coverage or cost. OEMs therefore want to be able to switch at will – to an alternative local provider. A prerequisite for this is that the OEM has been able to enter into a commercial agreement with this alternative local provider and to integrate with its IoT connectivity platform. Once this is done, if using an eSIM, they can replace the initial bootstrap profile by a local operational profile.

### **Freedom has never been free**

As a consequence of the huge numbers of connected devices involved in IoT, much of the focus has been on ensuring the costs of connectivity are low enough to sustain high volume, low value business cases. However, the cost of connectivity within the traditional IoT value chain is often given too much prominence. Figures from analyst firm Analysys Mason suggest that typically, the devices total 25% of deployment costs, the application 60% of the costs and connectivity just 15%. Small variations in connectivity cost have little impact on the overall cost of an IoT service.



However, the quality of connectivity has potentially the greatest impact on IoT service performance. For example, in the case of a German forklift manufacturer that serves a wide range of industries, choosing a provider that has uneven coverage in a country like South Africa could mean that all the OEM's effort in developing the device and application, and exporting into that country, is wasted because the machine cannot connect or experiences service-affecting connectivity interruptions. And the challenge is massively multiplied if this forklift manufacturer exports in the majority of countries around the world.

In IoT, connectivity is fundamental to the business case and has a substantial impact on customer perception of a service. OEMs are therefore looking to ensure their connectivity provider is able to support all their connected applications everywhere and that the experience is consistent. The same performance needs to be available in rural Argentina, urban China, North American suburbs and the cities of Europe.

### **How eSIM combined with a Global SIM profile matches enterprise needs**

eSIMs provide an elegant solution to support global deployments by OEMs:

- **For embedded connectivity:** initial global connectivity can be embedded into the hardware, in the factory, with a global bootstrap SIM profile. This global bootstrap profile is typically configured with a data allowance that can be used in any country in the world and covers the amount of data needed for initial configuration of the connected hardware.
- **For flexibility:** to support its connected applications, the OEM can select in any region or country a preferred connectivity provider and replace the initial global bootstrap SIM profile by an optimised operational SIM profile. Typically for regional/local cost or network performance optimisation.

The above enables simple global deployment of a large number of devices (the connectivity is natively there without any manual configuration in all pieces of hardware) and the ability to optimise it with the best connectivity provider in every region or country.

The next question is then which partner will support connected applications everywhere the OEM has business.

For enterprises that sell their products in one country, a local SIM profile is a manageable option because the enterprise only needs to perform one local technical integration, agree one local commercial deal and manage their operations on a day-to-day basis with only one connectivity partner. The drawback, of course, is that the enterprise only gets access to one local network with this approach.

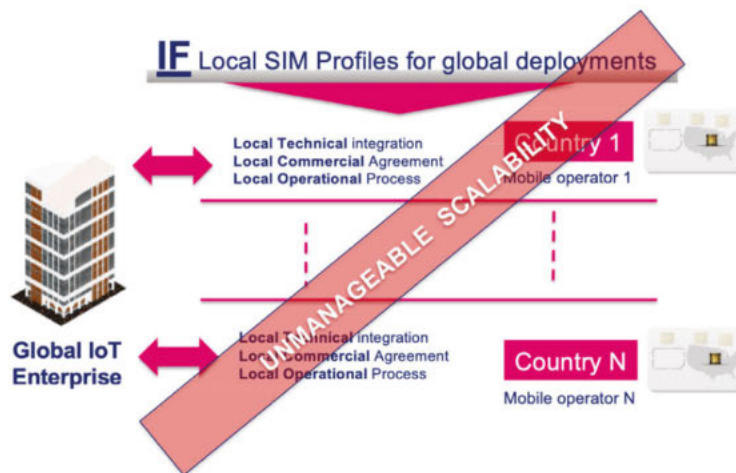
However, the one-to-one nature of negotiating a local SIM profile makes it impractical for enterprises that operate in more than a few countries. Every step in the process has to be replicated for each country entered, making scalability unmanageable.



Any connected business requires multiple integrations with connectivity providers, such as:

- **For provisioning of the service:** each SIM shall be configured according to the application running on the device, such as in which country the connectivity is allowed, data packages to configure, notifications to send at which threshold, and others. This means integration between the enterprise's customer relationship management (CRM) or enterprise resource planning (ERP) systems with application programming interfaces (APIs) of the connectivity provider's M2M/IoT platform.
- **For billing of the services:** any connected business integrates connectivity somewhere in the business model. As such, the enterprise needs integration with their billing systems of usage records or reports. And, needless to say, that business model should be as consistent as possible across different countries: if different connectivity providers do not offer same flexibility or details, this can harm the global business model.

## Enterprises Need **Global eSIM Profiles** For International Deployments





- **For support of their customers:** any connected application requires online support by a customer care team to ensure that the service is working as it should. Customer care needs for this to have advanced real-time tools to check connectivity of each SIM, wherever they are located in the world. Obviously, this customer support team cannot afford to have different tools for each country: they need it to be integrated into one single global tool, which requires extensive technical work for each additional connectivity provider to integrate.

On top of this technical complexity to integrate each additional connectivity provider, the OEM needs to negotiate and sign a new contract, which requires a procurement team with local knowledge for every country and of course the right size in terms of resource.

Finally, and this should not be forgotten: every connectivity provider is a business partner with day-to-day activity to manage, in case of local connectivity issues or simply invoices to manage and settle.

Overall, the only feasible approach for the OEM is to minimise the number of connectivity providers and carefully select them to support global connectivity for their connected applications.

When using eSIM to support their global deployment, OEMs should therefore consider a global bootstrap profile from a connectivity provider that can also support the global operational profile of their connected application. This strategy of deployment would enable a simple bootstrap profile to be uploaded in an eSIM into the device in the factory. It enables shipping globally and, when the device is initialised, utilisation of a default global operational profile to connect to a network in every country. Ultimately, this global operational profile can be locally optimised for cost and/or quality with a local SIM profile, thanks to the flexibility inherent to an eSIM.

If the right partner, this global profile provider would then ensure the correct level of quality and reliability of connectivity everywhere: as elaborated above, this is essential for the success of deployment of any connected business. The selection of such partner will require some particular care from the OEM but will bring very high benefits in terms of simplicity, meaning operational management costs to support the global deployment and of end-customer satisfaction, through quality of connected applications everywhere.



### **BICS SIM for Things for global eSIM**

BICS has developed its SIM for Things offering to address the needs of any enterprise with an international connected business. Acting as a global mobile virtual network operator (MVNO) for IoT, BICS provides a full mobile core network utilising 2G, 3G and 4G infrastructure plus LTE-M and NB-IoT networks where available and if appropriate to the application.

The offering relies on BICS' global infrastructure, whereby BICS fully operates all the different components of global connectivity; signalling, data roaming (GRX/IPX) and roaming agreements. With a global market leadership of more than 20 years, carrying more than 50% of today's global data roaming traffic, BICS is uniquely positioned to ensure the reliability of connectivity everywhere.

This is combined with BICS' regional MVNO infrastructure, a global network of more than 120 points of presence (PoPs), and follow-the-sun network operations centres (NOCs) and support teams in every region: this guarantees customers' performance everywhere along with the services of a regional partner, and uniquely positions BICS to control end-to-end connectivity from the visited network up to the customer's datacentre.

SIM for Things provides coverage in more than 200 countries worldwide with access to more than two networks in each. With multiple networks everywhere applications, applications receive optimised, reliable nationwide coverage plus backup for consistent performance in case of failures. Ubiquity of coverage is often required for IoT deployments such as smart meters.

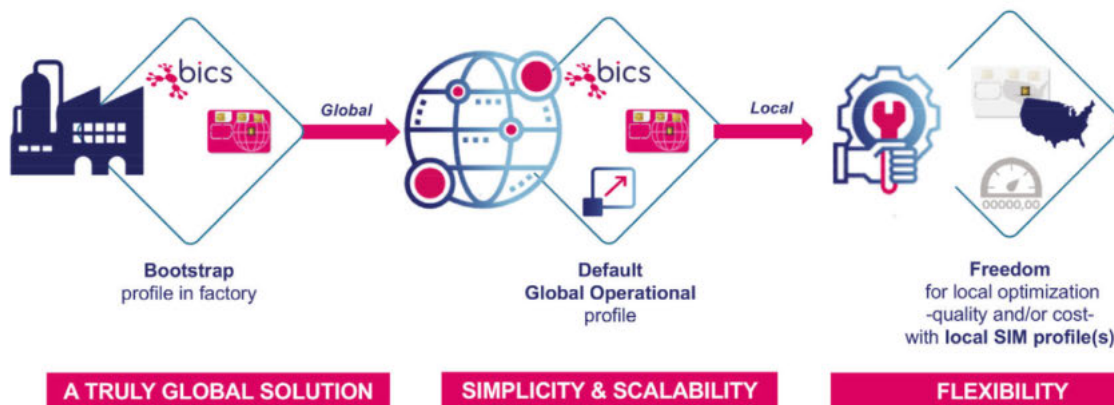
In addition to the network, BICS IoT platform provides enterprises with full control of their connected businesses from the management of connected devices through to business model customisation and advanced real-time tools for customer support teams. The platform has been fully designed using an API philosophy, with all functionalities available through highly flexible APIs that can be customised to support the M2M/IoT use cases of any vertical industry.

Finally, BICS' eSIM subscription manager tools enable enterprises to use SIM for Things integrated into an eSIM, either as a global bootstrap profile or global operational profile.

The BICS SIM for Things profile offers unique strength in terms of global coverage, capabilities to ensure highest reliability, quality and security everywhere, and flexibility to ensure the right solution for the global deployments of OEMs.



## GLOBAL IoT DEPLOYMENT WITH BICS



### Use case examples

eSIMs are applicable to all enterprises conducting global IoT business and are increasingly adopted across every industry. BICS, for example, has been supplying global connectivity, enabled by eSIM, to a bus manufacturer that sells its vehicles around the world. The bus maker needed to embed connectivity in its buses for telematics and remote maintenance purposes.

Its key requirements included:

- Simplified logistics enabled via a single SIM to enable connectivity in all countries worldwide.
- A single platform to enable integration of connectivity management with back end systems. This was a mandatory requirement to enable the bus maker to manage more than 10,000 connected vehicles with a high degree of automation. In addition, provision of a single tool to control connectivity worldwide was a key selection criterion in order for the bus maker to support its customers.
- A single partner so no resources were required to negotiate and manage commercial agreements with local mobile network operators in individual countries. In addition, the bus maker wanted consistent operational processes across the globe.
- eSIM so local profiles could be utilised in the few countries where the bus maker already had direct agreements with network operators, and no lock-in to provide flexibility for the future.



In addition to the bus maker, BICS is supplying its default global operational profile to Digitanimal, a provider of care and monitoring systems for livestock. The company monitors animals and herds via a range of services. One example is Digitanimal's GanGest service, which is a livestock management application that records data related to management of livestock and their facilities.

Finally, Sayme, a provider of smart waste management and asset tracking solutions, utilises BICS eSIM Bootstrap profile capabilities by installing them in the factory. This enables products such as its dumpster monitoring service and its assistance request buttons with the means to access global connectivity simply and flexibly from the factory.

### Why choose eSIMs

eSIM is being selected by a growing number of organisations because they enable the automated provisioning of connectivity that is essential for the mass deployment of IoT globally. Without eSIM capability, global deployments are not practical because of the time, cost and management constraints of adopting local SIM cards for every country an organisation operates in.

There are three key drivers for the adoption of eSIMs:

- **Reliable, high quality** connections everywhere at the level of end-user expectations
- **Simplicity and scalability** in order to keep the operational cost of the deployment low enough
- **Flexibility** to fit with the needs of the connected business

Finally, the barrier to entry can be low. eSIMs can be easily installed in OEM production lines and a bootstrap profile that can be used as a global operational profile provides a simple, yet effective way to ensure connectivity for a product or device is available natively, without any additional operational work.

Selecting an eSIM provider that offers this foundational capability along with the flexibility to access multiple operator networks in each country, and that backs up their offering with a standardised, global management tool, demystifies the complexities of achieving cost-effective, high quality global connectivity. This frees up organisations to focus on their business models that the connectivity enables, rather than on the connectivity itself.

To learn more about how eSIMs can enable flexible, simple and global connectivity to supercharge your IoT-enabled business visit: <https://bics-iot.com/>

