bics

Solving the permanent roaming puzzle for IoT connectivity

How to ensure seamless international IoT deployments in a changing regulatory landscape with eSIM HUB

The growing need for seamless IoT connectivity

IoT isn't the future; it's here, transforming industries, unlocking efficiencies, and driving billions in revenue. Yet, a fundamental challenge threatens its global potential: **connectivity**.

Traditional telecom infrastructure was never designed for the massive scale and complexity of IoT deployments, and now, as the market surges towards $1 billion revenue predictions, roaming restrictions are tightening or already permanent, in regions like China, Australia, Brazil, North America, the Middle East and Turkey. The result? Higher costs, unreliable service, and disconnected devices.

For enterprises deploying IoT globally, the stakes couldn't be higher. When devices lose connectivity, projects fail, customers churn, and revenue is lost. But navigating local agreements and compliance requirements is a costly and time-consuming maze.

To stay ahead, businesses need a smarter, future-proof solution—one that guarantees **seamless global connectivity** while overcoming the barriers of permanent roaming restrictions.

Who needs this solution?

Permanent roaming restrictions impact different industries in varying ways. The need for a robust connectivity solution is especially urgent for:

OEMs (Original Equipment Manufacturers)

Manufacturers integrating connectivity into devices must ensure seamless compliance across global markets while maintaining efficient production and deployment processes.

Asset management companies

Logistics, supply chain, and industrial IoT companies rely on real-time tracking and connectivity to optimize operations and reduce disruptions.

Connected vehicle providers

Fleet management companies require uninterrupted, location-compliant connectivity to support vehicle telematics, infotainment, and fleet tracking systems.
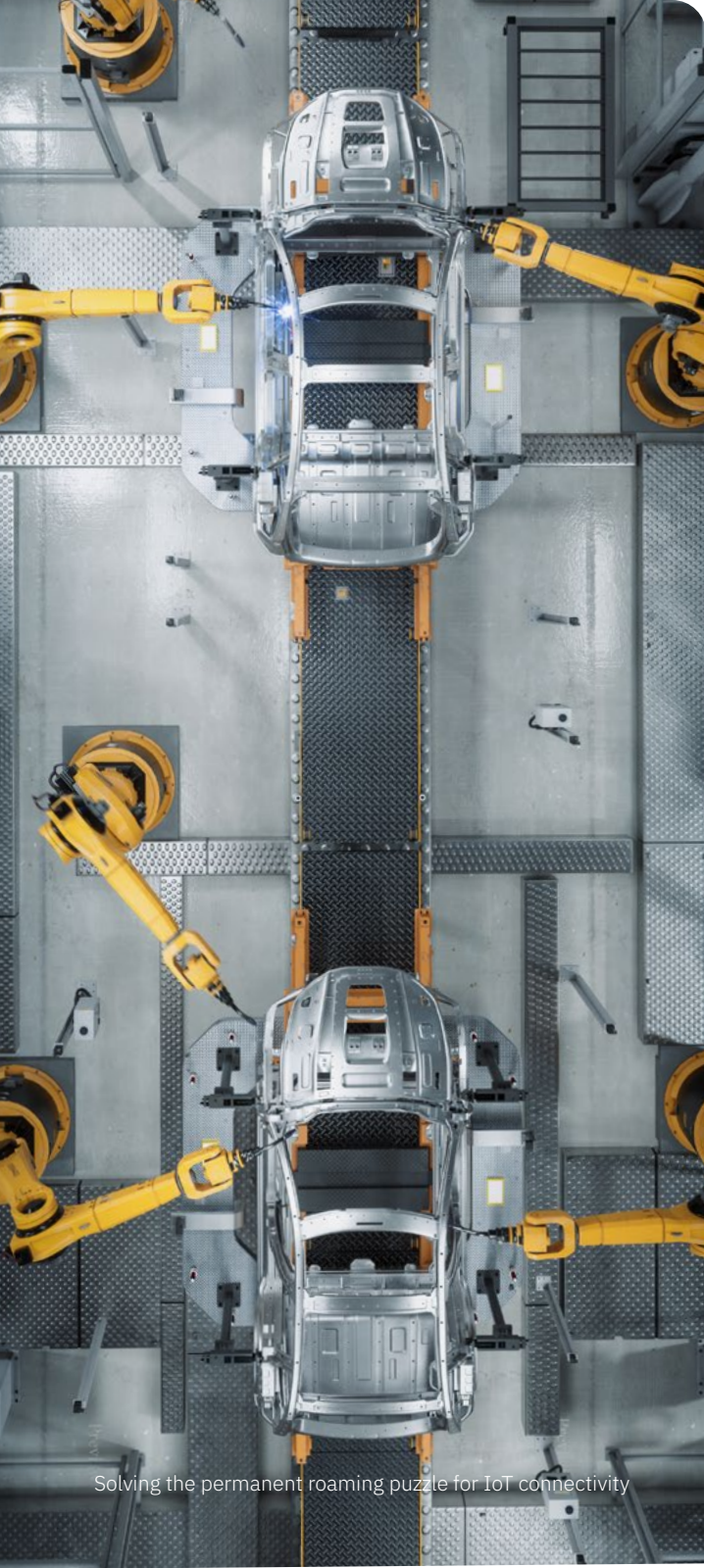
Evolution of permanent roaming

Roaming was built for people on the move, giving people access to networks abroad while using the same phone number. But IoT doesn't travel like people do. **IoT devices are 'permanent roamers'**, staying connected to foreign networks for months or even years.

This is extremely common, as many IoT devices are produced in one country but deployed globally elsewhere. While this enables large-scale global deployments, many regulators and operators see it as a loophole to be closed, not a feature.

As a result, permanent roaming faces growing opposition. Faced with a lack of visibility on how long permanent roaming devices will remain within their networks and motivated to protect the local market, operators and regulators in many countries around the world are becoming increasingly negative towards inbound permanent roaming by IoT devices.

Operators worry about network strain. Regulators aim to protect domestic markets. And businesses deploying IoT worldwide are caught in the middle—facing unexpected costs, disconnections, and deployment roadblocks.

It's impossible for IoT providers to know at the point of manufacture where each device will be deployed. This means devices can't just be tailored to the unique regulatory landscape of the region they'll end up in.

Instead, **global IoT connectivity must be embedded from the start** when the product is manufactured. This way, when a device is switched on, it can instantly connect to the local network as a roamer. But how does this actually work?

The challenges of permanent roaming

One of the primary problems IoT faces is that **permanent roaming can differ significantly from region to region**. In the EU, there are no restrictions to worry about, but in Brazil, it is completely banned. Then in the USA, while there are no restrictions, local MNOs are hostile to the practice and commercial restrictions are enforced by local mobile carriers. In China , large scale deployments are also systematically targeted by Chinese mobile operators.

Evidently, regulations can be extremely varied and often shift. Yet somehow, **IoT devices must connect seamlessly** regardless of whether they're in the EU or China. For businesses deploying IoT globally, this fragmented regulatory landscape creates complexity, cost, and risk.

So why are operators and regulators so heavily opposed to permanent roaming from IoT devices?

Roaming agreements are established to accommodate travelers for a limited period of time. They weren't established for the permanent roaming of IoT devices, as they consume resources differently from standard human users and their connected devices.

This leads local networks to feel resistant to them for a number of reasons:

Resource drain

Permanent roaming of IoT devices can lead to suboptimal resource allocation from networks. These devices often continue to consume network resources, even when idle. As a result, this continuous consumption can hinder the overall performance of other connected devices, leading to slower response times and decreased efficiency across the network.

Network congestion

IoT deployments at scale can place significant strain on network performance and capacity. The presence of numerous IoT devices may contribute to network congestion, ultimately resulting in increased latency.

Security risks

IoT devices that are permanent roaming may not adhere to local network security standards, potentially exposing them to attacks or breaches.

Revenue leakage

Local mobile carriers want to prevent local companies from choosing foreign operators for domestic deployment. In general, selling their SIM subscriptions is more profitable than inbound roaming.
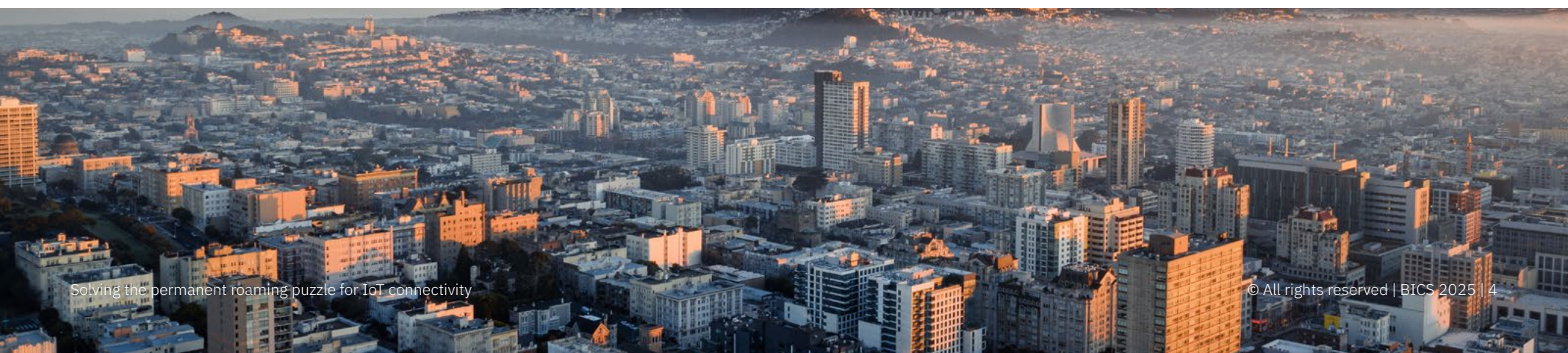
The challenges of local SIMs

A simple answer to compliance is using local SIMs. But **swapping SIMs in IoT isn't as easy** as with a mobile phone. Many IoT devices aren't designed for SIM cards to be easily switched out, often being soldered directly onto devices. And IoT devices themselves are also often not easily accessible. Vast, worldwide deployments all requiring SIM cards to be physically changed is not only a very manual and time-consuming, but costly process.

Transforma Insights estimates replacing an IoT SIM can cost at least $190 per device.[1] This cost, spread across hundreds if not thousands of IoT devices can quickly reach an eye-watering amount. That's without even starting to consider the customer impact of every IoT-connected device requiring maintenance.

For enterprises without telecom expertise, the challenge is even greater. Managing multiple MNO contracts, navigating ever-changing restrictions on permanent roaming, and ensuring uninterrupted connectivity is a full time-burden. It can significantly slow down time-to-market and can have a negative impact on margins.

[1]Position Paper: Permanent Roaming

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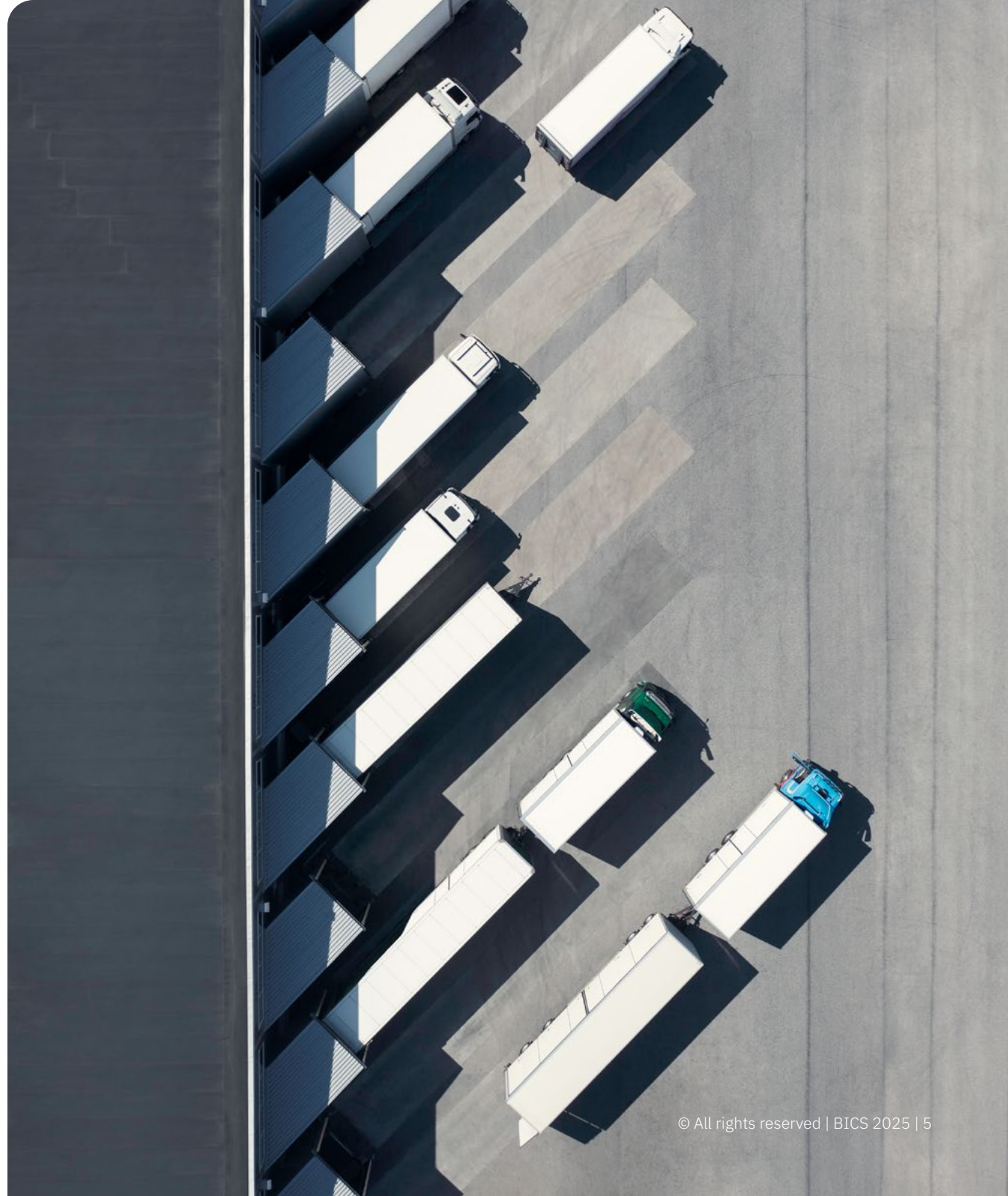
A smarter solution: eSIM technology

How does it work?

An embedded SIM, or **eSIM helps devices receive new carrier profiles over the air,** as needed. Once you power on your device, it can effortlessly download the best local profile available—all without any physical adjustments.

However, deploying this across multiple markets can be complicated and cumbersome. Companies often need to partner with a variety of local eSIM connectivity providers. This coordination can bring along challenges like managing different pricing models, escalation processes, and connectivity platforms, as well as navigating various integration portals and APIs. And keeping SIM profiles updated throughout the device's lifecycle can be a task on its own.

Rather than trying to negotiate local relationships, outsourcing can help overcome the logistical issues of reaching terms on data rates, maintaining the technical aspects, and other facets that need significant investment in expertise and equipment.

Global carriers can be ideally positioned to leverage their global commercial relationships with mobile operators and develop an **eSIM HUB managing all these commercial and technical deployment challenges** into a single pane of glass.

While the eSIM HUB delivers to you a panel of option for local eSIM profiles where permanent roaming is restricted, an ideal solution is a combination with multi-IMSI.

With **multi-IMSI roaming**, the initial connectivity profile, called often as bootstrap profile, can then be used as a **highly flexible default global operational profile**. The multi-IMSI SIM profile features an intelligent applet that automatically selects the most suitable IMSI for each country. The decision can be on what is the most important to support each global IoT deployment: cost optimization or NB-IoT/LTE-M coverage for low power use cases or 4G/5G coverage for high speed/low latency use cases, etc.

The combination of eSIM Hub for flexible local profiles and a multi-IMSI SIM solution for tailored default global roaming connectivity is a game changer for global IoT deployments. It addresses permanent roaming challenges while delivering the flexibility and capabilities you'd expect from a global SIM.

It's the answer enterprises have been searching for in streamlining global connectivity for IoT.

BICS eSIM HUB

BICS eSIM HUB is purpose-built to overcome permanent roaming challenges, delivering uninterrupted IoT connectivity worldwide, combining BICS market leading multi-IMSI solution for default global operational profiles and a panel of local eSIM profiles for destinations with local permanent roaming restrictions.

Our eSIM HUB provides a unified solution for both roaming and local SIMs making global deployment easier and more flexible than ever.

The eSIM HUB typically enables global IoT players with large domestic deployments the flexibility to manage connectivity to local networks and seamlessly localize devices.

eSIM HUB Is a value added service on top of BICS' SIM for Things global solution. It ensures 100% global coverage, harnessing multi-IMSI technology to connect IoT devices to the best available local network in **200 countries and over 700 networks**.

By enabling eSIM localization and over-the-air (OTA) reprogramming, businesses can optimize local connectivity if needed for performance, costs or obligation reasons.

Deploy in countries with permanent roaming restrictions easily with our one-stop solution for all your connectivity needs. Managing several connectivity suppliers with all the commercial, technical, operational challenges it raises is now a thing of the past.

Benefits for specific industries

For OEMs

Streamlines connectivity integration into IoT devices, ensuring global compliance from the point of manufacture.

For connected vehicles

Supports seamless telematics, remote diagnostics, and real-time vehicle tracking, for large scale domestic deployments in any country.

For asset management companies

Guarantees uninterrupted tracking and data transmission wherever the connected assets are deployed.

Key benefits

Our eSIM HUB addresses global deployment challenges by providing local eSIM profiles where needed, reducing complexity and providing simplified control over the local profiles and offers.

One contract and invoice to access all our local connectivity providers and global roaming offers.

One connectivity and management portal to manage your fleet of local and global eSIM cards.

One eSIM (eUICC) with one default global roaming profile and local profiles that can be downloaded over-the-air (OTA).

Operational efficiency

Say goodbye to the complexity of managing different local SIM cards. By enabling permanent roaming across key markets, eSIM HUB ensures cost-efficient, seamless global deployment for IoT devices without needing multiple operators or different SIMs.

Global reach with local control

Seamlessly switch devices between global and local networks, allowing your customers to deploy in over 200 countries with 700+ networks. Local connectivity with permanent roaming is guaranteed via eUICC SIM cards, offering remote management and local profile downloads OTA.

Simplified management & support

Simplify device management with a single platform for connectivity management across diverse regions. No more dealing with complex SIM management, multiple ticket systems for support, or different billing systems for local operators.

Unified portal & APIs

Manage local SIMs and global connectivity in one seamless interface, providing centralized management through a unified portal and API integration.

Unique combination with multi-IMSI

With BICS default global operational profile using multi-IMSI, benefit from a tailored global connectivity, optimized everywhere for your IoT use case.

The future of IoT connectivity

Roaming restrictions no longer need to rule your IoT deployments. With the right partner, solution, and technology, permanent roaming becomes a challenge of the past.

With vast roaming experience and seamless local connectivity, look no further than BICS for your ideal IoT connectivity partner.

Find out more about **BICS eSIM HUB**, and how it harnesses multi-IMSI technology to ensure seamless global roaming for IoT.

About BICS

BICS is a global leader in communications, providing secure and reliable mobile connectivity worldwide. Our solutions enable seamless roaming, fraud prevention, authentication, global messaging, and IoT connectivity. With headquarters in Brussels and a presence across five continents, BICS is shaping the future of global communications.

For more information visit www.bics.com