Pelion delivers a unique managed eSIM-as-a-service offering that ensures a simple, seamless on-ramp to remote SIM provisioning and a flexible life-long ability to customize and optimize your connectivity solution.

Benefits & Value

- Simplify manufacturing, procurement, logistics, & provisioning
- Ensure network access regardless of location
- Optimize for the best local network access and tariffs
- Empower lifelong optimization of access, coverage, & costs
- Future-proof interoperability, portability, & agility
Machine-based connectivity is increasingly nuanced. IoT devices are manufactured and deployed at scale, potentially worldwide, but typically benefit from a localized approach to network access. Often, restricted physical access makes swapping a conventional SIM unfeasible, requires skilled personnel, or might introduce unacceptable downtime or risk.

Miniaturization and hardening are also considerations, with some device manufacturers seeking to transition from removable to fixed SIMs to reduce a device's size, cost, and potential points-of-failure. Additionally, removable SIM cards can present very genuine security concerns in specific industries and use-cases. The totality of these factors gives rise to the need for a radically different approach.

A conventional connectivity solution requires you to provision, stock, and ship various SIM cards based upon every combination of regional or network access requirements. The SIM – that little piece of plastic and metal that's technically a Universal Integrated Circuit Card (UICC) – is a legacy of the cellular's consumer-based heritage; however, it's typically ill-suited to IoT and Machine-to-Machine (M2M) applications.

Although officially known as Remote SIM Provisioning (RSP), eSIM is a user-friendly term and is often used interchangeably with RSP. Both describe the various components, including RSP-capable SIM hardware (an eUICC), eSIM profiles, and the different RSP platform functions that facilitate the remote provisioning of SIM profiles. Pelion's eSIM implementation follows the GSMA's specification, ensuring broad interoperability and solution longevity.

The result is a capability that streamlines the logistics required to support a large-scale connectivity solution, future-proofs network choice, and – with Pelion’s fully-managed eSIM-as-a-Service offering – abstracts all the complexity necessary to enable and deliver these operational benefits.

Consolidating to fewer SIMs – potentially just one – means that your job of onboarding new connectivity just became so much easier, more cost-effective, and far more responsive. No longer do you have to manufacture specific SIMs with just the right combinations of operational profile and form-factor.

Additionally, for device OEMs servicing a global market, the transition from multiple to a single stock-keeping unit (SKU) delivers rapid and genuine manufacturing and logistical advantages.
Unlike a conventional SIM strategy that permanently defines the network access profile at manufacturing, eSIM flips the script. Pelion’s managed eSIM service provides the lifelong flexibility to update or change profiles remotely. This agility to change profiles – as and when required – means that you can adapt your connectivity due to changes of network region or coverage requirements, network operator choice, or other operational or economic factors.

Crucially, Pelion eSIMs are agnostic to the device hardware, nor do they require any special software.

Compared with SIMs, where the onus is on you to precisely and proactively architect your connectivity provisioning logistics, Pelion’s managed eSIM-as-a-service offering assumes this burden. We make your transition to eSIM quick and easy. Additionally, the underlying technology that enables remote SIM provisioning is very sophisticated, requiring interactions between multiple entities. It would be a very daunting and time-consuming burden for organizations – that merely seek eSIM’s benefits – to invest in an eSIM ecosystem of their own. Pelion delivers the gain without the pain, and there’s no need to master completely new technology.

- **Device User**: negates managing multiple SIM alternatives
- **Solution Provider**: facilitates difficult-to-access devices
- **Device OEM**: optimizes supply chain & fosters innovation
- **Distributor**: simplifies logistics & reduces customization
- **Network Operator**: enables expansion into new markets
- **Ecosystem**: leverages established & proven trust models
eSIM versus Roaming

Attempts to solve the challenge of global connectivity for IoT/M2M applications are not new. The most obvious alternative has been establishing and leveraging international roaming agreements forged by the customer's "home" MNO and its partner ecosystem.

However, roaming is an increasingly imperfect solution. Again, taking something developed for the consumer market – in this case, to support short-term international travel – and applying it to long-term machine-based communications was never going to be ideal.

The issues are many:
- Tariffs are never optimal compared to a localized connection profile.
- Data volume capping can occur.
- Mismatch between the scale of connections and the wholesale revenue this generates.
- Impacts on network design and capacity, with implications for signaling resources needed to service an MNO’s domestic base.
- Some markets impose strict limits of the total number of foreign roammers or the periods that any single SIM can roam.

Certain MNOs and specific national regulatory authorities are becoming increasingly hostile to long-term roaming. Even when inter-MNO agreements currently accommodate machine-based connectivity, the longevity of these arrangements would typically not provide a guarantee that matched the life expectancy of the average IoT rollout.

Future-proofing an IoT project is one of the key deliverables, and eSIM is the only option available that avoids the pitfalls of roaming, the vagaries of MNO geopolitics, and the limitations, and security and vendor lock-in concerns of half-measures such as Multi-IIMSI.

Ecosystem of Identity & Trust

Leveraging trusted identity as the cornerstone for authenticating legitimate access has been a foundational tenant of cellular networking for decades. The conventional SIM delivers this by implementing a physical Secure Element, as part of the GSMA’s Security Accreditation Scheme (SAS), playing a vital role in the security of the network, the subscriber’s account, and related services and transactions.

With the development of eSIM and its enabling components, the GSMA has applied the same principles. While the SIM profile’s role in subscriber-to-network identity, authentication, and trust is not changing, eSIM establishes a new mechanism to load it into devices, with profiles securely downloaded over-the-air. To enable this, the GSMA has facilitated an ecosystem of trusted platforms and players, with only fully accredited manufacturers and service providers permitted to participate.

Crucially, it offers a security level and protection equivalent to that provided by the conventional SIM card. This trusted ecosystem approach ensures robust security, proven identity, cross-vendor interoperability, service portability, and solution longevity.
eSIM: How it Works

An eSIM profile holds a device's unique identity and is used to match the customer's subscription agreement with a specific network operator. Enabling an eSIM profile on the eUICC SIM grants it access to the operator's network. An eSIM profile is replaceable and is provisioned on an eUICC SIM using the Remote SIM Provisioning process. eSIM profiles broadly fall into two categories: an initial activation profile – what Pelion refers to as the Bootstrap profile – and Operational profiles.

Pelion’s Bootstrap profile is the base eSIM profile preconfigured to an eUICC SIM. It serves two purposes: firstly, it facilitates global network access for the provisioning of Operational profiles to the eUICC SIM, and secondly, it acts as the fallback option enabling global roaming to Pelion’s worldwide network of operator partners should the network access defined by the Operational profile no longer be available. Once the Bootstrap profile has enabled initial network access, customers will typically download an Operational profile customized for local access and avoid any potential roaming restrictions.

eSIM customers should note that while more than one Operational profile can be downloaded to and stored on the eUICC, only one can be active at any one time.

Encapsulating and combining the various ecosystem functions needed to support the RSP process is Platform Management; this includes eSIM profile generation and personalization, secure profile storage and transport, and profile provisioning actions such as download, install, enable, disable, and delete.

Platform Management involves the orchestration of several entities - MNOs, eUICC Manufacturers, and eSIM SM-DP and SM-SR service providers.

The SM-DP (Subscription Manager Data Preparation) and SM-SR (Subscription Manager Secure Routing) services are crucial elements of the RSP ecosystem. The SM-DP securely prepares eSIM profiles and stores them awaiting provisioning to eUICCs; preparation includes encryption of profiles using digital certificates. The separate SM-SR service performs the actual over-the-air secure transmission of profiles to devices.

Pelion eSIM-as-a-Service Architecture
And finally, it's probably worth clarifying the term eUICC, the abbreviation of “embedded Universal Integrated Circuit Card.” Although the original UICC term defined only the removable SIM form-factor, eUICC is a more generic term.

The development of the eUICC – with its dedicated operating system and read/write capabilities – is vital to the remote provisioning process. The term applies equally to both removable and fixed SIM form-factors, provided they support the GSMA’s standardized RSP capability. And eUICCs are available in all common form-factors: the removable triple-cut (also known as 2FF, 3FF, and 4FF) and the fixed, surface-mounted option (referred to as MFF2 or QFN8).

Pelion eSIM: One SIM Connecting the World

Fundamental to the Pelion value proposition is that we accelerate your speed-to-market. You get all the eSIM benefits in days, rather than investing months or even years building multiple relationships.

Reap eSIM’s benefits without diverting precious, finite resources into becoming an expert on the labyrinthine global MNO landscape and esoteric technology. With Pelion’s fully-managed eSIM-as-a-Service offering, customers benefit from a single vendor managing all these complex relationships within an agreed regulatory framework.

Pelion’s approach to integrating strategic technologies translates into establishing and building operational relationships more quickly than attempting to develop and maintain primary infrastructure ourselves, giving customers access to a diverse range of eSIM capabilities. Truly future-proof your IoT/M2M connectivity with a fully standards-based implementation that guarantees complete interoperability and flexibility.

### Consolidating to a single eSIM

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<th>Simplifies procurement, logistics, &amp; provisioning</th>
<th>Minimizes admin &amp; complexity, reducing costs</th>
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### Pre-loading with Global Bootstrap Profile

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<th>Ensures network access regardless of location</th>
<th>Guarantees zero-touch activation &amp; onboarding</th>
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### Remotely downloading the initial Operational Profile

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<th>Optimizes for the best access &amp; data rates</th>
<th>Minimizes operating costs &amp; maximizes availability</th>
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### Changing Operational Profiles, as required

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<th>Empowers access, coverage, &amp; cost optimization</th>
<th>Futureproofs network flexibility &amp; tariff choice</th>
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With its managed eSIM-as-a-Service offering, Pelion acts as a single point of integration for the various players necessary to deliver a seamless global RSP ecosystem.

Time is money: Pelion saves you both

Agile, business-focused, and less MNO-savvy companies want to concentrate on servicing their key markets and customers; they need to out-source complexity, not defocus. The managed eSIM-as-a-Service offering from Pelion is ideal for organizations that want to maintain a high degree of flexibility, appreciating that IoT is a constantly moving target; the final state is currently unclear and may never be.

For additional information about Pelion’s future-proofed eSIM-as-a-Service offering, Pelion IoT Connectivity, or any other Pelion product offering, please visit us at pelion.com.

Pelion is at the forefront of delivering the innovations essential for the secure management and connectivity of IoT devices and services.

With the mission of connecting a world where people and devices thrive, Pelion leverages a solid foundation of connectivity and device expertise.