**White Paper**

# FUTURE-PROOF YOUR CONNECTIVITY WITH VELOS IOT ESIM CONNECT

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# Introduction

Connectivity is often challenging for companies that manage large groups of connected devices. If you're running one or several IoT projects, or selling smart products to your customers, transferring devices from one network to the next is a monumental task.

Even just overseeing each of these devices can be unwieldy at best and impossible at worst.

However, introducing eSIM into the connectivity marketplace is quickly changing how IoT networks handle their connectivity.

ESIMs transfer the power from the Network Operator to enterprises and customers. Essentially, eSIM digitalises the logistic process, reduces the logistic complexity and offers greater flexibility in choosing between networks — allowing businesses to migrate their IoT devices from one MNO to another, from wherever they are in the world in seconds (not weeks or months).

eSIMs also pave the way for more connected digital products and new business models. eSIMs have enabled automotive companies to optimise the production and logistic process for frequent travellers to roam globally without needing to buy a local SIM and inspired a new wave of innovative, eSIM-enabled promotional marketing campaigns.

Perhaps most importantly, when applied well, eSIM solutions reduce the total cost of the IoT solution — increasing return on investment, in turn. If you're considering how IoT and eSIM can benefit your business, then Velos IoT is here to help you.

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# The evolution of SIMs, from traditional SIM cards, to eSIM and beyond

Believe it or not, as recently as 20 years ago, you had to change your mobile phone handset to switch to a new network operator. That was a lot of hassle, as you'd imagine. So, a lot of the time, customers were locked in.

Then, traditional SIM cards were introduced. SIM cards, the conventional form factor most of us are familiar with (2FF, 3FF, 4FF and Triple), are plastic cards that plug into devices to keep them connected to mobile networks. These SIMs allowed users to change network operators by replacing the plastic card (but keeping the same handset or device).

Fast forward to today; maybe customers still use traditional SIMs in their mobile phone handsets. But for others — especially in the case of enterprise IoT — it's simply not viable to physically replace plastic SIMs, which is where the eSIM comes in.

eSIMs (embedded SIM cards) are the latest in SIM card technology, which changes the SIM life cycle management from today's traditional linear model to a more digital circular model with repeatable improvising. eSIMs make it possible to switch network providers in seconds without physically interacting with the device or SIM card. eSIMs are available for all Form Factors; the technology has advanced so much that eSIMs no longer have to be physical cards.

But even greater change is on the horizon. The industry is currently working to define an integrated SIM (iSIM) solution, where the SIM functionality — including the remote provisioning support — is implemented in a trusted environment within the System-on-Chip. This is called an integrated UICC (iUICC).

Using eSIM and iUICC solutions is crucial to continue driving digital transformation for consumers, enterprises, governments, and countries. It is opening the door to connectivity assets and solutions, enabling enterprises to create better IoT solutions, often delivering environmental, social, and political benefits, too.eSIM vs eUICC — what's the difference?

'eSIM' and 'eUICC' are often used interchangeably, especially outside the telecom industry — but this isn't exactly true.
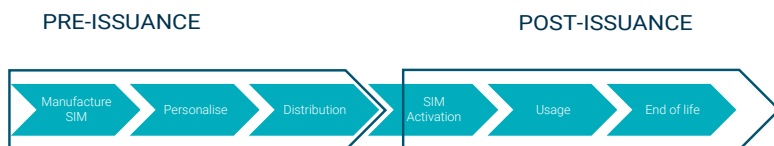
eUICC (Embedded Universal Integrated Circuit Card) is the physical hardware supporting the next evolution of the SIM card. An eUICC allows users to change service providers over the air (OTA) without needing to change the SIM card physically.

eSIM is a global standardisation that follows the latest GSMA SIM provisioning specification — empowering enterprises to download, activate and delete eSIM profiles on eUICC to any MNO worldwide.
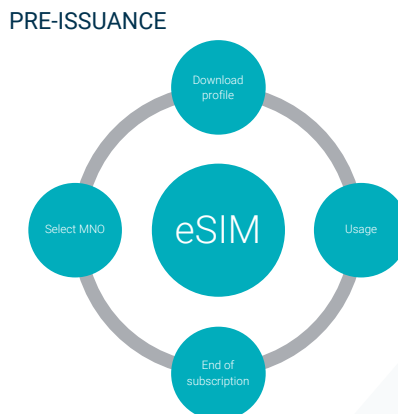
Essentially, the eUICC needs an eSIM solution to work. While using these terms interchangeably is incorrect, they are very much linked.

At Velos IoT, eSIM is a group name for both eSIM and eUICC, which represent the most radical change in over two decades of GSM connectivity — specifically, in terms of how customers can select and change service provider profiles based on the criteria, or the business rules of their choosing.

## From linear model

PRE-ISSUANCE                                    POST-ISSUANCE

Manufacture SIM → Personalise → Distribution          SIM Activation → Usage → End of life

## To a digital repeatable model

PRE-ISSUANCE

Manufacture SIM → Select MNO → Personalise → Distribution

PRE-ISSUANCE

Download profile

Select MNO   eSIM   Usage
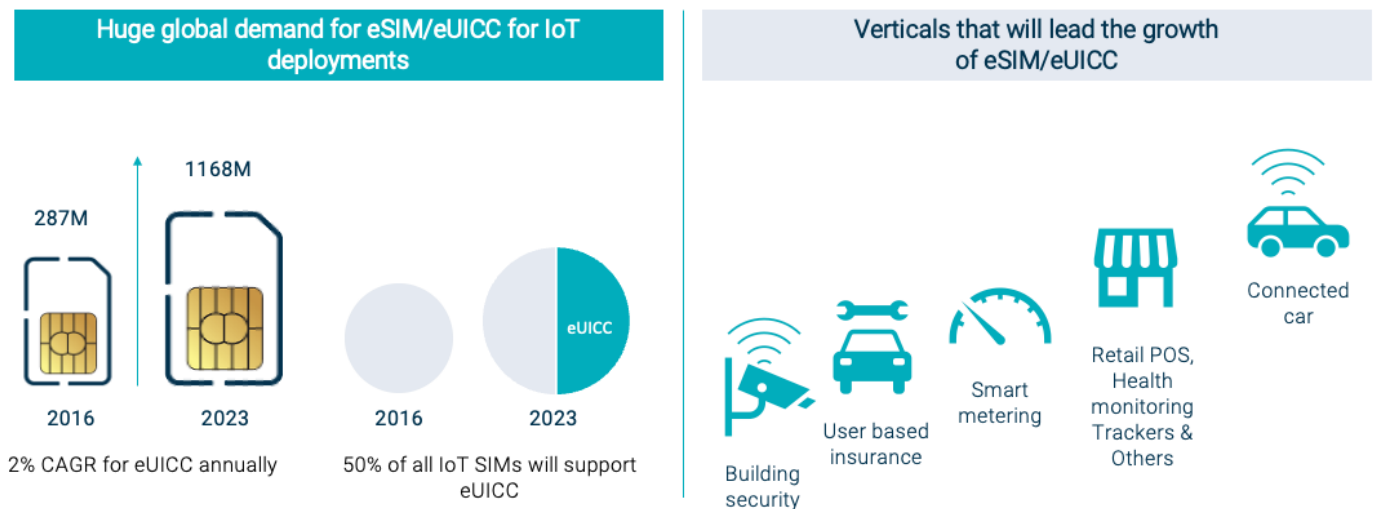
End of subscription

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# eSIM adoption is expected to grow rapidly

The global eSIM market is predicted to grow at a compound annual growth rate of 31% from 2018-2023, producing revenue of up to $978.3 million by 2023.

There are several drivers for this huge upswing in eSIM sales. Still, a large proportion comes from the rapid adoption of eSIM within connected cars, retail POS, smart metering, user-based insurance and building security.

On top of this, Apple uses eSIMs in their Apple Watch devices (Series 3 and above), the iPhone (iPhone XS and above), and every edition of the iPad Pro. Google has also implemented eSIM cards in its smartphones, starting with the Google Pixel 2.

With tech leaders like Apple and Google paving the way in eSIM applications, it's not surprising the rest of the industry is taking note. It is estimated that by 2030, 50% of all sold SIMs will support eSIM technology.



**Huge global demand for eSIM/eUICC for IoT deployments**

287M — 2016
1168M — 2023
2% CAGR for eUICC annually

50% of all IoT SIMs will support eUICC
2016 — 2023
eUICC

**Verticals that will lead the growth of eSIM/eUICC**

Building security · User based insurance · Smart metering · Retail POS, Health monitoring Trackers & Others · Connected car

# eSIMs make IoT projects more manageable, and more cost-effective, for business across all sectors

Unsurprisingly, eSIMs are being adopted at an exceeded rate.

After all, eSIMs significantly reduce logistic complexity, offering the enterprise a single SKU for global deployment. This means they can sell the same product everywhere, with minimal effort.

The eSIM market also opens up new opportunities for businesses to quickly reduce connectivity costs by seamlessly changing from one network operator to another. You can also change network profiles based on location, consumption and other rules by creating automation in connectivity management platforms.

Together, these benefits drive substantially higher operational efficiencies — the total cost is reduced, and the return on investments is increased by lowering switching and connectivity costs.

Lastly, eSIM opens access to local network operators' eSIM profiles for inbound roaming capabilities. This creates space for new exciting technologies, such as NB-IoT that are not yet available for a roaming solution.

If you're considering switching from traditional SIMs to eSIM — you are making a wise choice. Yet there are, as always, some limitations to consider first, especially if you're a small business or just getting started with IoT.

# What do you need to know before switching to eSIM

At Velos IoT, our goal is to help our customers switch, and manage, eSIM — reducing entry barriers and overall costs.

We'll do everything possible to support you through a successful eSIM uptake. However, there are some areas you need to be aware of before switching to eSIM.

## Device requirements

In essence, eSIM is a solution that enables the user to download and activate Network Profiles. To be able to download a profile and activate it for you, your device needs to support all eSIM device requirements.

At Velos IoT, we're experts at taking you through this process. First, we'll produce a device requirement document clearly stating all required commands. We'll then send you the eSIMs you need, guiding you through downloading and activating the profile and deleting your old profile if needed. Once the eSIMs are in place, we'll launch a device verification, managed by Velos IoT's Solutions Consulting team — should this test be unsuccessful, Velos IoT's experienced team will do everything they can to get your IoT project back up and running as quickly as possible.

Velos IoT clients can use the Device Verification service, which tests the device(s). This final assessment uses Sniffer tools to analyse the device's eUICC communication and eSIM functionality. This test consists of:
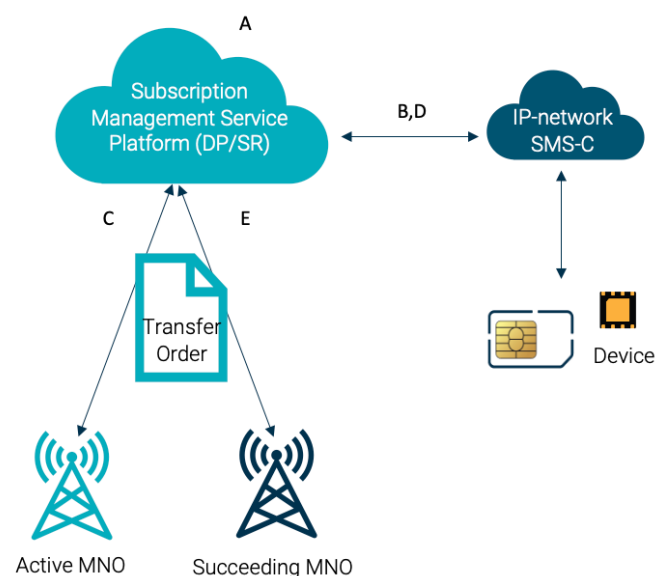
Basic troubleshooting performed by the test team (limited to the scope of testing — additional troubleshooting may have to be done by the device manufacturer or customer)
Test automation is used wherever suitable
Main elements of the test infrastructure
Test eUICCs and profiles
Tools for communication analysis

Velos IoT will be here to help throughout the process, providing expert recommendations on establishing a more robust device policy supporting all required eSIM commands (should you need it).

## Integration to other eSIM donor Network Operators

eSIM is a technology that allows the customer over the air to change Network Profiles without physically replacing the SIMs. eSIM Connect is delivered with one initial profile, accessing 600+ roaming networks in over 210 regions. To add additional eSIM profiles from other network operators, these network operators need to be integrated into Velos IoT's eSIM platform.

Velos IoT is an eSIM engineering team responsible for helping you to define the best and most cost-efficient integration model. With Velos IoT's eSIM project managers, you can rest assured that the integration is executed smoothly and cost-efficiently.

# Is eSIM a good match for your organisation?

Outside of these considerations, the majority of businesses make excellent candidates for eSIM cards — so there's a good chance yours will too.

Businesses that use eSIM cards internally will have an easier time migrating from one network to the next — some can even have dual networks on their devices, improving connectivity and separating their fees (one network for talk and text, the other for data usage).

Manufacturers of smart products, like IoT and smart home companies, can use eSIMs for a streamlined approach to connectivity. Rather than having to physically add SIM cards to each of these devices (which can number in the thousands), businesses can equip them with eSIMs as soon as they're manufactured.

eSIMs also make it easier when businesses decide to switch network providers. For IoT projects, where devices might be in areas that are difficult or impossible to reach, eSIMs offer an over-the-air solution to network migration. In devices that are sold to consumers, this saves businesses from having to arrange for technicians to swap out the SIM cards in their customers' homes.
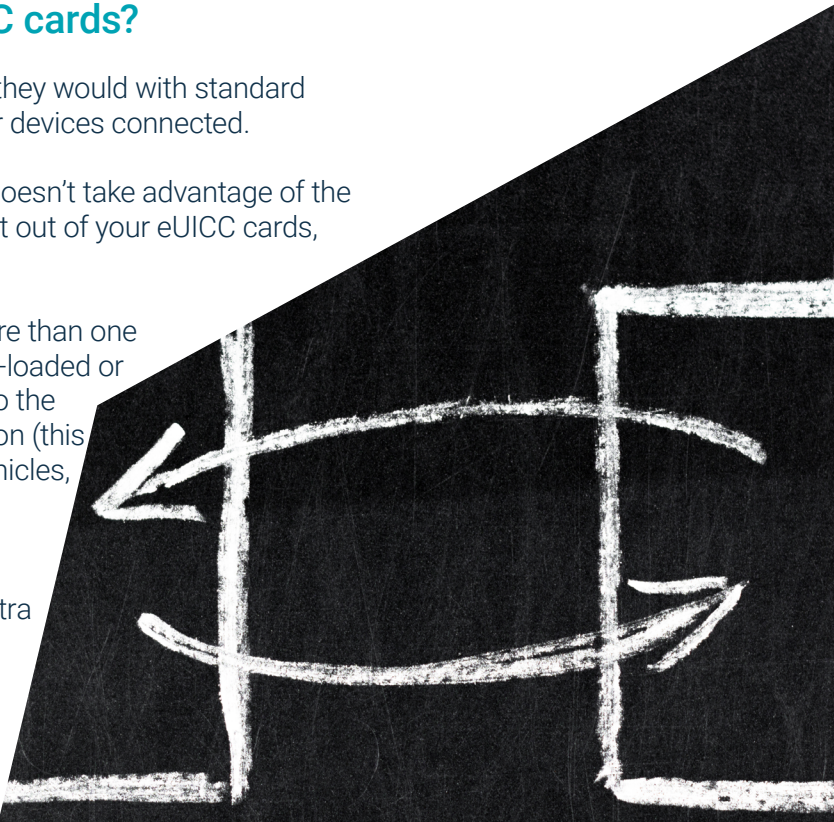
## How to get the most out of your eUICC cards?

Upon switching, some users tend to their eUICCs as they would with standard SIM cards — as a little piece of hardware to keep your devices connected.

Though there's nothing wrong with this approach, it doesn't take advantage of the benefits that come with eUICC cards. To get the most out of your eUICC cards, companies need to embrace their flexibility.

There are multiple ways to do this. One is to have more than one network provider on your devices available, either pre-loaded or available to be downloaded from the eSIM platform to the eUICCs. This makes them less likely to lose connection (this is great for devices that roam a lot, like wearables, vehicles, and laptops).

Another is to use the extra space eUICCs provide. Because eUICCs are so small, businesses can put extra features and power behind the devices they offer.

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# Velos IoT eSIM Connect makes eSIM easy

For companies that want to make the switch to eSIM and capitalise on the flexibility of the technology, Velos IoT has created the eSIM Connect service.

## Connected with a fall-back

Velos IoT eSIM Connect is a complete 'connect and manage' IoT solution allowing you to control when and how your devices are connected.

Reach global customers worldwide by starting your journey with Velos IoT's global connectivity and expanding your data coverage and capacity by adding our partners' connectivity to the solution as your demand increases, all managed in the Nomad Connectivity Hub.

Unlike other eSIM providers on the market, we allow our eSIM Connect partners to change between different connectivity providers over the air, so you can move your devices to a new network without ever having to interact with them physically.

Velos IoT eSIM Connect works with the best connectivity solutions - 2G, 3G, 4G and LTE-M on a global and local scale. Choose the right solution for your needs and avoid the effects of 2G and 3G sunsets in the future with Velos IoT eSIM Connect's flexibility.

Our eSIM solution is GSMA SGP.02.v3.2 specification certified and fully operable with all eSIM suppliers and MNOs on the market. We offer the full range of eUICC form factors and options.
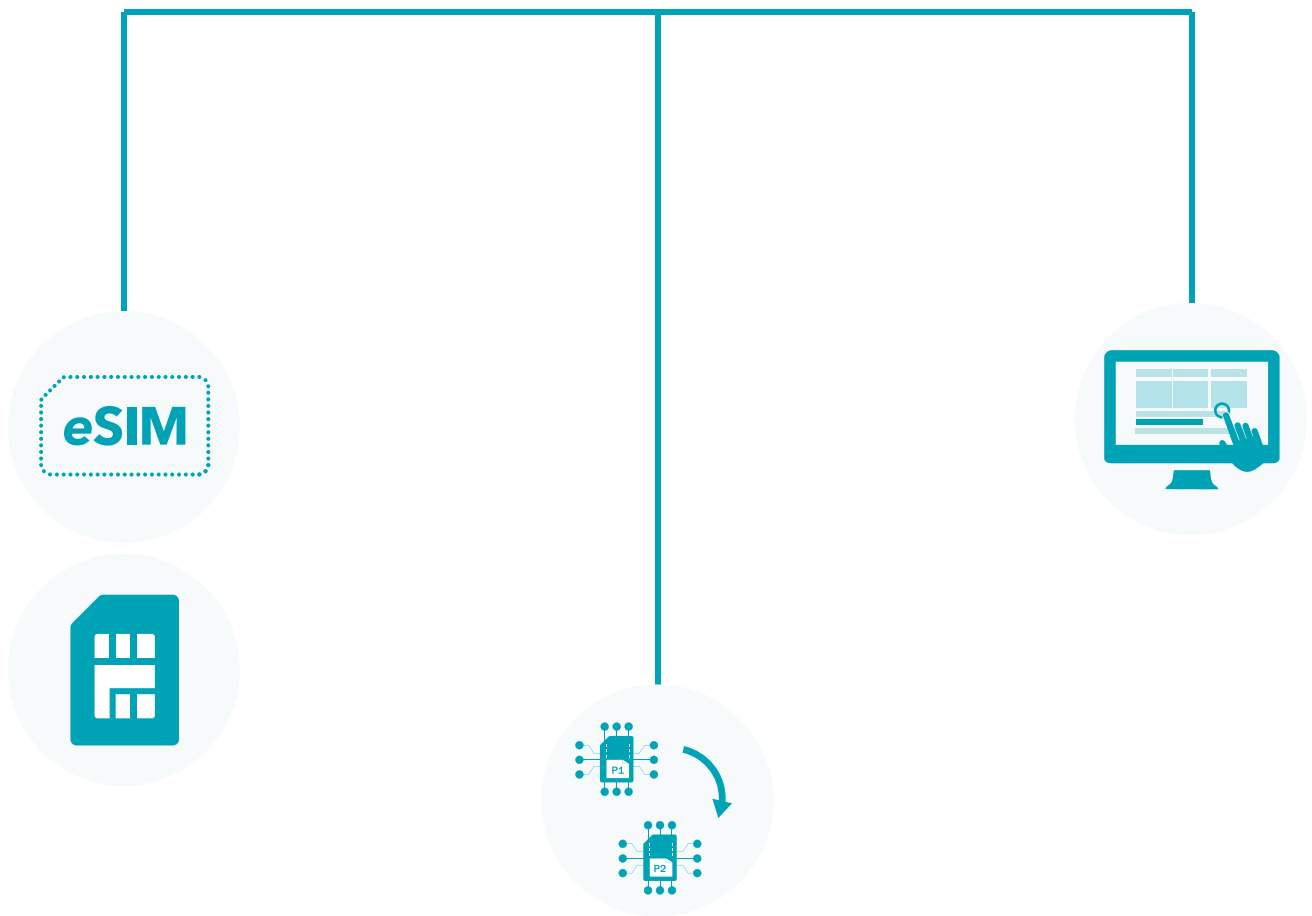
## The Nomad Connectivity Hub

Velos IoT eSIM Connect is based on the principle of "one tool to orchestrate your connectivity". With Velos IoT eSIM Connect, you can take control of your eSIM estate through Velos IoT's proprietary Nomad Connectivity Management Platform. This would allow you to manage every step of your connectivity in one place - from SIM activation and network selection to billing, OTA provisioning and deactivation.

The Nomad Connectivity Hub is an all-inclusive management platform for your eUICC cards. It enables Velos IoT customers to move to eSIMs without service providers needing to upgrade their core systems, and it gives you a high-level view of all of your connected devices.

Best of all, transitioning to another network provider through the Nomad Connectivity Hub with eSIM Connect is the simplest way to switch networks. You can complete the entire process from the platform through the User Interface or the APIs—access direct support from our eSIM team.

We will ensure the solution fits your business need and assist you with device verification to ensure your estate supports all necessary eSIM requirements and is ready for successful deployment.

# eSIM Connect

eSIM Connect supports all eUICC form factors from 2FF to embedded MFF2.

Certified under the latest GSMA SGP.02. v3.2 specification, eSIM Connect is interoperable with all eSIM suppliers and MNOs on the market.

Choose between the available connectivity profiles.

Access regions with Velos IoT's profile or through one of our local partners.

Swap profiles over the air, monitor your data consumption, compare pricing and control your estate with the Nomad Platform.

One portal, one invoice, one point of contact for all devices around the world.

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# Choose Velos IoT as your global eSIM partner today

Formerly Velos IoT, Now a combined global business with Velos IoT, Top Connect and NextM2M. Velos IoT is a leading IoT connectivity solutions provider with over ten years of best industry knowledge and strong financial stability.

We provide resilient global IoT connectivity with over 600 networks in over 200 countries and territories managed through a world-class connectivity management platform to over 17 million cellular devices worldwide. Whether you are a growing business or a global enterprise, we have a fully scalable business model that can be adapted to your specific business needs.

eSIM Connect is our line of services designed to give you the best connectivity experience. The service alleviates the pressure of picking a mobile operator for your business by giving you a flexible connectivity plan that works for you. It's integrated with the rest of our services, which makes even ambitious IoT projects more manageable.

If your business is looking to take advantage of eSIM cards, consider doing so through the eSIM Connect service by Velos IoT. It's an all-in-one solution to worldwide flexible, modern, and secure connectivity.

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