Kigen Masterclass

Securely managing IoT eSIMs (SGP.32) with Kigen

Kigen eIM solution

Available October 2024

Nov 2024

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We'll be starting soon, but in the meantime, let us and your network know you're here.

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Use the chat panel for questions

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Who this session is most useful for?

Understanding how the new evolution of eSIM standards for IoT supports your business

OEM

Freedom to manufacture and manage eSIM in bulk

‹ Convenience of consumer eSIMs – in IoT

‹ Manufacture one global eSIM SKU for all devices

‹ Integrate differentiating features with security, loss-less connectivity switching

‹ Freedom to work with any network, any EIM

MVNO

Optimize eSIM fleet management costs

‹ For fast growth IoT LPWAN market

‹ Without expensive infrastructure costs

‹ Streamline large-scale fleet eSIM profile operations

‹ Flexible and dynamic connectivity offering

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Meet the speakers

Bee Hayes Thakore
VP Marketing

Loic Bonvarlet
SVP Solutions & Marketing

Saïd Gharout
Head of Standards and Chair
GSMA eSIM Working Group 2

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Agenda for today's session

- Understanding the eSIM Standards evolution and IoT eSIM architecture

- What makes an eIM solution? Exploring what you get in Kigen eIM solution?

- See the solution in action!

- Your QnA!

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55.3%

Global LPWAN Market growth rate (CAGR) by 2031

54%

Of the above LPWAN growth is NB-IoT (outside China)

Challenges of LPWAN eSIM fleets

*Low Power Wide Area Networks

- Profile download operations are too demanding on memory and network-constrained devices

- Lack of UI inhibits ability to 'elect' or 'pull' profile operations by devices

- Critical infrastructure IoT markets demand that devices do not directly connect to the public internet

- Scale of such IoT fleets deserves interoperability between Profile management infrastructure

Source: Counterpoint Research, Juniper Research, and Kigen estimates

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What are the different GSMA standards?

- SGP.02 = M2M (Machine to machine)

- SGP.22 = Consumer eSIM for Individuals / user devices (Consumer devices such as smartphones, laptops, tablets)

- SGP.32 = IoT eSIM to addresses all challenges for IoT devices, especially for LPWAN networks, industrial IoT, auto, metering
  - Simplified architectural agents
  - Simpler infrastructure interfaces
  - Latest spec = SGP.32 v1.2

Consumer eSIM

IoT eSIM (SGP.31/.32)

M2M eSIM

Device capabilities

Past - 2024 | 2024 | Future
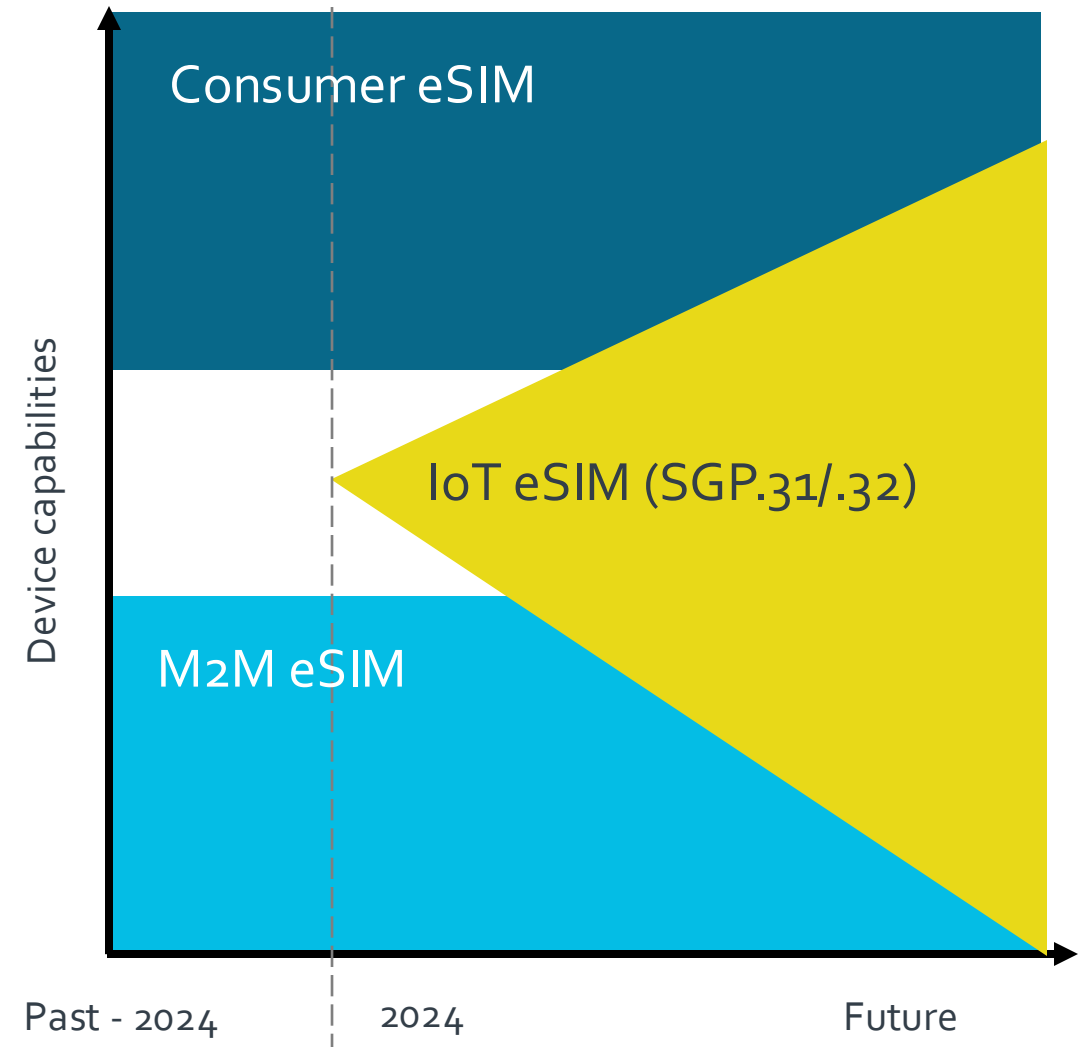
What does SGP.32 improve?

Addresses key challenges for eSIM in high growth markets

- **Easy eIM swap compared to SGP.02 SMSR**

  Device can receive secure profile activation from any provider and remote server swap is simplified

- **Adapted to constrained networks and devices**

  Removes a key barrier for LPWAN devices and technologies such as NB-IoT, no SMS dependencies

- **Simpler architecture for download flexibility**

  Defines "eIM" = eSIM IoT remote Manager, which orchestrates and authenticates secure profile operations – allowing pull, push (direct download) or indirect downloads
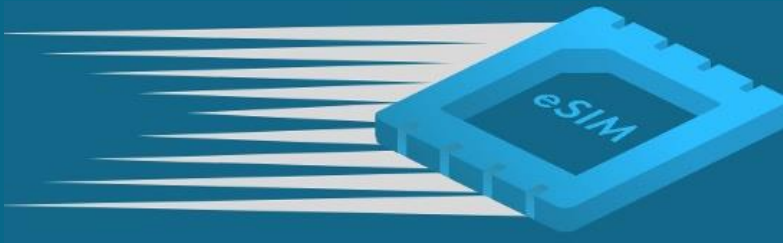
Changes introduced in SGP.32

GSMA™
eSIM specifications

SGP.32 v1.2
published June 2024

A key milestone to simplify eSIM development efforts for OEMs

Extends consumer eSIM specification SGP.22

- Adapts consumer eUICC for IoT, tunes Local Profile Assistant and leverage existing fleet of SM-DP+ for use in both IoT and Consumer Devices

New: eIM (eSIM IoT remote Manager)

- eIM is the service that enables remote control and management of the eSIM

New: IPA (IoT Profile Assistant)

- An optimized local profile agent with two variants
  - Runs either in the eUICC (IPAe) reducing development time
 - Runs in the IoT device (IPAd)

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What to look for in an eIM for your business?

- The eIM is responsible about Profile Download triggering (AC handling), Profile State Management (Enable, …), and Indirect Profile Download.

- An eIM implementing all the defined options in SGP.32 ensure compatibility with any IoT Device and and SM-DP+.

- The eIM is:
  - Open: anyone can deploy an eIM.
  - Dynamic: you can easily add and remove an eIM at any point of time.
  - Interoperable: no need to customization to connect to the SM-DP+.

- SGP.31 defines security requirements for the eIM.

- Kigen eIM
  - implements all the defined options in SGP.32.
  - Deployed in SAS-SM.

SM-DP+

eSIM IoT remote Manager

IPA

eUICC

IoT Device

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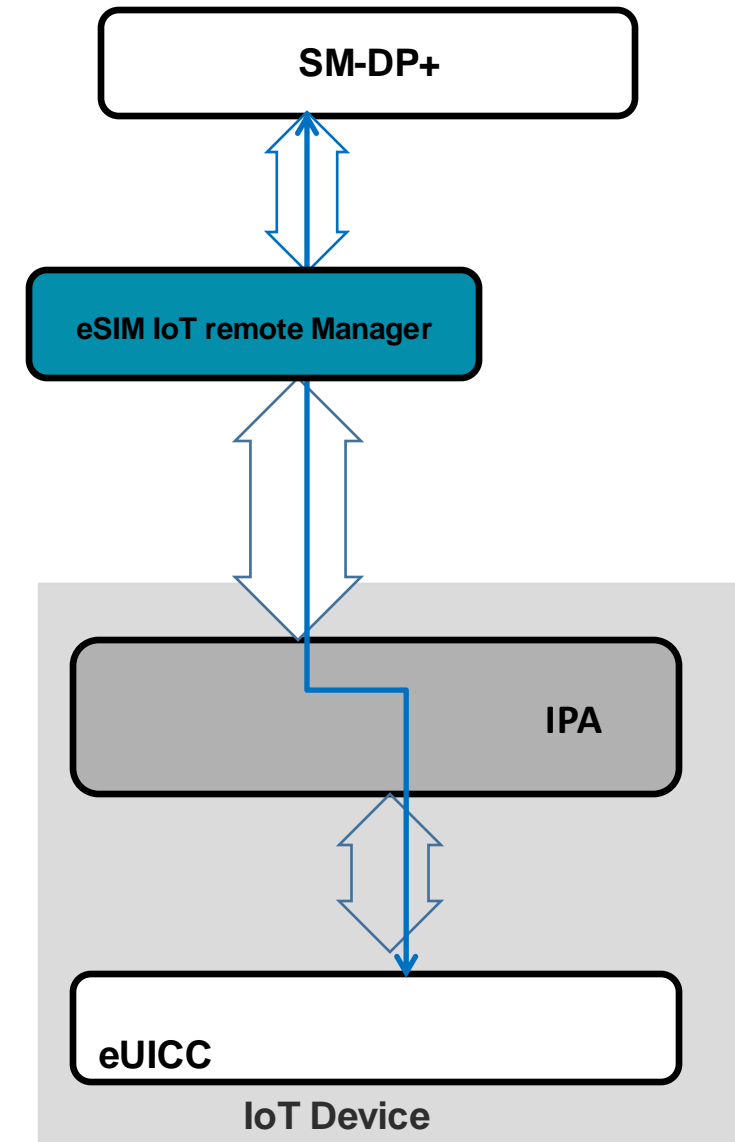
IPA in the eUICC

- IPA in the eUICC reduce development effort for IoT Device makers. No need to have eSIM expertise.

- The eIM and SM-DP+ doesn't distinguish if the IPA is located in the IoT Device or in the eUICC.

- This is optional to allow IoT Device makers to develop their own IPAd or ask the EUM to implement the IPAe.

- IPA-mode included to report which IPA is used: IPAd or IPAe.

- Kigen's eUICC implements the IPAe.

IPAd

Profile

eUICC

IoT Device

IPAe

Profile

eUICC

IoT Device

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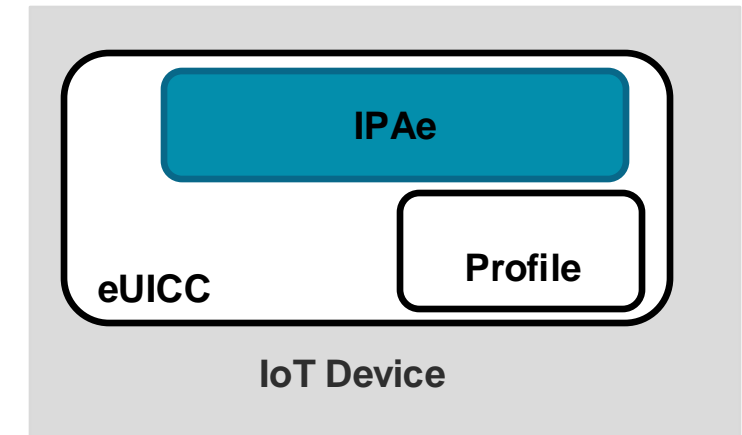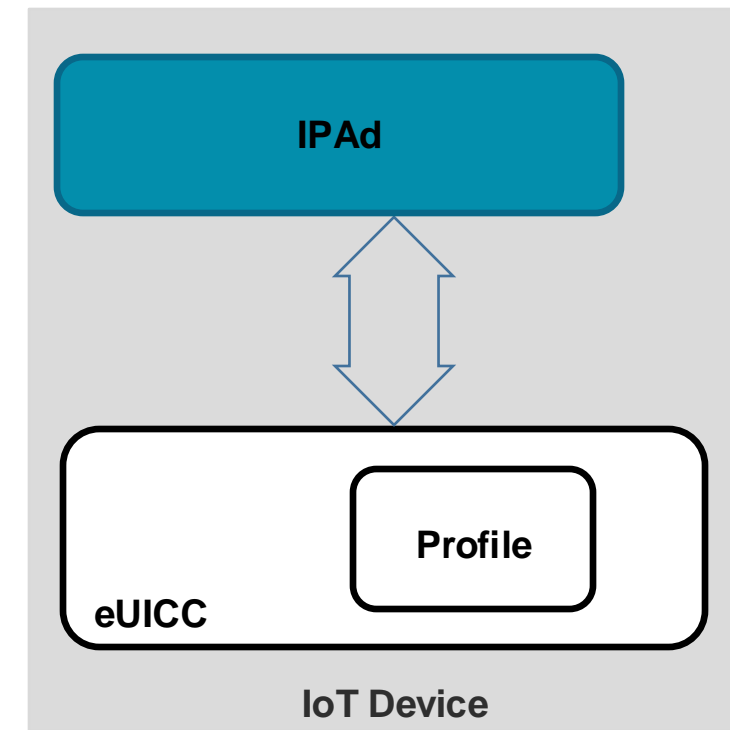
Essential functions of the eIM in IoT eSIM management

Improving cost-efficiency and performance of managing IoT devices on masse

1. Profile download optimization
- Reduces bandwidth and energy consumption for constrained devices
- (Advanced) Indirect profile download to securely fetch profiles on behalf of devices

2. Lifecycle management
- Simplifies and automates profile activation, updates, and deactivation
- Crucial for smart metering: devices need to last 10-15 years autonomously

3. Bulk device management
- Large-scale fleet management at the scale of millions, efficiently
- Reduces operational costs across a wide array of IoT

4. Security enhancements
- Ability to leverage stronger security mechanisms
- Potentially play a key role leveraging eSIM for end to end security

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What makes the eIM solution?

Loic Bonvarlet
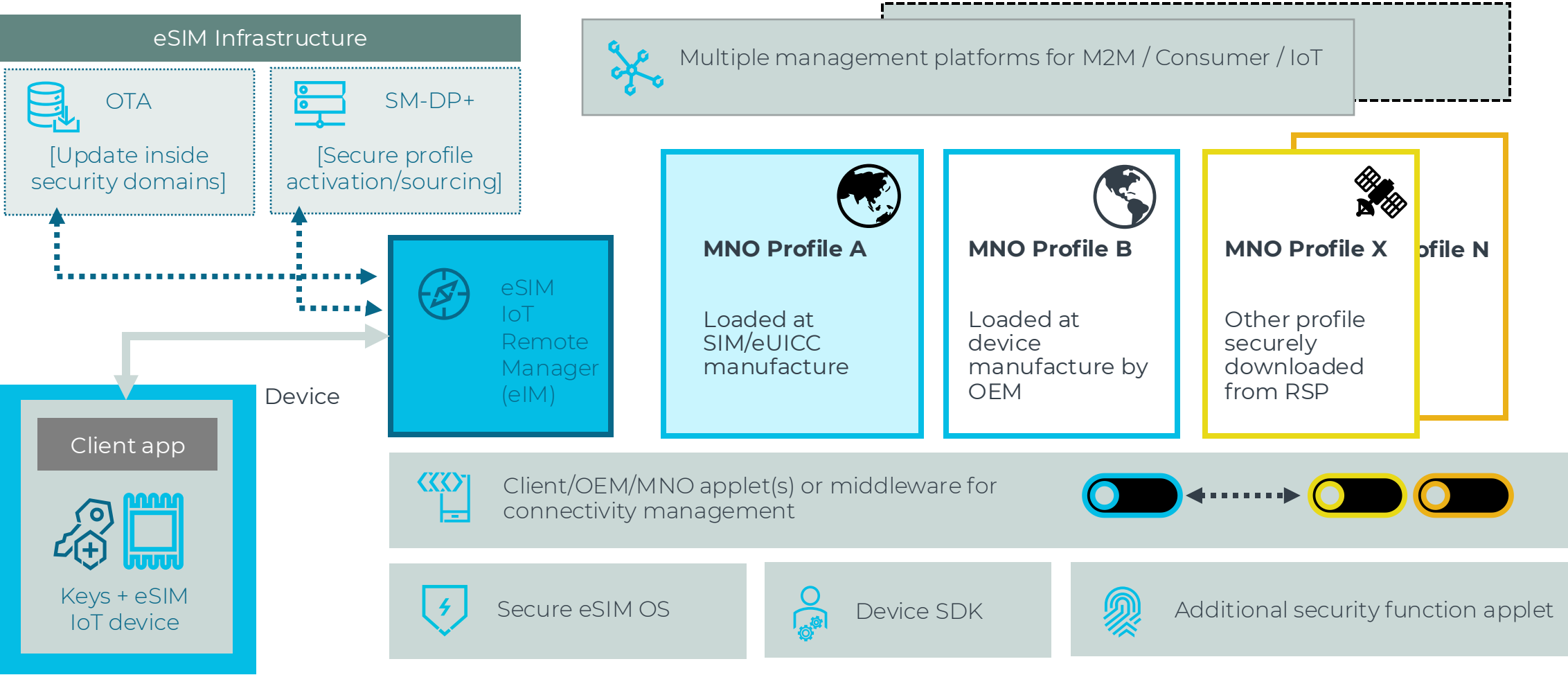
What is in an eSIM solution?

eSIM

The whole service ecosystem

eUICC
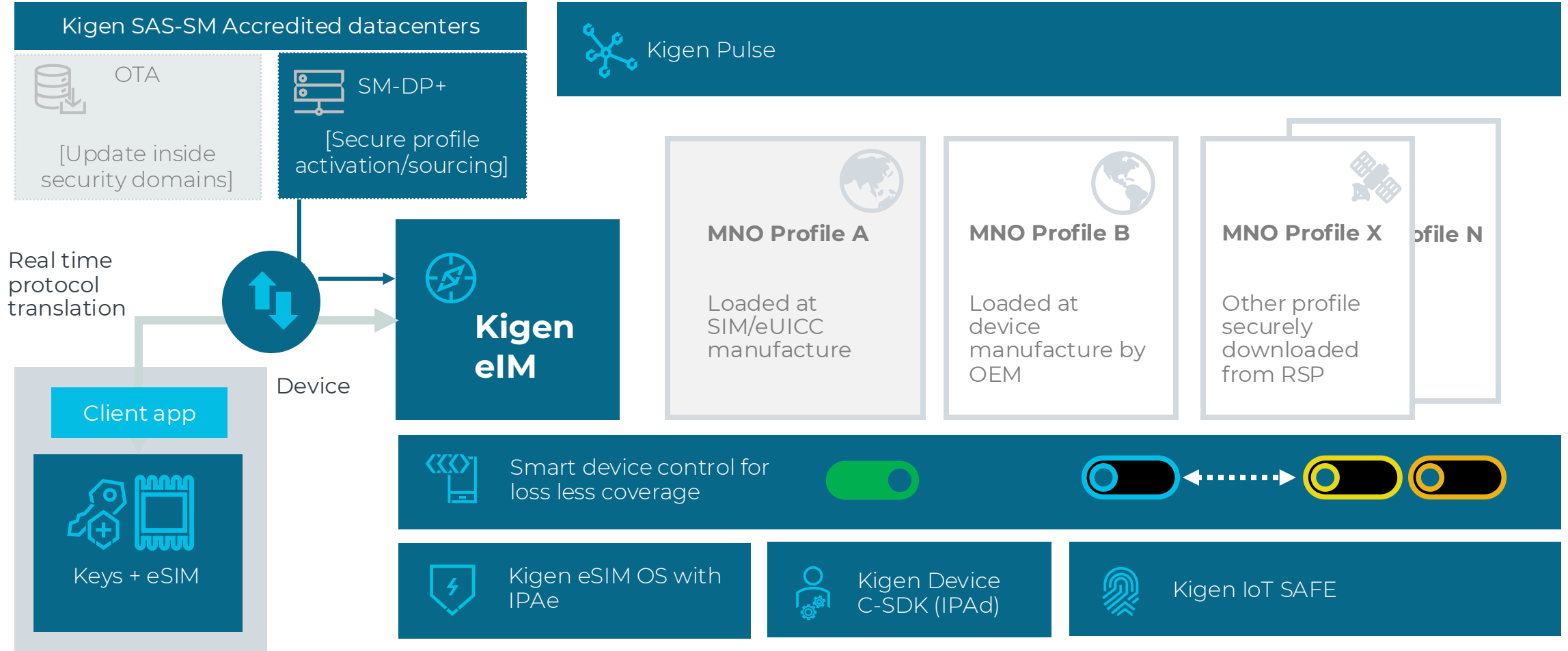
The functionality that allows remote SIM provisioning

Compliant to GSMA standards to maximize interoperability

eSIM = **Hardware** + **eSIM OS** + **Platform** + **Tools**

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eSIM/eUICC Management at a glance

With applets, remotely managed and distributed logic. eIM is central to eSIM operations

eSIM Infrastructure
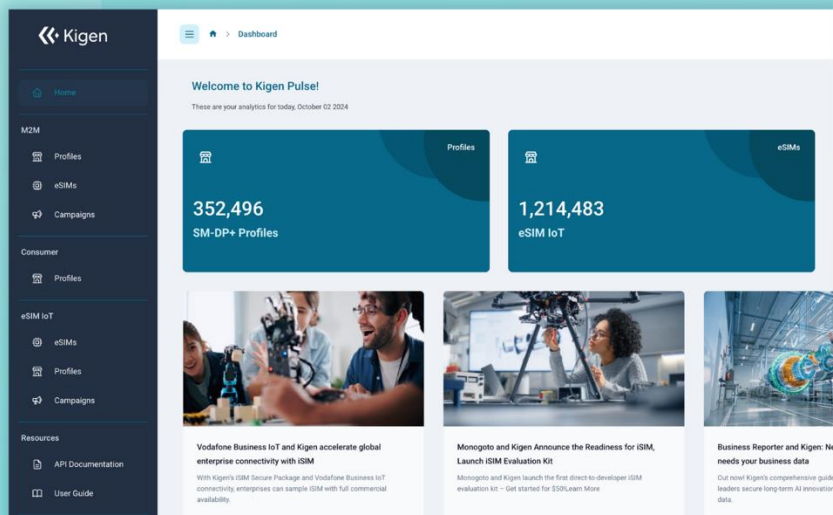
OTA

[Update inside security domains]

SM-DP+

[Secure profile activation/sourcing]

Multiple management platforms for M2M / Consumer / IoT

eSIM IoT Remote Manager (eIM)

Device

Client app

Keys + eSIM IoT device

MNO Profile A

Loaded at SIM/eUICC manufacture

MNO Profile B

Loaded at device manufacture by OEM

MNO Profile X ...ofile N

Other profile securely downloaded from RSP

Client/OEM/MNO applet(s) or middleware for connectivity management

Secure eSIM OS

Device SDK

Additional security function applet

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Kigen eIM solution for SGP.32

First, market-ready and robustly tested solution

Kigen SAS-SM Accredited datacenters

OTA

[Update inside security domains]

SM-DP+

[Secure profile activation/sourcing]

Kigen Pulse

Real time protocol translation

Device

Kigen eIM

Client app

Keys + eSIM

MNO Profile A

Loaded at SIM/eUICC manufacture

MNO Profile B

Loaded at device manufacture by OEM

MNO Profile X

Other profile securely downloaded from RSP

Profile N

Smart device control for loss less coverage

Kigen eSIM OS with IPAe

Kigen Device C-SDK (IPAd)

Kigen IoT SAFE

Kigen

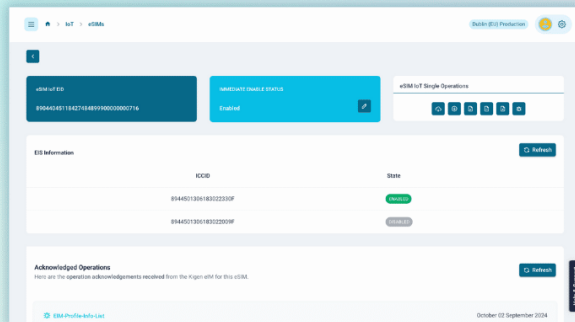# Simpler, cost-effective, efficient eSIM IoT is within reach

Available for trials now

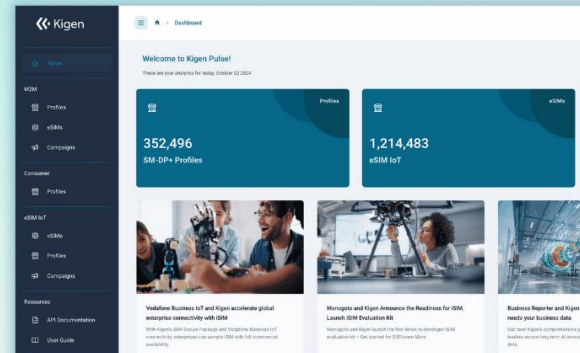| Works with any existing SM-DP+ with Kigen's real-time protocol translation | Single management layer for all M2M, Consumer and IoT RSP eSIMs | Build, operate and expand on innovative features with comprehensive tools |

Full interoperability
with Kigen eIM

All your eSIMs unified
with Kigen Pulse

Ready for your innovation
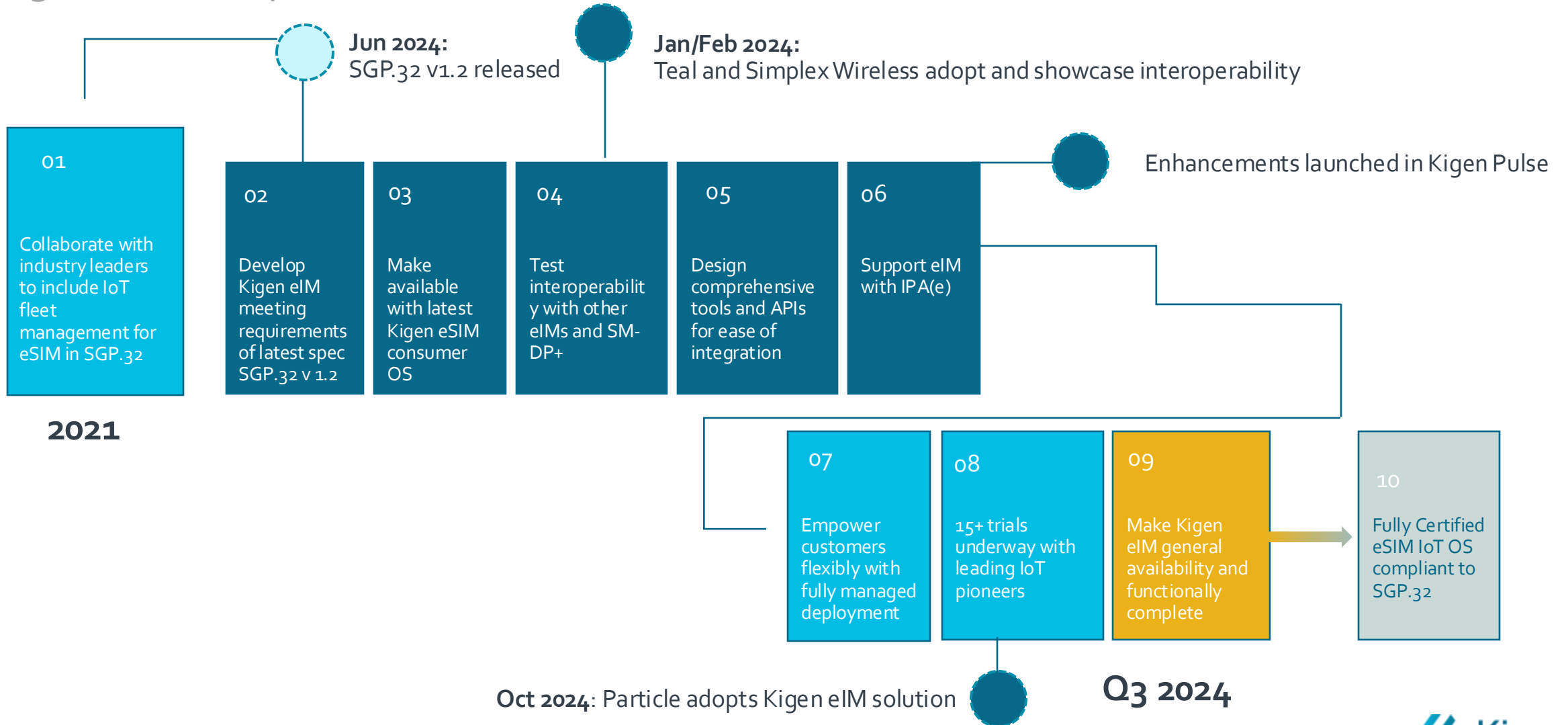with Kigen eSIM OS

Embedded C
Device-SDK

Secure In-factory
Profile
provisioning

Smarter
control for
loss-less
connectivity

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Robustly tested and widely adopted

Kigen's roadmap has been:

Jun 2024:
SGP.32 v1.2 released

Jan/Feb 2024:
Teal and Simplex Wireless adopt and showcase interoperability

Enhancements launched in Kigen Pulse

01

Collaborate with industry leaders to include IoT fleet management for eSIM in SGP.32

2021

02

Develop Kigen eIM meeting requirements of latest spec SGP.32 v 1.2

03

Make available with latest Kigen eSIM consumer OS

04

Test interoperability with other eIMs and SM-DP+

05

Design comprehensive tools and APIs for ease of integration

06

Support eIM with IPA(e)

07

Empower customers flexibly with fully managed deployment

08

15+ trials underway with leading IoT pioneers

09

Make Kigen eIM general availability and functionally complete

10

Fully Certified eSIM IoT OS compliant to SGP.32

Oct 2024: Particle adopts Kigen eIM solution

Q3 2024

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Never lose sight of your IoT fleet with smarter device control between satellite and terrestrial connectivity.

Kigen eIM: Maximizing interoperability and efficiency

Available today with Kigen eSIM Consumer OS, robustly tested by 15+ customers

Robust, sure-start path to SGP.32

- Leverages deep expertise of standards, built to SGP.32 v 1.2 requirements
- Supports indirect profile downloads, resulting in:

- **Maximizes interoperability for seamless profile operations**
- Supports both HTTPS and CoAP with UDP comms to IPA
- On-the-fly protocol translation to accommodate legacy SMDP+
  - JSON and ASN.1 both supported

- **Minimizes the strain on device resources**
- Configurable to address efficiency, automating for scale and traffic tuning
- Tested in enhanced traffic protection scenarios – such as device firewalling

Benefits for connectivity providers
Optimize cost of eSIM management

- **Expand reach** by activating new range of LPWAN IoT devices growing exponentially

- **Streamline profile management** across large fleets of IoT devices through automation and in bulk, without needing extensive backend infrastructure modifications.

- **Offer flexible and dynamic connectivity** Effortlessly address changing conditions such as location or signal strength

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Benefits for manufacturers

Addressing key challenges with an ecosystem-centric approach

- **One eSIM SKU for all devices**, including a **generic eUICC** that can be customized by OEMs.

- The **convenience of consumer eSIMs, in IoT,** simple to manage as a fleet.

- **Power-optimized mechanisms** for battery-powered devices like sensors and meters ensure energy efficiency and long operational life.

- Integrate seamless **profile switching** and **secure element functions** with a Device **C-SDK for quick feature integration**.

◀◆ **Kigen**

Innovative products on Kigen eSIM OS

Proud to be the trusted partner of pioneering brands for global IoT and consumer devices

Compact IoT NTN enabled motorola defy satellite link

Feature-rich Armor 23 Ultra by Ulefone

#FutureofSIM

GL.iNet secure travel routers, such as Mudi (pictured Mudi V2) , Puli and Spitz product ranges

Profile 1
Profile 2
Profile 3 (Activated)

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Built for innovation

Available for you to extend the benefit of the Kigen secure eSIM OS advantages

Ready for your innovation
with Kigen eSIM OS

Embedded C Device-SDK

Secure In-factory Profile provisioning

Smarter control for loss-less connectivity

- **Leverage** the industry's leading compact OS for consumer and IoT

- **Intelligence** built-in for smart device control to prevent connectivity loss

- **Ease of implementing** advanced applets with Kigen Embedded C-Device SDK

- **Just-in-time profile provisioning** coming soon (discuss your needs now)

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IoT Features of the Kigen eSIM OS

1. Load profile securely streamlining SKU management
   – OEM can load connectivity profiles at the last stage of manufacturing or on the field, reducing SKUs

2. Download profile using standardized RSP
   – Trigger the download of a profile from an SM-DP+ to IPAe or IPAd for an IOT device
   – (Device triggered or via OTA)

3. Switch between profiles
   – List profiles already in the eUICC and select the one to use
   – (Device, remotely, or eUICC Applet triggered)

4. Embedded Secure Element Crypto
   – Device can leverage IoT SAFE for safe storage and generation of PKI key pairs

Kigen SDK for Embedded C

Designed to provide a complete and consistent solution
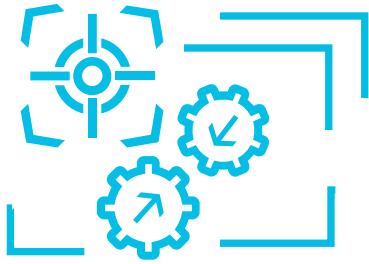
Comprehensive set of tools and libraries for testing and development

Platform - independent code suitable for multiple use cases
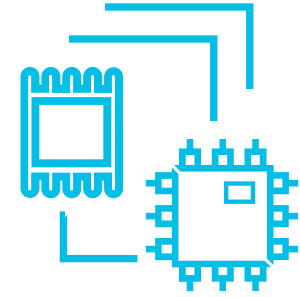
Empower customers to use Kigen eUICC features on the device or during production

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Kigen Pulse

Unified view across all M2M, consumer, and IoT eSIMs, any SM-DP+
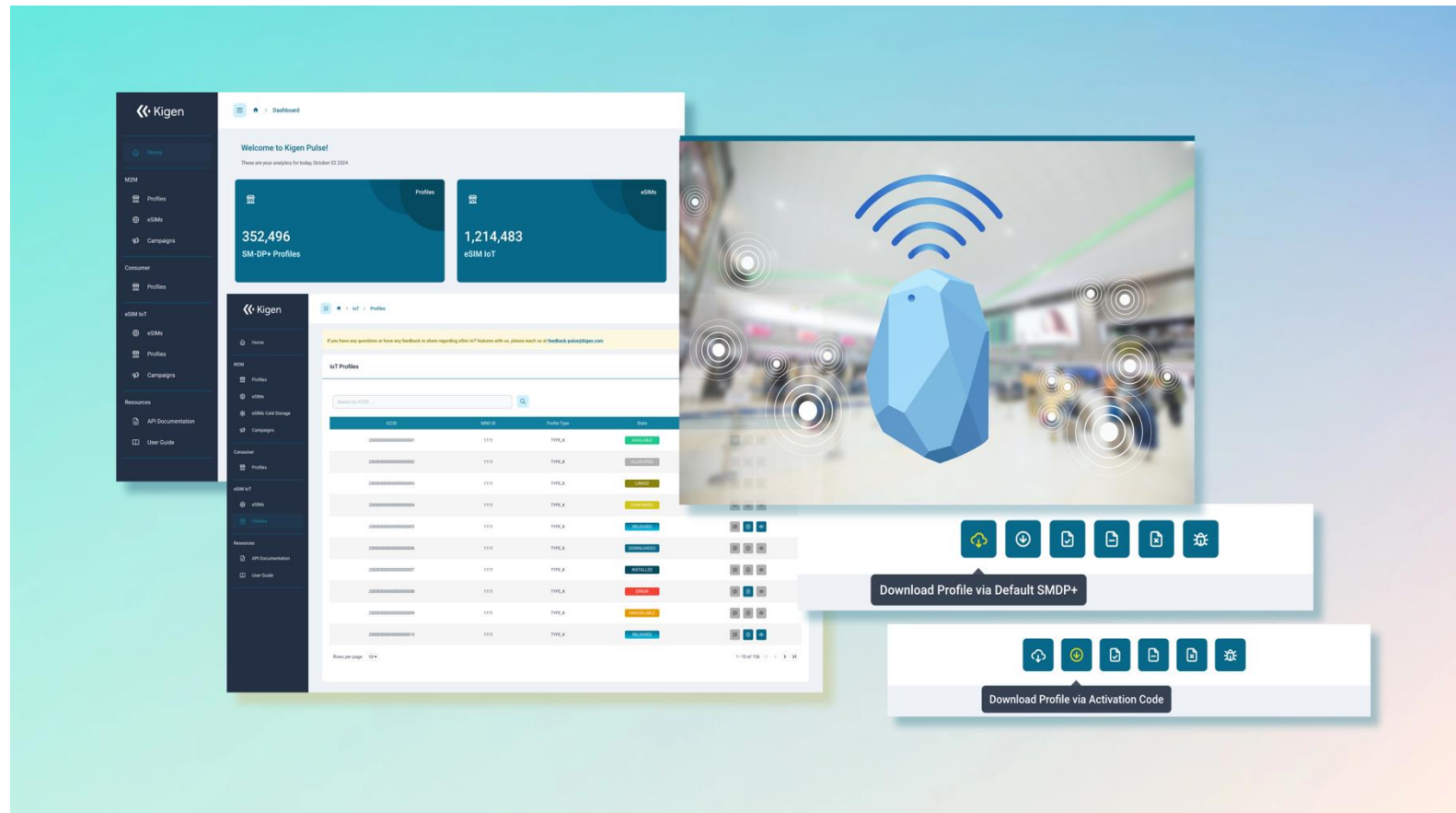
- **Automation** for activation, bulk campaigns, advanced profile operations based on location

- **Configurable** polling to minimize device strain

- **Advanced eUICC operations** to meet demanding field scenarios:

  - Downloads over multiple sessions

  - Package injection

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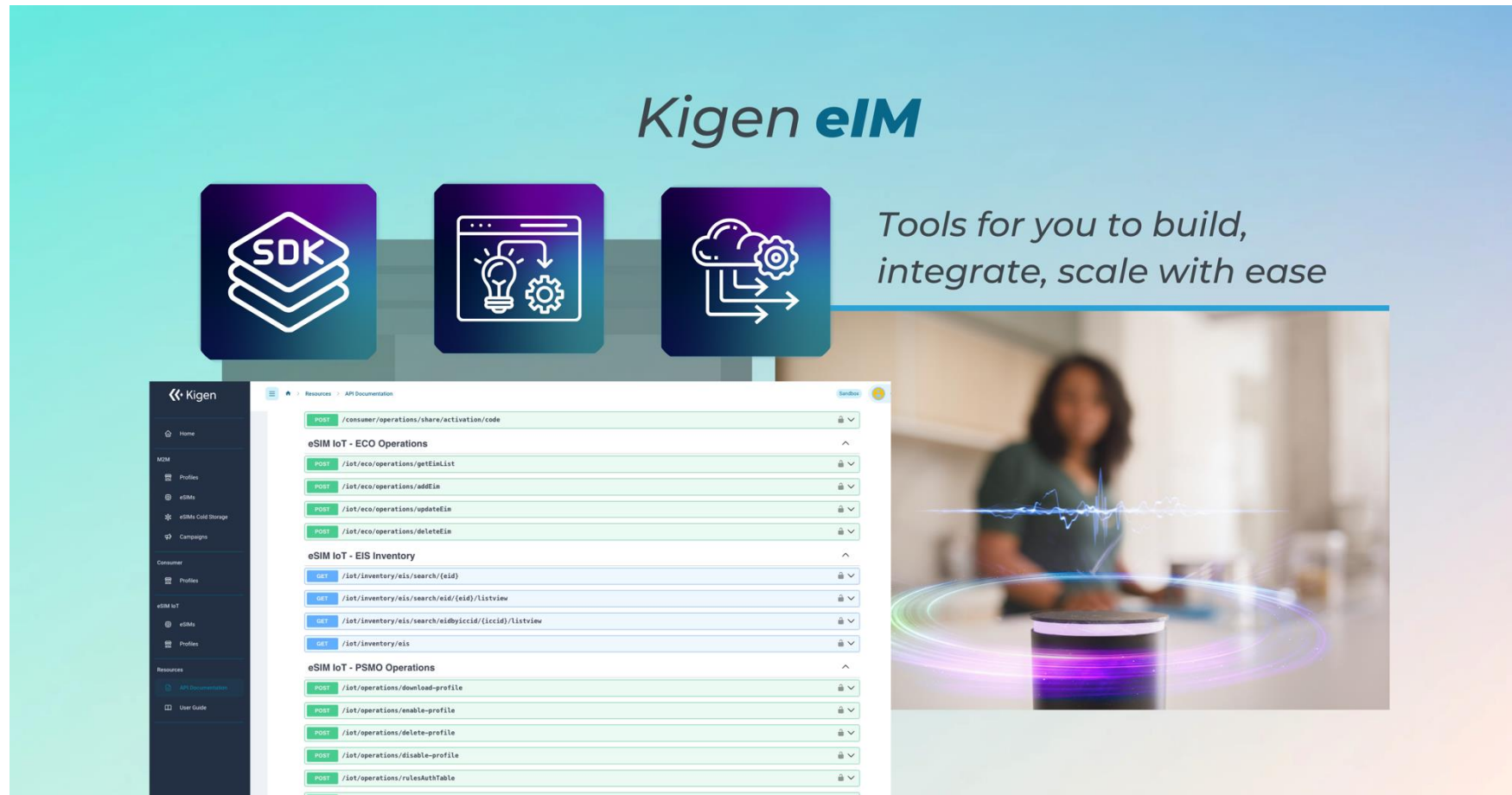
See Kigen eIM in action!

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Kigen eIM and Pulse solution demo

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Kigen Pulse – UI / APIs

Designed for ease of use, and ease of integration as you grow

- Intuitive UX for eIM, inventory management of eUICCs and Profiles and PSMO

- Kigen Pulse is also an API aggregator

- Fully documented OpenAPIs v3.0 with clear documentation on API specs and UI to integrate without overheads

- Ability to scale with any eIM, SM-DP+, or other service from Kigen

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Kigen eSIM for IoT opens the ecosystem to:

❮ **Any Device** featuring a compliant eSIM

❮ **Any Connectivity** profile, no integration required

❮ **Any Network** bearer including NB-IoT and CAT-M

Kigen eSIM Consumer OS - the most compact in the industry and available on leading secure ICs.

Kigen eSIM IoT remote Mager (eIM) - full remote capability to control fleet of IoT devices with even the most network constrained devices.

Kigen IoT Profile Assistants for eUICC and device (IPAe/IPAd) - seamlessly integrate with Kigen OS to provide a robust transport layer for communicating with the eIM.

Kigen IoT RSP (SM-DP+) is SGP.32 compatible and is widely adopted by IoT connectivity providers in various use cases.
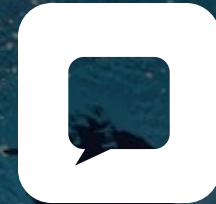
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Over to you for questions

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Use the chat panel for questions

https://kigen.com/contact/

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Thank You
Go raibh maith agaibh
Merci
Dank u wel
谢谢
ありがとう
Diolch
Dziękuję
Tak
감사합니다
धन्यवाद
شكرًا
Paldies

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