THALES
Building a future we can all trust

Revolutionising Smart Metering
with Last Mile, Global Connectivity Solution

Smart metering is changing the way energy utilities are doing business: more accurate energy load balancing, integration of renewable energy sources, transparent consumption and billing. The demand for smart meters has skyrocketed and is expected to grow by more than 8.5 billion USD in just five years[1]. However, to reach this potential, smart meter vendors must take advantage from the latest industry breakthroughs to ensure:

Overcoming Smart Meter Manufacturers Challenges

Global deployments require global solutions

Top smart meter vendors serving multiple countries and roll-outs typically require a multitude of product SKUs*, each with a regional IoT connectivity module and Mobile Network Operator (MNO) specific SIM card requiring complicated manufacturing and logistics.

Low Power Wide Area (LPWA) IoT modules are now capable of providing worldwide connectivity, but **that's only half the battle** of delivering a seamless and global connectivity experience.

A **single connectivity solution** for provisioning service on any cellular network, anywhere in the world can help simplify smart meter design and deployment as well as save time and expense. A solution flexible enough to adapt to traditional and "as-a-service" business models is a crowning achievement.

Success = resilient connectivity + agility

In a context of increasing grid complexity, grid managers require always-on connectivity for complete visibility of energy supply and demand. This is the foundation to ensure grid stability, reliability and safety. Grid managers and utilities rely on smart meter vendors to deliver rugged devices and secure connectivity services that meet demanding service level agreements (SLAs).

A successful solution requires the ability to pivot swiftly and seamlessly, updating service plans and providers as needed to eliminate network disruption and simultaneously ensure security. Remote meter software updates and real-time connectivity monitoring are also becoming a must to lower physical maintenance costs and ensure device uptime.

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[1] **Markets and Markets**, March 2020

* SKU = Stock Keeping Unit

Future-Proof, Global Connectivity from a Single SKU: **A unique solution combining a cellular IoT module and eSIM under one single roof!**

EXS82 – NB-IoT/CAT M/2G
EXS62 – NB-IoT/CAT M
EMS31 – CAT M

TX82 – NB-IoT/CAT M/2G
TX62 – NB-IoT/CAT M
TN23 – NB-IoT

ELS62 – LTE CAT1 Bis/2G

PLS63 – LTE CAT1/3G/2G

Often deployed in remote areas with a serviceable life of a decade or more, smart meters require rugged IoT connectivity solutions specifically designed for longevity, reliability, flexibility, and extreme power efficiency, especially when powered by a battery.

Seem like an impossible challenge? Not for Thales!

Thales is a pioneer in metering applications, delivering market leading IoT modules for more than 25 years. Our comprehensive portfolio of highly efficient Cinterion® 4G LTE Modules, as well as our growing portfolio of 5G, Low Power Wide Area (LPWA) connectivity solutions including LTE-M and NB-IoT are ideally suited to the metering market's stringent requirements.

CINTERION IoT MODULES FOR SMART ENERGY

LTE Cat. 1
4G LTE solutions that meet high performance demands for data concentrators

LTE-M and NB-IoT
LPWAN high efficient 5G connectivity for data only assets and smart meters

The Cinterion IoT Module Difference:

▐ **Built-in security** provides a strong digital identity and embedded credentials in the root of the smart meter, which ensures safe enrolment in any metering or IoT cloud.

▐ **Regional and global solutions** meet all connectivity needs: Thales IoT modules are delivered in both local market and global variants, sharing a common footprint to ensure seamless migration.

▐ **Full Type Approval and global network operator pre-certifications** ensure simplified development and accelerate time to market.

▐ **Embedded eSIMs** eliminate physical eSIM manipulation and simplify design with a global module and eSIM under one single roof. This streamlines logistics, strengthens security and reduces Total Cost of Ownership.

▐ **Extreme power efficiency,** ensured by an advanced power management system, reduces power consumption by up to 70 percent and extends device longevity.

Groundbreaking Cinterion TX62-W IoT Module:

Instant Global Connectivity and IoT eSIM Capabilities in a Single SKU!

The innovative TX62-W Cinterion IoT Module is driving the evolution to 5G, enabling instant, reliable LPWAN connectivity for millions of global smart metering applications. This tiny device offers LTE-M and NB-IoT connectivity (with 2G fallback on TX82-W), an embedded processing and embeds a Cinterion IoT eSIM delivering global connectivity provisioning from one single SKU.

The IoT eSIM leverages **Thales bootstrap connectivity** to provide **instant connectivity** on any global network from the first use of the meter. The system is completely flexible: the Distribution System Operator (DSO) or the meter vendor (in the case of managed connectivity services) then pre-select their preferred connectivity service providers according to personal business rules. Connectivity according to these rules is immediately activated at the time of deployment.

Revolutionising Smart Meter Installation with Autonomous Connectivity Activation
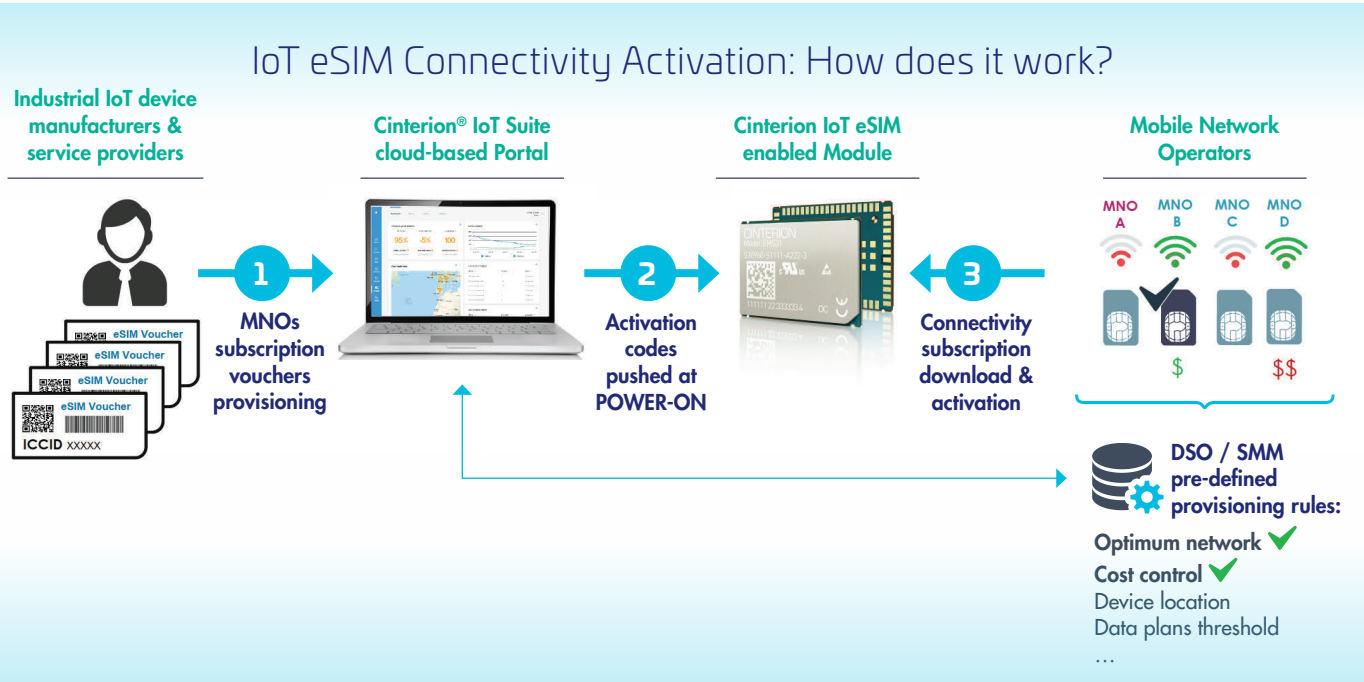
eSIM technology has transformed the consumer device market, allowing users to select mobile carriers or add devices to existing service contracts using WiFi or Bluetooth with just a few simple taps on their home screen.

This doesn't work for smart meters and other industrial IoT devices that operate autonomously without a user interface. IoT devices, such as smart meters, usually lack the very first connection, known as a 'bootstrap', between the meter and cellular network.

The complexities of designing a dedicated industrial IoT eSIM architecture, as well as navigating MNO interconnections, project set-up, and multilateral MNO agreements are extremely time consuming and may perplex even the most experienced smart meter vendors. Thanks to its long eSIM experience and close collaboration with more than 400 MNOs, **Thales makes it easier for you!**

Thales is digitising SIM selection and activation with its groundbreaking Cinterion® IoT eSIM

Embedded in Cinterion modules during manufacture, the powerful solution provides a native Thales bootstrap that **automatically provisions cellular connectivity** with the carrier of your choice based on your pre-defined business rules and criteria including **network signal strength or smart meter location**. The solution also provides remote, agile updates as needed to maintain connectivity and reliability in the field. It is easier to deploy and more future-proof than alternatives based on multi-IMSI or permanent roaming scenarios, which are increasingly unpopular with MNOs.

IoT eSIM Connectivity Activation: How does it work?

Industrial IoT device manufacturers & service providers

eSIM Voucher
eSIM Voucher
eSIM Voucher
eSIM Voucher
ICCID XXXXX

1 MNOs subscription vouchers provisioning

Cinterion® IoT Suite cloud-based Portal

2 Activation codes pushed at POWER-ON

Cinterion IoT eSIM enabled Module

3 Connectivity subscription download & activation

Mobile Network Operators

MNO A   MNO B   MNO C   MNO D

DSO / SMM pre-defined provisioning rules:

Optimum network ✔
Cost control ✔
Device location
Data plans threshold
…

The Cinterion IoT eSIM helps smart meter vendors improve their overall return on investment:

Simplified manufacturing and logistics via a unique meter design and global connectivity solution that eliminates the need for multiple SKUs. The Thales solution manages the embedded eSIM at any point in the meter lifecycle: from manufacture, deployment, installation, in-field operations to end of life.

Faster installation time
The IoT eSIM autonomously selects the cellular network with the best coverage at the point of installation and throughout the lifespan of the device.

Maximised device uptime maintains business continuity by automatically switching to back-up providers as needed in order to avoid network grey zones. Smart grid managers can simply change cellular subscriptions without sending technicians to the field.

Enhanced security and trust are inherent to Cinterion IoT eSIMs, which provide a secure, tamper-resistant environment.

Protecting Metering Assets with Cloud-Based Lifecycle Management

Smart meter vendors deploy huge fleets of devices in remote locations all across the world. The success of deployments depends on maintaining strict SLAs, which involves keeping device software and security up to date.

A central component of our Smart Metering offer is the **Cinterion® IoT Suite**, a powerful device lifecycle management platform that monitors metering assets to push planned updates and diagnose connectivity issues, providing early notification which ultimately prevents downtime. Signed, secure software and security upgrades take place over-the-air, at scale, to avoid costly service visits in the field.

The Cinterion IoT Suite provides:

Software Updates for smart meters in an extremely efficient and secure way, for any fleet size, in any location. The Cinterion firmware repository and tools enable automated update campaign execution. The system is designed to ensure that no malicious software is downloaded, by leveraging digital signatures and strong mutual authentication techniques.

Device Performance tools monitoring IoT device connectivity and application performance to detect behavior anomalies in real-time. The campaign-planning tool easily executes appropriate corrective actions, such as device reconfiguration.

Connectivity Activation tools that enable remote connectivity subscription provisioning based on customers' pre-defined business rules and criteria. The platform ensures simplified activation at the first use of the meter as well as seamless connectivity lifecycle management. For example, a switch to a preferred data plan or connectivity provider can be executed remotely and automatically, when pre-defined thresholds have been reached.

Trusted Identity for smart meters to secure the complete data-to-cloud journey for the lifespan of devices. The platform remotely activates the digital IDs, which are embedded in IoT modules during manufacture, and manages automated, secure cloud interworking. The solution leverages the Thales **Trusted Key Manager for Smart Energy**, for security updates and end-to-end protection of the grid.

Highly efficient FOTA strategy – Our breakthrough incremental firmware over-the-air (FOTA) solution decreases update file size by 95% compared to competing LPWA solutions, reducing transmission time, power draw, and data usage while preserving smart metering investments.

Thales Solutions for Metering Connectivity:

laying the foundation for resilience, efficiency and security

By combining highly efficient Cinterion IoT Modules with breakthrough IoT eSIMs "under one roof," together with agile lifecycle management tools, Thales greatly simplifies the way smart meter vendors design, deploy and manage global deployments. The comprehensive solution lowers Total Cost of Ownership for all stakeholders, from the beginning of design and manufacturing through managing widely distributed assets in the field for years to come.

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