gemalto
security to be free

Connect. Secure. Monetize.™

Gemalto's Three Pillars to Support Your Success in Industrial IoT

Industrial IoT: the fourth industrial revolution

The Industrial Internet of Things (IIoT) has started to dramatically change the industrial landscape, transforming organizations around the world, opening up exciting new business opportunities and blazing a trail for economic growth.

We are on the cusp of the 'fourth industrial revolution', which Professor Klaus Schwab, Executive Chairman of the World Economic Forum, says is "characterized by a range of new technologies that are fusing the physical, digital and biological worlds, impacting all disciplines, economies and industries."

IIoT will create a revolutionary new way of working and living, powered by a multitude of connected machines and devices, sharing data and turning it into business intelligence.

Gemalto is the go-to partner to help mine these exciting opportunities. As a global expert in machine-to-machine communications, with 20 plus years' experience in the field, we have developed an extensive portfolio of solutions, services and platforms to build trust in this truly connected world.

By reading this book, you will find out more about how IIoT is transforming your world and how Gemalto is acting as a key enabler for this exciting, new industrial ecosystem.
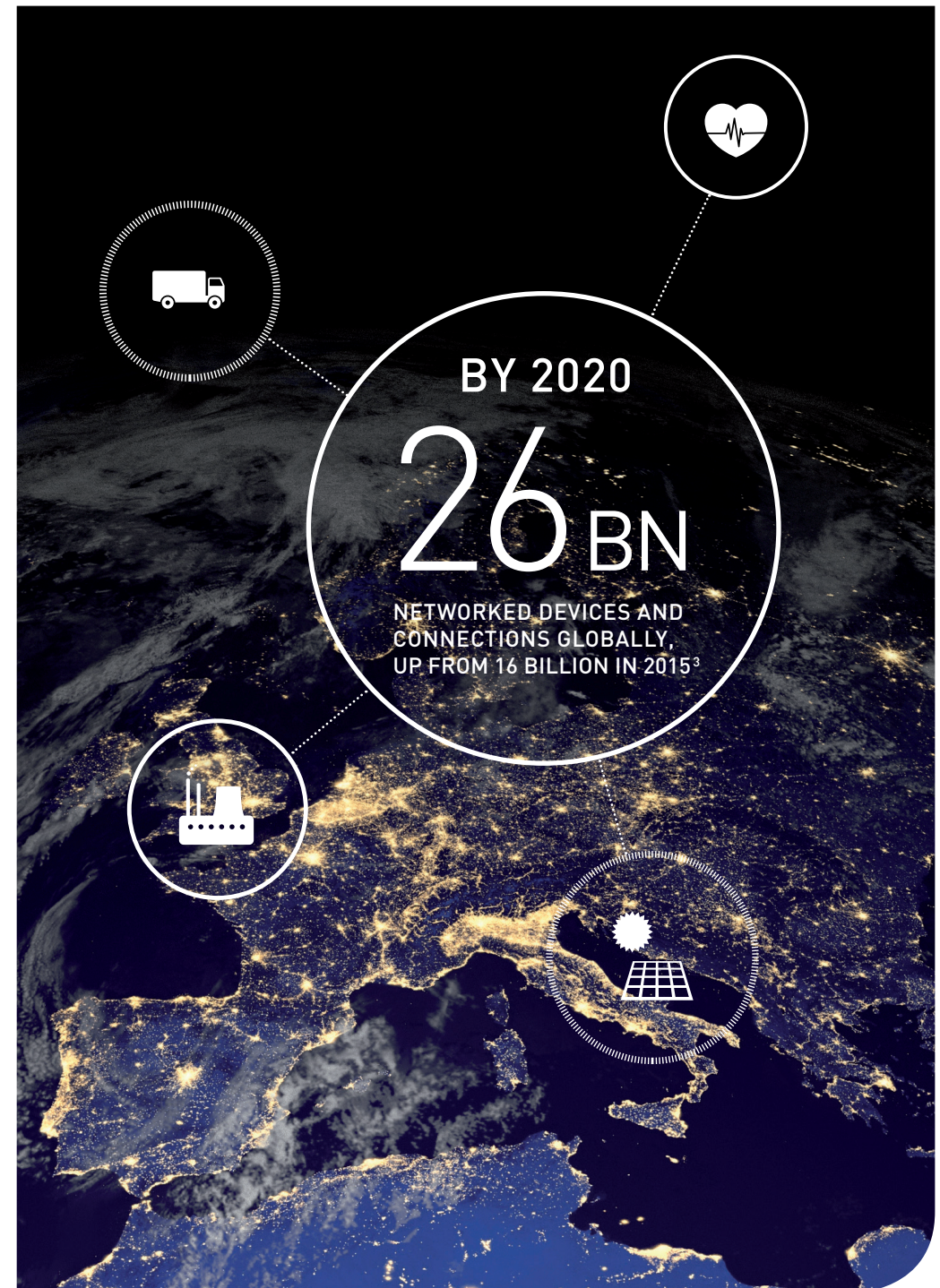
IF POLICY MAKERS AND BUSINESSES GET IT RIGHT, LINKING THE PHYSICAL AND DIGITAL WORLDS COULD GENERATE UP TO

$11 TN

A YEAR IN ECONOMIC VALUE BY 2025[1]

1 TN SENSORS

CONNECTED TO THE INTERNET BY 2025[2]

BY 2020

26 BN

NETWORKED DEVICES AND CONNECTIONS GLOBALLY, UP FROM 16 BILLION IN 2015[3]

IIoT: opportunities and hurdles

The potential for IIoT is staggering. Over the next 15 years, IIoT could add as much as $14 trillion to 20 of the world's major economies.[4]

Machine-to-machine, commonly known as M2M, has come a long way. A decade or so ago, it provided basic machine-to-machine communications. It is now often referred to in the industry as the 'plumbing system' for IoT, providing the connectivity for a multitude of machines and infrastructures that makes IoT happen.

IoT and 'smart devices' will revolutionize human-machine interaction and the way machines talk to one another. Energy, healthcare, automotive, agriculture, transportation, supply chain logistics, green practices and manufacturing are among the sectors already exploring the capabilities of IIoT.

But, IIoT does not come without its challenges. Embracing IIoT requires a new way of thinking about how industrial systems are designed and used.

Industrial applications have very specific requirements compared to consumer applications. Often, devices are in the field unattended for many years and exposed to extreme environmental conditions. These devices need to be very reliable and scalable 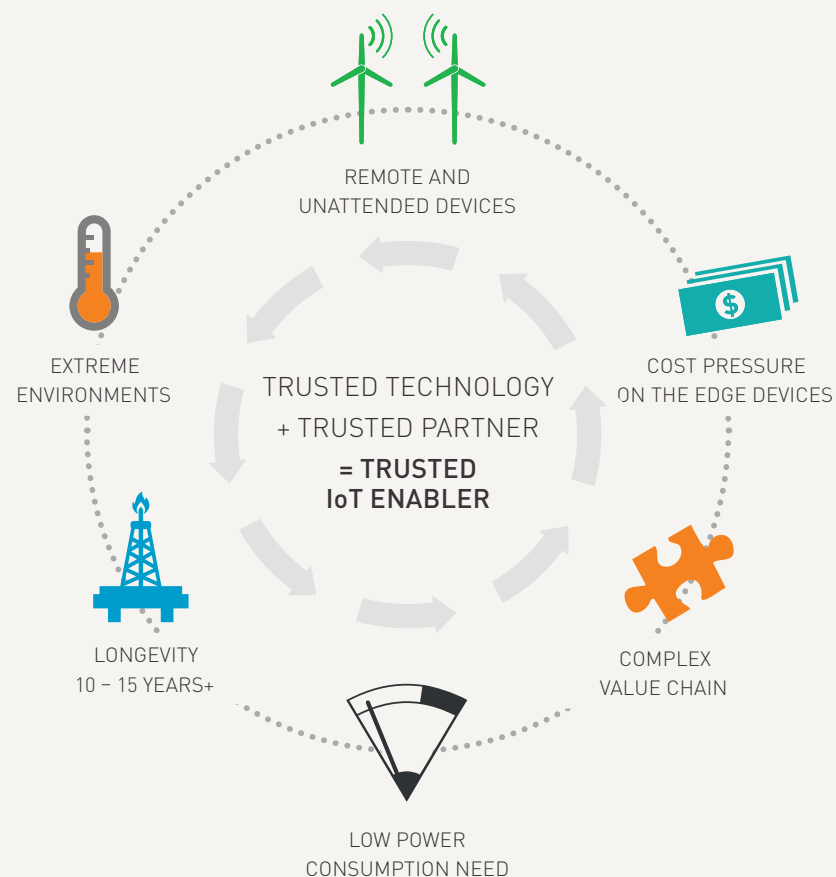– and backed up by robust connectivity. Forward and backward device compatibility is essential for applications to adapt to changing environments, allowing for updates over their long lifecycle.

An adaptable security infrastructure is also paramount as systems can be built on hundreds of thousands of sensor nodes, hugely increasing the attack surface and scope of cyber threats and data breaches.

At the same time, companies need to retain their agility in an increasingly competitive playing field. This can be done through software monetization platforms allowing for updates, upgrades and the flexible deployment of innovative business models providing excellent return on investment.

Above all else, strong partnerships with experienced players in the IIoT ecosystem are essential for organizations to successfully connect industrial devices and use advanced analytics and intelligent decision-making to harness the power and potential of a 24/7 connected world.

KEY REQUIREMENTS ARE NEEDED TO ENABLE INDUSTRIAL IoT

REMOTE AND UNATTENDED DEVICES

COST PRESSURE ON THE EDGE DEVICES

TRUSTED TECHNOLOGY + TRUSTED PARTNER = TRUSTED IoT ENABLER

EXTREME ENVIRONMENTS

COMPLEX VALUE CHAIN

LONGEVITY 10 – 15 YEARS+

LOW POWER CONSUMPTION NEED

Trust is key to the success of IIoT

Gemalto takes a 360 degree approach by providing the essential building blocks that are required to create a robust IIoT ecosystem. By bringing a circle of trust to IIoT, Gemalto helps companies focus on 'trusted connectivity', 'solid security' and a 'valuable monetization platform'– all prerequisites of a productive and rewarding IIoT roadmap.

We are with you every step of the way...

We are an established global company, operating extensively at local level. Whatever your company size – from an aggressive start-up to a global enterprise – we are here to help you. From connectivity and security consulting to IoT infrastructure recommendations, support, training and beyond. Our solutions are easily scalable, with Over-The-Air updates allowing you to grow at your own pace.

Many sectors rapidly benefit from IIoT:

> **Smart energy:** 800 million smart meters will be installed globally by 2020. China is expected to drive penetration to almost 70% by 2022.[5]

> **Automotive:** There will be 10 million driverless cars on the roads by 2020.[6]

> **Healthcare:** The installed base of healthcare IoT devices, which provide real-time diagnostic information to enable doctors to track patients' progress will grow from 95 million in 2015 to 646 million in 2020, representing a 46% CAGR.[7]

> **Transportation:** Volvo has already taken part in a truck platooning challenge, where autonomous trucks driven in convoy, connected wirelessly, with the lead truck determining speed and route, drove across Europe. Changes in European transportation legislation will open up the highways to 'platooning'.

GEMALTO BRINGS A CIRCLE OF TRUST TO INDUSTRIAL IoT
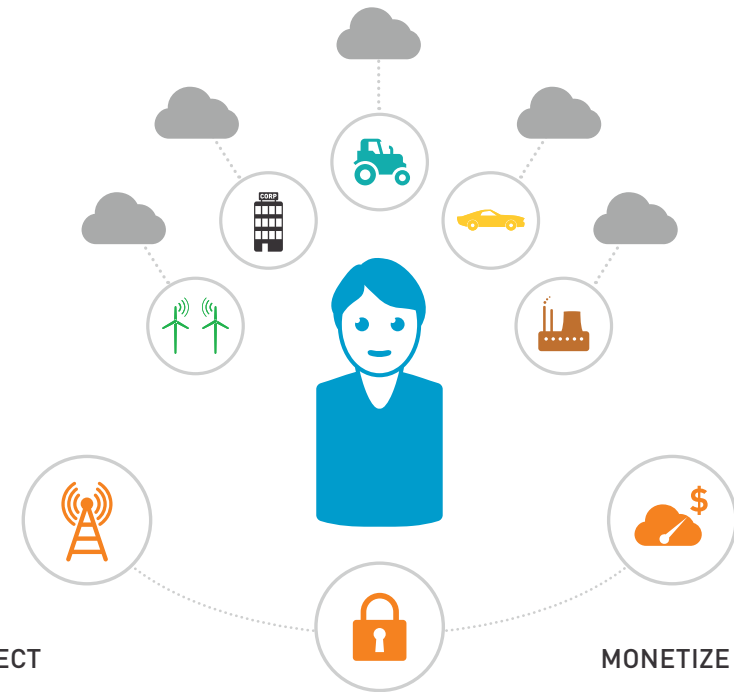
CONNECT

Out-of-the-box connectivity

Multiple form factors

Easy technology migration

Quality of Service

Subscription Management

SECURE

Secure the device

Secure the data

Secure the cloud

Secure the network

Security Audit and lifecycle management

MONETIZE

Flexible revenue models

Licensing and entitlement software

IoT application development

OTA upgrades

Opening the trusted box of connectivity

Sensors and other ´tracking´ devices provide vital data needed to feed analytical engines to improve efficiency and productivity. Maintaining trusted and robust connections is key.

This can become challenging for monitoring applications with a variety of profiles: some that require high or low bandwidth, extra low latency or those deployed in remote locations with extreme heat, dust and moisture exposure.

To get the very best performance out of IIoT, companies need to move away from consumer-grade platforms and adopt robust industrial grade solutions able to answer all of the challenges of an industrial environment. Deployed applications need to provide reliable, secure and future-proof connectivity with long-run uninterrupted services.

To achieve this, Gemalto offers a comprehensive portfolio of ruggedized modules and terminals, backward and forward compatible footprints for easy migration to new technologies such as LTE, simplified network subscription management and quality of service platforms for effective remote lifecycle management. This comes with the experienced assistance and back up of Gemalto's global technology consulting services and engineering support.

Gemalto ticks ALL the boxes for trusted connectivity:

> Reliable connectivity, ensuring business continuity

> Global technology coverage / local optimization capabilities

> Stable form factors and footprints for investment protection

> Backwards and forwards compatibility to ensure smooth migrations

> Bespoke optimization for IIoT

> Provision of a number of industrial interfaces and embedded systems

Getting "things" connected

Connectivity is the very backbone of IIoT. At Gemalto, we provide global end-to-end solutions to ensure robust, secure, uninterrupted connections.

We can address customer requirements in all configurations – 2G, 3G, 4G LTE Advanced or IoT-optimized LTE radio technology (LTE Cat 1, Cat M, NB-IoT), designed with IoT in mind to focus on low power, low bandwidth, long battery life and indoor coverage.

We work with all the 450 major carriers, including AT&T, Vodafone and Verizon, as well as regulatory authorities to get prior approvals on our products and solutions. Our customers win valuable time to market as we take care of all the testing processes. They can be safe in the knowledge that our products are compliant in the deployed region.

Take a deeper dive into what Gemalto offers to secure customers´ IIoT deployment success:

Gemalto enables always-on cellular communications

Our broad portfolio of **Cinterion® Modules and Terminals** enable always-on cellular communications for virtually any IoT or M2M application. Their rugged design, unparalleled engineering and manufacturing standards make them reliable in the most extreme environments and over the long life of IIoT solutions.

Gemalto ensures SIM-cards are optimized for the most challenging industrial environments

Often standard components just don't work. To meet the needs for an M2M SIM card that is ruggedized for long life and extreme conditions, we developed the **Cinterion Machine Identification Module (MIM™)** to enable secure cellular M2M connections.

Gemalto helps monitor IoT application connectivity performance in real-time

To ensure that our customers get the very best in IoT quality of service (QoS), we offer high-level connectivity monitoring platforms. Gemalto **MIM Services Platform** enables regular MIM audits and hardware monitoring to ensure peak performance for deployed devices throughout their lifespan. The Gemalto **Module Services** offer a set of tools to proactively update and manage deployed applications and firmware on Cinterion modules. For comprehensive application monitoring, our **Quality of Services for IoT** platform monitors the cellular QoS of smart objects in real time, ensuring both device and network instant status and analysis, for the most reliable connectivity.
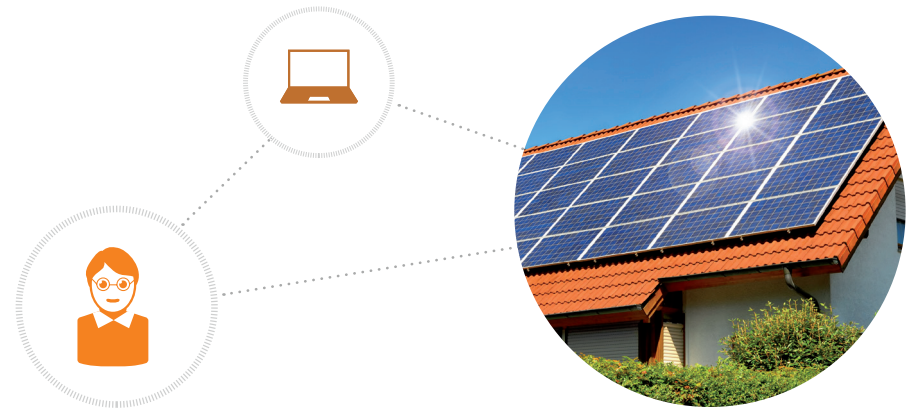
Gemalto provides flexible device connectivity subscription anytime anywhere

Our **On-Demand Connectivity (ODC)** platform simplifies connectivity deployment and provides a way to securely manage mobile subscriptions for the entire lifecycle of industrial devices, delivering a totally seamless customer experience.

The ODC offer is based on the implementation of an **eUICC**, also referred to as eSIM, in the device, which allows for remote network connectivity activation.

We provide instant connectivity on the very first use of a device. This means manufactured products can remain generic until they reach the hands of end-users or solution providers, solving the supply chain headache of multiple product variants and multiple profiles for multiple usage locations.

Over-The-Air (OTA) provisioning activates connectivity on devices at any time and in any location for companies to choose and alter subscriptions based on their own preferences. This is important as the lifecycle of an industrial device may be over 10 years.

Securing the IIoT ecosystem

With billions of devices connecting to IIoT, offering interconnected services, the possibility of vulnerabilities increases dramatically. A proven and robust approach to security is required to create a trusted and reliable ecosystem to protect devices and data.

A water utility's control system was hacked and the levels of chemicals used to treat tap water were altered. The hackers compromised the company's computers by exploiting a vulnerability in the web-accessible payments system, using it to get into the company's web server. The hackers also gained access to the personal records of over 2.5 million customers. Due to the sensitive nature of the hack the company's real name or location have not been disclosed.[8]

A cyberattack on an unnamed blast furnace at a German steel mill caused "massive damage". The hackers used a 'spear phishing' campaign to dupe employees, gaining access to logins to get into the steel mill's control systems. The hackers stopped part of the furnace closing down as normal, causing untold destruction.[9]

Our security solutions and services help all stakeholders in the community build a secure infrastructure by providing and implementing technologies to address potential threats. Our offerings secure the complete ecosystem through the entire lifecycle of devices – making sure the data is secure at rest or in motion, in the network or in the cloud.

All industries are vulnerable

Recently, the Israel National Electricity Authority was hacked and systems were infected with ransomware. Soon after, the Gundremmingen nuclear plant in Germany was found to be infected with computer viruses. The results could have been catastrophic if they had not been isolated.

The truth is all industries are open to hack attacks against critical infrastructures, instigated to steal data and alter industrial control systems (ICSs) to shut down operations, or alter them to cause maximum damage.

As energy, transportation, agriculture, manufacturing, automotive and heavy plant industries become more reliant on IIoT, they will become increasingly vulnerable to cyber attacks. All it takes is one open door and the whole ecosystem can be affected in seconds.

Security by design should be a given

One of the biggest challenges of IIoT is that security has often been an afterthought in product development for devices, many of which have never been connected to the internet before. The increase in the number of devices connected and the amount of data in motion and at rest inevitably increase vulnerability to malicious attacks.

Security by design is imperative to address the major security concerns associated with IIoT. An emphasis on building security into products from the ground up ensures devices are shielded from attacks as much as possible, from the core to the edge of applications.

"The IoT redefines security by expanding the scope of responsibility into new platforms, services and directions. Moving forward, enterprises should consider reshaping IT or cybersecurity strategies to incorporate known digital business goals and seek participation in digital business strategy and planning."

**Ganesh Ramamoorthy,
Research Vice President at Gartner**

Security lifecycle: managing the threat

IIoT brings with it more complexity: networks are getting bigger, more powerful and more distributed. To make sure enterprises and people can trust in our increasingly connected world, Gemalto delivers solutions, services and platforms that protect IoT applications from the edge to the core.

Lifecycle management starts at the product design and development stage and runs through to device activation, maintenance, upgrades and beyond. Any vulnerabilities can mean delays, system failures or data leakages, leading to lost business. To build a root of trust in lifecycle management we help device manufacturers, service providers and Mobile Network Operators deal with security challenges head on:

Gemalto secures the device

Gemalto offers a complete portfolio of software and hardware solutions enabling truly secure connectivity.

Gemalto IP Protection solutions protects the intellectual property (IP) of embedded software applications and data files, preventing reverse engineering or tampering.

The **Cinterion® Secure Element**, a tamper resistant hardware component embedded in devices, delivers smart card level digital security, ensuring strong device authentication. It allows advanced protection of automotive and industrial IoT applications.

Both tamper-resistant environments offered by our **M2M-optimized SIM (MIM)** and **eUICC** also represent a strong authentication token for cellular applications, whereas our **Trusted Key Manager** provides credential management for other non-cellular networks, including LPWAN.

Gemalto secures the cloud

Our portfolio of solutions for data encryption and cloud security, including **SafeNet Data-at Rest and Data-in-Motion**, enable cloud service providers and enterprises to secure their cloud assets and sensitive data at all critical points of their lifecycle.
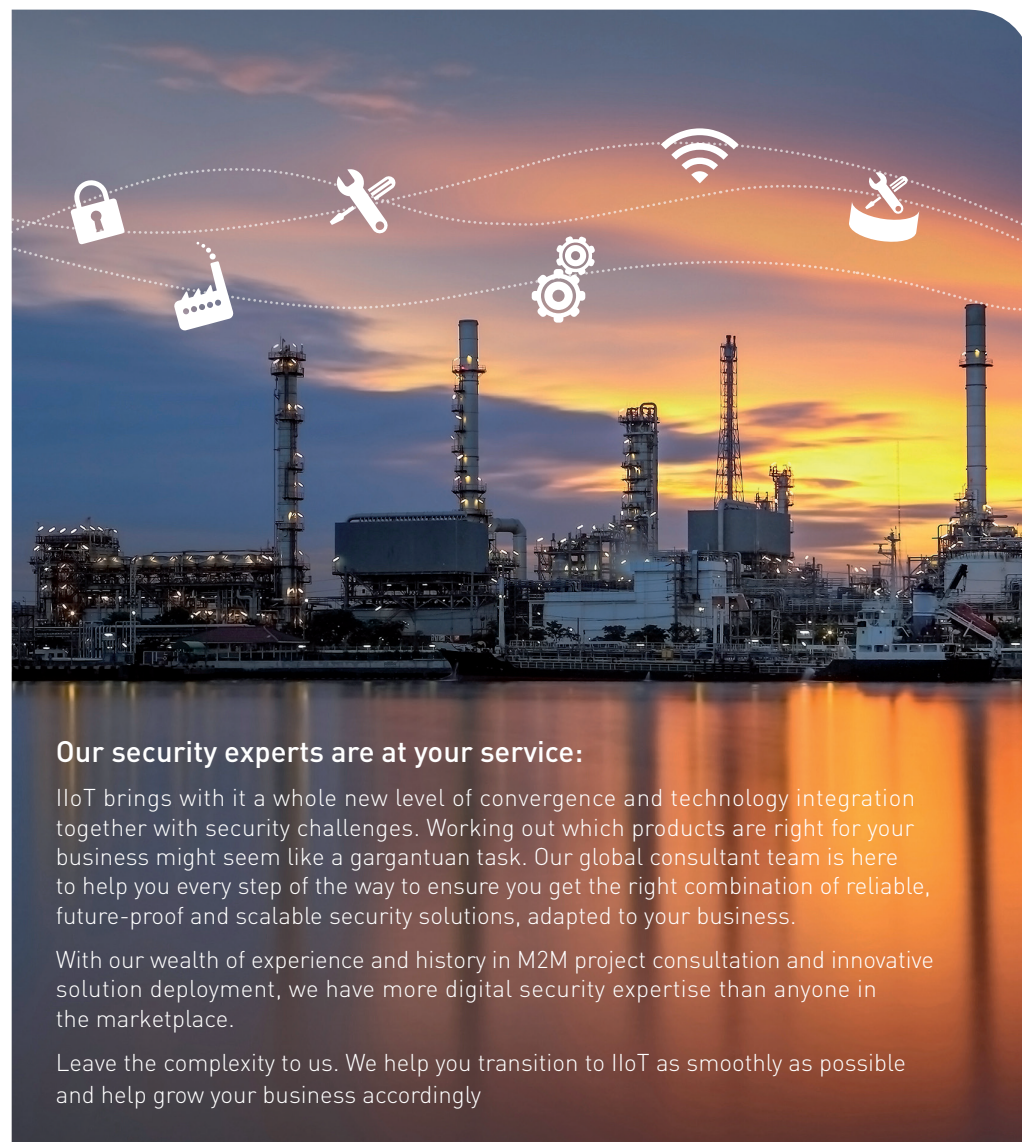
Our security experts are at your service:

IIoT brings with it a whole new level of convergence and technology integration together with security challenges. Working out which products are right for your business might seem like a gargantuan task. Our global consultant team is here to help you every step of the way to ensure you get the right combination of reliable, future-proof and scalable security solutions, adapted to your business.

With our wealth of experience and history in M2M project consultation and innovative solution deployment, we have more digital security expertise than anyone in the marketplace.

Leave the complexity to us. We help you transition to IIoT as smoothly as possible and help grow your business accordingly

Gemalto secures lifecycle management

We provide robust and remote solutions to create a sustainable security lifecycle management infrastructure. Through our **Trusted Service Hub**, we manage the distribution of credentials towards various types of devices already in the field, for complex ecosystems involving many stakeholders. Our Safenet's **code signing** security solutions are also a building block of device trust, ensuring only software from legitimate providers may run on the device.

The foundation for your monetization strategy

Streaming data from billions of devices will provide a huge insight into markets for those willing to take the time to mine it. These new insights form the basis of new business models and revenue streams.
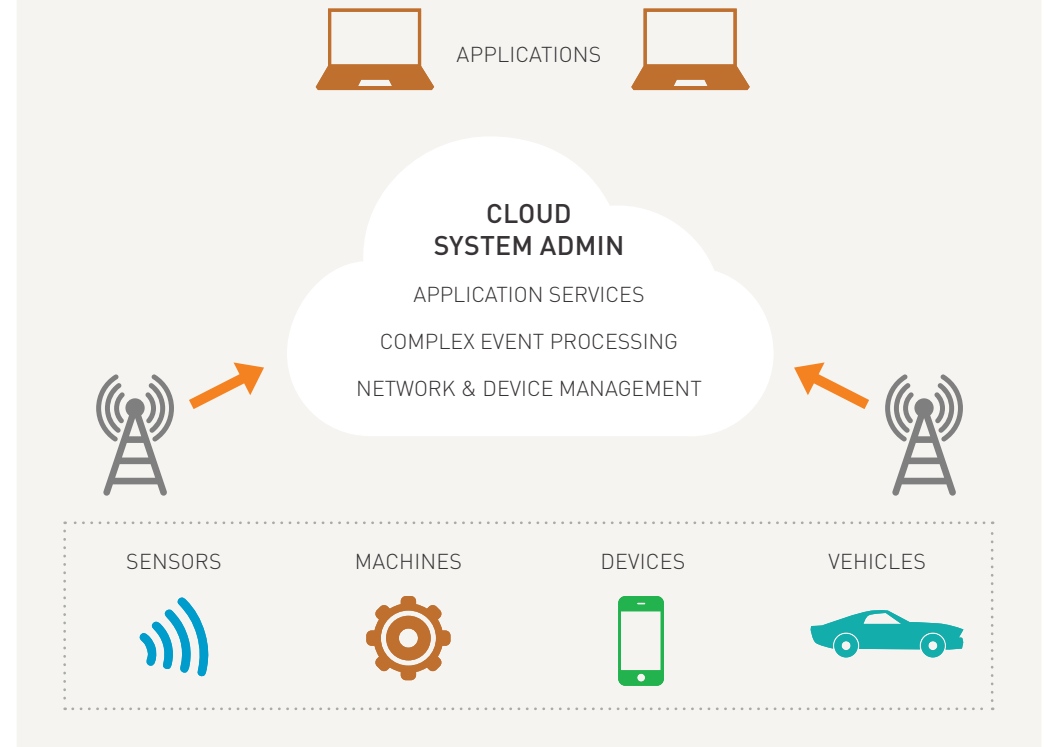
An established and well-thought out monetization program helps business adapt to transformative markets and stay ahead of the curve.

Gemalto can provide you with real insight into your data through our monetization solutions. We can help you to effectively monetize your IoT applications through deployments of new services, pay-per-use models and all recurring revenues which create a relationship with the customer long after they have actually purchased a product.

Build and roll out IIoT applications easier and faster

Our **IoT application enablement platform** helps you to bring new cloud-based capabilities and features to devices already in the field, using proven application building blocks, shortening your development time and cost, and ensuring you remain competitive in the long term.

IOT APPLICATION ENABLEMENT PLATFORM

APPLICATIONS

CLOUD
SYSTEM ADMIN

APPLICATION SERVICES

COMPLEX EVENT PROCESSING

NETWORK & DEVICE MANAGEMENT

SENSORS   MACHINES   DEVICES   VEHICLES

In tune with this new agile way of thinking, it provides flexibility and scalability aligned with business requirements, no matter which network or devices you are using. You can design, create and manage applications simply by using pre-built services and tools. This way, you can develop and roll out revenue-gathering applications quickly, without getting bogged down in complexity and risks involved in developing IIoT applications from the bottom up.

The platform also allows you to combine real-time device data with contextual information from cloud applications and enterprise systems, to create actionable business intelligence generating new revenue.

9

Software – the road to monetization

Software monetization utilizes different strategies to optimize profitability on software running on any platform: device, desktop, cloud or platform as a service. These strategies can range from IP protection modes to innovative pricing and packaging options meant to align with your customer expectations.

By proactively implementing a software monetization strategy you can adjust pricing models with business goals, maximize the value of features and functions in your device, and maintain control over your intellectual property.

SOFTWARE MONETIZATION
PRODUCT DIFFERENTIATION BASED ON SOFTWARE FEATURES

Advanced customized services for better end-user experience

Agility to remain competitive

Usage based self-service (pay-per-use)

Quick time to market

Easy device upgrade

Easier manufacturing and pricing

Gemalto protects Intellectual Property and help track product usage

Our solutions help **protect your IP** and trade secrets from competitive theft and reverse engineering. This helps prevent counterfeiting in high piracy markets and ensures brand protection.
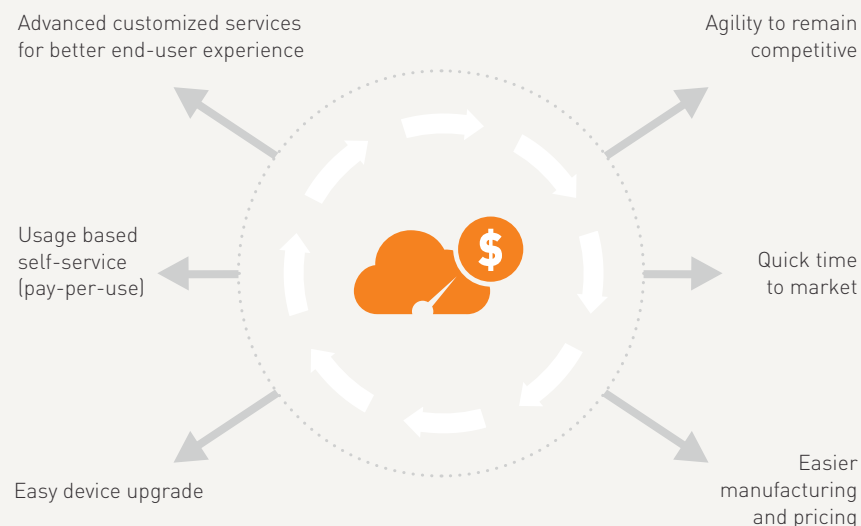
Gemalto helps improve customer experience and create new pricing models

Allowing users to activate software functionality via self service portals and view their software license consumption provides greater transparency improving customer experience.

Being able to implement perpetual subscription and **usage based pricing** from the same code base allows streamlined development processes, and flexibility in pricing models, appealing to a broader addressable market.

Gemalto delivers intuitive end-user license and entitlement self-services capabilities

Our web-based **entitlement management solution** gives software vendors and device manufacturers the ability to activate and provision cloud, on-premise and embedded software applications from a single platform. They can carry out a variety of tasks on a self-service portal, improving overall satisfaction. Gaining full visibility into software license activation and **feature usage** allow our customers

to understand customer behavior, feature valuation and plan future roadmaps more effectively.

We are here to help you every step of the way in your monetization journey. Deploying a winning software monetization platform backed by expert consultation, trainings and workshops, customer portals, electronic software delivery could not be easier.

"All of a sudden you can program the world... If there is something to be done in the world, you must be able to do it by writing software".

Marc Andreessen, Co-founder venture capital firm Andreessen Horowitz

Gemalto – a partner of choice

In an increasingly connected industrial world, Gemalto is leading the way. We've been innovating in IIoT for twenty years. We are proud that we develop and own our technologies and make a considerable annual investment in R&D.

Gemalto thinks and acts globally. We have a worldwide presence, but know the importance of local support. We serve a host of industries and have an extensive network of distributors and partners in diverse locations.

We employ 14,000 people from 117 different nationalities. We serve customers in 180 countries, meeting industries' demands for mobile connectivity, security and monetization. We do far more than keep the lights on, we help industries maximize potential and beyond. Their vision is our goal.

Gemalto offers a Circle of Trust for the IIoT with a 360° portfolio of hardware and software solutions systems and services designed to ensure you reach every objective on your roadmap.

Connect. Secure. Monetize.™ Uncover the untapped potential of industrial IoT in your business with Gemalto.

2BN+ END USERS BENEFIT FROM OUR SOLUTIONS

15K+ EMPLOYEES

48 COUNTRY LOCATIONS

€3.1BN 2016 REVENUE

94 TOTAL PATENTS FILED IN 2016

For more information, please visit **gemalto.com/iot,**
or follow **@GemaltoIoT** on twitter

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