WHITE PAPER

Industry 4.0:
Why IoT is key to Smart Manufacturing

One of the keys to success in Industry 4.0 is adding IoT connectivity to machinery. With connected machines in the production environment, industrial enterprises are able to integrate diverse data sets into business practices and secure systems for the entire lifespan of a machine.

Connected machines used in factories, refineries and all manner of industrial environments provide the tools to streamline operations, optimise productivity and improve ROI. Here's an overview of some of the benefits of connected machinery, and how Telenor Connexion works with industrial machine manufacturers to integrate IoT technologies.

telenor | connexion

Connecting things. It's all about people.

Succeeding in Industry 4.0 requires more than just technology

The opportunities and challenges presented by Industry 4.0 for industries like manufacturing, energy, gas and oil, and construction are many and varied. Before adopting IoT, it's important that enterprises understand the underlying opportunities and key challenges that exist.

In the industrial sector, IoT adoption can result in greater optimization of business workflows and processes, enhanced safety, improved research and development, and the creation of new revenue streams.

Telenor Connexion is dedicated to helping its customers identify the business value of connectivity and showcasing how IoT can be used by enterprises to create solutions that solve problems and unlock new revenue streams.

For industrial machine manufacturers, that means reduced machine downtime, increased safety, increased quality control, a data-driven supply chain, improved inventory, and much more.

Manufacturers are focused on digitalization in four areas

Connected Products

New Services

Connected Production

Supply Chain

IoT-enabled smart manufacturing provides full visibility of assets, processes, resources, and products. This, in turn, supports streamlined business operations, optimised productivity and improved ROI. The key to success is connecting equipment, integrating diverse industrial data, and securing industrial systems for the entire lifespan of equipment.

Connected products

Connectivity allows a manufacturer to not only improve and automate production, but expand their offerings with services that connect directly with customers.

The connected product value chain

The Manufacturer
- Cost savings
- Efficiency gains
- Insights on product utilization
- New service offerings
- Improved customer experience

The Dealer/Service Provider
- Remote troubleshooting
- Efficient utilization of technicians
- New or extended service offerings

The End Customer
- Less downtime
- Lower service costs
- Tools for automation

Connected machines create links in the digital value chain

With connectivity, machine performance can be optimized through its entire lifecycle with over-the-air (OTA) firmware. This increases efficiency and reduces costs for the manufacturer. Two-way data communication also allows the machine manufacturer to collect data for R&D. This data can be used to identify emerging trends about user behaviour, to refine existing services and eventually create new ones.

Machine service processes can be streamlined with a connected product. If a problem occurs, the machine can send an alarm to the owner/operator and service providers.

With a connected offering, the manufacturer can tighten the bonds with their dealer and service ecosystem. This makes the manufacturer more appealing to work with, while providing a more consistent customer experience.

Alert!
Change air filter

Notification
Update available

What does an IoT solution look like?

An IoT solution can offer a wide range of possibilities for businesses, from a connected device that reports end-user behaviour to solutions that allow vehicles and machinery to operate autonomously. Telenor Connexion, and its partner ecoystem, provide everything you need to get going quickly and leverage the full power of connected products - from launch and integration to optimization.

The thing
This can be anything – an old product or new. Many things are already hard at work in the field and collecting data, but they can't connect to the cloud.

The connectivity hardware
Our partners can help you add connectivity and computing capabilities to the thing, ensuring you a reliable IoT solution that will work at an international scale.

The connectivity
The thing can connect to our secure global IoT network from any market in the world using our Global IoT Connectivity – which is backed up by 24-7 expert support.

The platform
This is where everything comes together – Managed IoT Cloud securely collects and stores the data from your connected devices and gives you the tools to manage your devices .

The application
With Managed IoT Cloud, you can use our standard dashboards and apps to visualize and track data, or easily build your own applications with our developer-friendly APIs.

The customer value
The value of connectivity is delivering better products, services and experiences to your customers. With a solution built to last, you can make IoT part of your success story.

CONNECT & CAPTURE | STORE & PROCESS | PRESENT

Why mobile IoT connectivity makes sense for manufacturers

Choosing the right connectivity technology is one of the critical decisions that a manufacturer needs to make when designing a connected product.

Though production machinery might be static and installed indoors, mobile connectivity is still the right choice for many manufacturers. Using a mobile SIM card-based solution allows the manufacturer to avoid the problems of connecting to the end-customer's local network using Wi-Fi or other radio technologies.

No matter where the machine is first deployed (or where it ends up) mobile networks offer a highly-available and reliable source of connectivity. With quality of service guaranteed by service level agreements (SLAs) from the connectivity provider, a manufacturer can confidently offer their customers services such as secured product uptime.

Why mobile IoT?

- ✔ Established global networks & standards
- ✔ High data rate
- ✔ Quality of service backup up by SLAs
- ✔ Future-proof for long term deployments
- ✔ Scalable and flexible

Global IoT made easy

When we ask manufacturers what they need from their IoT solution, fast deployment, global scalability and rapid return-on-investment are always high on the list. Telenor Connexion have a long history of working with manufacturers to achieve these goals.

Our **Managed Connectivity** allows our clients to connect their products to mobile networks anywhere in the world.

Our **Managed IoT Cloud** provides the tools to store, collect and analyse the data generated by connected devices.

Global managed connectivity with one single point of contact

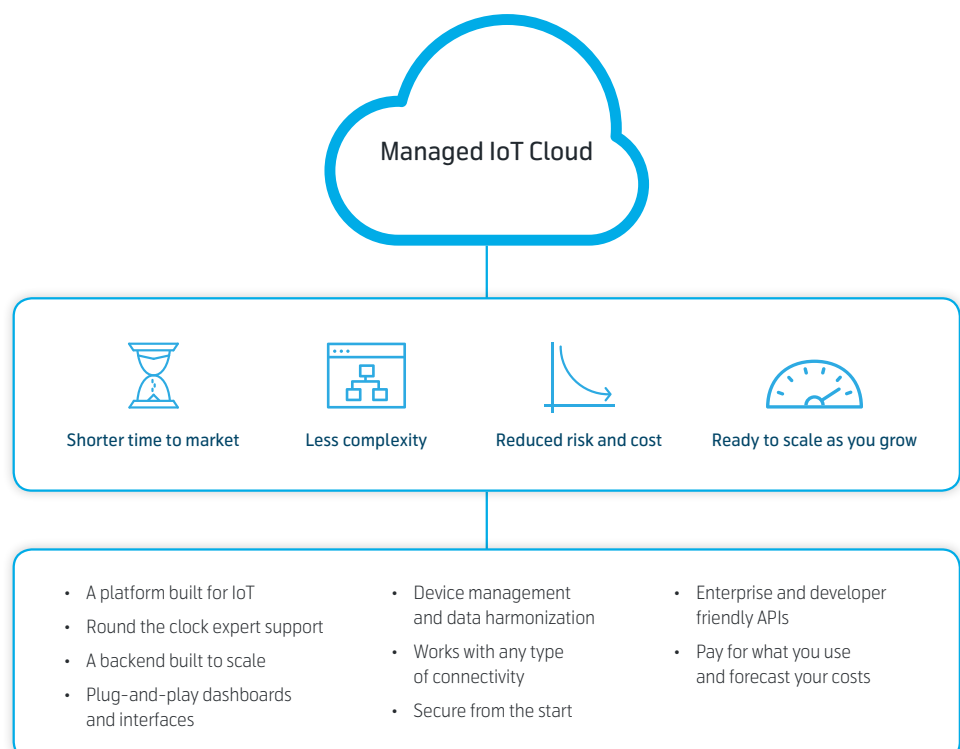| 180+	400+	1
Countries	Mobile Networks	Reliable Partner

Generating business value from IoT data

The data that your connected products generate must be easy to turn into business value. You need tools to make data easy to understand and easy to integrate into your business processes. Our Managed IoT Cloud provides flexible and intuitive data-visualization tools that will allow you to get started in days rather than months.

No matter how your devices are connected, our Managed IoT Cloud provides the platform capabilities for your fleet of IoT assets. This means you can onboard devices connected with Wi-Fi, ethernet, or cellular technologies including Lower Power Wide Area (LPWA) technologies such as NB-IoT. Though Telenor Connexion are specialists in global mobile connectivity, Managed IoT Cloud works with any type of connectivity technology.

Managed IoT Cloud

| Shorter time to market | Less complexity | Reduced risk and cost | Ready to scale as you grow |

- A platform built for IoT
- Round the clock expert support
- A backend built to scale
- Plug-and-play dashboards and interfaces

- Device management and data harmonization
- Works with any type of connectivity
- Secure from the start

- Enterprise and developer friendly APIs
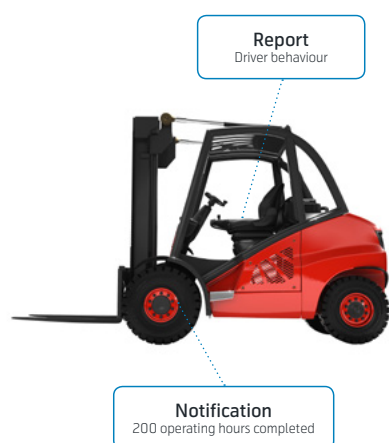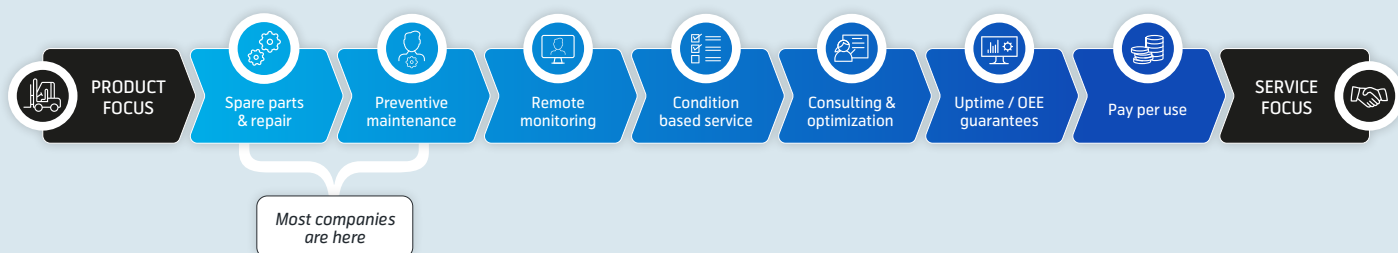- Pay for what you use and forecast your costs

Value added services

Value-adding offerings tied to a connected product can evolve through its entire lifecycle.

Connectivity enables the transition from selling products to providing services

Succeeding with servitization requires reliable connectivity and easy access to data analytics. Working with Telenor Connexion allows you to focus on your products and user experience while we provide the supporting infrastructure.
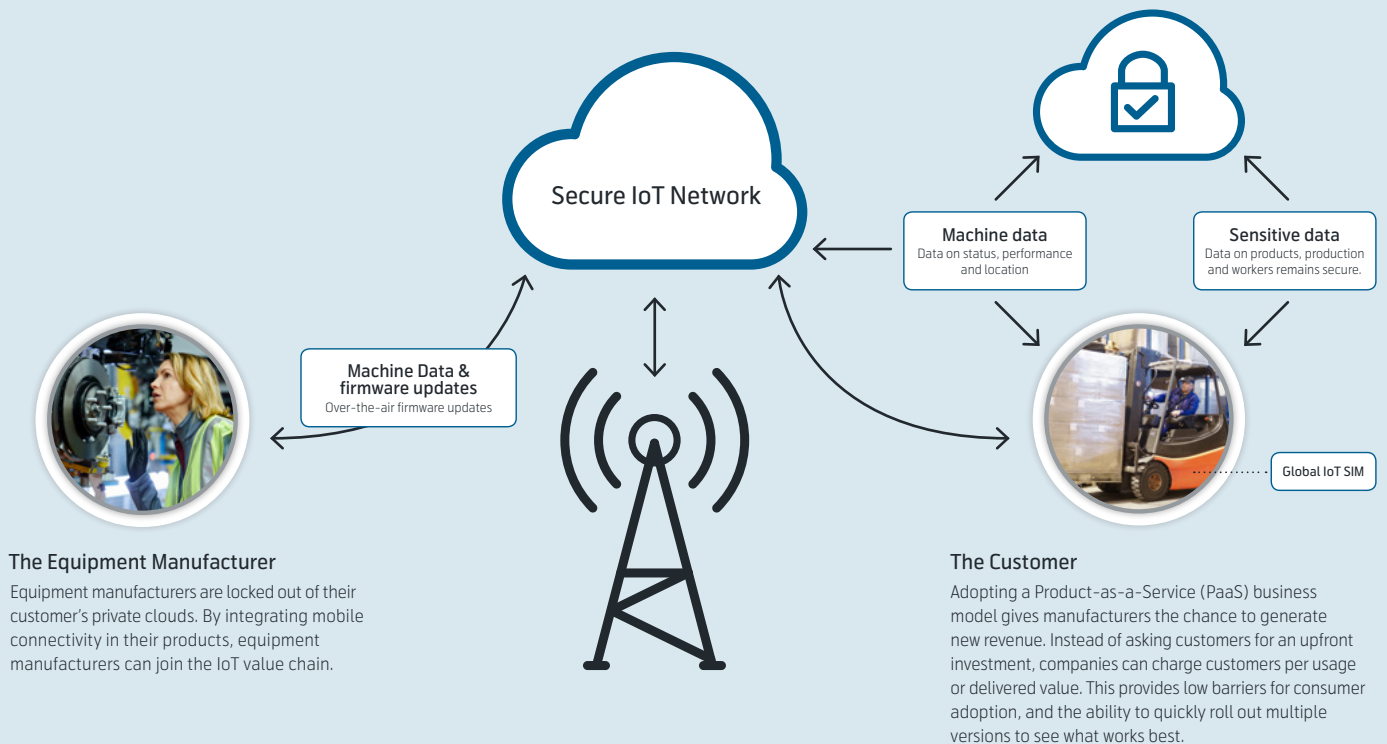
| PRODUCT FOCUS | Spare parts & repair | Preventive maintenance | Remote monitoring | Condition based service | Consulting & optimization | Uptime / OEE guarantees | Pay per use | SERVICE FOCUS |

Most companies are here

Connected products open the door to servitization

Differentiating your product from the competition can be difficult. Once connected, your products can eventually become the touchpoint for evolved services that are integrated in your customer's operations.

For example, in the future a company that manufactures forklifts may decide to not only sell their product to the customer via a dealer. Instead, they may offer a package of operating hours, selling the machine's capability "as a add-on service" – not necessarily the forklift itself. This could involve a range of add-on services such as data on user behaviour, consumables, machine performance and many other metrics. This is an opportunity that often develops over time. However, most manufacturers start more simply, by connecting a product where the benefits are clear.

With a Product-as-a-Service offering, the value provided by the manufacturer is reliable, on-demand performance.

Report
Driver behaviour

Notification
200 operating hours completed

The Equipment Manufacturer

Equipment manufacturers are locked out of their customer's private clouds. By integrating mobile connectivity in their products, equipment manufacturers can join the IoT value chain.

Secure IoT Network

Machine Data & firmware updates
Over-the-air firmware updates

Machine data
Data on status, performance and location

Sensitive data
Data on products, production and workers remains secure.

Global IoT SIM

The Customer

Adopting a Product-as-a-Service (PaaS) business model gives manufacturers the chance to generate new revenue. Instead of asking customers for an upfront investment, companies can charge customers per usage or delivered value. This provides low barriers for consumer adoption, and the ability to quickly roll out multiple versions to see what works best.

Connected manufacturing and production processes

IoT enables manufacturers to make the shift to more responsive, adaptive and connected manufacturing.

As a result, the smart factory is a fully connected and flexible system that can adapt efficiently to the demands of a changing marketplace.

The smart factory is a black box

As sensors and IoT solutions become more accessible and affordable, production inside the factory becomes more connected. But the data from production equipment and machinery is often locked inside the smart factory.

In order to join the IoT value chain, the businesses that build and supply manufacturing and processing equipment need access to the data from their machines. But closed networks are a barrier to achieving all of the benefits of digitalization and IoT.

Connected things inside the smart facility can talk to each other, but manufacturers are sometimes reluctant to connect their factories to the cloud.

Manufacturers can break free of closed networks with mobile IoT connectivity

Equipment manufacturers are often locked out of the private cloud inside the customer's factory. Mobile IoT connectivity provides a plug-and-play solution to that obstacle. IoT can help ensure sensitive data, such as process results, remains secured within the factory, while non-sensitive data can be made available outside it. This connected production process is responsive and adaptive, thereby freeing customers up to focus on their business and services.

Connectivity tightens the supply chain

Connectivity in logistics is not new, but thanks to the proliferation of sensors along the value chain, connectivity is expanding from 'high-value' assets to mass deployment.

A connected supply chain enables optimization and savings through the value chain – for the manufacturer, service provider and end customer. Manufacturers can leverage the connected supply chain to move to just-in-time production, whereby materials, goods, and labour are scheduled to arrive or be replenished exactly when needed in the production process. This allows the manufacturer to avoid costly overstock and move to demand-based production. For the customer and service provider, optimizing parts purchasing, inventory and replacement is easier when connected machines report what they need and when they need it. This way, the service provider can improve customer satisfaction and the customer can avoid downtime.

Fast track the rollout of your connected solution

Telenor Connexion help companies plan, test and roll-out IoT solutions around the globe. We can provide all the necessary sensor technology, software and device control, and access to reliable connectivity. Beyond just tech, we provide our partners with industry experience and insight into emerging trends to build a personalised IoT solution that can develop over time. Our services are built to help you realize value faster. We offer project management and implementation support services to industrialize use cases within months instead of years.

Here's how we help you rapidly industrialize your solution

Strategy   Mobilize   Build   Scale

About Telenor Connexion

Telenor Connexion is the specialized IoT company within the Telenor Group, one of the world's major mobile operators. Building on almost 20 years of experience, Telenor Connexion provides global IoT connectivity and cloud services to enterprises with large fleets of connected devices as well as third-party service providers.

Telenor Connexion manages more than 10 million connected things in more than 180 countries for global customers including Volvo, Scania, Hitachi, Verisure Securitas Direct and Husqvarna. With headquarters and tech centre located in Sweden, the company has regional sales representation in the UK, US, Germany, Italy, South Africa, Singapore, South Korea, China, Malaysia and Japan.

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