Internet of Things

When you successfully digitalize and create real added value

INSIDE M2M
SMART MACHINES

Inflation, rising energy costs, uncertainties in supply chains - as if the increasing pressure to digitalize and innovate were not enough, organizations are constantly faced with new challenges. One way to make business and production processes more resilient and strengthen their own competitiveness is to use smart machines.

However, companies in the DACH region have so far been slow to take advantage of machine-to-machine communication (M2M communication) and IoT. According to an IDC study from 2021, only 29% of companies in the industrial sector have networked machines.

One of the main reasons for this reluctance is that many decision-makers view IoT as a cost-intensive investment with a late, uncertain return on investment. Although the integration of M2M communication is technically demanding, risks can be minimized with a strategic approach. The introduction of smart devices is worthwhile for the vast majority of companies, especially in economically uncertain times.

Machine-to-machine communication is a basic technology. It is essential in order to benefit from the latest digital technologies. McKinsey predicts that by 2023, 5.5 - 12.6 trillion US dollars of added value worldwide will be attributable to IoT technology alone. Companies that want to expand their market position in five years' time will not be able to sit out this development.

- **What can value-adding use cases look like in different industries?**
- **What distinguishes the numerous IoT providers on the market and how do companies find the right technology for them?**
- **What to look out for when introducing IoT technology for the first time?**

In this white paper, we answer the most important questions that decision-makers should ask themselves before introducing IoT and M2M technology, share our best practices from 20 years and present our solution for the future-proof implementation of a wide range of IoT systems: M2MGate V.

"Whether big data, analytics, AI, machine learning or data mining... behind all the drivers of digitalization is the collection and storage of billions of data records from decentralized sensors and machines of all kinds. This is what has characterized M2MGate as a solution used worldwide in over 150 countries for almost 20 years! Secure, reliable and fast."

Derek Uhlig

CEO
INSIDE M2M GmbH

CONTENT

IOT, IIOT and M2M communication

WHAT DOES THAT MEAN?

The Internet of Things, or IoT for short, describes the digital networking of devices and machines with the internet. If devices store data on their use and status, this data can be forwarded to central company platforms via interfaces and be analyzed.

Thanks to the internet connection, users are able to access and control machines from any location. Depending on the technology used, devices can also exchange data with each other and carry out certain activities fully automatically.

Machine-to-machine communication (M2M) thus describes one aspect of the Internet of Things. Supported by artificial intelligence and machine learning, networked devices (smart devices) can take on increasingly complex tasks.

In the industrial environment, the term **Industrial Internet of Things (IIoT)** or **Industry 4.0** is often used, but the same technologies are used as in the consumer sector. As diverse as the terminology around IoT is, in the end it is always about the **digital networking of physical devices with the aim of organizing processes more simply, securely and cost-efficiently.**

Over the past ten years, the Internet of Things has quietly conquered more and more areas of our lives. From the fitness trackers we wear and the smart thermostats in our homes to the fleet management solutions that track our parcels and sensors that optimize the energy efficiency of production machines - internet-connected devices are no longer an exception. Nevertheless, companies, especially in the SME and B2B sectors, are still barely exploiting the potential of this technology.

V

Why the use of IoT pays off

THE 5 MOST IMPORTANT IOT BENEFITS

The use of IoT and the associated process digitalization is neither limited to industry nor to tech start-ups: companies in (almost) every sector and of every size can benefit from smart devices with the right approach. The economic benefits of the investment are usually immediately apparent in various dimensions.

1. Process efficiency

Whereas technicians previously had to check that devices and systems were operating properly, they can now monitor themselves and regulate many faults autonomously. Smart machines carry out (follow-up) activities automatically and thus increase process speed while minimizing the error rate. .

2. Better decisions

IoT technology brings greater accuracy to data-based decisions. Thanks to the large amounts of data collected by IoT devices, evaluations can identify correlations that human analysts would otherwise have missed. Machine learning can be used to create forward-looking forecasts that go beyond mere extrapolation: a clear competitive advantage.

3. Less downtime

IoT technology creates the basis for machines to monitor their own performance and intervene in the event of critical measured values. As a result, downtimes and costs caused by machine and production stoppages are reduced. At the same time, optimized operation increases the service life of devices, which offers additional cost benefits.

4. Higher customer satisfaction

Companies can use IoT technology to collect customer feedback, better tailor their product and service portfolio to demand, offer self-services via smart devices and develop personalized services.

5. New business opportunities

Be it the sale of data, the low-risk development of new markets or the expansion of existing services - IoT technology is an enabler for growth and sales.

What benefits do companies notice?

IOT DEPLOYMENT IN NUMBERS

44% of companies achieve an optimization of their business processes.

32% increase their turnover with the help of IoT technology.

40% improve existing products and services.

31% reduce their costs.

Source: IDG-Study, 2022

The bottom line: the strategic use of IoT technology makes companies competitive, future-proof and ready for the coming phases of digital evolution.

WHAT ARE EDGE DEVICES IN THE IOT CONTEXT ?

Edge devices consist of hardware and software components that enable and control the exchange of data between the cloud and the connected devices. Depending on the type of device, edge devices can process the data at the point of origin (edge computing). The differences in quality and functionality of edge devices on the market are huge and have a direct impact on the efficiency of the IoT platform.

When selecting edge devices, in addition to the hardware features, which should ideally be particularly small and robust, it is important to pay particular attention to the software. This should already enable intelligent data processing in the edge device: for example, only deviations from a target value are transmitted instead of transmitting all measured values at fixed intervals. In this way, data streams can be minimized and costs reduced.

Securing data processing and transmission is essential for IoT applications. Therefore, a look at the security and encryption technologies used also simplifies the selection of possible edge devices, as some manufacturers still use outdated security protocols - an unacceptable risk in a business context.

Last but not least: modern edge devices support bidirectional communication so that not only can data be sent from the device, but the device can also be accessed remotely. If there is a malfunction, for example, technicians can easily rectify the fault remotely, cost-intensive on-site service calls are avoided and machine downtimes are minimized.

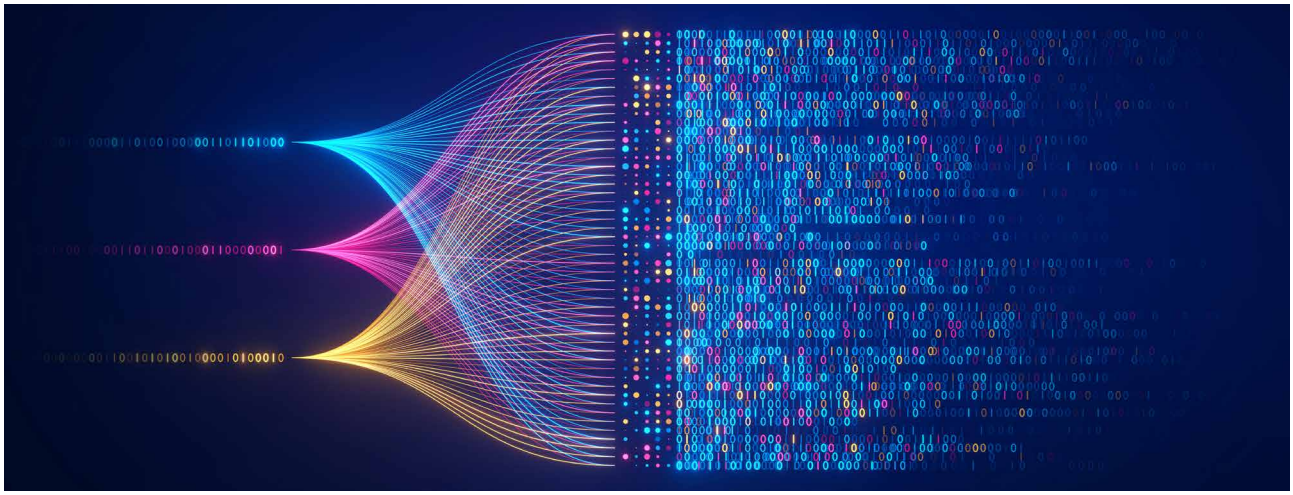
Bidirectional communication is also essential for keeping the security features of a widely distributed fleet of machines up to date: this is the only way to roll out a security update for thousands of devices remotely in the shortest possible time.

The heart of the systems

IOT PLATFORM

The heart of every IoT system is the IoT platform: it controls communication between the connected devices and handles a large part of the data analysis.

It can be hosted in a private or public cloud or in your own data center. Its performance determines how intelligent the devices connected via it can really be. The more powerful the platform, the more additional digital functions IoT devices receive and the greater the potential contribution to added value.



Users can view the data collected and sent by an IoT platform at any time via dashboards: Integrated analysis tools make it easier to maintain an overview of even large data and device inventories and to take corrective action at an early stage in the event of undesirable developments.

In the DACH region alone, there are more than 500 providers of predominantly industry-specific IoT platforms. Although this complicates the selection process, it also ensures that every company can find an optimal solution that already meets most of its requirements as standard.

The most important tasks of IoT platforms

Monitoring
Monitoring the connection status, signal quality and data consumption

Management
Managing and distributing different firmware versions and access management for the hardware

Controlling
Remote access to devices and execution of manual or automated commands

Analyze
Checking defined metrics and creating individual reports

HOW TO FIND THE RIGHT IOT PLATFORM

We often see that the decision to implement an IoT platform is associated with enormous uncertainty for companies. This is understandable, as the introduction of the technology has far-reaching economic consequences and the system should ideally last for years. As the platforms are deeply integrated with the respective IoT software, a wrong decision can necessitate a costly platform change, including high costs and strategic disadvantages.

You should therefore carry out a careful requirements analysis and systematically evaluate possible options. Below you will find key aspects that should be considered when choosing a provider.

WHAT YOU SHOULD CONSIDER WHEN CHOOSING AN IOT PLATFORM

Independence
IoT platforms can be hosted on-premise in your own data center or in a public, private or hybrid cloud. For cost and efficiency reasons, many providers rely exclusively on public cloud solutions. In order to maintain their independence and data sovereignty in the long term, companies should choose a provider that supports private or hybrid clouds in addition to a public cloud.

Security
Some machines transmit business-critical data to the cloud and entire systems can be controlled remotely by accessing the IoT platform. Ensuring data confidentiality, integrity and authenticity in data communication is challenging due to the technical complexity. At the same time, traditional security mechanisms and techniques such as firewalls, which were not developed for IoT infrastructures, often fall short. Therefore, find out exactly what security measures are used.

Another challenge is the long service life of IoT components. In contrast to consumer products such as smartphones, which have an average lifespan of a few years, IoT components can be in use for decades. During this time, technologies change. New points of attack emerge that need to be secured with updates.

Integration into existing systems
An investment in IoT technology only pays off if the data collected can also be used comprehensively, ideally across departments. Check in advance whether your IT systems can be easily connected to the IoT platform. In some cases, even the most modern IoT platforms use protocols that are not compatible with common ERP and CRM applications, as there are no industry-wide standards for M2M communication.

Flexibility
At first glance, some IoT platforms seem to offer a perfect functional package, but are only developed for certain use cases and are therefore difficult to take into account changing requirements. If companies want to connect additional device types and run additional applications, costly custom development becomes necessary. Platforms with a modular structure, on which software components can be combined as required and without major development costs, are more flexible.

Some systems also do not support bidirectional, but only one-way data transfer, which excludes application scenarios such as remote maintenance, display advertising or real-time intervention in automated production control systems from the outset.

Scalability
Not every IoT platform is capable of processing large amounts of data at sufficient speed and connecting hundreds of thousands of devices. Companies in the growth phase should ensure that the chosen IoT infrastructure is highly scalable at a reasonable cost.

Service & Support
Clarify in advance whether long-term support is guaranteed and whether it meets your requirements. For example, would you like to work with a personal contact who can assist you with software and system updates or make server-side changes? Is German language support important to you? Do you value fast response times? Don't just compare the technology itself, but also include the running costs and scope of services in your considerations.

CONNECTION OF EDGE DEVICES TO THE IOT CLOUD

WLAN

When it comes to wireless internet connections, many people think of Wi-Fi first: high bandwidths can also transfer large amounts of data quickly. However, the range of WLAN is comparatively short and energy consumption is high. What's more, every additional device in the company network creates additional administration work.

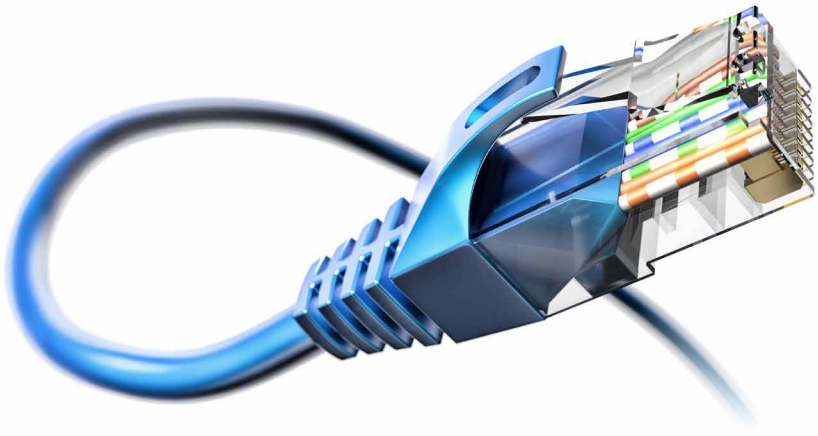
LAN

LAN connections are an alternative. If connections are available near the devices to be networked, this connection is ideal. However, the structural conditions are often not ideal for a wired connection, and in some cases there is no local Internet connection at all.

Mobile radio

Companies are always most flexible when they opt for a mobile connection - not least because the devices do not have to be integrated into the local company network and there is no administrative overhead.

Today, 4G mobile communications offer the widest coverage and good bandwidth for most use cases. In the future, the range of applications will increase even further thanks to nationwide 5G. And the costs for mobile data tariffs are falling continuously, but it is still important to ensure data-saving transmission for large device fleets.



SHORT-RANGE CONNECTION BETWEEN TERMINALS AND EDGE DEVICES

It does not always make sense to have every end device communicate directly with the cloud. Particularly in use cases where many end devices are in close proximity to each other, costs and energy consumption can be significantly reduced by having the end devices communicate with the cloud via short-range radio using an edge device.

Bluetooth Low Energy

Bluetooth Low Energy is a suitable transmission technology for data transmission at close range. Although only bandwidths of up to 2 Mbit/s can be achieved here, this data transmission rate is completely sufficient for most use cases in the consumer sector (e.g. wearables) and many industrial applications.

Zigbee

Another frequently used transmission protocol is Zigbee. It scores with high security, low power consumption and good scalability. Like Bluetooth LE, it is designed for the close range of 10 to around 100 meters. The data transmission rate is around 250 Kbps, meaning that Zigbee is only suitable for small IoT applications.

LoRaWAN

LoRaWAN is becoming increasingly popular for data exchange over medium distances. The communication protocol was specially developed for IoT and M2M applications and has a range of 2 to 5 kilometers in urban areas and a maximum of 15 kilometers in non-urban areas.

PRACTICAL APPLICATION SCENARIOS

Let our customer projects inspire you with the economic added value that can be achieved through the IoT networking of machines, real-time data analysis and data-supported automation of processes.

YUNEX TRAFFIC

The transport specialists, formerly part of the Siemens Group, worked with us to implement an intelligent control solution for local public transport. Buses and traffic control centers communicate with each other - for more safety on the roads and a green wave for public transport.

LIEBHERR

When mobile cranes come to an unscheduled standstill, it becomes expensive for companies. Crane specialist Liebherr implemented a remote diagnostics solution with the help of INSIDE M2M. The result was so convincing that we also implemented the digital fleet management platform shortly afterwards. This results in promising use cases for customers.

WMF

WMF's fully automatic coffee machines for professional use not only deliver many hot drinks at the touch of a button. Thanks to the introduction of M2MGate V, they also provide operators in the hospitality and corporate sectors with valuable insights into users' consumption preferences.

Green wave for sustainable transportation

YUNEX TRAFFIC MAKES TRAFFIC CONTROL EVEN SMARTER

YUNEX TRAFFIC

Yunex Traffic is one of the world's leading providers of intelligent transportation systems. Formerly part of the Siemens Group, the company is represented in 24 countries and its intelligent mobility solutions are used in over 40 countries worldwide. One of its main goals is to make traffic more efficient, safer and more environmentally friendly, thereby improving the quality of life in cities.

"Yutraffic Stream is an important innovation solution for us in the field of intelligent local public transport. We are continuously working on the further development of the system, together with INSIDE M2M.

We plan to continue this trusting partnership in the future."

Michael Sax, Global Product Manager at Yunex Traffic

A key element on the road to more sustainable mobility is the strengthening of local public transport. For example, a green wave for buses, trains etc. can contribute to this by increasing travel comfort and thus the attractiveness of using public transport. Until now, however, it has been associated with cost-intensive construction measures for cities and municipalities, as the technical systems had to be equipped with special signaling technology. With Yutraffic Stream, Yunex Traffic offers a cost-efficient and innovative solution.

To this end, INSIDE M2M developed an application based on the M2MGate platform that collects data from GPS-based registration and deregistration points. The points are stored purely virtually on the city map and are not linked to any local construction measures.

As soon as a vehicle passes a registration or deregistration point, this is reported to the traffic control center - via a small on-board unit installed in the vehicle. The control center can then generate the green wave or switch back to normal operation.

In practice, the on-board unit with GPS tracking is mostly used in buses, but it can also be used by fire and rescue service vehicles to get to the scene more quickly in emergency situations.

The M2MGatePortal solution has been expanded to include elements that are required for the specific application. These make it possible for traffic planners to store new GPS registration and deregistration points in the city map at any time and thus react to changes or the expansion of the infrastructure without the need for construction work on site.

"We value INSIDE M2M as a creative partner who supports us with valuable advice on efficiency and functional improvements instead of simply implementing them as ordered," emphasizes Michael Sax, Global Product Manager at Yunex Traffic. *"Over the years, we have developed an excellent collaboration that is flexible and takes place as required, both in product management and in technical development."*

With the increasing global awareness of more sustainable mobility, interest in mobile traffic prioritization and Yutraffic Stream is growing. In order to motivate even more cities to strengthen their public transport, Yunex Traffic is constantly developing the system further - and we are happy to provide support with M2MGate.

Digital knowledge advantage

LIEBHERR EQUIPS CRANES WITH ANALYTICS & REMOTE DIAGNOSTICS APPLICATIONS

LIEBHERR

The Liebherr Group is a family-run technology company with a broadly diversified product range. The company is one of the largest manufacturers of construction machinery in the world. However, it also offers high-quality, user-oriented products and services in many other areas. Today, the group comprises over 140 companies on all continents. In 2021, it employed more than 49,000 people and generated a consolidated total turnover of over 11.6 billion euros. Liebherr was founded in 1949 in Kirchdorf an der Iller in southern Germany. Since then, the employees have pursued the goal of convincing their customers with sophisticated solutions and contributing to technological progress.

Software is playing an increasingly important role in mobile and crawler cranes. It improves the safety and durability of the vehicles. However, the technical complexity also increases the risk of malfunctions that require time-consuming and costly repairs. Together with INSIDE M2M, Liebherr-Werk Ehingen GmbH has developed a remote diagnostics solution that drastically reduces downtimes and costs. In future, customers will also be able to optimize the use of their cranes based on data with the help of a new telemetry solution.

"With M2MGate, we have found a future-proof technological setup that will enable us to implement innovative services in three and five years' time."

Christian Gumper, Digital Products and Services, Liebherr-Werk Ehingen GmbH

Reduce service costs and downtime

Liebherr sells its mobile and crawler cranes worldwide. The company supports equipment via local branches and service partners, but for the end customer this does not change the fact that maintenance and support visits by technicians cost time. Time that delays projects and increases costs. Liebherr turned to INSIDE M2M to offer customers an efficient and modern remote support solution.

"We have been enabling remote access via the GSM standard for years, but this is not supported in many countries," explains Christian Gumper, Head of Digital Products and Services. *"We wanted to switch to the latest mobile technology and at the same time meet the increased customer requirements for data protection and encryption."* An ideal case for INSIDE M2M's mobile-optimized IoT technology, which serves both 3G and 4G.

Liebherr's high security requirements were a hurdle for many providers. But INSIDE M2M was able to offer a solution here too: M2MGate can be hosted locally and access customer cranes securely via encrypted connections (VPN). The application for crane operators remains extremely simple. All it takes is the push of a button to release the connection request and give employees from Liebherr headquarters real-time insights into the crane control system.

"What sets INSIDE M2M apart is its great flexibility. You get exactly what you want - not just an off-the-shelf solution." - Christian Gumper, Digital Products and Services, Liebherr-Werk Ehingen GmbH

The next step: data-based fleet management

For Liebherr, the successful rollout of remote diagnostics was just an interim stage on the road to digital transformation. The next step: the introduction of a telemetry solution that allows customers to view and evaluate fleet data live. Here too, INSIDE M2M became the implementation partner: *"We were impressed by the approach and the collaboration so far has been excellent."*

Liebherr once again relied on M2MGate to connect the cranes to the fleet data management solution: a mobile radio modem and a router with M2M software are now integrated in new Liebherr cranes, and cranes in the field can be easily retrofitted.

The connection is also encrypted here, in accordance with the latest TLS standard, and authorized systems are authorized via certificates (Keycloak), ensuring a high level of protection against unauthorized access. Data exchange between cranes and the analysis platform is fully automated in the background, and updates no longer need to be installed manually.

Further digital services for crane operators

What advantages does the new solution offer? *"Customers can optimize their strategic decisions based on actual fleet data,"* emphasizes Christian Gumper. If certain crane models are regularly underutilized, companies may be able to switch to a smaller, more cost-effective model for future purchases. If the disruption rate at certain locations is above average, companies can initiate targeted investigations. The use cases are numerous.

In addition to site and performance data, further live data can be measured, for example on wind speeds and CO2 emissions. Individual reports for construction projects simplify the cost overview and reporting of sustainability requirements. Many analyses that were previously not possible or only possible via random samples can now be carried out with real-time data and just a few clicks.

The potential for cost savings offered by the telemetry solution is enormous. Not least because Liebherr wants to further expand its digital offerings: "We are only at the beginning In the coming months and years, we will enable increasingly complex analyses and bring new digital services to the market."

Coffee Analytics

WMF TRANSFORMS FULLY AUTOMATIC COFFEE MACHINES INTO MARKET RESEARCHERS

With a 170-year history, WMF is a leading premium supplier of household products, professional coffee machines and hotel equipment. WMF stands for innovation based on tradition and impresses with development and design "Made in Germany". The company has been part of the French group Groupe SEB since 2016. The Group now distributes a variety of home-use products for cooking, dining, and serving beverages in 120 countries. Business customers, particularly from the catering and hotel industry, can choose from a range of products for coffee preparation, table settings and buffets under the "SEB Professional" umbrella with the WMF, Schaerer, Curtis and Hepp brands.

Coffee is culture. Demand has continued to rise in recent years. This has also been felt by coffee machine manufacturers, whose customers are becoming more and more demanding: not only top quality and a variety of drinks are desired, but also additional digital services. The trend is towards smart, fully automatic coffee machines. WMF Professional Coffee Machines has been using INSIDE M2M's telemetry expertise for its products for years and is one of the leading providers in the segment.

INSIDE M2M ensures the right data flow

The fully automatic coffee machines from WMF and Schaerer AG - combined under the "SEB Professional" umbrella - offer IoT services, i.e. customers can use a web portal to call up information on beverage purchases and usage times, play advertising on the coffee machine display remotely and perform other remote functions.

Major customers in particular appreciate the new smart functions: By cleverly evaluating the collected data, they can optimize the operation of their machines and tailor their offering more precisely to customer demand in order to reduce costs and increase sales. New business models are also emerging, such as renting out the coffee machine's display for advertising purposes.

INSIDE M2M developed the digital infrastructure so that the data from the coffee machines is transferred quickly and reliably to the SEB infrastructure and is available to customers for analysis in the web portal almost in real time. Bidirectional data transfer, high data quality and reliable connectivity were important factors for WMF when selecting a provider, and INSIDE M2M had well thought-out solutions at the ready.

Customized data architecture improves cost efficiency

To make data transmission and analysis even easier, INSIDE M2M developed its own data protocol together with WMF and Schaerer AG. *"We now record the data that we really need in a standardized format that we can easily reuse in our applications,"* says Jochen Bauer. Despite a heterogeneous IT landscape, SEB Professional minimizes the effort required to provide the data in data analytics applications and other systems, saves server capacity and thus reduces operating costs.

"The INSIDE M2M team had the most convincing offer and has become a trusted partner for us over the years."

Jochen Bauer, Head of Product Management Digital Solutions, Global Business Unit Professional Coffee Machines, Groupe SEB

INSIDE M2M regularly develops the data transmission architecture together with SEB Professional: *"With INSIDE M2M, we have a partner at our side who keeps an eye on the market for us, draws our attention to technological opportunities at an early stage and ensures that we use the best that is currently available."*

Ready for further growth and innovation

When introducing the new user platforms to WMF CoffeeConnect and Schaerer Coffee Link, INSIDE M2M ensured that the IT infrastructure was able to cope with the increasing number of users. Around 135,000 smart coffee machines are now connected to the user platforms using the "INSIDE M2M" data architecture, and the trend is rising.

"The possibilities of IoT have reached the mainstream in recent years. We are also noticing this: our customers' demands for availability and service have increased significantly. Usage has become more intensive. Not every backend can cope with this easily. The fact that we set the right course right from the start with INSIDE M2M is paying off here. The architecture is easy to upgrade and INSIDE M2M has always been able to find solutions for more demanding requirements."

The latest result of the collaboration: the introduction of M2MGate V as the central IoT platform for controlling the IoT gateways used for connectivity. Previously, SEB Professional had focused on the hardware, with the relevant issues of transmission stability and data security. The advantage now: The company can control the entire fleet of coffee machines itself in detail and provide its customers with targeted services without having to go through a service provider. *"We can react much faster to peaks in capacity utilization, manage resources proactively and have a deeper insight into individual components. This is enormously helpful for our further service development."*

"The fact that we have been working with INSIDE M2M for more than ten years speaks for itself. Competence, innovation and partnership-based cooperation - that's what we value - and that's what we get."

Jochen Bauer, Head of Product Management Digital Solutions, Global Business Unit Professional Coffee Machines, Groupe SEB

M2MGATE V

Perhaps the smartest IoT platform was designed to support the development of scalable and secure IoT applications and enable seamless connectivity between devices and services. It offers a range of functions that simplify both the connection of devices and the analysis of the data generated by these devices. The platform can be flexibly adapted by companies to their specific needs and requirements.

Continuously developed since 2004, M2MGate has earned a reputation in the market as an extremely trustworthy and reliable solution. More than 750,000 devices connected to M2MGate worldwide testify to the broad acceptance and success of the platform. With M2MGate V, INSIDE M2M is now presenting the fifth generation of the platform, which is characterized by further optimized stability and performance.

High flexibility: hosting, integration, features

M2MGate is not just an IoT communication platform for machines. It can also be used to quickly roll out firmware and configurations. It also offers fleet management functions, including client assignment and geo-localization.

You decide where you host M2MGate V. We will be happy to advise you on whether a hyperscaler such as Amazon AWS or Microsoft Azure, a private cloud in our data center or an on-premise solution is the best choice for your use case.

We develop all our services according to current standards and frameworks such as MicroProfile and Quarkus, which offers a high level of investment security. As all M2MGate services are equipped with OpenAPI specifications as standard, you can integrate them seamlessly into your existing IT infrastructure.

Microservices architecture for easy scalability and optimization

We use development frameworks with extensive component catalogs and implement low-code platforms based on open source products. This allows you to deploy your IoT solution within a very short time and upgrade it as required.

Once in operation, we can usually make changes or functional enhancements at runtime - without affecting the processes. The reason: M2MGate V is based on a container-based microservices architecture in which we can intervene precisely.

If functional components reach their performance limits, for example due to an increasing number of connected devices, you can simply expand individual microservices in the case of cloud hosting by booking additional server capacity.

Bidirectional communication and IoT protocols

Unlike many other IoT platforms, M2MGate supports bidirectional communication between the cloud and the machines. Devices not only send data for analysis, but can also be controlled remotely. Via Direct Connect, you can access the devices at any time to retrieve log files, analyze errors and replace automations with manual commands if necessary.

M2MGate works with its own TCP-based communication protocol, which is optimized for data transmission via mobile radio. In this way, data can be transmitted in a particularly energy-efficient and secure manner. If required, a connection via WLAN or LAN is also possible. Communication between the end devices can take place using all common technologies, such as BLE or ZigBee.

Highest safety standards

It is essential to ensure the security and integrity of the transmitted data when it is created in the end device, during its transmission to the IoT platform and during transfer to other IT systems.

All M2MGate services are therefore monitored centrally. Data transmissions are encrypted according to the latest standards and are additionally protected by authentication technologies and identity access management solutions. We also implement tools for the continuous monitoring of connections so that potential security risks are indicated at an early stage.

The long service life of the machines poses a security risk if local software is not updated. With the M2MGate distribution service component, we therefore offer users the opportunity to keep their devices in the field up to date at all times and thus prevent security gaps.

Cost-efficient and intelligent performance

IoT devices can quickly become a cost trap if machines transmit data unnecessarily frequently. This is why M2MGate relies on smart edge devices, among other things: The integrated intelligence ensures that the data stream is already minimized on the data-producing device, thereby reducing the costs for transmission to the cloud. M2MGate also enables the end devices to monitor and optimize themselves with the help of artificial intelligence.

The key point for data transmission is the M2MGate message adapter: it links data from the end devices with the IoT platform. We use MQTT message brokers on the device side and Kafka message brokers in the cloud. In this way, we achieve optimum interaction between the protocols and often transfer rates of 10,000 messages per second. Thanks to the scaling option, higher data rates are also possible without any problems.

V

FIVE STEPS FOR THE SUCCESSFUL INTRODUCTION OF IOT

The introduction of IoT technology is changing the way people and machines work together, both within and across departmental boundaries. Companies are not embarking on a one-off project, but are embarking on a transformation process for greater efficiency and growth.

Over the years, we have developed a best-practice approach for the implementation of IoT projects using M2MGate in many national and international customer projects. Every company and every implementation project is different. That's why we take a flexible approach to methods and standards. However, the roadmap to an initial smart IoT solution can always be divided into five phases.

1. Actual and target analysis

We analyze your requirements in a kick-off workshop: Which use case would you like to optimize with smart machines? What are your expectations in terms of timeline and budget? We look at your existing technical infrastructure and advise you on what a possible solution involving M2MGate could look like.

2. Conception & development

The decisive factor is that you can ultimately create value with your IoT solution. This is why we generally favor a collaborative conception phase and an agile development phase. We coordinate closely with our customers and optimize development in short iterative sprints. Your advantage: you can get started with the first functions quickly and without any detours.

3. Deployment

We provide your key users with comprehensive training so that they can work confidently and productively with the new tools and workflows from day one. A multi-stage test procedure ensures that commissioning runs smoothly.

4. Service & Support

Errors can occur in any IoT system, no matter how well thought out. That's why we don't leave you alone even after going live. As a support partner, we offer you fast and uncomplicated support throughout the entire life cycle of the system. We maintain, optimize and upgrade the system according to your wishes.

5. Further development

Once initial successes have been achieved after the initial launch and the potential has been recognized, new ideas for further possible applications or new business models quickly emerge. It is then important to understand the ideas and test them carefully before developing them - according to the "fail fast, learn fast" principle.

If it is not certain whether the idea meets a real need on the market in the best possible way, a prototype can help to test the idea or solution approach with the potential end user.

WHAT HAPPENS NEXT?

More and more companies are recognizing the potential of smart devices, which is also reflected in the high growth rates of the IoT market. The extent of the economic added value of using the technology in individual cases depends on the use case and the company's digital implementation maturity.

In some sectors, such as industry and logistics, companies are already integrating smart devices into their processes at an above-average rate; use cases for other sectors are less well known. With creativity and technical know-how, ways can be found almost everywhere to improve efficiency, productivity and customer focus with IoT systems.

Although the technology is complex, the investment risk can be managed with a structured approach and an experienced partner at your side. Once up and running, the first practical successes quickly become apparent. The biggest mistake companies can make is not exploring the use of IoT systems for themselves.

HAVE WE PIQUED YOUR INTEREST?

Then let's talk about your plans without obligation.

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