COMARCH
MANHOLE MONITORING

MONETIZE DATA THROUGH IOT

Comarch Manhole Monitoring is an IoT solution for fully automatic monitoring of the opening and closing states of all hatches, including sewage wells, electrical boxes, tips and doors. It can be used on the surface and in underground, hard to reach places, where there is no power supply or where the traditional GSM signal does not reach. By combining the work of sensors, innovative Narrowband IoT (or LTE Cat.M1) technology and cloud capabilities, it is possible to collect, analyze and monetize data.

BENEFITS OF SOLUTION

Real-time intrusion notification	Up-to-date information about the opening / closing status	Integration with supplier's IT system	Alerts about the presence of business partners in monitored places

HOW IT WORKS?

The system consists of small battery-powered devices that are mounted to the manholes or any other infrastructure that can be opened or closed with a limit switch. Each opening and closing of the is noted by sensors located in the gateway. These, via standardized communication protocols (NB-IoT or LTE Cat. M1) send an event signal to the IoT platform (Comarch IoT Platform or other). Then, data are received, processed and analyzed. On this basis, the platform can send alerts to the customer and generate reports. Importantly, it can also be integrated with other Comarch or external IT systems (such as Comarch FSM, which is used to manage the work of field employees).

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MAXIMIZE BUSINESS EFFECTS THANKS TO COMARCH SMART METERING

The system can be used in several business models, as an independent solution and as part of Comarch Smart Metering (this is an IoT system for remote data reading from utilieties meters). Comarch Manhole Monitoring is a fully flexible system that can also be expanded with other sensors or Internet of Things modules.

COMPONENTS OF SOLUTION

1) GATEWAY (Comarch Manhole Monitoring Module)

2) TECHNOLOGY: Narrowband IoT (NB-IoT) – LTE Cat.M1

3) IoT PLATFORM or external systems

Comarch Manhole Monitoring Module	
INPUT: Open/Close sensor	OUTPUT: NB-IoT / LTE Cat.M1, Multi Band, COAP over UDP
Protection rating	IP68
Encrypted communication	AES-128
High Sensitivity radio interface	up to -135 dBm (Good for indoor & underground coverage)
Data logging	up to 45 days

WE DEVELOP OUR SOLUTIONS END TO END

Comarch Manhole Monitoring is an end to end solution. It was entirely designed and prepared in Poland, from the R&D process, through prototyping and the production of equipment, to software development after integration with the customer systems. This model allows us to maintain the highest standards of quality and reliability.

ABOUT COMARCH

Comarch is a leading Central European IT business solutions provider specializing in forging business relationships that maximize customer profitability while optimizing business and operational processes. Comarch Technologies draws from the extensive expertise Comarch has accumulated during 26 years doing business in the field of delivering comprehensive IT solutions. Its main concern is to provide customers with the most reliable and secure solutions that consist of advanced software and innovative hardware infrastructure supported by professional services

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www.comarch.com/iot-ecosystem

COMARCH IoT
SMART METERING

The system uses Comarch Smart Metering Module and IoT Platform.
Some of functionalities offered by systems are:

- Automatization of service and network maintenance (through Comarch FSM)
- Alarm generation and sending

- Remote reading of water, gas and electricity meters
- Leakage detection
- Integration with supplier IT systems

Narrowband IoT (NB-IoT) – LTE Cat M1:
First networks were launched in late 2017/early 2018. The network coverage in both EU and non-EU countries increases on monthly basis. Both are LTE based and IoT optimized wireless technologies allowing to create IoT devices with very long battery life.

MAIN ADVANTAGES OF NB-IOT AND LTE CAT M1 ARE:

Long range coverage
deep penetration
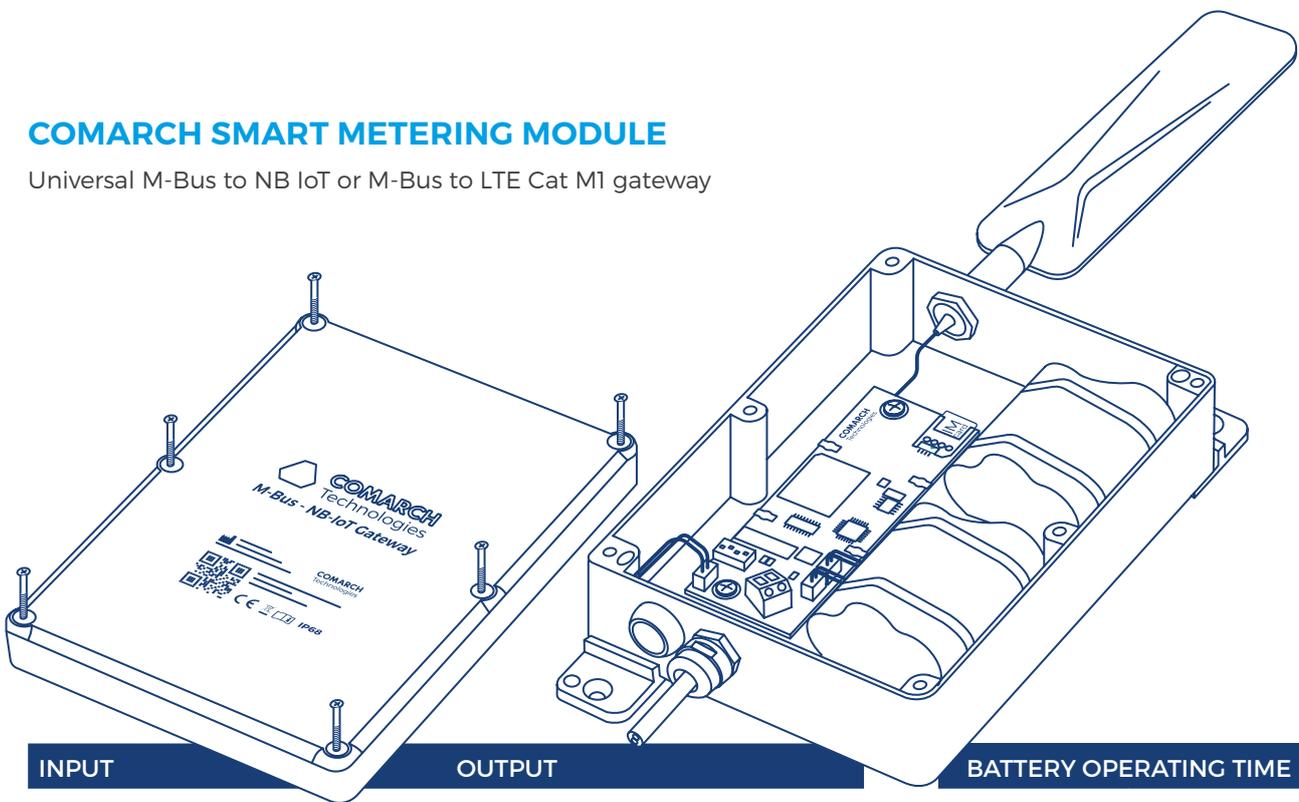(up to +20dB)

Secure & Reliable
industry standards
based

Optimized for low power consumption
up to 20 year battery life

Easy deployment
integrates into cellular
system

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COMARCH SMART METERING MODULE

Universal M-Bus to NB IoT or M-Bus to LTE Cat M1 gateway

| INPUT	OUTPUT	BATTERY OPERATING TIME	
		Sending period [Hours]	Estimated operating time [Years]
M-Bus / wireless M-Bus *	NB-IoT / LTE cat.M1, Multi Band, COAP over UDP		
Protection rating	IP68	0,5	4
Encrypted communication	AES-128	1	10
High Sensitivity radio interface	up to -135 dBm (Good for indoor & underground coverage)	**6**	**12**
Data logging	up to 45 days	Up to 45 days for the data logging	

*Roadmap Q2 2019

COMARCH IoT PLATFORM

As a universal and scalable cloud solution it allows to provide Smart Metering services. The platform can be integrated with: Advanced Metering Infrastructure (AMI) as a part of Head-end Systems (HES), Comarch FSM (Field Service Management) or other suppliers internal systems.

PLATFORM OFFERS:

- Lifecycle management
- Device & Users Management
- Business Rules and Processes
- Security & Access Management

- Location & Context
- Events & Alarms Management
- Statistics and Analytics
- Well defined APIs
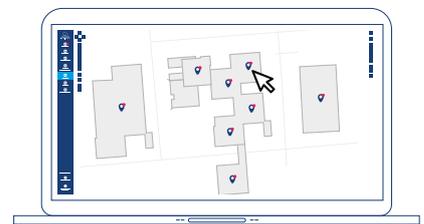
COMARCH IoT PLANT

It offers a sophisticated infrastructure facility suitable for low-volume production, industrial design and rapid prototyping complemented with quality assurance and compliance with industry standards (i.a. ISO 13485). Iot Plant expertized employees are responsible for the production of Smart Metering solution which is the guarantee of reliability and innovative approach.

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CASE STUDY
SMART METERING

RETROFITTING WATER METERS WITH THE USE OF NARROWBAND-IoT IN A WATER SUPPLY COMPANY

CUSTOMER NEEDS

One of the biggest challenges in water supply companies is to have in place infrastructure which requires wired data transmission. Currently, meters require manual data reading, thus generating higher costs and the necessity to maintain a fleet of technicians. Comarch's client is a water supply company from one of the most dynamically developing cities in the world, in the United Arab Emirates. Because of the desert area it had logistics problems with readings (water meters were located between two and eight meters underground), and it had to provide rational water management and prevention of leaks. However, the good condition of the existing infrastructure rendered the replacement of water meters unnecessary. Comarch took on retrofitting which allowed:

| Remote, safe reading of meters | Reduced network maintenance costs | Service automation | Early alerting on probable leaks and breakdowns | Integration with the customer's external system |

COMARCH SMART METERING SOLUTION

In response to the customer's needs, we created Comarch Smart Metering - a solution for reading data remotely from water meters which is following the concept of Industry 4.0. Its deployment requires installation of small devices (Comarch M-BUS - NB IoT Gateway). They collect data from water meters periodically (for example, every hour) and then use standardized protocols to send this information to the IoT cloud platform (Comarch IoT Platform or the client's own systems), where it is collected, processed and analyzed.

IMPLEMENTATION FOR THE CUSTOMER

At the beginning of 2019, we installed 500 of Comarch M-BUS - NB IoT Gateways in the UAE. They are installed in manholes without need to deintegrate measuring devices by using M-BUS interface. This is important from the assurance perspective. In cooperation with the local telecommunications operator, we applied Narrowband-IoT (NB-IoT) in the Comarch Smart Metering solution.

Narrowband-IoT is a new radio standard which, in comparison to other GSM technologies, ensures better signal penetration (the range is increased to +20 dB) and optimizes battery life to guarantee secure information transfer. Installed devices have high radio interface sensitivity (up to -135 dBm). This allows them to work underground in manholes covered by metal hatches. They are also characterized by a very high level of protection (IP68), which ensures complete water-tightness. Data readings are transmitted via Comarch IoT Platform to the client's external IT system, where information is collected and analyzed. In 2019, there were further deliveries of devices for the client (8 500 Gateways in total).

The implementation of Comarch Smart Metering is the first commercial implementation of the IoT service from available NB-IoT networks in the UAE. This technology is also gaining popularity in Poland. The solution can be based on other types of LPWAN technology, such as LTE CaT M1, which results in a wider scope of utilization.

- says Comarch's Radosław Kotewicz, responsible for the implementation of IoT solutions

BENEFITS OF IMPLEMENTATION

The use of Comarch Smart Metering based on Comarch IoT Platform enables remote reading of water, gas and electricity meters, and early detection of anomalies such as leaks, violations and security alerts. It also allows device lifecycle management, rule-setting, business process enhancement, and the generation and transmission of alarms. Implementation automates the service and maintenance of the existing network. It allows organizations to optimize the work of their technicians makes it possible to ensure effective infrastructure management at water supply companies. Implementation - combined with the possibility of integration with Comarch FSM or internal systems - opens up a wide range of possibilities for automatic billing, invoicing and creating forecasts for the company and their clients, fitting perfectly into the smart city concept.

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COMARCH IIoT
FOR INDUSTRY 4.0

Data revolution for each plant

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INDUSTRY 4.0

Industry 4.0 is considered to be a technological transformation focused on manufacturing and the integration of cyber-physical systems. Within implementation of the IIoT (Industrial Internet of Things) every device is connected to the internet and exchanges vast amounts of data in real-time, facilitating the effective control of multiple production phases with **MES (Manufacturing Executions Systems).**

RETROFITTING

In short, it means implementing new technologies such as sensors and connectivity on existing equipment. Retrofitting is considered to be a cost-saving solution allowing legacy systems to be retained, and avoiding the necessity to purchase totally new equipment. Such a thriftiness according to **Lean Management** approach puts impact on eliminating any wastage and cutting additional costs.

ADVANTAGES

Maximizing effectiveness by cutting paper and manual work

Ensures high quality and prevents equipment from being lost or stolen

Reduces human errors and accelerates new employees induction

Provides data for analysis and optimization

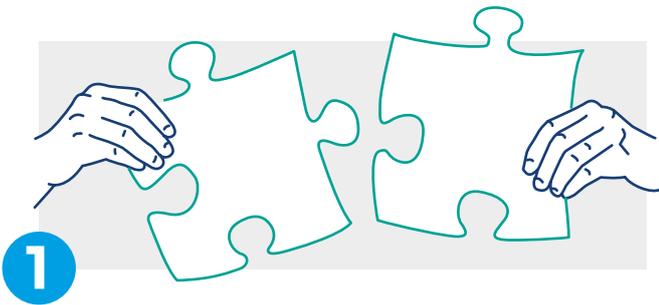Mitigates stoppages and malfunctions by predictive maintenance

Cuts expenses for new equipment by retrofitting

REFERENCES

"Comarch knows our company, our processes and our quality thinking and can map all this in holistic software" – emphases CEO of Abnox - Matthias Iseli

ABNOX®
Lubrication & Metering Solutions

# COMARCH SOLUTIONS FOR INDUSTRY 4.0

1

Thanks to the possibility of integration with any ERP on the market, Comarch's solution enables control and management of the whole production process including supply chain, production, distribution, back office and sales. Implementing the Comarch system ends an era of printed lists with daily tasks for individual employees.

2

By adding detectable tags to manufactured items, the Comarch system can track items and register the order, time and condition of completed production stages. Data thus collected help with final quality checks, ensuring adherence to required lead times between stages. Additionally, Comarch's solution permanently eliminates the problem of lost inventory.

3

By equipping assembly lines with dedicated screens, employees are led through the manufacturing process and informed about the appropriate task order. With such instructions they do not omit any steps or confuse elements. The system is not only the data gatherer but also the knowledge distributer. It is especially important in onboarding new employees.

4
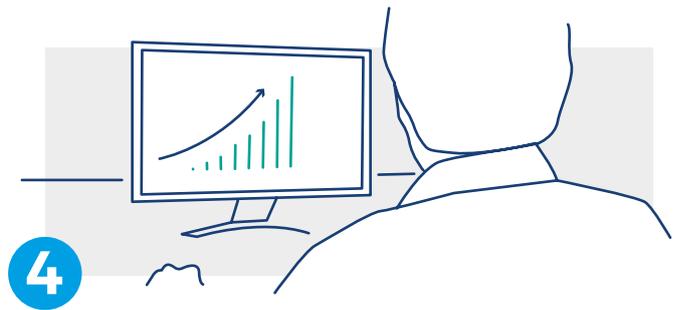
Through incorporation with MES, the solution provides real-time data and feedback across the whole production cycle to prevent bottlenecks and wastage while maximizing uptime. It is crucial to provide flawless manufacturing processes based on up to date production performance analysis. That means no more "just in case" products or sudden shortages.

5
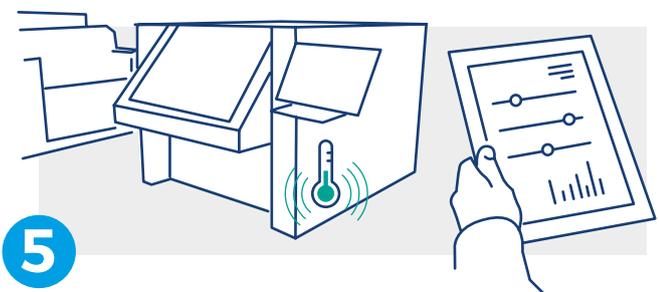
Thanks to temperature, vibration and sound sensors fitted to machines, the Comarch system allows possible production hitches to be detected before they happen. Sensors warn of unexpected malfunctions during the overall process. With PdM (predictive maintenance) it is easier to arrange maintenance work according to necessity.
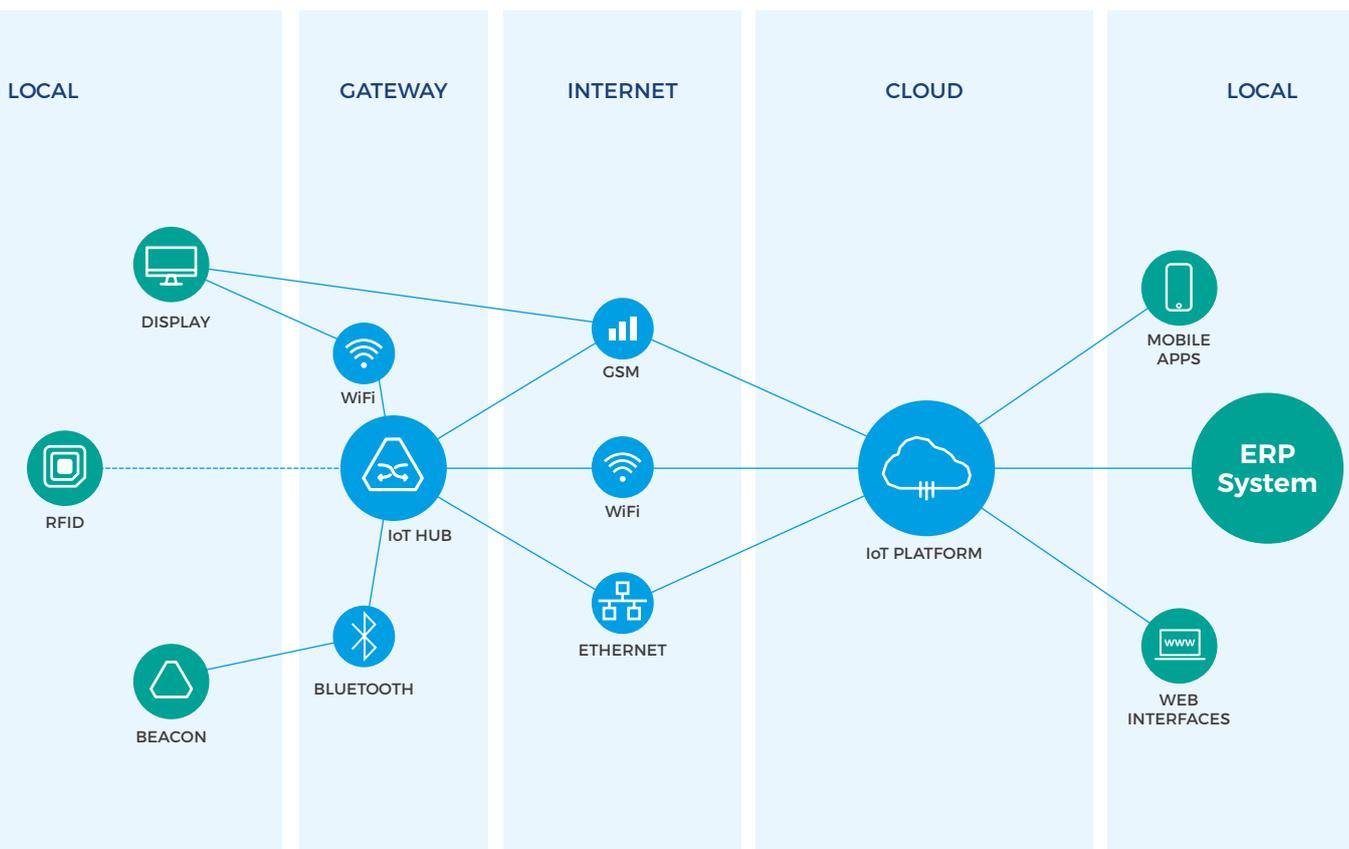
6
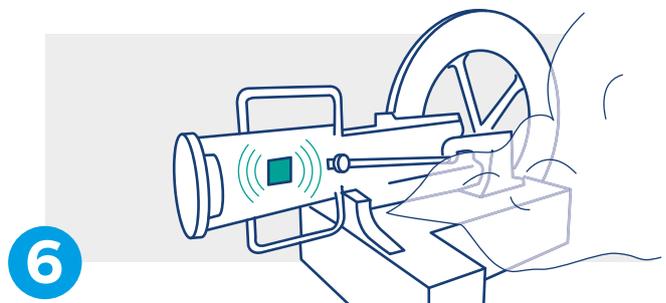
Comarch solutions are designed with particular emphasis on existing plant. Retrofitting eliminates the need to purchase new equipment, enabling legacy system upgrades at lower cost. Sensors with connectivity modules can even be added to the old machinery to give it the same functionality as a brand new device.

HOW DOES IT WORK?

Comarch for Industry 4.0 is a comprehensive system provided in SaaS (Software as a Service) or deployment model. It is composed of sensors with transmitters (e.g. Comarch Beacons) and receivers (Comarch IoT Hubs), connected to a cloud database (Comarch IoT Platform) integrated with the factory ERP system. Transmitters are installed on equipment such as production lines, forklifts, warehouses and components of the final product. Then, production floor data from sensors is collected by IoT Hubs, which are installed in crucial places to cover the whole plant area. After the IoT Hub transfers the data to the IoT Platform, the information becomes accessible online via a web browser and mobile application. Comarch IoT Platform is the heart of the smart factory, the place where all data are stored and analyzed. It allows easy control and management by defining rules and alerts. Comarch IoT Platform is the missing link between the production floor and ERP system.

| LOCAL | GATEWAY | INTERNET | CLOUD | LOCAL |

DISPLAY

WiFi

RFID

IoT HUB

BEACON

BLUETOOTH

GSM

WiFi

ETHERNET

IoT PLATFORM

MOBILE APPS

ERP System

WEB INTERFACES

ABOUT US

Comarch is a leading Central European IT business solutions provider specializing in forging business relationships that maximize customer profitability while optimizing business and operational processes.

Comarch Technologies draws from a wide expertise Comarch has accumulated during 25 years of its business activity in the field of delivering comprehensive IT solutions. Its main concern is to provide the customers with the most reliable and secure solutions that consist of advanced software along with innovative hardware infrastructure supported by professional services.

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