Perinet

Digitalisation made easy

Practical examples of innovative applications with Perinet and Zentinel technology

Digital innovation for Industry 4.0

The digitalisation of industrial processes is the key to increasing efficiency, safety and competitiveness. This booklet presents a selection of use cases that show how companies can achieve these goals with the innovative solutions from Perinet GmbH and Zentinel MDS.

The basis: Perinet technology

As a technology leader, Perinet provides the basis for these solutions. Our Single Pair Ethernet-based Smart Components form the bridge between the machine level and the IT systems. Our basic products are designed to integrate seamlessly into existing infrastructures and offer maximum flexibility.

The realisation: Zentinel MDS

Our partner company Zentinel MDS builds on this foundation and develops customised solutions that are perfectly tailored to the customer's specific requirements. Thanks to extensions and customised firmware adaptations based on Perinet technology, use cases can be implemented in record time - without changes to the machine controls or complex system integration.

Strong team for your digitalisation

The collaboration between Perinet and Zentinel MDS combines technological excellence with customisation. This booklet shows you specific examples from various industries that illustrate the added business value of this partnership.

Who is this booklet for?

- **Production experts:** Find out how you can organise your production processes more efficiently.
- **IT Manager:** Learn how to easily integrate production data into your systems.
- **Decision-makers:** Discover the financial benefits of lower costs and greater security.

Invitation to co-operate

The solutions presented in this booklet are flexible, scalable and ready to use. Let us inspire you and contact us to find out more about the possibilities of digitisation with Perinet and Zentinel MDS.

Monitoring mobile concrete pumps
(Perinet)

The challenge

A manufacturer of mobile concrete pumps needed a reliable system for monitoring line pressure. The aim was to recognise overpressure situations at an early stage in order to prevent damage to the equipment and safety risks. At the same time, the solution needed to be robust and mobile.

Realisation

- periNODE adapters continuously record the pipe pressure via sensors installed directly on the hydraulic pump.
- The data is transferred to a periMICA Edge computer, which stores it locally and visualises it in a web-based dashboard.
- Critical pressure increases trigger alarms, which are reported both visually and by notifications to the control centre.
- The entire solution is designed for mobile use and is powered by the vehicle battery.

Added value

- **Safety benefit:** Real-time alarms warn of dangerous pressure rises, preventing potential damage and downtime.
- **Flexibility:** The system can be expanded with additional sensors without the need for reconfiguration.
- **Cost efficiency:** The cost of the basic configuration per vehicle is a fraction of the cost of a single damage or failure.
- **Ease of use:** Installation is possible directly on the vehicle, without additional housings or protective devices.

Additional application options

- **Pulp and paper industry:** Monitoring of pipeline pressure in slurry transport or water circuits.
- **Water management:** Monitoring pressure conditions in water pipes or desalination plants.
- **Vehicle construction:** Monitoring of hydraulic pressure systems in mobile or stationary applications, e.g. cranes or forklift trucks.

Energy consumption management
(Zentinel MDS)

The challenge

A large residential building needed a precise, automated solution for monitoring and billing electricity consumption per flat. Previous manual meter reading methods were time-consuming, error-prone and not scalable.

Realisation

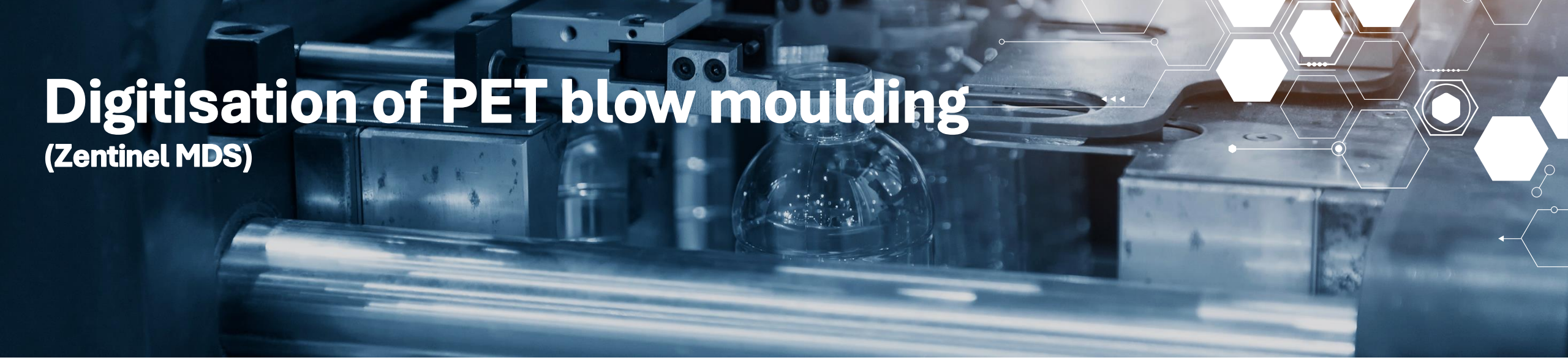
- ZentNodeMT adapters count the pulses from electricity meters (e.g. 1 pulse = 100Wh) and convert them into consumption data (kWh).
- The data is transferred to a ZentEdge server, which acts as a central MQTT broker and SQL database.
- The building management is able to call up both the current and cumulative consumption of each flat via a central dashboard.
- With the help of MQTT control commands, the power circuit of individual flats can be switched on or off remotely as required.

Added value

- **Automation:** Fully automated recording and billing without manual intervention.
- **Scalability:** The solution supports practically an unlimited number of flats.
- **Security:** TLS-encrypted communication guarantees data protection.
- **Cost efficiency:** No additional SCADA systems or expensive control units required.
- **Flexibility:** Ready for immediate use with plug-and-play configuration.

Additional application options

- **Office buildings:** Monitoring the electricity consumption of individual rental units or departments.
- **Industrial plants:** Monitoring the energy consumption of specific machines or production lines.
- **Smart cities:** Integration into urban energy monitoring systems, e.g. for public buildings or street lighting.
- **Public utilities:** Monitoring of pulse-controlled water or gas meters.



Digitisation of PET blow moulding
(Zentinel MDS)

The challenge

A multinational beverage manufacturer in Spain and Portugal needed to integrate a new PET blow moulding machine into its existing MES system. The manual recording of production data and limited access to machine controls led to inefficiencies and high integration costs.

Realisation

ZentinelMDS implemented a fully integrated solution with minimal intervention in the existing infrastructure:

- ZentNodeCT adapters capture the machine's production data, including:
  - of incoming PET blanks,
  - outgoing PET bottles,
  - Level signals from the machine output (jam signals).
- The ZentNodeIO adapters read machine status signals (e.g. from status lights).
- A ZentEdge server, based on the periMICA edge computer, processes and stores the data in an SQL database, which is connected directly to the MES system.
- All communication takes place via a Single Pair Ethernet infrastructure, secured by mTLS certificates.

Added value

- **Cost savings:** No conversion of the machine or access to control systems required.
- **Minimised downtime:** The installation can be carried out without interrupting the production process.
- **Security:** mTLS-encrypted communication and a physically protected infrastructure.
- **Ease of use:** Data can be accessed directly in IT systems via SQL queries, without additional software or network configuration.

Additional application options

- **Food production:** Recording of production data for bottling plants for drinks or tinned food.
- **Pharmaceutical industry:** Integration of packaging machines into existing MES systems.
- **Automotive industry:** Counting and quality control of manufactured components in production lines.

OEE monitoring for packaging lines

(Zentinel MDS)

The challenge

A chocolate manufacturing company wanted to monitor the overall equipment effectiveness (OEE) of its packaging lines in real time in order to identify weak points and increase efficiency.
At the same time, the production data was to be recorded and analysed centrally for long-term optimisation.

Realisation

- ZentNodeOEE adapters captures signals from the packaging machines in real time, including:
  - production speed,
  - unit numbers (good/not good),
  - run- and downtimes of the machines.
- The data is stored on a ZentEdge server, which provides an SQL database.
- The key figures of availability, performance and quality are visualised via dashboards, supplemented by reports for detailed analyses.
- The solution enables easy scaling to additional machines or production lines without interrupting ongoing operations.

Added value

- **Real-time transparency:** production problems are recognised and rectified immediately.
- **Data-based optimisation & increased efficiency**: Long-term analyses of the OEE data leads to a continuous improvement of the processes, minimising downtimes and increasing productivity.
- **Cost efficiency thanks to short installation time:** The installation was completed in just a few hours without any changes to the machine controls, and the solution was implemented without interrupting production.
- **Flexibility & scalability:** The modular ZentNodeOEE adapters allow the system to be easily extended to other machines.

Additional application options

- **Assembly lines:** Monitoring efficiency in the production of consumer goods, e.g. electrical appliances or furniture.
- **Textile production:** Measurement of machine running times and production quality for weaving machines or printing processes.
- **Logistics centres:** monitoring the availability and performance of automated sorting systems.
- **Paper industry:** Analysing efficiency in the production of packaging materials such as cardboard.
- **Plastics processing:** OEE measurement for injection moulding or extrusion machines.
- **Electronics production:** Monitoring the production performance of automated assembly systems.

SAP S/4HANA data integration

(Zentinel MDS)

The challenge

A manufacturing company wanted to integrate production data, such as the number of parts produced, into SAP S/4HANA in real time without modifying the machine control system or accessing existing systems.

Realisation

- ZentNode adapters capture signals from a sensor (e.g. pulses for each completed part) and transmit the data to the ZentEdge server.
- The data is stored in an SQL database that can be accessed by SAP HANA in real time via the Smart Data Access functionality.
- A simple configuration of the ZentNode devices allow the adjustment of counting intervals and data formats directly via a browser.

Added value

- **Direct SAP integration:** Standardised SQL queries enable immediate availability of production data in SAP S/4HANA.
- **Cost efficiency:** No changes to the machine or additional automation programming required.
- **Flexibility:** Several ZentNode devices can work in parallel and be extended to different machines.
- **High availability:** ZentEdge server stores data even when temporarily disconnected from SAP.

Additional application options

- **Chemical industry:** Integration of production data, e.g. mixing quantities or reaction times, into ERP systems.
- **Food processing:** Recording and integration of production volumes and cycle times in SAP.
- **Medical technology:** Data management for production lines that manufacture medical devices or consumables.

Compressed air monitoring
(Zentinel MDS)

The challenge

A manufacturer needed a solution to analyse the use of compressed air in its production facility and identify inefficient systems. The aim was to reduce energy costs and detect leaks without having to rely on complex OT systems (e.g. SCADA).

Realisation

- ZentNode AL adapters collect data from pressure and flow sensors along the compressed air lines and send it to the ZentEdge server via a Single Pair Ethernet infrastructure.
- The data is stored in a local SQL database and displayed in a web-based dashboard that enables both real-time and historical analyses.

Added value

- **Savings potential:** Analyses identifies leaks and inefficient use, which significantly reduces energy costs.
- **Openness:** The data can be queried using any SQL-compatible software, which facilitates access for different IT tools.
- **Scalability:** The system can be expanded with additional sensors without interrupting existing processes.
- **Security:** TLS-encrypted communication ensures the protection of sensitive data.

Additional application options

- **Automotive industry:** Monitoring of compressed air systems used in painting lines or assembly processes.
- **Power generation:** Control of the compressed air supply in turbines or generators.
- **Food industry:** Monitoring of process pressure during pasteurisation or homogenisation.
- **Breweries:** Compressed air monitoring for processes such as filtration or bottling.
- **Chemical processes:** Pressure monitoring in reactors or distillation columns.
- **Pharmaceutical industry:** Control of pressure conditions in the production of medicines or vaccines.

Production data for ML

(Zentinel MDS)

The challenge

An industrial company wanted to continuously collect production data from various machines in order to carry out operational optimisations using AI-supported algorithms.

Realisation

- The ZentNode adapters were connected directly to the machines to collect signals such as cycle times, parts produced and energy consumption.
- Data is stored locally on the ZentEdge server and made available in an SQL database for import into AI systems.
- The solution enables continuous data collection with minimal network and infrastructure changes.

Added value

- **ML optimisation:** Provision of reliable, structured data for machine learning.
- **Cost savings:** No additional hardware or software licences required.
- **Simplicity:** Direct access to production data without IT programming effort.
- **Security:** All communication is TLS-encrypted.

Additional application options

- **Predictive maintenance:** data provision for AI-supported predictions of maintenance requirements.
- **Quality assurance:** Use of production data for AI models for error detection and process optimisation.
- **Warehouse management:** Analysis of cycle times and production data to optimise material flows.

Analysing machine KPIs
(Zentinel MDS)

The challenge

A company wanted to analyse the energy consumption, production capacity utilisation and cycle times of various machines without directly influencing the control systems.

Realisation

- ZentNode adapters collect data from analogue current sensors and production detectors connected to the machines.
- A ZentEdge server aggregates and stores the data in an SQL database, which is used for analyses and reports.
- The dashboard provides real-time and historical analyses of machine performance.

Added value

- **Energy optimisation:** Identification of inefficient energy consumption to reduce costs.
- **Flexibility:** Expansion of the system to include additional machines or sensors without interruption.
- **Security:** TLS encryption protects the data from unauthorised access.
- **Cost efficiency:** Modular design enables a favourable implementation.

Additional application options

- **Heavy industry:** Monitoring energy consumption and efficiency in energy-intensive processes such as steel or cement production.
- **Data centres:** Energy consumption analysis to optimise server capacities and cooling systems.
- **Logistics:** recording and optimising the energy consumption of automated conveyor systems.

Summary

This booklet offers you an insight into the collaboration between Perinet GmbH and Zentinel MDS and shows how innovative technologies and customised solutions are leading companies into Industry 4.0. While Perinet creates the basis for digitalisation with its Single Pair Ethernet-based Smart Components, Zentinel MDS takes this technology to the next level. With specific firmware extensions and customised solutions, Zentinel enables the seamless implementation of your requirements.

The use cases presented illustrate how this cooperation can reduce costs, optimise processes and secure competitive advantages. From the collection of simple production data to complex real-time analyses, this partnership offers end-to-end solutions for the challenges of digital transformation.

Why Perinet and Zentinel MDS?

- **Innovative basis:** Perinet technology provides you with a reliable basis for the digitalisation of your machines and processes.
- **Customised solutions:** Zentinel MDS extends this basis with specific customisations that meet your individual business requirements.
- **Efficiency:** Reduced integration costs and minimised downtime during implementation.
- **Security:** mTLS-encrypted communication protects your data from unauthorised access.
- **Scalability:** Solutions grow with your requirements - from individual machines to networked factories.

Get in touch with us

Take advantage of the experience and expertise of Perinet and Zentinel MDS to make your production processes more efficient, safer and smarter. Our teams are ready to analyse your requirements and develop a suitable solution.

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Personalised advice & next steps

Perinet and Zentinel MDS work together to develop the ideal solution for your specific requirements. Whether it's the digitalisation of your production, the optimisation of OEE key figures or the integration of production data into your IT systems - we are there for you. Arrange a non-binding consultation today!

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