



Control Cloud
by **zähnen**

The AI-powered process control system for maximum reliability and efficiency

in modern water and wastewater treatment plants

Skill shortages, extreme weather conditions and operational reliability pressures make digital support essential for modern plants.

- ACT INSTEAD OF REACT
AI enables early detection of critical conditions and provides a solid foundation for operational decision-making in real time.



Detect faults before they occur.

With your centralized **warning and monitoring system.**



Your Challenges

System vulnerability, loss of time & liability risk

Why traditional operational monitoring is reaching its limits today.

- ✗ Plants are becoming more complex, while staff is becoming increasingly scarce.
- ✗ Increasing risks due to the rise in extreme weather and flooding.
- ✗ Malfunctions are often detected too late or by chance.
- ✗ Legal compliance requires complete data and reports
- ✗ Manual documentation takes time and leads to mistakes.
- ✗ On-site PCs are prone to errors, require extensive maintenance, and are no longer up to date
- ✗ Monitoring trips tie up valuable resources and leave little room for core tasks.



Zahnen Technik combines technology, experience and forward-thinking planning

Holistic system services

Engineering, SCADA, & AI all from a single source

Control Cloud

Future-proof: AI-ready ex works

Retrofit without replacing the PLC

Uniquely streamlined modernization

In-house Innovation

Dedicated research & software teams

Family-Run Excellence in Technology

Trust and Agility



Control Cloud
by **zahnen**

Your central platform for visualization, alerts, reporting & control.

The Control Cloud stays ahead—monitoring, analyzing, and alerting you before assets fall out of sync.



Your system alerts you before anything happens.



Works on any device and is easy to use right in your browser.



A system that thinks ahead and provides support when staff is absent.



AI-ready for automated analysis & predictive forecasts.



Scalable from small pumping stations to large wastewater treatment plants

Core functionalities

- Logging
- Plant visualization
- Complete data storage, accessible at any time
- Automated reporting
- Plant control
- Alarm notification

Your benefits with the Control Cloud.



Better operational reliability

through AI-powered monitoring & early warning systems



Reduced human resources

fewer inspection runs, fewer false alarms, less manual documentation



Automated Legal Compliance

Complete reports, digitally archived



The future of process control technology

- Faster, global access; no on-site PC required
- Automatic updates & backups
- Real-time fault information
- Digital data collection instead of pen and paper



24/7 Monitoring Management

- Asset overview anytime, anywhere, and on the go
- Active alerts
- Direct contact with the Zahnen Technik service team



Scalable & Future-Proof

- Modular growth to meet your needs
- From monitoring to active control
- Compatible with all interfaces
- AI-ready (operational reliability & efficiency)



Maximum connectivity

- Integration of all internal and external structures
- Direct connectivity with specialists
- Ideal for any water and wastewater facility



Legal certainty

- Complete, error-free recording of operational data
- Legal requirements and regulations always kept in view



Intuitive operation

- Role-based access control
- User-friendly interface
- Training through the Zahnen Academy

— ON-PREMISE IS A THING OF THE PAST

Maximum security through hosting in the German cloud.



100 %
DSGVO-konform

Hosting in Germany

- Data center in Berlin
- Tier III certification (>99,99 % uptime)
- No reliance on U.S. providers
- Climate-neutral



Control Cloud
by **zahn**

WHAT DOES THIS MEAN FOR THE OPERATOR?

ISO-certified security

Meets all requirements of municipalities & special-purpose associations

No more in-house servers

Lower costs & fewer risks of downtime

Automatic Updates

No maintenance required by the team



INTUITIVE & BROWSER-BASED —

Secure access without software installation

System control via browser:

Extremely user-friendly with maximum data security.

Your data is always fully protected by TLS 1.2/1.3 encryption (SSL) and secure two-factor authentication.

**Reduces
IT complexity**

**Maximizes
operational reliability**

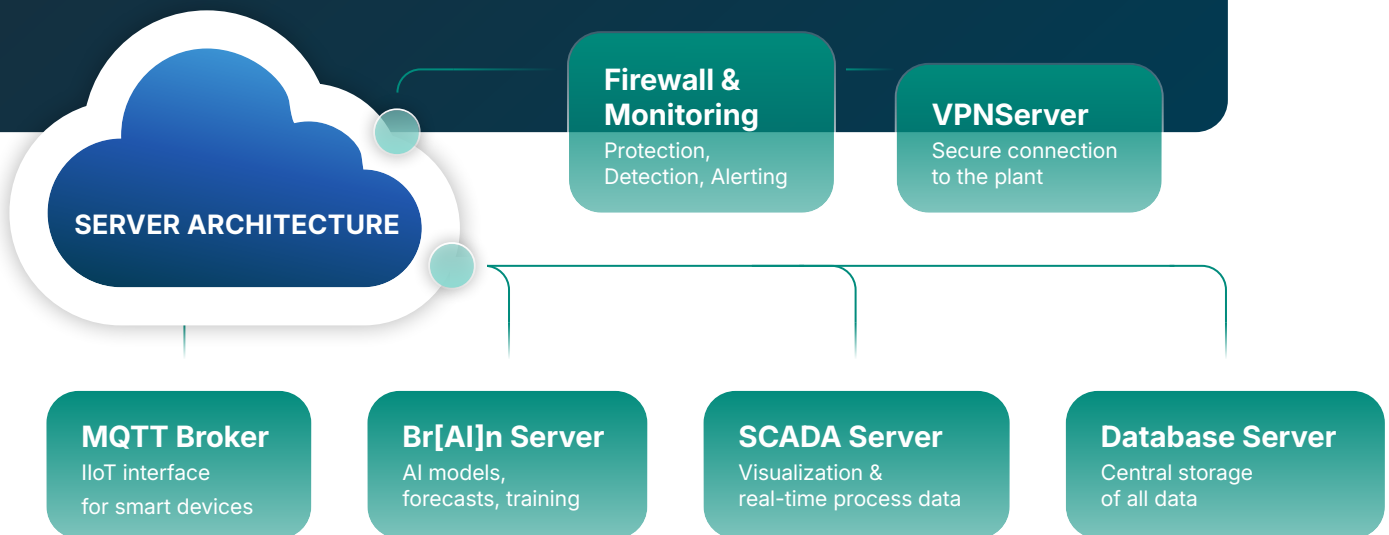
**Saves
capital costs**

— SERVER & SERVICE

A solid foundation for your plant operations.

It takes the pressure off your IT department

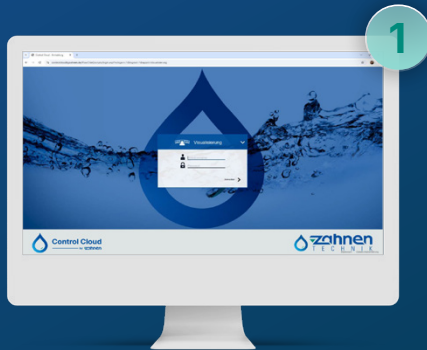
Our architecture handles security, monitoring, and secure data operations. This frees you up to focus on what matters most, while we ensure stability in the background.



- ✓ **Maximum reliability**
- ✓ **Flexible use**
- ✓ **Available everywhere**

SCADA function modules

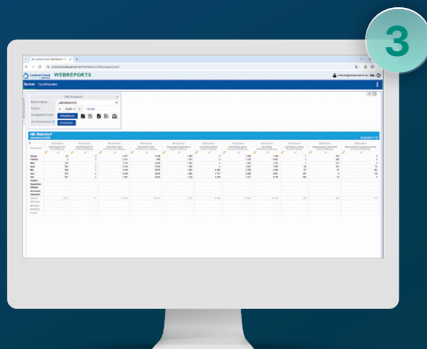
User Management
Secure roles & permissions



Process Visualization
Real-time, HTML5



Reporting
PDF / XLS / CSV



Operations Log (BTB)
For compliant and structured documentation of plant operations

Charts
High resolution
<200 ms



Dashboards
Customizable



Maintenance management
integrated

Alarm Management
Escalation,
On-call schedules



— PROCESS CONNECTIONS FOR CONTROL CLOUD

Cloud connectivity for plants and control systems of any size.

Signal processing devices

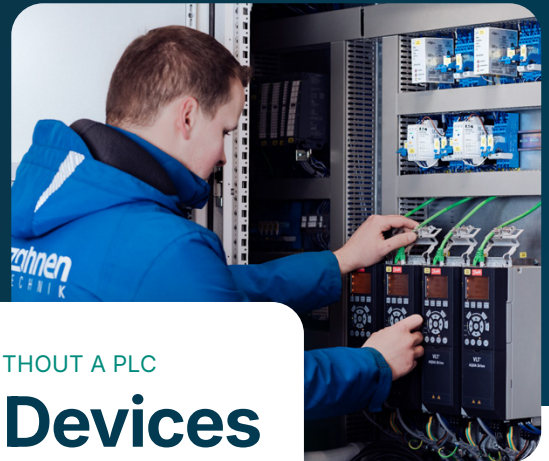
Direct connectivity without a PLC or additional hardware.

IDEAL FOR

- Small stations
- Shaft structures
- Water levels

HIGHLIGHTS

- Integrated interfaces and modem
- Standalone monitoring
- Ideal for compact systems



SIGNAL PROCESSING WITHOUT A PLC

Logging Devices

Ideal for small to medium-sized facilities, level measurement points, or outdoor structures.



Logging XS

SMALL-SCALE SYSTEMS

- LTE transmission
- 2 digital inputs
- Flexible alerting (e.g., for on-call duty)



Logging S

PUMPING STATIONS & SMALL-SCALE CONTROLS

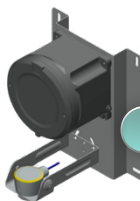
- 10 digital / 4 analog inputs
- Remote access
- AI-ready



Logging Battery L

OPEN CHANNELS & LEVEL MEASUREMENT

- Battery life over 3 years
- Independent radar or pressure measurement
- 15-minute measurement interval, remotely controllable



Logging Battery L EX

CLOSED-CHANNEL MONITORING OF STORAGE & OVERFLOW

- EX certification, Zone 1
- Environmental monitoring during heavy rain
- LTE & AI-ready

KEEP THE PLC, REPLACE THE COMMUNICATION MODULE,
IMMEDIATELY AI-READY

Retrofit Gateway. Modernization without replacing the PLC

Our greatest advantage over other providers
is our innovative strength, which helps us find smart
and efficient solutions.

What makes this solution special?

- No changes to the PLC program required
- Data-efficient: Transmits only relevant values
- Higher polling rates than older modems
- Seamlessly integrates into the Control Cloud
- LTE + MQTT
- Extremely cost-effective
- Plug-and-play installation

Benefits for operators

- ✓ Minimal investment
- ✓ Maximum impact
- ✓ Quick access to modern cloud and AI technology



CONNECTION TO SIEMENS S7 & OTHERS

Gateways for PLCs

Gateway XS

SMALL SIGNAL VOLUMES

- RFC1006
- MQTT / Sparkplug B

Gateway S

SMALL/MEDIUM-SIZED SYSTEMS

- Up to ≤ 200 digital / 50 analog signals
- Ethernet or LTE
- VPN & remote maintenance

Gateway M

MEDIUM-SIZED SYSTEMS

- Up to ≤ 1000 digital / 200 analog Signals
- OPC UA & AI-compatible
- Extra-large data storage in case of connection failure
- VPN & remote maintenance

Gateway L

LARGE SYSTEMS

- Up to 5 SPS
- Multiple connections possible

Gateway XL

AVAILABLE FROM Q1/2027

- Maximum scalability for large systems
- Integration of entire local process control systems



— AI-FEATURES

Boosting efficiency with artificial intelligence

Why we're setting new standards

- ✓ Sustainable energy management instead of just alarm detection
- ✓ Trained on real systems
- ✓ Modular, ready to use & easy to learn
- ✓ No black box

100 %

visibility into the plant

All BrAIIn modules



4Rain – Stormwater Overflow Tank Management

- Detects implausible events
- Automatic DWA Reports
- Ideal for decentralized basins without electricity



4Pump – Pump Monitoring

- Early warning system
- Energy optimization
- Detects clogging, sand, and foreign objects



4Flood – Flooding

- Water level forecasts
- Early warning
- Monitoring of remote locations



4Bio – Biological Treatment

- Weather detection
- Offline emergency mode
- Optimizes aeration, coagulants, and energy



4Leakage – Pipe break

- AI detects pipe breaks
- Integrated weather data



4PAK – 4th treatment stage

- Optimizes PAC & coagulants
- Emergency mode
- Trace Guard-compatible

— YOUR BENEFITS

Smarter with AI & smart energy management

- ✓ Leverage the expertise of your & our experts
- ✓ Save energy through load shifting
- ✓ Optimal use of self-generated energy

Reliable data foundation

We ensure that the necessary information is available in a structured format.



Br[AI]n
— by **zähnen**

AI expertise

We possess the in-depth expertise needed to leverage intelligent algorithms effectively.

Deep process knowledge

We understand the practical aspects of water management down to the finest detail.

Real-world examples of our solutions

Early warning system

Detects blockages in the pump before damage occurs.



Clear signals

Reduces false alarms during rain.



Dynamic control

Ventilation is automatically optimized & saves energy.



Predictive

Level forecasts provide hours of advance warning.



Our AI learns something new every day! That means more intelligence and less stress.

Where does our AI come into play?



Data



Analysis



Recommendations



Control

Key information at a glance

Information & FAQs about
our services & projects.

Added value & operational benefits

→ Typical results

- Increased operational reliability
- More stable processes
- Automated reports
- Greater legal certainty
- A path toward modern plant management

UP TO

25 %

Energy savings

40 %

fewer false alarms

60 %

fewer inspection visits

Investment & cost-effectiveness

→ **Costs vary depending on size and specifications.
We provide a clear, transparent cost estimate.**

Costs depend on

- Number of structures
- Type of measurement points
- Type of connection (logging, gateway, retrofit)
- Scope of functionality (SCADA, AI, control)

We provide a clear, transparent, modular
cost estimate for manageable and predictable costs.

Practical experience & project successes

→ We have already implemented numerous projects in this field.

GREVENMACHER

Commune de Mertert

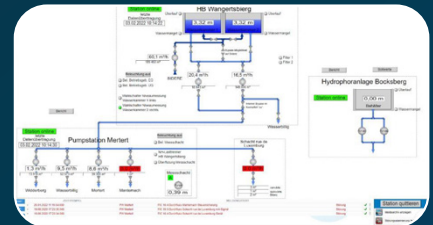
The goal of the project was to modernize the control technology and upgrade the supervisory control system. Originally, a locally installed solution was planned.

SOLUTION

- Plant design, delivery & installation of electrical and control systems
- Project planning & programming of the cloud system
- Cloud Lösung solution instead of a local installation

RESULTS

- More cost-effective than an on-premises system over 10 years
- No IT infrastructure, maintenance, or IT expertise required
- Regular updates, high IT security & availability
- Access from any device, scalable at any time



DISTRICT METTMANN

City administration Heiligenhaus

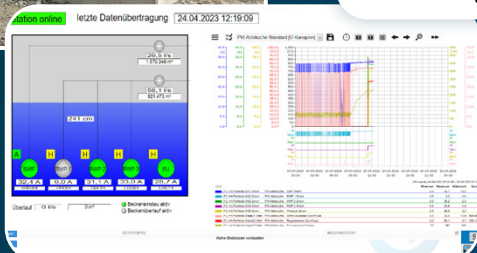
The project aimed to implement a reliable, cloud-based process control system for the existing facilities in the city of Heiligenhaus without requiring any in-house IT infrastructure, maintenance, or specialized IT expertise.

SOLUTION

- Implemented as a customized cloud solution instead of an on-premises installation
- Design & programming of the cloud system

RESULTS

- No IT infrastructure, maintenance, electricity costs, or IT expertise required
- Cloud system with high availability, availability, accessible from any device
- High IT security, regular maintenance
- Scalable, optimized maintenance management & data analysis



MORE
REFERENCES

Water treatment with decades of experience

We are passionate plant engineers

Driven by our vision that everyone has the right to have clean water, Zahnen Technik develops holistic solutions for water and wastewater technology. Founded in 1958, we combine technical expertise, innovative strength, and experience from over 500 projects to ensure water quality and design plants that are both efficient and sustainable.

Our practical experience in the water sector forms the foundation of our Wave Cloud platform.



Zahnen core values

- Effective innovation
- Sustainable value
- Real reliability



CORE COMPETENCIES

Innovative solutions for a safe & sustainable water supply



Digitalization

Efficient planning & reliable expert knowledge with Wave Cloud & Control Cloud



Process Engineering

Reliable process solutions for water & wastewater treatment plants



Standardization

Consistent standards for quality, efficiency, and reusability



Mechanical Engineering

Construction & manufacturing of mechanical system components



Electrical Engineering

Planning & implementation of smart control and automation systems

For over 68 years, we have been combining process engineering with innovative project management.

With a nationwide presence

As part of Deutsche Wasser Holding, we combine local expertise with nationwide reach, drawing on over 1,000 completed projects

100 %

specialized in

water & waste-water systems



Deutsche Wasser Holding

Arzfeld

zähnen
TECHNIK

Rödermark

KURT FREUDENBERG
Technik für Wasser & Abwasser

Bayreuth

KWT ZWT

Eisleben

AWT

Jüterbog

AUGUST FREBE
Wasser- & Abwassertechnik seit 1889

Rahden

HIK
HOCHWASSER- & KANALISATION- & ABWASSER-TECHNIK

Request a workshop

- Gather requirements
- Define specific benefits
- Establish a roadmap





**Because everyone has a
right to have clean water.**

Zahnen Technik GmbH

Bahnhofstraße 24
D-54687 Arzfeld

Tel. +49 6550 9290-0
Fax +49 6550 9290-129

vertrieb@zahnen-technik.de



zahnen-technik.de