



The growing number of sensors and smart devices generating vast data has driven the development of an IoT architecture where edge devices communicate with IoT cloud platforms for quick, reliable processing. This architecture ensures low-latency responses and seamless data flow, enabling real-time decision-making for critical applications, from smart cities to industrial automation. Our innovative approach enhances operational efficiency, minimizes data transmission costs, and scales effortlessly with increasing data demands. By leveraging our technology, the exact condition of buildings can be precisely recorded and diagnosed, much like an exact EKG monitors heart health. This enables proactive maintenance and informed decision-making, significantly extending the lifecycle of infrastructure.

SMART BUILDINGS ARE GAINING IMPORTANCE THANKS TO THE INTERNET OF THINGS

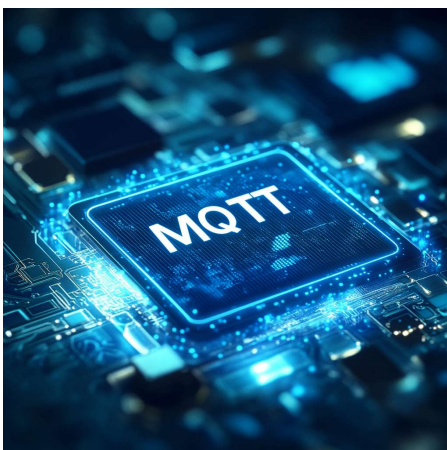
With advanced connectivity and intelligence real estate evolves into smart buildings.

While smart homes serve end customers, smart buildings cater to commercial and industrial needs. Smart buildings use intelligent hardware and software for real-time control of building functions through a single interface. They heavily rely on the Internet of Things (IoT), making smart buildings the third most significant IoT application. By leveraging the power of connected devices, cloud computing, and data analytics, IoT-enabled HVAC systems are redefining the way we manage and maintain our indoor climate control.

KEY FEATURES

Main platform characteristics

- Cloud-native by design, our platform supports both on-premises and cloud applications
- Multitenancy for users and their applications
- Distributed IoT by design
- High-availability system nodes
- Includes modules for databases, analytics and AI, user management, security, governance and compliance, integration and APIs, Data Lake
- Supports MQTT, Modbus, BACnet and other protocols



CONNECTING DEVICES CREATES ADDITIONAL FEATURES FOR YOUR CUSTOMER

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Connecting devices to create a digital twin provides real-time information on their operational status, enabling analyses and assessments.

Digital twins allow for realistic simulations. All stakeholders rely on digital twins to better understand how their devices and work as well as how they are set up and used in practice. In contrast to a device that is not connected, all stakeholders benefit in many ways from connected devices. Advantages include:

- Real-time information on device use and operations, such as time frames and frequency, as well as the status and operation of devices and the building. Hence, connected devices are tremendously appealing to end customers, as they can access information about the condition of their device and building at any time.
- Support technicians can remotely service the device.
- Connectivity creates new opportunities for interaction and new points of contact between device manufacturers and customers.

CASE 1: RESIDENTIAL BUILDING IN MUNICH

45% heating cost reduction:

- Reduction of the daily peak consumption from 2.900 kWh to 1.600 kWh
- Fixing design and installation issues thanks to quick integration of IoT sensors
- No need for gas heating from April to October
- Optimal coordination of heat pumps and gas boilers making a hybrid heating system thanks to IoT data: system integration weak points, temperatures, heating circuits, gas and power meter data, warning and alarm signals
- Understanding: power flows, district heating, losses, load profiles, load distribution gas vs heat pumps
- Improvement: fixing installation issues, optimal heat pumps settings, dynamic heat generation transition
- Design: flow optimization, data acquisition, PV 5x150 kW, EV charging station
- Operation: online available BMS and controls, operational excellence, service management, contracting, PV power supply and contract management

LEVERAGE FIELD DATA FROM CONNECTED DEVICES

The challenge does not lie in equipping a device with a certain technology, but in developing precisely those devices that customers really need. In this regard, connectivity grants us a decisive edge in knowledge." (Andrew France, Bosch Power Tools GmbH)

Initially, a connected device is simple and not smart, but additional data exchange can provide it with intelligent functions without modifying the physical device. For instance, system analytics can use weather data to optimize HVAC system operations. The information generated from connected devices adds value, such as HVAC devices generating data for better sizing and understanding building usage. Real-world data from digital twins helps refine product specifications more accurately than standard estimates. This enables companies to better meet customer demands before production begins.

The digital twin provides real-time status and data on devices, enabling corrective, preventive, and predictive maintenance.

Connected devices reduce on-site service calls and offer longer service life through remote monitoring and predictive insights. Our IoT platform facilitates these services, enhancing maintenance processes and overall device efficiency.



CASE 3: DISTRICT AND HOTEL IN REGENSBURG

Overall costs reduced by 20%:

- Heat and power supply contracting for 75 residential units and a hotel
- Increased operational security thanks to IoT data

MANUFACTURER AGNOSTIC APPROACH

Our IoT platform connects sensors, equipment, and devices in a building to the cloud and external services securely, enabling remote assessment of each connected technology.

CASE 2: OFFICE BUILDING IN STUTTART

Gas consumption decreased by 68%:

- The gas consumption is directly reduced after addressing the problems identified thanks to the quickly installable IoT sensors.
- Rapid design of heat pumps and photovoltaics using IoT data: states, temperatures, gas and power meter data, hot water and return circuits, pump data, flows
- Understanding: power flows, energy production, losses, building physics, outdoor temperatures
- Improvement: new controls, acquisition of all parameters, consumption profile, system temperatures, partial shedding
- Design: 360 kW heat pumps, 120 kW PV, 400 kW boiler for max load
- Operation: online available BMS and controls, alarm management, Computer Aided Facility Management (CAFM), service management, contracting, PV power supply and contract management

PROVIDING DIGITAL SERVICES FOR ALL YOUR STAKEHOLDERS

When systems and devices are connected, their technicians and engineers can access the data and the owner benefits from service.

But if a customer chooses not to take advantage of this service, the business model will not succeed. We therefore rely on additional information for system owners displayed on a different portal where they can check and control their heating systems from anywhere in the world. Owners benefit from helpful information on how to conserve energy and comply with regulations such as ESG reporting.

NEUTRAL INTEGRATION APPROACH

Our IoT platform connects sensors, equipment, and devices in a building to the cloud and external services securely, enabling remote assessment of each connected technology.

A dashboard displays data on energy consumption, presence data visualizations, and equipment usage history for better maintenance. Cloud connectivity allows for the creation of new digital services and provides tenants with necessary information through a separate portal. The platform's open APIs facilitate the integration of third-party hardware and digital services, offering valuable room use data. This data can help optimize cleaning schedules, manage room reservations, and detect unusual building activity.

By leveraging an agnostic manufacturer approach, the platform ensures compatibility with a wide range of IoT devices and technologies, removing dependencies on specific vendors. This flexibility empowers users to seamlessly integrate their preferred hardware and software solutions, ensuring a scalable and adaptable system tailored to diverse needs. Cloud connectivity enhances the ecosystem by enabling the creation of new digital services while providing tenants and users with relevant information through a separate portal. The platform's open APIs play a pivotal role in this agnostic strategy, facilitating the effortless integration of third-party hardware, sensors, and digital services, regardless of the manufacturer.

ARCHITECTURE

Our modern IoT architecture has already been identified as the future of IoT:

For the last several years, enterprises have focused on cloud computing and have been developing strategies to “move to the cloud” or at least “expand into the cloud.” It’s been a one-way, straight highway. There’s a sharp left turn coming ahead, where we need to expand our thinking beyond centralization and cloud, and toward location and distributed processing for low-latency and real-time processing. (Gartner)

SPECIFICATIONS

System Nodes:

- Control nodes are three servers manage the IoT platform and require at least one operational nodes for functionality.
- Workers are computing nodes run cluster services, with universal and dedicated types of workers, where the control servers manage capacity and process migration during node failures, which may cause performance decreases or outages.

Operating System: Linux family

Platform Management:

- System management and monitoring
- Events and alerts

On-premises Application Platform:

- Built for Kubernetes or VMs
- "Build, deploy, and scale."

Cloud Application Platform: AWS, Microsoft Azure, Google Cloud, or IBM Cloud

Data Platform:

- Data and analytics
- Data and ML governance
- "Collect, Organize, Analyze"

Storage Options:

- NFS
- AWS S3
- Azure BLOB

PARTNER WITH EXPERTS

Collaborate with IoT and HVAC specialists to develop a tailored IoT strategy and implementation plan that aligns with your unique business needs.



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Supported by:  AI TECHNOLOGIES



Cloud-native by design

The IoT Platform integrates data and AI services to modernize workloads, optimize resource use, and streamline IT operations, enhancing scalability and efficiency while reducing costs. Integration of digital twin BIM model enables mapping digital and real assets with visual color-coding and reports.

Multitenancy

The IoT platform supports multitenancy by allowing different users to run multiple independent application instances to operate in a shared, yet logically isolated, environment.

Remote locations

The IoT platform can be deployed on a cluster with remote physical locations, which are registered and added to the control nodes, allowing users to deploy workloads across these locations.



Central IoT & Cloud
Databases
Analytics and AI
User management
Security
Governance
Compliance
Integration and APIs
Data Lake

MQTT

Distributed IoT

MQTT
Modbus
BACnet
...

Physical devices
and sensors
SCADA and BMS



Smart IoT Dashboards

Our IoT solution features advanced dashboards that transform vast data from smart devices into actionable insights, enabling real-time monitoring, efficient energy management, and precise diagnostics for building conditions, much like an exact ECG for infrastructure.