Telemetry Controlover the Boilerhouses Network

Sibedge company has designed and developed a system for boiler houses network monitoring and management automation.

About Client

A large heat and power company that owns dozens of boiler houses on the territory of Kazakhstan. It provides transmission and distribution of heat energy, as well as maintenance and repair of heat networks.

Challenge

The company's strategy is aimed at minimizing the costs associated with operation and maintenance of the boiler houses network. For this purpose,a centralized remote control system was required that would provide control over the set temperatures, uninterrupted production and supply of heat during the heating season.

At the initial stages the customer tried to use the solutions of Owen, which produces measuring equipment. But the systems of this manufacturer were too slow, worked on a schedule, not in real time, and it was difficult to adapt them to a variety of equipment used in boiler houses. As a result, the customer decided to develop the customized system able to meet their requirements and contacted Sibedge.

Industry
IoT

Location
Russia

Key points

- Developed a remote centralized control system.
- Reduced response time to accidents and emergencies.
- Optimized fuel consumption in the network of boilers.

Team
Project manager — 1
Hardware engineer — 1
Embedded engineer — 1
QA engineer — 2
Python developer— 2

Duration
5 months

Technologies
Python, Modbus, Embedded C, Kubernetes, GSM, LoRaWAN

Approach

Communication with client was based on the following principles:

Quick Start

Transparency of process

One-Hour Response

Scalability

High level of trust

As a solution, Sibedge engineers suggested an Automated Control & Monitoring System (ACM) which could provide feedback in case of emergency.

The project stipulated development of a set of hardware and software tools, which, among other things, included:

- Two-loop hardware controller for boiler house control.
- Wireless data transfer module and backup power supply.
- Software to control the boiler house controller.
- Array of wireless sensors to collect data from the boiler equipment.

The system would monitor deviations of boiler critical parameters from the specification in 24/7 mode. In the event of emergency, a light-and- sound alarm would be triggered and would attract attention of the personnel.

The alarm would be also sent to the central control room, from where all the company's boilers would be managed. In addition, a security system was developed that could signal opening of door and window locks, as well as intruders' presence in the boiler house.

System development took a team of seven experts five months. Core technologies used: Python, Embedded C, Kubernetes, Modbus, LoRaWAN, GSM, PLC.

Result

The system was successfully deployed at one of the customer's boiler houses. Thanks to its flexibility and modular architecture, it can be easily scaled andadapted to any new hardware.

Numerous sensors in real time monitor significant parameters, such as:

- Temperature inside the boiler furnace and inside the pipe.
- Temperature of the heat transfer agent at the input and the outputof the boiler.
- Temperature of heated objects and the outdoor air.
- Current heating system pressure.
- Amount of fuel consumed by boilers.
- Heat transfer agent consumption per hour and per day.

The data received from the sensors is continuously sent to the database located on the company's server.

Based on this data, operators can remotely control temperature, fuel consumption, and monitor condition of the boiler equipment. In case of emergency situations, the engineer responsible for the boiler is notified via SMS.

The implementation of the system allowed the customer to significantly reduce the number of employees servicing the boiler houses network and optimize fuel costs. Now all the company's boiler houses can be managed from a central control room.

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