Refrigeration Equipment Monitoring System

Fresh food always and no equipment failures

Summary

Sibedge has developed and implemented a monitoring system for industrial and commercial refrigeration equipment for Lama Group of Companies.

Team	Duration	Technologies
Project Manager — 1	6 months	Python
Hardware Engineer — 1		ARM
Embedded Engineer — 1	Industry	Embedded C
QA Engineer — 1	IoT	Kubernetes
Python Developer — 2		GSM
		LoRaWAN

About Client

Lama Group of Companies was founded in 1992. Today it owns more than 50 stores and a large food processing plant that produces semi-finished meat, sausage and confectionery products. The company employs more than 4,600 people.

Challenge

More than 800 refrigeration units that operate 24/7 are installed at Lama Group of Companies commercial and industrial premises. At the same time, there was no single system for equipment monitoring. The temperatures inside the refrigerators were hand-recorded into the notebooks, and it took several days to set the correct operating mode for each unit with the help of an expensive device. There were cases when equipment failed or there was a leak of refrigerant, but the employees did not notice it immediately, which led to stored goods damage and multimillion-dollar losses. The company needed a simple and effective solution for timely detection of failures, as well as for automatic data collection from the refrigeration equipment.

Solution

Sibedge experts suggested creating a system for refrigeration equipment network monitoring based on an existing software solution of their own design. This solution included a web interface, a cloud data storage, an SMS notification system, and an array of wireless temperature sensors. The digital sensors used in the project would not require long calibration, characterized by high stability, long service life and low power consumption. Temperature data collection would now be fully automated:

- data would be collected from the wireless temperature sensors via Wi-Fi;
- then it would be processed and analyzed by a special algorithm;
- after that it would be uploaded to the company's cloud data storage.

Wireless data transmission saves the customer from having to lay hundreds of meters of additional wires from one refrigerator to another. In case of emergency SMS notifications are sent to technical support so that they can quickly fix the problem. It took a team of 6 developers 6 months to develop the project. Core technologies: Python, Kubernetes, Embedded C, LoRaWAN, GSM.

Result

The first version of the monitoring system was implemented at the enterprise just two months after the start of development. This allowed the client to immediately start using the basic functionality of the solution and evaluate its following main advantages in comparison with previous experience:

- time and cost of setting refrigerators have been significantly reduced;
- correct operating modes have increased equipment useful lifetime;
- the load on multi-compressor central refrigerating plants has been optimized;
- temperature data is automatically uploaded into the cloud;
- data can be accessed through the corporate web portal.

The system not only automatically notifies technicians of failures, but also describes the failure: if the refrigerator compartment is broken, or the compressor is out of order, or there is a leak of refrigerant. Inventory loss is now kept to a minimum. And thanks to correctly selected operating modes, power consumption and operating costs have been significantly reduced.