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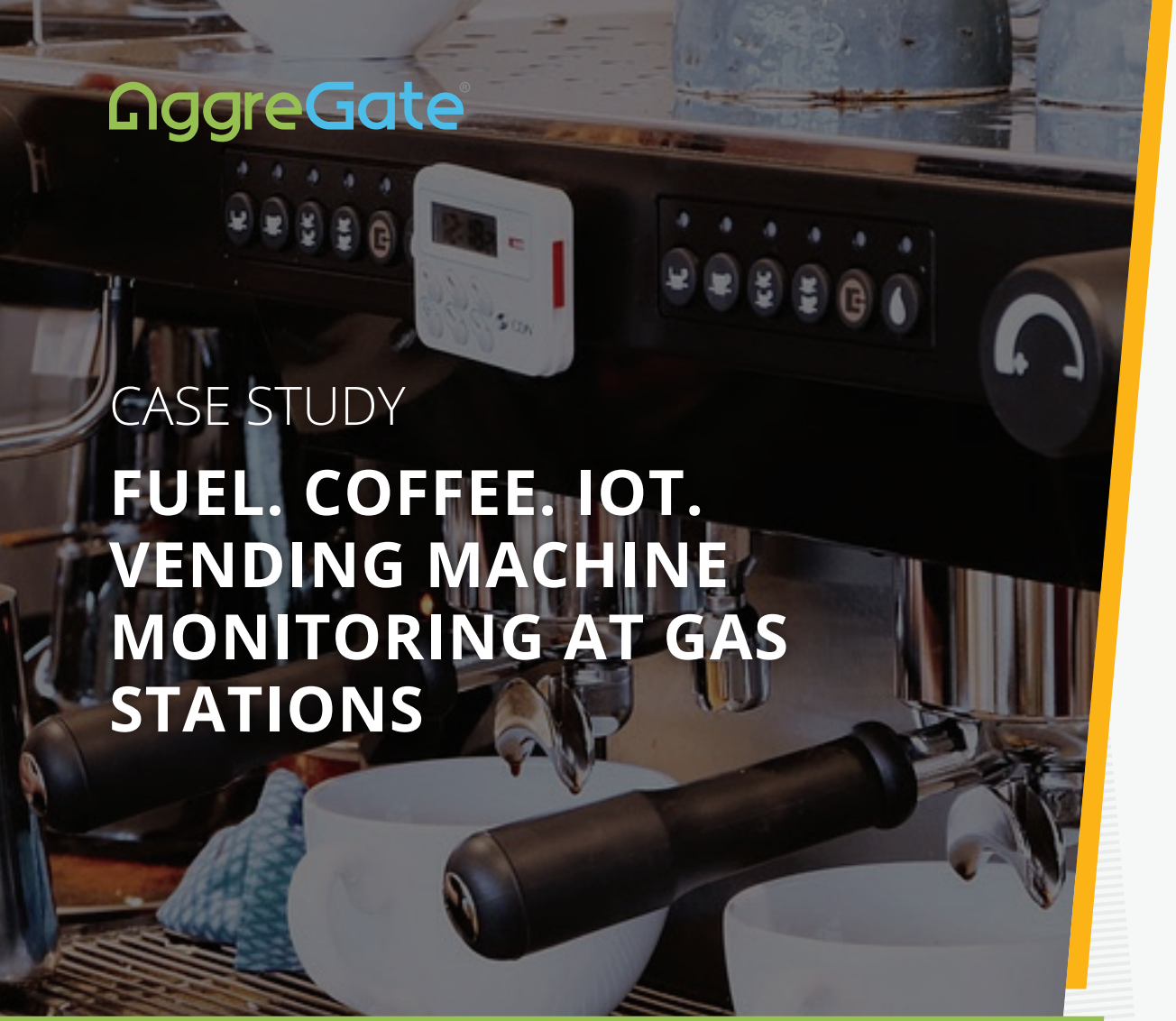

CASE STUDY

FUEL. COFFEE. IOT. VENDING MACHINE MONITORING AT GAS STATIONS

INDUSTRY

OIL AND GAS

COUNTRY

Russia

Tibbo SYSTEMS

PARTNER

INNOWATT

Innowatt

Developer and system integrator, develops smart technologies and products.

PARTNER

Yandex Cloud

Yandex.Cloud

Cloud services complex for organizations and technical specialists. Infrastructure services ensure the project with core resources: establish data processing and storage, safe access, and traffic exchange. Thanks to platform services you can develop applications based on managed databases, as well as use speech technologies and machine translation.

PROJECT TASKS AND CHALLENGES

"Profit from one cup of coffee is equal to 6 liters of fuel"

The customer was a retail store at a fuel station in the Moscow region in this project, where a professional coffee machine was located. When buying it, an IoT block was not ordered, which would allow collecting accurate data and receiving analytics on the drinks consumption. When the owner began to count the cost of supplies and thought about the equipment control, it turned out that obtaining data for analysis was not easy. It was necessary to recognize operation modes, organize data storage, visualize the appropriate indicators in graph form. Four contractors worked on the task and the Innowatt company was the fifth one.

Strictly speaking, initially, the goals were broader and also included collecting data from a baking machine and a CO2 sensor, but the task related to the coffee machine turned out to be the most interesting and difficult. Innowatt solved it with the Yandex.Cloud services and the Tibbo Systems company.

The following was important for business:

1. Sort out the real costs and enhance processes transparency;
2. Build an efficient accounting system and reduce losses by ensuring accurate and reliable measurements.

Two hypotheses expected to be tested during a pilot project:

1. If AggreGate IoT Platform and the Yandex.Cloud computing infrastructure were compatible with IaaS services;
2. If it was possible to use the IoT platform in the cloud environment in order to provide both easy and convenient access and reliable industrial operation.

SOLUTION

The basis of the solution was Yandex.Cloud virtual machines, on which AggreGate IoT platform was easily launched. It was important to ensure secure data exchange with customer devices via the MQTT protocol over the TLS connection. The Yandex IoT Core service was chosen for this.

Since we quickly worked out the integration with Yandex.Cloud, we focused on working on business logic: pairing a programmable controller, developing a structure for data storing and aggregating, configuring a service model containing the basic functions necessary for receiving data from sensors, and setting up dashboards.

Careful pre-project facility investigation played a great role in the success of the project. We found a problem typical for small retail stores: the electric system was poorly made. Phase imbalance and poor climatic equipment management significantly affected energy consumption.

Thermoplan BW3 Coffee Machine

The coffee machine turned out to be sophisticated equipment that combines a cooler, heater, and other electrical devices complicating the analysis of energy consumption and recognition of operating modes. The extensive experience of Innowatt specialists helped to solve those tasks successfully. The FESKOM company — the RnD division of the group of companies including Innowatt — carried out data mining.

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SCREENSHOTS

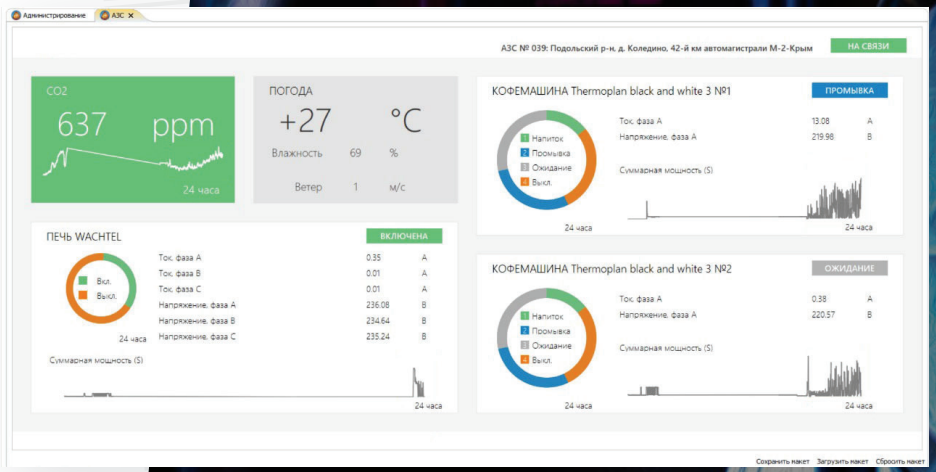
We recognized the operation modes at its most detailed level, even in more detail than we had planned initially. For example, it was obvious that the system understood the type of prepared drink and the portion size, but in addition to this, we managed to recognize many internal modes — for instance, turning on the internal milk cooler for a cappuccino. It meant that cappuccino really had its own pattern in terms of the analytical system.

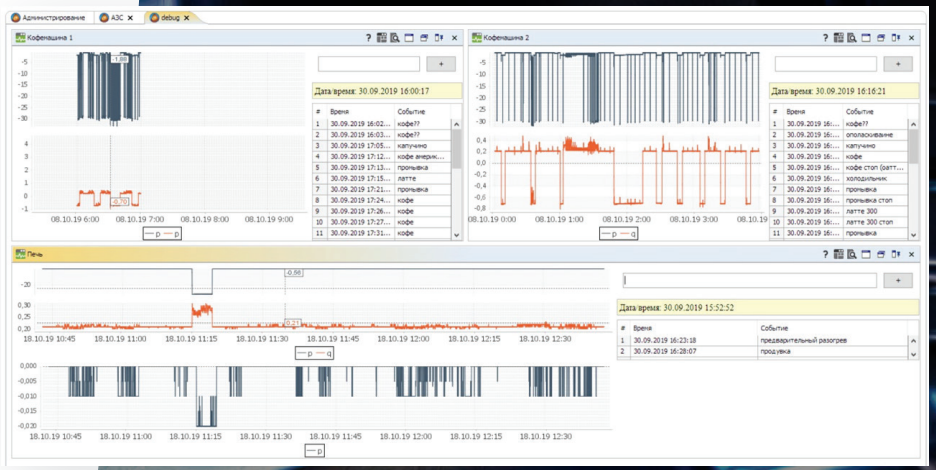
According to the pre-project investigation, a test bench was deployed, the performance of the hardware and software solution components was verified, as well as their compatibility with the Yandex.Cloud computing infrastructure in terms of virtual machines.

The implementation included several stages:

1. Monitoring equipment installation at the customer's facility;
2. Computing infrastructure deployment in Yandex. Cloud (X64 virtual server, 12 GB RAM, 4 cores, 200 GB of free memory in the data storage system);
3. Pairing a programmable controller located on the automation object with AggreGate Server;
4. Testing Yandex IoT Core service for secure data exchange.

The customer has access to the dashboard where data on the device and controlled modes is displayed in a convenient form: status on / off, date and time of inclusion, statistics on the inclusion of modes.





BENEFITS

Analytics from the aggregated data

Visitors of the retail store drank cappuccinos most often. Of course, this is not the main result of the project, but the created system was able to "recognize" this fact as well. The pilot project was implemented successfully and in full. All tasks were completed in a short time - up to 4 weeks.

Ability to estimate the impact of staff on product consumption and sales

The customer is pleased with the real-time monitoring of the equipment usage on the trading floor and with receiving regular statistical reports.

Cloud integration

The industrial Internet of things highly likely suggests the factory's machinery and workshops. In fact, the equipment can be anything. This solution is a classic Cloud integration with the popular IoT platform represented on the market for a long time. Yandex.Cloud IaaS services allow you to:

- Deploy IoT platforms for each user's tasks and build a comprehensive SaaS IoT service easily enough and with minimal labor input.
- Increase the efficiency, scalability, and failover of IoT platforms by using PaaS (for example, Yandex IoT Core and Managed Databases).

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QUOTATIONS

"Initially, we just deployed the application on the Yandex.Cloud VM, but it would be logical to use Yandex IoT Core from the very beginning in such a project because all the MQTT protocol features were used in it. This immediately increases reliability and information security even in such a small project, and when scaling, you can still expect a gain in speed. After this pilot project, we are transferring our solutions to Yandex.Cloud technologies."

Oleg Bukhtiyarov
Technical Director, Innowatt

"We are pleased to note that thanks to the professionalism and well-coordinated work of the Innowatt and Yandex.Cloud teams, all the technical tasks related to the implementation and development on AggreGate were completed by them independently without additional support from Tibbo Systems. This case confirms our business model very well: as a vendor, we focus on the technology development (AggreGate IoT platform), and our partners successfully create and implement solutions targeted at the customer's business tasks."

Alexander Dolbnev
Business Development Director, Tibbo Systems

Tibbo SYSTEMS

Tibbo Systems is a part of an international company group leading in hardware and software solutions for the Internet of Things, IT infrastructure management, industrial and building automation, remote monitoring and service, physical access control, and data center management.

We develop, deploy and service solutions based on AggreGate IoT Platform. Established in 2001, Tibbo Systems takes care of developing AggreGate Platform itself, as well as all vertical market products based on it. There are many software professionals, IT infrastructure engineers, automation experts and IoT gurus in our core team.

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