

Achieving Centralized Asset Management With Simplified Edge-to-cloud Connectivity

A very large producer of air separation equipment and supplier of industrial gases in Russia used the IIoT to monitor their air separator equipment in the field and track energy consumption. A dashboard that can be accessed from anywhere provides real-time reports from the field by the second.



Softline

Industry: IT

Global Headquarters: Moscow, Russia

Number of employees worldwide: 4,800

Challenges

- A limitation in the legacy SCADA system means that collecting real-time data is very expensive
- Upgrade the system without changing existing platforms or encountering costly budget overruns.

Solutions

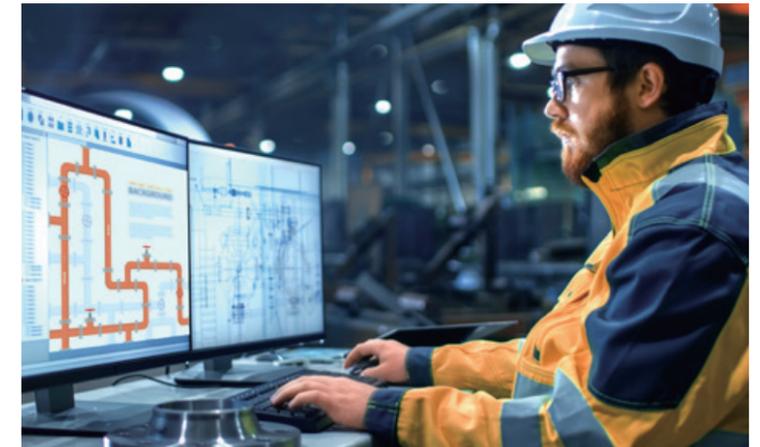
- Moxa's IIoT Gateway with ThingsPro support requires zero programming efforts, which simplifies OT data acquisition
- Moxa's IIoT Gateway uses MQTT protocol and a built-in client for Azure services to deliver OT data directly from the edge to cloud platforms
- Microsoft Azure Cloud Services offer flexible tools for application development and secure communications via the Azure IoT hub

Results

- Real-time monitoring of sensors and acquisition of energy consumption data
- Analysis of equipment performance and error protection to boost productivity

The company needed a service for remote monitoring of an air separation plant and collection of data with a specific set of metrics. The project objective was to develop a mathematical model to optimize the process of maintaining equipment and a number of related business processes including: procurement, supply, client relationship management, financial services, and production planning. The service should collect, transform, and store data for further analysis, as well as for further solutions:

- For remote diagnostic maintenance (the service ensures real-time integration of telemetric data into the mathematical model for predicting the outage of air separation units).
- For prognostic services (to help predict the time that pump maintenance should be performed on remote pump stations to avoid unplanned equipment failures and stoppages).
- To determine the production function (to search for various combinations of production factors to maximize production output).
- To analyze the impact of temperature, humidity, and ambient air composition on performance.



“It is one of the pioneering IIoT projects in Russia” said Sergey Belyaev, Project Director at the Strategic Project Management Division at Softline, who oversaw the pilot. “The company will widely adopt this technology within the next three years. Together with Moxa, we are already able to offer it right now.”

Limitations of the Legacy SCADA System

The legacy SCADA system was capable of running their equipment, but subject to severe limitations. It lacked the capacity to collect real-time data, or transfer it to remote locations. Moreover, the information that was gathered could be stored for only 30 days, making long-term observation and predictive monitoring impossible. The SCADA system lacked the capability to automatically track the output values from the air separator units.

This meant that, in order to provide their integrated services to customers, the specialists at the company had to travel on-site both for standard maintenance and to address equipment malfunction. The frequency was dependent on the conditions in which the units were housed, and the rate of utilization. On the other hand, the end-users were forced to keep a full-time operational engineer to run the system. They were also at a competitive disadvantage, because they did not have an up-to-date picture of their gas production values, which had to be measured manually just once every shift.

Simplicity of Development and Implementation

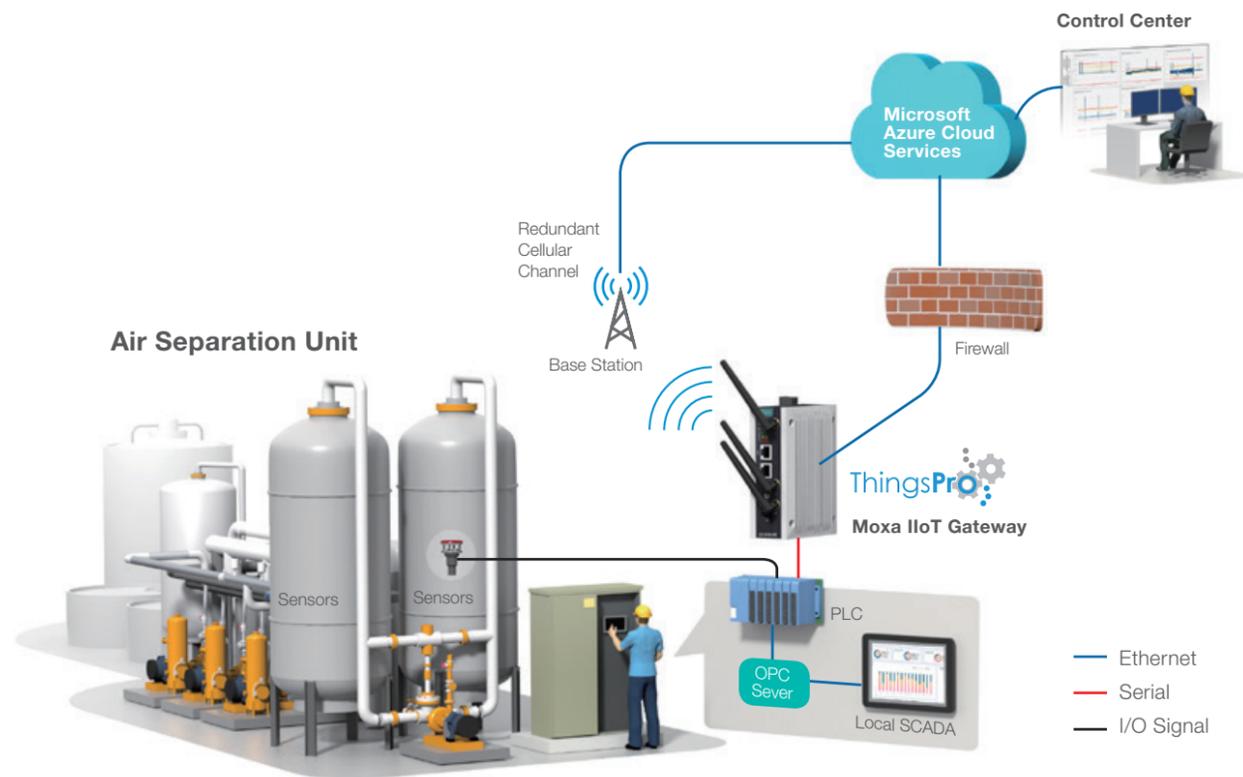
It was noted that the challenge was not just the new technology and how to implement it but also about getting the buy-in from the companies management and convincing them that the system can be implemented without costly budget overruns. Softline opted for an IIoT solution that incorporates a Moxa IIoT edge gateway and Microsoft Azure Cloud Service. Azure IoT Hub enabled development of a workable proposal in just two weeks using existing templates.

For the software part, Moxa's IIoT edge gateway features ThingsPro Gateway, which enables easy acquisition of OT data and delivers it directly from edge to cloud platforms using MQTT protocol and built-in clients for Azure. ThingsPro Gateway not only provides IIoT connectivity without requiring additional programming efforts, but also helps implement edge intelligence and centralized asset management. For the hardware part, Moxa's IIoT edge gateway is an embedded computer for industrial applications. It can work in unfavorable conditions and use traditional RS-422/485 interfaces to connect to a PLC and wire-based Ethernet or LTE are used for Internet access.

"We needed to offer them a comprehensible implementation of an Industrial IoT system. And we were able to do that." says Sever Sudakov, a Senior Field Application Engineer at Moxa, who was part of the project.

Initial resistance came from those furthest away from the functional part of the solution.

"The most difficult part was convincing the client's security department that providing external internet access would not make them vulnerable. They were scared that access to the cloud could result in their confidential data and trade secrets being compromised," says Belyaev. "Though, of course, thanks to end-to-end encryption, their risks are minimized. "But once the prototype was in place and could be demonstrated first-hand, the benefits were self-evident.



Real-time Online Dashboard Accessed From Anywhere

The company is now able to remotely monitor 11 different production values for its air separators, such as oxygen, nitrogen, and argon, and the quantities that are available for a potential customer. In addition to this, existing energy consumption sensors collect 44 individual measures of electricity usage throughout the unit, which is key for a power-intensive production process, where electricity is the main operating cost. Reports can be viewed



through a real-time online dashboard that can be accessed from anywhere. A reporting software compiles the information collected from the field by the second and produce reports for any period of time.

The company now has a better understanding of its equipment, which has allowed them to boost productivity. Maintenance costs have been lowered manifold, staff time has been freed up, while transparency has increased between the head office and the St. Petersburg plant, leaving less room for potential issues.

The project has received official recognition, winning the Microsoft Inspire Partner of the Year prize in the Manufacturing category in 2018.

In the future, in addition to expanding the number of real-time indicators, Softline and Moxa plan to roll out the solution to all air separation units. There is also a plan to use the invaluable information that is already being added to the company's database to introduce the ambitious predictive maintenance functionality that could bring high financial returns.

"This is a signature project for us and we want to use this experience to replicate and export this solution worldwide. Moxa can enable clients to build data-driven connected plants, and Softline can assist clients to turn their data into value. By working together, we can realize the vision of digital transformation and fundamentally change our customer's business model" says Sudakov.