Benefits

- Monitor transformer status in real time

- Optimise its performance and predict its remaining lifetime

- Evaluate the risk of failure in advance

- Schedule maintenance activities based on actual conditions to optimise the associated costs

- Actuate controls on the devices to optimise consumption and thus achieve energy efficiency

Solution: Remote Data
- www.ewon.biz/remote-data -

System Integrator:
W2W Solutions Italia Srl
- www.w2wsolutions.it -

Customer: Tamini Trasformatori
- www.tamini.it -

Distributor: EFA Automazione
- www.efa.it -

Give Your Transformer An Extra Life
A story about preventive maintenance & MQTT

To ensure a long working life of its transformers for steelworks, Tamini Trasformatori has implemented an advanced real-time remote control and history data analysis solution for preventive maintenance. At the core of the system developed by W2W solutions lies the eWON Flexy IIoT gateway using MQTT technology.

Remote assistance for transformers is often provided in the field of energy distribution networks while it is still very new when it comes to metallurgy. Tamini Trasformatori designs transformers for networks and steelworks. The function of the transformers for steelworks is to prevent alternating cycles of high energy stress (electric current and power). Their operation must be continuously monitored; otherwise, there is a risk of deterioration and damage to the system.

Continuous data monitoring for preventive maintenance

Sophisticated algorithms first analyse the transformers historical data. Then a compilation of trends reveals the process status and predicts future conditions. The data which the monitoring system is based on include: the system data (voltage, current, temperature of cooling water, etc.), and specific machine data (temperature, oil levels, alarm signals, gas content in oil, the absorption of various components, position and number of actuations of the switch, etc.). The solution calls on advanced and smart instrumentation capable of providing data in real-time to collect these specific data from the machine.

The information that is gathered and appropriately processed allows for evaluation of the transformer performance together with the actions to be taken to optimise operation. As a second step, the system enables Tamini Service personnel to take remote action and provide real-time support to the customer/user.

Also, alarm thresholds can be defined by the Tamini specialists. In transformer operating conditions, if the pre-alarm threshold is exceeded, notifications are automatically generated and sent to Tamini Service personnel, who take timely and proactive action to solve the problem. In most cases, interventions can be done remotely, which drastically save time and costs relating to onsite travels.

Maximum simplicity and integrability

Tamini's initial intention was to base the application on a standard analogue/digital interface by wiring every sensor with a series of cables to carry the signal. As an alternative, W2W Solutions redesigned the solution using a single communication bus, Modbus. This reduces the wiring and optimises the system from the standpoint of cost and lightness.

An IIoT gateway fully adaptable to Tamini's field requirements

For this IIoT project, W2W Solutions and Tamini decided to use eWON Flexy routers from HMS Industrial Networks with MQTT technology. eWON Flexy is a combined remote access router and IIoT gateway designed to fully adapt to the requirements of many different industrial applications. W2W solutions chose to build the remote-control architecture around this device mainly for the versatility of the product concerning hardware interfaces in the field. It is made up of combinable modules: choosing the most appropriate functions and protocols for your own needs, then connecting them, and finally, personalising the flow control and management applications. With the need to interface analogue inputs, digital inputs, and Modbus/TCP and to send data wirelessly on a 3G/4G network, eWON was able to guarantee maximum integration of the parts.

## MQTT technology for data transfer

The Flexy device supports MQTT technology which is fully compatible with the CoIOTe Platform cloud system (www. coiote.io) developed by W2W Solutions.

MQTT is a very lightweight and reliable protocol that is catching on, thanks to the arrival of the Internet of Things. The protocol is much appreciated as it guarantees data transfer even when connections are not entirely stable.

A successful IIoT project

Tamini has gained several advantages by implementing such remote monitoring and control system. For starters, there is an opportunity to offer customers the possibility to continuously monitor their transformers with obvious improvements in preventive maintenance, transformer lifetime, and cost optimisation.

The real-time control of operating data enables a whole set of functionalities that provides energy efficiency. eWON Flexy's versatility in interfacing with the field and the cloud has brought simplicity and performance to the system architecture. The use of the MQTT protocol to transfer data has simplified communication and guaranteed lightness and stability in line with IoT directives.
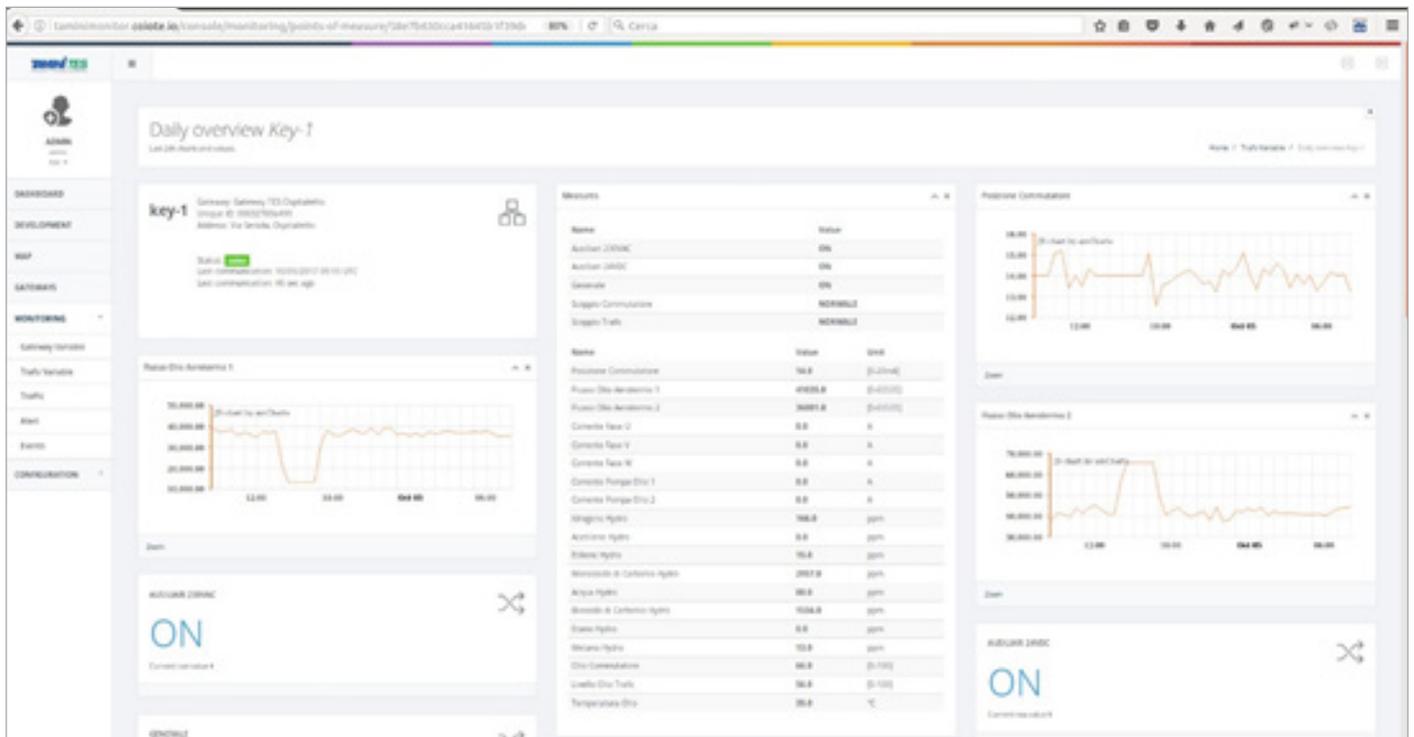
Tamini's remote monitoring and control system in action - running on Coiote IIoT Platform developed by W2W Solutions.