



LTE ROUTER ENABLING GENERATOR PREDICTIVE MAINTENANCE

HIGHLIGHTS

- ✔ [Pragma](#) offers real-time online monitoring of asset condition and health as well as predictive maintenance of client solutions to enhance their operational efficiency and maintenance task admissions.
- ✔ Pragma's client required remote data acquisition from its generators for predictive maintenance throughout its entire system, enabled through the Modbus RTU protocol.
- ✔ Our RUT956 LTE router, with its robust network connectivity transmission and support of the RS485 interface, enabled Pragma's EAMS (On Key) platform to assist its client in extracting data, such as fuel levels, and transmitting it to Azure IoT Central.

THE CHALLENGE – WHEN MAINTENANCE ISN'T OPTIONAL

The fuel-powered generator market is expansive and shows no signs of slowing down. Expected to reach a global value of [\\$74.1 billion by 2032](#), generators will continue to be a popular power source in the coming years. This is particularly relevant in South Africa, where [frequent power outages and load shedding](#) perpetuate the ongoing energy crisis.

Since such generators are and will continue to be high-demand products, ensuring their longevity and operational efficiency is non-negotiable. But this is where things get complicated.

Generators are complex devices that involve electrical, mechanical, and electromagnetic components. All of these components must be maintained to prevent one malfunctioning part from damaging another.

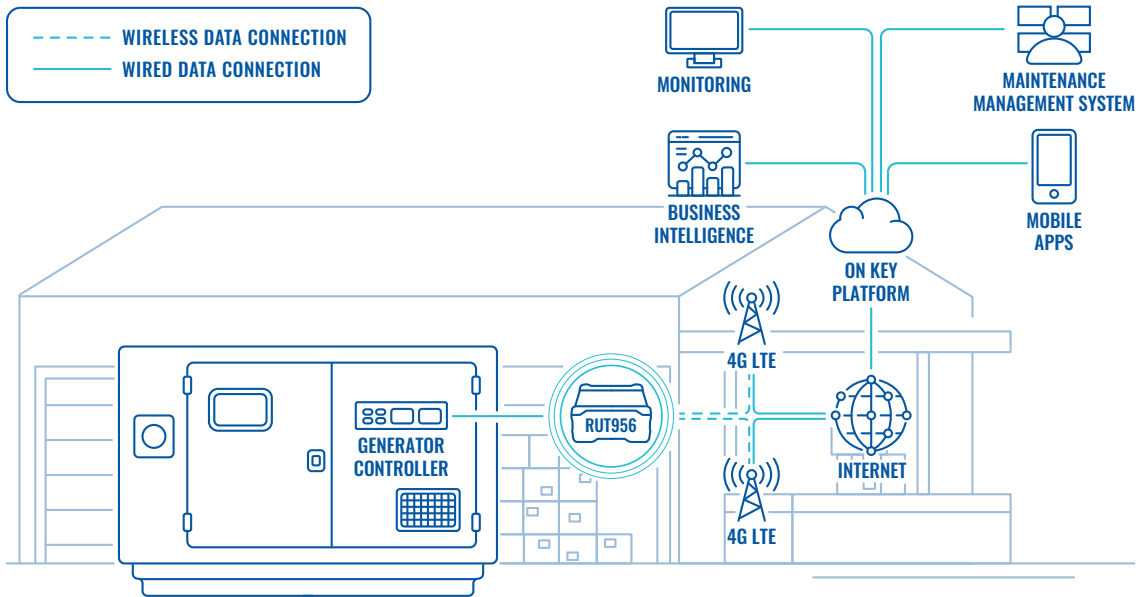
Indeed, if not taken care of, this could lead to a series of unfortunate events, as unmaintained generators can become potential fire hazards or sources of environmental contamination by releasing poisonous gases.

All this stems from a root cause: the lack of generator maintenance posing risks to the solutions it powers. Such risks include unreliable power supply and the jeopardy of critical operations.

Implementing predictive maintenance for the generator's health and operational efficiency is the best way to prevent a chain reaction of unfavourable outcomes.

Pragma's client, [Fair Cape Dairies](#) from South Africa, needed a trustworthy solution for the maintenance of its generators. Fortunately, we had the right LTE router – the RUT956 – to make this possible.

TOPOLOGY



THE SOLUTION – OFF YOU GO, GENERATOR

Plugged into each generator’s controller via its RS485 interface, the RUT956 LTE router establishes a robust and uninterrupted network infrastructure between each end device and the EAMS (On Key) platform, thanks to a wireless connection. However, there are many more reasons why our LTE router was chosen for such a task.

The RUT956 features failover and load-balancing capabilities, ensuring that network connectivity and data travelling through this network infrastructure maintain top efficiency. With this 4G [failover](#) router, Pragma ensures its client is continuously equipped with an Internet connection, and if one connectivity source gets disrupted, the backup one covers it immediately.

Now, the role of [load balancing](#) in this case lies in distributing data packets during their transmission to the cloud. Depending on the configured settings, this feature can ensure that no WAN interface of the LTE router becomes overly congested with data travelling from one point to another. This is particularly crucial for generator monitoring purposes, as it enhances the router’s reliability in sending gathered data as quickly as possible.

Importantly, this wireless router boasts high superiority over other routers due to its wide range of interfaces, including RS232, RS485, Ethernet, and I/Os, alongside its impressive operating temperature, effortlessly reaching as high as 75°C. These features facilitate the router’s seamless integration into any IoT solution required to operate in adverse environmental conditions, just like this one!

With all these features on the table, the RUT956 4G router does the most important part of the role Pragma requires – it retrieves all the data from the generator thanks to the router’s support of the Modbus RTU protocol.

Establishing this data retrieval method on the LTE wireless router’s end leads to a data-to-server setup that exports all this data to an Azure IoT Hub. From this point, the data is processed by the Azure Functions application system and sent to Azure IoT Central, from where Pragma’s EAMS platform retrieves it.

Having all the data set for transmission, Pragma enables its client to analyse the collected data and designate certain action admissions. Pragma’s solution also enables its client to monitor each generator’s operating parameters and quickly react to anomalies or obstructions before they happen.

Behind all the curtains, another standout feature that makes this networking solution thrive is our Remote Management System ([RMS](#)). With this IoT platform, Pragma can remotely access the RUT956 LTE router and perform configuration changes depending on the Modbus address, connected endpoints, or data-to-server details.

It’s safe to say that the RUT956 LTE router, RMS IoT platform, and Pragma’s EAMS platform greatly facilitate predictive maintenance for Fair Cape Dairies’ generators without any hiccups.

And that’s what we like to hear!

