CELLULAR ROUTER FOR PREDICTIVE MAINTENANCE & MACHINE MONITORING

HIGHLIGHTS

✓ [Regnus Engineering Solutions](#) is a Turkish provider of robust predictive maintenance products, services, and solutions, providing real-time data on the health and criticality of machine equipment.

✓ To enable its solution, Regnus needed a cellular router to provide its IoT gateway with reliable connectivity, separate from the networks of client manufacturing facilities to mitigate security risks.

✓ The chosen device is the RUT241 4G router, enabling the solution via its LTE Cat 4 connectivity, equipped with two RJ45 Ethernet ports, WAN failover for automatic backup switching, and a wide range of supported VPN and industrial communication protocols.

THE CHALLENGE – UNPERNICIOUS PREDICTIONS

It would be difficult to imagine today's Industry 4.0 without the magic of predictive maintenance. True to its name, [predictive maintenance](#) continuously monitors and evaluates the health of any given equipment via sensors and real-time data analysis, thereby spotting any potential need for maintenance before any equipment failure or disruption occurs.

In 2023, the global predictive maintenance market size [was evaluated](#) at $5.7 billion and was projected to surpass $49.34 billion by 2032 at a CAGR of 27.1.

One company offering predictive maintenance tools is Regnus Engineering Solutions. Its engine health and machine monitoring services use an array of sensors to monitor the criticality of electric motors, pumps, fans, gearboxes, etc. The data collected from these sensors is transmitted to a cloud server, where it is analysed and the predicting part of predictive maintenance is performed.

But there's a catch.

The IoT gateway Regnus deploys to collect data from the sensors has Wi-Fi capabilities, but not cellular ones. Its clients are averse to connecting the gateway to the cellular network of their manufacturing facilities, as its wireless data transmission could represent a potential security risk.

In other words, Regnus needed to supply its gateway with a separate connectivity source – a cellular router.

TOPOLOGY
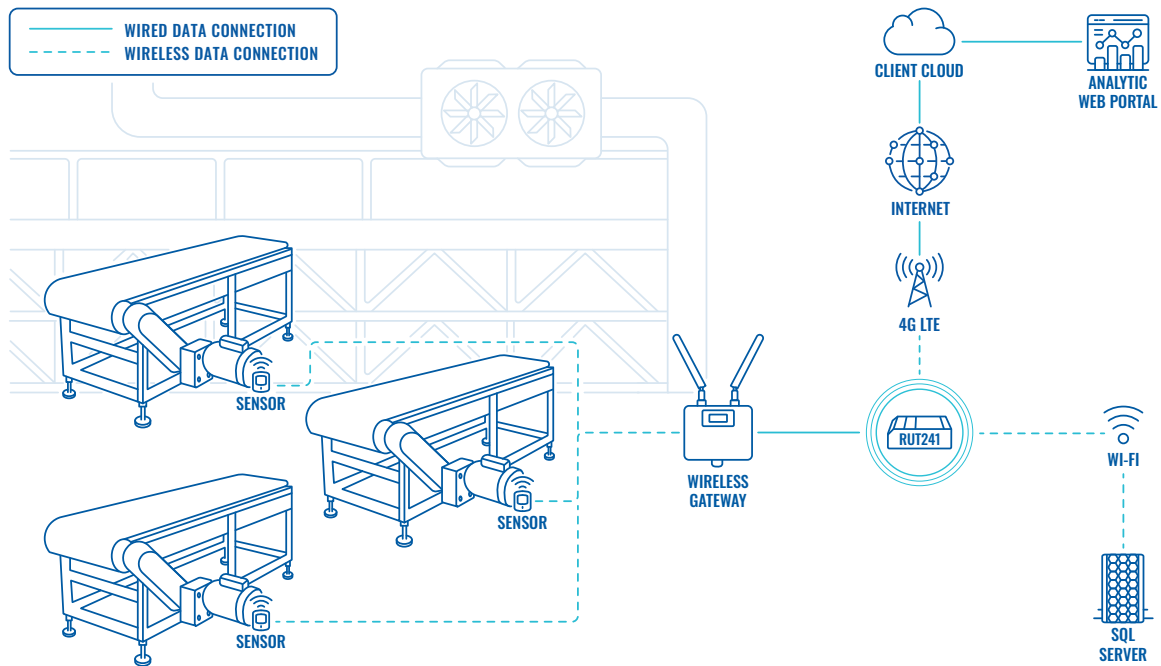
THE SOLUTION – A RELIABLE CELLULAR ROUTER

Regnus chose the Teltonika Networks RUT241 industrial cellular router to enable its predictive maintenance solution. The RUT241 is connected to the IoT gateway via one of its two RJ45 Ethernet ports. The gateway is then connected to any number of sensors monitoring metrics such as vibration, temperature, etc., depending on individual client needs.

Thanks to the cellular router's connectivity, the gateway then uses its own Wi-Fi capabilities to transmit the collected data to a cloud server in real time. In some cases, the Modbus TCP protocol is used to transfer the data to a SCADA system.

The connectivity provided by this cellular router is LTE Cat 4, backward compatible with both 3G and 2G. This more than meets the throughput needed for this predictive maintenance solution, while also allowing it to be deployed in areas where a strong 4G signal isn't available.

Integral to this solution is connection reliability. This 4G LTE router is equipped with WAN failover, making it automatically switch to an available backup connection, such as a different ISP, in case the original connection is disrupted for any reason. In turn, this maintains uninterrupted connectivity, allowing the gateway to continuously transmit data in real time.

The connection of this 4G router isn't just reliable – it's also secure. The RUT241 supports a host of VPN protocols, including ZeroTier, WireGuard, Tinc, IPsec, and many others.

It also supports a wide range of industrial communication protocols, on top of the aforementioned Modbus TCP. These include the MQTT protocol, HTTP(S), and the SNMP protocol, among others, allowing the solution to be flexible in meeting different client needs.

The RUT241 was designed for the rugged industrial environment. Encased in sturdy aluminium housing with plastic panels, it can withstand extreme temperatures ranging from -40 °C to 75 °C. Bottom and sideways DIN rail mounting slots, as well as its compact size of 83 x 25 x 74 mm, make this cellular router easy to slot into Regnus's solution.

When it comes to engine health and machine monitoring, a reliable connection is key. The RUT241 ensures smooth connectivity and enables predictive maintenance technologies worldwide.