CELLULAR ROUTER FOR AUTONOMOUS METEOROLOGICAL STATIONS

HIGHLIGHTS

✓ Ambimetric is a Portuguese developer of automatic environmental monitoring solutions for a wide range of applications, including environmental and meteorological, solar power plants, and water and water quality assurance.

✓ For its automated meteorological station, AmbiDL, Ambimetric needed a cellular router equipped with a high number of different interfaces needed for the environmental sensors used in its solution, including LAN, I/Os, and serial interfaces.

✓ The perfect device for the job was our RUT956 cellular router, providing robust and reliable connectivity with auto-failover functionality and extensive versatility in supported serial interfaces, including MQTT, Modbus TCP, and Modbus RTU.

THE CHALLENGE – AUTOMATED METEOROLOGY

Accurate weather prediction is the unsung hero of many industries. In marine stations, meteorological data ensures safety at sea and aids in planning shipping routes. In wind farms, this data is crucial for optimising the placement and operation of wind turbines and for predicting power generation. The same level of importance is true for agriculture, aviation, solar energy plants, construction, and many others.

The data in question is gathered at meteorological stations equipped with a wide range of sensors measuring temperature and precipitation, wind speed and direction, atmospheric pressure, and so on. Accurate weather forecasting demands efficient analysis of this data. As such, the more automated this process can be – the better.

Our partner, Ambimetric, set out to create AmbiDL – a fully-automated meteorological station capable of automatic datalogging and transmission of environmental data. In order to do so, AmbiDL requires reliable connectivity at each meteorological station.

But connectivity alone is not enough; since those stations are often spread out in remote, rural locations, GNSS functionality is also a must. And because AmbiDL is comprised of so many different sensors, the cellular router must have I/Os and support key serial interfaces, such as Modbus TCP and Modbus RTU. Lastly, the device must be durable enough to withstand the harsh environmental conditions that meteorological stations call home.

Fortunately for Ambimetric, Teltonika Networks had just the cellular router for the job.

TOPOLOGY
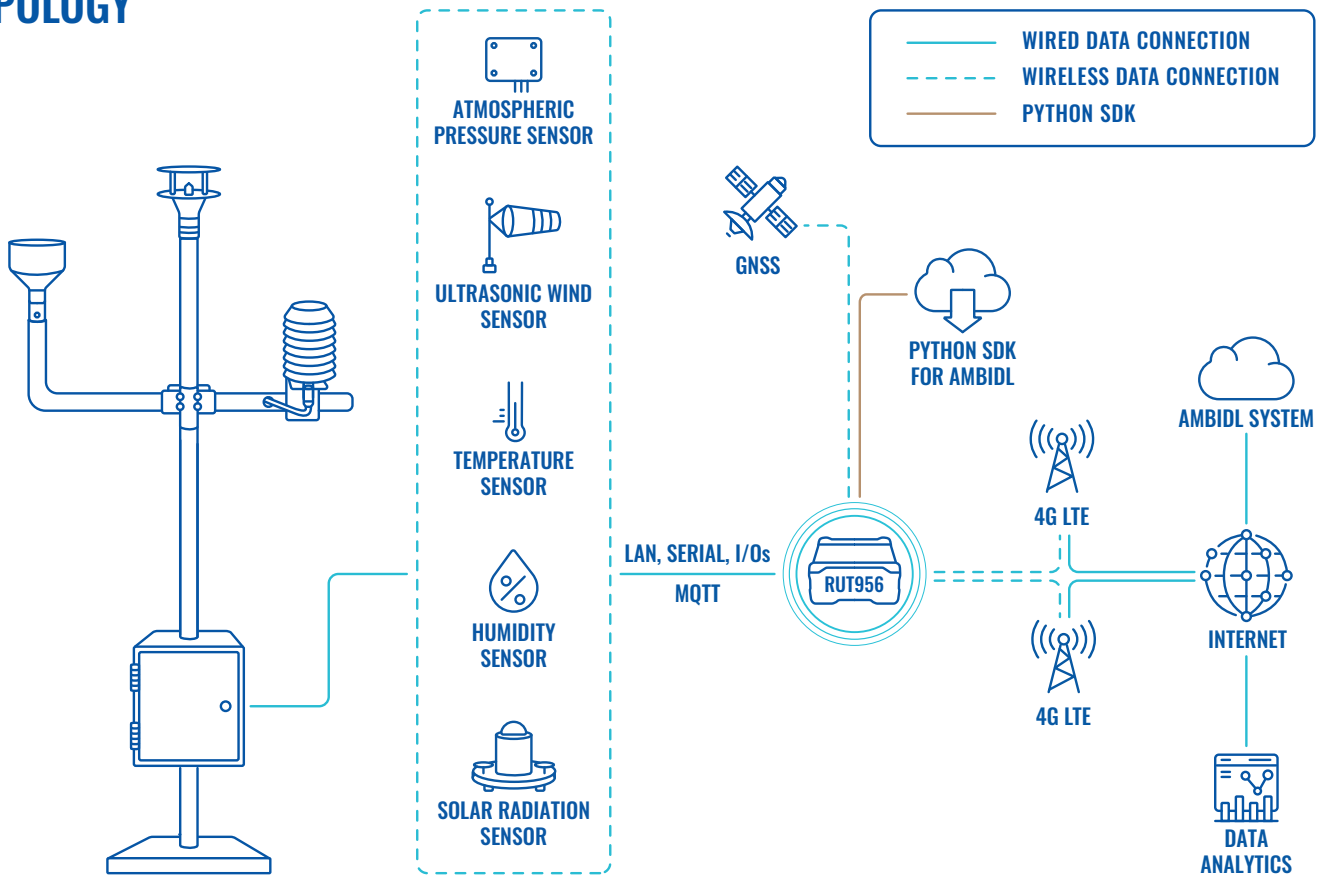
THE SOLUTION – SEAMLESS CONNECTIVITY WITH A CHANCE OF RAIN

Ambimetric chose the RUT956 industrial cellular router by Teltonika Networks for its AmbiDL system. Let's have a look at what this solution looks like when implemented in a solar energy plant.

Housed inside an IP66 protection box, AmbiDL adopts into its set up the RUT956 4G wireless router. The 4G router is then connected to the following sensors via either LAN, I/Os, or serial interfaces, depending on the sensor, such as solar radiation, ultrasonic wind, temperature, humidity, and atmospheric pressure sensors.

Data from these sensors is gathered and goes through an automated quality control phase performed by AmbiDL. It is then automatically processed, recorded, and sent via GSM/GPRS or a LAN connection to a data-collection remotely. The wireless transmission is done via Modbus, MQTT, and custom Python SDK at LTE Cat 4 speeds of up to 150 Mbps.

Of course, a number of features ensure that this automated process remains flawless at all conditions. The RUT956 cellular router is equipped with 2 SIM card slots, allowing for auto-failover, backup WAN, and other switching scenarios that keep the connection running at all costs.

GNSS functionality and extensive serial interface support are another strength of this 4G LTE router. Included among these interfaces are Modbus TCP and Modbus RTU (both RS232 and RS485), MQTT, Azure MQTT, Kinesis, and the list goes on and on, making the RUT956 highly-adaptable for the myriad meteorological sensors.

The RUT956 is a device ready to brave the elements. Enclosed in sturdy aluminum casing with plastic panels, this 4G router can comfortably withstand extreme temperatures from -40 °C to 75 °C and operating humidity from 10% to 90% (non-condensing).

No matter how harsh or volatile the weather may be, the RUT956 cellular router can take it without breaking a sweat and ensure robust and reliable connectivity with maximum sensor compatibility.