IOT GATEWAY FOR UTILITIES SCADA SYSTEM IN SHARJAH, THE UAE

HIGHLIGHTS

- Avanceon is an automation and control engineering solution provider operating from Dubai and Abu Dhabi to service 16 industrial and manufacturing market segments, including energy and utilities, critical infrastructure, and transportation.
- Its client, the Sharjah Electricity, Water & Gas Authority, has a SCADA system that includes APN SIM cards. These bolster the system's security but present some M2M communication challenges, necessitating an IoT gateway that supports the DNP3 protocol and is capable of port forwarding.
- The device chosen is our TRB246 IoT gateway, enabling this remote management solution by providing robust serial communication support and reliable LTE Cat 4 connectivity.

THE CHALLENGE – THE COMPLEXITIES OF SCADA COMMUNICATION

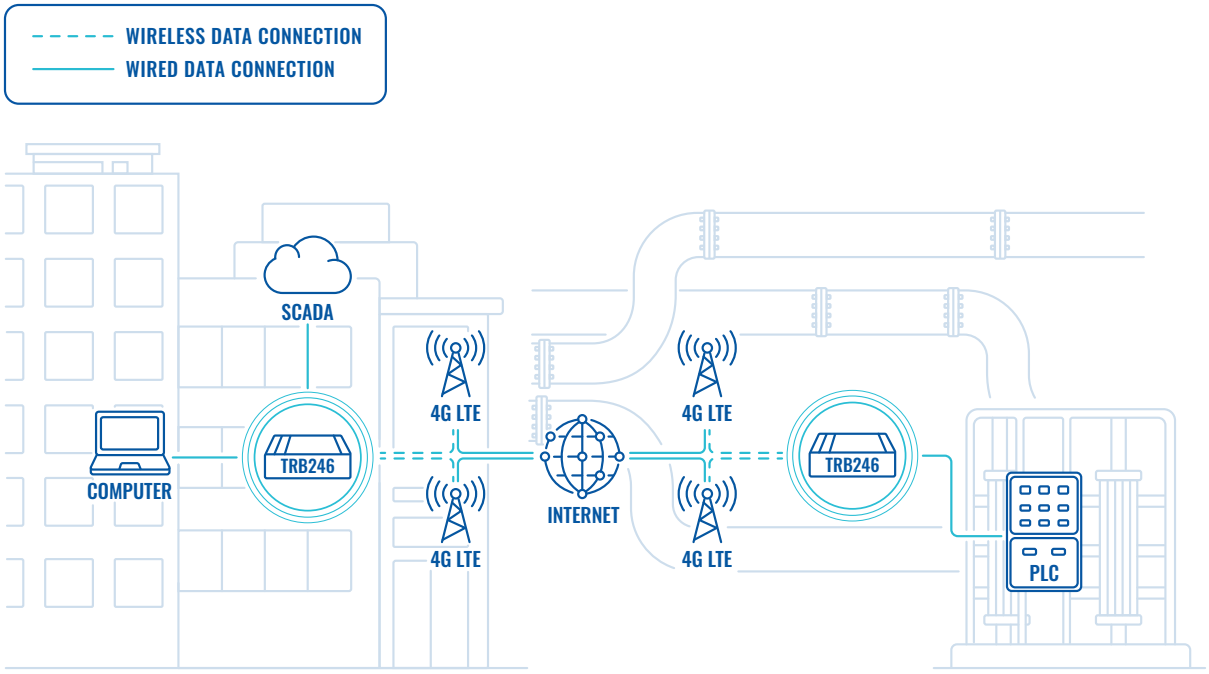
Supervisory control and data acquisition (SCADA) systems are an integral part of the telemetry and utilities sector. SCADA systems enable both private companies and governmental authorities to remotely manage and control PLCs, collect usage data of utilities such as electricity, water, and gas, and perform tasks such as pump activation or valve closing.

Our partner, Avanceon, was helping the Sharjah Electricity, Water & Gas Authority (SEWA) in the UAE to establish smooth connectivity and implement a SCADA system for the energy and utilities critical infrastructure in the city of Sharjah. When it came to choosing the networking device, however, this solution's criteria presented a challenge.

SEWA needed the chosen networking device to include private Access Point Name (APN) SIM cards. This inclusion would bypass the security risk of using a regular SIM card and have its data transmitted publicly over the cloud.

However, private APN SIM cards make remote management and control of the PLCs difficult. They demand port forwarding to be used, directing M2M communication to a designated TCP port number supported by the SCADA system. In other words, an IoT gateway that could enable this redirection was needed.

TOPOLOGY



THE SOLUTION – PORT FORWARDING IOT GATEWAY

Avanceon chose the Teltonika Networks TRB246 industrial IoT gateway to facilitate redirected M2M communication in SEWA's SCADA system.

On one end of the system, the device is connected to the SCADA computer system in SEWA's headquarters in Sharjah. On the other end, for every PLC distributed in Sharjah and connected to this SCADA system, a TRB246 IoT gateway is installed as well. The connection on both ends is done via the IoT gateway's RJ45 port.

The complexity of this solution is not in its physical setup – it's in the architecture of its M2M communication. The PLC monitors the myriad of telemetry data, such as water pressure in pipes, gas flow, and electricity usage, and transmits it wirelessly to the remote SCADA system.

This transmission is carried out via port forwarding: redirecting and forwarding the communication request from the PLC to a designated port number supported by the SCADA system: the TCP port 20000. This facilitates secure and effective communication via the DNP3 protocol.

The SCADA system then analyses the telemetry data and can perform remote troubleshooting of any end equipment connected to the PLC. This minimises downtime and eliminates the need for engineers to travel for manual troubleshooting – resulting in an impeccably-automated remote system without sacrificing security.

Port forwarding and support of the DNP3 protocol are the main features needed in this case, but the TRB246 has plenty more to offer. This industrial IoT gateway provides reliable LTE Cat 4 connectivity with dual SIM functionality, auto-failover, backup WAN, and more switching scenarios for maximum connection reliability.

Apart from the DNP3 protocol, the TRB246 also supports Modbus TCP, Modbus RTU, DLMS, and many other communication protocols. In terms of interfaces, it is equipped with the aforementioned RJ45 port, as well as I/Os and 16-pin terminal block RS232 port and RS485 port.

Housed in durable aluminium housing with DIN rail mountain options and capable of withstanding temperatures ranging from -40 °C to 75 °C, this IoT gateway can handle any industrial environment the PLCs are installed in.

When it comes to connection reliability and architecture versatility, the TRB246 is the perfect choice for SCADA systems managing critical infrastructure and telemetry.