Embedded System Smart City Management

euristiq

Novalume is an international company that develops and manufactures advanced energy-efficient LED lighting solutions.

Challenge

The client was looking for support and improvement of an existing smart IoT system for lamp control units, which are installed in several cities. In addition, they required integration of new hardware modules into the next generation of the system, which entailed new firmware development.

The challenging requirements to the product included its performance, usability, reliability, security and scalability. In this case, it was also a high concurrent, heavily loaded network.

Several live networks have already been working for years and were sensitive to changes in the firmware.

Also, there was a lack of SoC onboard memory for existing firmware and not enough space for new features.

Solution

The software is an intelligent control and maintenance system that optimizes street light usage to lower energy consumption, by decreasing the lighting level at off-peak traffic hours. It also reduces maintenance costs via real-time performance monitoring and reporting. Many other features are available at the click of a mouse, all without compromising quality or safety.

The lack of SoC onboard memory was resolved by optimizing the existing firmware and adding external memory in the new hardware generation.

Tools and technologies

- Embedded C
- TCP/IP
- GSM, GPRS
- Zigbee
- Mesh
- NFC
- GPS
- IAR
- Eclipse
- Batch Scripts
- J-Link
- OSAL (TI OS)
- Energy measurement

Scope of work

- Architectural engineering
- M2M Interfaces
- Decisions on the technical stack
- Technical consulting
- Requirement elaboration

Results

- Traffic optimization between the network coordinator and the back-end server.
- System security improvement (device and communication channel protection).
- Optimization of used proprietary protocols.
- The system includes up to several hundred units in the mesh network and tens of thousands of units on the city scale.
- Adding support for the NFC and GPS technologies.
- Project development is ongoing with a team of two Embedded engineers.