Graduation project – traffic management for IoT applications in a dedicated M2M network for smart grids and smart meters

Utility Connect (a joint venture of Alliander and Stedin)

Period: 6 months, 40 hours per week

Compensation: €500,- per month (bruto)

Location: Meidoornkade 15, Houten

Master in mathematics, informatics of operations research (or comparable)

Background

In the Netherlands there is a large scale roll out program ongoing to install smart electricity meters in all houses in the Netherlands (see www.slimmemeters.nl). Metering data is remotely read over mobile networks. Dutch DSO’s, Alliander and Stedin, have created a dedicated wireless network (CDMA, 450Mhz) for this purpose, that is operated by Utility Connect. Besides reading smart meter data, also smart grid IoT applications are currently being developed that will use the same M2M network for their connectivity. These applications aim at measuring and switching in the electricity network that is becoming more and more important with the rise of decentral power production (e.g. solar and wind energy). To ensure stable energy supply in the Netherlands, in the future the smart grid applications require higher priority on the mobile network than smart meter readings.

Within certain boundaries, reading smart meters can be spread over time. Traffic of many other applications has more real time requirements. From a cost efficiency perspective, the radio network has been designed primarily on coverage and has limited capacity. In order to optimize the usage of the network and prevent investments, peak traffic of smart meters is flattened and real time applications are prioritized in the network. To achieve this goal a traffic management functionality has been introduced in the network.

Project

The aim of the project is to answer a number of main questions that are to be investigated using a combination of mathematical modelling and simulations.

- Analyze and model the structure and components of the traffic manager and its configuration and optimize its parameters. Determine the efficiency gain that the traffic manager brings to the mobile network.
- Create guidelines/instructions for developers of IoT applications to optimize the use of the network by their applications.
- Design the traffic manager of the future from a greenfield approach and from the perspective of optimizing the currently deployed traffic manager. Show the efficiency gain to be achieved by both designs compared to a network without traffic manager.

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