Development of the CoSES Internet of Things Platform

The TUM Center for Combined Smart Energy Systems (CoSES) is a laboratory focused on analysis of multi-energy systems. The laboratory has a capability to emulate a small microgrid with Low Voltage Electric Distribution Grid and Three Temperature Level Bidirectional Heat Grid. These energy grids supply 4 Single-family houses and 1 Multi-family house with different distributed energy sources and loads.

The experimental microgrid is controlled through the control system developed using National Instruments technology such as VeriStand software, PXIs and NI Industrial controllers. This control system is monitoring all relevant signals in the microgrid and issues commands necessary for operating the microgrid in desired way.

This project will develop Internet of Things solution for the existing lab. This project will enable further development of optimization applications that can be deployed in the IoT framework. This is an opportunity to learn about state of the art and acquire hand-on experience working on the next generation of monitoring and control systems.

Project Tasks

1) Classify and group all relevant signals used in the laboratory (measurements and commands).
2) Create a LabVIEW model compliant with NI VeriStand that access all the data streams (Read/Write).
3) Set-up and store the data into rea-time database (e.g. InfluxDB).
4) Create an IoT dashboard (e.g. Grafana) to visualize the laboratory data.
5) Create a simple app that performs basic processing of the data and issues appropriate commands.

Requirements

1) Background in Electrical Engineering, Mechanical or Software Engineering.
2) Solid background in software engineering, data management and control systems.
3) Previous experience in with IoT, Databases and LabVIEW is preferable.
4) Affinity to programming and structural thinking.
5) Good team-player and an attitude to learn and explore new approaches.

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