BIM interface for visualization of smart home data

A smart home system with sensors and actors is installed at our chair. It shall be visualized in a suitable BIM environment for monitoring and facility management (FM). For this purpose, different tools and frameworks are in use and available. The goal is to connect our Smart home instance with a 3D model in Revit. Figure 1 shows a schema of the desired system.

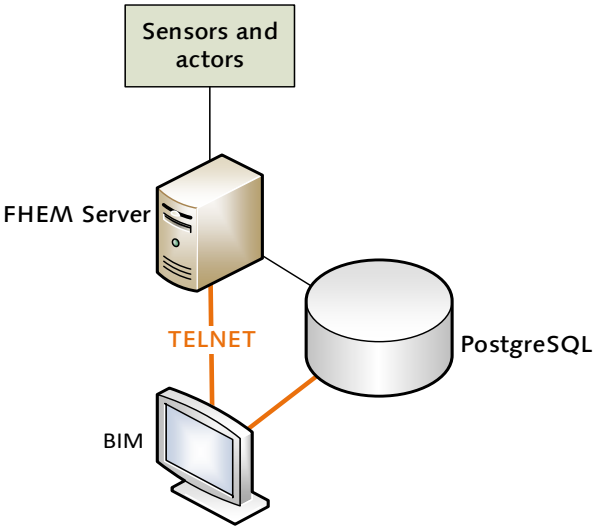

Figure1: Contributors in the part system

The FHEM server represents the smart home system. It manages all devices and logs data into the PostgreSQL database. The connection between the sensors and actors works via radio-communication at 868 MHz. Every sensor and actor has multiple channels, i.e. actual temperature, temperature setpoint, humidity, low battery, valve state and so on.

For FM it's the intention to display the data from the smart home system directly within the 3D model. This produces a fast overview about environmental conditions. FHEM has the possibility to receive and send message via TELNET. This is suitable to get actual values and adjust actors. The first tasks are design and implement an interface between Revit and FHEM using the Telnet protocol.

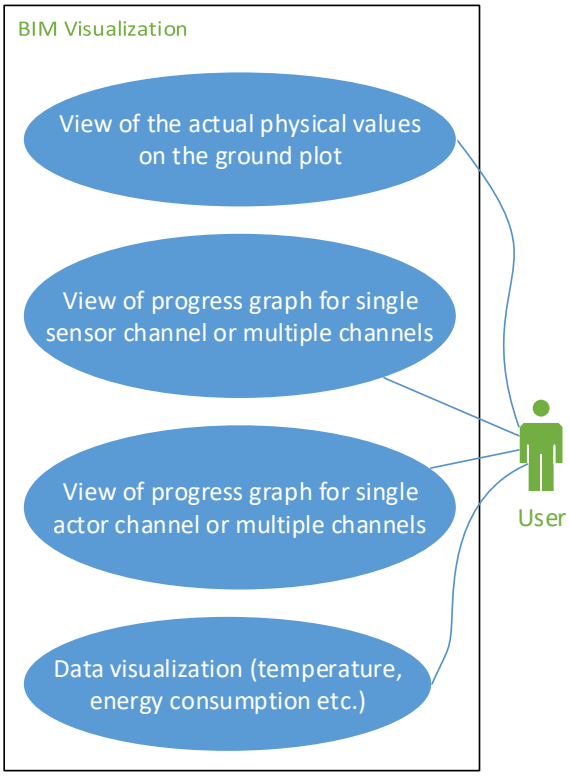

Figure 2: Use cases

FHEM pushes all data into the PostgrSQL server to store it persistently. It can be used to create graphs with progress, mean values and so on. Hence, the second task is to implement an interface for retrieving this data and displaying it in an adequate way. It's aim is the analysis about energy consumption, lights, water and so on. It serves information about ventilation, heating and energy management. Besides this, the FM is supported when making decisions about maintenance scheduling, e.g. if the radiator isn't used for a long time period, the valve of the thermostat might be stuck. Figure 2 shows the use cases for the scenario in general.

Finally this work will form the bases of a subsequent extension with simulation and optimization tools.