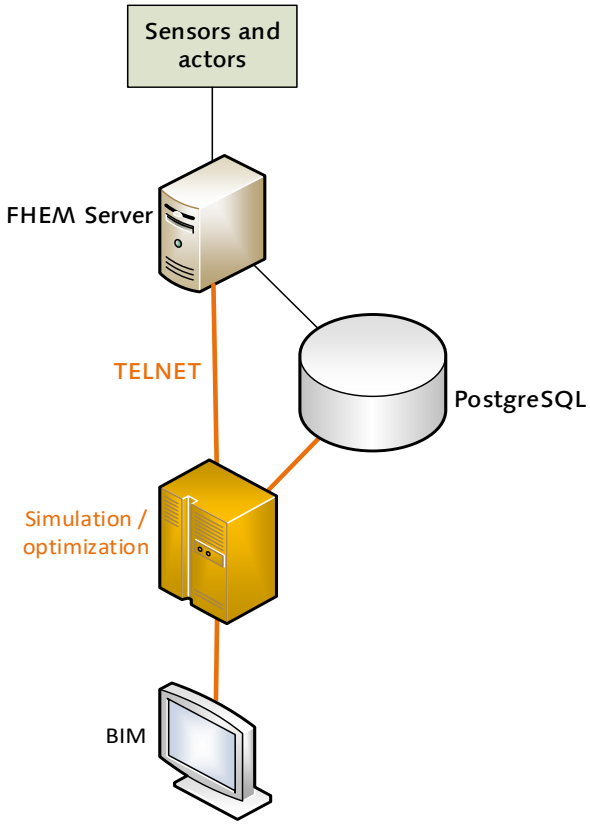
Simulation software and interface for smart home system

At our chair is a smart home system with sensors and actors is installed. The data gained from this shall be used for simulation and optimization. For this purpose different tools and frameworks are in use and available. Figure 1 shows a schema of the desired system. All orange components shall be defined and implemented in multiple student works.

Today we now much about optimal control strategies, energy saving methods and climate changes. We want to optimize our power consumption at the chair. But there are to much system parameters to do this only with a short sight. A numerical simulation and later optimization is what we want to have.



At the moment we've got a system to gather data but nothing to work with it. There are many software available to simulate models numerical. We would like to have a system which takes the data from our smart home system and build with it a digital numerical twin. It should simulate actual states, predict future behaviour and offer optimization tools.

The simulation environment can take the data from the building model from a IFC-file (BIM). Actual sensor data can gotten from the FHEM server via a TELNET connection. Past data is saved by fhem in a PostgrSQL-Server. Both can be used for the purpose of simulation and optimization. Figure 2 shows a summary of all use cases.

First a simulation environment has to be chosen and second the interfaces between FHEM, PostgreSQL and BIM has to be implemented.

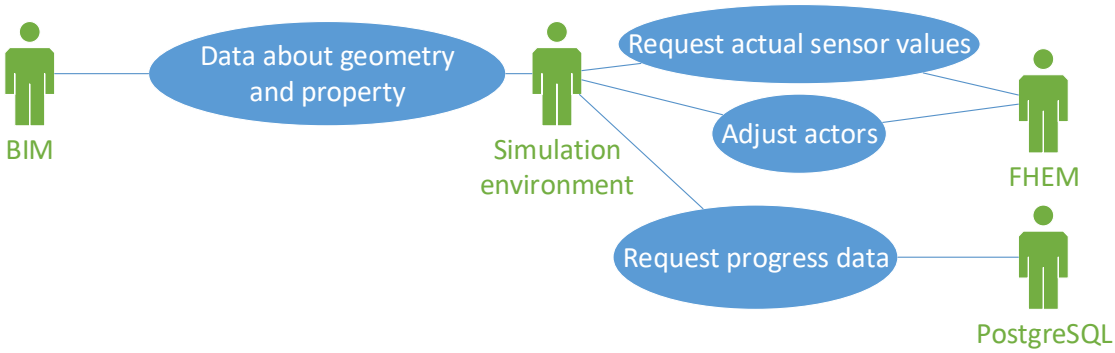


figure 2: use cases