

# **Towards Open Modeling of Building Automation** over the entire building life cycle

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# **Motivation & Challenges**

- Operating buildings efficiently is necessary to achieve climate-neutral
- Research has shown that the energy consumption during operation is higher than designed
  - Full energy-saving potential is rarely exploited
    - Building automation only detailed during commissioning
    - Lack of time and budget
  - Break between design and implementation phase
    - Information is lost
    - Logic may be mapped twice time-consuming and error-prone
    - Lack of method for translating control logic from simulation tools to engineering tools

# **Solution Architecture & Initial Results**



### **Digital Building Model**

- ✓ Holistic Meta Data Model [1]
- ✓ Digital Representation of **Networks**

Transfer datapoint information Embed control logic

Transfer datapoints,



Modeling and Testing of

**Building Automation and** 

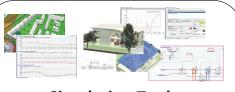
Control Systems (BACS)

already at design phase

#### **Control Logic Modeler**

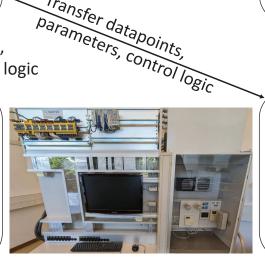
✓ Uniform exchange format based on the standard VDI 3814 [2]

Transfer data points, parameters, control logic



#### **Simulation Tools**

- ✓ Simulation of a ventilation system
- NMF Code for IDA-ICE





## **Engineering Tools**

✓ Creation of application description for realization

- Structural information (devices, data points, ...) are stored in the Digital Building Model
- Control Logic Modeler
  - · Data points of the digital building model can be used in the UML state graph
  - Creation of the control logic
- Model transformation to simulation or engineering
  - IEC 61113-3 Structured Text (ST)
  - IDA ICE (NMF)

# **Next Steps**

- Automate the workflow
- Consistently track changes during iteration phases
- Support of more source/target formats

[1] https://github.com/bph-tuwien/SIMULTAN, 16.05.2024

[2] Felix Knorr, Wolfgang Kastner: Towards a Uniform Exchange Format for Home and Building Automation using VDI 3814. ETFA 2023: 1-4 This work has been supported by the Austrian Research Promotion Agency (FFG) for the "OpenBAM - Open Building Automation Modelling" project under the contract number 886982



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