

IBPSA Project 1

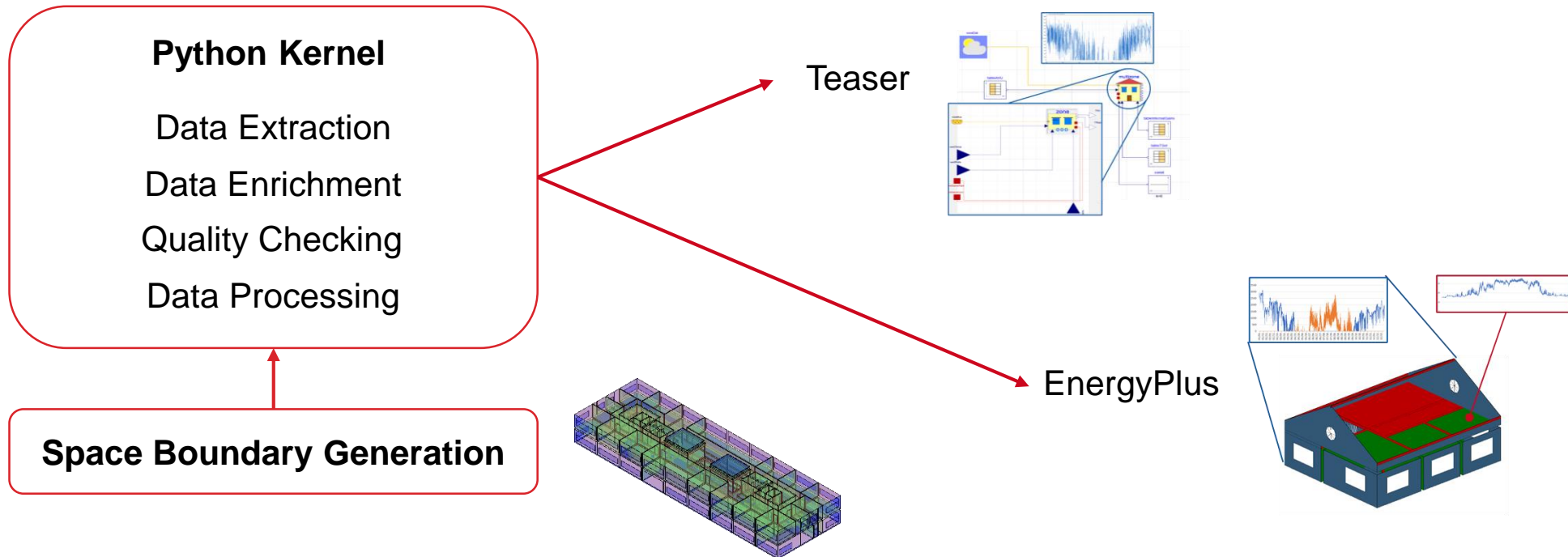
International Building Performance Simulation Association

Work Package 2.2 - Building Information Modeling (BIM)

Web Meeting, 18 October 2021

Goal

- Development of basic methods and tools to derive building simulation models, starting from a digital building information model (IFC4)
- Development of two main components: 1) Python Kernel as simulation preprocessor
2) C++ Space Boundary Generator
- To complete tool chain, usage of existing tools, e.g., IfcCheckingTool



Progress in last half year



Published papers I

BIM2SIM - Development of semi-automated methods for the generation of simulation models using Building Information Modeling (Jansen et al.)

- At IBPSA Conference 2021
- Presenting current project status for all domains

Automatic generation of second level space boundary geometry from IFC models (Fichter et al.)

- At IBPSA Conference 2021
- Geometric preprocessing for building simulation
- Full use of geometric information for E+
- Topological and other information for TEASER

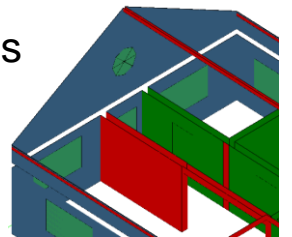
Examination of Reduced Order Building Models with Different Zoning Strategies to Simulate Larger Non-Residential Buildings Based on BIM as Single Source of Truth (Jansen et al.)

- At Modelica Conference 2021
- Testing different zoning strategies and there effect on CPU-time and accuracy
- Compares TEASER and EnergyPlus with BIM as single source of truth

Algorithms for Overcoming Geometric and Semantic Errors in the Generation of EnergyPlus Input Files based on IFC Space Boundaries (Richter et al.)

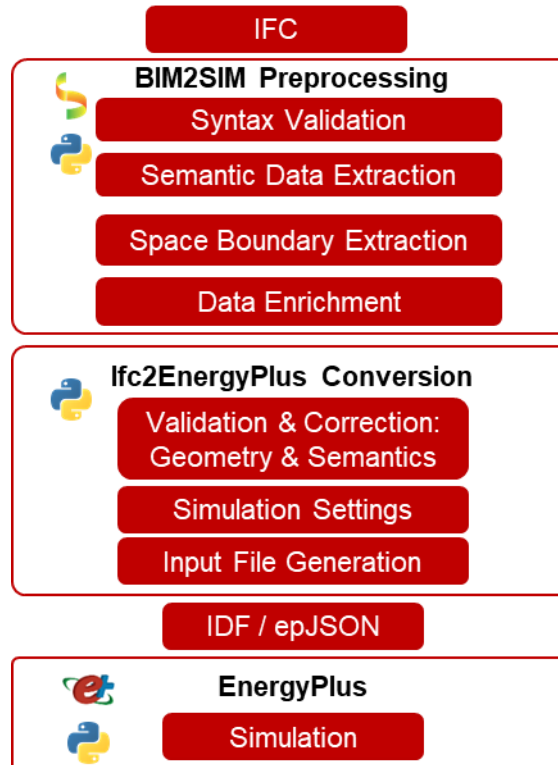
- At 32th Forum Bauinformatik 2021
- Proposing of algorithms for
 - Matching corresponding surfaces
 - Parent-child relationship (e.g., openings and walls) for hybrid modeling approaches
 - Coplanarity
 - Transforming surfaces with inner loops

FZK Haus: matching surfaces are set adiabatic (red) if both are within same zone and set to be surface (green) otherwise.



General Preprocessing

- In validation stage
- Only minor changes expected in tool chain



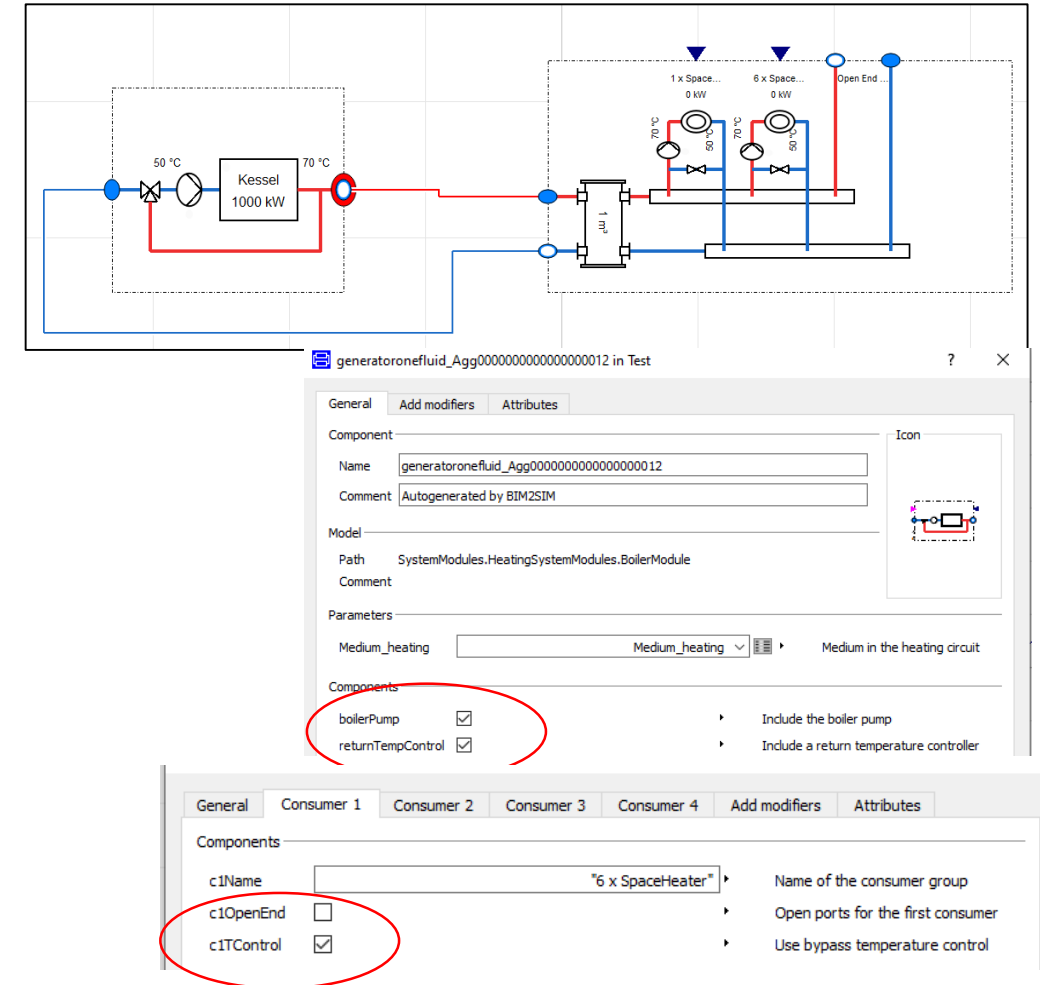
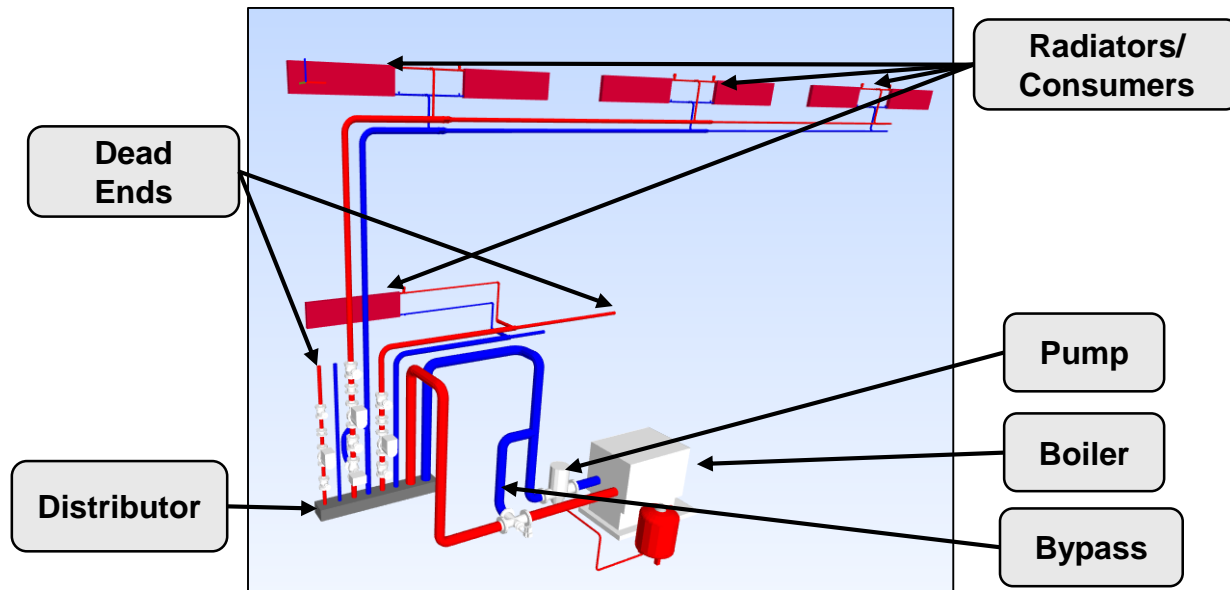
Space Boundary Generation

Progress on data export

- Providing quantity sets for spaces, used by TEASER
- Providing further geometric data with the IFC to reduce calculation effort by simulation preprocessing
- E.g. areas, tilt, shading
- Reduce holes and concave faces before export

HVAC Simulation

- Working Modelica export with created heating example
- Semantic Information and derived information from topology bundled in Modelica model



- Embedding all workflows and plugins into WebApp
- Progress on graphical user interface
- Visualization of building geometry and space boundaries
- Coupling visualized shapes with decision system

Decisions

2 / 2

1. Do you want for all the thermal zones to be cooled? - with cooling

2. Do you want for all the thermal zones to be heated? - with heating

Answers: 2 / 2

Send

