IBPSA Project 1

BIM/GIS and Modelica Framework
for
building and community energy system
design and operation

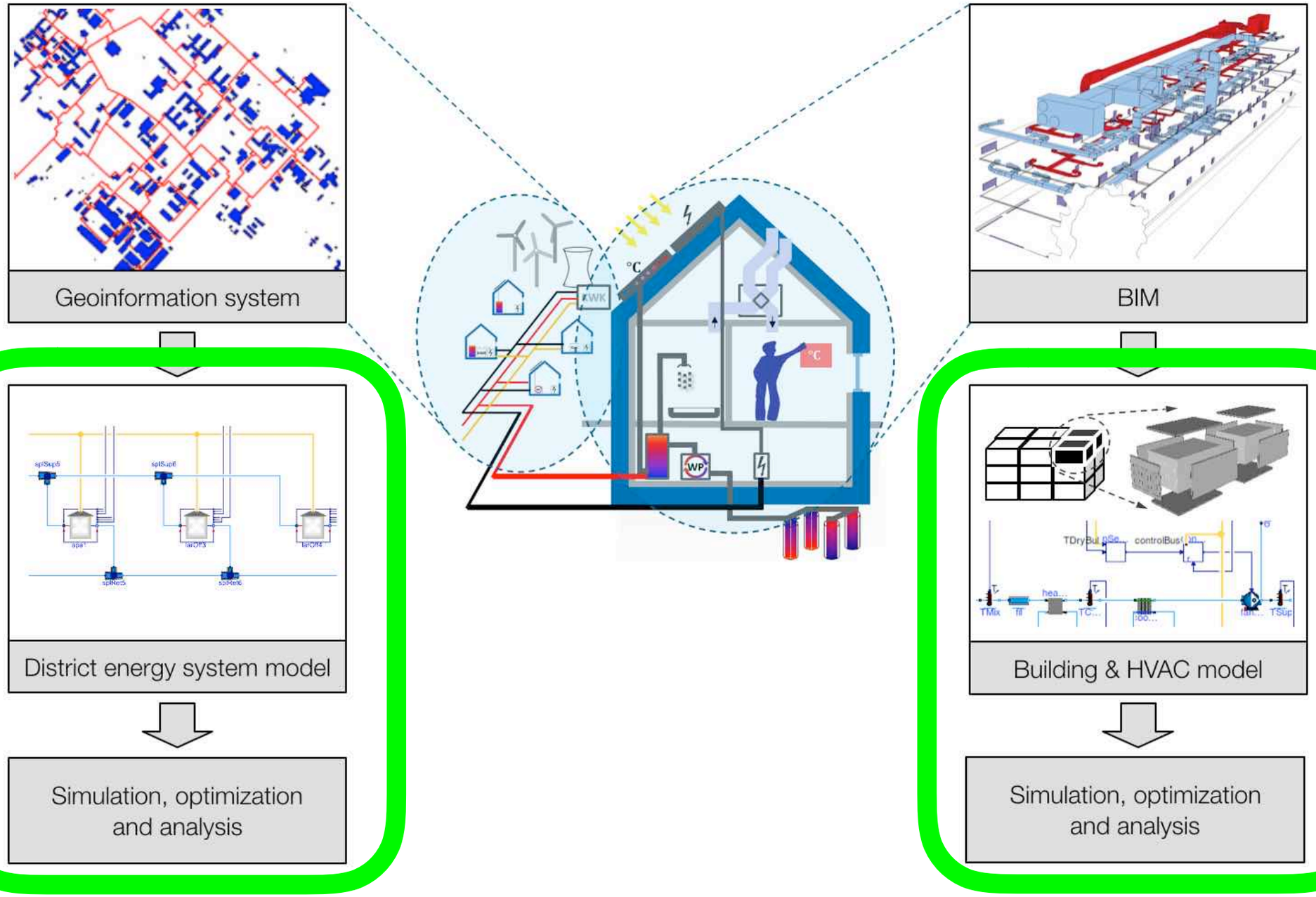
WP 1.1- Modelica Library for Design and Operation

February 27, 2018

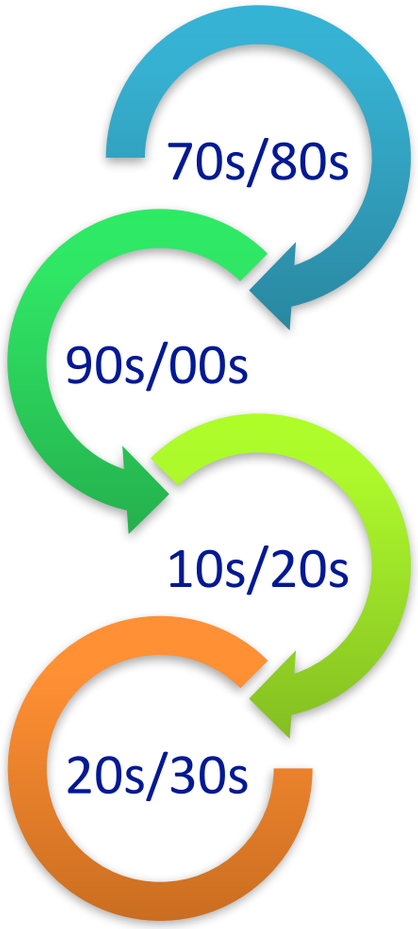
Michael Wetter

Scope of WP 1.1

Solutions to automate dynamic model generation process at building and/or city quarter scale based on interoperable standards such as CityGML and IFC



Work Package 1.1 Goal



Simulation

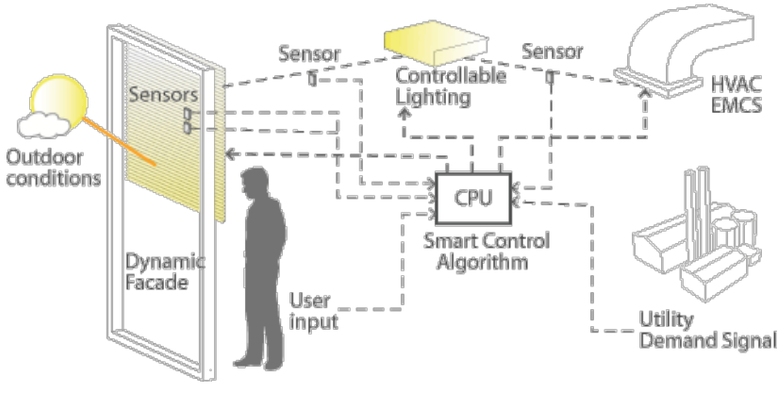
Modeling

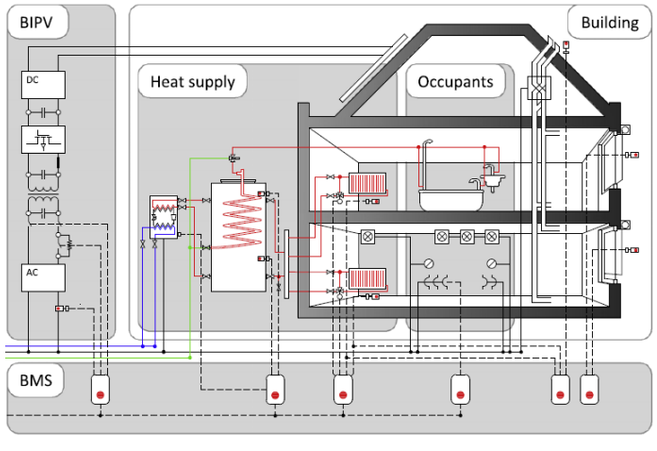
Tool integration

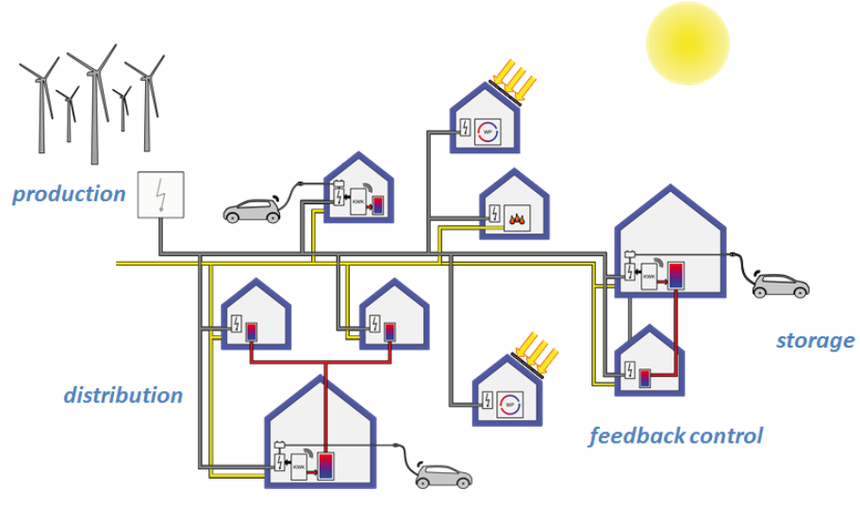
Autonomous modeling

Develop model library applicable for system-level autonomous modeling.

- validated
- well documented
- state-of-the-art physics and dynamics







From controls to buildings and communities

Outcome, deliverable and success criteria

Anticipated outcome

- comprehensive, free, validated and well documented open-source library
- used by the above libraries, by EnergyPlus and potentially by other building simulation programs.

Deliverable

Continually updated library; depending on need, official “frozen” release.

Publications in the peer-reviewed literature.

Success

Used as basis of major Modelica Libraries for building and district energy systems.

Integrated in major building simulation programs.

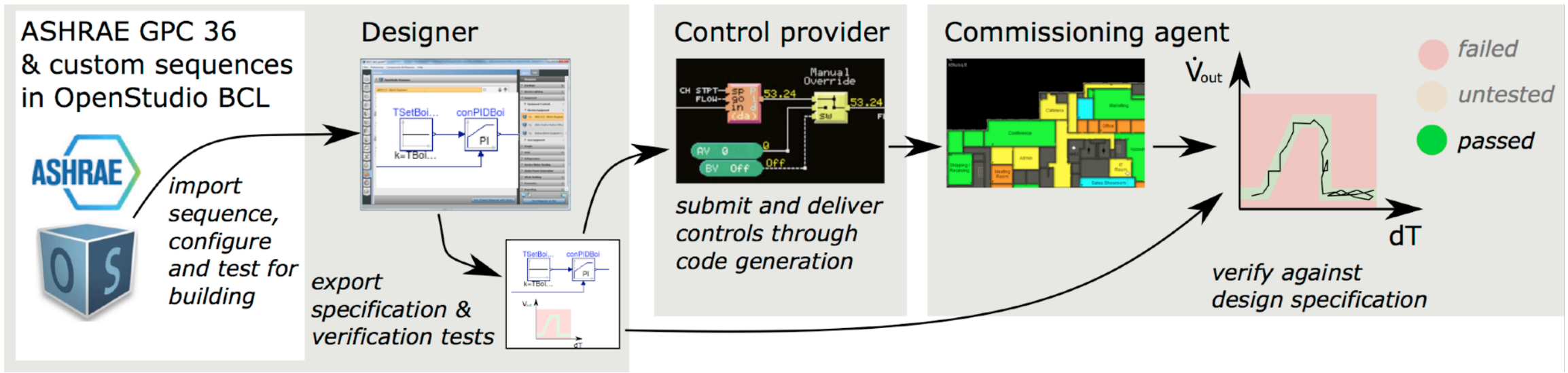
Main focus for next years

Make library easier to use

- parameters
- IBPSA.Water and IBPSA.Air (rather than only IBPSA.Fluid)

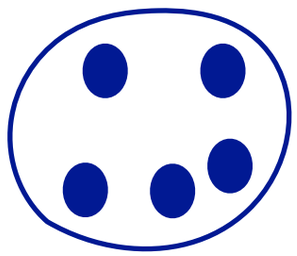
Adding new models (see breakout session).

- components
- template air and water systems
- control sequences that can be translated to real building automation systems?

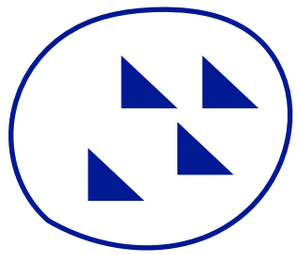


10 years ago…

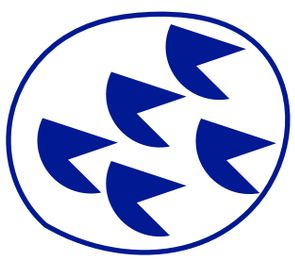
RWTH Aachen - AixLib



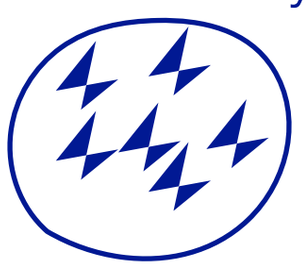
XRG — HVAC



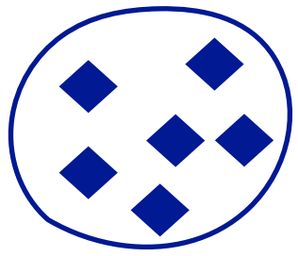
UdK - BuildingSystems



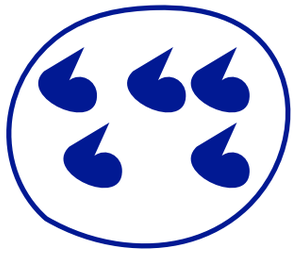
EdF — BuildSysPro



LBNL-Buildings

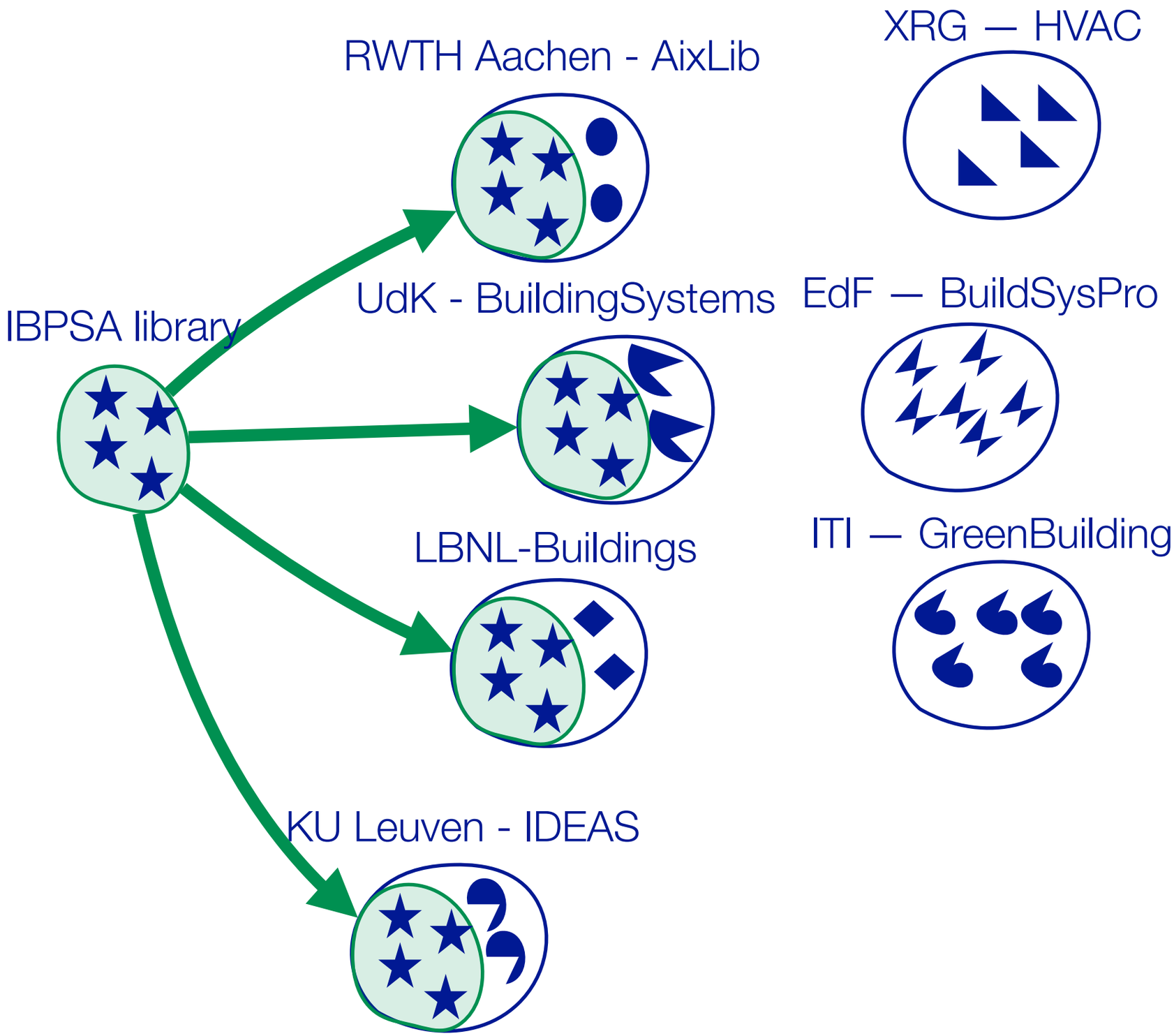


ITI — GreenBuilding

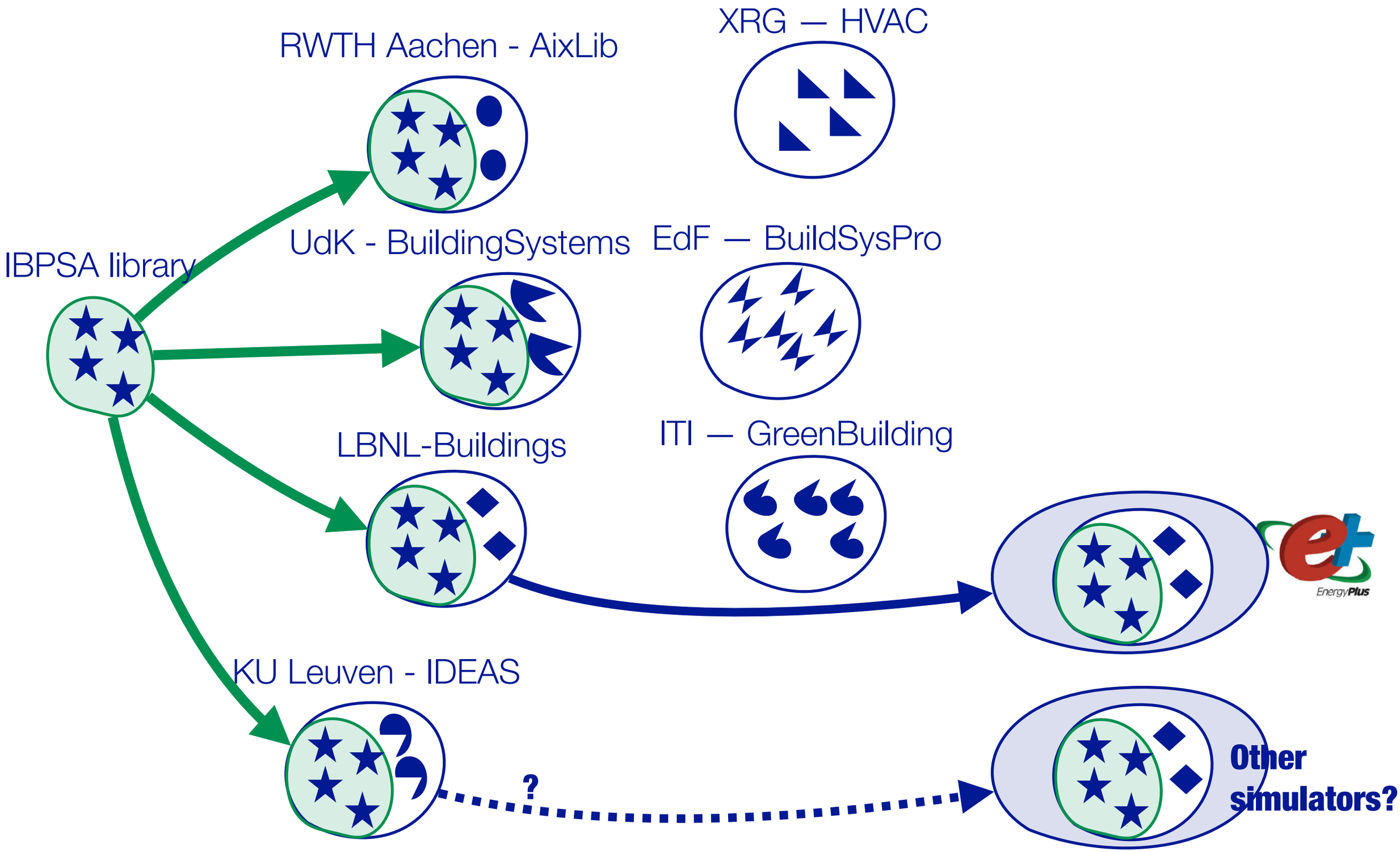


KU Leuven - IDEAS

At Building Simulation 2011, a joint effort started to avoid fragmentation, collaborate and implement common models



In 2016, tight integration of Modelica into EnergyPlus started.



In 2016, tight integration of Modelica into EnergyPlus started.

Developer

Advanced user

Practitioner

IBPSA library

RWTH Aachen - AixLib

XRG — HVAC

UdK - BuildingSystems

EdF — BuildSysPro

LBNL-Buildings

ITI — GreenBuilding

KU Leuven - IDEAS

?

Other simulators?

How to join

Contribute through

- testing and validation
- code development (including examples)
- improvement of documentation

None of us was an expert modeler when we started.

Meetings are announced through
https://groups.google.com/forum/#!forum/ibpsa-project-1-announcements

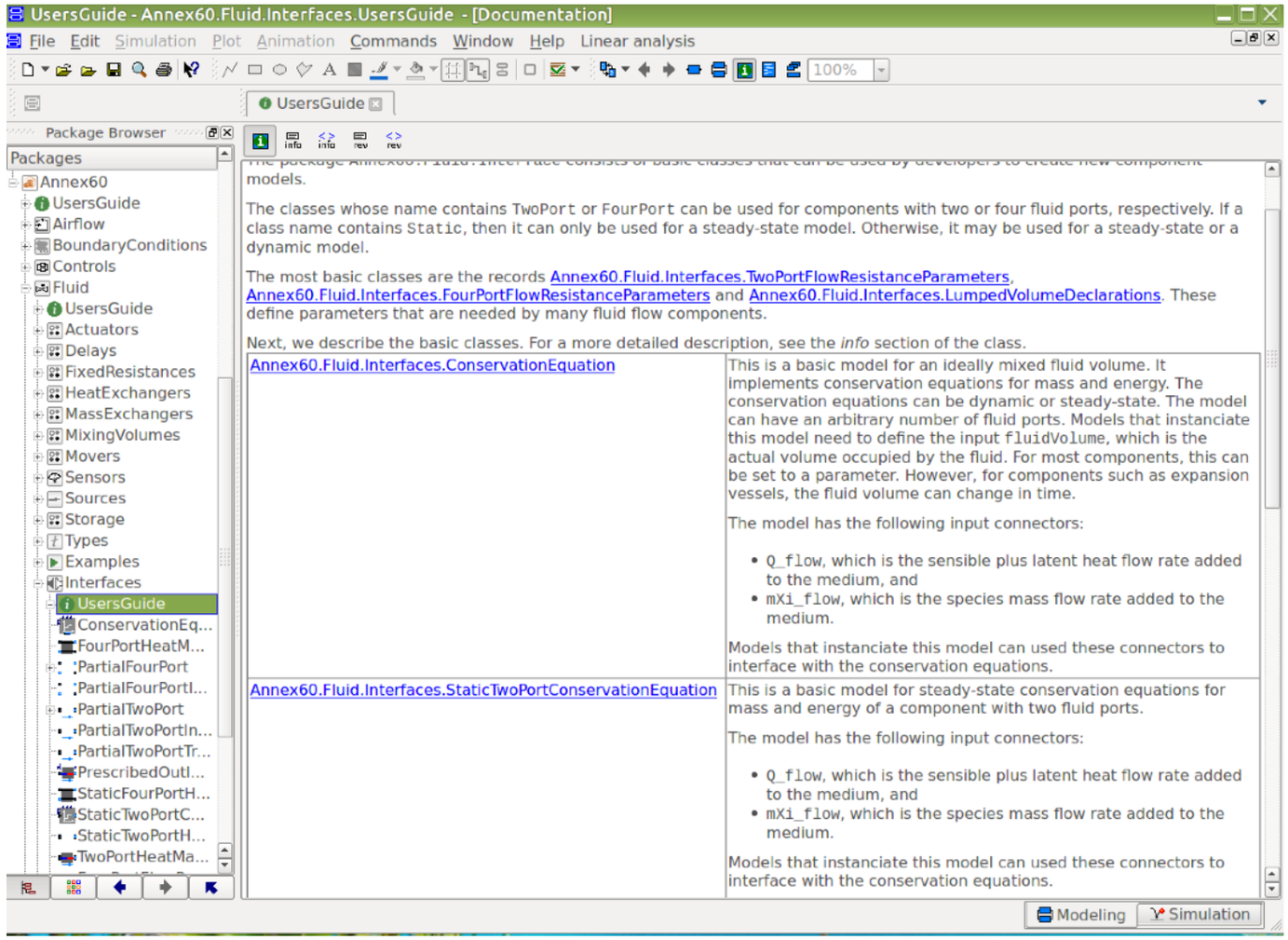
We meet every 3 to 4 weeks to coordinate.

Repository is at https://github.com/ibpsa/modelica-ibpsa

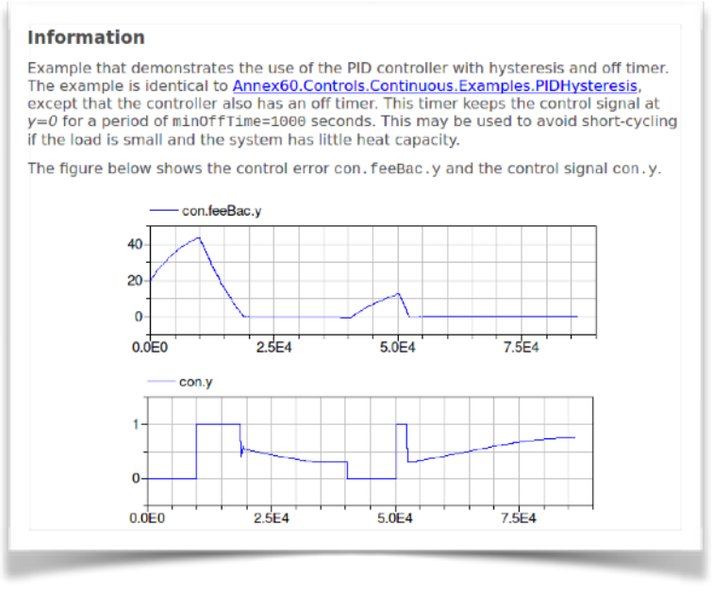
Requirements for adding new classes

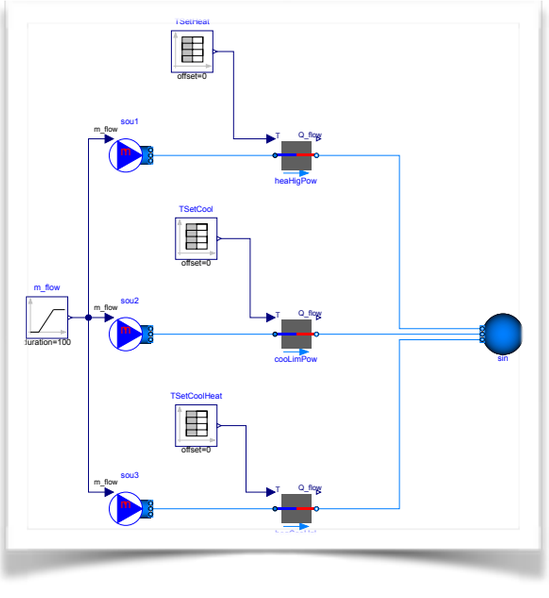
Follow style guide at https://github.com/iea-annex60/modelica-annex60/wiki/Style-Guide

Extend base class

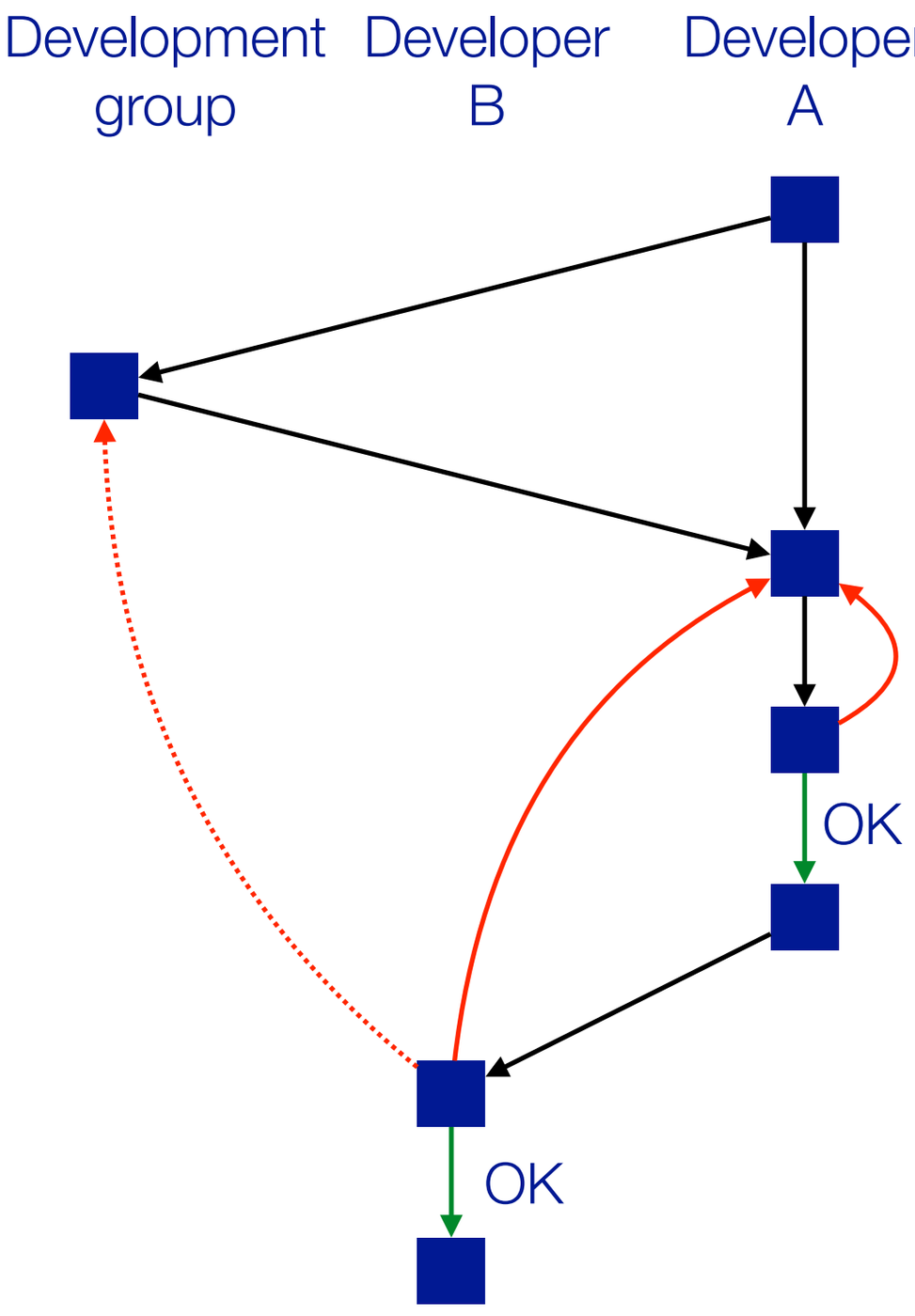


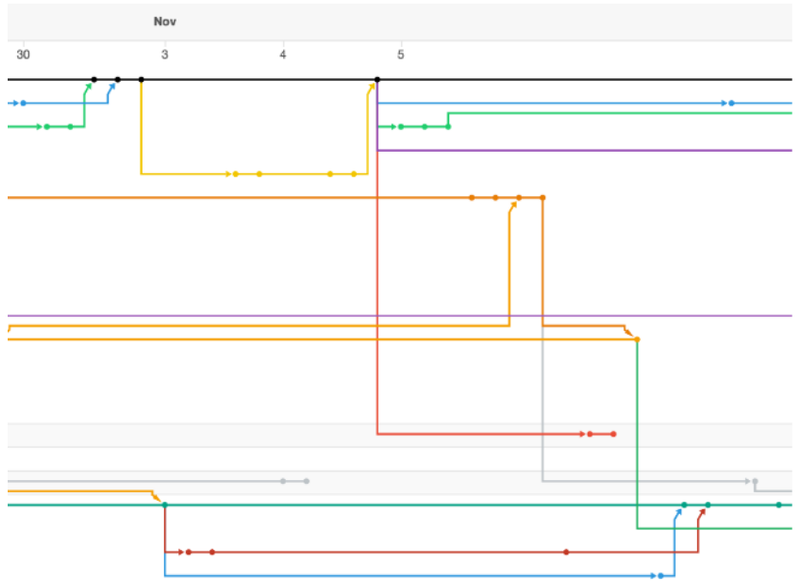
Add documentation, examples and validation





Quality control - Development flow





Submit an issue on github

Discuss within developer group (as needed)

Implement changes, including a model that illustrates bug to be fixed.

Pass unit tests

Issue pull request

Review and test implementation

Merge to master branch

More details at:
https://github.com/ibpsa/modelica-ibpsa/wiki/Workflow-for-code-changes

We
Need
You!!!