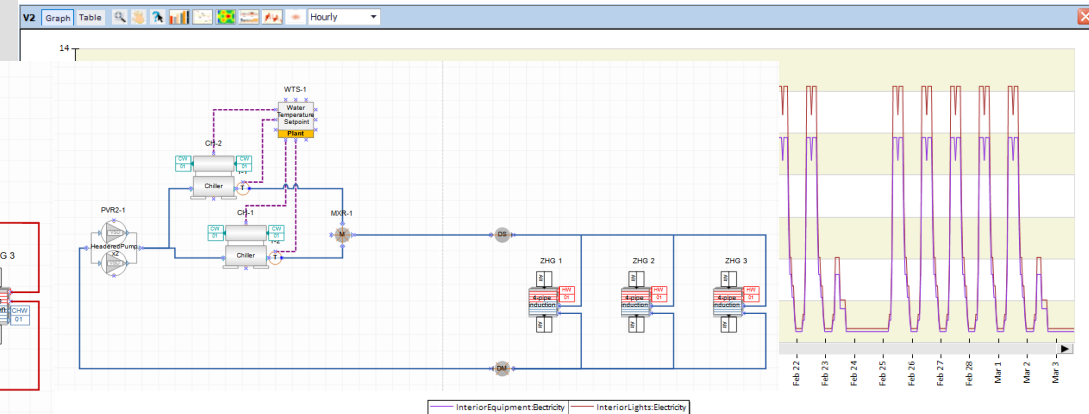
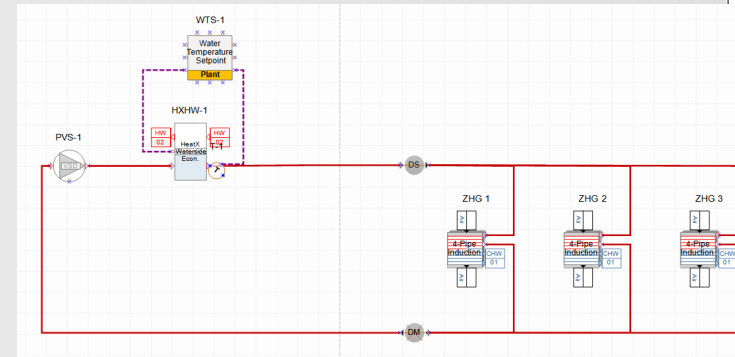
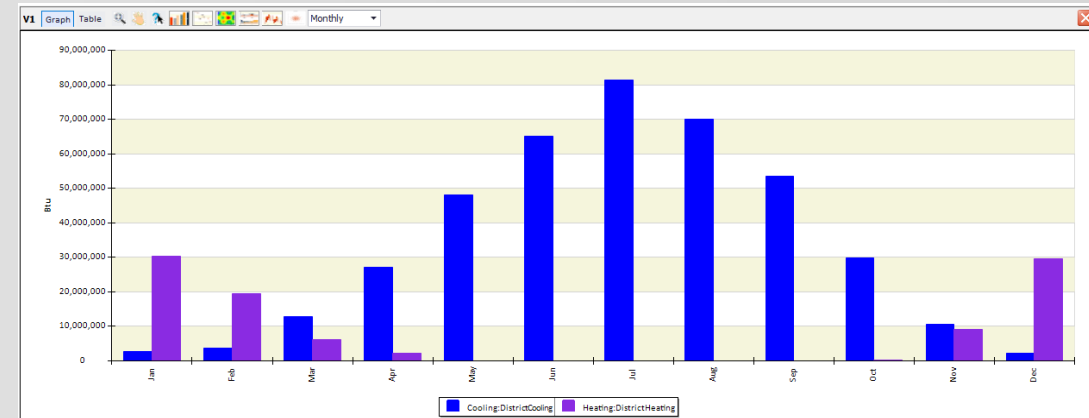
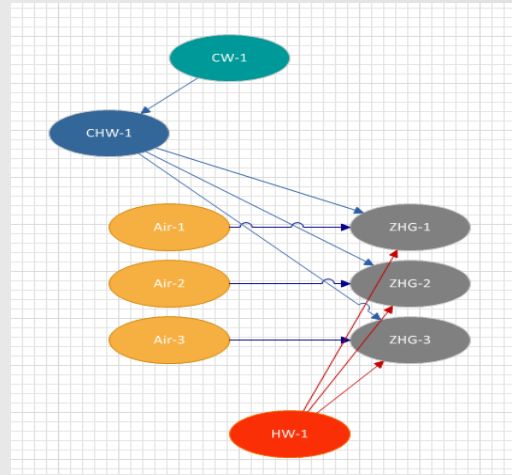


# Simergy training

## 102

*DWG Model-Over  
Editing HVAC Loops  
Results Visualization*

Tobias Maile & Richard See



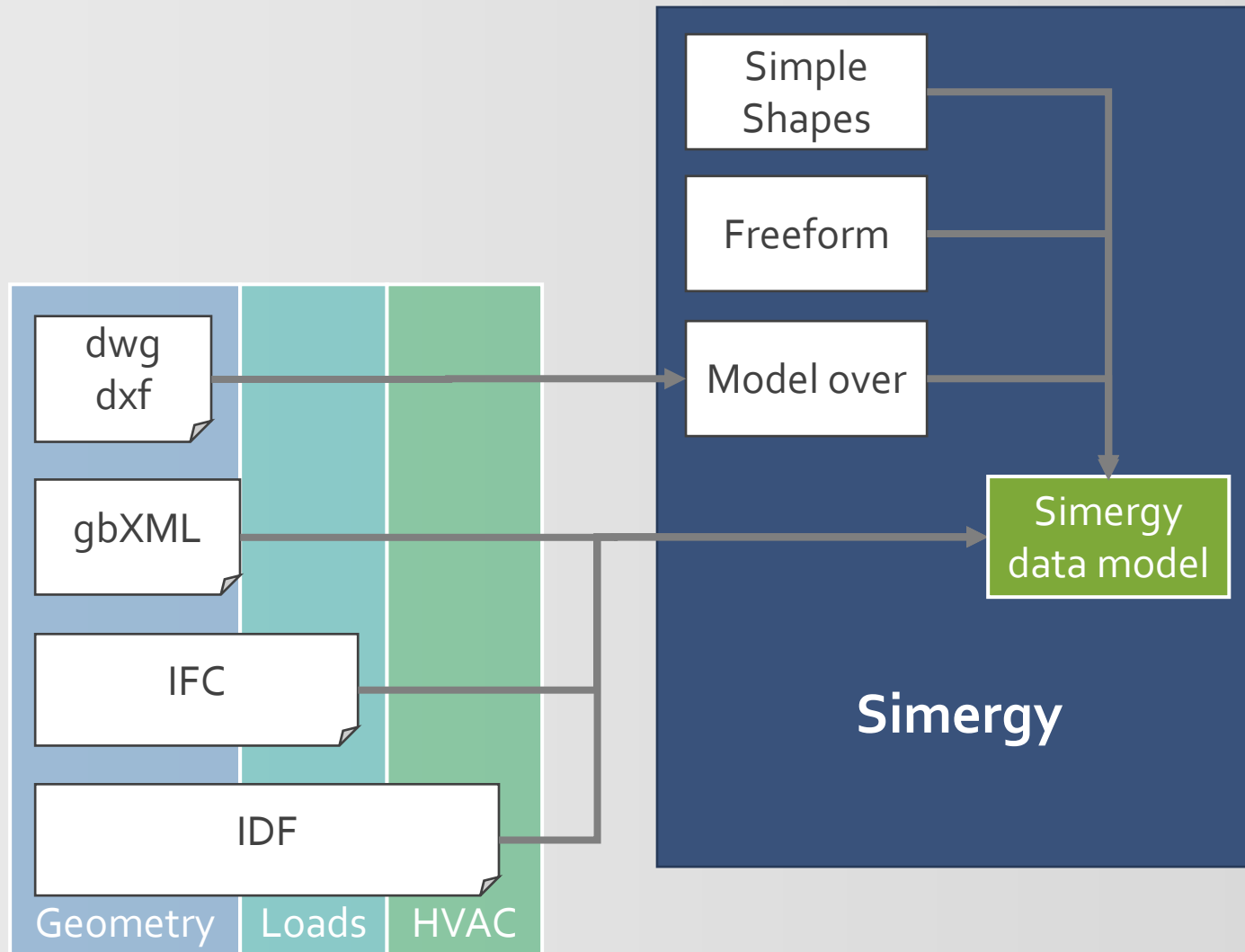
# Agenda

- Introduction (**keep it simple**)
- Lesson 1: DWG Model over – basic geometry
  - **External building elements**
  - **Single zone per story**
- Lesson 2: DWG Model over – simplified geometry
  - **Simple zoning (5 zones per story)**
- Lesson 3: HVAC system: Active beam with DOAS (gas heating and dx cooling)
  - **System creator**
  - **System Edits**
- Lesson 4: HVAC system: Active beam with DOAS (water heating and cooling)
  - **Creation and editing of HVAC systems**
- Lesson 5: Result visualization
- Lesson 6: DWG Model over – detailed geometry
  - **Detailed zoning (20 zones)**
  - **Fenestration**

# How this training works!

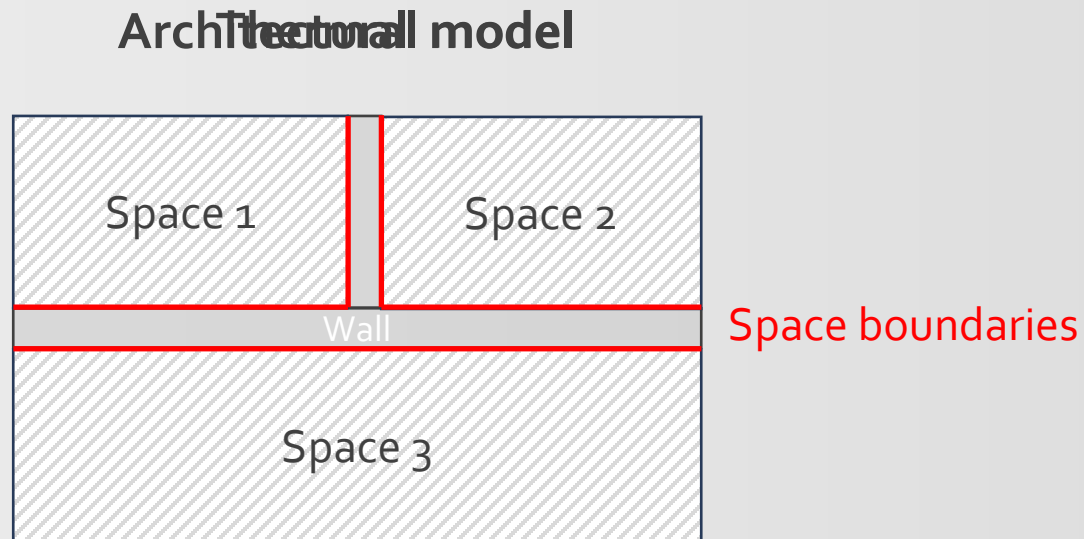
1. Step by step instructions to create this model
  - in this video
  - in the related script (step by step)
2. Please ask questions
  - In chat
  - by voice
  - or after the training via email: [Support@D-Alchemy.com](mailto:Support@D-Alchemy.com)

# Geometry options in Simergy



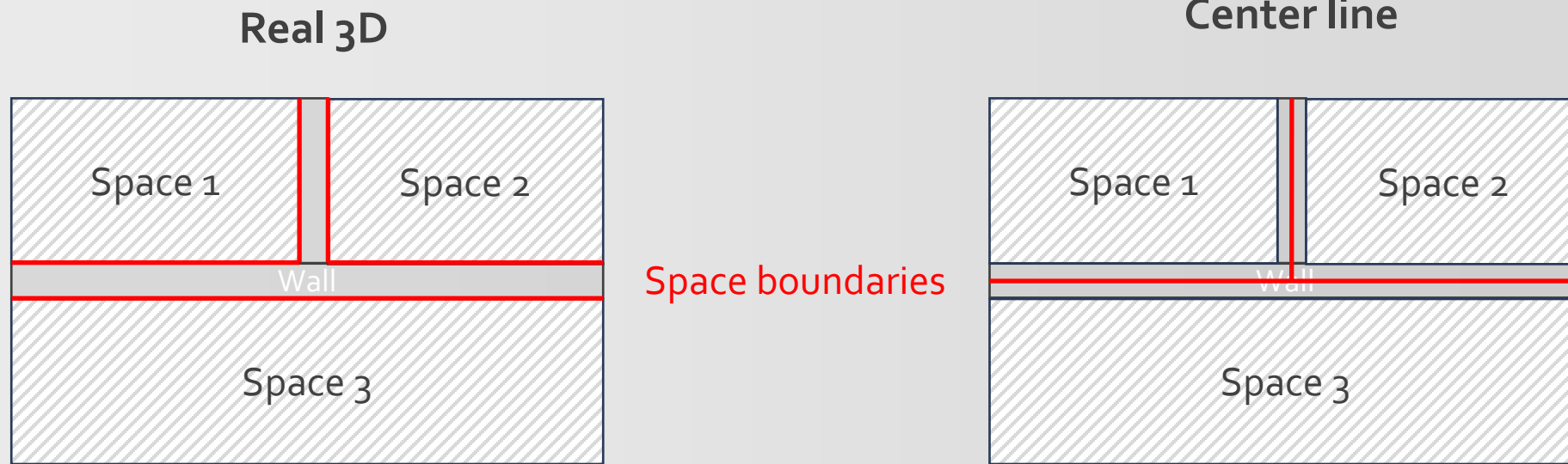
# Heat transfer based on space boundaries

- What are space boundaries?
  - 2D surfaces as basis for 1D heat transfer
- Generation of space boundaries from buildings elements and spaces (just in time or via IFC import)



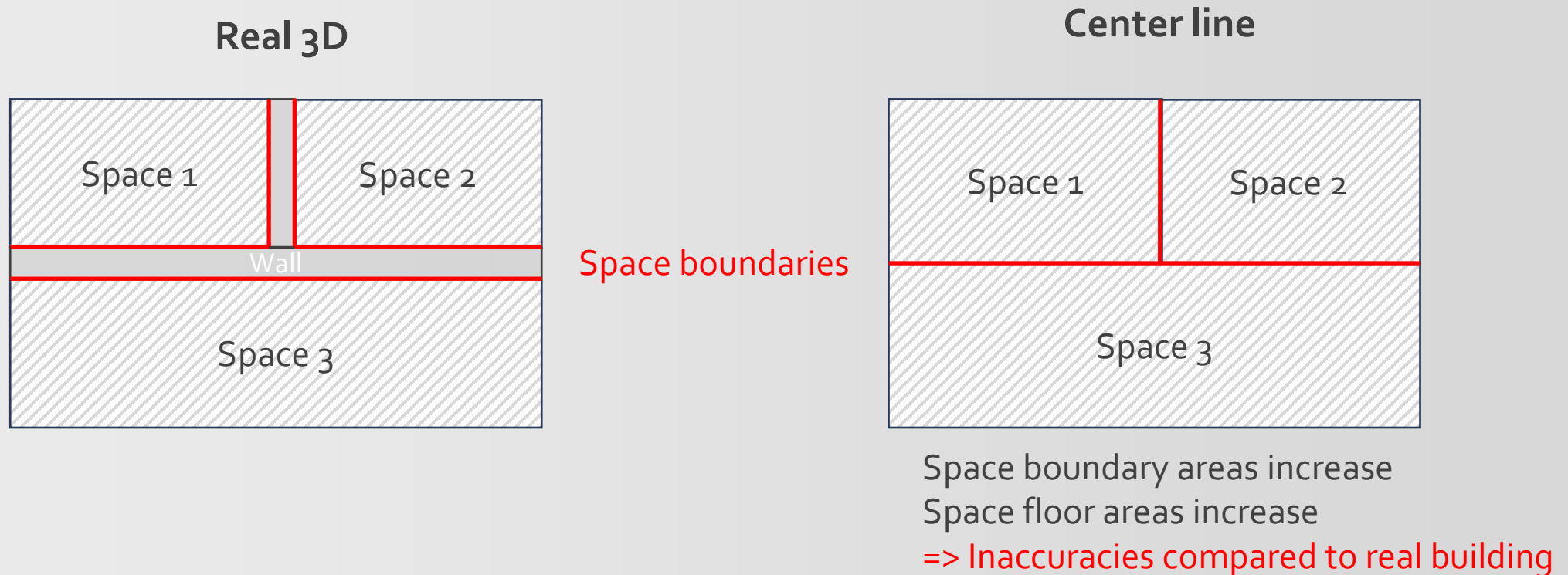
# Simergy 3D geometry

- Real 3D geometry compared to traditional center line geometry



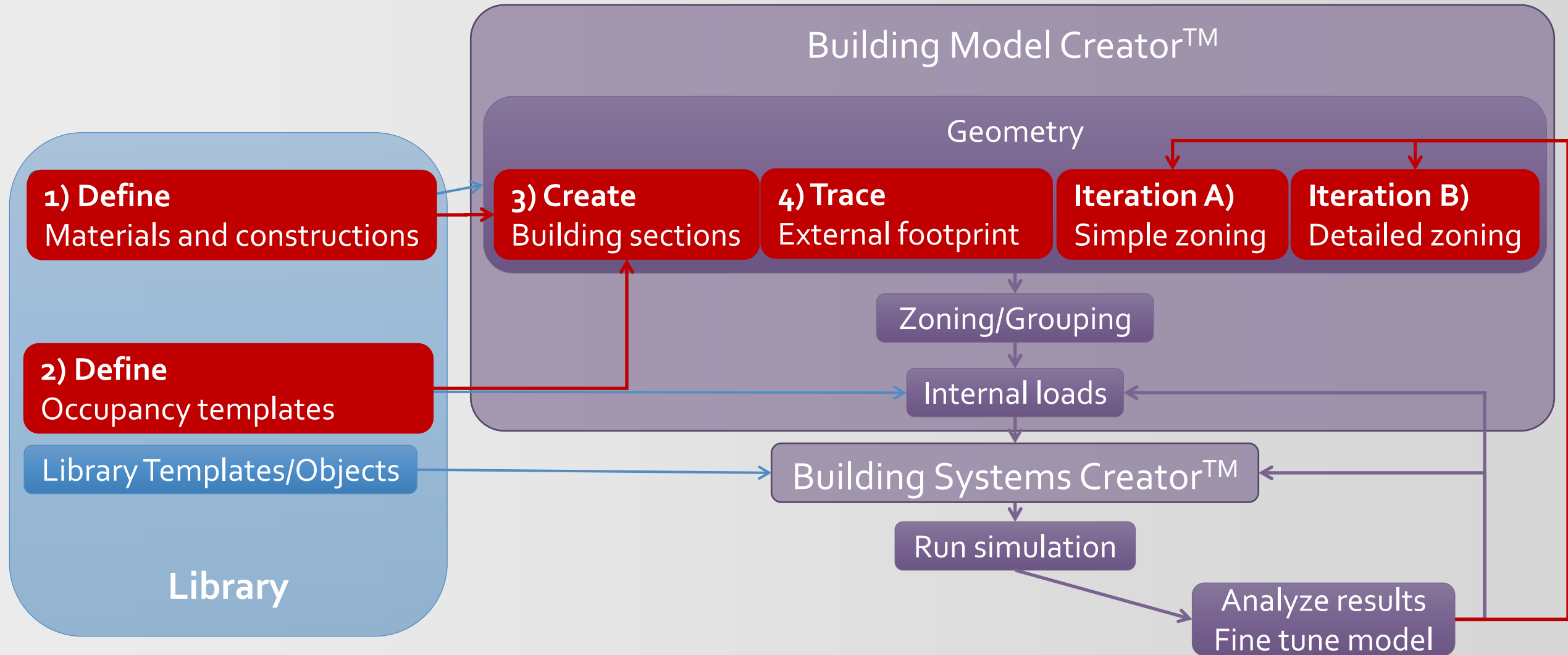
# Simergy 3D geometry

- Real 3D geometry compared to traditional center line geometry



*Bazjanac et al.: Generation of building geometry for energy performance simulation using Modelica, BauSim 2016*

# DWG model generation workflow – Building Model Creator

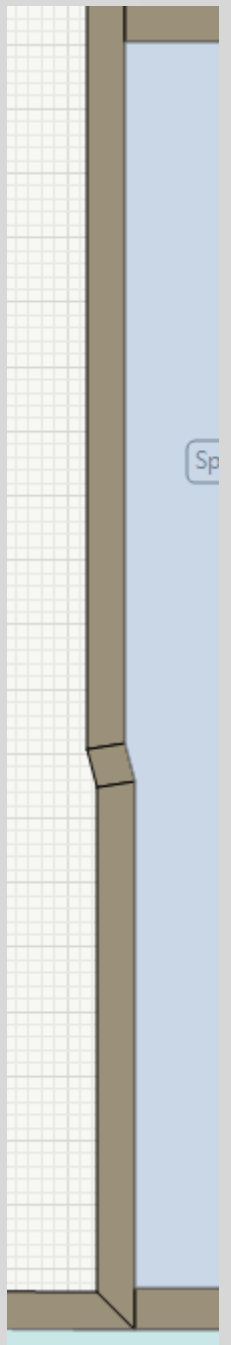
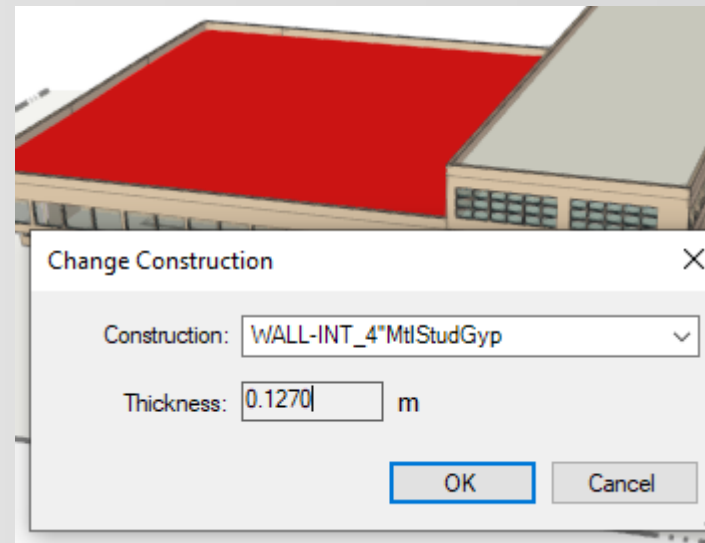
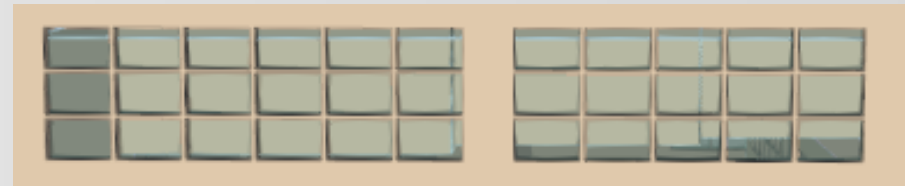
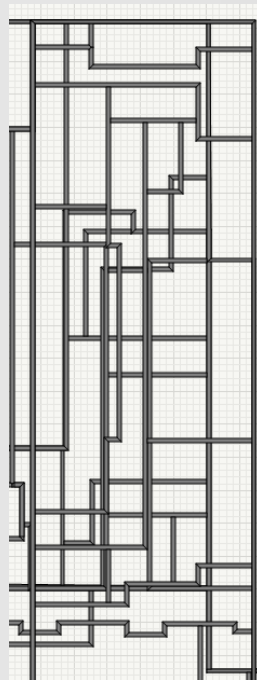
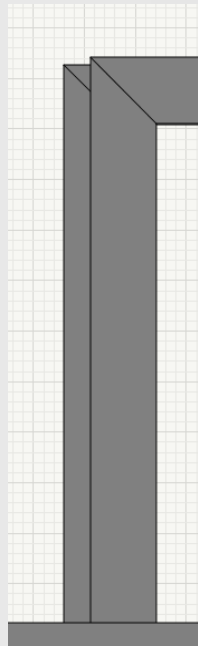
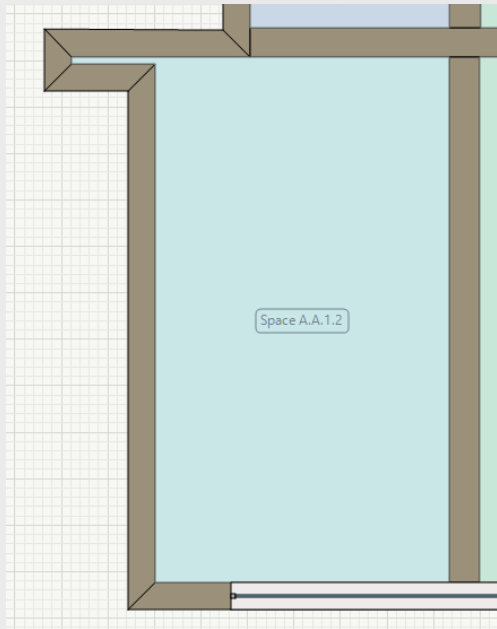




Keep it simple

# Common problems

- Slight offsets between stories
- Too much detail that slows down simulation
- Too detailed geometry modeling that does not add value



# Results Visualization workspace

## Template configuration

The screenshot displays the Simergy Professional Results Visualization workspace. At the top, the menu bar includes File, Project, Site, Buildings, Systems, Simulate, Reports, Results Visualization, Libraries, and Templates. Below the menu is a toolbar with options like 'New from Scratch', 'New from Template', 'Delete', 'Rename', 'Copy', 'Save', 'Save As Template', and 'Manage Template'. The main workspace is divided into several panels:

- Available Components:** A list of components and their associated units and frequencies.
- Available Output Variables:** A table with columns for Environment (Envr), Alternative (Alt), Configuration (Con), Run, Area, Unit, Frequency (Freq), and Variable Type (VarTp). It lists variables like 'tempera', 'Pump Outlet Temperature', 'Site Outdoor Air Drybulb Temperature', and 'Zone Air Temperature'.
- Output Variable Selection:** A panel for selecting variables to display in the current graph, with 'View4' selected.
- Views:** A panel showing different view layouts (e.g., 1x1, 2x2, 3x3 grids).
- Graphs:** Four graph windows are visible:
  - V1:** A bar chart showing monthly energy consumption in Btu. The y-axis ranges from 0 to 100,000,000. The x-axis shows months from Jan to Dec. A legend indicates 'Cooling:DistrictCooling/Basic geometry' (blue) and 'Heating:DistrictHeating/Basic geometry' (purple).
  - V2:** A timeseries chart showing monthly energy consumption in Btu. The y-axis ranges from 40 to 100. The x-axis shows months from Jan to Dec. A legend indicates 'Zone Mean Air Temperature/Basic geometry' (blue), 'Zone Thermostat Cooling Setpoint Temperature/Basic geometry' (purple), and 'Zone Thermostat Heating Setpoint Temperature/Basic geometry' (red).
  - V3:** A scatter chart showing the relationship between Site Outdoor Air Drybulb Temperature (x-axis, -10 to 100) and Btu (y-axis, 0 to 350,000). A legend indicates 'Cooling:DistrictCooling/Basic geometry' (blue) and 'Heating:DistrictHeating/Basic geometry' (purple).
  - V4:** A surface chart showing Zone Air Temperature (F) over time. The y-axis ranges from 40 to 100. The x-axis shows months from Jan to Dec. A legend indicates 'Zone Air Temperature/Basic geometry' with a color scale from 46.1 to 98.3.

View layout options

Dynamic Zoom

Filter

All available variables

Variables for current graph

Bar chart

Scatter chart

Graphs

Timeseries chart

Surface chart

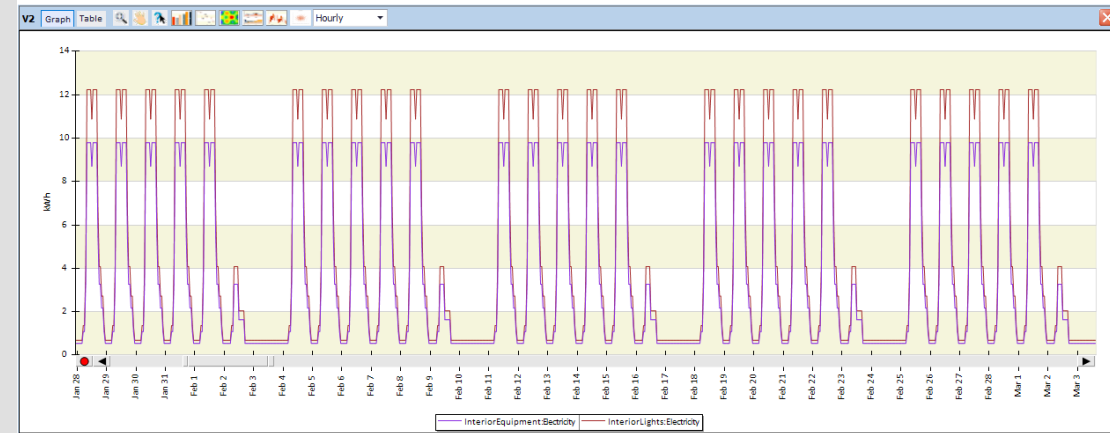
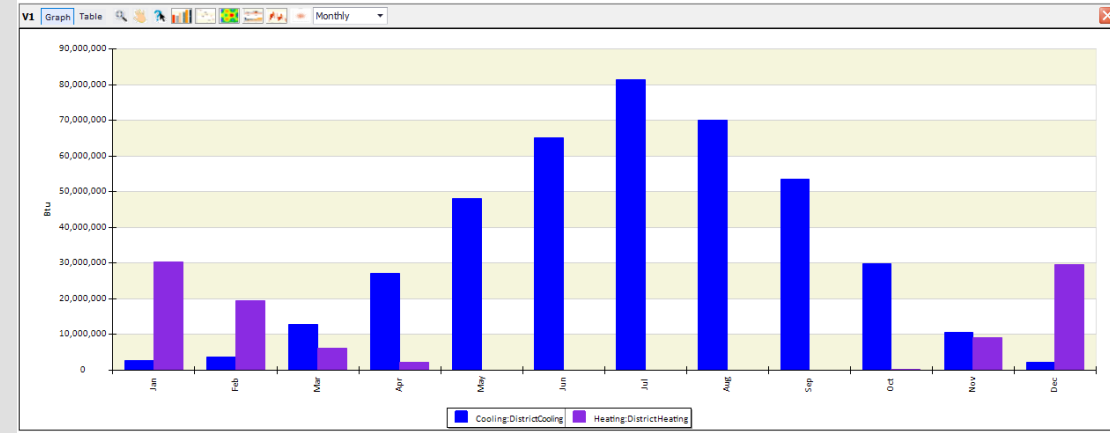
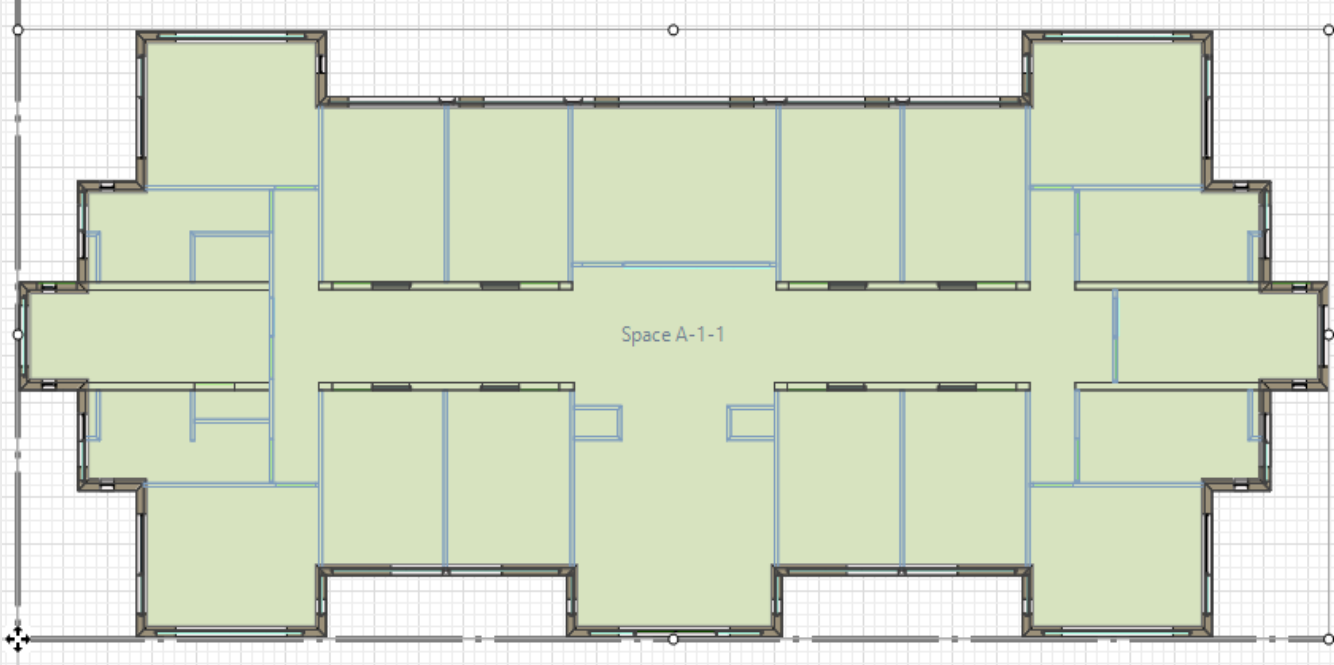
- Chart types:
- Time series
  - Bar
  - Surface
  - Area
  - Scatter (xy)
  - Data table

Customizable legends

Dynamic interval

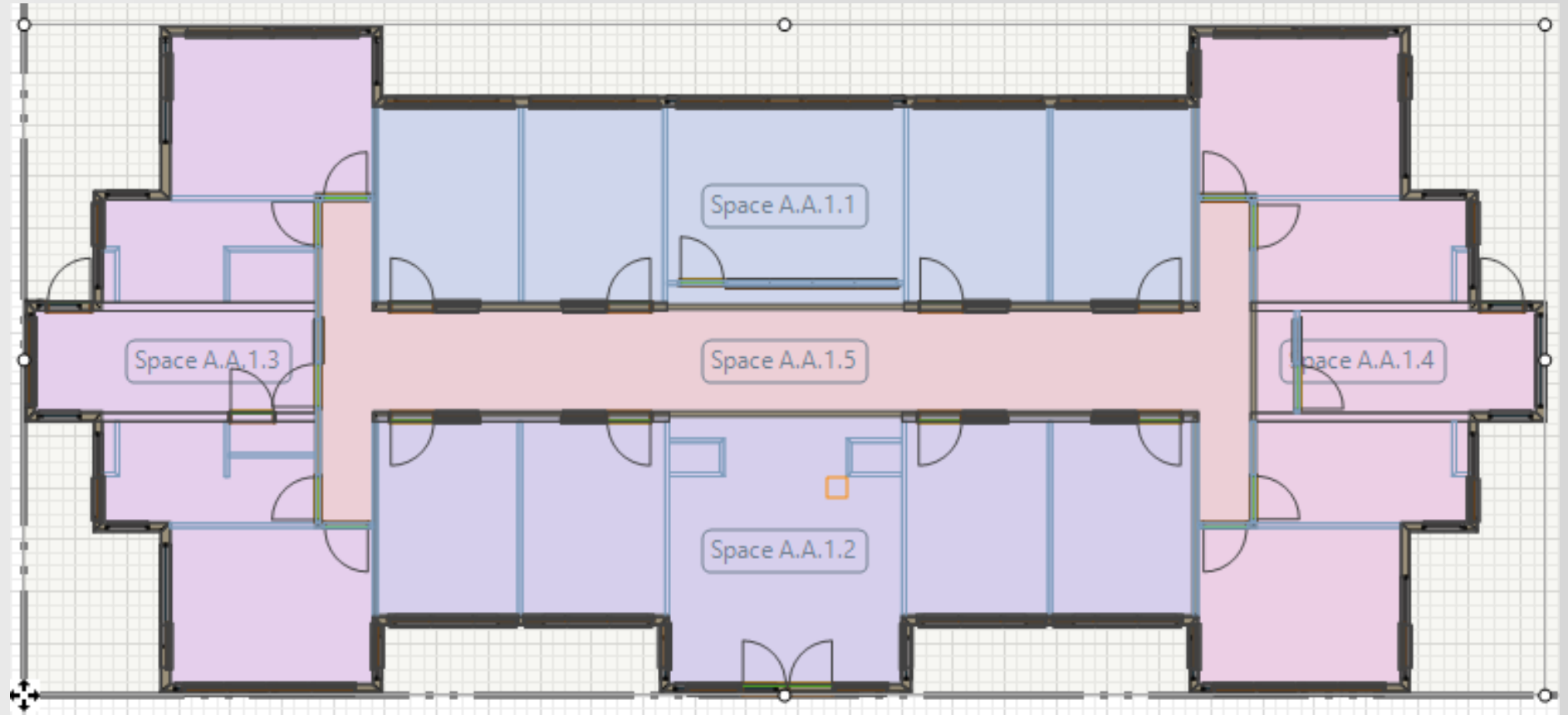
# Lesson 1: DWG Model over – basic geometry

- Focus on **external envelope** (for now)
- 3 identical floors
- Load calculations
- Look at **monthly heating and cooling** as well as **hourly electricity**



# Lesson 2: DWG Model over – simple geometry

- Adding simplified zoning (internal walls and space seeding)
- **Keep it simple** yet meaningful



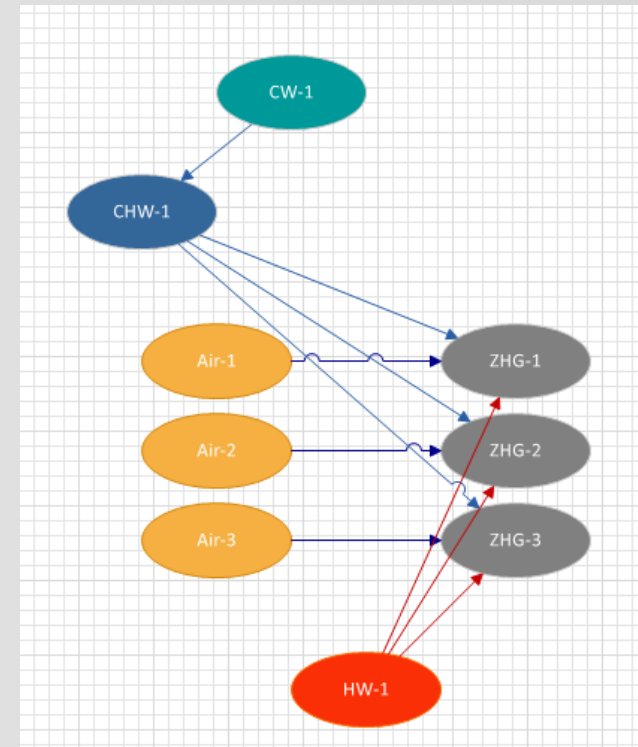
# Lesson 3: HVAC system: Active beam with DOAS (gas heating and dx cooling)

- Use system creator to generate Active Beam system
- Adjust sizing parameters

**Template Name:** ChilledBeam wDOAS dxC gasH

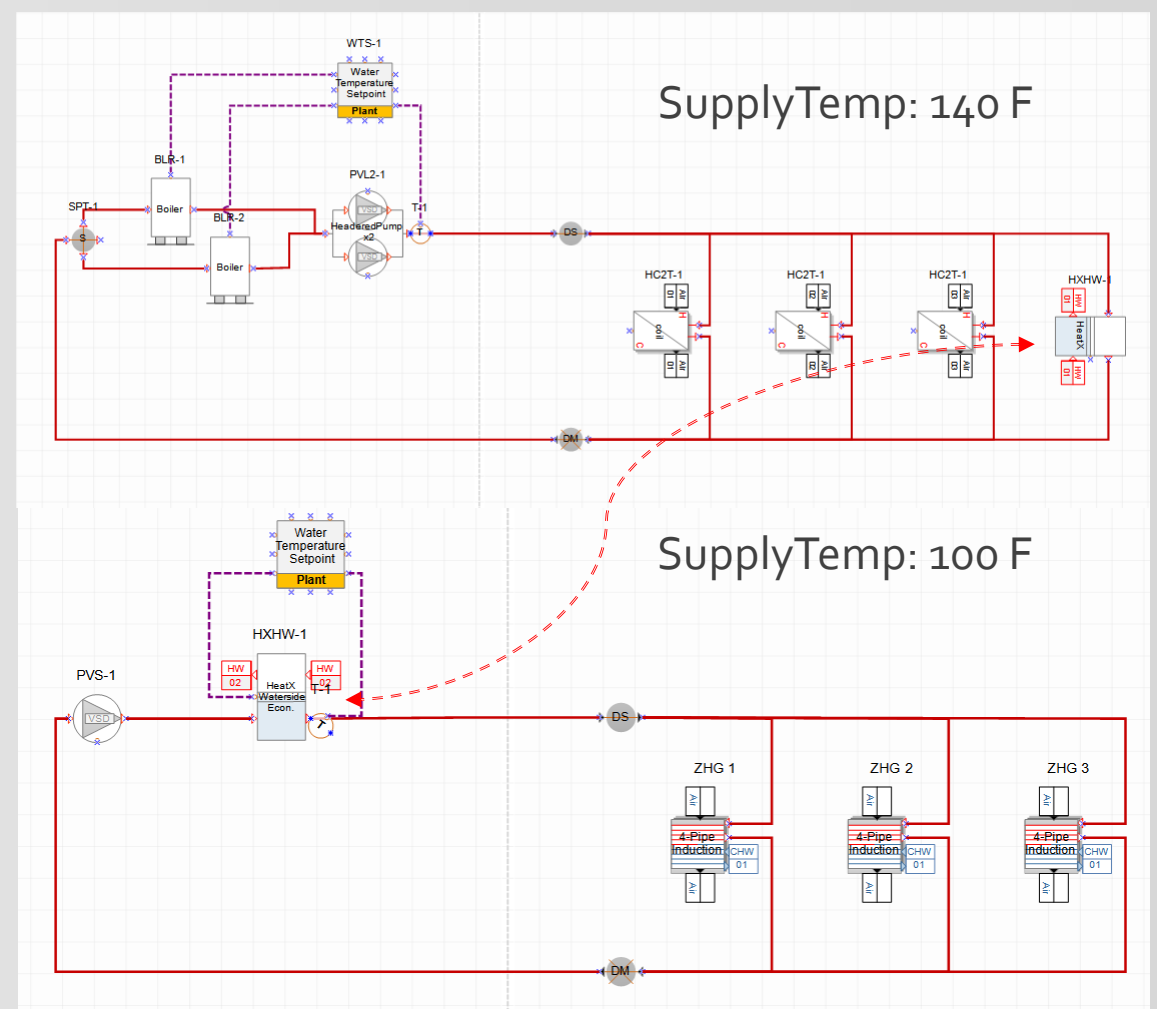
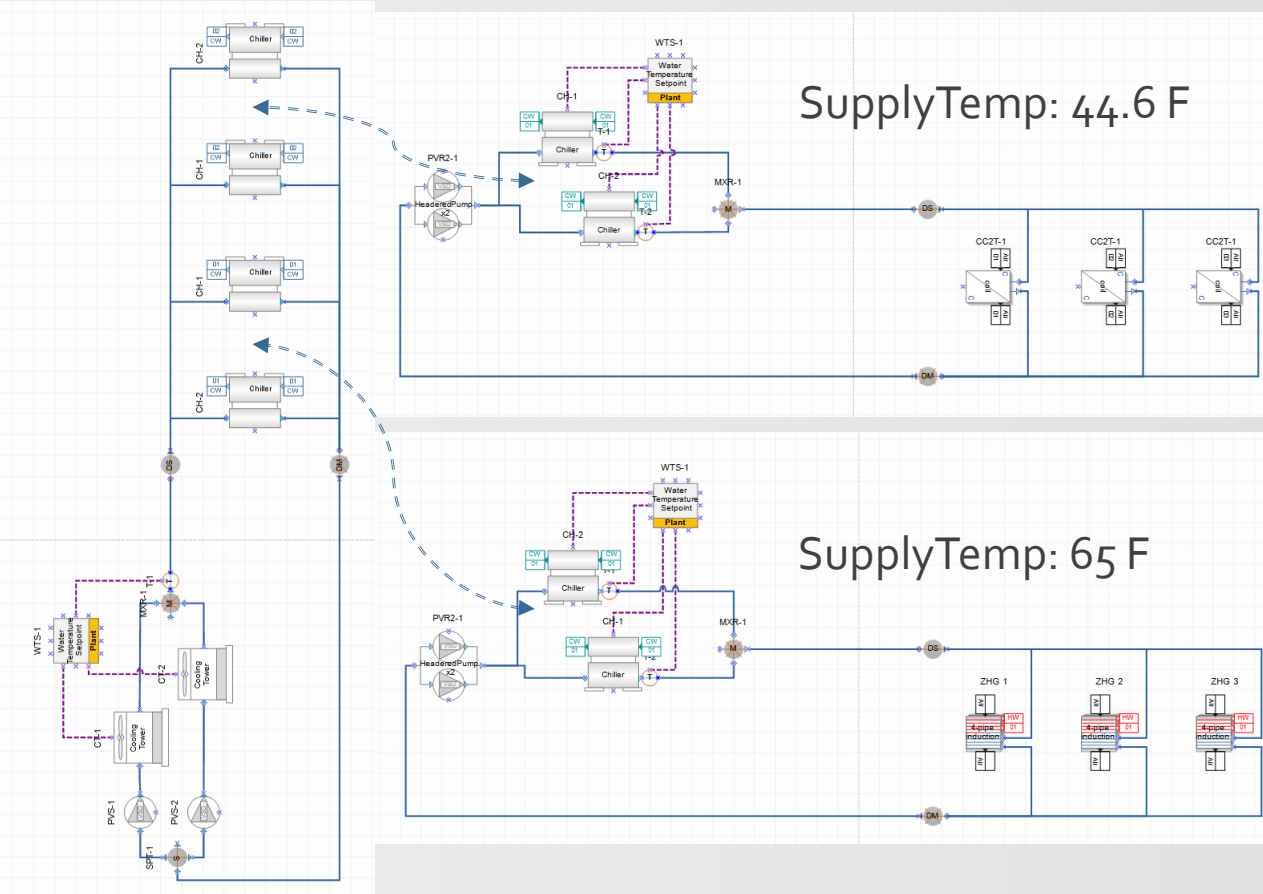
**All existing systems will be replaced**

Zone HVAC Group:	AT_4PipeInduction_Active	<input type="radio"/> One per building	<input checked="" type="radio"/> One per story	<input type="radio"/> One per zone
SHW Group:	None Selected	<input checked="" type="radio"/> One per building	<input type="radio"/> One per story	<input type="radio"/> One per zone
Air loop:	DOAS_CAV_dxC_gasH_HR	<input type="radio"/> One per building	<input checked="" type="radio"/> One per story	<input type="radio"/> One per zone
Hot water loop:	Boil(2)_HW_VSD(2)_Radiant	One per building		
Chilled water loop:	Chlr(2)_VC-Elec_VSD(2)_Radiant	One per building		
Condenser loop:	CoolTwr(2)_2SP_VSD	One per building		
Mixed water loop:	None Selected	One per building		
Steam loop:	None Selected	One per building		
VRF loop:	None Selected	One per building		
SHW Loop:	None Selected	One per building		



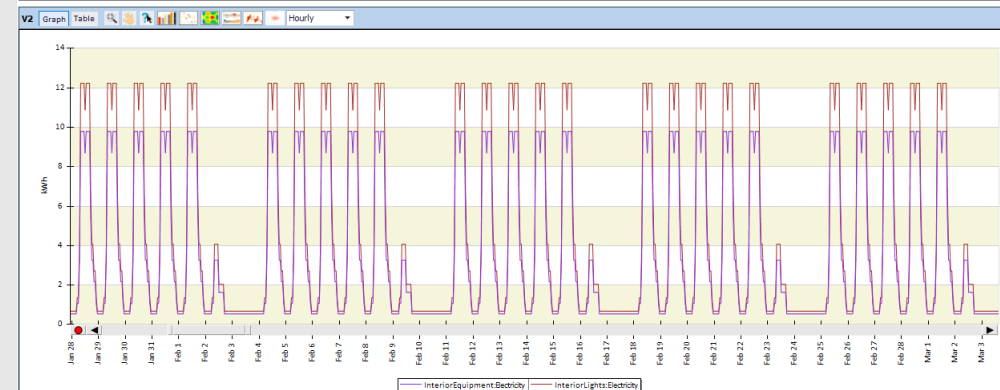
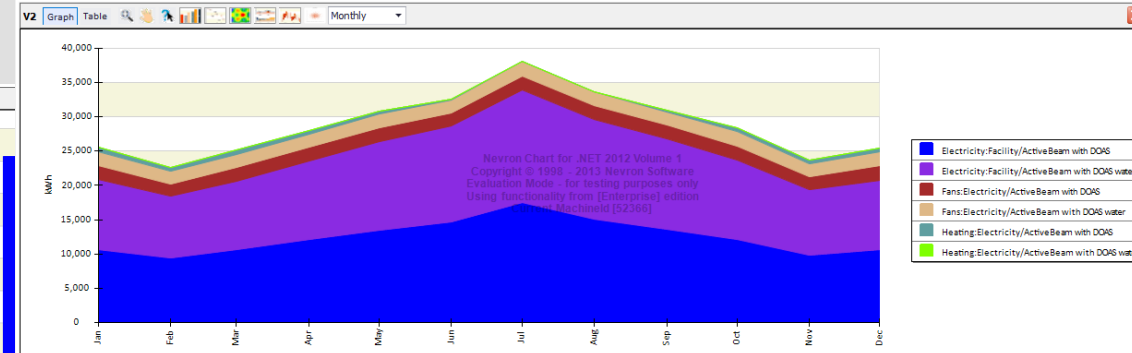
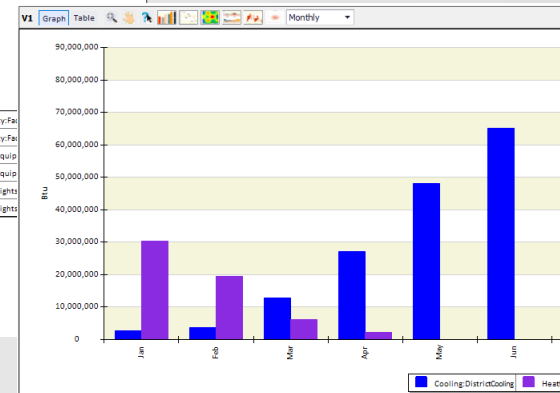
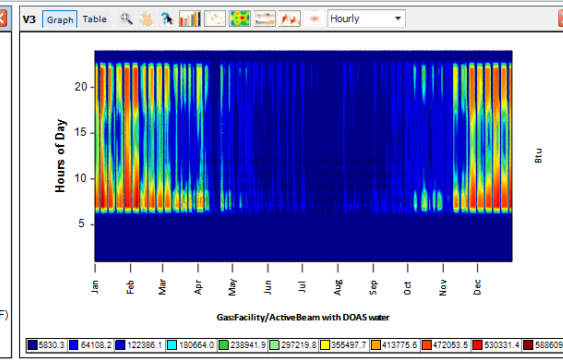
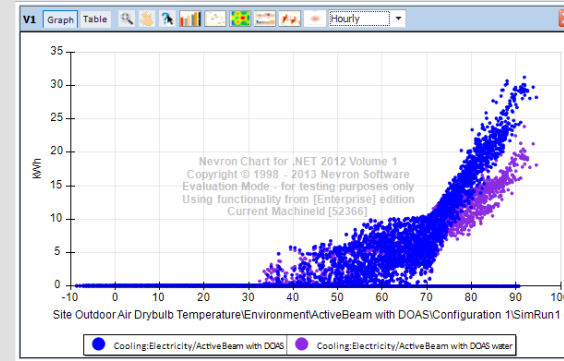
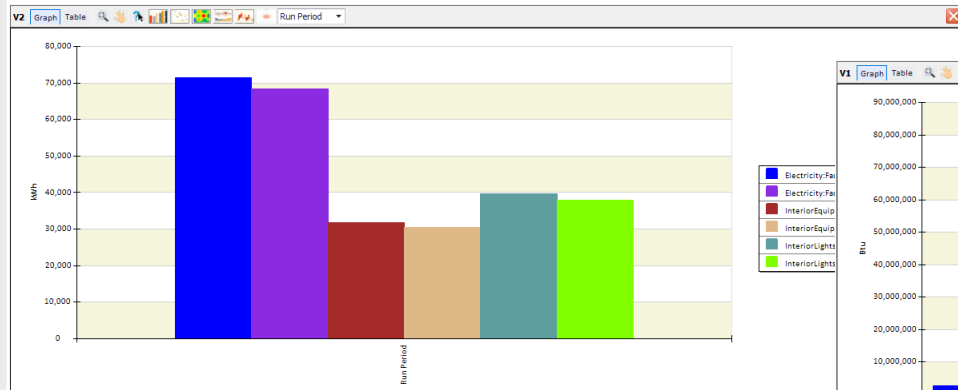
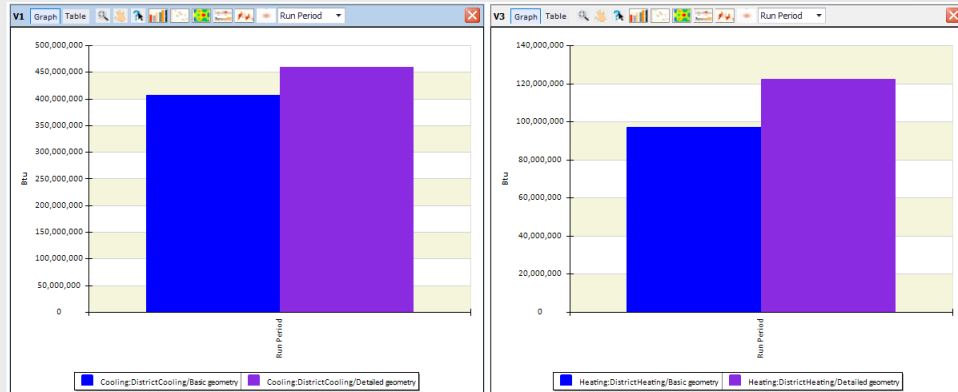
# Lesson 4: HVAC system: Active beam with DOAS (water heating and cooling)

- Change DOAS from gas heating and DX cooling to water heating and cooling
- Add two more water loops to enable two different temperature supplies



# Lesson 5: Result visualization

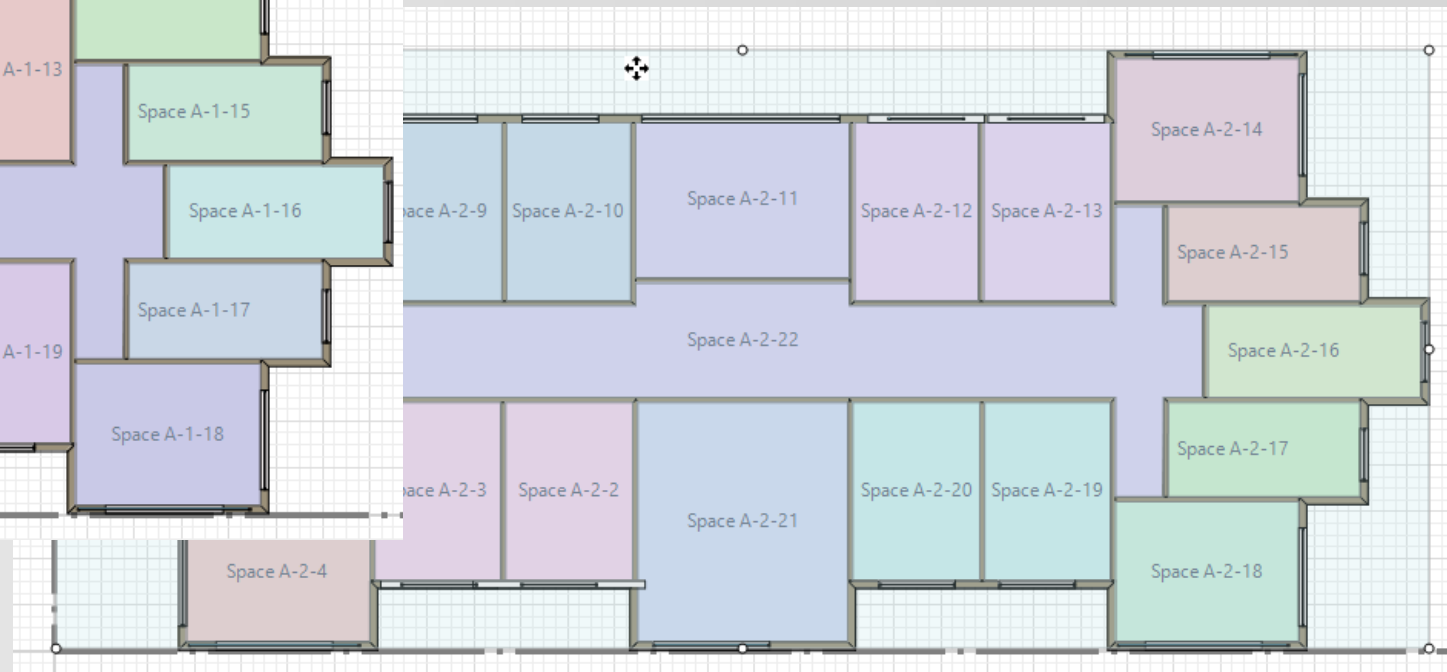
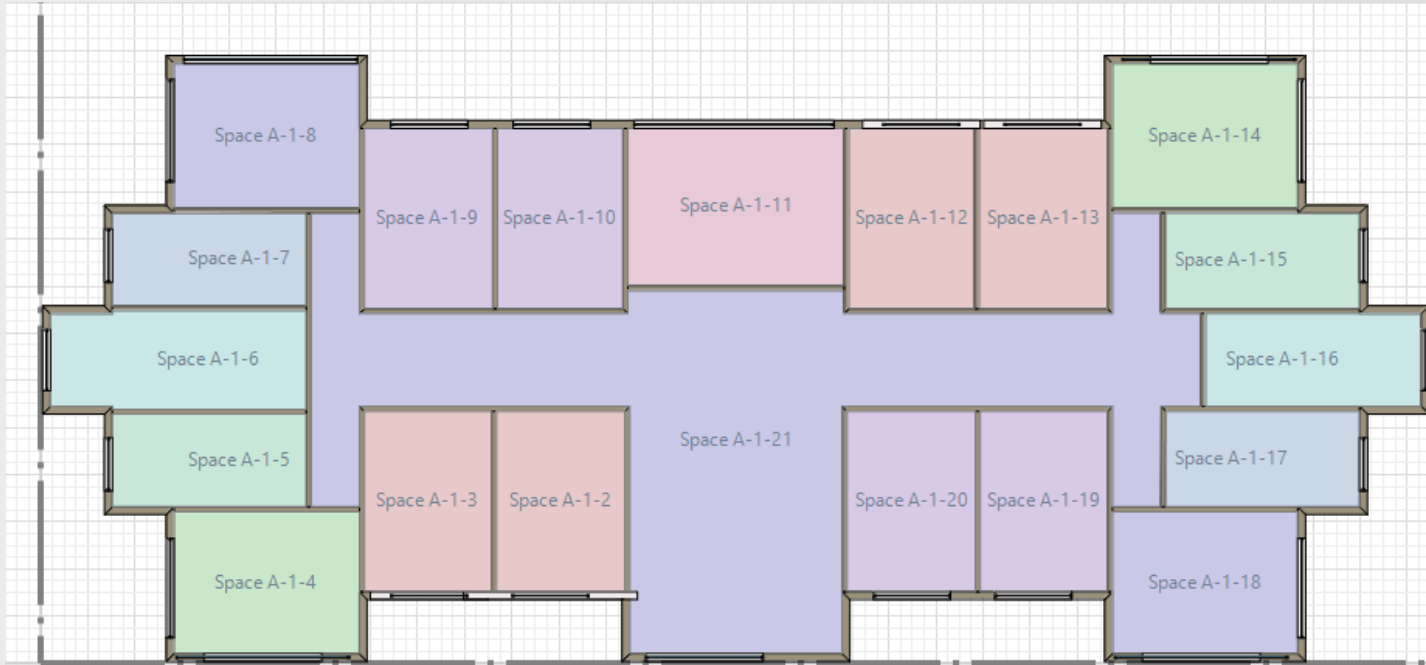
- Filtering
- Graph layout
- Legend
- Graph types
- Time interval
- Zoom





# Lesson 6: DWG Model over – advanced geometry

- Adding more detail (internal walls, actual spaces, thermal zoning, windows)
- Ground floor is a little different then the other two floors
- Load calculations



# Demo - Lesson 1:

## DWG Model over – basic geometry

- **external envelope**
- 3 identical floors
- Load calculations
- Look at **monthly heating and cooling** as well as **hourly electricity**

## Demo - Lesson 2:

# DWG Model over – simple geometry

- Adding simplified zoning (internal walls and space seeding)
- Keep it simple yet meaningful

## Demo - Lesson 3:

# HVAC system: Active beam with DOAS (gas heating and dx cooling)

- Use system creator to generate Active Beam system
- Detailed HVAC

## Demo - Lesson 4:

### HVAC system: Active beam with DOAS (water heating and cooling)

- Change DOAS from gas heating and DX cooling to water-based heating and cooling
- Add two more water loops to enable two different temperature supplies

# Demo - Lesson 5:

## Result visualization

Create

- Bar charts
- Surface plots
- Area plots
- Time series
- Zoom
- Etc.

## Demo - Lesson 6:

# DWG Model over – advanced geometry

- Adding more detail
  - internal walls
  - actual spaces
  - detailed windows
- Two different floor layouts

# New features in Simergy 3.2

## Simergy (application framework)

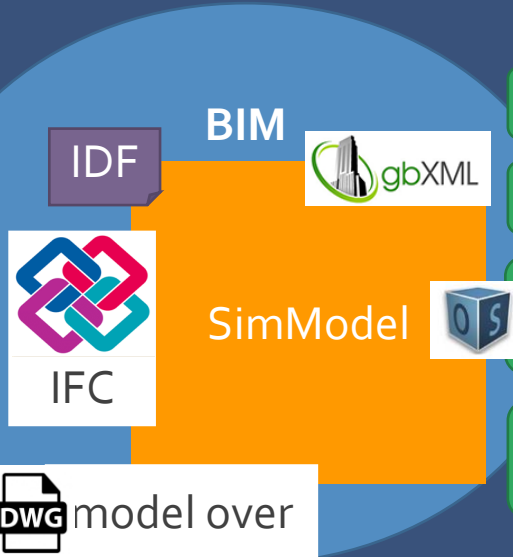
Parametric model creation with

Building Model Creator™

Multiple Buildings

Occupancy templ.

Building Systems Creator™



Schedule editor

MLS editor

Scripting via Measures

Results Visualization

predicting building performance through



Energy simulation

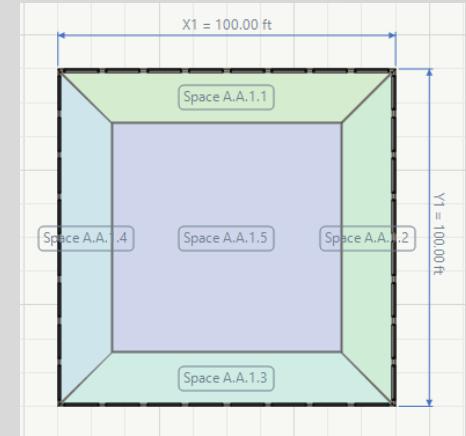


Daylighting simulation



Title24 certification

1. Updated ASHRAE content to 2016
2. Added ASHRAE system 9 & 10
3. Dimensions in plan view



4. Auto adjusting schedules for mixed occupancy
5. Improvements throughout
  1. Building Model and Systems Creator
  2. Space boundary generation
  3. Import/Export/Validation
  4. More samples, etc..



# New features in Simergy V3.3 (to be released soon)

- Support for the latest EnergyPlus Version 9.2
- Support for additional HVAC components, more heat exchanger, new components in 9.2
- Support for refrigeration loops
- Improved and faster IDF import
- Improved Building Creator (e.g., zone ceiling/floor configurations)
- Improved startup time/dashboard
- Improved unit testing
- Enhanced System Creator (support for secondary loops)
- More online content (e.g., FAQs)

