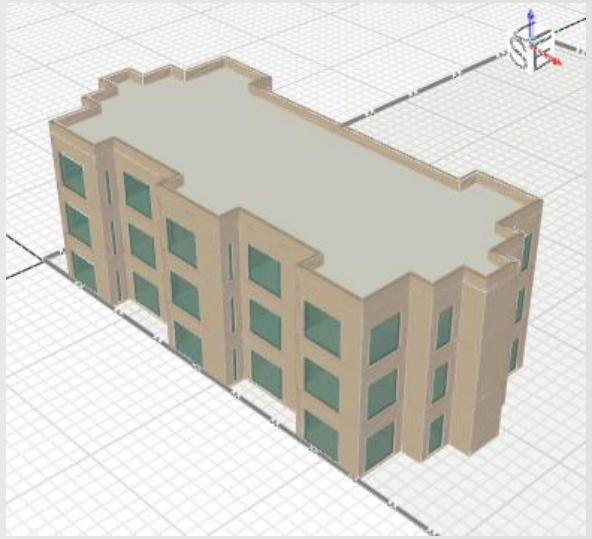
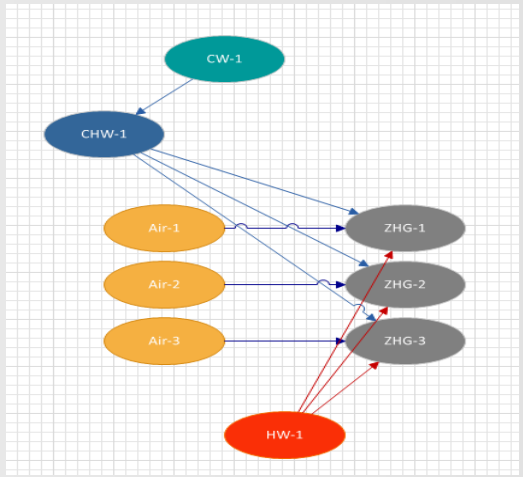
Digital Alchemy
THE BUILDING MODELING EXPERTS

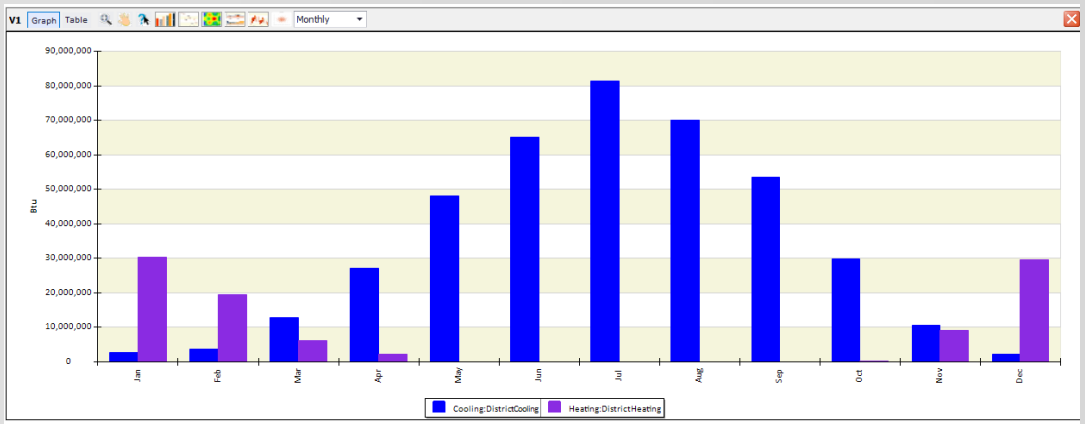
Simergy training 102

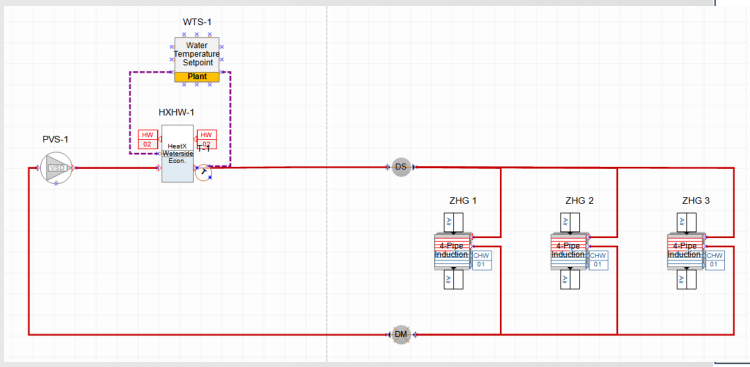
DWG Model-Over
Editing HVAC Loops
Results Visualization

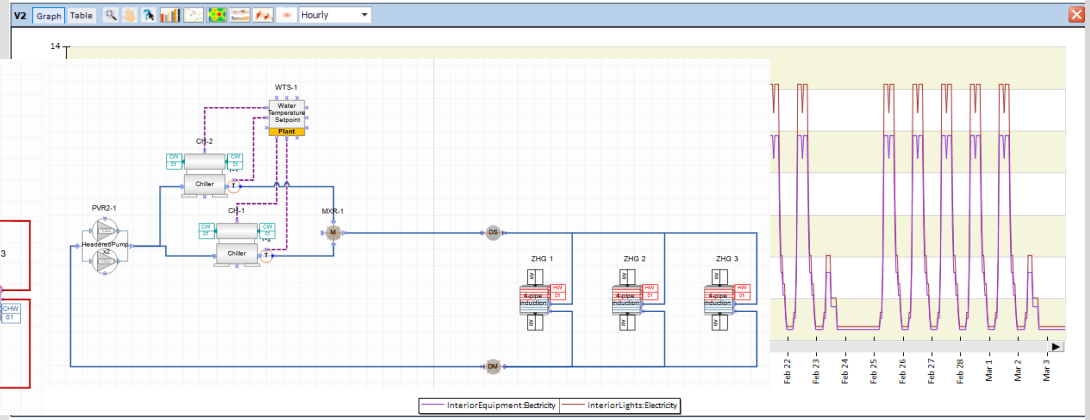
Tobias Maile & Richard See











Agenda

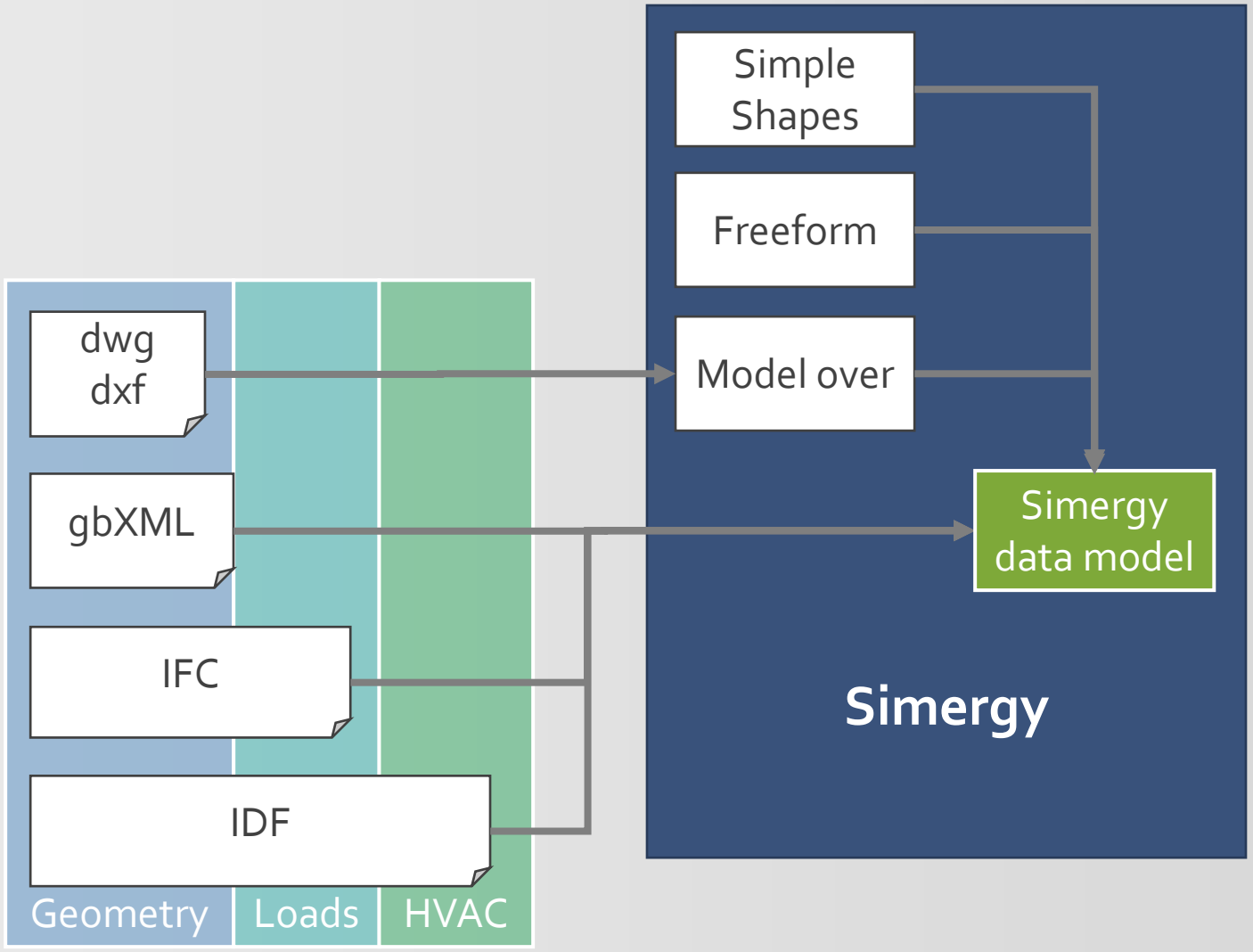
- Introduction (k**eep it simple**)
- Lesson 1: DWG Model over – basic geometry
  - **External building elements**
  - **Single zone per story**
- Lesson 2: DWG Model over – simplified geometry
  - **Simple zoning (5 zones per story)**
- Lesson 3: HVAC system: Active beam with DOAS (gas heating and dx 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

Digital Alchemy
THE BUILDING MODELING EXPERTS

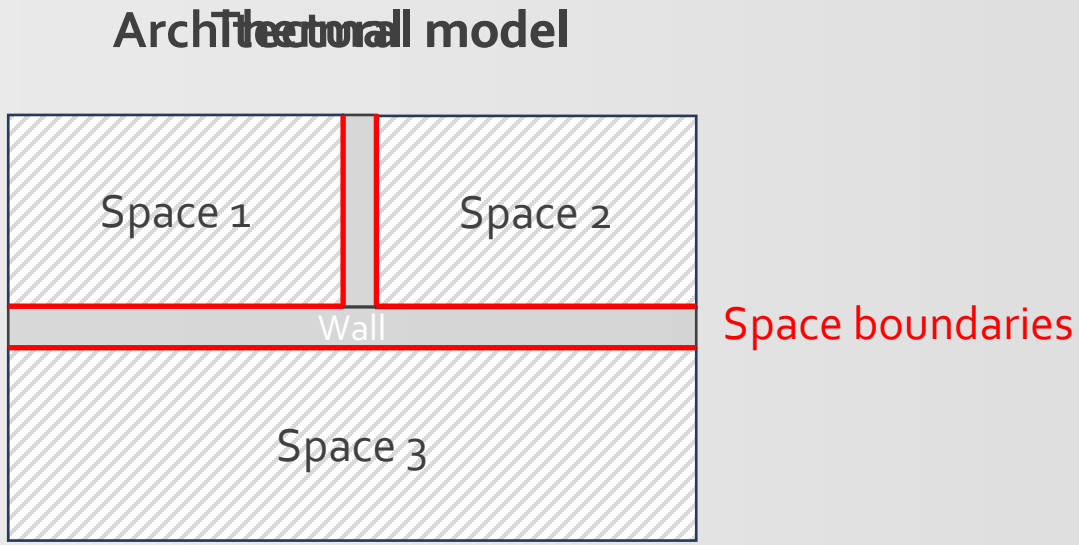
Geometry options in Simergy



Digital Alchemy
THE BUILDING MODELING EXPERTS

Heat transfer based on space boundaries

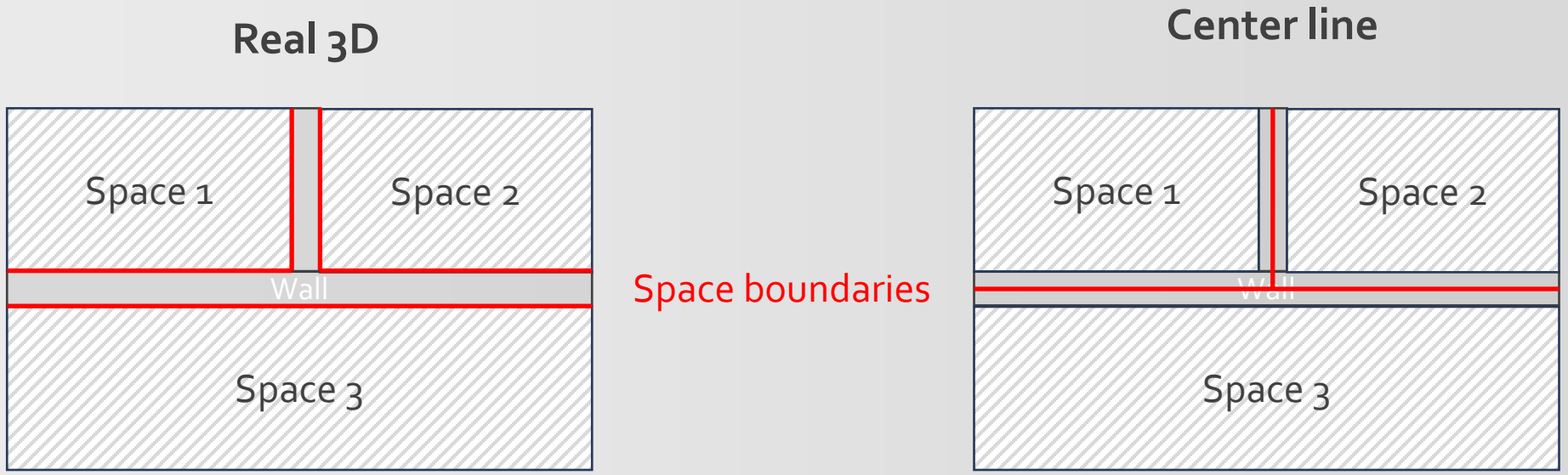
- What are space boundaries?
  - 2D surfaces as basis for 1D heat transfer
- Generation of space boundaries from buildings elements and spaces (just in time or via IFC import)



Digital Alchemy
THE BUILDING MODELING EXPERTS

Simergy 3D geometry

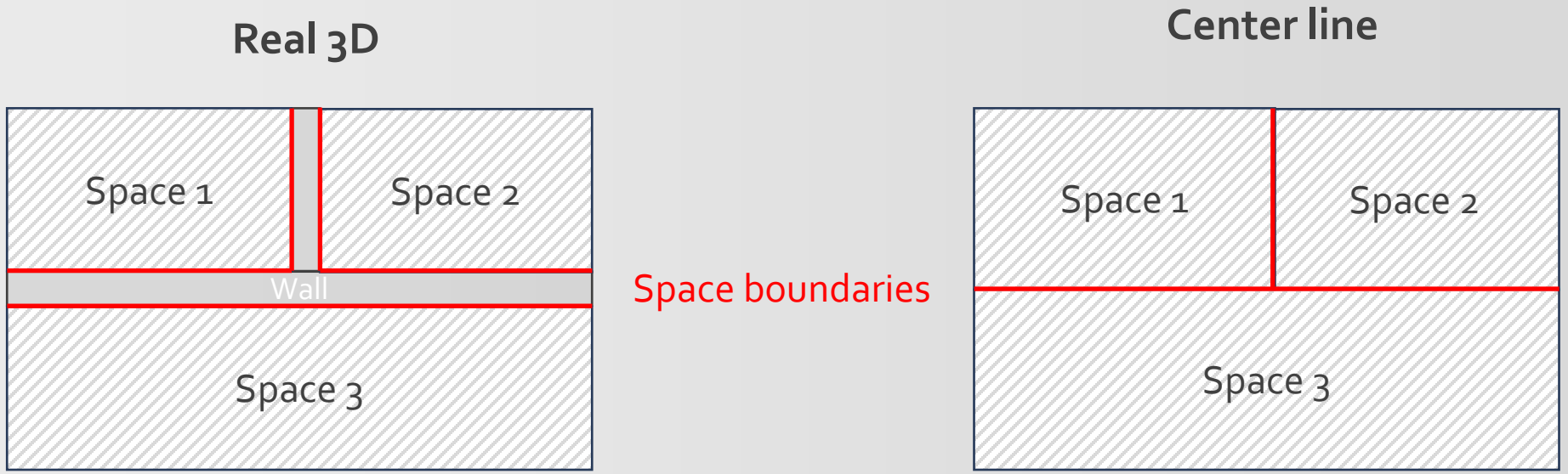
- Real 3D geometry compared to traditional center line geometry



Digital Alchemy
THE BUILDING MODELING EXPERTS

Simergy 3D geometry

- Real 3D geometry compared to traditional center line geometry

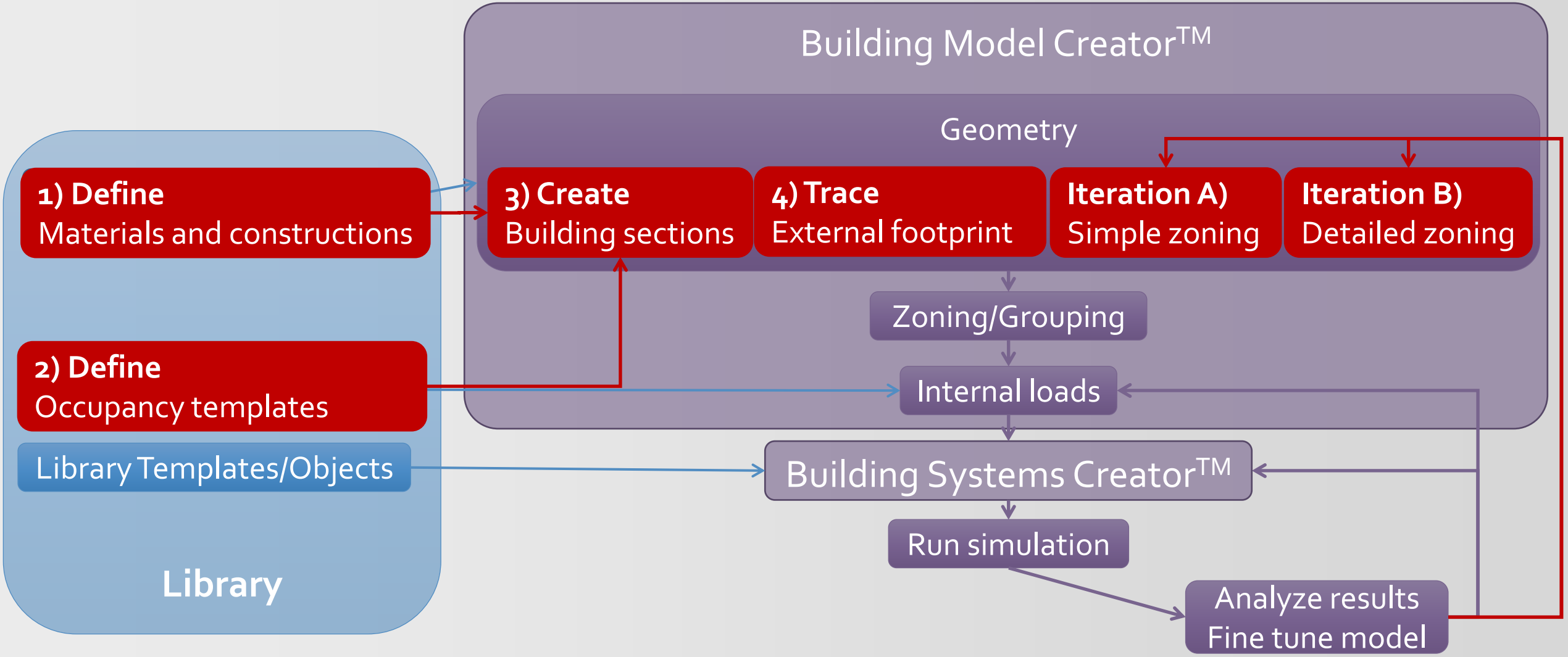


Space boundary areas increase
Space floor areas increase
=> Inaccuracies compared to real building

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

Digital Alchemy
THE BUILDING MODELING EXPERTS

DWG model generation workflow – Building Model Creator

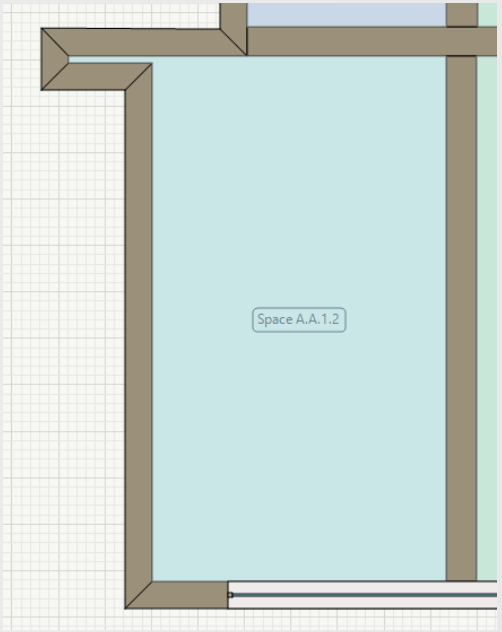


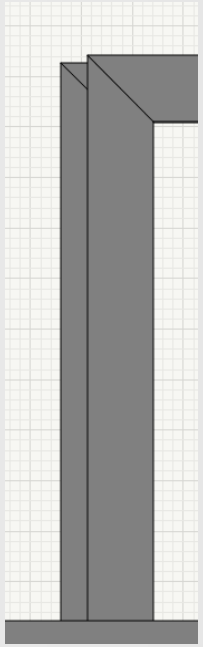
Digital Alchemy
THE BUILDING MODELING EXPERTS

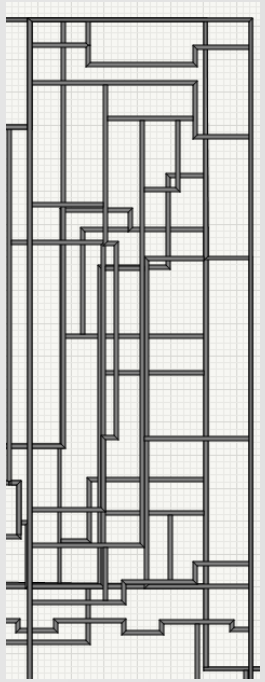
Keep it simple

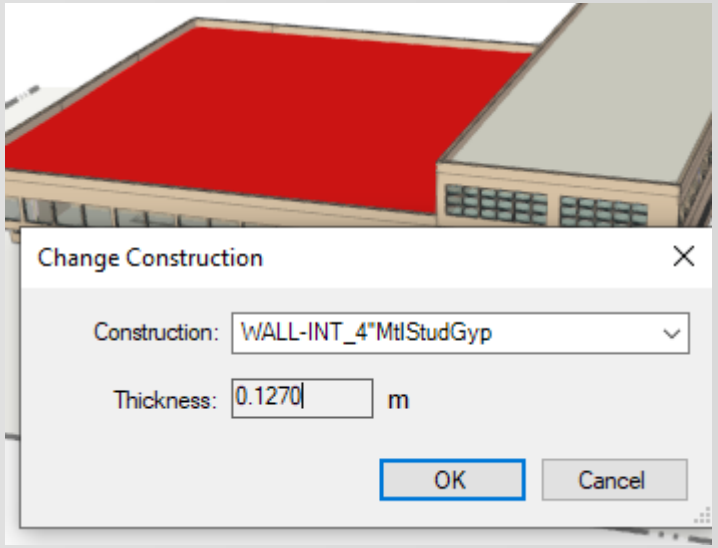
Common problems

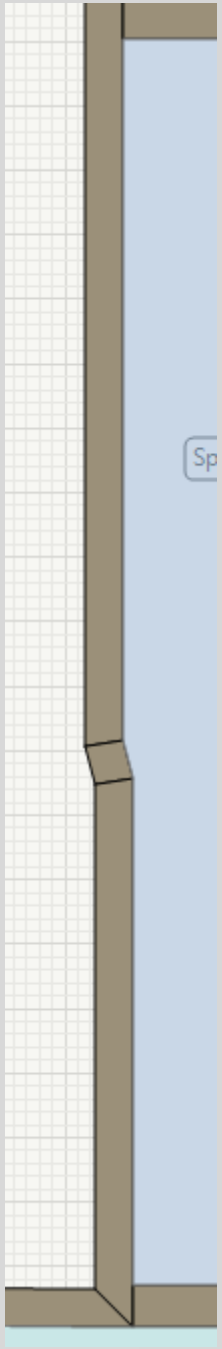
- Slight offsets between stories
- Too much detail that slows down simulation
- Too detailed geometry modeling that does not add value











Digital Alchemy
THE BUILDING MODELING EXPERTS

Results Visualization workspace

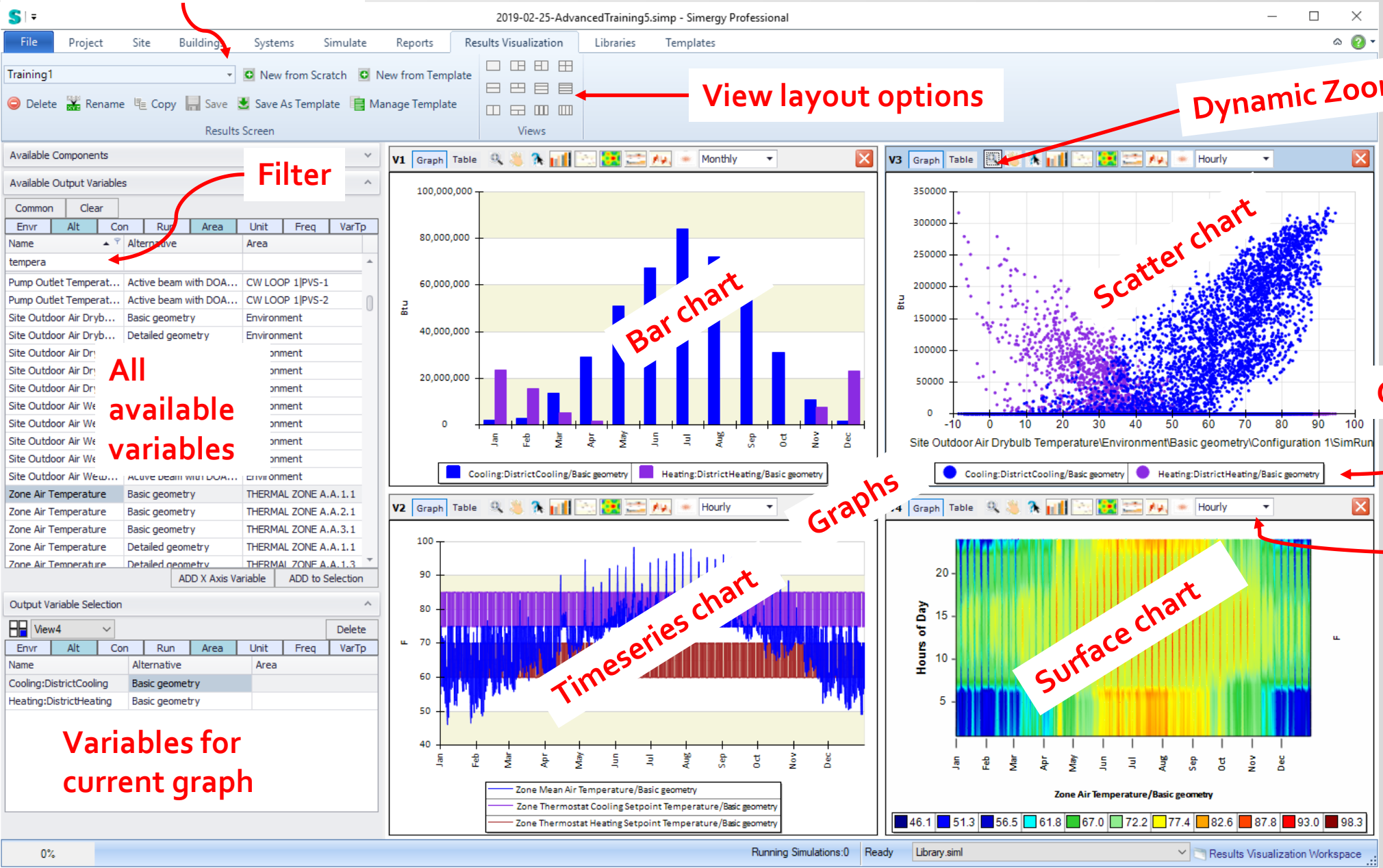


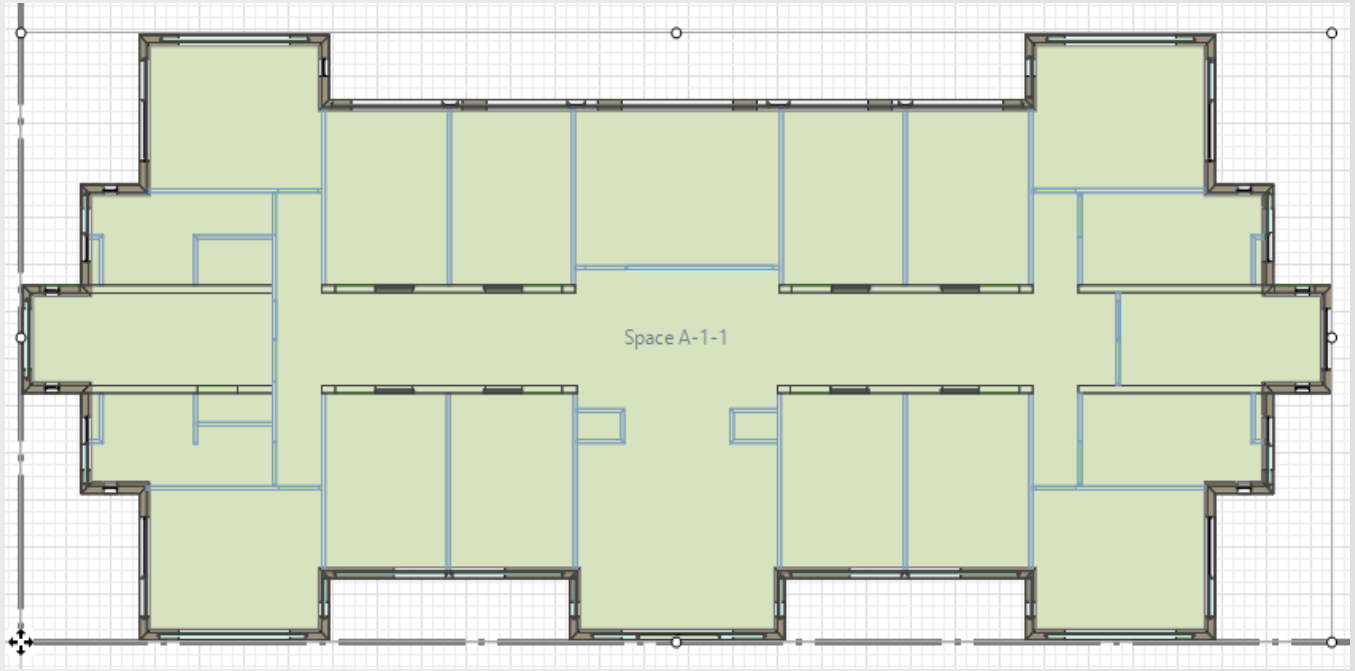
Chart types:

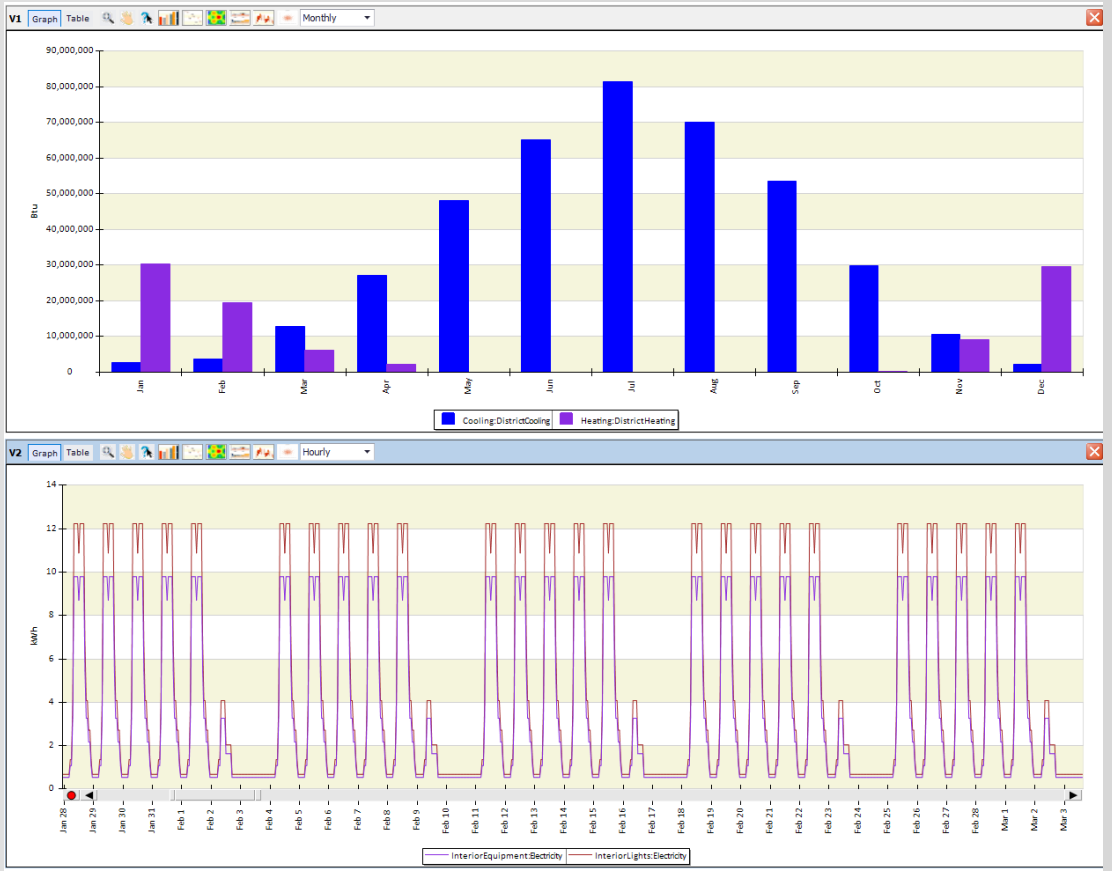
- Time series
- Bar
- Surface
- Area
- Scatter (xy)

Data table

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**

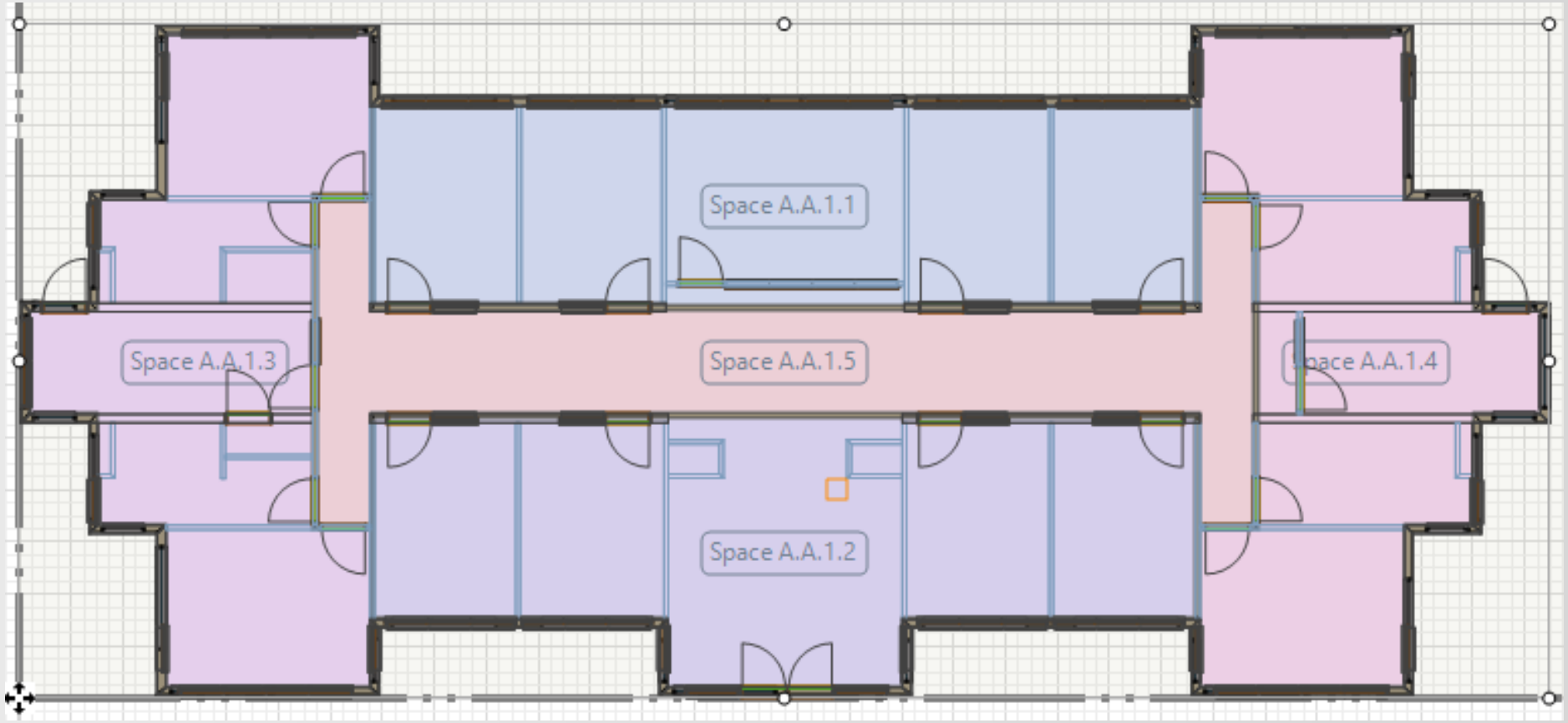




Digital Alchemy
THE BUILDING MODELING EXPERTS

Lesson 2: DWG Model over – simple geometry

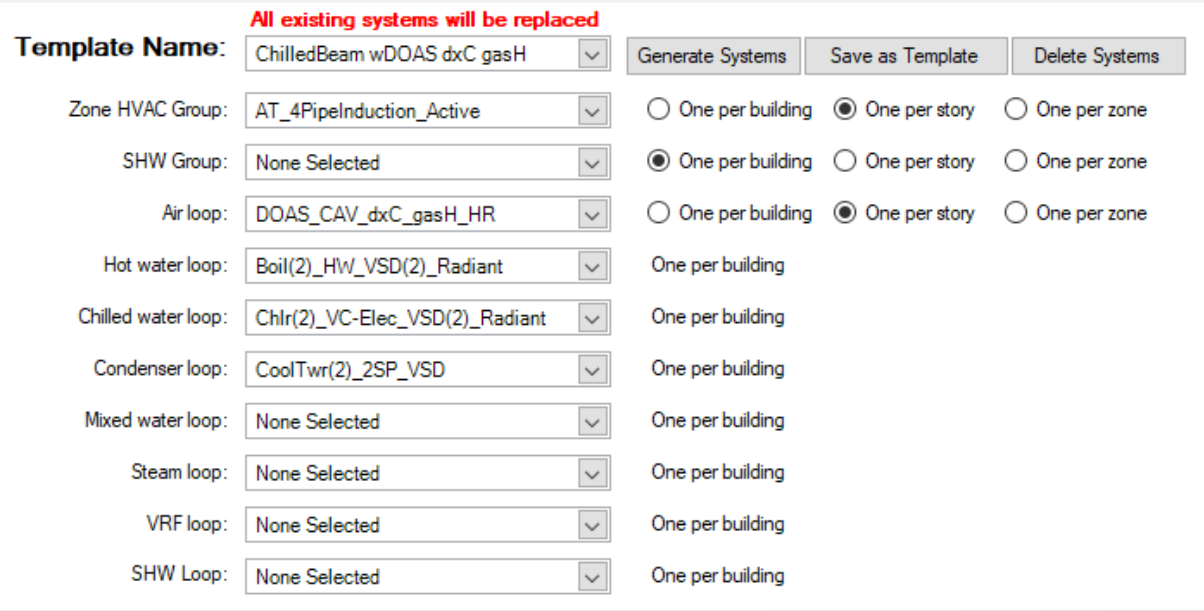
- Adding simplified zoning (internal walls and space seeding)
- **Keep it simple** yet meaningful

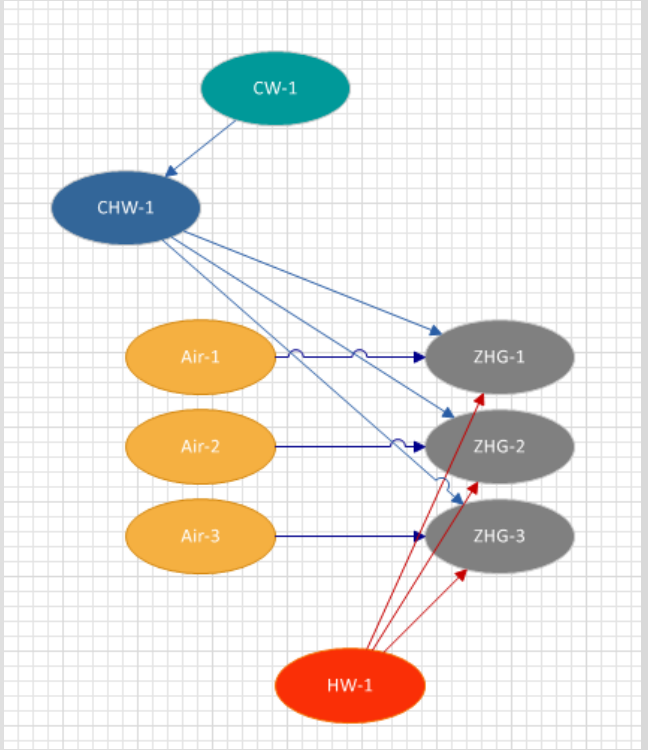


Digital Alchemy
THE BUILDING MODELING EXPERTS

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

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

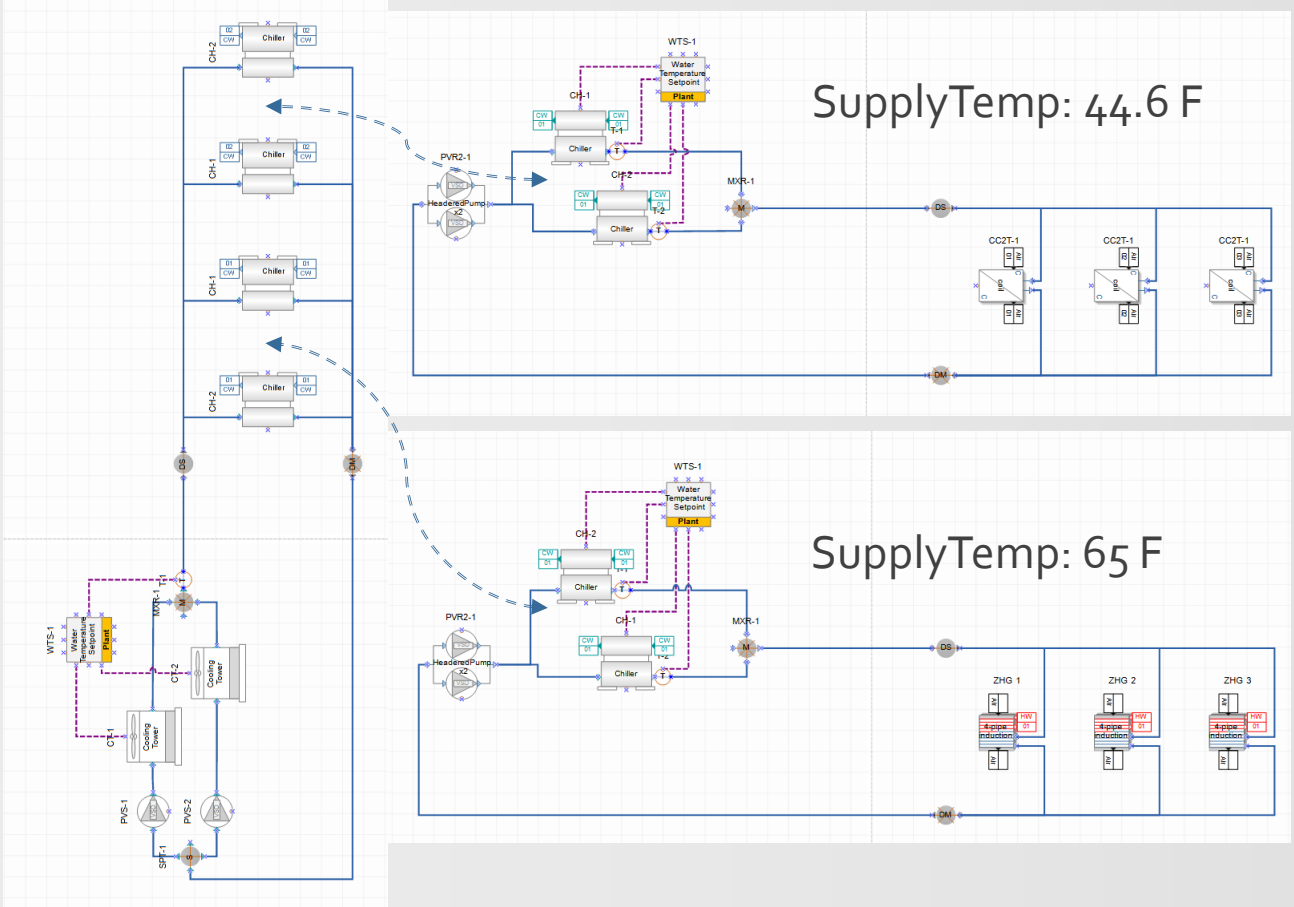


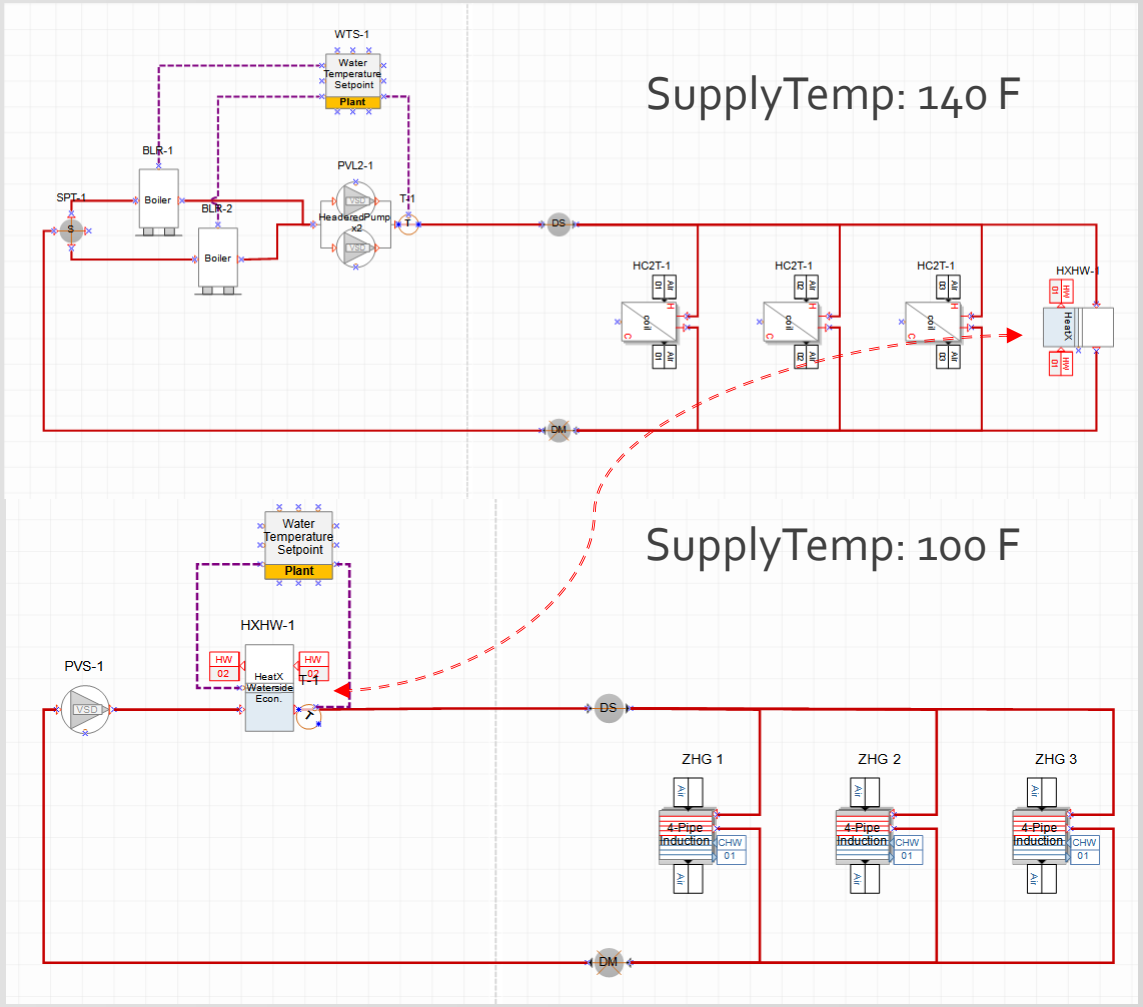


Digital Alchemy
THE BUILDING MODELING EXPERTS

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

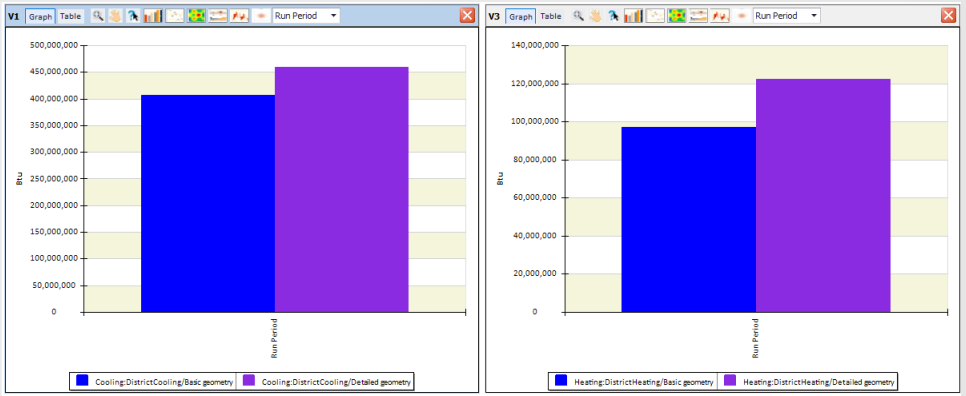


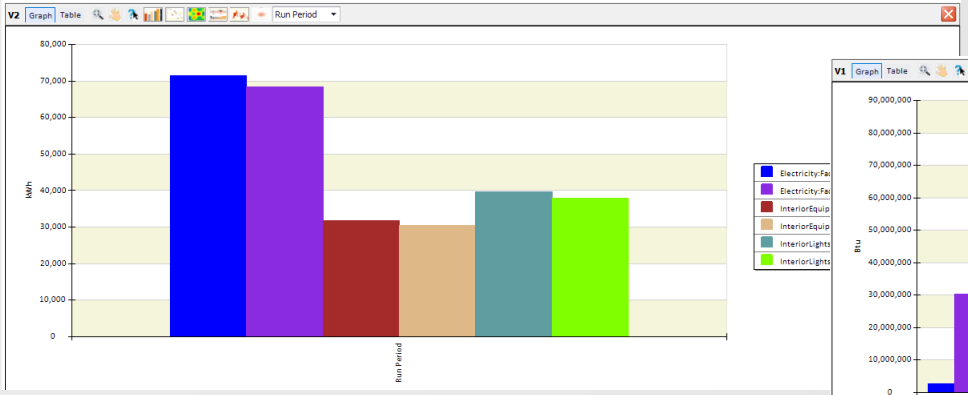


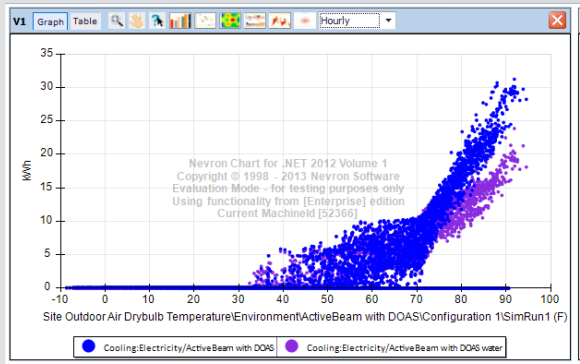
Digital Alchemy
THE BUILDING MODELING EXPERTS

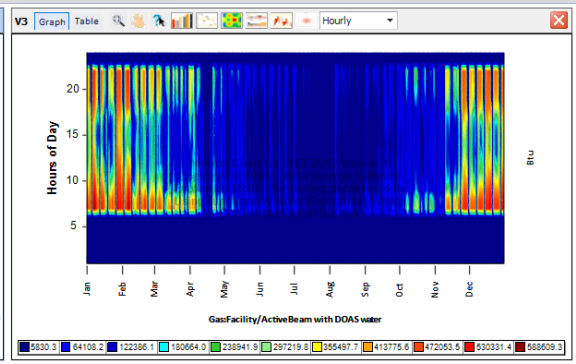
Lesson 5: Result visualization

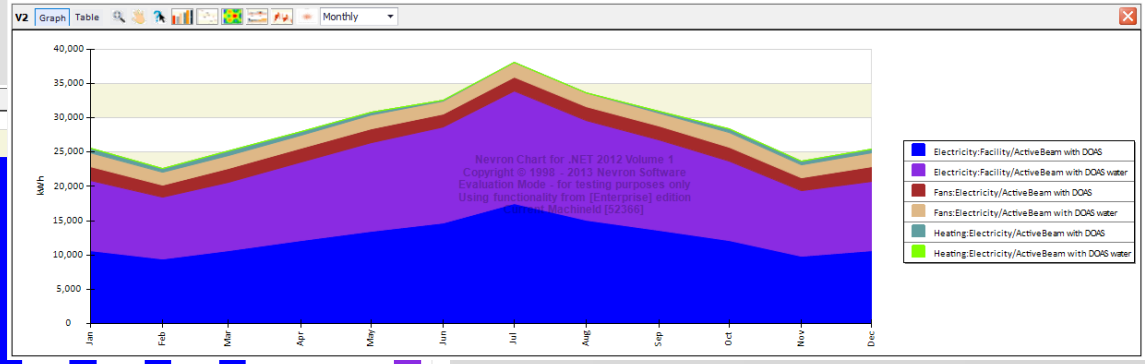
- Filtering
- Graph layout
- Legend
- Graph types
- Time interval
- Zoom

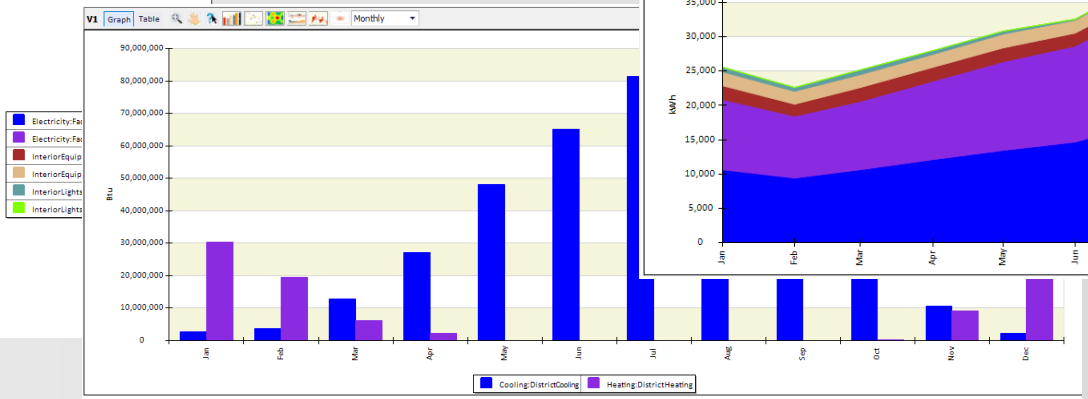


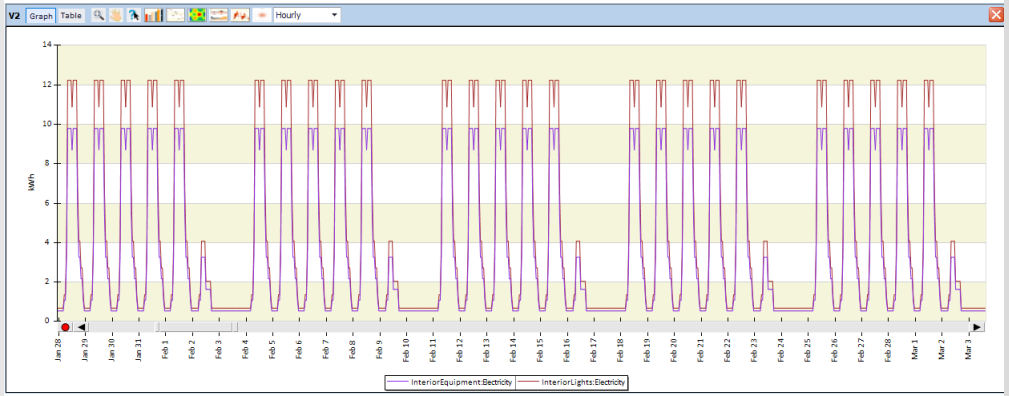








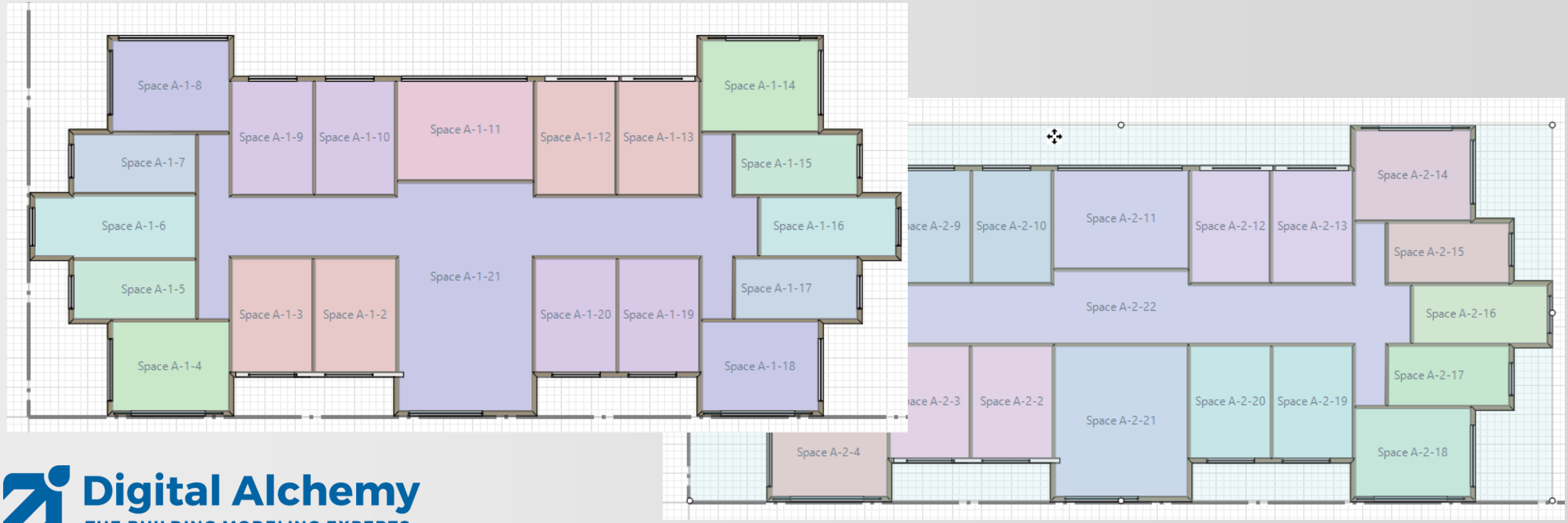




Digital Alchemy
THE BUILDING MODELING EXPERTS

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



Digital Alchemy
THE BUILDING MODELING EXPERTS

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**

Digital Alchemy
THE BUILDING MODELING EXPERTS

Demo - Lesson 2:

DWG Model over – simple geometry

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

Digital Alchemy
THE BUILDING MODELING EXPERTS

Demo - Lesson 3:

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

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

Digital Alchemy
THE BUILDING MODELING EXPERTS

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

Digital Alchemy
THE BUILDING MODELING EXPERTS

Demo - Lesson 5:

Result visualization

Create

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

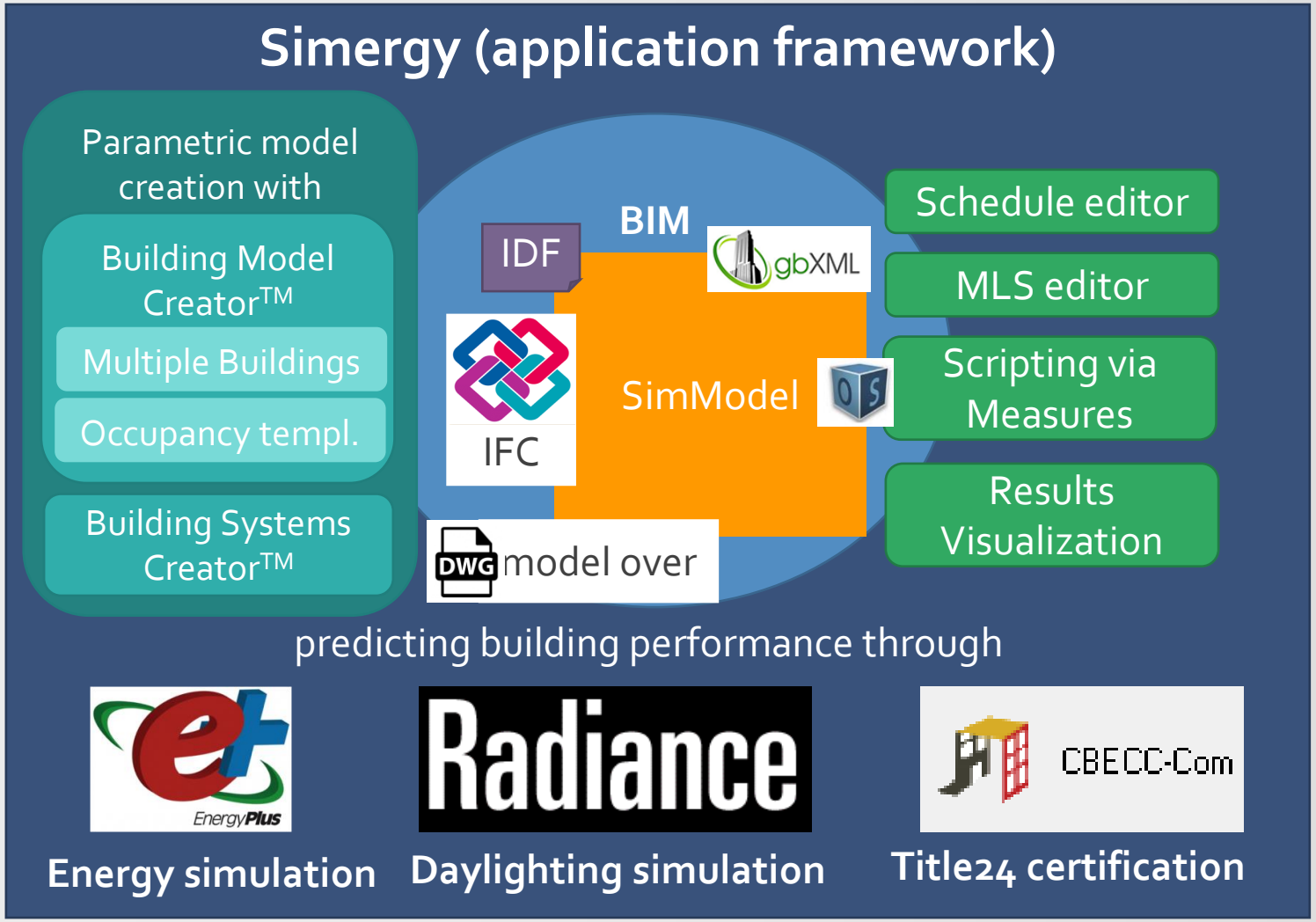
Demo - Lesson 6:

DWG Model over – advanced geometry

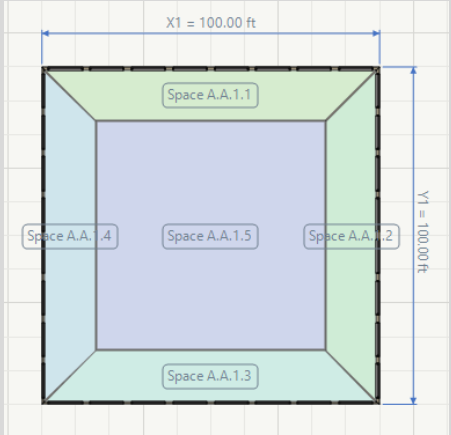
- Adding more detail
  - internal walls
  - actual spaces
  - detailed windows
- Two different floor layouts

Digital Alchemy
THE BUILDING MODELING EXPERTS

New features in Simergy 3.2



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



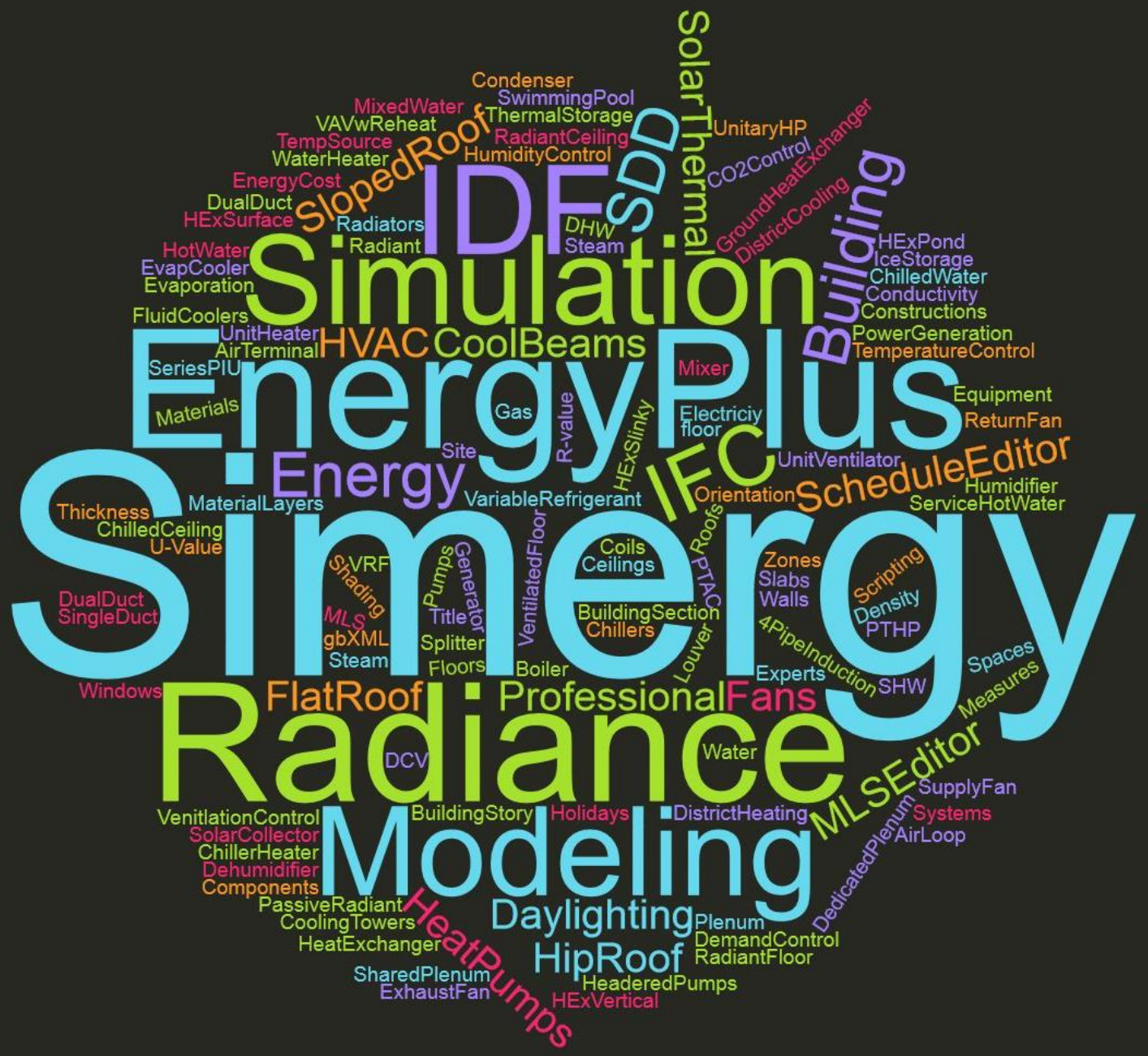
4. Auto adjusting schedules for mixed occupancy
5. Improvements throughout
    1. Building Model and Systems Creator
    2. Space boundary generation
    3. Import/Export/Validation
    4. More samples, etc..

Digital Alchemy
THE BUILDING MODELING EXPERTS

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)

Digital Alchemy
THE BUILDING MODELING EXPERTS



Feedback and/or Questions?

- New website: d-alchemy.com
- Email support: Support@D-Alchemy.com
- Topics you would need help with?