

NHERI Computational Modeling and Simulation Center
 User Workshop
 May 18, 2018

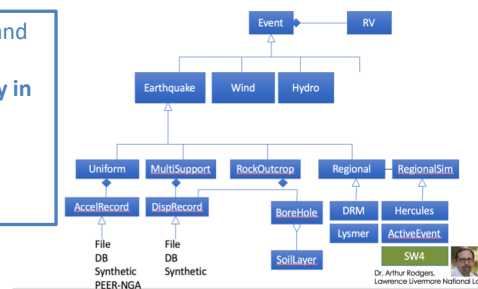
SimCenter

Computational FEM Tools

NHERI Berkeley UNIVERSITY OF CALIFORNIA

EE-UQ: Tool to Predict the Response of a Building to an Earthquake Event

- For Moment Frames, Braced Frames, and Concrete Shear Wall Buildings
- Tool to include measure of uncertainty in computed responses
- Also to include **SSI**
- Jobs to run locally or remotely at **DesignSafe**.



SSI Questions:

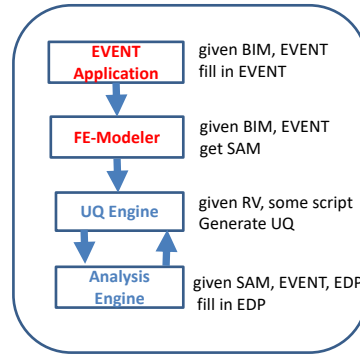
- 1) Add additional elements, nodes & boundary conditions to model in EVENT file
- 2) Describe something and let model builder deal with the Elements, Loads and B.C.?

Tool Architecture



Front End UI in which user defines (RV, BIM, EVENT, EDP)

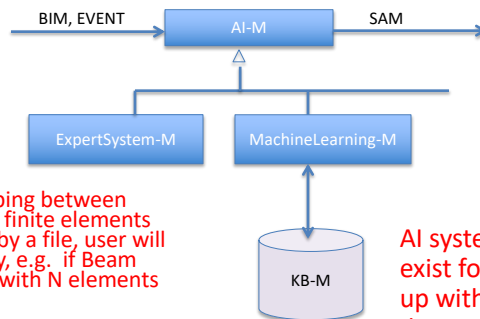
Back End Workflow



running locally or on XSEDE through DesignSafe

Some AI Code To Make it Work

e.g.: Where do we get the SAM (structural analysis) models?

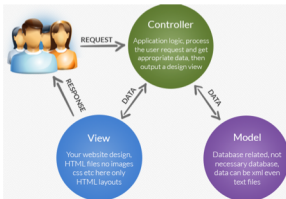
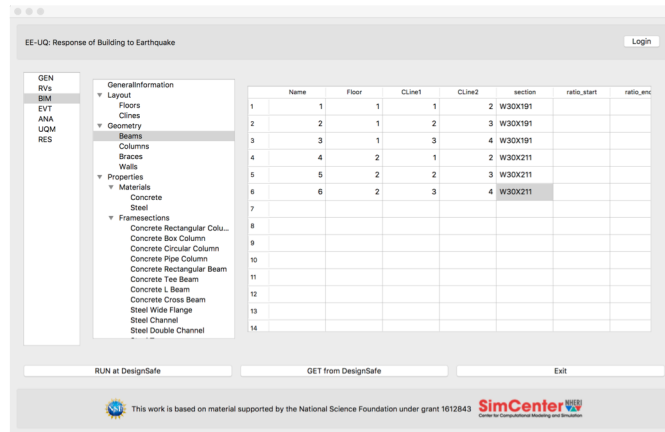


Initially the mapping between components and finite elements will be provided by a file, user will be able to modify, e.g. if Beam and Steel model with N elements of type X.

If SSI notions of foundation, piles, soil layers and the mapping from these to actual nodes, elements and materials

AI system for SSI what KB exist for allowing it to come up with models? Need some data, LEAP!

Interface for describing the building



Other View Options to be presented to User:

- Graphical (3d building interface) – something someone likes?
- Scripting language?
- Other?

Questions for Breakout

- Uncertainty:
 - What pre-defined staged RV would be useful?
- Modeling
 - AI – needs data! Any ideas on sources for models and experiments
 - Initial Mapping for Structural Elements (Filip)
 - For continuum modeling of walls, any good open-source quad mesher, CUBIT from Sandia?
 - Form SSI Group (John, Pedro, ET, Peter) + Michael Gardner, other volunteers?
 - Rock Outcrop & Soil Mass...motion into building at base nodes or foundation model, what is needed?
 - Soil block: DRM and/or Lysmer and/or something else? PMLs?
 - Defining Soil Layers: Provide Built in Soil Properties; for interface (can we use what was developed in Pile Group tool)
 - AI + LEAP? Or not at all?
- Interface (the spreadsheet is envisioned as the underlying model in MVC)
 - Existing 3d Graphical anybody like?
 - Interpreter languages