EP Control Supersocket UCEF Federation

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SuperSocket federate combines the former Controller and Socket system, enabling truly scalable simulations to practically any number of EP building models. This is a work-in-progress refactoring of "Scalable Simulation" and "EnergyPlusOccOpt2Fed_v5-6_Stable". 100% of code has been rewritten by Brian.

Capabilities

- Run Fixed, Adaptive, & Occupancy simulations
- Occupancy data is loaded in Java using custom-built CSV conversion code
- Occupancy probability is handled inside Java without Python, using a nearest-percent approximation for comfort range expansion.
- Scalable to practically any number of simulations without rebuilding Java code (within computing power limits)
- Easy to add another simulation - simply change the config files!
- Potential for human error virtually eliminated: 0 weather files, 0 pricing files, all weather data directly from EP, config files are differentiated by simulation location, duration, and control type.
- Get up to 1 year of occupancy data from "OccupancyAnnualHourly.csv". Occupancy loopback (if not enough occupancy data is present) is implemented.
- Merged with Hannah's Appliance Scheduler v2.2 -> upgraded to multisim arrays

Quick instructions

1. If this is the first time using this system on this computer, go to "generated" folder, open terminal, type `bash build-all.sh`
2. In "deployment" folder:
   a. Open `setNumSims.txt`: Should have only a single integer on the first line. Set this to the number of sims. Save + close
   b. Open `config.txt`: Right now the only things that need to be changed are IP to match UCEF VM, and building names. This is a list, one per simulation.
   c. Create or open `config_buildingName.txt` files for each building. Use

`config_demo1.txt` as a template.

MODE: type of HVAC control. "fixed" "adaptive90" or "occupancy"

optimize Must remain false; not implemented yet

thermostat_code_language: "java" is implemented and tested for the 3 modes. "python3" is implemented but not tested so use at your own risk

dishwasher: Appliance scheduler is depricated but it might work; it is safest to set to "false"

occupancy_dataset: is not implemented yet. All buildings default to "OccupancyAnnualHourly.csv"

d. run in terminal `bash run-default.sh ../EP_Control_generated`

3. Make sure that config.txt, config_buildingName.txt, and OccupancyAnnualHourly.csv are in the "Deployment" folder.

4. Launch EP sims from Windows VM. Change the port number in the `config.txt` in `Joe_ep_fmu.fmu` if needed; typically the first simulation is 6789 and the subsequent simulations are +1 each. Careful to match the order they are listed inside the UCEF config file.

Warnings

1. This has only undergone basic testing, use at your own risk!

2. Appliance scheduler is depricated but it might work; it is safest to leave dishwasher=false in config_buildingName.txt

3. Optimization is not yet implemented

4. CAREFUL with config files. There is `config.txt` AND `config_simulationName.txt` for EACH simulation

5. `setNumSims.txt` must contain a single line with just one integer which is the number of sims

6. Suspect 2 timestep delay, one each direction from EP. Previous stable version had adaptive computed with 1 timestep delay by pulling in data from csv files instead of EP, but the feedback on indoor temperature was 2 timesteps delayed.