

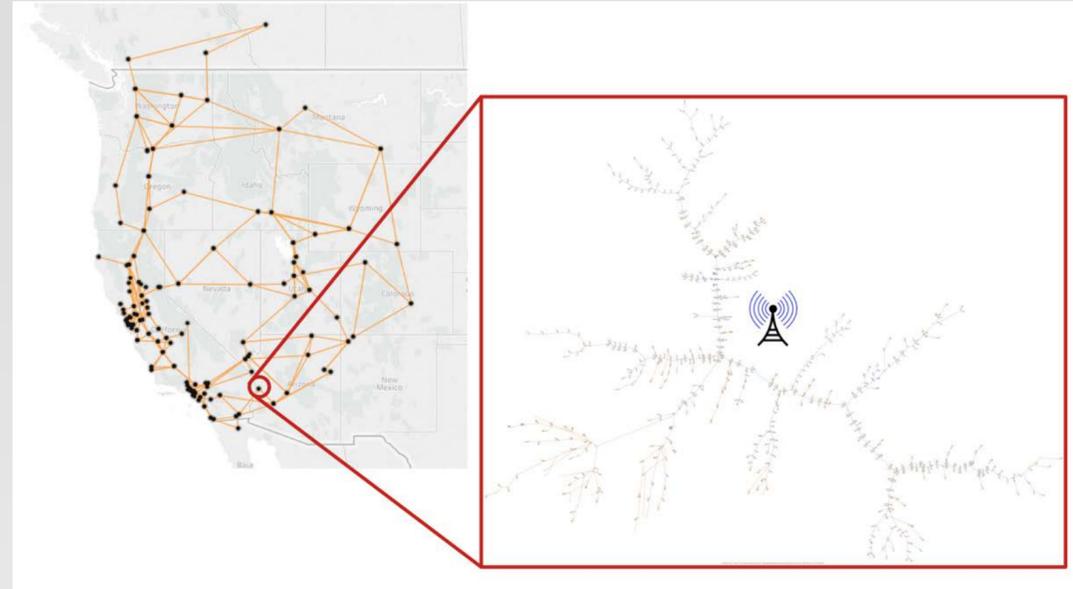
Project 2.5 Co-Simulation Platform

for Rapid Prototyping of Control Algorithms

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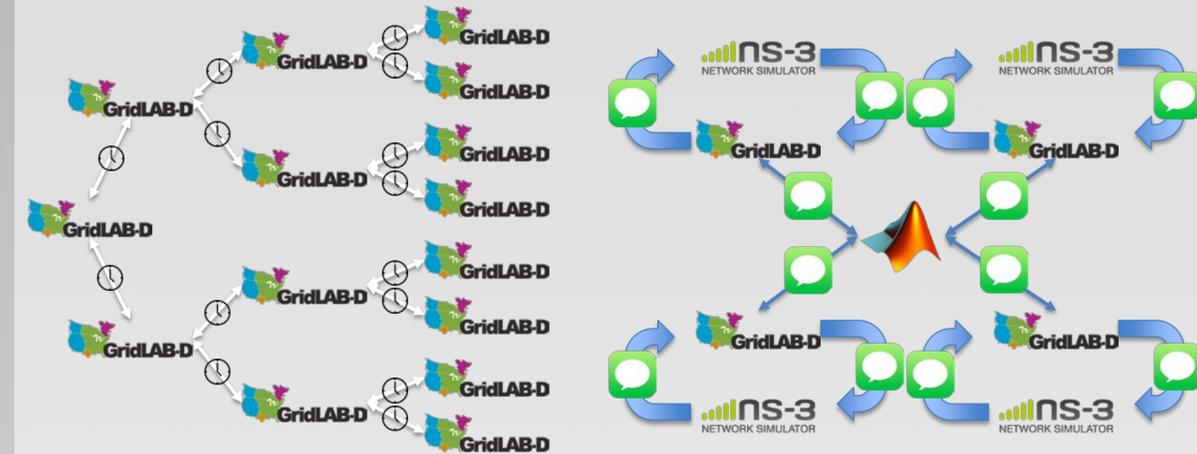
Objective

Improve co-simulation performance, enabling unprecedented fidelity at WECC-like scale.



Methodology

Analyze FNCS performance for determining bottlenecks as well as the gained efficiencies of the new distributed broker.

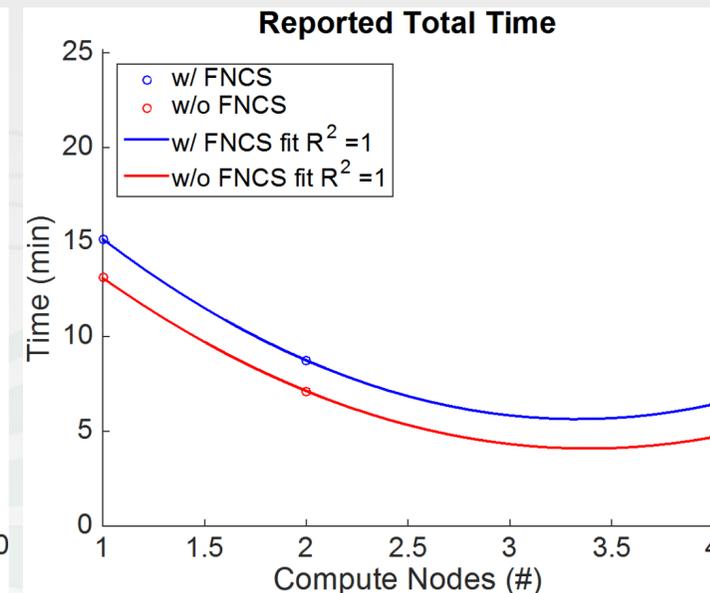
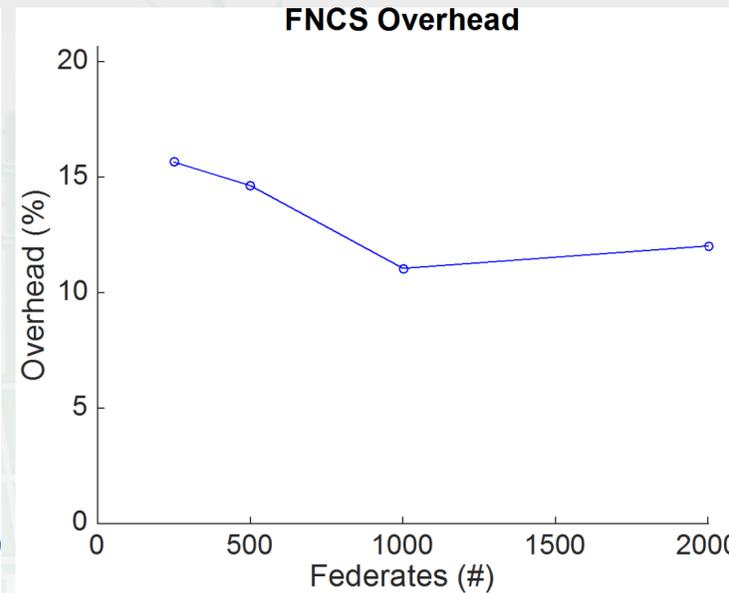
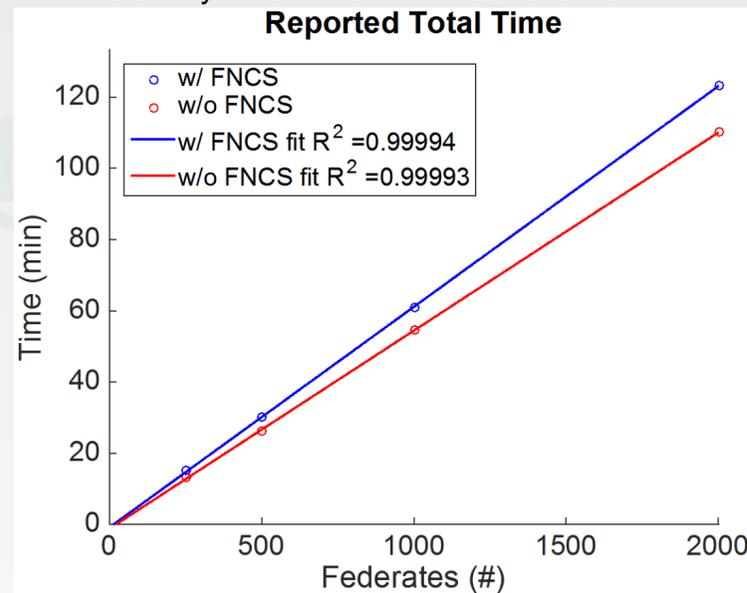


Conceptual distributed time synchronization as a binary tree.

Conceptual point-to-point message passing between tightly-coupled simulators.

Results

- Over 10x improvement to memory consumption by GridLAB-D, detected and fixed by our team. Memory is no longer the limiting factor for large-scale co-simulation.
- A T&D co-simulation has now been run across 80 compute nodes, featuring an 118-node transmission system and 15,000 distribution feeders.
- FNCS only amounted to 10-15% overhead.



From left to right, FNCS consistently keeps its overhead below 15%. Running a co-simulation across multiple compute nodes does not increase the overhead while decreasing the time to solution.

- **Final Steps:** WECC-like scale will be accomplished by end of FY.