NC STATE UNIVERSITY

Microgrid Control/Coordination Co-Design (MicroC3) Srdjan Lukic, Iqbal Husain, Aranya Chakraborty, Wenyuan Tang, Ken Dulaney (North Carolina State University) Abhishek Dubey, Gabor Karsai (Vanderbilt University) Honghao Zheng (ComEd)



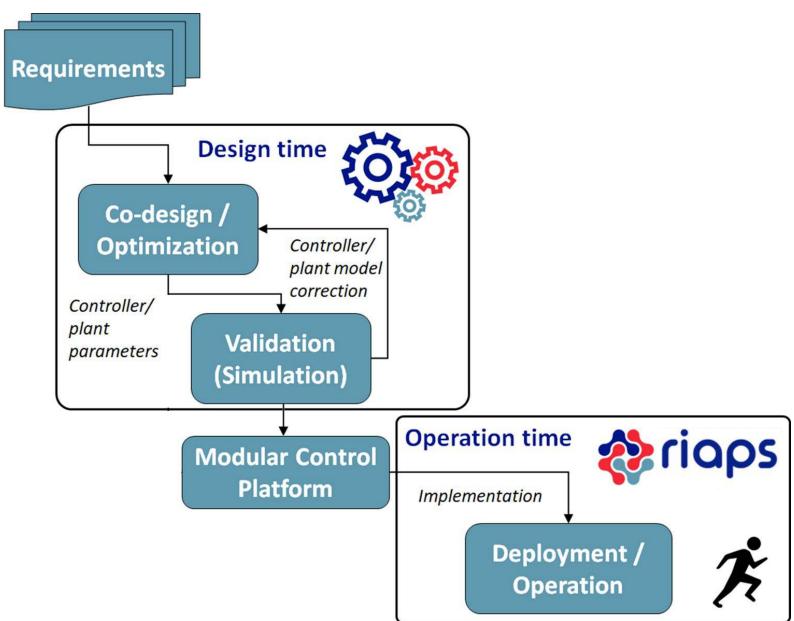
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Problem

 Microgrids today achieve system stability through oversized DER, reliability through redundancy, and allow plug and play for small loads/DER

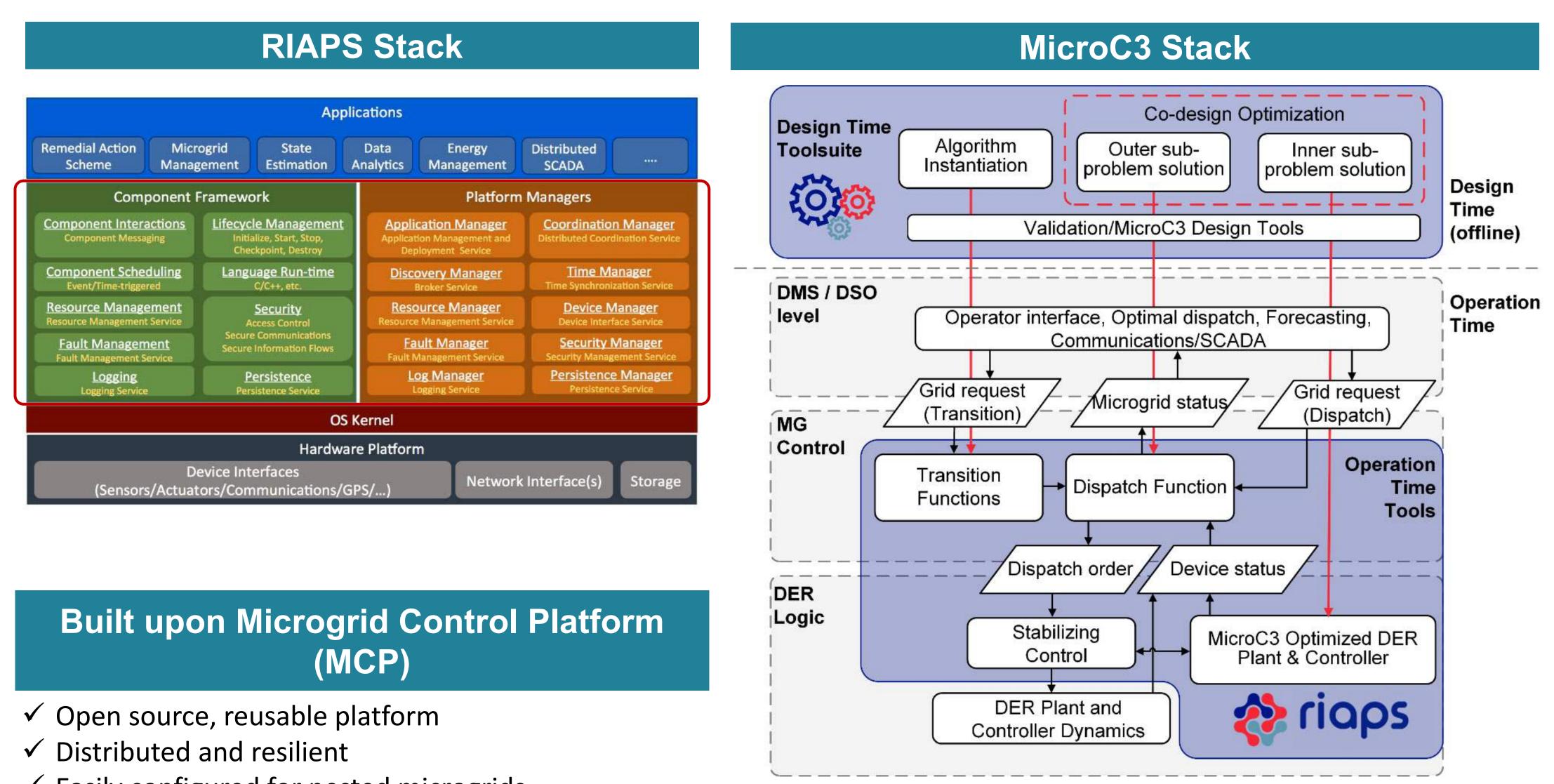
Project Objectives

- Develop a tool suite that systematically designs all aspects \checkmark (plant & control) of a microgrid (MG), given a set of design objectives and performance constraints
- ✓ Tool predicts & achieves the desired MG performance & reliability metrics with significantly smaller and/or less capable & less expensive components.

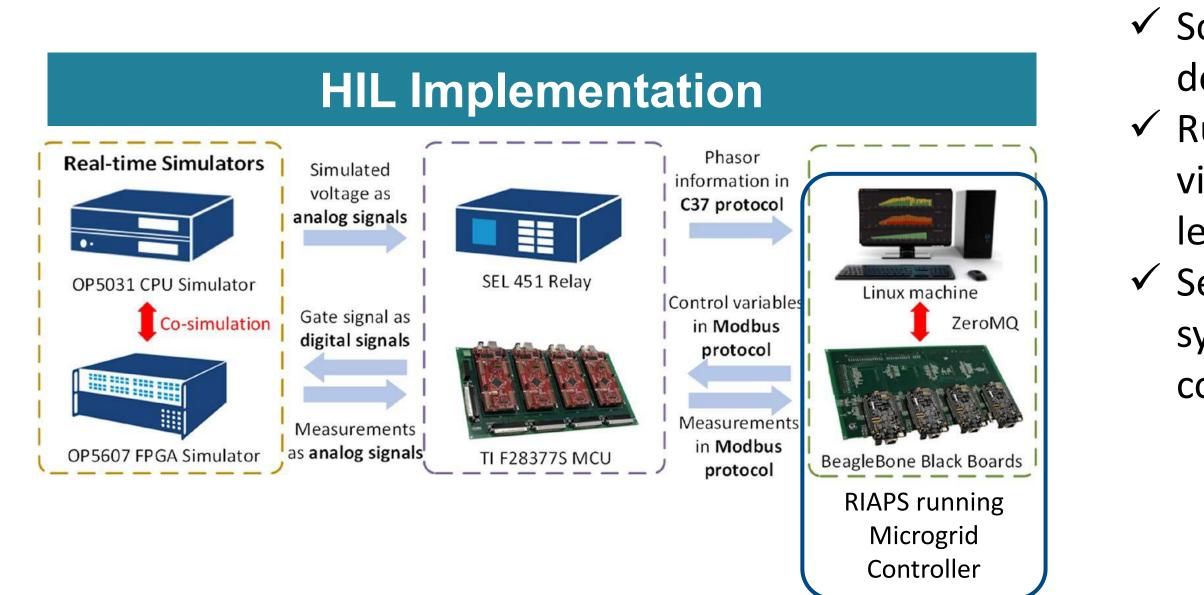


Built upon Resilient Information Architecture Platform for Smart Grid (RIAPS)

- ✓ Provides an 'Operating System' (like Android for Smart) Phones) that enables the construction of distributed software 'apps' that run the microgrid.
- ✓ Supports IoT technologies (e.g. interface to building energy) management systems)
- ✓ Supports machine learning apps on edge devices (e.g. NVIDIA boards)



- ✓ Easily configured for nested microgrids
- ✓ Supports plug-and play integration
- ✓ Provides additional intelligence to legacy devices



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Key Outcomes

- ✓ Scalable Algorithms for Co-Design that define the MG design and implementation
- ✓ Run-time Platform that implements TSN and provides visibility and control at primary, secondary and tertiary level
- ✓ Seamless integration into a single tool that starts with system sizing and delivers executable code on distributed controllers located at each asset.