OpenSG Simulations Working Group: draft Charter

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# DRAFT OPENSG-SIMSWG CHARTER

The *purpose* of the OpenSG Simulations Working Group is to facilitate work on modeling and simulation of modern electric power systems as they evolve from highly centralized to more distributed and hybrid architectures, with control schemes based on increasingly integrated and pervasive information and communications technologies.

The *goal* of the WG is to develop a framework and requirements for modeling and simulation tools and platforms, which support this evolution in power system design, engineering, and operation.

The *business rationale* for the WG’s work is based on the financial and operational advantages that modeling and simulation of complex technical systems can deliver to the utility industry.

Discussion

Modeling and simulation have been used to good effect in power systems planning and operations. However, most modeling efforts have tended to be limited, due for example to a narrow focus on specific components (transformers, distribution feeders) or a specific class of problems (power flow, load profiling). As electric power systems incorporate more varied and distributed sources and loads, and rates become more granular and dynamic particularly at the “customer edge”, the modeling and simulation challenges will grow proportionally.

Communications infrastructure has become an integral part of the Smart Grid. Accordingly, there is a need to integrate the modeling and simulation of communications and power systems into a “co-simulation” framework.

The new power system structure has similarities to other systems in the manufacturing, automotive, and aviation industries, among others, where simulation is used intensively. In developing our requirements, we will study the modeling frameworks and tools that are used to meet similar challenges. In pursuing our work, we will follow some guiding principles intended to enable broad participation and rapid innovation, which we believe will drive advances in power system simulation to meet Smart Grid needs.

Guiding Principles

* Pursue *openness* in design, implementation, and access:
  + Promote open source tools and low barrier-to-use (cost, IPR terms, etc.) commercial tools.
  + Promote open source models and datasets to support sharing, reproducibility, testing, etc.
* Identify and characterize the *domains and boundaries* that are most appropriate and productive for Smart Grid modeling/simulation.
* Pursue a *modular* *modeling framework* and define *open interfaces* enabling the construction of complex simulations from sub-models.
* Pursue a *modular* *simulation framework*enabling scalable and optionally independent execution.
* Pursue *collaboration -* encourage dialogue amongst industry, commercial vendor, academic, research, and government organizations.
* Pursue *coordination* with other Smart Grid requirements and standards development efforts, both within OpenSG and with groups such as the IEEE, the SGIP, NIST, et. al.

For the purposes of this WG, the term ‘model’ means a formal (mathematical) model of a system, and ‘simulation’ refers to the use of computer-based tools or platforms for evaluating the performance of models under varying conditions (“computer assisted investigation”). While electrical, electronic, and physical models and simulations may be used in conjunction with computation, for example in “hardware in loop” systems, the main focus of this WG will be on the requirements for software-based simulation and modeling.

The following references are provided as guideposts to the scope of our work:

<http://en.wikipedia.org/wiki/Mathematical_model>  
<http://en.wikipedia.org/wiki/Simulation>