Software Architecture
Breakout Session

Kevin Tomsovic
Director
Breakout Session

Software infrastructure: data management, workflow support, and numerical methods.

Data infrastructure: what data sets are needed and how can they be collected or synthesized, curated, and shared

• What are the driving business problems that will drive changes in software infrastructure?
• What changes are needed to existing operational and planning systems? What patterns for software from other domains can be reused for power grids?
• What changes are needed in data management and information exchange?
• How do we acquire/share datasets to drive research and validate approaches?
• How do we work together to maximize progress and transfer new technologies out of research?
General Summary

Presentations
- **Russell Robertson** – Data issues
- **Adam Wynne** – GridOptics (middleware)
- **Robin Podmore** – Training (operator driven)

• General consensus on volume of data and rates expected
• Importance of operator (decision) driven rather than technology driven
• Open source issues and building a community or researchers (how to do it)
• Data
  • high volume streaming vs. very large data sets
  • Mapping between different models
• Middleware
  • Open source issues
  • Resolving different simulators – granularity, multi-time
  • Privacy issues – sharing system views
General Summary

• Middleware
  • Open source issues
  • Resolving different simulators – granularity, multi-time
  • Privacy issues – sharing system views
• Training
  • Operator centric
  • Importance of simulation testbeds
  • Regulation driven (or constrained)
Communication Barriers

Operator
- Node Breaker
- Real-time decisions, SCADA

Engineer (Planner/Operator)
- Bus Branch
- Powerflows, contingency analysis, transient studies.

Application Engineer
- Build Power System Application (i.e. powerflow)
- Fortran, Matlab, C

IT / CS
- Build infrastructure
- C++, Java, OOD, OODB
Do we really agree on the requirements?
Will industry be regulation driven or innovation driven?
What are some of the systems views that really have a chance to come together?
  • Transmission and distribution – maybe
  • Operations and planning – maybe
  • Business and operations – probably not
Need to really look at streaming as it is (not batch data)
Can we push analytics out to the sensors?
Report Out – Software Architecture

• Community
  • What is the open source model that can truly get the community to work together?
  • Must support the vendors and not compete
  • Need to identify open/common architectures for all (academics, national labs, vendors, etc.)
Report Out – Software Architecture

• Drive effort by use cases
  • Helps to quantify user requirements
  • Helps define the users
  • Helps make the business case
  • Helps define the open source model that will work best

• Select a few activities to kick start cooperation and can show something in the 12-18 month time frame. For example:
  • Streaming data problem with some data analytics
  • Modeling across domain boundaries – e.g., communication and power system, transmission and distribution
  • Predictive simulation for contingency analysis
  • Workshop 6 month time frame – early adopters