Simplified Planning Process

- Well-defined processes and tools for designing new power system extensions, simulating their impact, defining new contingencies, etc.
Moving Design to Operations

- CIM has improved the ability to move models from planning to operations (and vice-a-versa) in a multi-vendor environment.
  - To be expected through use of standards.
  - Eventually enable wide exchange of planning models like ENTSO-E and WECC.

- EMS and planning already use a set of tools that have been harmonized to enable the flow of information between them.
Moving the Design to Substations

- Substation engineers use a completely different set of tools supporting a completely different set of standards to define the substation automation and protection systems.
It’s About Productivity

• The effort and knowledge put into the planning and operations models that isn’t embodied in the one-line diagrams is lost and has to be transferred manually into the substation design through the engineering process duplicating previous effort.

• If the tools used a common set of standards the flow of information can be automated enabling topology, SCADA, protection, communications, settings, etc. to be preserved and leveraged through the engineering process.
IEC 61850 Based Modeling Tool (SCL)

Logical Node Designations

Used to allocate power system functions to specific devices.
Two Different Purposes – Two Solutions are OK, BUT

- Detailed system wide description
- Model exchange for high-level systems
- Power flow, state estimation, etc.
- Market operations
- Planning and system design

- Substation design and modeling
- Device configuration management
- Protection and device control
- SCADA, protection, & control data exchange
Interpreting CIM and IEC 61850

Are these the same objects?

IEC 61970-301 EMS Diagram

IEC 61850-6 SCL Diagram
CIM Asset-Power System Models & IEC 61850 Device Models

IEC61970/68 CIM

Power System Models

Asset, trading, etc.

Harmonization

IEC61850

Power System Models

Device Models

Measurements
Harmonization of CIM – IEC 61850

• Integration of non-overlapping models into a single unified model

• Rules and procedures for transforming overlapping models when needed.
  – Convert from one model form to another to suit the application
  – Transformations are not bi-directional
  – Complete integration may require some mapping in special circumstances
  – Most applications can use transformation.
    • Substation engineering and operations use different tools.

• EPRI project documented a proposed approach to harmonization
Harmonization Tasks

• UML for IEC 61850 Device and Object Models

• Aligning Network Connectivity/Topology
  • Already use similar topological elements in both
  • All IEC 61850 topology is within a substation
  • Equipment containership in IEC 61850 will be enhanced
  • IEC 61850-6 (SCL) updated with Globally Unique Identifiers (GUID) instead of names for identifying elements.

• Communications addressing of IEC 61850 will be added to CIM
  • With extensions to support DNP3/IEC 60870-6 and ICCP-TASE.2

• Measurement Model alignment
  • Support for “vector” measurements for synchrophasors in CIM
  • CIM to use SI units for all measurements
Harmonization Status

• Presented to WG 19 (Interoperability within TC 57), WG 13 (CIM), and WG 10 (IEC 61850) with general agreement on the approach.
  – Resolving goals and objectives was important to the agreement:
    • Harmonization vs. Unification

• EPRI Initiative to demonstrate usefulness of harmonization

• New Work Item Proposal (NWIP) being generated by France to proceed with the necessary changes to both IEC 61970-301 (CIM) and IEC 61850-6+ (SCL) under WG 19.
Thank You

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