



### Developing a Distribution Grid Model Data Management Architecture

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### Developing a Distribution Grid Model Data Management Architecture

- Drivers
- EPRI Distribution GIS & Grid Model Data Management Project overview
- Data architecture development approach



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Grid planning & operation requires new analytics & simulations



#### **Distribution Grid Model Data Management Architecture Drivers New analytics and simulations**





### **Distribution Grid Model Data Management Architecture Drivers New analytics and simulations**

- What do those 'future applications' do?
  - Execute power flow-based simulations (network analysis functions)
- What do those 'future applications' need?
  - Network (grid) model data:

Data representing an analytical view of the electrical grid, including equipment, its electrical behavior and its connectivity, as well as its operating state at a moment in time, that is sufficient to describe a starting point for network analysis.



### Distribution Grid Model Data Management Architecture Drivers Challenges to managing distribution network (grid) model data

- Distribution grid model data is complex to manage because it:
  - Is big
  - Is made up of different types of data with different update cycles coming from multiple sources
  - Typically is viewed as coming from a primary source that often:
    - Has major consistency / completeness issues
    - Serves a primary purpose other than managing grid model data
  - Must be assembled into internally consistent, 'electrically logical' cases



### Distribution Grid Model Data Management Architecture Drivers Challenges to managing distribution network (grid) model data

- Distribution grid model data is complex to manage because, despite the fact that there is only one grid,
- Different consumers want cases with
  - Different parts of the system
  - Different types of data
  - Different levels of detail
  - Different system states
  - Different points in time





Targets & cases





- Targets & cases
- Sources





- Targets & cases
- Sources
  - Physical network model data



ELECTRIC POWER

**RESEARCH INSTITUTE** 

- Targets & cases
- Sources
  - Physical network model data
  - Situational data



- Targets & cases
- Sources
  - Physical network model data
  - Situational data
  - Engineering design





### **Distribution Grid Model Data Management Architecture Drivers Summary**

- Increasing need
  - For distribution network analysis
  - For accurate, accessible network models
- Convergence of challenges
  - Data that is inherently complex to manage
  - Consumers that require different 'views' of the same underlying data
  - A messy existing eco-system



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# **EPRI Distribution GIS & Grid Model Data Management Project Project goals**

- Define industry architecture for Distribution grid model data management
- Promote industry understanding of grid model data management and vendor product support for it
- Provide participating utilities with actionable strategies for improving GIS data and grid model data derived from it
- Advance the CIM data exchange standard to fully support Distribution grid model management





# **EPRI Distribution GIS & Grid Model Data Management Project Project status**

- 30-month initiative, launched late 2017
- 9 utilities
  - Ameren
  - Arizona Public Service
  - ConEd
  - Duke
  - ESB (Ireland)
  - FirstEnergy
  - Great River Energy
  - Pacific Gas & Electric
  - Salt River Project
  - …and seeking more…
- Doing utility deep-dives





### **EPRI Distribution GIS & Grid Model Data Management Project Project schedule**





# **EPRI Distribution GIS & Grid Model Data Management Project Project approach**

- A practical architecture for both product vendors and utility users, not an implementation solution for a utility
  - Need business function-based approach
  - Tech transfer is essential
  - Vendor buy-in as important as utility buy-in
  - Crucial that results are introduced into CIM standard



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#### **EPRI GMDM Project Data Architecture Development Approach Business functions provide the foundation**









 An Network Model Management function is the answer





- An Network Model Management function is the answer
- We know what we want it to do
- But how?





- An Network Model Management function is the answer
- We know what we want it to do
- But how?

 The CIM has concepts and constructs that help





### **GMDM Reference Architecture Working on the business function reference model**

Blue: Functions focus on the electric grid. Purple: Functions focus on facility design, construction and maintenance.



### **GMDM Reference Architecture Working on the business function reference model**







### **EPRI Distribution GIS & Grid Model Data Management Project**

### We invite you to join us on the journey...

- As a active project participant and collaborator
- As an interested vendor
- As a reviewer/commenter
- As an interested observer...

- Talk to us:

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