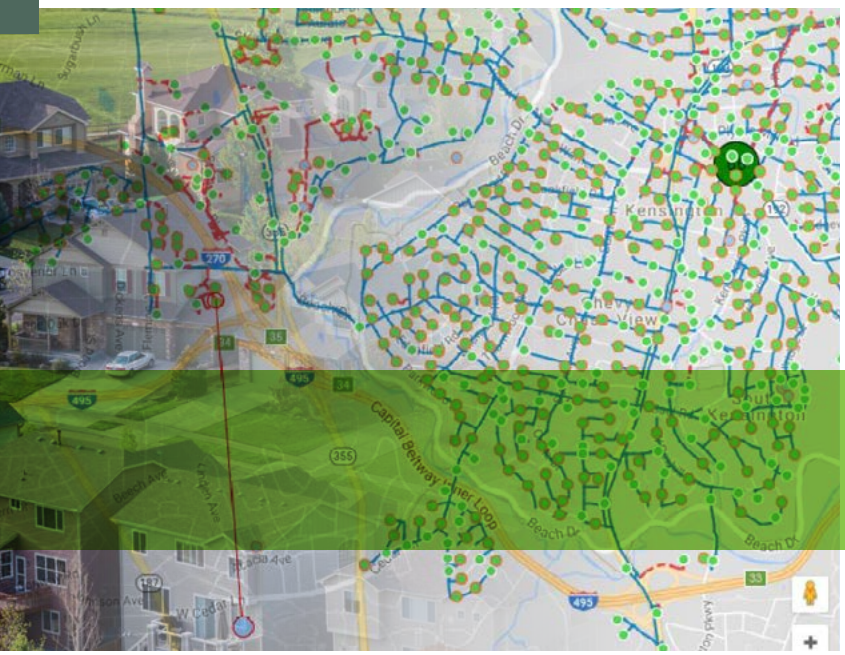

Network Model Validator

Landis+Gyr
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Helping Utilities Improve Accuracy of Electric Distribution Network Models

Overview

The process of maintaining an accurate distribution system model presents a significant challenge for many utilities. The ability to automate this process provides tremendous time savings and assurance that the planning and operational activities dependent on the model are reliable. As part of Landis+Gyr's comprehensive Advanced Grid Analytics platform, the Network Model Validator (NMV) application inspects the distribution network model, identifies and reports data gaps, and provides recommendations to help utilities correct and maintain accurate GIS and connectivity models.

NMV uses advanced physics-based algorithms to perform meter-to-transformer mapping, identify phasing mismatches as well as topological errors. The application also corrects inconsistencies in distribution asset electric parameters and identifies circuit model errors.

NMV provides the ability to develop an electrically accurate system model, by applying loadflow calculations from the substation all the way down to the meter. This application highlights changes in system loading and voltage associated to the respective asset and system loading at specific intervals of time. NMV provides the ability to validate the GIS / distribution model of record against the physical connected network in the field.

Key Solution Capabilities

- **Parameter Validation and Correction:** Electrical parameters and characteristics of all the assets is checked for correctness. NMV will provide the capability to run analysis based on the above criteria and provide recommendations for likely fixes for adequate voltage rating(s) for assets with voltage rating mismatch, adequate voltage rating for service locations with voltage rating mismatch, adequate capacity rating for assets with inadequate capacity ratings and assets with incomplete or a suspicious settings definition.
- **Meter to Transformer Connectivity and Phase Identification:** NMV will perform validation of meter to transformer connectivity information utilizing multiple methods using voltage, outage and asset geo-spatial data and AMI network data. The application will also use this data to identify phase issues and recommend fixes for any meter-transformer phase mismatch.
- **Connectivity Island Testing:** A distribution system cannot contain any large un-energized islands or islanded customers. Connectivity islands typically result from incorrect device-node connections (nodes of assets not matching up to the upstream sources) and also from abnormal switch statuses. Presence of such islands indicates GIS or translation errors that need to be corrected at the source system. NMV will test the distribution network model for presence of any un-energized connectivity islands, especially large connectivity islands and islands with customers. Afterwards, it creates a report. This report can be used to correct the islanding issues at the source GIS system. Once the model is cleared of any such islands, the next step is to test the network model for phase islands.
- **Phase Island Testing:** During this step, the model is tested for the presence of any un-energized phase islands. Phase islands occur due to incorrect phase code designations on line sections and/or transformers, as well as from phase mismatches between neighboring parts of a distribution network (e.g., an A-phase switch between two B-phase distribution lines). Phase islands are identified and reported by NMV. This report can be used to correct the source data.
- **Loop Testing:** Loop testing identifies any significant unplanned loops in the distribution system. On occasion utility personnel inadvertently connect radio systems in a loop as part of a restoration or maintenance effort.

These are sometimes undocumented or lost which can cause significant challenges in safety and in managing the distribution system. NMV testing identifies any loops that are outside of a substation and along all the radial feeders. Any loops detected along the feeder are identified and reported by NMV, which can be used to correct the data in the source system.

- **Load Flow Testing:** Load flow test provides the final test for the network model. Load flow test is run on the network model using various loading conditions. Any substation that does not solve with the load flow, is further tested for data inaccuracies and corrected.

Platform

The Network Model Validator application utilizes Landis+Gyr's Advanced Grid Analytics platform that enables utilities to leverage data integration, visualization and advanced algorithms for multiple analysis and business cases. With adaptive, modular functionality, the platform and data can be utilized to support evolving utility needs, leveraging economies of scale and eliminating data silos and the need to manage multiple vendor systems.

Each application can be deployed individually or as part of an enterprise solution. Flexible deployment options ensure that the benefits of the Advanced Grid Analytics platform are quickly achievable and easily accessible for utilities of any size; by deploying the platform within the utility's own infrastructure, hosted in the cloud or delivered as a service offering.

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