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Ensure correct meter to distribution transformer connectivity

EnergyIP Analytics – Asset Topology Mapping

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The energy system is changing dramatically – posing new challenges, but also new opportunities to distribution grids. New demand patterns caused by electric vehicle charging or generation variability for example from residential photovoltaic installations, are becoming more dominant and has an impact on the reliability of the electric network. By rolling out an advanced metering infrastructure, we are now able to collect more data and use them to tackle the upcoming challenges. All the future opportunities lie in analytics. Transparency about generation and consumption, costs, and power quality is the key intelligence to make the right decisions and to design further use cases. That will pave your way to optimize grid efficiency and security as well as to create additional value for your business.

Siemens has developed the right solutions for realizing this. EnergyIP is an extremely powerful, flexible, and scalable platform that easily handles millions of sensors – be it smart meter or others – and the huge volumes of data generated.

With **EnergyIP Analytics – Asset Topology Mapping**, Siemens offers a solution that validates the accuracy of distribution network topology. It is estimated that between 5% and 20% of meter-to-transformer data is incorrect in utilities' systems of record. Storm restoration efforts and bad record keeping often lead to discrepancies between meter-to-transformer data and the truth on the ground. The software application leverages AMI data, spatial data from the GIS, and the existing distribution network topology to detect and report inaccurate meter-to-transformer connections. The Asset Topology Mapping application runs several analytics algorithms utilizing the time series data to detect the errors in the asset topology. In our solution, we further apply an advanced ranking system which combines the outcome of these algorithms to generate a robust score. The score defines the confidence of the algorithms in detecting errors in the existing meter-to-transformer connections. The score will allow utilities to prioritize their work on correcting the errors.

EnergyIP Analytics – Asset Topology Mapping Main benefits

Prerequisite for other grid application products

ATM should be the foundation of any grid application since it improves the accuracy of these applications. The meter-to-transformer connectivity is usually defined by the load capacity of the transformer and its physical proximity to the meter. Accurate meter-to-transformer connectivity in the distribution network will be essential in accuracy and performance of other grid applications.

Improve safety

Inaccurate connectivity models can lead to stressed assets which could exacerbate safety concerns both for utility workers and the public. With inaccurate meter-to-transformer connectivity information, there is a higher risk of de-energizing incorrect customer meters to the distribution transformer during maintenance which results in fatal accidents.

Customer satisfaction

Outages are extremely inconvenient both for utilities and their customers. Uncertain outage locations could result in longer time to restore power and leave utilities with angry and unsatisfied customers. ATM can help utilities to minimize dissatisfied customers during outages. With a validated and accurate distribution topology network, the utility will be able to improve the customer experience during outages by contacting the right customers when forced outages or preventive maintenance is undertaken. Also, accurate and updated meter-to-transformer connectivity will help utilities to provide their customers with better insight when power quality issues begin to occur.

Reduce cost

The common practice of collecting inventories by sending the crew to the field is very expensive and time-consuming. Based on our research, it costs utilities about US $5.00 per meter to validate their existing network topology when they send field crew to validate the meter-to-transformer connectivity. Our software solution is robust, fast, and cost savings will be immediately realized from reducing unnecessary truck rolls. Also, accurate network topology will eliminate the considerable cost of sending crews to the wrong location during outages and maintenance.

Flexible to Customize Algorithms

Big data analytics is usually a journey and not an event. Every open door enables new possibilities and the Asset Topology Mapping application allows the plug-in to further customized algorithms so that you can further explore and unlock the value of your own data. For example, you can exclude certain older meter models which did not report outage events at the time of validating the meter-to-transformer connectivity.

In the cloud or on-premises

Asset Topology Mapping can either be deployed on-premises, on an existing system, or as a Software as a Service (SaaS) cloud model that integrates with available data sources.

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