EPRI DATA ANALYTICS CASE

Validating Meter to Service Transformer Association

The Data Challenge

The distribution network of the utility system is under constant change. As the system changes, the relationship between devices will change. As such, the utility's relational databases and systems that present these relationships require validation and update to ensure the safe and effective operation of the distribution system network. An example of such a case would be the discontinuity that would come about if an advanced metering infrastructure (AMI) meter was incorrectly designated to a distribution transformer with which it does not have a relationship. This condition would create a situation in which attempting to identify a potential source of a transformer issue is made difficult because the database would point to the incorrect transformer.

Solution Overview

By aggregating coincident event data sets from multiple devices, such as AMI meters and supervisory control and data acquisition (SCADA), the relationship between nodes and branches (assets and circuits) on the power system can be derived, verified, and reconciled within the utility's databases and reporting systems. In production, the reconciling of systems would be managed automatically without operator intervention. This data analytics case presents solutions that bring disparate data sets and information together, primarily sourced from the event logs and registers of an AMI meter network and SCADA system to feed an analytics engine to reconcile relationships based on a triggering event, such as an outage. An outage event, for example, would allow the analytics engine to discern devices that see the same triggering event (coincident time-stamped data) and other devices on the distribution circuit, such as a distribution transformer, as being a potential for association.

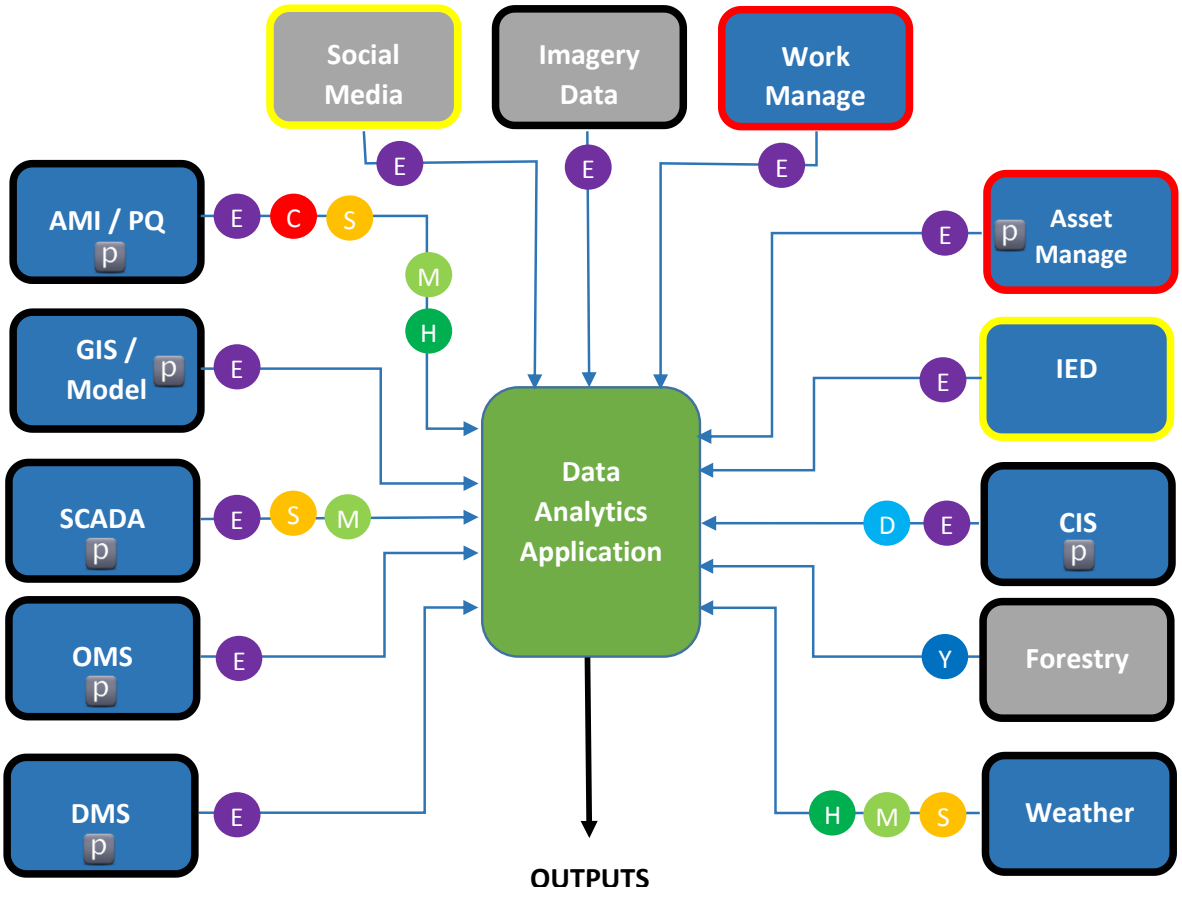
Potential Methods for Solving the Problem

The following are potential methods to solve the challenges in this data analytics case:

- By leveraging the coordinates of assets shown in the utility GIS, reasonable assumptions can be made on the relationship between an AMI meter, its service transformer, and the premises it serves. Past and current methods using proximity metrics have not provided what is believed to be the highest attainable accuracy.
- Using time-stamped outage event data, devices experiencing the same event may be leveraged to build a relationship matrix. Combined with GIS coordinates, reasonable assumptions can be made to link intelligent devices with other utility asset and premise information that is housed in the utility's customer information system (CIS).
- Algorithms developed by EPRI that derive the relationship between an AMI meter and a distribution service transformer based on leveraging the voltage measurements within an AMI meter and the transformer voltage may be used.

Available Data Sets

The data sets highlighted in the following figure are available in the EPRI Data Repository to solve this data analytics case.



Classifications of Data:

- Traditional Data Set
- New Data Set
- Structured Data
- Un-structured Data
- Format of Data Varies

p **Denotes a primary data set used to solve this data analytics case.**

Frequency of Measurement

- C — Cycles
- S — Seconds
- M — Minutes
- H — Hours
- D — Days
- Y — Months to Years
- E — Event Driven