Grid Health 360

Abstract

Merging siloed data systems can be challenging. Utility CTOs are being tasked with incorporating more and more data assets with the explosion of IoT "connected" devices. At the same time, more complex analytics are possible when IoT data is combined with data available in the public domain. Public domain datasets such as LiDAR measurements and weather information, for instance, will be incorporated to provide improved asset management.

The creation of a "golden record" of grid asset information is critical to laying a baseline foundation for highly holistic analytics. In this article, we will study the value in merging data assets into a "golden record" in order to support predictive maintenance.

When creating a "golden record" there are inherent challenges your organization will face when merging datasets. Utility systems frequently have conflicting information with varying levels of value or "trustworthiness." This is exactly the problem Informatica Master Data Management (MDM) is architected to resolve. Database objects are on-loaded and assigned "trust scores" based on a series of attributes and dependencies. Informatica MDM then bulk loads and processes the data into a golden record (the program is precisely designed to deal with the resolution of issues such as transformer/meter miss-assignments, missing meter end dates, missing pulses, etc.). When joined with Informatica Data Quality, the end result is improved data quality and governance, which allows for increased granularity of the analytics.

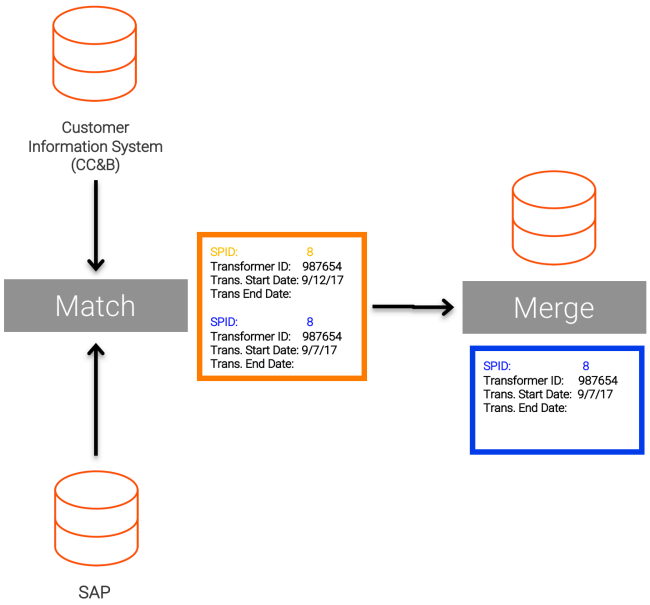

Figure 1. Auto-merge of Oracle and SAP databases based on trust scores

This information can then be correlated with public domain data such as wind speeds, satellite imagery, and LiDAR measurements, to help improve vegetation management. A promising indication of how public domain data can be leveraged is in the use of LiDAR data to deduce the proximity of vegetation to high power transmission lines. When measuring the risk associated with tree arcing, proximity and wind data is correlated with the "golden record" data to interpolate potential revenue losses from a tree arcing or the possible legal exposure associated with a hospital losing power for an extended time – these are just a few examples.

In whole, this strategy allows for high-resolution load planning, fraud mitigation, and highly holistic risk assessments. The following section showcases how public domain LiDAR and satellite imagery can be leveraged with the Informatica "golden record."

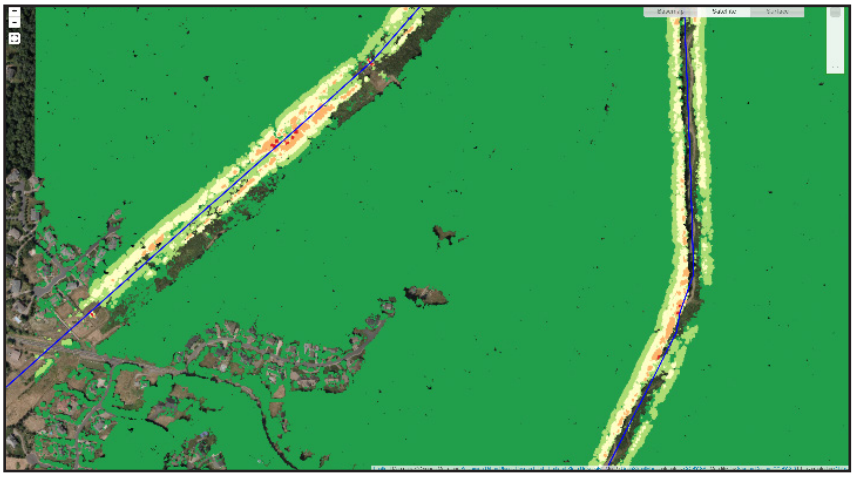

Figure 2: From Lidar data risk of arcing is interpolated. 3D viewing provides context and verification.

Vegetation Management

LiDAR Transmission Lines vs. Tree Canopy

Transmission lines are high-voltage (115kV+) and uninsulated, carrying an increased risk of tree arcing. Managing the encroachment of vegetation on transmission lines can be overwhelming. Utilities are often tasked with maintaining these vast assets with limited resources.

Laser measurement technology (LiDAR) has the potential to improve the classification of high-risk vegetation. LiDAR technology offers increased precision with a spatial resolution of less than 1m². When overlaid with transmission line mapping, a precise assessment of tree canopy proximity to transmission lines can be interpolated. 3D satellite imagery can be used to provide context and verify the need for maintenance crews to be dispatched. Experts project $1 billion in annual savings potential for North American utilities. As a rule, utilities should be able to save upwards of $700 per brush mile from deploying increasingly sophisticated tools and data to keep vertical and horizontal corridors cleared.

The true value of this information becomes apparent when this data is used in conjunction with Informatica MDM and Data Quality.

National Size of the Problem:

- Miles of Transmission Lines: 200,000
- Millions of Miles of Distribution Lines: 5.5
- Billions Spent in Annual Maintenance: 5.4
- Number of Annual Wildfires Caused by Arcing: 3,000 to 4,000