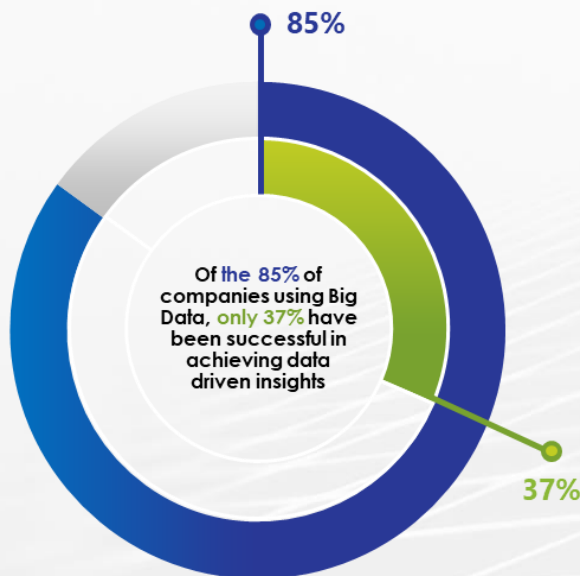


Data Enrichment: Data Asset Value Maximization

Improve Data Quality & Analyses to Drive Insights and Accelerate Action



In the face of accelerating technology, data assets are extremely valuable in helping companies to improve decision making, better serve customers, reduce costs, and ultimately, increase revenue and profits. Do you actively manage, enrich, and analyze your data and treat it like the precious asset it is?



REALITY

Most utilities have failed to extract significant value from big data investments. This has been primarily due to lack of insight into the linkage between data, assets, risk, and functional performance.

WHY ISL ANALYTICS

We add value as a strategic partner - as external data analytics experts and consultants with broad industry experience in helping utilities adapt and drive sustainable change. By combining cross utility data sets with advanced analytic tools and methodologies, ISL Analytics acts in a data enrichment capacity – auditing, collecting, correcting and creating data as needed for each critical decision or use case, always on a faster path to value and at a much lower cost than alternative Big Data software solutions.



COMMON DATA GOVERNANCE CHALLENGES



Big Data : Finding the Value ...

Data volumes continue to grow and analysis possibilities are nearly limitless. But the scale of data often exceeds what can be easily stored, retrieved and computed, and many organizations struggle with what to do with their data, or even where to get started.



Integration and Data Transformation is a Major Challenge

Integrated views of data across various systems and layers to support decision making often require a series of queries, joins and exports. Likewise, data is often in slightly different formats and requires some degree of transformation, which can be a very time-consuming process.



Data Silos Still Exist and We Have Not Come Close to Full Data Democratization

A major theme emerging for utilities is de-risking assets. Breaking down departmental silos ("Data Democratization") and improving data quality produces dramatic increases in analytic and reporting speed, which enables a virtuous cycle for extracting value.



Data Quality Issues Persist and Data Enrichment is Desperately Needed to Effectively Drive Decision Making

Data sets must often be integrated with advanced analytic tools and enrichment methodologies (i.e., auditing, normalizing, correcting, synthesizing and creating data proxies as needed)



There's a Shortage of Skilled People (Data Scientists, etc.)

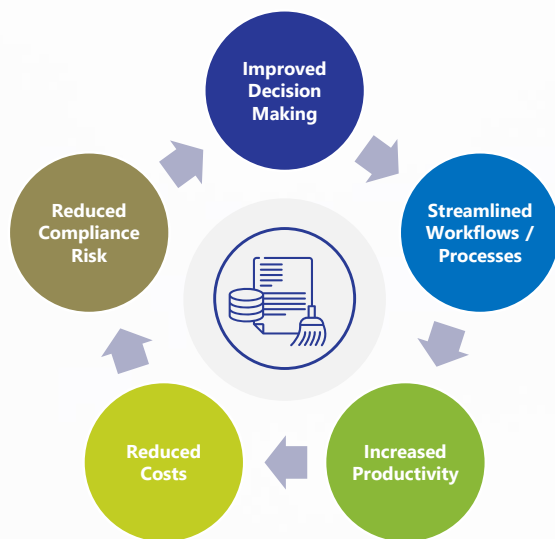
Management feels the urgency but hiring Data Scientists/Analysts without industry expertise is not the answer. That creates the illusion of progress but in-fact distracts / delays insight & model development. Training people at entry level is also expensive and slow. Light-weight analytic platforms with ubiquitous access for SMEs is the solution.



Real-Time Can be Complex – Know When it's Really Needed

Depending on the application and use of data, integration and updates may only be needed daily, weekly, or even less frequently for sufficient insights. Avoid extra complexities when real time integration isn't truly necessary.

WE BELIEVE THAT CERTAIN CORE PRINCIPLES DRIVE SUCCESSFUL DATA GOVERNANCE:



Specific benefits derived from better data governance, cleansing, and enrichment:

- ✓ Recognize that **data is one of your company's most important assets** --- if put to use properly!
- ✓ **Data ownership and accountability** must be clearly defined.
- ✓ Don't start with "**What data can we capture?**" Instead, ask "**What data is needed to make the right decisions?**" In most cases, data must be cleansed, transformed, and/or enriched for meaningful insights.
- ✓ Value requires understanding the linkages between data, assets, risk, and functional performance. **Data has little value unless linked to a decision that will create value!**
- ✓ Wherever possible, leverage **diagnostic and prescriptive data analytics** to better understand where you are today and to provide data-backed insights and decision support.
- ✓ **Harness predictive analytics**, including best practice algorithms and machine learning techniques, to improve your identification and understanding of the likelihood of future outcomes or events.

Because we are known for our fast and light operational and predictive analytic applications and benchmarking services, we understand the importance of "good" data. We have expanded our service offerings to help companies achieve better data governance, with an initial focus on data cleansing and enrichment.

WITH ANY ISL ANALYTICS DATA GOVERNANCE PROJECT, YOU CAN EXPECT TO:



IMPROVE DATA QUALITY

Our data services team identifies outliers, anomalies, and suspect data. We automate data cleanup through alerts, highlighting suspect events for immediate validation and correction by operations. Additionally, we drive data enrichment initiatives to fill gaps and create new datasets, like transmission structure elevations and spans-as-an-asset database.



REDUCE COST AND EFFORT OF DATA MANAGEMENT

Utilities face two options for data validation and cleanup: dedicating costly resources or relying on analysts to discover and correct anomalies. Both approaches have drawbacks; the former is expensive and not always reliable, while the latter is less effective and can lead to costly decisions based on inaccurate data. Our data quality solutions offer comprehensive data governance with automatic anomaly detection, alerts, and timely corrections, saving time and effort.



ACCELERATE CORRECTIVE ACTION

We offer rapid, automated data validation, cleanup, and enrichment services for outage, asset, work, and customer data. From routine periodic validation to daily tests and notifications for each data record, we ensure outlier identification and anomalous pattern detection. Corrected and refined data leads to faster and better data-driven decisions, empowering your key data insights to drive action!

EXAMPLE DATA ENRICHMENT PROJECT WORK

EXAMPLE WORK & USE CASES

Creation of a new asset class consisting of more than 180,000 transmission line spans

Establishment of this asset class was a significant step forward, allowing more effective asset risk management, as well as development of condition assessments, lifecycle strategies and risk profiles for each span.

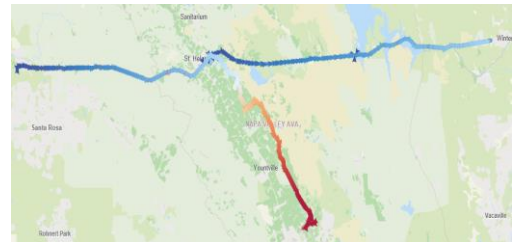
Methodologies developed to find instances of customer/transformer mis-assignment

Analysis of data from GIS distribution assets, customer records, reliability events, and AMI data files to develop a range of algorithms to help identify instances where the assignment of customer meters to distribution transformers was suspect

An audit of the lat/long location of ~150,000 transmission structures

Development of 950+ substation fence shape files

- This new shape layer allowed for the identification of gas transmission assets crossing through substation boundaries, and identified closest distance for each pipe section, and for specific gas pipeline sections that passed within any substation boundary, classification of those gas assets by pipe size, pressure and other risk factors
- For each substation, the distance in feet to the nearest corrosion and insulation boundary was calculated, and for corrosion also documented elevation and likely impact of the marine layer in terms of corrosion effect.

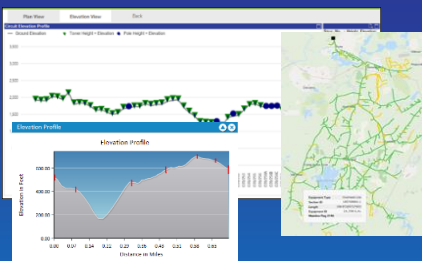


Creation of a data collection template and process to record insulator and structure information from inspection photos

- Analysis has demonstrated that insulators are a common source of failure leading to ignition events on the transmission system. Fully understanding as much as we can about insulators, as an asset class, is therefore imperative
- Manually reviewed photos and populated data collection template with key insulator and structure characteristics with high levels of accuracy and efficiency

Automated collection of elevation data for ~150,000 transmission structures

Elevation data is important for a number of asset management analyses and strategies needed by the LOBs, e.g. linking to climate variations and impact on asset insulation values and design standards, operating practices and Maintenance strategies



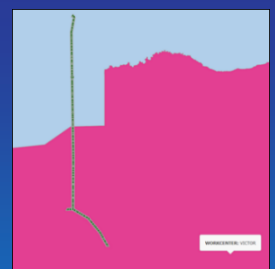
DEVELOP, VISUALIZE, ANALYZE ELEVATION PROFILES FOR T&D CIRCUITS.



GEO-FENCED ASSETS WITHIN FIRE ZONES, OR...



...WITHIN / ACROSS POLITICAL BOUNDARIES , OR ...



...WITHIN / ACROSS WORK CENTERS ...

DATA ENRICHMENT: A DATA ENRICHMENT PROJECT IN ACTION

CASE STUDY: TRANSMISSION LINES - SPAN ASSET REGISTER DEVELOPMENT



COMPANY: A large investor-owned utility in the western US, serving over 5 million customers.



OVERVIEW

Many utilities have towers/poles/structures in their GIS, with long lengths of conductors (wire from splice to splice), but are missing an asset class called "Spans" (parts of conductors). This is a critical gap because much of the risk of these conductors lies in the interface between the line and the ROW (vegetation) below it, something unique to each span.



METHODOLOGY

In just three weeks, the ISL Analytics Data Services team created a new asset class: over 148,000 transmission line spans. They used a custom BI application for quick calculations, mapping, and geospatial analysis. The spans were derived from a transmission structures database and supplemented with various attributes for versatile analysis.



DATA UTILIZED

Structure database/sequence, circuit guest/host relationships, OH Line shape files, OH conductor attributes (type, size, age, etc.), child asset data sets (e.g. geolocations of splices, spacers, and marker balls), etc.



CHALLENGES

Data quality and data availability were the two greatest challenges:

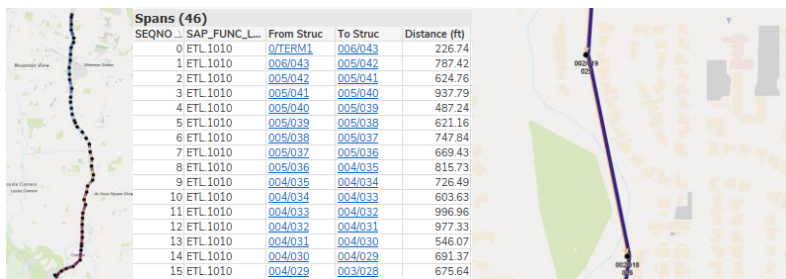
- **Data Quality:** duplicate data, missing data, incorrect sequence numbers, incorrect/outdated structure IDs, incorrect Lat/Long coordinates
- **Data Availability:** the table of structures existed, but the sequence numbers associated with each structure did not. And Data to indicate on which "branch" of a multi-directional/split Tx line the structure existed – a methodology to automate was defined and developed.



SUCCESSSES

ISL Analytics swiftly compiled a database of 148,000 transmission line spans in under 3 weeks. This asset class significantly improved asset risk management, condition assessments, and lifecycle strategies for each span. ISL Analytics have rectified 15,000 data errors, assessed conductor risk, measured vegetation management risk, and linked asset condition to potential consequences like river and highway crossings. The client recognized the crucial importance of this asset class for effective risk-based inspections and vegetation management prioritization.

Sample visualization of a client transmission line – showing each structure and its sequenced path, overlaid with an OH line shape file. This is used primarily for identifying data quality issues. Sample data with span length are shown as well. All "long spans" were investigated to identify and validate anomalies via Google Earth and on-site confirmation if needed.



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