Dominion Energy: Building an evergreen asset model

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Driven by the Grid
The electric utility and its service landscape are evolving rapidly

- For decades, the model was sound: Generation, transmission, and distribution worked as isolated organizations.
- Shared services including IT, finance, and purchasing function as independent support organizations
- The shift to renewables and a growing load on Dominion's system is posing new challenges that is demanding a shift in the operating model.
Dominion is Big. Dominion is Regulated

Fast-Paced Innovation is Tricky

• Like most big companies we suffer from a case of corporate segmentation and siloing of our data
• Conventional business units continue to focus on their functional and operational needs
• The challenges of an evolving system will not wait, but the regulations are here to stay
• We need to enable a data environment that allows for nimble development and greater accessibility to information while ensuring we meet the complex regulations of our industry
In an industry that avoids risk and change in the name of reliability, we had to take steps to build an environment that challenges decades of habit

**Challenge**

- Our SCADA historian was increasing in size and complexity
- Thousands of new assets come online or get retired weekly
- Disparate business function means inconsistent data

**Solution**

- Dominion deployed an ever-green centralized model that combines data from multiple systems of record for an intuitive and easy to use experience.

**Results**

- An automated AF that reduces data exploration and data cleansing exercises
- Enabled data analysis and data science capabilities by integrating with powerful modeling software (ESRI, Seeq, PredictiveGrid)
- More intelligent data-forward decision-making including CBM
Business challenge
Business Challenge

Developing new data capabilities was difficult for many reasons. We had to enable Dominion

- **The environment is convoluted:** Required substantial domain knowledge and data skills to find and gather information.

- **Data silos:** meant Excel warriors and/or highly specialized gatekeepers required to get data.

- **Access:** Requests for data could take several weeks.

- **Unprecedented growth:** New assets come online, and old ones get retired at rates that make it extremely difficult to maintain a model manually. We are talking 5k to 10k point updates a week, sometimes more.

- **Complex layering:** Decades of naming conventions, legacy names, and multiple systems.
Solution and Implementation
Establishing a Unified Asset Environment

We have worked to overcome the obstacle of data access, data naming, and data misalignment

AFSDK

Governance Database

Evergreen Asset Framework
Growth of an Enabling Asset Framework

Asset Framework Today

• Templates: 24
• Analysis: 135K
• Elements: 28K
  • Substations and DPs: 615
  • Transformers: 1093
  • Circuits and Breakers: 6014
  • Capbanks: 1115
  • Lines: 1408
  • Reclosers: 9032
  • Batteries: 445

5 Million+
Points on PI Data Archive

54 VMS
Across Prod, QA & Dev
Model Validation
Providing Proactive Vigilance

Creating a culture of awareness for admins and the business was critical for the growth and adoption of the AF
• The application runs daily as a service
• An email goes out to admins with all updates

Information Shared Includes
• NEW assets includer
• RETIRED assets
• Point mapping success/errors

Sample Email Report

[PROD] AFsync Run Report

Manual—Auto mapped: 1/1
LINES
Number: ####
[NEW] LINEID1 under SUBSTATION1 Substation
[NEW] LINEID2 under SUBSTATION2 Substation
Line AMPS mapped: 2/2
Line MVA mapped: 2/2
RECLOSES
Number: ####
Reclosing tags mapped: 0/0
Hot Line tags mapped: 0/0
BATTERIES
Number: ####
[NEW] BATTERYID1 under SUBSTATION1 substations
TX BREATHER ALARMS
Number: ####
[NEW] Alarm for ALARMID1 under TRANSFORMERALARMS1
Execution completed in 01:22:25.5193267
Success Stories at Dominion
Supporting the Maintenance of Load Tap Changers (LTC)

Through the newly deployed asset framework, the Engineering Analytics & Modeling team helped model and visualize hundreds of transformer LTCs

- Integrated with maintenance system to forecast future maintenance dates.
- Capture events and notify engineers on multiple alarms and events use cases.
- Incorporated drill-down capabilities to help engineers diagnose and take action
The Larger Impact of VOLT VAR Control

The deployed AF Hierarchy enables disparate resources to co-exist. Today, engineers can promptly find and visualize an array of assets including:

- Capbanks
- Transformers
- Buses

We now serve an increasingly complex set of use cases with greater expediency that allow experts to meet business requirements previously maintained manually (or left entirely unserved)
Dominion’s system is slated to grow as much as 5% year over year. Executives and engineers want to keep up.

- Roll ups at multiple levels of the hierarchy.
- Pre-calculation of computer intensive analysis for quicker view and reporting.
- PI Vision allows for easy playback and backtrack.
Enabling a Geo-Spatial Capability

The deployment of an AF based entirely on templates provided a seamless means for an ESRI integration.

From asset monitoring to loading heat maps, AF is helping EA&M deploy new geospatial capabilities for its customers.
Next Steps

• Automation of PI point creation from both EMS and ADMS
• Full ESRI integration (migrate to BA Integrator)
• Implementation of more business use cases (over two dozen tracked)
• Roll out and training for a growing user-base
• Full-time Engineering Analytics Team set to grow from four to 16 by 2024
I wanted to pass along a success story from the LTC Pages that your team built. It identified excessive operations on [LTC], and upon review, the team alongside Distribution Planning determined a settings change was required to resolve the issue. Without these pages/alerts, we would not have caught the problem.

- Kevin Goldsmith, Manager, Substation Operations
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Questions?
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State your name and company.

Please remember to...
Navigate to this session in the mobile app to complete the survey.

Thank you!
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