# AVEVAWORLD



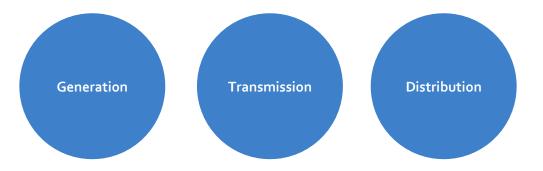
# **Driven by the Grid**



## **An Industry in Flux**

#### The electric utility and its service landscape are evolving rapidly

- For decades, the model was sound: Generation, transmission, and distribution worked as isolated organizations
- The shift to renewables and a growing load on Dominion Energy's system is posing new challenges that is demanding a transformation in the operating model
- More than 70% of the world's internet traffic flows through Dominion Energy's territory
- Data centers in Dominion Energy's footprint can account for up to 21% of our system loading
- By 2035, Virginia's data center demand will require as much power as New York City (16.5GW)

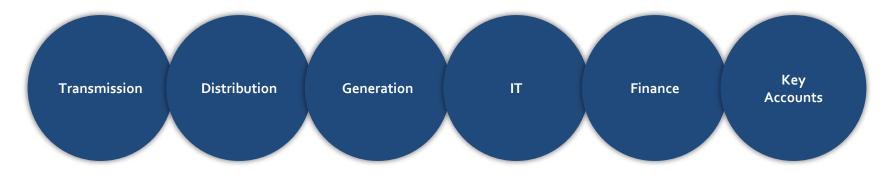




## **Dominion is Big... and Regulated**

#### **Fast-Paced Innovation is Tricky**

- Like most big companies, we can 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 evergreen 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

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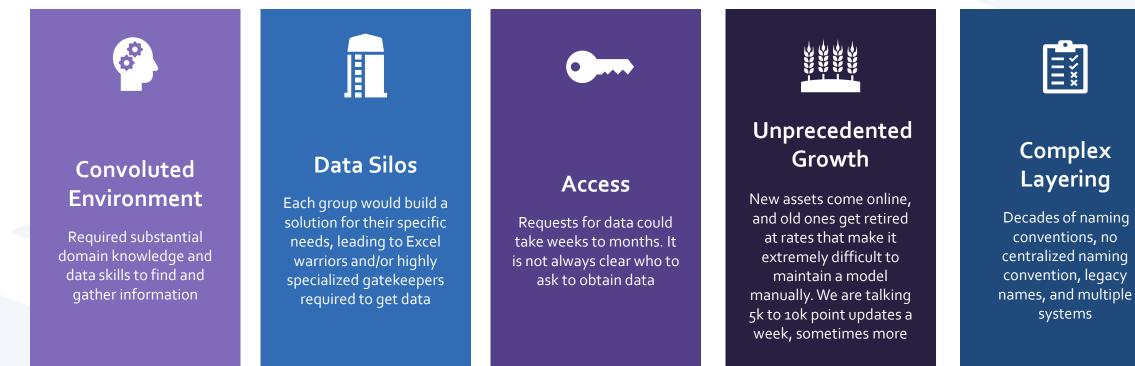
Category: Configuration					
ADMS Equip Code	TX_2				
AnalysisPointName	COLD_HARBOR-TX_2				
EMS Equip Code	TX2				
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Manufacture Year	2011				
Manufacturer	Lumon				
Model					
Primary SAP Equipment Description	Transformer, LTC				
Primary SAP Equipment ID	TX178				
Primary SAP Functional Lo	A				
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## **Business Challenge**



#### **Business Challenges**

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

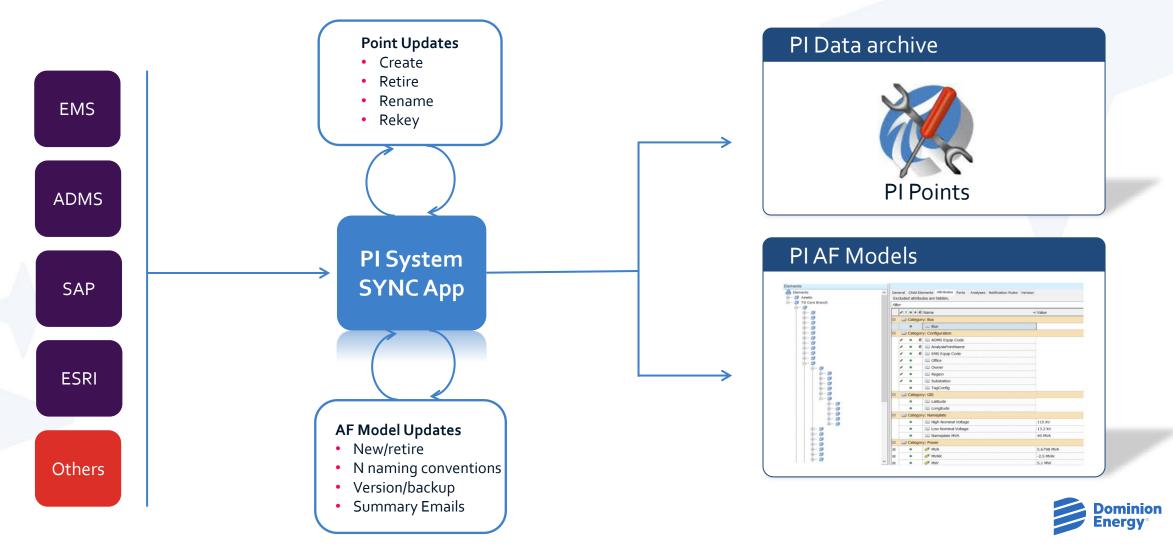


## Solution and Implementation



## **Automated Point management and Model Updates**

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



#### **Growth of an Enabling Asset Framework**

#### Asset Framework Today

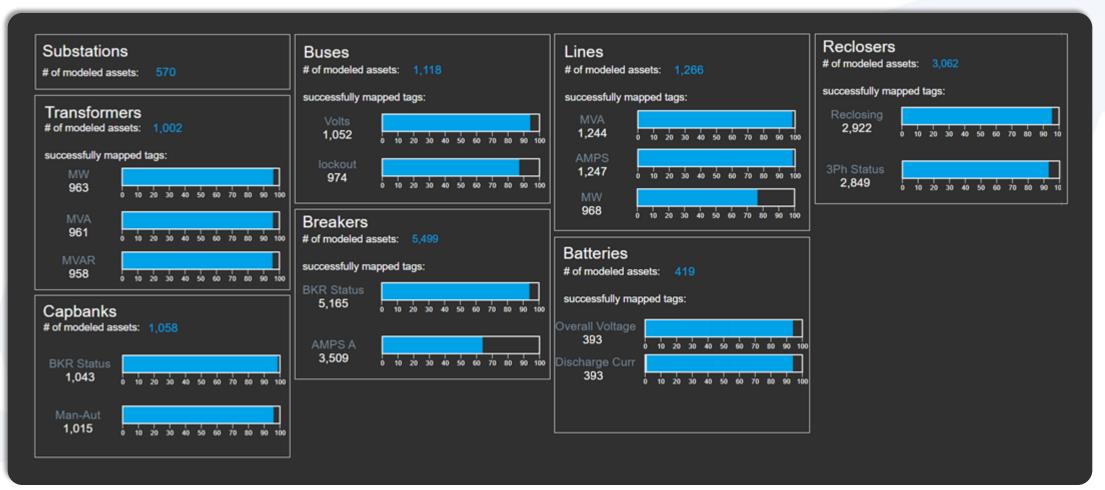
- Templates: 53
- Analysis: 135K
- Elements: 27K
  - Substations: 634
  - Transformers: 1068
  - Circuits and Breakers: 7216
  - Capbanks: 1074
  - Lines: 1461
  - Reclosers: 3343
  - Batteries: 800
  - Buses: 216
  - Delivery Points: 301
  - Distributed Generation: 188

## **5.4 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
- Model backups created daily

#### **Information Shared Includes**

- NEW assets includer
- RETIRED assets
- Point mapping success/errors

#### Sample Email Report

#### [PROD] AFsync Run Report

Bruno.Bachiega@dominionenergy.com To © Bruno Bachiega

Manual—Auto mapped: 1/1 LINES

Number: 1501 [NEW] LINE7 under COLD HARBOR Substation [NEW] LINE9 under ALLENTOWN Substation Line AMPS mapped: 1410/1497 Line MVA mapped: 1410/1497 RECLOSERS Number: 3222 Reclosing tags mapped: 9201/9237 Hot Line tags mapped: 9201/9237 BATTERIES Number: 1374 [NEW] DRANESVIL\_BAT under DRANESVILLE substations **TX BREATHER ALARMS** Number: 576 [NEW] Alarm for ZURICH.TX1\_BREATH\_TROUB under TX Breather Alarms Execution completed in 01:22:25.5193267



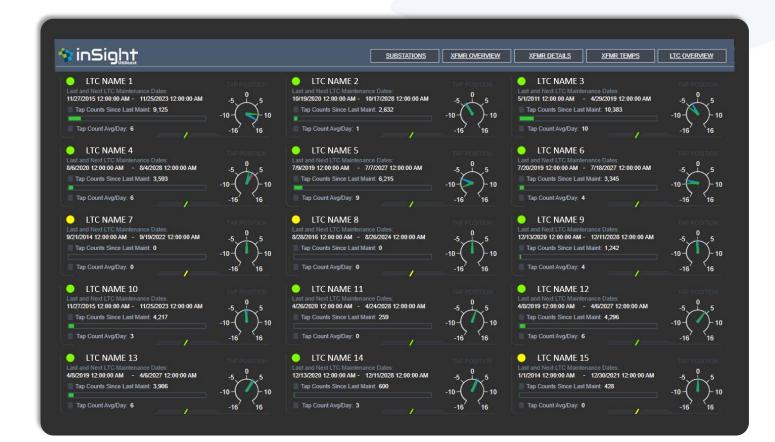
## **Success Stories at Dominion**



#### Supporting the Maintenance of Load Tap Changers (LTC)

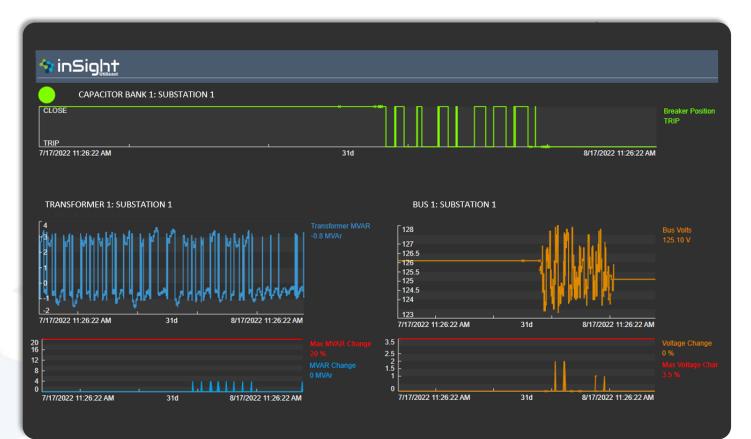
Through the newly deployed asset framework, the Engineering Analytics & Modeling team helped model and visualize hundreds of transformer LTCs

- 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)



### **Keeping up with Growing Load**

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

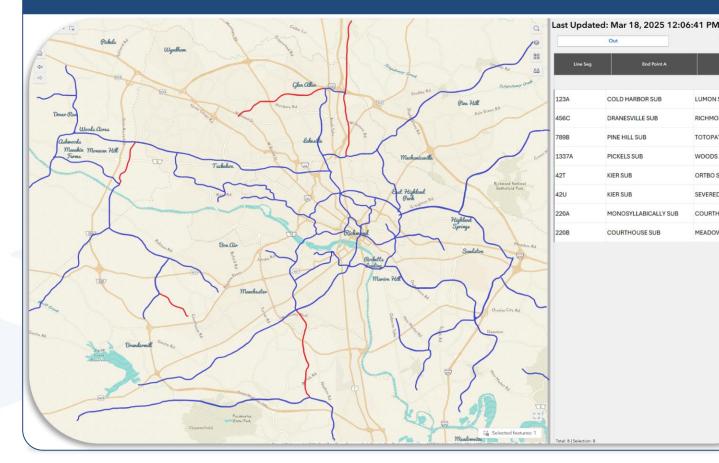
System Profile										
Current Load		Current	Generation							
DE Load 23,174.8	PJM Load Forecast 23,497.0 MW	Total Generation (MW) 21,429.8						System % Asset Us 41.73		
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Data Center Alley (Loudoun County)		Generat	ion Source	5						
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**Dominion Customers Out Customers Out** Percentage 6,349 Interchang Percent of Generation Interchange (MW) Exporting Importing 6000 MV 6000 M Tie Lines FIRST ENERGY AEP Name Interchange (MW) Line ZURICH 6 557 55 ORTBO LUMON LEGACY 558 EAGAN REPLICA 559 241 HELENA MDR 257 560 ALLENTOWN 258 LEONORA 561 2101 HARMONY COBEL 563 DRUMMOND 567 COLD HARBOR 564 DUK CAIRNS 565 LUCKNOW Line Name Interchange (MW 566 123 BAIRD 225 QUARTERLY PERFORMANCE 267 1231 SEVERED REFININC PERPETUITY • 172 281 295 GOAT



## **Enabling a Geo-Spatial Capability**

#### ARCGIS to Track a Physical System



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

End Point B J∱ Sement asc : 2Ξ

LUMON SUB

RICHMOND SUB

TOTOPATOMY SUB

WOODS ACRE SUB

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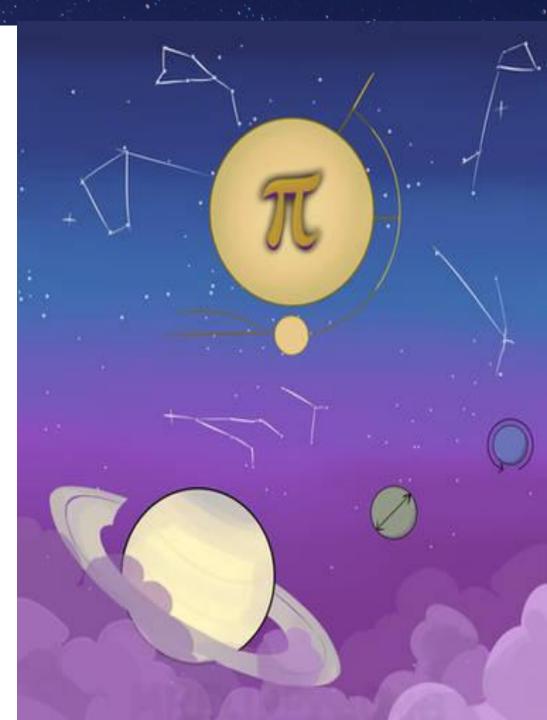
MEADOWVILLE SUB

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



### **Next Steps**

- Full ESRI integration
- Implementation of more business use cases (large backlog)
- Roll out and training for a growing user-base
- Full-time Engineering Analytics Team set to grow from 4 to 16 by the end of 2025





## Seth Milchick

MANAGER, MACRO DATA REFINEMENT

The automation of the PI System has bestowed upon our team the extraordinary boon of alleviating laborious tasks related to creating points and maintaining a digital twin in AF.

Furthermore, this august innovation also helped reduce the technical debt from the manual methodologies that were in place before the automation, whose inefficiencies now stand as mere relics of a less enlightened epoch.

As a result, our esteemed colleagues have now the latitude to engage in pursuits of greater consequence.



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