

DTECH

February 2-5, 2026

San Diego, CA

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Network Model Management (NMM)

From Fundamentals to Real-World Implementation - Focus on the Ameren GNMM Project

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‘The single biggest challenge for T&D Utilities is managing the Equipment, Asset and Network Model Lifecycle’

- Andy Motsinger, Director: Asset Management, JEA

As grids become more complex with DERS, advanced technologies, and regulatory pressures, the need for a trusted, accurate network model is no longer a technical detail but a core business imperative

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Part 1 : NMM Fundamentals

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Key Points

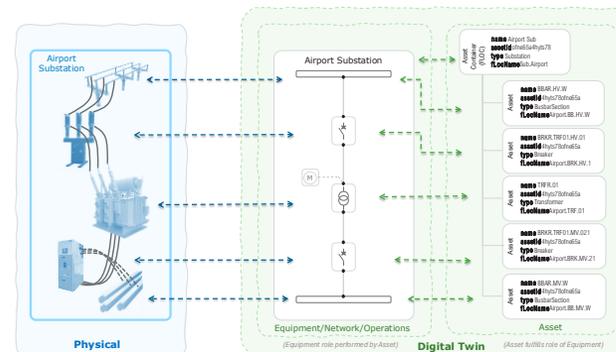
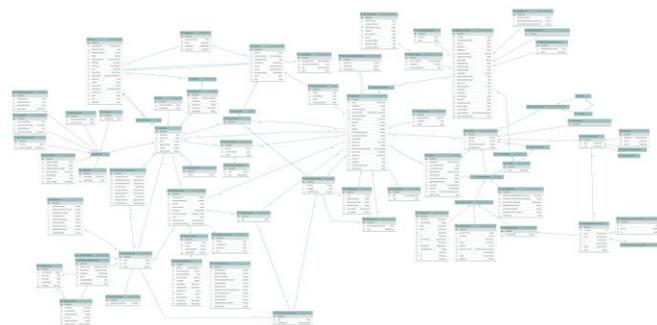
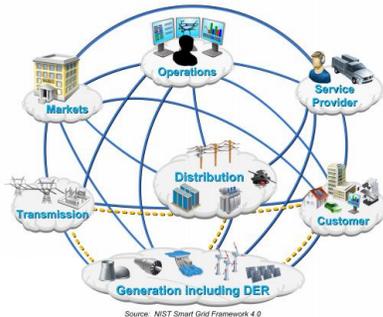
Network Model Management (NMMS) = foundation for the Digital Twin

Past, present and future network representation

Composed of multiple datasets, from various stages of the lifecycle

What is Network Model Management?

A complete digital twin of the entire electrical system



Contiguous Network Model

Transmission → Substations →
Distribution → Customer service points →
Distributed Energy Resources (DER)

Data Includes

Equipment, Topology & Connectivity,
Service points, Loads, Load Profiles &
Forecasts, Ratings, Limits, Equivalent Sources,
Protection settings, Measurement Points,
Control Points

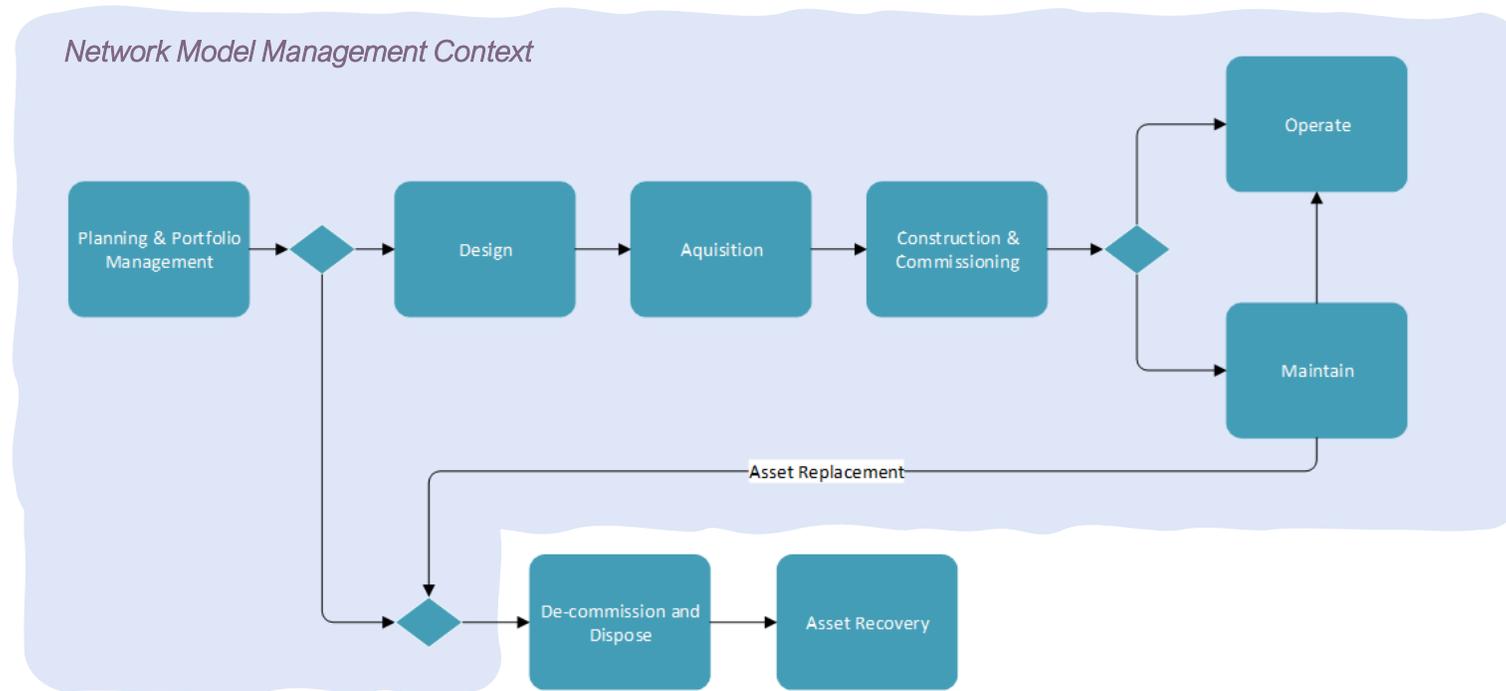
Focus

Function & behavior of the grid as one
electrical system

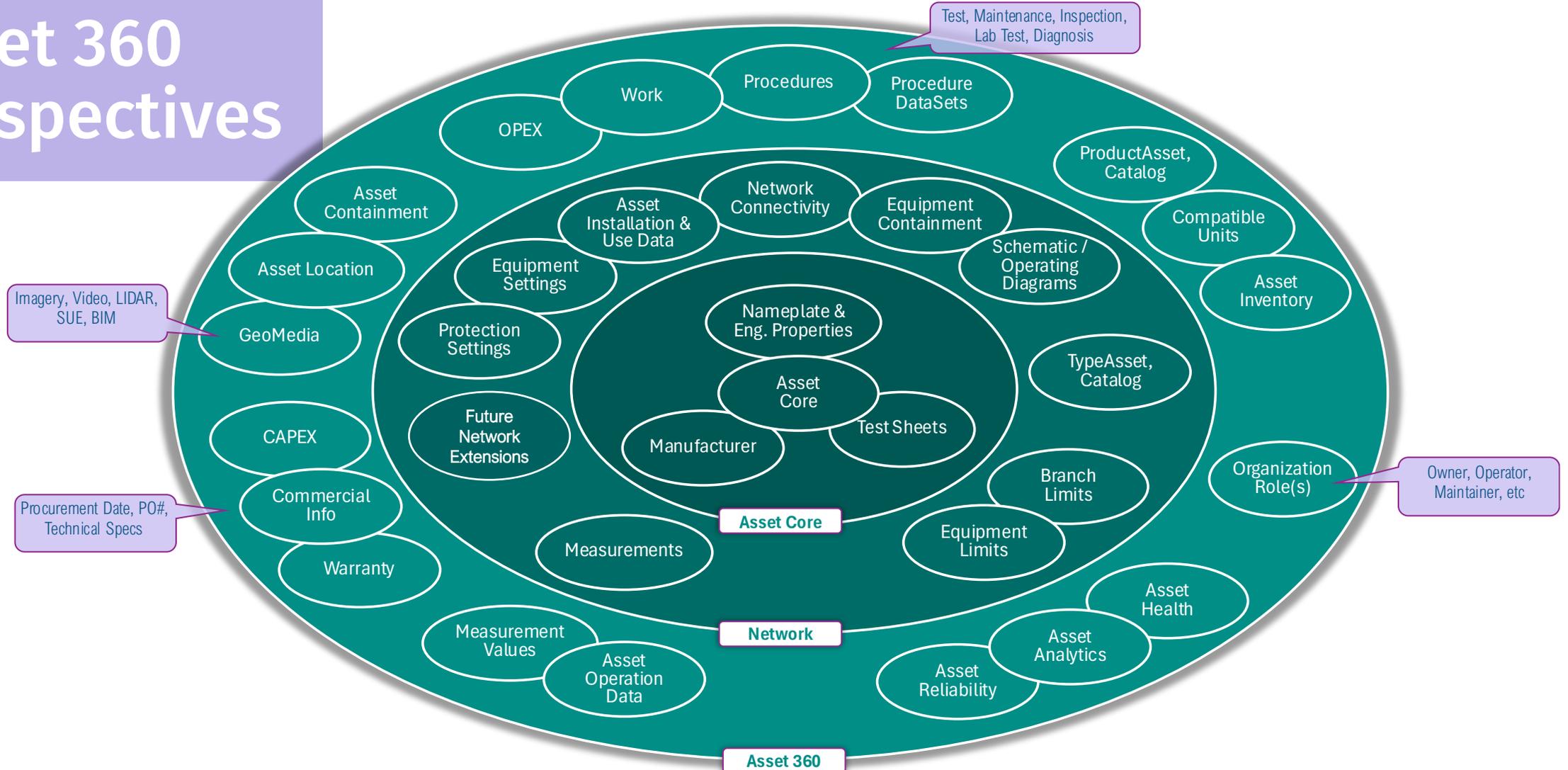


The Digital Twin Lifecycle & NMM

- Network Model Management => Critical backbone throughout Digital Twin Lifecycle
- Data Complexity: Equipment, Topology, Ratings, Measurements, Loads, Service Points, Protection...



Asset 360 Perspectives



Grid Network Data Today: The Utility “Junk Drawer”

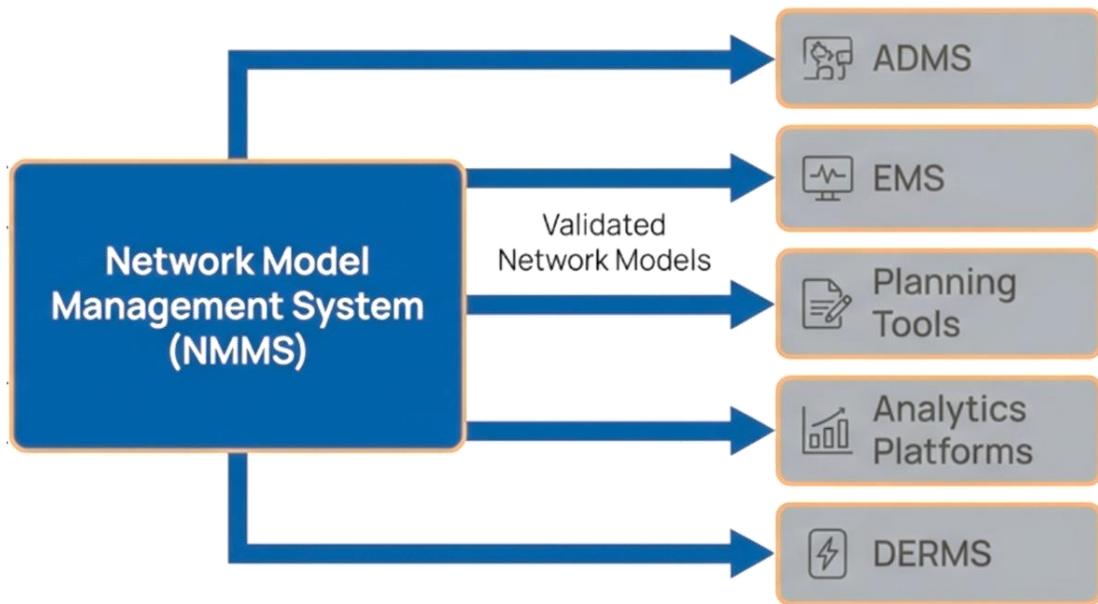
- Most utilities rely on a collection of siloed systems and ad-hoc processes to manage critical network data.
- Engineers manually reconcile information from spreadsheets, home-grown databases, and file shares.
- This leads to multiple, conflicting versions of the truth, making it inefficient, brittle, and impossible to scale.
- Key decisions in planning & operations are made with “outdated, inconsistent, and sometimes incorrect information.”

The “Junk Drawer” Reality



- Many ‘silos of excellence’
- Much ‘shadow IT’
- Much duplicated effort of data management
- Much manual data (re-)entry
- Not much re-use of data
- Each silo trust their own data – but is it current?

The NMM Approach

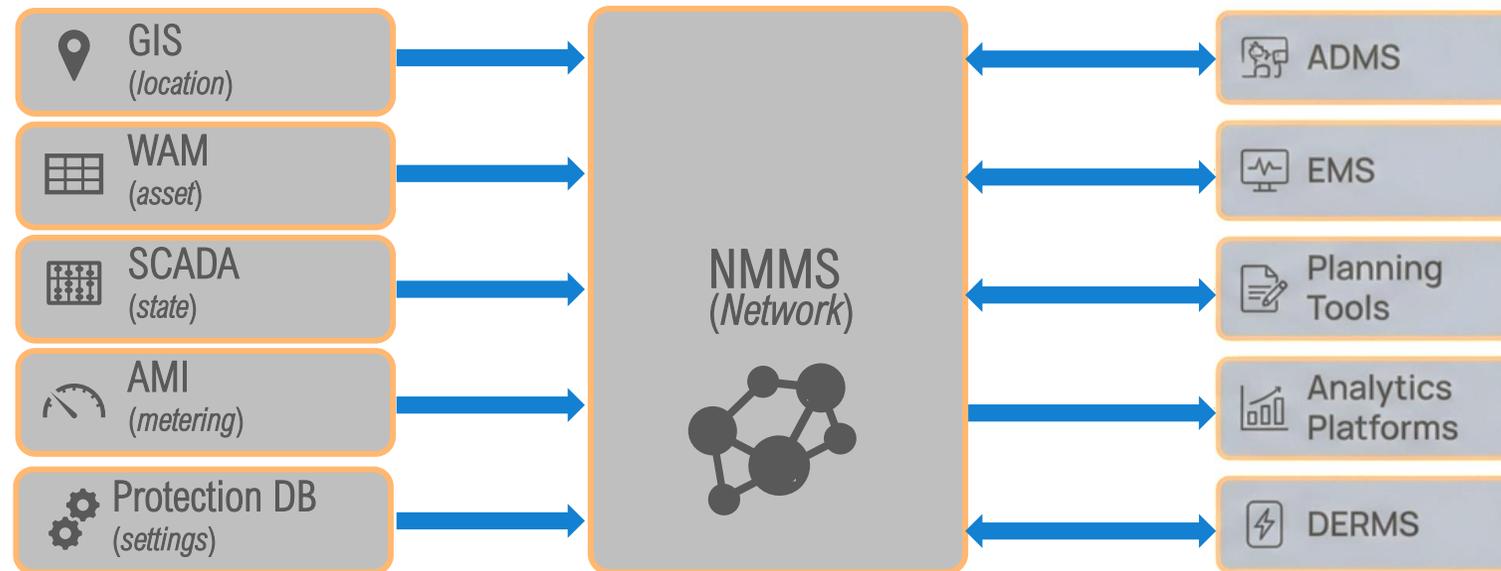


The Foundational Shift: A Single Source of Truth for Your Grid

- Grid Network Model Management (GNMM) is a formal strategy and system of record that delivers a sustainable, single source of truth for grid network data.
- It moves beyond siloed data to create a unified, living model of the entire electrical system—from transmission to the customer service point.
- This improves data consistency, timeliness, and quality, enabling a 360-degree operational view across all business functions.

The Central Hub for Network Intelligence

- GNMM (NMMS) doesn't replace existing systems; it integrates & orchestrates them.
- By ingesting data from systems of record and publishing validated models, it ensures that all consuming applications work from a single, consistent, and high-quality view of the network.



A Network Model Is More Than a Map

- While essential, GIS is fundamentally location-focused.
- A true network model requires explicit connectivity and is focused on the electrical behavior, connectivity, and function of grid components.
- It is the model required by software that analyses and simulates grid behavior.

Geographic Information System (GIS)



Location, Implicit Connectivity,
Features, Geography

“Where is it?”

Grid Network Model (GNMM)



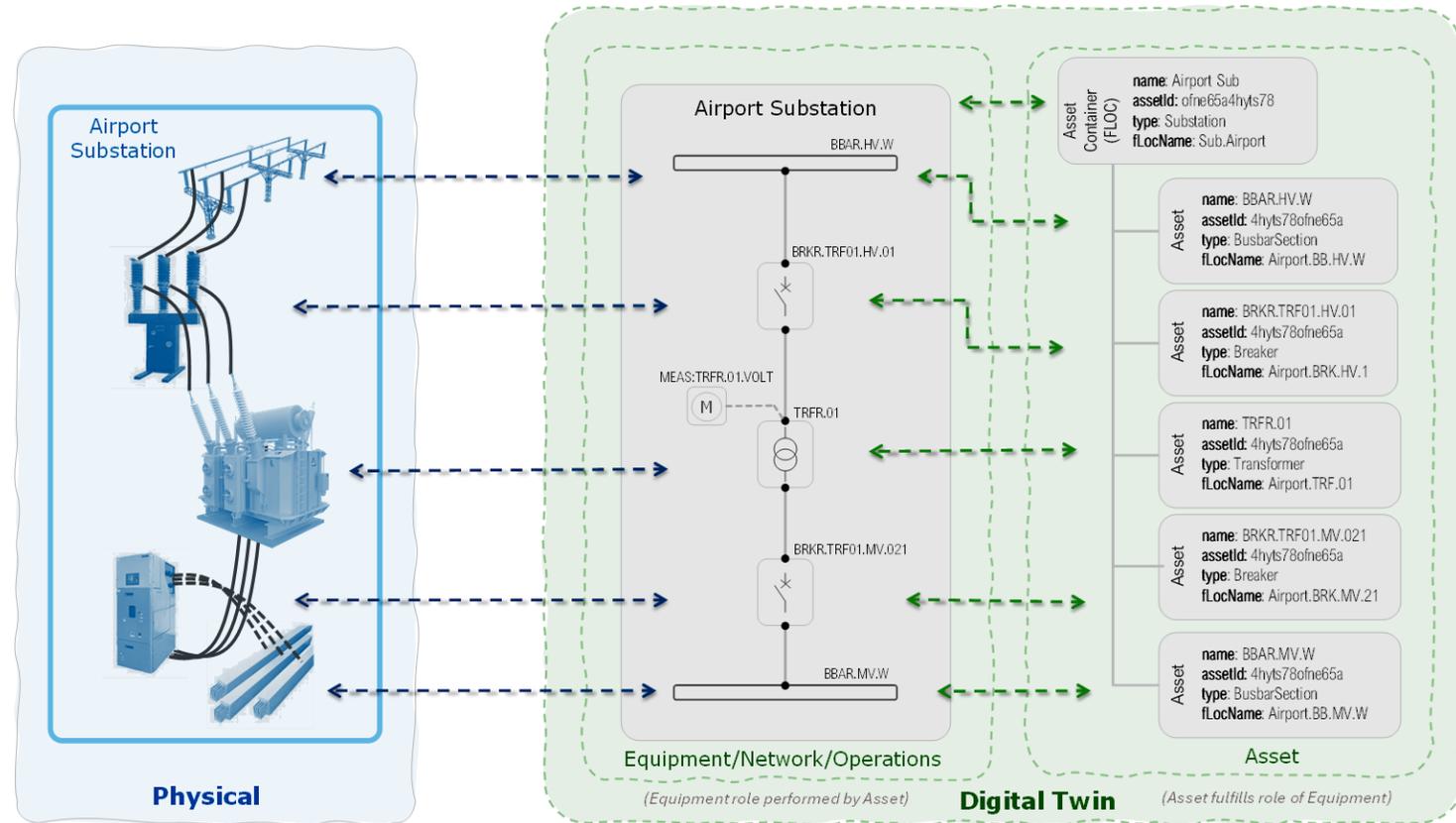
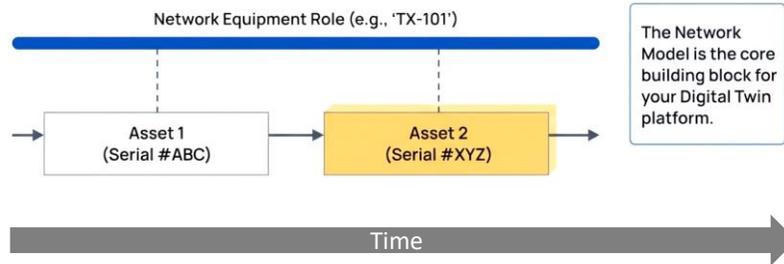
Equipment, Explicit Connectivity,
Electrical Properties, Settings,
Sources, Loads, Behavior

“How does it work?”



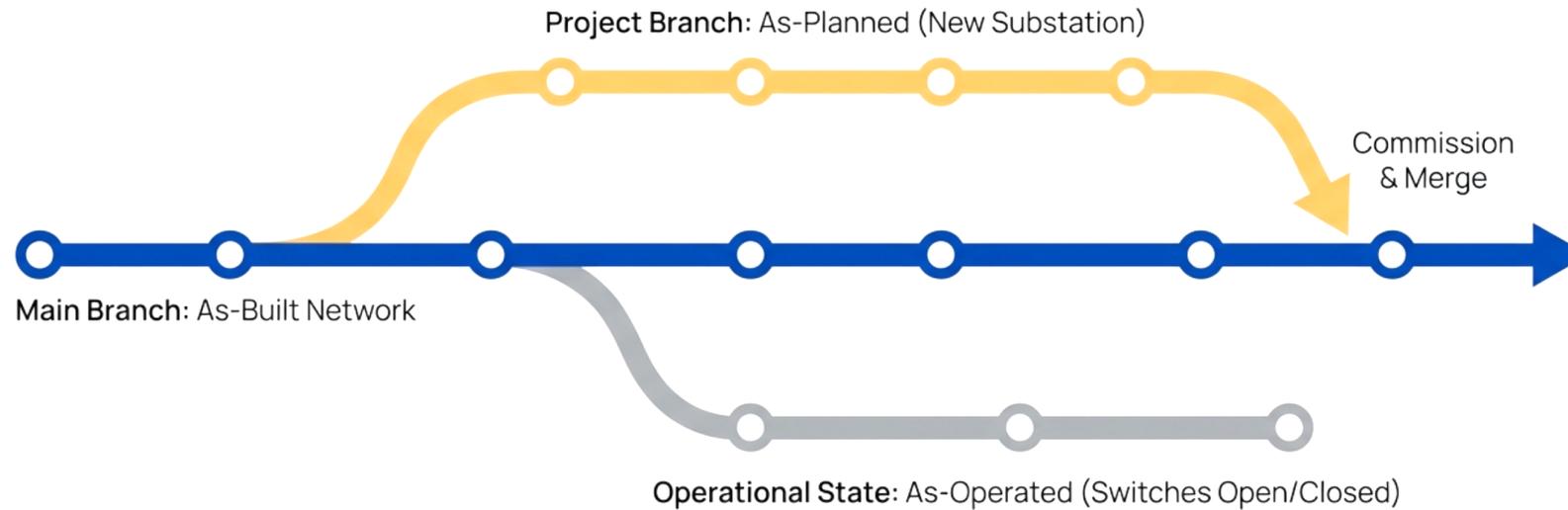
Digital Twin: 'What It Is' vs. 'What It Does' + Asset Replacement

- A critical principle of GNMM is the logical separation of the physical Asset from its role as electrical Equipment.
- The Equipment perspective is persistent, while physical Assets are assigned to it throughout the lifecycle (e.g., when a transformer is replaced).



'Git for the Grid': Managing Every State of the Network

- A modern GNMM provides version management, branching, and merging for every piece of equipment and its connectivity.
- Allows planners, engineers, and operators to work on different views of the network simultaneously and merge changes in a controlled, auditable way.



The Blueprint: Core Capabilities of a Modern GNMM

A comprehensive GNMM is built on three pillars of capability.



Total Lifecycle View

- Manages As-Built, As-Planned, As-Designed, and As-Operated network states.
- Point-in-time views for past, present, and future.
- Supports temporary equipment like cuts and jumpers.



Guaranteed Data Quality

- Automated data and network validation (rules, load flow, topology processing).
- Formal governance and workflows for data change management.
- Full provenance and audit tracking of all changes.



Universal Interoperability

- Built on a common, vendor-neutral format (CIM).
- Automated transformation and publishing to proprietary formats (ADMS, EMS, PSS/E, Aspen, CYME, Synergi).
- Assimilates data from numerous sources (GIS, SCADA, WAM, etc.).



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Part 2 : Ameren GNMM Project

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The Proof in Practice: The Ameren GNMM Journey



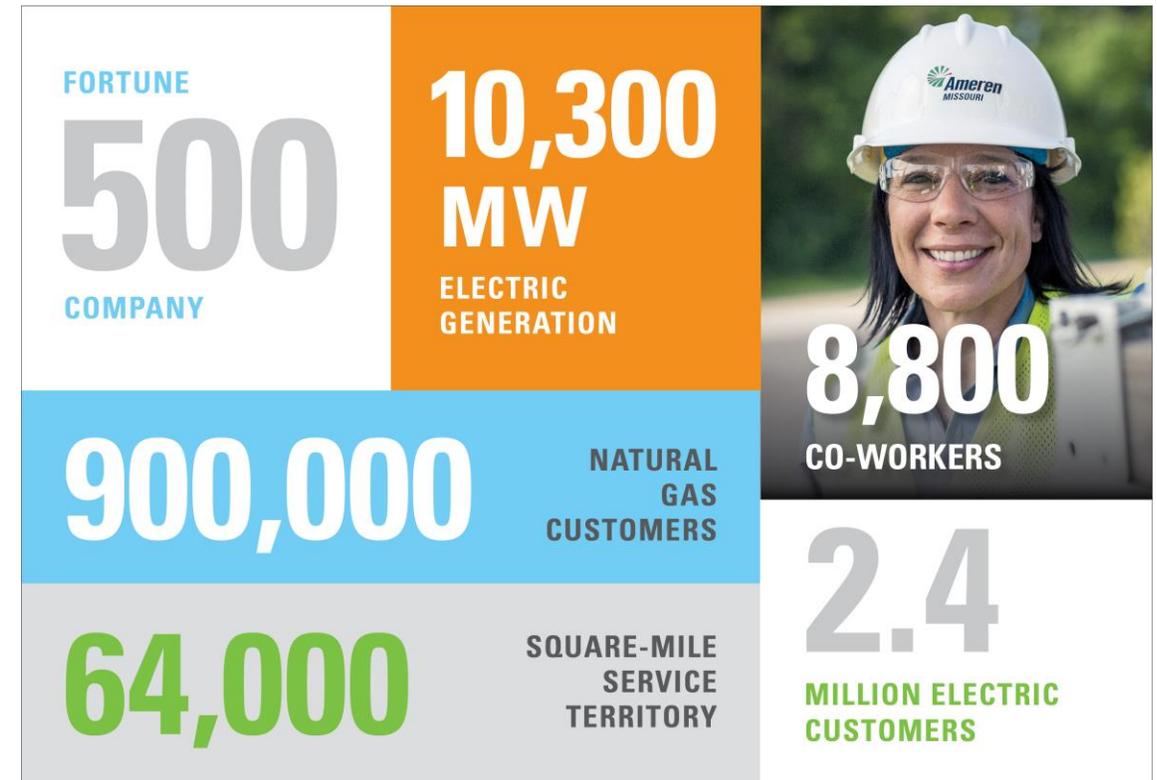
“GNMM gives Ameren a single, standards-based source of truth for grid data to improve consistency, interoperability, and data accuracy for advanced grid operations and planning.”

– Dave Hammon, Senior Director of Digital Field and Grid, Ameren

About Ameren

Ameren Corporation is a Fortune 500, fully rate-regulated electric and gas utility company headquartered in St. Louis.

We pride ourselves on operating safely and maintaining financial strength while providing reliable, reasonably priced energy in an environmentally responsible fashion.



Service Territory



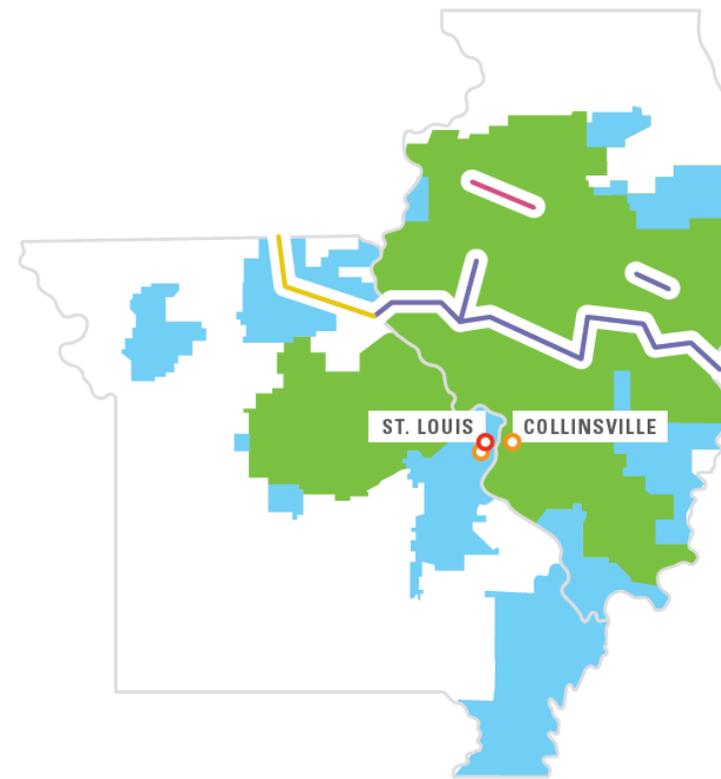
This integrated utility owns a mix of energy centers with 10,200 megawatts of electric generation capacity.



This delivery-only utility is the second largest distributor of electricity and third largest distributor of natural gas in Illinois.



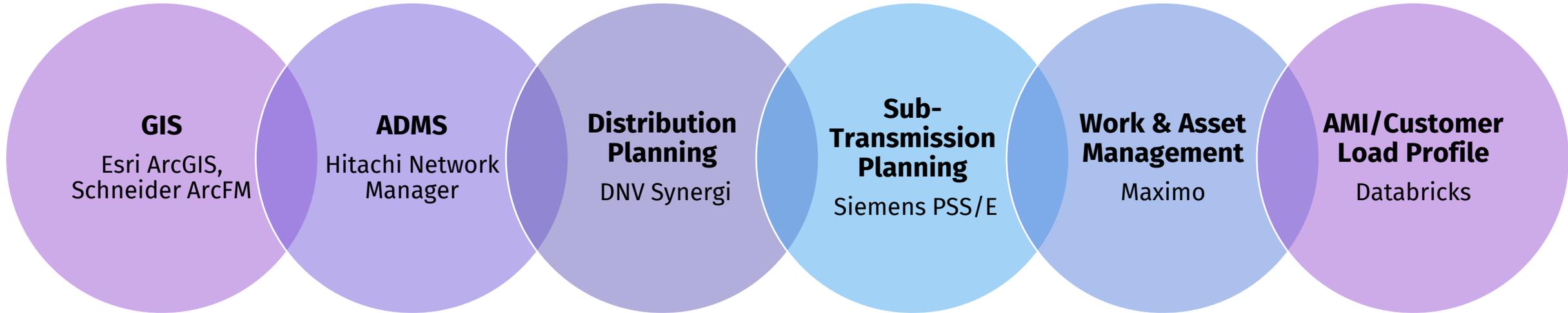
This subsidiary is dedicated to electric transmission infrastructure investment and expanding Ameren's already robust system of high-voltage lines.



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Key Applications



Ameren's 'Why': From Data Fragility to Strategic Enablement

Ameren recognized that their ability to modernize the grid was being limited by their existing data management practices.



The Challenge

- Grid operators and planners making decisions with outdated, inconsistent information.
- Existing point-to-point integrations were fragile, complex, and costly to change.
- Heavy reliance on manual processes and experienced employees for data wrangling.



The Opportunity

- Create a single, reliable source of truth for all network model consumers.
- Increase automation to reduce labor and improve quality.
- Maximize the value of ADMS and planning applications with accurate data.



The Goal

- Provide a robust and resilient roadmap for managing and sharing network models across the enterprise.



A Principled Approach to Grid Model Management

Leading utilities are adopting a set of core principles to guide their GNMM strategy & ensure long-term success.



Adopt Open Standards

- Base your model on CIM to ensure interoperability and avoid vendor lock-in



Streamline Operations

- Eliminate redundant tools and align processes across the entire asset lifecycle value chain



Logically Separate Data

- Maintain a clear distinction between Network Equipment and physical Asset data



Enable DER Integration

- Build the data foundation required for effective assessment, planning, and operation of Distributed Energy Resources



Automate Validation

- Implement rigorous, automated quality assurance processes before publishing data to any consuming application

Ameren's Critical Factors for Success

A successful GNMM implementation is a strategic program, not just an IT project. Ameren identified several key factors that were essential to their progress.



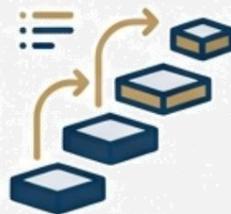
Broad Organizational Engagement

- Secure buy-in from leaders across planning, operations, and IT who share the vision



The Right Expertise

- Assemble a team with deep knowledge of GNMM/CIM, utility processes and systems, and modern software development



An Incremental Approach

- Start with a solid foundation (e.g., NMMS, GIS, ADMS integration) and deliver value in phases



Leverage Open Standards

- Adhere to standards like the CIM to avoid vendor lock-in and ensure future flexibility

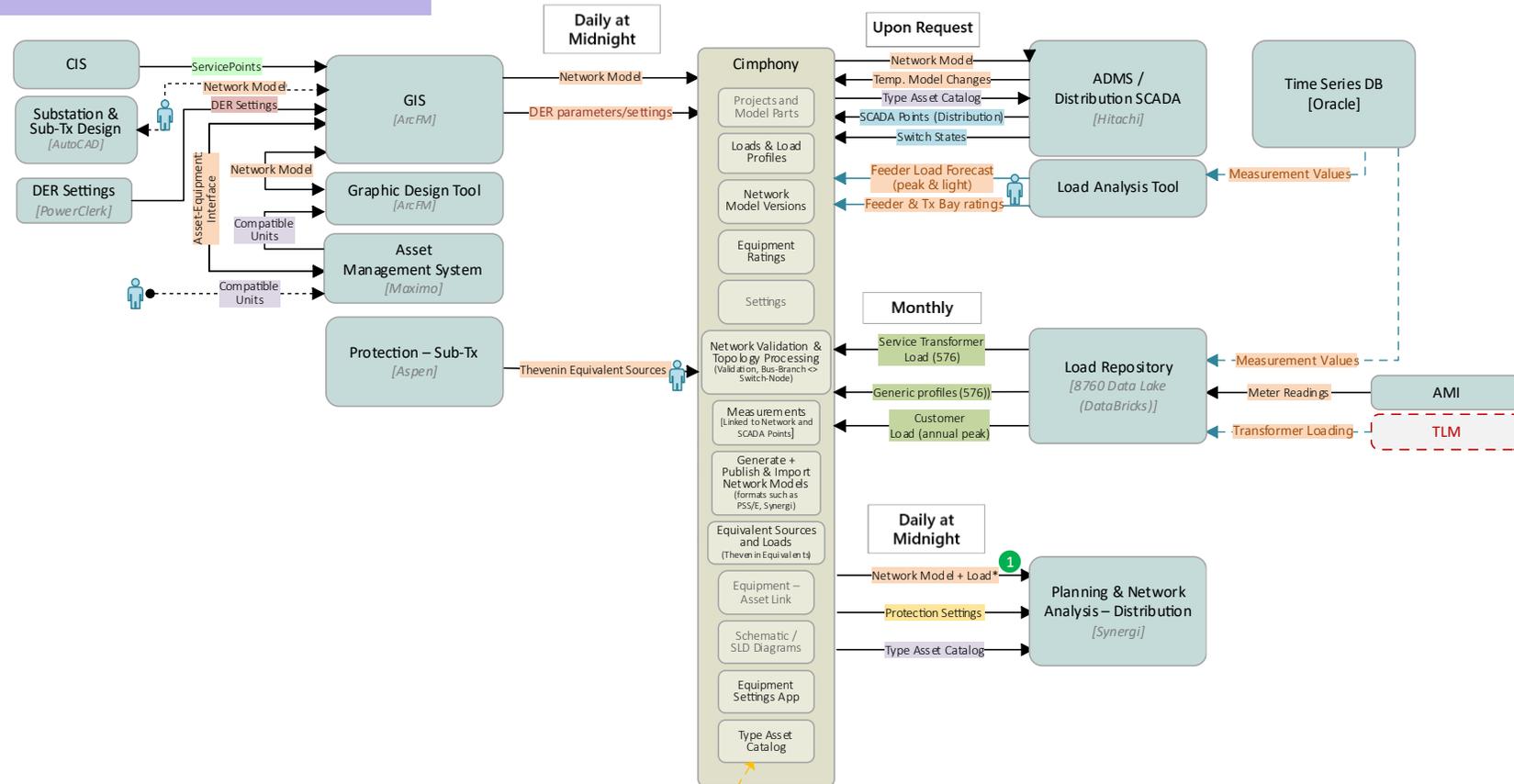
Ameren's GNMM Design

Deliveries

- GIS integration
- Load Repository integration
- ADMS integration
- Synergi Electric integration

Value

- Increased frequency, reliability, and quality of model updates
- Reduce maintenance costs and friction of point-to-point integrations
- Enable ADMS advanced apps
- Enable Synergi time series analysis
- Improve modeling of DER on the distribution system



The Result: Increased Velocity, Reduced Effort, and a Foundation for the Future

Even in the initial phases, Ameren's foundational GNMM implementation delivered measurable improvements and enabled advanced grid operations.

Daily Updates

- Frequency of network model updates to ADMS increased from bi-weekly to weekly*

Reduced Manual Effort

- Significantly decreased the manual overhead required to maintain and validate the network model.

Enabled Advanced Functionality

- Unlocked better use of ADMS features like load flow and Fault Location, Isolation, and Service Restoration (FLISR).



Thank You!

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