

**Ameren's Network Model Management Strategy
Accelerates Operational Efficiency With a Single
Source of Truth for Electrical Network Data**

“The integration of AspenTech Cimphony Network Model Management™ allows us to reliably update our ADMS data with as-built information from our GIS. Cimphony NMM reduces the time it takes to move data from weeks to as little as a day.”

— Tyler Friedel, Technical Product Owner, Ameren



CHALLENGES

Ameren faced challenges in fully utilizing its Advanced Distribution Management System (ADMS) due to manual, time-consuming data transfer processes from its Geographic Information System (GIS). GIS alone could not provide the complete, validated electrical connectivity data that the ADMS needs for advanced applications. The typical GIS-to-ADMS connection couldn't provide sufficient data quality or completeness. Ameren needed a rich data model integrating multiple data sources beyond just GIS.

SOLUTION

Ameren chose AspenTech Cimphony Network Model Management (NMM) to deliver a single source of truth for electrical network data. As system of record for the Ameren sub-transmission and distribution electrical network model, Cimphony NMM provided enterprise data integration, transformation and validation.

VALUE CREATED

- Achieved faster model updates and faster exports through Cimphony centralized model.
- Improved reliability through historical model tracking and change correlation.
- Unlocked ADMS advanced applications by providing complete, validated electrical models.



Overview

Ameren Corporation is a utility serving approximately 2.5 million electric and 900,000 natural gas customers across a 64,000-square-mile territory in Missouri and Illinois. With a net capacity of 9,300 megawatts of electricity and over 8,000 miles of transmission lines, Ameren is committed to modernizing its electric grid infrastructure to enhance reliability, integrate renewable energy and meet evolving customer needs.

Realizing this vision is no small feat. The electric utility industry is undergoing historic levels of change, including rapid load growth driven by a proliferation of data centers, expanded domestic manufacturing and electric transportation. In response, utilities are building new grid infrastructure and assets at an unprecedented rate. According to the consulting firm Deloitte, capital investment in the power sector reached an all-time high of \$179 billion in 2024. Deloitte expects utilities will spend \$1.4 trillion between 2025 and 2030 and will maintain similar levels of investment through 2050¹.

A significant influx of distributed energy resources (DERs) like rooftop solar and energy storage also adds control and reliability challenges. Ameren's Grid of the Future vision is designed to accommodate growing numbers of DERs and to fully leverage data through smart grid modernization. Ameren's approach includes:

- Deployment of smart meters and other advanced technologies to simultaneously provide customers with insight into their energy use and data for Ameren to improve grid reliability
- Replacement of aging infrastructure with automated switches, sensors and other tools to optimize voltage so that Ameren's power delivery system is increasingly efficient and reliable

For Ameren's Grid of the Future vision to become reality, the utility must share a common set of data across departments and functions. The data then must be structured, contextualized and controlled in ways that support planning, investment and operational decisions. One opportunity was Ameren's electrical data model across different systems and processes.

¹ [Funding the Growth in the US Power Sector](#), Deloitte, February 2025.



systems and processes. This included the manual and intricate process necessary to transfer data from Ameren’s GIS, which serves as the utility’s system of origin for the as-built electrical network, to its ADMS, which serves as the as-operated electrical network model.

The process relied on extensive manual QA efforts, making it risky and time-consuming. This data transfer bottleneck prevented Ameren from fully leveraging the advanced applications within their ADMS, such as load flow analysis and state estimation which require accurate and up-to-date network models. Furthermore, the growing pains associated with interconnecting increasing numbers of DERs and optimizing their siting highlighted the need for more efficient grid upgrades and data management. Organizational silos where planning and operations teams exchanged data through inefficient means like Excel sheets further complicated efforts to maintain a cohesive and current view of the grid.

With increased attention to DER interconnection, consistent and accurate modeling practices are imperative—from publicly available DER hosting capacity maps to detailed DER interconnection studies to ADMS operational modeling to distributed energy resource management systems (DERMS).

The Need for Network Model Management

To overcome these challenges, Ameren deployed AspenTech Cimphony Network Model Manager. This implementation was a crucial step in their Grid of the Future initiative and was specifically designed to address the complexities of network model management and DER integration. The core idea behind the deployment of Cimphony NMM was to establish a central, neutral repository for Ameren’s distribution network model data that was free from the constraints of any individual analysis tool or operational system.

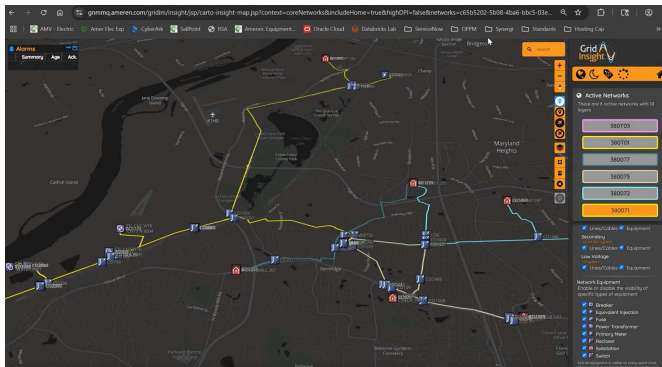
Cimphony NMM's key functionality lies in its ability to sit between the GIS and ADMS, providing a seamless and automated data flow. It transforms, verifies and validates incoming GIS data against an industry-standard format, ensuring that the ADMS receives clean and usable information. The automated GIS-NMM-ADMS integration helps to achieve:

1. Reduced operations and maintenance (O&M) costs.
2. Increased rapid model update cycles, reducing the time between updates from weeks to as frequent as daily.
3. Reduction in model export time. Now model exports covering approximately 7,000 feeders in Illinois and Missouri can be completed in less than 30 minutes—meaning that minor data updates or the resolution of a data issue can be achieved quickly and easily.

Beyond accelerating data transformation and transfer, Cimphony NMM acts as a system of record, holding all network data in one place, tracking changes and managing workflows in an automated fashion. This centralized approach simplifies data translation and maintenance, as GIS updates are handled in simple increments rather than full retransfers. Cimphony NMM also plays a critical role in data quality by identifying and flagging issues with incomplete, missing or faulty data through its validation processes.

Moving Closer to the Grid of the Future

The deployment of AspenTech Cimphony NMM has been instrumental in Ameren's journey towards its Grid of the Future vision. By establishing a robust and automated system for network model management, Ameren has significantly improved reliable and efficient ADMS data updates.



This foundational improvement has unlocked the full potential of Ameren's ADMS while enabling the operation of advanced applications like load flow and state estimation that were previously hindered by manual data processes. Furthermore, Cimphony NMM's role as a centralized system of record has facilitated better integration of DERs and streamlined data exchange across previously siloed operational groups.

Looking ahead, Ameren plans to continue investing in their implementation of Cimphony NMM to support several future use cases. A key short-term improvement is the enhanced ability to quickly correct any data inconsistencies between GIS, Cimphony NMM and ADMS. This rapid feedback loop ensures the ADMS always operates with the most accurate as-built information. Additionally, Ameren is now able to pass network model data into its ADMS and consume measurement data from the ADMS back into

Cimphony. This allows for roll-back of the network to previous states for analysis as well as storing information about device temporary states.

In addition, the association between SCADA points and specific network devices is improved by maintaining active links between the devices within the network model. Readings from SCADA points across the physical network pair readings with equipment.

Cimphony NMM is also an indispensable tool in Ameren's journey from traditional peak system modeling to both dynamic time-series modeling and the release of dynamic (time-series) DER hosting capacity maps. These advancements pave the way for more sophisticated grid planning, analytics, protection engineering and revenue management, allowing Ameren to fully realize the benefits of smart grid investments and reduce friction in DER interconnection.



Glossary

Source of Truth: As the system of record, Cimphony NMM also functions as a single source of truth across utility stakeholders, providing a centralized data model using electrical network data from disparate origin systems to represent a single source of comprehensive, accurate and high-quality data.

System of Record: Cimphony NMM functions as a system of record to maintain a full history for all electrical assets down to the object level, as well as full audit trails of all actions carried out, providing the utility with clear insights into the changes made to assets through time by individuals and systems with appropriate access.

System of Origin: The various systems or databases that electrical data originates from such as a GIS. Interfaces using the IEC CIM protocol are built to share data between these systems of origin and the system of record, Cimphony NMM.





About Aspen Technology

Aspen Technology, now part of Emerson, is a global software leader helping industries at the forefront of the world's dual challenge meet the increasing demand for resources from a rapidly growing population in a profitable and sustainable manner. AspenTech solutions address complex environments where it is critical to optimize the asset design, operation and maintenance lifecycle. Through our unique combination of deep domain expertise and innovation, customers in asset-intensive industries can run their assets safer, greener, longer and faster to improve their operational excellence.

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