

Data and Communication Network Strategies Workshop

Enhancing Grid Performance Through Data & Communication Strategies



CENTER FOR OPERATIONAL
EXCELLENCE

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Executive Summary

The AEIC's Center for Operational Excellence hosted a two-day workshop on Data and Communication Network Strategies, bringing together utility leaders, data scientists, and industry experts to address the challenges and opportunities of modernizing grid infrastructure through data-driven strategies. Key discussions focused on integrating real-time data analytics, overcoming data silos, leveraging cloud infrastructure, and enhancing communication networks to support grid reliability and resilience.

The workshop highlighted the following focal points:

- **Real-Time Data Needs:** The urgency of transitioning from static to real-time data for grid operations and decision-making.
- **Cloud and On-Prem Strategy:** Challenges in capitalizing cloud investments while balancing on-prem requirements due to regulatory and security concerns.
- **Data Governance and Silo Reduction:** Establishing unified data governance frameworks to improve data accessibility and reliability.
- **Return on Investment (ROI) from Data Analytics:** Building business cases and demonstrating ROI through improved efficiency and decision-making.
- **Communication Network Modernization:** Enhancing secure communications for grid edge integration and interoperability.

Actionable Insights:

- **Unified Data Governance:** Adopt federated governance models to streamline data management across departments.
- **Cloud Strategy Alignment:** Develop hybrid strategies to optimize cloud and on-prem capabilities while ensuring regulatory compliance.
- **Investment in AI and Predictive Analytics:** Leverage AI to enhance decision-making and operational efficiency.
- **Training and Change Management:** Establish continuous education and stakeholder engagement programs to support the data transition.



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AEIC Center for Operational Excellence

The mission of AEIC’s Center for Operational Excellence is to provide the electricity industry with authoritative information as a basis for decision-making on local, state, and federal infrastructure investments. The Center facilitates industry projects addressing critical challenges such as supply chain management, grid reliability, electrification, and technological innovation. By fostering collaboration and sharing best practices, AEIC ensures stakeholders are equipped with actionable insights to navigate the dynamic energy landscape. This workshop underscores AEIC’s ability to convene diverse perspectives to tackle industry challenges and advance operational excellence.

Data and Communication Network Strategies Workshop Context

Twenty utility leaders convened for this AEIC-hosted workshop, aiming to address the escalating challenges of managing data growth and enhancing communication infrastructure for grid reliability. The workshop facilitated in-depth discussions among senior managers, data scientists, strategists, and technical leads to explore practical solutions for integrating real-time data analytics, overcoming data silos, and modernizing communication networks.

The primary focus was on aligning data governance frameworks with operational and regulatory requirements to enable a seamless transition to data-driven grid management. The workshop emphasized the need for a unified approach to data governance, secure communication protocols, and a balanced cloud strategy to optimize grid operations and ensure resilience. Participants highlighted actionable strategies to capitalize on cloud investments, enhance data accessibility, and foster cross-functional collaboration within utilities to drive data-driven decision-making.

Enhancing Grid Performance Through Data & Communication Strategies

This workshop brought together utility leaders and experts to explore strategies for modernizing grid operations through advanced data analytics and communication technologies. Discussions focused on overcoming real-time data limitations, breaking down data silos, and optimizing cloud and on-premise solutions to improve grid efficiency, resilience, and security.

Using the Integrated System Planning (ISP) framework as a foundation, participants shared best practices for aligning data strategies with grid modernization goals, securing communication networks, and navigating complex regulatory requirements.

A key challenge raised was the latency in real-time data, especially SCADA systems, which currently operate with a 15-minute delay impacting operational responsiveness. As more utilities move toward cloud-first analytics, striking the right balance between cloud and on-premise architectures has become critical, particularly given regulatory and cybersecurity constraints. The need for a federated data governance model was repeatedly emphasized as essential to reducing silos and enabling accessible, reliable data across utility functions.

Participants also highlighted the difficulty of capitalizing cloud investments and underscored the importance of establishing standardized ROI metrics and cost-recovery mechanisms. Appointing cross-functional data stewards and creating unified governance frameworks emerged as a high-impact opportunity to strengthen data accessibility and internal coordination.

The workshop also stressed the urgency of building secure, interoperable communication networks, especially at the grid edge to manage increasing volumes of data from distributed energy resources (DERs). Strengthening IT/OT integration and investing in resilient communication protocols were identified as critical for future-proofing grid operations.

These insights provide a strategic foundation for utility leaders to advance grid modernization through data-informed decision-making. The outcomes from this workshop will inform a forthcoming White Paper and educational curriculum designed to support utilities in navigating the evolving data and communications landscape.



Gaps / Challenges

The workshop surfaced several critical challenges that utilities face in modernizing their data and communication infrastructure. These challenges span from technical limitations to regulatory constraints, highlighting the need for foundational changes in strategy, governance, and investment approaches.

Table 1. Key Challenges Hindering Data and Communication-Driven Grid Modernization

#	Gap / Challenge	Description
C1	Real-Time Data Limitations	15-minute latency in SCADA data limits real-time decision-making and impairs operational responsiveness.
C2	Cloud Capitalization Challenges	Difficulty in capitalizing cloud investments due to regulatory and financial constraints.
C3	Data Silos	Isolated data systems impede comprehensive analytics and decision-making.
C4	Regulatory and Security Concerns	Diverse regulatory requirements complicate cloud adoption and data management.
C5	ROI Demonstration for Data Investments	Need to align data analytics projects with clear ROI and business value.
C6	Workforce and Expertise Gaps	Shortage of skilled data scientists and engineers for managing advanced data systems.
C7	Unified Data Governance Deficit	Lack of standardized governance frameworks across utilities.
C8	Secure Communication Network Integration	Challenges in integrating secure communications at the grid edge.

Path Forward Opportunities

Building on these challenges, participants identified clear opportunities to strengthen utility operations and enable future-ready grid systems. These strategies offer practical pathways to accelerate modernization through improved governance, smarter investments, and cross-functional collaboration.

Table 2. Strategic Opportunities to Accelerate Grid Modernization Through Data and Communication

#	Opportunity	Description
O1	Cloud-Hybrid Strategy	Develop hybrid models balancing cloud and on-prem capabilities.
O2	Federated Data Governance	Implement cross-functional data stewards and unified governance frameworks.
O3	AI-Powered Decision Support	Leverage AI for predictive analytics to enhance decision-making and operational efficiency.
O4	Secure Communication Protocols	Invest in secure, interoperable communication networks for grid edge integration.
O5	Standardized ROI Metrics for Data Investments	Establish clear KPIs for evaluating the ROI of data analytics initiatives.
O6	Continuous Training and Stakeholder Engagement	Launch ongoing education and feedback mechanisms to support the transition to data-driven strategies.
O7	Collaboration and Knowledge Sharing	Facilitate cross-utility collaboration to share best practices and technical knowledge.

Conclusion

This workshop highlighted a clear industry consensus: **robust data and communication strategies are essential to modernizing the electric grid.** As utilities face rising complexity, evolving customer expectations, and increasing regulatory demands, the ability to act on high-quality, real-time information has never been more critical.

Discussions emphasized the need to overcome longstanding challenges such as data silos, SCADA latency, and unclear ROI for digital investments. At the same time, participants identified practical strategies to accelerate progress from federated data governance and secure grid-edge communications to cloud optimization and stronger IT/OT integration.

Ultimately, the exchange of insights reinforced the value of collaboration and cross-functional alignment in shaping a more reliable, secure, and adaptable grid. As utilities continue to evolve, these shared lessons will serve as a strategic compass for navigating the path ahead.