A Turning Point in Grid Modernization: Making Data Interoperability the New Normal for Utilities

By Peter Londa

Announcing the Tantalus Grid Modernization Platform™
On January 30, 2024, Tantalus officially launched the Tantalus Grid Modernization Platform (TGMP™), a breakthrough technology platform that helps utilities accelerate their grid modernization efforts. The platform includes a smart grid architecture comprised of connected devices, communications networks, grid data management, applications and analytics. In parallel we launched our TRUSync™ Grid Data Management System, which automates the integration of grid data across any device, any system and even any vendor, including smart appliances located behind the meter.

Together, our platform delivers new levels of visibility, command and control across the *entire* grid and helps unify Information Technology (IT) and Operational Technology (OT) deployed by utilities without extremely costly, complex and time-consuming manual data integration projects. That is why this announcement is not just a major milestone for Tantalus—it represents a quantum leap forward for the entire industry.

The mandate to modernize the distribution grid

Every utility already knows that aging infrastructure is being further strained by the increasing frequency of extreme weather, the rise of electric vehicles (EVs) and the deployment of Distributed Energy Resources (DERs). Coupled with an increasing push towards decarbonization through electrification, a host of operating and financial challenges are forcing utilities to think differently.

In 2023, we issued our first inaugural Utility of the Future survey, which quantified the priorities and concerns of 116 utilities and which ones they felt least prepared to resolve. Despite slight variations in the findings from one utility to the next, one conclusion united them all- the time is *now* to modernize the distribution grid. More than nine out of ten utilities felt grid modernization was a priority (half of all utilities, in fact, called it a "high priority").

Despite that conclusion, only one in nine of those surveyed felt completely prepared for modernizing their grids. That may be why more government funding is being made available to help accelerate these efforts. The National Conference of State Legislatures concluded that with 60% of U.S. distribution lines already past their 50-year life expectancy, the U.S. will need to spend up to $2 trillion on grid modernization by 2030 just to *maintain* the reliability of the electric grid. Meanwhile, the top 25 Investor-Owned Utilities are expected to invest approximately $5.9 billion on grid modernization in 2024 alone. Grid modernization is a growing and undeniable need.

When evaluating the operational and financial benefits of grid modernization, it is easy to understand why this initiative is becoming so mission critical for so many utilities.

The undeniable benefits of grid modernization

The U.S. Department of Energy (DOE) outlines six elements that the modern grid must deliver:

- Greater resilience to hazards of all types;
- Enhanced security from an increasing and evolving number of threats;
- Superior flexibility to respond to variability and uncertain conditions;
- Improved reliability for everyday operations;
- Additional affordability to maintain our economic prosperity and ensuring equitable access to services across an entire community; and
- Increased sustainability through energy-efficient and renewable resources.

To achieve these six elements, grid modernization will take time, money and resources. In some cases, utilities lack the skill sets required to support modernization because the modern grid is much more complex than many people realize. There are so many disparate devices, systems and vendors involved in deploying, operating and maintaining a grid of *any* size - and each one of those devices, systems and vendors relies on various protocols and applications, which leads to further complexity to manage the grid.

Investments being made are leading utilities to the same realization- the grid cannot be modernized when data is trapped across systems and devices that were never designed or deployed to be interoperable in the first place.

The real problem: Fragmented data from disparate systems

If a utility cannot access and visualize all of the available data from systems managing substations, feeders, sensors, meters, DERs and smart appliances located behind-the-meter in a unified manner, that

creates a real problem. In order to modernize the grid, utilities have to be able to leverage *all* the data generated from *all* the devices deployed across the entire grid. But utilities cannot do that without a single version of the truth about what is happening across all of their operations.

Further, the edge of the grid is quickly expanding to devices located behind the meter. Inverters for roof-top solar and storage devices, EV chargers and other smart appliances are becoming increasingly common across parts of the United States. As these devices are deployed behind the meter, there is an increasing amount of data tied to various protocols and often tied to proprietary systems that are not aligned to true interoperability. These new devices, while intending to reduce carbon footprints and energy costs, will lead to further unpredictability and risk to utilities if left unmanaged.

In other words, the *real* problem to solve is the fragmentation of data arising from discrete systems that are being deployed from the substation down to the meter and now inside the home. That is why the Tantalus Grid Modernization Platform includes a critical layer, the TRUSync Grid Data Management System.

The real solution: Grid data management that powers grid modernization

TRUSync is a breakthrough middleware solution that automates the integration of *all* utility data across systems, devices and vendors. Building on the technology we secured through our acquisition of Congruitive in early 2022, TRUSync allows utilities to unify all the data captured from systems deployed throughout the grid into one interface that provides a single version of the truth and gives utilities the visibility, command and control they need.

In technical terms, TRUSync provides a federated data fabric with grid-level security and IoT scalability and helps with data aggregation and coordination. In financial terms, utilities can leverage existing systems to accelerate the modernization of the distribution grid with a platform-based approach. Because TRUSync enables utilities to mitigate the cost and risk of leaving existing systems behind, more utilities are prioritizing this kind of approach.

However, not all grid data management systems are the same. That is why we believe it is important to know what to look for in a system geared towards interoperability. Based on our discussions with utilities, industry experts and partners, here is what utilities need a grid data management system to deliver:

- True interoperability across any device, any system, any vendor and any data protocol (including devices and systems located behind the meter);
- Cost savings and lower total cost of operations across the grid;
- A single version of the truth that bridges the systems and devices across every aspect of a utility's operations, including the traditional gap between IT and OT;
- Unparalleled scalability in terms of memory, processing power and storage;
- Enhanced data services, like data concentration and aggregation; and
- Utility-grade security.

Data-centric, not device-centric

In order to modernize, utilities must shift their perspective from traditionally being device-centric to becoming data-centric. The challenge confronting utilities seeking to modernize their grid is data management, not a lack of powerful connected and intelligent devices. Grid modernization requires the

integration of increasing volumes of data from a growing number of connected devices in a *synchronized* manner.

Further, the approach utilities take to achieve data interoperability needs to be device- and system-agnostic. Otherwise, utilities risk getting locked into a single solution or vendor and lose the flexibility to deploy the most cost-effective and innovative solutions in the future.

By offering a modular approach in which utilities only buy what they need, TGMP enables utilities to be more surgical and strategic in their deployments while minimizing the cost of prematurely abandoning existing investments and assets. Also, by including TRUSync as part of all our solutions (and even offering it as a standalone solution), we can deliver unprecedented levels of visibility, command and control *and* the most flexible and affordable path to grid modernization.

In fact, this is such an important moment in time that Tantalus has rebranded our existing solutions and mapped each offering against our TGMP architecture. This way, utilities can not only build towards a common platform, but also can *purchase only what they need* to fill in the missing pieces of their *own* grid modernization platform. Our rebranded solutions include:

- **TRUConnect™**: Our suite of purpose-built communications network solutions, including (but not limited to) our AMI network, with robust edge computing to integrate a wide range of field devices and meters deployed by electric and multi-commodity utilities.

- **TRUGrid™ Automation**: Our rapidly expanding suite of data analytics that leverage AI to anticipate and proactively respond to challenges arising from failing distribution equipment, such as transformers, extreme weather events or imbalances between the supply and demand of electricity.

- **TRUFlex™ Load+DER Management**: Our solution to help utilities manage a wide variety of residential and commercial loads responsively, reliably, and flexibly while reducing costs associated with power outages and improving operational efficiencies.

- **TRUSense Gateway™**: Our innovative suite of collar-based connected devices that deliver AMI 2.0 functionality without unnecessarily ripping and replacing existing meters. These devices also capture substation-level power quality measurements at the meter socket and deliver a utility-dedicated and secure connection to DERs and smart appliances located behind the meter. TRUSense Gateways also enhance investments in fiber-to-the-home broadband initiatives.

Making data interoperability the new normal

This is a pivotal moment for Tantalus, our user community and our partners, and we could not have arrived at this approach without the hard work and dedication of our team and forward-thinking customers.

Together, we are helping utilities harness the power of data. Together, we are making data interoperability the new normal and making grid modernization a reality—for the hundreds of utilities we support and the local communities they serve.

Stay tuned in the coming weeks and months for updates on our progress. Meanwhile, if you would like to explore what the Tantalus Grid Modernization Platform can do for you and *your* community, please contact us at TantalusInfo@tantalus.com.