The Importance of Technology Integration

By Steven E. Collier

Increasing complexities of operating a public power utility in the 21st century require new solutions. New and emerging technologies can vastly improve economy, efficiency, productivity, reliability, sustainability and customer service. The benefits of these new technologies can far outweigh the costs, but it is crucial to have a comprehensive technology integration plan in place based on open systems sharing data across multiple platforms from a variety of vendors. This will enable your utility to obtain the maximum benefits of each solution. It will amplify the total benefit, achieving a whole that is greater than the sum of the parts.

Stakeholders, including customers, utility employees, governing bodies and public policymakers, are inundated by claims of benefits from advanced smart grid technologies. These claims are subject to a major caveat: Not every one can easily share data, much less seamlessly interoperate, with others. This can result in a utility getting less than the full functionality of one or more of the technologies that it has chosen and result in additional work and stress for employees as well as substantial additional expense, both up front and year after year, for the utility.

When evaluating new smart grid technologies, these maxims are paramount: Every new solution should be easy to deploy ("plug and play"), interoperate with a utility's existing and future solutions ("mix and match") and produce and consume all necessary data ("share data"), all without expensive customization or manual employee intervention. The cornerstone is sharing all of the necessary data, sometimes referred to as operations data management (ODM). Absent a good technology integration plan, a utility will likely spend more on consultants and others to achieve data integration and functional interoperability than it invested in the original solutions.

Consider as an example an automated outage management system (OMS), which is a collection of hardware, telecommunications and information technologies that enables an electric utility to better detect, evaluate and manage responses to customer power outages. Many products from different vendors tie into the OMS.

The customer information system (CIS) provides information about customers affected by an outage, including those with critical life medical support systems as well as those that have been disconnected for an unpaid bill. Sometimes the CIS is part of a more comprehensive enterprise resource planning (ERP) solution that includes fixed and mobile work and workforce management.

A geographic information system (GIS) can identify and display where an affected customer is located and connected to the network as well as what utility facilities are affected. Engineering analysis (EA) software, based upon a detailed circuit model, can help predict the cause of a power outage, accelerating repair and restoration, as well as identify all customers affected by the outage.

Communications systems, which, in addition to the utility's main telephone system, may include interactive voice response (IVR), remote call centers, email, text messaging, social media, web portals and mobile apps, ensure that every stakeholder can communicate with the utility and vice versa.

A supervisory control and data acquisition (SCADA) system provides real-time data, including power on/off, voltage and current. Smart meters, including some traditional AMR/AMI devices, can provide similar information to help determine who has lost power and who has power restored. A utility can ping smart meters in the vicinity of a reported outage to speed determination of the extent and cause of an outage.

New technologies will further improve the ability to monitor, analyze and manage not just outages but other matters like volt/VAR optimization, conservation voltage reduction (CVR), distributed generation (DG) and storage, EVs and PHEVs, and customer energy management systems.

To achieve the greatest success with the minimum unpleasant surprises, a utility must prepare a technology plan. Central to this is carefully screening vendors during technology evaluation and procurement phases:

Choose only vendors who are willing to commit in writing to open (not proprietary, customized, recurring cost) integration with the existing and planned systems and applications (even if they are provided by competitors).

If at all possible, choose only vendors who have demonstrated integration with the existing and anticipated systems and applications at another utility.

Choose only vendors who use open software architecture and industry standard data formats.

Do not get locked into proprietary, closed-system technologies. Andres Carvallo, former CIO of Austin Energy, has said, "smart grid technologies have the shelf life of a banana." No single vendor or single product line will be capable of doing everything that one utility needs. No longer will utilities deploy a single vendor systemwide for decades. It requires a mix-and-match approach.

Ultimately, machine-to-machine communications in the cloud will prevail. The technology evaluation and procurement phases should give preference to vendors who demonstrate both understanding and commitment to a smart grid that will be a part of the Internet of things.

The prime directive should be mix and match. This will rule out a lot of solutions. It will rule out some vendors who will counter with promises, dissembling, even animosity. In a successful situation, the utility's employees, customers, governing bodies and communities will be eternally grateful. ☒