



The Road to Integration Strategy

You Won the Federal Grant, Now What?

It's not an unusual scenario – a utility receives a Smart Grid Investment Grant to invest in the technology and infrastructure to enable a smarter distribution grid. Suddenly, there are twenty different stakeholders around the table, a multitude of vendors knocking on the door, regulators on the phone, and an IT department staring down the reality that they have over a dozen different legacy applications and systems that somehow must be seamlessly integrated with just as many new applications and systems. Essentially, you won the grant, but now what?

It can be an overwhelming process without an effective integration strategy. An integration strategy is a blueprint for smart grid implementation and takes into account the foundational transformation that is needed to achieve business and technology objectives. For example, the vision and Smart Grid objectives; the systems and applications that are being procured; and the outcomes and deliverables that are expected to achieve successful results.

Transitioning from the Silo Mentality

Today, many processes and systems operate in silos – or separated by divisions. There is minimal cross-functional use of the utility processes – primarily due to a lack of business drivers but also because in many cases, systems have been procured as necessary and implemented as recommended by suppliers. Additionally, low cost stopgap solutions have been implemented to achieve short-term objectives. There has been little to no need for strategically leveraging assets across multiple departments or business units.

IT and Power Systems Engineering (OT) applications have typically operated in silos due to the lack of any compelling need for integration – integration between business units, integration between business processes, integration between applications, and even integration of databases. Up until now, the industry has had minimal real-time integration capabilities built into IT systems because applications and data integration needs have been met tactically through a one-off and project-based approach. IT has never had the motivation, the business drivers or the budget to develop a strategic architecture or develop a standardized approach to integration. Application and Data integration requirements have been met through a tactical approach based upon any available technology or middleware offered by the application or system vendor.

Smart Grid has changed the “silo mentality” out of necessity. In order to optimize the value of Smart Grid and systems, the business processes that require a cross-divisional approach to leveraging systems, data and technology functionality must be defined as part of the integration strategy. The business must foster an enterprise-wide approach to collaboration and decision-making as opposed to a siloed approach where stakeholders only consider the impact to their own respective departments. Otherwise,

even the slightest fracture in the alignment between the business with the Smart Grid systems and capabilities can set the stage for an impassable road in the future.

The Accidental Architecture

In general, many vendors deliver their products and are not used to working collaboratively with other vendors. In the absence of a strategic IT architecture directed by the utility, vendors will typically gravitate towards using custom coded interfaces because that is what makes the most business sense for *them*. Unfortunately for the utility, this type of point-to-point integration eventually evolves in to an “accidental architecture” that is not scalable, precludes future upgrades and increases risk to the organization - as any change to one application would have a ripple effect on other downstream applications. The viral impact of P2P continues to reduce the overall integration capability, making each change riskier than the one prior. Data continues to be locked in silos and Smart Grid & Demand Response initiatives are forced to make their way across a gauntlet of integration pitfalls before ever becoming successful.

As an example, take the popular approach of connecting MDM with CIS in a point-to-point manner. That may work for low volume and low transaction pilots but will not scale to production quality volumes and bi-directional communication models as needed. Moreover, if the CIS is ever to be replaced, the MDM integration with CIS will require redesign and rework.

Once organizations are able to mine volumes of usage, outage data, peak load and other market and operational data that will be collected from Smart Meters and other applications, this information will need to be sourced and consolidated from disparate systems - such as meter readings from MDM, operational data from SCADA, customer data from CIS and outage data from OMS. Such data can also be used to improve customer service, lower cost of operation, increase grid reliability, and improve market operations – however, that will only be the case when a strategic IT architecture is present to support the integration and interoperability required to make it happen.

The Right Technical Integration Strategy

Over the years, many vendors have led the charge in driving the integration strategy. In many cases, an application integration strategy is determined by whichever tool is being used by a specific vendor. Using a completely proprietary approach may work for each vendor, but utilities can't afford multiple proprietary approaches if they ever want to future-proof their applications and systems. What ultimately results over time in the absence of a strategic IT approach is the evolution of the previously referenced accidental architecture.

As an alternative, the right technical integration strategy and approach is needed so that all vendors can use that approach to integrating their equipment to the back office. Unless a simple and common approach is followed, the products and technologies that need to be maintained and supported after the systems have been deployed, can become a major challenge. Multiple approaches also results in increased cost.

The right technical integration strategy also gives vendors a clear direction on how to meet interoperability objectives and truly make the Smart Grid technology a value to the business. Ideally, an

open source Smart Grid Reference Architecture would provide the backbone for a technology agnostic, vendor neutral platform for integration. Utilities simply can't afford proprietary vendor solutions that may work today as quick fix, but are not flexible to support future technology changes. That would result in increased complexity and cost to maintain in the future. Leveraging industry integration and data communications standards to achieve interoperability can ultimately minimize the impact and cost of technology changes in the future.

A Common Approach for Application Integration

Multiple products and technologies from disparate vendors need to work together to achieve Smart Grid objectives. Many utilities focused on deploying smart meters, communication infrastructure and Meter Data management products in their pilots phases have not yet included developing a strategic integration architecture that ties MDM data with other enterprise applications such as OMS, CIS, GIS, DMS, SCADA, etc.

Consider a utility that wants to leverage the AMI network for last gasp. The utility could leverage its investment in Smart Meters and AMI network to detect outages from the Smart Meters since each meter is capable of sending its "last gasp" should there be an interruption of power. Such "last gasp" can be detected and acted upon to restore power. Customers may also expect to view the extent of such outage through a graphical interface. These channels would require integration with GIS system as well. Hence, integration must be forwarding thinking, future-proof and scalable to include other applications.

No matter what the case - business and technical integration of new and legacy systems including SCADA, DMS, OMS, AMI, MDM, CIS, GIS and others will enable utilities to, in turn, offer various services to its customers such as Outage detection, Fault Detection Fault Isolation and Recovery (FDIR), loss minimization, Time of Usage, Dynamic Pricing, Engineering Analysis, Load curtailment and other such programs. None of which is possible without strategic integration architecture.

The End Game

The Electric Power industry has two choices: One, to be proactive and have a strategy for managing Grid Operations & IT transformation through a strategic Smart Grid integration architecture, or two, be reactive and tactical in responding to problems as they appear. The latter approach is risky and will prove to be a major impediment to Smart Grid success.

Leveraging an Integration Strategy as a blueprint for executing Smart Grid integration initiatives will help to identify and execute the organization, process and technology transformation needed to realize the full value of the Smart Grid implementation objectives. A collaborative approach to developing an optimum set of cross-cutting (holistic) business requirements and system design with vendors, stakeholders and partners will ultimately result in mutually agreed upon expectations and product capabilities/limitations. It's important to realize that the completion of a Smart Grid integration program is not the end game for a utility, but rather the beginning of a new era of transformation in the delivery and operation of utility services for their customers.