Technology architecture considerations for Smart Metering and beyond?

It is common knowledge that Utilities face concurrent challenges as they try to meet their commitments to their customers, shareholders and regulators, while safely managing the health and reliability of the network. Further, over the next five years we anticipate disruptive trends will put additional pressure on utilities' economic models: an increasing focus on energy efficiency, the growth of demand-response programs, the impacts from increasing adoption of distributed generation, the electrification of heat and transport.

In response, many utilities are deploying smart technologies to enable new capabilities and extract greater value from their assets. What are the technology architecture considerations for utilities if they are to adapt easily and expeditiously to the rapid changes in technology and solutions on the horizon?

The Utility industry is currently moving 2-3 key siloed applications (typically CIS, SCADA/DMS, and GIS) to more of a distributed platform accelerated by smart meter/smart grid adoption. As a result, most utilities have started on a smart grid rollout journey with deployment of smart meters. In those cases, our experience has been that architecture efforts have been focused on the deployment of applications primarily supporting the "Meter to Cash" functionality, rather than on a strategic vision for a more future-proof, smart grid architecture. In other words, utilities have been focused on savings in meter reading and connect/disconnect truck rolls, rather than the broad benefits of a more digital grid.

Our architecture roadmap aligns with the deployment of smart meters, but it is simply a first step in the longer journey of the realization of true smart grid architecture. As utilities get started, this "simple" first step has complexities through which they need to carefully maneuver.

1. Ever-evolving technology context: Over the years of working on smart grid related projects, we have witnessed an evolution in the standards around integration (e.g. in CIM, OpenFMB, etc), in the tools/solutions that support large volume/velocity data processing (numerous technologies/

products that continue to evolve), and new architecture concepts (e.g. "intelligence at the edge").

2. Quicker short-terms wins add to longer-term integration complexity: In most cases, the utility will be assessing the use of the meter head-end (including AMI), a meter data management system (MDMS), a customer information system (CIS)/billing system, and an enterprise asset management system (EAM)/geographical information system (GIS). While most utilities will already have a CIS and EAM/GIS in place with well-defined interfacing mechanisms, they will need to procure a head-end and MDMS together, with the focus being on getting meter information to the CIS for billing purposes. While this would work for utility's immediate needs, in the future, additional interfaces or new interfaces need to be built every time one of these requirements comes to the fore:

- Utility wants to share meter data with other applications (analytics, grid control, demand response, load planning)
- Utilities want to refresh their application portfolio (new/ upgrades to CIS, GIS, EAM, etc.)
- Utilities add more head-ends or embark on upgrades

3. Who owns what: As is typical with a distributed application landscape, utilities will need some data to be replicated across applications, requiring careful planning and stewardship around data ownership (data owner/master vs copies).

In our experience, it is essential to define an end-state that is relevant to the utility's strategic goals, a phased approach that is in line with the business objectives (e.g., starting the journey with the rollout of smart meters and building your grid architecture from there), a governance model that guides projects appropriately, and an open flexible attitude that allows for principled compromises in the journey to the end state.

Get in touch

We have the skills, infrastructure and know-how to help utilities with the technology solutions needed when integrating renewables into the energy mix. Contact us today to start the conversation.

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