

# SMART DATA: THE FOUNDATION OF THE SMART GRID

+ Xtensible Solutions

→ Everyone talks about standards and the Smart Grid, but few utilities today actually make a concerted effort to live them. A large utility on the eastern seaboard that recently made the commitment to implement standards-based information technology (IT) solutions in its energy-trading services is an exception. Although the utility owns its utility assets, in the past critical IT systems and infrastructure were operated by a service provider who also managed most business processes, including energy trading. The utility took a fresh look at information systems when it awarded energy-trading services to two new providers while keeping other critical transmission and distribution services with the original service provider.

The utility used what it had learned in a multi-year effort to establish standards-based integration and data management to build a system for energy-trading services that offered near plug-and-play flexibility for data and IT systems. A core component of its strategy was an enterprise semantic model (ESM) that simplified integration between business systems and processes, turning bits and bytes into smart data that could be consistently used across applications and processes without additional, costly manual manipulation and translation.

## Why Smart Data Is Important

In the future, the need for standards-based integration and data management will become more common. With more data-driven information being required to make decisions, the utility landscape has become more complex. Utilities are demanding that various operational systems, which typically act as silos of information, share data with the enterprise to improve financial performance and productivity. At the same time, there has been exponential growth in the number of field and customer devices providing data to the utility. All this data, from both systems and devices, must be stored, managed, analyzed, and more importantly, transferred between different applications.

What's more, utilities need the ability to process and react to events in real time, as well as present information to people in formats that help them understand its meaning. Presenting real-time data through portals and websites, for example, helps third-party suppliers as well as customers make timely decisions in a timely manner about issues like pricing and usage.

As a result, utilities are demanding systems that are open and interoperable. This means solutions that follow standards,

specifically those promoted by the National Institute of Standards and Technology (NIST) interoperability framework. Utilities also want systems that reduce duplication and translation of data, which can negatively affect performance. Ultimately, utilities are looking for smart-data-driven solutions that provide a consistent view of customers, work, assets, and business performance.

## Smart Data Strategy

Breaking down data silos is the first step toward developing an enterprise that operates on smart data. This requires an Enterprise Information Management (EIM) strategy that incorporates best practices for agile and adaptable information management and facilitates data sharing between people, processes, and technologies.

The business drivers for EIM are statutory, regulatory, and utility-process related. The federal government has made EIM a cornerstone of policy with the Energy Policy Act of 2005, the Energy Independence and Security Act of 2007, and its stimulus-funding measures. In response, utilities also are evolving to models that require the flexibility provided by an EIM strategy for systems development. For example, utilities can employ EIM strategy to develop solutions that are more easily integrated to third-party applications. Continued pressure to reduce costs and increase revenue also drives utilities to look for ways to operate more efficiently. Even deregulation has an effect, as utilities look to become more agile in the marketplace.

Employing an EIM strategy provides a number of benefits for utilities. It establishes a sustained approach for data

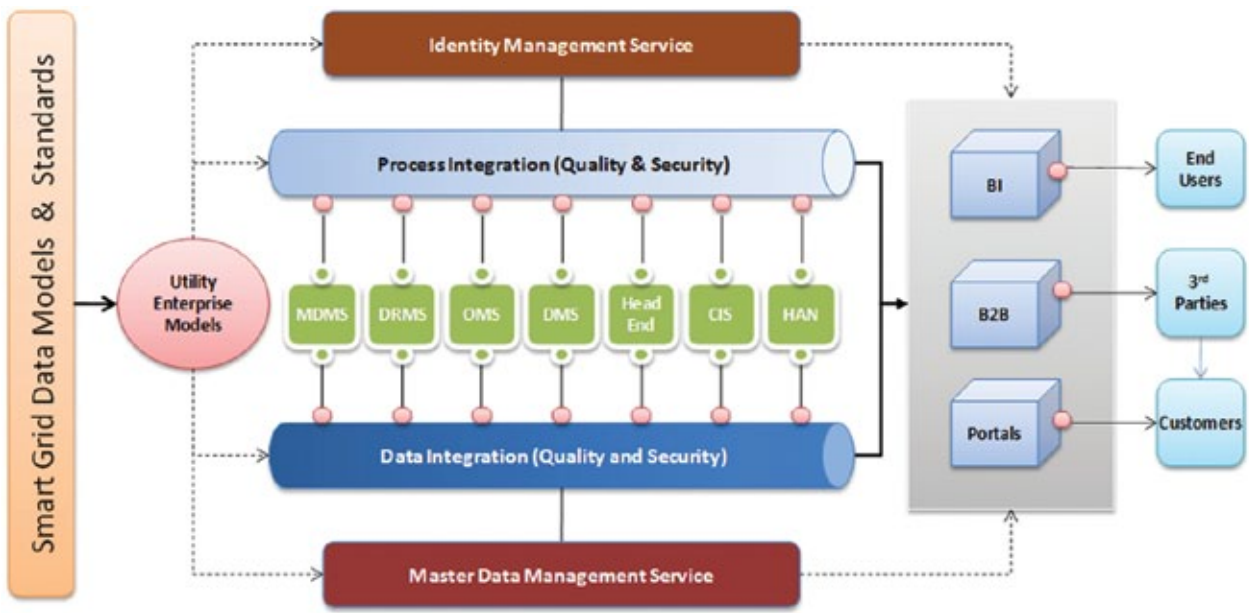
management and standards support, resulting in overall lower costs of ownership. Utilities do not get locked into proprietary technologies that precipitate stranded assets and leave no room for system enhancement as standards evolve. The interoperability offered by an EIM approach makes utilities more flexible – they can decide when and how fast Smart Grid projects proceed. In addition, an EIM strategy positions the utility to manage regulatory requirements to support Smart Grid standards.

## Why Implement EIM

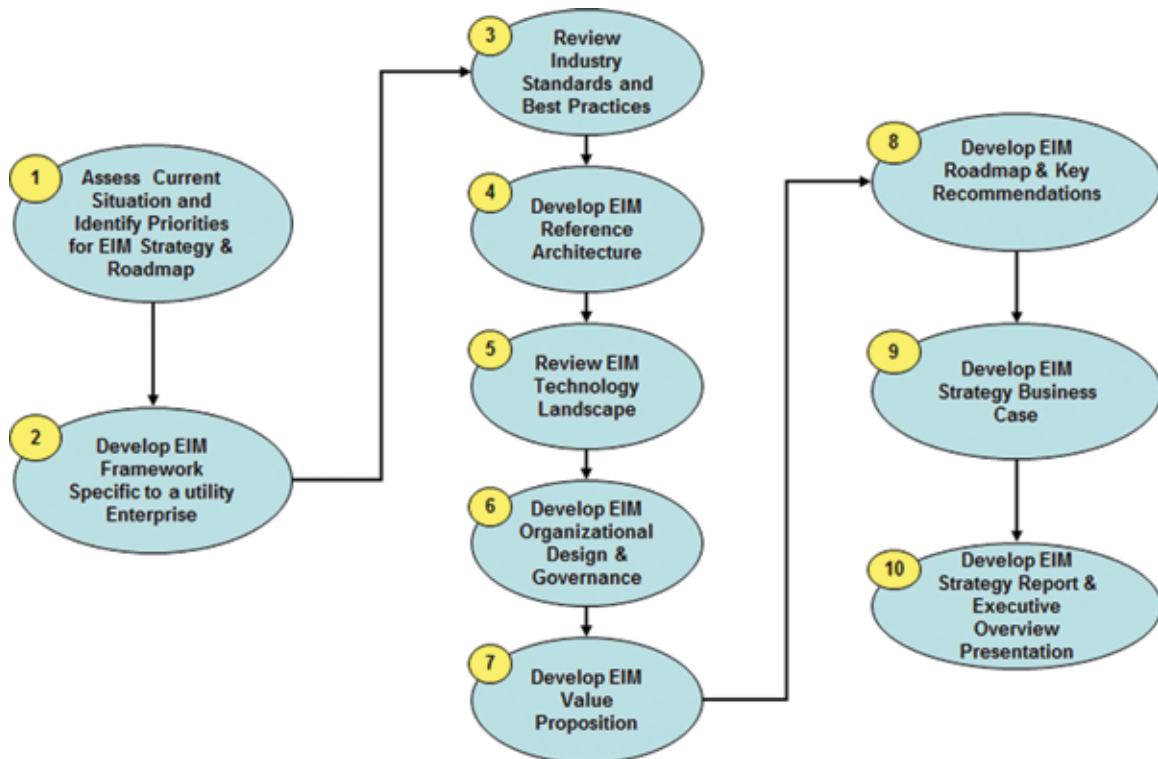
Typically, a utility's data reside in a number of repositories within the organization. These repositories maintain the data in specific, proprietary formats that differ from application to application. Each individual application recognizes the structure, or language, of its data, but does not understand the structure of any other application's data. An integration to translate data is typically required for one application to use data from another.

However, it is difficult to ensure data quality, integrity, security, accuracy, and consistency as data are exchanged and duplicated between applications through integrations. Plus, as repositories grow due to implementation of data-generating applications such as advanced metering infrastructure and geographic information systems, more data silos form and problems related to data quality worsen.

A good EIM strategy can reduce the number of silos in an organization and provide a consistent view of customers, work, assets, and business processes. EIM reduces data duplication in the organization and provides for real-time data



*An enterprise semantic model based on standards acts as the platform for integration across the enterprise. Instead of data silos employing differing formats and repositories, the utility ends up with a uniform approach to data. This approach facilitates Smart Grid development and makes it easier and less expensive for business-information, third-party, and customer-facing applications to access and use data.*



*Since enterprise information management projects must be approached in a centralized and organized way, executive sponsorship is critical to success. The steps above illustrate the initial groundwork that should be completed to make the case for EIM and achieve executive-level buy-in.*

exchange. Plus, an EIM approach to standards-based development can be implemented in an incremental manner and does not require wholesale replacement of legacy systems or a big-bang approach. By planning upfront, EIM provides the perfect platform for semantic integration on future projects.

## EIM and Smart Data

EIM strategy requires utilities to think differently about data and how it is shared by processes and applications. Instead of relying on integrations that duplicate data from one application to the next, good EIM strategies take a holistic approach to resolving the semantic differences that make data difficult to exchange, analyze, and understand. In other words, EIM makes data smarter.

Xtensible Solutions, with its Model-Driven Information, Integration, and Intelligence (MD3i™) methodology, provides a framework for deploying an EIM strategy throughout the utility enterprise. At the core of the MD3i approach is an ESM that serves as the logical representation of the information assets used by an enterprise to manage and facilitate business processes. The ESM provides a common language recognized by all applications in the utility ecosystem. Developing an ESM within the MD3i framework consists of three steps.

First, a common vocabulary that will be employed in the model is established. This vocabulary comprises the basic

building blocks by which applications will communicate with each other. Next, a standards-based common model of the utility's data is built around the vocabulary. Finally, the common model is implemented through a series of semantically consistent design artifacts, or business models.

Artifacts include business processes, use cases, services, schemas, mappings, and design documents. In the MD3i framework these artifacts are created and maintained in Unified Modeling Language (UML) notation, a standard, general-purpose modeling language used in object-oriented software engineering. The utility stores artifacts in a separate library.

MD3i is unique in that artifacts are developed and extended (as appropriate) by leveraging rapidly maturing, standard-information models from a number of NIST-specified standards, such as the International Electrotechnical Commission's Common Information Model (CIM), National Rural Electric Cooperative Association's MultiSpeak, Lawrence Berkeley National Laboratory's OpenADR (Open Automated Demand Response), and ZigBee Alliance's SEP 2.0 (Smart Energy Profile). Employing a standards-based ESM through the MD3i framework allows developers to write software once and implement it many times without rewriting or losing the integrity of the data and content. When compared with traditional integration methods, the standards-based approach personified by MD3i reduces the cost of integration between applications because developers can continuously reuse artifacts.

## Secrets To Success

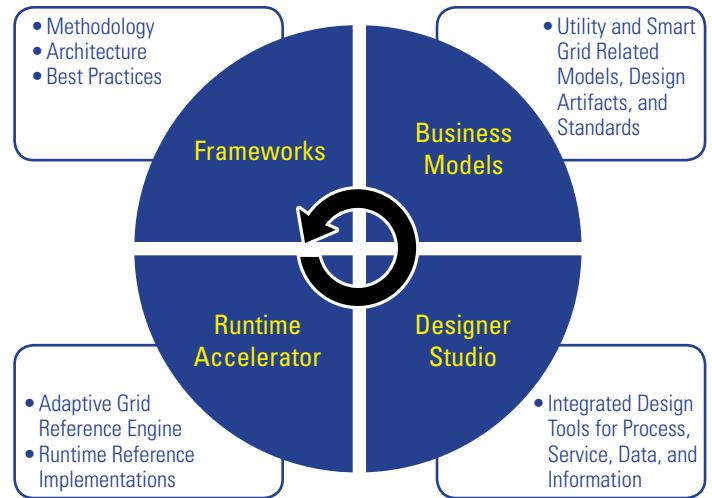
A top-down approach is absolutely critical to the success of standards-based EIM strategy and the development of smart data. The point of semantic integration through an ESM is to allow loose coupling of applications to the enterprise. Therefore, data modeling as well as model maintenance must be centrally managed to ensure system flexibility.

In addition, standards are constantly evolving, so utilities should manage implementation of EIM strategy to ensure that it is consistently applied as standards evolve. This approach gives the utility flexibility and options for upgrading in the future. It also is important in today's utility environment to be prepared to use data effectively in ways that are not easily anticipated, so using open and interoperable solutions is crucial.

The skill sets and technology required to develop consistent data models and deploy them effectively throughout the enterprise are not core to the utility's primary business, which is to deliver energy to businesses and individual consumers. Utilities may find that the costs of procuring and developing the specialized skills needed to effectively deploy EIM to an enterprise may undermine the cost benefits achieved by having flexible, open, standards-based solutions in place.

Therefore, utilities may find it advantageous to develop strategic partnerships, or centers of excellence, that engage experts who can deliver a total information-management solution that evolves as business requirements and standards change. For example, Xtensible deploys its MD3i framework in strategic partnership with utility clients to provide architecture and design, end-to-end implementation, and managed services unique to the utility's requirements. The utility benefits from Xtensible's expertise, from the competitive advantage of access to repeatable methods and tools, and from reusable artifacts.

Partnerships personified by centers of excellence provide advantages to utilities, shifting some risk of development from utilities to vendors. In addition, utilities avoid being locked into certain technologies because it is up to the partner to maintain an open and sustained approach to data management and standards support. Utilities that implement EIM in this way also end up in a better position to deploy Smart Grid plans because the interoperability provided by the ESM leads to flexibility and scalability. This approach also positions utilities perfectly for managing regulatory requirements to support Smart Grid standards. All these benefits add up to lower total costs of ownership.



*Xtensible Solutions' MD3i methodology provides the frameworks for defining a reference library of reusable business models or artifacts, and the tools necessary to produce new artifacts and efficiently build an enterprise information model.*

## Standards Are Essential

It is imperative for utilities to replace data silos with processes that allow ready sharing of data across applications. Standards-based EIM strategy allows the utility to establish a single version of data that is used by all business processes and applications, enabling the utility to take advantage of improved data quality, information accuracy, and consistency. By controlling unnecessary data duplication and proliferation, EIM enables flexible and scalable process integration.

Standards-based EIM also maximizes the return on any investment in SOA-related technologies by establishing a single vocabulary for defining data, and mitigates risks by providing a single version of the truth accessible by all applications. This makes it easier to integrate new applications into the enterprise, maximizes the value of commercial applications, and improves the efficiency and effectiveness of operations and business processes.



*Aclara and Xtensible Solutions are partnering to provide solutions that allow utility applications to more easily exchange data. The methodology provided by Xtensible is an integral part of the comprehensive, standards-based approach Aclara promotes to utilities. Working together, Aclara and Xtensible help utilities get the most from the data they collect from meters and other devices.*



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