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Medidores inteligentes en la industria del agua del siglo 21

Oportunidades de negocio para el sector de agua, saneamiento e infraestructura:

En este informe presentamos un análisis comparativo entre los beneficios del sistema de Manejo de Datos de Medidores (MDM por sus siglas en inglés) aplicado a la industria de energía eléctrica y agua.

Los orígenes de la medición remota o inteligente se remontan a finales de la década de 1990 donde la industria de energía eléctrica desarrolló el concepto de Infraestructura de Medición Avanzada (AMI por sus siglas en inglés) con el fin de acceder a datos más frecuentes y más precisos; sin embargo, ocasionalmente esta información requería una validación previa y dio lugar al MDM para administrar y depurar el nuevo flujo de datos proveniente de medidores inteligentes.

Los sistemas de Manejo de Datos de Medidores en la industria del agua tienen una dinámica menos compleja y de menor escala comparada con la industria eléctrica que es más intensiva en uso de plataformas tecnológicas y además tiene un mayor volumen de negocios.

La mayoría de las prestadoras de servicios de agua potable integran su AMI con su sistema informático de facturación y solicitan a los proveedores de medidores que añadan ciertas funcionalidades ligeras de MDM en su AMI como la capacidad de almacenamiento de datos de hasta 24 meses, exportación de archivos, reportería básica e interfaz de programación de aplicaciones desarrollada por terceros.

No obstante, este enfoque en la industria del agua presenta algunos riesgos entre ellos: la funcionalidad limitada de MDM (almacenamiento de datos hasta 24 meses), la baja posibilidad de sustituir al proveedor de medición debido a que la plataforma de datos es un diseño conjunto y la necesidad de integración e interoperabilidad de los sistemas de medición y facturación.

Las empresas de agua interesadas en migrar su sistema de medición tradicional a uno inteligente deben tener en cuenta: 1) buena relación costo/beneficio, 2) una alta capacidad de almacenamiento y procesamiento de datos, 3) escalabilidad, 4) permitir pilotos y uso de diversas tecnologías o plataformas, y 5) acceso a lecturas de facturación. El almacenamiento de datos en nubes (cloud) ofrece una oportunidad a bajo costo para el manejo de este tipo de información.

La industria del agua requiere avanzar hacia una estandarización de protocolos e interoperabilidad de datos como ya se ha dado en la industria de la energía para acelerar la adopción de tecnologías AMI que conduzcan de manera sistemática a reducir costos y mejorar la confiabilidad de los sistemas.

Water Meter Data Management: To sink or SWIM?

The role of a Meter Data Management System (MDMS) is not well defined within the water industry. Many products on the market claim to provide MDM functionality, but few people understand the value of what these systems offer. To understand how this confusion has come about and what can be done to

address data management needs in the water industry, we need to first examine the evolution of the MDM.

A Brief History of the MDMS

In the late 1990's, the electric industry pioneered the concept of Advanced Metering Infrastructure (AMI), recognizing a need for more frequent and accurate meter data. However, this emerging meter information occasionally delivered anomalistic or missing data, and an MDMS was designed to manage and clean the incoming flood of data.

Electricity metering can capture detailed measurements, rate features, net metering, and other structured tariffs. Over time, electric MDM solution providers have added tools to clean and process incoming metering data, now known as "VEE": validation, estimation, and editing. This system catches data anomalies and flags them for further analysis or remediation, where either computer programs or users can intervene to "edit" the data before it becomes "data of record." VEE can also automatically synthesize missing read data.

While MDMs don't technically need to be dedicated systems, electric utilities have unique considerations that have contributed to the evolution of the MDMs as standalone systems, distinct from an AMI platform.

This is the result of electric utilities needing to track large volumes of data associated with hundreds or even millions of meters, as well as sync with other smart devices (part of the concept of the "smart grid"). Additionally, given the scale of a typical electric utility, there can be multiple metering technologies in place at any given time. Having a central independent data repository for the management and dissemination of all this disparate metering data is the only rational solution in the face of such complexity.

The Elusive Water MDM

The water industry has, unsurprisingly, yet to embrace the concept of an MDM in its original (i.e. electric-specific) form. While many consultants talk about MDMs, and we often see language in AMI RFPs referencing MDMs, the majority of true MDM capabilities are not beneficial to water utilities, and the major challenges presented by a true MDM are nearly insurmountable for small agencies.

Benefit and Challenge 1: Multi-vendor and multi-technology support

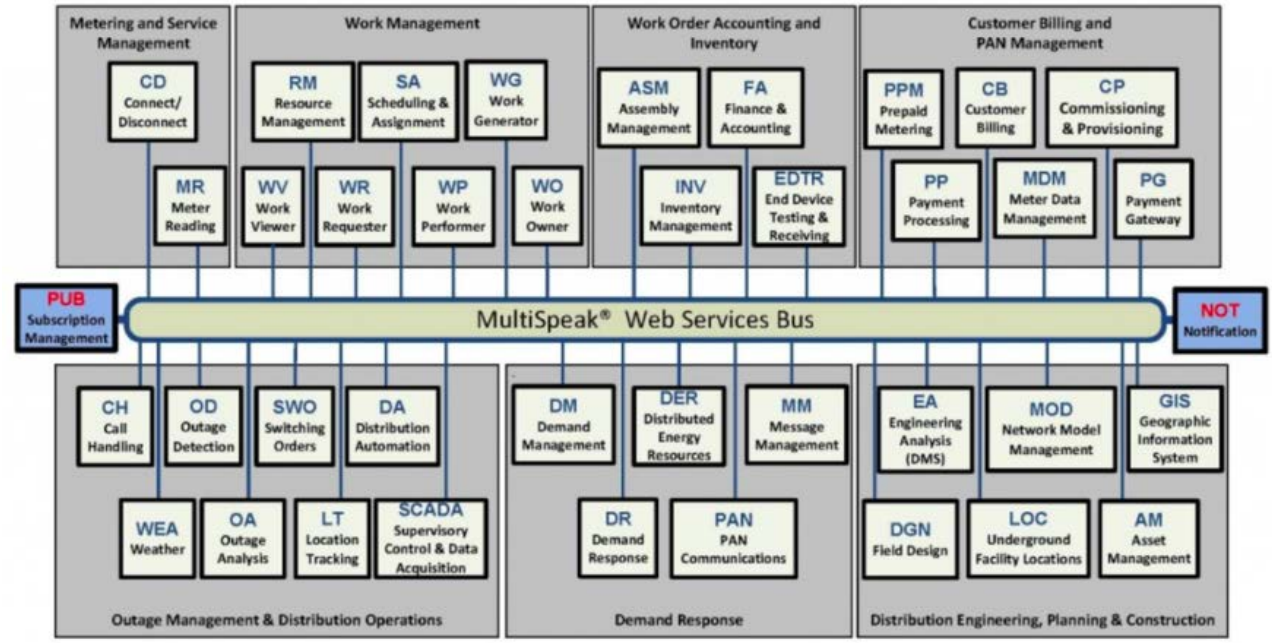
MDMs centralize and normalize metering data from multiple systems for electricity utilities. Electric utilities typically cover large service areas, requiring different technologies depending on geography. For example, RF based AMI may work in urban or suburban areas, whereas rural locations may require PLC, cellular or manual/AMR reading. Water utilities, conversely, tend to be much smaller and do not typically implement multiple technologies to cover their local territories. In the rare instance when they do, they often utilize technology from a common vendor.

Electric utilities also want an independent source for meter data ownership. An MDM often functions as a data bus, shepherding normalized information between various systems. Its replacement is challenging due to the number of systems typically reliant on it. Consequently, electric utilities typically implement 3rd party MDM solutions from major providers like Oracle or SAP rather than from the metering vendors themselves. In many cases, the metering vendors do not even offer full MDM functionality, so using an independent solution provides the most flexibility in selecting an AMI network provider.

Most water utilities integrate AMI with their billing software and call it a day; no MDM required. They generally push the metering vendors to add some MDM "lite" functionality into their AMI head-end systems such as longer-term storage (up to 2 years max), billing file export, basic reporting, and 3rd party APIs. However, this approach has downsides. It means a high risk of vendor lock-in and because both the MDM and the head-end system are conjoined, the MDM functionality is often limited. Also, many utilities wish to keep their data for much longer than 2 years, yet almost no head-end systems support more than 13 to 24 months of storage.

Benefit and Challenge 2: Interoperability

Electric utilities have a large number of data systems (as many as 12+) that require metering information. Getting access to all this data is no small feat (see diagram below).



The National Rural Electric Coop Association (catering to utilities under 300k endpoints) has developed a standard for meter data system interoperability known as MultiSpeak. From the MultiSpeak About page:

The MultiSpeak Specification is a key industry-wide standard for realizing the potential of enterprise application interoperability. The MultiSpeak Specification is the most widely applied de facto standard in North America pertaining to distribution utilities and all portions of vertically-integrated utilities except generation and power marketing.

Unfortunately, the water utility industry has no equivalent initiative to MultiSpeak. Without a standard, system integration becomes a reality only with massive custom integration efforts on a case-by-case basis, or through vendor-to-vendor partnerships. Both are costly and require the utility to assume some level of risk. Even enhancing interoperability with the billing system, the one system historically "in scope" for AMI/MDM integration, often proves difficult.

Benefit and Challenge 3: Scale

Since most electric utilities are very large, they need data warehouse systems that are built for massive scale and are highly reliable. Electric MDM providers have built systems to match such needs. The industry now utilizes highly robust, though relatively expensive systems that meet the specific needs of electric utilities.

Water utilities are much smaller and draw from a significantly smaller base of ratepayers, making a massively scalable, reliable MDM offered to electric utilities cost prohibitive. Consequently, there emerges a significant mismatch between need and budget when it comes to the requirements of a water MDM.

Current State in the Water Industry

The current state of the water industry as it relates to the MDM concept is in a state of flux. A few disruptive entrants into the market are creating confusion with MDM "like" products while consultants are increasingly encouraging utilities to require true MDM functionality and meter technology independence. However, interoperability challenges coupled with a lack of technical skills at most water utilities are ever-present.

Scalable and cost-effective meter and network agnostic water MDM solutions are clearly desired by water utilities. Such solutions should include affordable, long-term data storage and cleansing, and billing read exports. A dedicated water MDM can help utilities avoid vendor-lock in while easily piloting multiple meter and network technologies. Since the MDM is essentially a file storage and software solution, it can be deployed in the cloud at very low cost with the ability to quickly and easily scale on demand while offering the ability to dynamically update software features as new reporting or export format requirements become relevant.

A System for Water Information Management (SWIM) is an inevitability for the industry and will likely be a crucial step to improving data interoperability through protocol standardization and help increase the adoption rate of AMI technologies to drive down system costs and improve service reliability. This would be a benefit to end-use customers, water utilities, and the communities that they serve.

Fuente: Jeff Lipton del Blog "Thisrty Water Smart", parte 1 y parte 2, 9/16-Jan-2018.