

THE CHANGING FACE OF METER DATA MANAGEMENT

By Richard Quigley

Meter Data Management (MDM) is taking a more active and prevalent role in today's IT system infrastructure. Organisations are no longer cocooned in the notion that an add-on database from a Customer Information System (CIS) or Automatic Meter Reading (AMR) vendor will adequately address the complexity and scalability needs.

The MDM system that is now offered by a number of suppliers has metamorphosed from a simple data repository 10 years ago to a highly sophisticated data management system, providing seamless data interaction between key IT systems (near real time responsiveness) and providing a new level of business insight. The principle drivers behind the change in the MDM system are generic in nature but specific in practice: Political, Economical, Sociological, Technical and Legal (PESTL), with the Environmental (PESTLE) driver now a key part of the mix.

The political and legal environment has played an enormous part in both the current and future MDM landscape, with the start of deregulation in the European Union (EU) and the European Economic Area in February 1999 (EU Directive 96/92), to the newest directive, the EU Energy Efficiency Directive, highlighting energy efficiency as the cornerstone of energy policy in the future. This latest directive has been a catalyst for one of the biggest changes in utility practices since the advent of the household meter, namely smart metering and the smart grid.

The environmental driver has finally reached accord with both regulators in Brussels (EU Energy Efficiency Directive) and consumers alike. The adoption of smart metering can bring benefits to the consumer and the environment with a greater control over energy costs that can lead to system-wide savings through reduced demand in peak hours. This will be provided through a mix of technology assistance and consumer behavioural changes.

To help make the changes demanded by both the regulators and consumers, technology plays a vital role. Smart meters themselves are a highly sophisticated piece of electronic equipment. Their deployment necessitates an explosion of data (intra-day reading capability) that will need to be collected, managed, transformed and distributed to the whole raft of willing recipients: Billing, operations, trading, marketing, and end consumers. The challenge for the industry is to realise the potential economic benefits from such a deployment, and to ensure that the MDM technology currently used is future proof for the challenges that lie ahead.

The paradigm governing the landscape that today's utility needs to operate in has changed dramatically in the last 5 years. Only the fittest will survive in this very dynamic and competitive marketplace. To help support the utilities in their bid to comply with regulations and legal directives, attract and retain customers, address environmental issues and at the same time attain an economic return on their investment, the Meter Data Management System (or more appropriately named Energy Data Management System) can provide the backbone and platform in which to meet the challenges ahead. MDM vendors are investing heavily in their products and services to meet the growing and complex demands from the industry.

BUSINESS PROCESS MANAGEMENT (BPM)

Although not a new concept to many, BPM is defined as the management of complex interactions between people, applications and technologies in a business designed to create customer value. With exponential growth in the utilities' data there is a demand for a real time, responsive technology solution. Companies that have embraced this have seen real productivity gains and improved customer service (in both speed and quality), and have been able to adapt much more rapidly to changing business requirements. From the present vendor offering of workflow tools, MDM vendors will widen their scope either to integrate with BPM software partners or to extend it to embrace the BPM revolution and offer this as part of their service.

SERVICE ORIENTATED ARCHITECTURE (SOA)

One fundamental practice that is being embraced throughout the industry is the adoption of SOA. A service-based approach to IT development changes the way in which functionality is developed and delivered. Functionality is considered, factored, and deployed once for use at all levels of the organisation, providing a business-focused infrastructure that supports continuous business evolution. Applications are not the only component that should be service-enabled. Data can be a shareable service, available to any application that can call a web service. The Enterprise Messaging System is an extension to this, facilitated by XML, SOAP and web services, which allows organisations to send semantically precise messages between computer systems. This Publish/Subscribe (Pub/Sub) functionality allows for the "decoupling" of messages between a publisher and a subscriber, which can reduce the cost, complexity and time required when integrating disparate systems.

TIME SERIES DATA ENVIRONMENT

Critical to the performance and scalability of the MDM is the ability to capture, process, manage and distribute an increasing amount of data. The deployment of smart meters at the residential customer's level will see a significant increase in data volumes, from monthly or annual frequency to daily and even intra-day resolution. The commercial and industrial (C&I) customer's data volumes (quarter and half-hour resolutions) will pale into insignificance with the residential customer base. Most vendors use relational database technology with some fine tuning (Oracle, SQL, DB2) and a handful use a true time series (a sequence of observations ordered in time) database environment, which is specifically designed to meet the unique requirements of time series data. This has become a very significant factor to performance, especially as vendors are under increasing pressure to handle the petabytes (1,000 terabytes) of data in a cost effective manner.

GRID COMPUTING AND VIRTUALISATION

The creation of a “virtual supercomputer” by using spare computing resources within an organisation is a serious option being deployed and considered by many companies looking for performance, flexibility and cost effectiveness. Rather than rely on the vendors to provide the answers to a high performing MDM, organisations are now taking back some of the control from the vendors, which will avoid technological dependence on hardware and software providers. Further, virtualisation is making it possible to run multiple operating systems and multiple applications on the same computer at the same time. This helps companies roll out applications faster, save on hardware costs by testing multiple operating system and hardware configurations on a single client or PC, and increase business productivity by instantly provisioning desktop systems for new users.

OBJECT ORIENTED DATA (OOD)

Traditionally, code and data have been separated. Now code and data are merged as a single object; instead of monolithic programming, there is now a componentised framework. The responsibility of actions, events, properties, etc. can now be moved into individual data objects. Organisations can now understand, organise and model data in an organic environment, reflecting true market and business structures. Although slightly abstract in some minds, OOD will become a necessity in the MDM system to ensure an optimal data modelling environment.

MULTI-DATA ENVIRONMENT

As the industry shifts to more advanced technology, the selection of the MDM system becomes critical in providing the maximum value across the organisation. The management of multiple data types that can provide enhanced business analysis is a necessity. The demands on the MDM system now require the management of multiple data types, including time series, relational databases, and the inter-relationship between different data types, e.g. events, operational, measurement, production, assets, customer, market pricing, weather, interval reads and documents, while processing, integrating and disseminating the data to downstream systems in a timely, accurate and robust manner.

DATA VISUALISATION

Data is a complex object that by itself is meaningless. It requires context to be “transformed” into information for use. Trying to derive meaning and insight from large volumes and multiple types of data is no easy task. Advanced business intelligence tools exist in the market that can assist the user. Although welcome, vendors are already looking at embracing (for some, further embracing) the use of Geographical Information System (GIS) technology in their offering, allowing geographic visualisation of special data. This geographical representation of the meter data may provide further richness to any data analysis and knowledge program.

INFORMATION QUALITY

There is no doubt that the exponential growth in the volume and consequently the quality of data that will be experienced with smart metering will add to the challenges of data reconciliation between operational and financial processes, and at a minimum could promote

inefficiencies while also impairing timely and reliable decision making. There is an enormous challenge for the industry to ensure data integrity and the management of the “golden data copy”. Data validation must become more automated and be managed by workflow management tools and business process management practices. Vendors’ offerings are expanding to offer meta-data management, data certification (versioning) and roll-back to previous versions.

REGULATORY COMPLIANCE

In the US public companies have a mandatory requirement to adhere to, embrace and interpret the Sarbanes Oxley (SOX) compliance regulations. In Europe there is a broad acceptance for compliance. Although the Act establishes many standards, SOX 404 has particular reference to IT and Database Management. This regulation requires the usage of an internal control framework (such as COBIT) that provides proper and consistent operation of other controls designed to adequately address financial reporting risks. Clients are now pushing MDM vendors for these controls to include process, application, IT and entity level controls.

SYSTEM INTEGRATION

Paramount to any business is the ability to manage the “islands of information” that exist in the many system applications required in today’s utility and to support the dynamic flow between these. Of course many APIs exist for interfacing with systems, including ODBC, JDBC, JMS, ActiveX/, COM API, and programmatic interfaces like VB/, VBA/, .NET/, C++/ and Java. However, using enterprise middleware like BEA Weblogic, IBM Websphere, JBoss and Oracle (SOA compliant) will manage data services that access, transform, integrate, and aggregate data to provide the information needed by applications while hiding the complex details of underlying physical data sources.

CONCLUSION

The external drivers that continue to push the boundaries of the utility landscape have and will continue to ensure the evolution of the MDM system being offered by the software vendors. The MDM system as we know it is transforming itself into an Energy Data Management system; meter reads are only part of the data landscape required to be analysed and actioned on throughout the organisation.

Many vendors exist in the market that can offer the functionality that is expected of the MDM. Each vendor product has its own functional strengths and weaknesses, architecture differentiators, different technologies, product development maturity, and the vendor’s implementation experience and expertise. It is imperative that all these are considered by the organisation in the selection processes in addressing its business needs and transforming information into a strategic asset and revenue centre. **MI**



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ABOUT THE COMPANY: DataGenic delivers an uncompromising and refreshing combination of technology, performance and value to meet the complex data management requirements of companies that provide services in the utilities, oil and gas, investment banking and public sectors. From a low-cost entry level to a full enterprise strength system, DataGenic sets a new standard in data management and operational efficiency by delivering the system infrastructure, flexibility and features to empower all business functions – transforming data into a strategic asset.

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