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Getting IT ready for AMI

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There is little argument remaining: Today, virtually everyone agrees that the value of AMI lies in the data it delivers. That means utilities will need their Information Technology departments to make that data easily accessible and useful to a variety of systems and applications. And that is a project unlike any other that most utility IT shops have tackled before.

Radical Shift

Mike Rozsa, director of IT system planning for American Electric Power (AEP), is gearing up for AMI. Just for fun, he recently did a little “back-of-the-napkin math” and determined that, with reads coming in every 15 minutes, AMI could potentially deliver some 3,000 times more meter data than he sees in his IT shop today. What’s more, he knows that everyone in the company hierarchy will eventually want to get their hands on

those data. Right now, however, most don't know exactly how they'll use AMI's information riches.

AEP is currently in the early phases of planning an AMI deployment. The utility has yet to pick a communications technology or meter-data management system. Still, its IT department is beginning to move in that direction.

Rozsa says his team surveyed AEP business units to see what they'd do with the available data. "The biggest problem is that people don't know what they don't know," he says. Until the business units have the opportunity to see AMI data in action and explore further, Rozsa doubts they will completely understand how these data can impact their business processes.

On the business side of a utility, AMI brings a "paradigm shift" surrounding day-to-day activities, according to Victor Monfort, an IT director at JEA, the community-owned electric and water utility in Jacksonville, Fla., serving 750,000 accounts in a four-county area. JEA began deploying AMI in 2000, so the meter-reading process has been automated for years.

However, some "day-two benefits," those advanced applications that make an AMI business case viable in the long run, still are under development.

"So many business processes are impacted," Monfort says. "You have to rethink your way of doing business from the ground up."

On top of that, IT professionals should be forewarned that AMI presents a huge network-building challenge. With AMI, an IT department's purview "extends beyond what people see as their traditional data center, where they have computers sitting in a basement or protected environment," says Gary Lutz, principal technical architect for WACS, an MDM systems provider. "AMI extends the scope of the data enter out into the service territory," he maintains.

That's because metering end points essentially become users of the head-end system. With a two-way AMI structure, those meter points will not only feed data into the utility, they'll be able to accept signals, commands and firmware from it.

"Extending communication all the way into the service territory and down to the meter is likely to be something new to most organizations," Lutz adds.

Complicating matters more, some AMI systems use multiple AMI vendors with varying communication systems, so the network won't be a homogeneous one. AEP, for instance, serves more than 5 million customers in 11 states with a mostly rural territory. Even now, that utility uses multiple reading technologies, including drive-by AMR from Itron, manual meter reading and power-line communication from the company now known as Cellnet+Hunt. Rozsa says his utility currently is testing a number of AMI technologies, and it may choose more than one solution in the end.

Integration is highly complicated in an AMI environment, too. "Almost all of our applications are talking to each other," says Bea Fore, JEA's director of corporate applications. "Our outage-management system, our field-dispatch system, our metering system, our Internet presence, our IRV — all of these things are touching."

Such complex integration issues, coupled with requirements to make meter data available to many departments and applications, push most utilities to meter-data management systems that provide a data-warehousing functionality along with integration advantages. When JEA deployed AMI seven years ago, IT staff built an MDM system of its own, but now the solution provided is eMeter.

AEP is close to picking an MDM provider, too. In fact, today's prevailing wisdom holds that implementing an MDM system should be step one in an AMI deployment. A year ago, there was some debate on that, but most utilities now put an MDM system in first.

Age of Agility

The JEA team had many reasons for implementing an MDM system. As mentioned earlier, one is the fact that meter data support traditional users such as the billing team, but the information also is useful to outage management, load monitoring and forecasting, workforce management and more. “Because we’re so integrated, when we do an upgrade to a major system, it’s a major interface issue, as well,” says Patrick Stone, JEA’s system project leader.

Plus, all those applications put extra demands on the system, Fore notes. “When people are polling these data, you want to make sure they’re not polling off your production system.” With an MDM system, data reside in a separate system, “so that as people poll data for analytical or operations purposes, it’s not impacting your billing system or any other system that’s using those reads,” she explains.

To make integration easier, many application developers — including those who create MDM systems — are now exposing functionality via a service-oriented architecture (SOA), Stone adds.

“If you have direct system-to-system integration and one system goes down, it can impact your entire infrastructure,” Lutz says. “With SOA sitting in the middle to host a lot of the integration, when one system goes down, everything that remains up still is viable.”

In his role with WACS, Lutz has found that SOA is making inroads into utilities, and such architecture could be considered an emerging best practice, he maintains. SOA makes use of “Web services,” which are computerized units of work that, strung together, create a larger application or functionality.

JEA is moving toward a service-oriented architecture, and so is AEP — for the most part. Although AEP requires tie-in applications to be web-service enabled, Rozsa believes some applications may not make use of SOA technology. “If you have a high enough

transaction volume, Web services become inefficient,” he says. Like most utilities, his is evaluating integration strategies for each application separately.

Planning Matters

Considering the vast scope of an AMI project, you’d think utilities would choose to chunk it up into manageable pieces. Not all do, however, and Lutz says this is a mistake. He’s seen utilities take on “too much too aggressively.” A smarter approach, he says, is to “understand the business benefits you want to take advantage of first, then build the integration between those critical systems before you take on integration of all systems.”

Along with avoiding a “big bang” approach to implementation, Lutz counsels utilities to pilot the IT portion of the project at the same time they’re testing communication technologies. That is, the pilot should verify integration of the “end-to-end system,” from the meter all the way up through billing, as an example. This will expose problems and processes that need to change.

Having been through it, the JEA team also advises utilities to plan not only the implementation, but also the eventual operations and maintenance phase of the deployment. “Think about what the AMI and MDM systems will look like when they’re institutionalized,” says JEA’s Stone. “Think about that at the beginning of the project, not the end.”

Fore says JEA’s handoff might have been smoother if the utility hadn’t physically isolated AMI project programmers from the rest of the technical services staff. This was done to support the initial implementation. After all, as Victor Monfort notes, the utility was changing out more than 1,300 meters daily at the height of its technology rollout. “That’s a warehouse operation.” And, programmers were moved to cross-docks — field staging centers — that facilitated rapid deployment.

But, the move “isolated that IT group from regular IT staff,” Fore says. “It didn’t help us in cross-training. There should be very good communication among staff members

throughout the whole process, not just at the turnover point” between installation and maintenance.

Lessons like this will probably appear in hindsight for many utilities, because few have fully deployed AMI at this time. As Fore points out, AMI and MDM are still in their infancy, which means integration specialists have yet to emerge in this IT space.

MDM solution providers will help, but even those are “immature” in AEP’s Rozsa’s eyes. Still, he plans to pick one early next year.

Believing the industry has some growing up to do, “we gave some consideration to making our system work with duct tape and bailing wire for a few years,” he jokes. But, ultimately, his team decided “to help the market mature” instead of waiting on the sidelines until it comes of age.

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