Does the Utility Industry Need a Standard for Data Communication with Residential AMR Devices?
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Abstract:
The latest set of ANSI standards covering communications and data structures for utility meters are scheduled for release later this year by the ANSI C12.17 subcommittee. The development of these standards has been seen as a great benefit to the utility industry.

The purpose of this article is to initiate a dialog on whether such a standard is also desired for AMR devices by the industry. The advantages and challenges associated with the development of a standard will be addressed in order to establish a starting point for these discussions.

Introduction:
Due to the hard work of a group of dedicated individuals in the ANSI C12.17 working groups, a set of five standards for data communications with Commercial and Industrial metering devices have been developed. Three of these standards have been released; C12.18, Protocol Specification for ANSI Type 2 Optical Port; C12.19, Utility Industry End Device Data Tables; and C12.21, Protocol Specification for Telephone Modem Communication. Completing the set are two new standards C12.22, Protocol Specification for Interfacing to Data Communication Networks, and C12.23 Compliance Testing For Standard Protocols and Tables (C12.18, C12.19, C12.21, C12.22). Revisions to the existing documents and the initial version of the new standards should be completed and released to ballot later this year.

The adoption of these standards is expected to provide a great benefit to the utility industry and thus raises the question of whether a similar standard is needed for residential AMR devices. Some argue that it should be so, as all of the advantages for
standardizing C&I metering also apply to residential AMR devices. However, the goal of this article is not to make a case for or against this question, but to open a debate on the need for such a standard by examining the advantages and challenges to all of the participants in the industry presented by the development of such a standard.

**Advantages:**

The value proposition of AMR systems is that they can reduce the cost of collecting individual meter readings. Currently, there are at least three methods for collecting data from residential AMR devices:

- **Walk-by systems,** where the meter reader reads the devices through a hand-held computer containing a radio transceiver is one method.

- **Analogous to the walk-by systems are drive-by systems;** where the data-collection system and transceiver are placed in a van that drives the meter-reading route.

- **Fixed network systems** where the individual AMR devices send their reading to the head end system at the utility through a private or public network. Examples of these networks are power line carrier, radio networks where equipment is placed in fixed locations and act to concentrate the readings from the devices in a defined area and pass them up through a series of hops to the head end system, satellite networks, and the Internet.

One concern in the implementation of these systems is that they tie the utility to a single source for the purchase of both AMR devices and data collection systems. This fact combined with the relatively large initial capital costs associated with deploying a large scale AMR solution raises concerns about the durability and extensibility of the system in the long term, particularly in the case of fixed network solutions. The development of a standard for data communications with residential AMR devices would help alleviate these concerns.
A standard would also spur innovation in the functionality and design of AMR devices by allowing device manufacturers to take the risk of developing devices with innovative designs and functions because their potential customer base would not be limited by the meter reading software used by a customer. In the software segment of the business, innovation can be driven by reassigning resources currently used to develop and maintain communication modules for a variety of manufacturers’ proprietary protocols to the development of new functionality desired by their utility customers.

**Challenges:**

The biggest challenge to the adoption of any standard is achieving buy-in from all participants; in this case utilities, hardware manufacturers and software developers. The industry was fortunate that a wide variety of individuals were involved with the working groups that developed the standards for C&I metering. Likewise, the development of a standard for residential AMR devices will need an equivalent level of participation.

The adoption of a standard will initially be disruptive to AMR device manufacturers and meter reading software developers as they will need to redesign their products to utilize the new standard. The active participation of hardware manufacturers and software developers will be critical to the development of any standard. This will ensure that the standard can be implemented and does not place an undue burden on anyone in particular.

Technical issues will also need to be resolved. These issues include items such as what radio frequency will be used for walk-by or drive-by AMR solutions and how the standard function will operate in fixed networks regardless of whether they are using radio, power line carrier, the Internet, or a combination of these technologies to transmit the data. There will also undoubtedly be new technological innovations that arise which will need to be evaluated and dealt with along the way.
Utility representation is also required so that the standard will meet their needs in terms of functionality. To be useful, every standard must consider how it can be extended in the future to meet the changing needs of the users. Most of companies can provide a handful of data items that would need to be supported in the standard, but looking to the future is much more challenging. The end users, in this case the utilities, are in the best position to provide this insight; thus, their participation in those committees developing the standards is critical.

Conclusions:
The development of standards covering the communications and data structures for C&I meters has been seen as a great benefit to the utility industry. It is possible that the benefits will be similar with the development of a standard for residential AMR device. Hopefully this article is a starting point for discussions in the industry on whether this statement is true. Ponder the idea and talk about it among colleagues. It will be up to everyone in the industry to determine whether there is a benefit in creating a standard for residential AMR and whether that benefit is great enough to make a commitment to participating in the process of developing a standard. I, for one, am ready to make this commitment.

About the Author
Robert W. McMichael, Jr., Ph.D. is Director of Software Engineering for Datamatic Energy Systems (www.datamatic.com). The company has been a leading supplier of enterprise meter reading solutions for utilities worldwide since 1977.

Dr. McMichael is a leading communications protocol expert with extensive experience in C&I metering communications, data extraction, data management and system development and integration. He is a contributing member of the ANSI C12 Committee on Electricity Metering that developed standards for reading energy meters.

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