

Using Cellular Machine-to-Machine Data Plans for Collection System SCADA: Is a Small Plan Big Enough?

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ABSTRACT

Reliable communication is the lifeblood of modern Supervisory Control and Data Acquisition (SCADA) systems. Many of our existing SCADA systems use private radio networks, but these networks are reaching the limits of their capacity. System maintenance can be labor intensive, and the Federal Communications Commission (FCC) continues to place restrictions on the spectrum by re-farming to narrower bands. Increasingly, utilities departments want to get out of the radio business.

So what is our best bet for communications in the future? Utilities are moving away from private radio networks toward machine-to-machine (M2M) solutions offered by cellular providers. These M2M data plans appropriately address the fundamental concerns of reliability, emergency response, ease of use and security. By offering data plans for \$5 to \$20 per month, they are extremely cost-effective.

But here's a catch; these M2M plans also come with small data usage budgets, typically 5 to 25 MB per month. Can we do everything we want to do within these small data plans? SCADA typically uses very small amounts of data; however, the overhead associated with Ethernet Protocol and security measures makes data usage prediction difficult.

We conducted a 'Proof of Concept' (POC) test to simulate existing and future SCADA needs of an East Coast utility. Using modern advanced protocol—DNP3— we simulated normal data collection, as well as failures, where the protocol would automatically buffer and backfill historical data.

The data usage for all these scenarios was measured during the POC testing, so that we now have a comprehensive and realistic understanding of efficient data usage and a basis for moving forward into the upcoming SCADA upgrade.

Purpose of Presentation: To share the results of a study to determine whether small data plans can meet the communications needs of utilities departments.

ABOUT THE AUTHORS

Daniel H. Cote, PE, for 40 years, has specialized in water/wastewater design, instrumentation design, wastewater reclamation systems, SCADA systems, plant operations, communications and computer programming. He developed the comprehensive hydraulic model *Forcemain*®, which combines water system, gravity and forcemain wastewater systems, and reuse modeling with GIS integration in a single program. This hydraulic model is used by numerous cities and counties for both the water distribution and sewer system.

Most recently, Dan has focused on the sustainability aspects of SCADA technology, working to develop green techniques, programming, strategies and models that can cut power requirements, reduce costs and preserve resources.