

Utility Geospatial Forecast: Partly Cloudy

Back when I was interning at a power company, the utility industry had recently adopted a revolutionary new technology called supervisory control and data acquisition system, or SCADA. Today the term SCADA is so common that most people would not even bother to spell out the acronym. But, back then, SCADA was very controversial. Prior to SCADA, every single minute of every day utilities staffed major electric substations with operators. Should something unusual happen at the substation, the operator would immediately take action to open or close a breaker, put out a fire, or call for help. The operator checked fluid levels, did a little maintenance and cleaning and inspections, performed routine switching, made the rounds, took readings, kept a log, spoke often with the central dispatchers, and made sure that everything in the station was running smoothly. It was a great job.

Then SCADA came along and changed everything.

Electric companies no longer needed substation operators. They installed remote terminal units in the substations. Those faceless, nameless boxes communicated the status of breakers, took readings, allowed dispatchers to open and close breakers remotely, and sent signals across telephone lines. The old-timers warned of imminent disaster. What would happen if those telephone lines failed? What about a cyberattack? Of course, the term *cyberattack* was unknown at the time. Their version of a cyberattack was of some deranged telephone repair guy climbing a pole, swapping wires, tripping breakers, and wreaking havoc on the electric grid.

Nothing ever happened.

Those of us in the electric utility GIS business know the vision of GIS—a transformational technology that applies broadly across the enterprise and is the foundation for many mission-critical and business functions of a utility. However, many utilities relegate GIS to a departmental engineering system that produces maps and documents the network. The vision has often been expressed, but actual practice has been spotty.

Then cloud GIS came along and changed everything.

Yesterday's worry about SCADA is no different from today's concern about the cloud. True, things are more complicated, but the concept is the same. Back then, utilities recognized that someone could compromise or destroy a SCADA system. So they built backup systems, alternate sites, and developed emergency procedures should something really bad happen. What they didn't do was to decide not to implement SCADA. The business case and operational advantages were just too great.

The business case and operational advantages of a cloud-enabled GIS platform also are just too great to ignore. Just as in the case of SCADA, the cloud introduces new risks. Sure, there are three very good reasons for utilities to avoid the adoption of the cloud: security, availability, and privacy. Like the old-timers in the early SCADA days, the new old-timers will worry about hackers deleting files or corrupting data, or the loss of the Internet during a hurricane, or the leaking of sensitive customer data to unscrupulous marketers. Some utilities will even worry about the erosion of their asset base. They would argue that since the utilities don't have to invest as much in computing assets, their asset base for rate increases won't be as high (regardless of the savings). Nonetheless, utilities will figure out the risks and craft backups and emergency scenarios to mitigate those risks. They will even figure out how to adjust their asset base to account for the virtual investment in cloud infrastructure.

The cloud has revolutionized the use of geospatial technology at utilities. It changes the use of GIS from essentially a departmental computer application to an enterprise information platform. The criticism of GIS technology has been that it is engineering focused, complex, expensive to implement, and difficult to roll out to the masses. Yet everyone in the utility needs a piece of GIS even if they don't know it. Does everyone need to know the tensile strength of each pole or the impedance of every distribution transformer or even the lumen level of every streetlight? Of course not. On the other hand, wouldn't it be helpful if everyone in the call center knew which streetlights were broken or reported dark by looking at a map without having to wade through all the engineering information?

Does the accountant, who once every three years has to do a damage assessment survey after a major storm, need to know the class of a wood pole? No. The idea is that cloud technology helps to broker just the right knowledge (and no more) to the right device to the right people to help them do their job. Cloud technology facilitates the collection of data from different sources, many from outside the utility. For example, if a utility employee's job is to knock on doors to urge delinquent customers to pay their bill, it would be very helpful to know the current status of crime activity in the area. That employee could use cloud GIS to view up-to-the-minute crime web maps from local police. The map may even show the location of the nearest police cruiser. Or perhaps, through cloud GIS, the police cruiser has a geotrigger to alert the officer that a utility worker has entered into a high-crime area.

Another benefit of a GIS-enabled cloud strategy is that it allows a utility to widely disseminate spatial data to the public, with computing power automatically adjusted for an unpredictable demand. Could a utility provide the scalability, elasticity, ease of collaboration and sharing and brokering for GIS without the cloud? Yes, but it would never have the business and operational advantages of the cloud.

So what about security? Cloud providers are at the forefront of security technology. It's their business. Utilities are perhaps just as or more vulnerable to cyberattack as professional cloud providers. What happens during a major emergency when the Internet is lost or wireless coverage is down? Utilities will build backup standby systems with GIS and basemap data updated regularly. What about privacy, and what about storing critical infrastructure data off-site? You got me on that one. One approach is to store only very critical or sensitive data on-premises. From a GIS perspective, that probably means only a fraction of data actually managed by GIS. That data might be the location and condition of critical infrastructure. The beauty of a cloud strategy is that not everything has to be stored or managed in a commercial cloud. Most information, such as streets, pole locations, and streetlights, for example, can be stored in the cloud. Sensitive customer or infrastructure data could and probably should remain on-premises and only editable by select employees.

So what's the forecast for utility GIS in the near future? Partly cloudy. That's right. Utilities implement a strategy that mostly uses the cloud but stores extremely sensitive data locally.

By implementing a partly cloudy strategy, the new old-timers can sleep more soundly.