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September 1, 2007

## Geographical Information Systems

### A Call for an HFC Standard

By Sean Bristol, Comcast

Enterprise geographic information system (GIS) solutions and applications have been on the table for many years. The **Broadband GIS Leadership Forum** ([www.broadbandgis.org](http://www.broadbandgis.org)) has tried, with mixed success, to solve industry issues by employing and utilizing GIS technology.

Legacy approaches, however, are holding the industry back. It's now time to push for a standard GIS template that will provide operators with a foundation to realize the full potential of this technology.

#### Successes, to date

There have certainly been individual, tailored successes. Over

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the last few years, for instance, my group in Seattle has used GIS to squeeze the serviceability opportunity of customers who didn't exist in our billing system.

The direct result of our GIS-based market analysis and subsequent marketing campaigns was the realization of more than \$12 million, year over year, in new revenue. A tangential benefit of having added the targeted address opportunity into the billing system was a reduction in expense of our monthly serviceability truck rolls by more than 50 percent, which resulted in at least another \$1 million plus annual savings.

Additional GIS-based business applications have enabled our team and other operators to streamline various operations and workflow throughout our market. Whether management uses such optimization to reduce headcount or to redirect trained employees for productive reasons is another matter.

The preliminary point here is that a majority of business solutions do not require employing sophisticated spatial analyses to meet a particular business objective. Often simple proximity and adjacency will suffice.

**Think big**

Yet what about bigger goals? Has anyone truly made it to the pinnacle of an integrated enterprise GIS implementation? Not to my knowledge.

To solve our business problems effectively, operators require correct, accurate and relevant information. A standardized logical model is just a best effort at mirroring the details about the infrastructure and the environment in which it lives. The problem from the larger perspective has mostly been in the lack of agreement on a common model for the industry and vendor community as a whole.

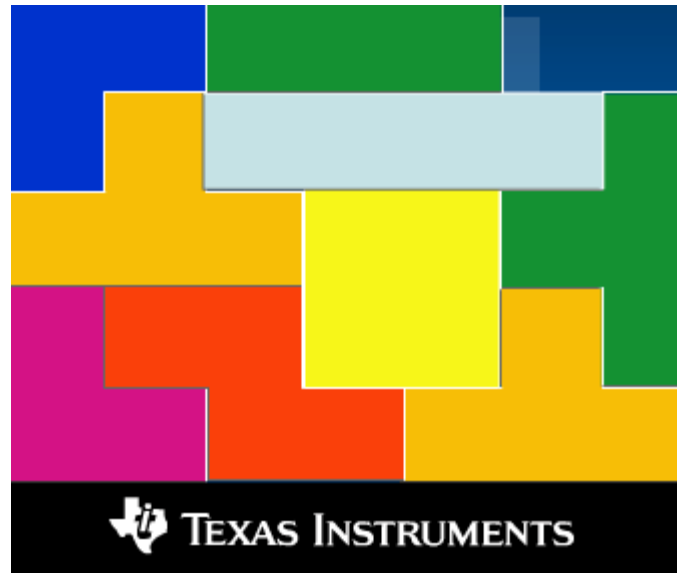
There is so much more to be gained from a common model. The more intelligently we can manage our business with accurately modeled data, the better our business will run.

That truism clearly applies to operational support systems (OSSs), where a standardized network model is crucial to solving our customer-affecting plant degradation issues. The reason being: Full upstream and downstream network tracing for point-of-failure analysis is needed within the spatial network.

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But the status quo has been an impediment in this area. "Over-reliance on billing systems, lack of integration and neglect of end users continue to characterize today's operations support systems," noted **Scientific-Atlanta's** Ron Ronco in the April issue of *Communications Technology*.

### The proactive mantra

One focus for many across the industry is true proactive monitoring of the HFC plant. The idea is to collect critical variables (for example, signal power, carrier-to-noise ratio [CNR], modulation error ratio [MER]/bit error rate [BER]) from all the customer premises equipment (CPE) in the plant, to then trend these values over time, and then by the use of basic statistics, prediction algorithms and regression analyses, to project imminent issues.

The idea also is to assign impending fault values to the active, passive or tap plant feeding the customers being monitored and determine the most probable point of failure. At **Comcast**, we have termed this concept Network Health (NHX).

What makes this concept possible is standardized plant data stored in an open data model and rules-based, service oriented architecture (SOA), such as **Cordys** technology, that provides the enterprise bus that can utilize the plant network, analytical and statistical data, customer data, and others to formulate exactly "where" in the HFC non-monitored plant a response is needed.

Like many other operators, we recognized the need to tackle this issue, but realized that the engineering network data was going to be critical in providing a solution at the address level for plant data aggregation. The key advantage was to be able to utilize legacy systems, where they performed well within the new system, while creating a composite application that creates an incremental value at each stage of integration.

NHX is one such solution that at its heart is trying to bring about consolidation of information to solve the critical business challenges for cable operators, efficiently and in harmony with all stakeholders involved. Because there are legacy systems, inaccurate data and various systems that can be found in most OSSs today, the challenge is to build a solution that is flexible, scalable and agile enough to integrate all the moving pieces. SOA technology today, when applied appropriately as an integration platform with GIS technology, can provide a solid



base for such enterprise composite applications.

It may not be in a GIS vendor's best interest to accommodate an HFC industry model in the short term. But a common logical model is the foundation in freeing the data for solutions built for the future. The lack of a good foundation can significantly hinder our successful deployment of applications and eat away at the value they once promised.

### **Why no standard?**

While many in the industry are working toward similar ideas and solutions, what strikes me is that we have not established industry-wide standards in relation to asset (plant) modeling. All of the big cable operators have some type of data model, which has probably changed numerous times (or at least with every failure) throughout the course of their efforts, but we don't have an industry standard.

Of course, a standard is not a cure-all. As one of my team leads, Curtis Hannah, Comcast Seattle manager in charge of Engineering Information Systems reminds me, it takes a well-thought-out architecture and implementation plan to make any deployment work. A standard model, however, is critical to reaching that desirable state of proactive response.

Why have we not given it the attention it deserves? Because it is not a service like high-speed data that DOCSIS was developed to support? Because competition (until recently) has been less intense? Because vendors of GIS products do not entirely share our perspectives or interests?

Whatever the cause, populating data into a model is by far the most expensive part of any large-scale GIS effort. Getting data out of one model and into another only happens with a significant level of data migration and translation effort if at all. However, if we joined to develop a standard cable operator-based data model, vendors would be inclined to map their unique models to the open-source industry model.

It is important to note that we are suggesting not replacing vendors' models, rather just setting the template for our own data models. The status quo is to use models that represent a vendor's unique technology-driven perception of our business.

Again, SOA-based approaches have much to offer in this transition. To quote Hannah, "A fundamental SOA shift in the

GIS industry professional attitudes is needed for the technology as a whole to be successful in truly meeting business solutions that have longevity and sufficient return on investment at an enterprise level."

### Running start

Once an open-source model was complete, then regardless of the system chosen to house a system's plant data, an operator could be confident that an investment in this area would not depend upon one vendor for success. Any applications or ideas or open-platform tools developed at any one cable company also could be shared by other cable companies.

The good news is that about 70 percent of standards development is already completed, with much of this work having been performed through a few operators interacting and sharing their failures, successes, ideas and experiences. That's a running start, but in standards work, it's the last 5 percent - never mind the last 25 percent - that can break deals.

**CableLabs** likes the idea of a common model and has supported moving forward. Now is the time to see whether cable's top management will buy into this concept. There isn't any one vendor-supplied system out there that has achieved the kind of GIS pinnacle that the industry should be aiming for, and there is no vendor-supplied system that will achieve it apart from our endorsement as an industry. We can, however, achieve SOA-GIS solutions if we join and stamp an industry standard on a plant asset data model.

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