Mapping Software Points INDOT in a New, Better Direction

By getting in sync, INDOT is saving time and money while winning a national award along the way.

For the past two years, INDOT has integrated a new information technology mapping system that synchronizes multiple map-based systems – including those for traffic counting, travel information, work management, and roadway inventory – into a connected database of roadway assets, events and characteristics.

National experts have taken notice. In July, INDOT will receive the Special Achievement in Geographic Information Systems (GIS) award at the Environmental Systems Research Institute (Esri) user conference in San Diego. The award is considered one of the most prestigious in the GIS community, as only 175 of more than 100,000 users of the mapping software receive this award.

The new information technology system is already receiving kudos at INDOT. The system has improved speed and communication between INDOT's roadways inventory section and our traffic statistics section and is positioned to save more than $160,000 per year in software maintenance, hosting and licensing costs.

Project Manager Kevin Munro (from left), Data Manager Joel Bump, and Enterprise Applications Technical Lead Michael Wampler worked on a project team for the new mapping system.

The new system enables INDOT to effectively synchronize multiple systems that locate assets, events or roadway characteristics using a Linear Referencing System (LRS). For most of the decade, this information was maintained in distinct, disconnected databases.

This meant that when an item in one database was updated, that update was not conveyed to the other information systems. As a result, information about INDOT's roads, bridges, mileage, traffic counts, statistics, accidents, roadway restrictions, and other items often did not match between systems. This forced INDOT GIS personnel, designers and engineers to constantly review and re-check information to ensure it was accurate.

"Sharing data between systems was time consuming, wasteful of scarce resources, and returned conflicting results when each system's data were analyzed," said Information Technology Project Manager Kevin Munro, who managed the database project and led a team that worked to integrate INDOT's existing information and systems into the new system.

To remedy this situation, INDOT in November 2012 contracted with Esri, the world's leading mapping technology company, to replace its existing LRS with an advanced LRS that would provide similar functionality, but added support for integration and other business systems.

Esri's software solution – called Roads and Highways – creates a single authoritative source for INDOT's referencing system, and incorporates several INDOT information management and database systems, including the Agile Assets Maintenance Manager, the Scheduling and Projects Management System (SPMS), the MS2 traffic database, and the Traveler Information system.
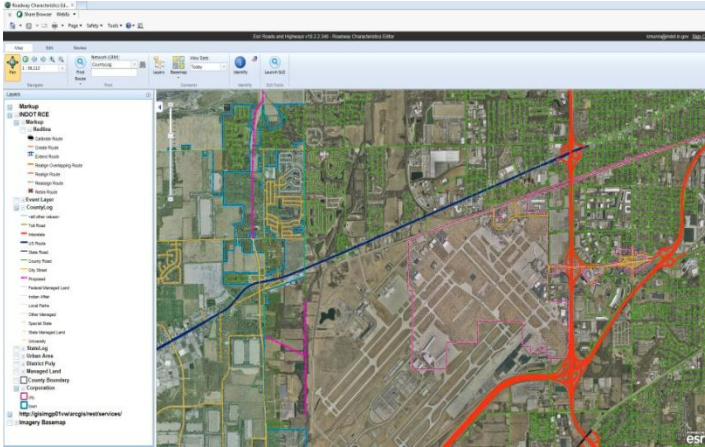
The new mapping system features an interface emphasizing roadway characteristics.

"The new system clearly defines the architecture for managing a single LRS for internal and external systems that use unique or shared referencing methods, events and assets," Munro said.

As INDOT moved into production with the new Roads and Highways information system, Monro's project team was called upon to help integrate the system with existing INDOT systems. Composed of Roadway Inventory Manager (acting) Eric Rader, who worked on business processes; IT Architecture and Data Manager Joel Bump, who oversaw system architecture; and Enterprise Applications Technical Lead Michael Wampler, who supervised systems integration efforts, the group even helped create a quick-start implementation process to help INDOT meet new federal funding reporting requirements.

Full benefits from a synchronized information system are yet to be realized, but some immediate intangible returns are already being seen. These include improved speed and communications between the roadways inventory section and the traffic statistics section, which share asset management workflow. INDOT anticipates that further expansion and development of the new information system will improve communications with local governments and district staff about the location and status of roadway characteristics and assets on their roadways.

Other return on investment includes:

- Saving $30,000 per year in software maintenance and support costs by moving from custom software to commercial off-the-shelf software.
- Saving $133,000 each year in extra database licensing and hosting charges by replacing old software with a newer version.
- Long-term reductions in employee training costs. Esri products are used in education programs across the United States. This results in a broader pool of potential workers skilled in the use of Esri.
- Positioning INDOT with the ability to keep pace with scheduled technology upgrades.

"We expect that, when all targeted business systems are integrated with Roads and Highways, INDOT will have timely, up-to-date business systems that agree fundamentally where assets reside and what roadway characteristics exist at any location in the state," Munro said. "We will have succeeded at cataloging each system's authoritative data and synchronizing all assets and events on a single network."

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