Florida Department of Transportation Research
Florida Model Information eXchange System (MIXS)
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Transportation planning largely relies on travel demand forecasting, which estimates the number and type of vehicles that will use a roadway at some point in the future. Forecasting estimates are made by computer models that use a wide variety of data inputs. For a particular roadway, local, state, and federal agencies may have unique forecasting models that address their interests. While these models often have similar goals, they often differ in descriptions of road segments and data structures. This creates difficulties sharing data, redundancies in modeling activities, and duplications in data collection. Most importantly, metropolitan planning organizations, departments of transportation, transit agencies, and the like cannot coordinate analyses and planning on the same physical roadway network.

In this project, University of Florida researchers investigated the issue of facilitating network information exchange among travel demand forecasting models. The researchers concentrated on two objectives: first, identify solutions for the information exchange problem and, second, assess the feasibility of implementing the proposed solution and provide recommendations for its practical implementation.

Central to the information exchange problem is how different agencies represent the same roadway network with different patterns of links and nodes. The researchers focused on two approaches to this mismatching networks issue. In the first, each agency's network would remain separate, and the network links would be resolved through a table that matches roadway segments. In the second solution, each agency must convert to a common roadway network representation. After investigating both possibilities, the researchers concluded that the second approach was more sustainable; also, Florida already has a unified, statewide GIS street network, which could serve as the basis for this solution.

With an approach to the problem selected, the

Roadway networks often differ among agencies. In this image, black shows the state model, blue a regional model, and gray the highly detailed, unified network.

researchers proceeded to outline a framework for an information exchange system that would guide programming and implementation of the new system. The framework included a database model, an organizational structure, and Web-based tools with which users could accomplish information exchange operations. With the tools, users could locate data of interest, extract them for local modeling, and then upload forecasts for common discussion and use.

Initial versions of the software, called the Model Information eXchange System (MIXS), were successfully validated by small-scale manual tests. MIXS was then tested on a full-scale, statewide model. The tests demonstrated that MIXS' structures, processes, and tools were feasible, thus providing proof of concept.

Implementation of MIXS depends on several factors, one of which is support for agencies to make the one-time conversion to the state's unified GIS roadway network. However, once in operation, MIXS will allow greater cooperation on collecting data, preparing travel demand forecasts, and planning roadways for Florida's future.