Model Information eXchange System (MIXS)

Presented to MTIF

Presented by Ilir Bejleri, PI, University of Florida

Project Manager Frank Tabatabaei, FDOT

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Problem

• Different models in overlapping geographic areas use different network representation of the same physical network
• We have FSUTMS standards but we lack a standard/common network
• Difficult to share common input data elements — Speed, Number of Lanes, Volume, Direction etc.
• Difficult to view and compare future projections
Problem: Different Networks

State Level Network

Problem: Different Networks

State & Regional Level Network
Problem: Different Networks

State, Regional & Local Level Network

Research Goal

- Facilitate network information exchange among models

STATE LEVEL MODEL

Network Representation A

REGIONAL LEVEL MODEL

Network Representation B
Proposed Solution - Concept

• Models should use a common/unified geographically accurate network
• Pros:
  – Shared network links can be easily established
  – Maintenance is easier than when networks are different
  – Eliminates data redundancies
  – Enables data sharing
  – Leverages state’s investment (Navteq unified basemap)
  – Serves as platform to add new data
• Cons:
  – Requires one-time network conflation to the common network
  – Some maintenance will still be needed

Information Exchange: Benefits

• Less need for data processing
• Reduction of duplicate efforts
• Ability to easily compare future demand projections from multiple models on the same GIS planning network
• Easier to find potential errors on shared links
• Facilitates coordination of agencies that rely on the same network - MPO, FDOT, Transit Agencies, Toll Operators
Common Geographically Accurate Network

Shared State & Regional Model Links

Proposed Solution - MIXS

• To accomplish this we propose

MIXS – Model Exchange Information System: a Data Model, a Set of Tools and Organizational Protocols
MIXS – Modeling Network Data Model

Model streets base

SCENARIO STREET
- street_id
- street_segment_id
- name
- name_pth1
- name_pth2
- ns_pth1
- ns_pth2
- shape

OTHER MODEL_ATTR
- name_name
- scenario_name
- year
- alternative
-
- vehicle
- mode
- mode
- mode
- mode
- mode
- mode
- shape

Proof of Concept Demonstration
MIXS Process - How it works?

• Initial MIXS Database
  • Extract Network for Modeling
  • Modify Network in Modeling
  • Upload Modified Network in MIXS
  • Update MIXS database periodically
Initial MIXS – FDOT Work Program

MIXS Process – How it works?

- Initial MIXS Database
- **Extract Network for Modeling**
- Modify Network in Modeling
- Upload Modified Network in MIXS
- Update MIXS database periodically
**Network Extract - Tool Specifications**

- **Inputs**
  - Select model, scenario, year, alternative
  - Select attributes/links from other shared models

- **Output**
  - Network layer
  - Optionally attributes of other models for the shared links
  - Zones & centroid connectors

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**MIXS - Network Extract - cont.**

**Extract scenario**

This step exports or documents specific components to your model/viewer. This includes layers, scenario attributes, and forecast attributes.

- **Model name**
- **Scenario name**
- **Alternative**
- **Target shapefile**

**Scenario extract**

- **Model streets layer**
- **Scenario street**
- **Other model attributes**

12/1/2013
MIXS Extract - Model Network Extracted

MIXS Extract - WPA Network Extracted
MIXS Process - How it works?

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Modeling - Network Editing - Input
MIXS Process - How it works?

- Initial MIXS Database
- Extract Network for Modeling
- Modify Network in Modeling
- **Upload Modified Network in MIXS**
- Update MIXS database periodically
### MIXS – Network Upload cont.

#### Import scenario

This step imports all scenario-specific customizations to your model streets. The
includes network, scenario attributes, and forecast attributes.

<table>
<thead>
<tr>
<th>Model name:</th>
<th>NERHM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scenario year:</td>
<td>2003</td>
</tr>
<tr>
<td>Alternative:</td>
<td>A</td>
</tr>
</tbody>
</table>

#### Model streets shapefile

[<!-- Browse button -->]

#### Street ID field

[street_id]

#### Route segment ID field

[network_segment_id]

#### Edit type field

[edit_type]

#### Valid values: BASE, EXTERNAL, LOCAL, PLANNED, FUTURE

#### Model attribute 1

<table>
<thead>
<tr>
<th>route_start</th>
<th>forecast_start</th>
</tr>
</thead>
<tbody>
<tr>
<td>route_end</td>
<td>forecast_end</td>
</tr>
</tbody>
</table>

#### Model attribute N

<table>
<thead>
<tr>
<th>route_all</th>
<th>forecast_all</th>
</tr>
</thead>
</table>

#### Import

### MIXS Updated – Before...

![Map diagram showing model streets before update]
MIXS Process - How it works?

- Initial MIXS Database
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MIXS Database Update

- Necessary to reflect updates in RCI & Navteq
- Updates can improve the network
Proposal for Implementation

MIXS Implementation - Objective/Task

- Populate MIXS database with models
- Proposed initial models to load:
  - State Level: Turnpike & Statewide
  - Regional Level: SERPM (including transit)
  - Future Work Program: start with 5-year adopted;
- Develop the proposed web-based tools
  - MIXS Explorer/Viewer, Extract & Network Selector, Upload, Versioning
- Revise Cube training to replace Olympus with a Navteq-based model
- Develop a training module to use the MIXS
- Explore feasibility and implementation of future integration of MIXS & Cube Cloud
Questions / Comments?

Contact:
Ilir Bejleri, ilir@ufl.edu
Frank Tabatabaee, Frank.Tabatabaee@dot.state.fl.us