presented to
MTF GIS Committee

presented by
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March 6, 2012
Background

- Models covering overlapping geographic areas in reality “share the road”, i.e. use same roadways.

- Example in South Florida area
  - Turnpike State Model (state level)
  - SERPM (regional level)

- This creates opportunities to share/exchange variables/attributes on shared links such as number of lanes, traffic volume, functional class etc.
Benefits of Exchange

- Less need for data processing
- Reduction of duplicate efforts
- Ability to easily see 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
Problem

- However at present the underlying networks of current models are different/independent.
- No exchange mechanisms are in place to facilitate sharing of information.
Problem

STATE LEVEL MODEL

Representation A

REGIONAL LEVEL MODEL

Representation B
Research Objectives

- Identify solutions to the model information exchange problem
- Assess the feasibility of implementation of such solutions
- Make recommendation for practical implementations based on findings
Specific Goals

- Identify methods to facilitate associations among models
- Identify challenges and limitations
- Demonstrate proposed solutions
- Identify functional specifications to implement information exchange
- Develop technical specifications for practical tools to support the information exchange
Solution 1

- Establish and maintain associations among different networks

- Assuming models will continue to use the existing networks

Advantages

- No need to conflate/transform the model network to another network

Disadvantages

- Associations challenging to establish
- Challenging to maintain in the long term
- Exchange and tools would be complex
Solution 1

Complex relationships

<table>
<thead>
<tr>
<th>DynampID</th>
<th>RoadwayID</th>
<th>BPInRd</th>
<th>EPInRD</th>
<th>Local ID</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>A</td>
<td>0</td>
<td>40</td>
<td>I</td>
</tr>
<tr>
<td>2</td>
<td>A</td>
<td>40</td>
<td>65</td>
<td>I</td>
</tr>
<tr>
<td>3</td>
<td>A</td>
<td>65</td>
<td>100</td>
<td>II</td>
</tr>
<tr>
<td>4</td>
<td>B</td>
<td>0</td>
<td>100</td>
<td>III</td>
</tr>
</tbody>
</table>
Solution 1

- Complex associations
Solution 2

Use the same network for different models - this is possible now that we have a unified basemap (Navteq GIS streets)

Benefits:

• Shared network links can be easily established
• Maintenance is easier than in solution 1
• Eliminates data redundancies
• Leverage state’s investment
• Servers as platform to add new data
MIXS Concept

- Use of unified model network as the platform for information exchange
- Extract the network for modeling needs
- Post back projected traffic on the network
MIXS Concept

STATE LEVEL GIS NETWORK

INPUT

OUTPUT

STATE LEVEL MODEL/CUBE
- FUTURE VOLUME
- FUTURE ROADS

REGIONAL LEVEL GIS NETWORK

INPUT

OUTPUT

REGIONAL LEVEL MODEL/CUBE
- FUTURE VOLUME
- FUTURE ROADS
MIXS Concept

STATE LEVEL GIS NETWORK
- FUTURE VOLUME
- FUTURE ROADS

MIXS GIS network for all model levels

REGIONAL LEVEL GIS NETWORK
- FUTURE VOLUME
- FUTURE ROADS

INPUT
OUTPUT
EXTRACT
POST BACK
MIXS Concept

MIXS GIS network for all model levels

STATE LEVEL GIS NETWORK

• FUTURE VOLUME
• FUTURE ROADS

REGIONAL LEVEL GIS NETWORK

• FUTURE VOLUME
• FUTURE ROADS

INPUT

OUTPUT

EXTRACT

POST BACK

EXTRACT
Method

- The Network – statewide Navteq GIS streets
- Tag each link with the applicable model
  - TSM
  - SERPM
  - ...
- Handle attribute discrepancies. Three sources:
  - Navteq
  - RCI
  - Local/Regional
Method - cont

- Create mechanism to identify attribute differences
  - Database tables to store the differences
  - Tools to highlight the differences
  - Side benefit: we can share this information with Navteq for future improvements
Method - cont

- Define the **Extraction** process: ability to extract the desired part of the network (links and attributes)

- Define **Post-Back** process: ability to post future traffic projections from Cube modeling results

- Develop a data model (tables and their associations) to support MIXS

- Develop functional and technical specifications for tools to facilitate data exchange through MIXS
Accomplished So Far

- We have evaluated Cube's ability to work with a detailed GIS network (such as Navteq) by evaluating options for what's known as 'network chaining'. **No issues.**

- We have also evaluated Cube's ability return the future demand projections to the GIS network - **It is doable.**

- Currently we are experimenting to apply the MIXS concept with two models: Turnpike State Model (example of a statewide extent) and SERPM (example of a regional extent);
Accomplished So Far - cont

- We have converted the network of the TSM from Teleatlas basemap to Navteq basemap. Still working on few final touches.

- Palm Beach MPO is contributing to this research by proving access to the Navteq-based SERPM network which is also almost nearly complete.

- Currently we are working on tagging of the network links with both TSM and SERMP models

- Next we will use the tagged network to develop a data model and test the extraction and post-back processes
Expected Challenges

- To benefit from MIXS current models will require to use Navteq GIS streets for their network.

- This may require a one-time conversion from existing networks to the Navteq network.

- We can provide example of what it takes with cases for the Turnpike State Model and SERPM model.
Expected Challenges - cont

- Network maintenance to support future changes

- Safety Office has already in place a process and tools to update versions of Navteq and associated RCI data such as number of lanes, traffic volume, functional class etc.

- Establish a mechanism/protocol for facilitating coordination of Navteq versions and model versions
Get Involved

- MIXS is not intended to be a rigid standard. It is envisioned to be a resource. Models will still have freedom and required flexibility.

- MIXS can operate within the FSUTMS Framework

- Organizational involvement: MTF and GIS committee coordination and outreach

- Technical involvement: Modelers and GIS folks are encouraged to engage/participate and provide guide to ensure that MIXS works for their needs.
Discussion

Questions / Comments
Contact

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