Model Information eXchange System (MIXS)

presented to
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Problem

• Different models in overlapping geographic areas use different network representation of the same physical network
• Difficult to share common input data elements
  – Speed, Number of Lanes, Volume, Direction etc.
• Difficult to view and compare future projections
State Level Network

Regional & State Level Network
Local & Regional & State Network

Why Exchange?

- 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
Research Question

- How can we facilitate network information exchange among models?

![Network Representation A](image)

![Network Representation B](image)

Proposed Solution - Concept

- All models use a common geographically accurate network

- **Pros:**
  - Shared network links can be easily established
  - Maintenance is easier than when networks are different
  - Eliminates data redundancies
  - Leverages state’s investment (Navteq basemap)
  - Serves as platform to add new data

- **Cons:**
  - Requires one-time network conflation to the common network
  - Some maintenance will still be needed
Common Network

Links in a Regional Level Model
Links in a State Level Model

Proposed Solution - Details

• To accomplish this we propose
  MIXS – Model Exchange Information System: a collection of data, tools and protocols
MIXS Framework

- A master network database (DB)
- Tools to manage the master network DB
  - MIXS Explorer: a tool visualize the master network data elements
  - MIXS Versioning: a tool to semi-automate maintenance of master network updates
- A data structure for individual models to support the exchange
- Tools to facilitate the exchange
  - Extract: extract a model network from master DB
  - Upload: post back modeling results to master DB
- Protocols to guide the exchange process

MIXS Data Model
MIXS-Compatible Cube Data Model

Scenario extract

SCENARIO_STREET
- street_id
- name
- segment_id
- type
- model.sh1
- model.sh2
- model.sh1
- model.sh2
- forecast.sh1
- forecast.sh2
- shape

OTHERMODEL_ATT
- model_id
- name
- scenario_name
- year
- alternative
- rank
- kind
- model.sh1
- model.sh2
- forecast.sh1
- forecast.sh2

MIXS Process Diagram
MIXS Import / Extract

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

- Model name: NERP
- Scenario year: 2020
- Alternative: A
- Model streets shapefile: C:\Data\nerp_scenario_a_2020.shp
- Street ID field: street_id
- Naming segment ID field: routing_segment_id
- Exit type field: exit_type
- Allowed values: BASE, EXTERNAL, LOCAL, PLANNED, FUTURE
- Model attribute 1: mode_{attr}
- Forecast attribute 1: forecast_{attr}
- Model attribute N: mode_{attr}
- Forecast attribute N: forecast_{attr}

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

- Model name: NERP
- Scenario year: 2020
- Alternative: A
- Target shapefile: C:\Data\nerp
- Export
**Navteq Upgrade Process**

**Project Status**

- Working to built a database prototype
- Using Turnpike State Model
  - Currently under development using Navteq 2011
- In the future add more models:
  - Florida Statewide Model
  - SERPM