Using GTFS Transit Data in Transportation Modeling

presented by

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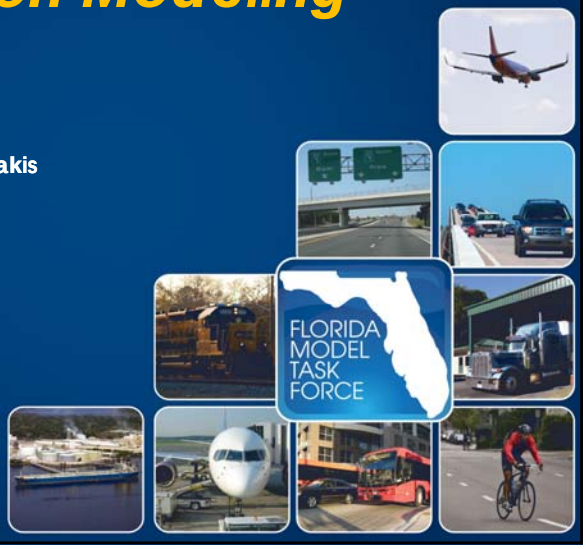

Presentation Outline

- GTFS Overview
- GTFS User Applications
- Data and Format
- Current Transit Modeling Practice
- Benefits of Using GTFS
- Challenges of Using GTFS
- GTFS – The Big Picture

What is GTFS?


- GTFS = the **G**eneral **T**ransit **F**eed **S**pecification
- Is a common format for **public transportation schedules** and **associated geographic information**
- "Feeds" allow transit agencies to publish their transit data and developers to write applications
- It is a collection of text tables
- De-facto standard among public agencies
- Common amongst route planning applications

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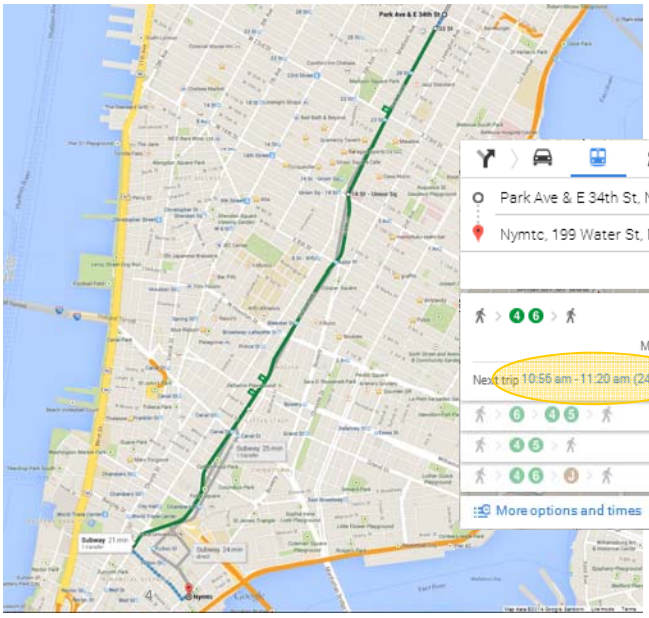
Example 1. Real Time Route Planning

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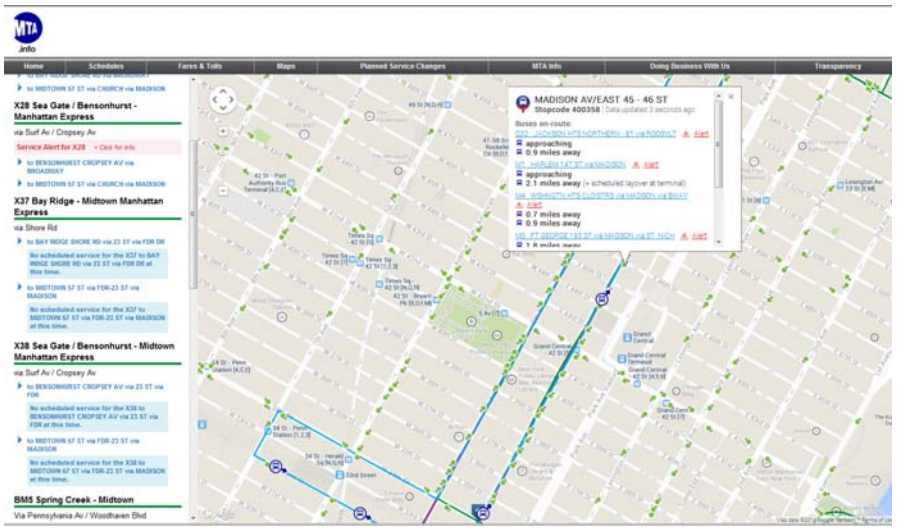
Example 2. Real Time Bus Location



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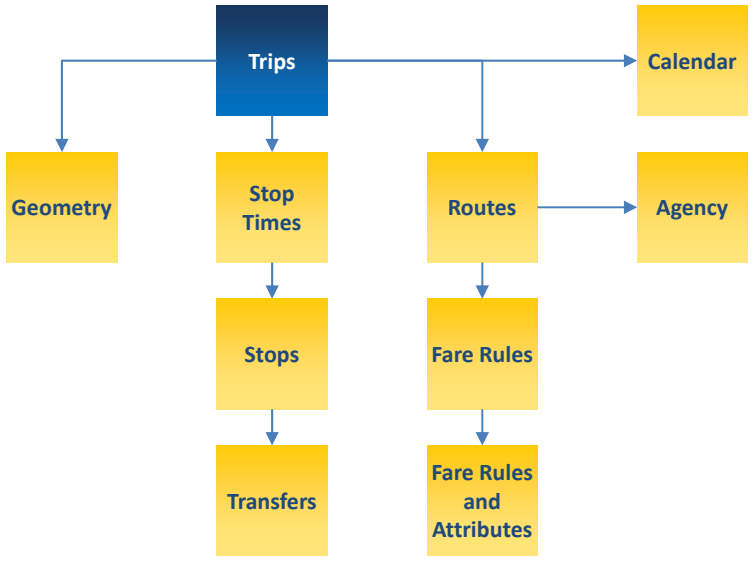
GTFS Tables



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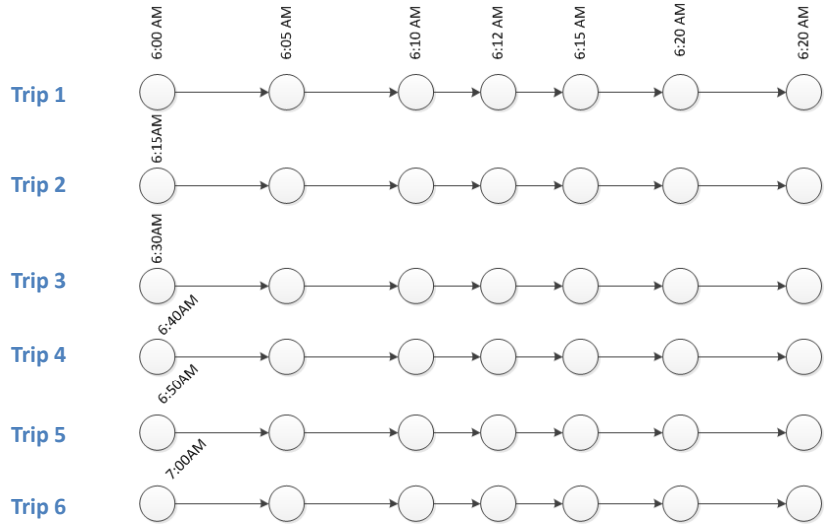
GTFS Schedule

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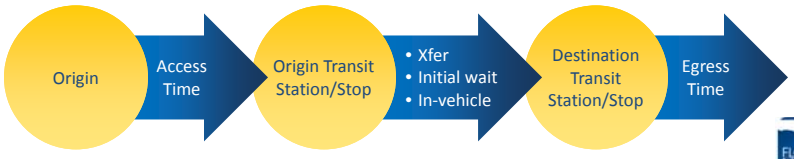
Transit Modeling Elements


- Complex transit network
  - Path could include a combination of modes
  - Several transfer opportunities
- Transit elements
  - In-vehicle times
  - Out-of-vehicle times – access, xfer, xfer wait, egress
  - Fares



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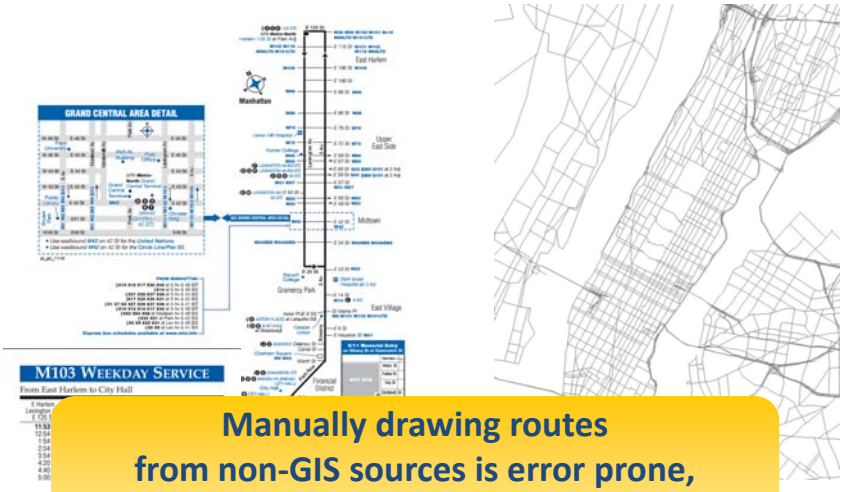
Current Transit Modeling Practice



Manually drawing routes from non-GIS sources is error prone, time-consuming, and hard to maintain

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Current Transit Modeling Practice

- Current Transit Modeling Practice
  - Network coding is time consuming and error prone
  - Periodic updates required – also time consuming
  - Unconflated transit network – introduces inaccuracies
  - Inaccurate access information – links need to be built manually in many cases
  - Many of the bus travel times are "model defaults"
  - Initial wait times – typically half the headway
  - Timed transfers – difficult to model
- Using GTFS could alleviate these limitations

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Benefits– *GTFS in Transportation Modeling*


- Used by several agencies – e.g., Brevard, Miami-Dade, Hillsborough and Space Coast
- Higher accuracy – geometry, stop detail, travel times, frequency based on schedule
  - Therefore improved calibration
- Easier to update – can be automated
  - Will need QA/QC
- Ability to integrate data from other agencies using GTFS
- Price is right – it's free!

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Challenges Using GTFS Data


- Challenges
  - Map the network agnostic routes to our network
  - Integration with highway network
  - Updating *select* data when importing
  - Data formatting issues while importing/exporting

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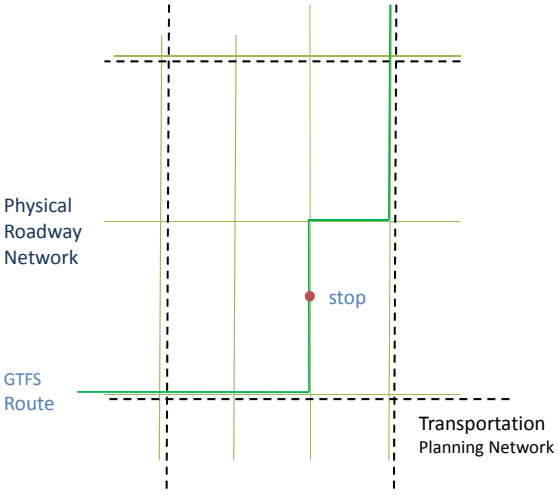
Challenge – *Map Matching the GTFS Routes*



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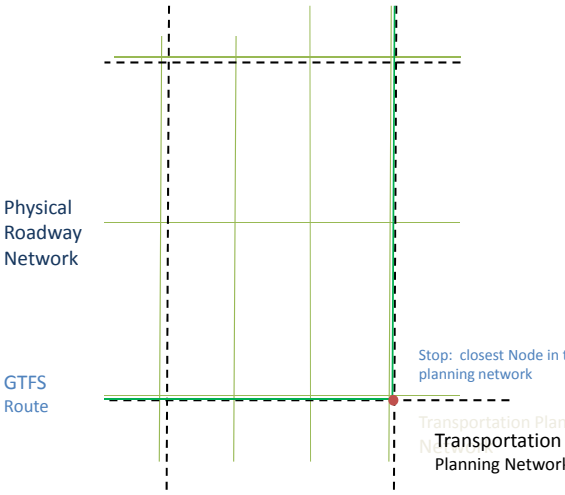
Challenge – *Map Matching the GTFS Routes*



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GTFS Data and Map-Matching

- The higher detail in the roadway network the easier it is to match an accurately coded route to the planning network
- Map matching is available now and has high success
- Knowledge of the GTFS data in the study area and collaboration with public agencies is necessary

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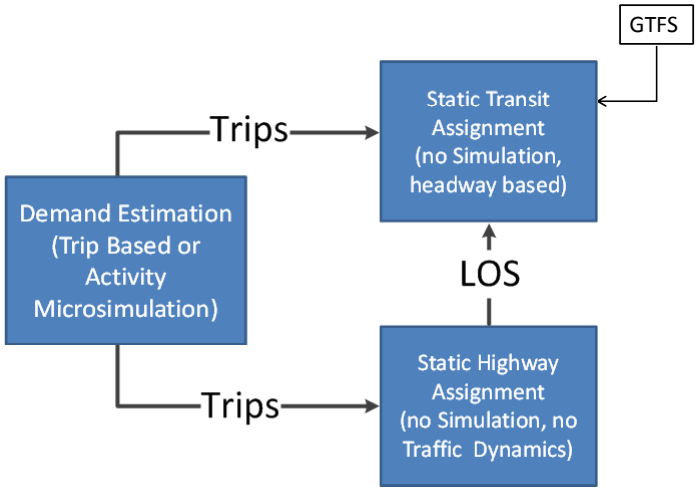
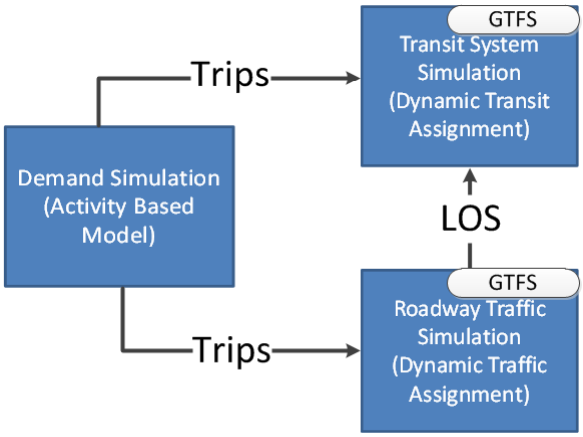
Current State-of-the-Practice



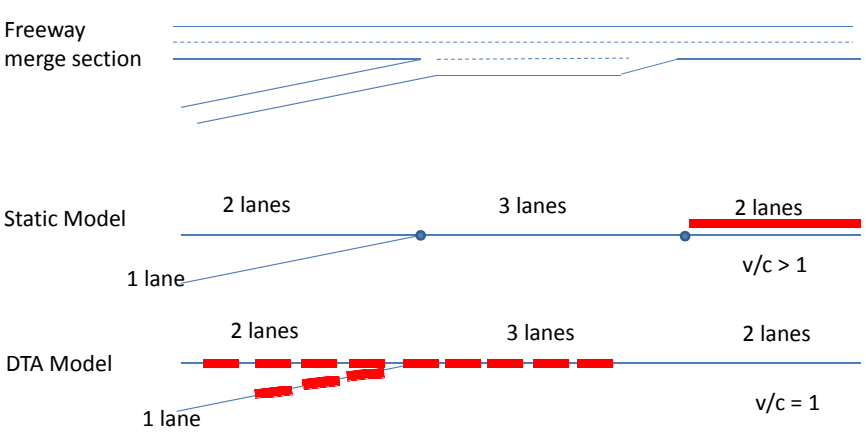
Emerging Modeling Practices



Dynamic Traffic& Transit Assignment

- Dynamic Transit Assignment uses schedule-based transit information instead of frequencies
  - Service and demand are time dependent while individual travelers can be microsimulated
  - Capacity, crowding, information provision, and service irregularities are modeled explicitly
- Dynamic Traffic Assignment can be the most appropriate tool for modeling traffic congestion
  - Realistic traffic dynamics that do capture congestion
  - Enhanced multiparametric route choice
  - Can use mesoscopic, microscopic, or a combination of both traffic simulation methodologies

Traffic Dynamics In DTA



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