National Transportation Model: Needs of Long-Distance OD Data

Brad Gudzinas
FHWA Office of Highway Policy Information

NHTS Workshop
June 7, 2011

U.S. Department of Transportation
Federal Highway Administration

Who's traveling? To where?

Why are long-distance OD data needed?

- First step toward developing a national transportation model
- Long-distance road map developed for FHWA identified a "pressing need" for a nationwide O-D matrix
- States can use long-distance O-D data for external trips in statewide models

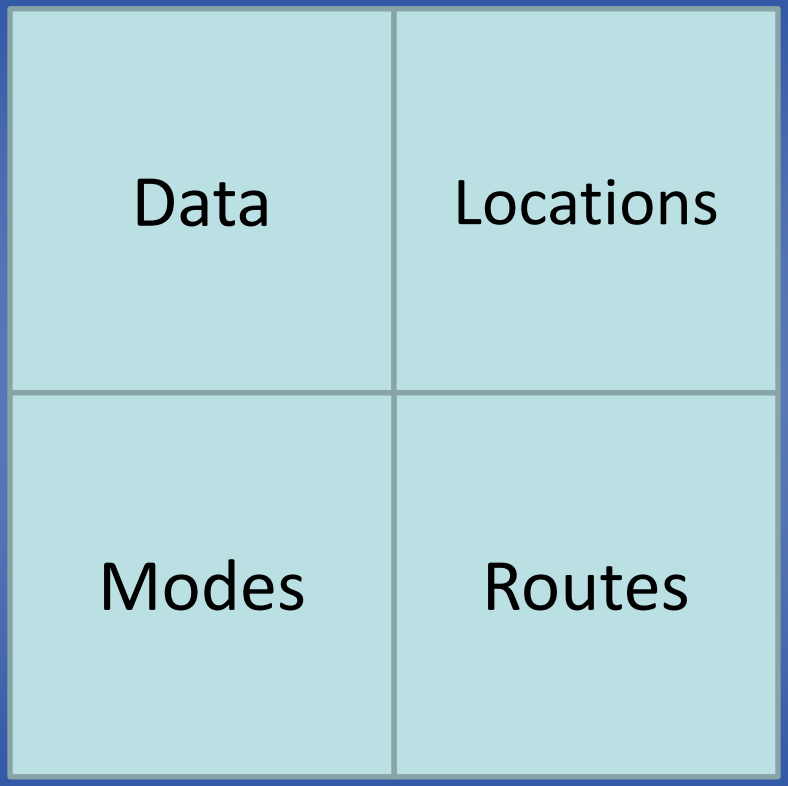
Why a national transportation model?

- Predicting travel behavior
  - Socioeconomic changes
- Understanding cause-and-effect relationships e.g. “What happens when gas prices change?”
- Quantitative analysis for infrastructure investment and operational effectiveness
- Emergency planning

Why a national transportation model?

- Freight has FAF (Freight Analysis Framework), but nationwide passenger travel model lacking
- States are collecting long-distance travel data and also develop statewide travel models, but they are not necessarily compatible; no "unified" long-distance modeling

Building a national transportation model



Building a national transportation model

- Primarily 1995 ATS and 2001 NHTS for estimation
- Airline, other modal data available
- Commercial data vendors
- Start with good data
- Limitations of existing data

Building a national transportation model

Locations

- Geographic distribution of trips
- Can start with a base O-D matrix and factor, or
- Size of zones (not too big, not too small) requires trade-offs
- More zones equals larger O-D matrix, more challenging to estimate accurately

Building a national transportation model

Modes

- Primarily auto trips
- Auto vs. air on trips >500 miles
- Bus / train in some areas
- Trip purpose matters (leisure and business)
- Usually modeled as discrete choice but other forms may be better

Building a national transportation model

- Routing trips on national transportation network
- Door-to-door access modes (e.g. how to get to airport)
- Both passenger and freight travel use the same networks (multi-class assignment)

Considerations

- Start with consistent and reliable data
- Time period: Most people rarely make long-distance trips, but a few make many
- Areal structure: necessarily course zones (~65,000 census tracts, ~3,100 counties)
- Model resolution: individual trip-making or aggregate trips

Considerations

- Additional relevant components (party size, advance scheduling)
- Integration with statewide models (external trips)
- Passenger and freight (FAF) routing
- Trade-offs
  - Complexity vs. simplicity
  - Accuracy vs. validity (statistically valid cell values)
  - Matrix size vs. file size

Current FHWA initiatives

- Origin-destination matrix estimation
- Long-distance mode choice model
- Long-distance travel model exploratory research (EARP)

Questions?

Brad Gudzinas
FHWA Office of Highway Policy Information
brad.gudzinas@dot.gov