INTEGRATION Framework for Modeling HOT Lanes

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Overview of Logic

- Model considers
  - Five vehicle classes
    - High occupancy and regular vehicles
    - Different values of time distributions (mean & dispersion)
  - Twenty-five vehicle types
    - Vehicle propulsion, aerodynamic, and rolling characteristics
- Considers the impact of traffic conditions on
  - Forgone and induced demand
    - Multi-runs reflecting multiple days
  - Vehicle re-routing conducted in real-time
    - HOT lanes modeled as separate links
  - Differences in driver values of time
  - Errors in travel time estimates

Demand Impacts

- Beta feature of the model
- Simulated congestion during iteration “n” impacts during iteration “n+1”:
  - foregone or induced demand,
  - peak spreading or recoil,
  - change in destination or origin,
  - trip chaining propensity,
  - mode choice, and
  - route choice.
- Feedback involves executing 10 steps during iteration “n” prior to initiating iteration “n+1”

Traffic Routing

- Decisions made at end of links using latest travel time database
  - Updated at user-specified intervals
- Traffic routing based on:
  - Access to latest pre-trip and en-route information
    - Subject to errors in travel time estimates
    - May be gathered at specific roadway segments on the network
    - Experiences of specific vehicle classes (e.g. vehicles on HOV or HOT lanes)
  - Drivers who consider tolls in their route selection
    - With different values of time

Lane Changing

- Vehicles maximize their travel speed by checking
  - Adjacent lanes every second
  - All lanes every 5 seconds
- Affected by subsequent links within routing tree
- Do not consider route choice considerations while traveling on a link
- Toll lane selection:
  - HOVs make lane selection within lane-changing logic
  - SOVs make decisions at the assignment level