Overview of Traffic Modeling

• PSRC regional model overview
• Dynamic Traffic Assignment model
• Questions and answers
Types of Traffic Models

- Operations models (user level):
  - To understand what individual users will do.
- Dynamic Traffic Assignment model:
  - Finer grain - to address operations on city/local streets.
- Regional traffic demand model:
  - PSRC – higher level to estimate overall traffic patterns.
PSRC Regional Travel Demand Model

• Four step model process
• Key inputs
• Key outputs
• Use of model results
PSRC Model Systems
The travel demand model is one piece of the modeling system developed by PSRC.

Toll forecasts are focused here, but many other models influence your results.
Traffic Modeling Process

PSRC regional model

- Trip generation
- Trip distribution
- Mode choice
- Trip assignment

Operations models
Key Inputs: Population and Employment

2011 Population: 3.72 million
2010 Employment: 1.85 million
Key Inputs: Network

Reflects region’s Metropolitan Transportation Network:

• Generally principal arterials and above.
• All transit, park and ride, and ferry routes are included.
• Regional bike trails.

Intended to inform **regional decision making** and analysis for **packages of improvements**.

• Informs travel demand – not traffic operations.
• Lane specific data not available.
• Pedestrian conflicts are not considered.
Key Inputs: Costs

- Parking costs are included for off-street pay lots only.
  - Includes new areas for paid parking in the future.
  - Doesn’t include on-street parking or free off-street lots.
- Transit fares by operator and peak/off peak rates.
- Toll and ferry fares by time of day.
- Auto operating costs (includes fuel and maintenance).
- All costs are assumed to rise at the same rate of inflation.
Value of Travel Time

• Models consider everything in terms of time – so costs are converted to time.

• Models are built on the assumption that people will always take the “fastest” trip.

• Value of time varies by trip purpose:
  • Work trips have higher values of time than non-work trips.
  • Freight trips are valued higher than commuter trips.

• Value of time varies for different income groups.
Key Outputs: Traffic Measures

- Annual average weekday
  - Volumes
  - Speeds
  - Travel times
  - Vehicle Miles Traveled
  - Vehicle Hours of Delay

Data is available for every link in the model, but is most useful to consider at larger levels of geography such as
- Screenlines
- Subareas
- Region
Uses for Regional Travel Demand Model Results

What are regional travel demand models good at doing?

• Understanding the impacts of changes on travel demand for facilities, jurisdictions, sub-areas and the region.
  • How would travel demand to downtown Seattle change if a cordon toll was implemented?
  • How does the use of transit change if we institute changes in parking prices in the region?
  • If we toll a bridge across the lake, how many people will consider using it and how many might shift to another route or mode?

Travel demand models are best at highlighting differences between scenarios, not necessarily giving you exact results.
Geographic Focus of Models

PSRC regional model area

Dynamic Traffic Assignment model area
Traffic Modeling Process and Models Used

PSRC regional model

- Trip generation
- Trip distribution
- Mode choice
- Trip assignment

Operations models
Traffic Modeling Process and Models Used

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Operations models

Dynamic Traffic Assignment model
Dynamic Traffic Assignment Model

- Pulls some information from regional travel demand model.
  - Trip origins and destinations
    - Mode trips taken by car, bus, freight trucks and transit.
  - Next step to understand traffic patterns at local level.
Dynamic Traffic Assignment Model

• Considers local street operations such as lane configuration and traffic signals.

• Provides better estimate of travel times due to increased detail of streets and their speed characteristics for an area such as the downtown street network, especially under congested conditions.

• Assigns traffic to the path of least resistance (i.e. least cost), providing a better estimate of toll diversion.
Dynamic Traffic Assignment Model Outputs

Measures:
- Volumes
- Speeds
- Travel times for representative routes
- Bottlenecks: Where traffic slows down

Modes:
- Cars
- Freight
- Transit
Uses for Dynamic Traffic Assignment Model Results

What are DTA models good at doing?

• Understanding the impacts of changes to vehicle travel on a street network if capacity is changed or a toll is charged
  • How are volume and travel speed likely to change on streets, SR 99 and I-5 in downtown Seattle and adjacent neighborhoods?
  • How does transit performance change on key streets and pathways approaching and in downtown?
  • How might these conditions be different throughout the day?

Traffic assignment models are best at highlighting differences between scenarios, not providing exact results.
Questions and Answers
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