

Modeling partial compliance

- Use multi-commodity flow model
 - Non-compliant drivers:
 - one commodity with set split ratios (can vary over time)
 - Compliant drivers:
 - Each route is a different commodity
 - Garavello, Mauro, and Benedetto Piccoli. *Traffic flow on networks*. Springfield, MO, USA: American institute of mathematical sciences, 2006.
- Control parameter
 - For each OD pair and each time step
 - Assign fraction of flow to each route serving OD.

PDE Network Optimization problem

$$\min_{u \in \mathcal{U}} J(x(u))$$

subject to

mass conservation constraints

boundary constraints

flow propagation constraints

junction constraints

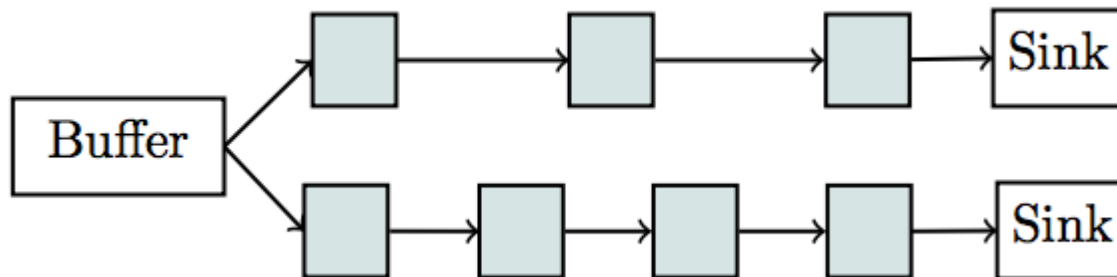
Set of feasible compliant driver split ratios at source of OD pairs.

Total travel time

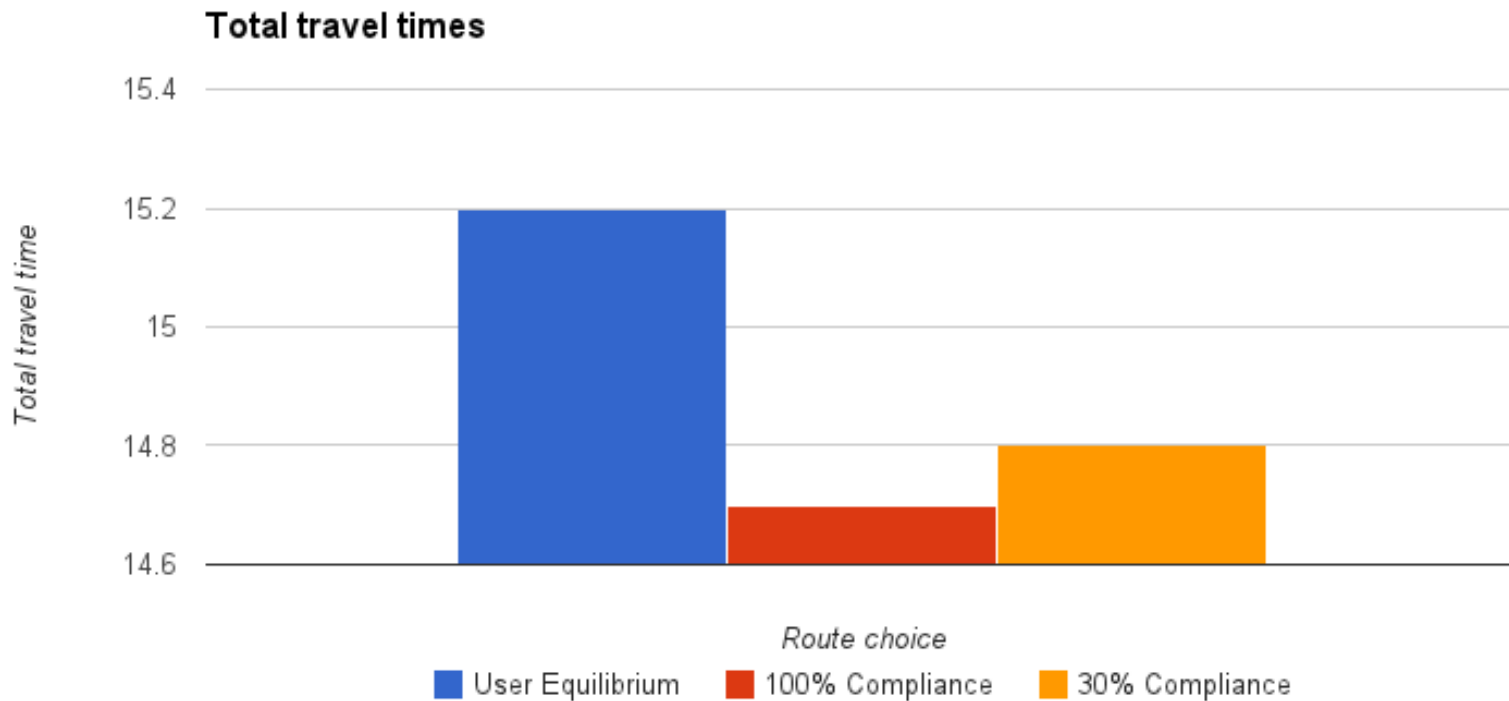
$$J = \sum_{k=0}^{T-1} \sum_{i \in \mathcal{A} \setminus \mathcal{S}} \rho_i(k) \cdot L_i$$

Preliminary results

- Using adjoint method with:
 - multicommodity flow model
 - Split ratio control with partial compliance
 - Noncompliant route choice = UE
 - Compliance rate of 30%



Preliminary results



Thank you for listening

Questions?