

Travel Modeling at MTC

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Outline

MTC is Developing an Activity-based Simulation Travel Model.

Comparing the Old and the New Travel Model.

Example Policy Analyses.

Questions.

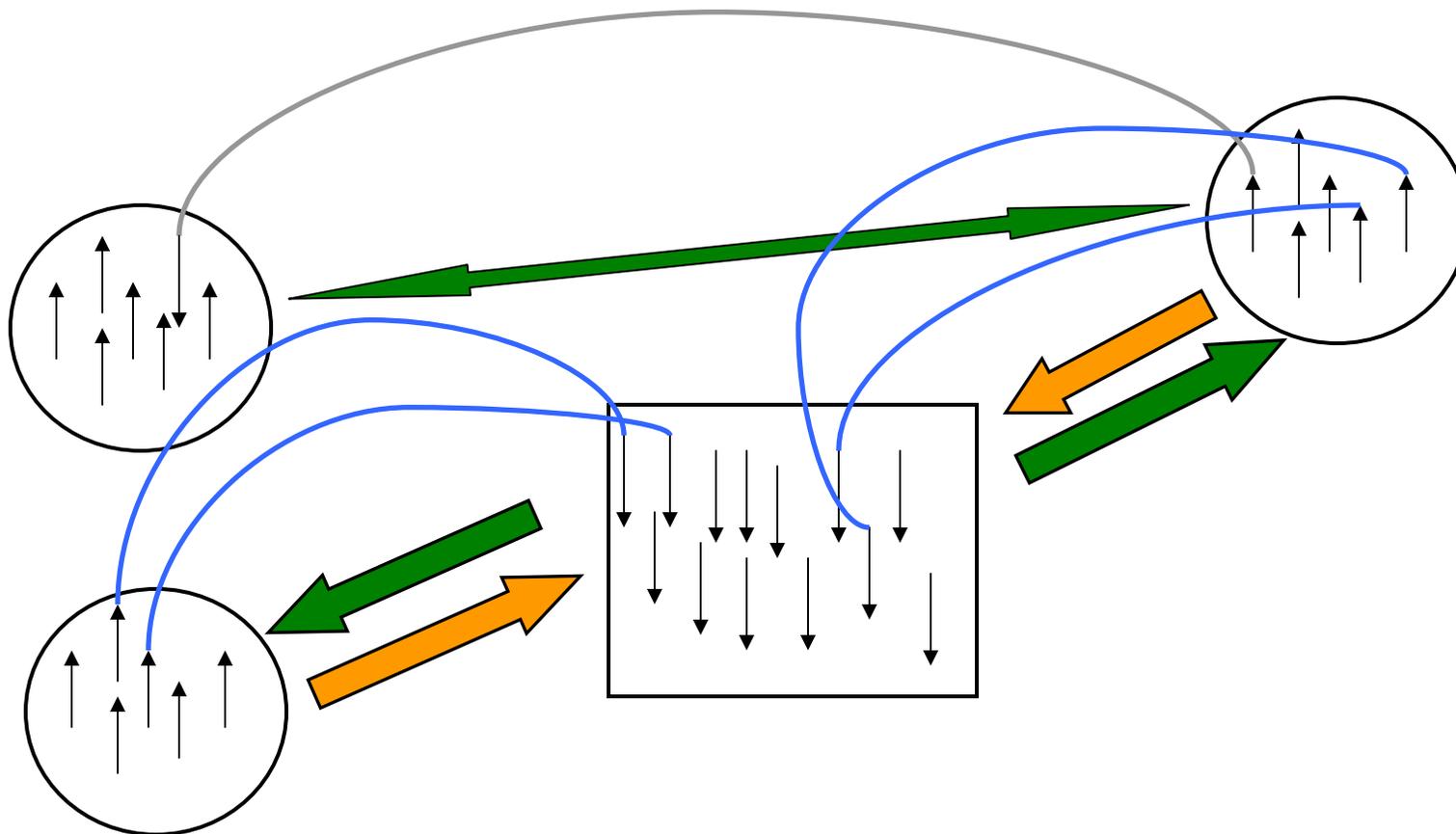
New Travel Model Development Schedule

Today through Summer. Calibration and Validation (i.e. turning the knobs such that the model replicates our best guess at reality)

Summer through Fall. Sensitivity Testing and Peer Review

January 2011. Ready to go

Trip-based Models in a Nutshell



Problems with Trip-based Models

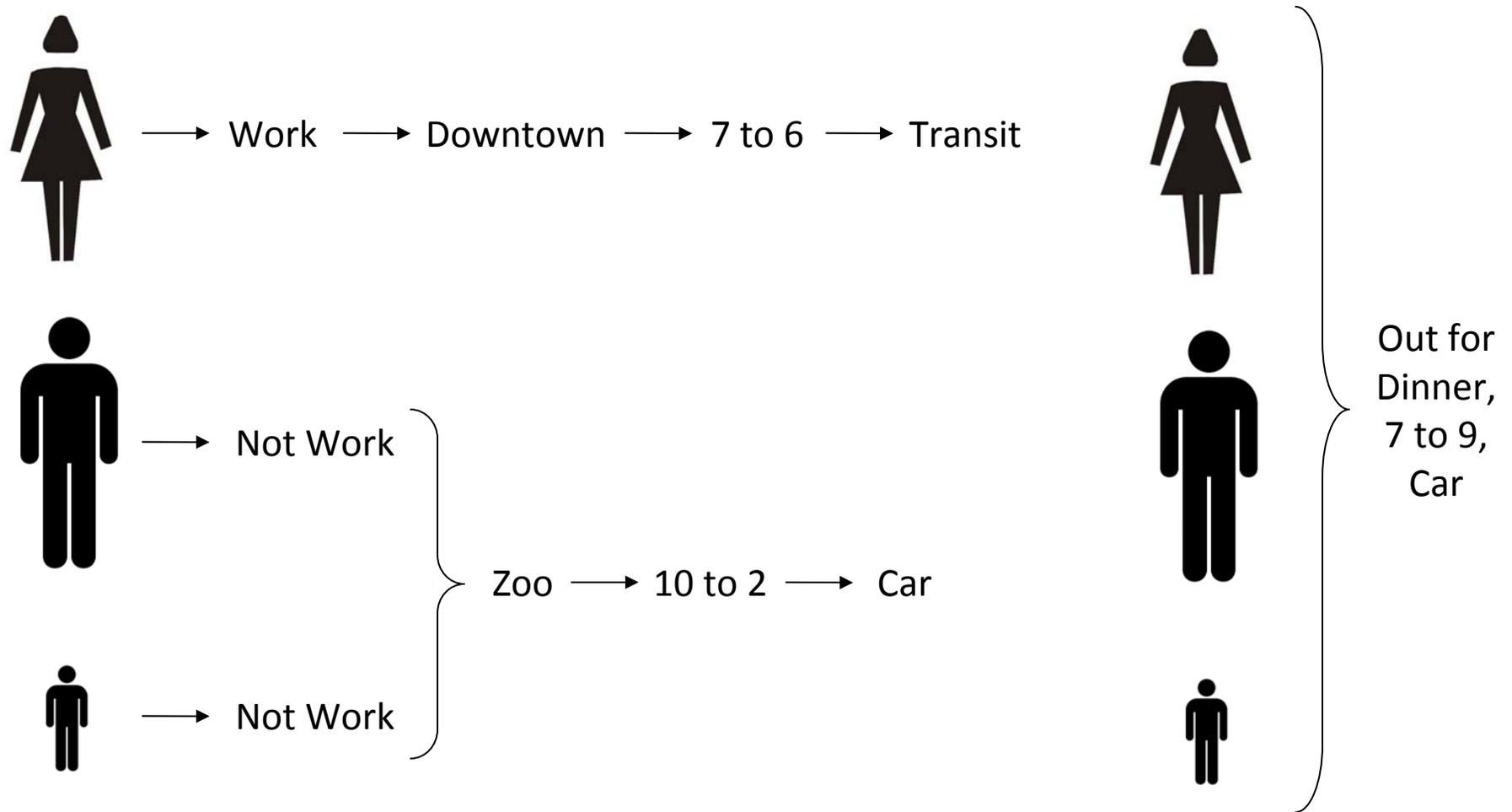
Aggregation. Bill Gates and I are, on average, obscenely wealthy.

Trip Independence. All the workers in zone A can commute to work via transit and travel to lunch in automobiles. A worker who stops for coffee is no longer traveling to work.

Scheduling. Diurnal distributions typically propagated to forecasts.

Household Dynamics. Someone needs to mind the baby.

Activity-based Simulation Models in a Nutshell



Advantages of Activity-based Simulation Models

No Aggregation. Bill Gates is incredibly wealthy; I am not. We make travel decisions accordingly.

Scheduling. Work and school travel scheduled first; joint and non-work/school travel scheduled in available time windows (both for individuals and for multiple household members traveling jointly).

Household Dynamics. Households make activity participation decisions together (e.g. if Adult A or B “chooses” to work, the other is more likely to stay home with the baby).

Improved Travel Mode Consistency. Transit commuters cannot drive alone to lunch. The model knows a commuter stopping for coffee is still going to work.

Market Segmentation. The synthetic population allows for the analysis of virtually any market segment (e.g., low-income single mothers in West Oakland).

Disadvantages of Activity-based Simulation Models

Operationally Demanding. There are a lot of choice models to calibrate; there are a lot of moving pieces to manage; and there is a lot of output to summarize.

Computationally Demanding. MTC uses four (4) fairly powerful computers.

Too Much Market Segmentation. The behavior of any specific market segment needs to be “validated” (i.e. compared to observed data) prior to being forecast; the model results will likely be used improperly.

Data Hungry. Though our previous (2000) household survey anticipated the development of an activity-based model, the data is not full enough to completely support model calibration.

Consistent, but not Perfectly so. Examples: casual carpool, parents taking children to school, household car sharing.

Policy Analysis and MTC's New Travel Model

Example One: Congestion Pricing. Relative to MTC's current travel model, the new analytical tool should offer the following advantages:

(1) *Scheduling.* Round-trip "tours" will be scheduled in full consideration of in-bound and out-bound travel conditions.

(2) *Mode Shifts.* Modes for round-trip "tours" will be selected in full consideration of in-bound and out-bound travel conditions.

(3) *Decision not to Travel.* Pricing policies will deter non-work/school peak period travel as well as some work/school peak period travel (i.e. increased telecommuting, more sick days).

(4) *Transit Representation.* Though not related to the model structure, MTC's new model will have a greatly improved representation of transit, including detailed path choice embedded in mode choice and short-/long-/no transit access zone segmentation.

Policy Analysis and MTC's New Travel Model

Example Two: Transit-oriented Development. Relative to MTC's current travel model, the new analytical tool should offer the following advantages:

(1) *Automobile Ownership.* Each of the below policy changes will reduce automobile ownership levels:

- Increased residential densities,
- Increased transit/walk competitiveness to work/school (relative to driving),
- Increased retail access via transit, and
- Increased retail access via walking/bicycling.

(2) *Transit Representation.* Non-spatial zone segmentation will provide a clearer picture of who does and does not have easy transit access until smaller zones can be implemented.

(3) *Market Segmentation.* Families with (particularly small) children get more utility out of owning an automobile.

Questions?