

# Integrating an Activity Based Model with a DTA model – the TRANSIMS Portland Application

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# Outline

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- Background
- Activity Generation Model
- DTA Model
- Integration Framework
- Results
- Conclusions

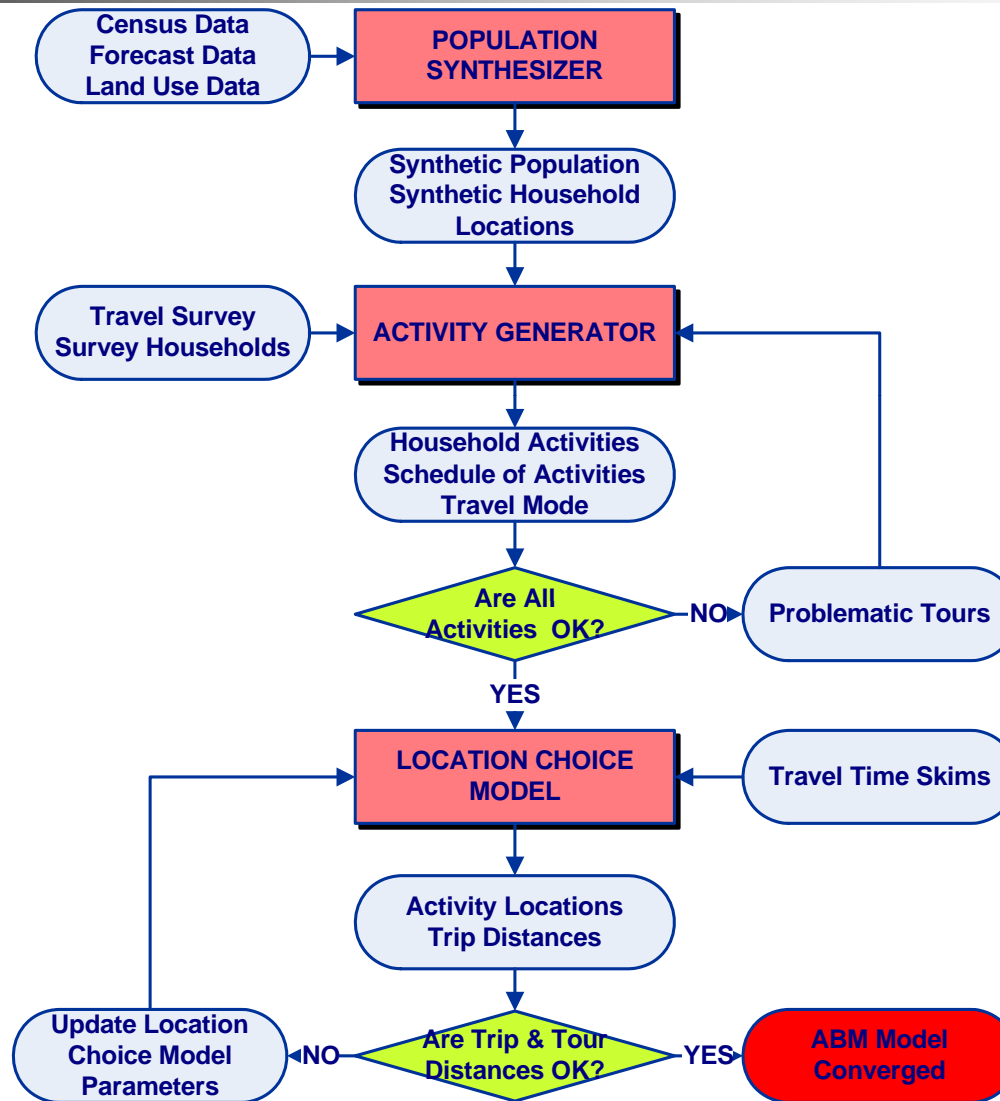


# Background

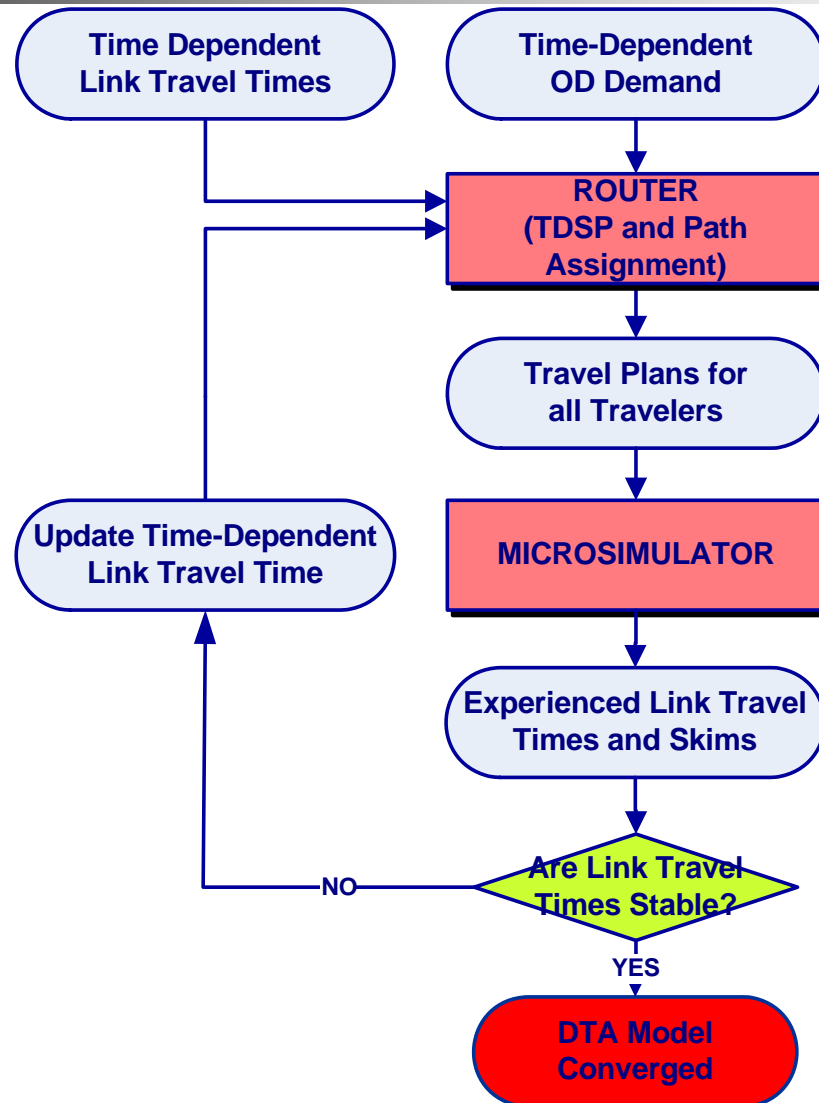
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- Supply and demand models have evolved separately
  - Supply models: DTA
  - Demand models: Activity Models
- Need to integrate models in a single platform to realize the benefits
  - TRANSIMS
  - CEMDAP-VISTA
  - Other

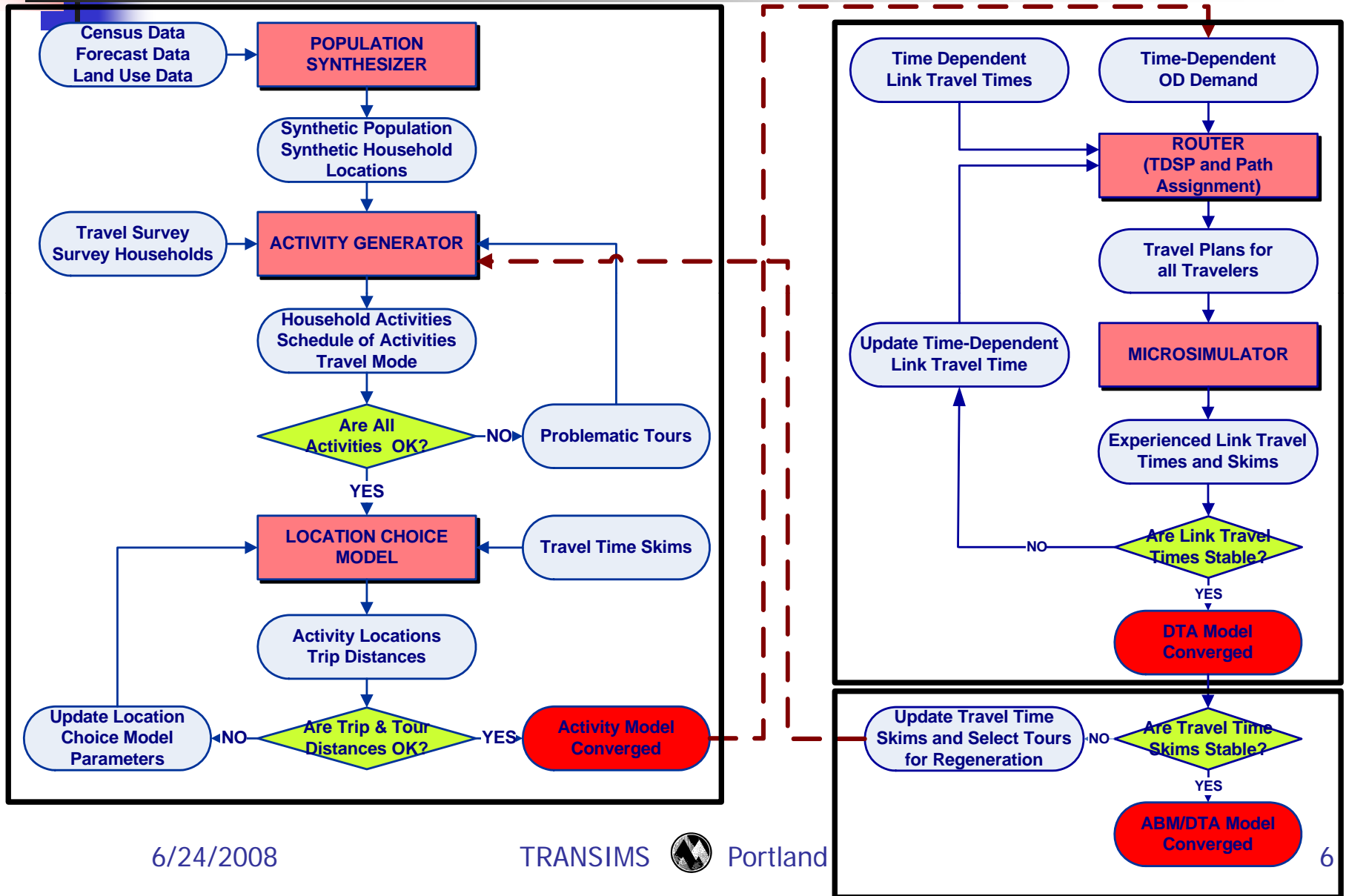
# TRANSIMS Activity Generation Model



# TRANSIMS DTA Model



# Solution Framework



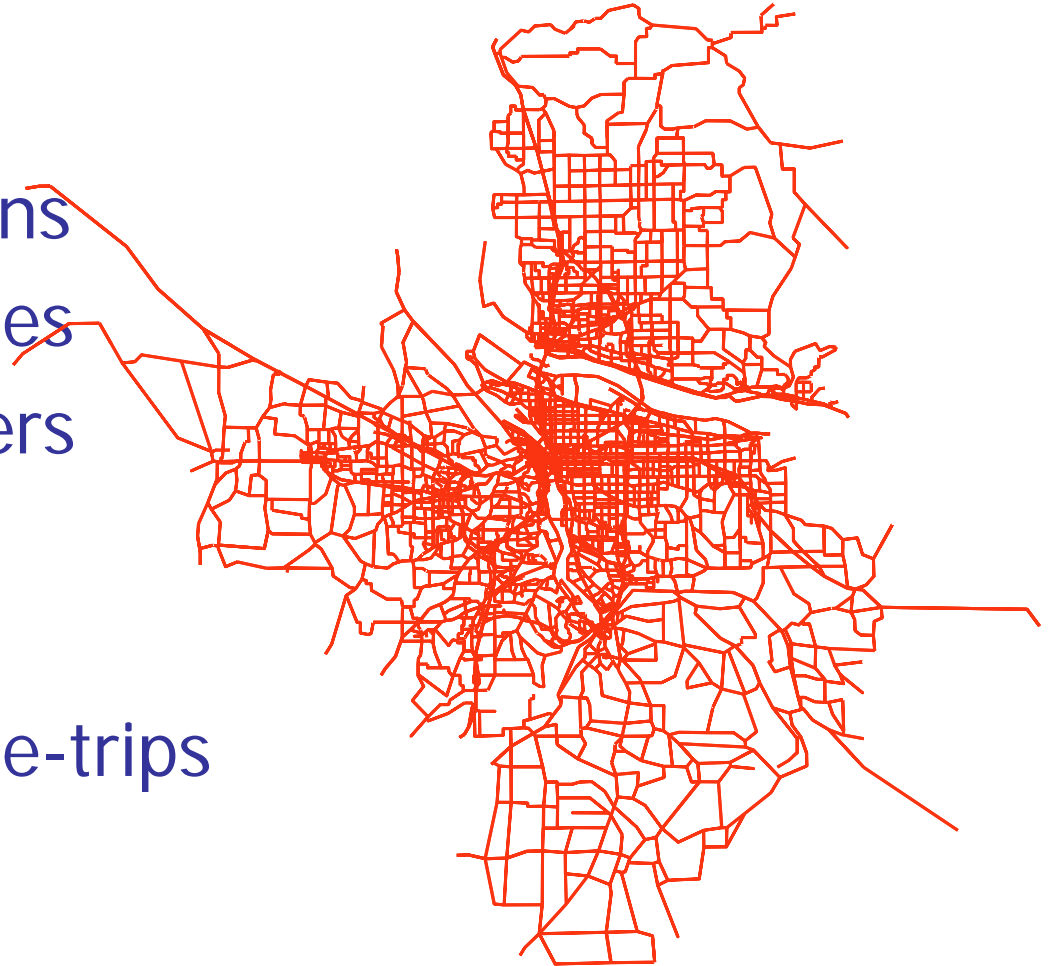
6/24/2008

TRANSIMS  Portland



# Portland Application

- 630<sup>k</sup> households
- 1.5 million persons
- 1.1 million vehicles
- 20<sup>k</sup> activity centers
- 16k links
- 6k nodes
- 4.2 million vehicle-trips





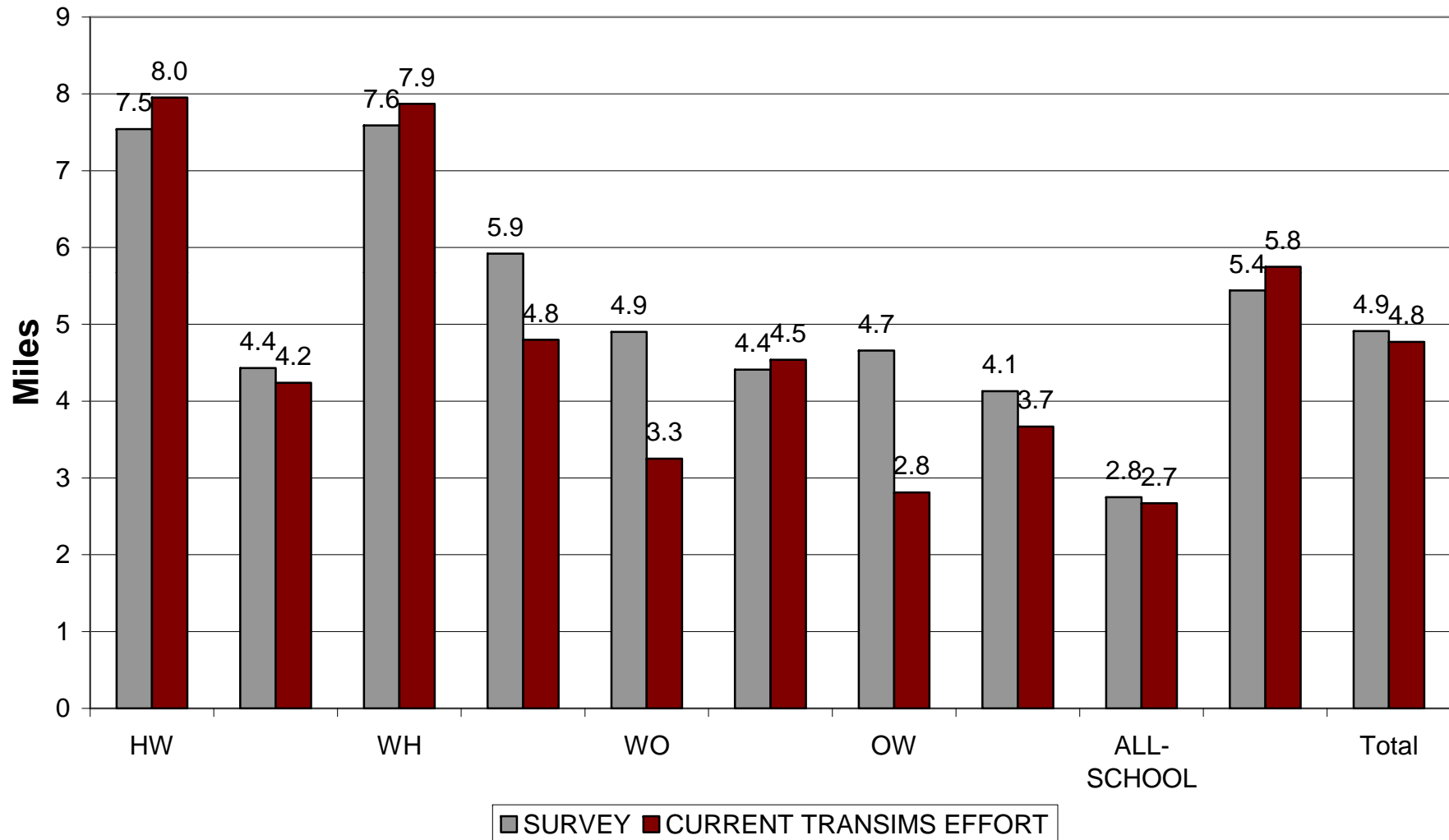
# Computer Processing Time

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- Solution is time consuming (for a single thread – 2.8 GHz)
  - Activity Generation Model: 13 hours (can be parallelized)
  - Router: 4 hours (can be parallelized)
  - Microsimulator: 6 hours (not ready for parallelization)
  - Activity Model: 8 iterations
  - DTA: 20-25 iterations
  - Activity Model - DTA: >10 iterations

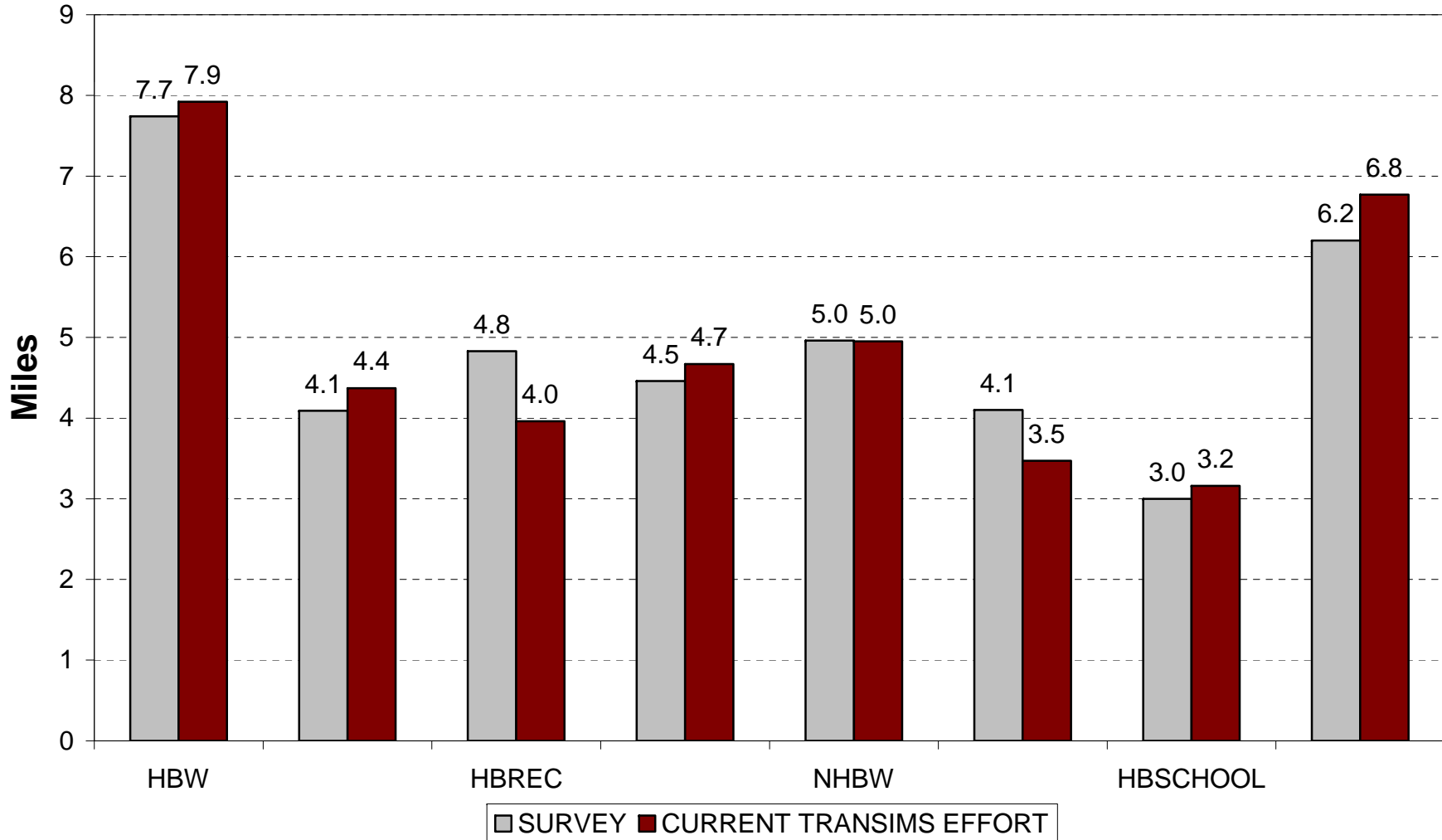
# ABM Calibration

## Mean Trip Distance

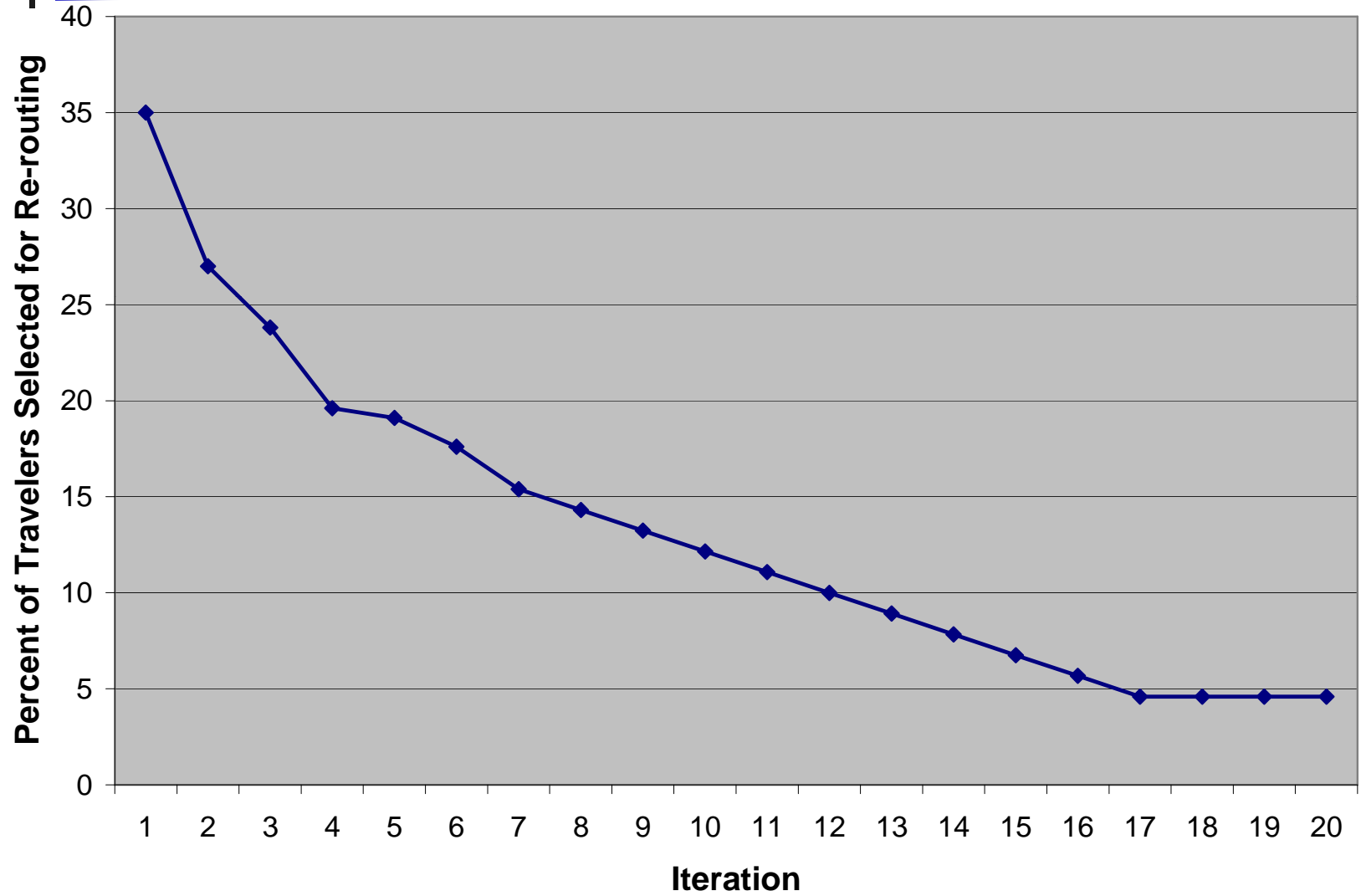


# ABM Calibration

## Mean One-way Trip Distance



# DTA System Convergence





# Link Counts Validation

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## Summary Statistics by Facility Type

Facility Type	Num.	-----Volume-----		---Difference---		--Abs.Error--		Std.	%	R	----V/C----	
	Obs.	Estimate	Observed	Volume	%	Avg.	%	Dev.	RMSE	Sq.	Avg.	Max.
Freeway	51	3128096	2874828	253268	8.8	11782	20.9	10774	28.2	0.553	0.43	0.75
Expressway	24	506450	409706	96744	23.6	5610	32.9	6532	49.8	0.871	0.37	0.66
Major Arterial	104	1563865	1143236	420629	36.8	5300	48.2	4515	63.2	0.519	0.37	0.80
Minor Arterial	82	559290	507048	52242	10.3	3177	51.4	3367	74.6	0.292	0.27	1.56
Collector	130	366139	462788	-96649	-20.9	1837	51.6	1477	66.1	0.219	0.15	0.65
Other	18	499418	286236	213182	74.5	11843	74.5	11254	101.4	0.716	0.57	1.01
<b>TOTAL</b>	<b>409</b>	<b>6623258</b>	<b>5683842</b>	<b>939416</b>	<b>16.5</b>	<b>4888</b>	<b>35.2</b>	<b>6457</b>	<b>58.2</b>	<b>0.873</b>	<b>0.36</b>	<b>1.56</b>



# Conclusions

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- Solution framework for integrating an Activity Model and DTA is presented
- Solution is iterative-based
- Only two full iterations have been performed
- We are matching trip distances (Activity Model) and link counts (DTA)
  - Additional solution dimension
  - Need to move in small “step” sizes
  - Trip distance calibration did not change much from (full) iteration to iteration



# Questions?

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