

# ***Adapting an Existing Activity Based Modeling Structure for the New York Region***

*presented to*  
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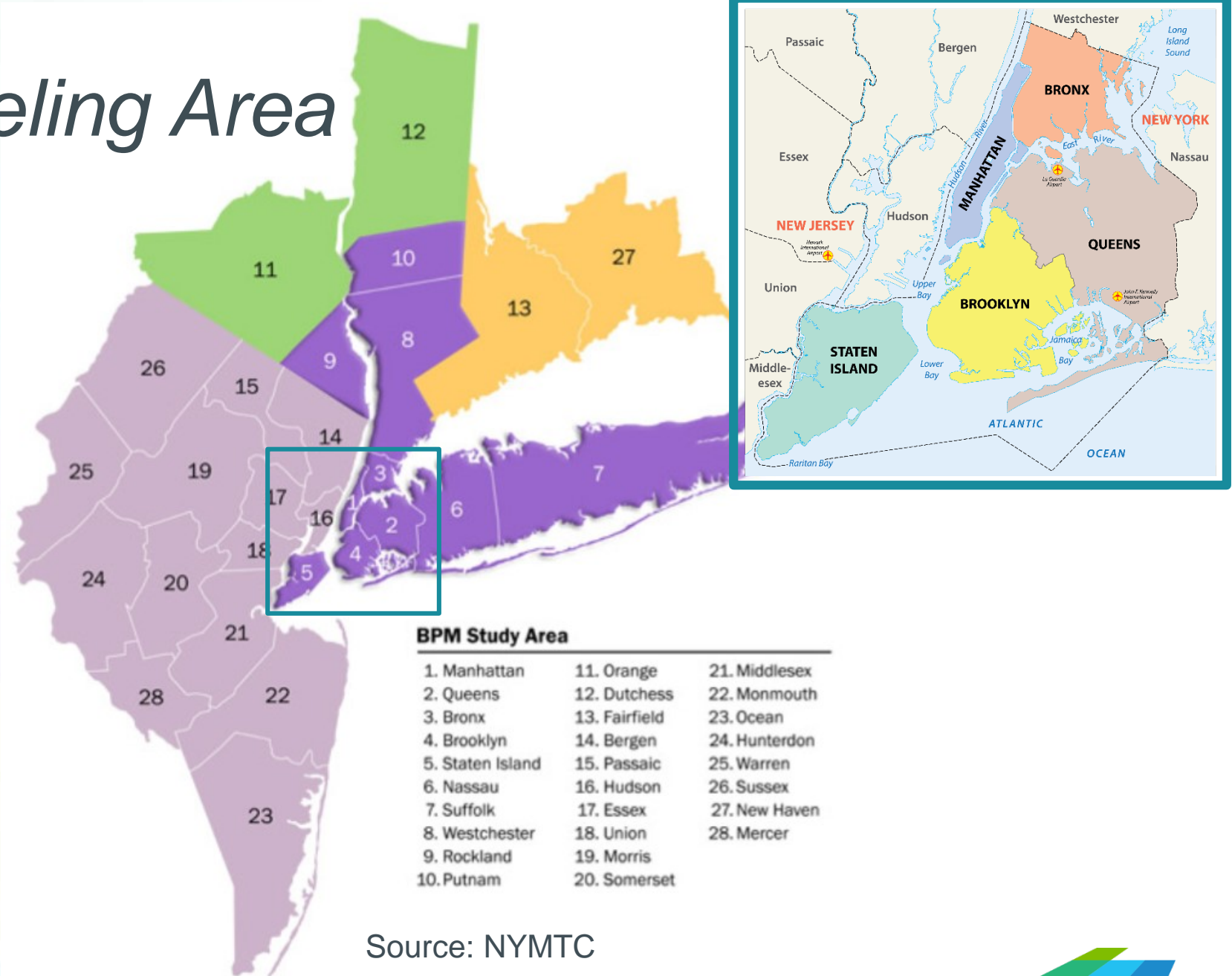
# *Outline of Presentation*

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- Characteristics of New York Region
- Background on Activity-Based Modeling Structure
- Model Structure Adaptation
  - » Overview
  - » Sub-region approach
  - » Mode choice changes
- Conclusion

# New York Modeling Area

- 20 million residents
- Very dense urban core, lower density suburbs
- High public transit share
  - » Much higher share within NYC



Source: NYMTC



# *Salient Characteristics of New York Region*



- NYC residents make fundamentally different long-term choices than residents of surrounding areas with similar socio-demographics
- Transportation system in NYC is vastly different from the rest of the region
- Region has wide variety of highly utilized transit options
  - » Serve a diverse swath of demographics and sub-areas within the region

Networks  
Land Use  
Travel Data

Scenario  
Definitions

Model  
Parameters

# TransCAD

User Interface / Skimming /  
Non-ABM Travel / Assignment

PopGen  
Synthesize Population

CEMSELTS  
Long-Term Choice

CEMDAP  
Daily / Tour / Trip  
Choice

TourCast Microsimulation  
Interface Platform

**NYMTC BPM 2012 Update**

Loaded  
Networks

Aggregate  
Demand

PostgreSQL  
Database  
Disaggregate Demand

# *Model Structure Adaptation*

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- Seamless integration with zonal structure and network/skim attributes
- Models were re-estimated with New York data
  - » NY Regional Household Travel Survey, Establishment Survey, NHTS for NY region
  - » Majority of models retained original SimAGENT structure
- Uniqueness of New York region led to:
  - » Taking a sub-region approach to some models
  - » Large changes to mode choice modeling

# *Sub-Regional Diversity*

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- Different sub-regions in New York region displayed very different choice behaviors (based on survey data)
  - » Manhattan
  - » Rest of New York City
  - » Outside New York City
- Particularly for longer-term choices
- Difference apparent even after controlling for accessibility, built environment

# *Example – Models Segmented by Sub-Region*

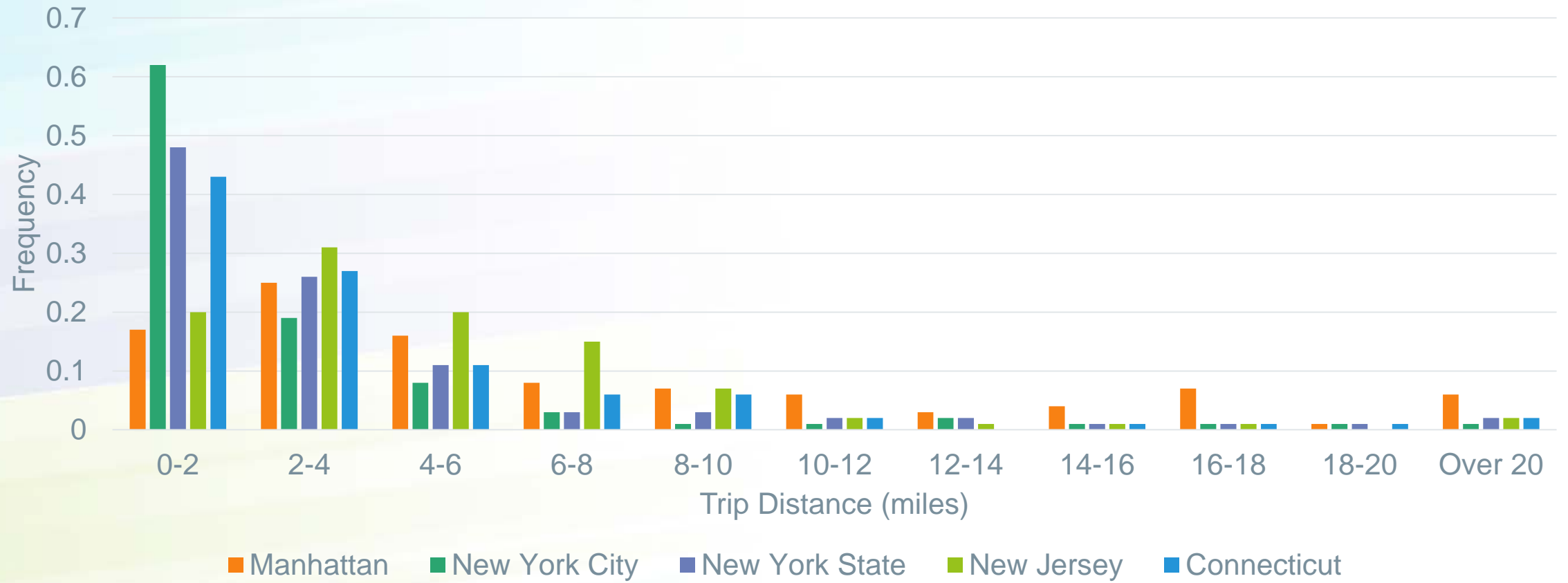
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- Household Tenure (own/rent)
  - » Income plays bigger role for those outside NYC
  - » Children & Education play bigger role for those living in NYC
- Housing Type (apartment, Single-family)
  - » Baseline housing types very different in NYC
  - » Renters outside NYC impacted more by presence of children than owners outside NYC



# School Locations

➤ Manhattan children travel farther for school



# Mode Diversity in New York

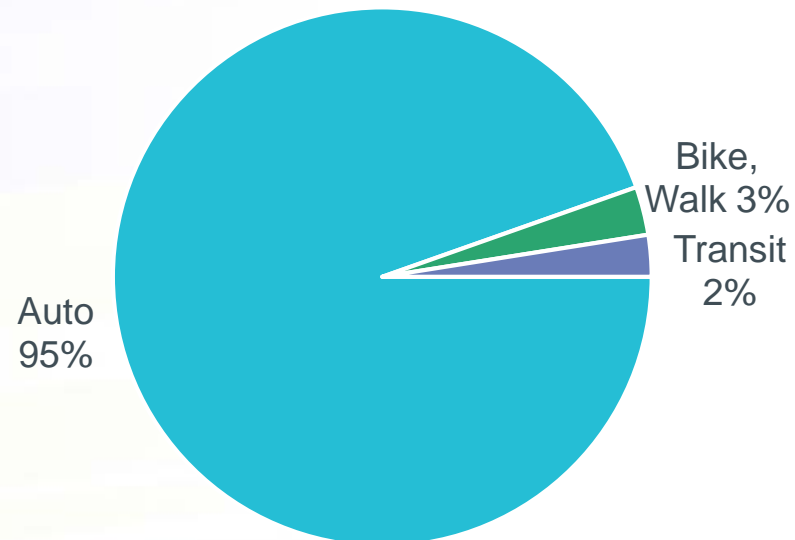
➤ NY region required richer mode alternative specifications than earlier SimAGENT implementations

- » 3 auto modes
- » Taxi
- » Walk
- » Bike
- » 6 transit modes

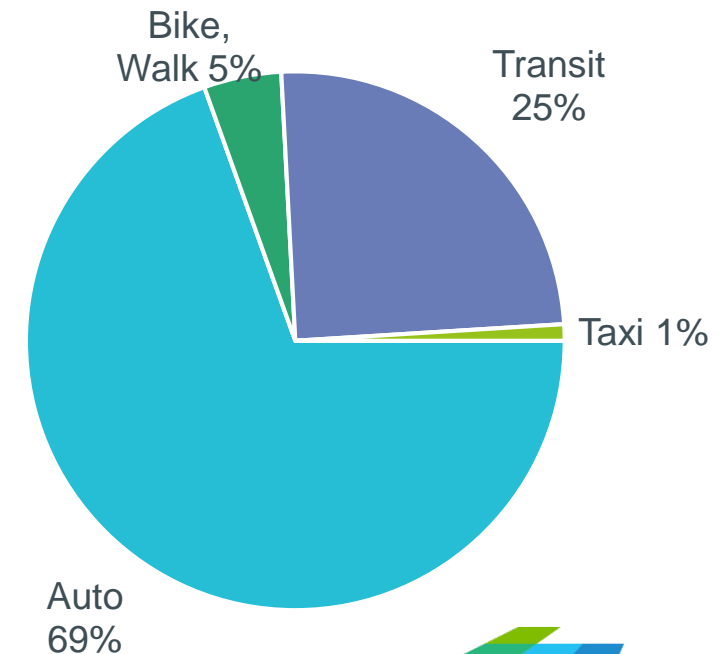
➤ Competitiveness

- » Mode impedances

Los Angeles Commutes

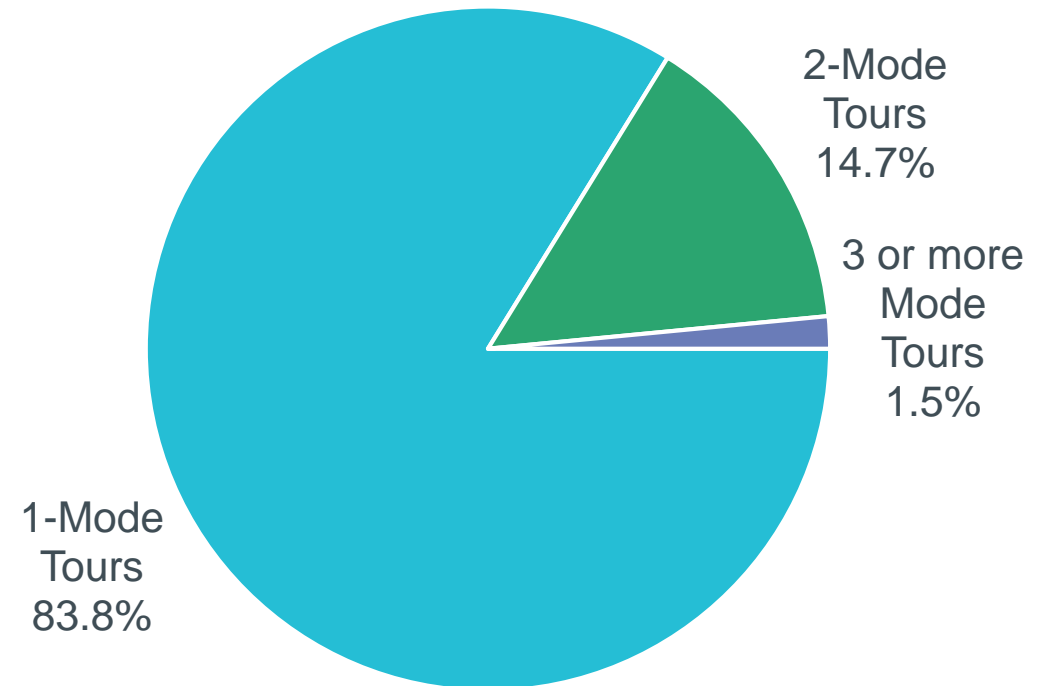


New York Commutes



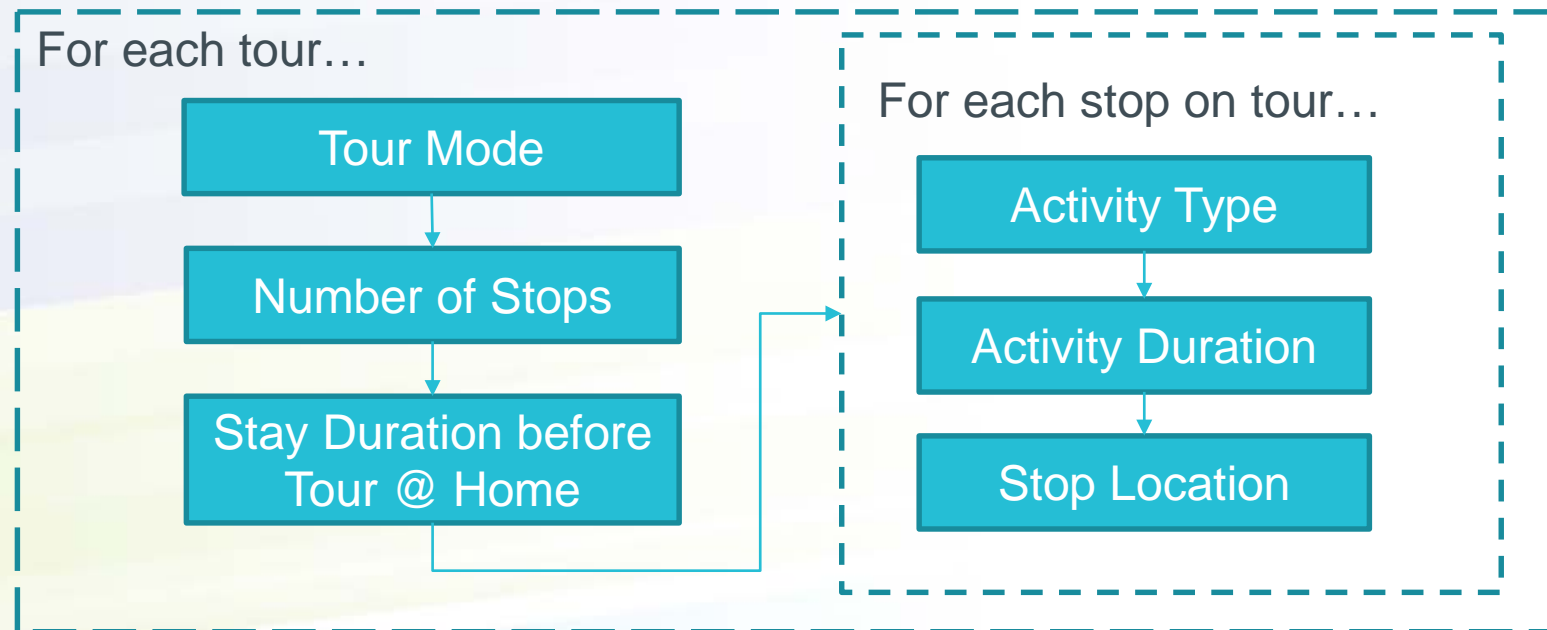
# Mode Switching

- NY sees a lot of mode switching within tours
- Some ABMs consider mode switching loosely
- Added mode switching behavior to SimAGENT



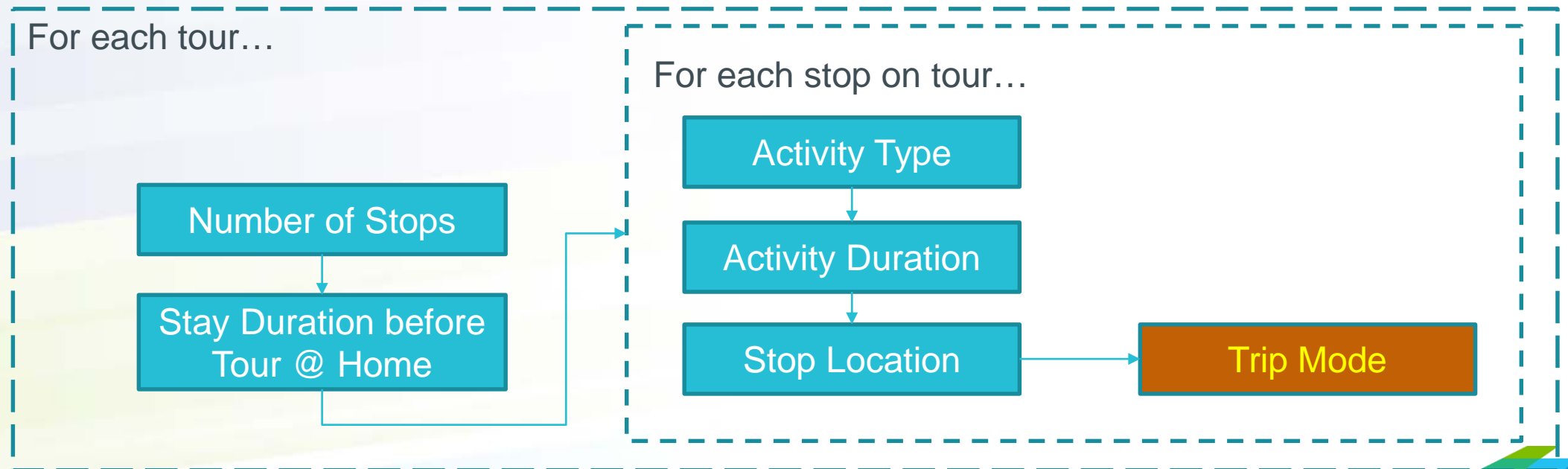
# SimAGENT Mode Modifications

- For commuting, a trip mode choice model was easily added to the model stream (conditional on chosen tour mode)
  - » This is similar to how other ABMs handle trip mode
- For other tours, SimAGENT model chain:



# SimAGENT Mode Modifications

- For commuting, a trip mode choice model was easily added to the model stream (conditional on chosen tour mode)
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- Adjustment to model chain:





# Mode Choice Estimation Findings

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## ➤ Key variables

- » Level of service & transit accessibility at destination
- » Previous modes used on tour
  - Particularly important since tour modes not modeled
- » NYC & Manhattan
  - Increased transit, taxi, non-motorized modes usage
  - City indicator variables over and above impacts of accessibility
- » Strong & clear nesting across estimated models
  - Auto, transit, non-motorized, taxi

# Conclusions

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- SimAGENT is a robust model system
  - » Much of model structure was unchanged
  - » Importance of analyzing region-specific data against modeling processes
- NYC is unique in U.S. & offers particular challenges for any model system
  - » Diversity of socio-demographics
  - » Diversity of travel options (particularly mode)
- New challenges may emerge as model is implemented & validated