

Portland State University

**PDXScholar**

---

PSU Transportation Seminars

Transportation Research and Education Center  
(TREC)

---

4-17-2015

# DASH: The Portland Region's Next-Generation Activity-Based Model

Richard Walker

*Metropolitan Service District (METRO) of Portland.*

Follow this and additional works at: [https://pdxscholar.library.pdx.edu/trec\\_seminar](https://pdxscholar.library.pdx.edu/trec_seminar)



Part of the [Transportation Commons](#), [Urban Studies Commons](#), and the [Urban Studies and Planning Commons](#)

**Let us know how access to this document benefits you.**

---

## Recommended Citation

Walker, Richard, "DASH: The Portland Region's Next-Generation Activity-Based Model" (2015). *PSU Transportation Seminars*. 24.

[https://pdxscholar.library.pdx.edu/trec\\_seminar/24](https://pdxscholar.library.pdx.edu/trec_seminar/24)

This Book is brought to you for free and open access. It has been accepted for inclusion in PSU Transportation Seminars by an authorized administrator of PDXScholar. Please contact us if we can make this document more accessible: [pdxscholar@pdx.edu](mailto:pdxscholar@pdx.edu).




***DASH*: Dynamic Activity  
Simulator for Households**

**PSU Transportation Seminar**


**April 17, 2015**

**Richard Walker, Metro**





**DASH** is the next generation activity based model being developed for the Research Center. This model will be used extensively in estimating the travel response by individuals to policies and infrastructure investments. Includes enhanced consideration of:

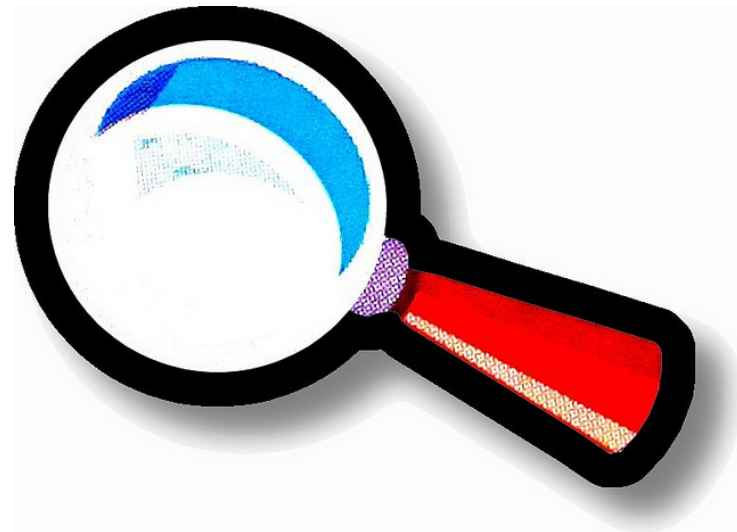
- Socio-economic roles of individuals
  - Temporal dynamics
  - Intra-household dependencies
- 

# ***DASH: Development Team***

- Consultant: Resource Systems Group (RSG)  
Dr. John Gliebe
- Metro Research Center Project Leads  
Richard Walker  
Cindy Pederson  
Bud Reiff

# ***DASH: Discussion Outline***

- Issues motivating the design
- Key elements
- Framework
- Status



# ***DASH: Designed to Better Address Policy Issues***

- **VMT reduction**
  - Better identifies if/how travelers would react to policies/investments (e.g., modal options, time constraints, household obligations)
- **Toll assessment**
  - Travelers have roles – unique VOT. Leads to better toll sensitivity
- **Emission reduction**
  - Improved demand/speed estimation by hour. Emissions can be traced to “home” location

# ***DASH: Designed to Better Address Policy Issues (2)***

- **Mobility**
  - Multi-modal access to jobs, shopping opportunities, and recreation
- **Equity**
  - The individual is the focus. Much better suited to address impacts by market groups (e.g., income, age, transit dependency)

# ***DASH: Key Features***

- Modeling **individuals** – not households
- All the daily travel for the individual is expressed in terms of **tours** (e.g., home-shop-work-home)
- Individuals have **“roles”** – influences trip start time tendencies, value-of time, modal preferences
- **Carpool obligations** (intra-household travel dependencies)



# ***DASH: Key Features (2)***

- “**Internal clock**” within model. Influences decision regarding trip departure times, infrastructure system characteristics, etc.
- Travel choices influenced by level of service, costs, and other characteristics **at the time of the journey**

# ***DASH: New Possibilities***

- Focus on individual facilitates **equity** analysis
- Concept of Individual travelers in unique cars links well with **dynamic traffic assignment**.
- **Population synthesizer** – improved integration with MetroScope
- Much **more than a travel model**. Examples:
  - Zonal population (by time-of-day, age, income, roles, etc)
  - Auto locations by time-of day

# ***DASH: New Sensitivities***

- Many potential **reactions to stimuli**
  - Time of day shifts
  - Trip chaining (linked trips)
  - Activity patterns and destination choices
  - Mode choices
- Accounts for time and location requirements dictated by **rideshare arrangements**

# DASH – Role Choice

- stay at home all day
- child pre K-12
- K-12 no school non-driver
- K-12 school non-driver
- K-12 no school driver not working
- K-12 no school driver working
- K-12 school driver not working
- K-12 school driver working
- college student not working without children
- college student not working with children
- college student part-time working without children
- college student part-time working with children



# ***DASH* - Role Choice (2)**

- adult full-time working with college without children
- adult full-time working with college with children
- adult not working no college without children
- adult not working no college with children
- adult full-time working no college without children
- adult full-time working no college with children
- adult part-time working no college without children
- adult part-time working no college with children
- adult planned joint activities

# DASH: Importance of Roles

- Tour patterns
- Trip start times
- Value of time
- Modal preferences



## TO DO LIST

(How to have an extraordinary day in the classroom)

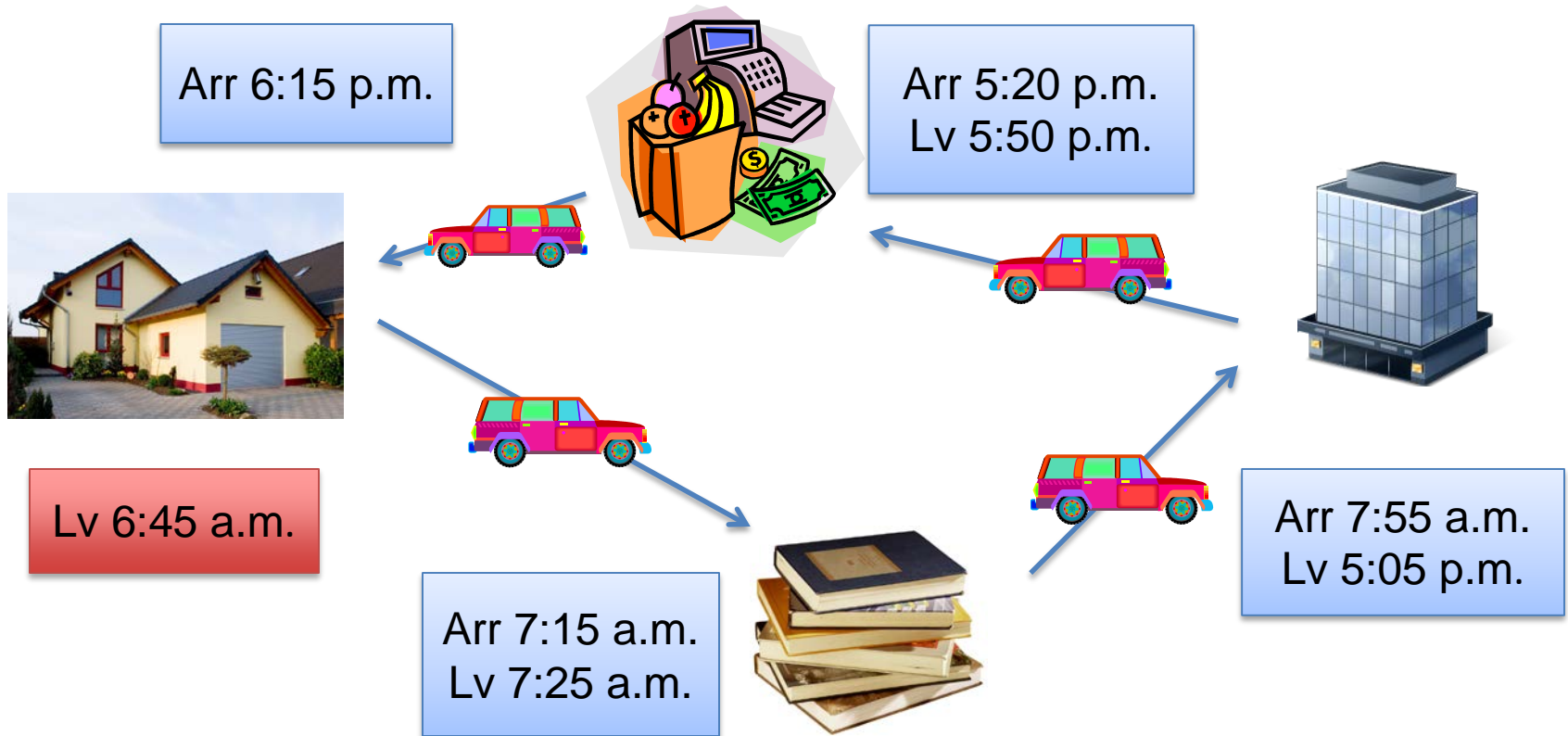
- write a kid to lunch and have a conversation with them
- leave a positive note in a colleague's mailbox just because
- Take an extra lap in the hallway in the morning and smile and say 'good morning' to every kid and adult you see
- call a parent and tell them something positive about their child
- get out your phone and take photos of all the things in your classroom that make you smile
- go to the library and get your favorite book from when you were a kid. Read it to your class.
- give your class a pile of junk and 15 minutes to create something. just stand back and watch.
- Teach like it's the best day of your career. IT JUST MIGHT BE.



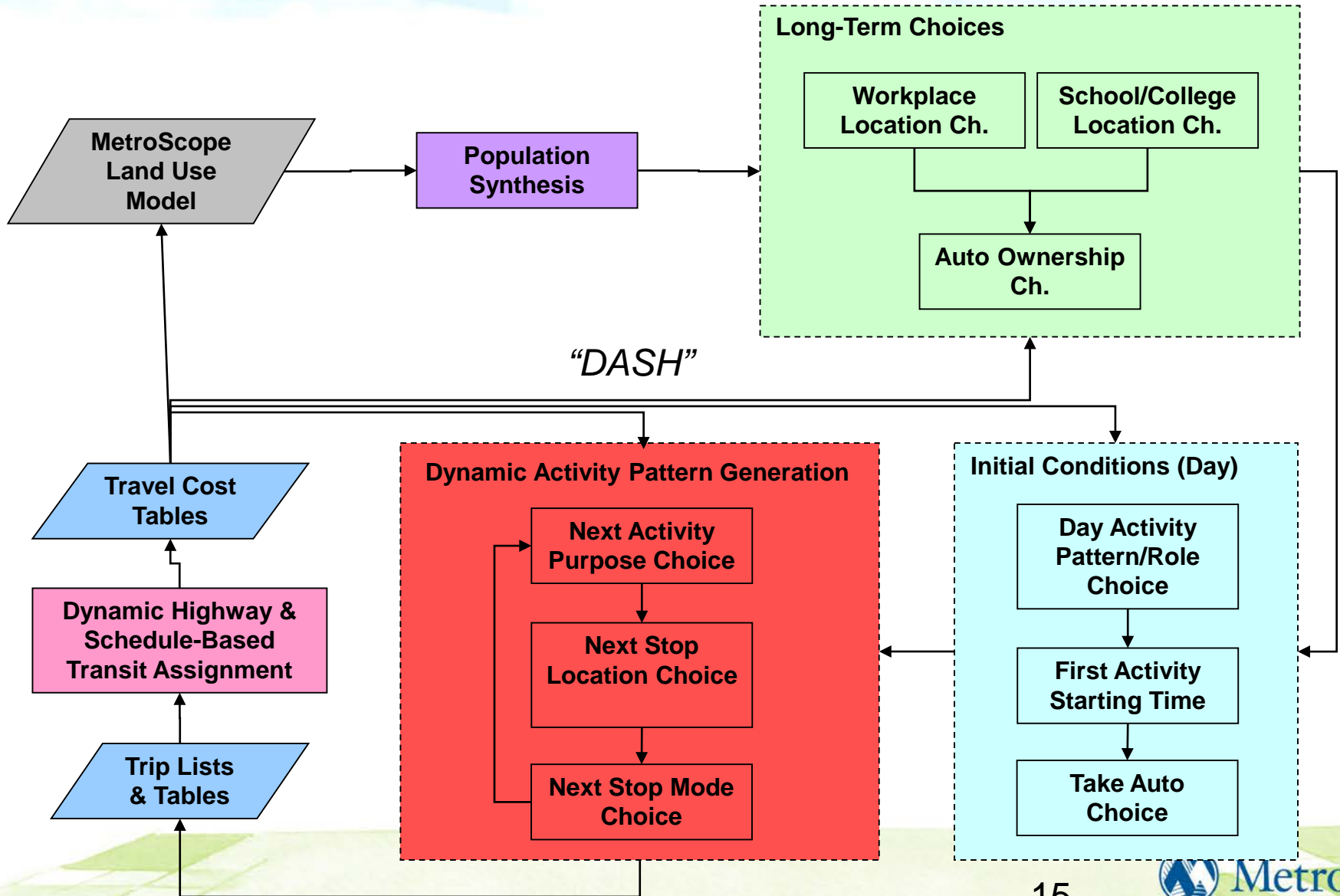


# DASH: Tour Concept

Mode, activity location, and schedule



# DASH: Conceptual Design





# DASH: Activity/Travel Logs

- Looks very much like a household trip diary!
  - Can be queried to produce summaries of activity/trip attributes by:
    - tour, mode, zone, zone pairs, activity type, time of day, person type, household types, etc.
  - Can be queried to produce trip tables for network assignment

pid	hhid	time	activity	location	tdist	ttime	mode	role	duration
1	200169	539	Workng	965	3.445	10.869	da	2	401
1	200169	949	SocRec	611	3.485	9.766	da	2	101
1	200169	1053	EndHom	611	0.549	3.554	da	2	386

# ***DASH* - Status**

- Currently under development.
- Schedule
  - Model estimation using 2011 survey – now
  - Model sensitivity testing – July 2015 thru March 2016
  - Model acceptance program – July 2015 thru July 2016



**Happy Modeling!!!**

