



# 2014 Ground Transportation Technology Symposium: Big Data and Innovative Solutions for Safe, Efficient and Sustainable Mobility



Urban Mobility Management, Planning and Operations with  
Big Data Analytics  
Presented by Vassilis Papayannoulis, Ph.D.



# Travel Demand Management

- A general approach to influence people's travel behavior.

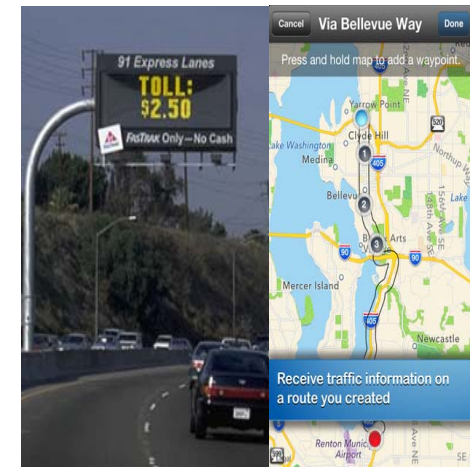
1980's



1990's



2000's



# What is the Big Idea Behind Metropia?



**Metropia** is an incentive-based intelligent traffic management platform that engages commuters, businesses, employers and governmental agencies to work together to improve mobility, reliability and quality of life.



# Metropia Ecosystem: Community-Based and Incentivizing Change





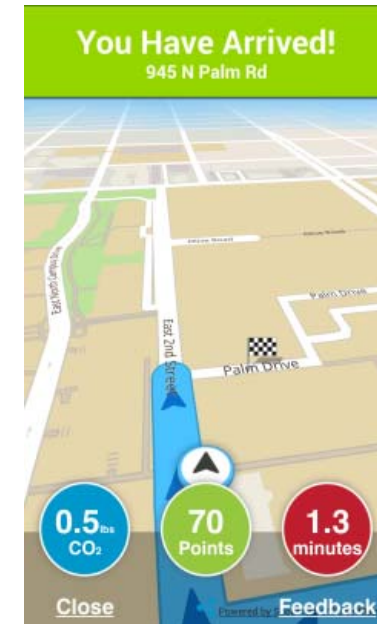
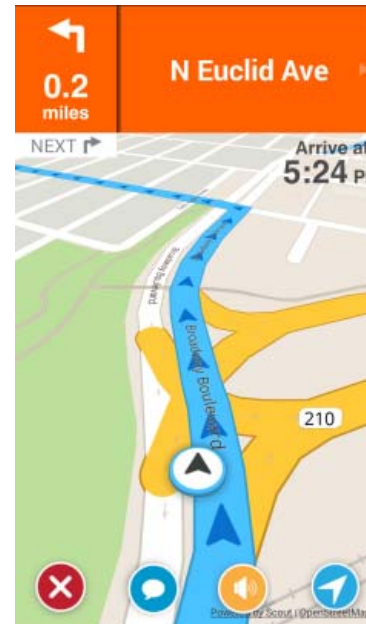
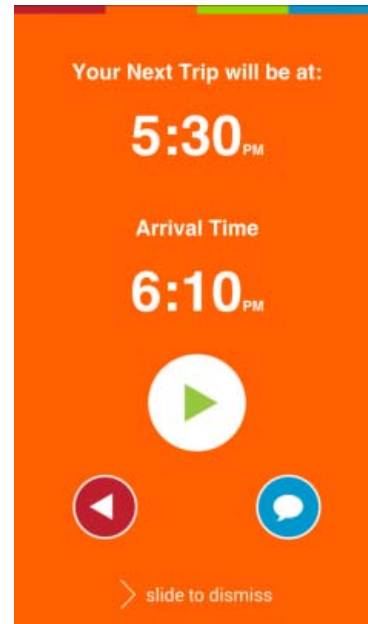
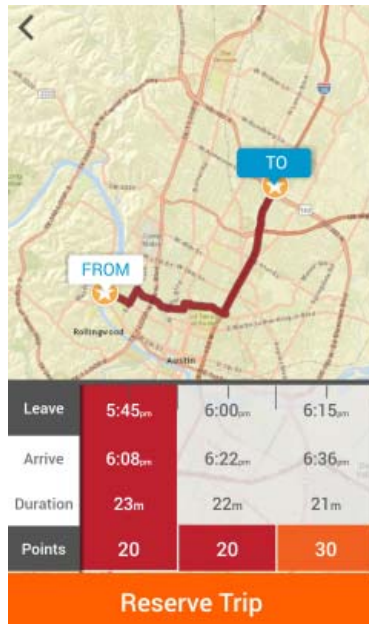
- A solution for a sustainable, safe and efficient transportation system
- Provides information for smarter decisions via a mobile app
- Uses real-time + historical data and travel prediction technology
- Incentivizes users, by earning points—more points earned for shifting departure out of peak period or taking an alternate route
- Deployed (beta-test) in Los Angeles, CA and Austin, TX
- Will be deployed (beta-test) in NYC (NYCDOT's DriveSmart program)



# Predictive Optimal Routing and Load Balancing

Reserve

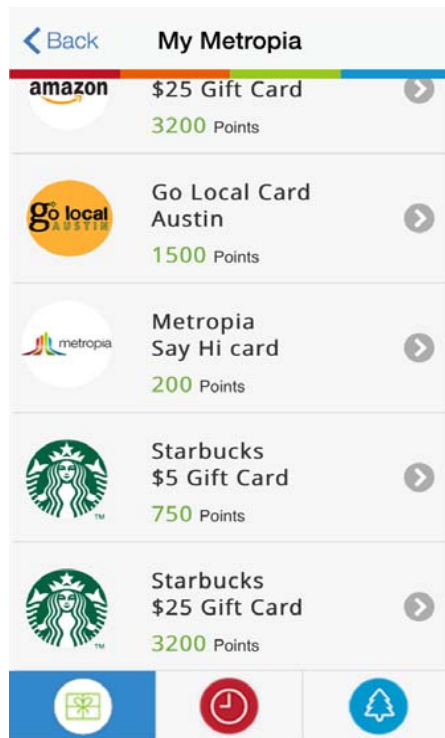
Validate





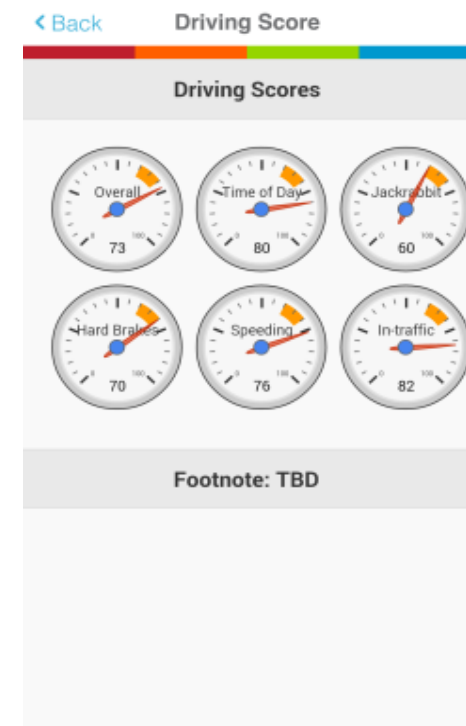
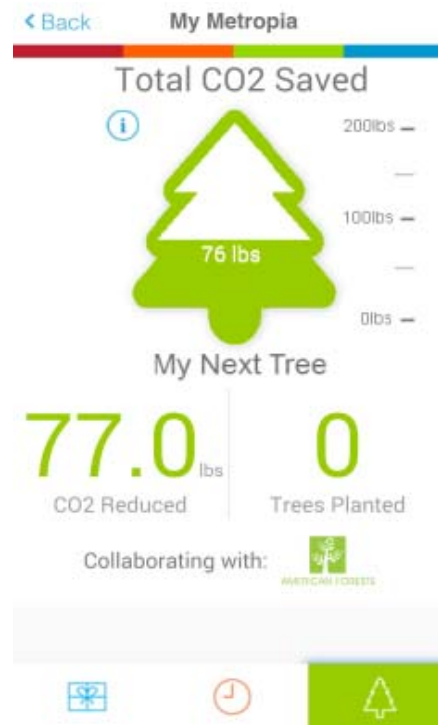
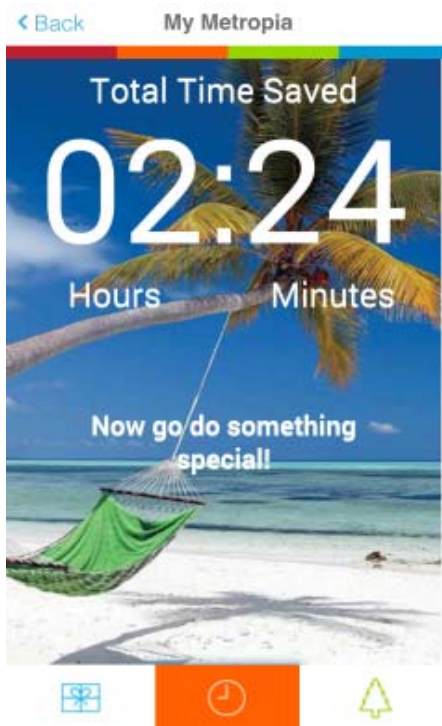
# Metropia's Gamification Features

- Earning Points can be exchanged for local merchant rewards or to plant trees



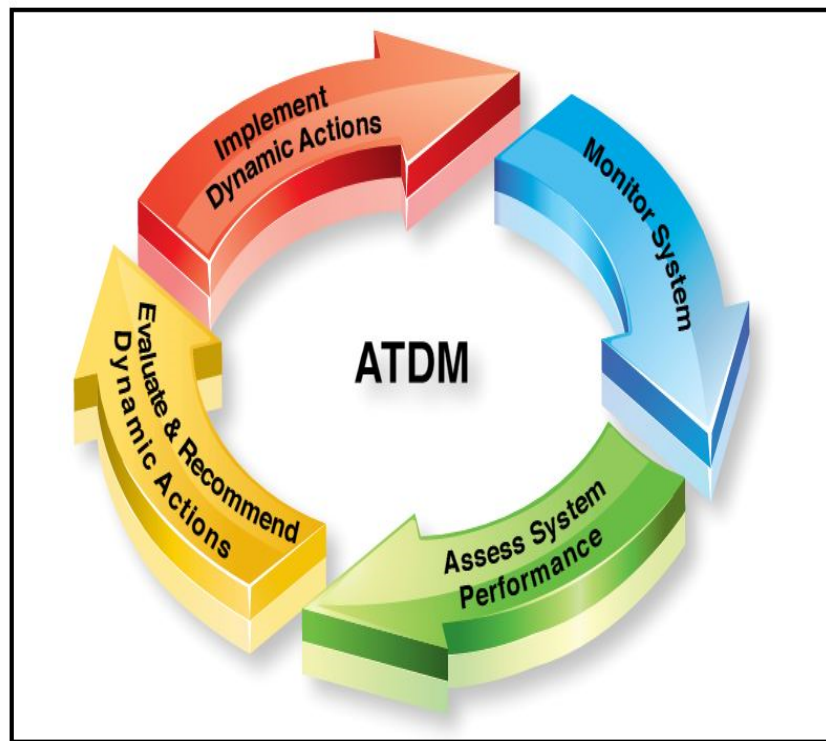
# Metropia's Gamification Features

- Users also get CO2 and Time Savings and Driving Scores





# Consistent with the ATDM & ICM Frameworks



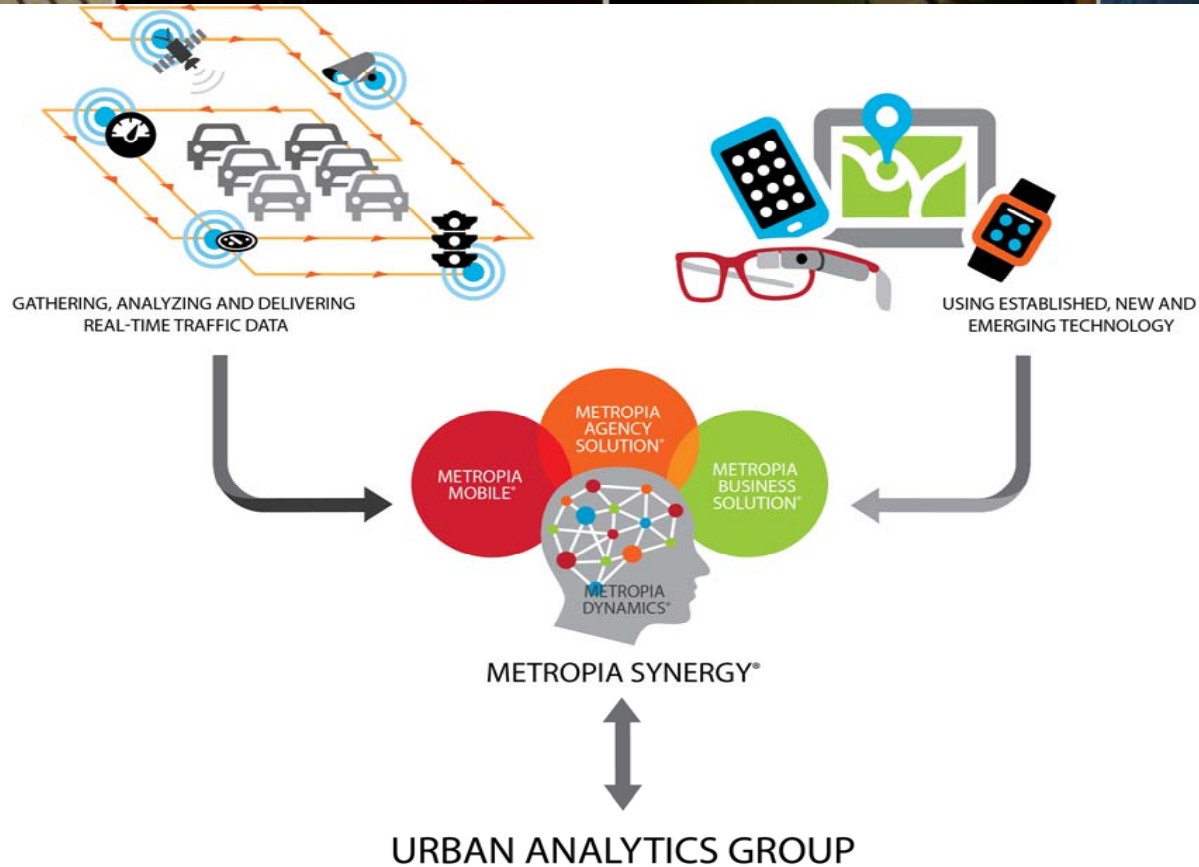
Source: ATDM Program Brief: An Introduction to Active Transportation and Demand Management, FHWA, June 2012



[Source: Research and Innovative Technologies Administration, ITS JPO.]

Source: FHWA Traffic Analysis Toolbox  
Volume VIII : Integrated Corridor Management  
Analysis, Modeling and Simulation Guide

# Metropia Synergy & Big Data Analytics



LARGE VENUE/EVENT  
TRANSPORTATION PLANNING



TRANSPORTATION SYSTEM  
OPERATIONS



MULTI-MODAL  
SOLUTIONS



ANALYTICS AND  
DECISION SUPPORT



# Metropia Synergy Data Applications

- Active Transportation Demand Management
- Traveler Information
- Origin-Destination Surveys
- Corridor Travel Times & Speeds
- Travel Patterns Analysis
- Activity history and patterns
- Reliability Measures
- Driving Behavior
- Safety Analysis
- User Based Incentive Policies
- Transit Lead Generation

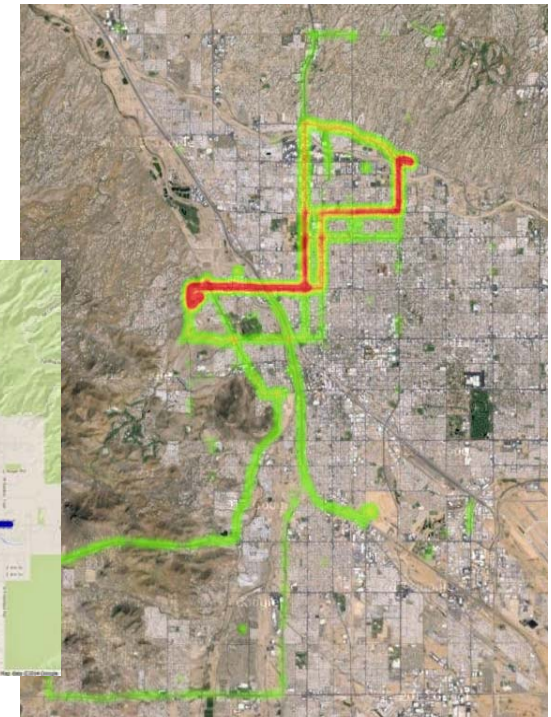
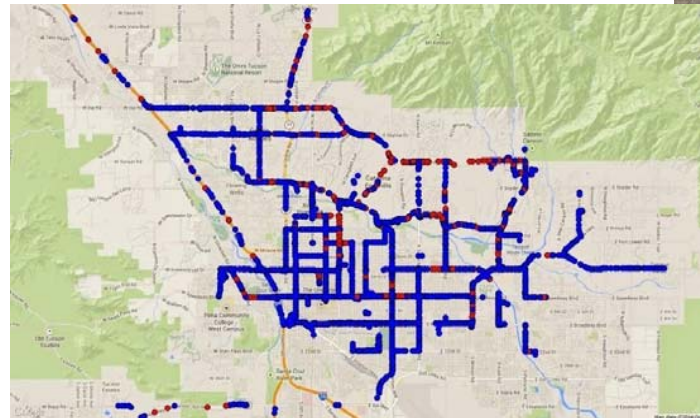




- Visualization

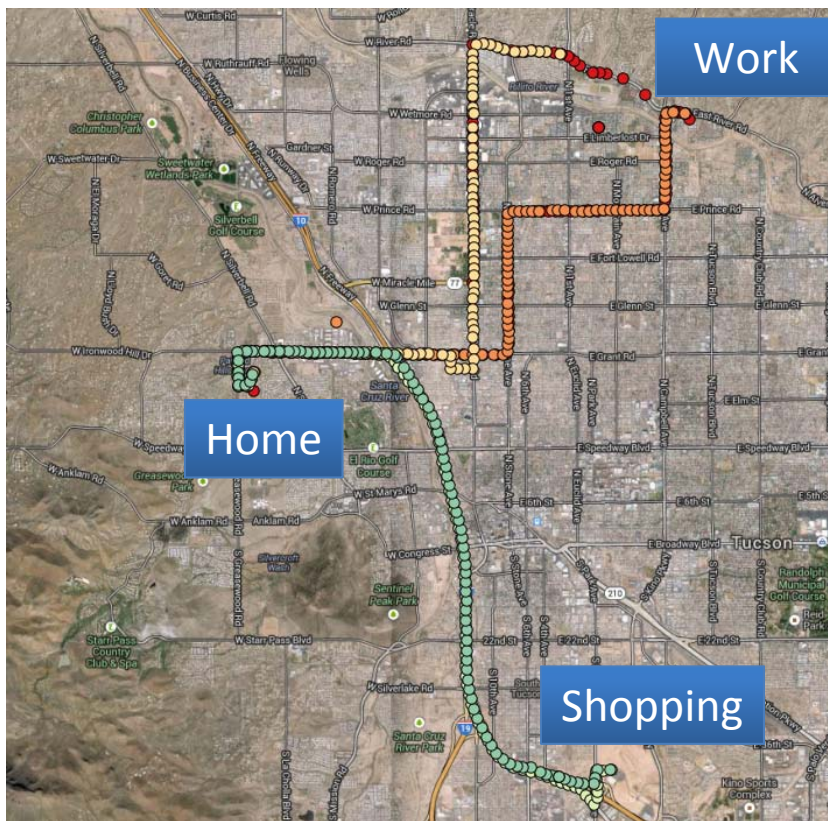
Latitude	Longitude	Altitude	Heading	Speed (mph)	Acceleration (ft/s <sup>2</sup> )	Time stamp
32.25037003	-110.9282074	2351.0	272.1	34.7	-0.5	4/9/2014 7:58:11 AM GMT-7
32.2503624	-110.9283981	2350.4	269.9	36.4	2.5	4/9/2014 7:58:12 AM GMT-7
32.2503624	-110.9285736	2349.4	269.8	36.9	0.8	4/9/2014 7:58:13 AM GMT-7

- Second-by-second GPS Trajectory Sample Data

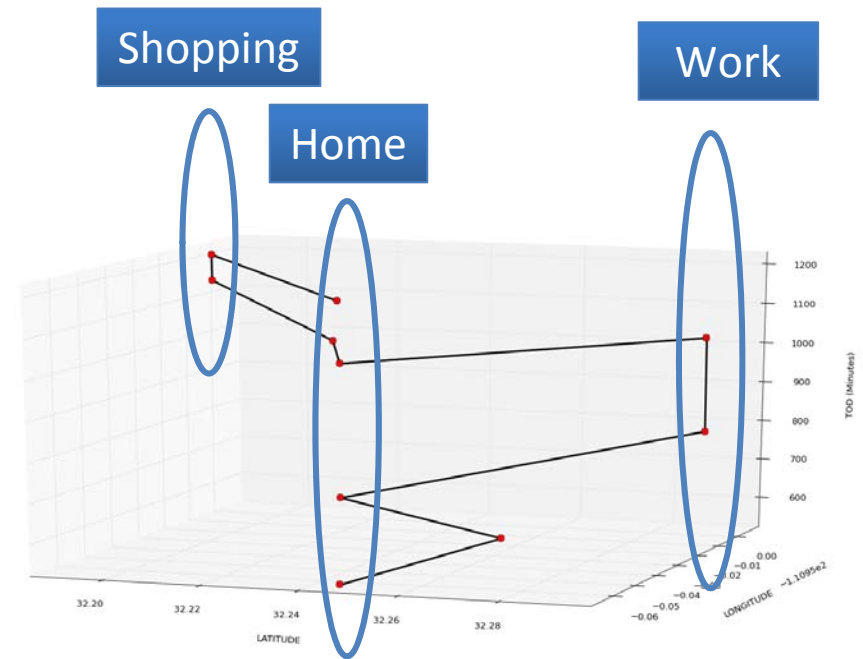





- Activity History



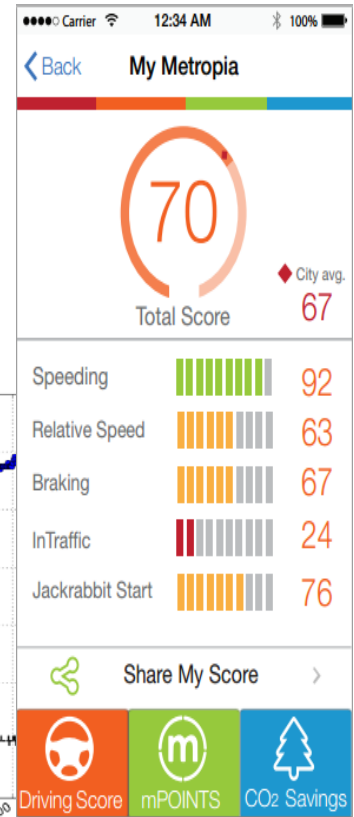
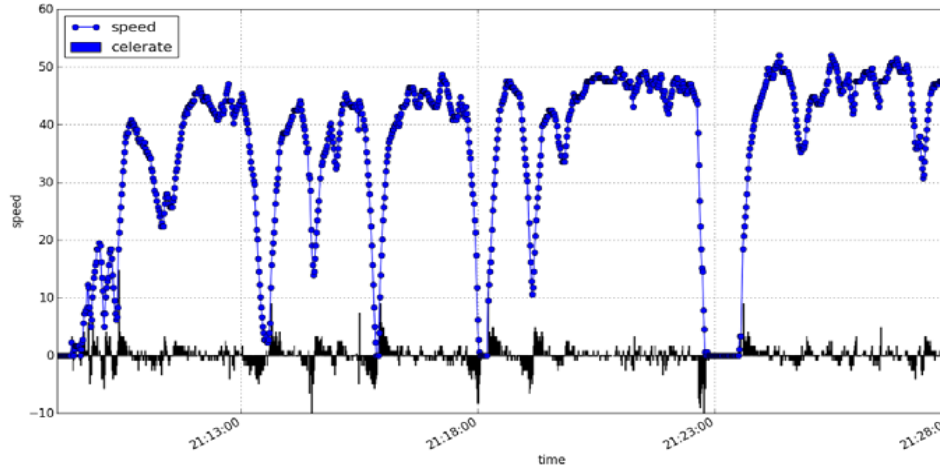
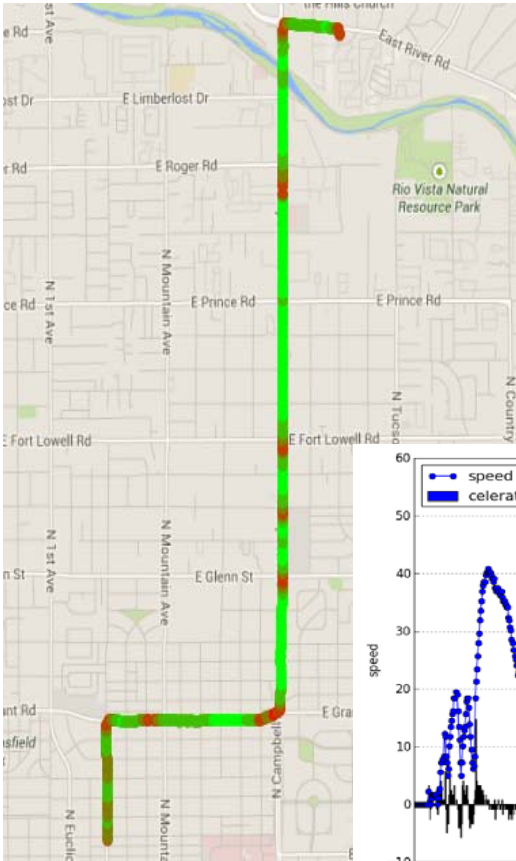
- Activity Pattern







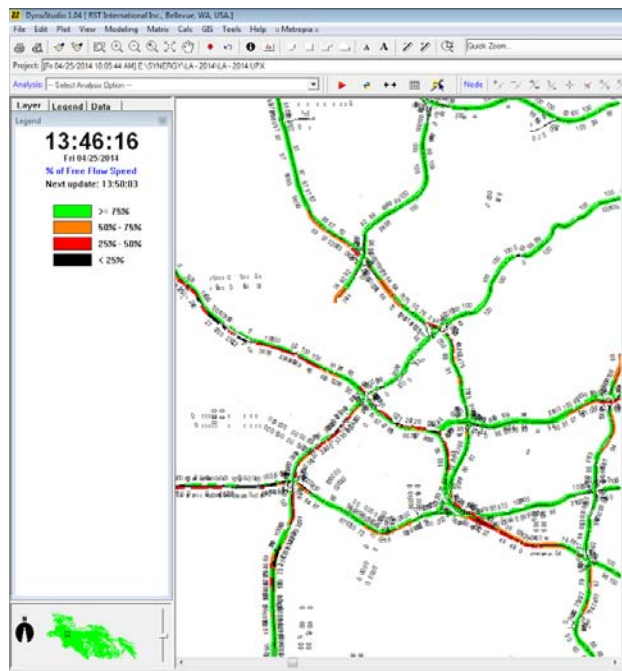
# Safe Driver Pre-Qualification for Auto Insurance Partners



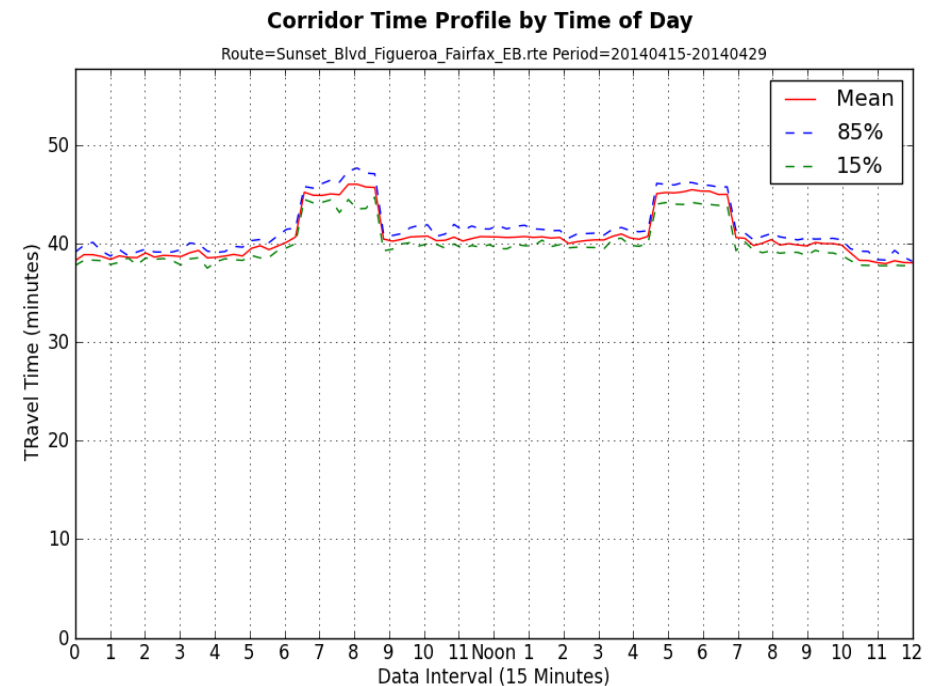




- Real time traffic condition

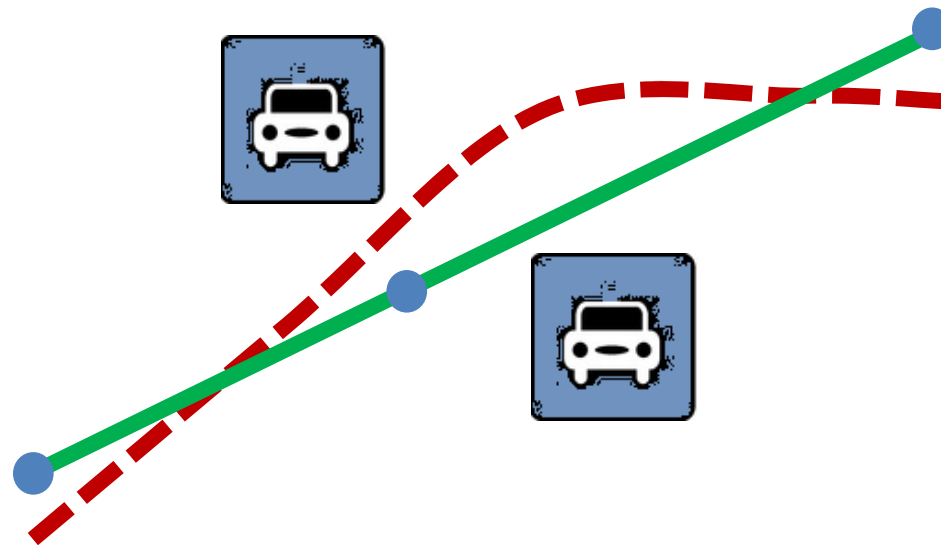


- Travel Time Reliability measures



# Targeted Multi-Modal Campaign

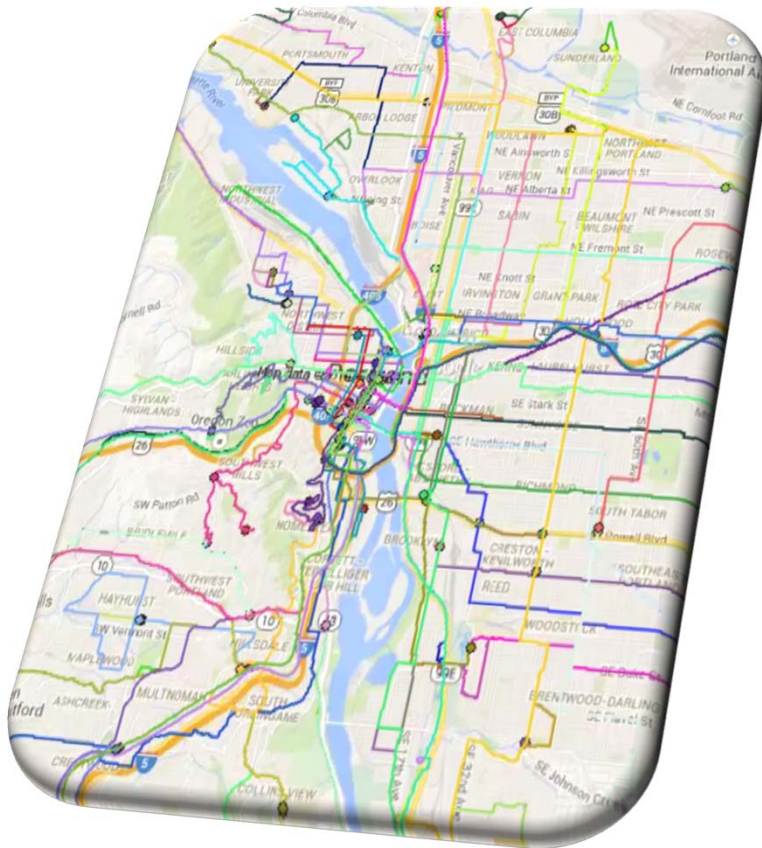
- Through data analytics, identify auto drivers who have transit as a competitive/attractive mode.
- Effectively apply resources for promoting transit to targeted drivers.



# Metropia Multi-Mode “Lead Gen” Example

(Portland Metro Network - PM Period)

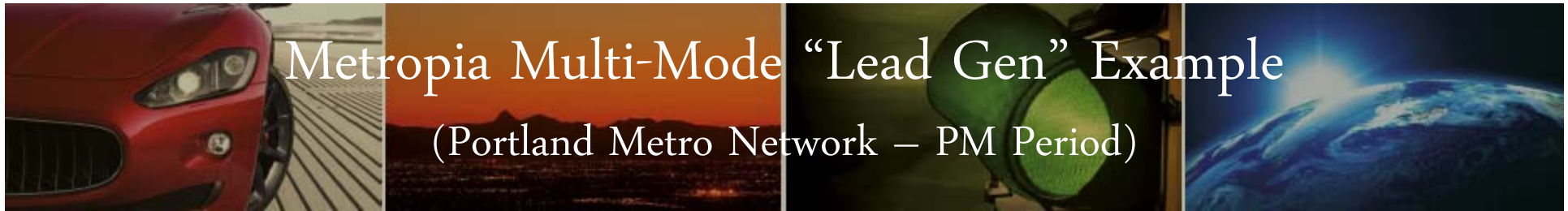
Schedule Based Transit Network Database  
with Detailed Departure/Arrival Times and  
Stop Locations



Dynamic Vehicle Trajectories (Real Time or  
Simulated) with Exact Temporal and Geo-  
Spatial information to Match the Static  
Transit Network



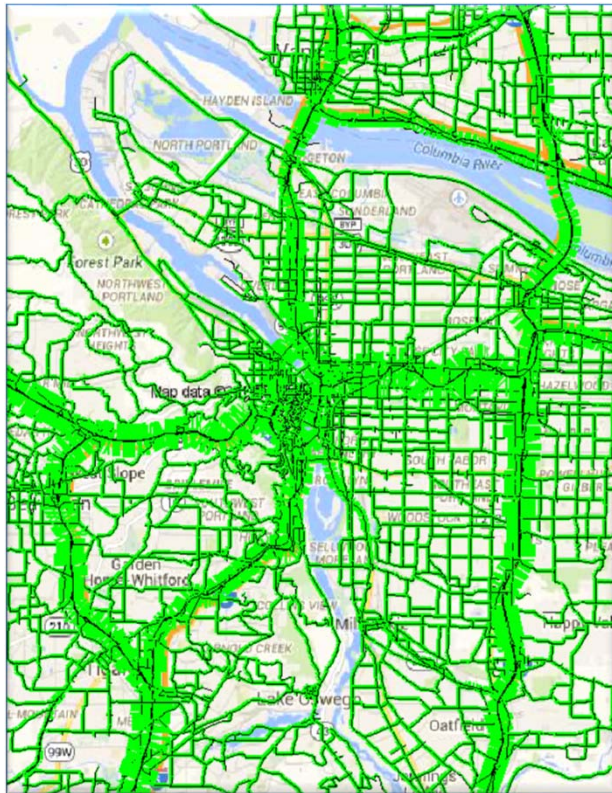




# Metropia Multi-Mode “Lead Gen” Example

(Portland Metro Network – PM Period)

Potential Travel Shed for Mode Shift with Lead Gen (Simulated)

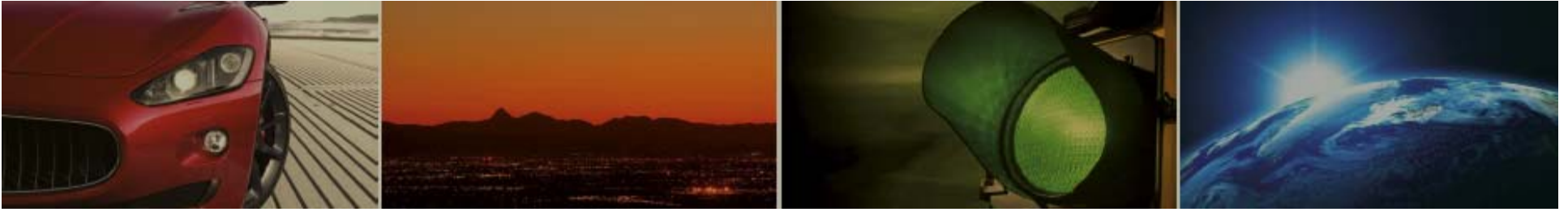


## Alternative Mode Feasible:

- SOV trips with direct transit services between origin and destination
- 280,000 trips captured (15%)

## Alternative Mode Attractive:

- SOV trips with direct transit services between origin and destination
- Wait time < 15 minutes
- Walk distance < 0.5 Miles
- 10,000 trips captured (0.5%)



For more information:

[www.metropia.com](http://www.metropia.com)

Thank you

