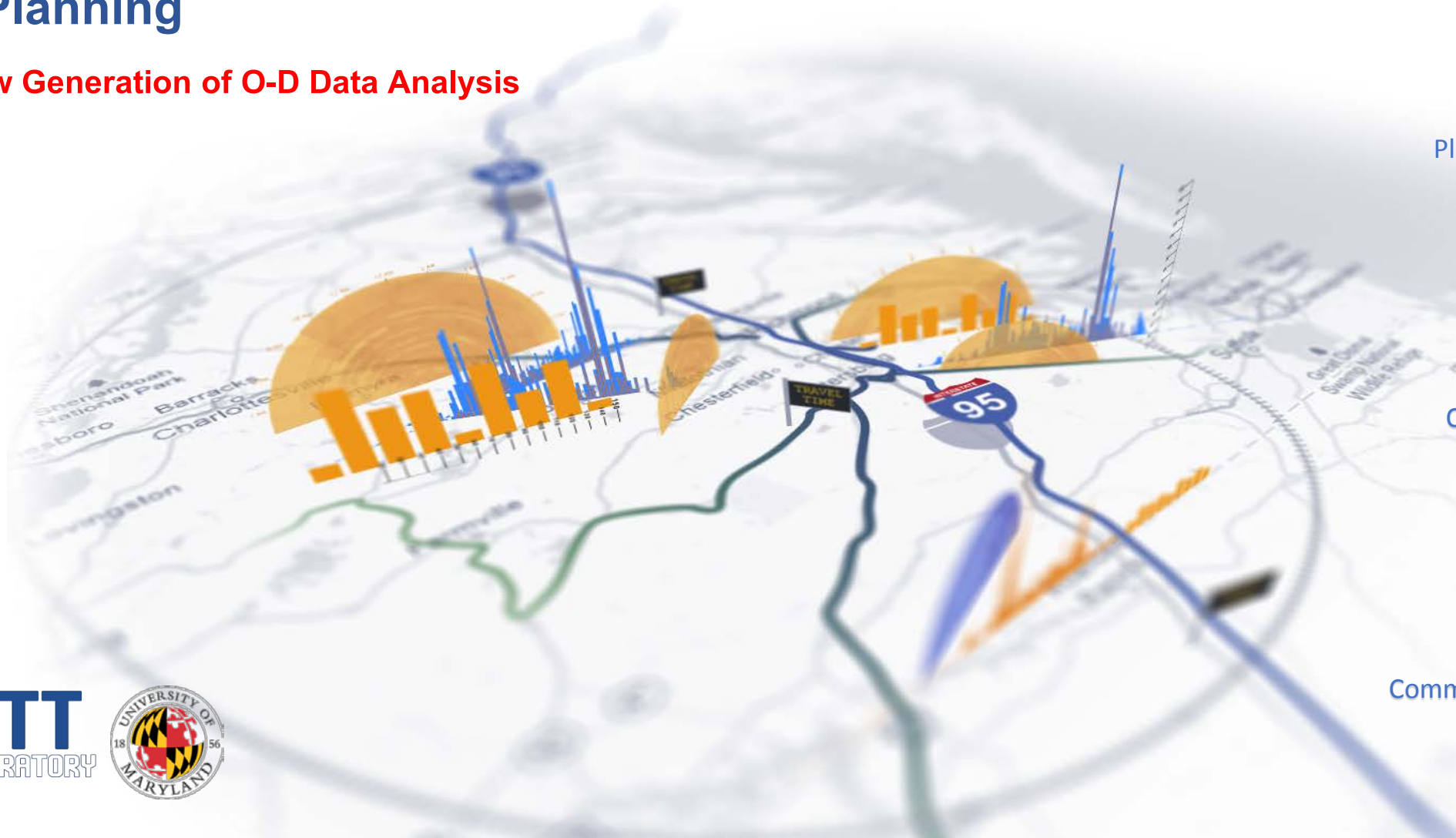


Origin-Destination Trip Data for Operations and Planning

The New Generation of O-D Data Analysis



Performance Measures

	4 PM	5 PM
	\$31.5K	\$23.8K
	\$16.4K	\$42.1K
	\$10.5K	\$131.8K
	\$4.7K	\$27K
	\$2.2K	\$34K
	\$3K	\$11.9K
	\$52.9K	\$18.8K
	\$684.4K	\$1,246.9K

Planning



Operations



Communications



Enabling Decision Making & Improving Freight Mobility

Origin-Destination Data Analysis

Traditionally collected using transportation surveys

Challenges:

- Surveys are expensive and tedious
- Survey may not be a true representative of mobility patterns
- By the time results are ready, they may be obsolete
- Collected data is fairly generic and static

More modern collection methods

- Bluetooth reidentification
- Cellular data collection
- Aerial photography
- GPS locations

Challenges:

- Cost
- Accuracy/bias

No 15000

1. WHERE DID YOUR TRIP BEGIN?
Address (or nearest intersection) _____
Municipality _____ State _____ Zip _____
CHECK ONE: Home Work Site Store School Other

2. WHERE DID YOUR TRIP END?
Address (or nearest intersection) _____
Municipality _____ State _____ Zip _____
CHECK ONE: Home Work Site Store School Other

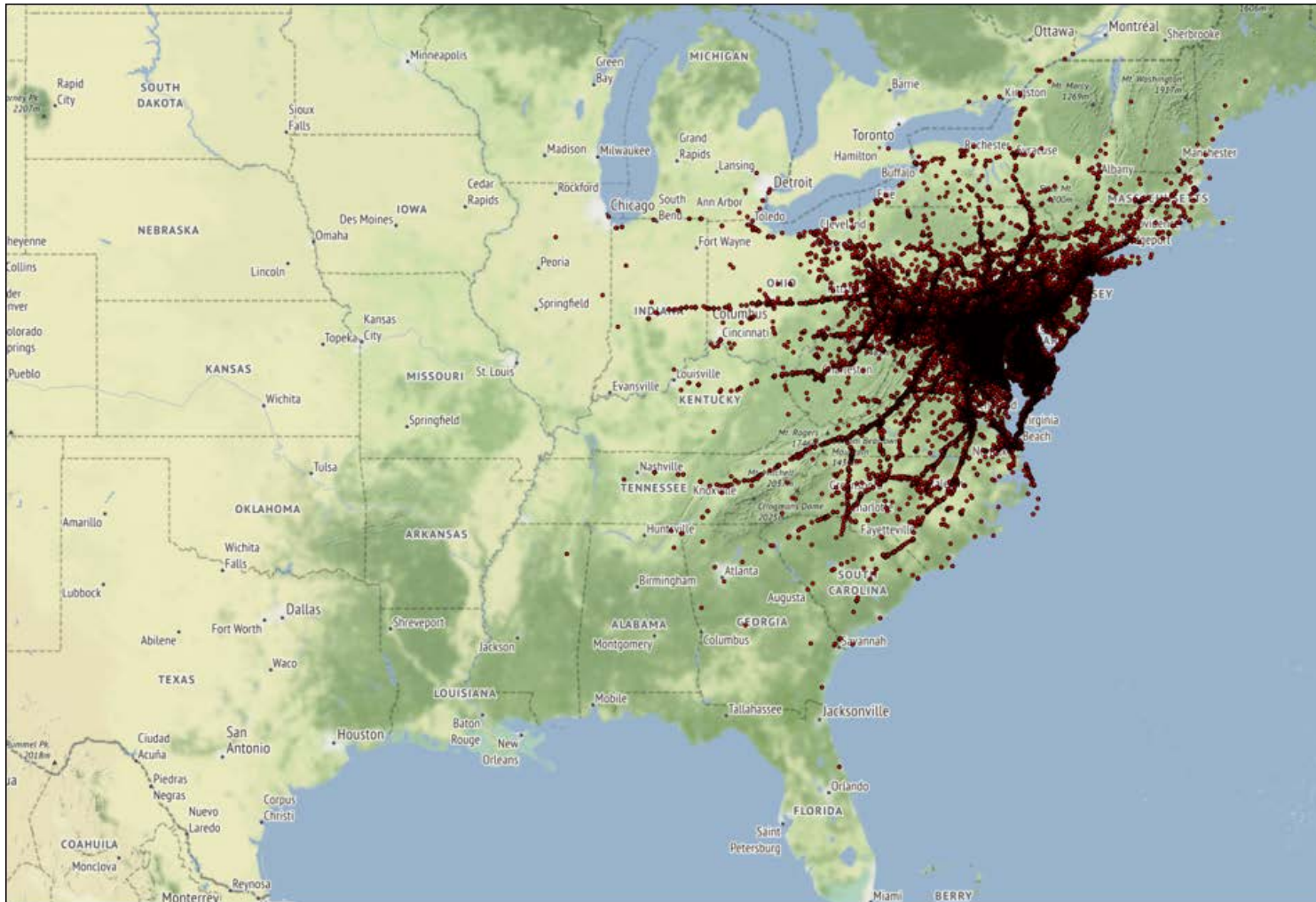
3. WHERE DID YOU PARK YOUR CAR?
Your destination as described above in question #2
 Park & Ride lot for carpooling Park & Ride lot for bus service
 Train station Other
Which Park & Ride or station? _____

4. WHAT WAS THE PRIMARY PURPOSE OF YOUR TRIP?
 Going to or coming from work To or from school
 To or from shopping Social or recreational
 Personal business (doctor, dentist, or other appointment) Business-related
 Other purpose

**5. INCLUDING YOURSELF,
HOW MANY PEOPLE WERE IN YOUR VEHICLE?** _____

6. WHICH ROUTES DID YOU USE ON YOUR TRIP?
 Rte 3 Rte 94 Rte 605 I-78
 Rte 97 Rte 6 Rte 607 I-80
 Rte 10 Rte 181 Rte 616 I-84
 Rte 15 Rte 183 Rte 653 I-280
 Rte 23 Rte 206 Rte 669 I-287
 Rte 24 Rte 208 Rte 739 Milford Br
 Rte 46 Rte 209 Dingman's Ferry Br

Probe Data for Origin-Destination Analysis



Origin Locations

July 2015:

20 Million Trips

- Average distance: 22 miles
- Average duration: 34 minutes

Probe Data for Origin-Destination Analysis



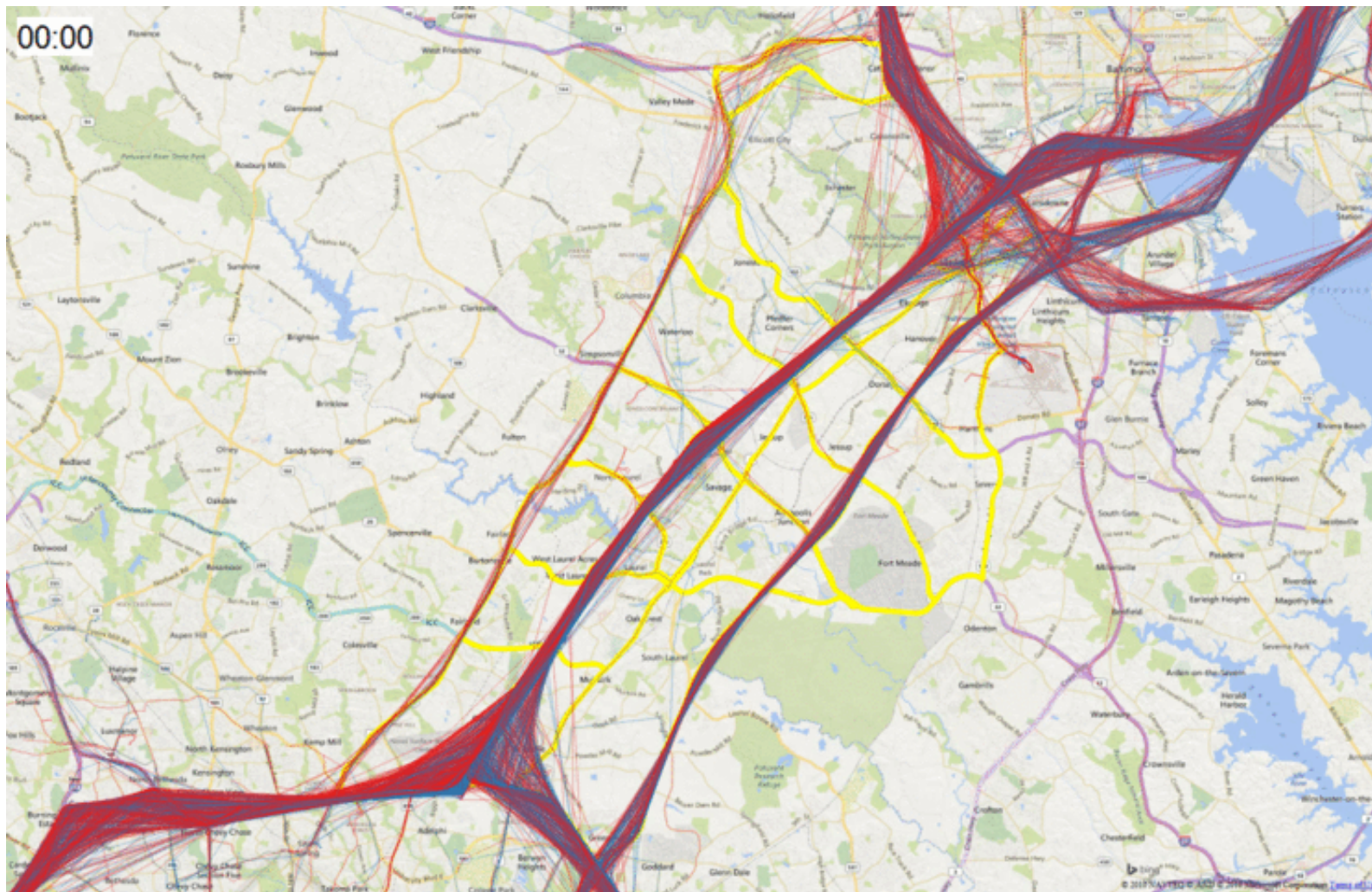
Waypoint Locations

July 2015:

1.4 Billion Waypoints

- Average distance: 0.23 miles
- Average duration: 19 seconds

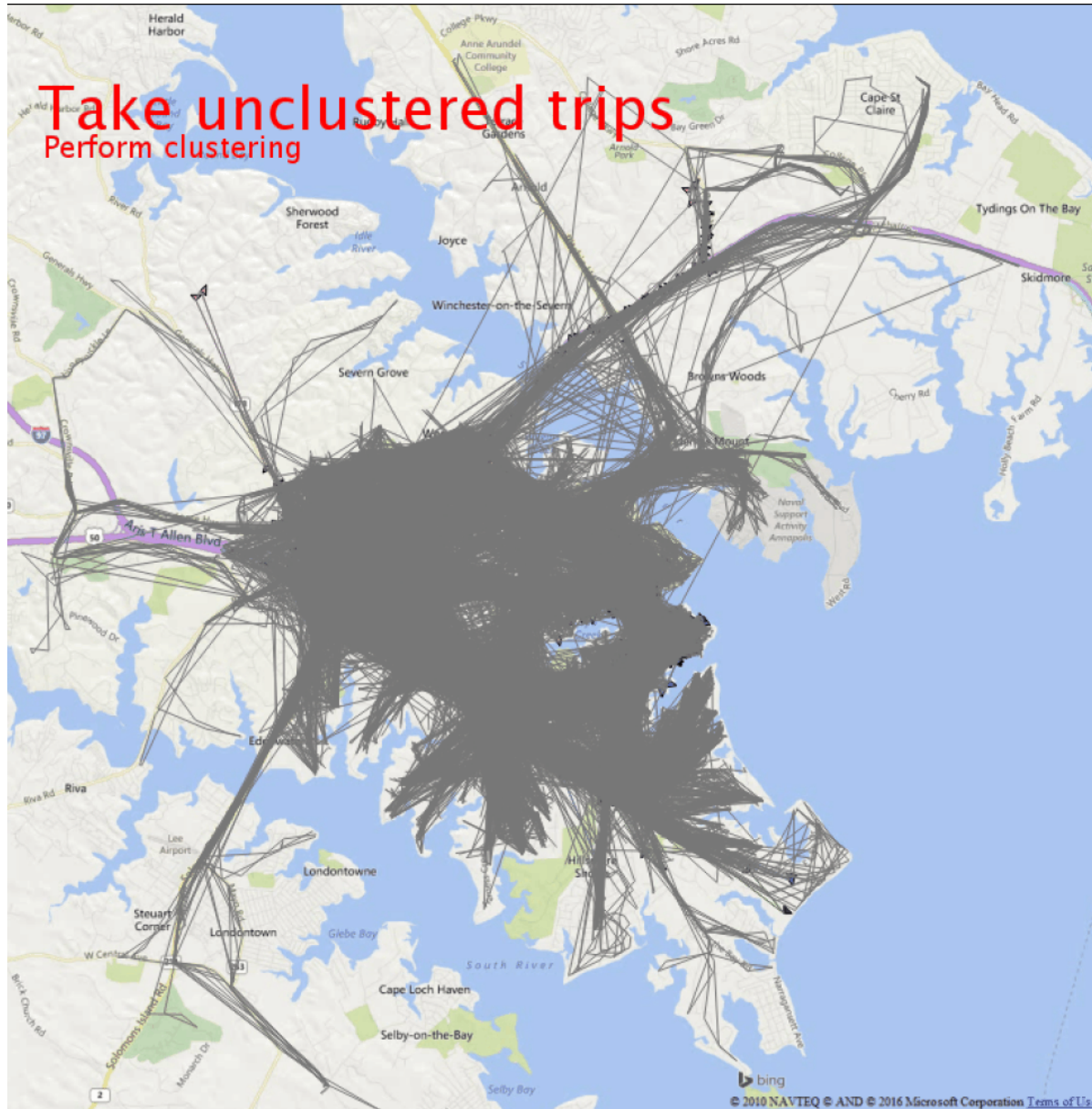
Trajectories



July 2015
Baltimore / Washington DC Corridor

Blue – Northbound Trajectories
Red – Southbound Trajectories

Clustering Analysis



Identify heavily used routes by analyzing clusters of travel

Freight Benefits:

- Evaluate most efficient routes by day of week

Other Benefits:

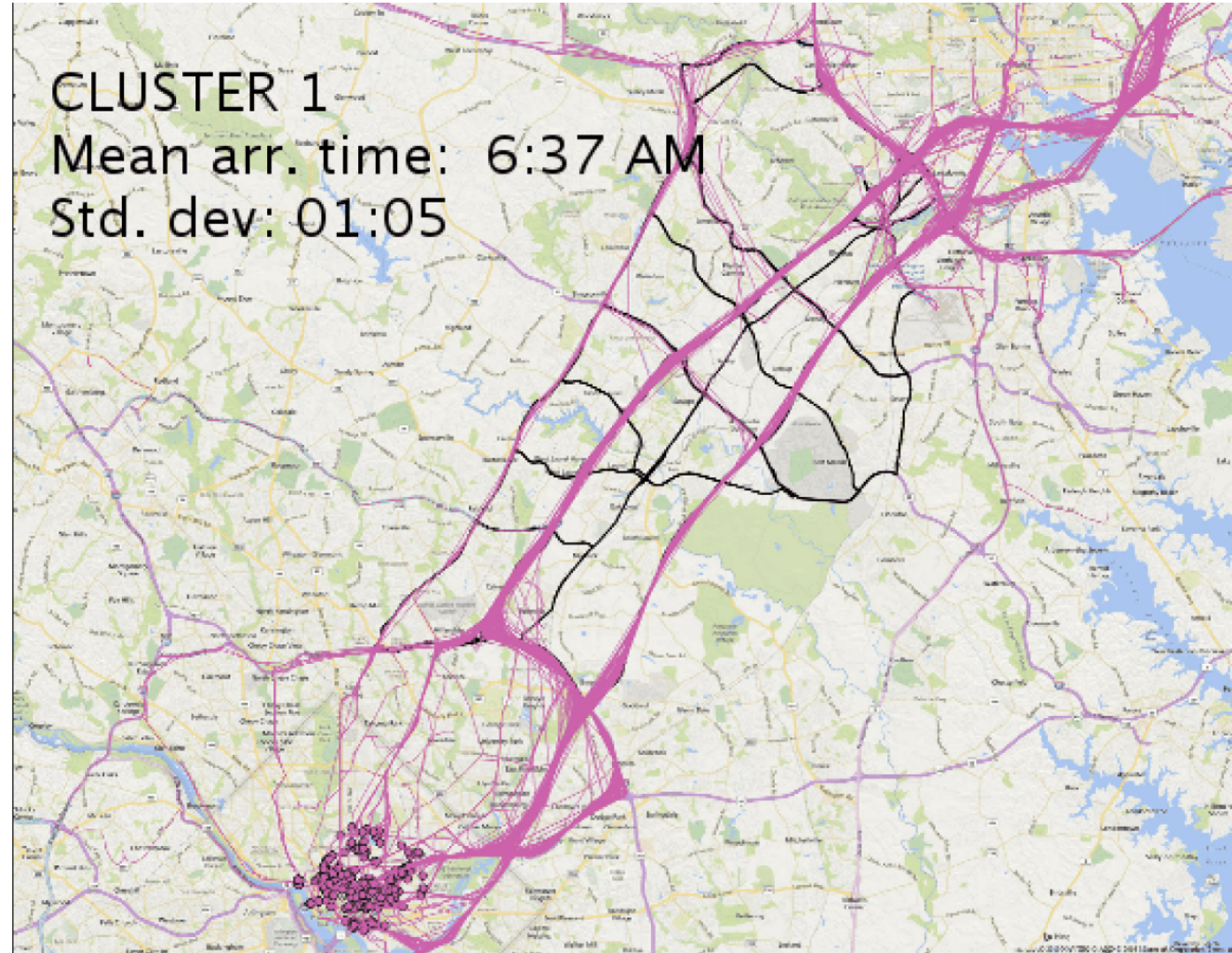
- Transit service improvements

Clustering Analysis

CLUSTER 1

Mean arr. time: 6:37 AM

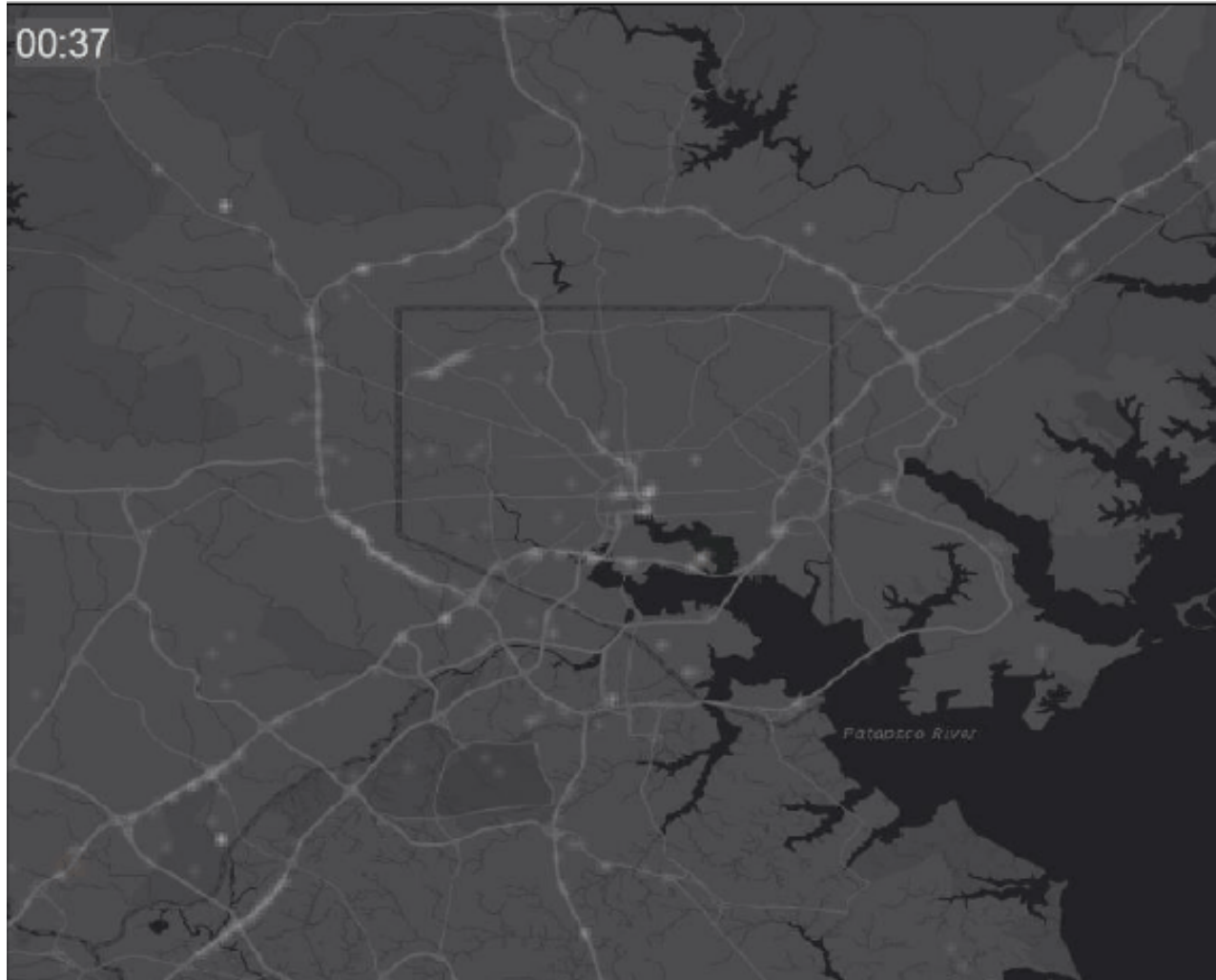
Std. dev: 01:05



Analyze causes of congestion along a corridor

Freight Benefits:

- **Identify congested routes by time of day/day of week based on volume of trips in the corridor with approximate same destination and arrival time**



Analyze vehicle movements in an area for a time period

Freight Benefits:

- **Identify major trip producers with minimal latency**

In-State OD Matrix

OD Data Suite

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Origin and Destination Matrix

Currently Using MD Data Set

SWITCH DATA SET

Selected date range June and July 2015 and March 2016 All Days of Week

Matrix controls

Display options



Legend

0% of Trips



MATRIX OVERVIEW

Destinations

		Maryland				Total trips from selected geographies
		Frederick County	Howard County	Baltimore County	Montgomery County	
Origins	Frederick County	6%	5%	5%	4%	20%
	Howard County	4%	8%	3%	7%	22%
	Baltimore County	7%	4%	6%	8%	25%
	Montgomery County	7%	12%	5%	10%	33%
	Total trips into selected geographies	24%	29%	19%	29%	100%

Multistate OD Matrix

OD Data Suite

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Origin and Destination Matrix

Currently Using MD Data Set

SWITCH DATA SET

Selected date range June and July 2015 and March 2016 All Days of Week

Matrix controls

Display options



Legend

0% of Trips



100% of Trips

Gray tiles

Only trips from the MD Data Set accounted for.

MATRIX OVERVIEW

Destinations

28 of 264 geographies

		Delaware			Maryland																			New Jersey					
		CountyA	CountyB	CountyC	CountyA	CountyB	CountyC	CountyD	CountyE	CountyF	CountyG	CountyH	CountyI	CountyJ	CountyK	CountyL	CountyM	CountyN	CountyO	CountyP	CountyQ	CountyR	CountyS	CountyT	CountyU	CountyV	CountyW	CountyA	CountyB
Delaware	CountyA	7%	1%	4%	6%	9%	4%	0%	7%	4%	9%	6%	8%	5%	2%	9%	8%	4%	5%	2%	6%	9%	2%	6%	7%	8%	6%	9%	3%
	CountyB	9%	5%	0%	7%	3%	1%	0%	5%	7%	6%	9%	5%	0%	1%	6%	3%	8%	7%	4%	6%	7%	8%	0%	1%	7%	5%	0%	6%
	CountyC	4%	6%	7%	0%	9%	7%	1%	3%	8%	4%	0%	0%	6%	0%	5%	5%	9%	0%	8%	7%	9%	2%	4%	8%	5%	6%	4%	7%
Maryland	CountyA	0%	5%	4%	8%	2%	4%	6%	0%	7%	1%	9%	7%	4%	6%	3%	8%	4%	7%	1%	4%	3%	9%	8%	2%	4%	9%	5%	6%
	CountyB	9%	2%	6%	4%	9%	8%	0%	3%	7%	6%	4%	8%	5%	4%	2%	6%	9%	0%	2%	3%	5%	6%	6%	2%	7%	6%	9%	1%
	CountyC	6%	7%	4%	8%	6%	6%	9%	3%	9%	6%	0%	8%	9%	4%	6%	1%	8%	7%	6%	2%	0%	6%	7%	9%	3%	1%	0%	4%
	CountyD	0%	1%	1%	0%	9%	8%	1%	5%	8%	4%	7%	0%	9%	0%	1%	5%	9%	0%	8%	1%	6%	2%	4%	8%	6%	5%	7%	7%
	CountyE	0%	3%	6%	4%	0%	3%	8%	2%	8%	2%	9%	2%	2%	0%	6%	4%	3%	7%	2%	1%	3%	4%	8%	2%	0%	2%	3%	9%
	CountyF	6%	2%	0%	4%	5%	8%	6%	9%	7%	1%	7%	5%	3%	8%	4%	0%	6%	8%	1%	0%	7%	9%	0%	7%	4%	6%	5%	1%
	CountyG	4%	8%	2%	6%	7%	3%	7%	6%	8%	0%	6%	8%	7%	1%	1%	4%	0%	9%	7%	8%	2%	6%	5%	0%	1%	8%	4%	6%
	CountyH	5%	7%	6%	8%	0%	4%	9%	0%	6%	3%	2%	4%	0%	8%	6%	9%	6%	2%	1%	5%	4%	0%	4%	9%	1%	2%	9%	3%
	CountyI	9%	1%	9%	8%	5%	2%	6%	7%	4%	7%	8%	6%	4%	9%	2%	5%	6%	7%	7%	4%	3%	1%	6%	6%	5%	5%	7%	7%
	CountyJ	2%	3%	4%	6%	7%	9%	7%	5%	3%	9%	4%	5%	1%	7%	5%	9%	3%	2%	5%	7%	8%	1%	0%	4%	9%	7%	8%	0%

14 of 264 geographies

Custom Date Ranges, Filters, and Displays

OD Data Suite

My Account | About | Log Out

Origin and Destination Matrix

Currently Using MD Data Set

[SWITCH DATA SET](#)

Selected date range June and July 2015 and March 2016
All Days of Week

Include dates
 All days Only the following days
 Except for...

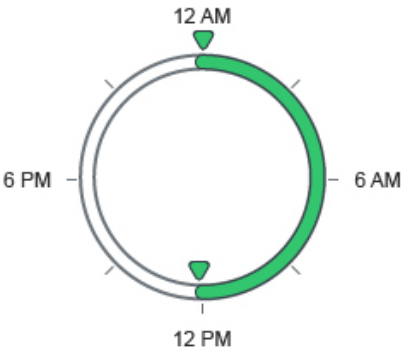
Available Date Range February, June, July, and October 2015
January, February and March 2016

Days of week
 Sun Mon Tue Wed Thu Fri Sat

2015
Jan Feb Mar Apr May **Jun** **Jul** Aug Sep Oct Nov Dec

2016
Jan Feb **Mar** Apr May Jun Jul Aug Sep Oct Nov Dec

Time of Day
12 AM - 12PM



Matrix controls

Show
 Other trips
 Heavy vehicles
 Medium vehicles
 Light vehicles

Show trips that were...
 Arriving
 Departing
 En Route
... during selected time period.

Show trips as...
 Percentages
 Daily average
 Total counts

Display options

Sort Origins and Destinations
In order selected

Display as
Total percents

Show numbers

selected geographies	
4%	20%
7%	22%
6%	25%
5%	33%
19%	29%
100%	

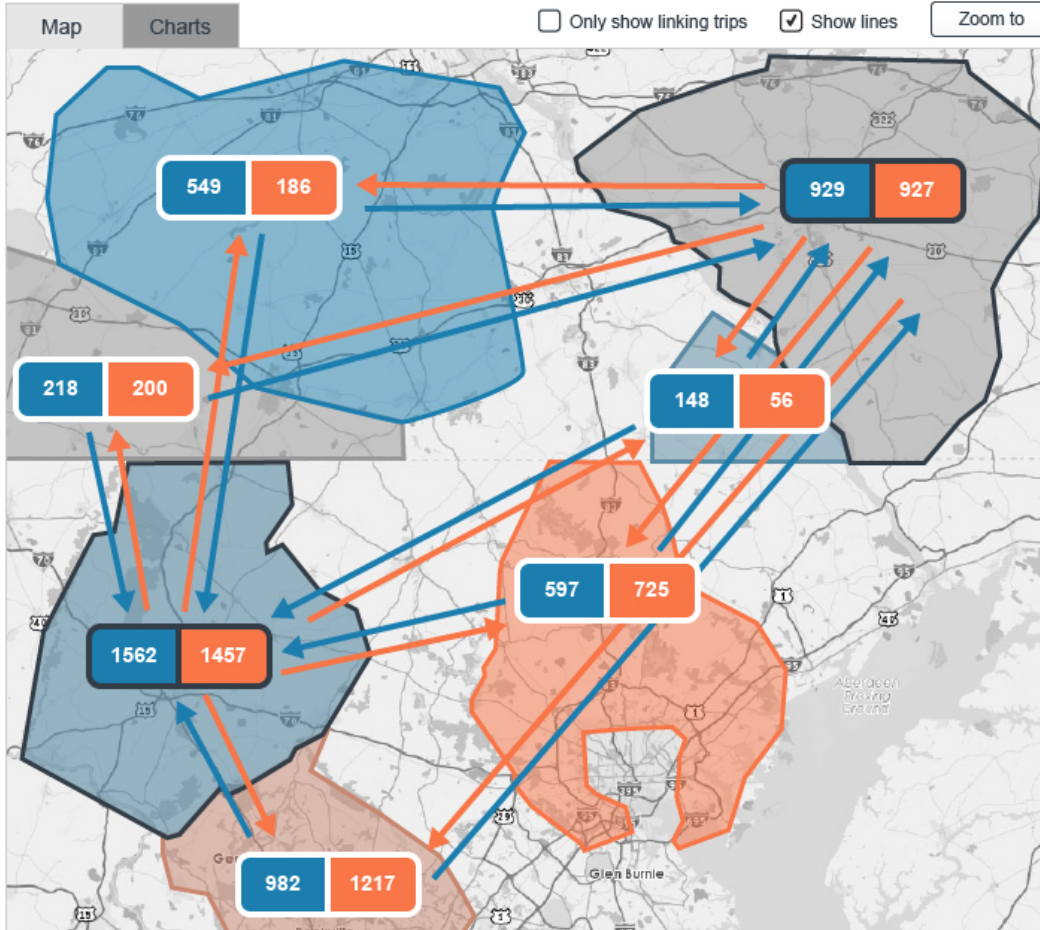
Custom Zone Analysis

Trajectory Data Suite

Trips Between

Route Volume

Trajectory Analysis



SELECT TIME PERIOD

11/26/16 through 12/15/16

+ Add time period

SELECT GEOGRAPHY

Fredrick County, MD

Show trips:

Into Out of Through Internal

Lancaster County, PA

Show trips:

Into Out of Through Internal

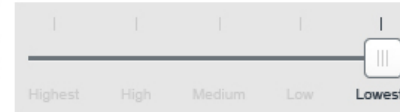
+ Add geography

LEVELS OF DETAIL

Origin and Destination Detail



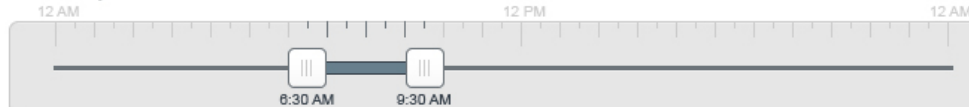
Route Detail



Legend

Most trips out Most trips in

Hour of day



Months

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec

Days of week

Sun Mon Tue Wed Thu Fri Sat

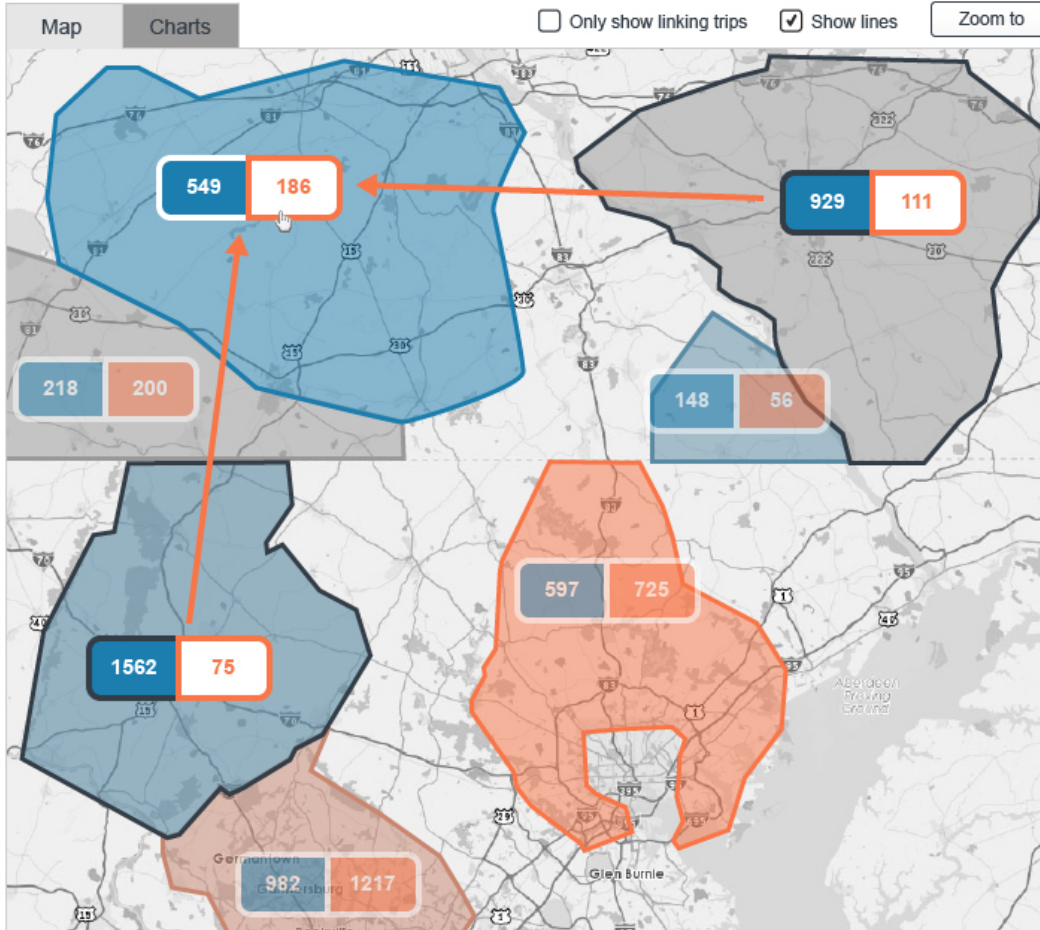
Custom Zone Analysis

Trajectory Data Suite

Trips Between

Route Volume

Trajectory Analysis



SELECT TIME PERIOD

11/26/16 through 12/15/16

+ Add time period

SELECT GEOGRAPHY

Fredrick County, MD

Show trips:
 Into Out of Through Internal

Lancaster County, PA

Show trips:
 Into Out of Through Internal

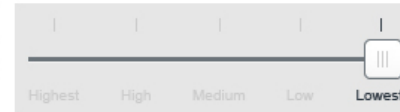
+ Add geography

LEVELS OF DETAIL

Origin and Destination Detail



Route Detail



Legend

Most trips out Most trips in

Hour of day



Months



Days of week



Road Segment Analysis

OD Data Suite

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Trips that traveled on the selected road segment

I-270 Southbound between Sam Eig Hwy and Montrose Rd

Geographic resolution

Subcounty

Show the...

- Origins of trips passing through the selected road segment
- Destinations of trips passing through the selected road segment
- Net totals of trips traveling through the selected road segment
- Routes

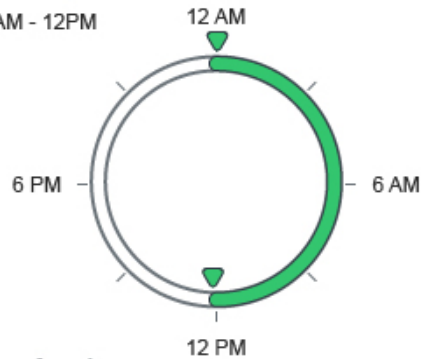
Number of trip origins



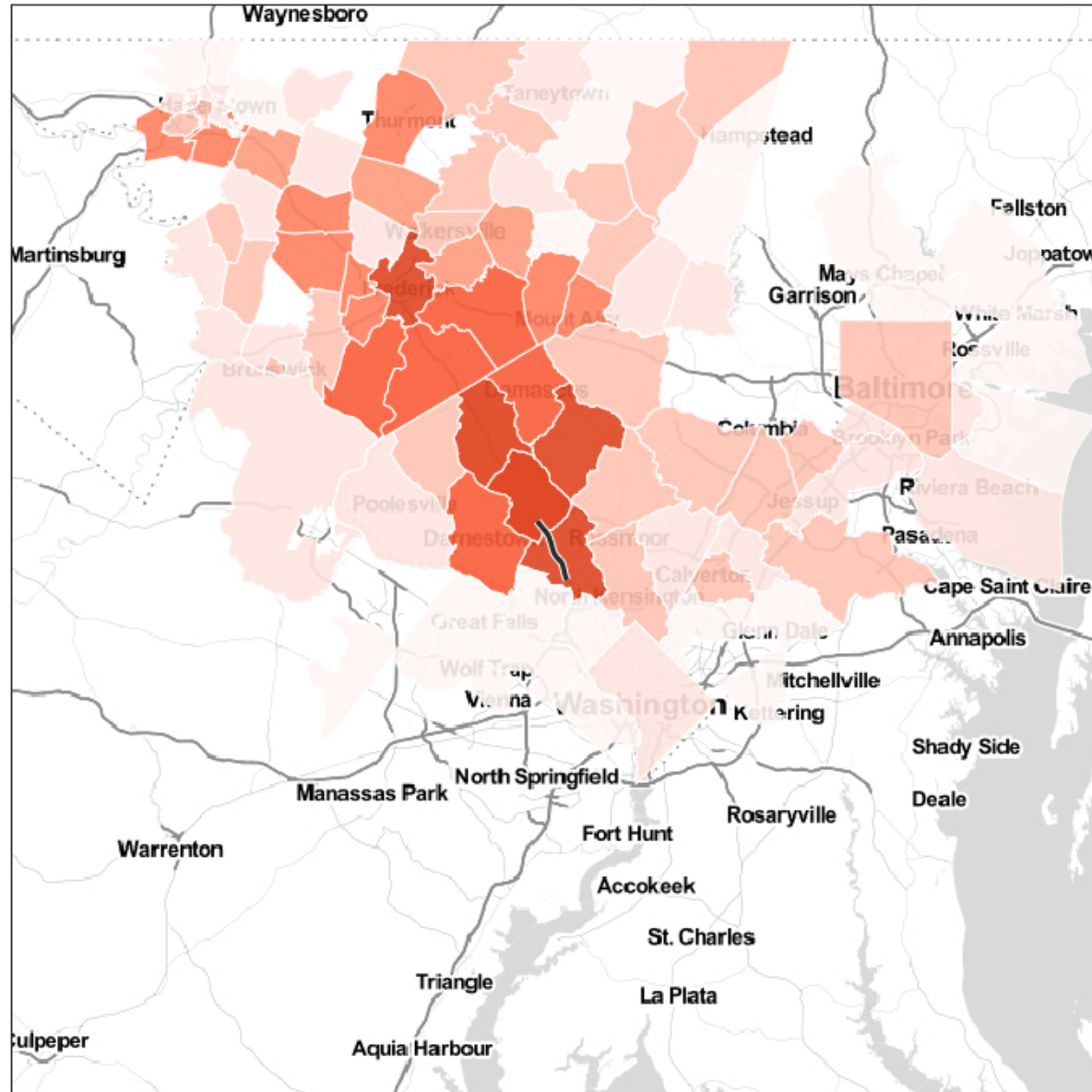
Date range - July 2015

Time of day

12 AM - 12 PM



Days of week



Road Segment Analysis

OD Data Suite

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Trips that traveled on the selected road segment

I-270 Southbound between Sam Eig Hwy and Montrose Rd

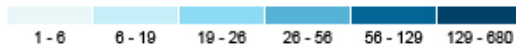
Geographic resolution

Subcounty

Show the...

- Origins of trips passing through the selected road segment
- Destinations of trips passing through the selected road segment
- Net totals of trips traveling through the selected road segment
- Routes

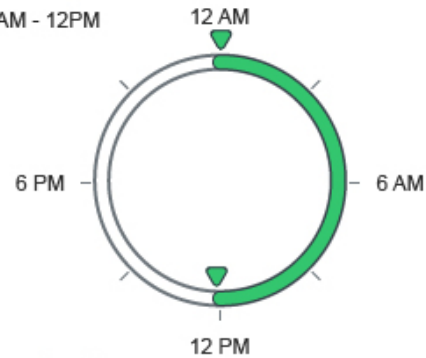
Number of trip destinations



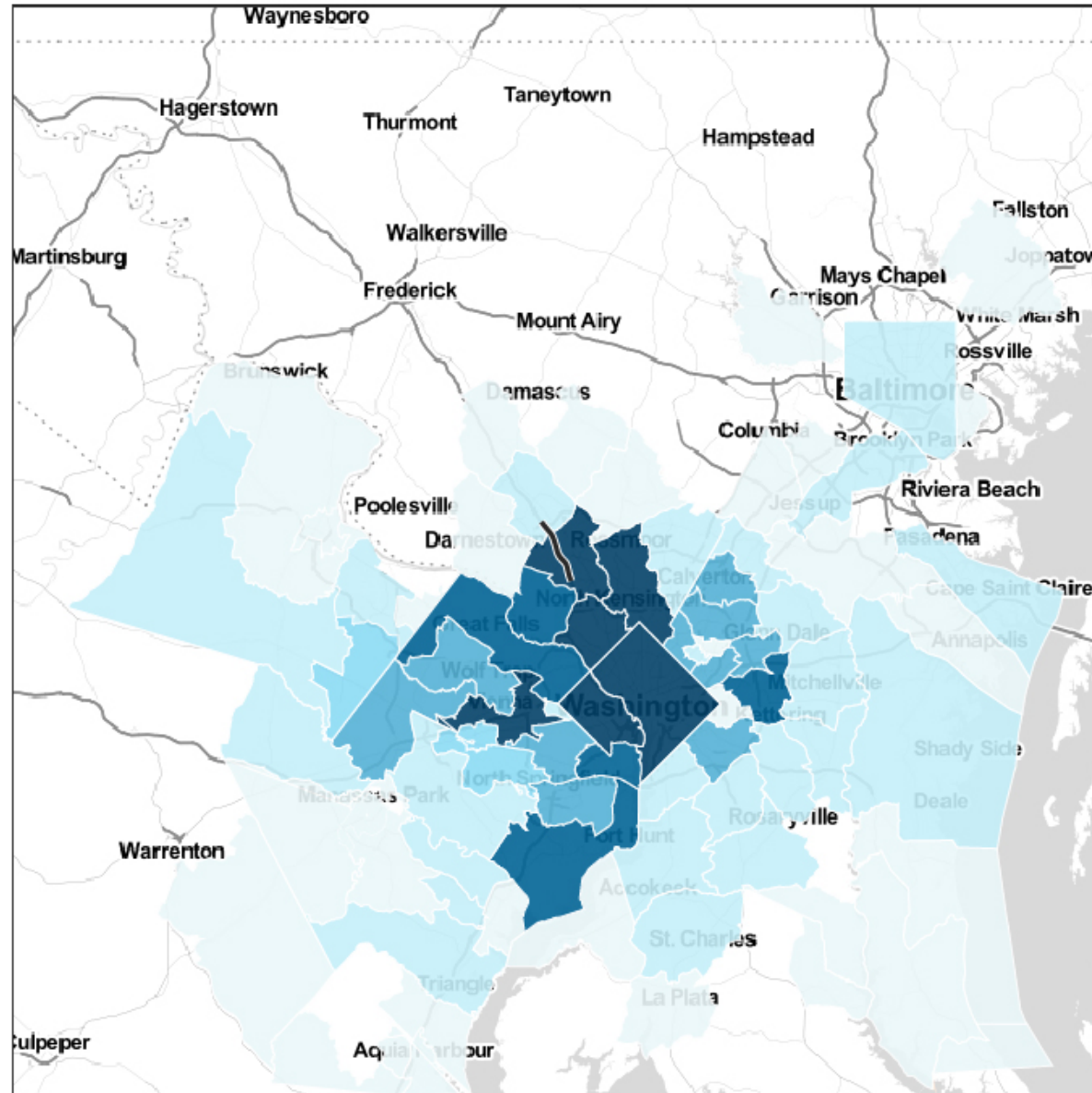
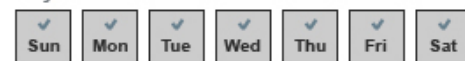
Date range - July 2015

Time of day

12 AM - 12 PM



Days of week



Custom Route Analysis

Trajectory Data Suite

Trips Between

Route Volume

Trip Breakdown

Choose a Route:

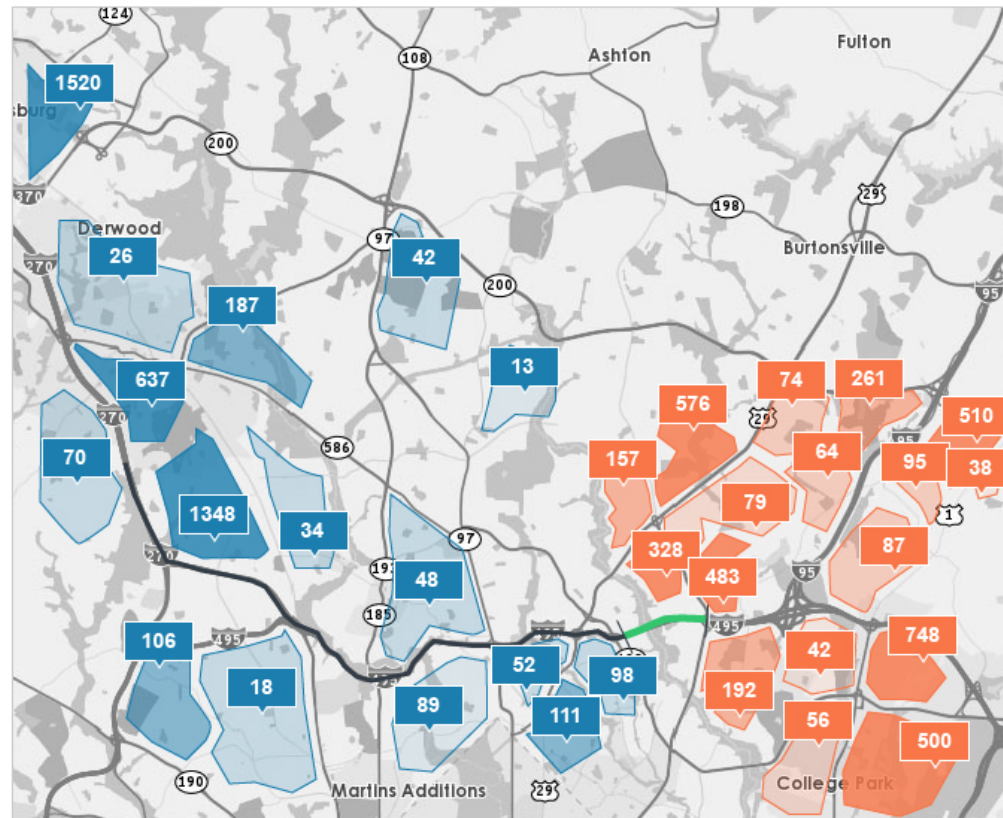
States

Search...



ROADS ON ROUTE

2016



- I-495 Counterclockwise
between MD-193/EXIT 29 and I-270/EXIT 35
- TMC Code: 110-04625
- TMC Code: 110N04625
- TMC Code: 110-04624
- TMC Code: 110N04624
- TMC Code: 110-04623
- TMC Code: 110N04623
- TMC Code: 110-04622
- TMC Code: 110N04622
- TMC Code: 110-04621
- TMC Code: 110N04621
- I-270 Northbound
between I-495/MD-355 and MONTROSE RD/...

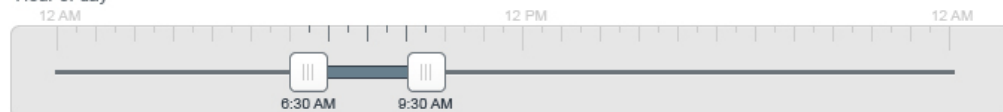
TMC CODE: 110-04625

Travel Time Index: **0.95**

Number of trips: **4,290**

[Download Data](#)

Hour of day



Months



Days of week



Thank You!

Nikola Ivanov

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301-405-3626

