



Trajectory Data Tools for Traffic Operations and Planning

2018 ITS Rural – ITS AZ

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Helping Operators and Planners
to Utilize Emerging Technologies
for Data Driven Decision Guidance



Agenda

- What is CATT Lab?
- Background: Data Description
- Applications
- Challenges
- Opportunity
- Trajectory Data Analysis Tool
- Planning Model Analysis Tool
- What's Next

RITIS overview

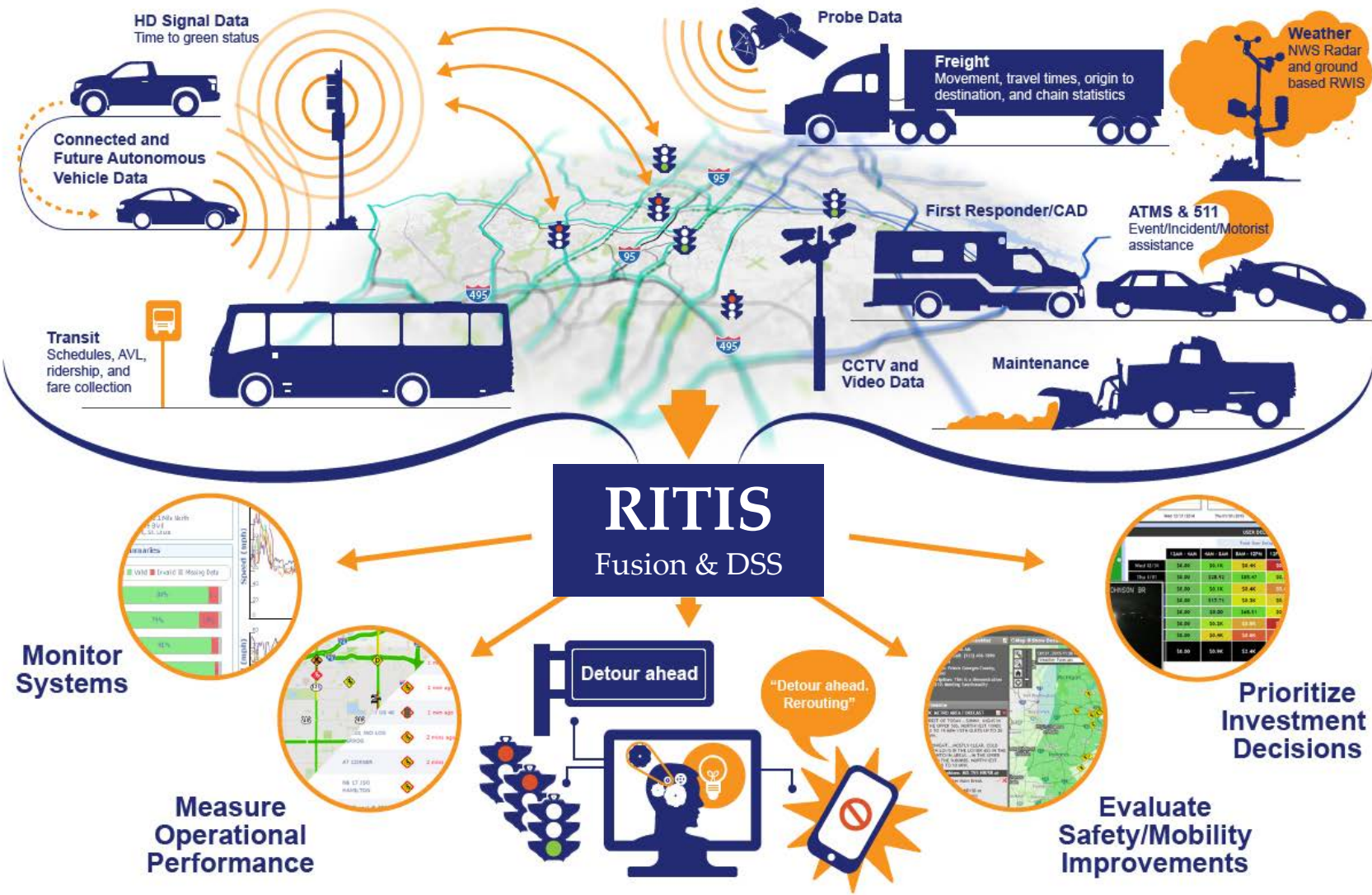
1 Consolidate lots of data



2 then fuse & disseminate



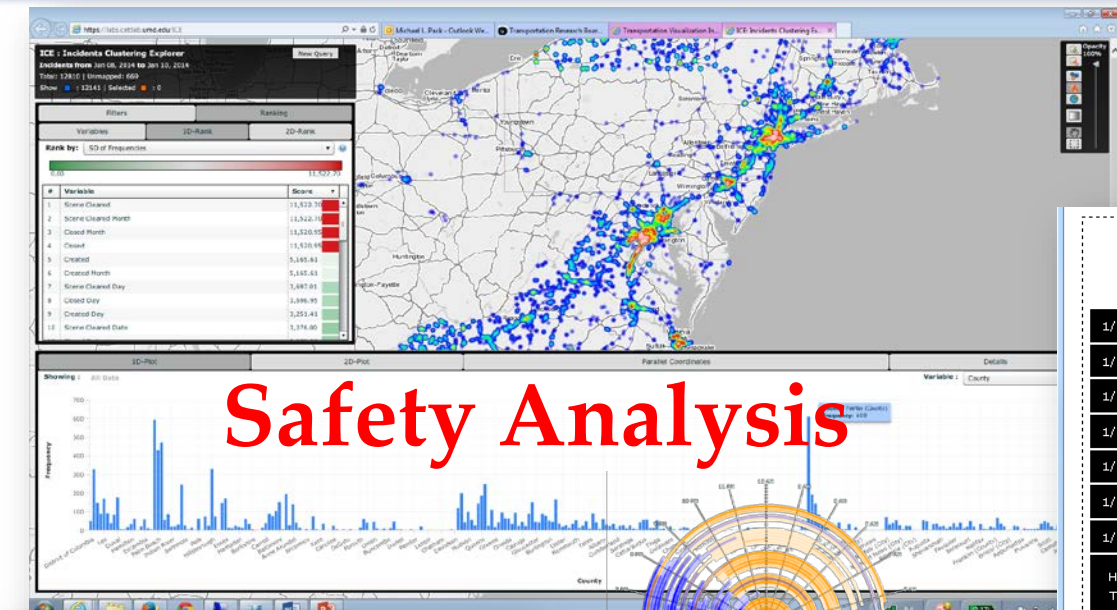
3 to multiple apps for your use



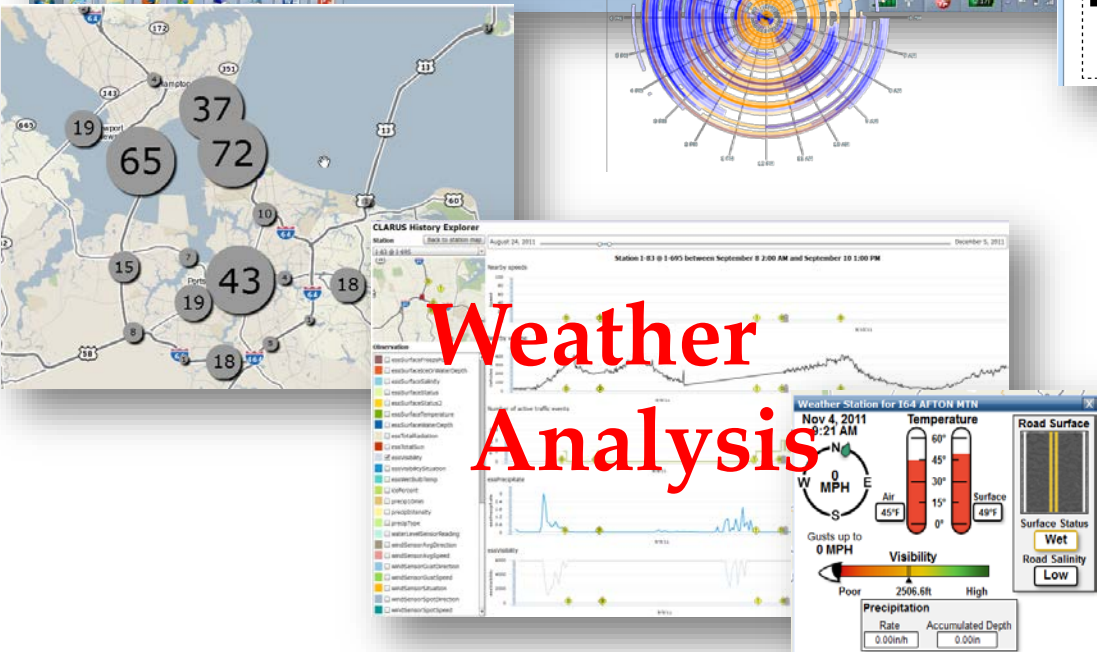
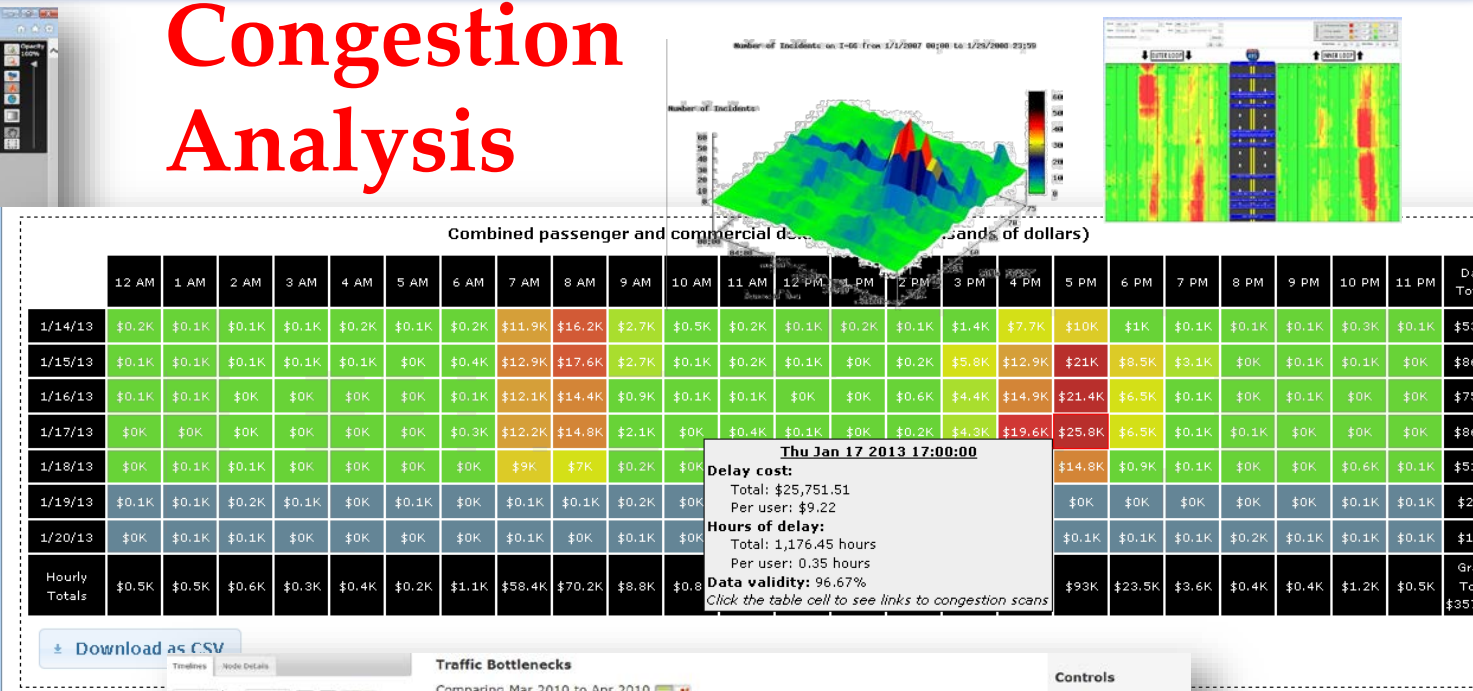
Regional Integrated Transportation Information System process

Many "Look Back" Tools Available

Congestion Analysis



Safety Analysis



Weather Analysis

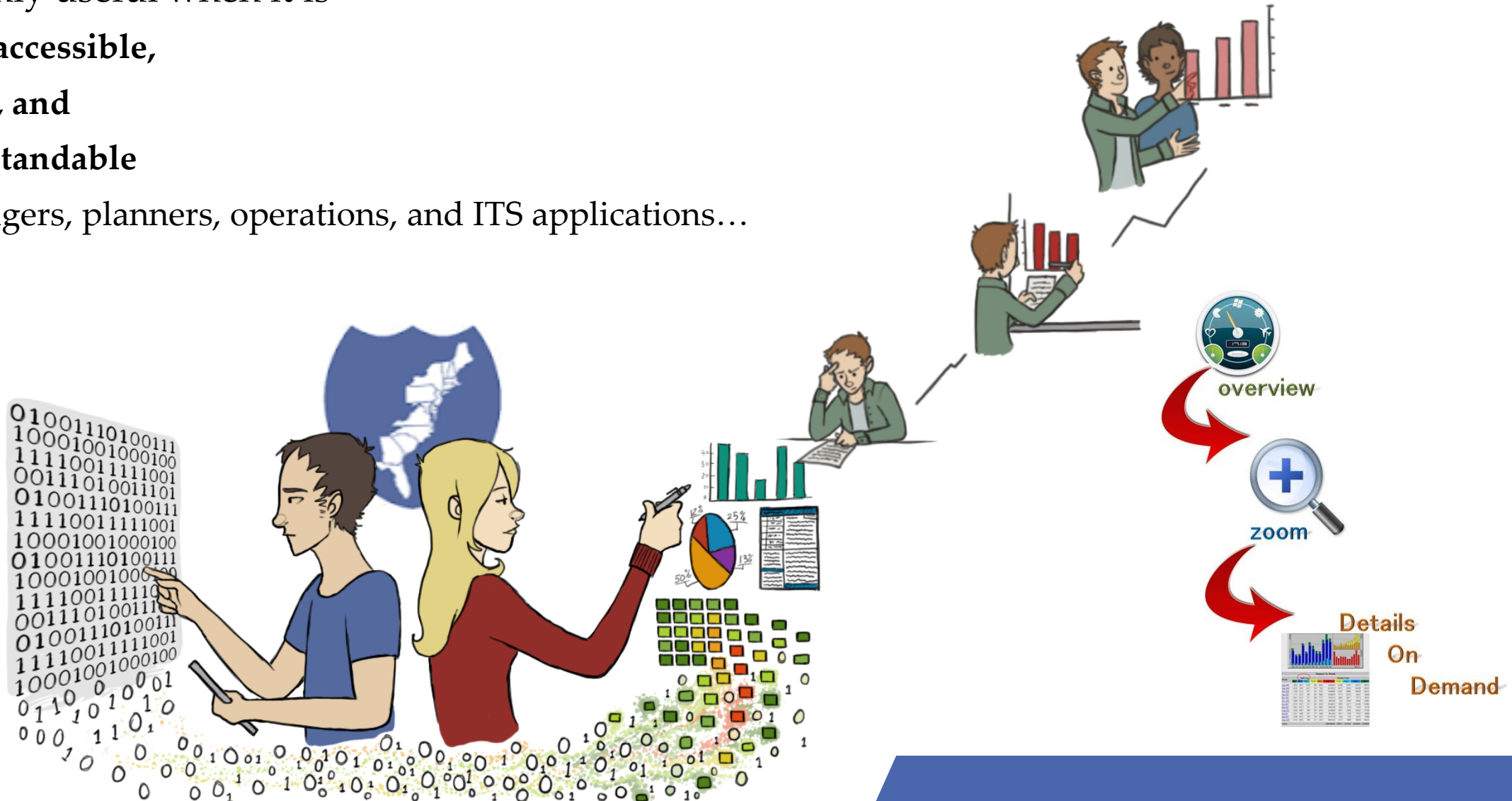
Trend Analysis & MAP-21 Reporting

We get a LOT of data from agencies, but...

- Data is only useful when it is

- easily accessible,
- usable, and
- understandable

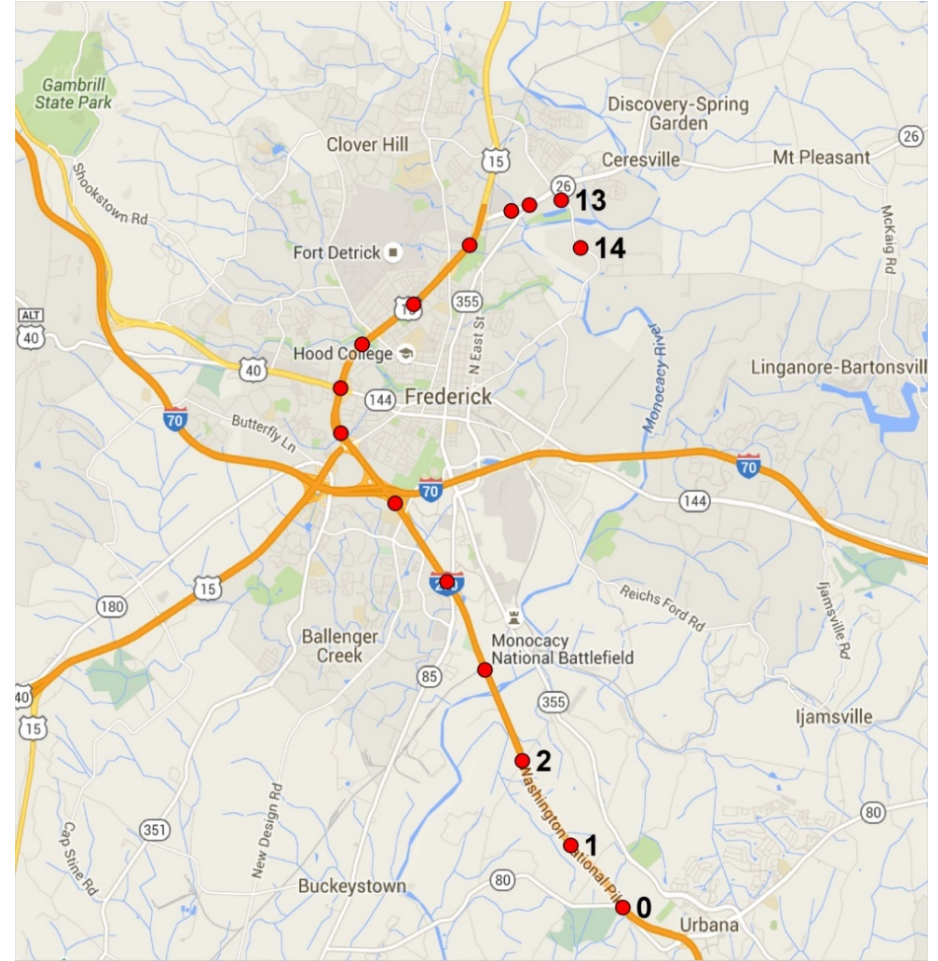
To managers, planners, operations, and ITS applications...



Trajectory Data Background

What is trajectory data?

- Time stamped location data from passively collected
- Data is collected on individual trips
 - Departure time and location (trip origin)
 - Route selection and travel time
 - Arrival time and location (trip destination)
 - All personally identifiable info is removed



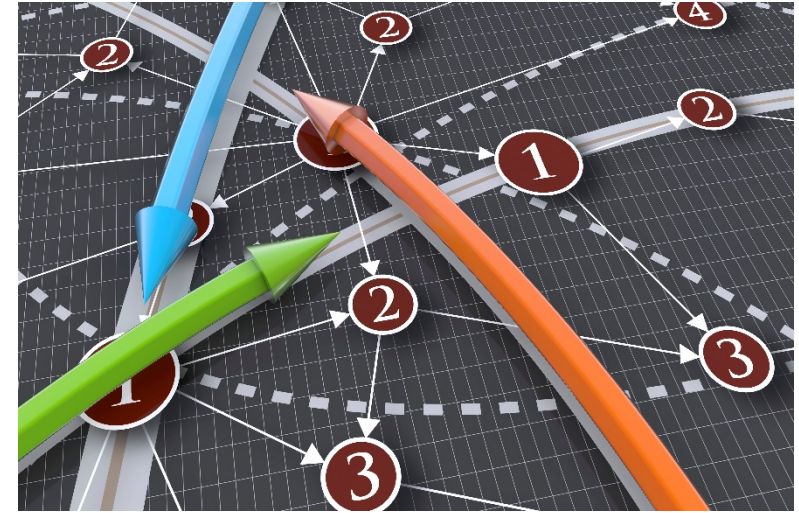
Applications

Trajectory data allows us to understand traveler behavior patterns

- Origin-Destination Patterns
- Mode and Route Selection
- Trip Travel Time

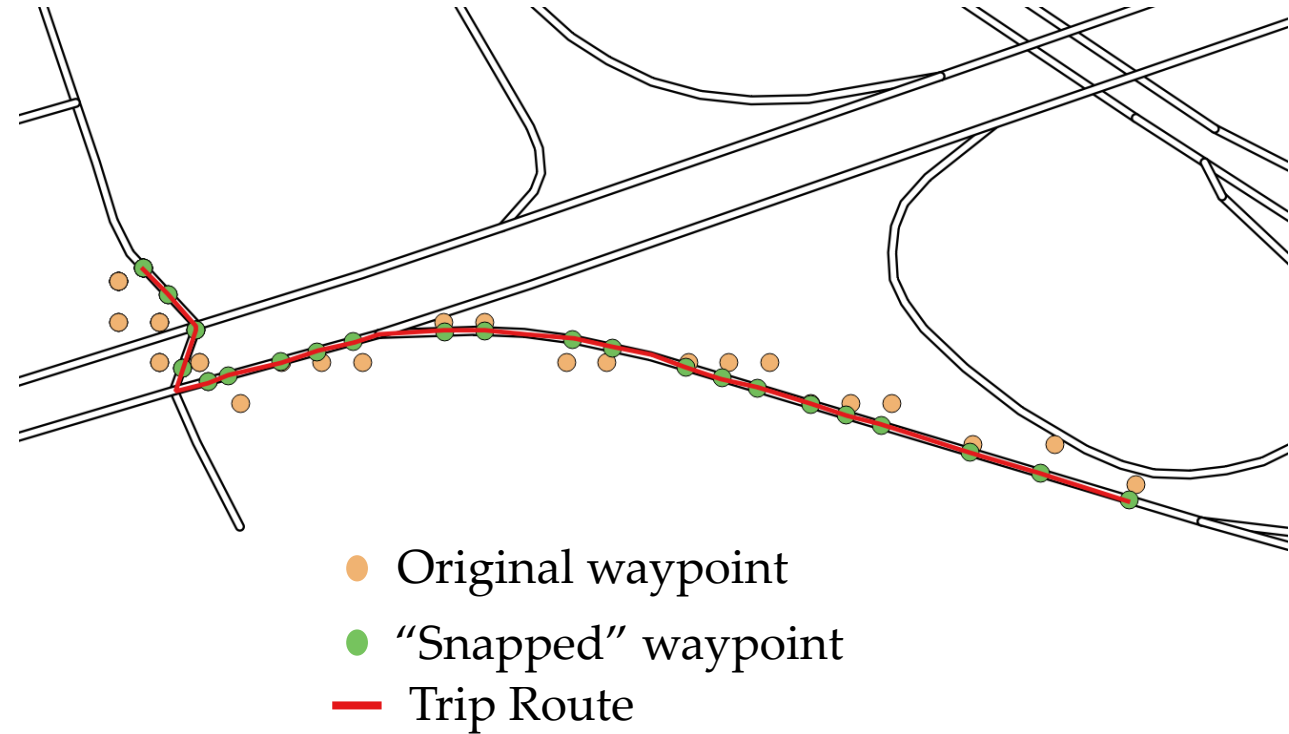
Such info can be used to

- Assess network performance
- Drive policy changes
- Inform decisions on transportation system investment



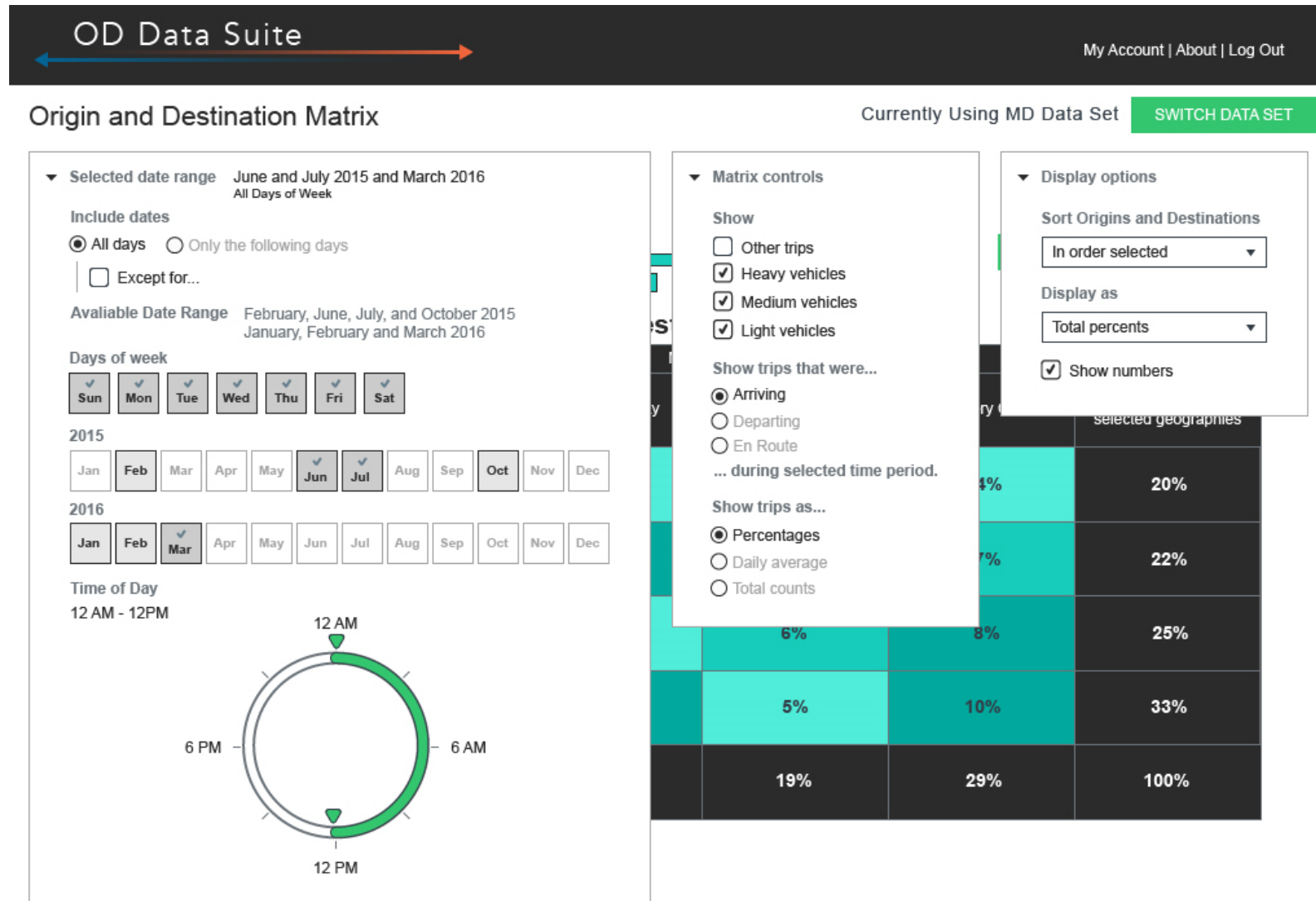
Challenges

- Big data
 - 4 Months of Data for MD
 - 20 Million trips
 - 1.4 Billion waypoints
 - 112 GB of data
- Data cleaning
 - Snapping
 - Routing



Opportunity

A tool is needed to assist analyst in utilizing this rich data!



Use Case 1: MD DOT is considering a VMT tax and wants to know the top county level OD Pairs in their state.

Developing a “traditional” OD Matrix

Developing a “traditional” OD Matrix



Use Case 2: Baltimore DOT wants to know what percentage of trips destined to the central business district come from counties X,Y and Z during the AM peak period.

Developing a “custom” OD Matrix

Developing a “custom” OD Matrix



Use Case 3: MD DOT evaluating a policy to give employers incentives to promote teleworking to alleviate congestion on a target corridor (I-270).

Developing a “pass through” trip map visualization

Developing a “pass through” trip map visualization



Related Work: Planning Model Analysis Tool

BMC Planning Model Suite

Trips that travelled on the selected road segments

Map Controls

Tour Filters

Time Range

Vehicle occupancy

☒ SOV

☒ HOV

Tour purpose

☒ Mandatory

☒ Non-mandatory

Value of time

☒ \$0.00 - \$10.23/hr

☒ \$10.23 - \$21.99/hr

☒ \$21.99 - \$40.89/hr

☒ \$40.89 - \$78.55/hr

☒ \$78.55+ /hr

Household income

☒ <\$15k/yr

☒ \$15k-\$30k/yr

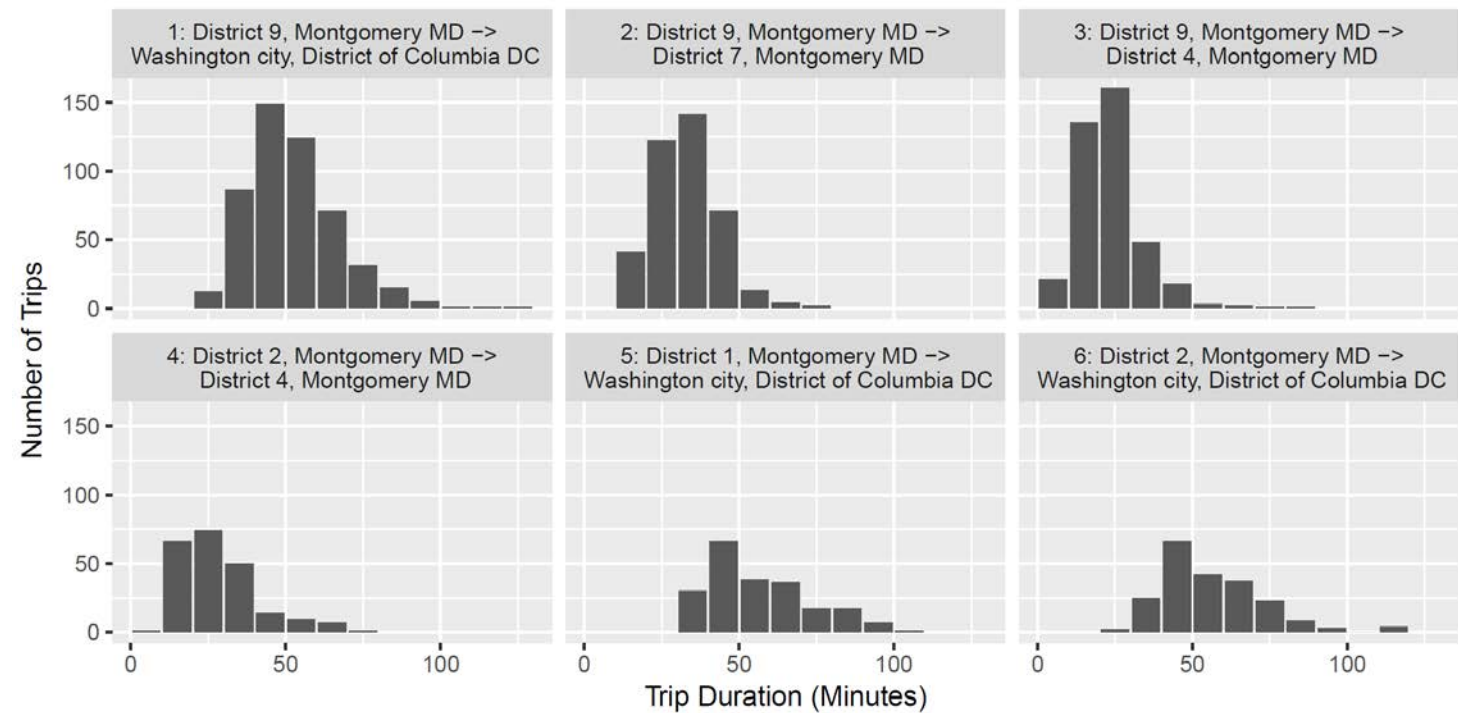
☒ \$30k-\$50k/yr

☒ \$50k-\$100k/yr

☒ >\$100k/yr

View Matrix

Submit



What's Next?



Route Analysis Tool

[Switch Origin and Destination](#)[Back to Query](#)

Trips from Frederick County to Custom Geography

Route Analysis Threshold

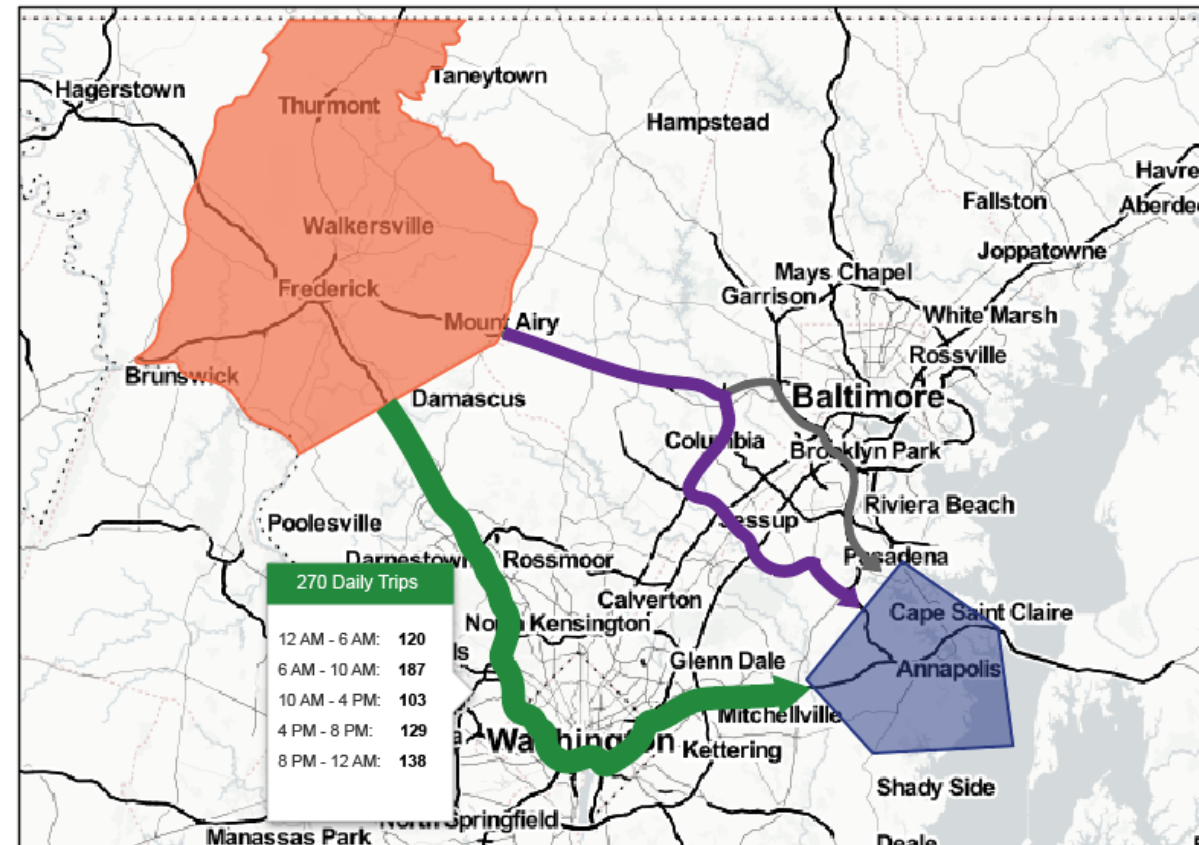
Time Range

February, June, July... All Da...
12 AM - 12 AM

Trip Filters



Route	Map View	Percent of Trips	Number of Daily Trips	Avg Travel Time	Min Travel Time	Max Travel Time
270	<input checked="" type="checkbox"/>	67%	677	1h 32 min	1h 06 min	2h 05 min
70	<input checked="" type="checkbox"/>	29%	291	1h 45 min	1h 18 min	2h 13 min
Others	<input checked="" type="checkbox"/>	3%	32	--	--	--



What's Next?



Thank you!

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