Big Data - Providing Intelligence to Optimize Transportation Planning and Operations Decision-Making

SCAG
INNOVATING FOR A BETTER TOMORROW

INRIX

July 21, 2020

Technology is Fundamentally Reinventing Transportation

Motivating cities to reinvent transportation in their cities to improve urban life

Transformation of Automotive Industry

Autonomous   Connected   Electric   Shared

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Smarter Transportation

Cities Use of Big Data

Urbanization   Sustainability   IoT   Analytics

INRIX is at the center of smarter transportation by positioning ourselves at the convergence of the connected car and smart cities

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Our 450+ Customers Are Leaders in Their Industries

A proven track record of applying insight and intelligence to move people, cities and business forward

Over 60 US Transportation Agencies

INRIX Real-Time & Historical Traffic
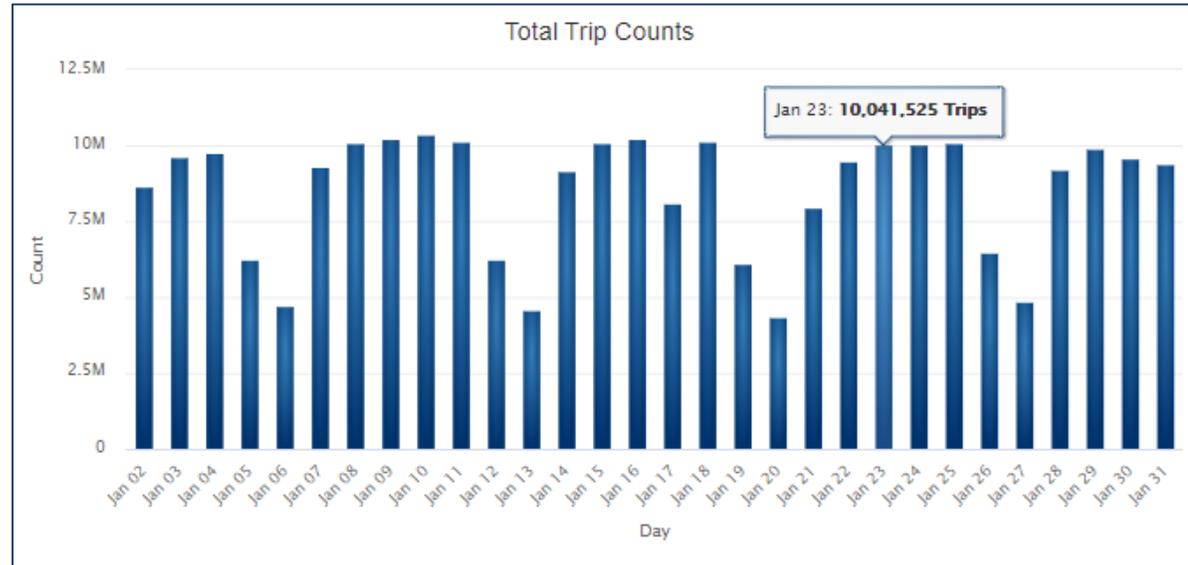
USES FOR BIG DATA ANALYTICS:

- Identify and analyze traffic bottlenecks to meet demands of growing population.

- Identify congestion and incidents in real-time to effectively deploy emergency response units.

- INRIX GPS probe data provides real-time traffic information that covers more than what is possible with sensors.

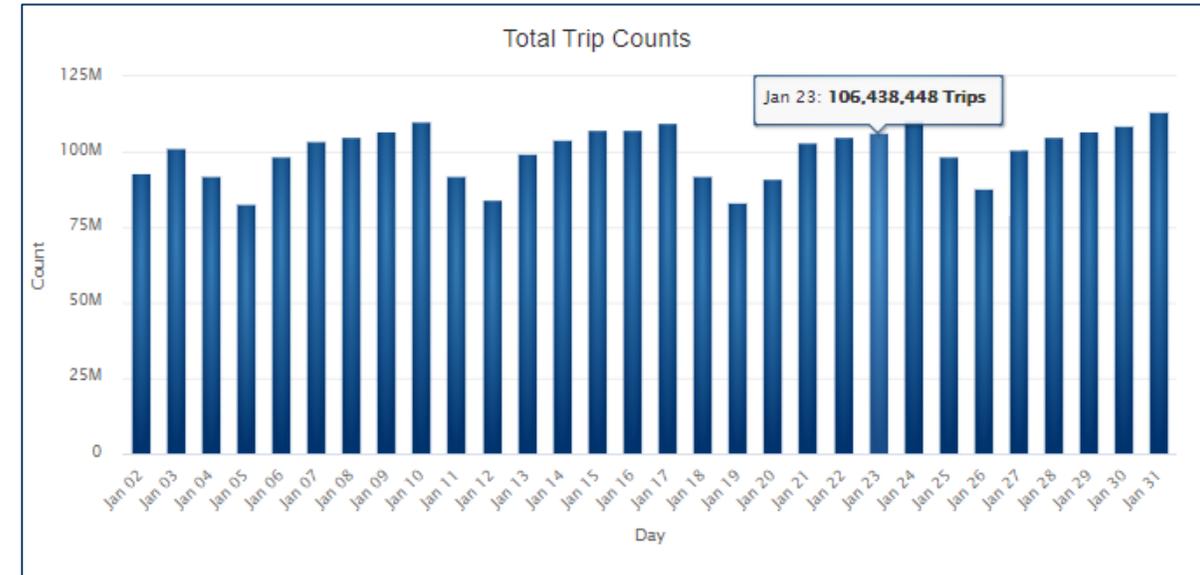- Provide freight-related congestion data to optimize routes for commercial vehicles.

INRIX GPS National Data Growth

Growth by a Factor of Ten in **One Year** (*and we have been around 15 years...*)

January 2019

Total Trip Counts

Jan 23: **10,041,525 Trips**

January 2020

Total Trip Counts

Jan 23: **106,438,448 Trips**

Now collecting 100 million Trips per day
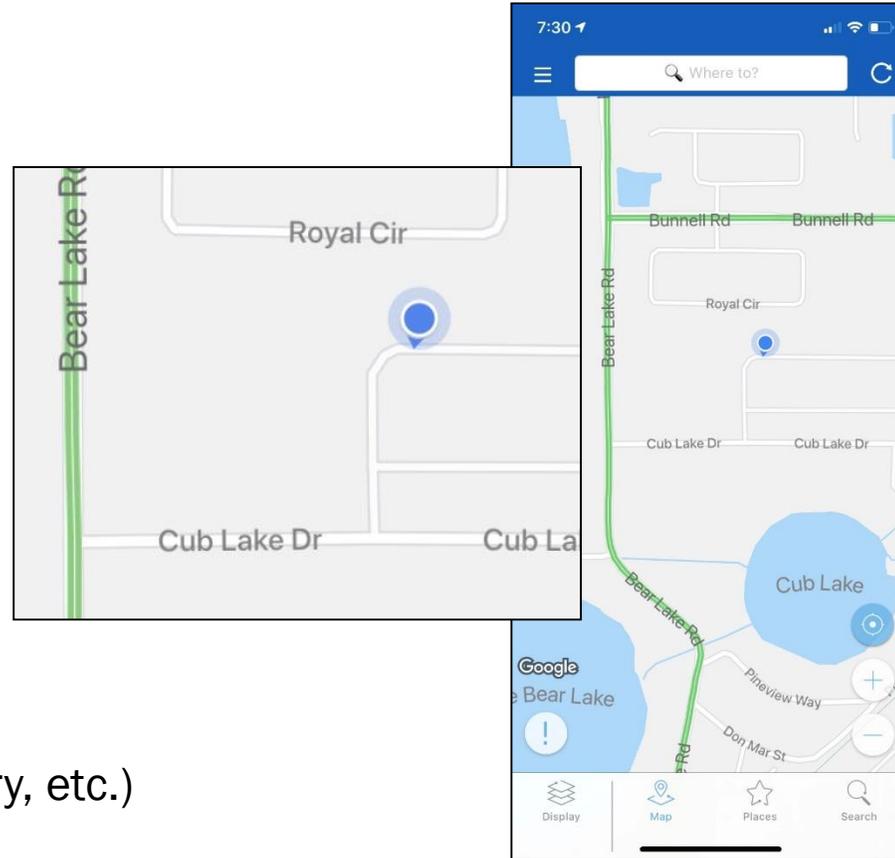
Foundational Source Data

100 million+ trips per day in the US – Multiple Types – All GPS Based

Core Source Data Elements:

- Device/Trip ID

- Location

- Heading
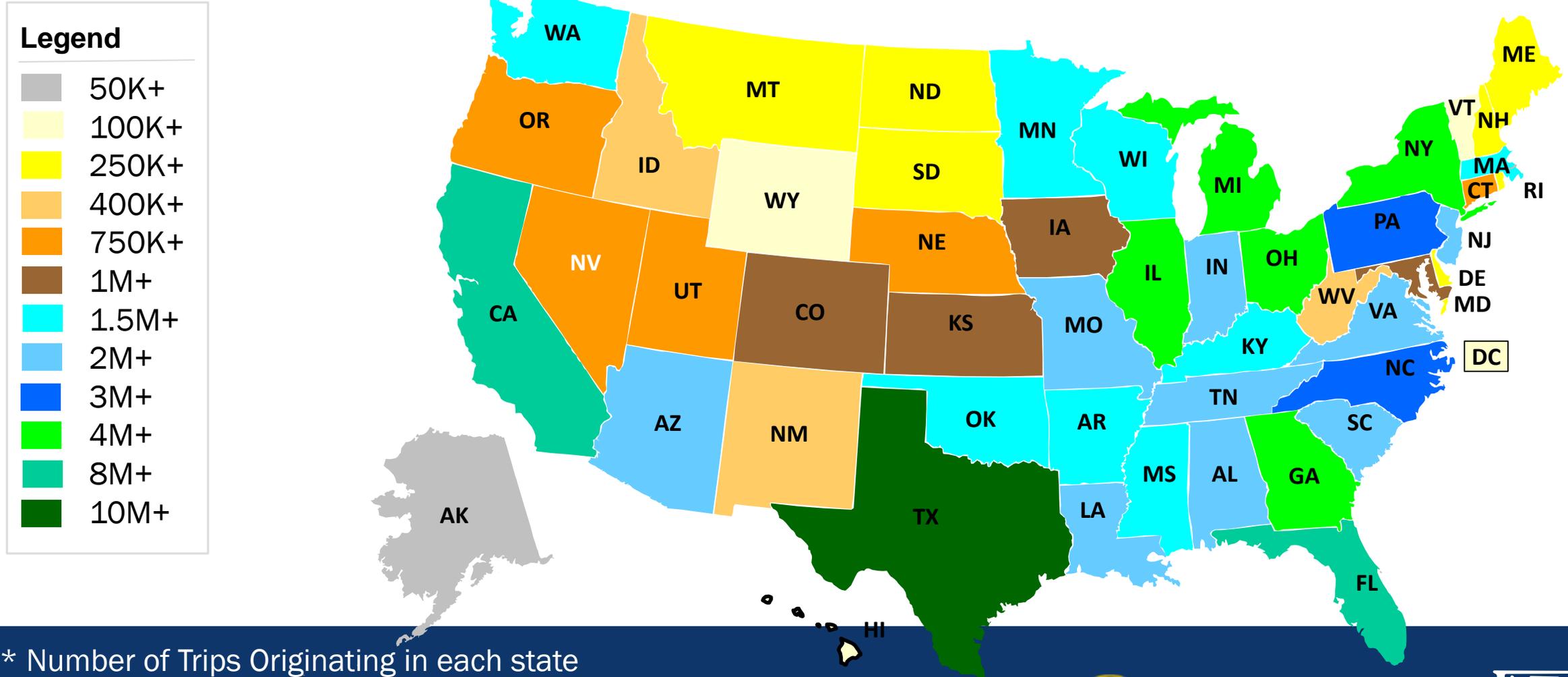
- Speed

Data Types:

- Consumers

  - Connected Cars

  - Mobile Phones

- Local Fleets (service, delivery, etc.)

- Long Haul Trucks

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Average Daily INRIX Trips Count* (February 2020)

100 Million+ Trips/Day Total

>30 BILLION TOTAL MILES – 12%+ all of US VMT

Legend

50K+	(grey)
100K+	(cream)
250K+	(yellow)
400K+	(light orange)
750K+	(orange)
1M+	(brown)
1.5M+	(cyan)
2M+	(light blue)
3M+	(blue)
4M+	(green)
8M+	(teal)
10M+	(dark green)

WA, MT, ND, MN, WI, MI, NY, ME, VT, NH, MA, CT, RI, OR, ID, SD, WY, NE, IA, IL, IN, OH, PA, NJ, DE, MD, WV, VA, NV, UT, CO, KS, MO, KY, CA, AZ, NM, OK, AR, TN, NC, DC, SC, TX, MS, AL, GA, LA, FL, AK, HI
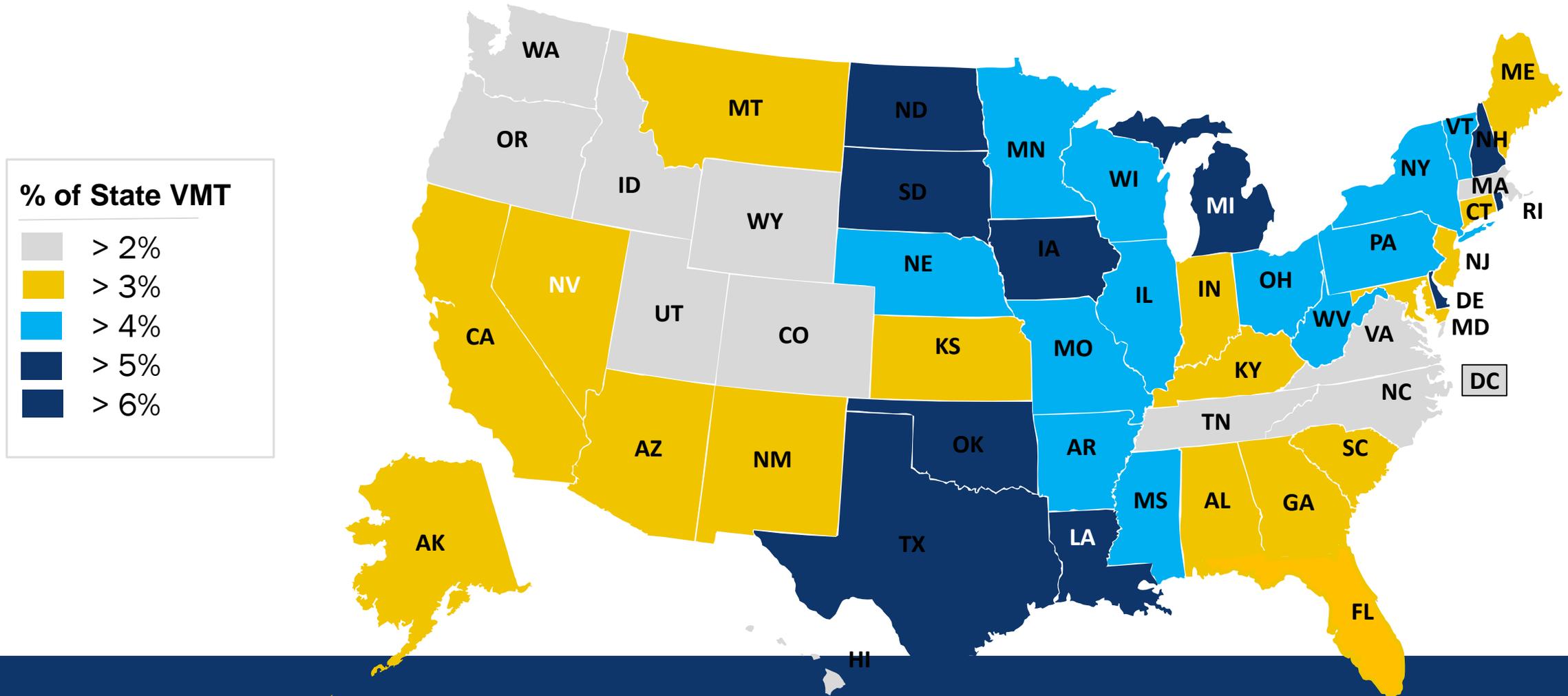
* Number of Trips Originating in each state

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Average VMT Penetration used in Signal Analytics (January 2020)

~Nationwide: 1.05 **BILLION** Trips, 9.75 BILLION Miles Traveled, ~3.8% of Total National VMT*

% of State VMT

- \> 2%
- \> 3%
- \> 4%
- \> 5%
- \> 6%

* Compared to State VMT per FHWA for January 2020: https://www.fhwa.dot.gov/policyinformation/travel_monitoring/tvt.cfm

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# Average Daily INRIX Trips Count (January 2020)

California

State	Full INRIX Fleet Metrics - Daily/Average			Monthly VMT (Millions)			Signals Analytics Fleet - Daily Average			
	Trip Count	Daily VMT (MMs)	Trip Time (Mins)	INRIX Fleet	State per FHWA	Average VMT (%)	Trips	Waypoints/ Trip	VMT (MMs)	VMT %
CA	9,066,003	79.75	18.75	2,472	24,653	10.0%	2,790,893	334	23.78	3.0%

SCAG INRIX Roadway Network Coverage

## Summary of the Six Counties

- TMC Roadway Network
  - Miles – 25,195
  - Segments – 45675
  - Average Segment Length – 0.55 miles
- XD Roadway Network
  - Miles – 32,116
  - Segments – 150,307
  - Average Segment Length - 0.21 miles
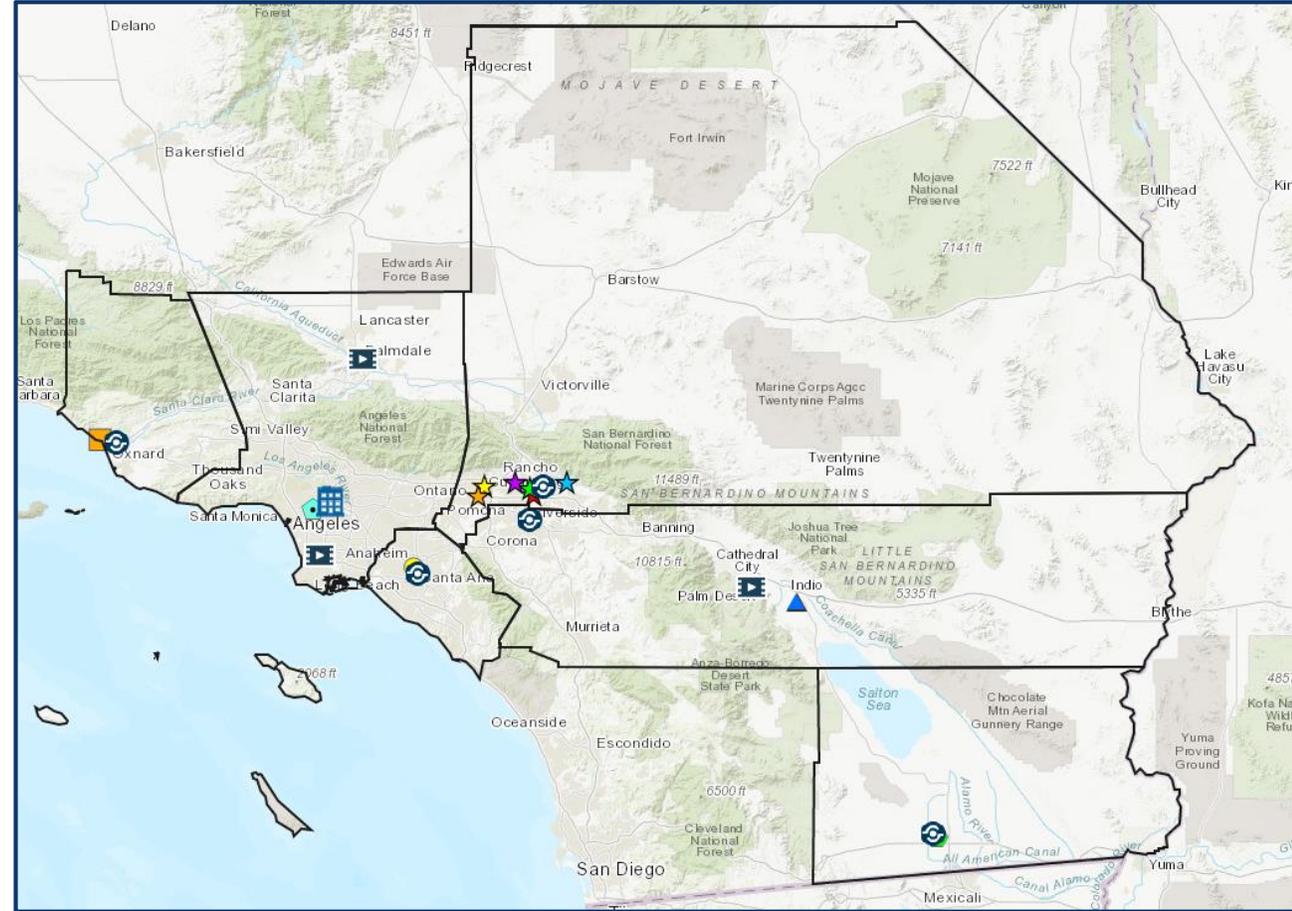
Two Segment Definition Options – Can be used interchangeably

XD and TMC Segments

- XD and TMC Coverage Options
  - Can use either/or depending on need
  - XD more roads, more granular segments
  - XD segments never more than 1 mile in length
- Sub-segments available in both XD and TMC
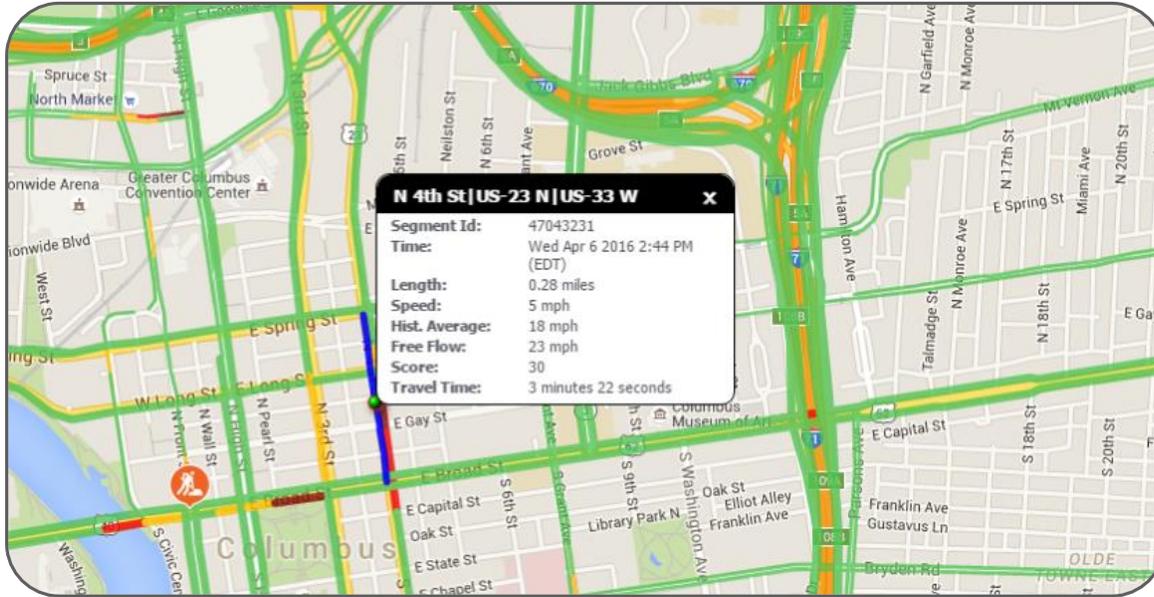 - Enriches monitoring site
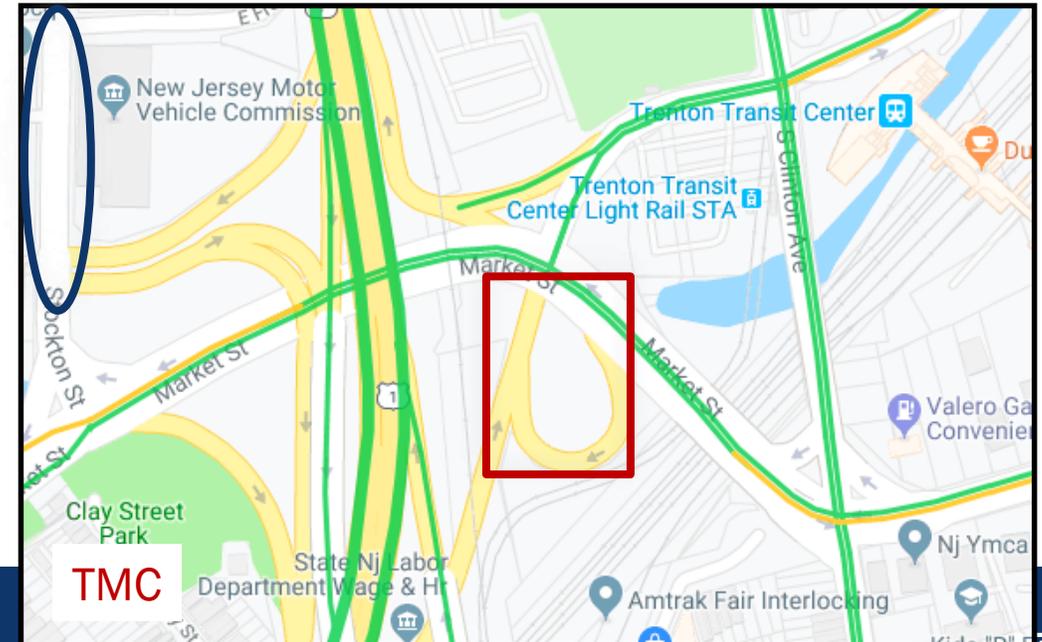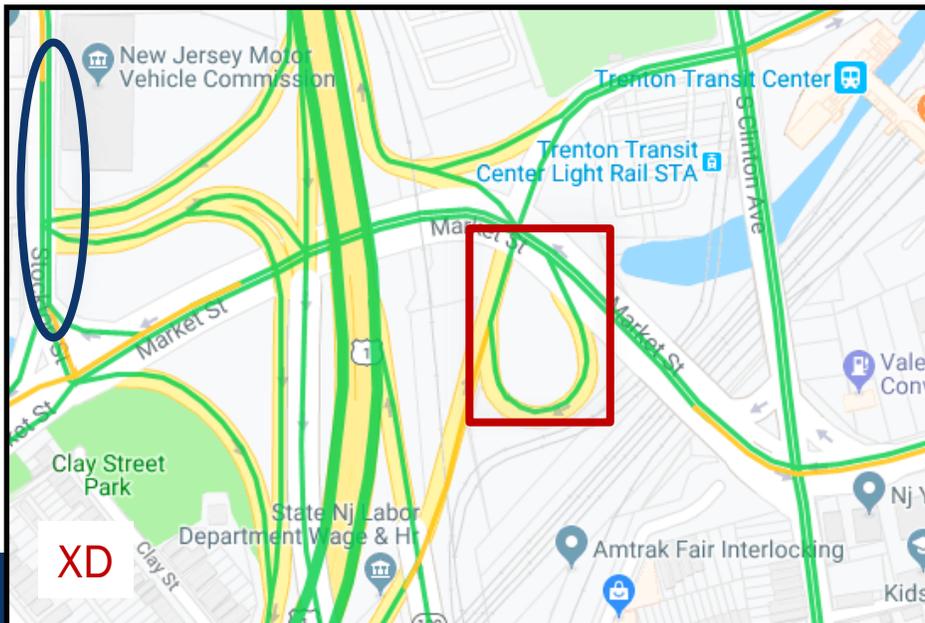
INRIX Public Sector Services

- Real-Time Data
  - Real Time Feed via API (XD/TMC)/ Web Tiles via API (XD/TMC)
- Historical Data (Archives and Profiles)
  - Speed/Travel Time Archives
  - Volume Profiles
- Analytics (web-based platforms)
  - Roadway Analytics – XD based
  - Probe Data Analytics – TMC based (in partnership w/CATT Lab)
  - Signal Analytics (brand new in partnership with CATT Lab)
  - COVID Traffic Trends
- Origin-Destination Data/Services
  - Trip Paths
  - Trip Analytics (in partnership with CATT Lab)
- Safety Services
  - HELP (Highway Emergency Link Platform) (in partnership w/Information Logistics)
  - Commercial Vehicle Safety Alerts (in partnership w/Drivewyze)

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INRIX Real-Time Traffic

Speed data calculated in real time, updated approximately every minute, from current conditions based on input from the INRIX Traffic Intelligence Network. Reported at the **TMC and XD** Traffic Segment level.

Field	Definition
Segment Code	Definition of the roadway link
Speed	Current real time speed in MPH on the road segment
Average	Historical average speed in MPH on the road segment. This is the typical speed for the current day of week and hour of day (in 15 minute increments)
Reference	Reference speed in MPH on the road segment. This is the proxy of the free flow or uncongested speed on the roadway, defined as the 68th percentile of calculated speeds throughout the entire day
Traveltime minutes	Time required to travel across the road segment
Score	This is a score between 10 and 30 that defines how the speed on the road segment was calculated: • "30" = Speed is calculated from real time data only • "20" = Speed is calculated from a blend of real time and typical/average speed on the road segment • "10" = Speed is calculated only from typical/average speed on the road segment
Confidence	This is a rating from 0 to 100% that defines INRIX's confidence on the real time speed on the road segment

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INRIX Traffic Key Route Travel Times

Provide current travel times along a precisely-specified route between any origins and destination in either direction
- Based on real-time traffic conditions
- Update frequency up to every minute

Enable travel times on dynamic message signs (DMS)

Real-time or archived basis for instantaneous & data analytics

Historical Archives

- Running archive of Real-Time speeds and Travel Times provided by INRIX for all segments in service at that time.
  - TMC: Available in 1-minute bins back to 1/1/15
  - XD: Available in 1-minute bins back to 1/1/14
- Data Available Through Yesterday

INRIX was selected by FHWA to provide the NPMRDS data set through 2022

Field	Definition
XD/TMC Code	Definition of the roadway link
Speed	The Real Time speed in MPH on the road segment recorded at one minute intervals.
Average	Historical average speed in MPH on the road segment. This is the typical speed for the current day of week and hour of day (in 15 minute increments)
Reference	Reference speed in MPH on the road segment. This is the proxy of the free flow or uncongested speed on the roadway, defined as the 85th percentile of calculated speeds throughout the entire day
Traveltime minutes	Time required to travel across the road segment
Score	This is a score between 10 and 30 that defines how the speed on the road segment was calculated: • "30" = Speed is calculated from real time data only • "20" = Speed is calculated from a blend of real time and typical/average speed on the road segment • "10" = Speed is calculated only from typical/average speed on the road segment
Confidence	This is a rating from 0 to 100% that defines INRIX's confidence on the real time speed on the road segment

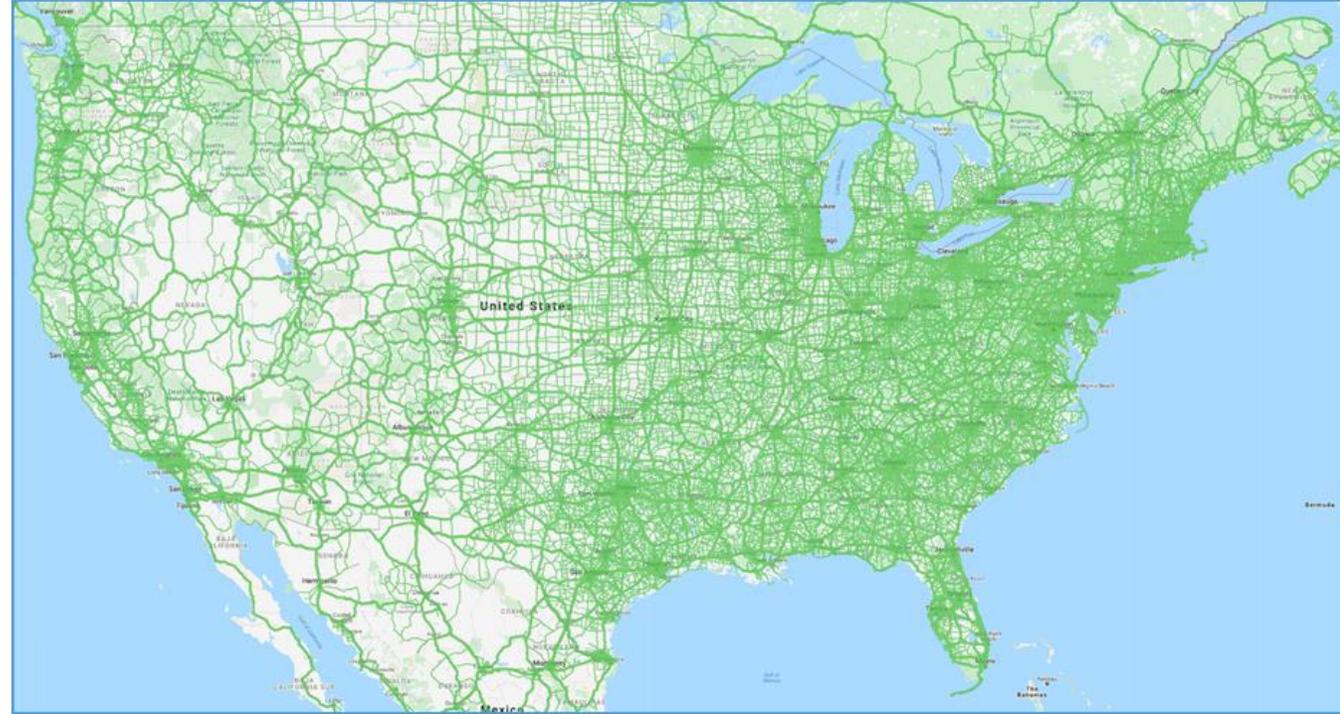**INRIX**

Volume Profiles

Provides direct access to dataset that powers volume-weighted analyses

Key Benefits

- Day-parted and direction-parted vehicle counts
- By time of day
- Day of week
- 15-minute bins
- Every XD road segment

Created

- Raw counts from INRIX GPS data aggregated to generate crossing counts by road segment, travel direction, day of week, time of day
- Crossing counts represent a scaled-down version of a volume profile; scale = penetration rate of contributing devices
- INRIX compares the observed vehicle population with the true vehicle count at a set of locations to generate unique scaling factors for different spatial regions and road types

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INRIX Roadway Analytics/ Probe Data Analytics

XD and TMC Options to Address Different Needs and use Cases

- Integrated tools to perform on-demand analytics and create visualizations for the particular situation you wish to study

- Real-time and historical data in a single platform (either Roadway Analytics or Probe Data Analytics)

- Conveniently create and share analysis sets with team members

- Utilize visualization and trending tools to more easily share findings with decision makers.

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Real Time View

Includes:

- Traffic Flow
  - ✓ Congestion
  - ✓ Comparative Speed
  - ✓ Actual Speed

- Incidents
- Construction
- Events
- Dangerous Slowdowns
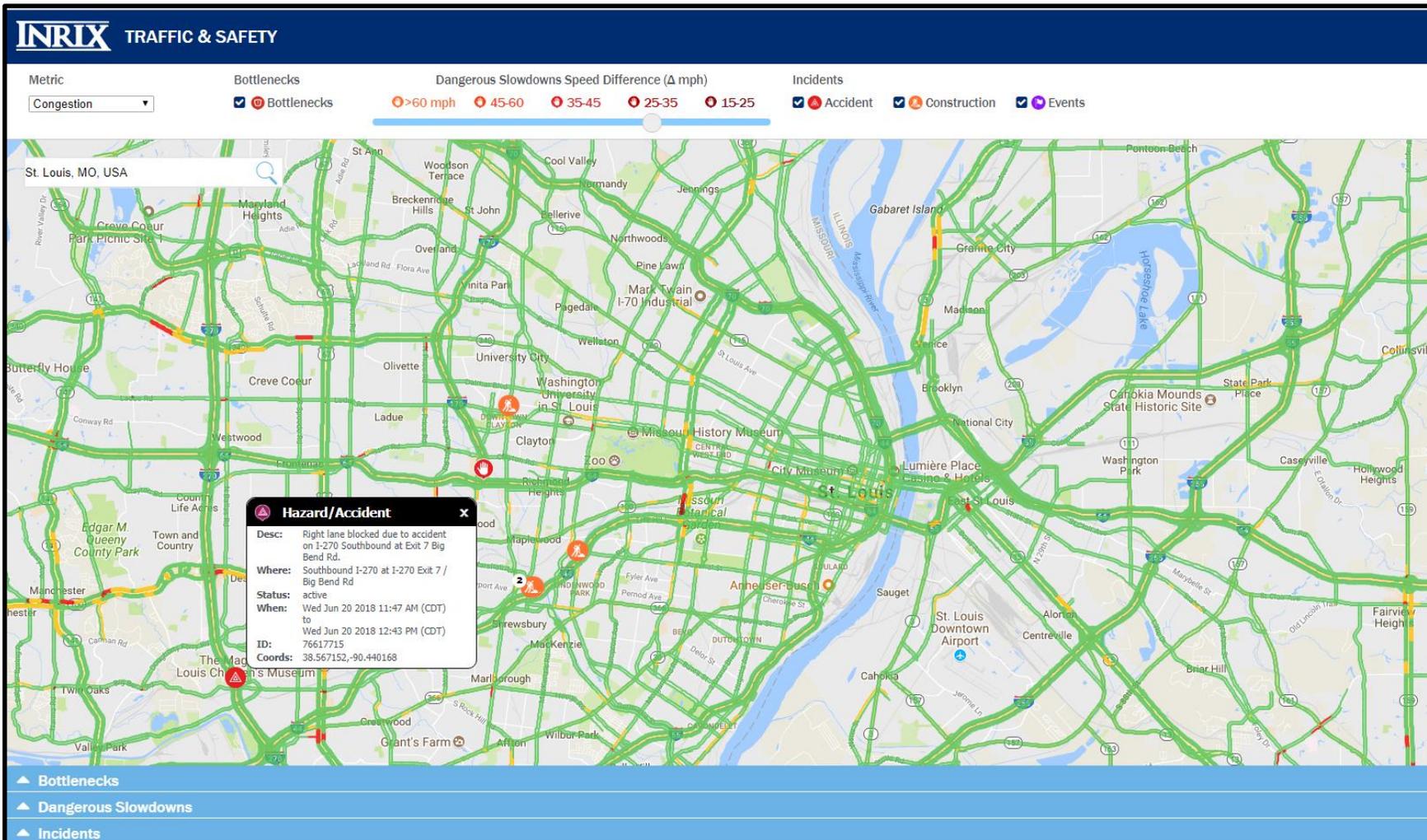
Data Downloader

Easy access for all of the underlying data

- Customize queries (per road, region, zip code, etc.)

- Save XD sets for streamlined analysis and coordination

- Customize time and date for multiple study periods

Performance Charts

Easily visualize data in graphical layouts

- Communicate findings using bar or line, charts

- Identify trends with year-over-year or before and after studies

- Select speed, travel time and other performance metrics (TTI/PTI/BTI)

- Export charts and complete data files

Venice Blvd. EB

Travel Time Seconds (mins) vs Time of Day

● Jun 1, 2017 – Jun 30, 2017 (Mo,Tu,We,Th,Fr)
◆ Jun 1, 2016 – Jun 30, 2016 (Mo,Tu,We,Th,Fr)

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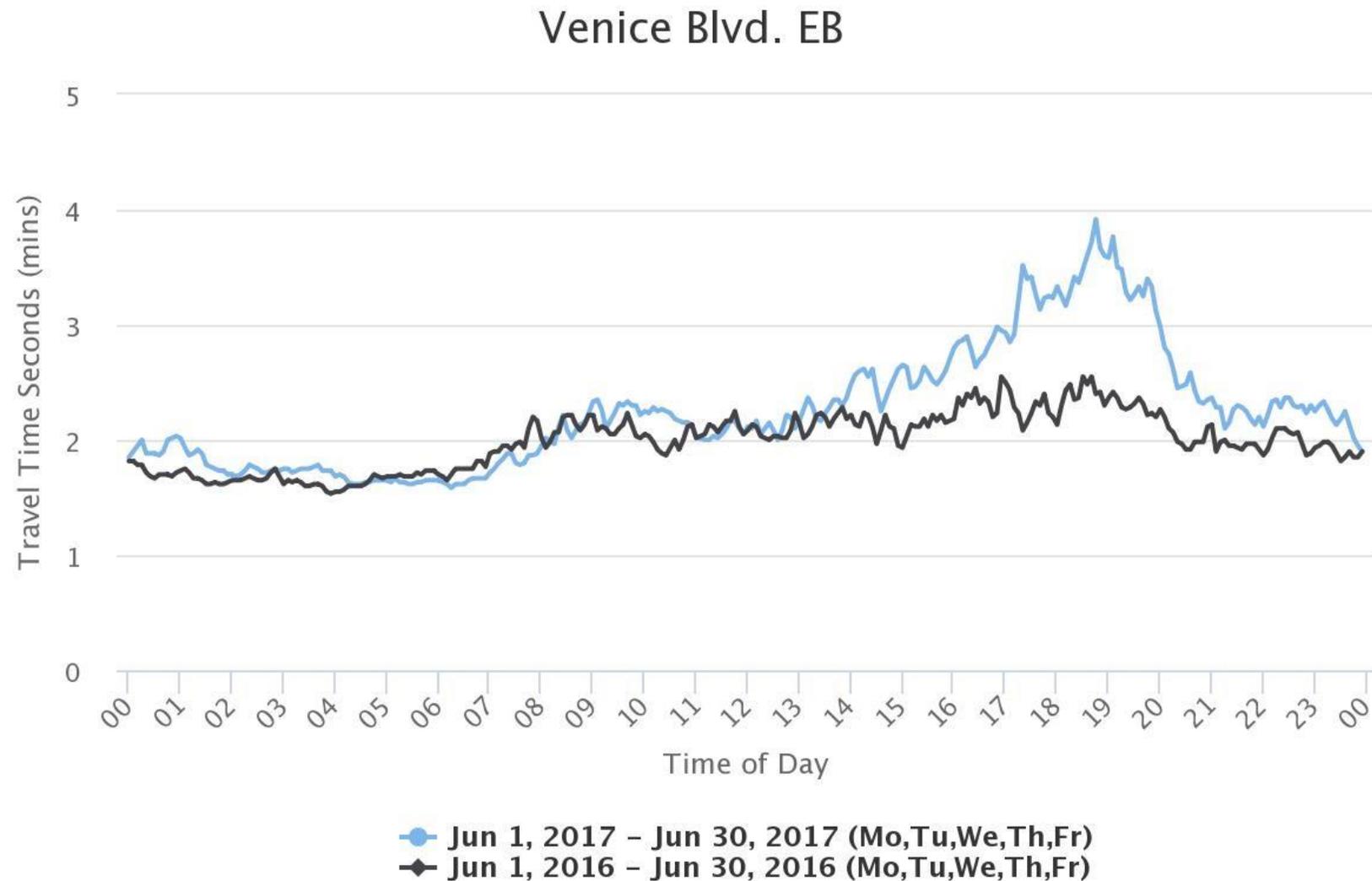
Congestion Scan

Pinpoint locations of sub-optimal conditions

- Extract and communicate details using customizable time & color sliders

- Generate multi-period, side by side comparisons

- View speed, travel time and performance metrics

- Identify pain points along travel corridors including multiple contiguous roads

Bottleneck Ranking

Identify and rank pain points

- Identify daily trends to:
  - Optimize work zones
  - Understand peak hours

- Identify daily, weekly or monthly trends

- Review detailed bottleneck occurrence information
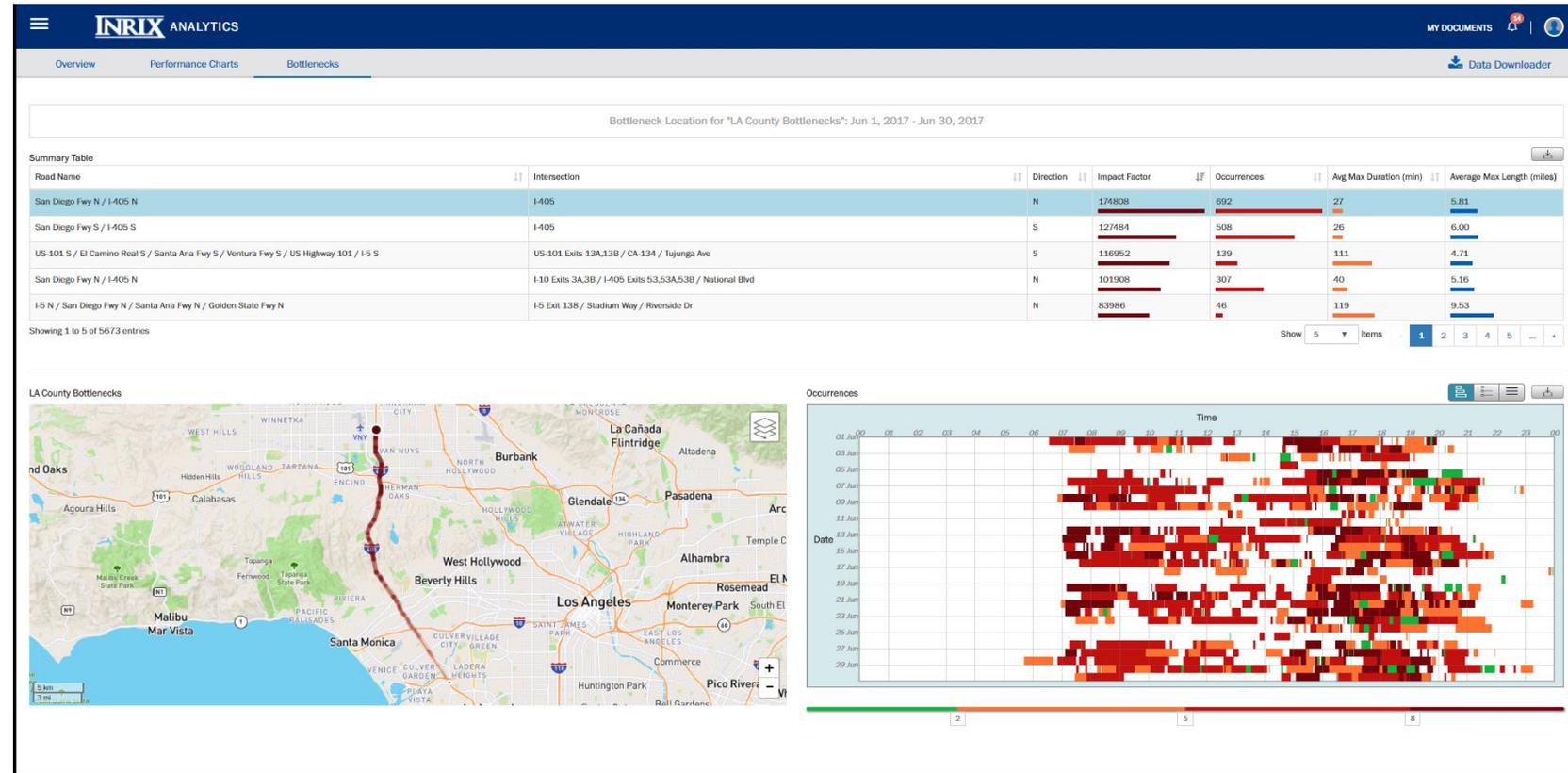
INRIX Signal Analytics

Vastly richer data set means signal analytics is finally possible

Data   ➞   Data Set   ➞   Solution

3-second frequency

3 - 5% sample size
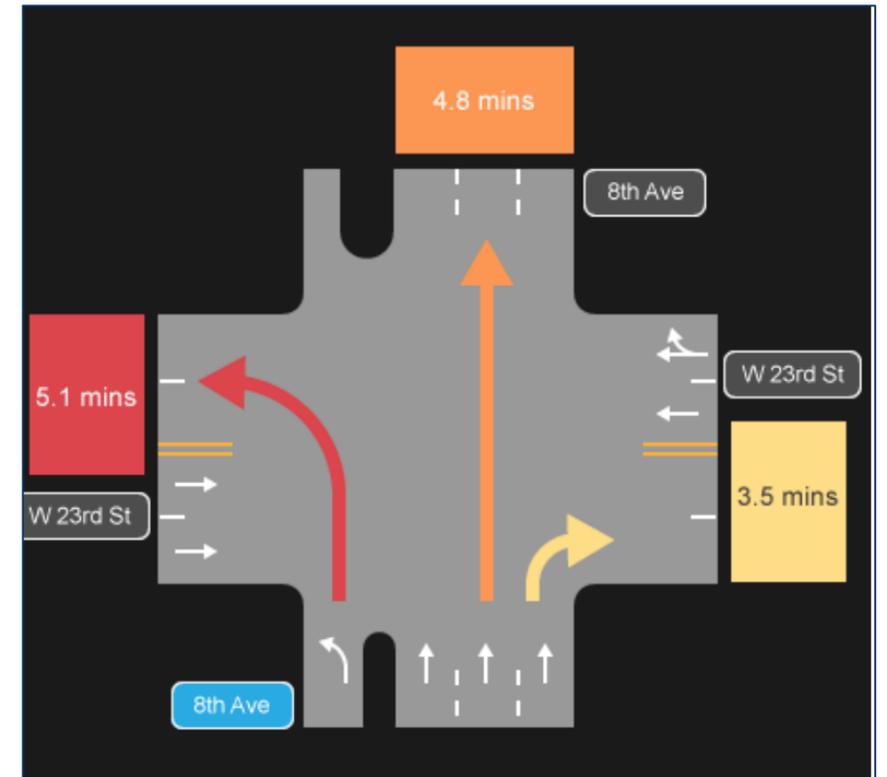
Computation Process and Parameters
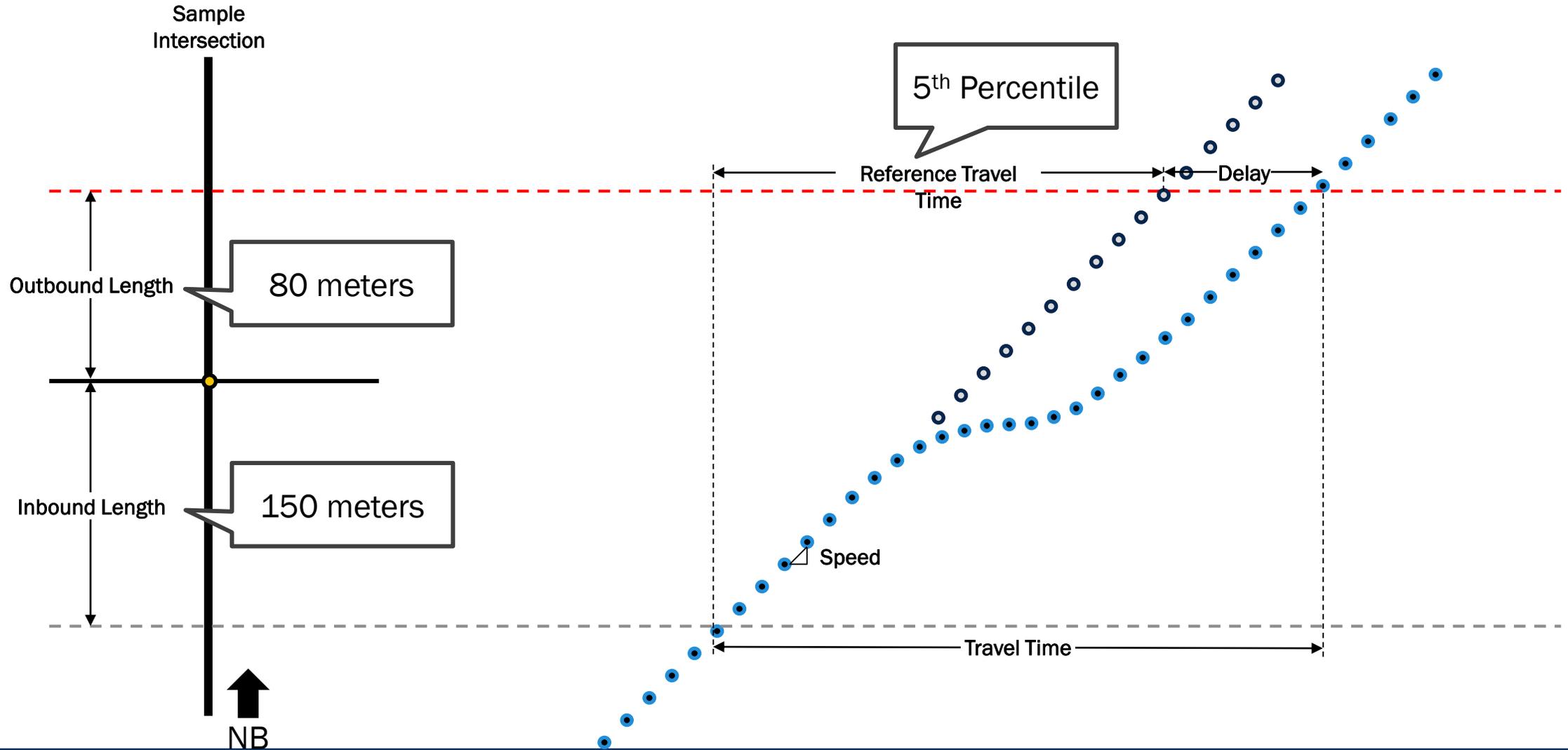
Initial Metrics

Aggregated from individual trajectories
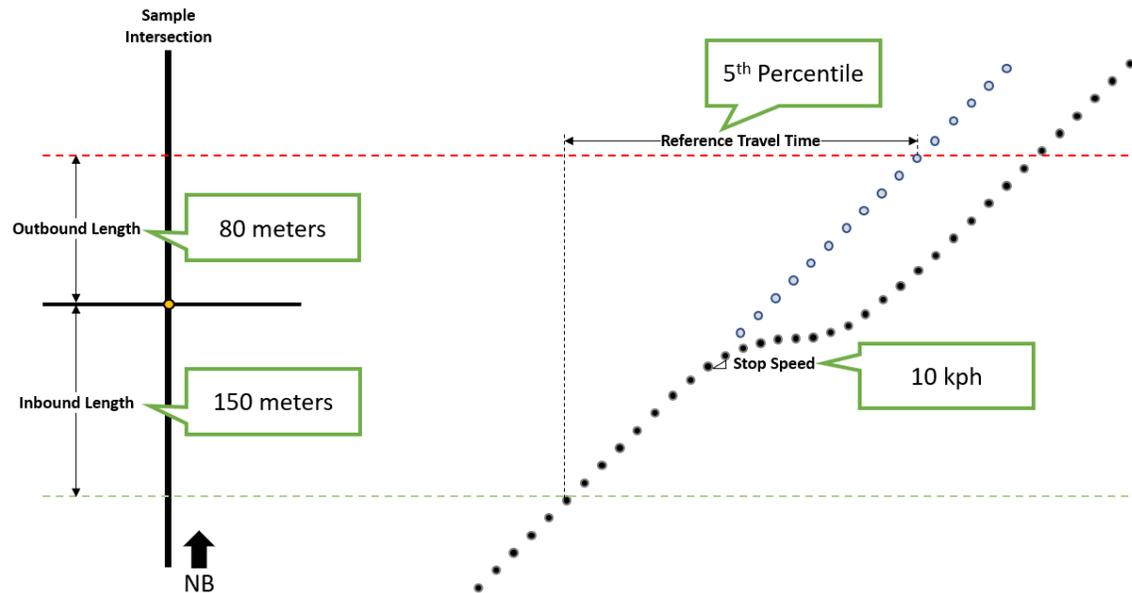
- Percent Arrival on Green (POG): Minimum vehicle speed above 10 kph
- Vehicle Count and Stopped Vehicle Count
  - Observed vehicle crossings
- Travel Times through the intersection, average and maximum
- Travel Speeds through the intersection, average and maximum
- Control Delay, average and maximum (the extra time required at an intersection due to slowing attributed to the signal compared to measured free-flow speeds).

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Signal Data Collection Pricing Example

- Capital Cost (4-way Intersection) [1] : $250,000 - $500,000

- Capital Cost of Sensors (4-way Intersection) :$10,000-$30,000[2]

- Annual O&M + Electric Cost[1] : $8,000

- Annual Communications/Data Storage Cost (50 meg plan): $350[2]
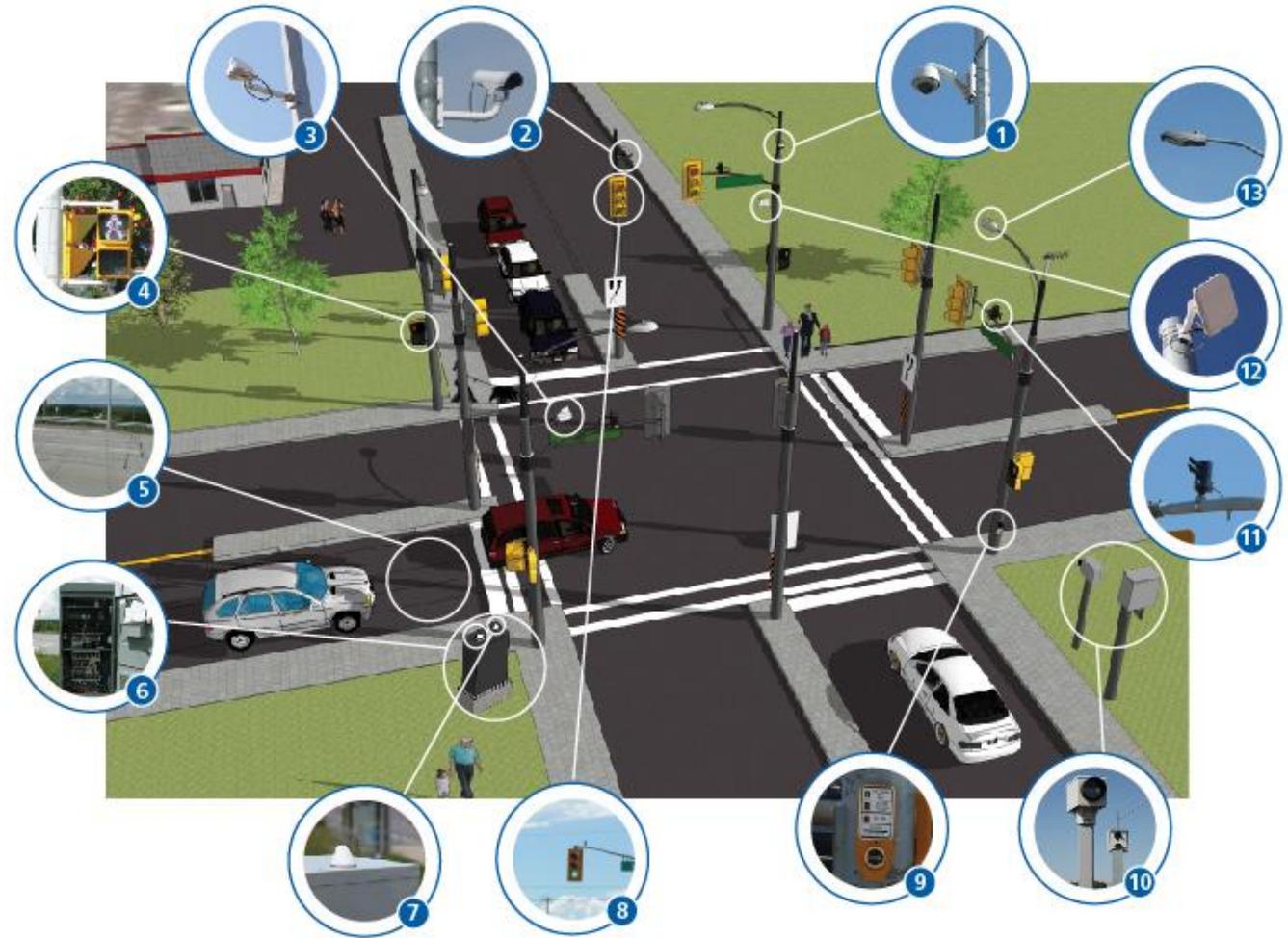
1 – From WASHDOT: https://www.wsdot.wa.gov/Operations/Traffic/signals.htm
2 – Review of various online actual bids

Image source: York, CA. Region -
https://www.york.ca/wps/portal/yorkhome/newsroom/CampaignsProjects/technologyattrafficsignals/!ut/p/z0/fY3JDoIwFEW_xQVL86pBDEuiJkokxLDBbsyzMhSwhfY58PdWPoDdPTd3AA45clVvWSFJrbBzfOXBjYUb_xhmLGZpuGfRKb2cD9t4lQU-xMDnA25hbZJdUgHvkeqlVKWGnApRK93pakQig2UphZWVe7T_gmyGgUfAhVZUfAnyOdwmrchjozatAQuSXpOBXSfw2aPrW1SP3uimEGQ9NnPSt_w-fqLFD_qXMOY!/#.XqC9zchKg2w

26

Trip Trends Dashboard

Daily Index by Vehicle Type and Geography

Indices included:
- VMT – Total vehicle miles traveled
- Total Trips
- Average Trip Length

Geographical Summaries
- 8 Countries
- 50 States plus DC
- 98 Markets – Major Metro Areas

"Typical Days"
- 5-week period, January 20 thru February 28, 2020, excluding school holidays
- Average created for each day of the week

Vehicle Types:
- Local Fleets
- Long-Haul Trucks
- Passenger Vehicles

Time of Day Filters:
- AM Peak
- PM Peak
- Off-Peak
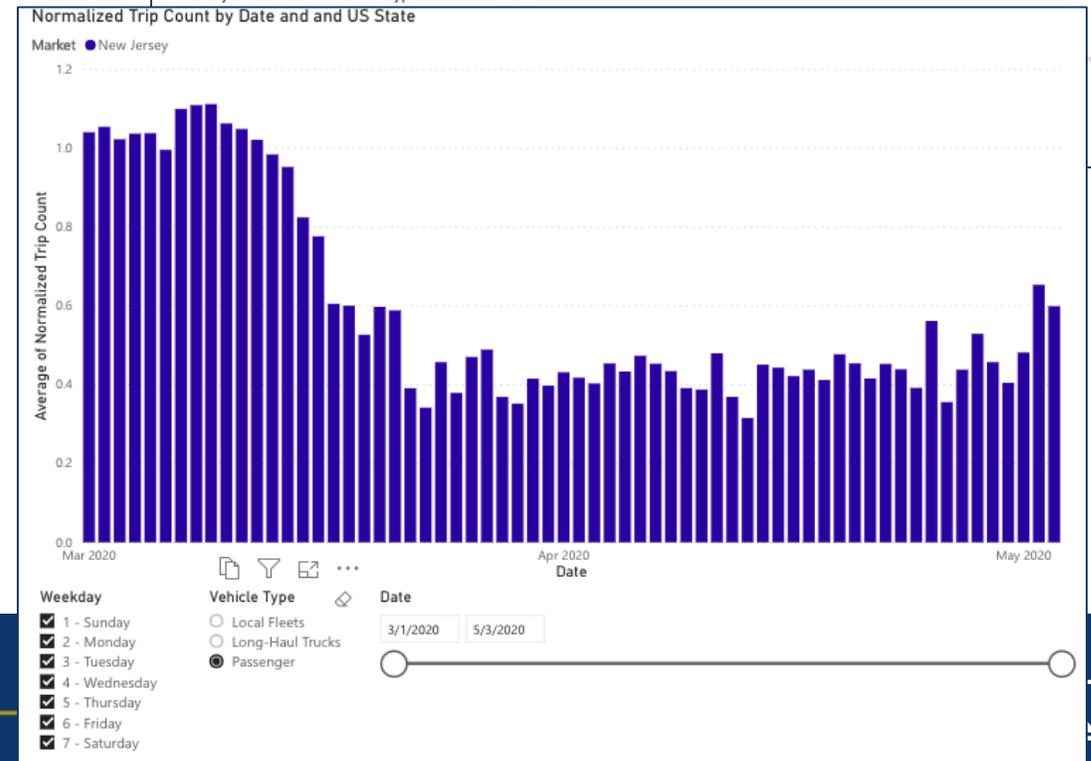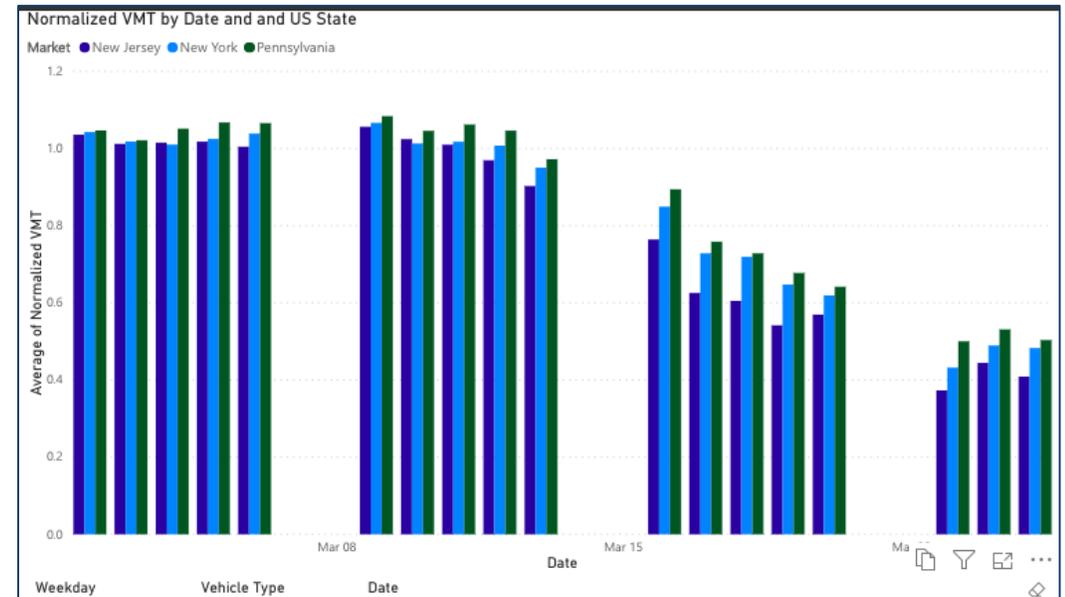
Origin-Destination Services

Trip Path Datasets

Billions of GPS pings from moving devices, cleaned up and map-matched to ensure the complete path of travel is represented.

- Matching trips by road segment
- Highly reliable, ready-to-query data
- Easy to compute corridor travel times and turn ratios
- Full corridor view on a map
- Easy segment ordering

Trip Paths files
- Trip Start/End Time
- Trip Start/End Latitude & Longitude
- Trips Start/End Zone
- Anonymous Device ID
- Provider ID and Type
- Trip Mean Speed, Max Speed, Distance
- Endpoint Quality
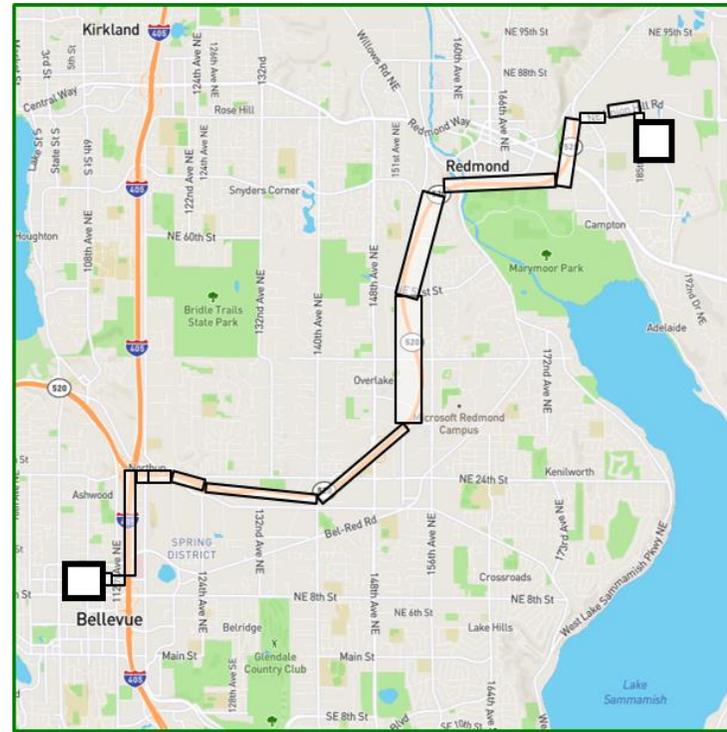
Time	OSM Segment
14:41:02	239487982
14:41:34	239487972
14:42:01	239487973
14:44:53	239488330
14:47:19	239478793
14:50:47	239502312
14:54:33	239502419
14:57:12	239510023
15:00:30	239510342
15:02:46	239510727
15:04:58	239510901
15:06:35	239511025
15:06:59	239523220
15:08:12	239543559
15:08:47	239545325
15:09:22	239545335

Trip represented as a series of road segment crossings over time

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Trip Paths Provides A Variety of Insights

Typical Use Cases

Transportation Demand Management

- Quantify the relative volume of travel in each target situation

- Determine the impact of project on level of service and other metrics

Internal/External Studies

- Understand how many pass-through trips are occurring

- Plan to minimize or attract more drivers to stop

Project Performance Evaluations

- Easily and cost-effectively evaluate the impact of decisions

- Show results of work in terms of travel time, trip speed and more

Congestion Studies

- Evaluate congested routes by times of day, types of day& more

- Realize the causes of congestion and plan to better optimize driving

- Origin-Destination Analysis
- Transportation Demand Management Modeling/ Travel Demand Modeling

- Congestion Studies
- Performance Measures
- Freight Movement

- Project Impact Studies
- Detour Planning
- Work Zone Analysis

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INRIX Trip Analytics

Origin Destination Matrix

Origin and Destination Matrix

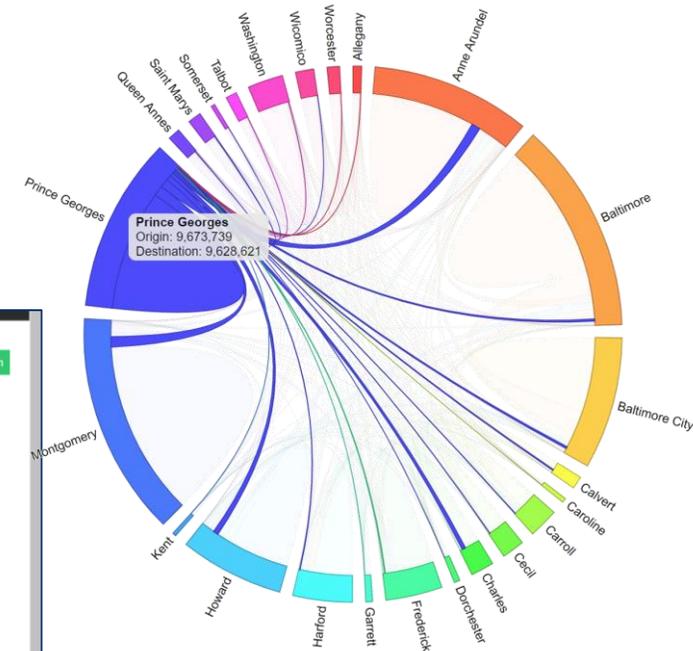Currently using the MD data set | Switch Data Set | Switch to Chord Diagram

▶ Time Range February, June, July, October 2015 and Jan... All Days of W... 12 AM - 12 AM ▶ Trip Filters ▶ Matrix Controls

Legend
0%   14.44%
0.22%

Destinations

Maryland

Origins (Maryland)	Allegany	Anne Arundel	Baltimore	Baltimore City	Calvert	Caroline	Carroll	Cecil	Charles	Dorchester	Frederick	Garrett	Harford	Howard	Kent	Montgomery	Prince Georges	Queen Annes	Saint Marys	Somerset	Talbot	Washington	Wicomico	Worcester	Total
Allegany	0.51%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0.01%	0.04%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0.05%	0%	0%	0.63%
Anne Arundel	0%	8.5%	0.64%	0.59%	0.08%	0.01%	0.06%	0.02%	0.03%	0.01%	0.05%	0%	0.08%	0.63%	0%	0.21%	0.72%	0.1%	0.01%	0%	0.03%	0.02%	0.01%	0%	11.82%
Baltimore	0%	0.63%	11.24%	1.98%	0.01%	0%	0.28%	0.08%	0.01%	0%	0.07%	0%	0.53%	0.58%	0%	0.12%	0.18%	0.01%	0%	0%	0%	0.04%	0%	0%	15.77%
Baltimore City	0%	0.59%	1.98%	6.17%	0.01%	0%	0.08%	0.05%	0.01%	0%	0.05%	0%	0.2%	0.33%	0%	0.1%	0.17%	0.01%	0%	0%	0.01%	0.04%	0%	0%	9.83%
Calvert	0.08%	0.08%	0.01%	0.01%	0.63%	0%	0%	0.03%	0%	0%	0%	0%	0.01%	0.1%	0%	0.06%	0%	0%	0.06%	0%	0%	0%	0%	0%	0.93%
Caroline	0%	0.01%	0.01%	0%	0%	0.19%	0%	0%	0%	0.02%	0%	0%	0%	0%	0%	0%	0%	0.03%	0%	0%	0.03%	0%	0.01%	0%	0.32%
Carroll	0%	0.06%	0.27%	0.08%	0%	0%	1.42%	0%	0%	0%	0.12%	0%	0.02%	0.13%	0%	0.06%	0.03%	0%	0%	0%	0%	0.02%	0%	0%	2.23%
Cecil	0%	0.02%	0.08%	0.05%	0%	0%	0%	1.23%	0%	0%	0.01%	0%	0.18%	0.03%	0.01%	0.01%	0.02%	0.01%	0%	0%	0%	0.01%	0%	0%	1.68%
Charles	0%	0.03%	0.01%	0%	0.03%	0%	0%	0%	1.22%	0%	0%	0%	0.01%	0%	0%	0.02%	0.3%	0%	0.08%	0%	0%	0%	0%	0%	1.72%
Dorchester	0%	0.01%	0%	0%	0%	0.02%	0%	0%	0%	0.26%	0%	0%	0%	0%	0%	0%	0%	0.01%	0%	0%	0.04%	0%	0.04%	0.01%	0.42%
Frederick	0.01%	0.05%	0.07%	0.05%	0%	0%	0.12%	0.01%	0%	0%	3.11%	0%	0.02%	0.12%	0%	0.35%	0.07%	0%	0%	0%	0%	0.21%	0%	0%	4.2%
Garrett	0.05%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0.41%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0.02%	0%	0%	0.5%
Harford	0%	0.08%	0.52%	0.2%	0%	0%	0.02%	0.2%	0%	0%	0.01%	0%	3.24%	0.06%	0%	0.02%	0.04%	0%	0%	0%	0%	0.01%	0%	0%	4.4%
Howard	0%	0.63%	0.58%	0.34%	0.01%	0%	0.13%	0.03%	0.01%	0%	0.12%	0%	0.06%	5.01%	0%	0.35%	0.41%	0.01%	0%	0%	0%	0.03%	0%	0%	7.75%
Kent	0%	0%	0%	0%	0%	0%	0%	0.01%	0%	0%	0%	0%	0%	0%	0.19%	0%	0%	0.04%	0%	0%	0%	0%	0%	0%	0.26%
Montgomery	0%	0.21%	0.12%	0.1%	0.01%	0%	0.06%	0.01%	0.02%	0%	0.36%	0%	0.03%	0.36%	0%	14.44%	0.85%	0.01%	0.01%	0%	0%	0.05%	0%	0%	16.63%
Prince Georges	0%	0.74%	0.18%	0.17%	0.1%	0%	0.03%	0.02%	0.32%	0%	0.06%	0%	0.04%	0.43%	0%	0.85%	9.96%	0.03%	0.05%	0%	0.01%	0.02%	0%	0%	13.02%
Queen Annes	0%	0.09%	0.01%	0.02%	0%	0.03%	0%	0.01%	0%	0.01%	0%	0%	0.01%	0.03%	0.04%	0.01%	0.03%	0.57%	0%	0%	0.05%	0%	0.01%	0%	0.9%
Saint Marys	0%	0.01%	0%	0%	0.06%	0%	0%	0%	0.07%	0%	0%	0%	0%	0.01%	0.04%	0.01%	0.04%	0%	0.78%	0%	0%	0%	0%	0%	0.98%
Somerset	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0.18%	0%	0%	0.05%	0.03%	0.29%
Talbot	0%	0.02%	0%	0.01%	0%	0.03%	0%	0%	0.04%	0%	0%	0%	0%	0.01%	0.05%	0%	0%	0.01%	0%	0%	0.61%	0%	0.02%	0%	0.82%
Washington	0.05%	0.02%	0.03%	0.03%	0%	0%	0.02%	0.01%	0%	0%	0.2%	0.01%	0.01%	0.03%	0%	0.05%	0.02%	0%	0%	0%	0%	2.14%	0%	0%	2.63%
Wicomico	0%	0.01%	0%	0%	0%	0.01%	0%	0%	0.04%	0%	0%	0%	0%	0%	0%	0.01%	0%	0.05%	0.02%	0%	0%	1.11%	0.09%	1.36%
Worcester	0%	0%	0%	0%	0%	0%	0%	0%	0.01%	0%	0%	0%	0%	0%	0%	0%	0%	0.03%	0%	0%	0%	0%	0.09%	0.77%	0.92%
Total	0.64%	11.82%	15.77%	9.84%	0.93%	0.32%	2.23%	1.7%	1.72%	0.41%	4.19%	0.48%	4.43%	7.76%	0.26%	16.61%	12.96%	0.9%	0.99%	0.29%	0.82%	2.66%	1.36%	0.92%	100%

Prince Georges
Origin: 9,673,739
Destination: 9,628,621

Top Ten OD Pairs

Origin		Destination	Trips
Montgomery	→	Montgomery	10,730,597
Baltimore	→	Baltimore	8,354,598
Prince Georges	→	Prince Georges	7,402,334
Anne Arundel	→	Anne Arundel	6,320,207
Baltimore City	→	Baltimore City	4,586,722
Howard	→	Howard	3,721,508
Harford	→	Harford	2,405,948
Frederick	→	Frederick	2,310,010
Washington	→	Washington	1,587,751
Baltimore	→	Baltimore City	1,474,783

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Segment Analysis Results: Origins

Example: Heavy Truck Route Selection from Boston to Providence

- Evaluate Routes Selected by Heavy Freight

- Determine if Designated Truck Routes are being used

- Allows for Better Planning of Designated Truck Routes and Freight Improvement Projects
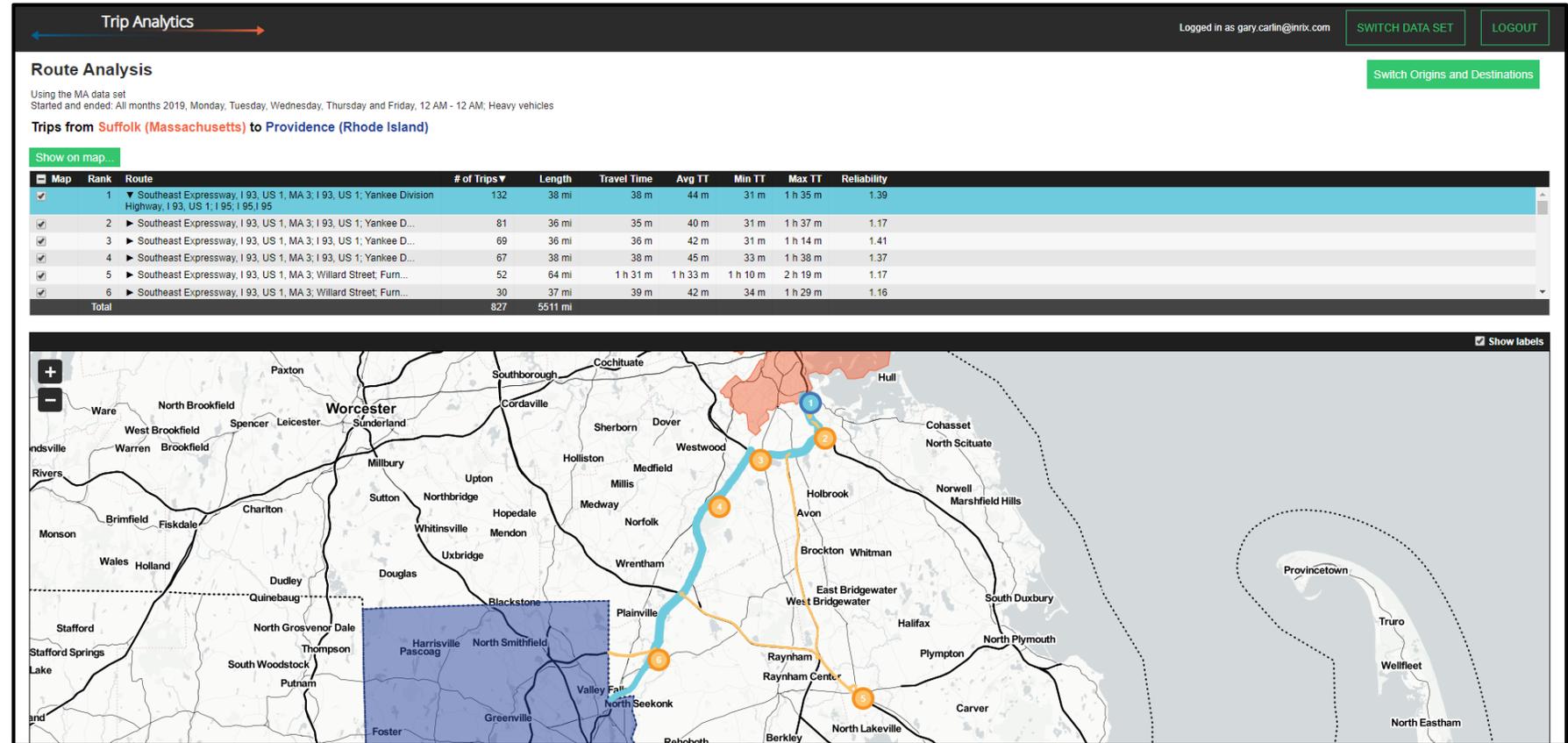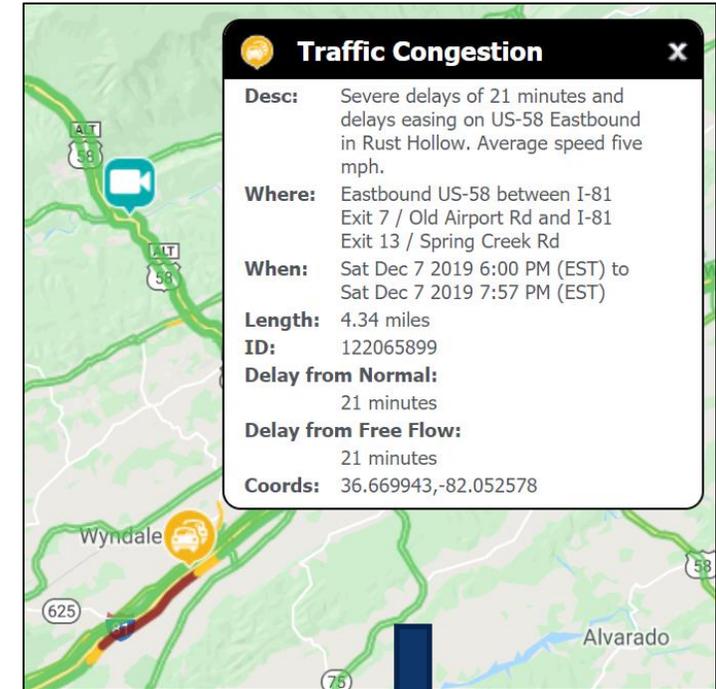
INRIX Safety Services

Real Time - Commercial Vehicle Safety Alerts (NEW)
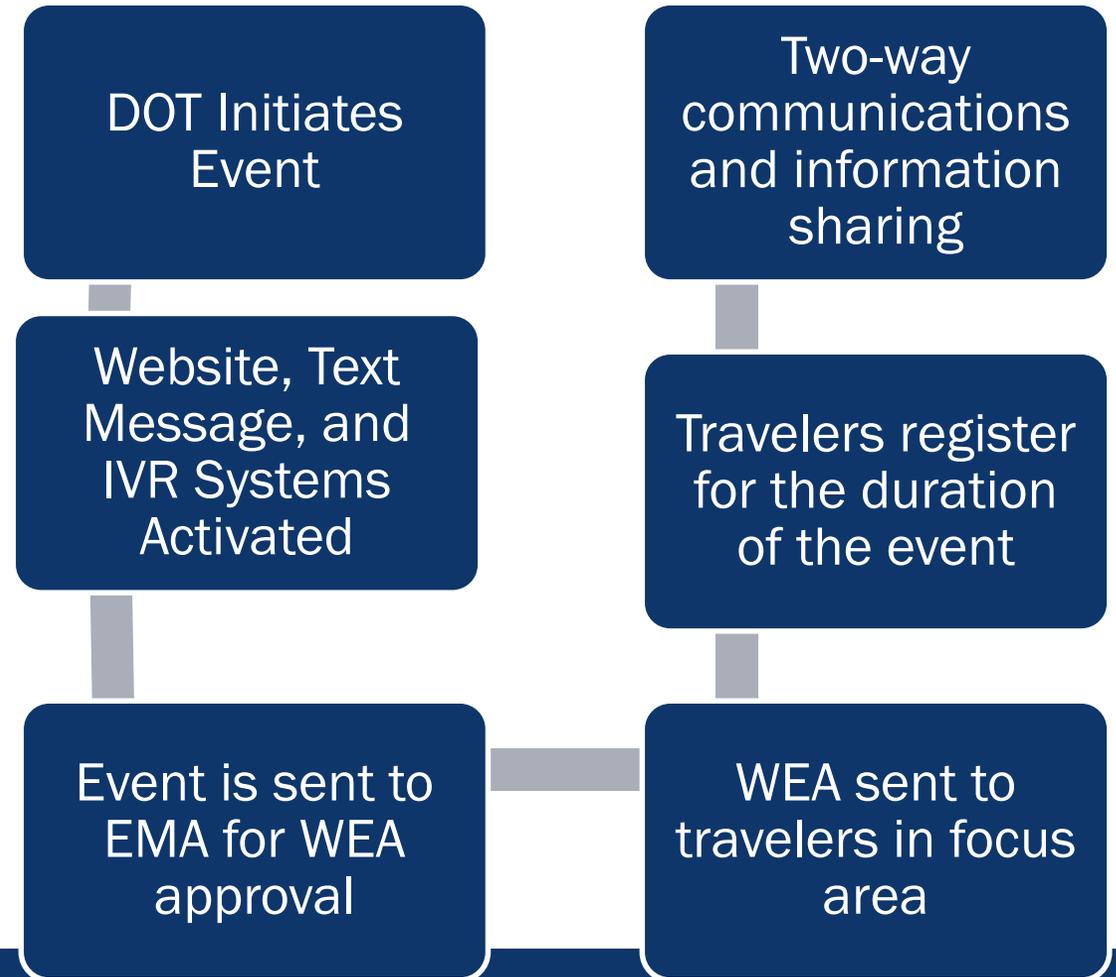
Partnering with Drivewyze

- New unique service to reduce truck crashes

- Safety Messages to Trucks in real-time on limited access roads

- Alert types:
  - Queues and Slowdowns (from INRIX)
  - Truck-relevant restrictions/detour (from Agency)

- Drivewyze 'geo-fences' each alert, sends to approaching trucks
  - Drivewyze partners with leading Electronic Logging Device (ELD) terminal operators
  - All trucks in 'Drivewyze Network' opting-in for safety notifications will get appropriate message
  - Network is 2.1 million trucks, and growing

Traffic Congestion

Desc:	Severe delays of 21 minutes and delays easing on US-58 Eastbound in Rust Hollow. Average speed five mph.
Where:	Eastbound US-58 between I-81 Exit 7 / Old Airport Rd and I-81 Exit 13 / Spring Creek Rd
When:	Sat Dec 7 2019 6:00 PM (EST) to Sat Dec 7 2019 7:57 PM (EST)
Length:	4.34 miles
ID:	122065899
Delay from Normal:	21 minutes
Delay from Free Flow:	21 minutes
Coords:	36.669943,-82.052578

BE PREPARED TO STOP

HEAVY CONGESTION
2-3 miles. Proceed with Caution

Real Time - HELP Alerts

- Establishes 1-way or 2-way communications during road closures or other emergencies

- No app needed – no preregistration needed
- Efficiently pushes official messages to geo-targeted customers

- Approved by the Federal Emergency Management Agency (FEMA) as an effective service for communicating with travelers in emergency situations

- PA511 Connect was original deployment

- NJDOT has launched & GDOT and MDSHA currently implementing system

HELP alerts

| DOT Initiates Event	Two-way communications and information sharing
Website, Text Message, and IVR Systems Activated	Travelers register for the duration of the event
Event is sent to EMA for WEA approval	WEA sent to travelers in focus area

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INFORMATION LOGISTICS

Evaluating COVID Impacts

# Example: Impact of COVID Travel Restrictions on National VMT

- Can Clearly Track National, State and Local Travel Patterns

- Allows DOTs to plan for estimated reductions in Gas Tax Revenue

- See Impacts of Re-Openings and Travel Restrictions

Relative Level of Nationwide Passenger Vehicle Travel (100% on February 29, 2020)
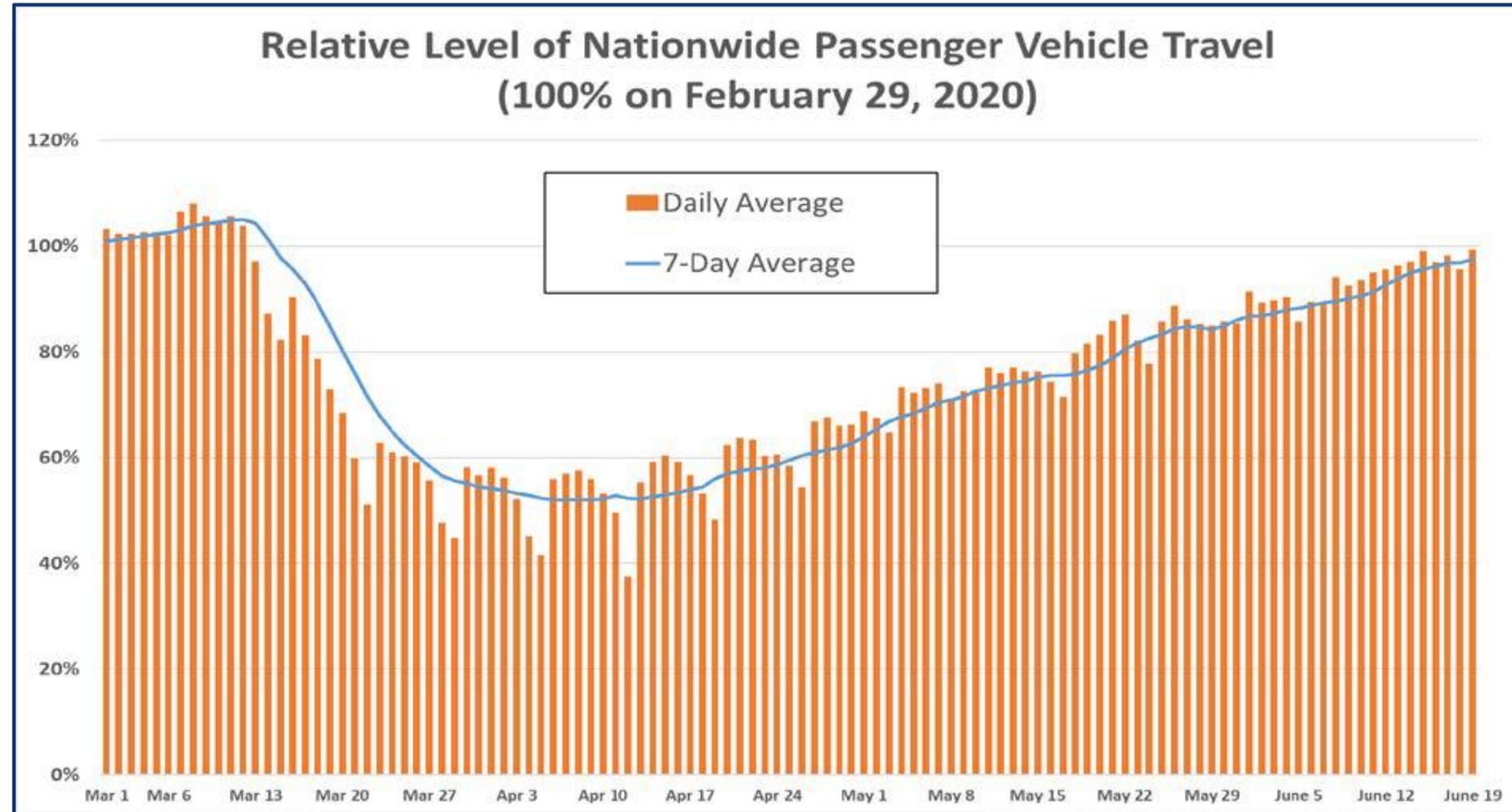
Example: COVID Travel Restriction Impacts

On I-80 WB from Omaha to Lincoln, NE; First Full Week of April 2019 vs, 2020

- Can Clearly See Before/After Changes

- Compare "New" Speeds vs. Historical Free Flow and Average Speeds

I-80 WB from Omaha to Lincoln, NE
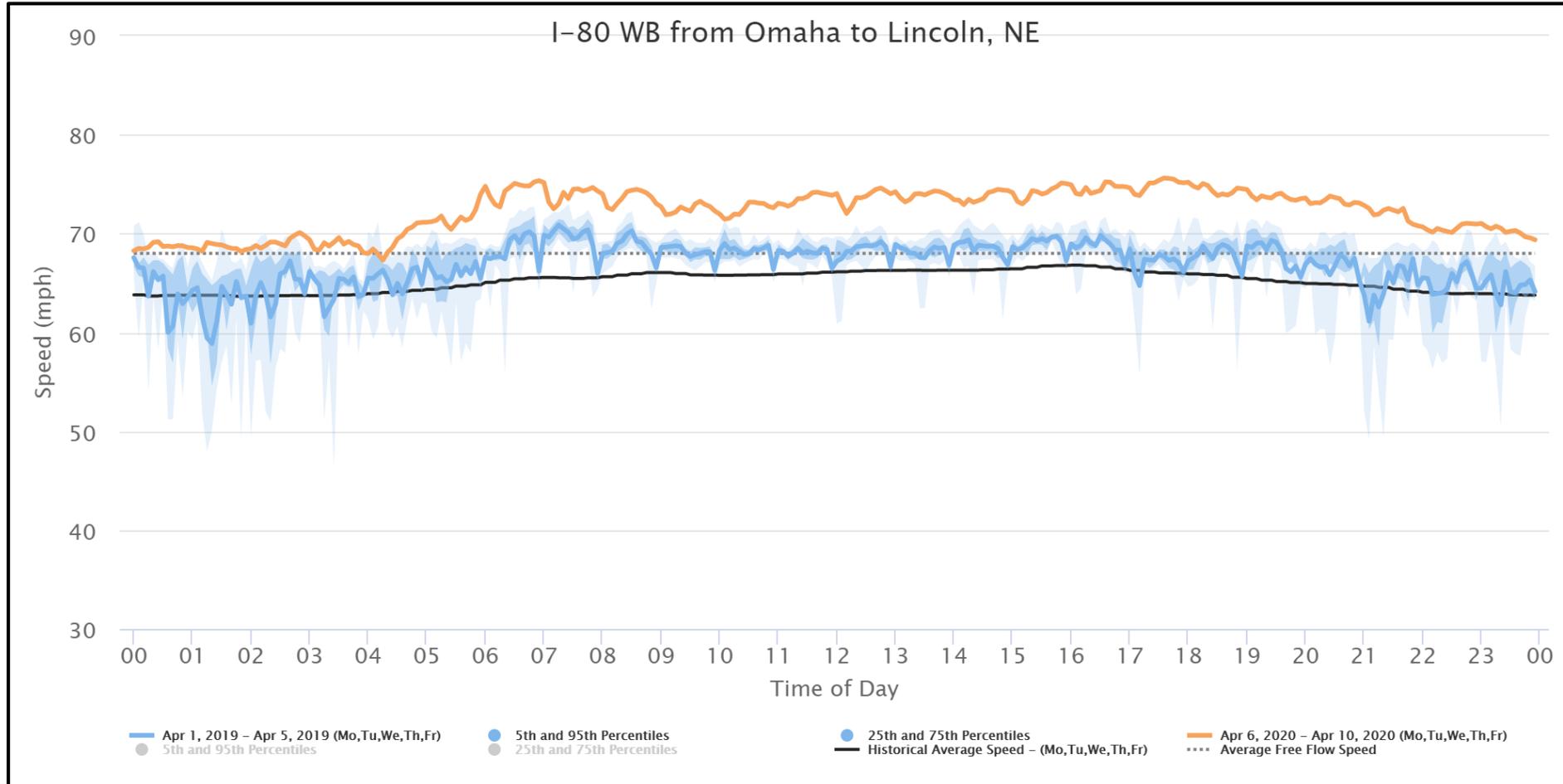
Case Study: Intersection Changes due to COVID-19

- Location:
  - Crooks Road and W. Wattles Road
  - Intersection 213
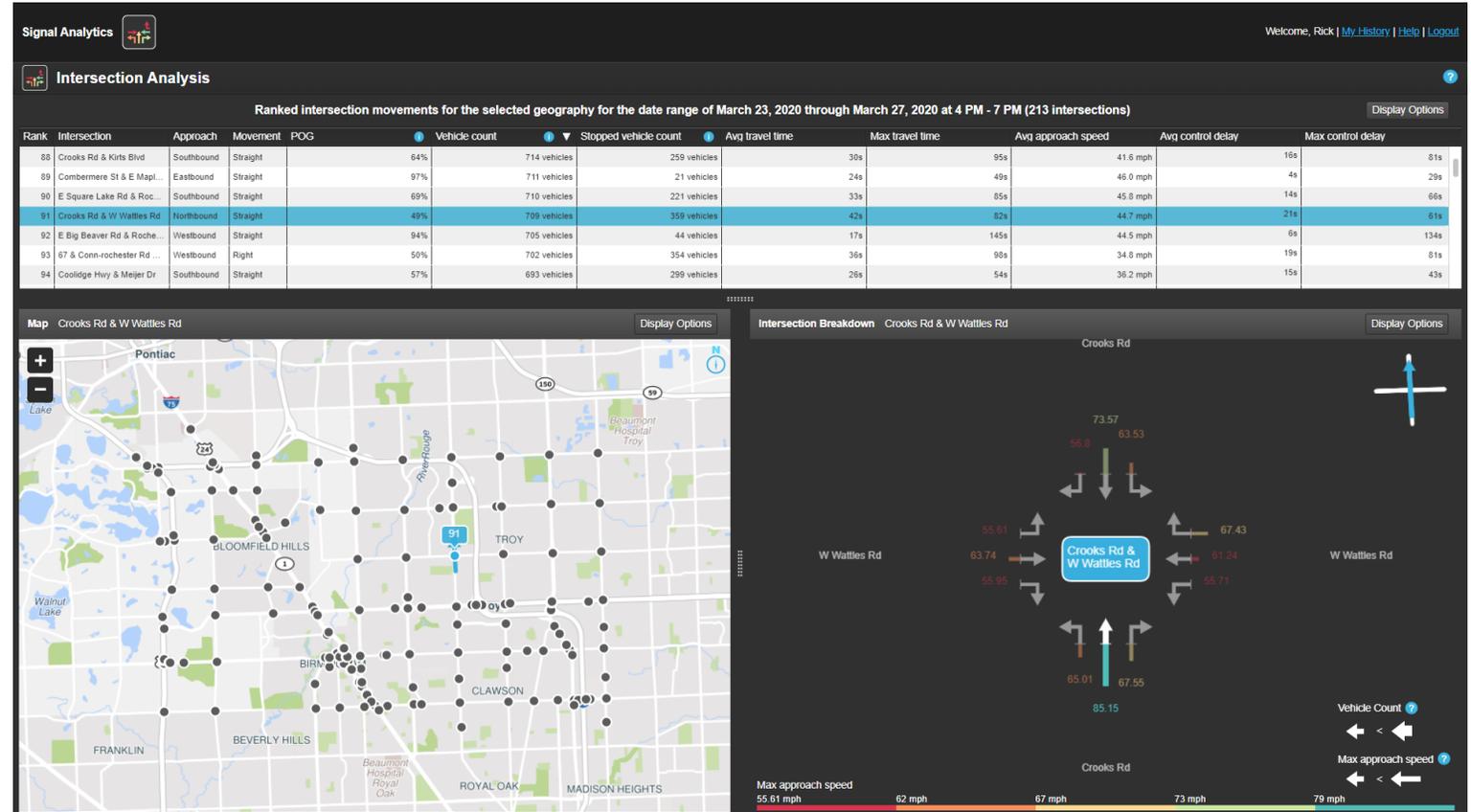 - Detroit, MI

- Dates:
  - March 2, 2020 – March 6, 2020
  - March 23, 2020- March 27, 2020

- Time: 4:00 PM – 7:00 PM

- Signal Metric Comparison:
  - Volume Count and Ranking
  - Percent on Green
  - Average Control Delay
  - Approach Speed
  - Average Travel Time

Case Study: Intersection Ranking and Volume Comparisons

March 2nd through March 6th

Rank	Intersection
72	E Long Lake Rd & Roche…
73	W Big Beaver Rd
74	Crooks Rd & W Wattles Rd
75	Bataan Dr & S Telegraph …
76	Crooks Rd & Meijer Dr & …
77	E Big Beaver Rd & Roche…
78	Conn-e Long Lake Rd & …

Vehicle count
2801 vehicles
2800 vehicles
2735 vehicles
2691 vehicles
2682 vehicles
2586 vehicles
2573 vehicles

range of March 02, 2020 through March 06, 2020 at 4 PM - 7 PM (213 intersections)   Display Options

count	Avg travel time	Max travel time	Avg approach speed	Avg control delay	Max control delay
1130 vehicles	45s	142s	38.1 mph	30s	127s
15 vehicles	18s	126s	44.7 mph	7s	115s
1684 vehicles	59s	203s	40.1 mph	37s	181s
220 vehicles	18s	57s	43.3 mph	7s	46s
560 vehicles	33s	73s	43.4 mph	12s	52s
298 vehicles	21s	108s	40.9 mph	10s	97s
814 vehicles	32s	118s	39.8 mph	19s	105s

Comparison for NB Straight
- **Rank: 74 to 91**
- **Vehicle count: 2,735 to 709, 74% Reduction in Volume**

March 23rd through March 27th

Rank	Intersection
88	Crooks Rd & Kirts Blvd
89	Combermere St & E Mapl…
90	E Square Lake Rd & Roc…
91	Crooks Rd & W Wattles Rd
92	E Big Beaver Rd & Roche…
93	67 & Conn-rochester Rd …
94	Coolidge Hwy & Meijer Dr

Vehicle count
714 vehicles
711 vehicles
710 vehicles
709 vehicles
705 vehicles
702 vehicles
693 vehicles

range of March 23, 2020 through March 27, 2020 at 4 PM - 7 PM (213 intersections)   Display Options

count	Avg travel time	Max travel time	Avg approach speed	Avg control delay	Max control delay
259 vehicles	30s	95s	41.6 mph	16s	81s
21 vehicles	24s	49s	46.0 mph	4s	29s
221 vehicles	33s	85s	45.8 mph	14s	66s
359 vehicles	42s	82s	44.7 mph	21s	61s
44 vehicles	17s	145s	44.5 mph	6s	134s
354 vehicles	36s	98s	34.8 mph	19s	81s
299 vehicles	26s	54s	36.2 mph	15s	43s

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Case Study: Signal Metric Comparison – NB Straight

Early March

Late March

Percent on Green
38% to 49%

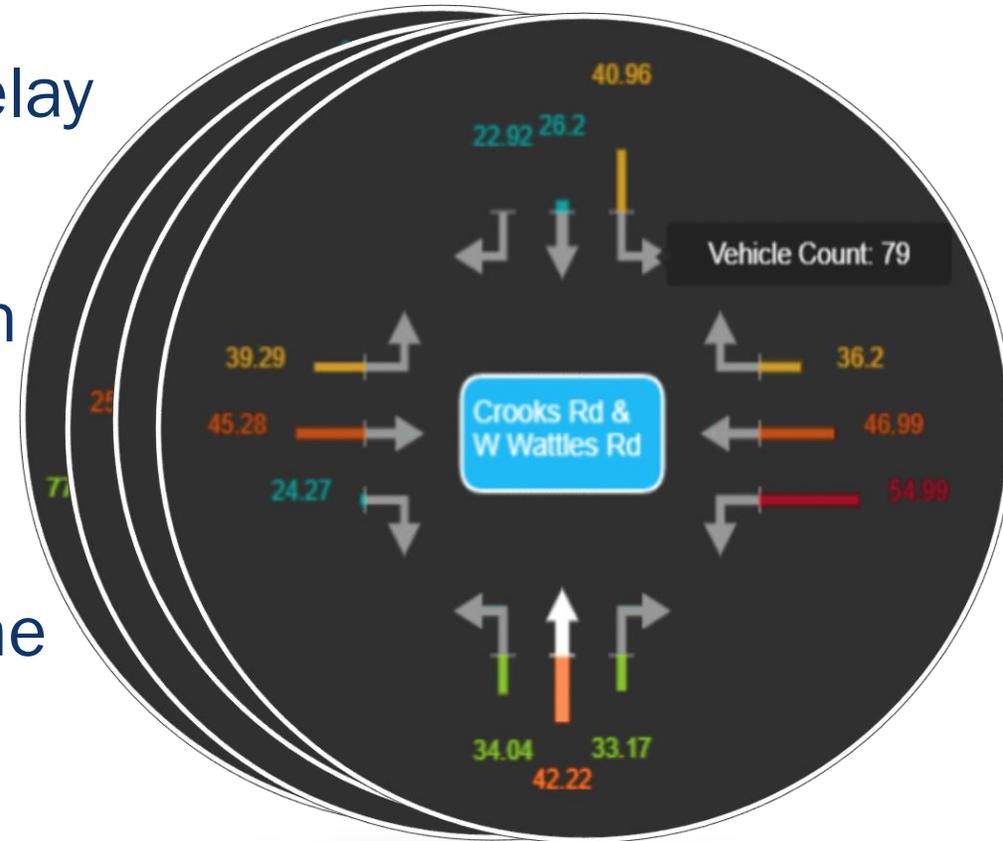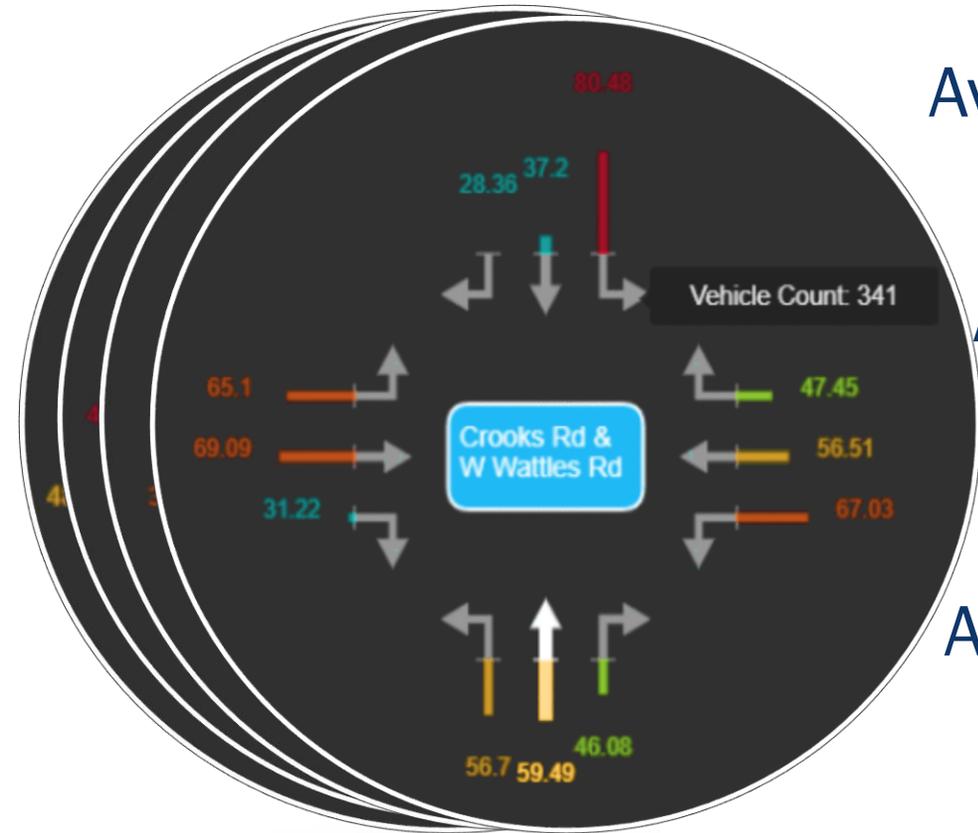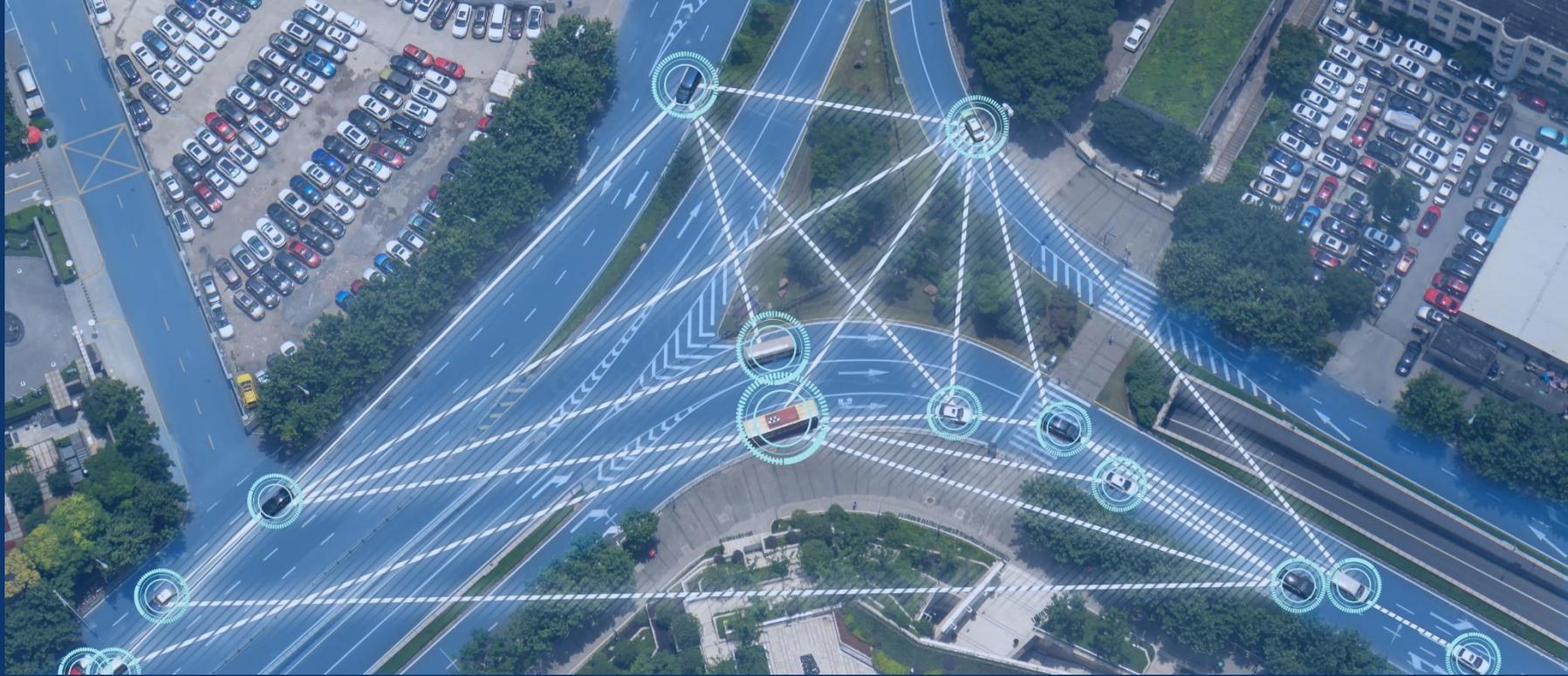**Average Control Delay**
37.5 to 21.2 sec.

Average Approach Speed
40.5 to 44.7 mph

Average Travel Time
59.5 to 42.2 sec.

Questions?

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