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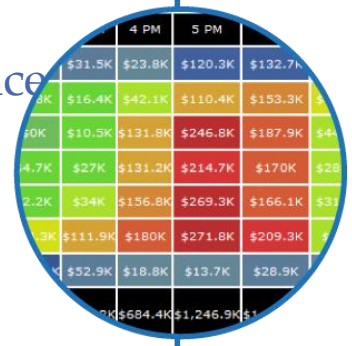
Filling the Real-time Data Gaps with WAZE and Other 3rd-Party Data

Filling the Real-time Data Gaps with Crowdsourced Data

Performance Measures



Planning

Operations

Communications

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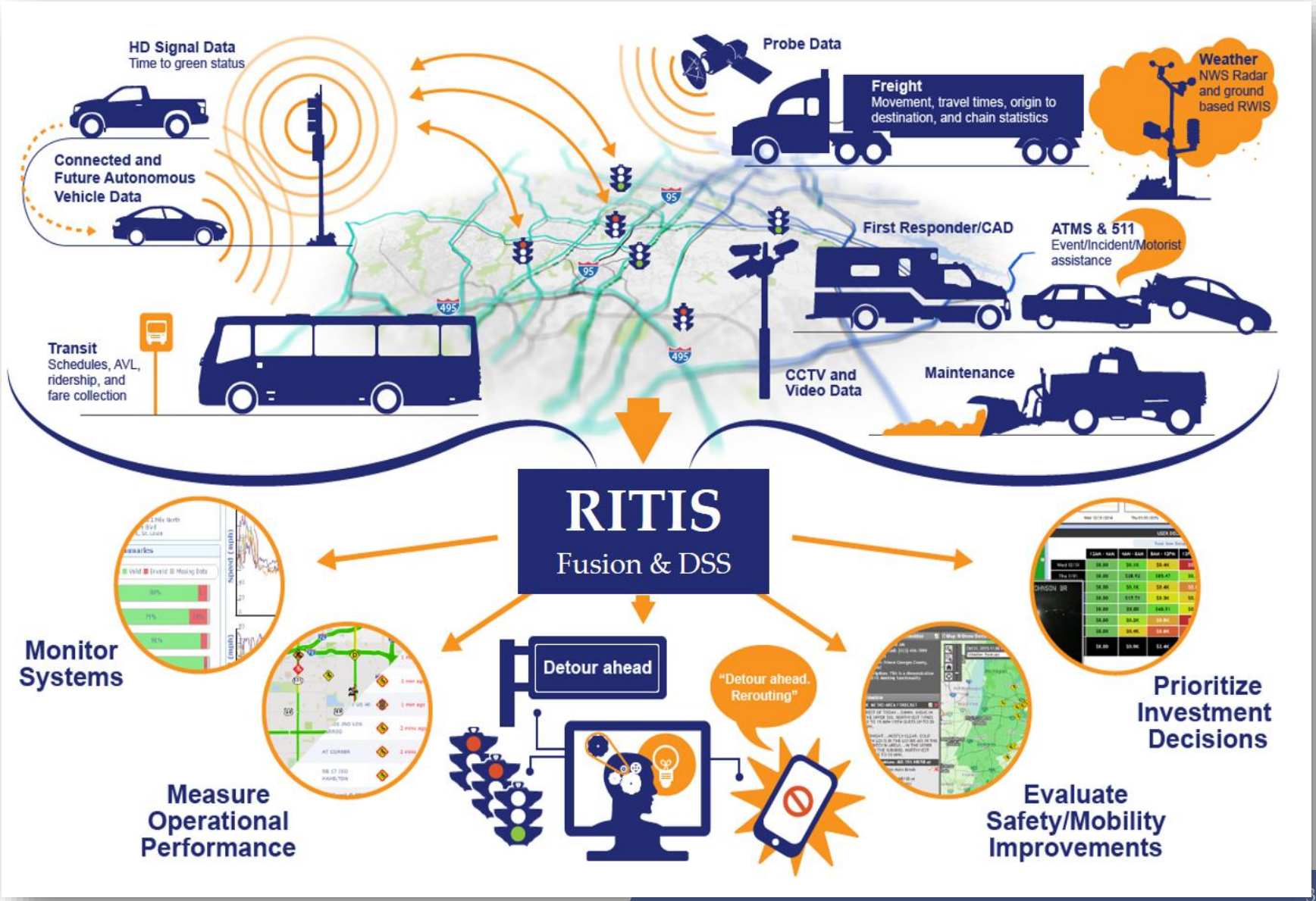
Enabling Decision Making & Effective Communication

WAZE—another piece of the SA puzzle…

RITIS Data Analytics

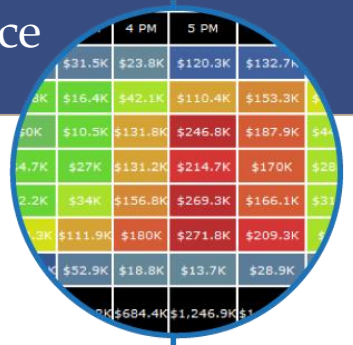
- 300+ data feeds from
  - State/Local DOTs
  - First Responders
  - Transit
  - Weather
  - Federal Gov
  - Military
- 7.5+ Billion data points every day
- 3rd Party Data Providers
  - HERE
  - INRIX
  - TomTom
  - WAZE
  - Verizon
  - Utilities
  - Etc.
- ~7,000 Users



Our Tasks

- Understand WAZE data's affect on operations and planning
- Facilitate the archiving of WAZE data for operations, planning, and research
- Explore solutions to WAZE data challenges including:
  - Integration with agency ATMS and 511 platforms
  - Duplicates (from WAZE)
  - Duplicates (WAZE and Agency/CAD/Other)
  - Long-term storage
  - Analytics
- Document recommended practices for negotiating data sharing agreements

Performance Measures



Planning

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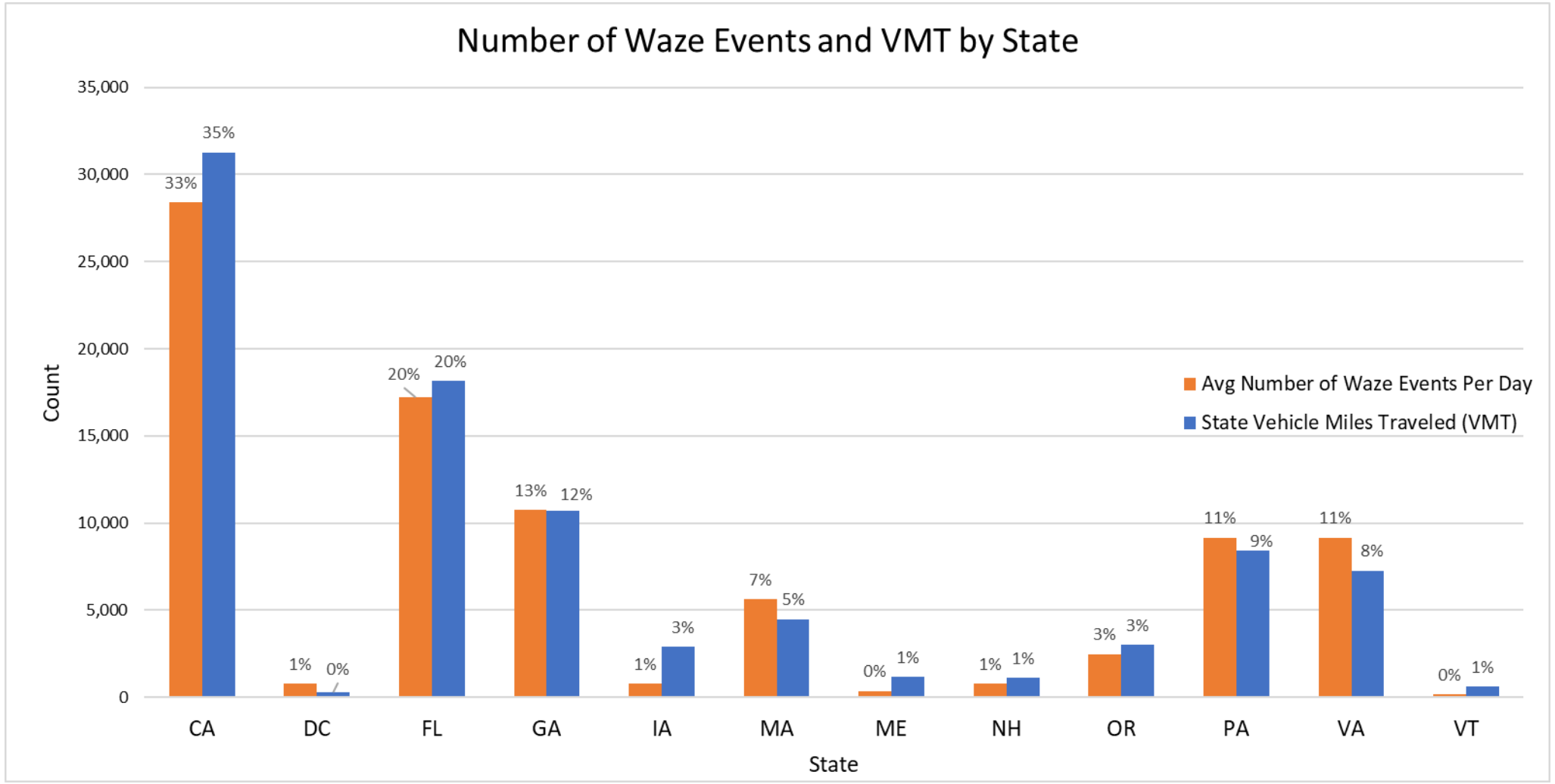
12 States for which we currently archive WAZE data

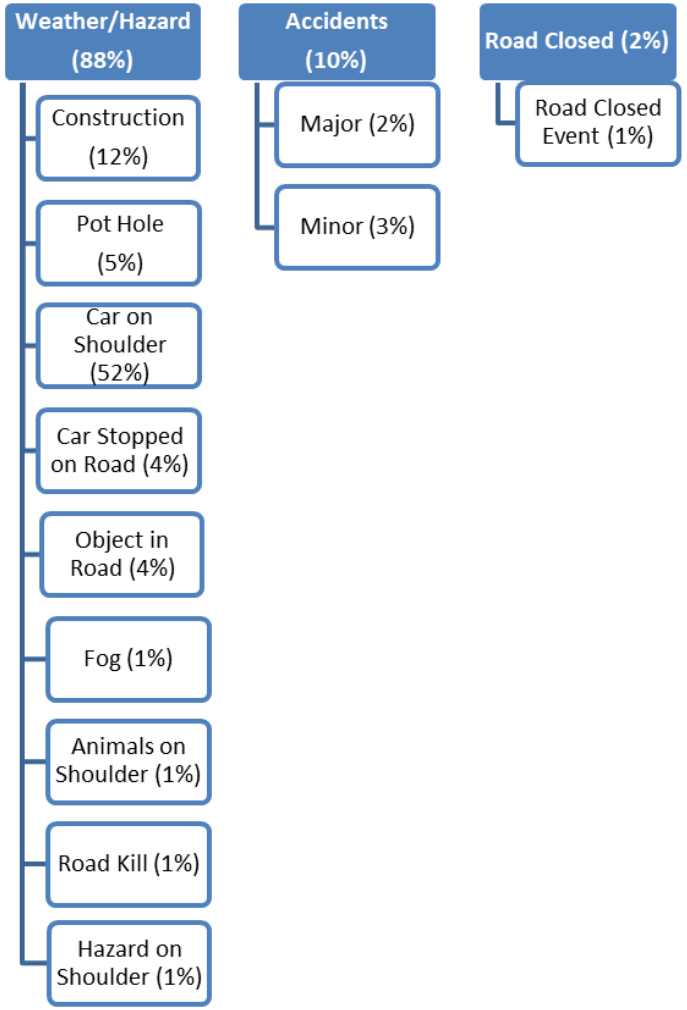


Note:

- Waze data excludes jams event type
- Waze 3 Month Period of 3/17 – 5/17 displayed

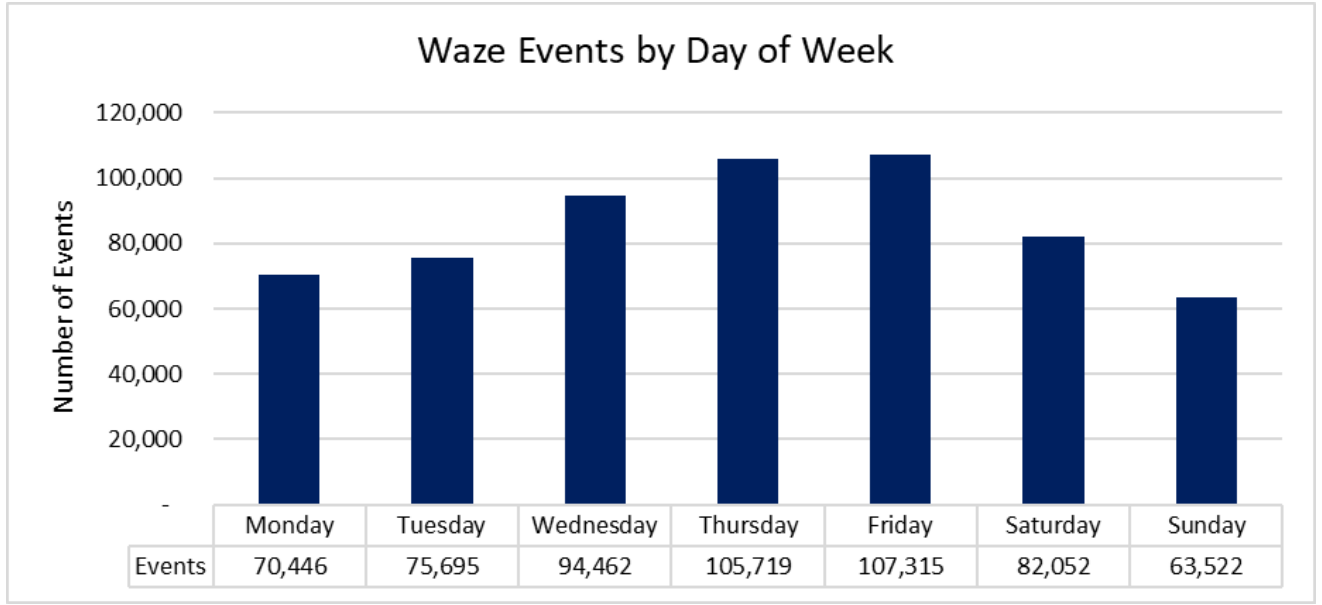
Waze Dataset Overview

Waze Event Types



Waze Event Data Summary

- Average number of daily / hourly events: 86,000 / 3,600
- Number of states: 12
- Day with maximum events: Thursday, 03/02/17 - 164,000
- Day with minimum events: Monday, 03/13/17 - 27,000

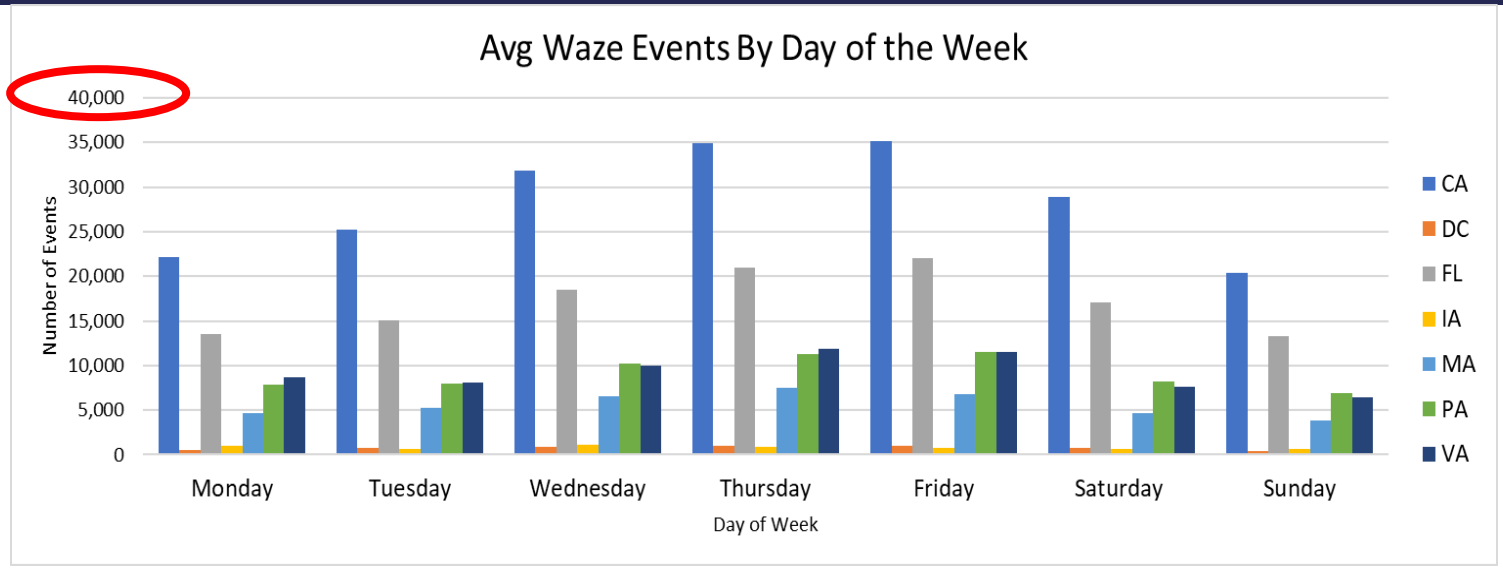


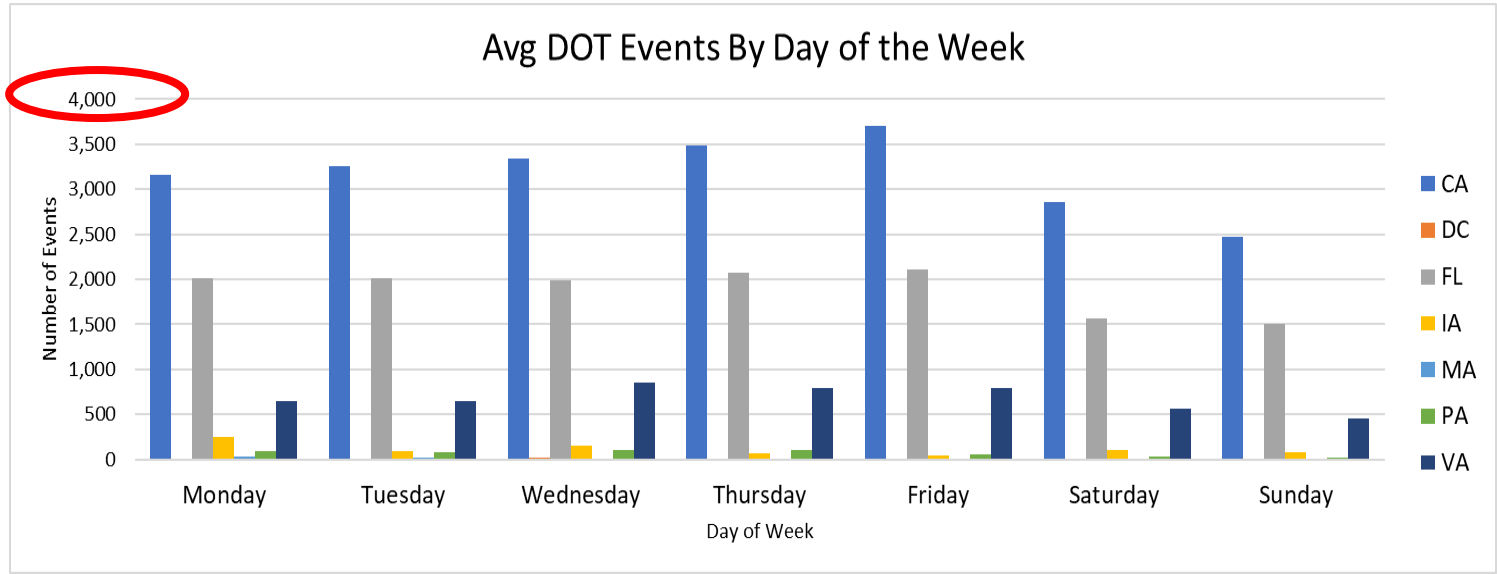
Note:

- Waze data excludes jams event type
- Waze 3 Month Period of 3/17 – 5/17 displayed

Events by Day of the Week: DOT vs Waze

10x more





State	Avg Waze Events Per Day	Avg DOT Events Per Day
CA	28,389	3,184
DC	777	16
FL	17,210	1,895
IA	810	114
MA	5,613	14
PA	9,171	70
VA	9,168	681

Note:

- Waze data excludes jams event type
- Waze 3 Month Period of 3/17 – 5/17 displayed

Investigating Disabled Vehicle Analysis on Freeways/Ramps

Duplicates, speed of reporting, and more…

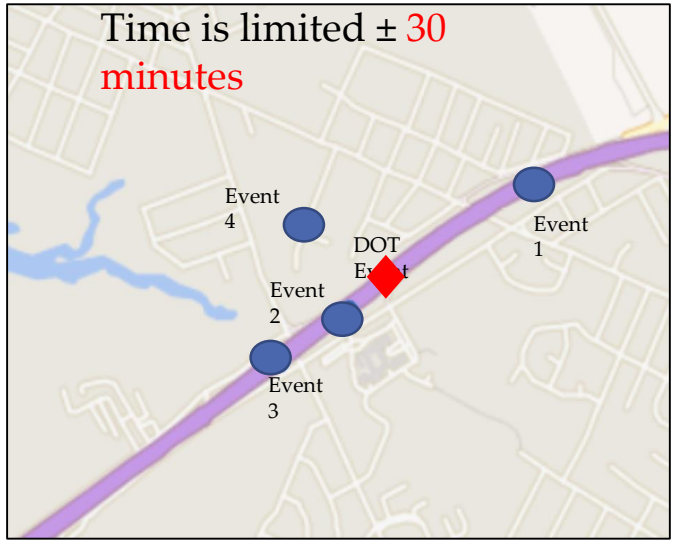
Analyzed approximately 2 million disabled vehicle events on freeways from 5 different states (FL, VA, PA, NY, MD)

Note: All results displayed in this presentation are for disabled vehicles on freeways/ramps

How do we Analyze Potential Benefits of Waze?

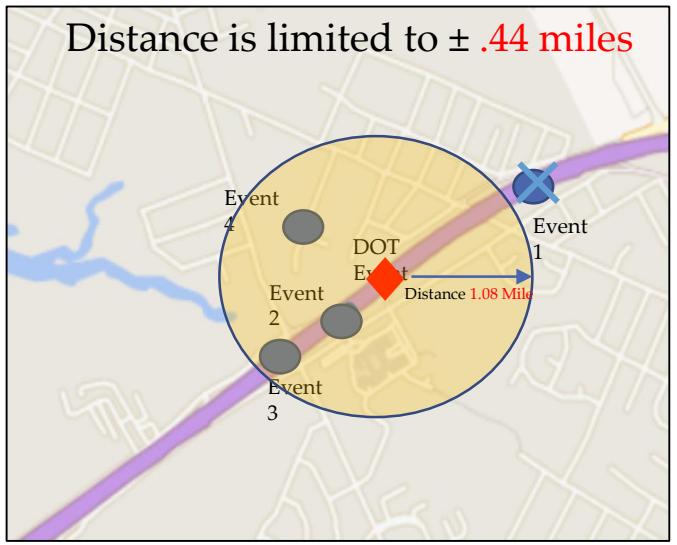
- Matched DOT reported events to Waze events from 3/01/17 to 5/31/17

Temporal Matching Threshold



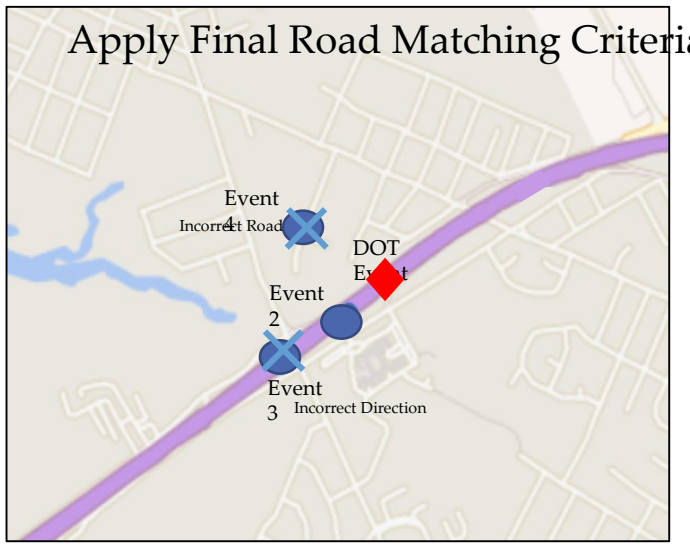
Identified 4 Waze events within ± 30 minutes of the DOT event

Spatial Matching Threshold



Determined that 3 of the Waze events were within ± .44 miles of the DOT event

Road Matching Rules



Determined that 1 of the Waze events was on the correct road and direction of travel

Enhanced Network Monitoring Results: Increased Situational Awareness

- Matched 41% (4,285) of VDOT disabled vehicle events to Waze
  - Found that in this 3 month period, 98.6% (364,646) disabled vehicle events from Waze were not matched to a VDOT event

- Matched 34% (6,562) of FDOT disabled vehicle events to Waze
  - Found that in this 3 month period, 99% (751,208) of disabled vehicle events from Waze were not matched to a FDOT event

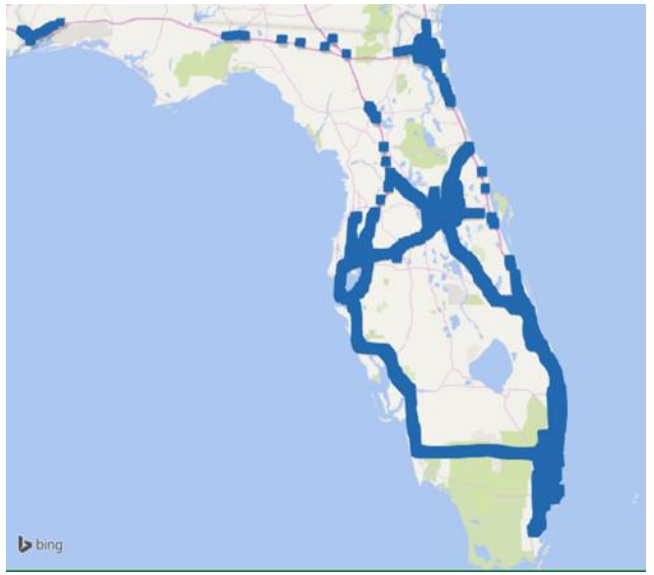
3 Month Period of 3/17 – 5/17 Displayed

Enhanced Network Monitoring Results: Florida Road Coverage

Waze Events

FDOT Events

Waze vs FDOT Matches



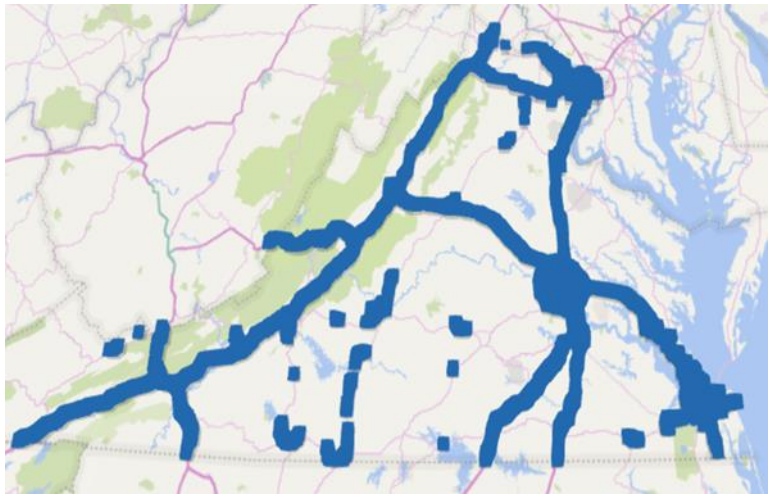
Top 3 Roadway with Highest Number of Events for FDOT

	I-95	I-75	91 Mainline/ Turnpike
Waze Dataset	160,138 (21%)	146,723 (20%)	119,570 (16%)
FDOT Dataset	7,154 (37%)	3,436 (18%)	2,559 (13%)

3 Month Period of 3/17 – 5/17 Displayed

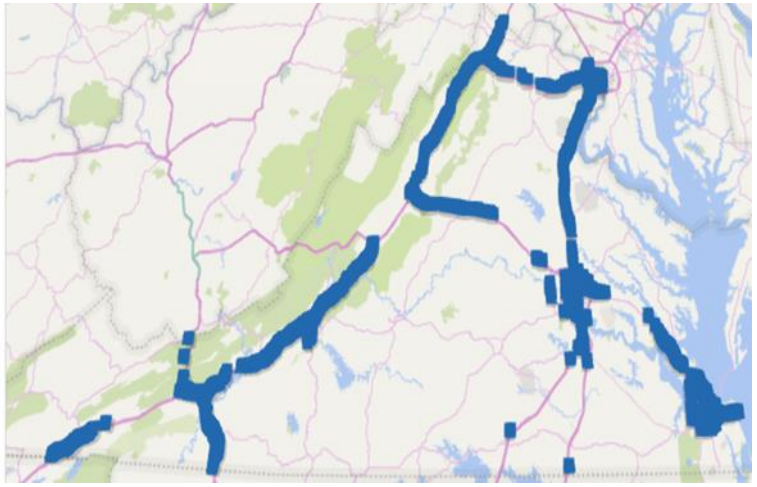
Enhanced Network Monitoring Results: Virginia Road Coverage

Waze Events



VDOT Events

Waze/VDOT overlap



Top 3 Roadway with Highest Number of Events for VDOT

	I-95	I-81	I-66
Waze Dataset	103,552 (29%)	51,639 (14%)	29,587 (8%)
VDOT Dataset	3,679 (36%)	1,978 (19%)	1,561 (15%)

3 Month Period of 3/17 – 5/17 Displayed

Enhanced Network Monitoring Results: Reducing Duplicative Waze Reports

- During this 3 month period, ~4% of disabled vehicle Waze event reports were duplicative
- Removing duplicative reports increases usability of Waze data:
  - FDOT: 309 fewer events a day / 13 fewer events an hour
  - VDOT: 187 fewer events a day / 8 fewer events an hour

Type of Event	Total Number of Waze Events During this Period	Total Number of Waze Events During this Period After Clustering	Percent Reduction in Events Due to Clustering
VA Disabled Vehicles	369,935	353,078	4.6%
FL Disabled Vehicles	758,956	731,149	3.7%

3 Month Period of 3/17 – 5/17 Displayed

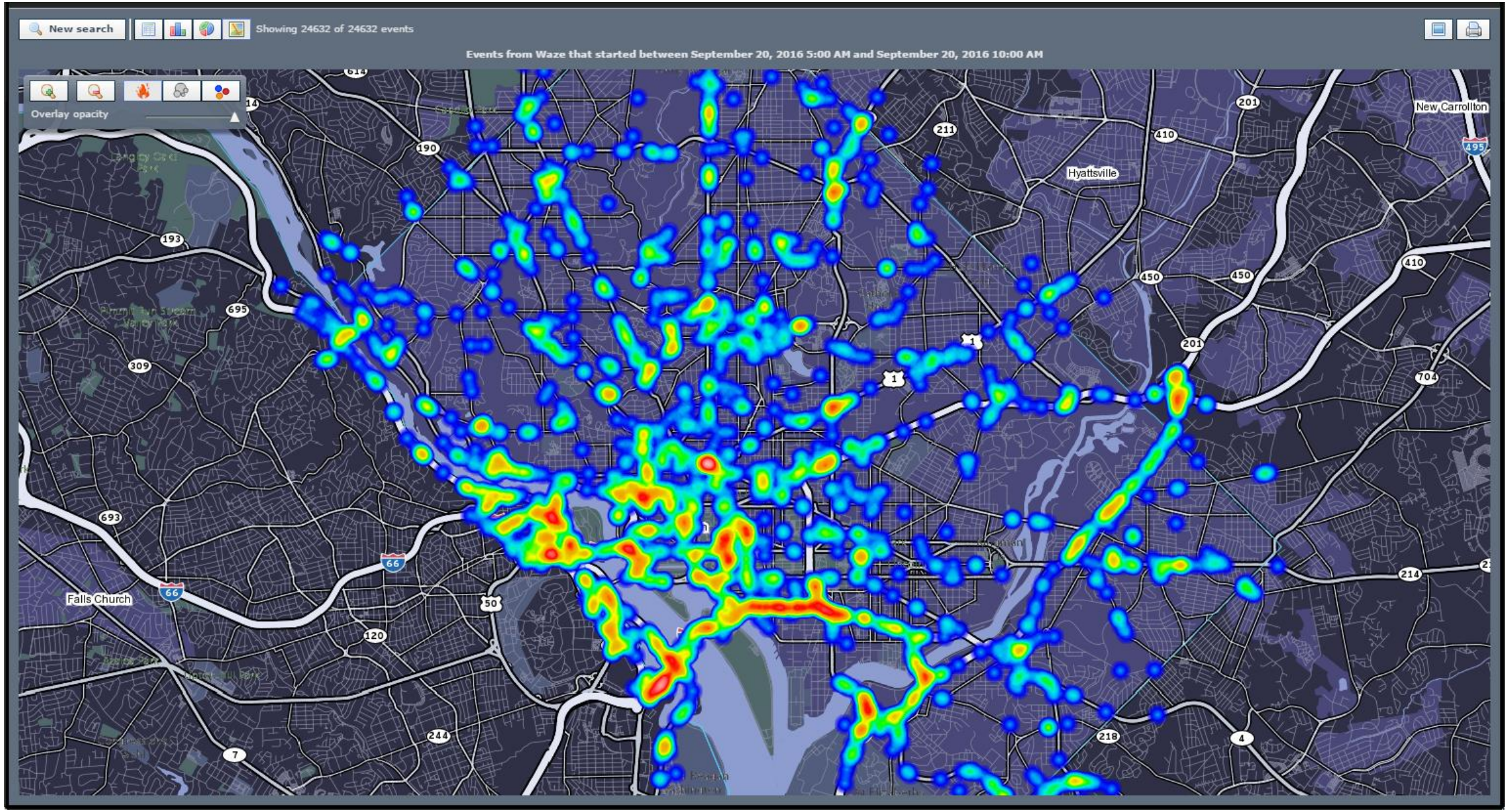
Event Detection Time Results

- During this 3 month period, Waze events were reported sooner than through the DOT ATMS which has the potential to improve response times

Type of Event	Total Number of DOT Events During This Period	Total Number of Waze Events During this Period	Percentage of Events that were Reported By Waze First	Average Time that a Waze Event was Reported Before a DOT Event
VA Disabled Vehicles	10,341	369,935	**68%**	**14 Minutes Earlier**
FL Disabled Vehicles	19,310	758,956	**56%**	**13 Minutes Earlier**

3 Month Period of 3/17 – 5/17 Displayed

Washington DC – Building Visual Analytics



Next Steps

- Continue to analyze other event types (not just disabled vehicles)
- Evaluate other states
- Explore other duplicate-reduction algorithms that take into account speeds, speed limits, and other factors beyond time and space variables.
- Synthesize other benefits and technical approaches from state partners
- Document technical approaches to reducing duplicates, storage, etc.
- Document recommended practices for negotiating acceptable use to keep from repeating past mistakes.

Thank You

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