

# Communicating Performance Trends for MAP-21

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# Agenda

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- Congestion Monitoring Approaches for Map-21
  - Initiatives with Big Data
  - Turning Data into KPI
- Using Big Data
  - NPMRDS what is it? What does it look like?
- Displaying Big Data
  - How do I use Big Data?
  - Tools to support Big Data and MAP-21

# Who We Are...

- Iteris is a leader in software-based information solutions for the **Intelligent Transportation Systems (ITS)** market
- We focus on three areas in the ITS market:
  - **Sensors:** Intersection and roadway vehicular detection
  - **Systems:** Provide local, state and federal agencies traffic management services
  - **Analytics:** Focused on traffic and weather-related data and analytics software to both public and commercial customers



# Congestion Monitoring Approaches

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## Services

- **Big Data Congestion Monitoring Consulting & Reports**

## Software

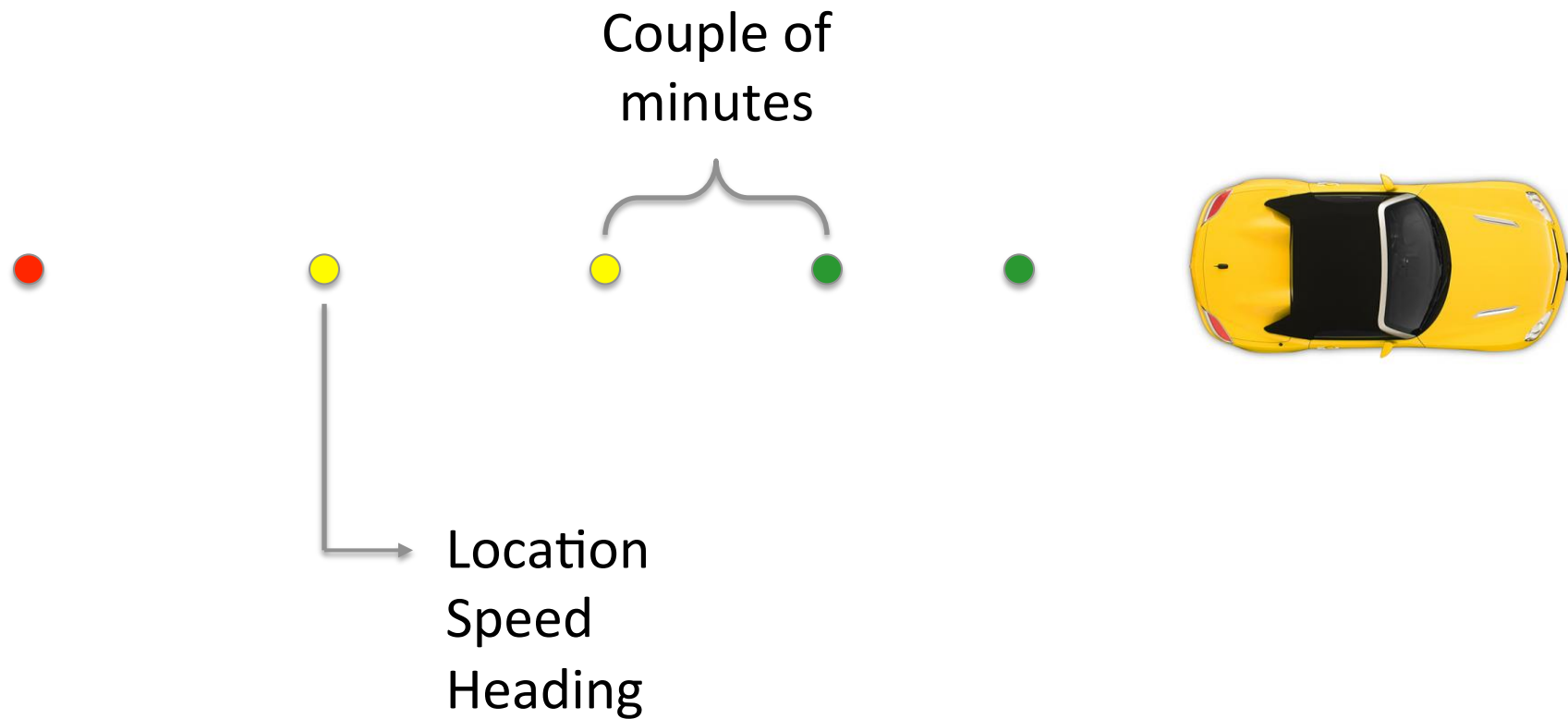
- **Analytics Software for real time & historical monitoring**

## Hardware

- **Crowd source**
- **Bluetooth/Wifi**
- **GPS**

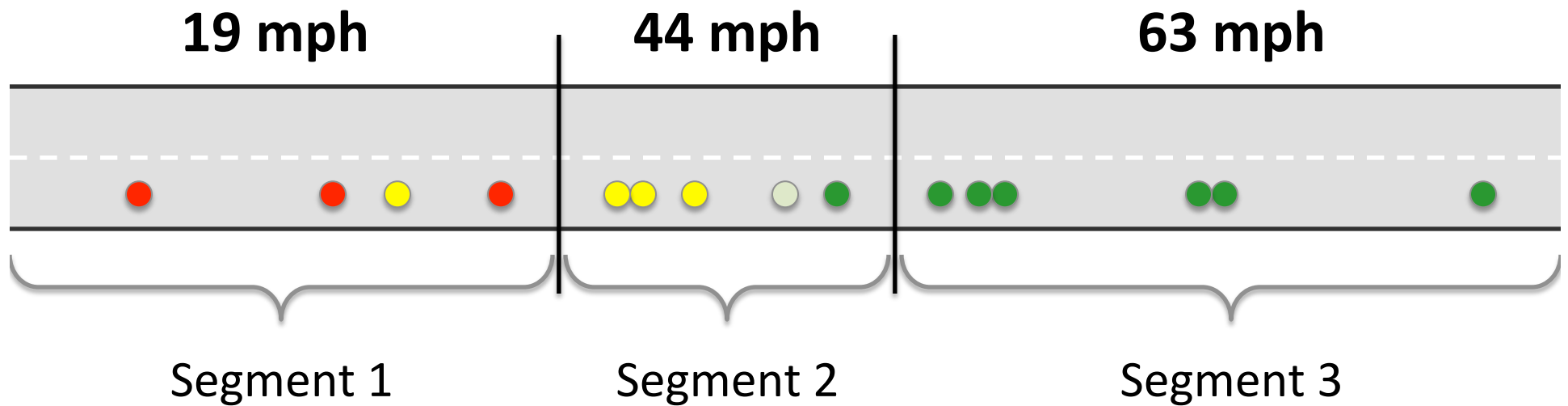
# What is big data?

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# What is big data?

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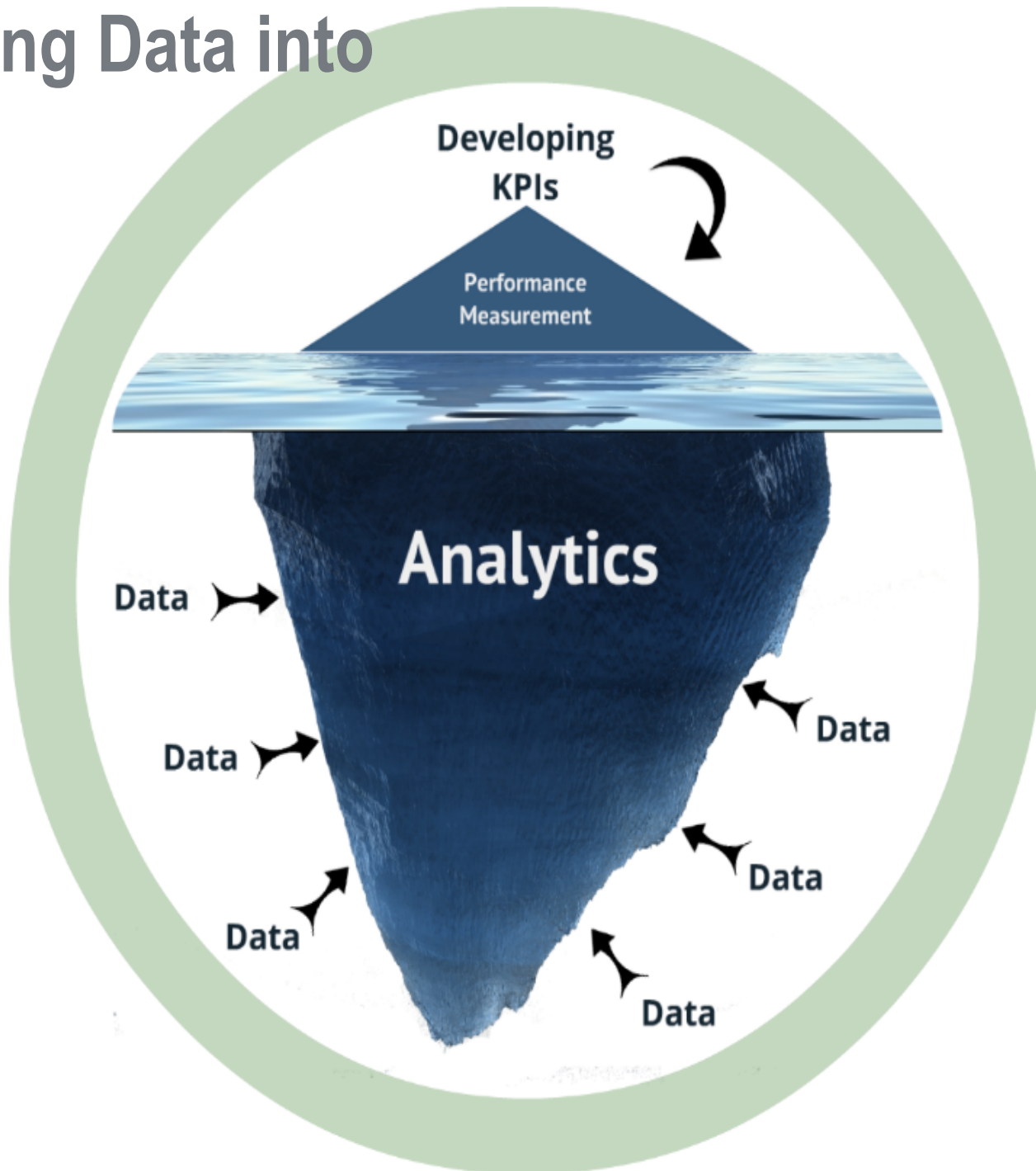
**@ 7:15 AM**

# How does Big Data help?

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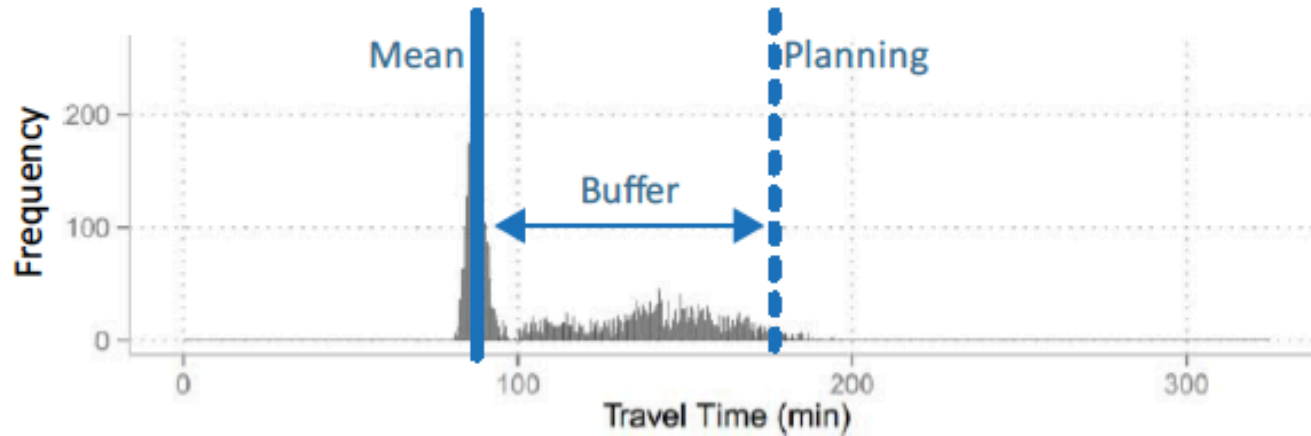
- **Greater accuracy**
  - Current approaches not statistically sound
  - (More vehicles) **X** (More times) **X** (More days)
- **Reduced costs**
  - Travel time runs are expensive
  - Probe data is cheaper
- **Deeper insights**
  - Understand reliability
  - Prepare for MAP-21



# Turning Data into KPI



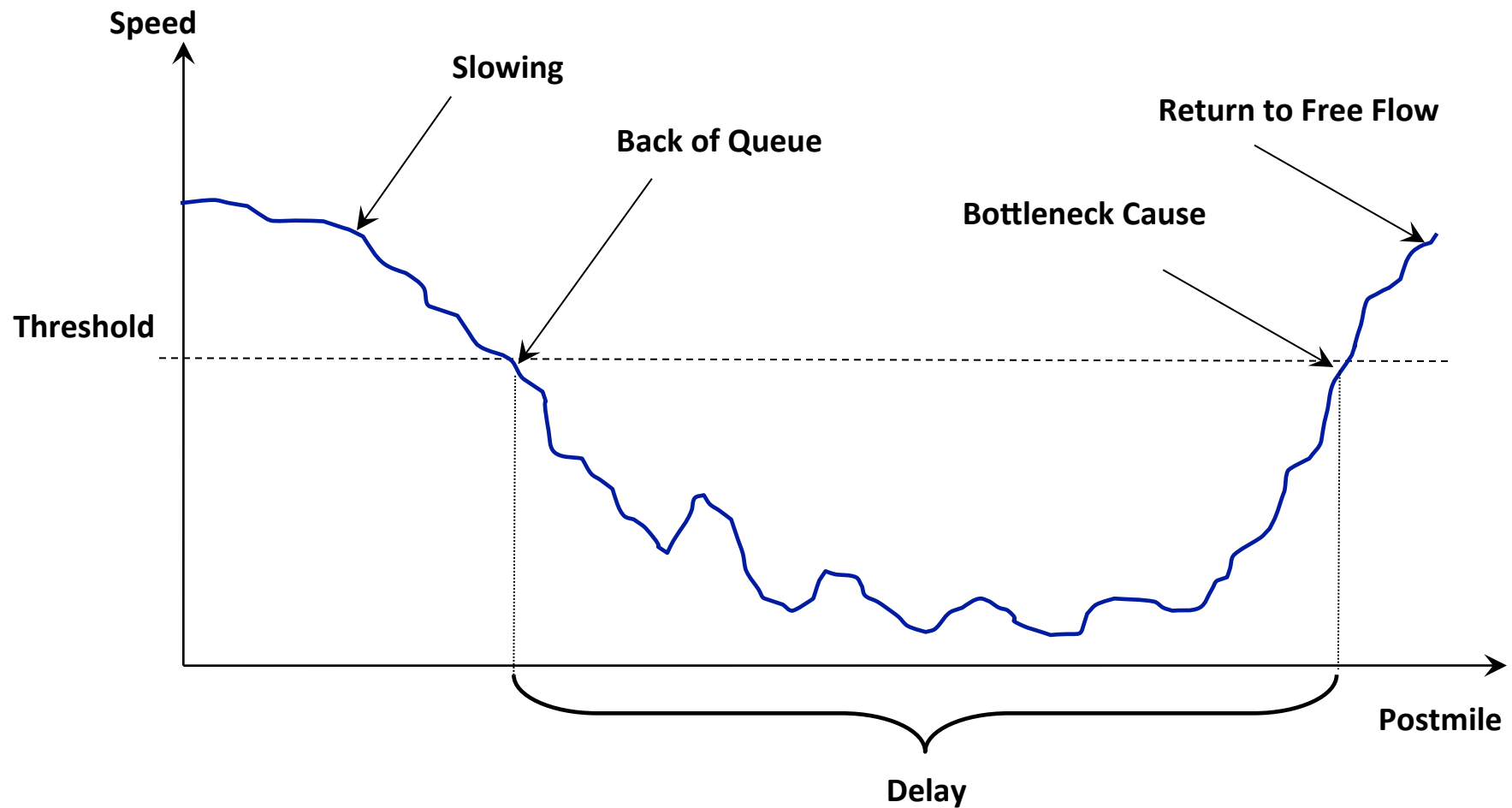


# What Story Do I Tell?



Measure	Description	Purpose
Planning Time 	95 <sup>th</sup> Percentile Travel Time	On-time arrival
Buffer Time 	Extra time to allow for trip variation	Quantify the spread

# Describing Congestion & Delay

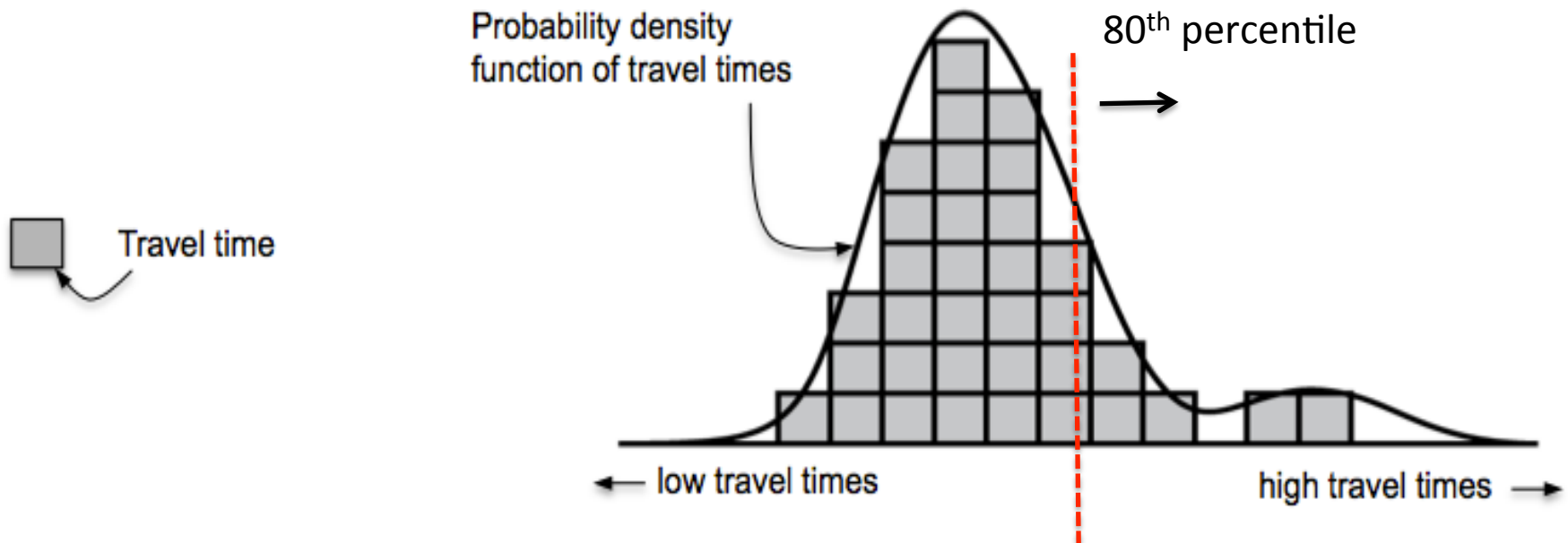


# What is Reliability?

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Standard

Reliability



# Applying to Map-21

## System Performance / Congestion



	<b>Delay</b>	<b>Reliability</b>
Units	vehicle hours	percentile
Coverage	National Highway System	
Required Data	1. Segment volumes 2. Segment speeds	1. Segment travel times
Segments	Agency defined	
Targets	Agency defined	

# NPMRDS Overview

- Free to States and MPO's
- National GPS traffic probe Big Data set
  - Includes both auto and freight
  - Raw (unmodeled) data only
- Historic, not real-time

**NPMRDS Spatial Coverage**  
Includes the National Highway System

Provided by:

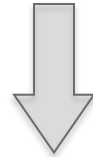
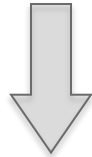
**here**

and

**ATRI** American  
Transportation  
Research  
Institute

# What does NPMRDS look like?

TMC	Date	Epoch	Travel Time (all)	Travel Time (auto)	Travel time (Freight)
105N04105	9112014	138	59	55	65



## Date

mddyymm

## Epoch

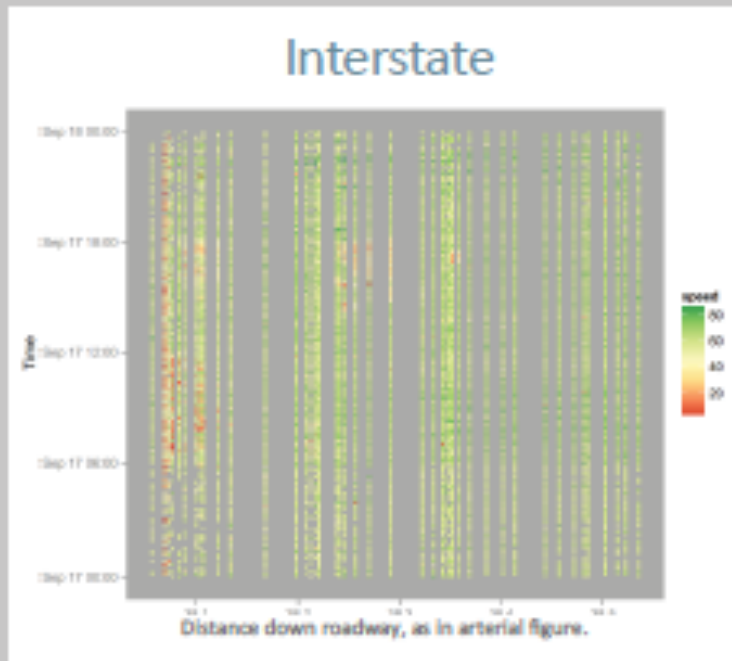
Represents time i.e. 5 min period since midnight (0 - 287)

- 0 00:00:00 to 00:04:59
- 1 00:05:00 to 00:09:59
- 287 23:55:00 to 23:59:59

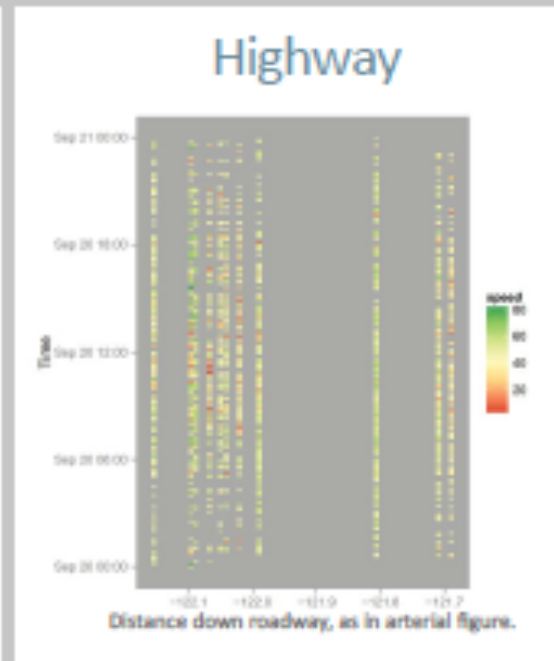
# Filling in Gaps



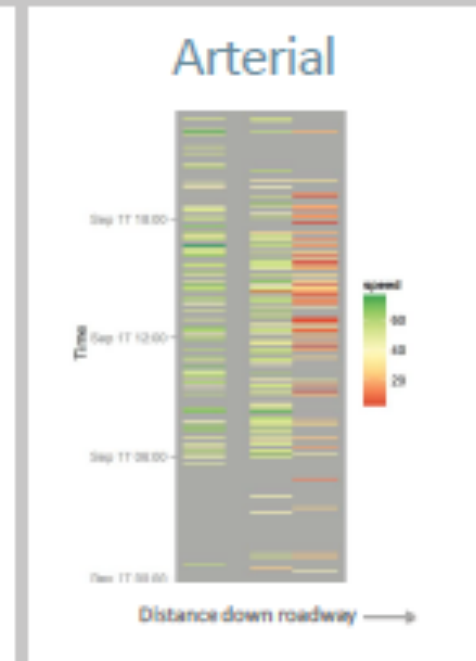
Each vertical line in these figures represent the variation in speed over the course of a day for a TMC on the facility. Gaps in coverage show up as holes in the lines.



For the **interstate** facility, there is good coverage during the day, but gaps occur at early and late hours due to fewer probe points providing data.



On this state **highway**, which has a lower density of observed probe points, many more gaps are present.

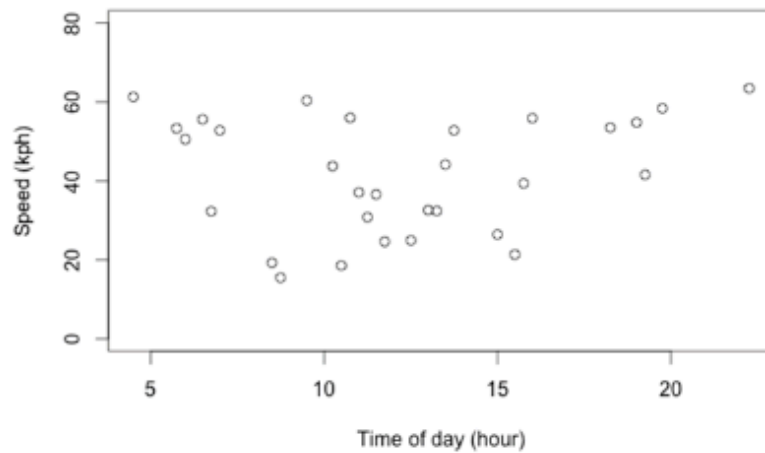


Gaps are even more substantial on **arterials**, where the density of observed probe points is the most sparse.

# Filling in Gaps

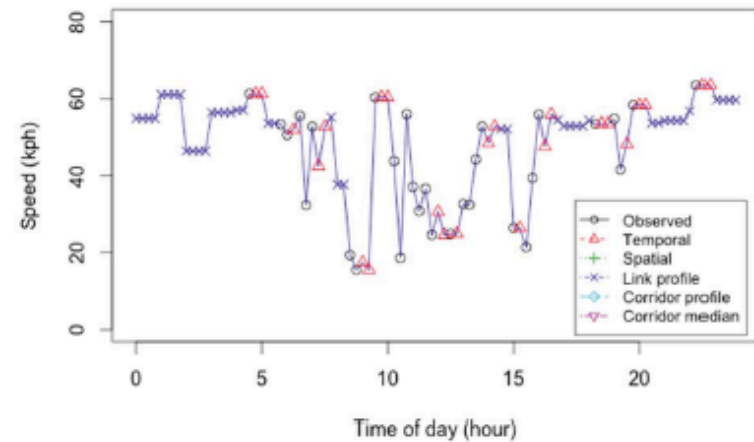
## Raw Data

101N06211



## Processed Data

101N06211

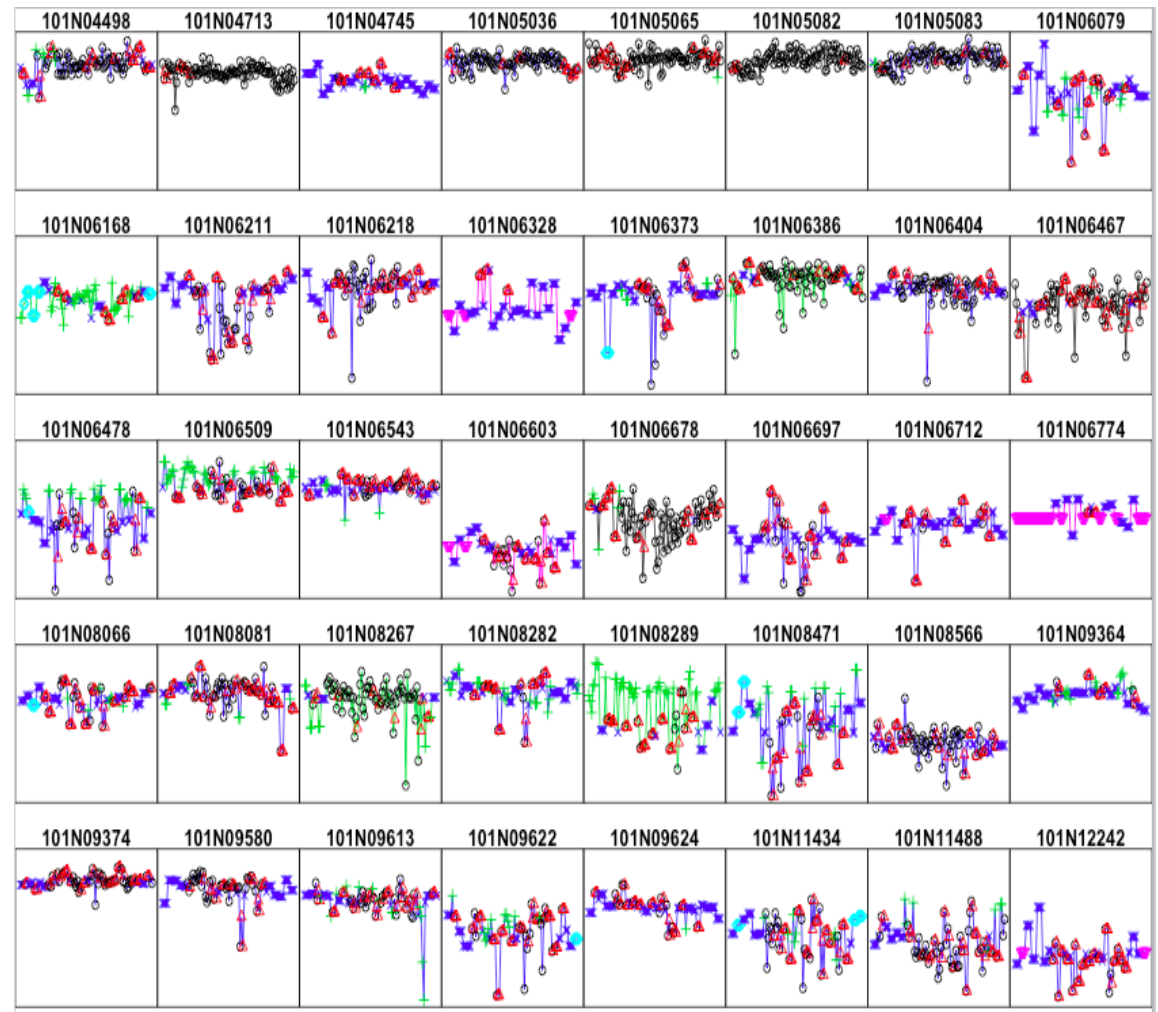




# Backend: Data Processing Results

## Process

- Raw Data are processed
- Processing with a series of methods
- Speeds for all time intervals are produced

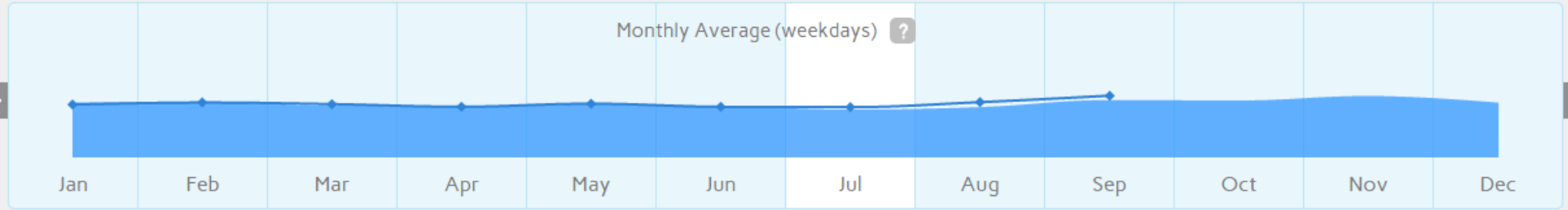


REGION: CA > County > Los Angeles

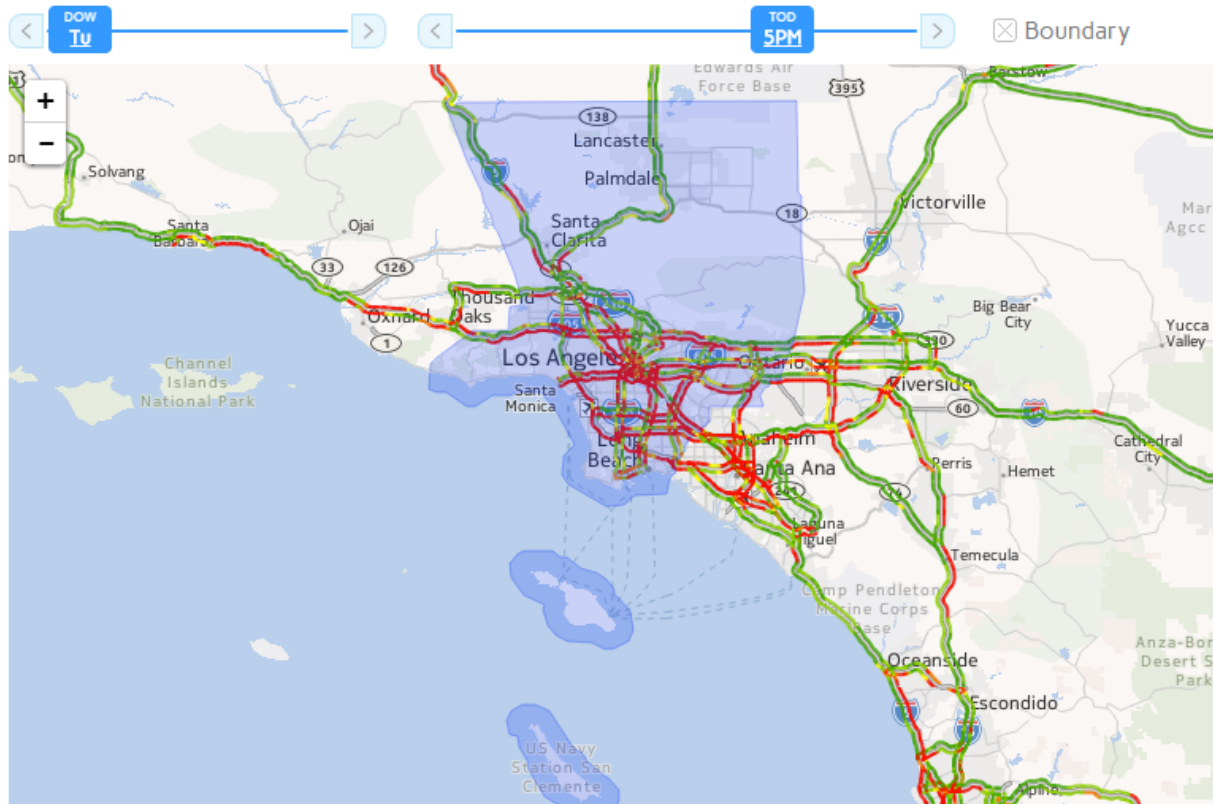
DATA TYPE: All Freight Passenger

2014 CONGESTED FREEWAY MILES (ALL) ?

PERFORMANCE MEASURE: Congested % TTI PTI Links with Data Delay



JULY 2014



CONGESTED (%)

**43.2%**

↓ 0.7% 1 month change

↑ 4.4% 1 year change

TRAVEL TIME INDEX

**1.9**

↓ 2.4% 1 month change

↑ 2.2% 1 year change

PLANNING TIME INDEX

**2.3**

↑ 3.8% 1 month change

↑ 4.7% 1 year change

REGION: CA > County > Los Angeles

DATA TYPE: All Freight Passenger

All elements change with new selection

Dynamic Geotags

Monthly Comparison

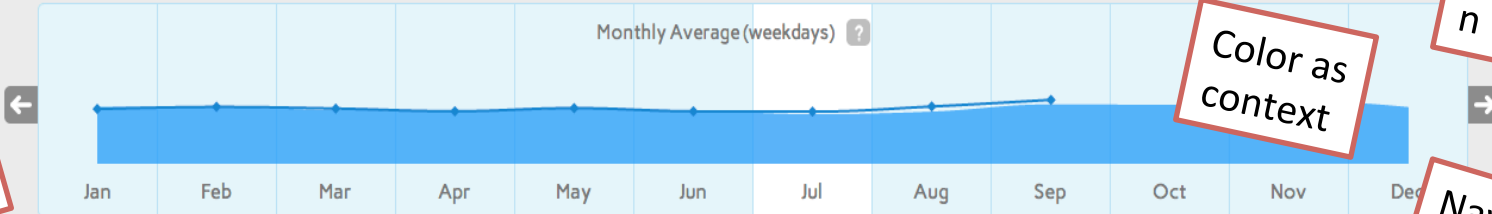
Day and Time Sliders

Maps & Graphs

Boundaries

2014 CONGESTED FREEWAY MILES (ALL)

Monthly Average (weekdays)

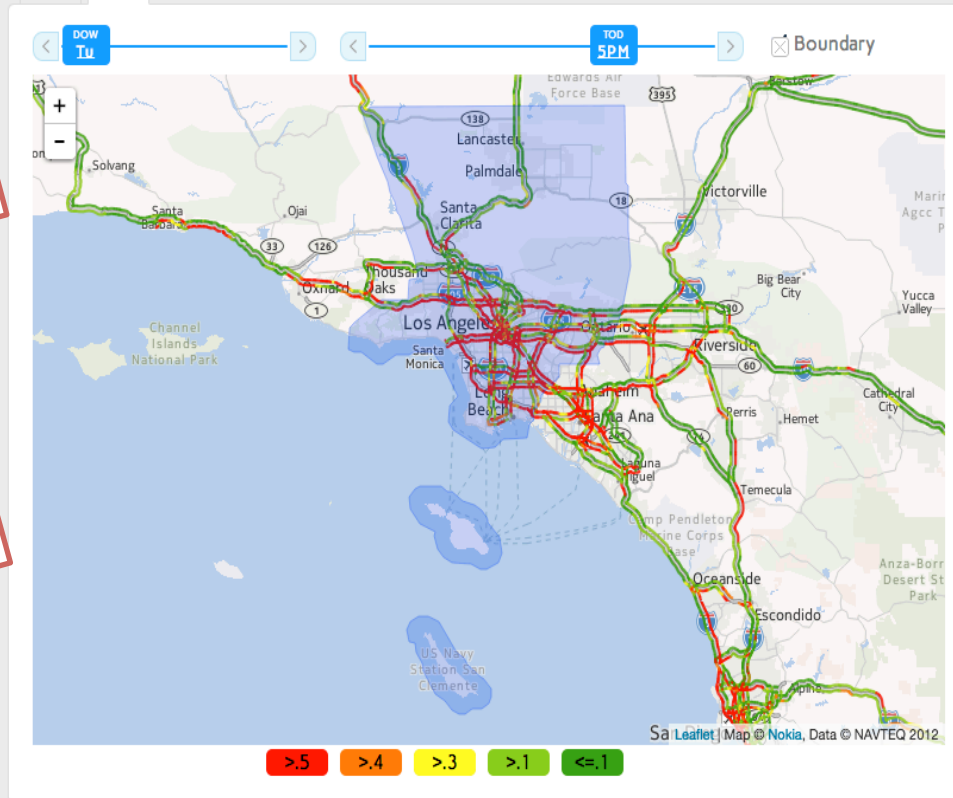


Color as context

Measure Selection

Navigation

JULY 2014



CONGESTED (%)

43.2%

↓ 0.7% 1 month change    ↑ 4.4% 1 year change

TRAVEL TIME INDEX

1.9

↓ 2.4% 1 month change    ↑ 2.2% 1 year change

PLANNING TIME INDEX

2.3

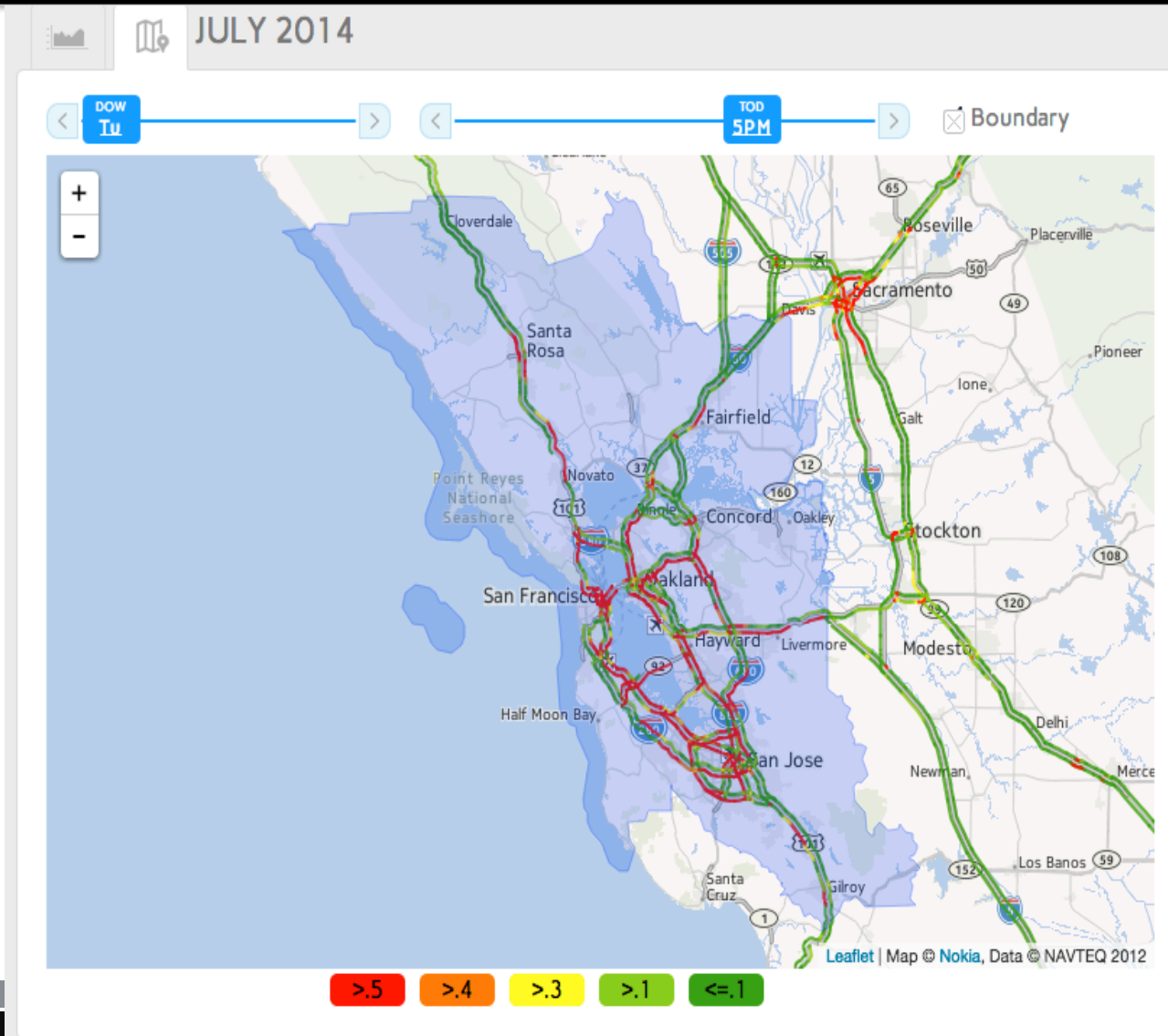
↑ 3.8% 1 month change    ↑ 4.7% 1 year change

DELAY

Month to Month & Year to Year

KPI

# National Travel Time Data Set iPeMS Dashboard: Map Visuals

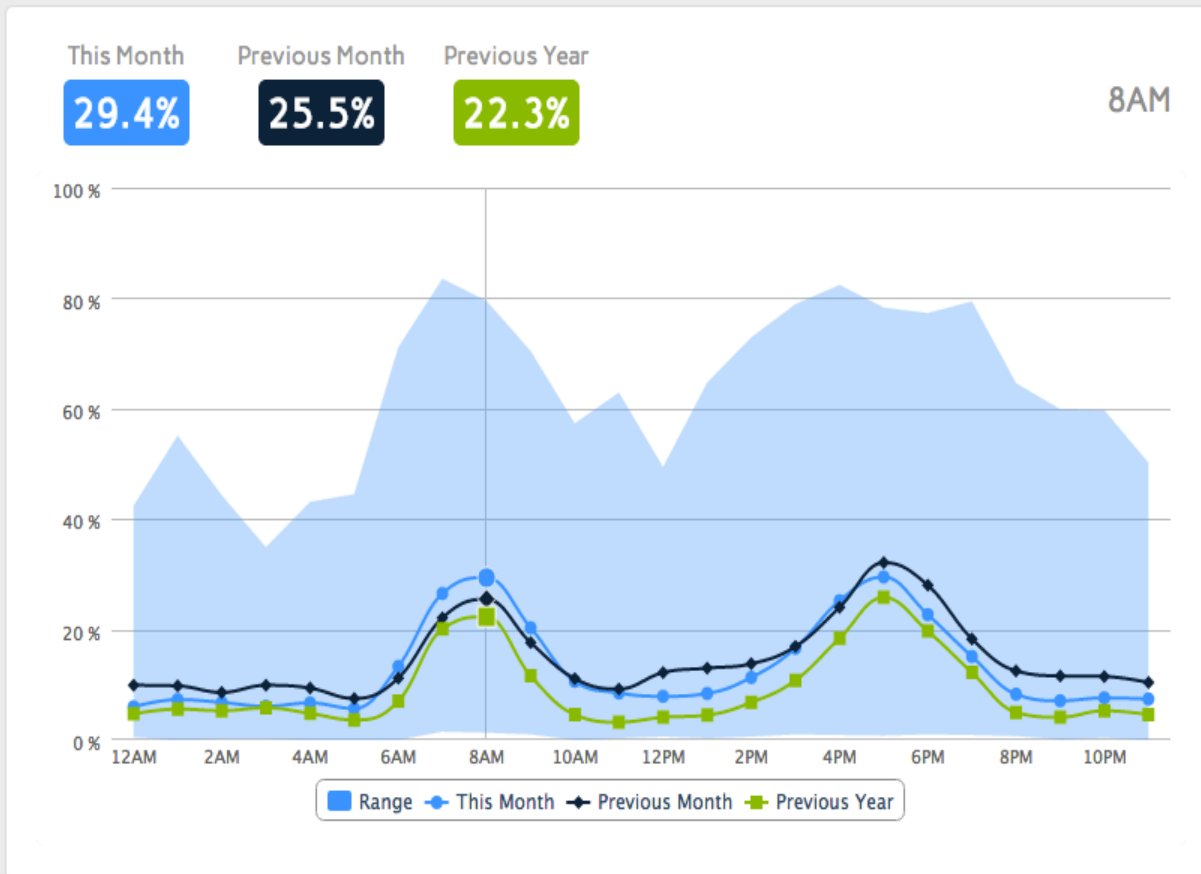


# National Travel Time Data Set iPeMS Dashboard: Time of Day



FEBRUARY

- TOD (weekdays)
- TOD (weekends)
- DOW (8 AM)
- DOW (5 PM)
- DOW (All Times) ?



CONGESTED (%)

**13.1%**

↓ -1.70% (1 month change)  
↑ 3.90% (1 year change)

TRAVEL TIME INDEX

**1.29**

↓ -0.26 (1 month change)  
↑ 0.03 (1 year change)

PLANNING TIME INDEX

**1.54**

↓ -0.62 (1 month change)  
↑ 0.11 (1 year change)

# National Travel Time Data Set iPeMS Dashboard: Day of Week

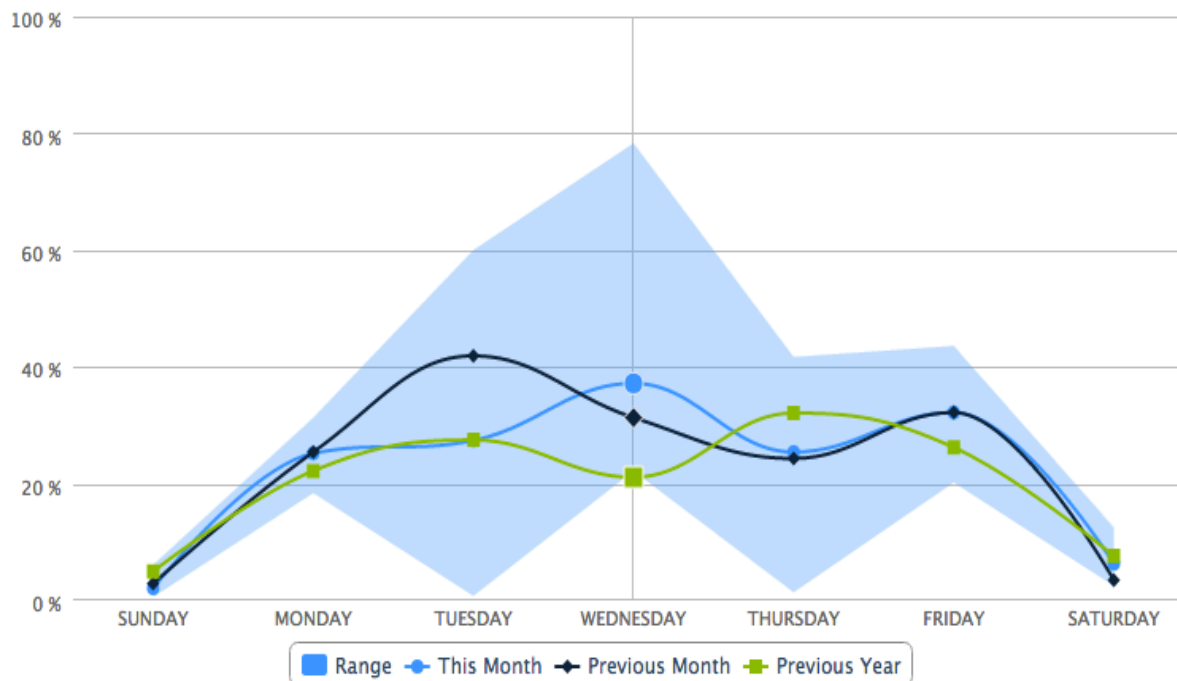


FEBRUARY

TOD (weekdays) TOD (weekends) DOW (8 AM) DOW (5 PM) DOW (All Times) ?

This Month **37.2%** Previous Month **31.3%** Previous Year **21.1%**

WEDNESDAY



# National Travel Time Data Set

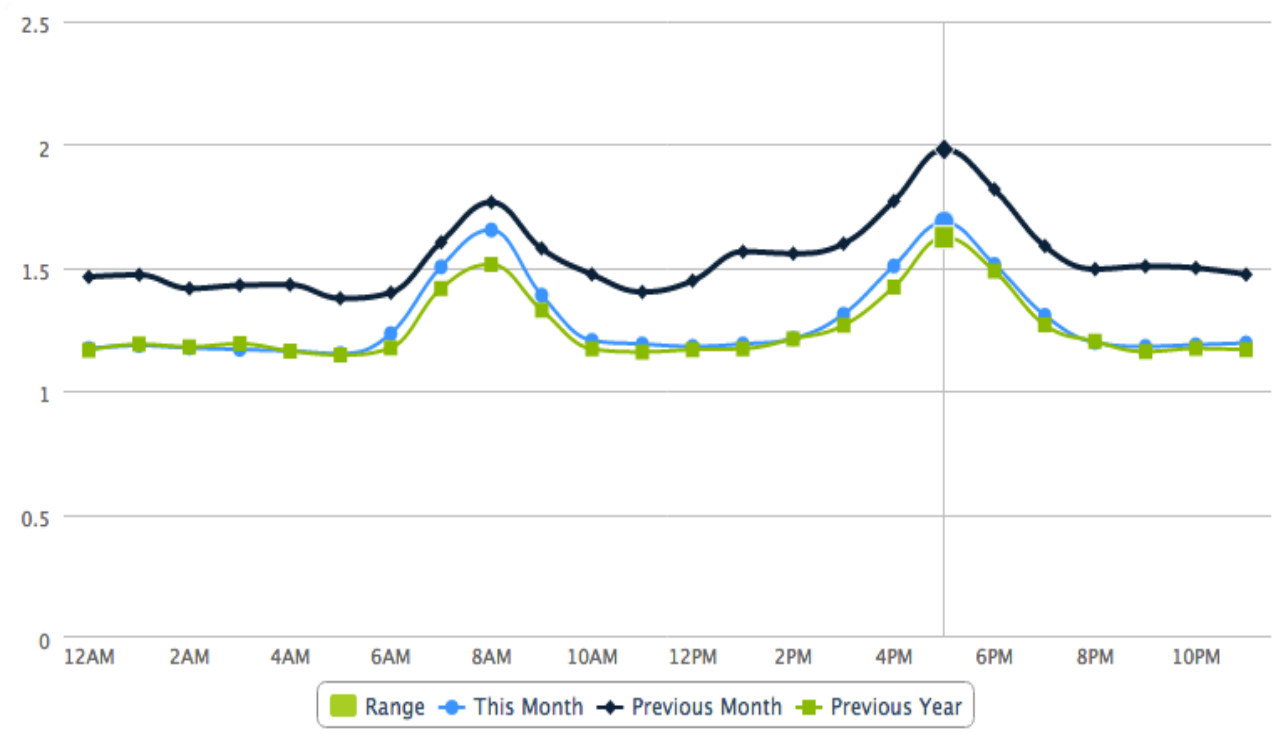
## iPeMS Dashboard: TTI



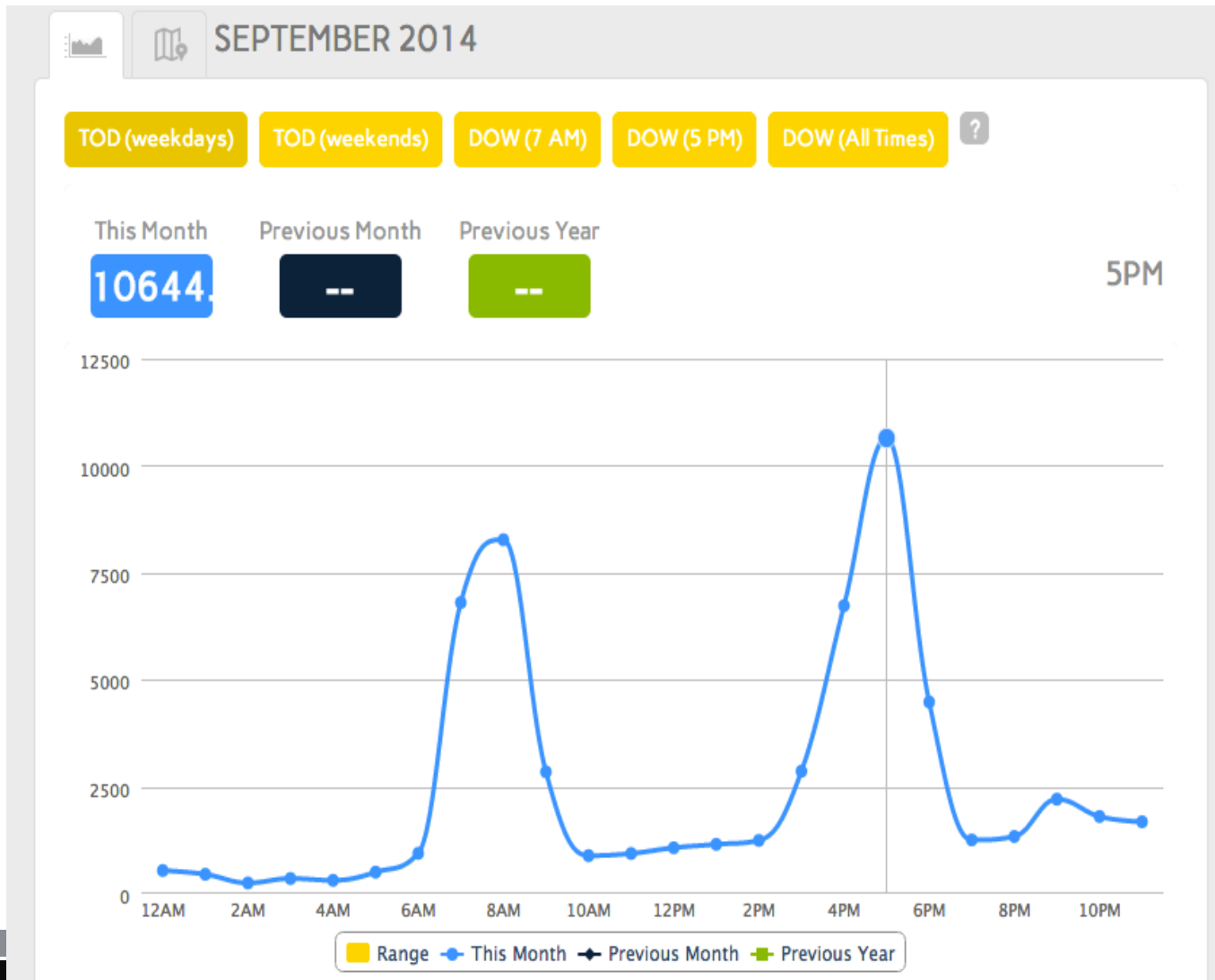
FEBRUARY

- TOD (weekdays)
- TOD (weekends)
- DOW (8 AM)
- DOW (5 PM)
- DOW (All Times) ?

This Month: **1.68**  
 Previous Month: **1.98**  
 Previous Year: **1.62**
5PM



# National Travel Time Data Set iPeMS Dashboard: Delay







# Questions?

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**For additional questions:**

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