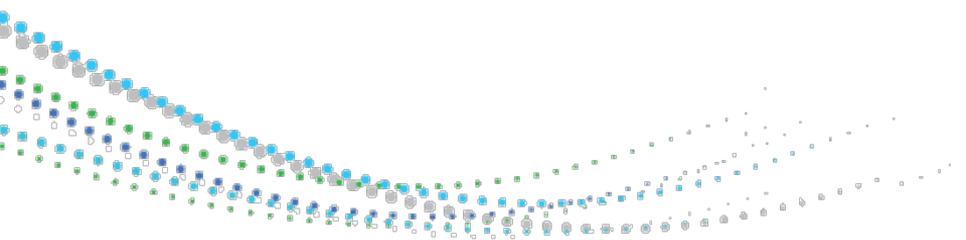




Iteris Performance Measurement System (iPeMS) Training and User Guide

February 20, 2018



Introductions

INSTRUCTOR

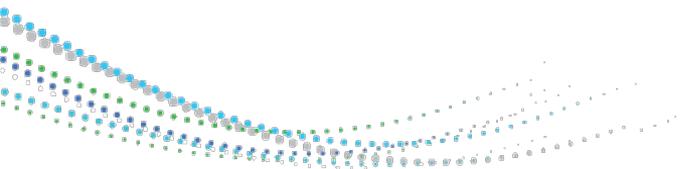
Tiffany Barkley

Director of Product, Performance Analytics

Iteris, Inc.

tbarkley@iteris.com

510-540-4816



Agenda

- iPeMS Background
- Metro iPeMS Data and Performance Measures
- Accounts and Homepage
- Map
- Link Reports
- Creating and Finding Routes
- Detailed Route Reports
- Area-Wide Route Reports
- Exercises

Objectives

Teach you the basics of using iPeMS

- How to navigate in the site
- Review the available data, report types, and performance measures

Give you some hands-on experience

- Clicking around in the site yourself is more memorable than only reviewing slides

Provide a tool for future reference

- This presentation, along with exercises, will guide you in future iPeMS use

iPeMS[®]

iteris[®]

iPeMS Solution

iPeMS collects, analyzes, and visualizes Smart Transportation data in the cloud for planning and operations performance measurement



Where is iPeMS?

Freeway Module



Third Party Module



Tollways



ICM & Transit



Arterial iPeMS Module



iPeMS Modules

Freeway Module



Arterial Module



Third Party Data Module



Event Module



Managed Lanes Module



Bluetooth Module



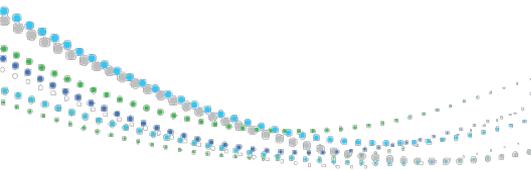
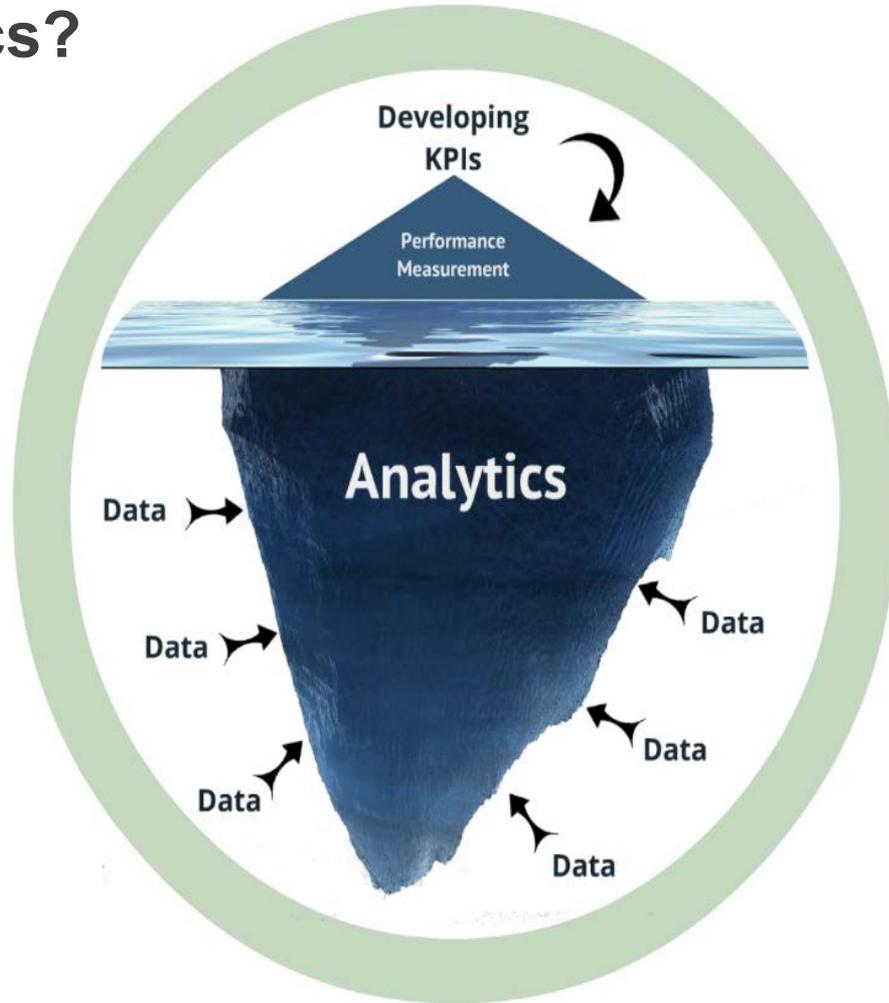
Transit Module



NPMRDS Module



What is Analytics?



Uses for the data

Why have access to speed data and what can you do with it?

Input into planning studies

Legislatively required monitoring
e.g. Congestion Monitoring
Program

Monitor the impact of a
construction project

Monitor a ramp metering
system

Before and after studies

Network-wide trend analysis

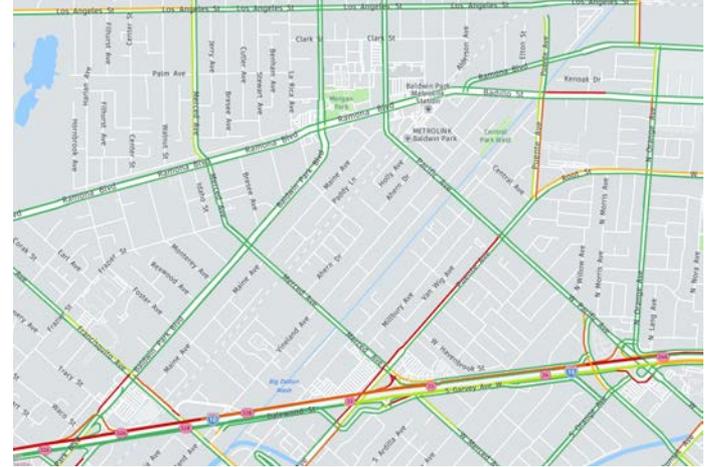
Monitor real time traffic
conditions



Metro iPeMS Data and Performance Measures

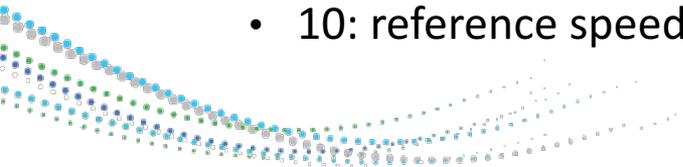
INRIX 3rd Party Speed Data

- Characteristics
 - Data is collected from GPS in vehicles and mobile devices
 - Processed into 1-minute average link speeds
- In Metro iPeMS
 - San Gabriel Valley region
 - July 1, 2014– December 31, 2016
 - Major arterials and freeways
 - Link segmentation is INRIX XD segments (which are smaller than TMCs)
 - On arterials, typically one or more links from intersection-to-intersection



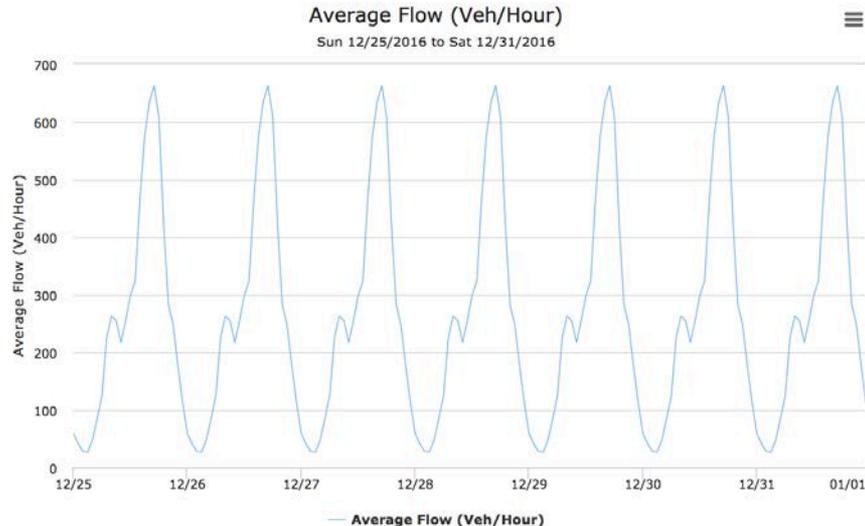
INRIX Speed Data- Terminology

- Speed: Speed measured from probe vehicles during that time period
- Reference speed: INRIX's estimate of the free-flow/uncongested speed on a link
 - In iPeMS, this is called the 'free-flow speed' and is used as a threshold speed for measuring delay
- Confidence Score: ranges from 10-30
 - 30: 'real-time' data
 - 20: historical average for that day/time period
 - 10: reference speed



Traffic volume profiles

- Traffic count data that has been applied across roadway links
- Applied to the speed data as hourly averages that represent a 'typical' day



Metro iPeMS Performance Measures

- On all links and routes
 - Speed
 - Travel time (average and reliability)
 - Travel time index
 - Travel time delay
 - Level of Service (link-based HCM methods)
- On links and routes with volume profile data
 - Vehicle- and person-miles travelled
 - Vehicle- and person-hours travelled
 - Vehicle-hours of delay (relative to different threshold speeds)

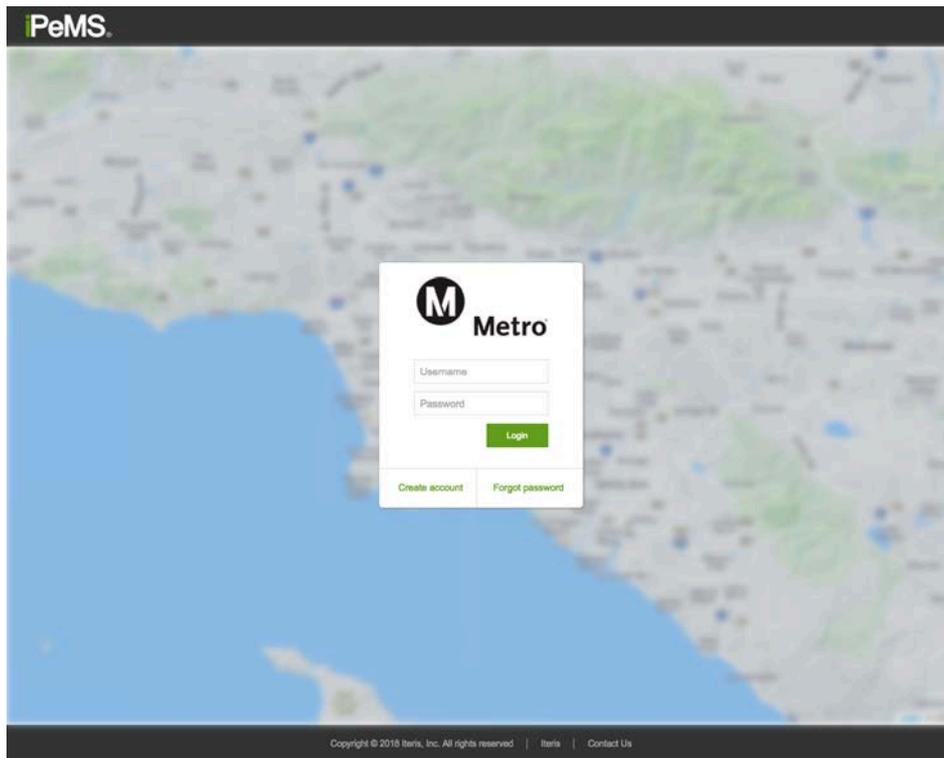




iPeMS Account and Homepage

Creating an account

- lametro.iteris-pems.com
- Create an account using your agency email address for immediate approval



Homepage

The screenshot shows the iPeMS homepage. At the top left is the iPeMS logo. The top right navigation bar includes links for Home, System Administration, Help, Logout, and Welcome admin. The main content area is divided into three sections: 1. A map of Los Angeles with a blue overlay on the city area and a 'Click to View Map.' button. 2. A 'Select Geography:' section with a breadcrumb 'CA > Region > LA County Pilot'. 3. An 'Area-wide Performance Overview' section with a 'ROUTE REPORTS +' button. Below this is a 'Detailed Performance of a Link or Route' section with three steps: 'STEP 1: Select Link or Route' (with a question mark icon) containing 'CHOOSE LINK FROM A MAP', 'CHOOSE ROUTE +' (with a plus icon), and 'CREATE A NEW ROUTE' buttons; 'STEP 2: Choose a report' with a mouse cursor icon; and 'STEP 3: Graph or Download' with a line graph icon and a download icon.

Click map to view Real Time Map

} Filter to a jurisdiction

} Area-wide Reports

} Detailed data

Homepage

PeMS

Home System Administration Help Logout Welcome admin

Click to View Map.

Select Geography:
CA > Region > LA County Pilot

Area-wide Performance Overview

ROUTE REPORTS +

Detailed Performance of a Link or Route

STEP 1
Select Link or Route ?

CHOOSE LINK FROM A MAP

CHOOSE ROUTE +

CREATE A NEW ROUTE

After Step 1, choose a report, graph and download content

STEP 2
Choose a report

STEP 3
Graph
or
Download

Leaflet | © HERE

M Metro

Terms of Use Feedback Release Notes

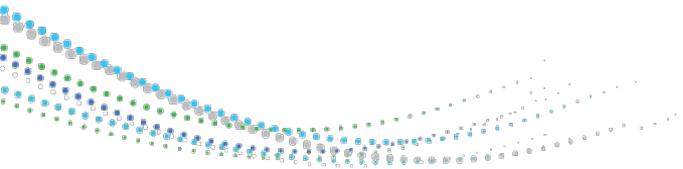
iteris

Access your account settings, change your password

Logout when you are finished using the site

Terminology

- **Link** - Small length of roadway.
- **Route**
 - A user defined directional path between two points
- **Report** – Feature in iPeMS used to graph, map or tabulate performance data





Map

Accessing the Map

Click the map to access

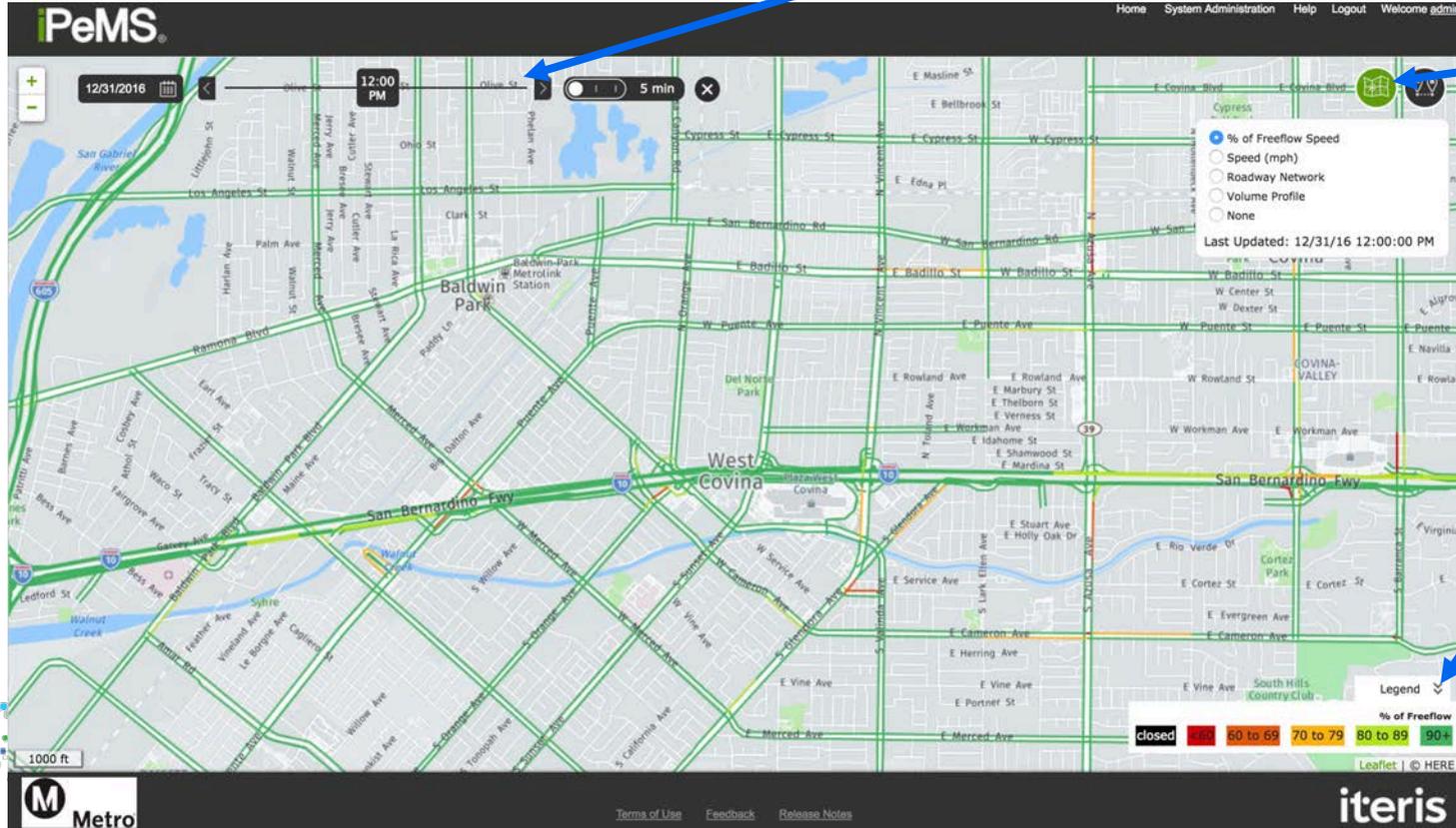
The screenshot displays the iPeMS web application interface. At the top left is the iPeMS logo. The top right navigation bar includes links for Home, System Administration, Help, Logout, and Welcome admin. The main content area is divided into two columns. The left column features a map of Los Angeles with a blue shaded region over the city center. A blue bracket on the left side of the map points to the text 'Click the map to access'. Above the map is a zoom control and a 'Click to View Map.' button. The right column contains a 'Select Geography:' section with a breadcrumb 'CA > Region > LA County Pilot'. Below this is an 'Area-wide Performance Overview' section with a green 'ROUTE REPORTS' button. The 'Detailed Performance of a Link or Route' section follows, containing a 'STEP 1' box with a 'Select Link or Route' dropdown and three green buttons: 'CHOOSE LINK FROM A MAP', 'CHOOSE ROUTE', and 'CREATE A NEW ROUTE'. To the right of these buttons is a 'STEP 2' section with a 'Choose a report' button and a mouse cursor icon, and a 'STEP 3' section with a 'Graph' button and an envelope icon, followed by 'or' and a 'Download' button with a download icon. The bottom of the interface features a Metro logo on the left, a footer with 'Terms of Use', 'Feedback', and 'Release Notes', and the iiteris logo on the right.

Map: Elements

Time Slider

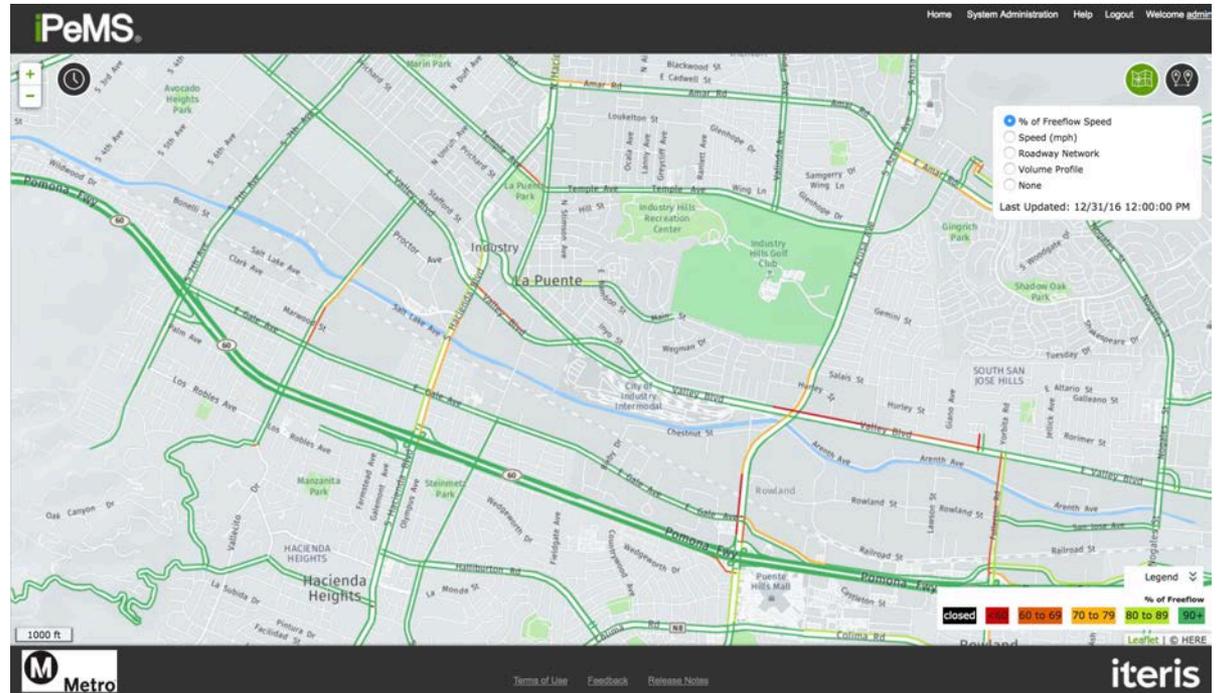
Layers

Legend



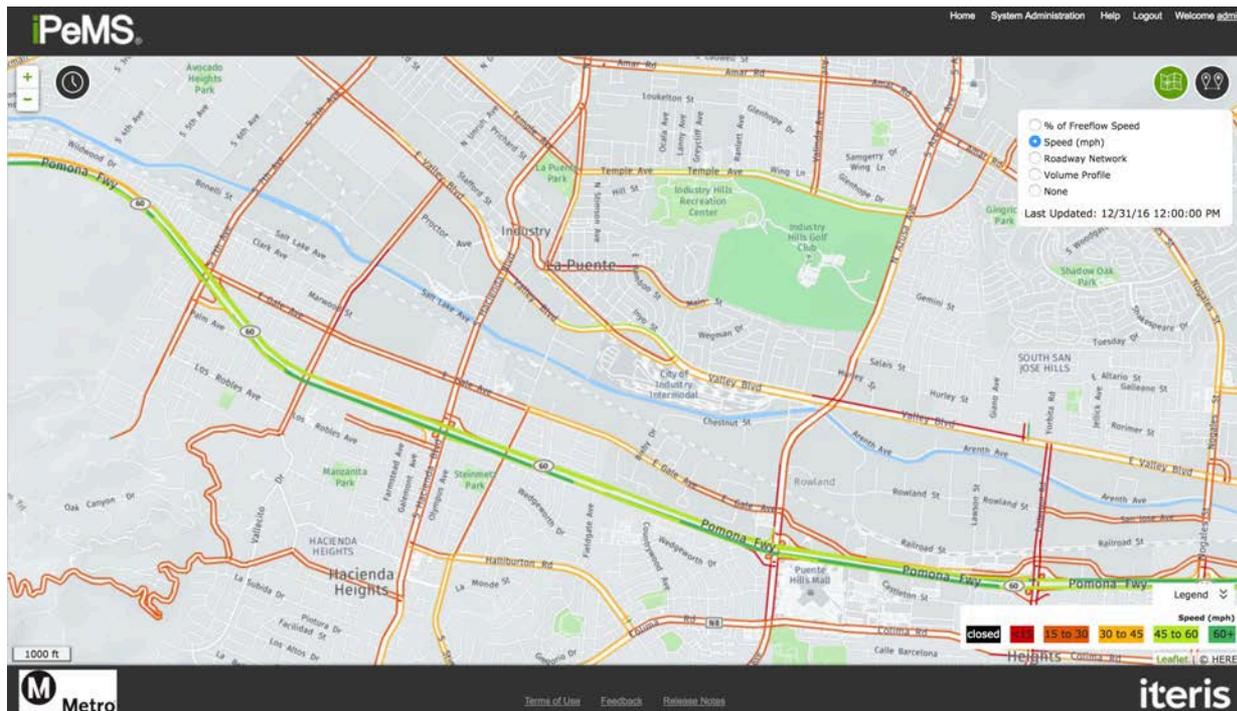
Map: % Free-flow Speed

- Indicates the level of congestion
- Dark Green: speeds are 90% of free-flow or higher
- Dark Red: Speeds are less than 60% of free-flow



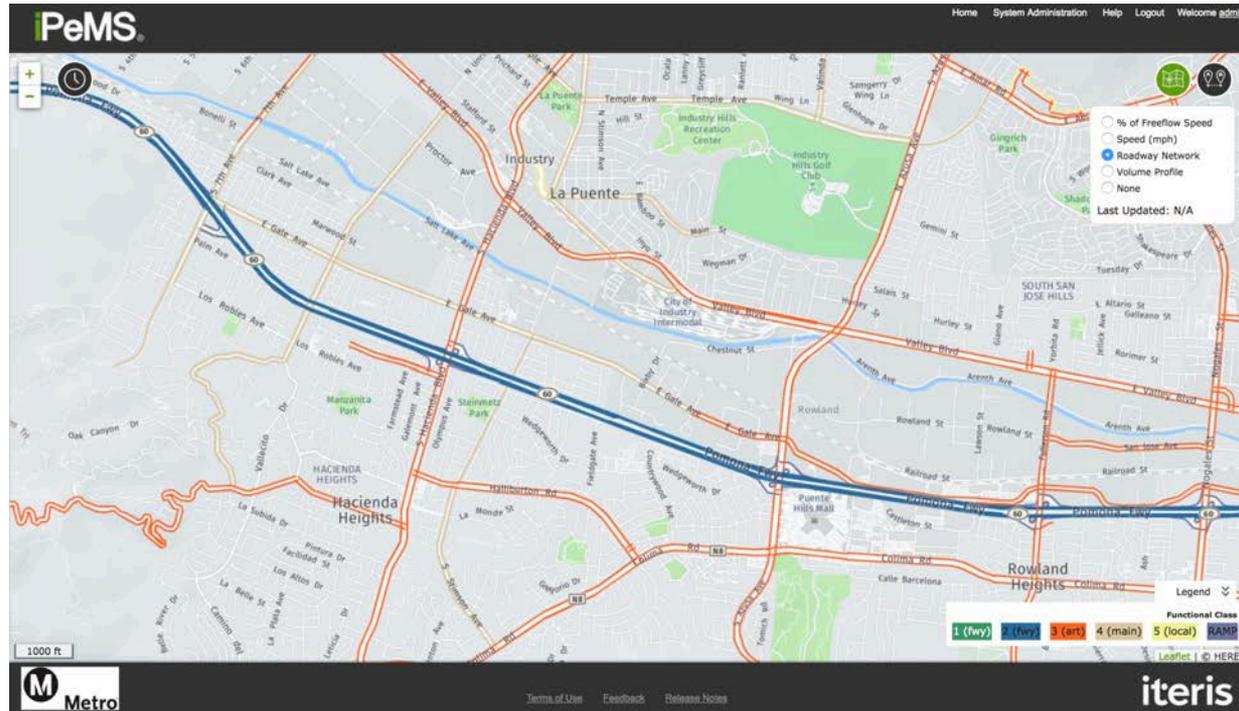
Map: Speed

- Colors based on the actual speed value



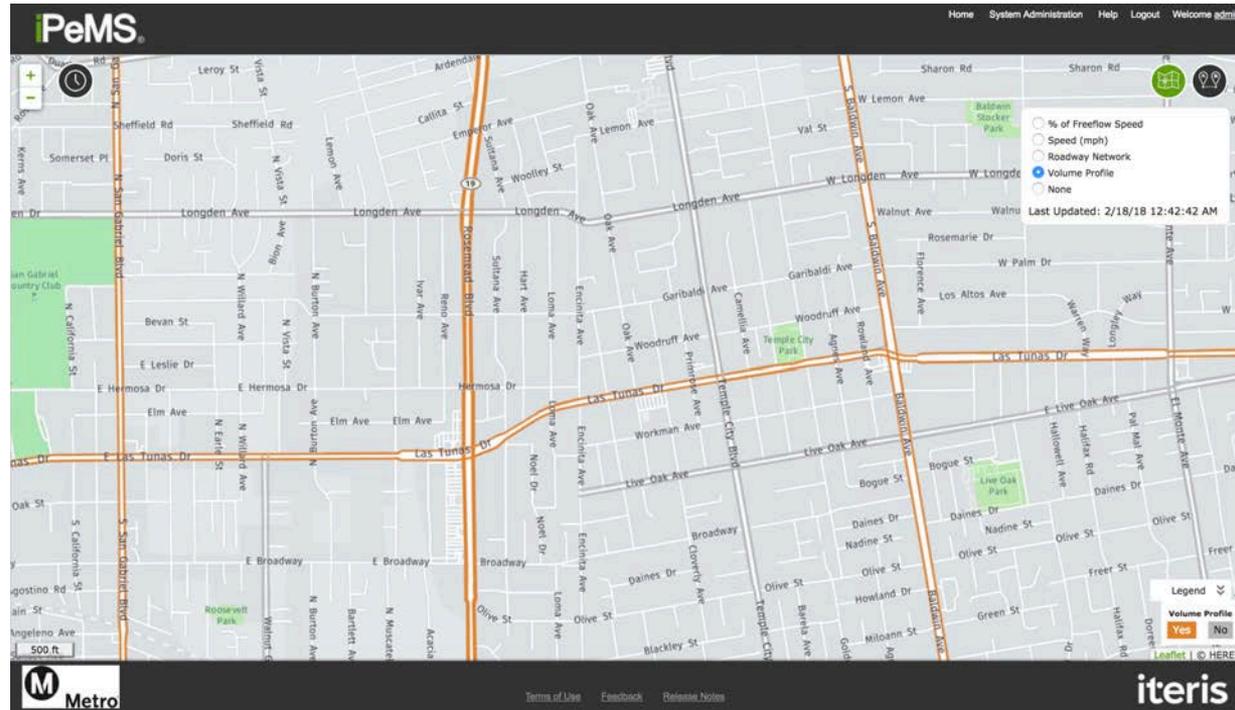
Map: Roadway Network

- Functional Class system as specified by INRIX



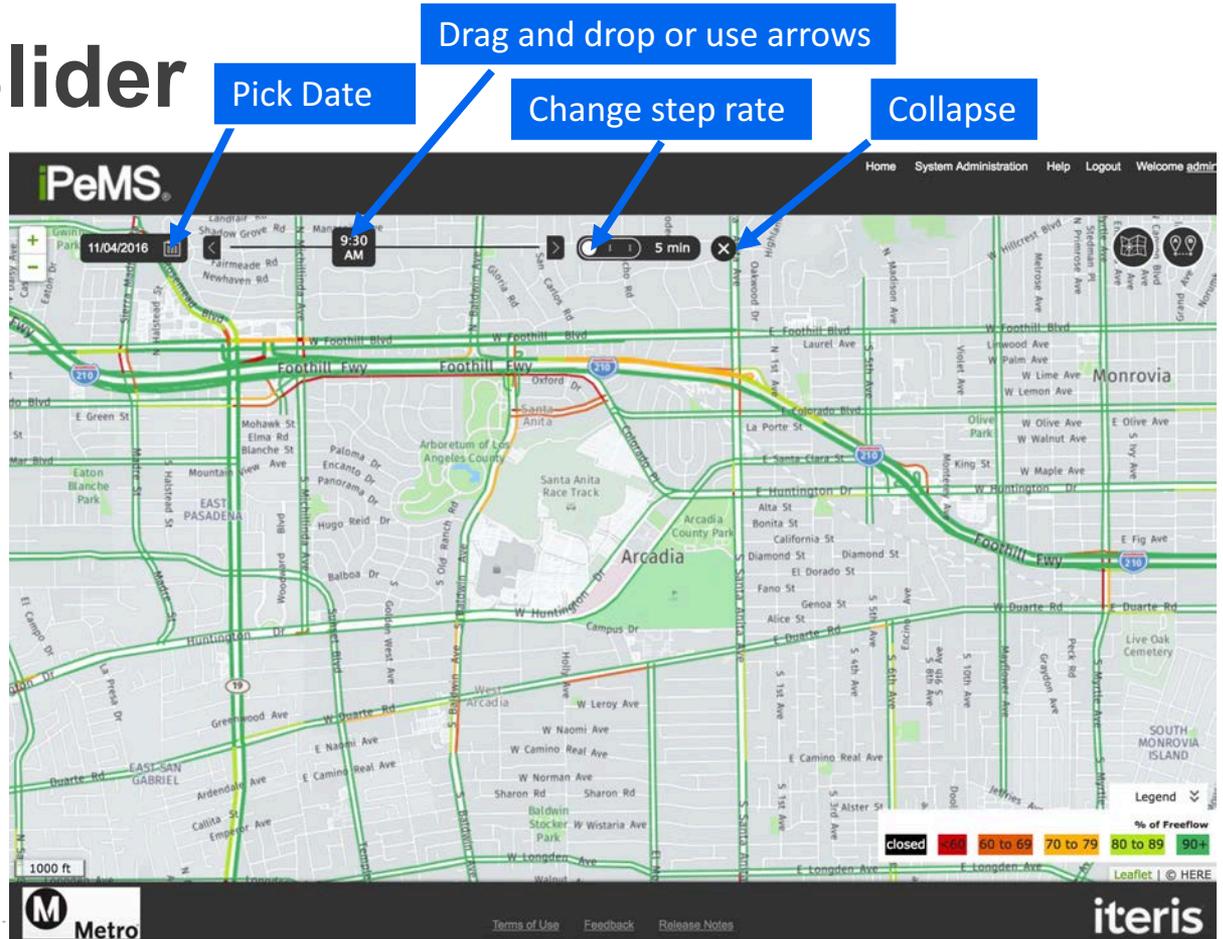
Map: Volume Profile Layer

- Shows which roadways have volume profile data
- These are the roadways that you can obtain volume-based performance measures on



Map: Time Slider

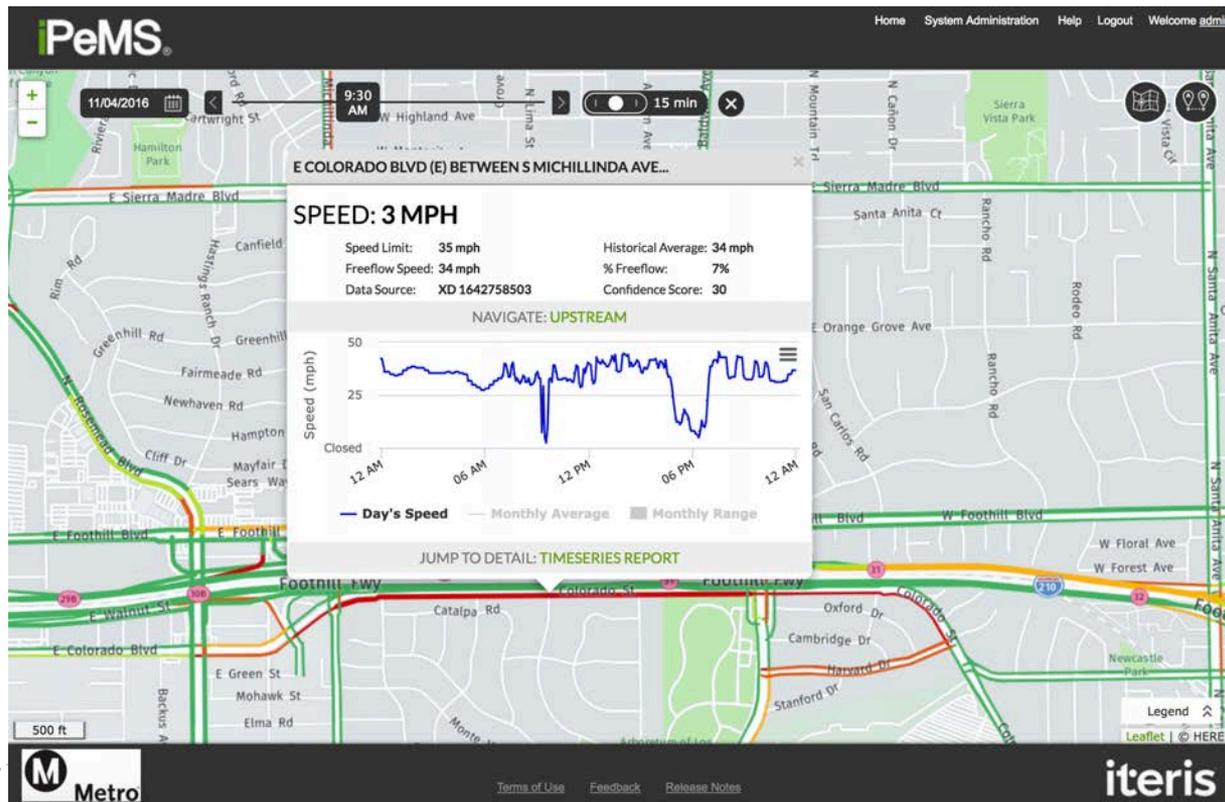
- “Play back” speed conditions on any day in the past
- Example: % of free-flow speed near Santa Anita Race Track on 11/4/16 at 9:30 AM (2016 Breeder’s Cup World Championships began at 11:25am)



Pick Date
Drag and drop or use arrows
Change step rate
Collapse

Map: Link Pop-up

- Hover over a roadway to display the link
- Click on a link to get detailed pop-up comparing that day's speed with the 'typical' speed
- Click on Timeseries Report at bottom of pop-up to go to detailed reporting

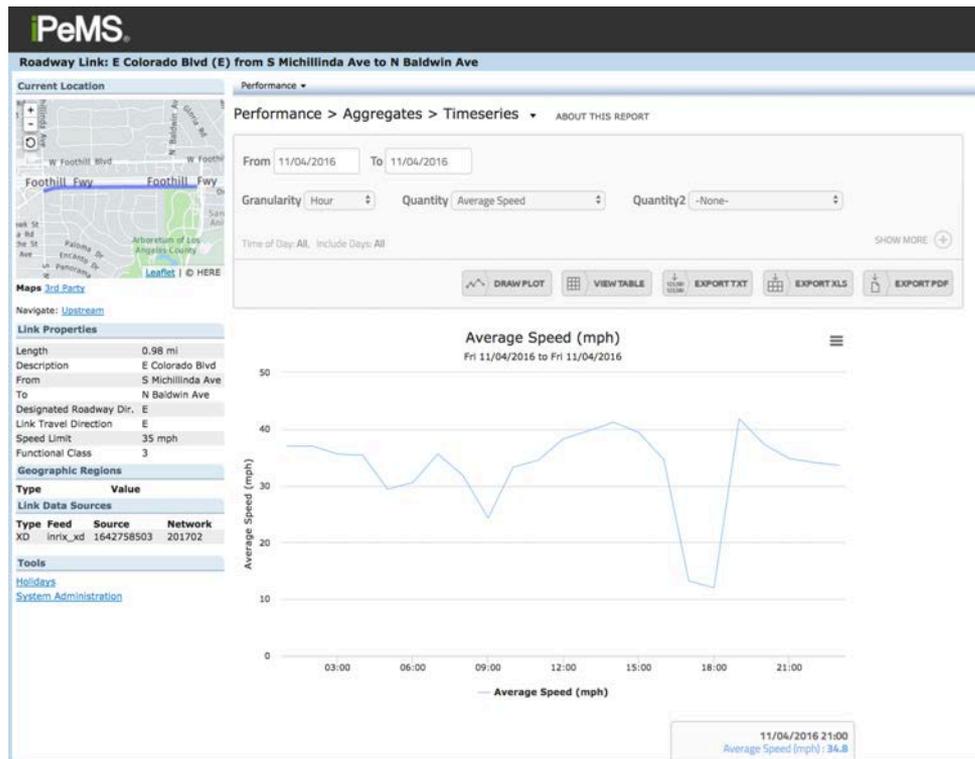




Link Data

Accessing Link Data

- By default, the link from the map goes to the Performance > Aggregates > Timeseries report for the link
- The default settings are the selected day, with granularity of one hour, showing the quantity of average speed
- Take a moment to review the granularities and quantities available
- See more detail by hovering over the chart



iPeMS Report Structure

The screenshot displays the iPeMS report structure for a specific roadway link. The interface is divided into several key sections:

- Locality map:** A map on the left side showing the current location of the roadway link.
- About the Link:** A section on the left providing details about the link, including its length (0.98 mi), description (E Colorado Blvd), and speed limit (35 mph).
- Link Ids:** A table on the left listing link data sources and their associated feed, source, and network IDs.
- Specify your query:** A central area for configuring the performance query, including date ranges (From: 11/01/2016, To: 11/05/2016), granularity (5 Minutes), and quantity (Average Speed).
- Fine tune the query:** A section for adjusting query parameters like 'Time of Day' and 'Include Days'.
- Choose your output type:** A set of buttons for selecting the output format, such as 'DRAW PLOT', 'VIEW TABLE', 'EXPORT TXT', 'EXPORT XLS', and 'EXPORT PDF'.
- Output:** A time-series graph showing the 'Average Speed (mph)' over the specified period, with a y-axis ranging from 0 to 60 mph and an x-axis showing dates from 11/01 to 11/05.

Link Reports Introduction

Click the + - to fine tune your query

The screenshot shows a query configuration interface with the following elements:

- Time range: From 03/07/2017 To 03/09/2017
- Granularity: Hour
- Quantity: Average Speed
- Quantity2: -None-
- Time of Day: All (selected), 00:00 to 00:59
- Day of Week: All days (Su, Mo, Tu, We, Th, Fr, Sa) and Holidays are checked.
- People per Vehicle: 1
- Buttons: DRAW PLOT, VIEW TABLE, EXPORT TXT, EXPORT XLS, EXPORT PDF
- A "SHOW LESS" button with a minus sign is located on the right side of the main configuration area.

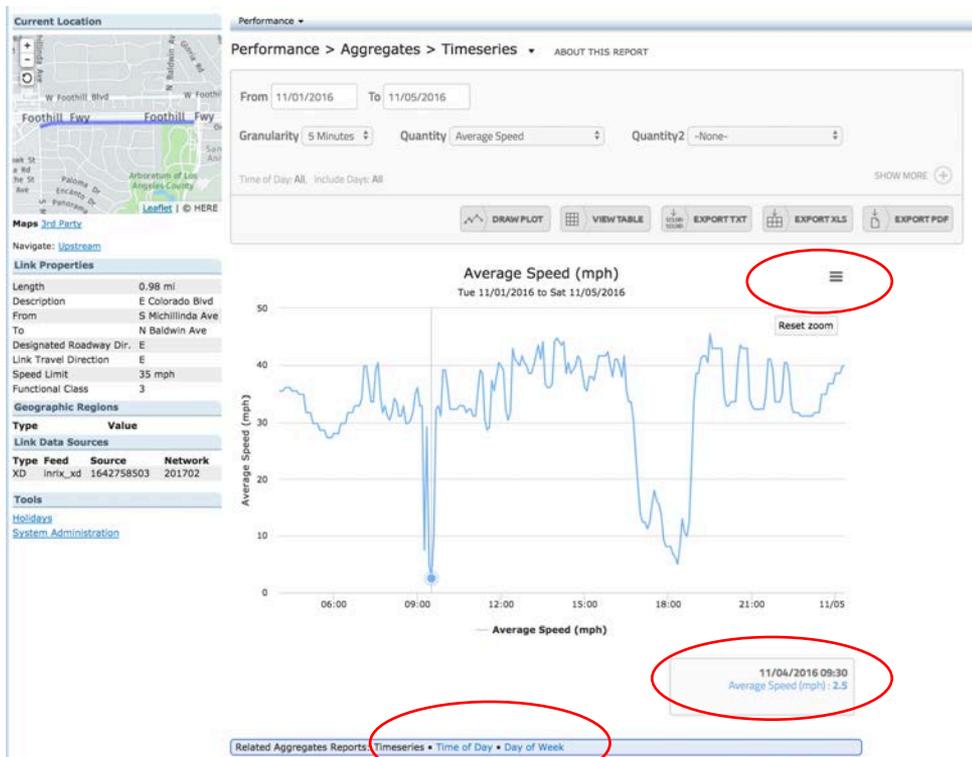
Specify your query

Expand the +/- to show more options

Specify the time of day or day or week to include

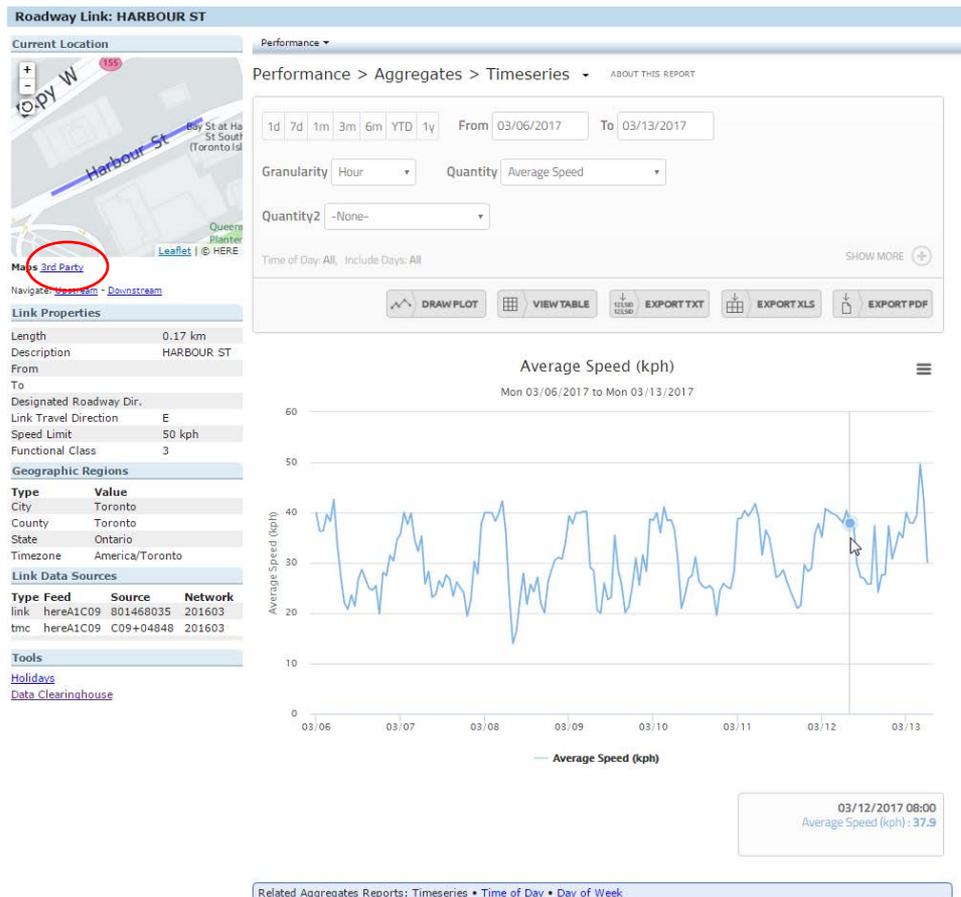
Accessing Data

- Note that you can hover in the plot to see values and that you can also view the data in table form or export the data to text, Excel, or PDF
- Export the image by clicking on the bars on in the upper right of the graph
- Click on the hyperlinks at the bottom to access other available reports for the same segment



Navigation Tip

- If you want to go back to the map, you can return to the Real Time Map by clicking '3rd Party' link underneath the inset map
- But don't do it yet as we are going to go through link data in more detail next



Link Reports

There are three different link reports

Timeseries

- Shows variables over time

Time of Day

- Shows the averages over the time of day
- Answers questions like, what is the typical speed at 7am?
- This plot is used to review typical traffic patterns.

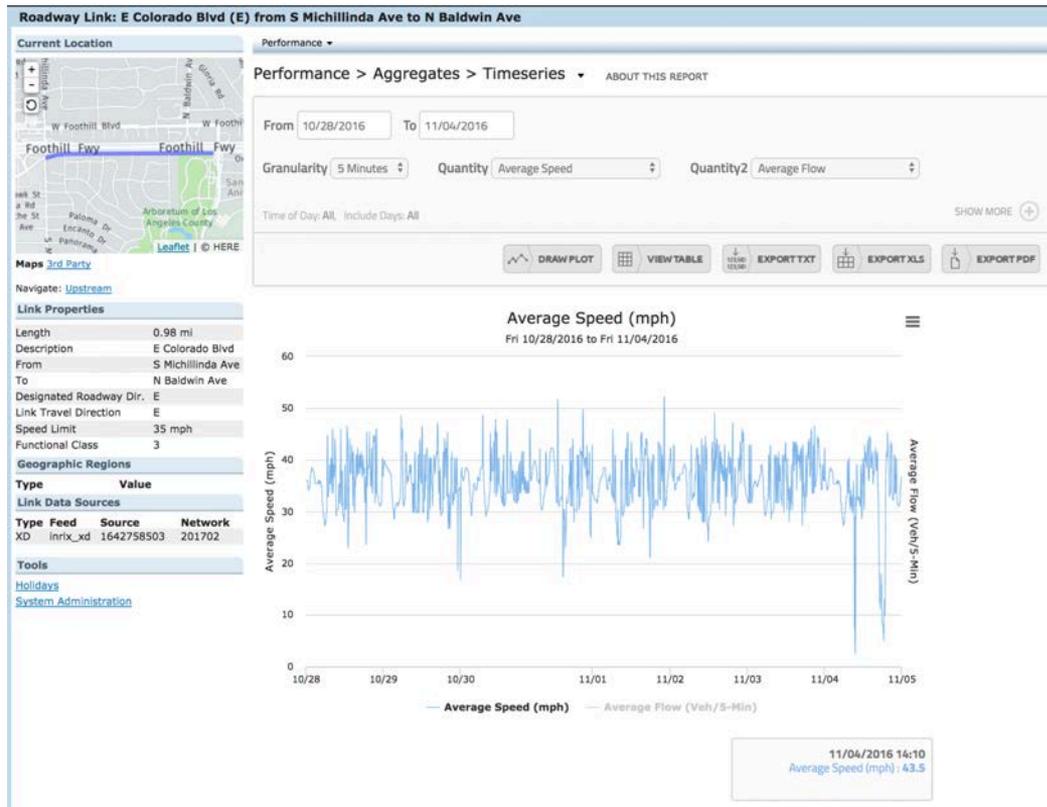
Day of Week

- Review the difference in performance between the days of the week
- How is a Monday's performance different from a Wednesday?



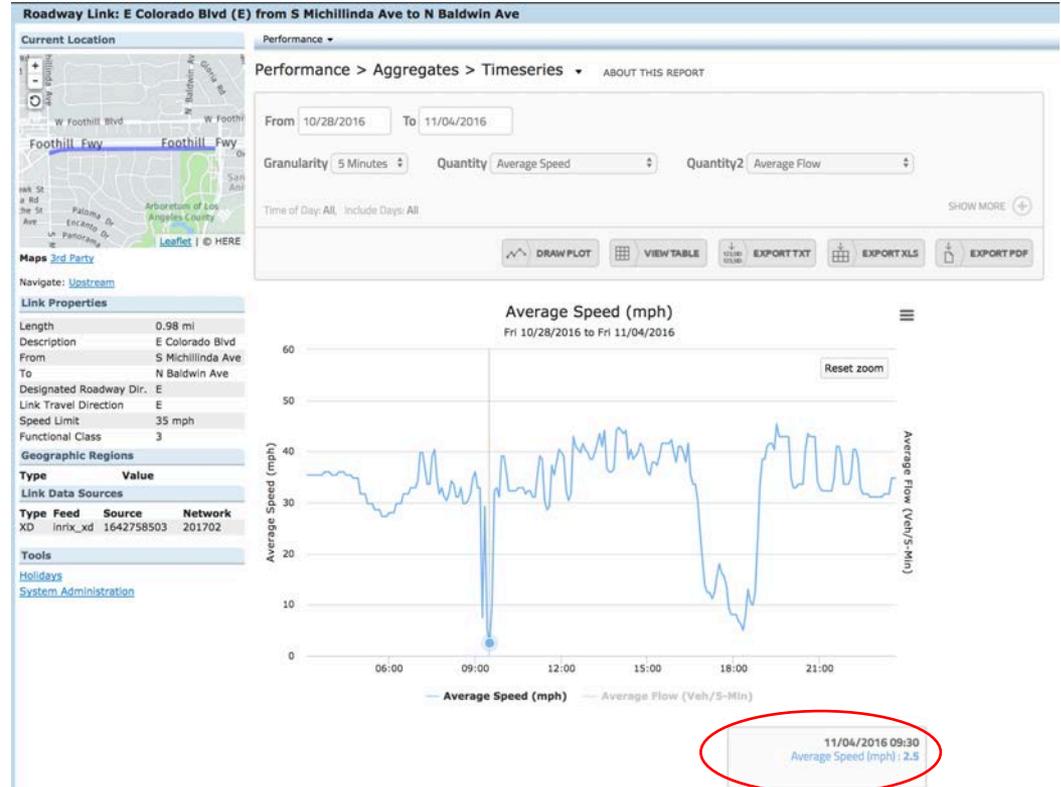
Timeseries Report

- Let's see how the Friday 11/4 congestion compares to conditions the rest of the week
- Date Range: 10/28/2016 – 11/4/2016
- Granularity = 5 Minutes
- Quantity = Average Speed
- Quantity2 = Average Flow
- Always click Draw Plot or View Table to refresh the report with your new settings



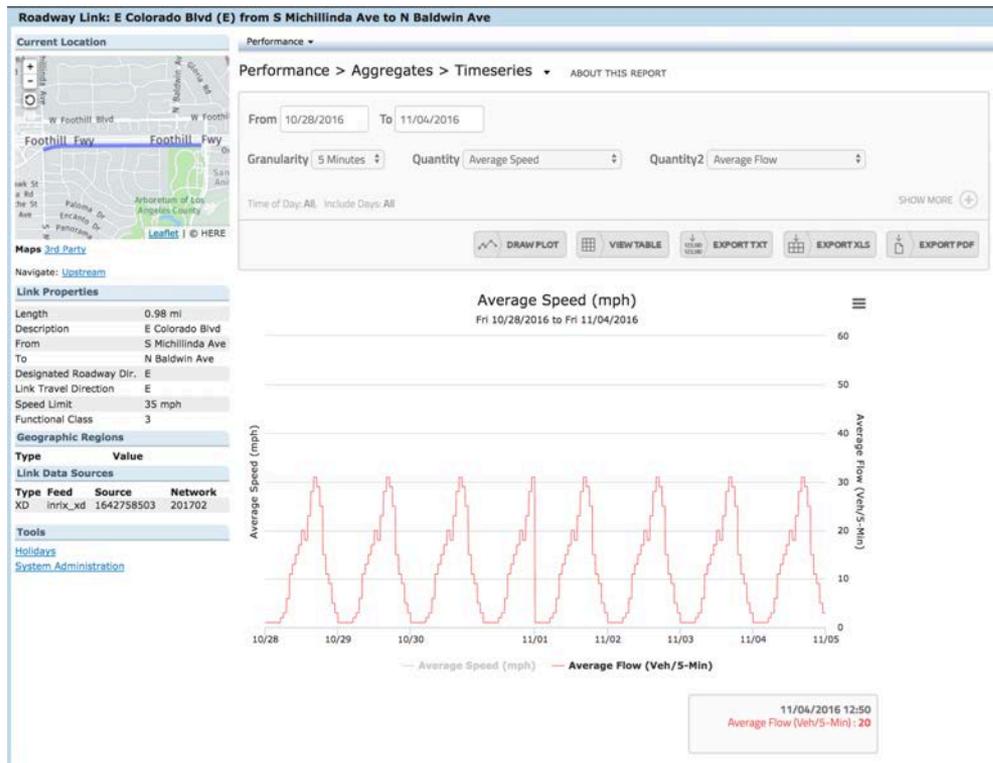
Timeseries Report

- Click and Drag on the plot to zoom into a particular area
- Hover over the plot to see the exact value in the box below the plot



Timeseries Report

- Look at Average Flow to see the traffic volume profiles for each link
- Note that the volume profile is the same every day
- These volumes are being used in the delay computations for the link (and for routes that the link is part of)



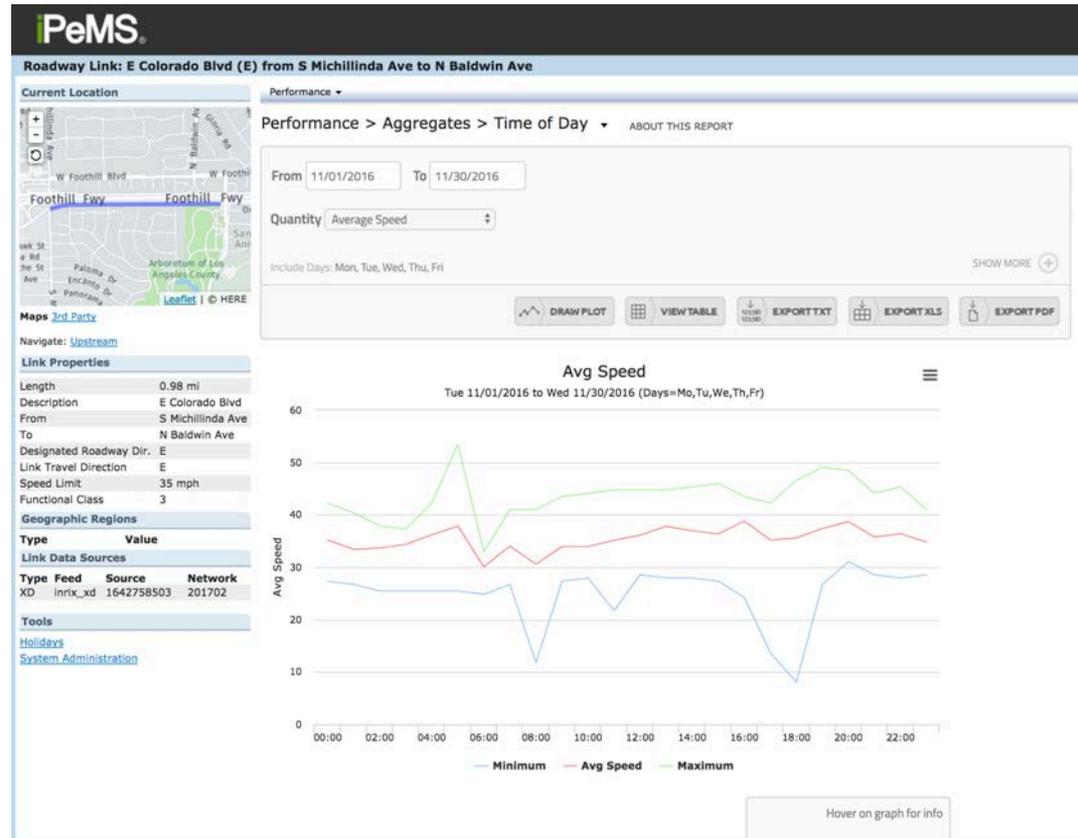
Time of Day Report

- Useful to answer questions, i.e. what are the average conditions at 9am?
- From the top tool bar, select, Performance > Aggregates > Time of Day
- Instead of presenting data in a chronological order from a beginning date to ending date, the Time of Day report aggregates the data according to the hour of day across the date range selected.
- So all 8am hours are evaluated together, and all 9am, 10am, etc., for all hours of day.
- The min, mean, and max values are the default values presented



Time of Day Report

- Staying on the same link, change the report settings
- Date range = 11/1/16 – 11/30/16
- Quantity = Average Speed
- Expand the “Show More” box by clicking on the plus sign
- De-select Saturday, Sunday and Holidays
- Keep the statistics as mean, min, max
- Draw Plot



Day of Week Report

- Helps answer questions like, how is Monday different than Wednesday?
- Note that you can also change the report by clicking on the small pull down triangle after the report name. Select Day of Week.
- The Day of Week report does a different kind of aggregation. Instead of aggregating days by their hour of day, it aggregates by the day of week.
- All Mondays are analyzed together, all Tuesdays, etc. This can be a useful report to evaluate weekday vs. weekend performance

Roadway Link: E Colorado Blvd (E) from S Michillinda Ave to N Baldwin Ave

Current Location

Performance ▾

Aggregates ▾

Timeseries

Time of Day

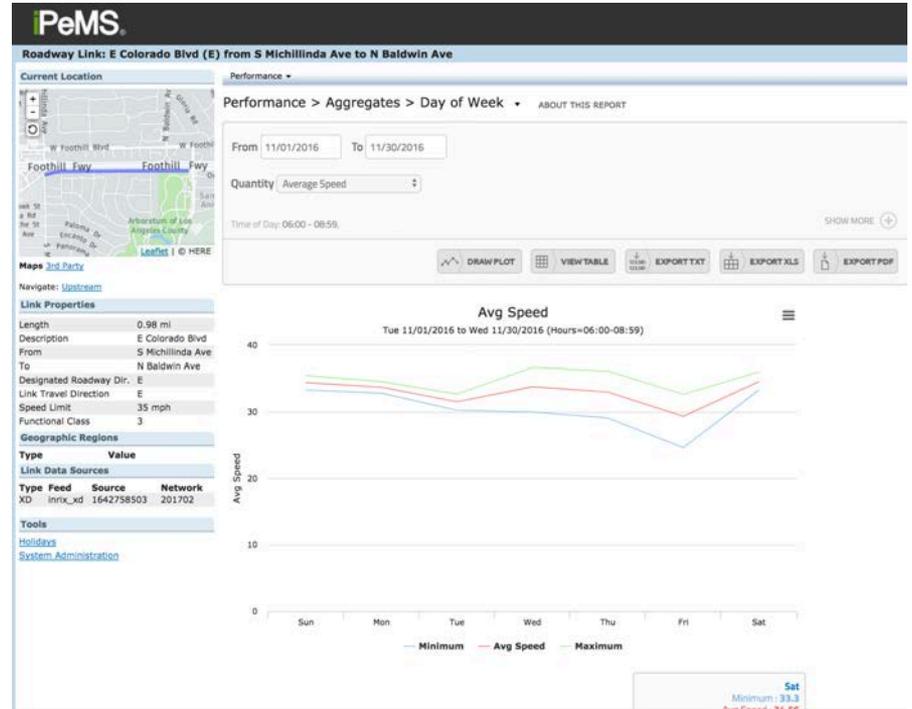
Day of Week

From 11/01/2016 To 11/30/2016

Day of Week

Day of Week Report

- Expand the + button and choose times between 06:00 & 8:59
- Quantity = Average Speed
- Tip: Make sure to choose a date range longer than a week to get results for each day of the week

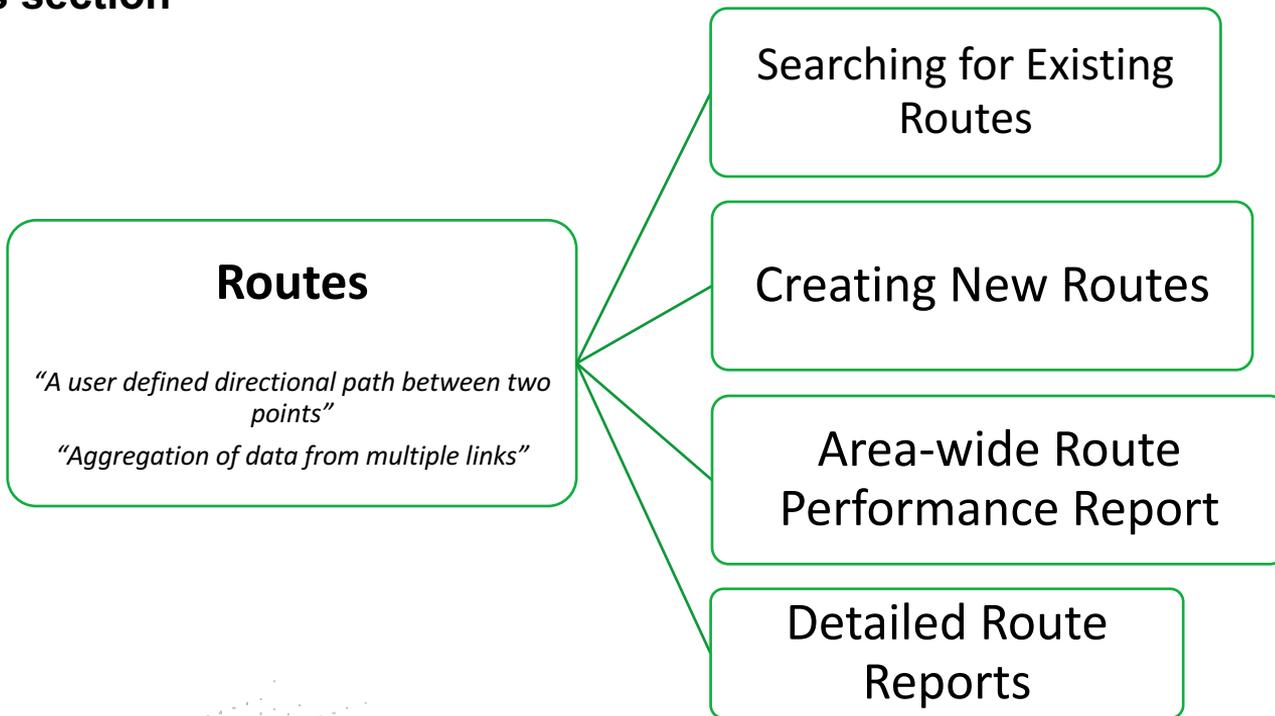




Creating and Finding Routes

Route Data

In this section

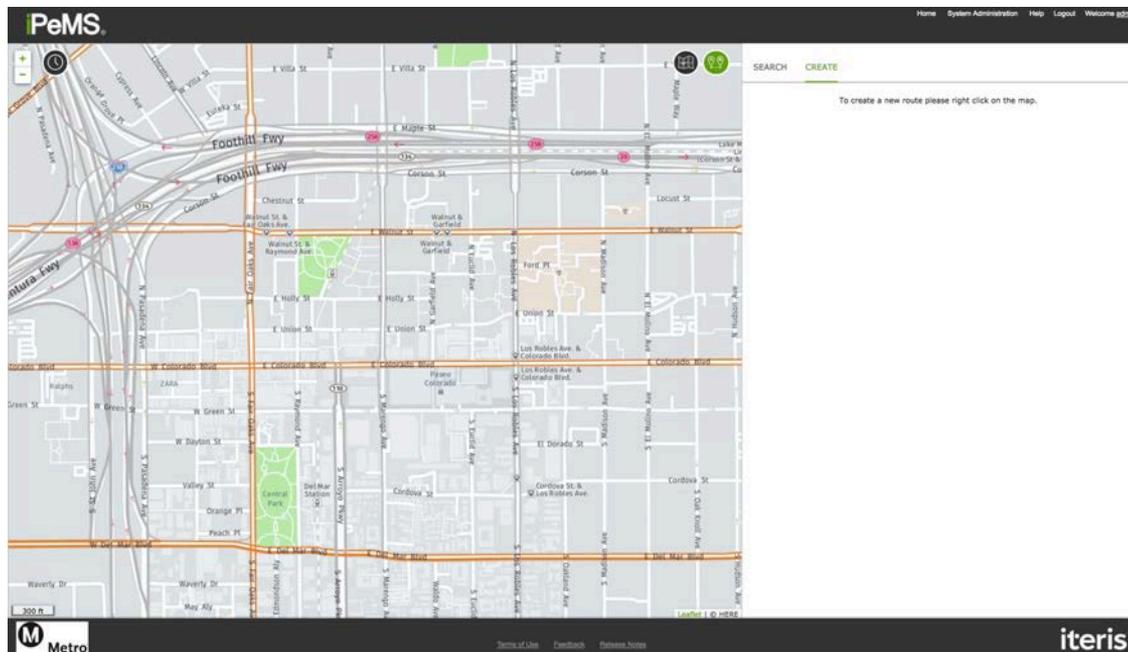


Creating a new route

- Click the Route icon in the top right

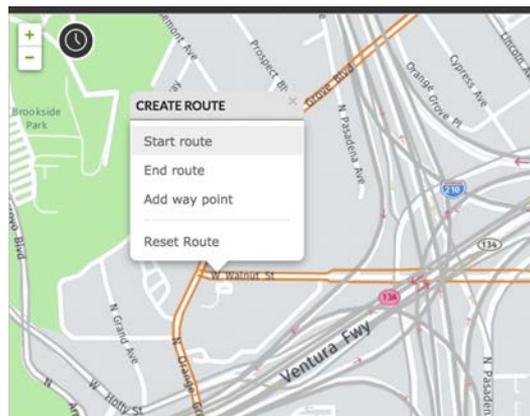


- This opens the Route creation side panel that displays information about your route as you create it.
- If you want to look at volume performance measures on a route, make sure you have the Volume Profile layer on and only choose roadway links that have volume data



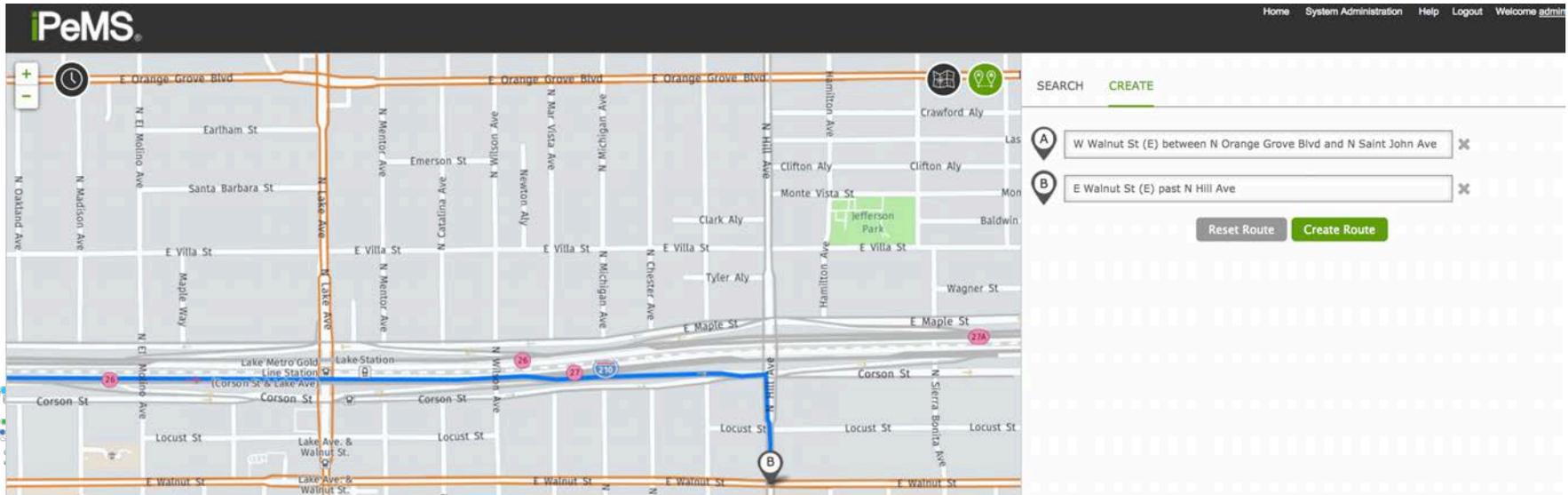
Creating a new route: Start

- Start by right clicking in the map, which brings up the Create Route pop-up. Click “Start route”



Creating a new route: End

- Then, right click again in the map where you want the route to end, and click “End route.”
- Starting and ending descriptions are provided



Creating a new route: Way point

- But I didn't want my route to take the freeway!
- We can fix this by adding a way point
- Right click on the map where you want to add a way point
- The route pathway will update to include your way point
- If you wanted to start over, select Reset Route



Creating a new route: Saving

- Click Create Route
- Route Name:
 - E.g. **Road Name Dir: Start to End**
Walnut St EB: Orange Grove Blvd to Hill Blvd
- Option to let other users see route
- Select Start date to process performance measures back to that date (earliest is 7/1/14)
- Select Roadway Type to calculate LOS using correct HCM link equations
- Tags let you organize and easily search for routes
 - Eg: pasadena, signal sync, ICM

SEARCH CREATE

A W Walnut St (E) between N Orange Grove Blvd and N Saint John Ave ✕

B E Walnut St (E) past N Los Robles Ave ✕

C E Walnut St (E) past N Hill Ave ✕

Reset Route Create Route

SEARCH CREATE RESULTS SAVE

Route name: Walnut St EB: Orange Grove Blvd to H

Share route? Yes No

Start date: 12/01/2016
Route data will be processed back to this date

Description: Test Corridor

Roadway Type: Arterial

Tag(s): (Separate keyword phrases with a comma) test pilot

Save Route

Searching for an Existing Route: List

- Route Listing

List of all routes in the tool

The screenshot displays the iPeMS web application interface. On the left, a map of Los Angeles is shown with a blue shaded area indicating a selected region. A blue arrow points from a text box on the left to the 'CHOOSE ROUTE' button in the 'STEP 1' section of the right-hand panel. The right-hand panel contains the following elements:

- Select Geography:** CA > Region > LA County Pilot
- Area-wide Performance Overview:** ROUTE REPORTS
- Detailed Performance of a Link or Route:**
 - STEP 1:** Select Link or Route. Includes buttons for 'CHOOSE LINK FROM A MAP' and 'CHOOSE ROUTE' (circled in red).
 - STEP 2:** Choose a report.
 - STEP 3:** Graph, or Download.

At the bottom of the interface, there is a navigation bar with the Metro logo, the text '© 2017 Iteris, Inc. All rights reserved.', and the Iteris logo.

Searching for an Existing Route: List

- Routes Listing page shows a list of all routes
- Can search by keyword or tag

LA County Pilot

Current Location

Overview

Overview > Third Party Data > Routes Listing

Keyword? Owner? All Tags? Select a tag... Apply Clear

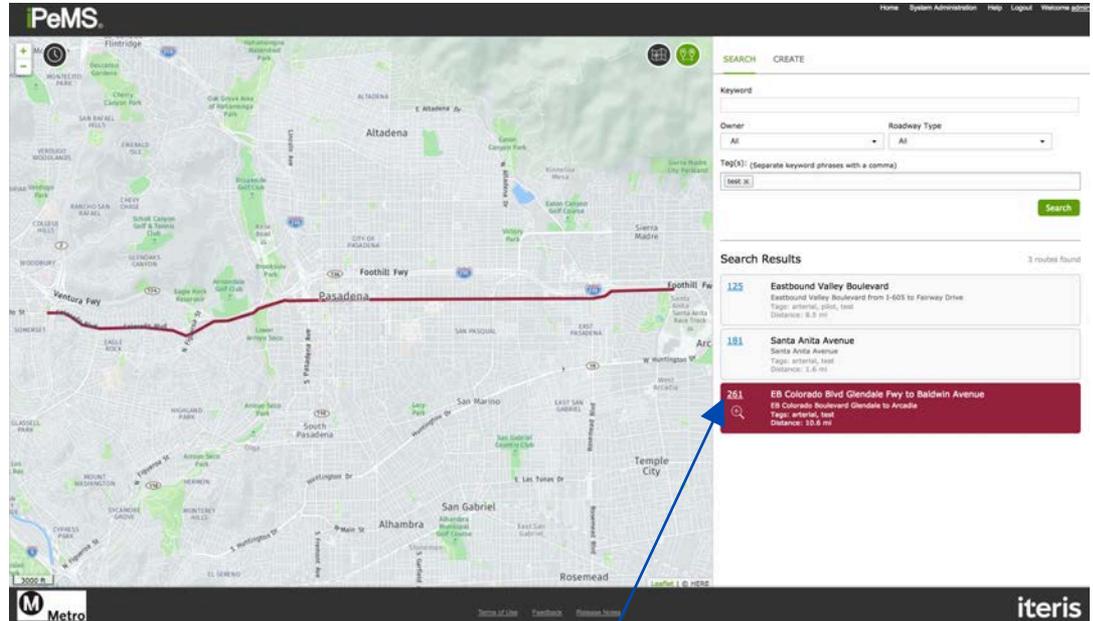
Route ID	Route Name	Description	Road Type	Tags	Owner	Length (mi)
125	Eastbound Valley Boulevard	Eastbound Valley Boulevard from I-605 to Fairway Drive	Arterial	pilot, test	System Routes	8.5
141	NB Rosemead I-10 to I-210	NB Rosemead from I-10 to I-210	Arterial	pilot	System Routes	5.2
142	EB Las Tunas Drive	Las Tunas Drive from Atlantic to Live Oaks	Arterial	pilot	System Routes	6.1
181	Santa Anita Avenue	Santa Anita Avenue	Arterial	test	System Routes	1.6
182	Sierra Madre Blvd	Sierra Madre Boulevard between Orange Grove Boulevard and Michillinda Avenue	Arterial	pilot	System Routes	3.3
201	Eastbound Valley Boulevard 2	test route	Arterial		System Routes	8.4
261	Colorado Blvd Glendale Fwy to Baldwin Avenue	EB Colorado Boulevard Glendale to Arcadia	Arterial	test	System Routes	10.6

Related Third Party Data Reports: Routes Listing • Route Performance • Route Report Card • Time Comparison • Real-Time Map

Click on the Route # to get detailed data

Searching for an Existing Route: Map

- From the Map, Click  & then Search
- All routes matching the search appear on the right
- Click any relevant routes and they'll be highlighted and plotted on the map



PeMS Home System Administration Help Logout Welcome

SEARCH CREATE

Keyword

Owner Roadway Type

Tag(s) (Separate keyword phrases with a comma)

Search

Search Results 3 routes found

125	Eastbound Valley Boulevard Eastbound Valley Boulevard from I-605 to Fairway Drive Tag: arterial, peak, toll Distance: 8.3 mi
181	Santa Anita Avenue Santa Anita Avenue Tag: arterial, toll Distance: 1.4 mi
261	EB Colorado Blvd Glendale Fay to Baldwin Avenue EB Colorado Boulevard Glendale to Arcadia Tag: arterial, toll Distance: 19.9 mi

Metro iteris

Click on the Route #
to get detailed data



Detailed Route Reports

Detailed Route Reports

Aggregates Reports

Timeseries

- Shows variables over time

Time of Day

- Shows the averages over the time of day
- What is the typical speed at 7am?
- This plot is used to review typical weekday traffic patterns.

Day of Week

- Review the difference in performance between the days of the week
- How is a Monday's performance different from a Wednesday?

Analysis Reports

Spatial Congestion

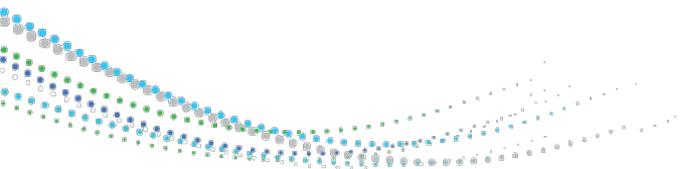
- Time in congestion along the length of the route

Contours

- Visual heat map of congestion in time and space
- Understand where and when congestion is occurring

Route Performance Measures: Speed-based

- Average Speed
- Average Travel Time
- Travel Time Index (Free-Flow): $\text{Travel Time} \div \text{Free-flow Travel Time}$
- Delay in Minutes (Free-Flow): $\text{Travel time} - \text{free-flow travel time}$
- Average Confidence: Ranges from 10-30



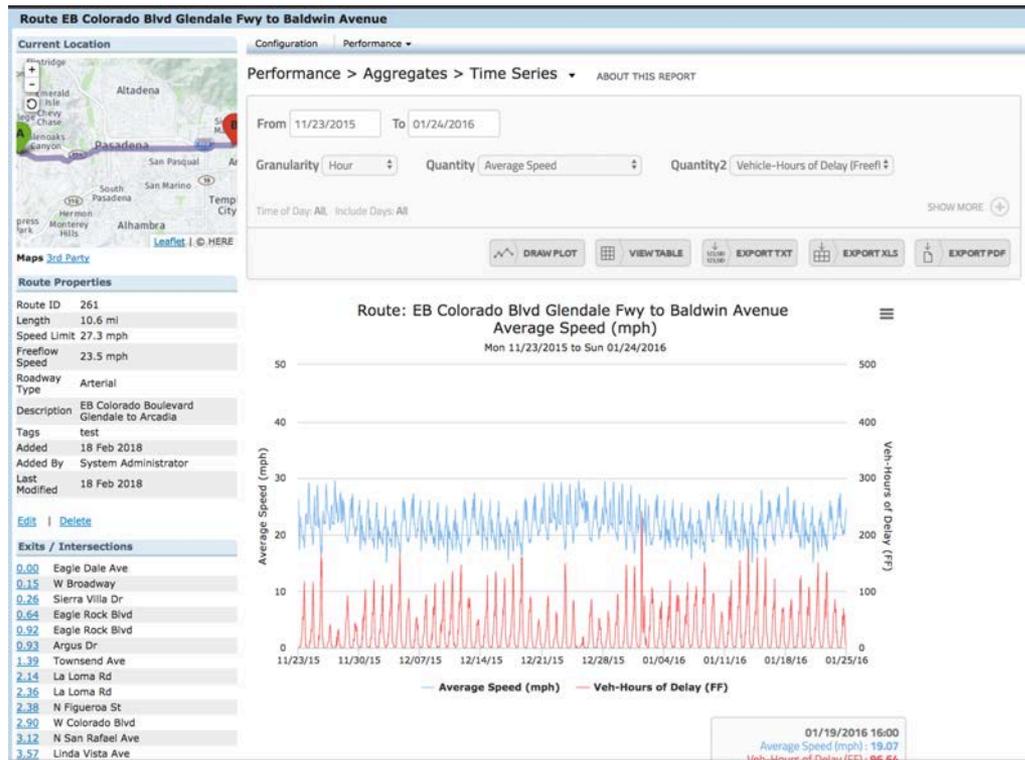
Route Performance Measures: Speed- and Volume-based

- Average Flow: Average flow across all links on the route
- Vehicle Hours of Delay (Free-flow): total vehicle-hours of delay due to travel below the free-flow speed
- Vehicle Hours of Delay (90% Free-flow): total vehicle-hours of delay due to travel below 90% of the free-flow speed
- Person-Hours of delay (Free-flow): vehicle hours of delay (free-flow) multiplied by the People per Vehicle value on the report
- Vehicle-Miles Traveled
- Person-Miles Traveled: $VMT * \text{People per Vehicle}$
- Vehicle-Hours Traveled
- Person-Hours Traveled: $VHT * \text{People per Vehicle}$



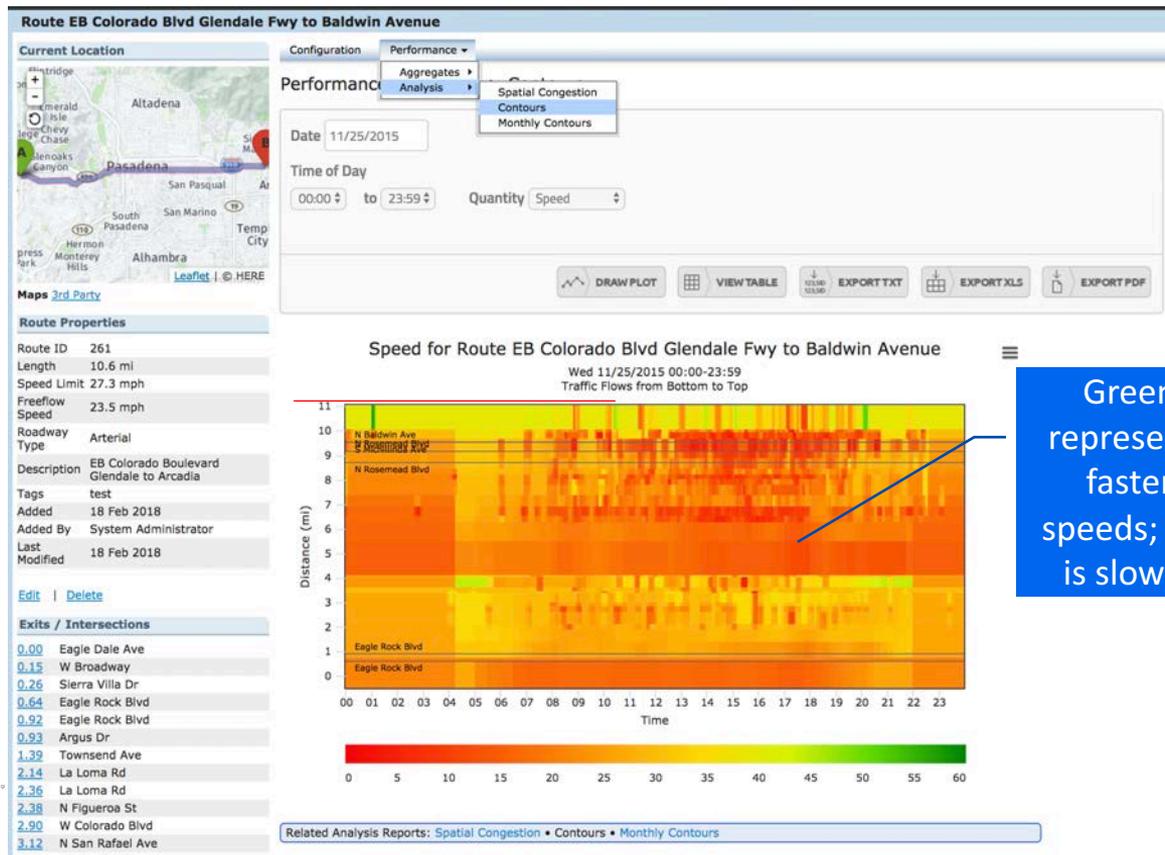
Route Timeseries Report

- Like the Link Timeseries report, but data is aggregated across all the links on the route
- Let's look at average speed and Vehicle Hours of Delay (free-flow) over the 2015 holiday season



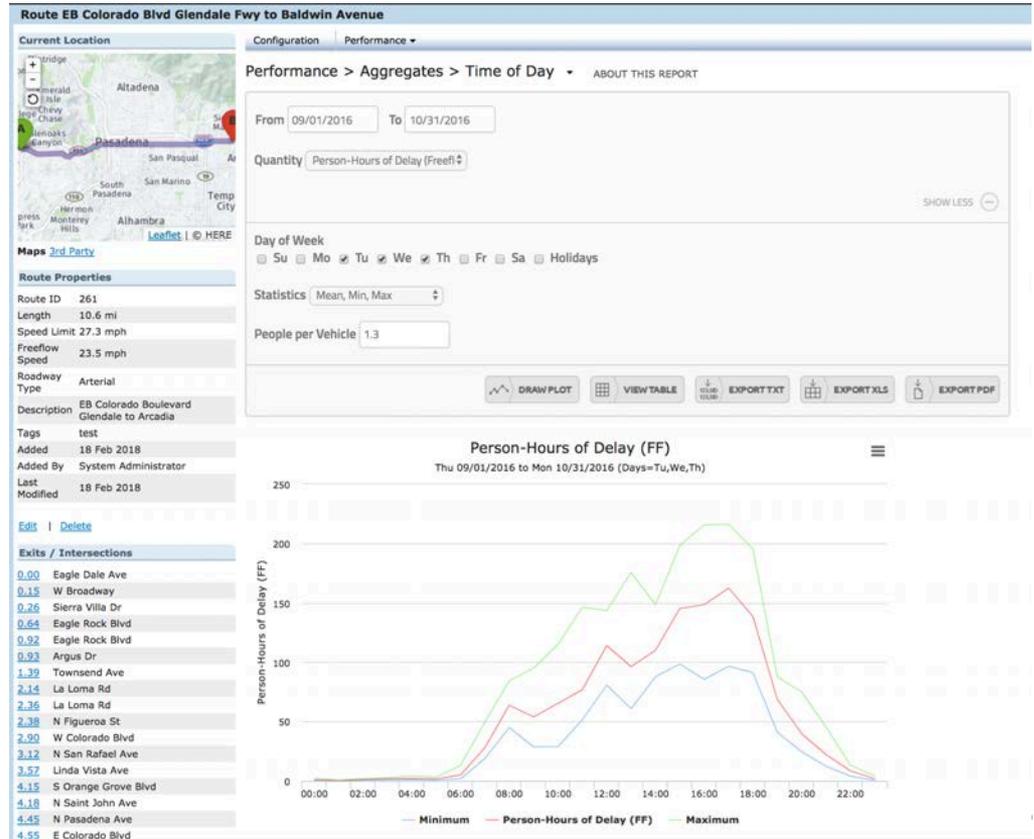
Route Contours

- Let's investigate where Thanksgiving travel slow-downs were happening on 11/25/15
- Choose Performance > Analysis > Contours in the menu
- Time / Distance heat map for a single day
- TIP – Hover over to see values and nearest exits/intersections



Route Time of Day Report

- Let's look at the min, mean, and max Person-Hours of Delay (freeflow) on Tues-Thurs of Fall 2016
- Set people per vehicle to 1.3
- Shows the range of conditions experienced over the two months





Area-Wide Route Reports

Area-wide Route Reports

Route Performance

- Performance across all routes for a given time and date

Route Report Card

- Travel times and speeds for AM (06:00 to 09:00), Midday(09:00 to 16:00) and PM (16:00 to 19:00) Peaks across all routes

Time Comparison

- Choose two time periods and compare the travel times across all routes
- Useful for before and after studies

Overview > Third Party Data > Route Report Card

1d 7d 1m 3m 6m YTD 1y From 02/01/2017 To 03/17/2017

Keyword Owner All

Road Type All

Time of Day: All, Include Days: All, Routes: All

SHOW MORE +

VIEW TABLE EXPORT TXT EXPORT XLS EXPORT PDF

Routes Listing
Route Performance
Route Report Card
Time Comparison
Real-Time Map

Area-wide Route Performance Report

Area-wide Route Performance Report:
See the performance of all routes for a specified time / date

The screenshot displays the PeMS web application interface. At the top left, the PeMS logo is visible. The main area is a map of Los Angeles with a blue shaded region. To the right of the map, there is a sidebar with the following elements:

- Select Geography:** CA Region LA County Pilot
- Area-wide Performance Overview**
 - ROUTE REPORTS
 - Route Performance
 - Report Card
 - Time Comparison
- STEP 1**
 - Select Link or Route
 - CHOOSE LINK FROM A MAP
 - CHOOSE ROUTE
 - CREATE A NEW ROUTE
- STEP 2**
 - Choose a report
- STEP 3**
 - Graph
 - or Download

At the bottom of the interface, there is a Metro logo and the Iteris logo.

Area-wide Route Performance Report

- Understand the performance of all routes for a given time and date with key performance indicators.
- This report may be used for periodic performance monitoring.

The screenshot displays the PeMS LA County Pilot interface. The main content area shows a route performance report for the period from 10/01/2016 to 10/31/2016. The report includes a table with columns for Route ID, Route Name, Average Speed (mph), Avg Travel Time (min), Travel Time Index (FF), Length (mi), Road Type, LOS, Owner, and Tags. The table lists six routes with their respective performance metrics.

Route ID	Route Name	Average Speed (mph)	Avg Travel Time (min)	Travel Time Index (FF)	Length (mi)	Road Type	LOS	Owner	Tags
141	NB Rosemead I-10 to I-210	20.06	15.98	1.43	5.2	Arterial	C	System Routes	pilot
182	Sierra Madre Blvd	20.77	9.48	1.21	3.3	Arterial	C	System Routes	pilot
261	EB Colorado Blvd Glendale Fwy to Baldwin Avenue	20.25	31.57	1.17	10.6	Arterial	C	System Routes	test
201	Eastbound Valley Boulevard 2	28	18.11	1.14	8.4	Arterial	B	System Routes	
125	Eastbound Valley Boulevard	28.13	18.3	1.14	8.5	Arterial	B	System Routes	pilot, test
181	Santa Anita Avenue	30	3.22	1	1.6	Arterial	A	System Routes	test

Area-wide Route Report Card

- Travel times and speeds for AM, Midday and PM Peaks across all routes

LA County Pilot

Overview > Third Party Data > Route Report Card

From: 10/01/2016 To: 10/31/2016

Keyword: Owner: All Road Type: All

Tags: Select a tag...

Include Days: Tue, Wed, Thu

VIEW TABLE EXPORT TXT EXPORT XLS EXPORT PDF

Route ID	Route Name	Direction	Length (mi)	Travel Time AM (min)	Travel Time MD (min)	Travel Time PM (min)	Average Speed AM (mph)	Average Speed MD (mph)
125	Eastbound Valley Boulevard	SE	8.5	17.92	18.29	20.68	28.69	28.12
141	NB Rosemead I-10 to I-210	N	5.2	14.59	14.08	15.23	22.3	22.57
181	Santa Anita Avenue	N	1.6	3.22	3.22	3.22	30	30
182	Sierra Madre Blvd	E	3.3	9.46	9.02	8.79	20.81	21.8
201	Eastbound Valley Boulevard 2	SE	8.4	17.74	18.1	20.56	28.56	28
261	EB Colorado Blvd Glendale Frey to Baldwin Avenue	E	10.6	30.25	31.76	32.89	21.19	20.05

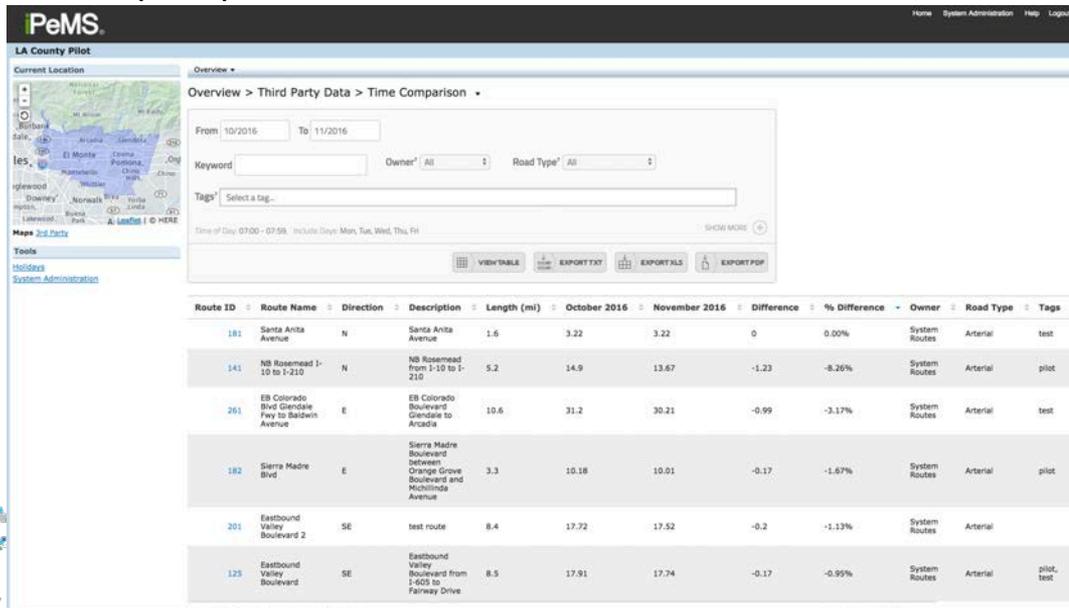
Show 50 records Showing 1 of 6 entries

Related Third Party Data Reports: Routes Listing • Route Performance • Route Report Card • Time Comparison • Real-Time Map

iteris

Area-wide Route Time Comparison

- Choose two time periods and compare the travel times across all routes
- Useful for:
 - Before and after studies
 - Compare performance month on month



The screenshot shows the PeMS LA County Pilot interface. The main content area displays a table titled "Overview > Third Party Data > Time Comparison". The table filters data for the period from 10/2016 to 11/2016. The table columns include Route ID, Route Name, Direction, Description, Length (mi), October 2016, November 2016, Difference, % Difference, Owner, Road Type, and Tags. The data shows that for all listed routes, travel times were either the same or slightly faster in November compared to October.

Route ID	Route Name	Direction	Description	Length (mi)	October 2016	November 2016	Difference	% Difference	Owner	Road Type	Tags
181	Santa Anita Avenue	N	Santa Anita Avenue	1.6	3.22	3.22	0	0.00%	System Routes	Arterial	test
141	NB Rosemead I-10 to I-210	N	NB Rosemead from I-10 to I-210	5.2	14.9	13.67	-1.23	-8.26%	System Routes	Arterial	test
261	EB Colorado Blvd Glendale Fwy to Baldwin Avenue	E	EB Colorado Boulevard Glendale to Arcadia	10.6	31.2	30.21	-0.99	-3.17%	System Routes	Arterial	test
182	Sierra Madre Blvd	E	Sierra Madre Boulevard between Orange Grove Boulevard and Michoud Avenue	3.3	10.18	10.01	-0.17	-1.67%	System Routes	Arterial	test
201	Eastbound Valley Boulevard 2	SE	test route	8.4	17.72	17.52	-0.2	-1.13%	System Routes	Arterial	
125	Eastbound Valley Boulevard	SE	Eastbound Valley Boulevard from I-405 to Fairway Drive	8.5	17.91	17.74	-0.17	-0.95%	System Routes	Arterial	test

No routes got slower during the AM peak in November vs October



Exercises

Exercise

Navigate to Route ID 281 (Rosemead Blvd NB: Beverly Blvd to Orange Grove Blvd) and answer the following questions

- Plot the timeseries of hourly average speeds and vehicle-hours of delay (free-flow) between 9/1/15 and 10/31/15
 - When was the lowest speed measured? What was it?
 - What was the corresponding vehicle-hours of delay during that hour?
- Navigate to the Performance > Analysis > Contours and visualize the speeds for that same day with the lowest speed. What patterns do you observe?
- Navigate to the Performance > Aggregates > Time of Day report and plot the mean, min, and max Delay in Minutes (Freeflow) for Tues-Thurs in Sep-Oct 2015.
 - What is the average minutes of delay at 6pm?
 - What was the highest minutes of delay at 6pm?

Thank You!

Questions?

