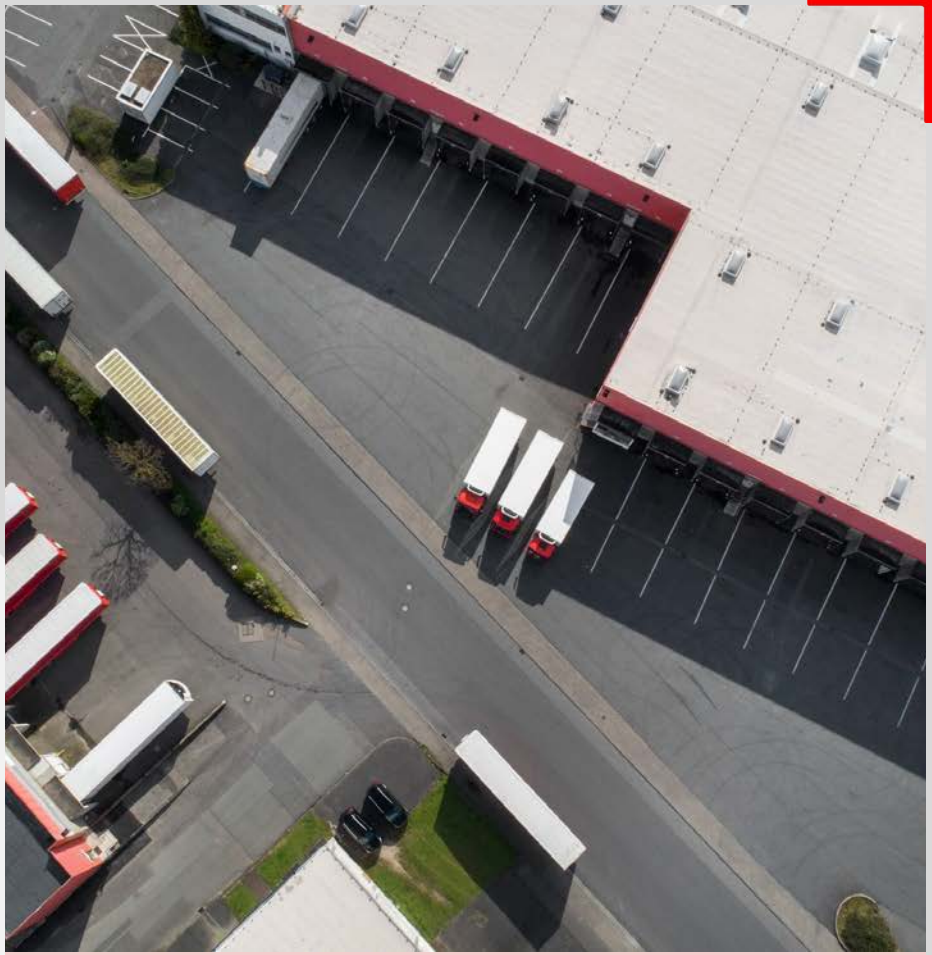
GEOTAB ITS

Contextualized Freight & Mobility Insights



Jean Pilon-Bignell - VP of BD, Gov & ITS

Presentation January 2022

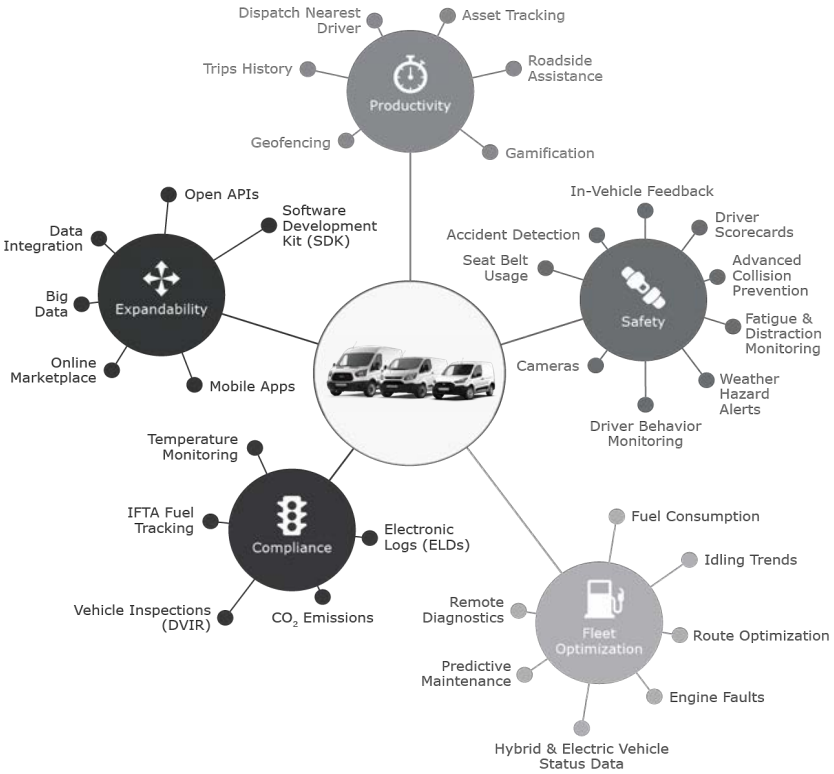
Agenda

- Introducing Geotab ITS
- Proxying the Commercial Vehicle Population
- NIITEC Case Study
- IDOT Case Study
- Modelling the Freight & Mobility Population
- Q&A

Get the Most out of CV Data

Connected-vehicles are an amazing source of transportation data:

- Vehicle classification
- Engine configuration
- Driving behavior
- Routing
- Travel speed and time
- Trip purpose
- Trip duration
- More



The **Where** and the **When** of Freight

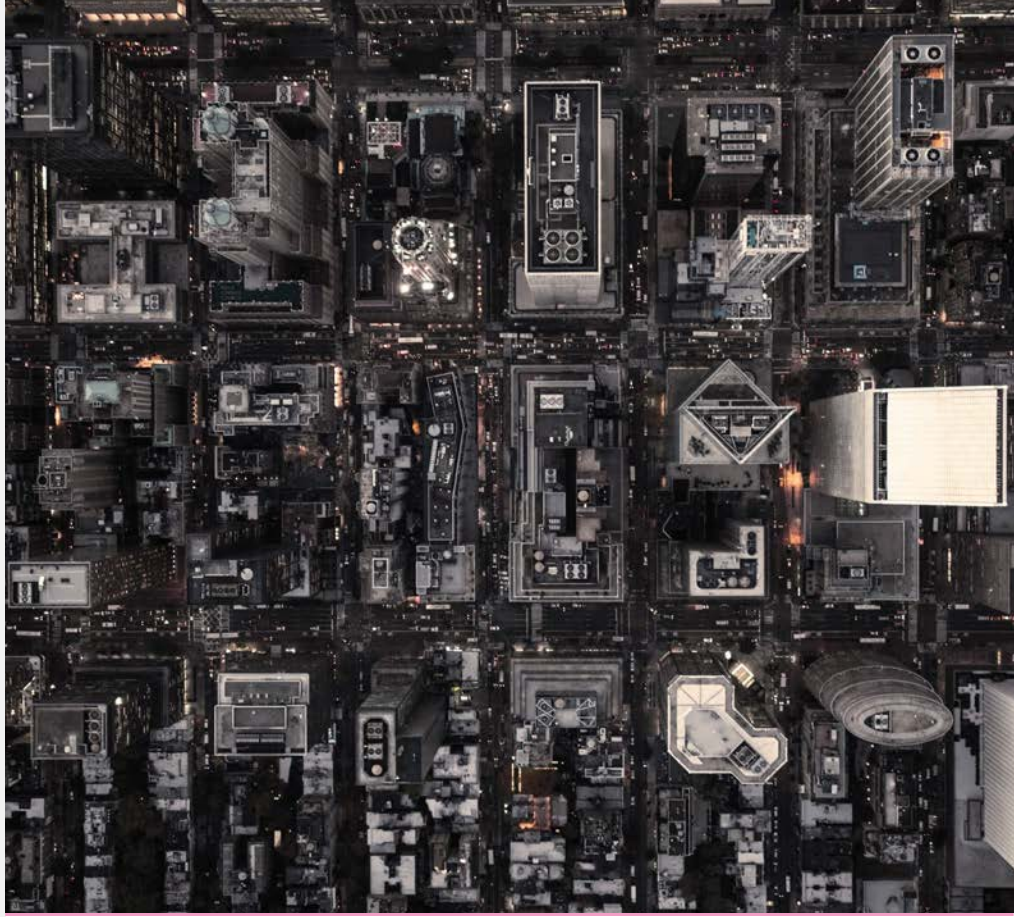
What if you could sample millions of vehicles worth of data from a single platform?

- 2.6M connected **commercial** fleet vehicles
- 25M trips per day
- 50B raw data records per day

The **What** and the **Why** of Freight

What if you could label journeys to understand **trip purpose**?

- People vs goods movement
- Vehicle classifications
- Trip vocations
- Commercial industry segmentation
- True origin and destination



Introducing Altitude

A **contextualized** transportation analytics platform

Origin/Destination

Plan smarter from point A to Z with a comprehensive picture of true origins and destinations

Intersections

Improve signal timing and progression for better traffic flow

Roads

Create smarter roadways with reduced travel times and bottlenecks.

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Can sample fleet data be used as a proxy for the **freight population**?

NITTEC Case Study - Objectives

Objective: could Geotab sample freight data be used to infer temporal wait times for the entire freight population at 4 critical Niagara region border crossings?

Labels: freight border wait times were provided from Transport Canada

Study Area:

1. Fort Erie
2. Queenston
3. Sarnia
4. Windsor

NITTEC Case Study - Methodology

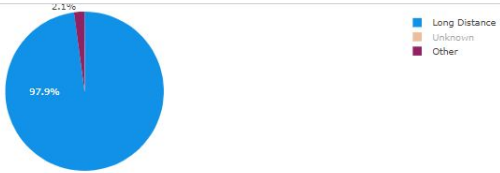
Journey Count

68,865

Origins	Connectors	Destinations
2	2	2

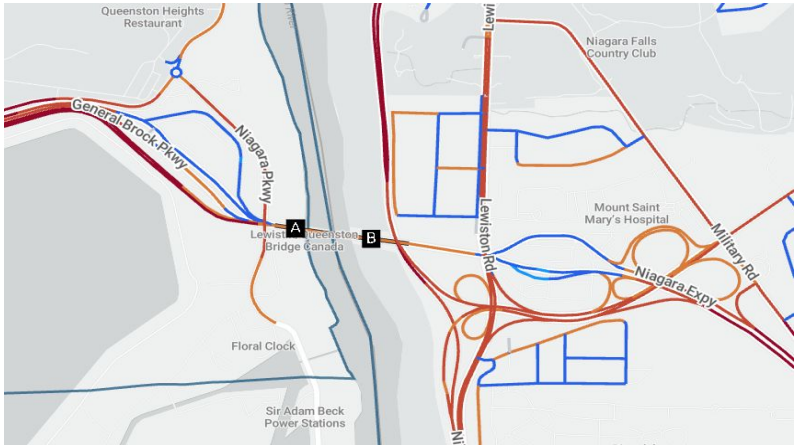
Vehicle Class Breakdown

Vocation Breakdown



Industry Breakdown

NITTEC Case Study - Methodology



Characteristics (average of multiple segments)

Free-flow Speed	Free-flow Travel Time	Speed Limit (avg)	Speed Limit Range
31.0 mph	00:00:32	15.0 mph	15 mph - 15 mph

Measurements (average of multiple segments)

Travel Speed About

Travel Speed (avg)	% of Free-flow Travel Speed	% of Speed Limit	% of Trips Over Speed Limit	Pace
13.1 mph	42%	88%	1%	20 mph - 30 mph

View details

Spot Speed About

Spot Speed (avg)	% of Free-flow Spot Speed	% of Speed Limit	% of Trips Over Speed Limit
25.7 mph	82%	171%	96%

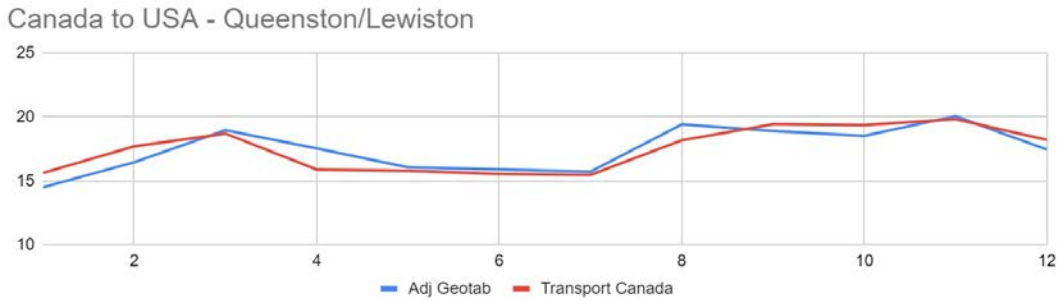
View details

Travel Time (avg) About

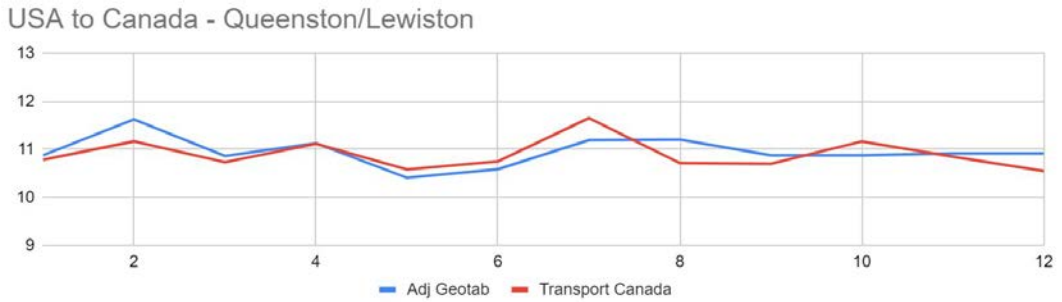
Travel Time (avg)	Travel Time Reliability Ratio
00:01:16	1.29

View details

NITTEC Case Study - Results



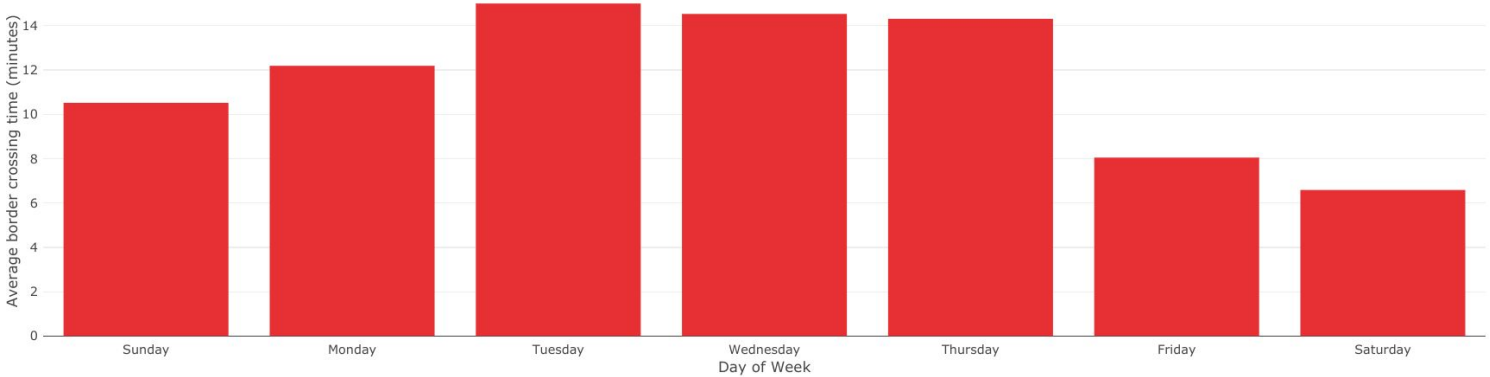
Correlation = **0.97**



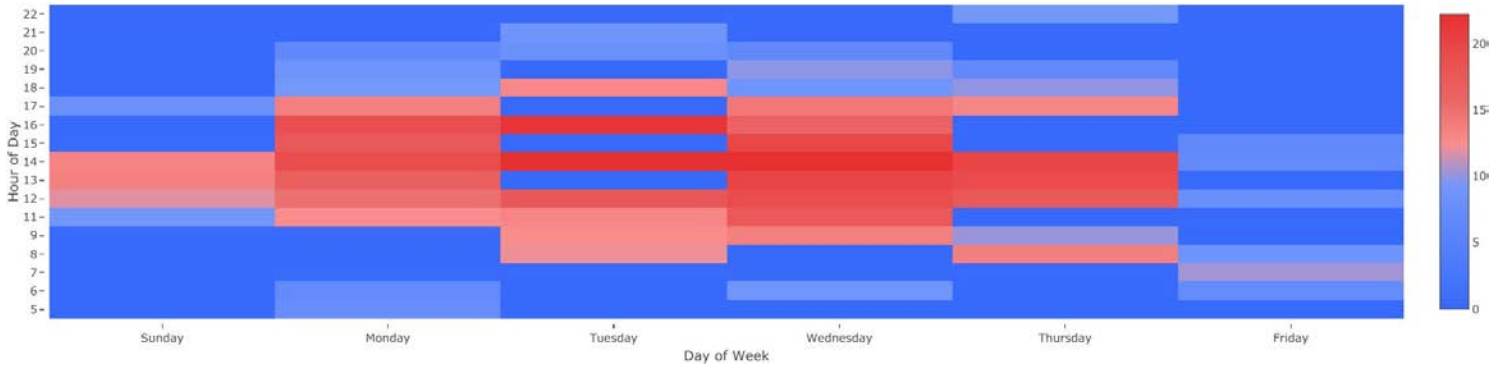
Correlation = **0.86**

NITTEC Case Study - Inferring the Population

Canada to US freight wait times



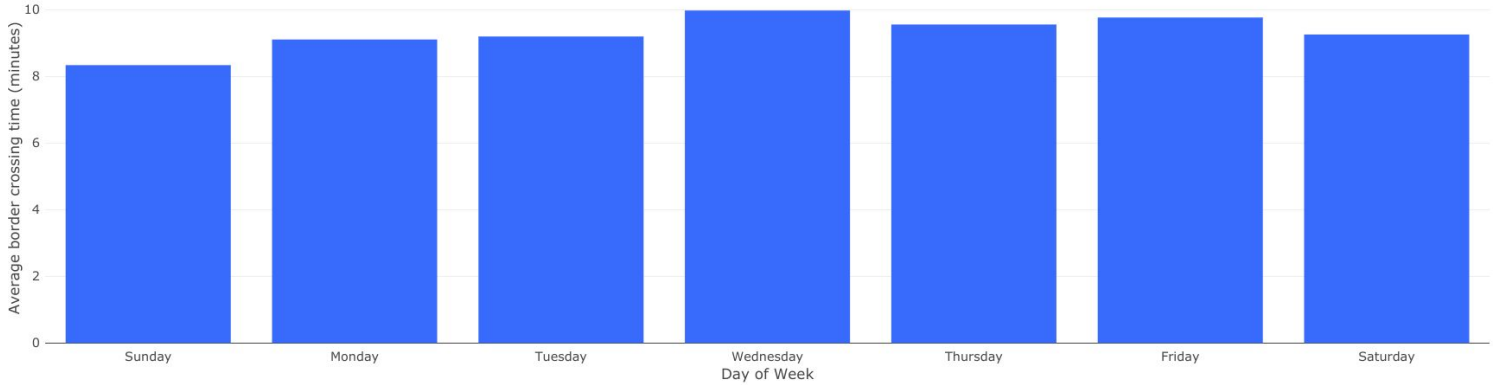
Average border crossing time is nominally higher on Tuesdays



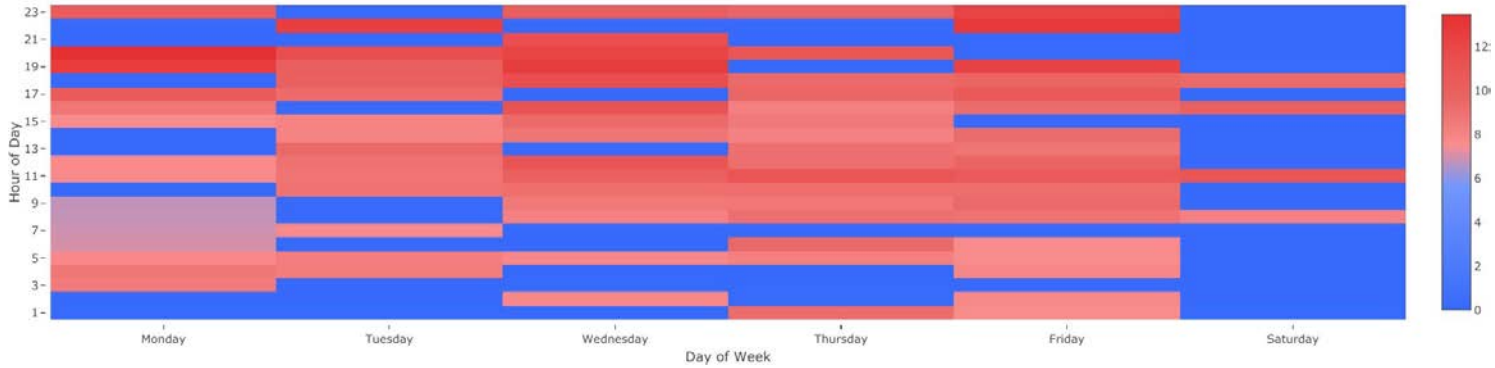
For Tuesdays, 2 pm and 4 pm are observed with the longest average crossing duration

NITTEC Case Study - Inferring the Population

US to Canada freight wait times



Average border crossing time is nominally higher on Wednesdays



6-8 pm with longest average crossing duration for most days;

Most noticeably for Mondays and Wednesdays

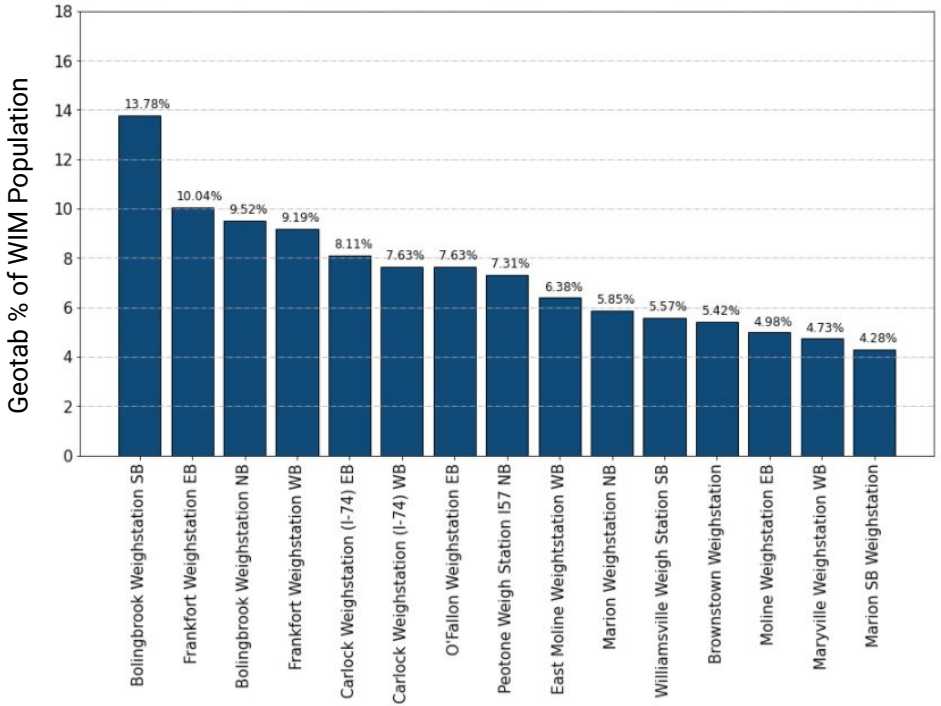
IDOT Case Study - Objectives

Objectives: could Geotab sample freight data be used to infer temporal volume variances in the freight population?

Labels: mainline Weight in Motion (WIM) sensors across the State of Illinois

Study Area: 15 mainline WIM sensors across the State

IDOT Case Study - Results



Geotab shows **between 4% and 14% freight penetration** at the various WIM locations

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IDOT Case Study - Results

Weigh Station	Daily (All Days)	Hourly (All Days)	Daily (Weekday)	Hourly (Weekday)
Bolingbrook Weighstation NB	95.890000	83.910000	92.350000	85.320000
Bolingbrook Weighstation SB	98.910000	96.450000	97.660000	96.730000
Brownstown Weighstation	97.850000	95.460000	98.710000	93.070000
Carlock Weighstation (I-74) EB	96.900000	93.330000	95.370000	95.060000
Carlock Weighstation (I-74) WB	96.920000	86.580000	93.510000	86.420000
East Moline Weightstation WB	99.360000	96.370000	98.700000	93.630000
Frankfort Weighstation EB	98.610000	97.600000	98.200000	97.520000
Frankfort Weighstation WB	93.800000	95.810000	88.750000	96.210000
Marion SB Weighstation	94.990000	85.990000	93.910000	82.840000
Marion Weighstation NB	99.150000	81.350000	99.170000	76.710000
Maryville Weighstation WB	98.230000	96.740000	97.860000	96.300000
Moline Weighstation EB	92.880000	92.490000	84.030000	91.610000
O'Fallon Weighstation EB	68.720000	92.960000	48.900000	90.650000
Peotone Weigh Station I57 NB	98.410000	96.480000	97.480000	97.410000
Williamsville Weigh Station SB	92.100000	89.170000	84.290000	86.770000

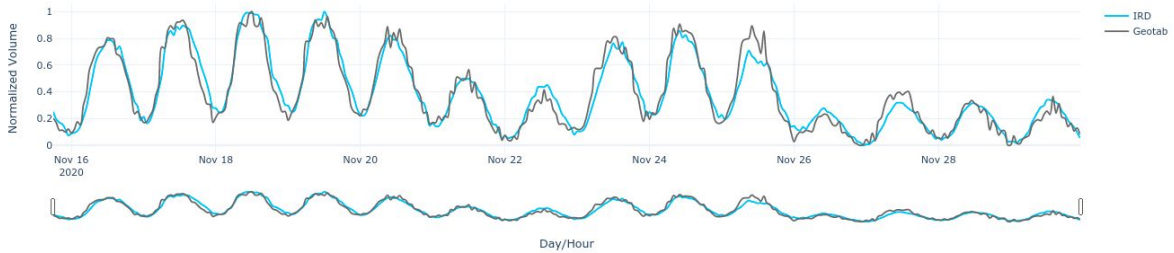
Overall volume correlation is excellent, varying between **96.6% and 98.5%**

IDOT Case Study - Inferring the Population

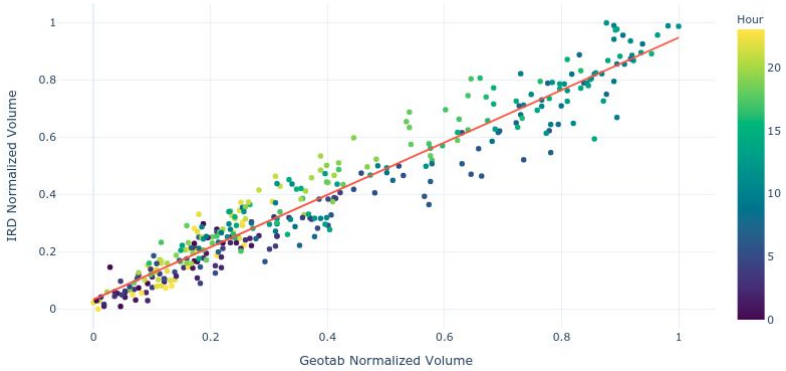
By applying geospatial expansion factors, Geotab sample freight data is a statistically significant representation of temporal volume fluctuations

Correlation at **96.6%** when compared to aggregated hourly WIM volumes

Time Series of Geotab and WIM Normalized Volumes - Day/Hour



Geotab and WIM Normalized Volume Scatter Plot - Day/Hour



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Conclusion

Can sample fleet data be used as a proxy for the freight population?

- **Yes**... in some cases
- Geotab freight sample data seems to be correlated with temporal and spatial label data
- More label data is needed!
- Geotab is working with SCAG and Caltrans to try and replicate this work and create a Freight & Mobility data set that is a **statistically significant representative of the entire trucking population in California**

Questions?