





CONNECTED VEHICLE DATA Origin/Destination

ITS-NY CROWDSOURCING WEBINAR

May 19, 2021

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CHALLENGES WITH CV DATA

- Three months of data for the NYC Metropolitan Area
 - Every three seconds
- Ingesting, processing and rendering CV data
- Real-time Conflation
- Privacy Priority for public transportation agencies and planning organizations



Waypoints/Day	560,000,000
Journeys/Day	1,800,000
Waypoints/rush hour (4 hours)	160,000,000
Journeys/rush hour (4 hours)	560,000
Files Processed/Day	8,160,000
Files Processed/rush hour (4 hours)	2,110,000
Database Size/Day	160 GB





CHALLENGES WITH CV DATA THAT IS CURRENTLY INTEGRATED CONT.

• Real Time Conflation of data

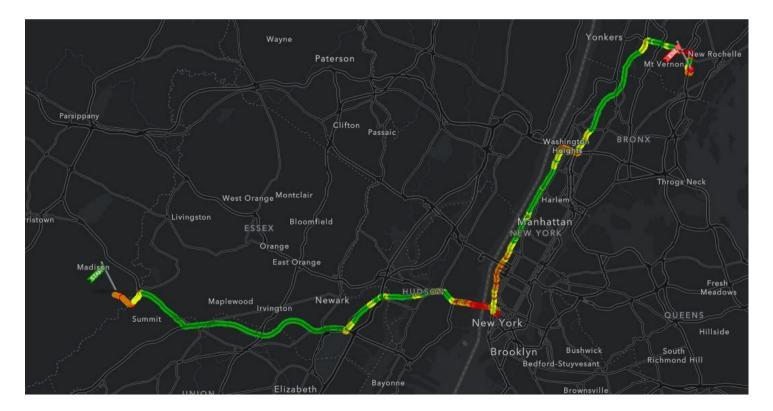
Speed / Waypoint – ~30 Seconds Origin and Destination -~ 15 minutes - Hour

- Various Visualization Systems
 - Open-source Business Intelligence (BI)
 - o Custom Dashboards
- Integrate CV Data using open source and paid map services



WAYPOINTS





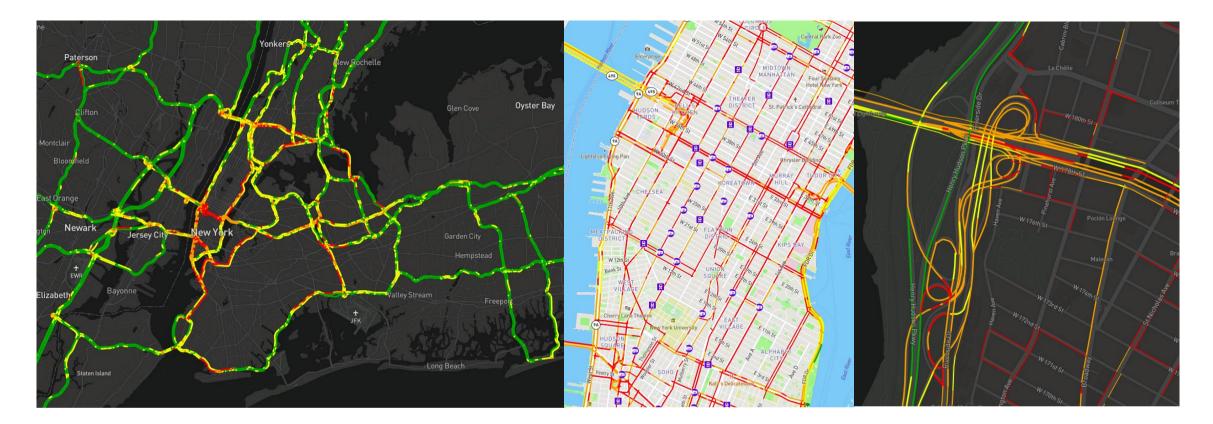




LIVE SPEED LAYER



- Live Speed Layer Refreshes every minute
- Conflating data to map segments in real-time

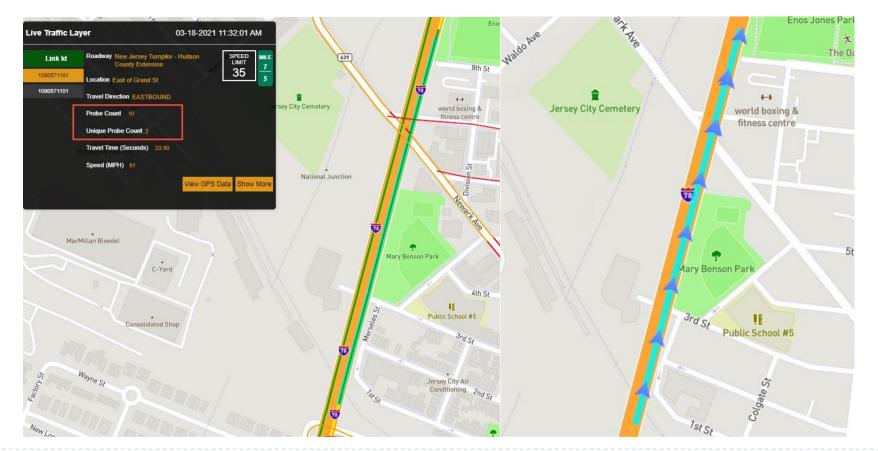


LIVE SPEED LAYER – CONT.



Live Speed Layer – Refreshes every minute

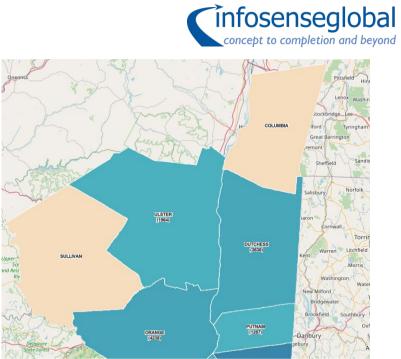
Conflating data to map segments in real-time



O-D ANALYSIS – TRIPS ORIGINATED ALL COUNTIES

Trips originated from counties between 4/21/2021 07:30 AM - 4/21/2021 09:30 AM

Originated County	Trips	Originated County	Trips
New York, NY	2872	Westchester, NY	10093
Richmond, NY	3672	Rockland, NY	2509
Kings, NY	4715	Putnam, NJ	1267
Queens, NY	6720	Orange, NY	4238
Bronx, NY	2606	Dutchess, NY	3630
Nassau, NY	18861	Ulster, NY	1964
Suffolk, NY	22591		





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O-D ANALYSIS – BETWEEN COUNTIES (Westchester, NY TO ALL COUNTIES)

Trips originated from Westchester County, NY between 4/21/2021 07:30 AM - 4/21/2021 09:30 AM

Trips

320

34

10

19

130

20

123

43

5

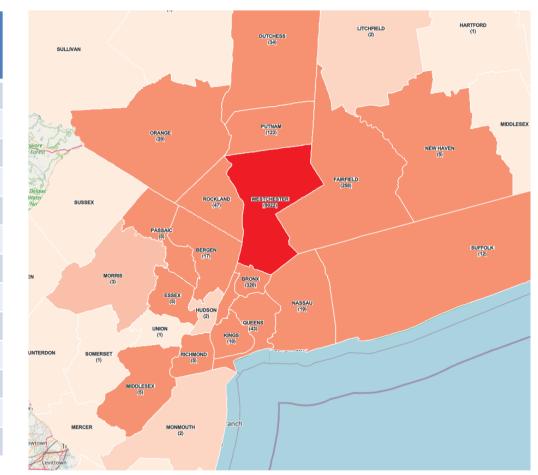
47

12

1

9022

Destination County	Trips	Destination County
Bergen, NJ	17	Bronx, NY
Essex, NJ	5	Dutchess, NY
Hudson, NJ	2	Kings, NY
Middlesex, NJ	5	Nassau, NY
Monmouth, NJ	2	New York, NY
Morris, NJ	3	Orange, NY
Passaic, NJ	5	Putnam, NY
Somerset, NJ	1	Queens, NY
Union, NJ	1	Richmond, NY
Fairfield, CT	258	Rockland, NY
New Haven, CT	5	Suffolk, NY
Litchfield, CT	2	Ulster, NY
Hartford, CT	1	Westchester, NY



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O-D ANALYSIS – BETWEEN COUNTIES (Westchester, NY TO ALL COUNTIES)

Trips originated from Westchester County, NY between 4/21/2021 07:30 AM - 4/21/2021 09:30

Origin County: WESTCHESTER, NY

	WESTCHESTER, NY (9022)
	BRONX, NY (320)
	FAIRFIELD, CT (258)
	NEW YORK, NY (130)
	PUTNAM, NY (123)
	ROCKLAND, NY (47)
	QUEENS, NY (43)
	DUTCHESS, NY (34)
	ORANGE, NY (20)
	NASSAU, NY (19)
	BERGEN, NJ (17)
	SUFFOLK, NY (12)
WESTCHESTER, NY	KINGS, NY (10)
	NEW HAVEN, CT (5)
	RICHMOND, NY (5)
	PASSAIC, NJ (5)
	MIDDLESEX, NJ (5)
	ESSEX, NJ (5)
	MORRIS, NJ (3)
	LITCHFIELD, CT (2)
	HUDSON, NJ (2)
	MONMOUTH, NJ (2)
	UNION, NJ (1)
	ULSTER, NY (1)
	HSBATERBEP, ST (1)



O-D ANALYSIS – BETWEEN COUNTIES

4/21/2021 07:30 AM - 4/21/2021 09:30 AM



Origin -> Destination By County

Destination County

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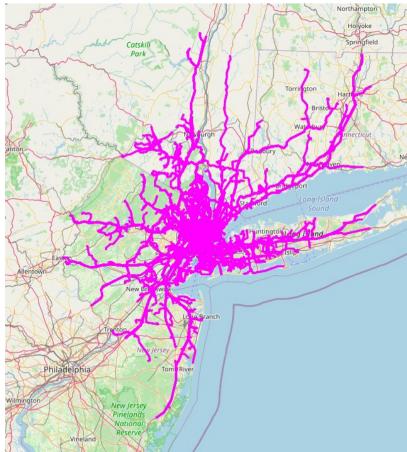
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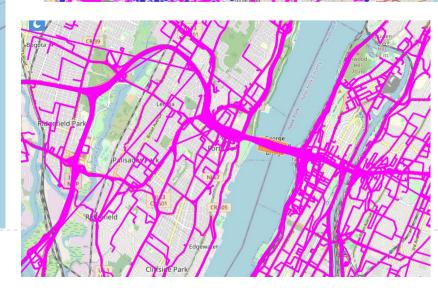


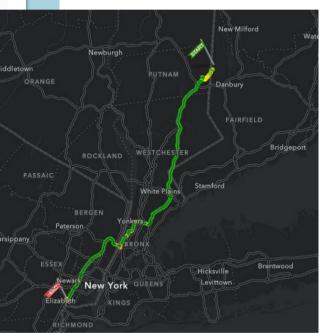
O-D ANALYSIS – TRIPS THROUGH

Trips through George Washington Bridge 4/21/2021 07:30 AM - 4/21/2021 09:30 AM



b8b8a7658f6fbb1b3e3a	a6d48423a935a555230e 🛛 🗙
Trip ID	1b8b8a7658f6fbb1b3e3a6d4842 3a935a555230e
Start Time	04-21-2021 05:59:16 AM
End Time	04-21-2021 07:44:21 AM
Time Duration (min.)	105
Origin	NEW FAIRFIELD, TOWN OF ,FAIRFIELD ,CT
Destination	ELIZABETH ,UNION, NJ







DEMONSTRATION O/D AND TRIPS

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VISUALIZATION TOOLS

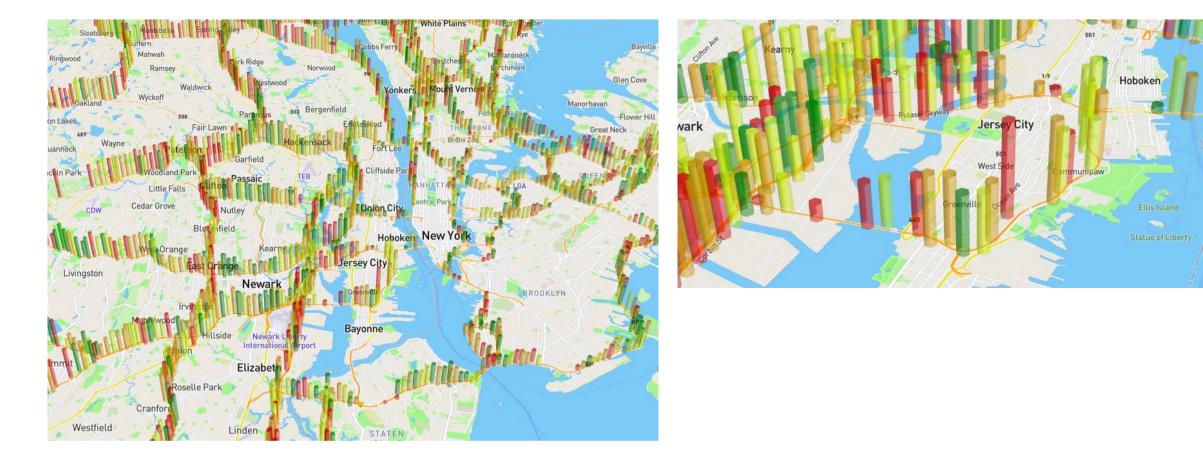
- Various Visualization Systems
 - Open-source (BI)
 - Custom Dashboards



Visualization



3D Map showing speed by color and waypoints by height



POSSIBLE ADDITIONAL USES

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- Traffic Volume analysis using AADT, including real-time volume
- Mobility patterns, changes and comparisons (weather events, special events, week to week, etc.)
- Impact Monitoring tool (Effects of Reduced Speed Ahead, Alternate Routes on DMS, Road Closures, etc.)
- Signalized corridor monitoring and analysis
- Parking Capacity
- Journeys to POIs (Stadiums, transit hubs, arenas, county parks, and more!)
- Integrate Driver behavior data sets