ITS NY 2022

How CDTA is leveraging Big Data to make Big Improvements

CDTA | OPTICOM™ GLOBAL TRAFFIC TECHNOLOGIES | miovision

TSP IS ON BRT LINES ONLY

Red Line BRT (2011)

50 Intersections, 20 BRT/TSP Buses

City of Albany, City of Schenectady, NYSDOT

Blue Line BRT (2020)

63 Intersections, 20 BRT/TSP Buses

City of Albany, City of Watervliet, City of Troy, City of Cohoes, NYSDOT
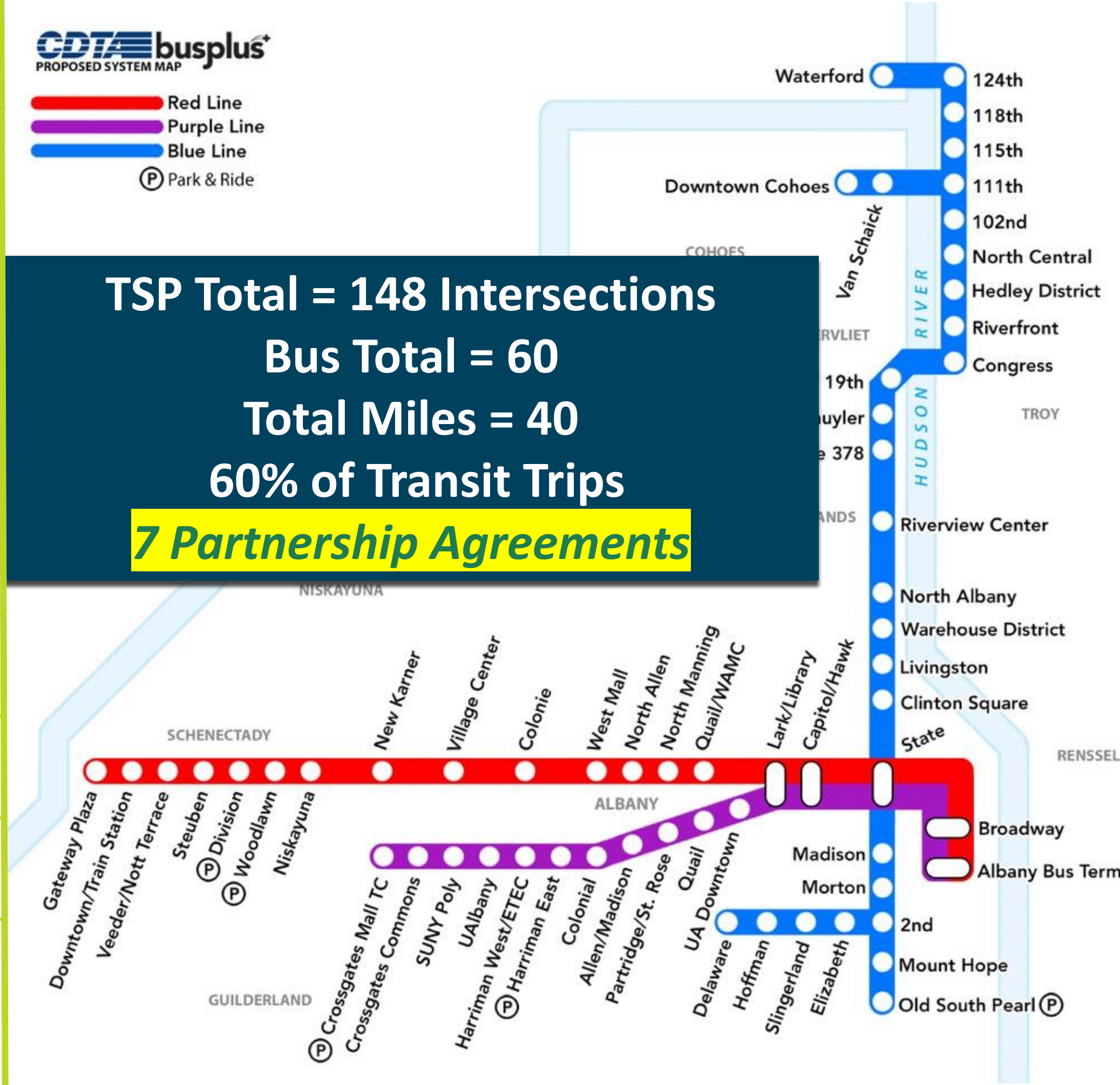
Purple Line BRT (Coming in 2023)

35 intersections, 20 BRT/TSP Buses

City of Albany, NYSDOT, Town of Guilderland

TSP Total = 148 Intersections
Bus Total = 60
Total Miles = 40
60% of Transit Trips
7 Partnership Agreements

The Problems

1. Inability to monitor system performance of TSP

2. Disparate Data and Systems cause decreased productivity and inability to leverage technology

3. Collaboration across teams is difficult

The Purpose

1. Combine emerging technologies to validate TSP and improve collaboration between transit operators, consultants and traffic agencies

2. Improve the operational efficiency of a city's transit and traffic agencies

3. Demonstrate the efficacy of transit signal priority (TSP) through data

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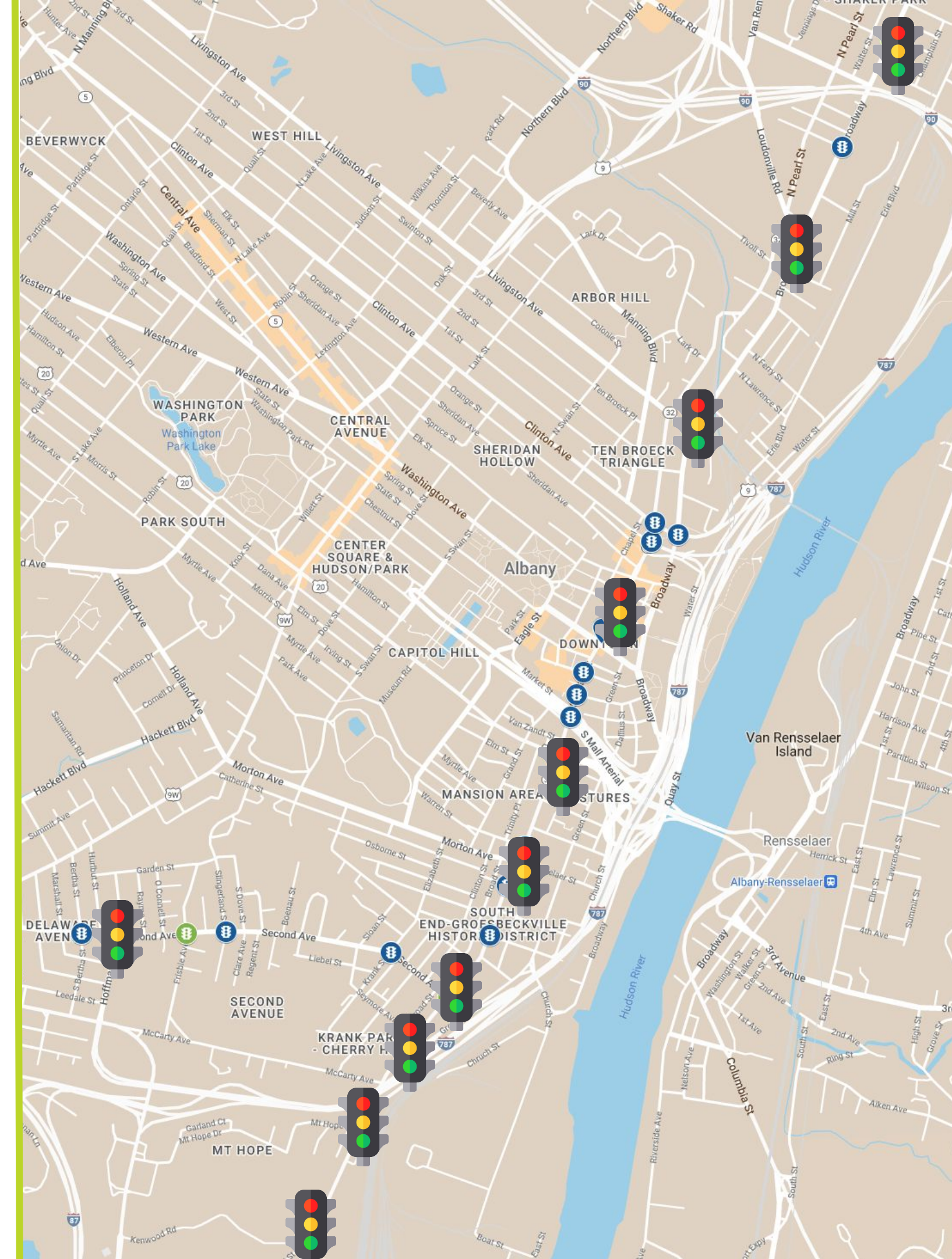Data → Information → Insights → Action → Results

TSP - WHATS WORKING WELL

- Stakeholder relations and partnerships
  - Mutual Benefits – Traffic Signal Preemption vs. Traffic Signal Priority = Improved Traffic Flow
  - Optimization of signal programming and coordination of signals
- New and reliable CAD/AVL Bus Technologies
- Strong IT – Tools, Data, Process, People
- Vendor relationships and partnerships continuing to expand & develop
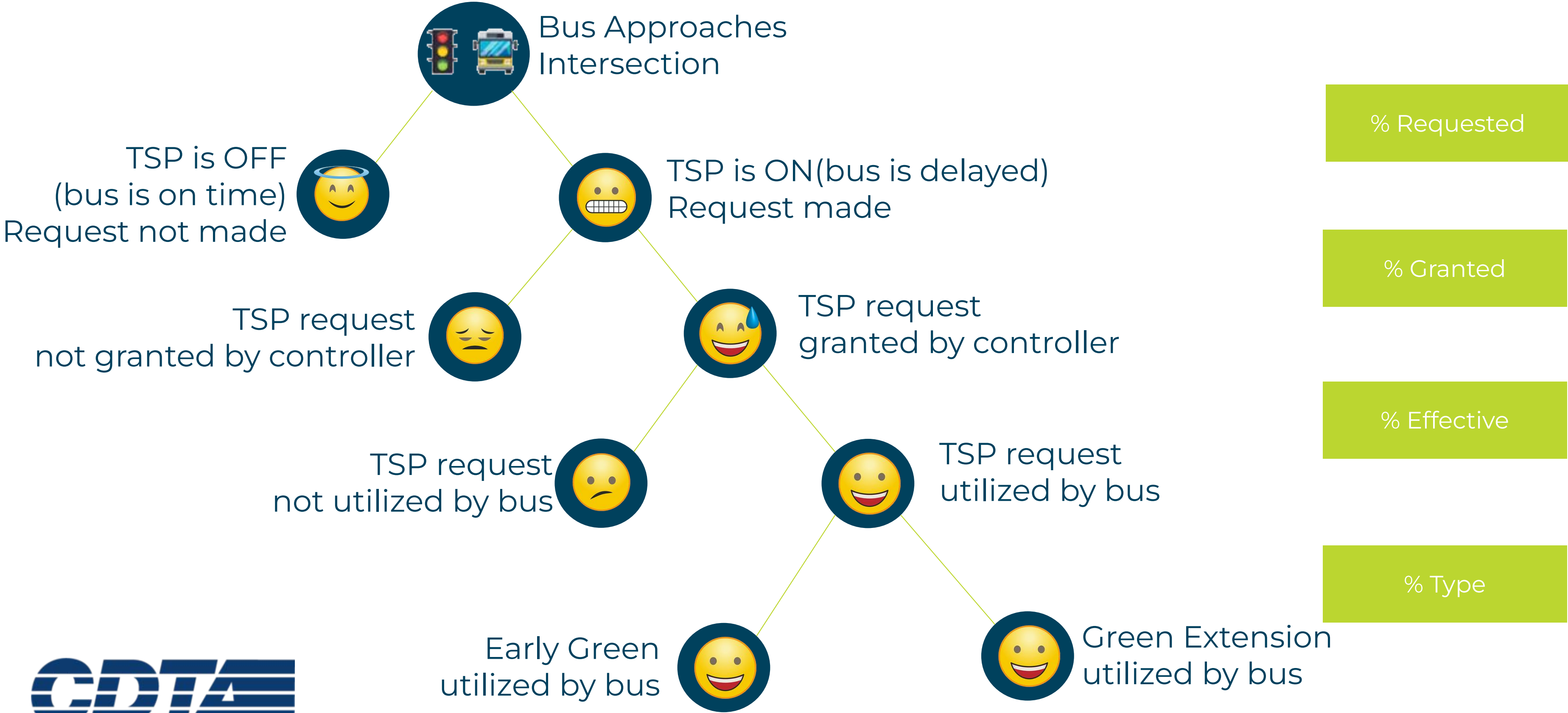
The Pilot

- 11 intersections in Albany, NY along River Corridor with GTT/Miovision devices installed
(Blue Line - 923 & 922)

- Collected data for 4 weeks
(Feb 8 – Mar 7, 2022)

- 7 of 11 intersections collected TSP requests for both NB & SB, 4 only had data for one direction

Demonstrating TSP "Effectiveness"

Reduced Number of Stops on Red
OR
Shortened Stops on Red

Bus Approaches
Intersection

TSP is OFF
(bus is on time)
Request not made

TSP is ON(bus is delayed)
Request made

TSP request
not granted by controller

TSP request
granted by controller

TSP request
not utilized by bus

TSP request
utilized by bus

Early Green
utilized by bus

Green Extension
utilized by bus

% Requested

% Granted

% Effective

% Type

CDTA

The Results

Stops were determined by

- Counting instances where the bus records a stop that overlaps with the red

Delays were calculated by

- Summing the stop time that overlaps with red

Metric	Average Delay (sec)		Average Savings (sec)		Reduction (%)		
	North-bound	South-bound	North-bound	South-bound	North-bound	South-bound	Total
Total Stops on Red Reduction	3,437	2,621	937	459	21%	15%	**19%**
Total Signal Delay Reduction	70,746	47,363	43,814	24,290	38%	34%	**37%**
Average Stops on Red Reduction per Trip @ Pilot Intersections	2.90	3.02	0.88	0.79	23%	21%	**22%**
Average Signal Delay Reduction per Trip @ Pilot Intersections	53	59	44	39	45%	40%	**43%**

- Total stops and delays comprise the raw number of stops and the associated delays they incurred
- Average stops and delays divides the raw number of stops and associated delays by the number of trips through each intersection

The Desired Outcomes

1. Provide better service to the riders of CDTA resulting in increased ridership and satisfaction.

2. Leverage a technology stack in new, innovative ways to improve operations and work more collaboratively than ever before.

3. Decrease traffic, runtime and number of buses on routes.

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Data ▸ Information ▸ Insights ▸ Action ▸ Results

Thank you!

QUESTIONS?

The Results
## COMPARED TO EXPECTED COUNT BASED ON SCHEDULE

Current:

- CDTA buses currently configured to only request TSP when INIT Co-pilot determines bus is behind schedule by 3 minutes
- Therefore, TSP can only be of use when bus is behind schedule

How to improve:

- Increase schedule aggressiveness
- Decrease "behind schedule" threshold
- Turn TSP to "always-on"

Example to right: Percentage of time buses are requesting TSP when south-bound on River Corridor during the week (all intersections >20% of time).
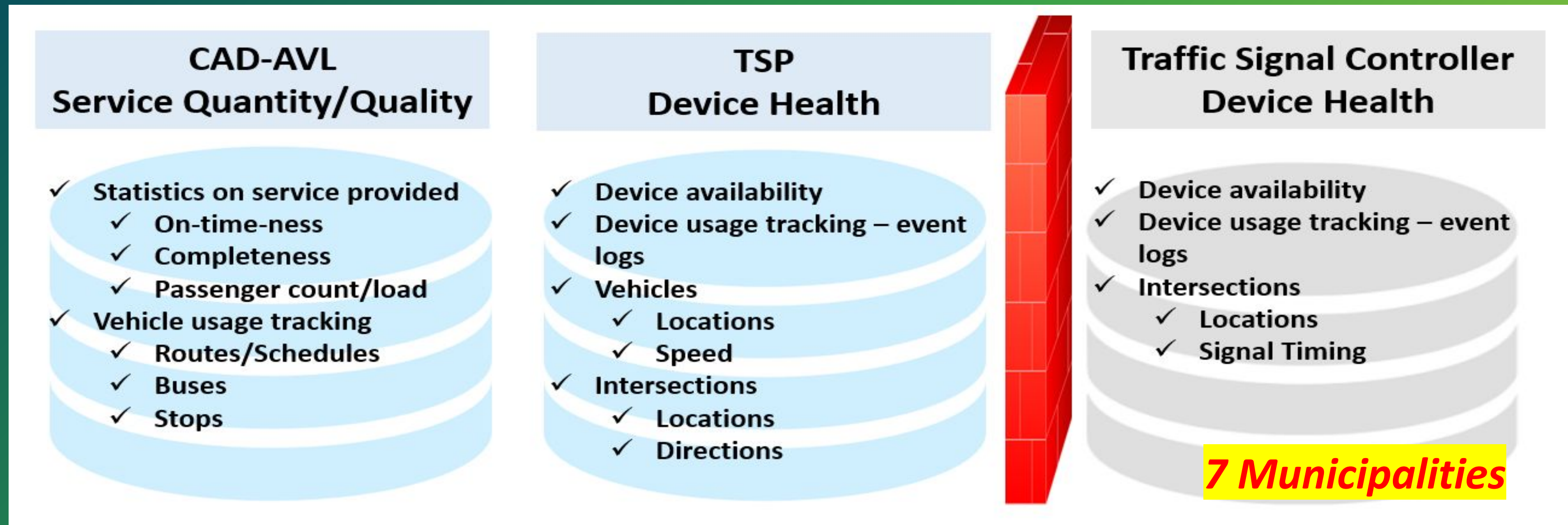Baseline is from number of trips in GTFS.

50% or more

40 – 50%
30 – 40%
20 – 30%
10 – 20%
0 – 10%

S. Pearl & First

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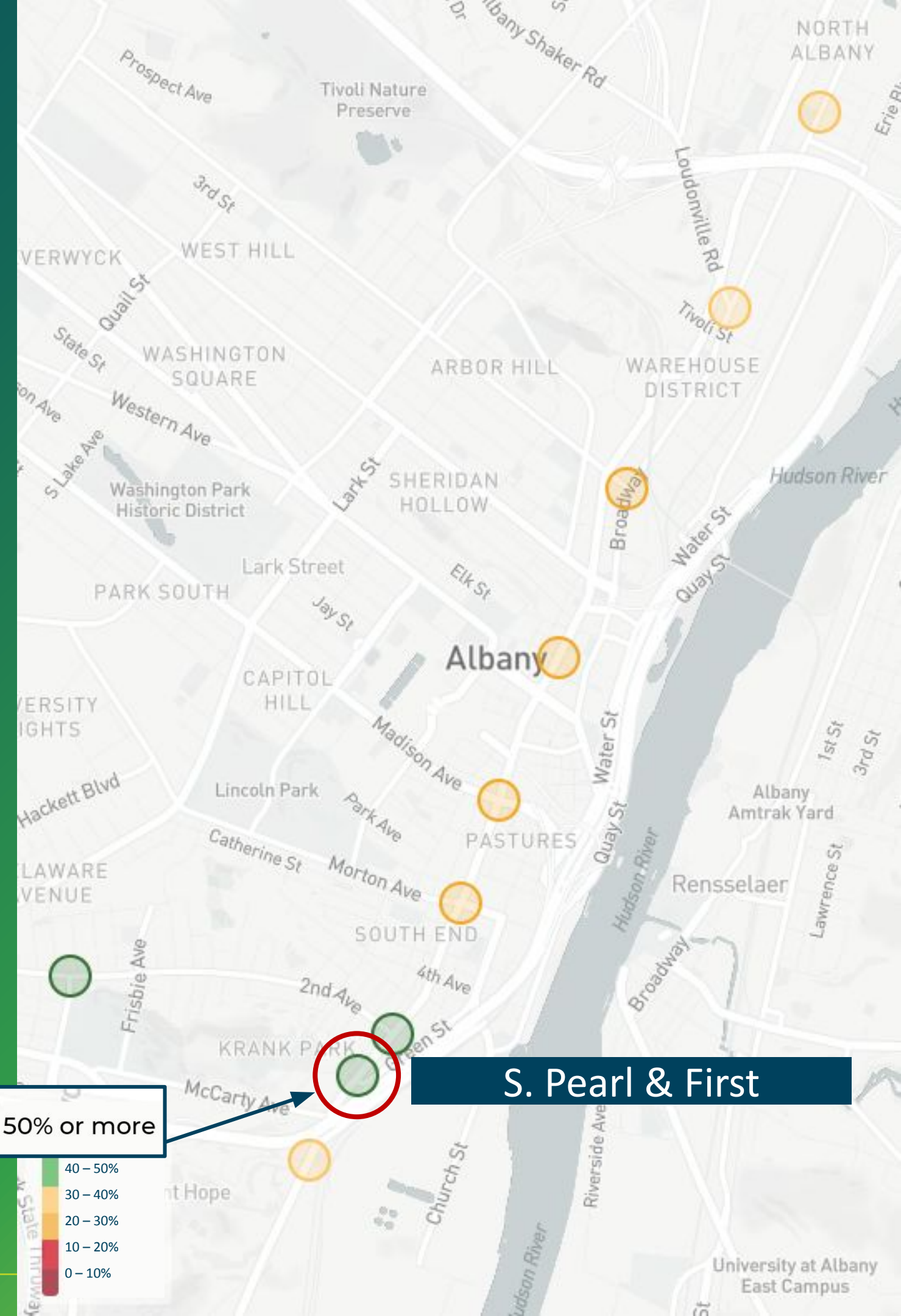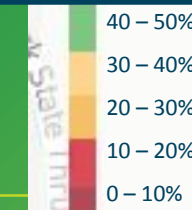
# Data Disparity – data not designed for integration

- Inability to monitor system performance of TSP
- Disparate Data and Systems causes decreased productivity and inability to leverage technology
- Collaboration across teams is difficult

The Pilot
Equipment & Software used to collect data

- GTT Intersection and Vehicle Equipment
  - Model 2101 Vehicle Kit
    - RT Radio Messages (GPS breadcrumbs)
  - Central Management System Software
    - Opticom Logs and Event Data
- Miovision Intersection Equipment
  - SmartLink Device / Core
    - Signal Phasing and Timing (SPaT)
  - TrafficLink Software
    - ATSPM data insights
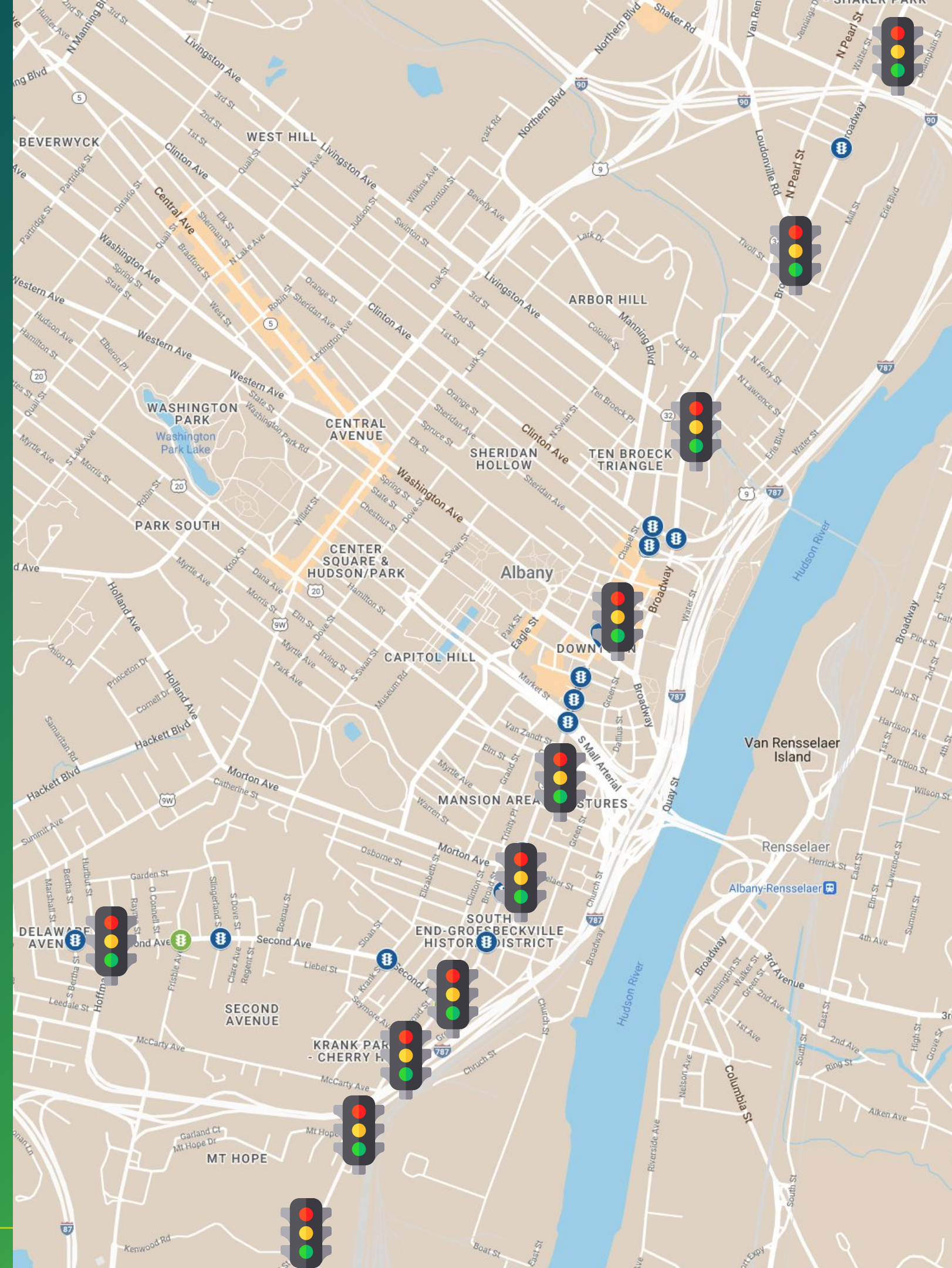   - Controller events, including TSP and signal phasing events
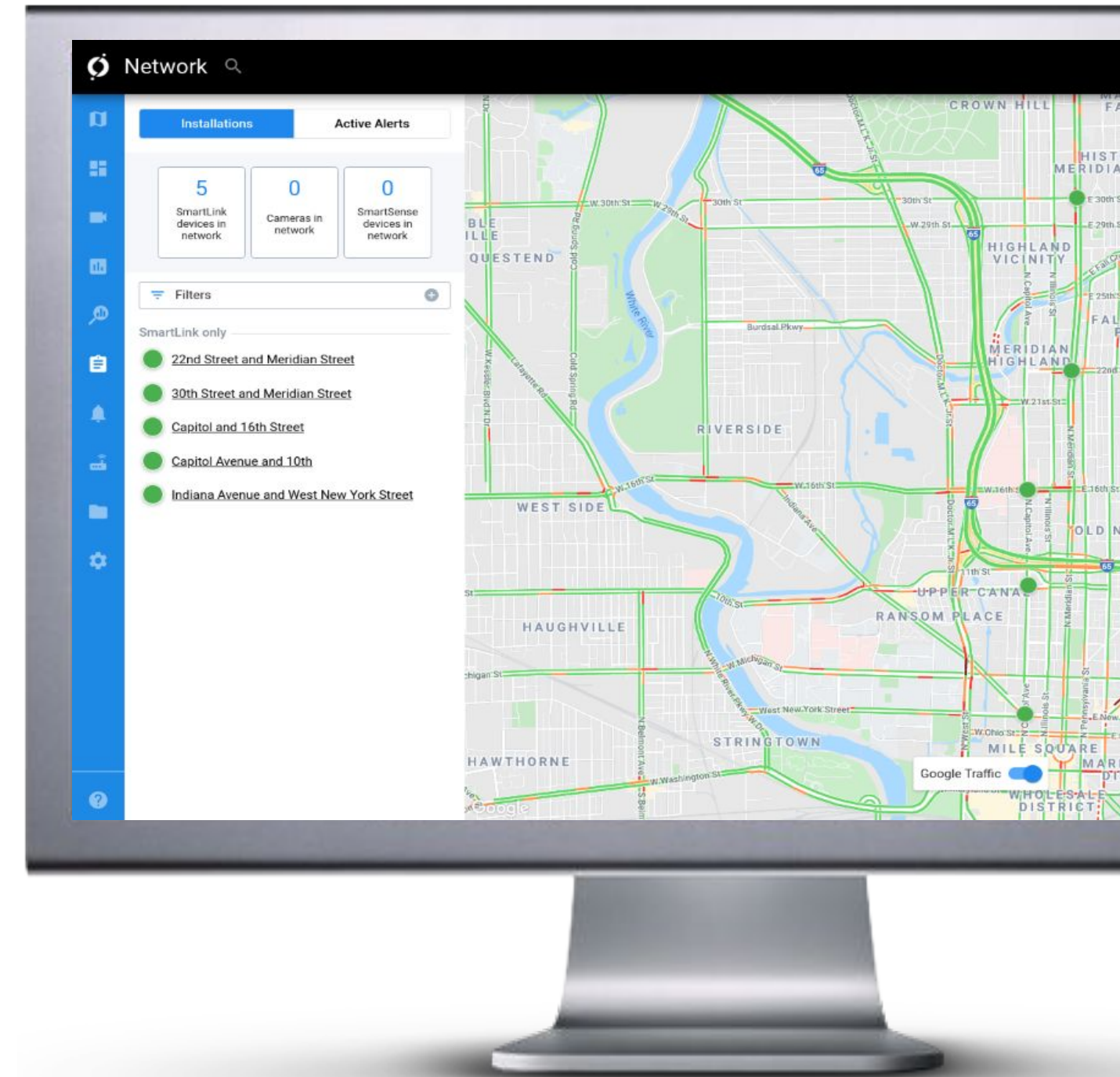
11 INTERSECTIONS HAVE MIOVISION INSTALLED

Study looked at 11 intersections in Albany, NY along River Corridor
(Blue Line - 923 & 922)

Collected data for 4 weeks
(Feb 8 – Mar 7, 2022)

7 of 11 intersections collected TSP requests for both NB & SB, 4 only had data for one direction

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Reduced Stops by 19% and Signal Delays by 37%

Stops were determined by
- Comparing stops at the bus stops on bound stops with the

Delays were calculated by
- Calculating stop time that overlaps

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TSP BIG DATA – Next Steps

- To Validate Overall TSP Effectiveness – Is it on?
- To Validate TSP Timings and Programming – Is it working as designed?
- To Demonstrate Performance based reporting for planning and scheduling service – Is it optimized for traffic flow and transit efficiency?
- Better coordination of regional traffic improvements through a coordinated approach that benefits all passenger transport modes
- Better overall collaboration for future improvements and funding opportunities
- Implement Signal Core on all TSP intersections
- Have seen better OTP performance on TSP enablged routes
- Look to reduce running time for route

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THE OPTICOM CLOUD PLATFORM

**FOR PRIORITY CONTROL THROUGH
EMERGENCY VEHICLE PREEMPTION (EVP) AND TRANSIT SIGNAL PRIORITY (TSP)**