Acyclica – Congestion Management

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Control Technologies

Overview

1. Goals
2. Data Collection
3. Measuring Congestion
4. Travel Time
5. Intersection Delay
6. Origin/Destination
7. Timing Plan Analysis & Detector Data
8. Asset & Sensor Management
9. The Big Picture (city of Seattle routes?)
10. Users & Applications
11. Questions

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Your Goal:
Mitigate Congestion

Our Goal:
Measure Congestion

- Many ways to solve traffic problems:
  - Better detection -- FLIR ;)
  - Better controllers
  - Better timing
- How do YOU measure congestion?
- We have the ability to show you where and when the problems are happening so you can provide the solution.

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Acyclica Unit

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Data Collection

Using both Wifi & Bluetooth to collect data increases data capture rates by 100x over using Bluetooth alone.

NTCIP Compliant using center to center protocol for communications

Compass sensors anonymously scan and collect MAC addresses (Media Access Control), matching them from point to point, providing highly stable, accurate, and reliable travel times, along with the ability analyze traffic flows at an unprecedented level of detail

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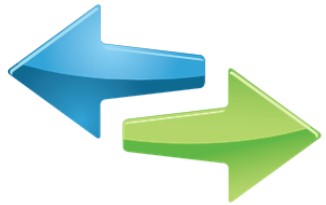
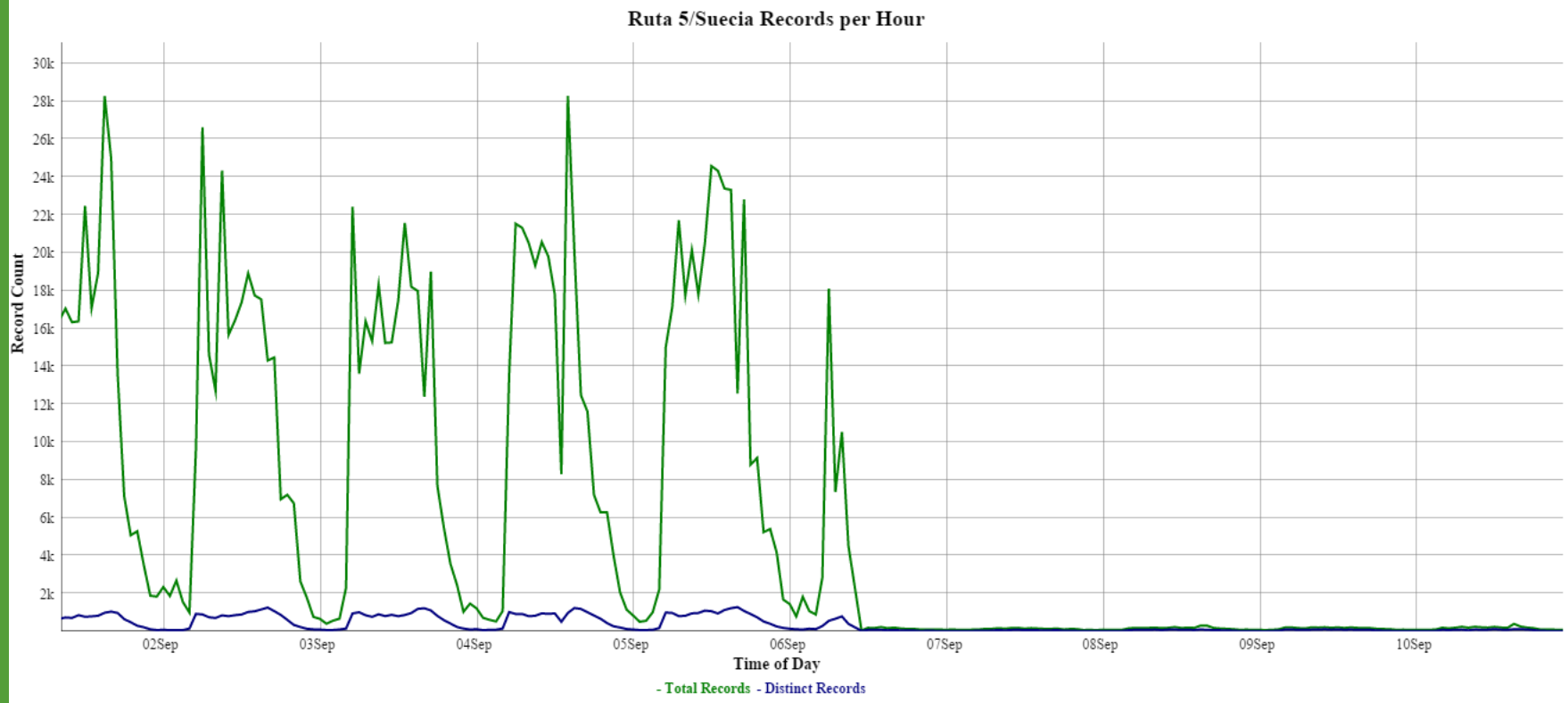
Wifi Vs. Bluetooth



Bluetooth™



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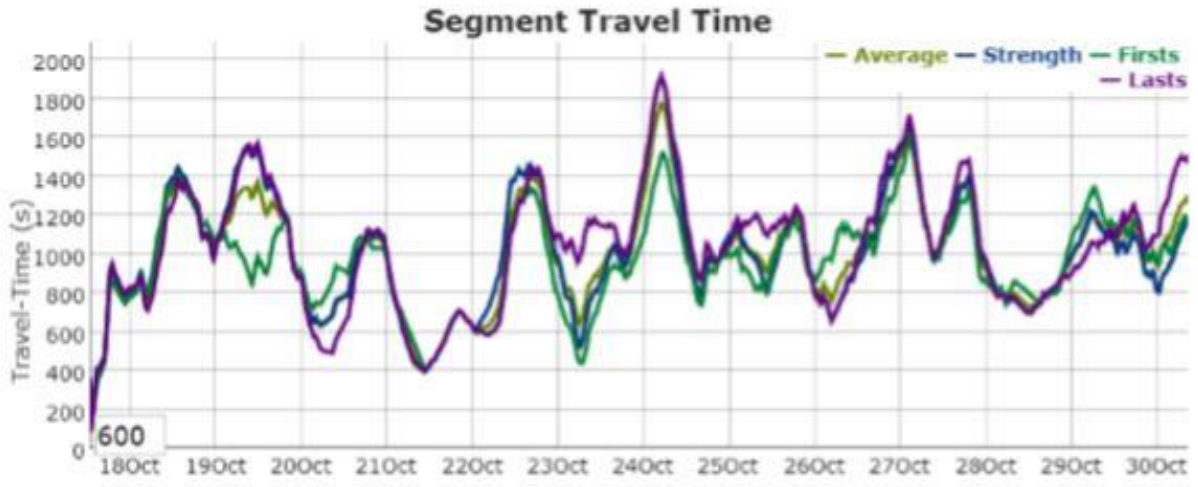
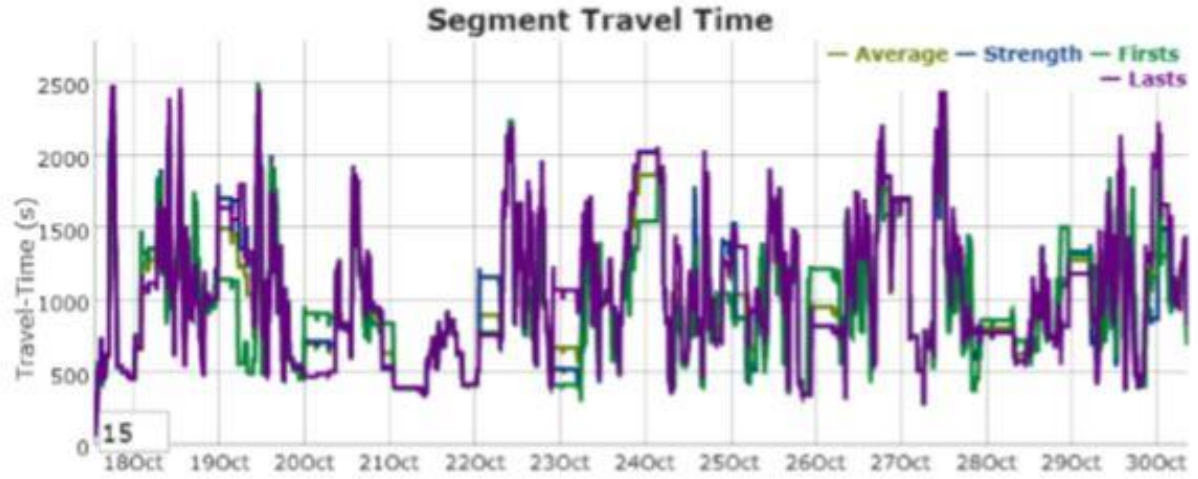
Measuring Congestion: Travel Time & Delay





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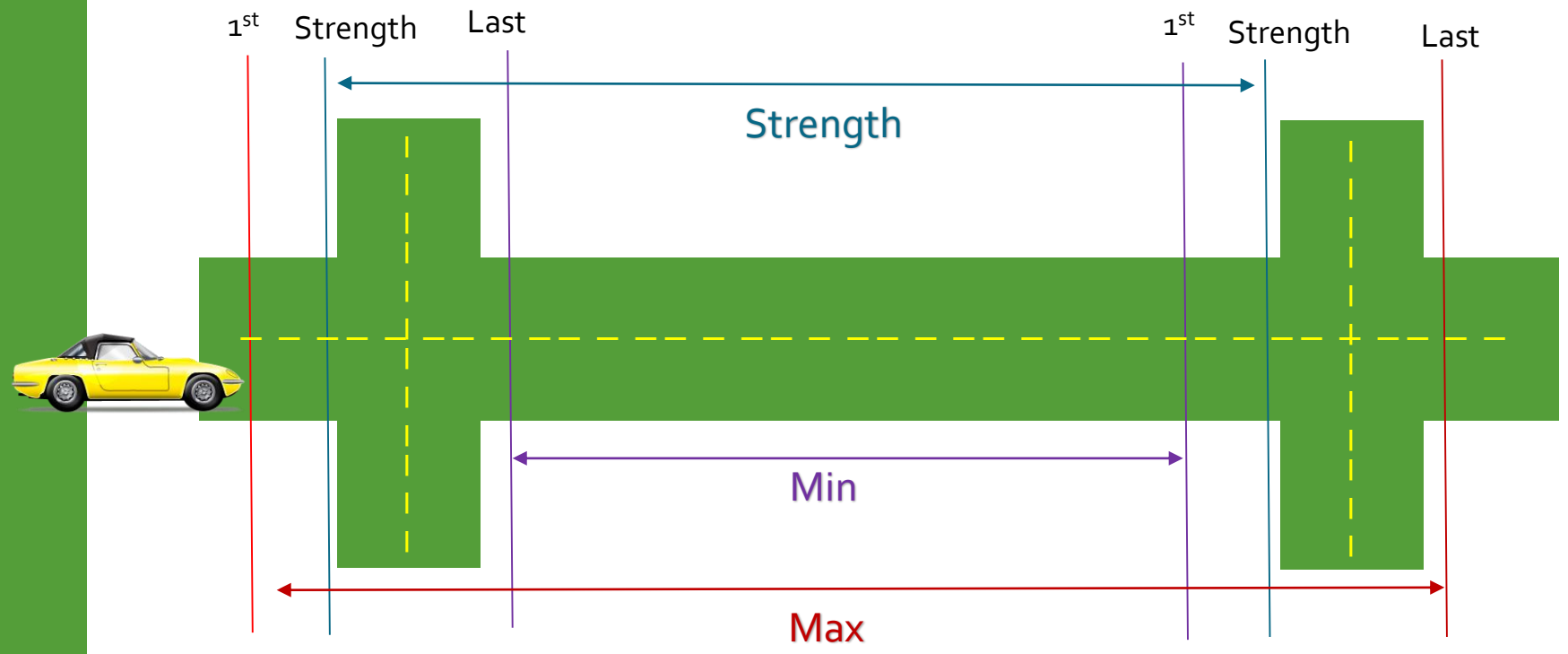
Measuring Congestion



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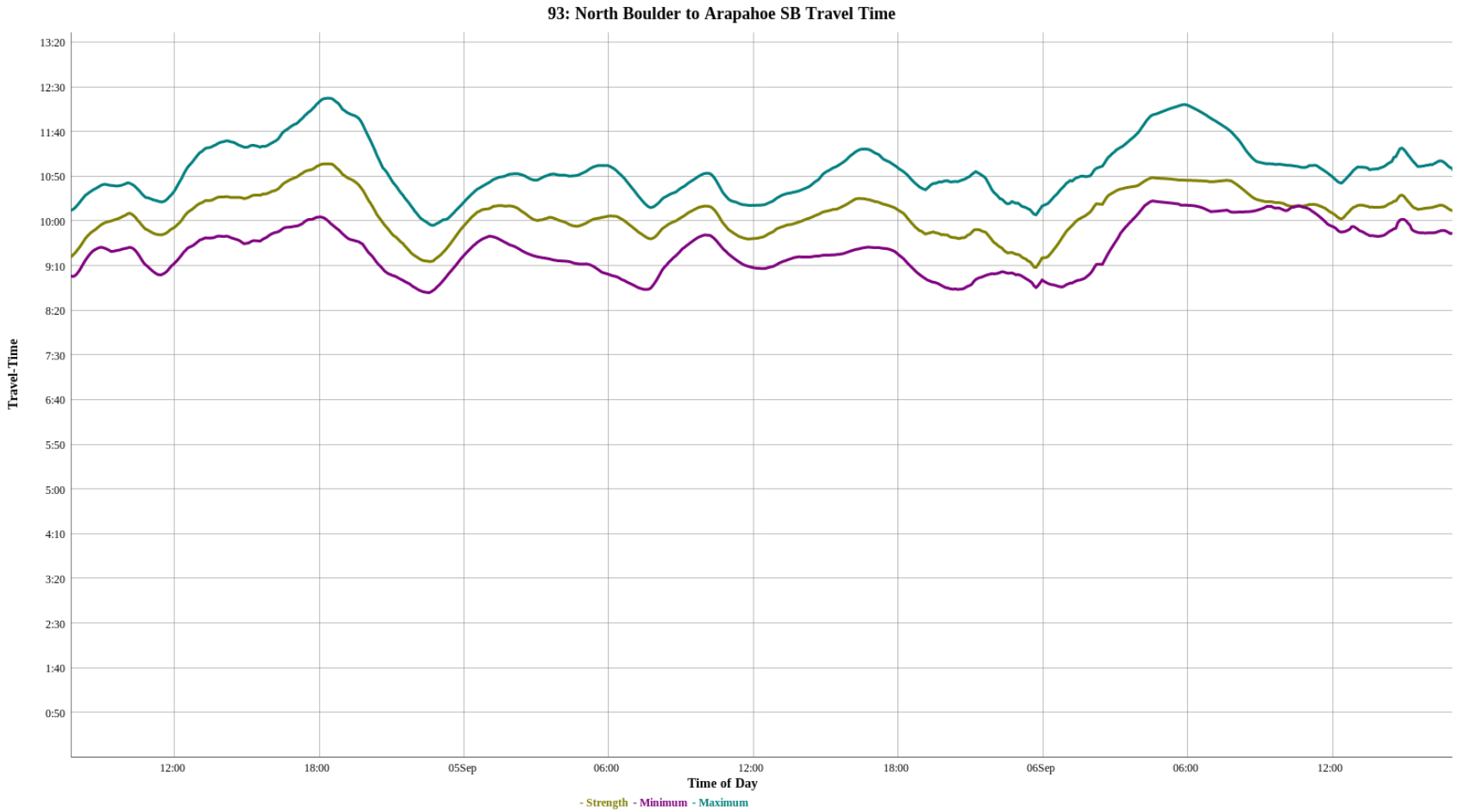
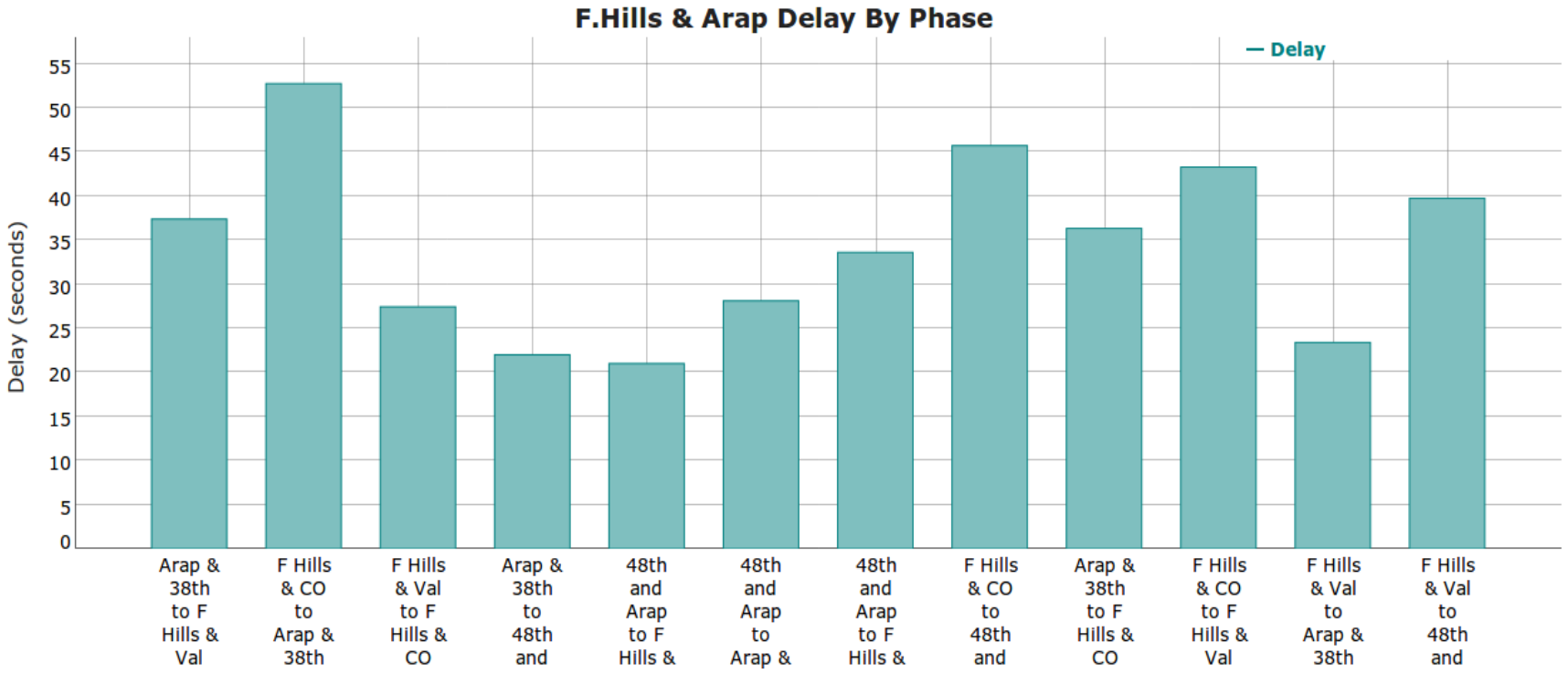
Travel Time


93: North Boulder to Arapahoe SB Travel Time
Travel-Time
13:20
12:30
11:40
10:50
10:00
9:10
8:20
7:30
6:40
5:50
5:00
4:10
3:20
2:30
1:40
0:50
12:00
18:00
05Sep
06:00
12:00
18:00
06Sep
06:00
12:00
Time of Day
- Strength - Minimum - Maximum

Intersection Delay

- Monitor intersection delay
- Report delay by approach or by movement at each intersection approach



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Origin-Destination

- Standard matrix to view
  - Match count
  - Percentage match
  - Travel-Time

	162027	265927	265928	265789	265790	265791
162027	0	5926	816	5723	6992	5174
265927	7387	0	465	4974	3331	4813
265928	1141	595	0	547	1278	481
265789	5835	4877	421	0	2668	6516
265790	6162	2858	1074	2720	0	2249
265791	4612	4012	317	5682	1953	0

	162027	265927	265928	265789	265790	265791
162027	0.0%	24.1%	3.3%	23.2%	28.4%	21.0%
265927	35.2%	0.0%	2.2%	23.7%	15.9%	23.0%
265928	28.2%	14.7%	0.0%	13.5%	31.6%	11.9%
265789	28.7%	24.0%	2.1%	0.0%	13.1%	32.1%
265790	40.9%	19.0%	7.1%	18.1%	0.0%	14.9%
265791	27.8%	24.2%	1.9%	34.3%	11.8%	0.0%

	162027	265927	265928	265789	265790	265791
162027	0.00	91.51	89.21	739.84	631.95	863.79
265927	89.11	0.00	686.47	616.21	731.28	804.30
265928	86.70	547.86	0.00	673.16	566.28	856.22
265789	680.69	553.02	877.13	0.00	838.57	764.43
265790	597.29	713.72	539.00	831.52	0.00	959.27
265791	722.34	592.07	897.08	709.43	906.13	0.00

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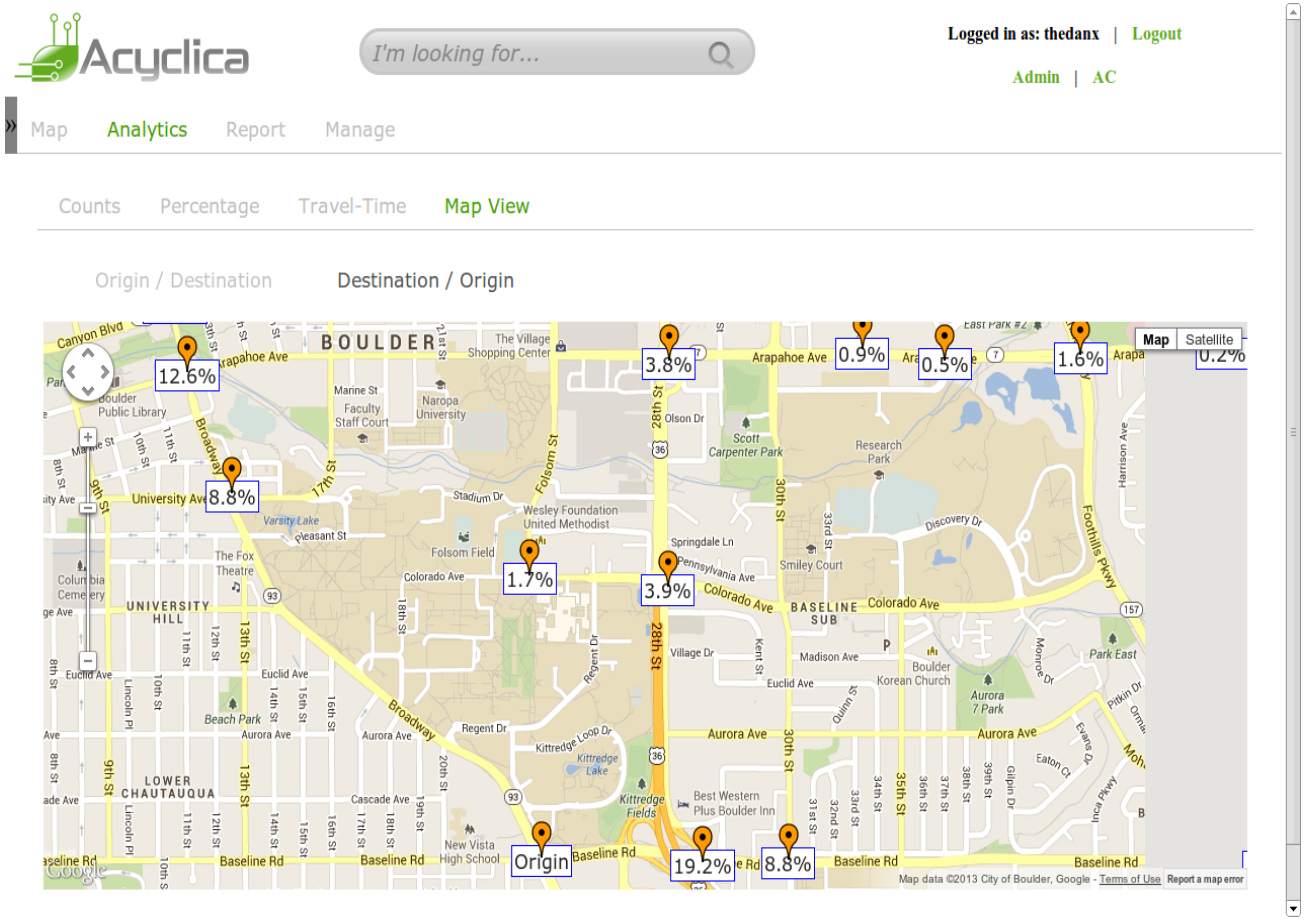
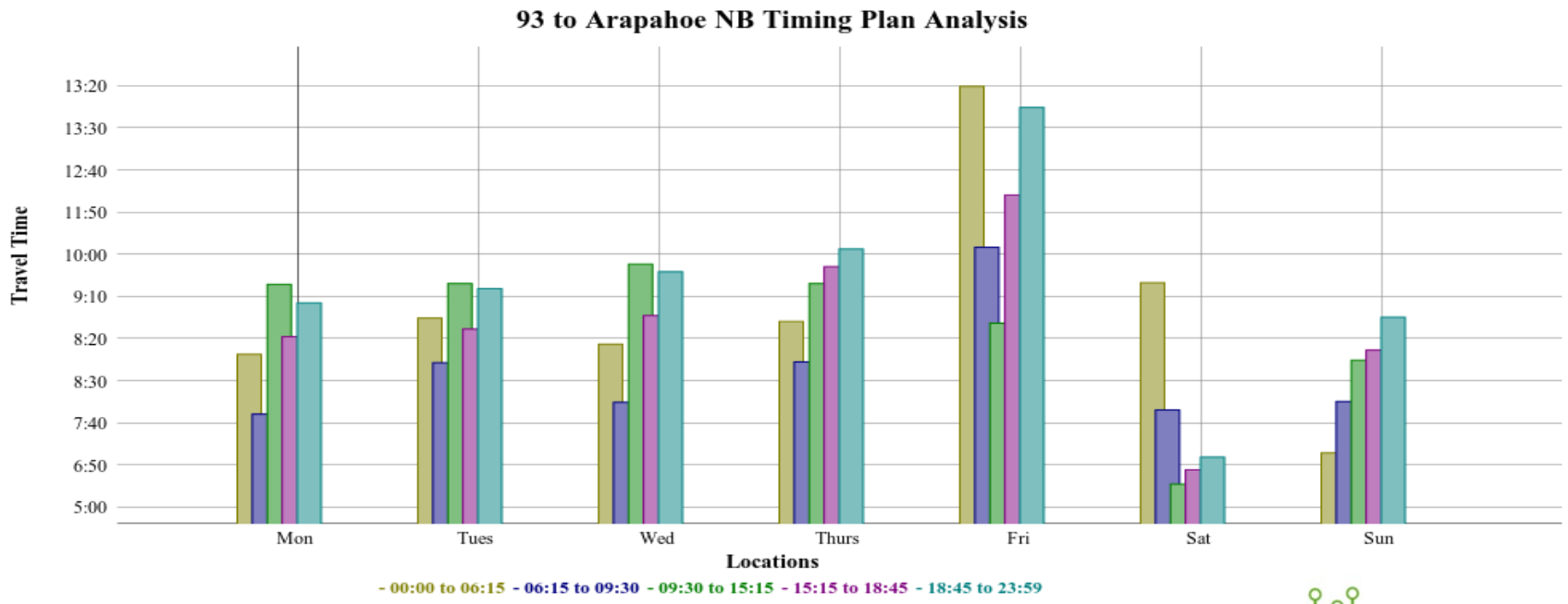
Origin-Destination

- Point and Click interface
- Easily visualize traffic flows
- View source or destination based results



Timing Plan Analysis

- Quickly view travel-times for any route by time of day plan and by day of week
- Choose comparison for any length of time: 1 week to multiple months
- Understand which day & time has congestion
- Efficiently plan signal retiming based on actual need



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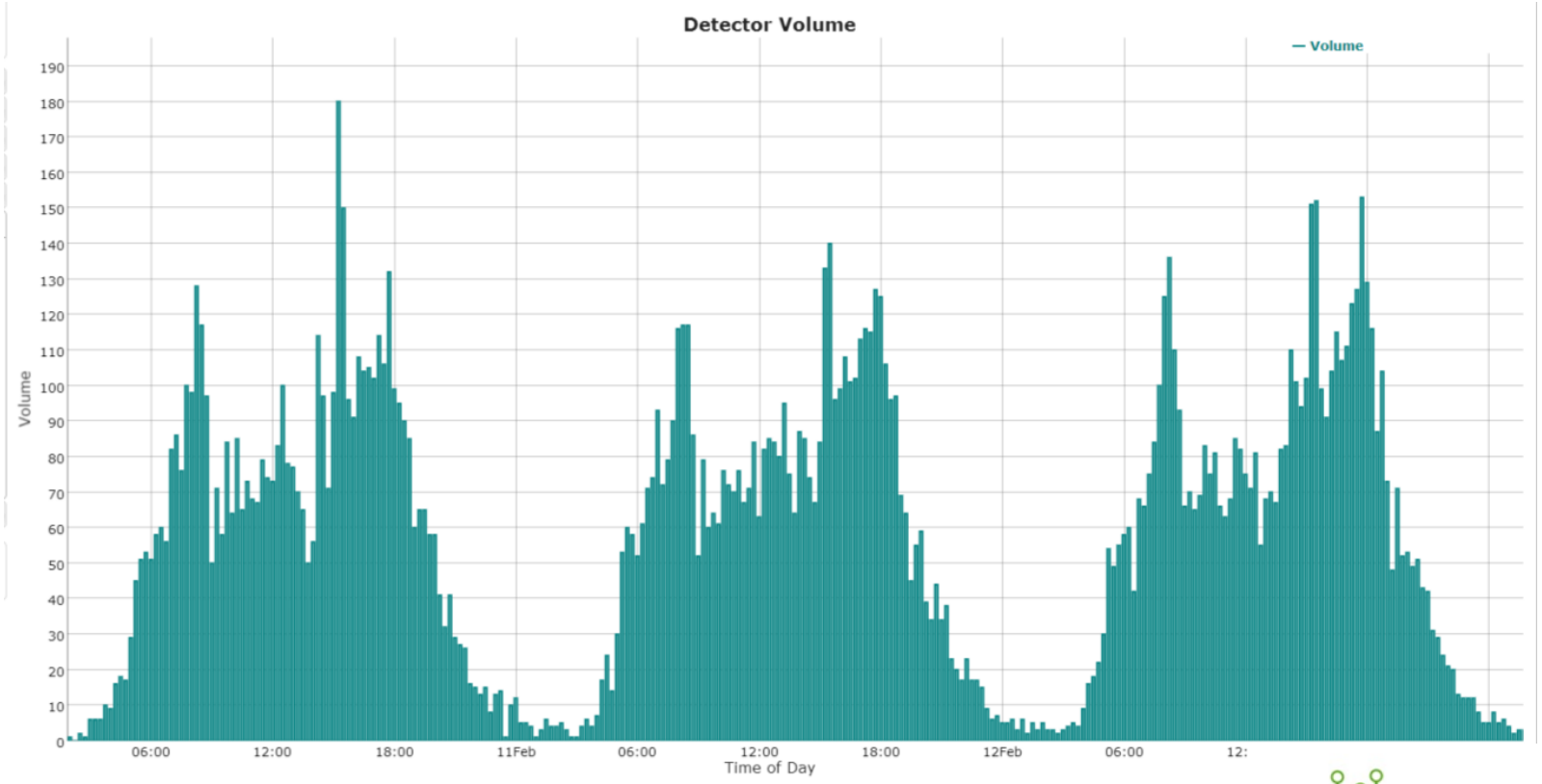
Detector Volume

- View traffic data from roadway sensors including: loops, video, thermal, radar, microwave
- Combine with delay to calculate emissions
  - Report vehicle-delay hours: economic impact of delay



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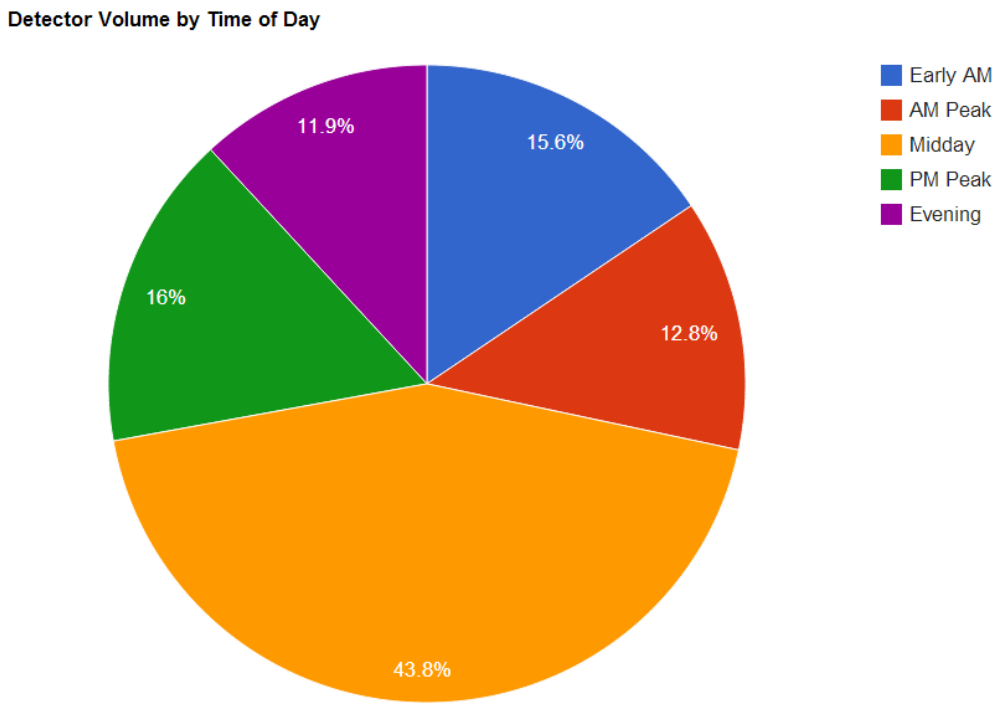
Time of Day Distribution

- Monitor detector volume distribution by time of day
- Understand when users are on the roadway by volume
- Help agencies optimize congestion based on actual demand



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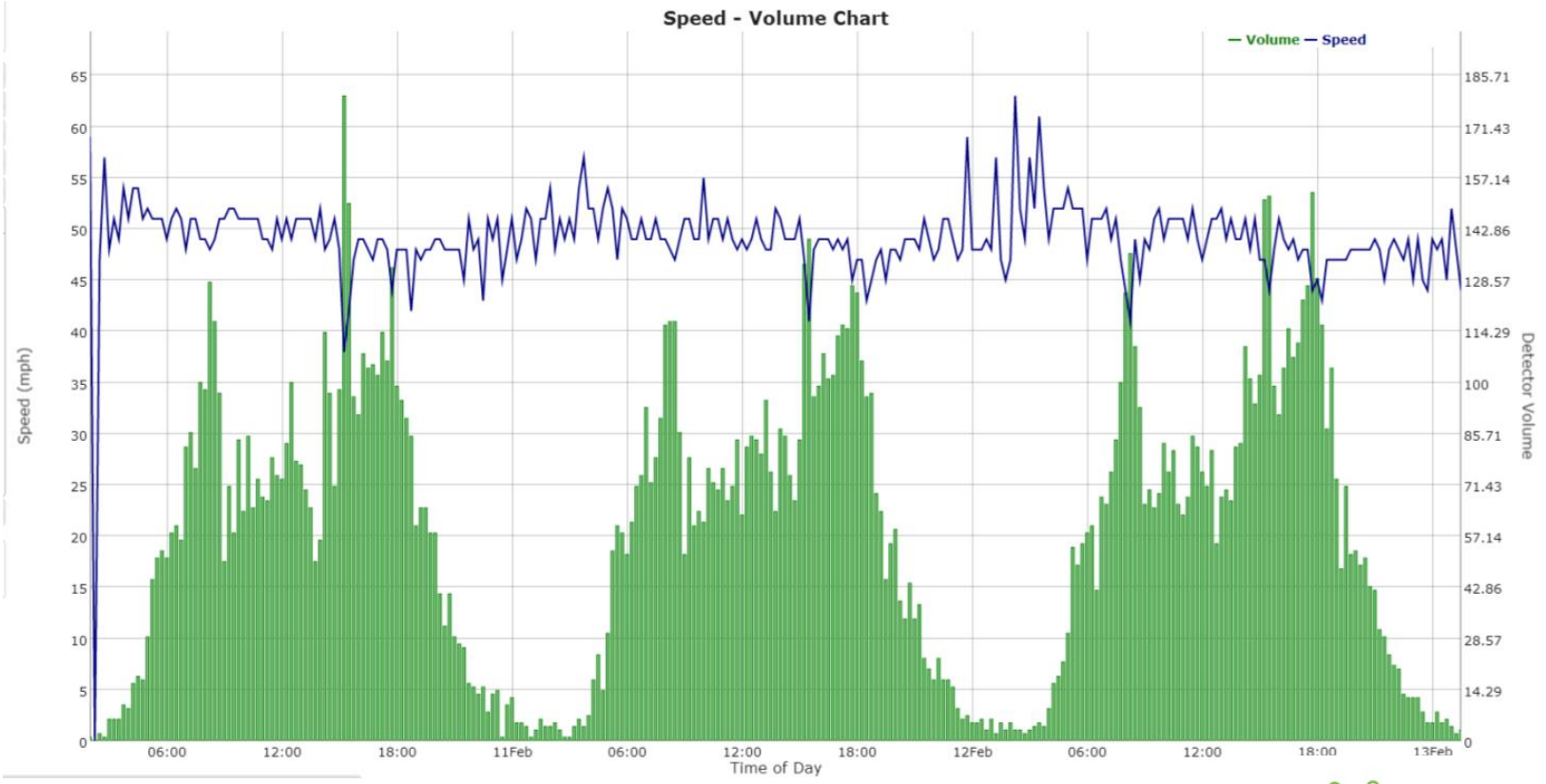
Detector Data

- Visualize speed / volume & occupancy data
- Combine delay and travel-time with other types of detector information
- Centralize data collection and analysis



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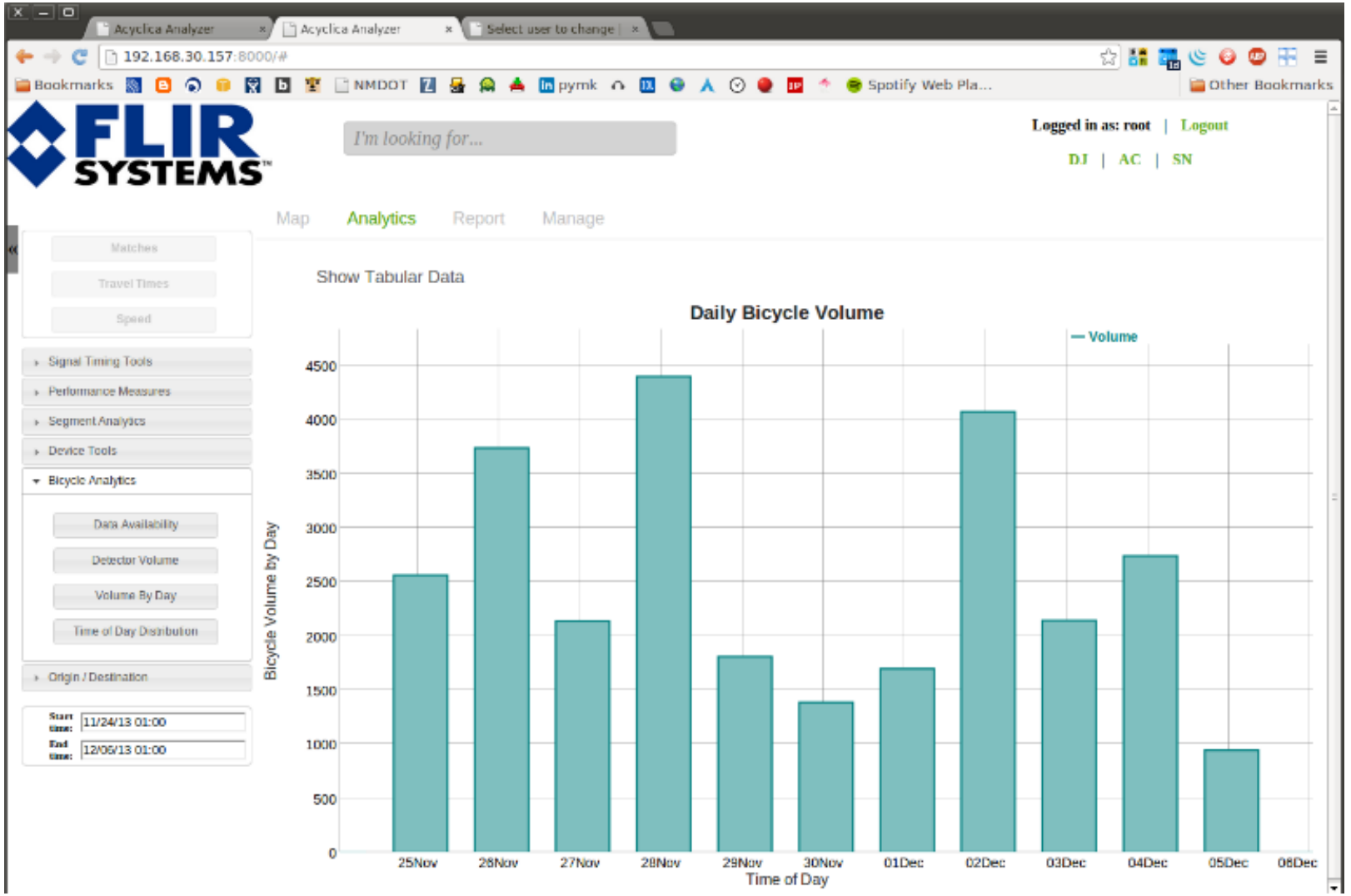
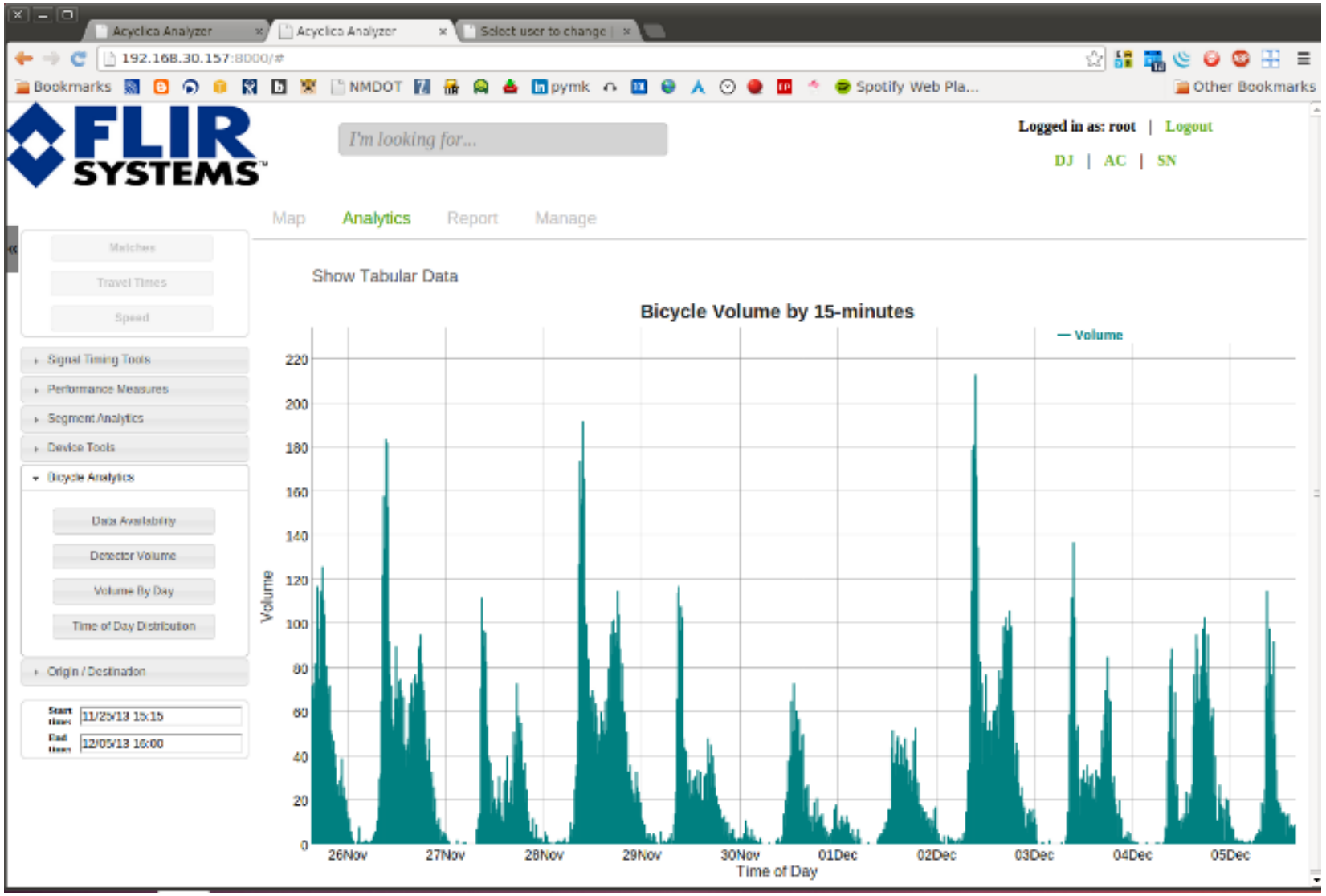
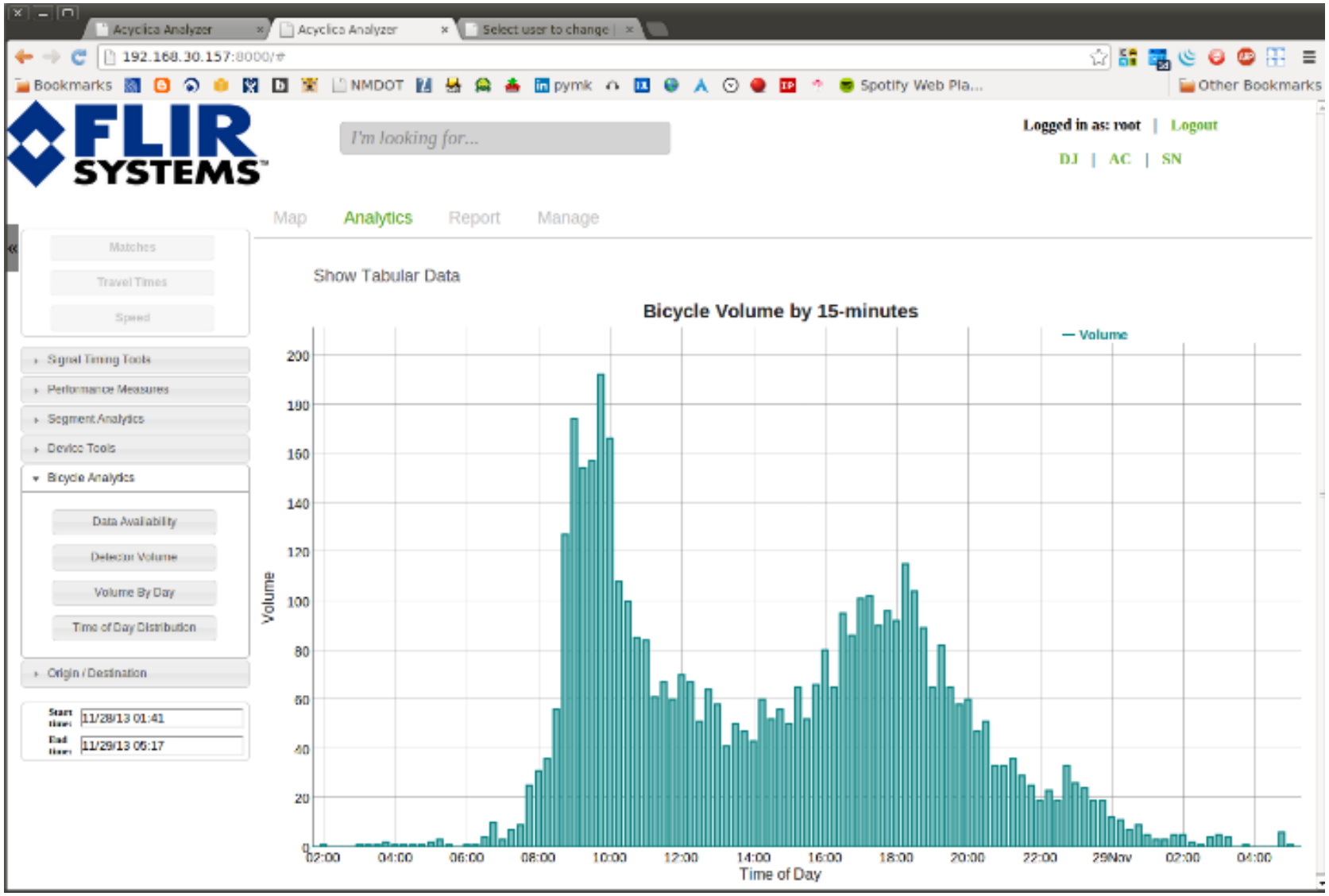
Detector Volume



Detector Volume by Timed Intervals

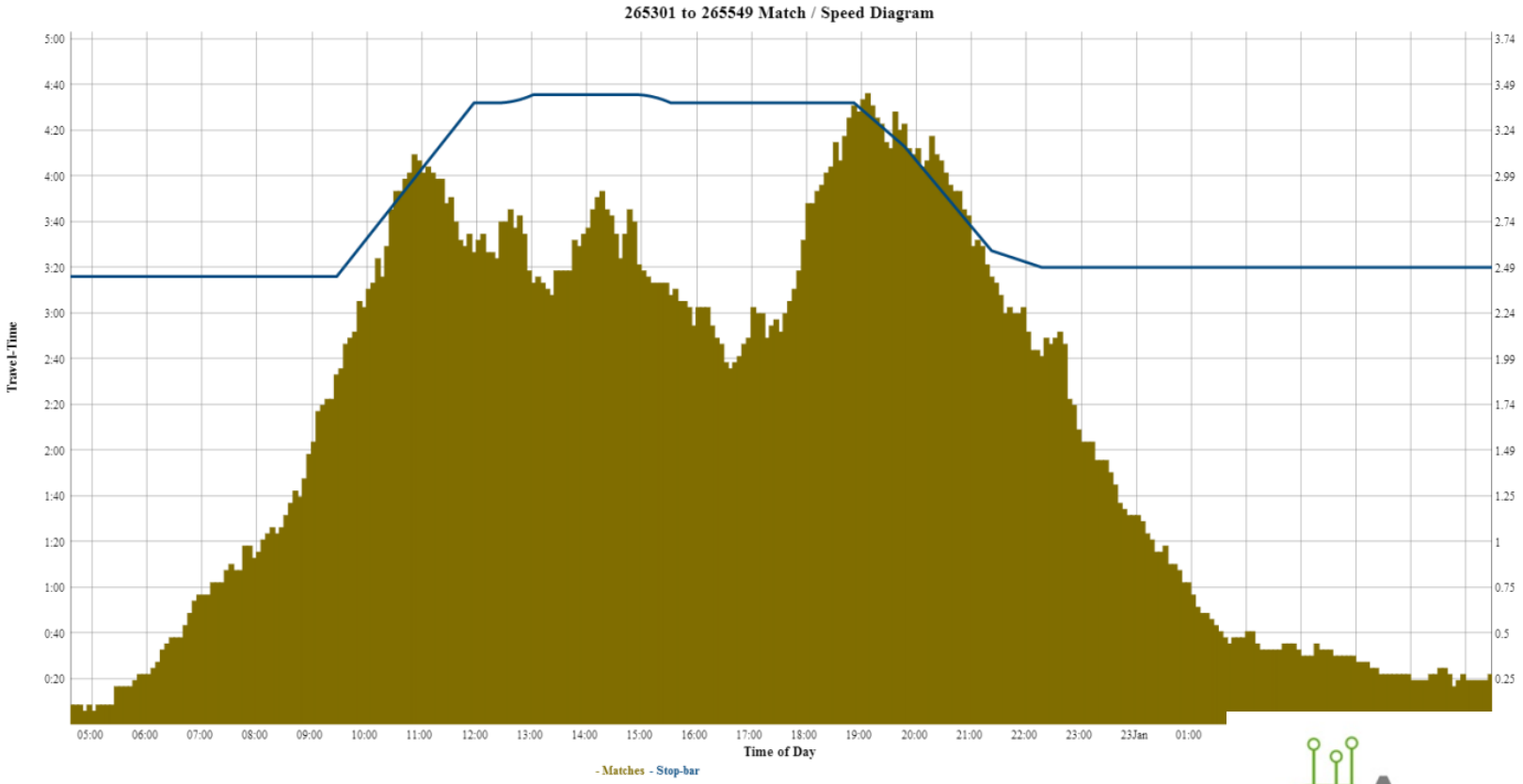


Detector Volume by Timed Intervals



Predictive Traffic Analytics

- Understand the correlation between related traffic metrics to predict future traffic conditions
- Provide realistic travel-time estimations based on overall network performance



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Asset Management

- Track all equipment at the cabinet
  - Serial number
  - Firmware
  - Custom Fields
  - Purchase / Install dates
- E-mail reminders for warranty expiration
- Easily add new asset types

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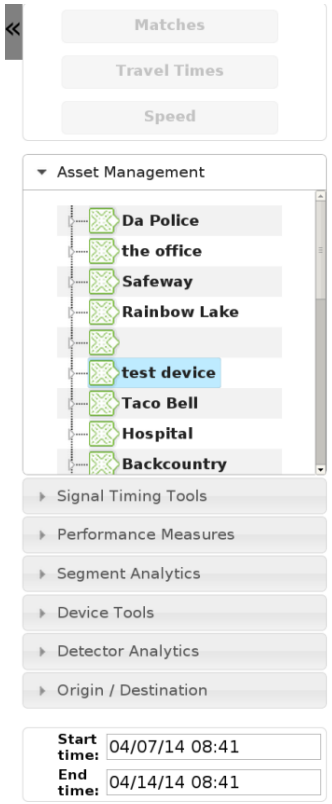
Adding Custom Assets



Devices Routes Overlays OD Groups **Assets** Account

Add Asset

Hardware Type: Wifi Sensor (New)

Model:

Manufacturer:

Part Number:

Documentation Link:

Optional Fields

Serial Number
Firmware Version
Date Purchased
Installation Date
Warranty Expiration Date
IMEI Number
SIM Number

Clear Add Asset Type

Hardware Type	Manufacturer	Model	Part Number
Access Point	Sensys	APCC	Sensys-APCC
Wifi Sensor	Acyclica	BlackCompass	BC9000
Cellular Modem	Cloudgate	Cloudgate	xxx
Microwave	Wavetronix	HD105	hd105
Wifi Sensor	Acyclica	CrossCompass	CC9000!
MMU	EDI	MMU2	xyz

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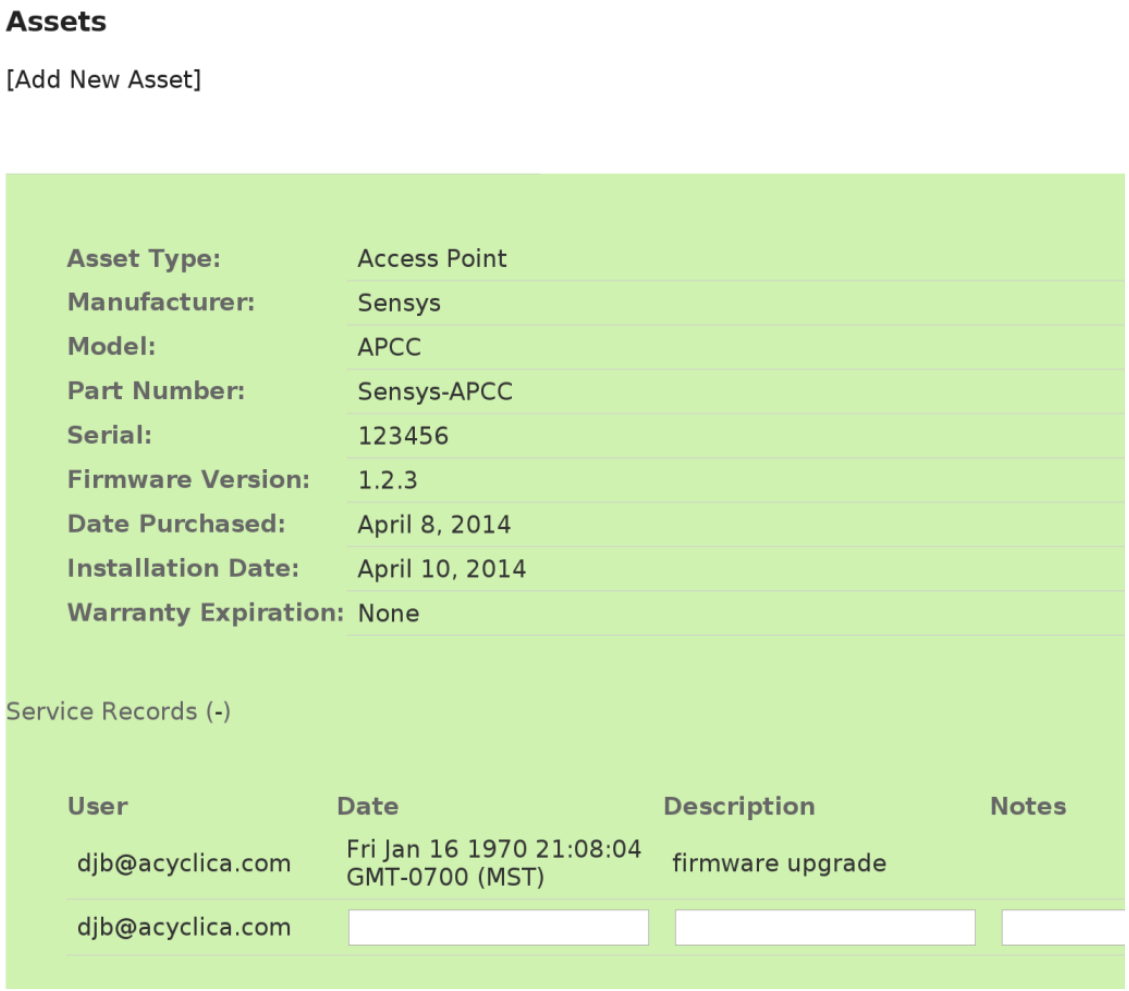
Service Records

- Track service records and maintenance logs
- Log user and time for each event for each asset
- Centralize information:
  - Improve customer experience & engagement
  - Monitor equipment service records
  - Provide to third parties



Assets

[Add New Asset]

Asset Type:	Access Point
Manufacturer:	Sensys
Model:	APCC
Part Number:	Sensys-APCC
Serial:	123456
Firmware Version:	1.2.3
Date Purchased:	April 8, 2014
Installation Date:	April 10, 2014
Warranty Expiration:	None

Service Records (-)

User	Date	Description	Notes
djb@acyclica.com	Fri Jan 16 1970 21:08:04 GMT-0700 (MST)	firmware upgrade	
djb@acyclica.com			

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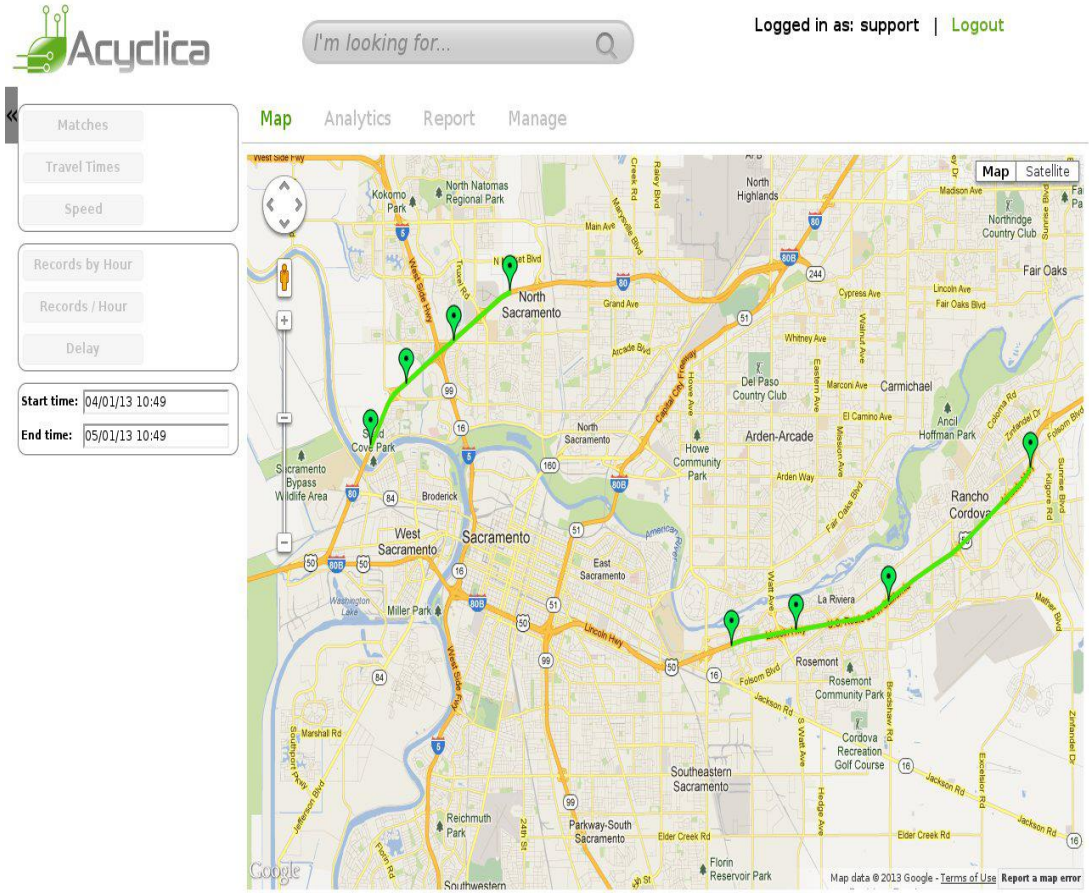
Current Applications

- Congestion mapping
- Route planning
- Intersection high speed approach
- HOV / congestion based tolling
- Travel times
- Intersection delay analysis
- Level of service indications
- 24x7 turning movement analysis



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Current Applications

- Work zone congestion enforcement
- Variable message signs
- Corridor speed & travel-time analysis
- Ramp metering activations
- Incident Detection
- Origin - Destination Analysis

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Current Applications

- Public transit utilization
- Public transit origin – destination
- Game Day traffic analysis
- Round-a-bout entry-departure analysis
- Time-based route planning
- Emergency responder routing

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Questions?

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