TRAVEL TIMES IN ETLS

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OVERVIEW OF TTMS

Why are travel times needed
State of practice Prior to ETL Deployment
Problem/Need Identified
Options Evaluation
Deployment result
TRAVEL TIME NEED

• ETL's are a Managed Facility
  • Need #1: We need to measure the management approach degree of success.
• Initially tolls are pre-set by time of day
• But may one day become dynamic – ie: tolls vary by actual traffic usage.
• Need accurate travel times to manage the traffic
  • Need #2: Used to set toll rates and schedule (times of day)
  • Need #3: Used in determine when a dynamic system may be necessary.
STATE OF PRACTICE

3rd Party private firms gather data.
- Cell phone and fleet data.
- Maryland participates in programs to get the data.
HOW TRAVEL TIME DATA WORKS

The data comes across with link ID’s that are associated with the segment of road. We build routes, consisting of contiguous links. The times for each link are added to calculate the travel time on the route.
LIMITATIONS OF CELL/FLEET DATA

Poor lane to lane differentiation

We did research in other states with similar lane configurations to determine performance of the cell phone/fleet data. Research showed poor performance. At best the travel times presented were a mixture of traffic in both sets of lanes. When volumes were low, travel times tended to be skewed heavily.
NEED IDENTIFIED

We needed to supplement the data.

Investigated many options, including but not limited to:
- EZPass readers
- License plate readers
- Bluetooth readers
- More private GPS tracking systems
- More Cell phone tracking systems
- Point detection (radar, loops, profilers)
Many options were infeasible and eliminated early in the analysis.

The hosting/backend was also investigated and played some role in the decision process.

Our “consumer reports” style final analysis was:

<table>
<thead>
<tr>
<th>Technology</th>
<th>Capital Costs (Cost/Mile)</th>
<th>Maintenance Costs</th>
<th>Autonomy/Agency Control</th>
<th>Accuracy</th>
<th>Technical Risk</th>
<th>Statewide Scaleability</th>
<th>Lane Data (GP vs. ML)</th>
<th>Competitive Bidding</th>
<th>Overall</th>
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Ez-Pass Readers were the selected Option
EZ-PASS ENABLED CONCEPT

EZPass Reader/
Lane Kit/
Antenna

Travel Time = 2 minutes
Speed = 60 MPH

Time = 8:04:00 AM
2 Miles

Time = 8:06:00 AM
SYSTEM DESIGN

8 - EZ-Pass reader antennas
- Entry and exit point (2)
- North Bound and South Bound (2)
- Managed Lanes (ETL) and General Purpose Lanes (2)

Two sites
- North and south
- ML, GPL’s at same point. Covers Entry and exit at same point. (comparable travel distance).

Central Virtual Server gathers matched pairs
- No transponder ID’s are stored.
- Outlier algorithm to eliminate bias in results.

From Final design to completed system was about 1 year.
RESULTS

Data from 3/6/15 incident (ML, SB), 5 Min Bin.

- Shown below

3rd party data – Reported only a single speed for the segment

- 3rd party does not show ML and GPL separately.
- Where we measured 55 minute delays, 3rd party shows <40 minutes.