Making decisions based on data

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Automated Freeway Performance Metrics
UDOT’S FREEWAY DETECTION SYSTEM
UDOT’S FREEWAY DETECTION SYSTEM
Configured on PeMS

- 1,272 Stations
- 3,070 Detectors
  - 94% Operational
- Types of Detection
  - Wavetronix SSM 105, 125, 126
  - Inductive loops
  - Sensys pucks
  - Microloops
UDOT’S FREEWAY
Performance Measures

• Project Concept Phase
  – Comparison of overall freeway performance
  – Objective data vs. perception
  – Data driven decisions

• Initial Freeway Performance Measures
  – Speed Report
  – Driving Experience
  – Travel time
  – Time Lapse
  – Mobility Cake
SPEED REPORT

Salt Lake County
Weekdays 5 to 6 pm
AUTOMATED SPEED REPORT
UTAH DRIVING EXPERIENCE
I-15 SB: SALT LAKE COUNTY

Utah Driving Experience

Southbound

Northbound

Eastbound

Westbound

May 2015 PM Rush Hour (5-6 pm)
TRAFFIC PERFORMANCE METRICS

WEBSITE

www.UDOTtraffic.utah.gov/PerformanceMetrics
UDOT FREEWAY PERFORMANCE MEASURES WEBSITE

www.UDOTtraffic.utah.gov/FreewayPerformanceMetrics
RELIABILITY

Southbound Mainline Reliability 5-6 PM
TIME LAPSE VIDEO

2015-6-10 15-59

Traffic Flow
Freeways: 51 - 60mph 21 - 50mph 6 - 30mph No Data
Arterial Streets: Light Medium Heavy No Data
MOBILITY CAKE

- Show the delay that can be attributed to the incidents, construction, and weather.
- Show where the delay is occurring on a corridor.
- Make assumptions that can be easily understood - don’t be a black box algorithm.
- Leverage existing databases and ITS infrastructure
Mobility Cake

I-15 in Salt Lake County

Total Delay (Vehicle-Hours)

5000 4000 3000 2000 1000 0

Incident  Incident Q  Capacity Q  Weather  Capacity
MOBILITY CAKE: CAPACITY & CAPACITY QUEUE

DECEMBER 2013

JULY 2014

Delay from bottleneck

Bottleneck
MOBILITY CAKE: WEATHER

DECEMBER 2013

JULY 2014
MOBILITY CAKE: INCIDENTS & INCIDENT QUEUE

Delay upstream from incidents
Delay from incidents

DECEMBER 2013

JULY 2014
DELAY FOR SALT COUNTY

I-15 NB Delay in SL County (All Day, Every Day)

Delay (Min-Hours)

1,000,000
900,000
800,000
700,000
600,000
500,000
400,000
300,000
200,000
100,000
0

2013
2014
2015

Jan  Feb  Mar  Apr  May  Jun  Jul  Aug  Sep  Oct  Nov  Dec

Under Construction
RELIABILITY (BTI) GRAPH

Annual I-15 NB in SL County (Weekdays 5-6 PM)
Reliability (Buffer Time Index)

Under Construction
Progression of the Mobility Cake

I-15 SB Delay 600 S to Lehi Main St

- Capacity
- Capacity Queue
- Incident
- Incident Queue
- Weather
- Construction
Delay Hierarchy

- DELAY RECORDED
- Weather Present
- Incident Present
- Construction
- Incident Queue
- Construction Queue
- Capacity Queue
- Capacity
Layers (Databases) in the Cake

- Delay – PeMS speed and volume data (5 min)
- Event Manager – Incidents
- Travel Advisory Telephone System (TATS) – Weather
- Lane Closure Log - Construction
Weather Entry Duration

![Graph showing the distribution and cumulative percentage of event durations for both non-weather and weather events.](image-url)
Incident Record

8/14/2015
Incidents Flow Chart

Go to next detector station upstream (A)

Crash on MP of station?

Yes

Any delay attributed to incident

No (A)

Is there a crash at downstream station?

Yes

Is the speed at STA A 0 - 10 mph slower than STA B?

Yes (A)

Check downstream station if an incident has occurred downstream of it

No (A)

No

Any delay attributed to incident queue (A)

Go to next detector station upstream