

Early Warning Detection using Big data

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Outline

What data?

Lets get Warded!!

EWD tool

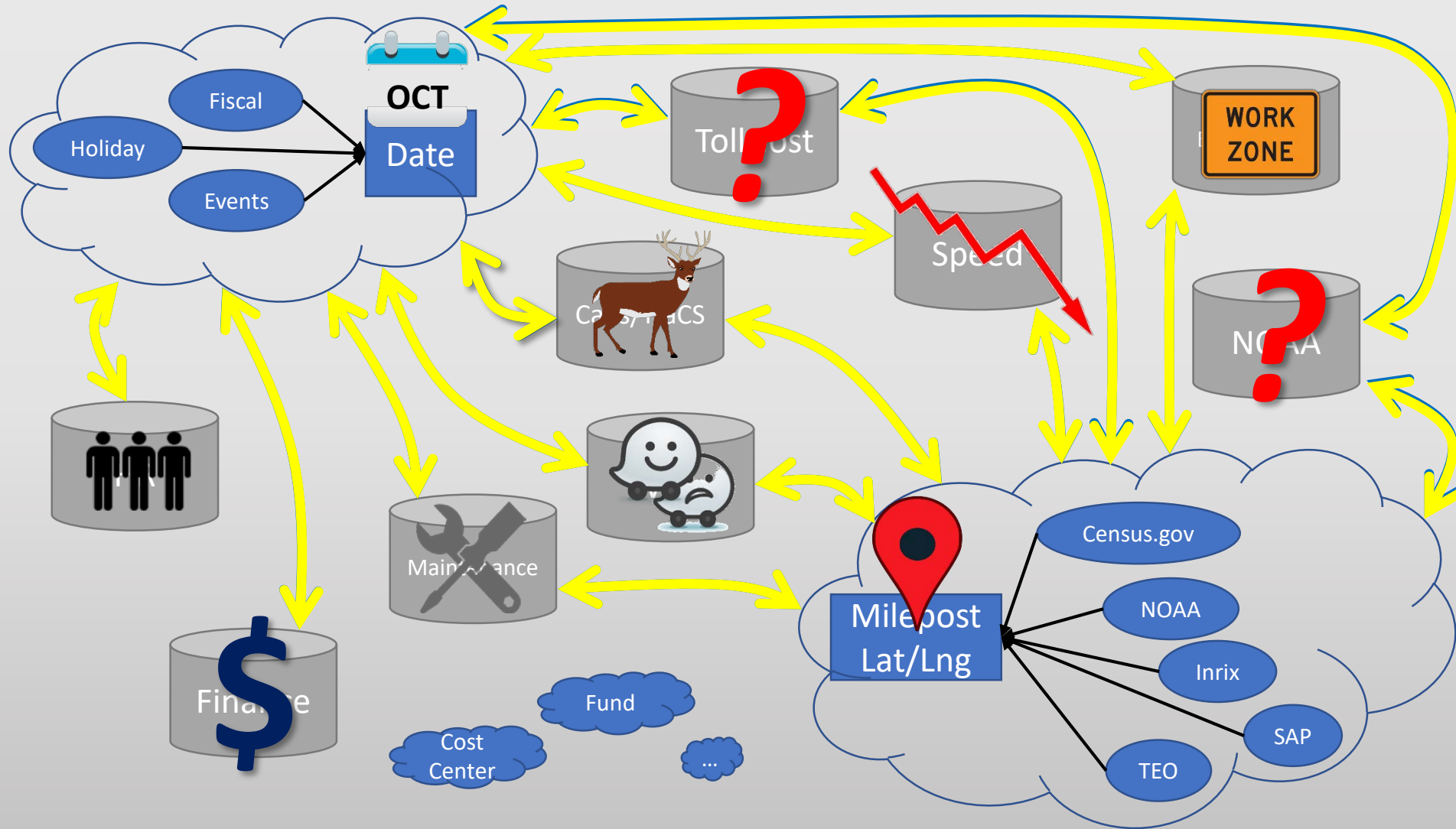
What's next

Annual	
<u>Feed</u>	<u>Records</u>
Inrix	273.4MM
Waze	16.6MM
Accuweather	123MM

Daily	
<u>Feed</u>	<u>Records</u>
Inrix	749k
Waze	45.5k
Accuweather	337k

BIG flat data facts

Conceptual Architecture






- Need for early detection
- Waze alerts are 4 minutes faster nationwide
- Combination of weather/speed/incidents

Business Need

What is EWD



Early Warning Detection
as of: 6/20/2018 12:59:07 PM

District

- District 1
- District 2
- District 3
- District 4
- District 5

Roadway

- A. Hutchinson
- Beaver Valley
- Mainline
- Mon-Fayette
- NE Ext.
- Southern Beltway

Waze Type

- Accident
- Jam
- Weather hazard

Waze SubType

- Accident Minor
- Heavy Traffic
- Moderate Traffic
- Road Construction

Toll Booths

- Exclude Tollbooth

Speed Threshold

-49 -46 -44 -42 -40 -39 -36 -34 -32 -30 -28 -26 -24 -22 -20 -19 -16 -14 -12 -10 -8 -6 -4 -2 0
 -49 -47 -45 -43 -41 -39 -37 -35 -33 -31 -29 -27 -25 -23 -21 -19 -17 -15 -13 -11 -9 -7 -5 -3 -1

Waze Rating Minimum

0 1 2 3 4 5

Waze Confidence Minimum

0 1 2 3 4 5

Waze Reliability Minimum

0 1 2 3 4 5 6 7 8 9 10

Visibility Threshold

0 0.5 1 1.5 2 2.5 3 3.5 4 4.5 5

Wind Speed Threshold

0 5 10 15 20 25 30 35 40 45 50

10 Active Watch Points

District	Segment	Conditions	Speed Differential	Speed (LastHour)	Waze Alerts	Visibility / Radar	Wind Speed
District 1	Mainline, Westbound : 22-22.5	Rain (75.96F)	-45		1	8.00	5.1 (W)
District 1	Mainline, Westbound : 20.7-21.2	Cloudy (73F)	-49		1	10.00	5.8 (N)
District 1	Mainline, Westbound : 21.3-21.9	Rain (75.96F)	-49		0	8.00	5.1 (W)
District 1	Mainline, Westbound : 20.1-20.6	Cloudy (73F)	-39		0	10.00	5.8 (N)
District 1	Mainline, Westbound : 19.4-20	Cloudy (73F)	-35		0	10.00	5.8 (N)
District 1	Beaver Valley, Westbound : 30.2-30.6	Cloudy (73F)	-11		0	10.00	5.8 (N)
District 1	Mon-Fayette, Northbound : 34.5-35	Cloudy (78.73F)	-12		0	8.00	5.1 (WNW)
District 5	NE Ext., Northbound : 116.6-117.1	Partly sunny (76F)	-25		0	10.00	5.8 (W)
District 1	Mainline, Westbound : 22.6-23.2	Cloudy (80.63F)	-24		0	8.00	5.8 (W)
District 1	Mon-Fayette, Northbound : 4-4.5	Mostly cloudy (77.91F)	-11		0	8.00	4.8 (NW)

Accidents (Waze)

District	Accident Type	Segment
District 2	Accident Minor	Mainline, Westbound : 120.4-120.9

JAM (Waze)

District	Segment
District 1	Mainline, Westbound : 20.7-21.2
District 1	Mainline, Westbound : 21.3-21.9
District 1	Mainline, Westbound : 22-22.5
District 2	Mainline, Eastbound : 195.8-196.3
District 2	Mainline, Westbound : 155.4-156
District 5	Ne Ext., Northbound : 59.9-60.4

Event Monitor

Status	P	Time	14 - Events	Type	Location
P	5	01:22:55	1806005455	NON	@VALLEY FORGE INTERCHANGE
A	2	01:24:08	1806005454	ACC	@A22.8N
A	2	00:35:11	1806005471	ACC	@T244.6W
A	2	00:23:34	1806005477	ACC	@T84W
A	2	00:11:29	1806005479	PD	@VALLEY FORGE IC
A	3	01:24:21	1806005453	DV	@T65.6W
A	3	01:12:55	1806005457	DV	@T269.4W
A	3	00:51:16	1806005468	DV	@T313.9W
A	3	00:42:22	1806005469	MA	@READING IC
A	3	00:24:32	1806005476	DV	@T255.2W
A	3	00:21:23	1806005478	DV	@HICKORY RUN PLAZA (A86.1N)
A	3	00:06:33	1806005480	DV	@T60.7E
H	2	15:54:49	1806005060	TC	@RT 903 SLIP RAMP A87.1N
H	4	00:31:35	1806005473	PD	@A77N

http://viewdev.paturnpike.com/QvAJAXzfc/opendoc.htm?document=accesspoint-all%20users%5Cearly%20warning%20detection_new.qvw&host=QVS%40cvqlikviewd1

An aerial photograph of a highway interchange featuring a tunnel entrance. The surrounding landscape is a dense forest with trees in various shades of green, yellow, and orange, indicating an autumn setting. The sky is a clear, pale blue. The text "What we learned?" is overlaid in the center of the image.

What we learned?

Next step?

- Data mining
- Calibration
- Verification
- Geo Analytics

Additional projects

- Partnership with ESRI – Predictive Analysis on Roadway using GeoEvent server
 - Accuweather alerts
 - Predicting Dangerous Slowdowns
- Tethered Drones – use of drones in Traffic monitoring
- Datacapable project

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