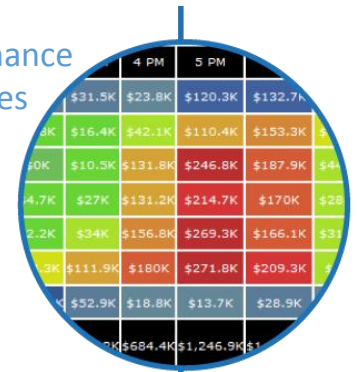


Traffic Analytics & Viz

Thoughts from the CATT Lab



Performance Measures



Planning



Operations



Communications



Data Data Everywhere!

- We generate a lot of data
 - 5,700 tweets per second [1]
 - Vehicle probe data collected for 2,800,000 segments of road in the USA every minute
 - The web recently reached 4 zettabytes [2]
 - 4,000,000,000,000,000,000,000 bytes
 - In two days we generate as much data as we generated between the beginning of time and 2003 [3]

[1] <https://blog.twitter.com/2013/new-tweets-per-second-record-and-how>

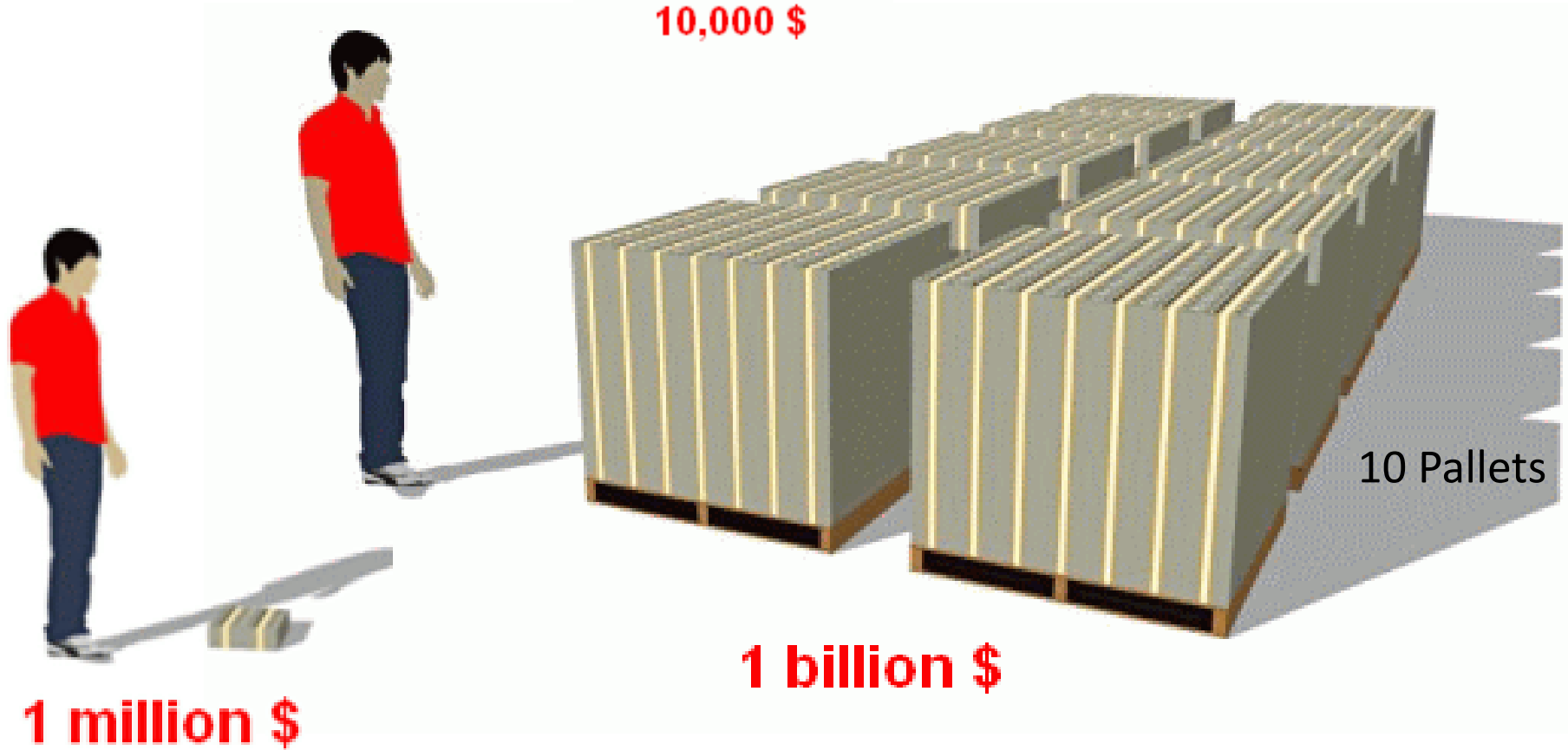
[2] <http://en.wikipedia.org/wiki/Zettabyte>

[3] <http://techcrunch.com/2010/08/04/schmidt-data/>

Those are big numbers!!!



10,000 \$



1 million \$

1 billion \$

10 Pallets

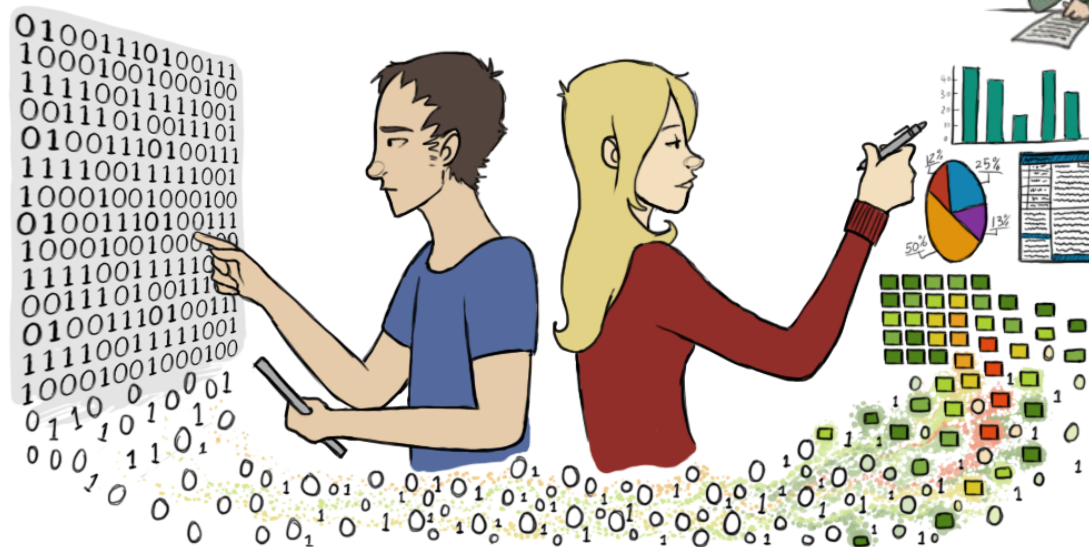
\$ 1 TRILLION
\$ 1,000,000,000,000

10,000
pallets



Our Challenge

- Our mission is to make ALL of this data
 - easily accessible,
 - usable, and
 - understandableto end users—whomever they may be...



Why Visualization?



- **Visual bandwidth is enormous**

- Human perceptual skills are remarkable
 - Trend, cluster, gap, outlier...
 - Color, size, shape, proximity...
- Human image storage is fast and vast

Visualization is so effective and useful because it utilizes one of the channels to our brain that have the highest bandwidths: our eyes.

- Robert Kosara

An Experiment:

On the next slide, tell me the 3 countries with the largest values beside them.

You have 3-seconds.

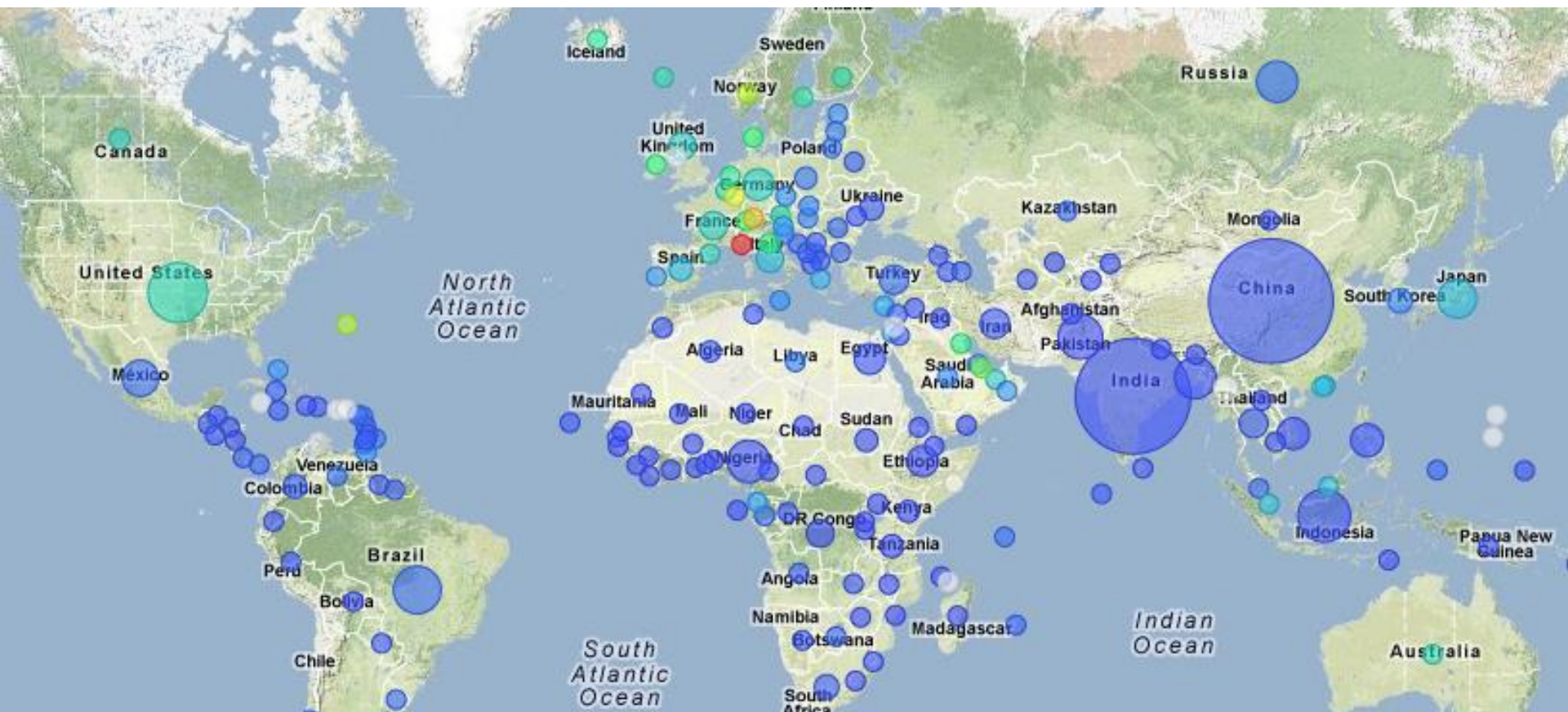
	Road deaths per 100,000 population	Population (millions)	Road deaths
Australia	8.0	20.3	1,627
Austria	9.3	8.2	768
Belgium	10.4	10.4	1,089
Canada	9.1	32.3	2,925
Czech Republic	12.6	10.2	1,286
Denmark	6.1	5.4	331
Finland	7.2	5.2	379
France	8.8	60.6	5,318
Germany	6.5	82.5	5,361
Great Britain	5.5	58.5	3,201
Greece	15.0	11.1	1,658
Hungary	12.7	10.1	1,278
Iceland	6.3	0.3	19
Ireland	9.5	4.2	396
Italy	-	-	-
Japan	6.2	127.8	7,931
Luxembourg	-	-	-
Netherlands	4.6	16.3	750
New Zealand	9.9	4.1	405
Norway	4.9	4.6	224
Poland	14.3	38.2	5,444
Portugal	11.8	10.6	1,247
Slovakia	-	-	-
Slovenia	12.9	2.0	258
South Korea	13.2	48.3	6,376
Spain	10.2	43.5	4,442
Sweden	4.9	9.0	440
Switzerland	5.5	7.4	409
Turkey	-	-	-
United States of America	14.7	306.4	43,443
OECD median	9.5		

What did you see?

Same Experiment:

On the next slide, find me the 3 countries with the largest values over them.

You have 3-seconds.



Good performance measures are like a really good movie

- 1) They tell a compelling story from beginning to end
- 2) about a compelling issue, and
- 3) they make important discoveries/observations along the way.



Performance Measures =
Story Telling

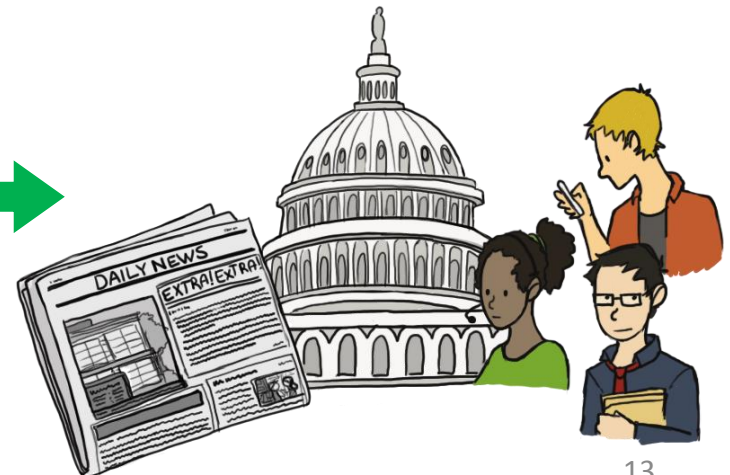
Who is your audience?



- Engineers
- Planners
- Operators

Vs.

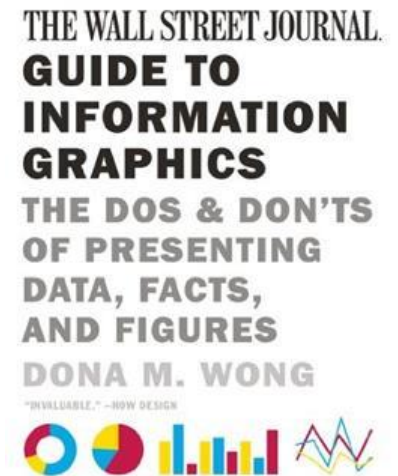
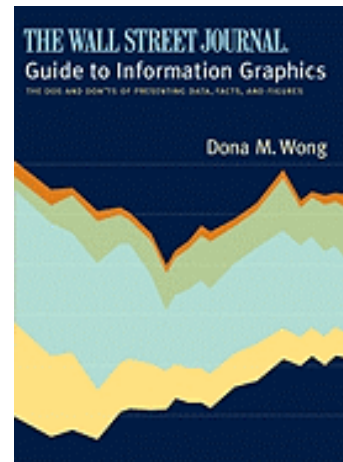
- Legislators
- Media
- Decision Makers
- Public



Ethics in InfoViz

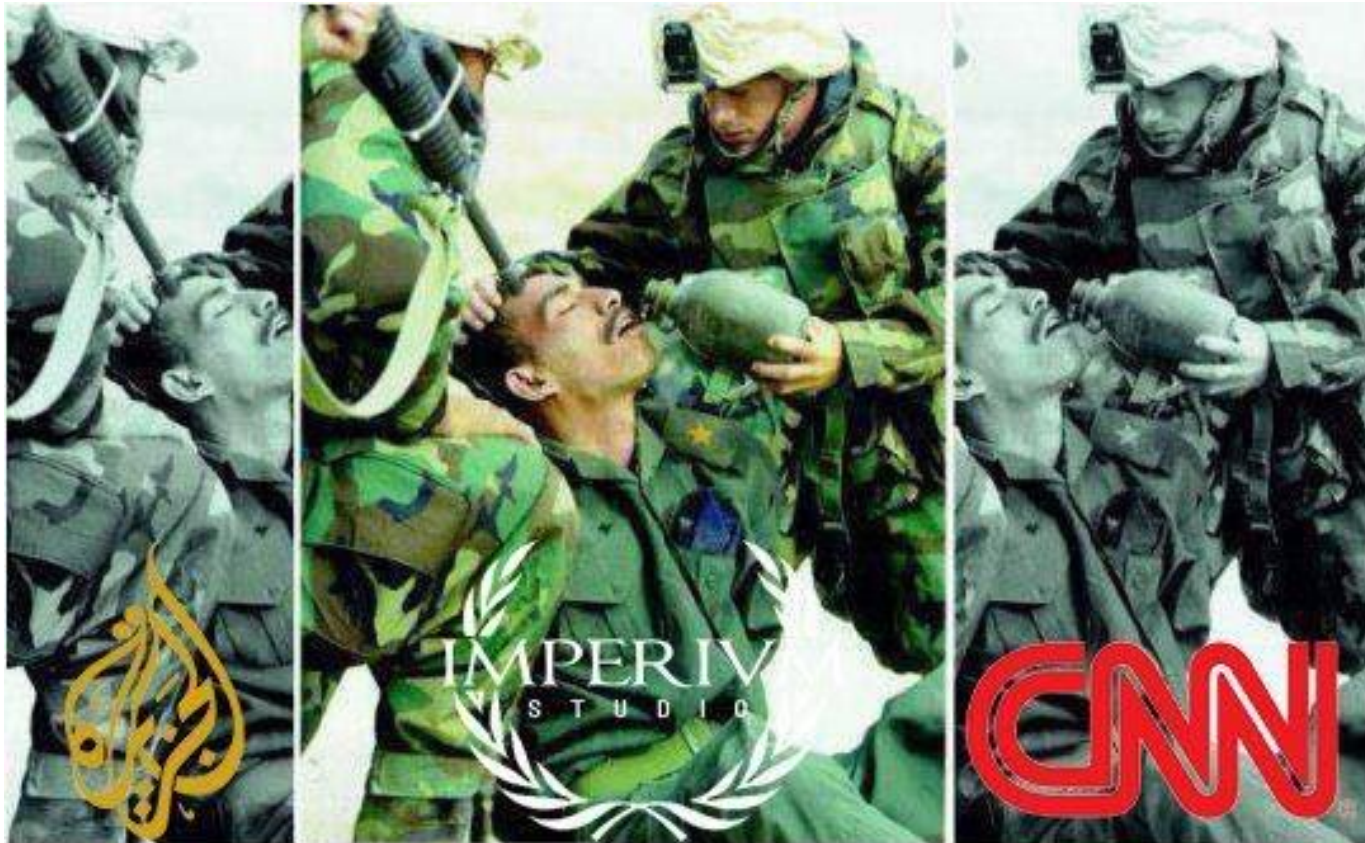
- Graphics are powerful, but they can be misused!
- Colors matter, fonts matter, location matters, size matters (no matter what she says)
- Cold War example.

Great Resource!!! →







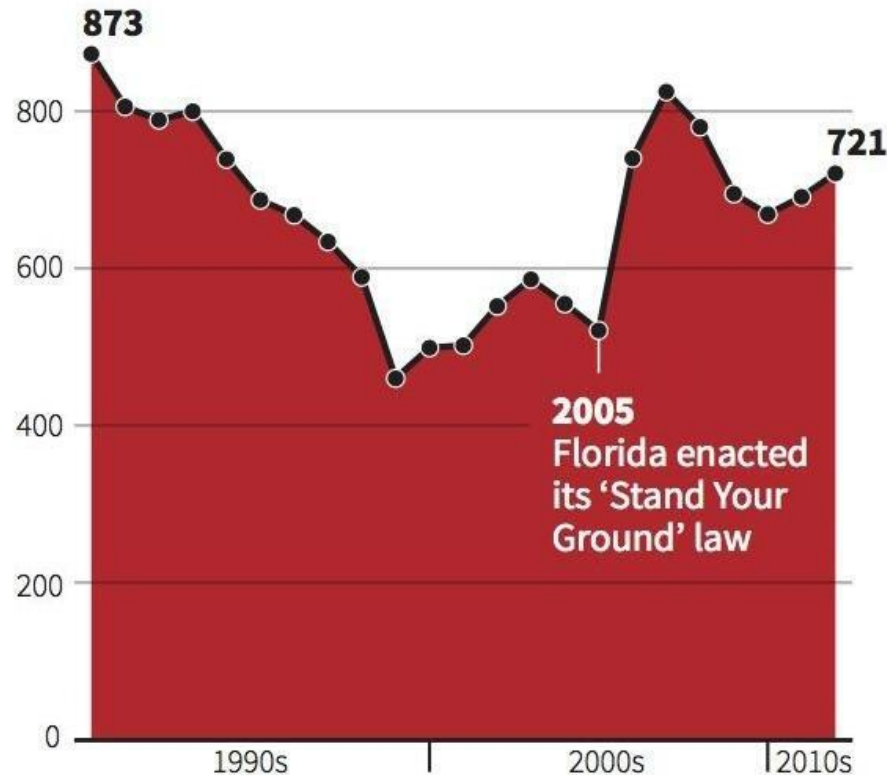


How the Media can manipulate our viewpoint

The devil is in the details: Don't break expectations

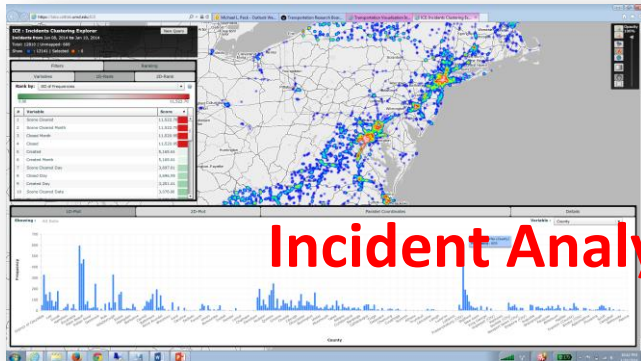
Gun deaths in Florida

Number of murders committed using firearms

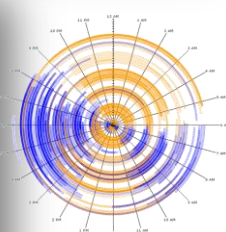


Source: Florida Department of Law Enforcement

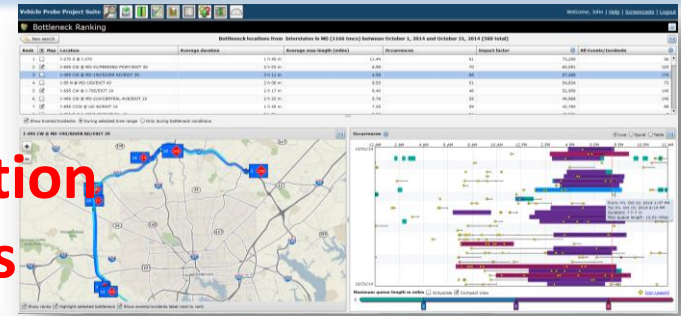
Our Growing Suite of Empowering Visual Analytics



Incident Analysis



Congestion Analysis

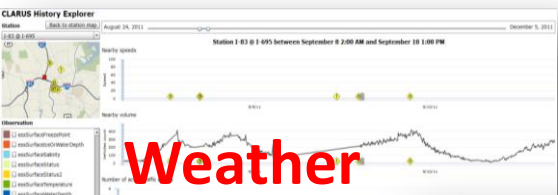


Combined passenger and commercial delay costs (in thousands of dollars)

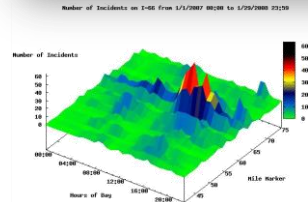
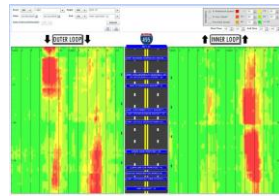
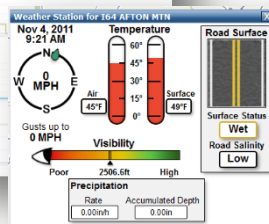
	12 AM	1 AM	2 AM	3 AM	4 AM	5 AM	6 AM	7 AM	8 AM	9 AM	10 AM	11 AM	12 PM	1 PM	2 PM	3 PM	4 PM	5 PM	6 PM	7 PM	8 PM	9 PM	10 PM	11 PM	Daily Totals
1/14/13	\$0.2K	\$0.1K	\$0.1K	\$0.1K	\$0.2K	\$0.2K	\$11.9K	\$16.2K	\$2.7K	\$0.5K	\$0.2K	\$0.1K	\$0.2K	\$0.1K	\$1.4K	\$7.7K	\$10K	\$1K	\$0.1K	\$0.1K	\$0.1K	\$0.1K	\$0.1K	\$0.1K	\$58.7K
1/15/13	\$0.1K	\$0.1K	\$0.1K	\$0.1K	\$0K	\$0.4K	\$12.9K	\$17.6K	\$2.7K	\$0.1K	\$0.2K	\$0.1K	\$0K	\$0.2K	\$5.9K	\$12.9K	\$21K	\$9.5K	\$3.3K	\$0K	\$0.1K	\$0.1K	\$0.1K	\$0K	\$96.1K
1/16/13	\$0.1K	\$0.1K	\$0K	\$0K	\$0K	\$0.1K	\$12.1K	\$14.4K	\$0.9K	\$0.1K	\$0.1K	\$0.1K	\$0K	\$0.6K	\$4.4K	\$14.9K	\$21.4K	\$6.5K	\$0.1K	\$0K	\$0.1K	\$0K	\$0K	\$0K	\$75.9K
1/17/13	\$0K	\$0K	\$0K	\$0K	\$0K	\$0.3K	\$12.2K	\$14.8K	\$2.1K	\$0K	\$0.4K	\$0K	\$0K	\$0.2K	\$4.3K	\$19.6K	\$25.8K	\$6.5K	\$0.1K	\$0.1K	\$0K	\$0K	\$0K	\$0K	\$86.5K
1/18/13	\$0K	\$0.1K	\$0.1K	\$0K	\$0K	\$0K	\$9K	\$7K	\$0.2K	\$0K	\$0.2K	\$0.2K	\$0K	\$0.1K	\$0.1K	\$0.1K	\$14.8K	\$0.9K	\$0.1K	\$0.1K	\$0K	\$0.1K	\$0.1K	\$0.1K	\$51.3K
1/19/13	\$0.1K	\$0.1K	\$0.2K	\$0.1K	\$0K	\$0.1K	\$0.1K	\$0.1K	\$0.1K	\$0K	\$0.1K	\$0.1K	\$0K	\$0.1K	\$0.1K	\$0.1K	\$0.1K	\$0K	\$0K	\$0K	\$0K	\$0K	\$0.1K	\$0.1K	\$2.2K
1/20/13	\$0K	\$0.1K	\$0.1K	\$0K	\$0K	\$0.1K	\$0.1K	\$0.1K	\$0.1K	\$0K	\$0.1K	\$0.1K	\$0K	\$0.1K	\$0.1K	\$0.1K	\$0.1K	\$0.1K	\$0.1K	\$0.1K	\$0.1K	\$0.1K	\$0.1K	\$0.1K	\$1.7K
Hourly Totals	\$0.5K	\$0.5K	\$0.6K	\$0.3K	\$0.4K	\$0.2K	\$1.1K	\$58.4K	\$70.2K	\$8.8K	\$0.8K	\$0.8K	\$0.8K	\$0.8K	\$0.8K	\$0.8K	\$0.8K	\$93K	\$23.5K	\$3.6K	\$0.4K	\$0.4K	\$1.2K	\$0.5K	Grand Total \$357.44K

Thu Jan 17 2013 17:00:00
 Delay cost: Total: \$25,751.51 Per user: \$9.22
 Hours of delay: Total: 1,176.45 hours Per user: 0.35 hours
 Data validity: 96.67%
 Click the table cell to see links to congestion scans

Download as CSV



Weather Analysis



Enabling Informed Decision Making

To receive slide deck examples of **Transportation Visual Analytics** for Safety, Operations, and Congestion, along with other visualization resources please email:

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