

Evolution of Airports in United States of America

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Concept

- A Time Series Visualization of the Airline Industry, animating the onset of different airports at various locations across the United States.

Research Questions

- We wanted to visualize the air travel industry in USA. Which were the first airports to be established?
- how did certain airports go from being scarcely used to one of the busiest airports in the world?

Motivation

There is a plethora of Flight visualizations on the flight routes, flight delays and airport to airport maps of routes.

But there is no real chronicle on how this huge air transportation network evolved from its onset.

This was compelling reason for us to venture into this wide corpus of data spanning over 21 years!
(over 10gb of data)

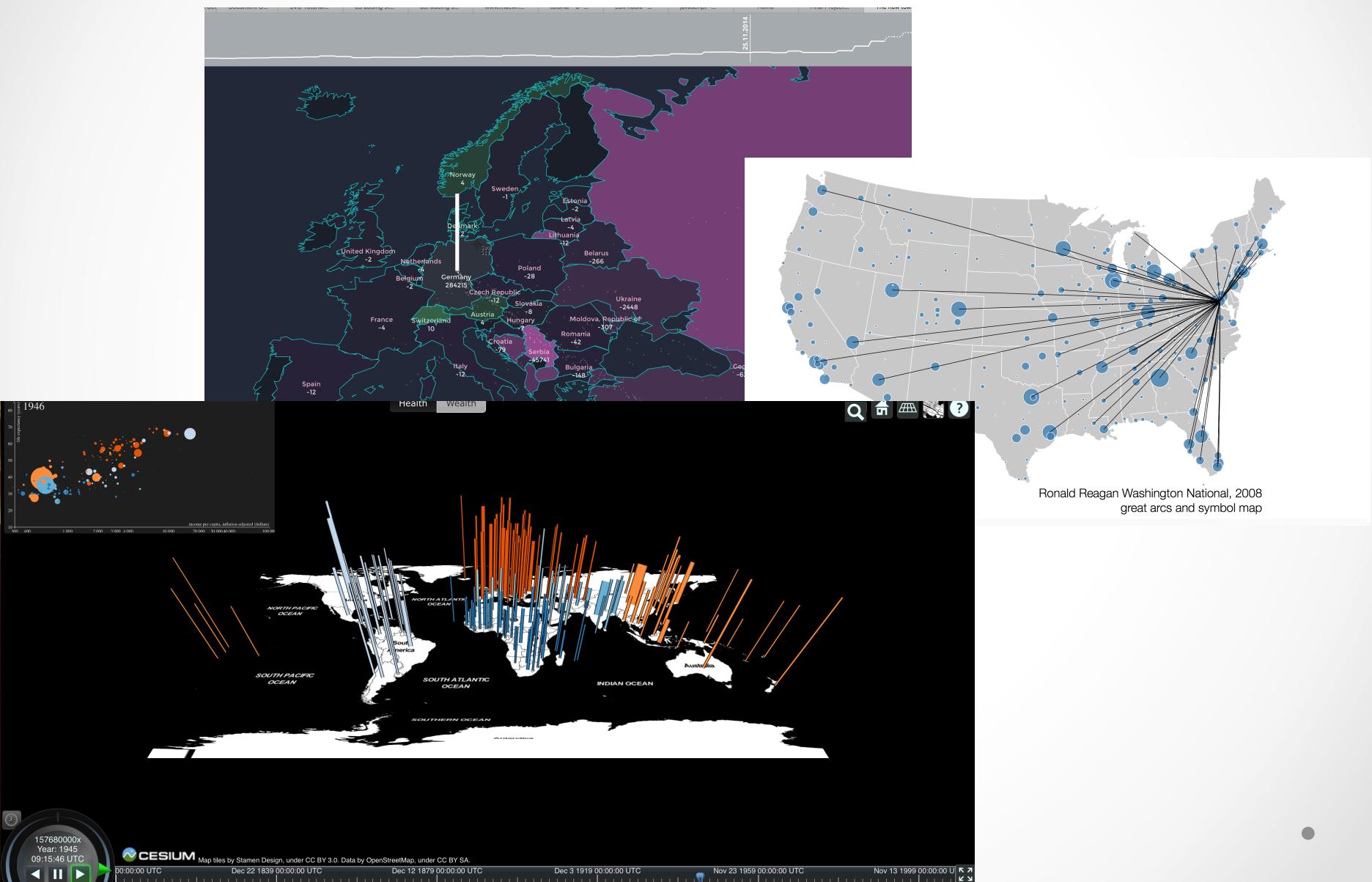
Data Wrangling

- Source:
<http://stat-computing.org/dataexpo/2009/the-data.html>
- Initial Data
 - From 1987 to 2009
 - Details
 - each file had around 1,041,827 rows, 29 columns
- Cannot be processed in Excel
- Hence we found the best way to take the columns we were interested in was by using Python

Data Wrangling

- We wanted the number of times the location acted as a Source and acted as a Destination
- We realized a simple value_counts with slicing of 20 would not work because a certain airport may be the Origin more frequently than a Destination, or vice versa

Existing Work

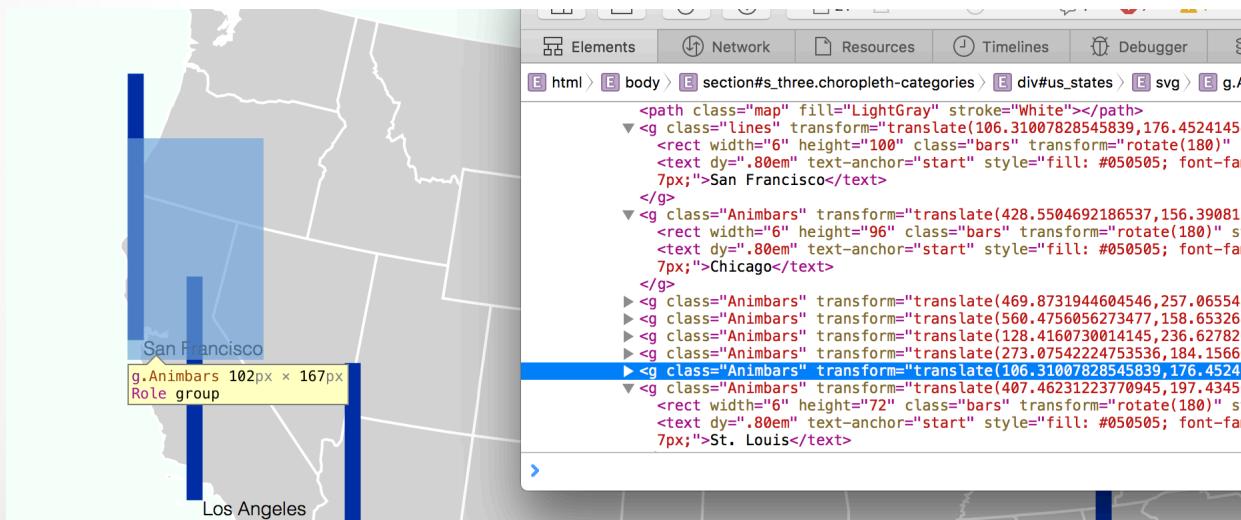


Visualization Techniques

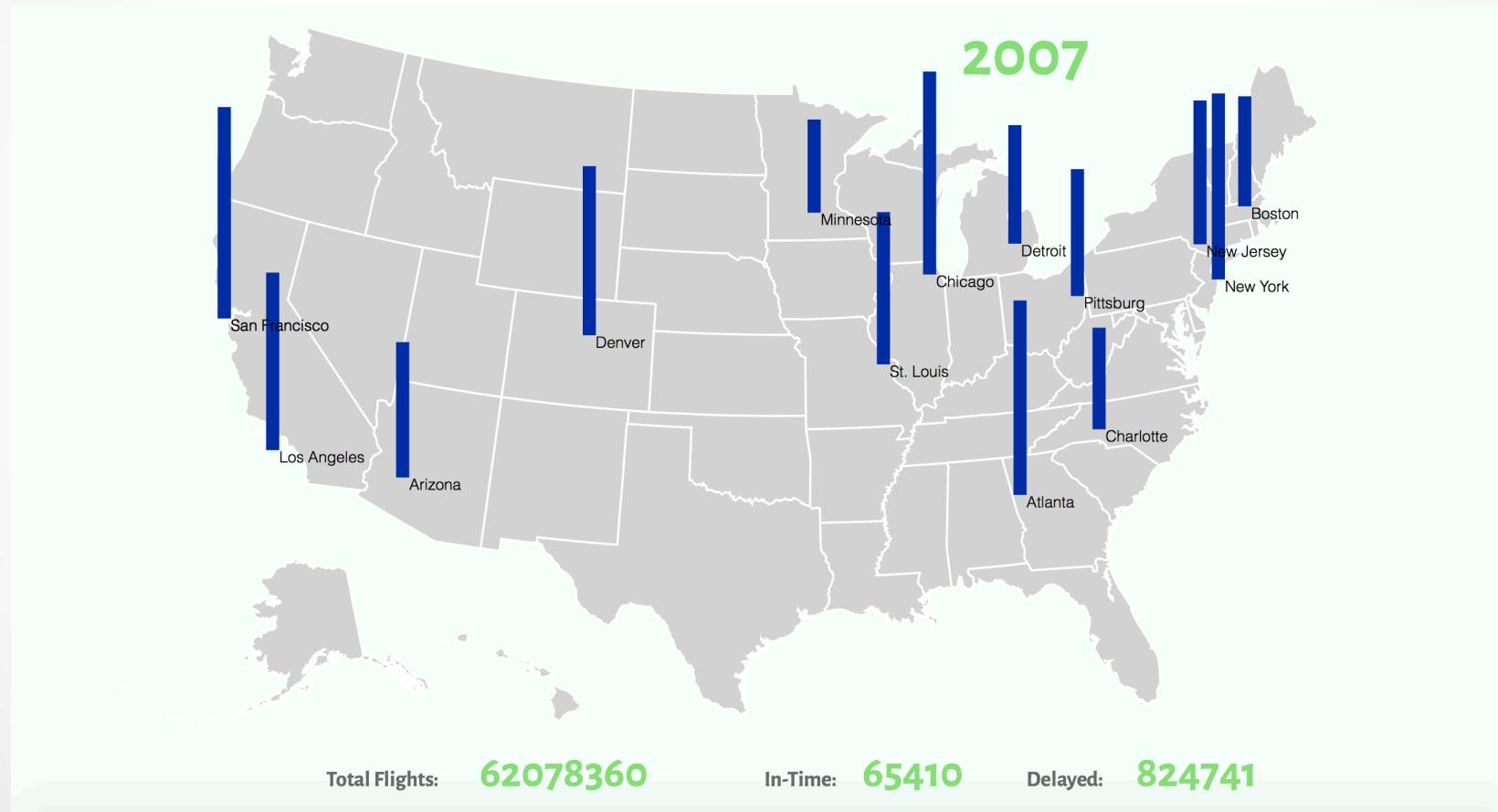
- A time series visualization with YEAR clock synced with Bar transitions.
- Along with year clock, we have some basic stats animating using the text tweens
- Groups that contain elements like text and rectangles that animate over time.
- To visually understand the magnitude we have a legend

Viz Technique cont.

- Linear scaling !
- - For the Magnitude of bars
 - The linegraph data scales
- Groups containing [Bars + Text label + mouse over event call]



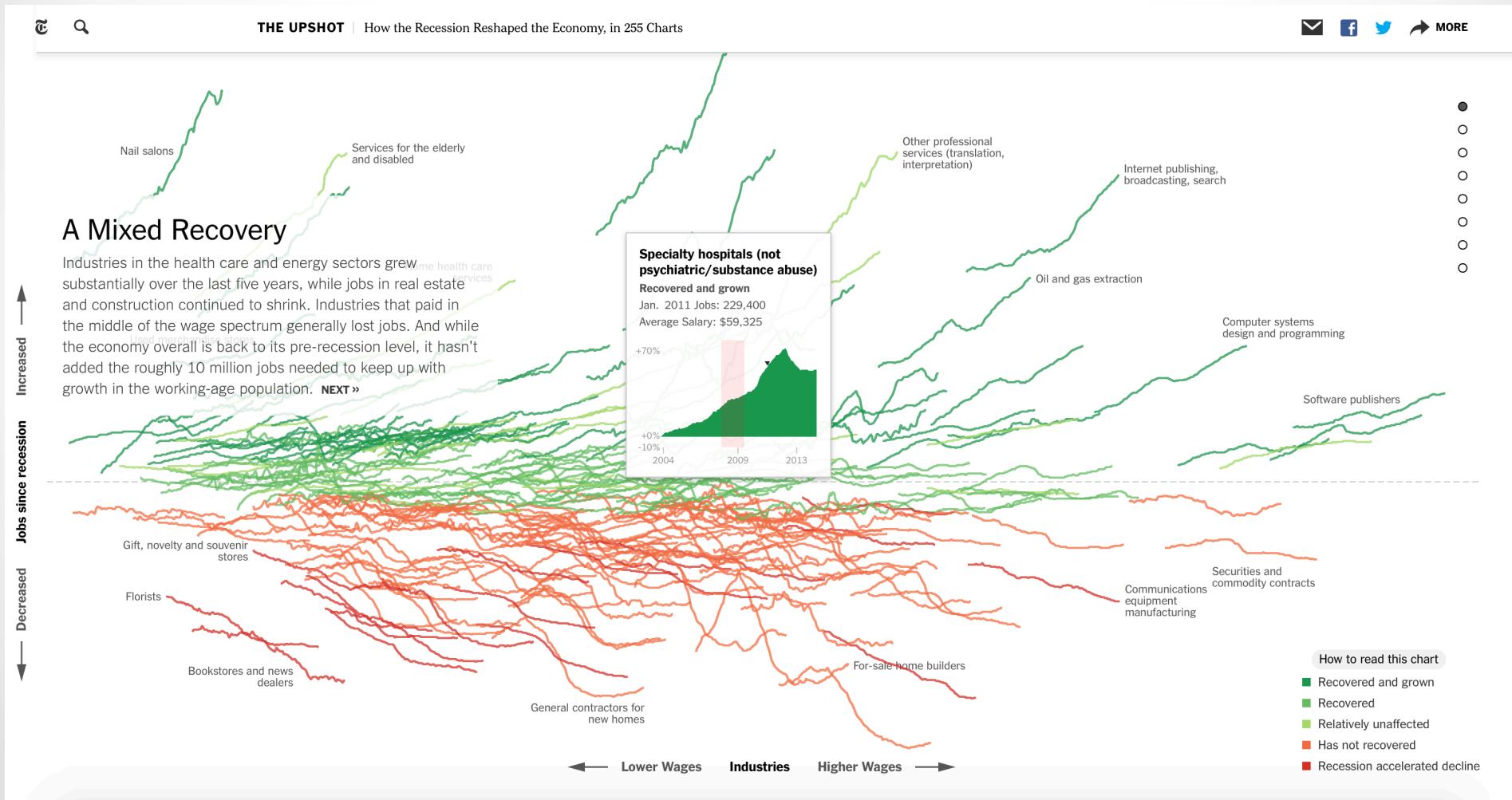
Our visualization, half way!



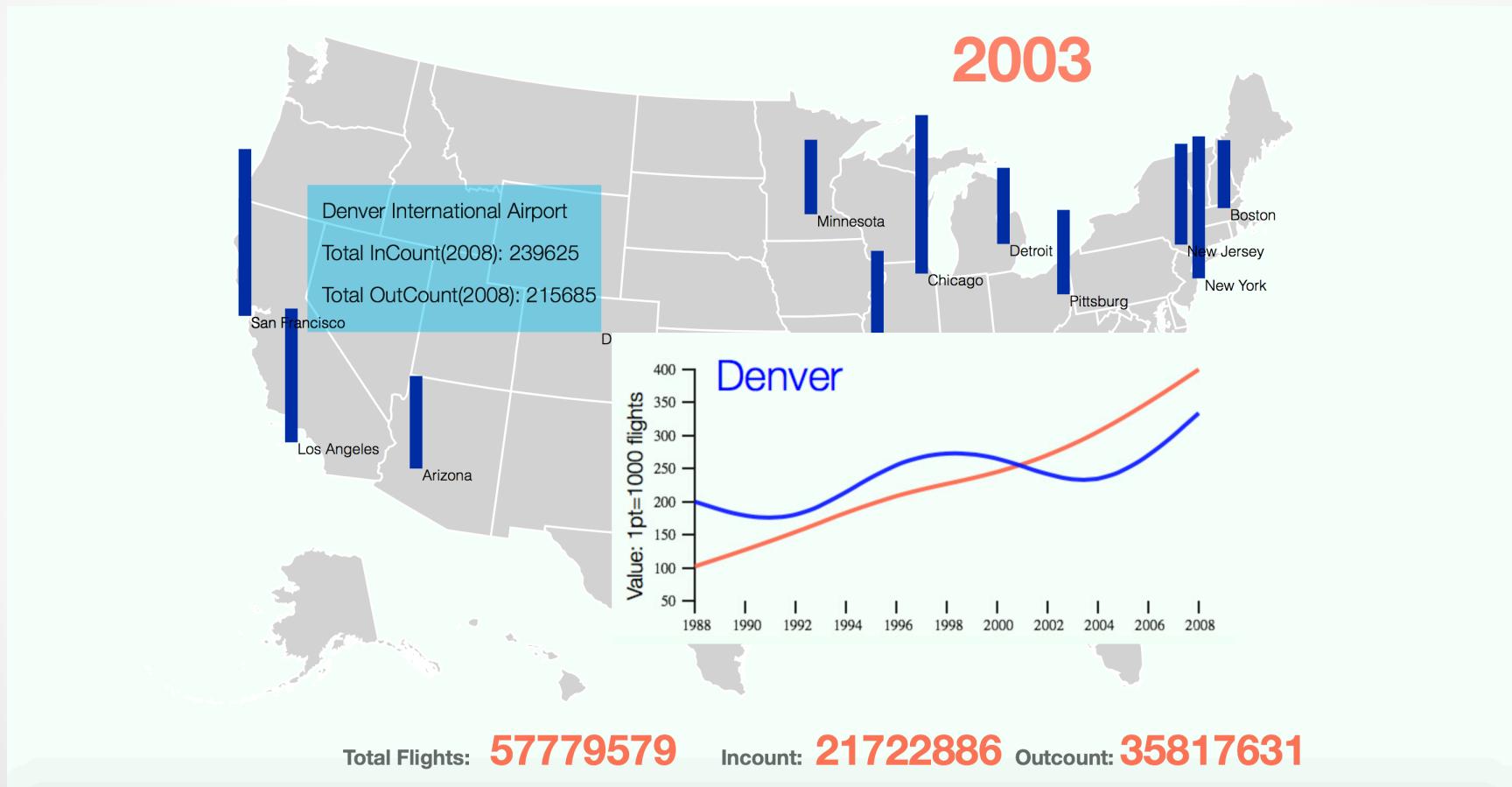
Suggestions

- We had initially considered only placing bar's to show the magnitude of increase in traffic at different airports
- After discussion with YY, he suggested we reconsider since the information could better be represented as in the below visualization by nytimes
- We now create a trend chart for each of the airports to show how the count of incoming and outgoing flights have changed over the years
- This chart is now overlaid on the map

On hover



Our Outcome:



Future work: Thanksgiving Flight Pattern

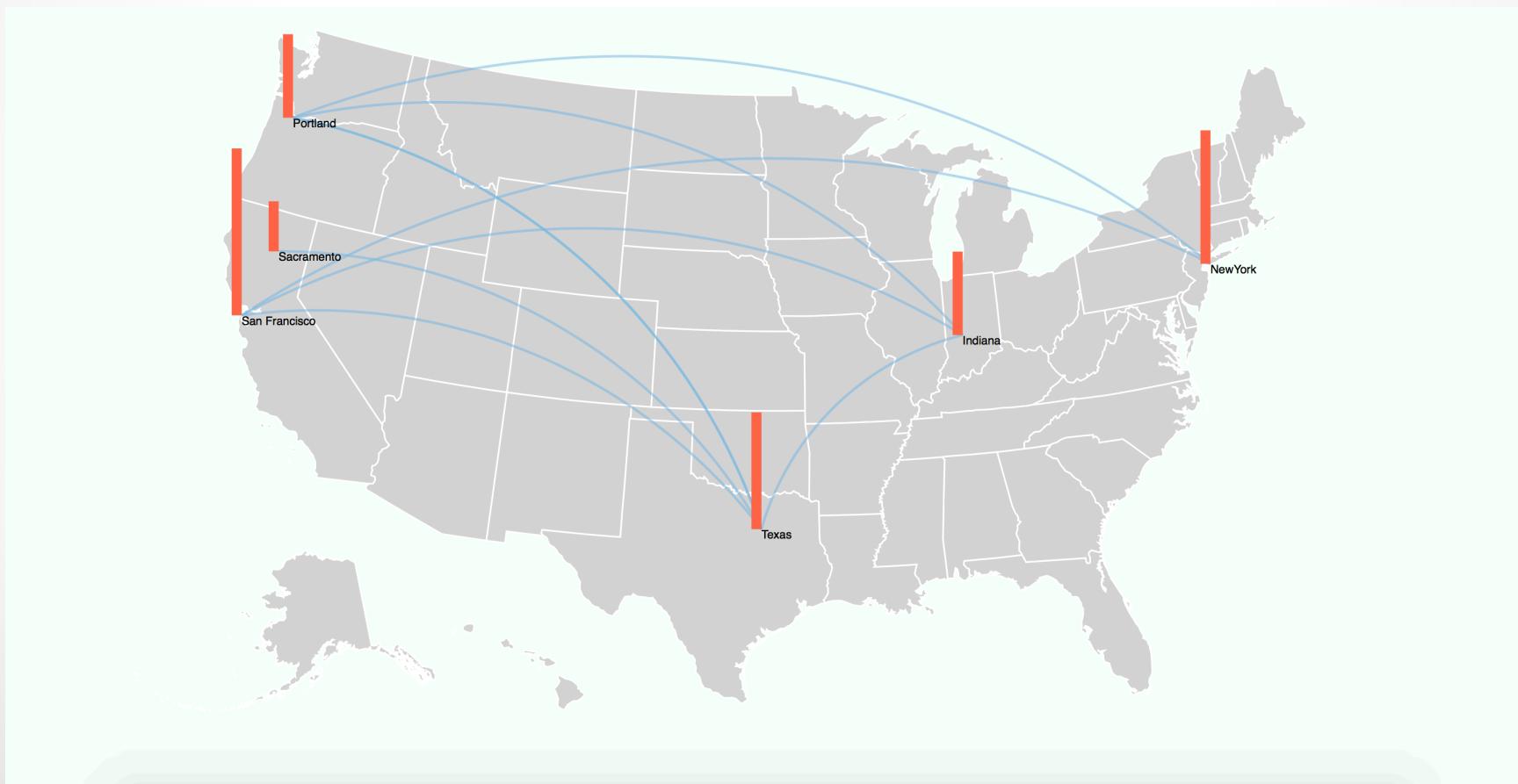
THE UPSHOT | Pumpkin Pie in Miami: Thanksgiving Flight Patterns



Width of route indicates increase
in Thanksgiving air travel demand

Our Route Projections

We used Lat/Lng pairs to generate path:



Insights

- We saw that a lot of factors influence the numbers... We had initially thought the count of incoming and outgoing traffic would increase year on year for a certain busy airport..
- We had not realised that factors like recession and other factors would reduce the number of operations at certain airports..Or airlines would choose their hubs and those airports would be the layover locations and would continue to become more busy

References

- <http://www.aaronkoblin.com/work/flightpatterns/>
- <https://www.processing.org/examples/>
- <http://bl.ocks.org/mbostock/5851933>
- <https://flowingdata.com/2009/09/10/3-in-depth-views-of-flight-delays-and-cancellations/>
- http://www.transtats.bts.gov/OT_Delay/OT_DelayCause1.asp
- <http://projects.fivethirtyeight.com/flights/>

Thank You