

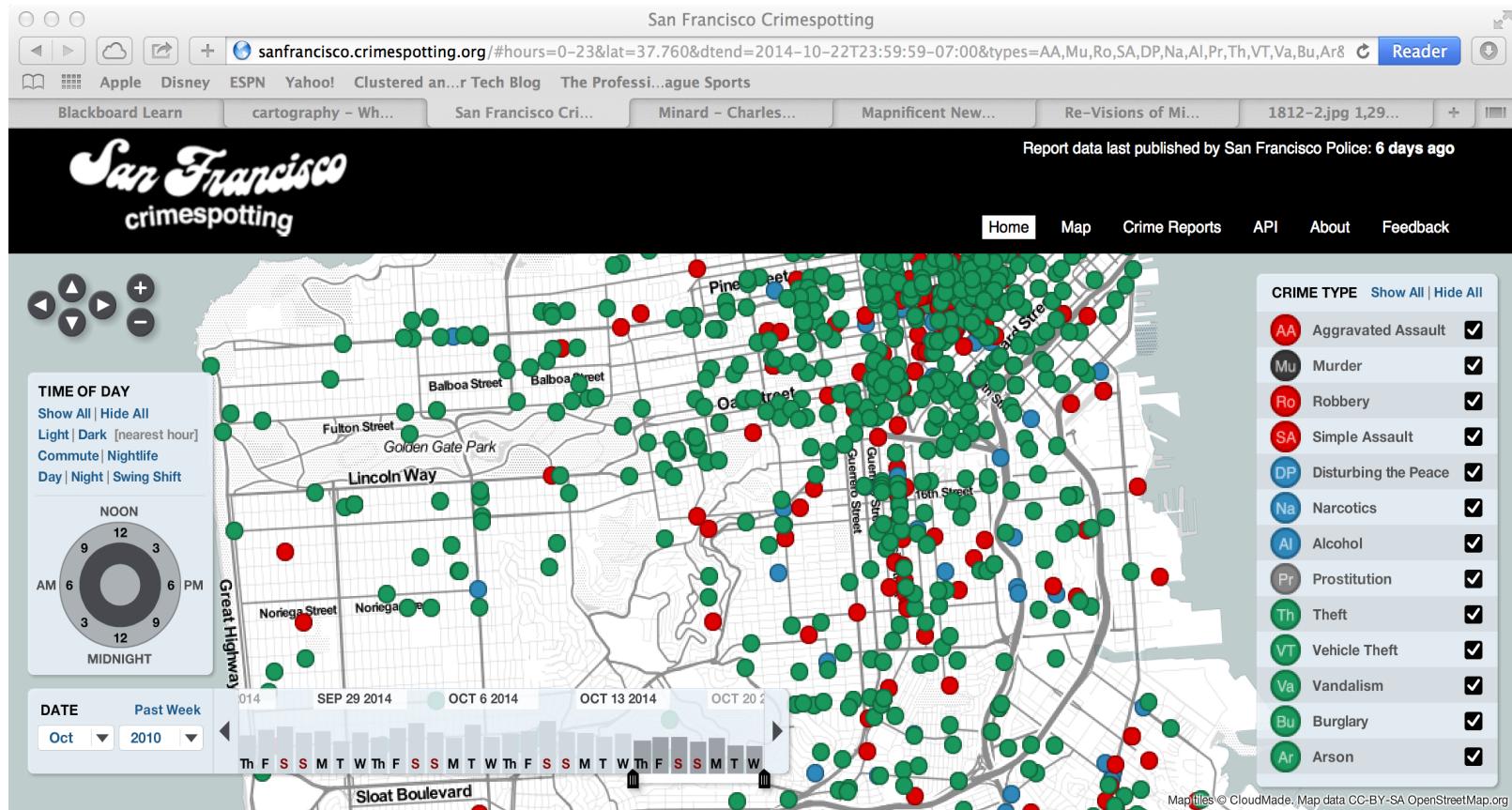
# Example Map Visualizations

# Mashup

- Anything that brings together disparate influences or elements
- Relative to application development
  - Bringing together various sources of data to create a new product with unique value

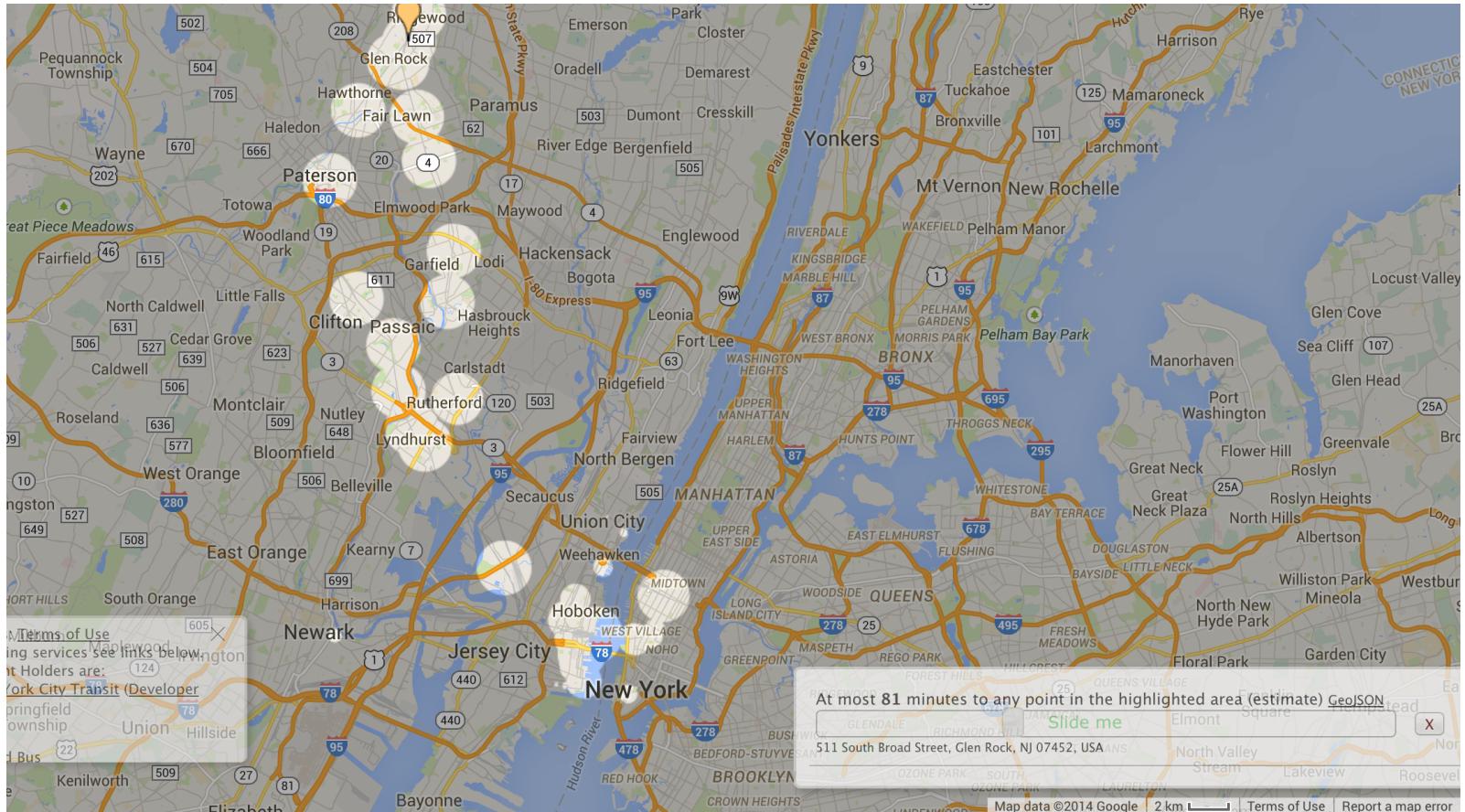
# Mashup Examples

<http://sanfrancisco.crimespotting.org>



# Mashup Examples

<http://www.mapnificent.net>



# Question

- Explore visualizations: “Play” with the apps
- Question:  
Is the visualization **useful**? If so, **how**?

# GGPLOT Map Introduction

# GGplot - Mapping Key Concepts

- `map_data`  
Get the data on the region to be mapped.
- `geom_map`  
How to render the map (e.g., colors, heatmaps).
- `coord_map`  
Make sure the map is not “stretched.”

# GGplot - Mapping Key Concepts

- map\_id is part of the AES
  - Logical way to describe data (e.g., “new york”)
  - *Note that GGplot requires all lower case.*
- Longitude and latitude:
  - Can also add a specific physical location using geom\_point; coordinates can be:
    - Hard coded
    - Via a conversion from logical to physical (e.g., use JSON to access google api)

# GGPlot R Code

```
> dummyDF <- data.frame(state.name,  
                         stringsAsFactors=FALSE)
```

```
> dummyDF$state <-  
    tolower(dummyDF$state.name)
```

→ Note state.name is data available within R.  
(There is additional info in the data set.)

```
> us <- map_data("state")
```

# Creating a Simple Map

```
> map.simple <- ggplot(dummyDF, aes(map_id = state))

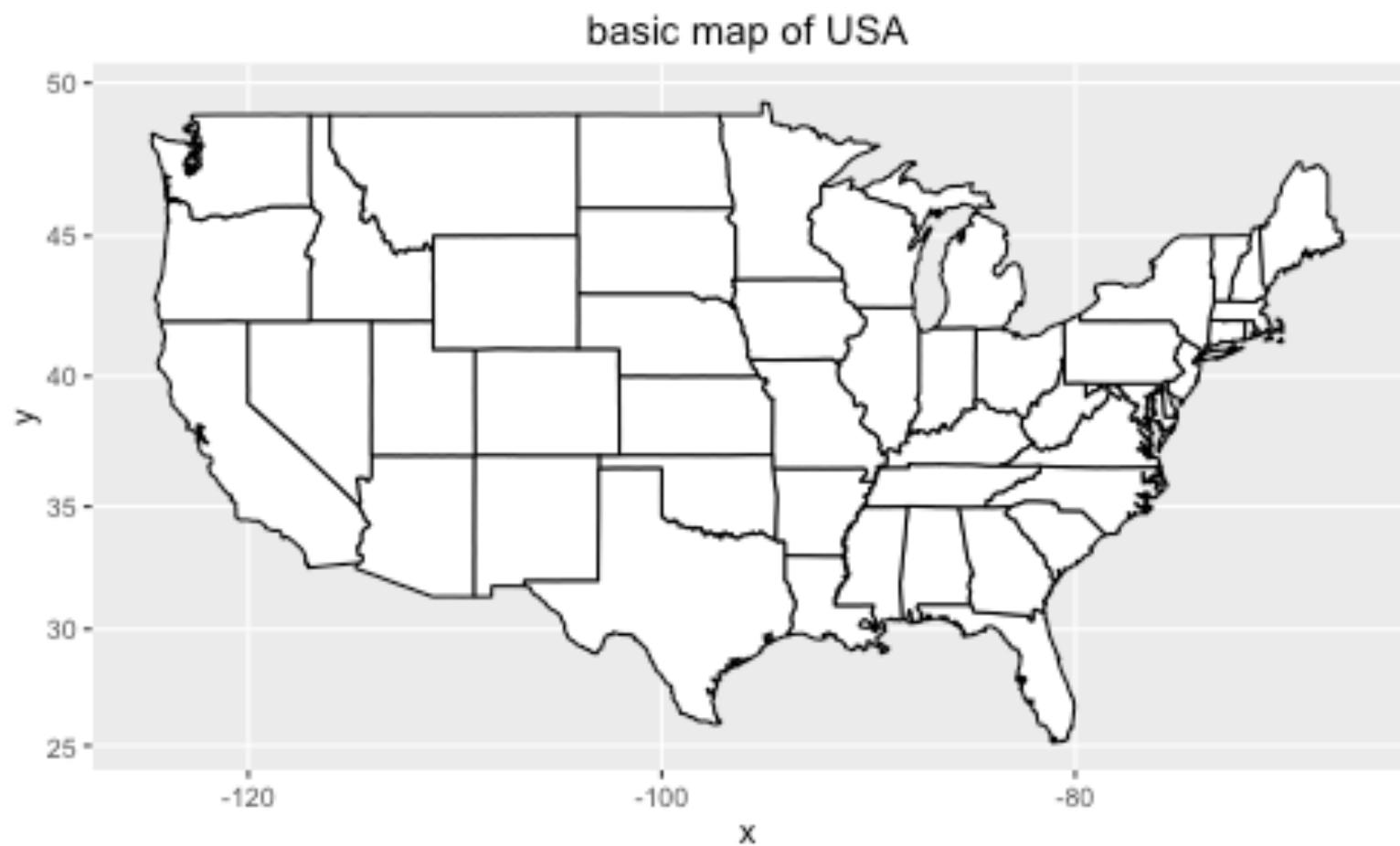
> map.simple <- map.simple +
  geom_map(map = us, fill="white", + color="black")

> map.simple <- map.simple +
  expand_limits(x = us$long, y = us$lat)

> map.simple <- map.simple +
  coord_map() + ggtitle("basic map of USA")

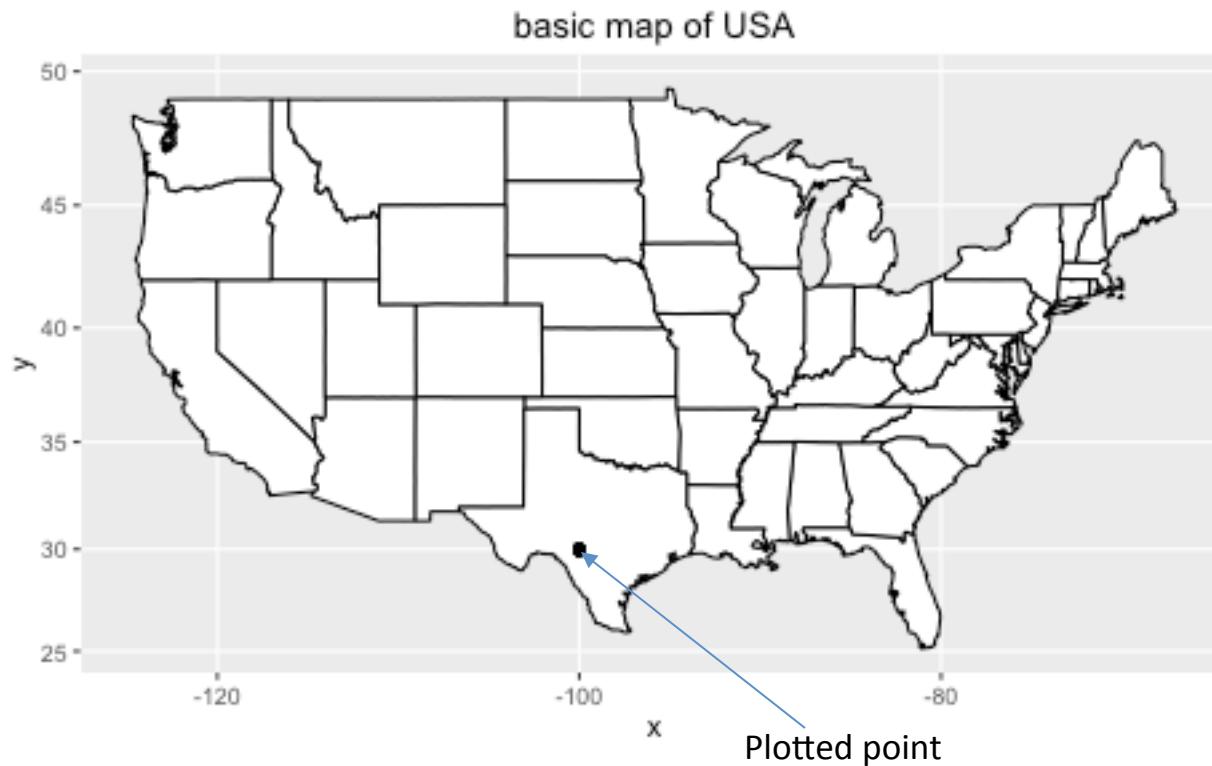
> map.simple
```

# Creating a Simple Map



# Add a Point to the Map

```
map.simple + geom_point(aes(x = -100, y = 30))
```



# Practice

Create a map and put a mark  
somewhere on the map.

# Maps and Data

## A Real Example in R

# Read in and Plot Census Data

```
#Read in the states and make lower case
```

```
> dfStates <- readCensus()
```

```
> dfStates$state <- tolower(dfStates$region)
```

```
> map.popColor <- ggplot(dfStates, aes(map_id = state))
```

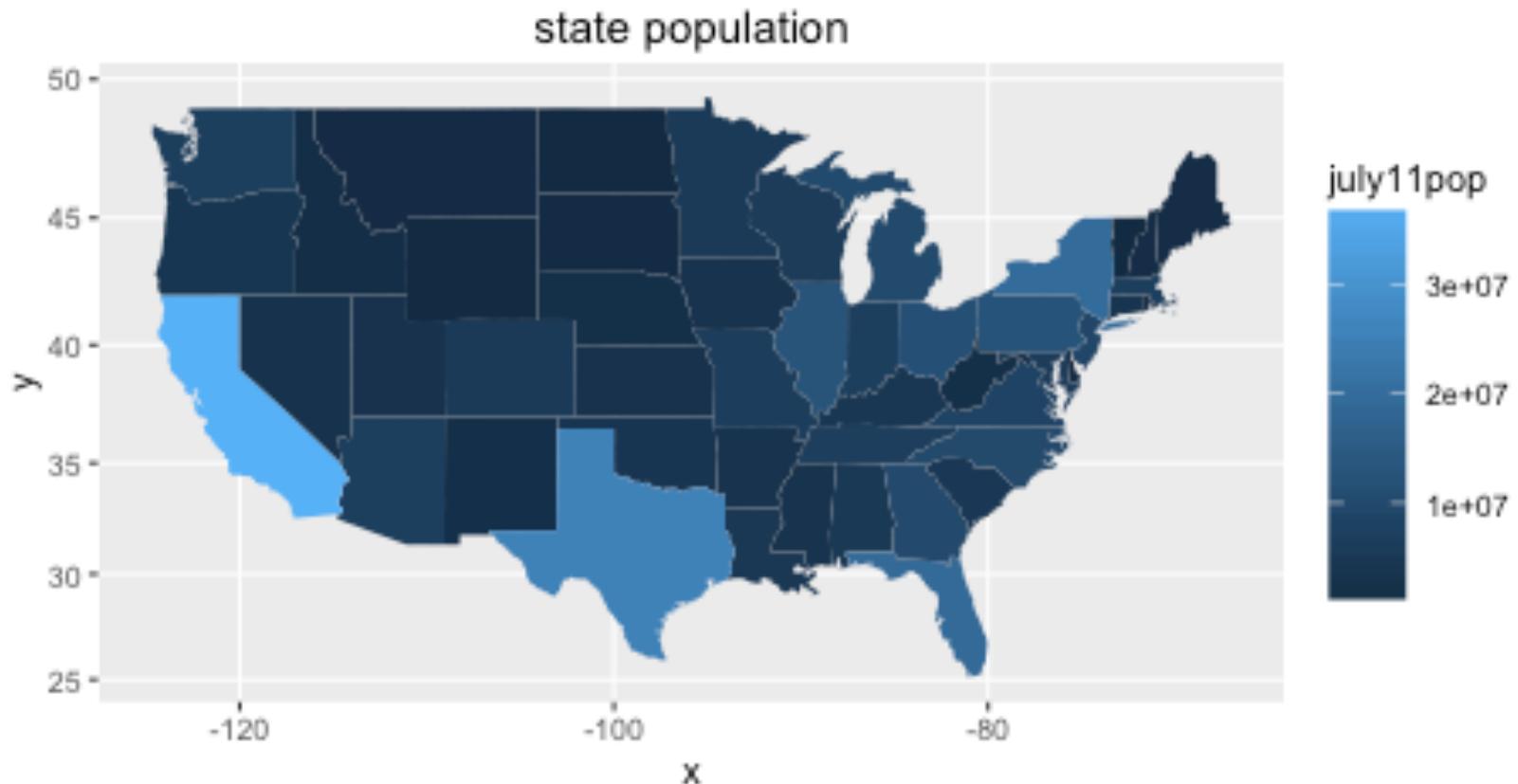
```
> map.popColor <- map.popColor +  
  geom_map(map = us, aes(fill=july11pop))
```

```
> map.popColor <- map.popColor +  
  expand_limits(x = us$long, y = us$lat)
```

```
> map.popColor <- map.popColor +  
  coord_map() + ggtitle("state population")
```

```
> map.popColor
```

# Viewing Census Data



# Getting a point to Map

```
> latlon <- geocode("syracuse university,  
                      syracuse, ny")
```

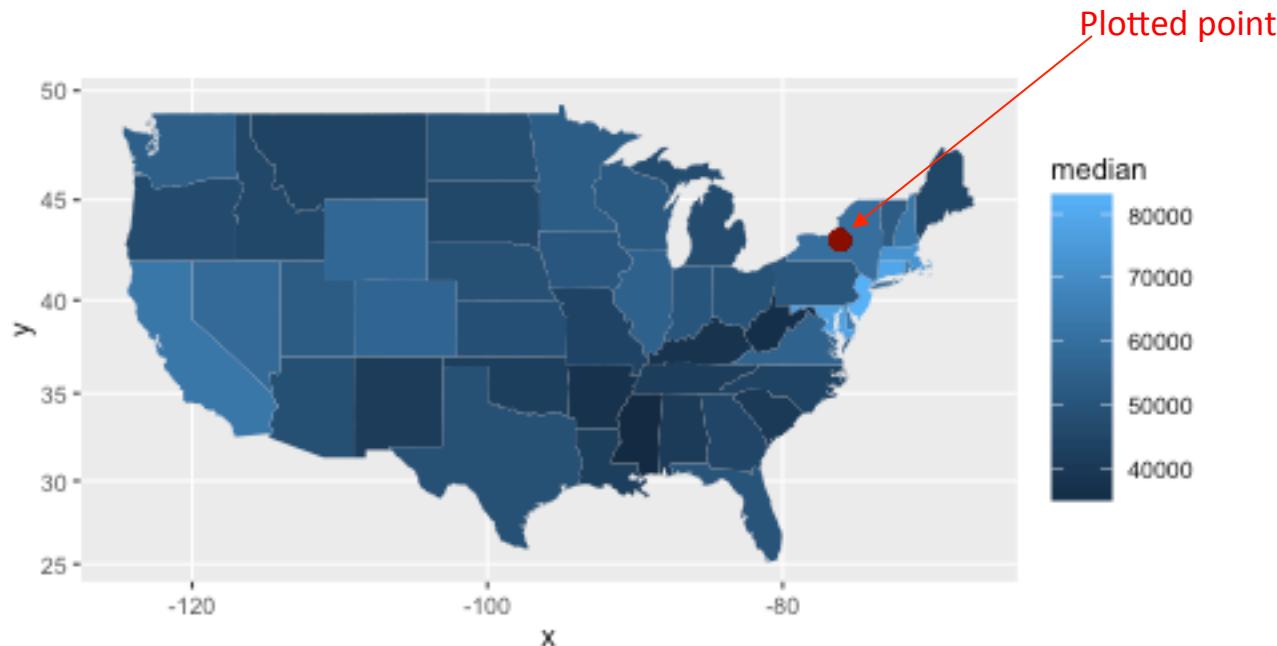
Information from URL : <http://maps.googleapis.com/maps/api/geocode/json?address=syracuse%20university,%20syracuse,%20ny&sensor=false>

```
> latlon  
    lon      lat  
1 -76.13452 43.03857
```

→ Could have used addr2latlon function we previously created!

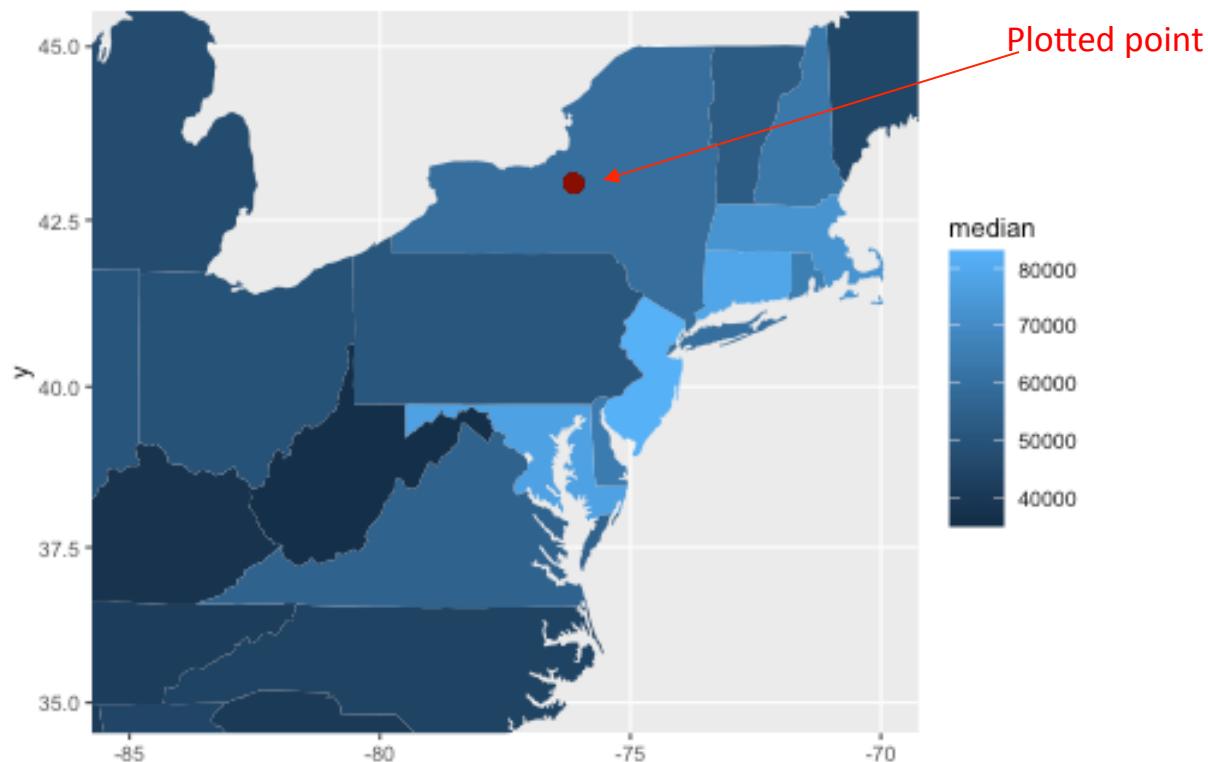
# Plotting the Point on the Map

```
>map.popColor + geom_point(aes(x = latlon$lon,  
y = latlon$lat), color="darkred", size = 3)
```



# Zooming

```
> g <- map.popColor + geom_point( aes(x = latlon$lon,  
y = latlon$lat), color="darkred", size = 3)  
> g + xlim(-85,-70) + ylim(35,45) + coord_map()
```



# Activity

Create a map of the United States,  
and put a mark in Miami, Florida.

# Maps and Data

# Example - Map and Data

Data on 10 Cities data set includes:

- Name (City, State)
- Business rating (1–10)
- Weather rating (1–10)
- Cost-of-living rating (1–10)

→ We want to map this information.

# Example - Map and Data

City	State	Business Rating	Weather Rating	Living Rating
Manhattan	NY	10	5	7
Boston	MA	7	3	6
Philadelphia	PA	6	6	6
Tampa	FL	5	7	7
Chicago	IL	7	3	5
Boise	ID	3	6	4
San Francisco	CA	10	10	6
Seattle	WA	7	7	8
Houston	TX	5	2	2

# Loading Data Into R

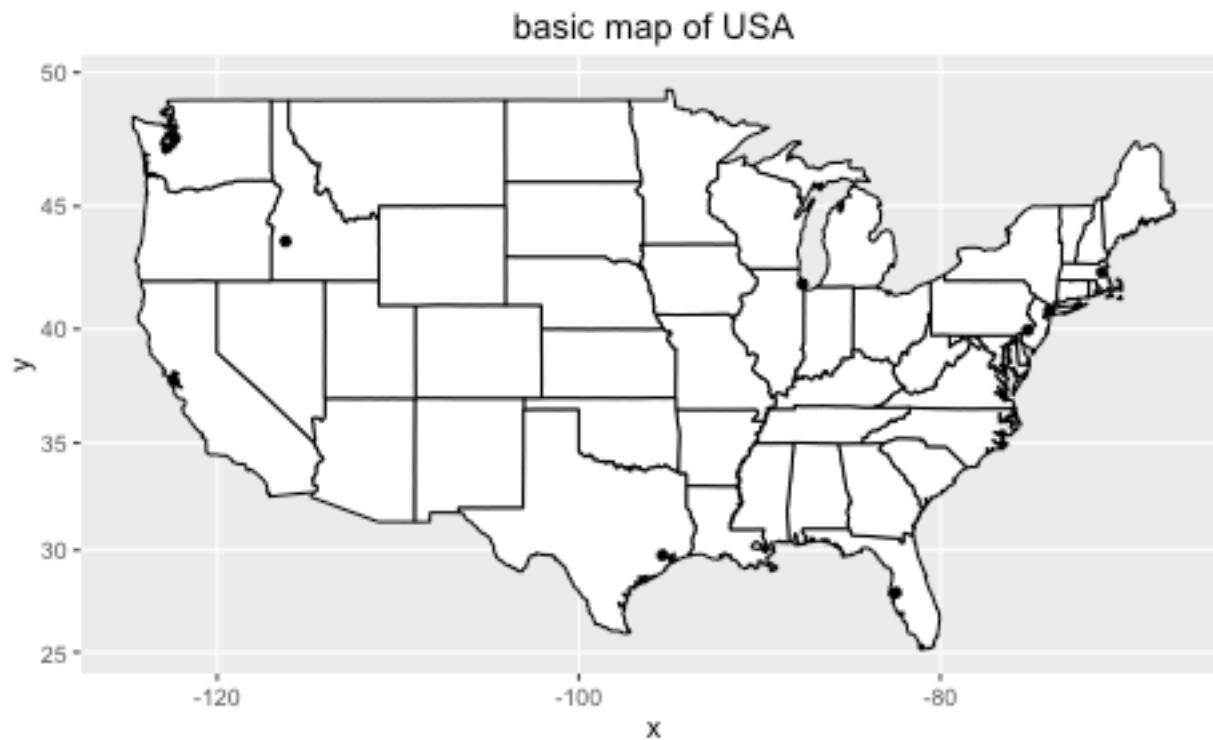
```
> cities <- c("Manhattan, NY", "Boston, MA",
  "Philadelphia, PA", "Tampa, FL", "Chicago, IL", "Boise, ID",
  "San Francisco, CA", "Seattle, WA", "Houston, TX")

> bus <- c(10,7,6,5,7,3,10,7,5)
> weather <- c(5,3,6,7,3,6,10,7,2)
> living <- c(7,6,6,7,5,4,6,8,2)

> city.df <- data.frame(cities, bus, weather, living)
> city.df$state <- statesFake
> city.df$geoCode <- geocode(cities)
```

# Putting Points on a Map

```
> map.simple + geom_point(data=cities.df,  
aes(x = geoCode$lon, y = geoCode$lat))
```



# Creating an Enhanced Map

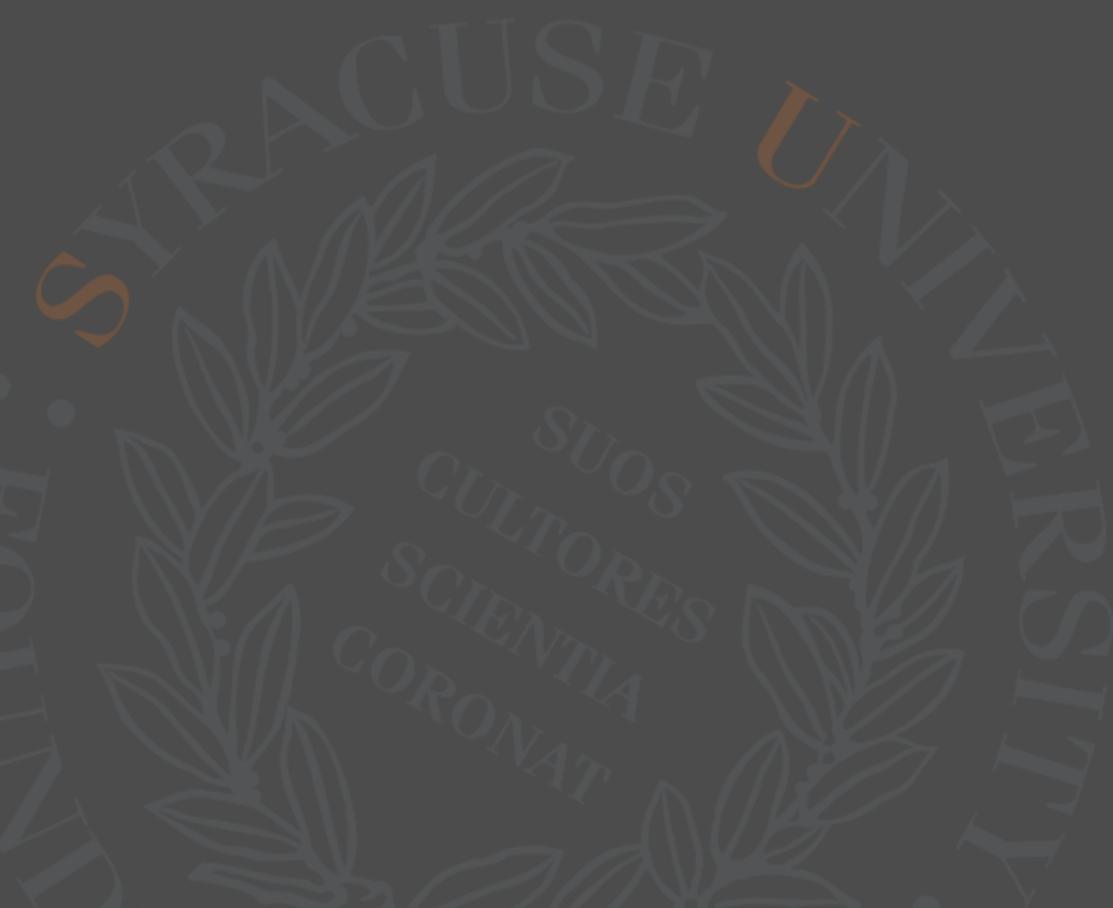
```
> map.simple + geom_point(data=city.df, aes(x =  
geoCode$lon, y = geoCode$lat, size=bus, color=weather))
```



Marker size represent business ranking  
Color represent weather

# Question

Where might maps and data be useful?



School of Information Studies  
**SYRACUSE UNIVERSITY**