Introduction to leaflet

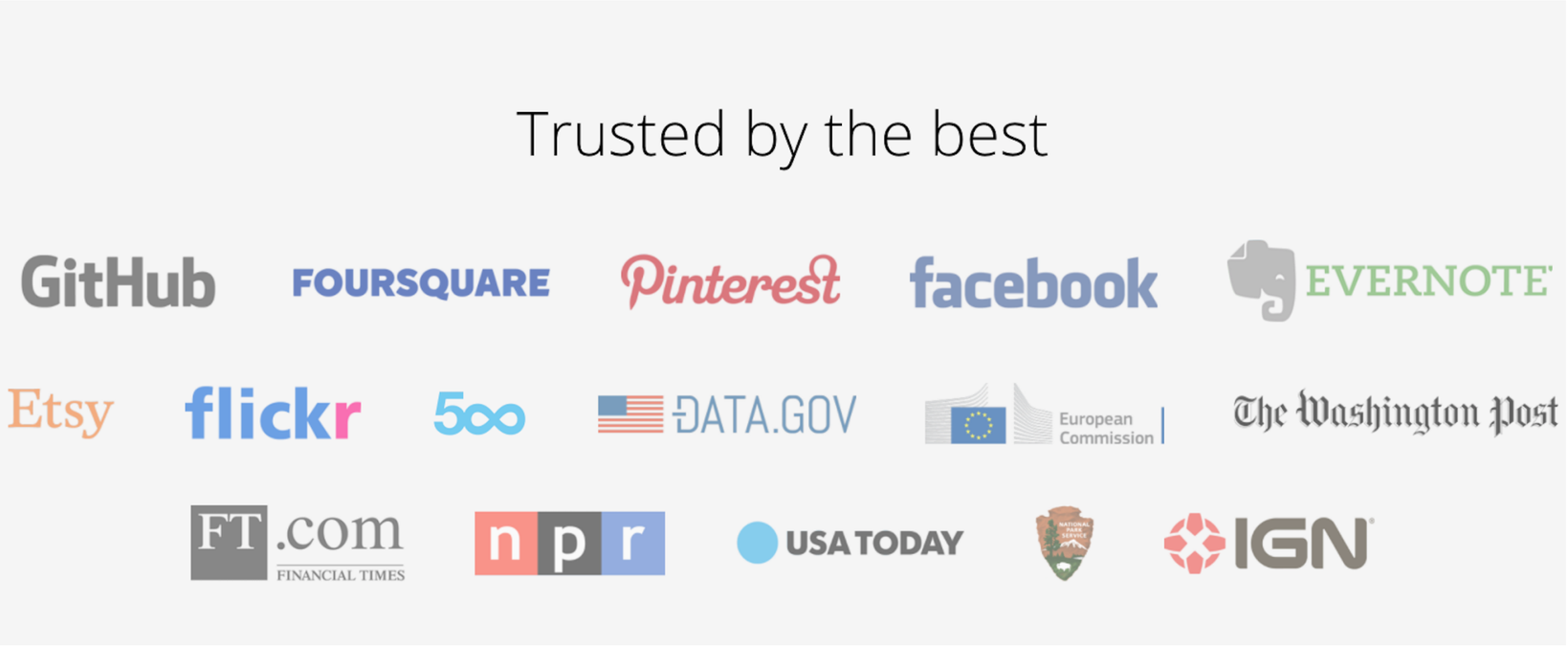
INTERACTIVE MAPS WITH LEAFLET IN R

Rich Majerus
Vice President of Strategy & Planning,
Queens University of Charlotte

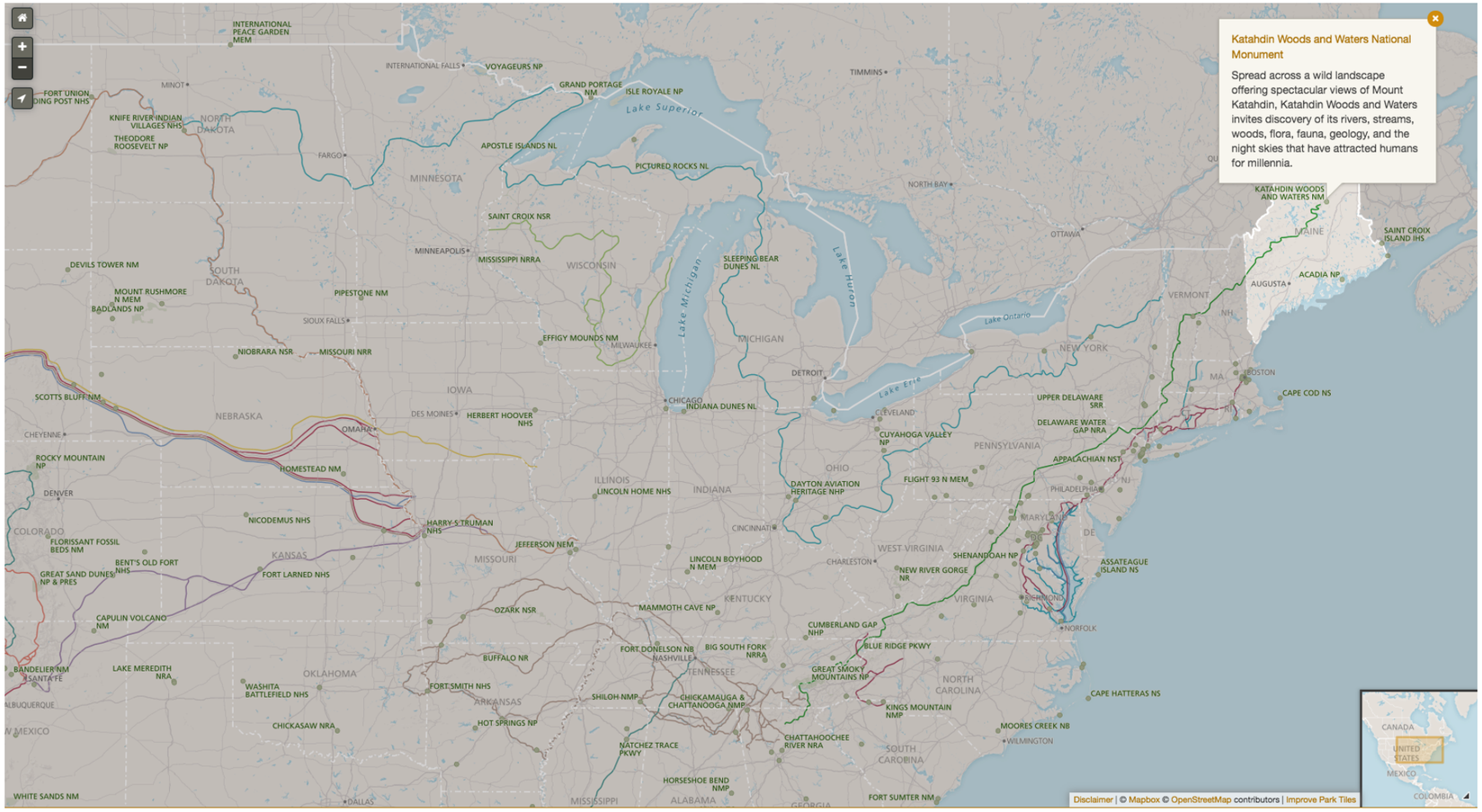
datacamp

leaflet

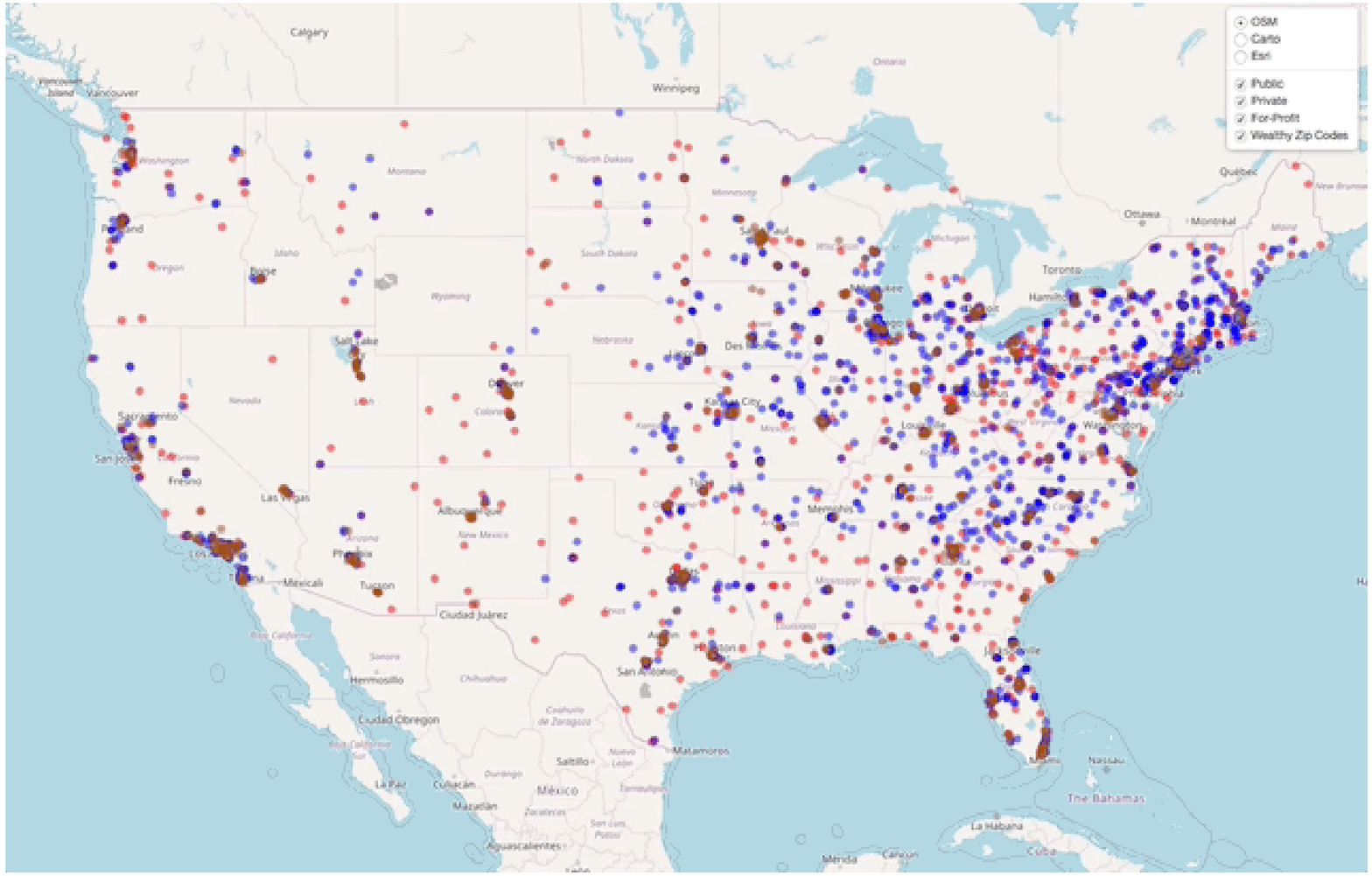
- Open-source JavaScript library
- Popular option for creating interactive mobile-friendly maps
- Can be created using only R code via the `htmlwidgets` package



leaflet Example: National Parks Service



What We are Working Toward

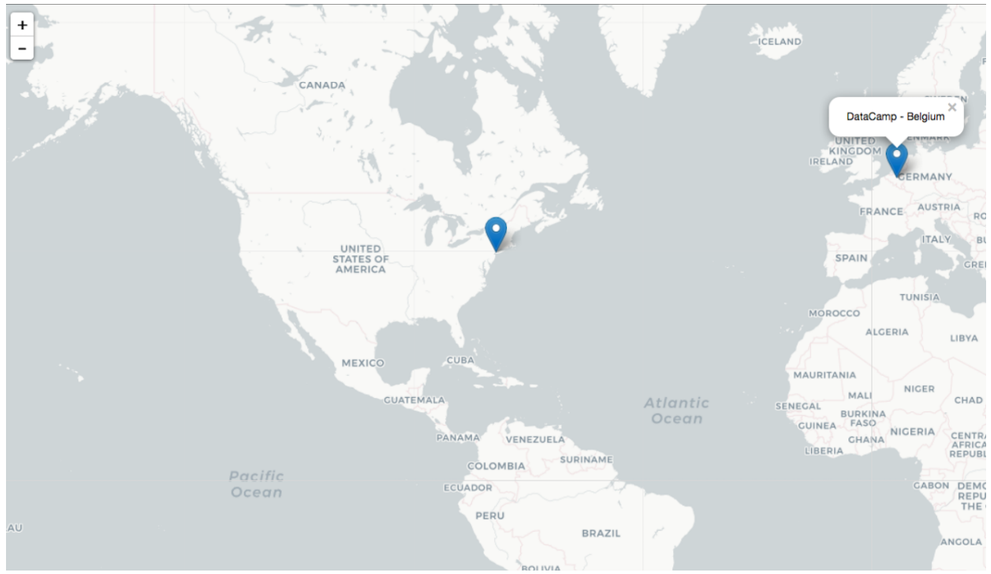


Creating our First leaflet Map

```
library(leaflet)
leaflet() %>%
    addTiles()
```

Where We are Going in Chapter 1

```
leaflet() %>%
   addProviderTiles("CartoDB") %>%
   addMarkers(lng = dc_hq$lon,
              lat = dc_hq$lat,
              popup = dc_hq$hq)
```



Let's practice!

INTERACTIVE MAPS WITH LEAFLET IN R

Provider Tiles

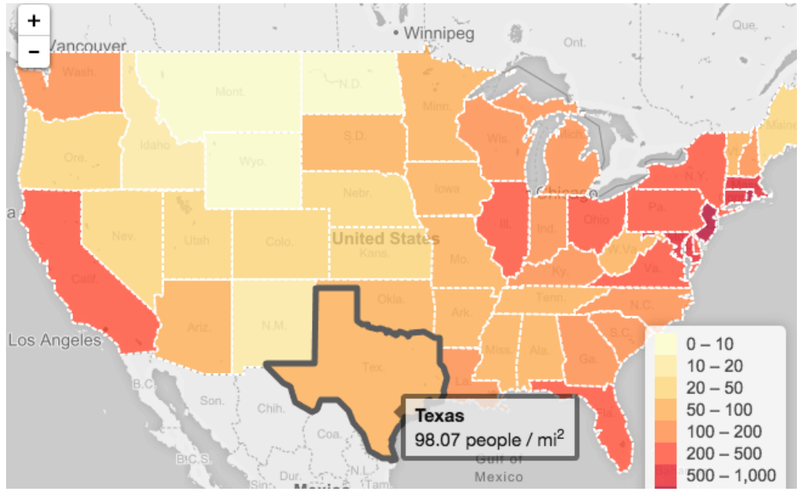
INTERACTIVE MAPS WITH LEAFLET IN R

Rich Majerus
Vice President of Strategy & Planning,
Queens University of Charlotte

Selecting a Base Map

- Why are you making this map?
  - Exploratory analysis
  - Deliverable product
  - Just for fun!
- What type of data are you plotting?
  - Points
  - Paths
  - Polygons

Selecting a Base Map



leaflet Provider List

- The `leaflet` packages comes with 100+ provider tiles
- The names of these tiles are stored in a list named `providers`

```
names(providers)[1:5]
```

```
  [1] "OpenStreetMap"
  [2] "OpenStreetMap.Mapnik"
  [3] "OpenStreetMap.BlackAndWhite"
  [4] "OpenStreetMap.DE"
  [5] "OpenStreetMap.France"
```

Exploring leaflet Provider Tiles

```
names(providers)[str_detect(names(providers), "OpenStreetMap")]
```

```
[1] "OpenStreetMap"                "OpenStreetMap.Mapnik"
[3] "OpenStreetMap.BlackAndWhite" "OpenStreetMap.DE"
[5] "OpenStreetMap.France"         "OpenStreetMap.HOT"
```

addProviderTiles()

- Replace `addTiles()` with `addProviderTiles()` to change your basemap
- Pass name of provider tile to `addProviderTiles()`

```
leaflet() %>%
      # addTiles()
      addProviderTiles("OpenStreetMap.BlackAndWhite")
```

Let's practice!

INTERACTIVE MAPS WITH LEAFLET IN R

Setting the Default Map View

INTERACTIVE MAPS WITH LEAFLET IN R

Rich Majerus
Vice President of Strategy & Planning,
Queens University of Charlotte

Geocoding in R

- A common approach is to use the `geocode()` function in the `ggmap` package
- Returns the latitude and longitude of an address or a place name

```
library(ggmap)

geocode("350 5th Ave, New York, NY 10118")
```

```
Information from URL : http://maps.googleapis.com/maps/api/geocode/...

lon       lat
-73.98575 40.74856
```

Geocoding in R II

```
geocode(location,
        output = c("latlon", "latlona", "more", "all"),
        source = c("google", "dsk"))
geocode("Colby College",
        output = "more",
        source = "google")
```

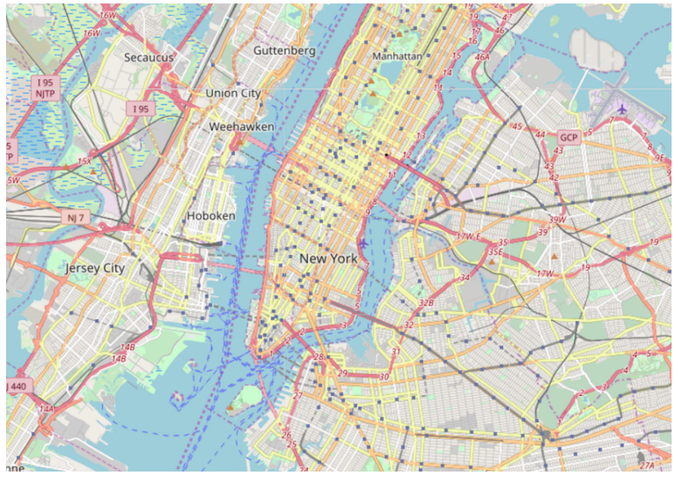
```
lon       lat      type          loctype
-69.66264 44.56387 establishment rooftop

address
4000 mayflower hill dr, waterville, me 04901, usa
```

Setting the Default Map View

setView()

```
leaflet() %>%
 addTiles() %>%
 setView(lng = -73.98575,
         lat = 40.74856,
         zoom = 13)
```



fitBounds()

```
leaflet() %>%
 addTiles() %>%
 fitBounds(
  lng1 = -73.910, lat1 = 40.773,
  lng2 = -74.060, lat2 = 40.723)
```

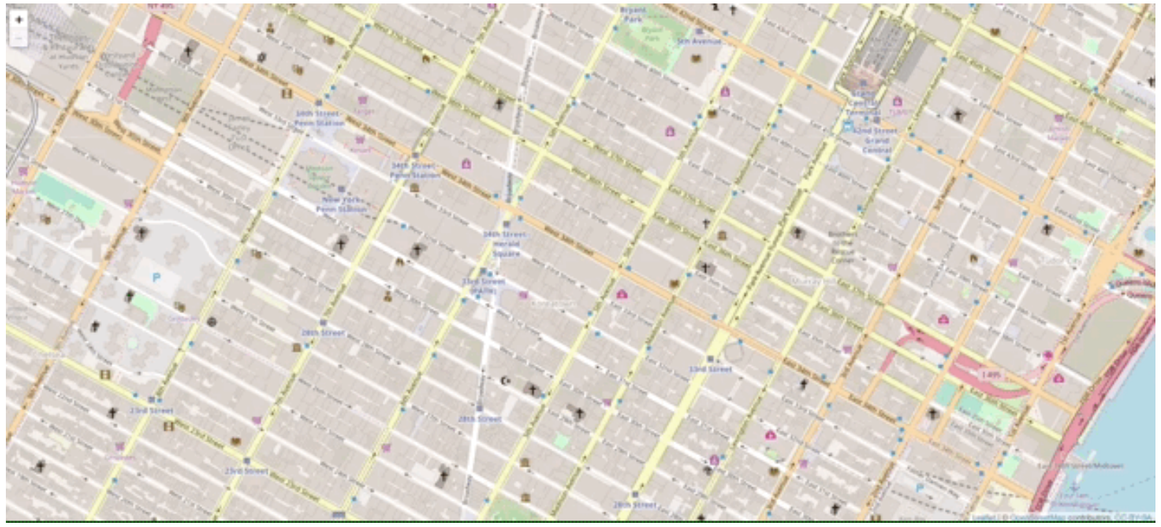
Staying Focused

```
leaflet(options = leafletOptions(dragging = FALSE,
                                 minZoom = 14,
                                 maxZoom = 18))  %>%
    addProviderTiles("CartoDB")  %>%
    setView(lng = -73.98575, lat = 40.74856, zoom = 18)
```

- Leaflet references
  - **http://leafletjs.com/reference-1.3.0.html**
  - **https://rstudio.github.io/leaflet/**

Restoring Focus

```
leaflet()  %>%
     addTiles()  %>%
     setView(lng = -73.98575, lat = 40.74856, zoom = 18) %>%
     setMaxBounds(lng1 = -73.98575, lat1 = 40.74856,
                  lng2 = -73.98575, lat2 = 40.74856)
```



Let's practice!

INTERACTIVE MAPS WITH LEAFLET IN R

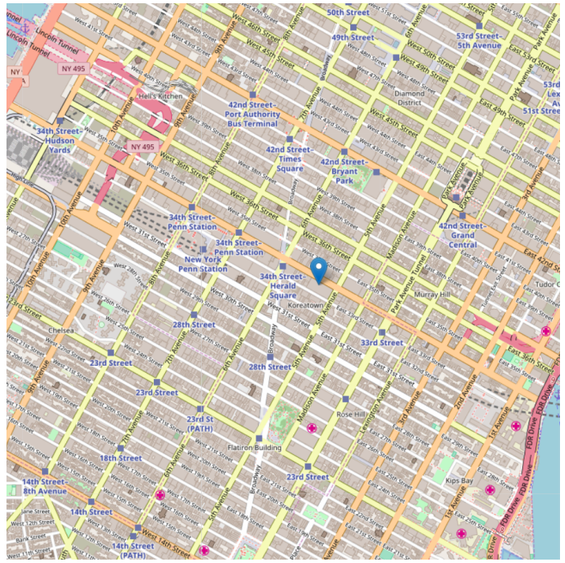
Plotting DataCamp HQ

INTERACTIVE MAPS WITH LEAFLET IN R

Rich Majerus
Vice President of Strategy & Planning,
Queens University of Charlotte

Plotting a Point

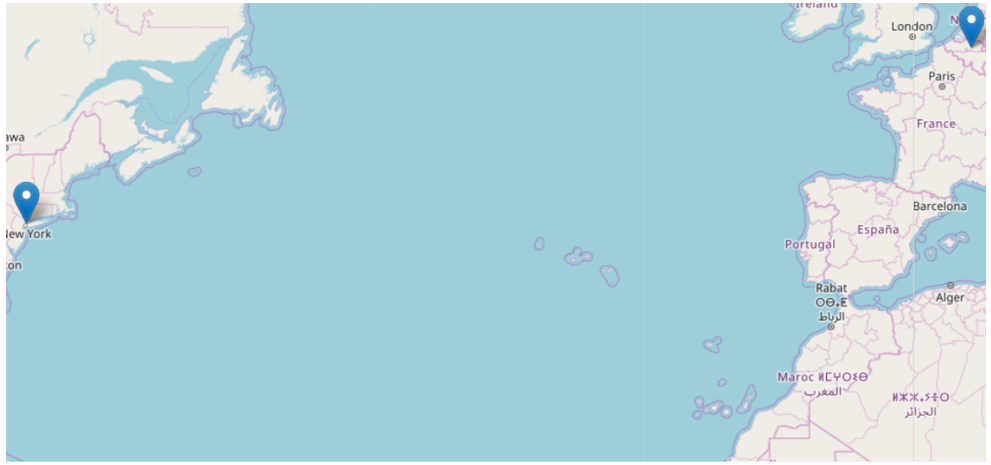
```
# add marker layer to map
leaflet() %>%
      addTiles() %>%
      addMarkers(lng = -73.98575,
                 lat = 40.74856)
```



- Supplying Marker Data
  - Numeric data frame columns
  - Numeric vectors
- `addMarkers()` Defaults
  - Centered on a single point
  - Zoomed to fit all points

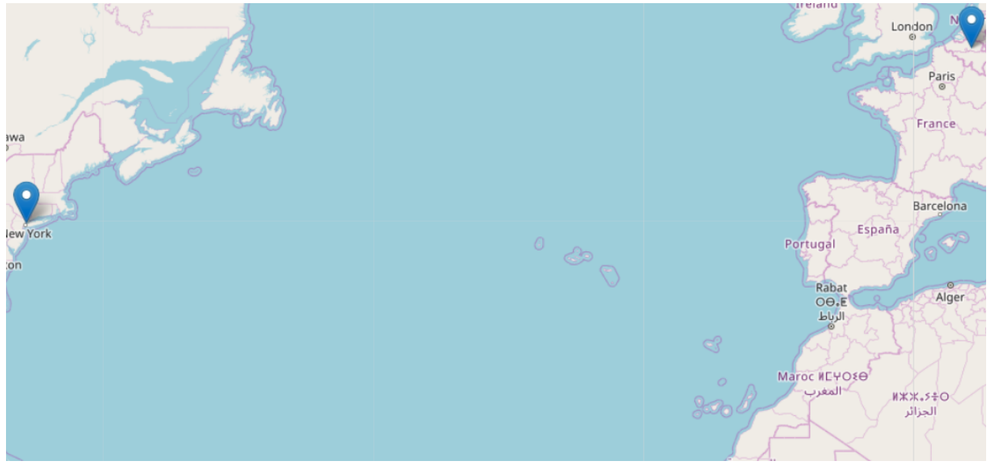
Plotting Multiple Points

```
dc_hq <-
     tibble(
          hq  = c("DataCamp - NYC", "DataCamp - Belgium"),
          lon = c(-73.98575, 4.717863),
          lat = c(40.74856, 50.881363))
leaflet() %>%
     addTiles() %>%
     addMarkers(lng = dc_hq$lon, lat = dc_hq$lat)
```



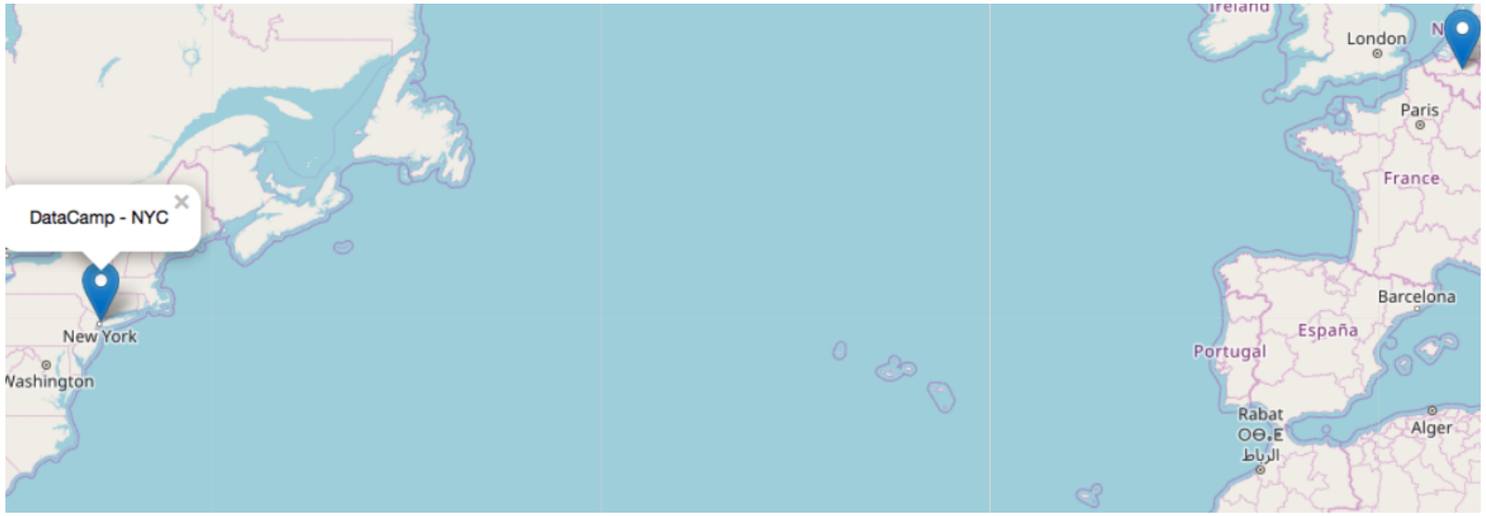
Plotting Multiple Points II

```
# When piping a data frame into the leaflet function, R will search
# for columns named lat/latitude and lon/lng/long/longitude
dc_hq  %>%
     leaflet() %>%
     addTiles() %>%
     addMarkers()
Assuming 'lon' and 'lat' are longitude and latitude, respectively
```



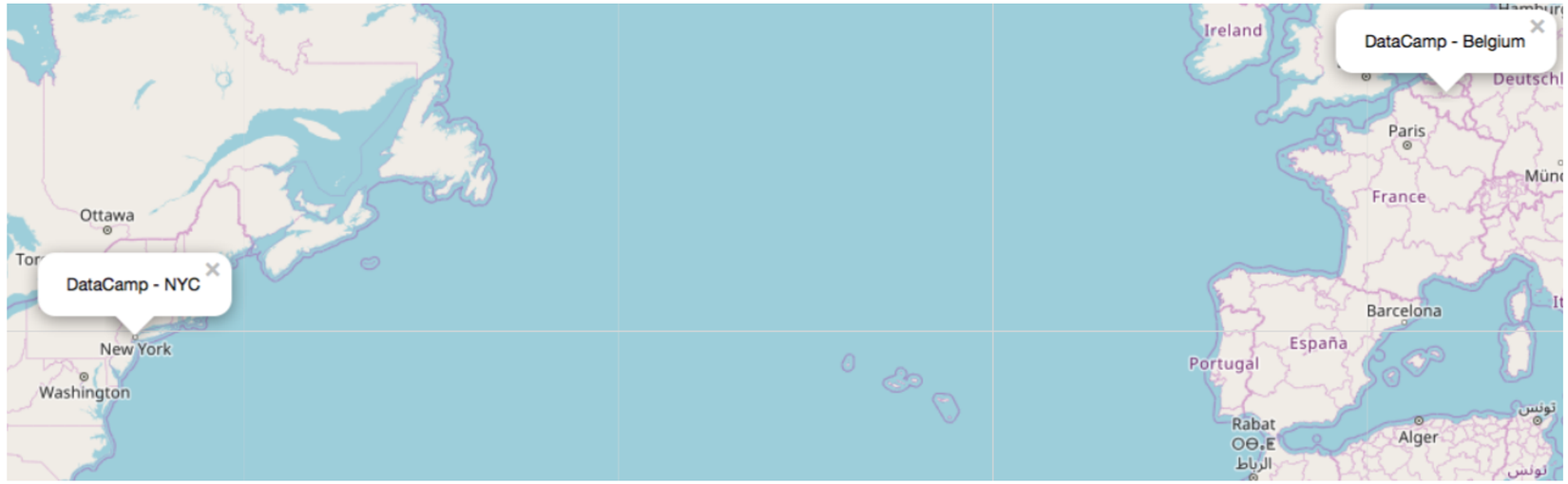
Pop-ups

```
leaflet() %>%
      addTiles() %>%
      addMarkers(lng = dc_hq$lon, lat = dc_hq$lat,
                 popup = dc_hq$hq)
```



Pop-ups II

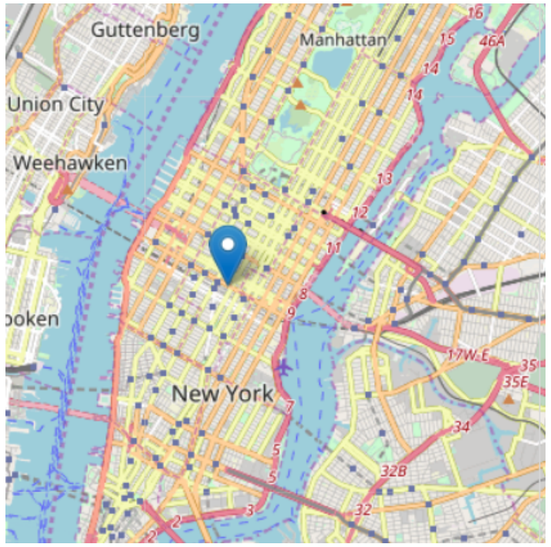
```
leaflet() %>%
     addTiles() %>%
     addPopups(lng = dc_hq$lon, lat = dc_hq$lat,
               popup = dc_hq$hq)
```



Storing leaflet Maps as Objects

```
m <- leaflet() %>%
     addTiles()  %>%
     setView(lng = dc_hq$lon[1],
             lat = dc_hq$lat[1],
             zoom = 12)
```

```
# %>% leaflet objects to functions
# to add or edit layers
m %>% addMarkers(lng = dc_hq$lon,
                 lat = dc_hq$lat,
                 popup = dc_hq$hq)
```



Let's practice!

INTERACTIVE MAPS WITH LEAFLET IN R