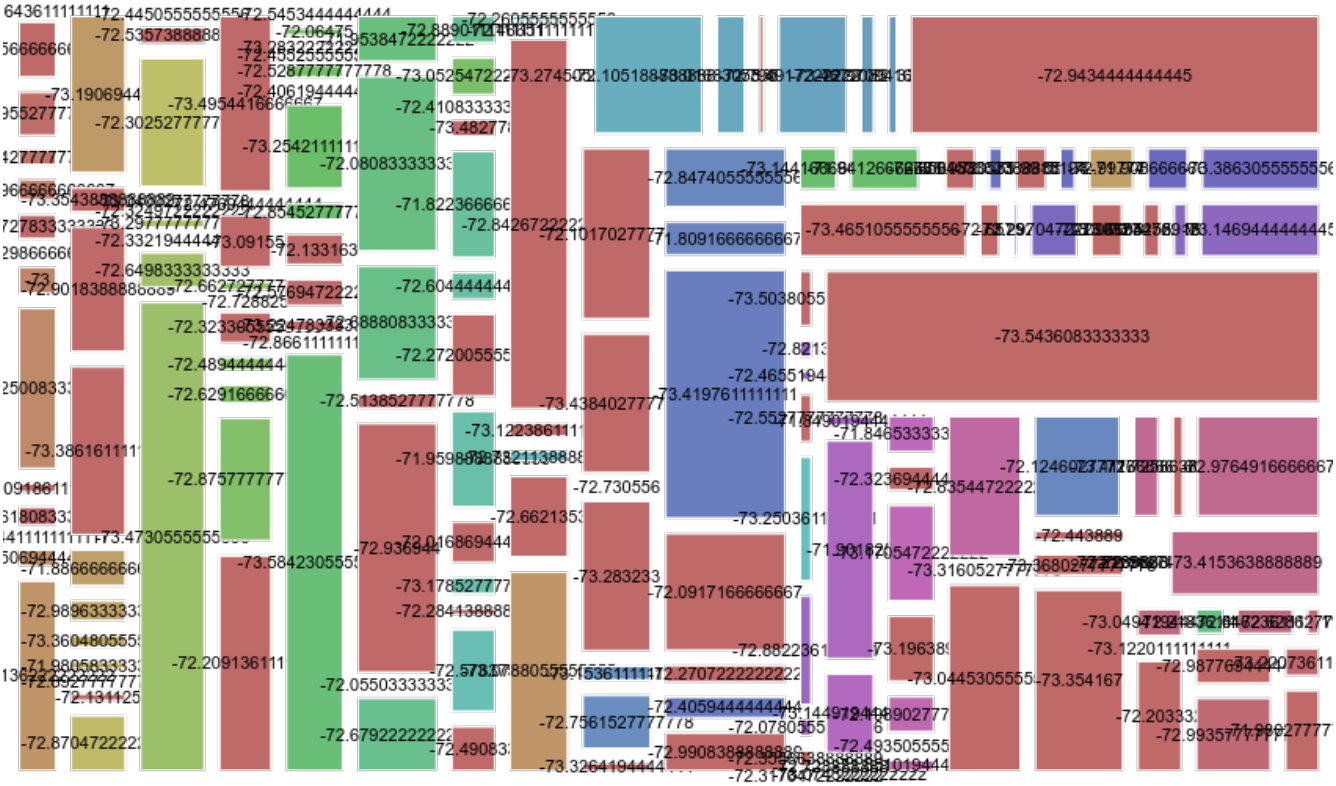
Data Visualization Case Study: Telecom Towers State-wide Samples: Connecticut and Vermont

Abstract: Telecom Towers take up a lot of space In order to allow us to communicate through GSM networks and the internet. Utilizing RAWGraphs, we look at various data visualizations of telecom towers in state level deployment. These visualizations are meant to fulfill the purpose of informing readers about how much infrastructure is required in order to get this off the ground. With technologies such as the decentralized-internet and its SDK, one is able to make a new type of wireless communications protocol that doesn't need all this infrastructure to fulfill such purpose, just devices.

Example of Telecom Tower, source: Needpix

Purpose of visuals: Convince people that telecom infrastructure is too much and needs to be replaced by a more simplistic software centric solution for the 21st century.

Treemap Visualization:



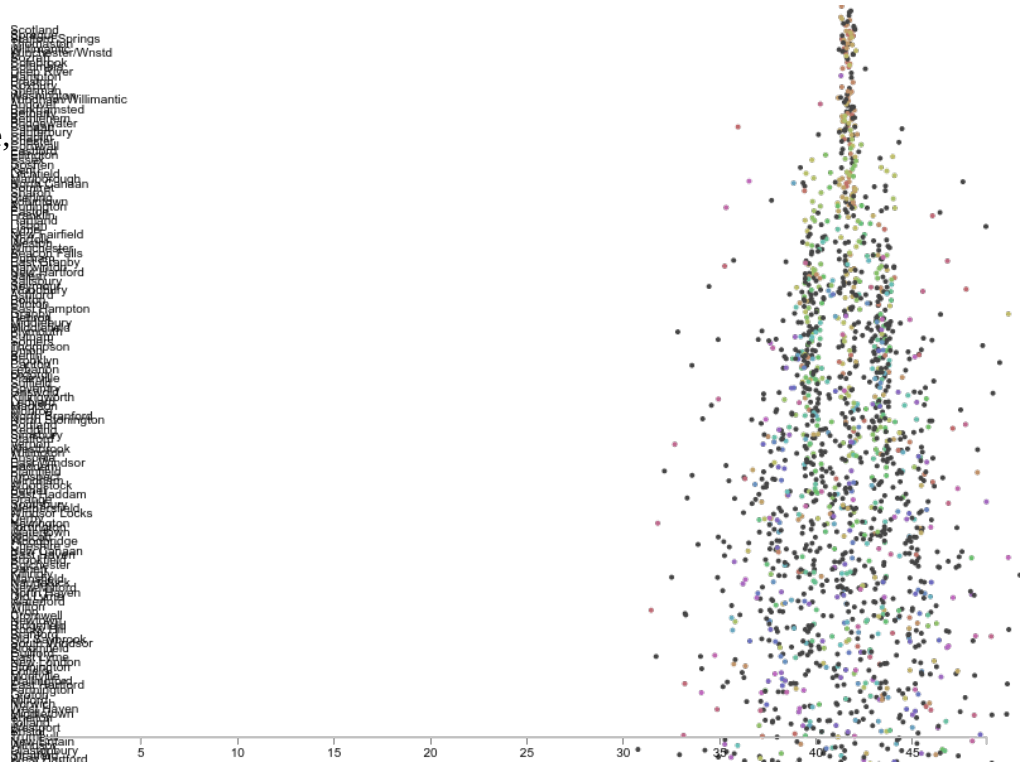
Graphed: Town, Georeferences, Carrier 2 Category, and Longitude

This treemap was mainly for georeferences and it showed the different carriers by color. There are also different sizes likely representing different sized telecom towers. As one can see, the amount of telecom towers needed to cover an entire city are numerous in numbers.

Beeswarm Plot:

Graphed: Town, Latitude, Tower Type, and Carrier 2 Category; sorted by total ascending

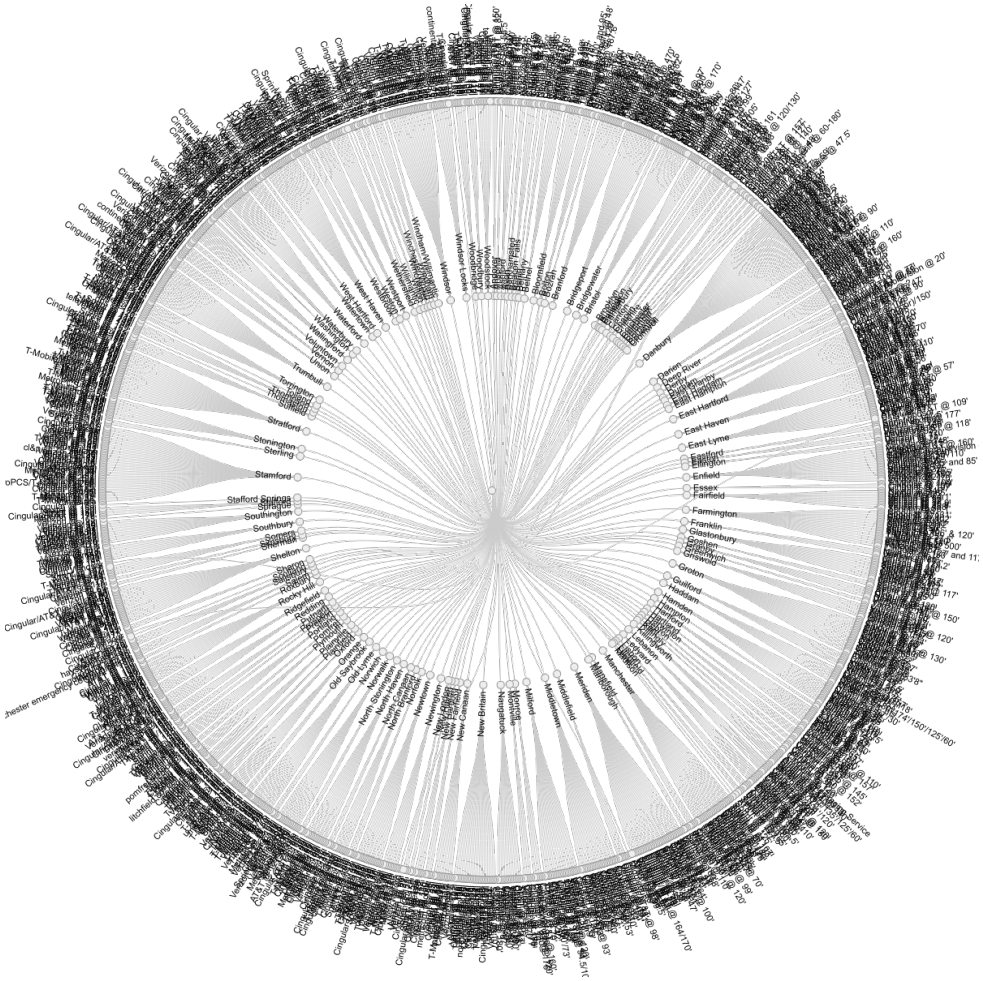
As you can see many cities seem to have a similar # of towers setup and



some have an extremely high amount of carrier towers. One can also tell that this is a lot of infrastructure for cities and towns. Utilizing the SDK I was talking about, one would be able to have an offline-centric network that doesn't require telecom towers in order to work.

Circular Dendrogram:

Graphed: Town, and Carrier 1 Category



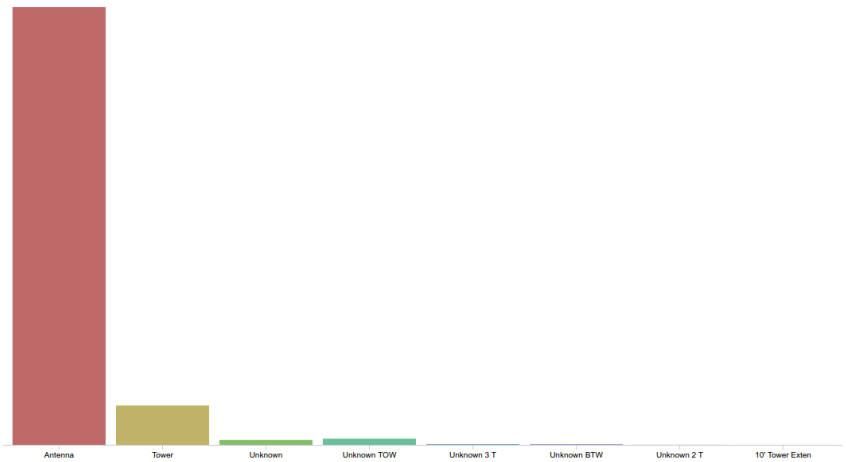
Connecticut Stats

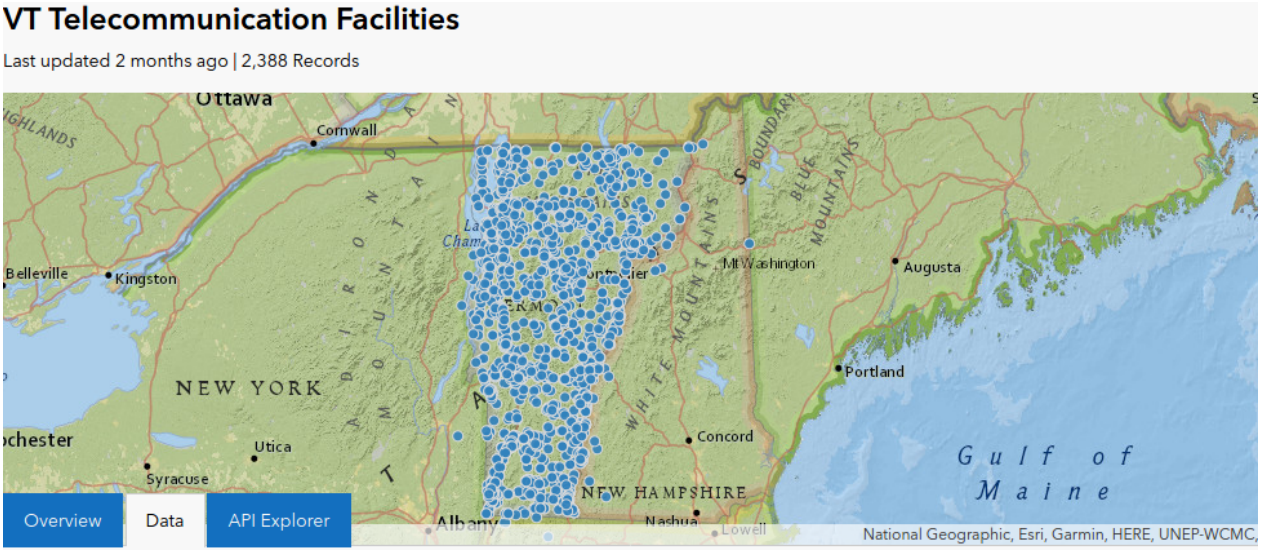
Mean ~ 125.4274056967ft in height

Median ~ 145ft in height

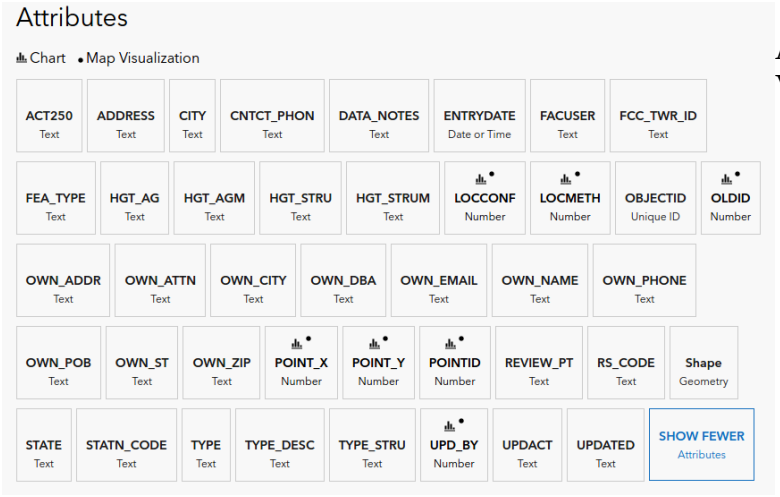
Standard Deviation ~ 94.2759307793ft in height

Graphed **Vermont sample** bar graph, Type, Point_Y, OldID #





Above seen is the Vermont Geodata Portal for this data



Attributes as seen in the Vermont Geodata portal

Data view via argis

Pros and Cons

Treemap:

Pros:

- Grid view
- Easy to differ colors
- Easy to differ size

Cons:

- Lacking enough data
- Limited assorting for legends

Beeswarm:

Pros:

- Easy assortment
- Full data set
- Color coded categorically

Cons:

Requires more space for full chart view

Circular Dendrogram:

Pros:

- Circular 360 view
- Categorically split

Cons:

- Hard to examine

-Not as much of a general sense of knowledge for the data

Geospacial:

Pros:

- Location based

- Easy to differ distances

Cons:

- Less categorical for data

For the datasets that I were using, I feel like beeswarm was the best given how easy the assorting was, and Geospacial was as useful given you should utilize geo mapping for visualizations. I found the tools quite easy to integrate and give me a general sense of knowledge on the data observed.

Sources:

[1] Hodan, G. (n.d.). Telecom,tower,wireless,network,signal - free image from needpix.com. Retrieved from https://www.needpix.com/photo/1455707/telecom-tower-wireless-network-signal-cellular-gsm-mast-wave
[2] Kleykamp, T. (2019, July 24). Telecommunications Towers and Antennas. Retrieved January 24, 2020, from https://catalog.data.gov/dataset/telecommunications-towers-and-antennas
[3] VT Telecommunication Facilities. (2018, August 4). Retrieved January 24, 2020, from https://catalog.data.gov/dataset/vt-telecommunication-facilities
[4] DensityDesign Research Lab. (n.d.). RAWGraphs. Retrieved from https://app.rawgraphs.io/
[5] VT Telecommunication Facilities. (n.d.). Retrieved from http://geodata.vermont.gov/datasets/9559bacdc938428ea4407f3c48cddded_59
[6] (n.d.). Retrieved from https://www.arcgis.com/home/webmap/viewer.html?panel=gallery&suggestField=true&url=https://maps.vcgi.vermont.gov/arcgis/rest/services/EGC_services/OPENDATA_VCGI_UTILITIES_SP_NOCACHE_v1/MapServer/59