How long does it take you to get work?

**Background**
Transit accessibility has a lot of economic and social benefits. By connecting the labor force to jobs, transit has the power to improve the overall employment rate in a city. From August 2014, the MBTA has been developing a real run-time information of all the buses, subway and train services. This study is assessing the transit-based job from homes to major employment centers in the MBTA service area using the real run-time of the multimodal transit networks of the MBTA. The data is still under construction, however the MBTA has released some of the built data open to the public.

The purpose of this analysis is to explore the real run time of transit services and assess how long it really takes to people to get to their work places at the block group level.

**Methodology**

- **Employment Centers**: located major employment centers using the Kernel density analysis that was overlaid with employment locations points. A graduate classification of employment points was performed and jobs with a number higher 4,060 jobs/ per block groups were selected.
- **Network Dataset with GTFS feeds**: a network dataset was built converting GTFS feeds into shape files with add GTFS tool in ArcGIS. Transit routes and stations were created also connectors between transit stations to street networks.
- **Multimodal Transit Network**: Using ArcGIS Network Analyst tool connectivity between the different transit networks was created taking into account pedestrian walk time to transit lines, wheelchair accessibility, and transfer time between transit stations.
- **Origin and Destination cost matrix**: travel time was then measured from block group centroids to the major employment centers. The origin and destination impedance was set to the travel time of my GTFS network dataset. Then, I performed three sequences of origin and destination matrices with cut of values within 35 min, 60 min and 80 min of travel from block groups to employment centers.

**Results**
I analyzed the origin and destination matrices of a transit-travel time duration of 35 min, 60 min and 80 min from block group centroids to employment centers. The red lines are representing the commute flow of the workers from their homes to their workplaces. We can see from the map results, the fartherest and more block groups takes longer time to get to the employment centers.

The histograms above are showing the distribution of block groups within each travel-time range. For instance, within a commute time range of 35 minutes the majority of block groups (90%) will take about 23 minutes to get to the employment centers. Within a commute time range of 80 minutes, most of block groups (90%) will take about 60 minutes to get to employment centers.

These are long time spent on transit networks which might be caused by waiting for the next bus/train because of unreliable transit services schedules. The data used in this analysis is highlighting the real time performance of the different transit networks of the MBTA. From the sequence of our analysis if more block groups wants to get to their employment centers they will have spend longer time commuting.

**Limitations**: This is just a partial analysis of the real performance of transit networks in the MBTA service area. Since the data is still under construction, to cover more neighborhoods of the service area, another analysis of this type will be useful with a complete real run time data of transit services.