

# TOPOS

## DataScience Internship Assignment

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### Contents

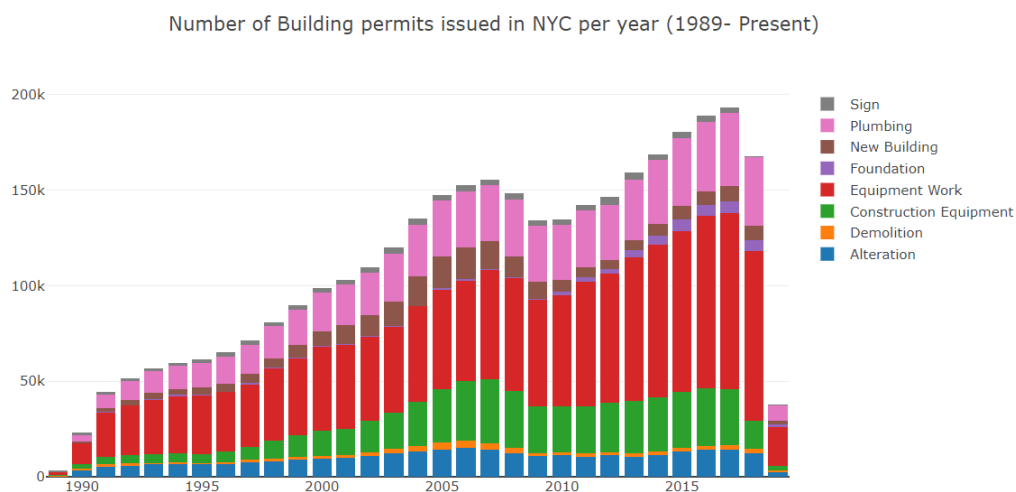
<b>1</b>	<b>Introduction</b>	<b>2</b>
<b>2</b>	<b>Exploratory Data Analysis</b>	<b>2</b>
2.1	Number of building permits issued per year by NYC DOB . . . . .	2
2.2	Number of permits issued per Borough in last 2 years . . . . .	3
2.3	NYC Construction of Buildings vs Employment . . . . .	3
2.4	Spatial Visualization of building permits issued by zipcode . . . . .	4
2.5	Visualization of 311 Noise complaints (Construction Before/After Hours) . .	5
2.6	Visualization of Demolition permits issued in 2018 . . . . .	6
2.7	Clustering New Building Residential permits by building type (1-family, 2-family) . . . . .	7

# 1 Introduction

In this report, I did exploratory data analysis on New York City Department of Buildings (DOB) permits data. Besides, the dataset is merged with other datasets to contextualize the investigation. In below sections, visualized data plots along with the corresponding investigation and findings are reported.

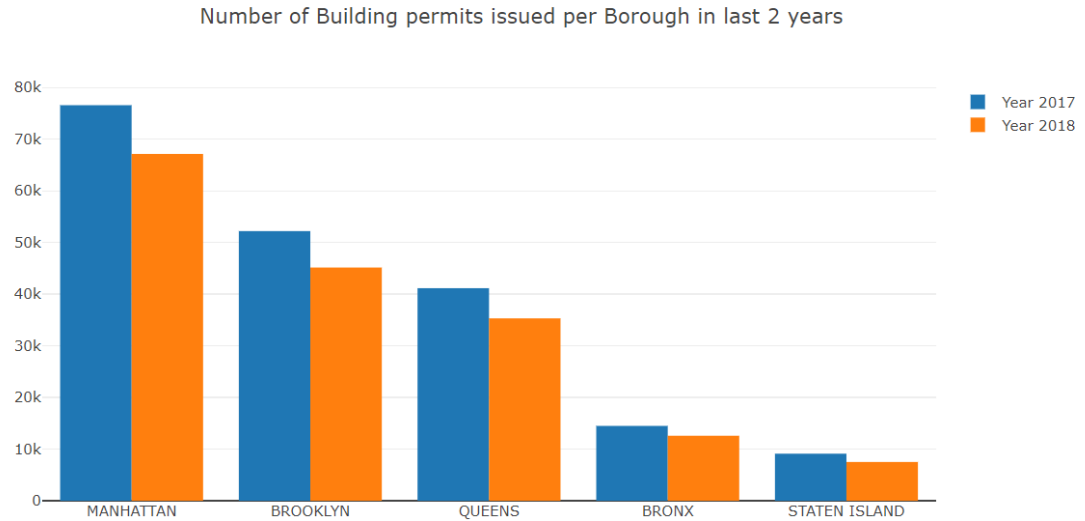
## 2 Exploratory Data Analysis

### 2.1 Number of building permits issued per year by NYC DOB



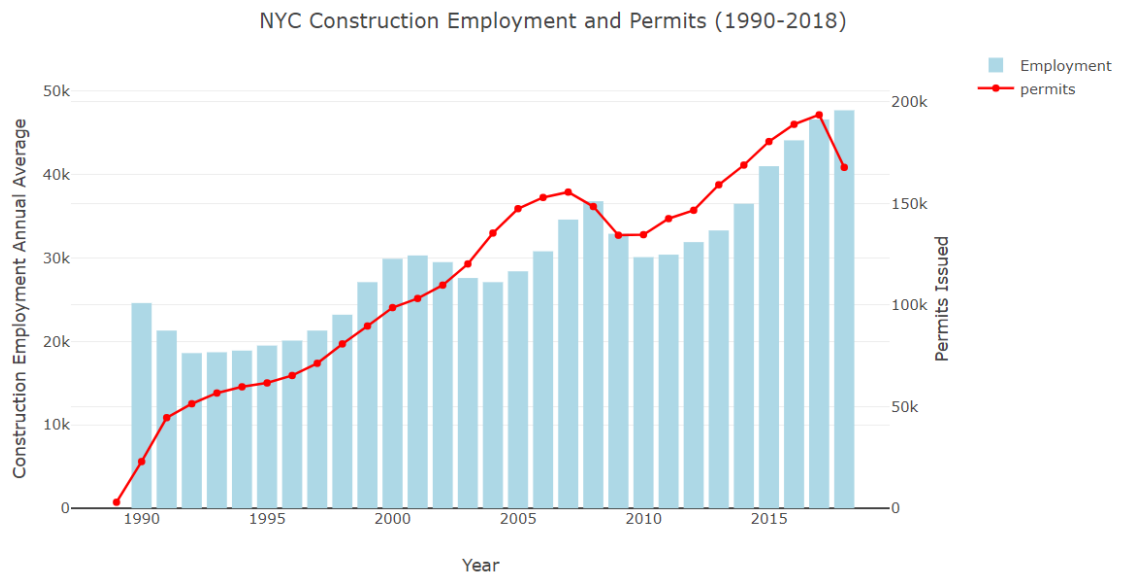
From the above graph, Total Building permits issued by NYC Department of Buildings has steadily increased from 1989 to 2007 and from 2010 to 2017. During 2008-2009 and 2017-2018, this count decreased. The decline in total building permits during 2008 and 2009 can be attributed to the 2008 economic crisis to some extent. Although nearly 169,000 permits were issued in 2018, it was the first decline since 2009.

## 2.2 Number of permits issued per Borough in last 2 years



Manhattan had the highest total number of permits issued in both 2017 and 2018. This shows that Manhattan had the highest construction activity in the past two years. It is followed by Brooklyn and Queens respectively.

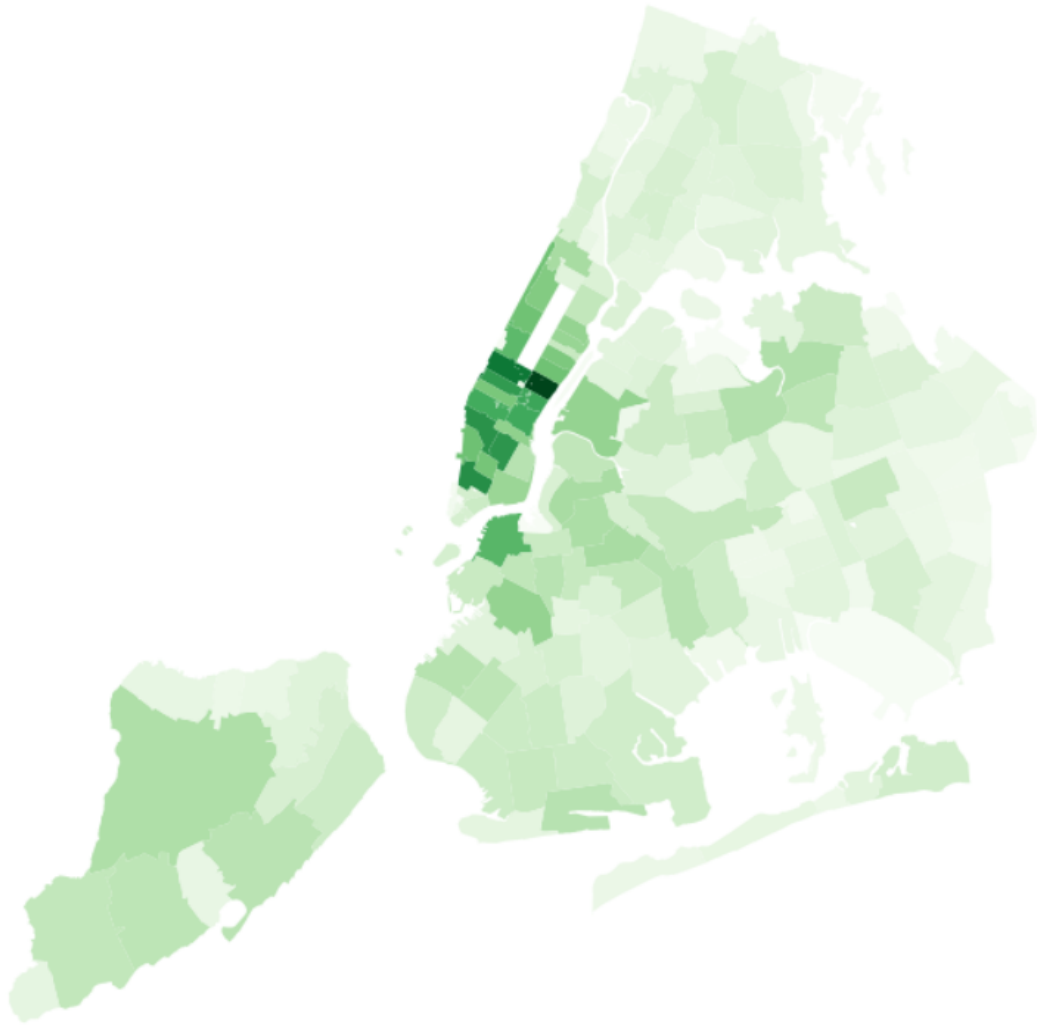
## 2.3 NYC Construction of Buildings vs Employment



Employment in construction industry has steadily increased since 2010. Intuitively it makes sense to assume that as building permitting activity increases, employment in construction industry also increases. So, there is strong positive correlation between number of building permits and construction employment. This is verified with a high pearson coefficient of 0.886 (p-value = 1.6e-10).

## 2.4 Spatial Visualization of building permits issued by zipcode

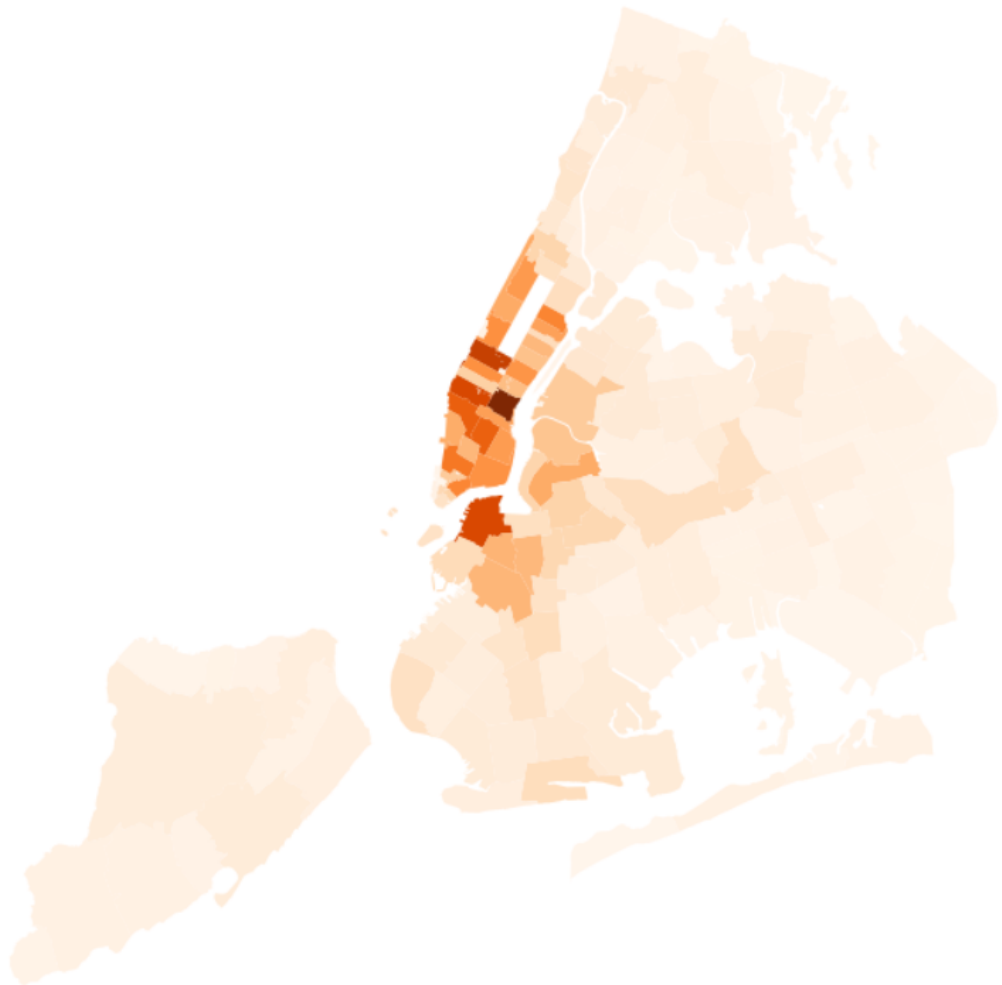
Building Permits by Zipcode



The above graph shows the density of building permits issued by zipcode. zipcodes with high number of permits are more dense green in color. We can see that the lower and midtown manhattan areas have high concentration of permits. These areas attract tourism and hence a lot of construction activity is done here to maintain the area and continue to drive the NYC economy.

## 2.5 Visualization of 311 Noise complaints (Construction Before/After Hours)

### 311 Noise complaints: Construction Before/After Hours

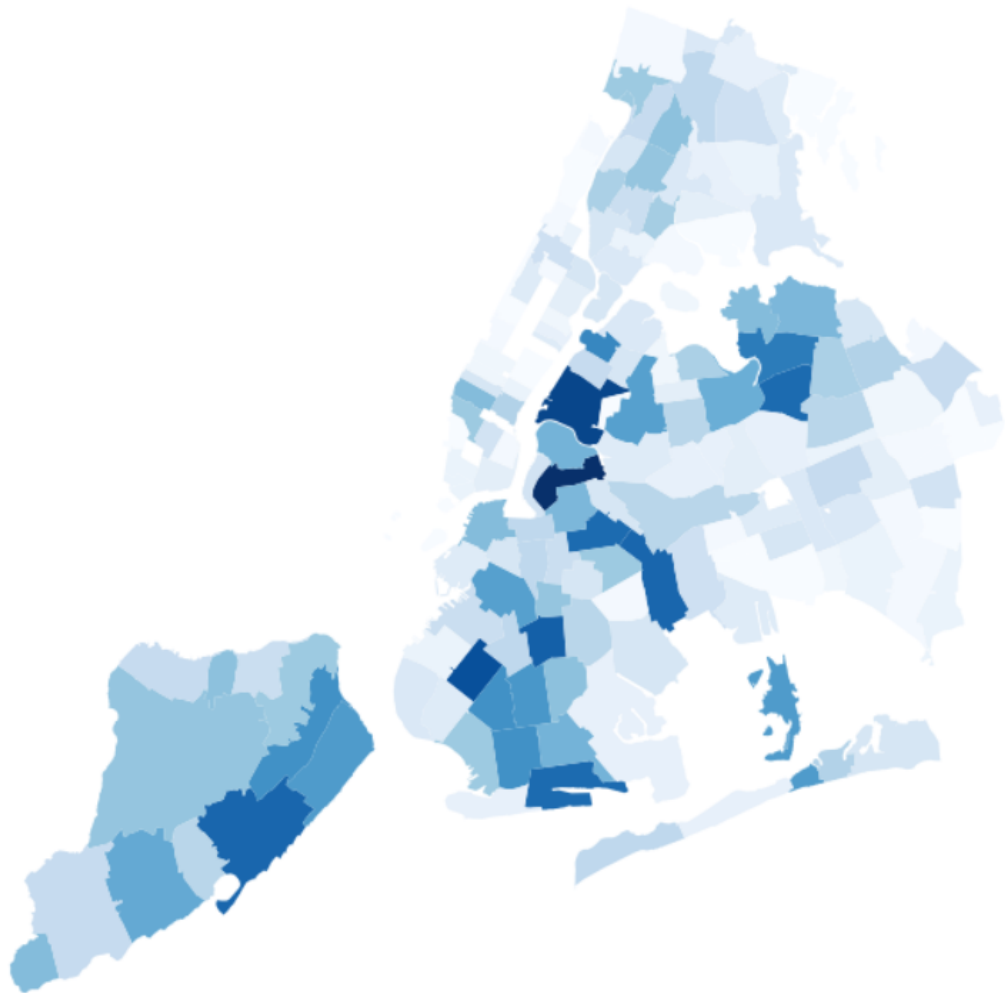


The above graph shows the density of 311 noise complaints corresponding to construction before/after hours . The dense regions in this graph are same as the ones in the previous

graph. Hence, it seems that there is strong positive correlation between number of permits issued vs number of 311 noise complaints related to construction by zipcode. This is evident by the pearson coefficient of value = 0.86 (p-value = 3.45e-76)

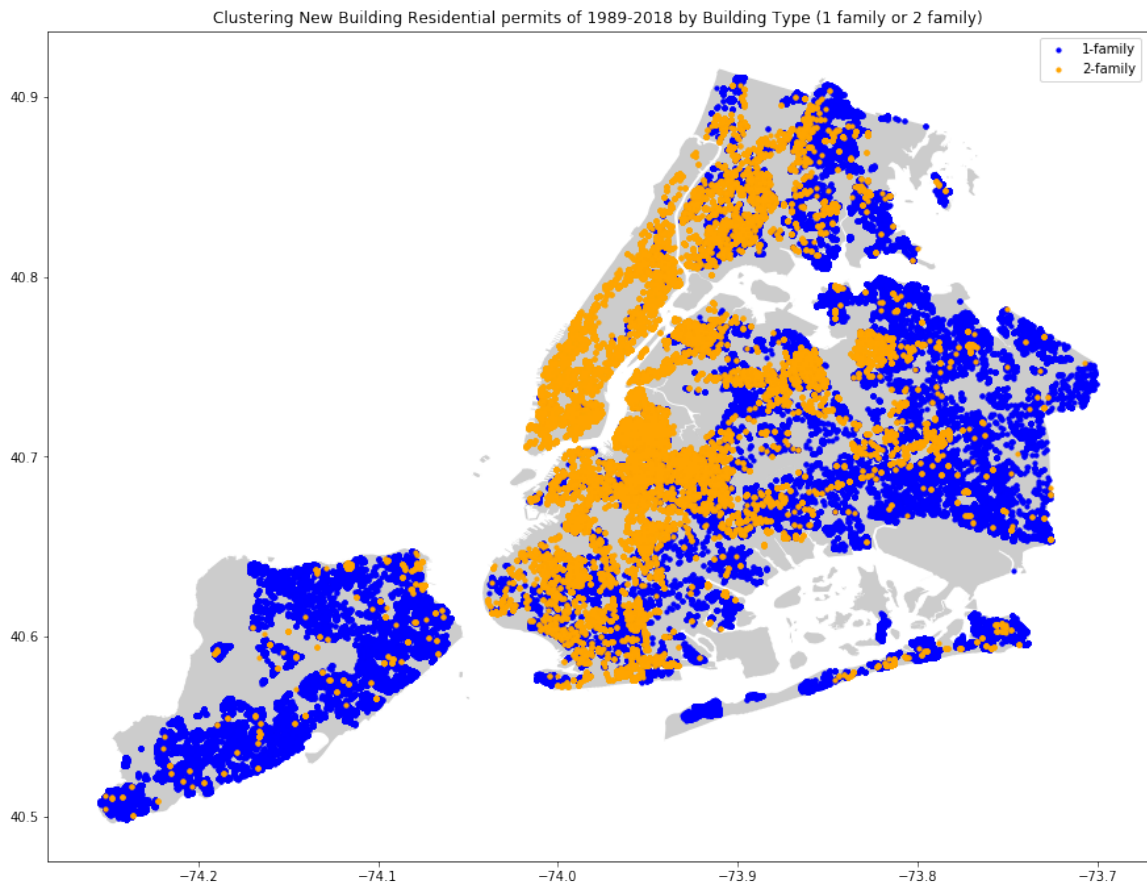
## 2.6 Visualization of Demolition permits issued in 2018

### Demolition permits issued in 2018

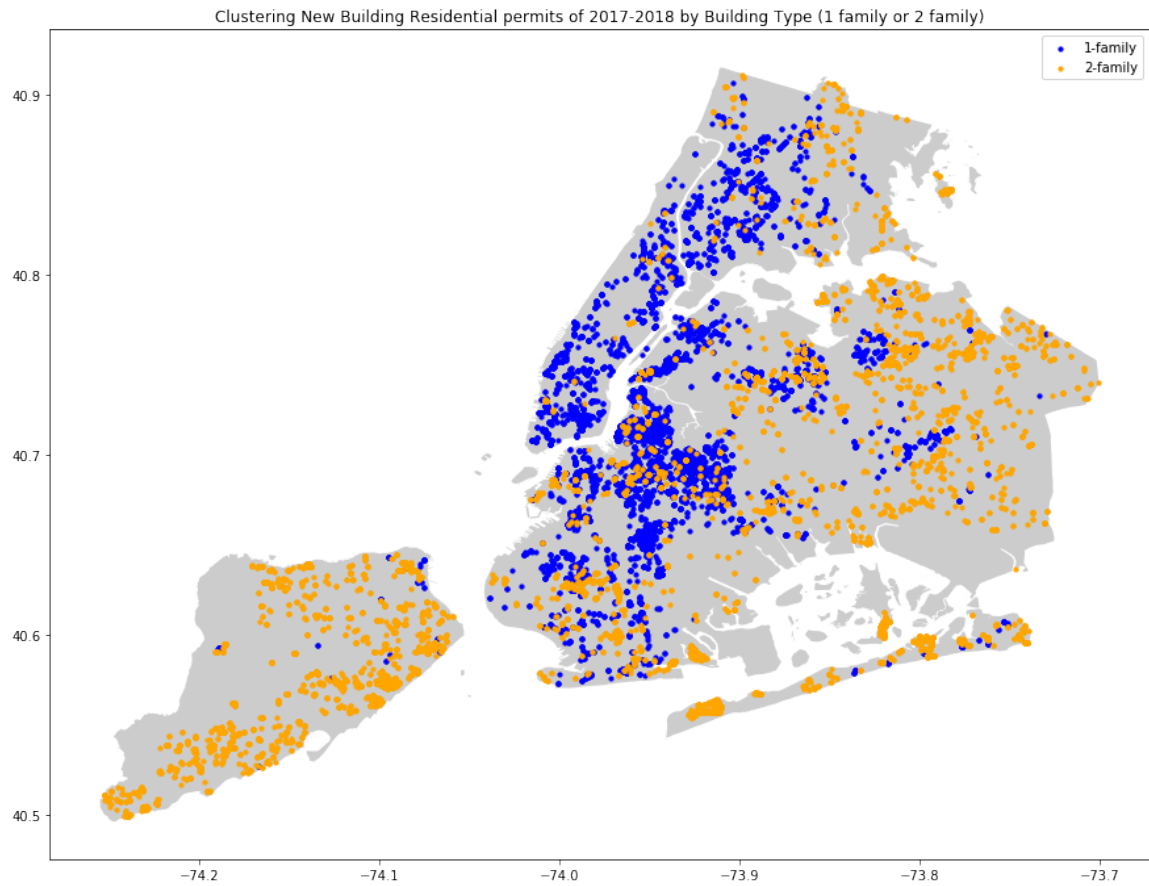


Demolition activity is predominant in Williamsburg, Borough Park in Brooklyn, and Long Island City and Flushing in Queens. This can imply that construction activity might begin in these regions in near future.

## 2.7 Clustering New Building Residential permits by building type (1-family, 2-family)



I have clustered the new building residential permits by building type. Blue circles represent the 1-family building permits. Orange circles represent the 2-family building permits. The above graph includes new building residential permits data from 1989-2018. 1-family buildings dominate in Staten Island, Queens and Bronx. 2-family buildings dominate in Manhattan and Williamsburg - Brooklyn.



The above graph includes new building residential permits data for the past 2 years, 2017-2018. Here, the observations differ from previous graph. 1-family buildings dominate in Manhattan and Williamsburg - Brooklyn. 2-family buildings dominate in Staten Island and Queens.