**NYC Wi-Fi Hotspot Locations, as of 2022**

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**Introduction:**

Wi-Fi is an essential part of our daily lives, enabling us to communicate, work, travel, and perform a multitude of other activities. As of 2024, [out of nearly 8 billion people in the world, 5.35 billion have access to the internet](https://www.forbes.com/home-improvement/internet/internet-statistics/#:~:text=Out%20of%20the%20nearly%208,the%20internet%2C%20according%20to%20Statista.). New York City offers an extensive network of free public Wi-Fi hotspots across its five boroughs, providing residents and visitors with convenient internet access. These hotspots are strategically located in parks, subways, and other public spaces, aiming to enhance connectivity throughout the city.

**Objective:**

The main objectives of this report are as follows:

1. To analyze the total number of hotspot locations in New York City as of 2022, with a focus on the number of free hotspots and a specific analysis of the Queens borough.
2. To identify and compare the number of hotspots in each borough relative to the population.
3. To determine which borough has the freest hotspot locations and compare this with the population of each borough.

**Data:**

The analysis utilizes the [NYC Wi-Fi Hotspot Locations](https://data.cityofnewyork.us/City-Government/NYC-Wi-Fi-Hotspot-Locations/yjub-udmw/about_data) dataset from NYC OpenData website. The dataset, provided by the Office of Technology and Innovation (OTI) in 2015, was last updated in 2022. The analysis focuses on the distribution of Wi-Fi hotspots across the boroughs and whether the hotspots are free. Population data for New York City was obtained from [citypopulation.de](https://www.citypopulation.de/en/usa/newyorkcity/) and manually entered into R as a data frame.

**Analysis:**

***Analytical Techniques:***

Microsoft Excel was initially used to explore and understand the dataset; and to create tables and graphs. R programming was then employed to identify discrete variables, examine and interpret the univariate distribution of two variables, and analyze the bivariate distribution of these variables. The NYC population data was manually entered as a data frame in R.

***Univariate Distribution:***

A univariate distribution analysis examines the distribution of a single variable, focusing on its rarity or frequency. In this analysis, I will assess the univariate distribution of the variables “Type” and “Borough Name” in the dataset to determine the number of hotspot locations in New York City, as well as the availability and cost of these hotspots. I will also compare these findings to the population of each borough.

***New York City Population:***

There is an estimate of [8,258,035 people in 2022](https://www.citypopulation.de/en/usa/newyorkcity/).

**Table A: Population of New York City and its five boroughs.**

|  |  |
| --- | --- |
| **Places** | **Population** |
| **New York City** | 8258035 |
| **Manhattan** | 1597451 |
| **Brooklyn** | 2561225 |
| **Queens** | 2252196 |
| **Bronx** | 1356476 |
| **Staten Island** | 490687 |

***1. To analyze the total number of hotspot locations in New York City as of 2022, with a focus on the number of free hotspots and a specific analysis of the Queens borough:***

There are 3,319 rows in this dataset, and according to [NYC OpenData website](https://data.cityofnewyork.us/City-Government/NYC-Wi-Fi-Hotspot-Locations/yjub-udmw/about_data), each row represents a Wi-Fi Hotspot location. Thus, there are 3,319 Wi-Fi hotspots throughout New York City. The ratio of people to Wi-Fi hotspot locations is approximately 1 hotspot for every 2,488 people. Out of these 3,319 hotspots, 2,736 offer free Wi-Fi, while 581 provide limited free access. Considering the population of New York City, there is 1 free Wi-Fi hotspot for every 3,018 people and 1 limited free Wi-Fi hotspot for every 15,942 people.

[Limited free Wi-Fi service](https://data.cityofnewyork.us/City-Government/NYC-Wi-Fi-Hotspot-Locations/yjub-udmw/about_data) typically provides users with three ten-minute sessions every thirty days or the option to purchase a 99-cent day pass valid until midnight.

**Table B- Number of Wi-Fi services provided by NYC.**

|  |  |
| --- | --- |
| **Type** | **Frequency** |
| **Free** | 2736 |
| **Limited Free** | 581 |
| **Partner Site** | 2 |
| **Total** | 3319 |

**Graph A: An illustration of Table B.**

To further analyze the data, I focused on the borough of Queens to determine the ratio of people per hotspot. In 2022, Queens had 379 free Wi-Fi hotspots. Given the borough's population of 2,252,196, this translates to 1 free Wi-Fi hotspot for every 5,942 people.

***2. To identify and compare the number of hotspots in each borough relative to the population:***

My analysis revealed that there are 1,672 Wi-Fi hotspot locations in Manhattan, 700 in Brooklyn, 531 in Queens, 316 in the Bronx, and 100 in Staten Island. Manhattan has more than twice the number of Wi-Fi hotspots compared to Brooklyn and over 1,500 more than Staten Island.

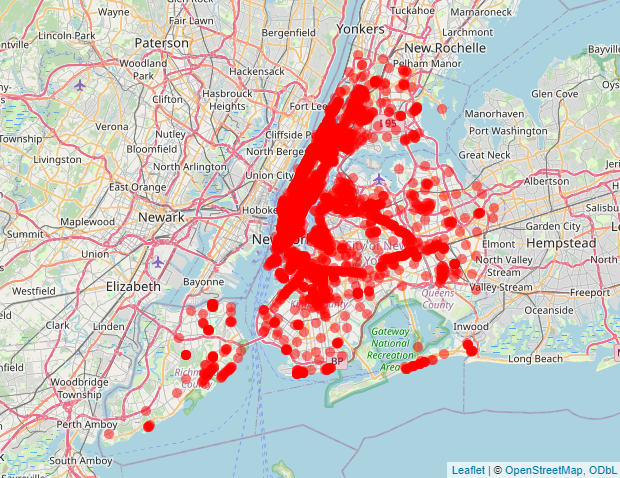
When comparing the number of hotspots to the population of each borough, there is no clear trend indicating that a higher population results in more hotspot locations. Manhattan, for example, has the most Wi-Fi hotspots but ranks third in population size. Conversely, Brooklyn has the highest population but only the second-highest number of hotspots. However, a correlation exists between the Bronx and Staten Island, which rank fourth and fifth, respectively, in both hotspot locations and population.

**Table C: Hotspot locations throughout NYC.**

|  |  |
| --- | --- |
| **Borough** | **Frequency** |
| **Manhattan** | 1672 |
| **Brooklyn** | 700 |
| **Queens** | 531 |
| **Bronx** | 316 |
| **Staten Island** | 100 |
| **Total** | 3319 |

**Graph B: An illustration of Table C.**

**Map A: A map visualization of hotspots in NYC (Numeric Values are better to visualize).**

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***Bivariate:***

A bivariate distribution analysis investigates the relationship between two variables. In this analysis, I will examine the bivariate distribution of the variables “Type” and “Borough Name” in the dataset to assess the quantity of free hotspot locations across New York City and its boroughs.

***3. To determine which borough has the freest hotspot locations and compare this with the population of each borough:***

There are 1,573 free sites in Manhattan, 540 in Brooklyn, 379 in Queens, 196 in the Bronx, and 48 in Staten Island. While there are 97 limited free sites in Manhattan, 160 in Brooklyn, 152 in Queens, 120 in the Bronx, and 52 in Staten Island. And there are 2 partner sites which are located in Manhattan.

Compared to the population of the respective boroughs, we saw before that the ratio of people to free Wi-Fi hotspot locations in Queens to be 5,942 to 1. For the other four boroughs, the ratio is 1,015 to 1 in Manhattan, 4,743 to 1 in Brooklyn, 6,921 to 1 in the Bronx, 10,223 to 1 in Staten Island.

**Table D: Free location in each borough.**

|  |  |  |  |
| --- | --- | --- | --- |
| **Borough** | **Free** | **Limited Free** | **Partner Site** |
| Manhattan | 1573 | 97 | 2 |
| Brooklyn | 540 | 160 | 0 |
| Queens | 379 | 152 | 0 |
| Bronx | 196 | 120 | 0 |
| Staten Island | 48 | 52 | 0 |

**Graph C: An illustration of Table D.**

**Results:**

The key finding from this analysis are as follows:

1. There are 3,319 Wi-Fi hotspot locations throughout New York City, resulting in a ratio of 2,488 people per Wi-Fi hotspot. Of these locations, 2,736 are free Wi-Fi hotspots, 581 are limited free locations, and there are 2 partner sites. The ratio of free Wi-Fi locations to the population is 1 free hotspot for every 3,018 people, while the ratio for limited free hotspots is 1 for every 15,942 people.
2. Wi-Fi Hotspot Locations in each borough:
   * Manhattan: 1,672
   * Brooklyn: 700
   * Queens: 531
   * Bronx: 316
   * Staten Island: 100

There is no clear trend when comparing hotspot locations to the respective populations of the boroughs; however, the Bronx and Staten Island rank fourth and fifth, respectively, in both population and Wi-Fi locations.

1. Free Wi-Fi Hotspot Locations in each borough:
   * Manhattan: 1,573
   * Brooklyn: 540
   * Queens: 379
   * Bronx: 196
   * Staten Island: 48

* The ratio of population to free Wi-Fi locations is 1,015 to 1 in Manhattan, 4,743 to 1 in Brooklyn, 5,942 to 1 in Queens, 6,921 to 1 in the Bronx, and 10,223 to 1 in Staten Island.

**Discussion:**

The likely reason for Manhattan having more Wi-Fi hotspot locations is its status as the [business capital of the world](https://www.investopedia.com/articles/investing/091114/worlds-top-financial-cities.asp#:~:text=Tokyo%2C%20and%20Chicago.-,New%20York%20City,the%20world's%20preeminent%20financial%20center.). The influx of visitors from various parts of the world for work, travel, and education underscores the need for greater internet access in this borough compared to other, more residential areas of New York City. Consequently, ensuring ample Wi-Fi availability in Manhattan is crucial to support its diverse and dynamic population.

**Conclusion:**

This analysis of Wi-Fi hotspot locations across New York City reveals significant disparities in accessibility among the boroughs. With a total of 3,319 Wi-Fi hotspots, Manhattan stands out with the highest concentration, reflecting its role as a global business hub. In contrast, the ratios of free Wi-Fi hotspots to population indicate that areas like the Bronx and Staten Island, while ranking lower in hotspot availability and population, still face challenges in providing adequate internet access to their residents.

Despite the considerable number of free Wi-Fi locations, the analysis highlights that population density does not necessarily correlate with hotspot availability. The findings suggest that addressing the digital divide requires targeted efforts to enhance internet access in underrepresented boroughs. I feel as the demand for reliable internet continues to grow, especially in an increasingly digital world, it is essential for policymakers and city planners to prioritize the equitable distribution of Wi-Fi resources across all boroughs to support the diverse needs of New York City's population.