



Project 1 - Group 12
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Dataset

We found datasets published on **InsideAirbnb.com**, and selected one that presents data focused on Metro Areas and neighborhoods in the United States from 2008-2020 that includes:

- Host information and property types
- Property location by Metro Area and neighborhoods/cities
- Booking prices
- Property amenities



Research Questions

1. Host Analysis

- How have Airbnb hosts joining airbnb increased or decreased over time (by year)?
- What is the share of Hosts & Superhosts? What are the most popular Metro Areas to host in?
- What are the most popular Property Types by Metro Area?

2. Price Analysis

- What are price statistics for listings between the years 2008 and 2020?

3. Amenities Analysis

- What are the most common amenities? Do they fall in specific categories?
- Does offering luxury items boost the price of a listing?
- Do the most expensive cities also have the most Luxury Amenities?
- Do Superhosts increase the listing price?

4. Historical Trends Analysis

- How have average prices for listings changed over the years in different cities and metros?
- Are there consistent peak and low seasons for Airbnb bookings in specific cities?



Data Exploration and Cleanup

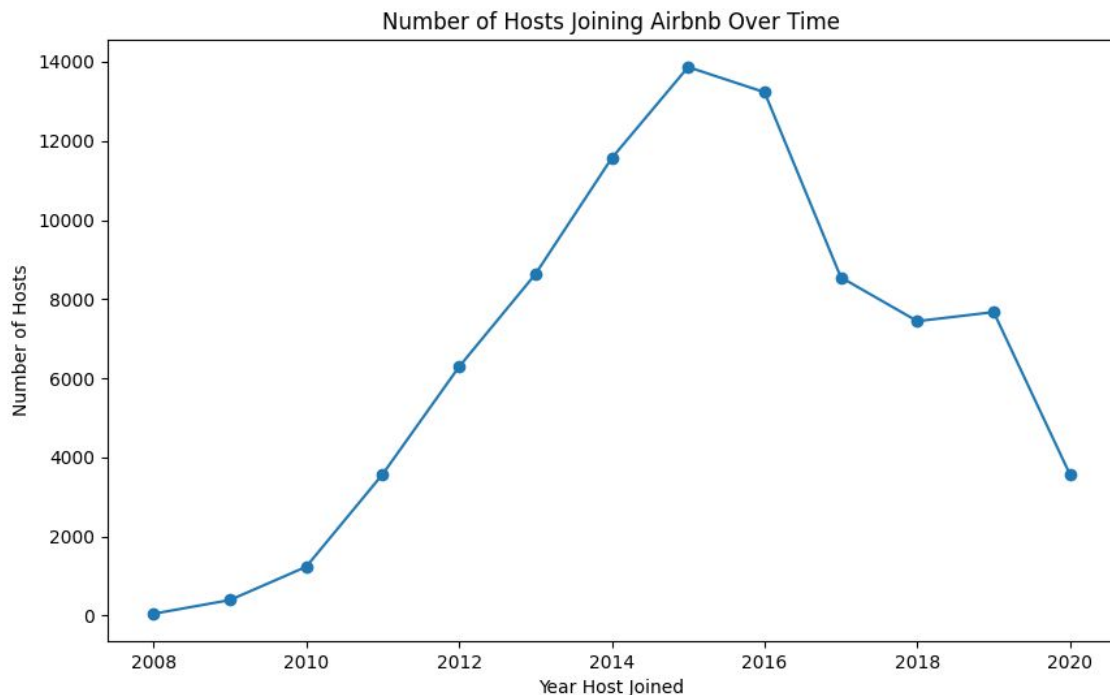
- Removed columns that we would not be using
- Removed rows for which site availability was 0/365 days and for which site price was \$0.
- Edited location column names for clarity, neater data frames and visualizations: ('neighbourhood_groups' to 'metro' and 'neighborhood' to 'city'); changed state names to an abbreviations; concatenated metro and state abbreviation.
- Reformatted dates since they were in two different formats
- Generated a number of different Data Frames and modules for visualizations to uncover trends and outliers

Host Analysis

The host analysis will look at the years hosts joined airbnb, the location of hosts and superhosts by Metro Area, and property types by Metro Area.

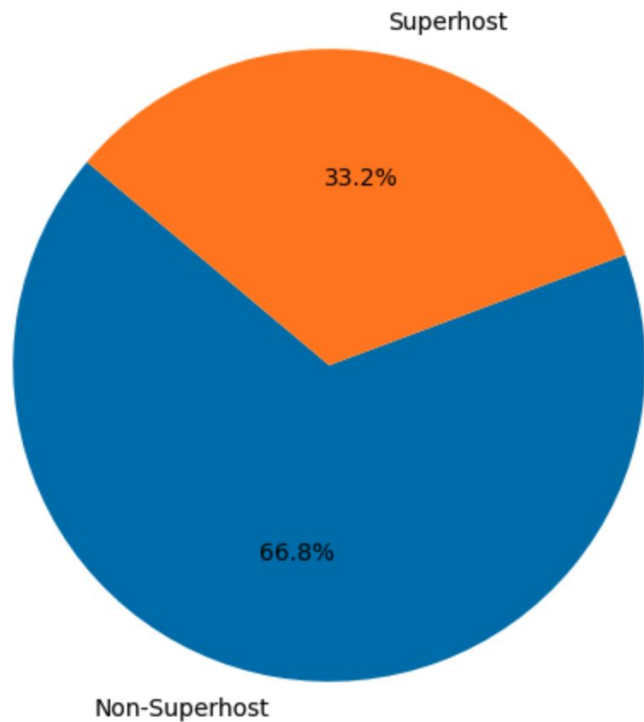


Years Hosts Joined Airbnb



- **Airbnb grew quickly when it first launched in 2008**, until hosts joining the platform peaked in 2014.
- **In 2015-2016, Airbnb began facing regulatory pressure across the country¹** requiring hosts to be registered, limiting how many properties a single host could manage, and for how long renters could stay at a time. This resulted in hosts being removed from the platform.
- **Then in 2020, the COVID pandemic** led to an even steeper decline in hosts on the platform².

Hosts & Superhosts on Airbnb

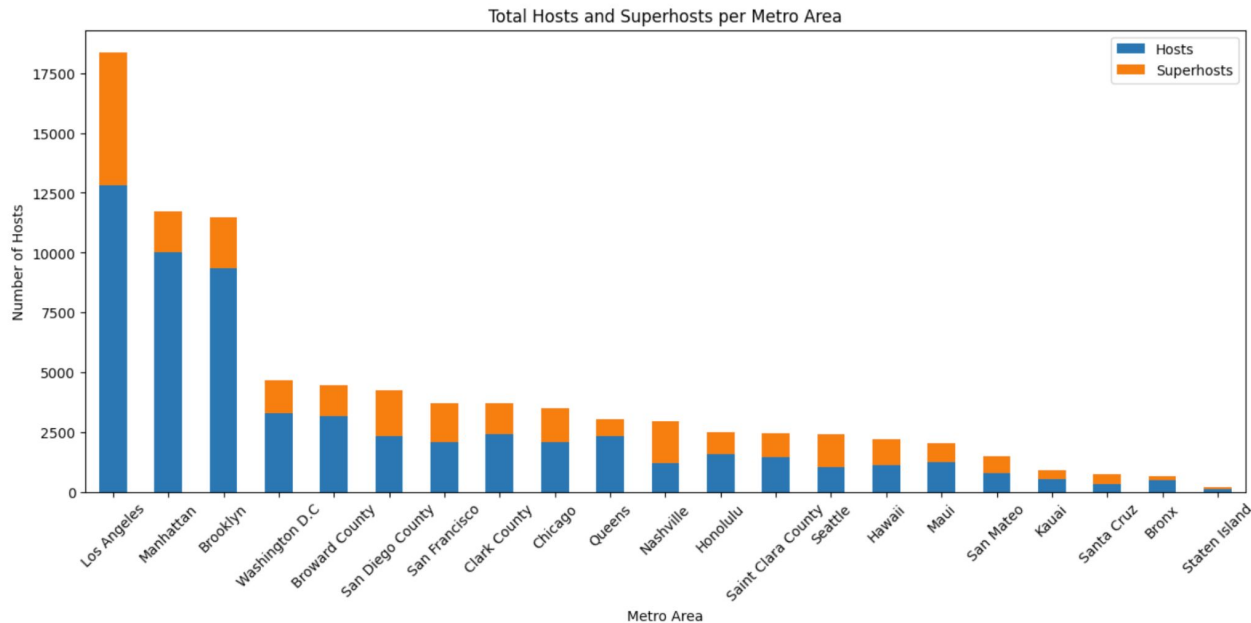


Through 2020, there were a total of 86K Hosts on the platform, with 33.2% designated as Superhosts.

To become a Superhost, a host must:

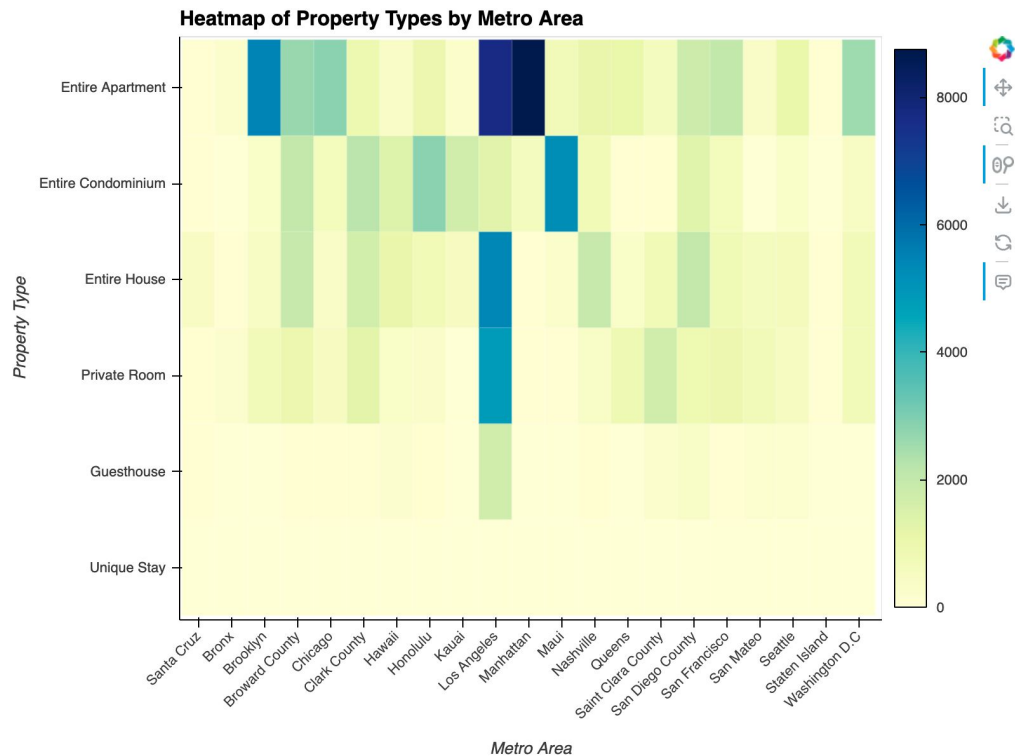
- Be rated at least 4.8 stars
- Pass an in-person quality inspection
- Have a cancellation rate of less than 1%

Hosts & Superhosts by Metro Area



- **Los Angeles** is the top Metro with the highest number of Hosts (12.8K) and Superhosts (5.6K)
- **Followed by Manhattan (10K) and Brooklyn (9K)**, however they have a lower number of Superhosts combined (4K) than all of Los Angeles.

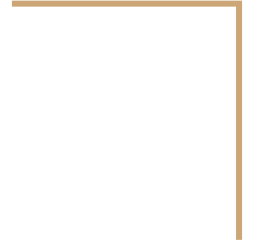
Property Types by Metro Area



- **Manhattan** has the largest number of Entire Apartment listings (8.7K) followed closely by Los Angeles (7.7K)
- **Los Angeles** has the largest number of Entire House (5.4K) and Private Room (4.8K) listings compared to all other Metro Areas
- **Maui** has the largest number of Entire Condominium listings (5.2K) of all Metro Areas despite having one of the smallest concentrations of Hosts (3.5%)

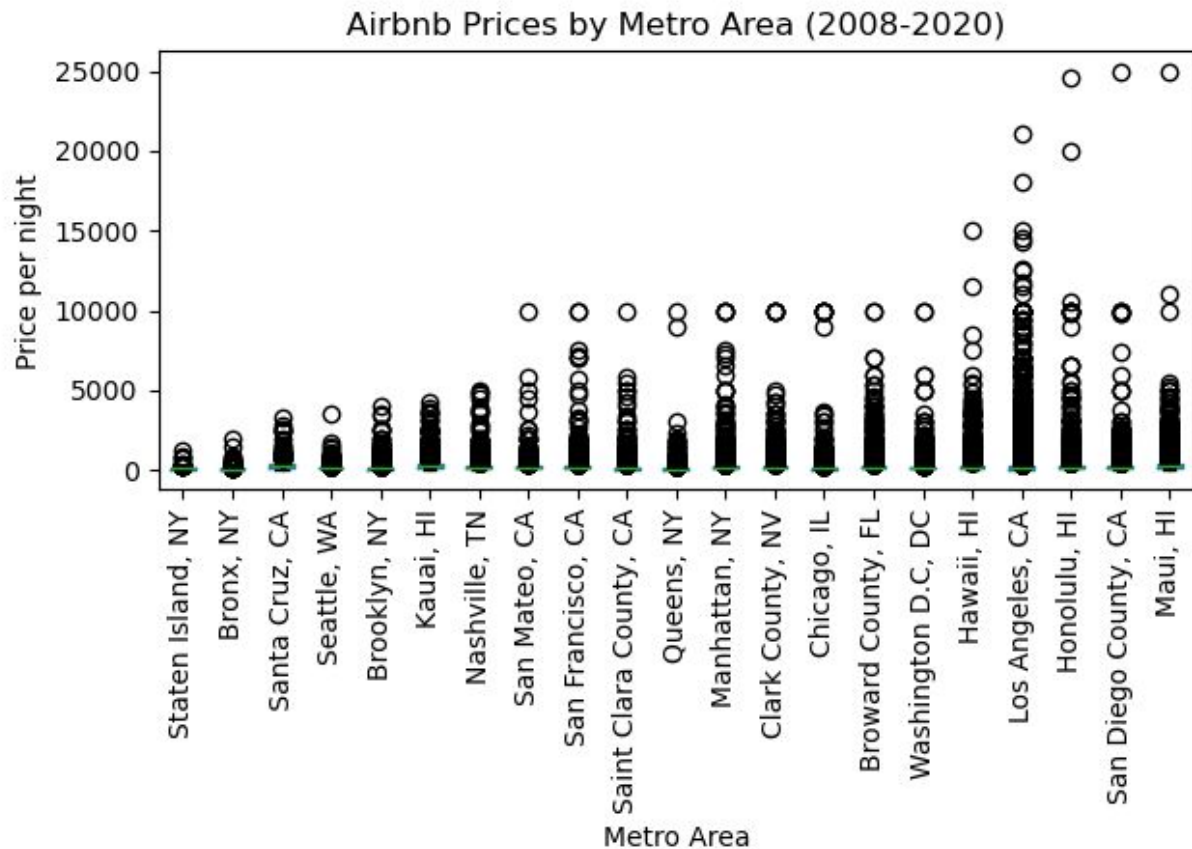
Price Analysis

This price analysis will look at statistical information to identify median, minimum, and maximum values for Airbnb site prices per night, for the years 2008-2020 for nine States. Median was ultimately used because there were extreme outliers.



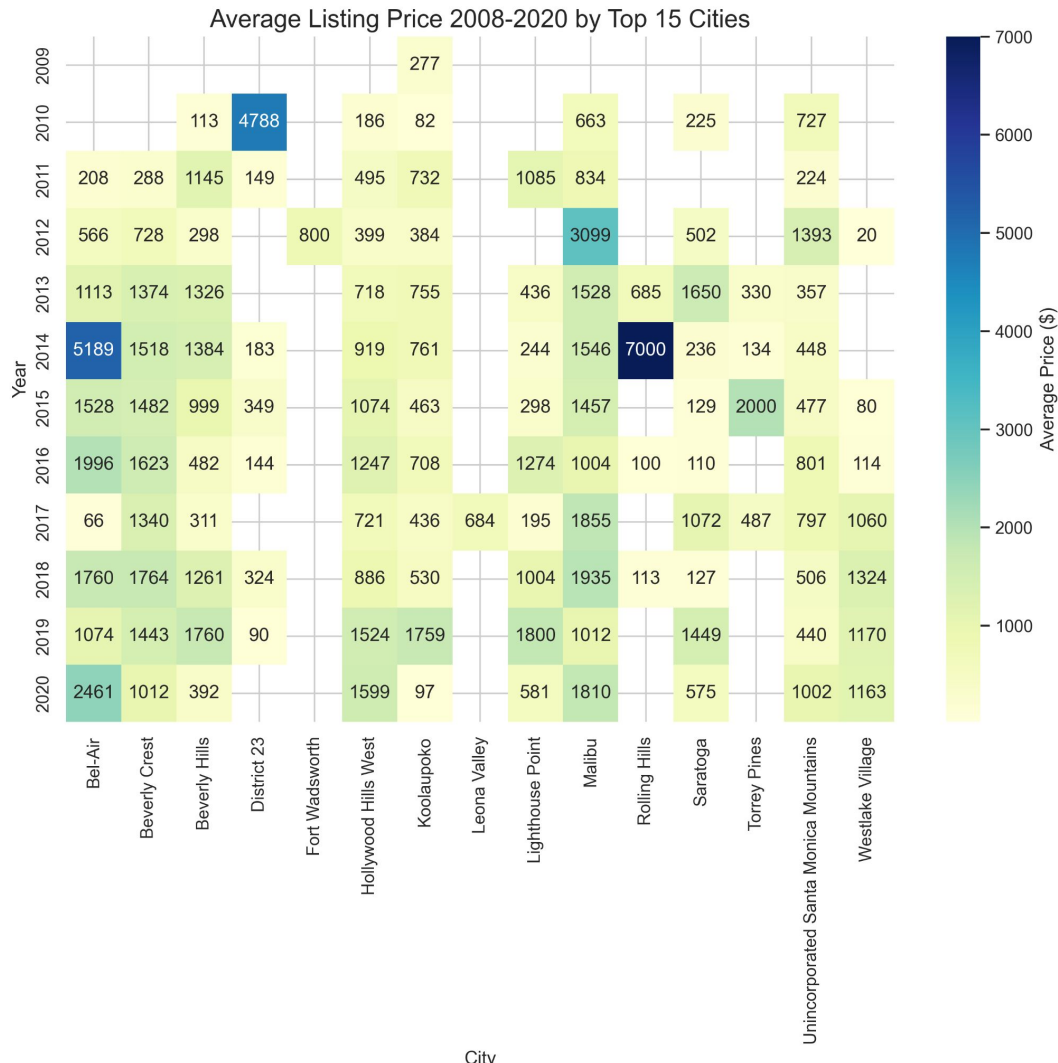
Listing Price Outliers

- There are some incredibly large outliers - especially starting at \$10,000/night and maxing out around \$25,000/night.
 - Entire houses, condos, and villas
- The median and minimum prices are much more similar.



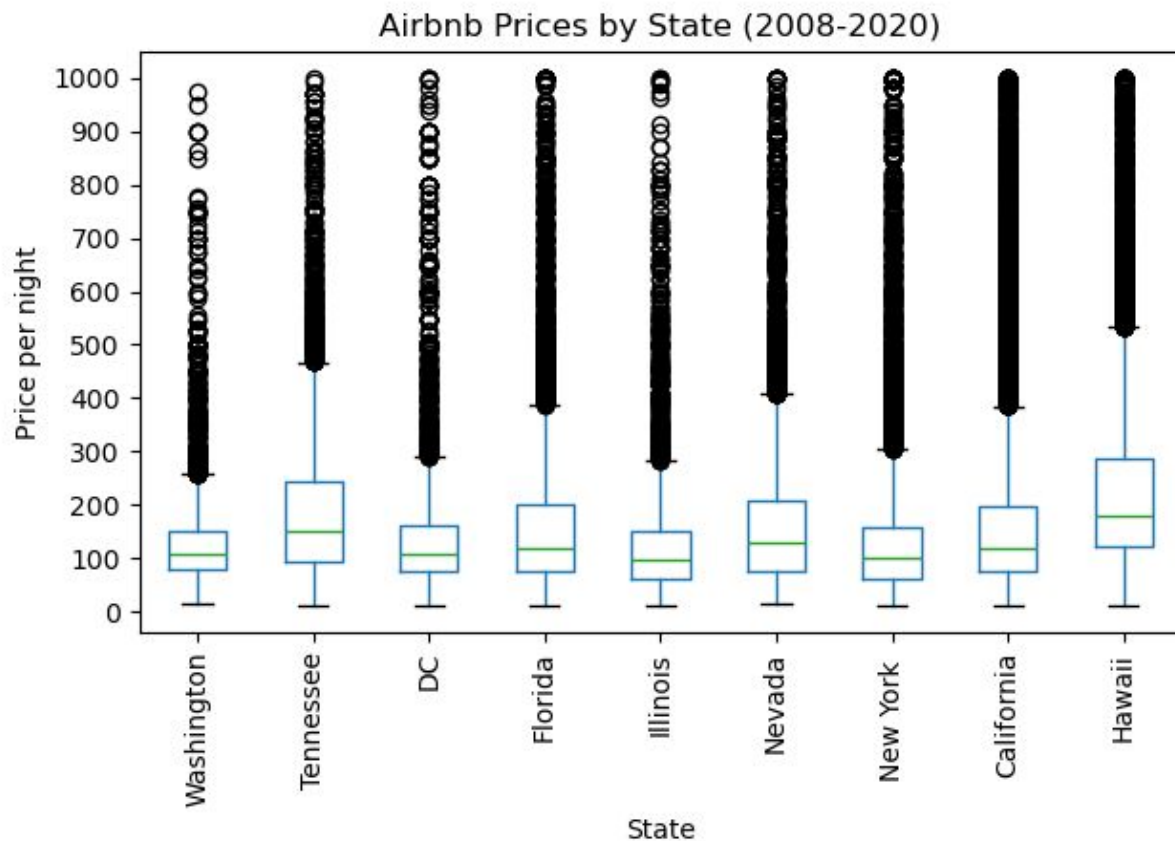
Listing Price Outliers: Top 15 Cities

- This heat map shows that average (mean) **prices for a city could vary extremely from year to year.**
- For example:
 - in **2014**, Bel-Air had an average price of **\$5,189**
 - in **2017**, this shifted dramatically to **\$66**



Filtering Out the Outliers

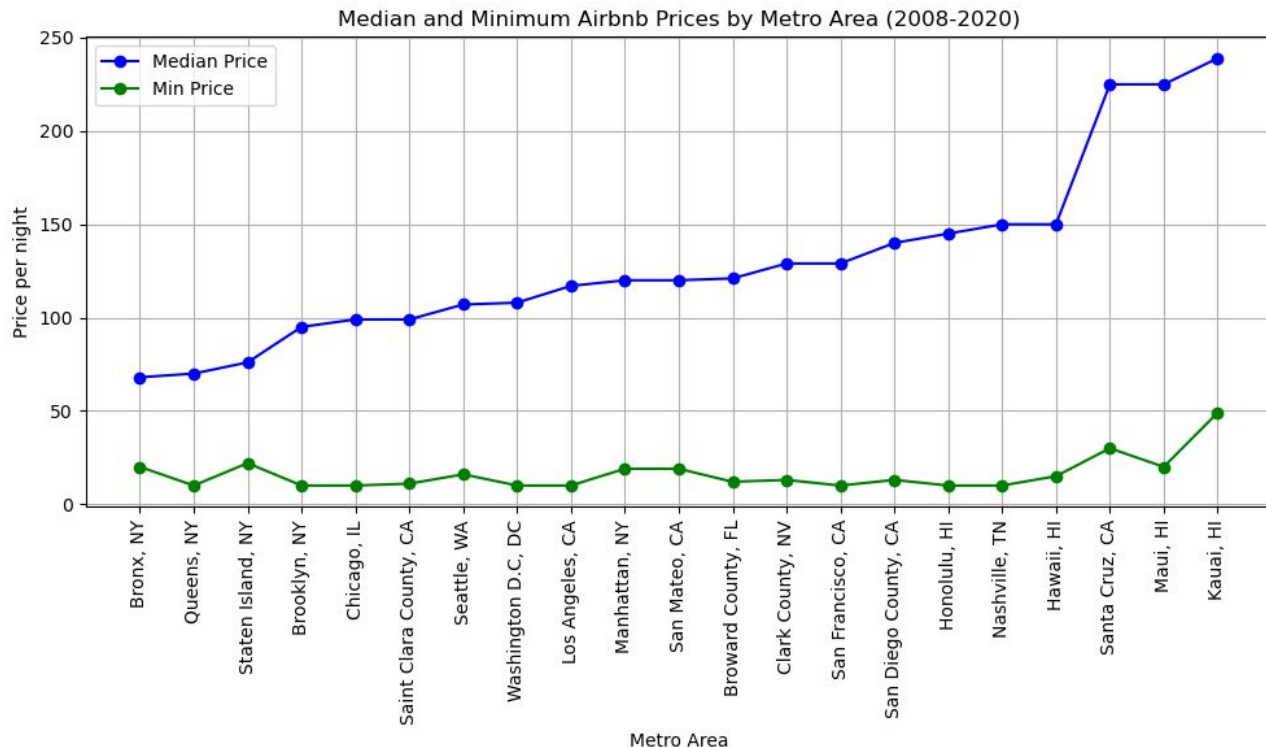
- **Filtering out** listing prices above \$1,000/night allows the box and whisker plot to emerge
- The majority of Airbnb rentals definitely fall along a median value of \$125/night



Median and Minimum Airbnb Prices

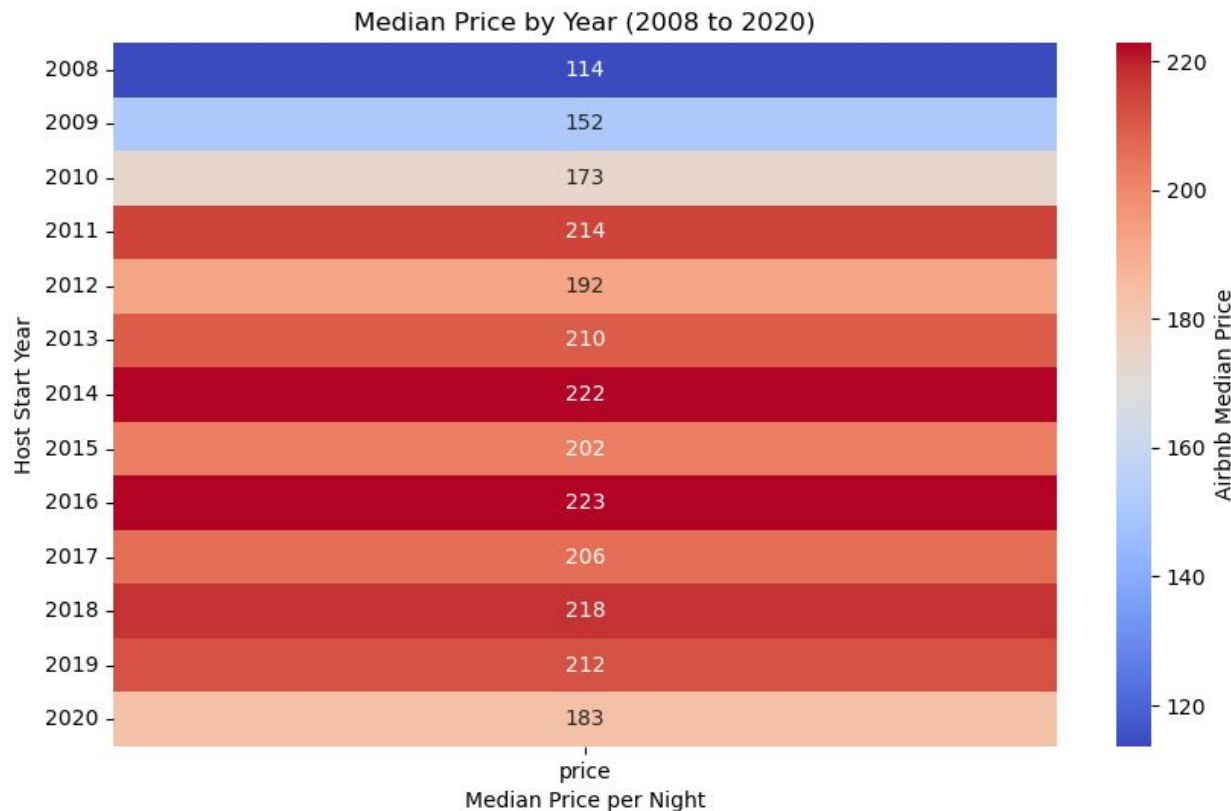
aka “Regular People” Prices

- Minimum prices are **relatively uniform** across metro areas
- As with maximum values, both the higher median and minimum prices appear to be in **California and Hawaii**



How did average prices change from 2008 to 2020?

- Overall, the trend seems to be an **increase** in price per night.
- Greatest median prices were in **2014 and 2016**
- Looked to be **decreasing** in **2020**
 - ✓ Further investigation could explore the downward turn

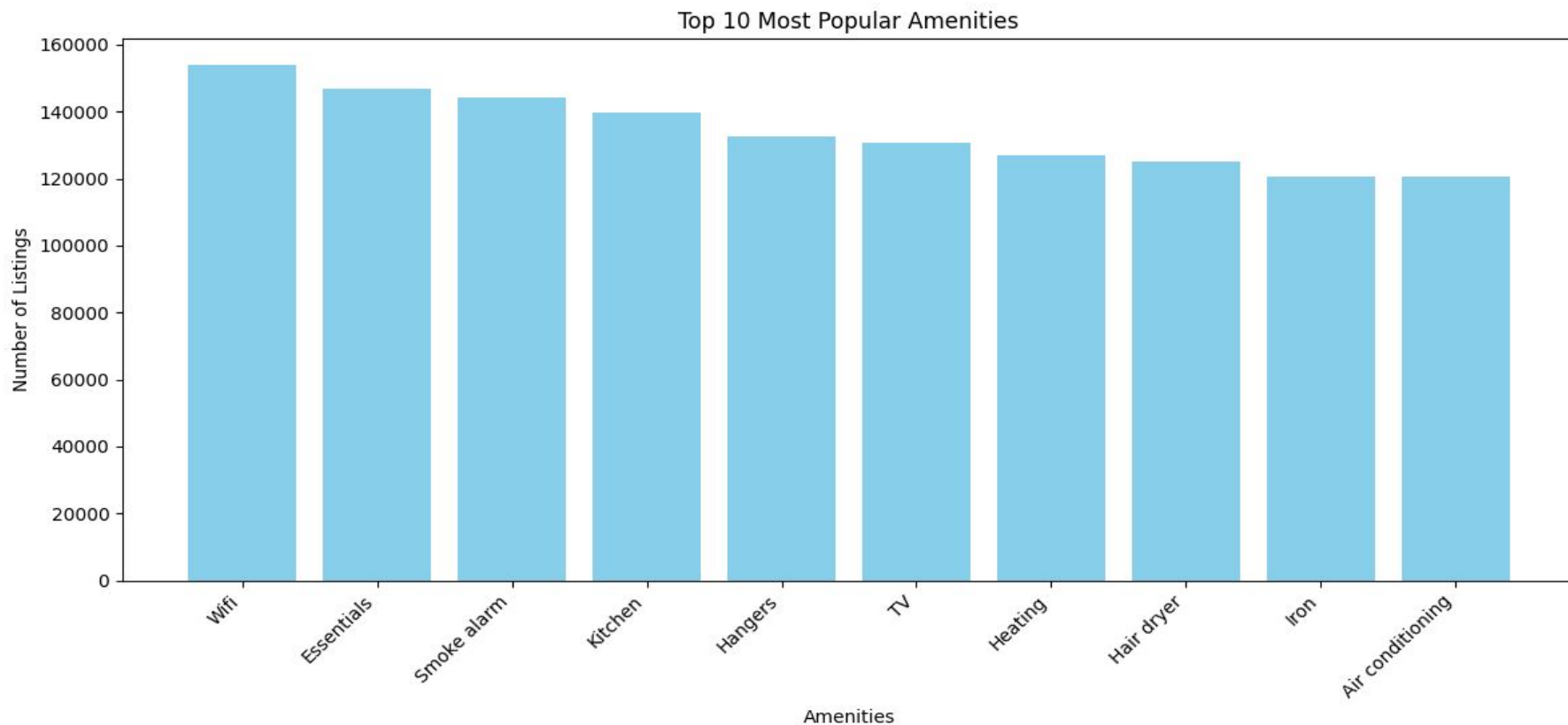


Amenities Analysis

The amenities analysis will identify the most common amenities and if they fall in specific categories. As well as, if offering luxury items boosts the price of a listing.



What amenities are most common?



Categories for Amenities

1. **Basic**

- a. A/C, Kitchen, Heating, TV, Essentials

2. **Luxury Amenities**

- a. Pool, Gym, Hot tub, Sauna, Outdoor Dining Area

3. **Safety amenities**

- a. CO2 Alarm, Fire Extinguisher, First Aid Kit, Smoke Alarm

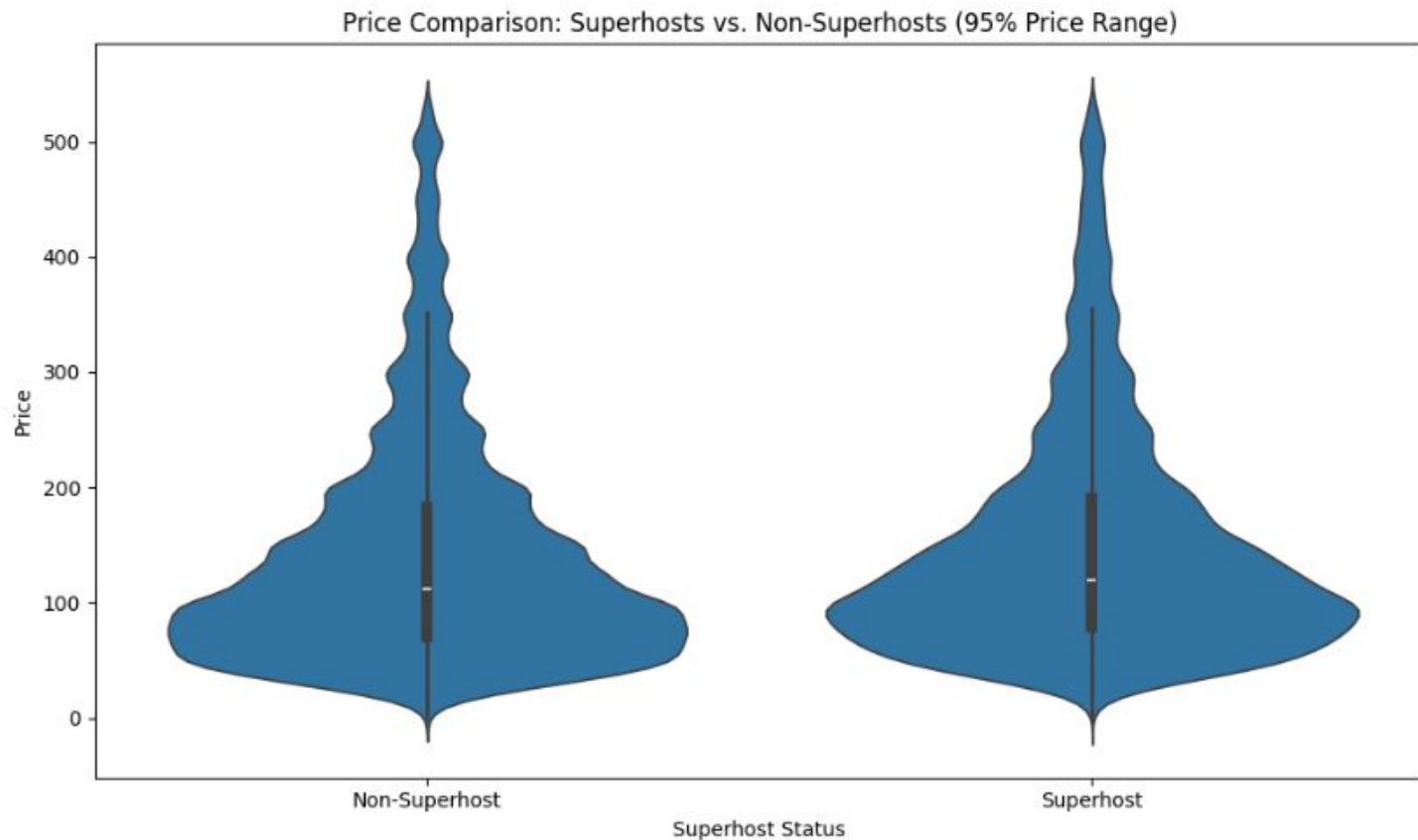
Does offering luxury items boost the price of a listing?



Do the most expensive cities also have the most Luxury Amenities?

Top 10 Neighborhoods by Highest Prices			Top 10 Neighborhoods by Luxury Amenities			
	neighbourhood	average_price		neighbourhood	total_luxury_amenities	luxury_amenity_percentage
705	Rolling Hills	\$3079.60	456	Las Vegas	6502	71.0%
53	Bel-Air	\$2278.89	427	Kihei-Makena	3447	95.1%
499	Malibu	\$1592.35	443	Lahaina	3093	94.2%
66	Beverly Crest	\$1297.12	672	Primary Urban Center	2932	67.5%
909	Westlake Village	\$908.79	390	Hollywood	2388	54.8%
392	Hollywood Hills West	\$882.33	314	Fort Lauderdale	1594	67.7%
315	Fort Wadsworth	\$800.00	593	North Kona	1405	71.8%
68	Beverly Hills	\$782.91	600	North Shore Kauai	918	74.4%
467	Leona Valley	\$684.00	768	South Kohala	908	86.2%
437	La Jolla	\$627.48	236	Downtown	825	75.8%

Do Superhosts have higher prices?



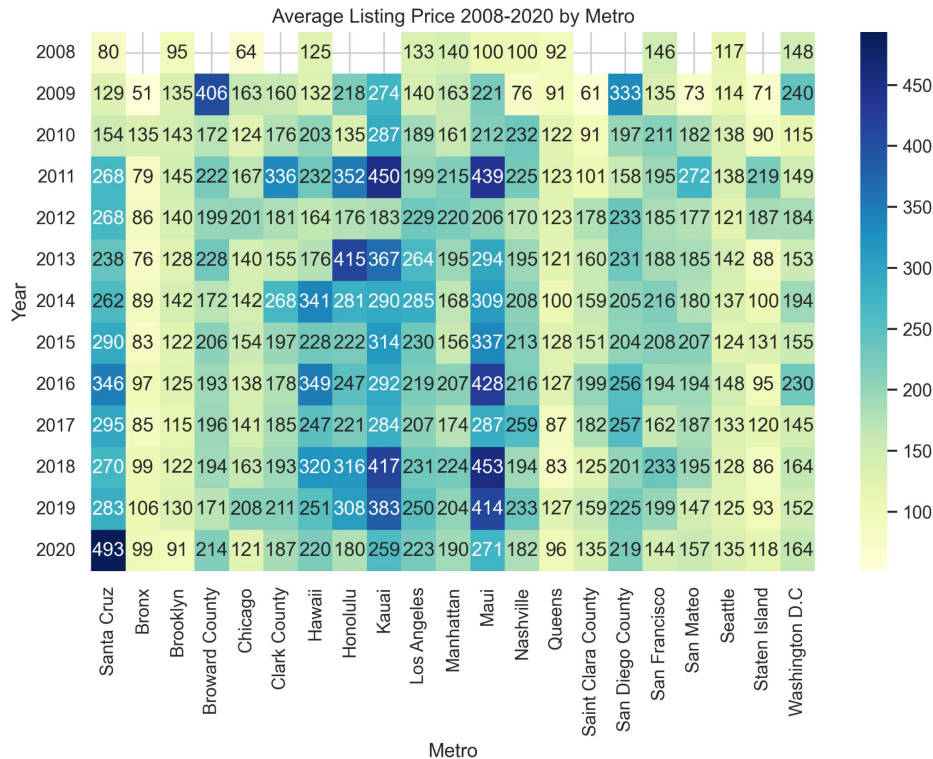
Historical Analysis

This historical analysis will uncover average prices for listings and how they've changed over the years in different cities and metros.



Market Trends Over Time:

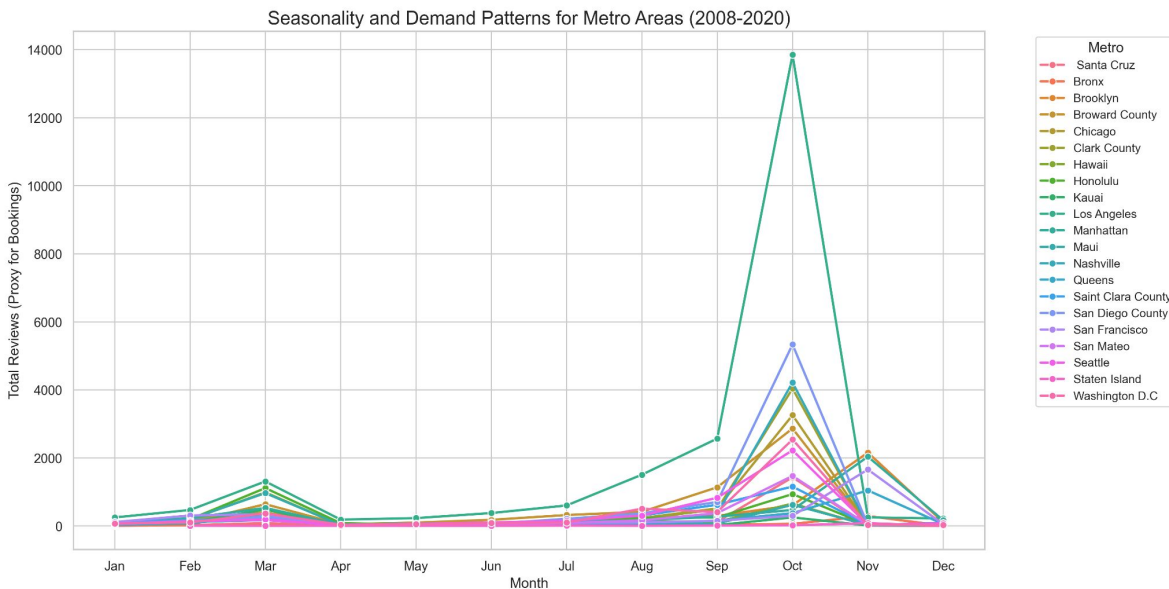
How have average prices for listings changed over the years in different metros?



- **Fluctuation in Prices:** Average Airbnb listing prices have shown significant variation across cities and metros over the years.
- **2020 Decline:** Sharp decline in prices in 2020, with Santa Cruz as an exception (maintained stable prices).
- **Highest-Priced Locations:** Maui and Honolulu consistently had the highest average prices.
- **Lower-Priced Locations:** The Bronx, Staten Island, and Brooklyn remained at the lower end of the pricing spectrum.
- **2012 Price Decrease:** Several metropolitan areas experienced a decrease in prices around 2012.
- **Most Expensive Cities:** Rolling Hills and Bel Air recorded the most expensive listings in 2014.
- **Pre-2020 Downward Trend:** Notable decline in prices observed in 2019, continuing into 2020.

Seasonality and Demand Patterns:

Are there consistent peak and low seasons for Airbnb bookings in specific metros?



Peak Booking Periods:

- Spring through summer, extending into early fall
- Highest number of reservations: **July to October**

Kauai:

- Significant surge in bookings during summer months
- Outpaces other locations in terms of bookings

Low Season for Bookings:

- **December and January:** Winter in the U.S.
- **April to June:** When school is in session

Factors Influencing Trends:

- Common travel periods: Spring break and summer vacation
- These are the times when most people plan trips and book Airbnb accommodations.

In conclusion, we found...

- **Hosts joining the platform peaked in 2014, similar to prices, then increased each year until 2016** when there was a downturn due to regulatory pressure. Then, there was a downturn in both the number of hosts and price per listing in **2020 due to the COVID pandemic**.
- There are **extreme outliers** in this dataset. However, for the years 2008-2020, the majority of prices per night lie around **the median of \$125/night**.
- **When a property contains luxury amenities it increases the average price significantly**, where properties with luxury amenities on average cost \$100 more. However, they are not as impactful on price as location.
- There were **strong seasonal booking trends from July to October** with a small trend in February-March
- The **Los Angeles metro area** leads in the number of hosts (and superhosts), property types, and price per neighborhood/city (i.e. Rolling Hills, Bel Air, Malibu).

Thank you!



Implications

Ways to use or extend this data

- Investigate how national health crises or economic regulation affect short-term rental property pricing trends
- Find a dataset with additional data (such as booking records) to explore:
 - Are bookings tied to leisure travel?
 - Are travelers from out of town or traveling locally?
 - Do these factors correlate to seasonal trends?
- Potential hosts could use seasonal data to identify most profitable rental periods