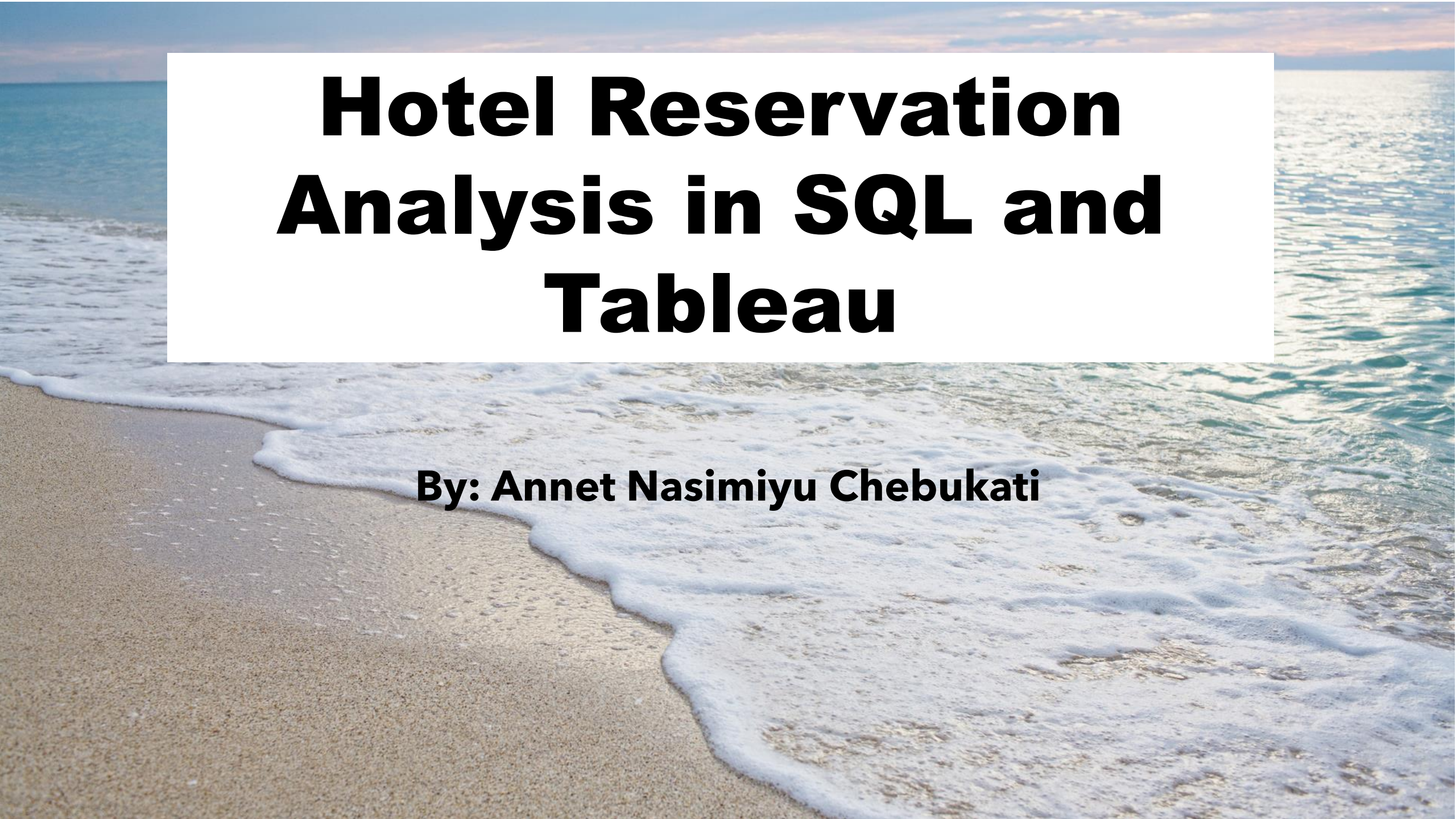


Hotel Reservation Analysis in SQL and Tableau

By: Annet Nasimiyu Chebukati

Agenda

- ✓ Introduction
- ✓ Data Collection
- ✓ Data Cleaning and Preparation
- ✓ Data Management in SQL
- ✓ Data Analysis In Tableau
- ✓ Data Visualization in Tableau
- ✓ Interpretation of Results
- ✓ Recommendations

Introduction

• **Objective**: This presentation aims to delve into the details of hotel reservation data analysis. By dissecting trends and guest behaviors, as I seek to unlock actionable insights that can propel the hotel's strategic initiatives forward.

• **Scope:** I navigated through the entire analytical journey, from data acquisition to the formulation of recommendations, ensuring a holistic understanding of the hotel's operational dynamics and market positioning.

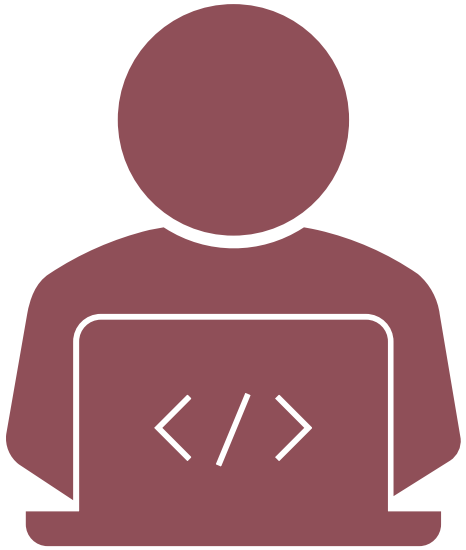
Data Collection

• **Acquisition:** The foundation of my analysis is built upon a dataset meticulously sourced from a publicly accessible GitHub repository, ensuring transparency and reproducibility of my findings.

• **Selection Criteria:** The dataset was chosen for its comprehensiveness and relevance, providing a robust platform for an in-depth examination of reservation patterns and guest preferences.

Data Cleaning and Preparation

• **Preprocessing with Python:** Leveraging the power of Python, I embarked on a rigorous data cleaning process. This involved the elimination of inconsistencies, the imputation of missing values, and the standardization of data formats to ensure the integrity and reliability of my analysis.



Data Management in SQL

• **Database Environment:** Utilizing PostgreSQL 16 and the intuitive interface of pgAdmin4, I imported the prepared dataset into a structured SQL environment.

• **Schema Design:** I crafted a schema that mirrors the complexities of hotel operations, encompassing tables for reservations, market segments, distribution channels, and meals, complete with relational integrity through primary and foreign keys.

• **Data Transformation:** The SQL queries not only organized the data but also transformed it into a CSV file within PostgreSQL and connect it to Tableau public as a csv file.

Data Analysis in Tableau

• **Tableau Integration:** With the CSV file in hand, I established a connection to Tableau Public, where the true potential of the data was unleashed through exploratory analysis.

• **Analytical Techniques:** Involved the creation of calculated fields, measures, and parameters. These tools allowed me to dissect the data further, revealing underlying patterns and trends that would inform strategic recommendations.

• **Insight Generation:** Performed analysis in Tableau to extract meaning, translating raw data into a narrative that would guide the hotel's future decisions.

Data Visualization in Tableau

Hotel Reservation Analysis

Key Metrics

Reservations	Resort Hotel	City Hotel	Reserved	Canceled
119,390	40,060	79,330	75,166	44,224

Loyalty Status

New	96.81%
Repeat	3.19%

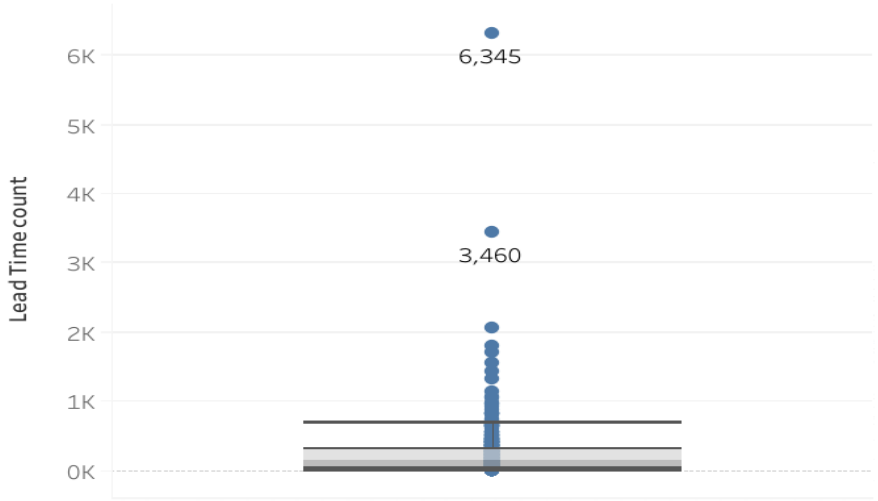
Year of Arrival
- ✔ 2015
- ✔ 2016
- ✔ 2017

R/W Line

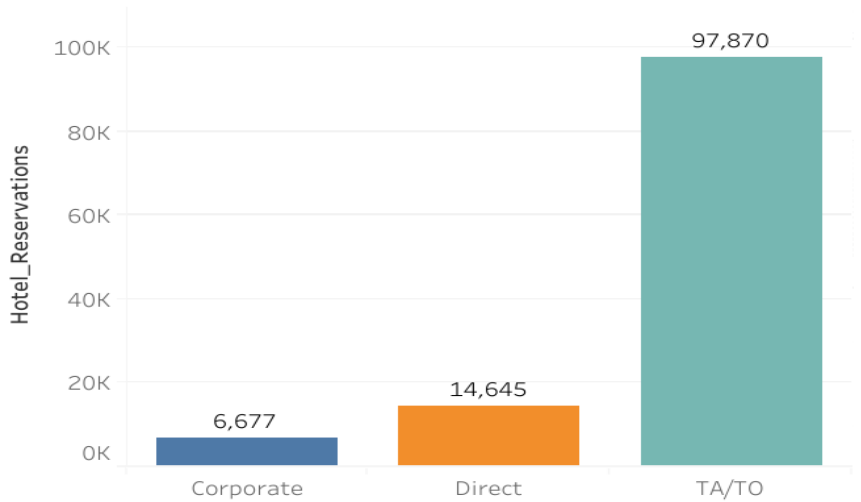
L-Time

Channel

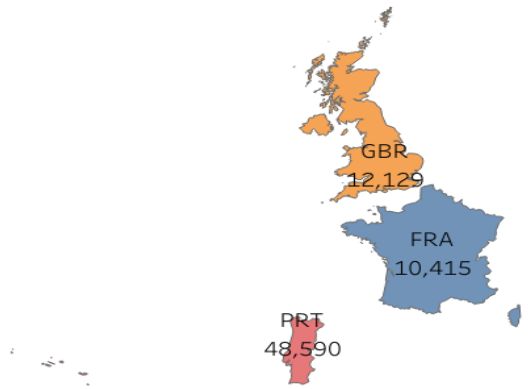
Lead Time Statistics



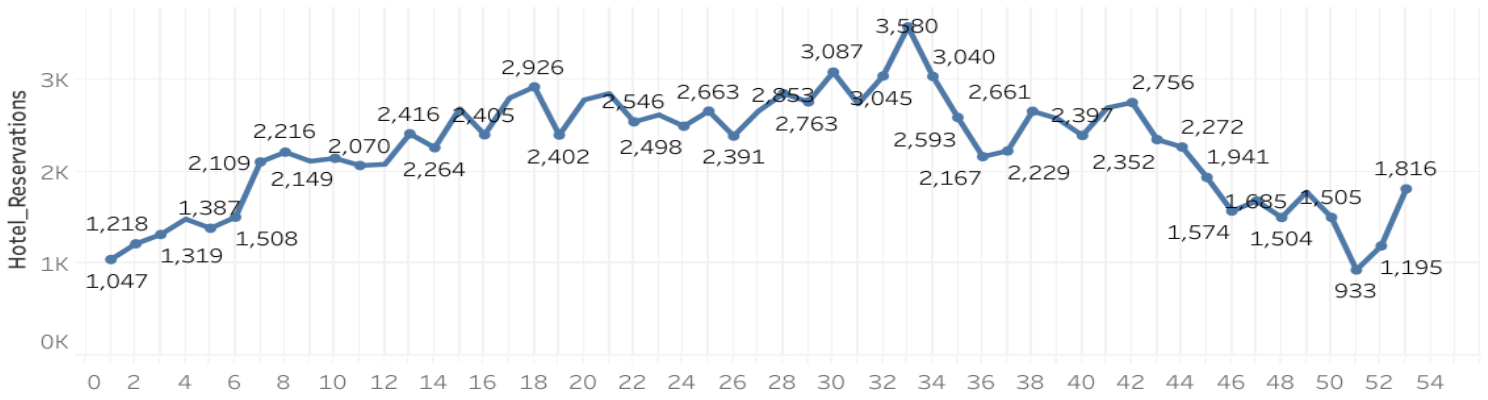
Top 3 Distribution Channels in Reservations



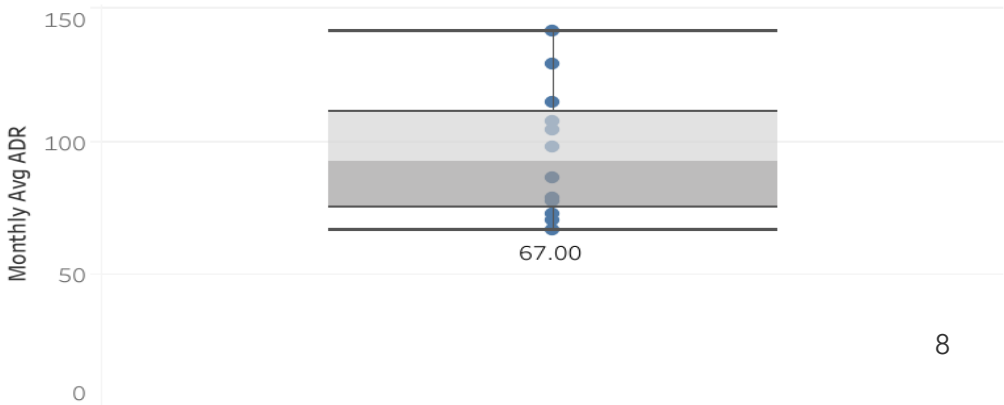
Top 3 Guest-Origin Countries



Reservations per Week



Average Monthly ADR Statistics



Data Visualization in Tableau

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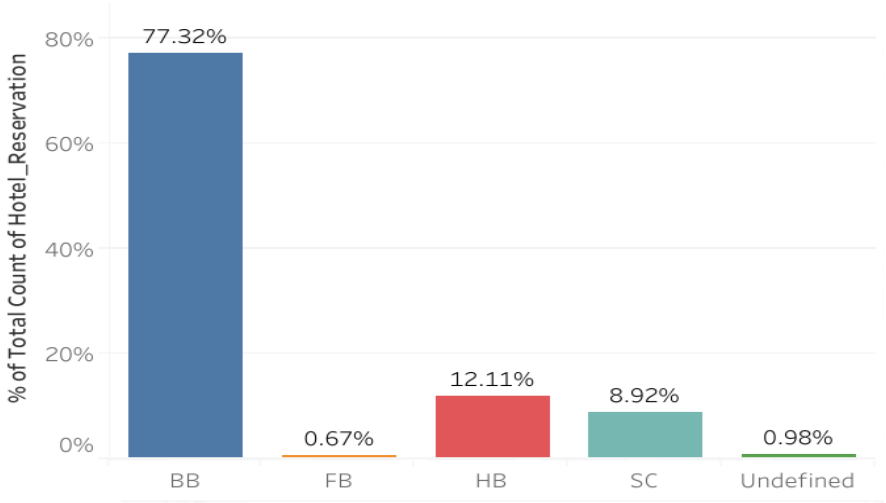
R/M Bar

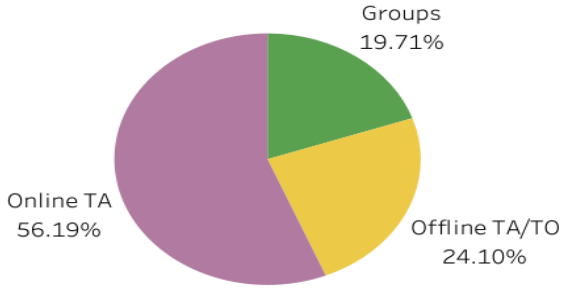
Meals

Segment

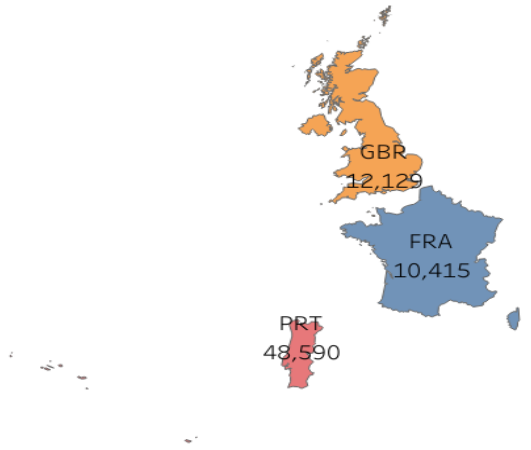
% Popular Meals in Reservations



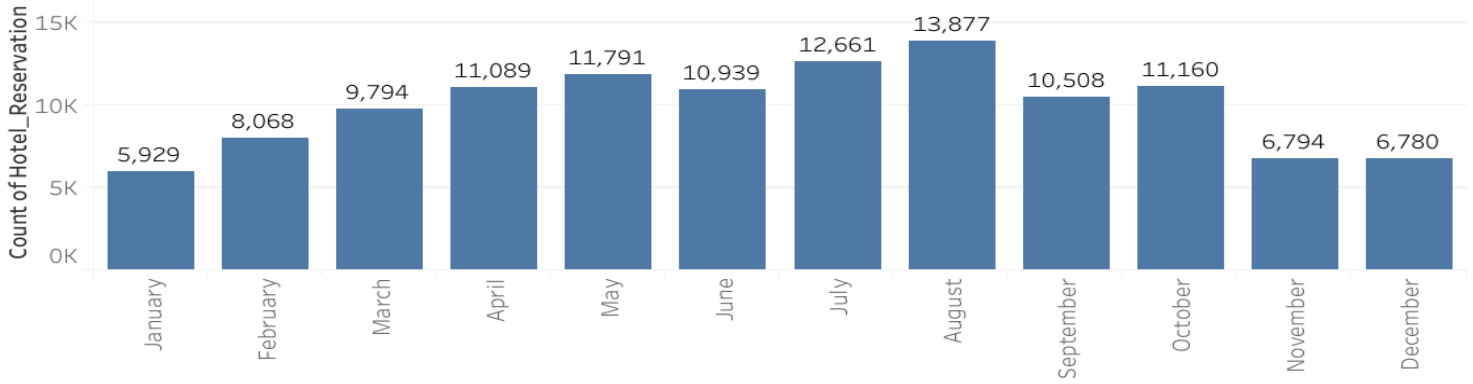
Top 3 % Market Segment Distribution in Reservations



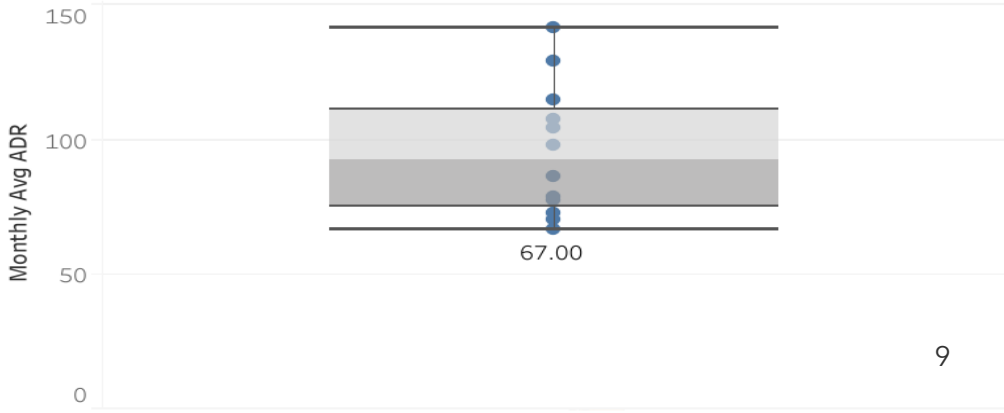
Top 3 Guest-Origin Countries



Reservations per Month



Average Monthly ADR Statistics



Data Visualization in Tableau

Hotel Reservation Analysis Dashboard Overview

- **Interactive Features:** Utilize the year filter to display data for specific years and analyze time-based trends.
- **Booking Volume:** High number of total reservations indicating strong market demand.
- **Hotel Types:** Preference for City Hotels over Resort Hotels.
- **Cancellation Insights:** Notable cancellation rate, pointing to potential improvements in booking policies.
- **Channel Distribution:** Dominance of Travel Agents/Operators in reservations, with opportunities to enhance direct and corporate bookings.
- **Loyalty Analysis:** Majority of guests are new, with a small percentage of repeat customers.

Data Visualization in Tableau

Hotel Reservation Analysis Dashboard Overview

- **Segment Performance:** Online TA/TO as the leading booking channel, followed by offline TA/TO and group bookings.
- **Meal Preferences:** Bed & Breakfast is the most popular meal plan among guests.
- **Seasonal Trends:** Identification of peak and low seasons for targeted marketing strategies.
- **Pricing Strategy:** Insight into pricing with the average daily rate fluctuating across different percentiles.
- **Booking Lead Time:** Most bookings are made well in advance, offering opportunities for early bird promotions.

Interpretation of Results

Detailed Hotel Reservation Analysis

- **Total Reservations:** A robust figure of **119,390** bookings indicates strong market demand.
- **Resort Hotel:** Captured **40,060** reservations, suggesting a solid interest in leisure and vacation stays.
- **City Hotel**: Dominated with **79,330** reservations, reflecting a preference for urban accommodations, possibly due to business travel or city attractions.
- **Canceled:** A notable **44,224** reservations were canceled, highlighting a potential area for policy improvement to reduce losses.

Interpretation of Results

Distribution Channel Analysis

Corporate: Accounted for **6,677** reservations, indicating room for growth in the business travel sector.

Direct: Achieved **14,645** reservations, showing that a significant number of guests value direct interactions with the hotel for personalized service.

Travel Agents/Operators: Led the way with **97,870** reservations, showcasing their effectiveness in reaching and influencing travelers' choices.

Interpretation of Results

Customer Loyalty Status Breakdown

New Customers: A vast majority, **96.81%**, are first-time guests, indicating successful attraction of new clientele.

Repeat Customers: Only **3.19%** are repeat guests, suggesting an area to strengthen for customer retention and loyalty programs.

Insight: While the hotel excels in attracting new customers, there is a significant opportunity to develop strategies that encourage repeat visits and foster loyalty.

Interpretation of Results

Market Segment Distribution

- **Group Bookings**: Account for **19.71%** of reservations, indicating a healthy demand for group travel.
- **Online TA/TO:** The largest segment with **56.19%**, showing a strong preference for online booking platforms.
- **Offline TA/TO:** Contributes **24.10%**, highlighting the continued importance of traditional travel agencies.

Insight: Online travel agents/tour operators are the most popular booking channel, but there's also a significant portion of reservations made through offline agencies. Group bookings hold a considerable share, suggesting targeted promotions for groups could be beneficial.

Interpretation of Results

Meal Plan Preferences in Reservations

- **BB (Bed & Breakfast):** The preferred choice for **77.32%** of guests, highlighting the demand for convenience.
- **FB (Full Board):** Chosen by only **0.67%** of guests, indicating a lesser preference for all-inclusive meal plans.
- **HB (Half Board):** Selected by **12.11%** of guests, showing a moderate interest in having some meals included.
- **SC (Self-Catering):** Opted by **8.92%** of guests, appealing to those who prefer arranging their own meals.

Insight: The dominance of Bed & Breakfast suggests guests prioritize a comfortable start to their day with an included breakfast. The low percentage for Full Board could imply that guests prefer exploring local dining options or have varying meal requirements during their stay.

Interpretation of Results

Monthly Reservation Trends

- **Peak Season:** August leads with **13,877** reservations, marking it as the busiest month.
- **Low Season:** January has the fewest with **5,929** reservations, indicating a potential off-peak period.
- **High Demand:** The summer months, particularly from **July** to **August**, show a significant increase in bookings.

Insight: Targeted promotions during low-demand months and preparing for high volumes in peak season can optimize occupancy rates and revenue.

Interpretation of Results

Weekly Reservation Trends

- **Lowest Reservations:** Week **53** with only **933** bookings.
- **Highest Reservations:** Peak at Week **33** with **3,580** bookings.
- **Peak Period**: Weeks **30** to **33** consistently show high reservation numbers.
- **Overall Trend:** A steady upward trend in reservations from Week **1** to **33**, followed by a decline.

Insight: Capitalizing on the high-demand period from Week 30 to 33 can maximize revenue. Understanding the reasons behind the steady increase and subsequent fall in reservations can inform targeted marketing and operational strategies.

Interpretation of Results

Monthly Average Daily Rate (ADR) Analysis

- **Upper Whisker (95th Percentile): 142.09**, indicating the top 5% of monthly ADRs are above this value.
- **Upper Hinge (75th Percentile): 110.93**, meaning 25% of monthly ADRs are above this value and 75% are below.
- **Median (50th Percentile): 92.35**, representing the middle value of the monthly ADR distribution.
- **Lower Hinge (25th Percentile): 74.88**, indicating 25% of ADRs fall below this value.
- **Lower Whisker (5th Percentile): 67.00**, suggesting the bottom 5% of daily rates are below this value.

Insight: The ADR varies significantly, with most rates falling between **74.88** and **110.93**. Strategies can be developed to increase the lower percentile rates during off-peak times and to optimize pricing for the higher percentiles during peak demand.

Interpretation of Results

Lead Time Distribution Analysis

- **Upper Whisker (95th Percentile): 20** days, indicating the top 5% of lead times are below this value.
- **Upper Hinge (75th Percentile): 89** days, meaning 25% of lead times are shorter than this and 75% are longer.
- **Median (50th Percentile): 187** days, representing the middle value of the lead time distribution.
- **Lower Hinge (25th Percentile): 242** days, indicating 25% of lead times are longer than this value.
- **Lower Whisker (5th Percentile): 324** days, suggesting the bottom 5% of lead times exceed this value.

Insight: The lead time for reservations shows a wide range, with most bookings made well in advance, between **89** and **242** days. This suggests guests are planning their stays far ahead, which could be leveraged for early bird promotions and better inventory management.

Recommendations

Boost Direct Bookings: Create loyalty programs and special offers to get more direct bookings.

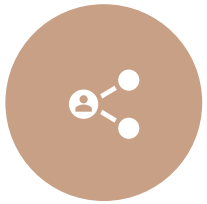
Improve Cancellation Policies: Change booking policies to lower cancellations.

Expand Online Reach: Use online travel agents and operators to get more bookings.

Increase Guest Loyalty: Start programs that give benefits to guests who come back.

Adjust Promotions for Seasons: Make marketing plans for busy and slow times to keep rooms filled.

Adjust Prices Smartly: Change prices based on demand using data from average daily rates.



Use Lead Time: Have deals for people who book early and make booking more flexible.

Thank you

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