
Call Volume Trend Analysis
Operational Effciency

ABC Call Volume Trend Analysis

Project Description

In this project, we will analyze call volume trends for the inbound calling team of a company. The dataset covers 23 days and includes details like the agent's name and ID, queue time, call time, call duration, and call status (whether the call was abandoned, answered, or transferred). By examining this data, we aim to understand how call volumes fluctuate and what factors might influence these trends.

Our focus will be on the role of customer service representatives, who handle various support tasks including inbound calls from existing or prospective customers. Through this analysis, we hope to identify patterns that can help improve customer experience, reduce wait times, and enhance overall service efficiency.

The insights gained from this project will be valuable for the Customer Experience (CX) team. They will help in making informed decisions about resource allocation, identifying peak call times, and improving customer satisfaction by ensuring a smoother and more responsive service.

Approach

Data Cleaning:

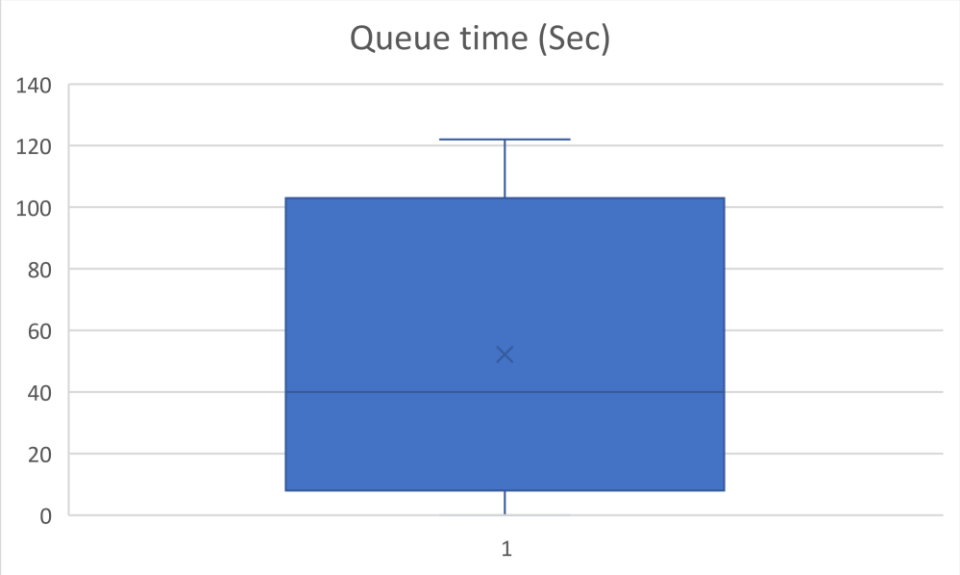
Handling Missing Values: Initially, I identified that the "Wrapped_by" column contained missing values. Since this column was not crucial for the analysis, I removed it. This ensured that the dataset had no null values.

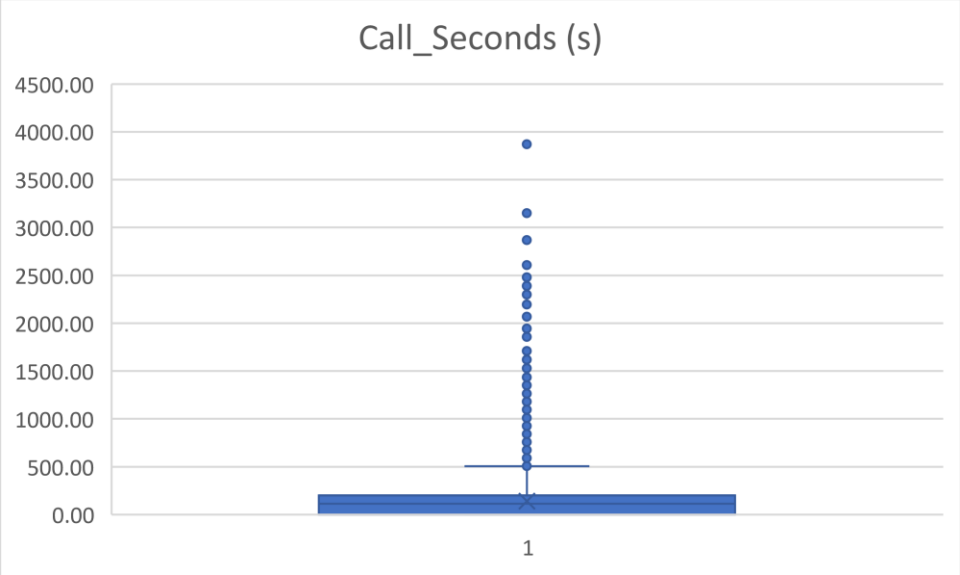
Descriptive Statistics:

I generated descriptive statistics for three key columns: "Queue_Time (Secs)", "Time", and "Call_Seconds (s)". This provided a foundational understanding of the dataset's characteristics.

Outlier Detection:

Box Plots: I created box plots for "Queue_Time (Secs)" and "Call_Seconds (s)" to identify outliers. The "Queue_Time" column had no outliers. However, the "Call_Seconds (s)" column revealed that 3238 calls lasted over 506 seconds (more than 8 minutes), and 8 calls exceeded 2500 seconds (over 41 minutes). Despite being unusually long, these durations were retained for further analysis.





Data Imbalance:

Call Status Analysis: To check for imbalances, I analyzed the "Call Status" column and created a pie chart to visualize the distribution. (Include space for the pie chart)

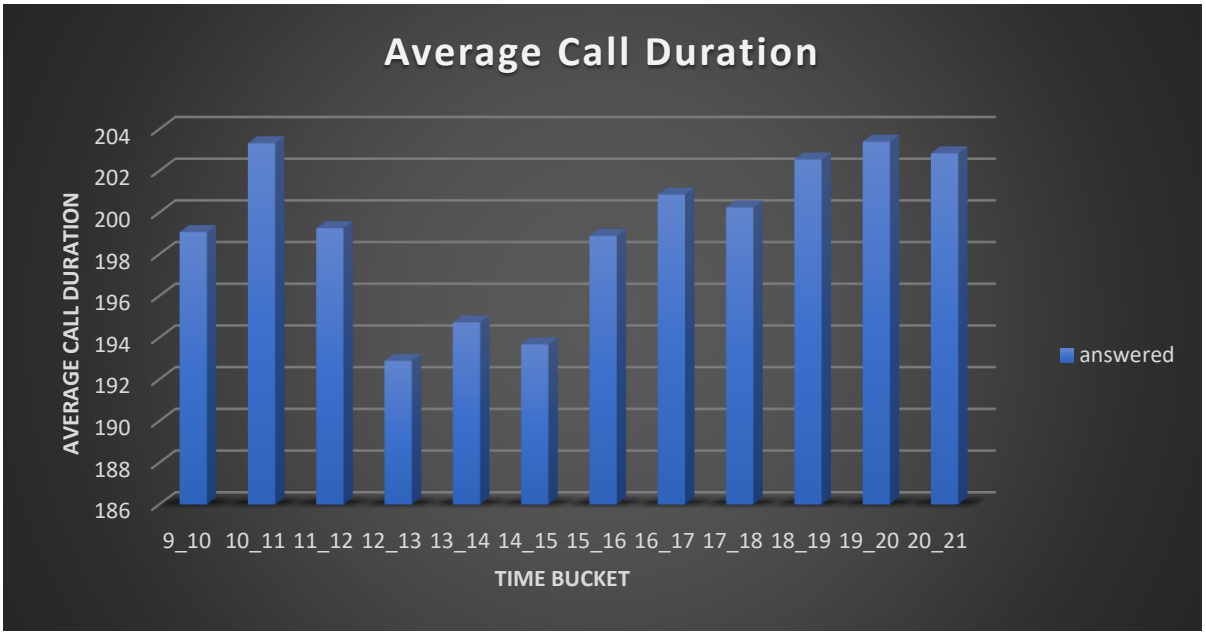
Ringing Column: The "Ringing" column consistently contained "yes" throughout the dataset, adding little value to the analysis and thus not being a focus of further study.

Tech Stack Used

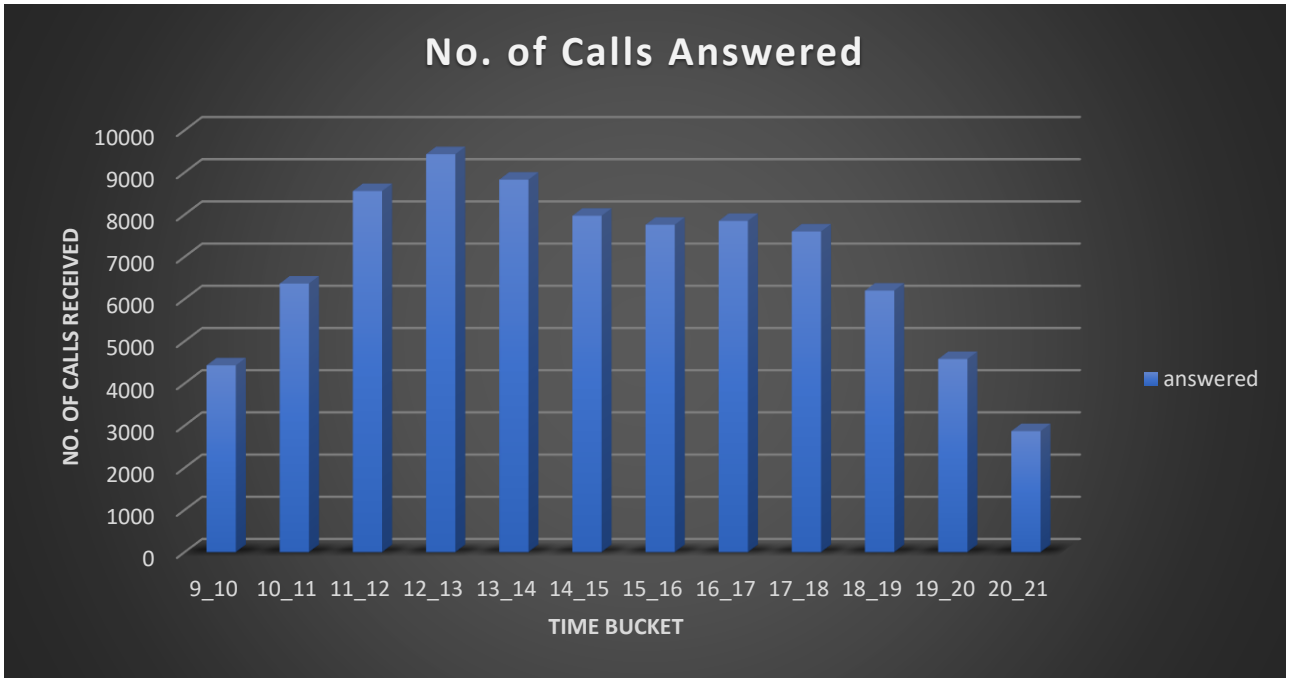
Microsoft Excel & Word 2021 version is used for this project due to its simplicity of use and extraordinary analysis and visualization capability.

Analysis Tasks

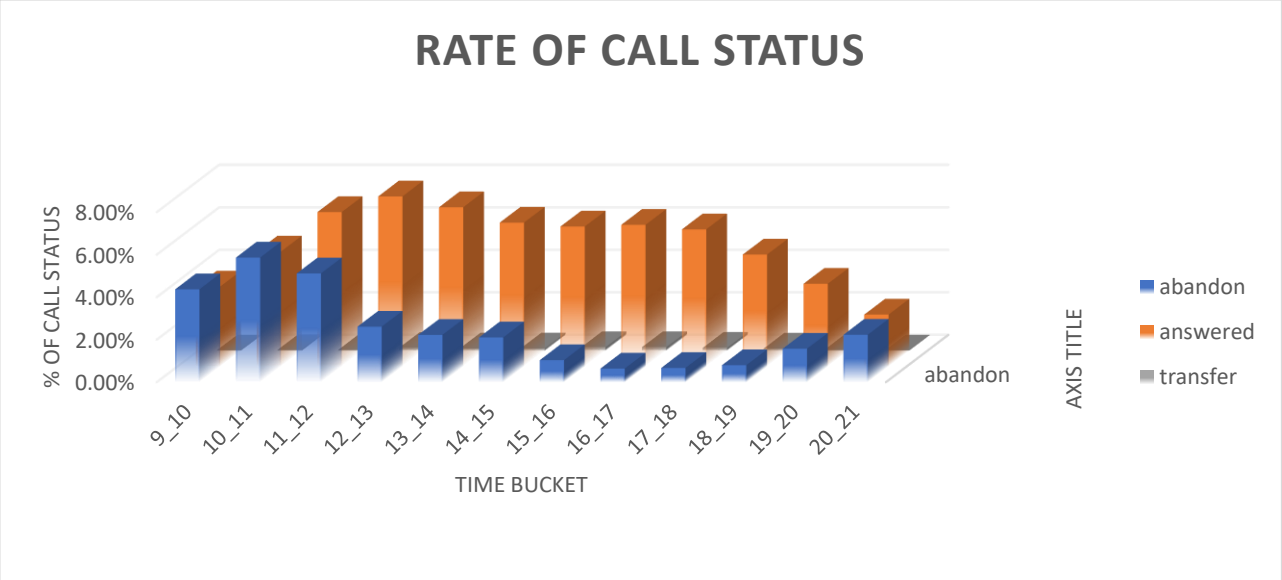
Task 1.A: What is the average duration of calls for each time bucket?



Task 2: Can you create a chart or graph that shows the number of calls received in each time bucket?



Task 3: What is the minimum number of agents required in each time bucket to reduce the abandon rate to 10%?



Time Bucket	Call Seconds (Current	Proportion of Total (%	Call Seconds (90% Answer Rate	Average Daily Call Second	Required Employee
9_10	8,81,478	5.38%	11,34,728	49,336	14
10_11	12,94,812	7.91%	16,68,345	72,537	21
11_12	17,05,623	10.41%	21,95,635	95,462	27
12_13	18,19,327	11.10%	23,41,167	1,01,790	29
13_14	17,19,361	10.50%	22,14,617	96,288	27
14_15	15,44,381	9.43%	19,88,937	86,476	25
15_16	15,43,378	9.42%	19,86,828	86,384	24
16_17	15,77,217	9.63%	20,31,120	88,310	25
17_18	15,22,091	9.29%	19,59,409	85,192	24
18_19	12,55,816	7.66%	16,15,616	70,244	20
19_20	9,31,193	5.68%	11,98,003	52,087	15
20_21	5,82,168	3.55%	7,48,752	32,554	10
Total	1,63,76,845	100%	2,10,91,594	9,16,660	NA

Task 4: Propose a manpower plan for each time bucket throughout the day, keeping the maximum abandon rate at 10%.

Time Bucket	Call Seconds (90% Answer Rate)	Average Daily Call Seconds	Required Employees	Employee dist.	4 Days leave adjusted Employees
9_10	11,34,728	49,336	14	Morning Shift 58 employees	Morning Shift 69 employees
10_11	16,68,345	72,537	21		
11_12	21,95,635	95,462	27		
12_13	23,41,167	1,01,790	29		
13_14	22,14,617	96,288	27		
14_15	19,88,937	86,476	25		
15_16	19,86,828	86,384	24	Evening Shift 40 Employees	Evening Shift 48 Employees
16_17	20,31,120	88,310	25		
17_18	19,59,409	85,192	24		
18_19	16,15,616	70,244	20		
19_20	11,98,003	52,087	15		
20_21	7,48,752	32,554	10		
21_22	6,32,803	27,513	8	night shift 16 Employee	night shift 19 Employee
22_23	6,32,803	27,513	8		
23_24	4,21,869	18,342	6		
00_01	4,21,869	18,342	6		
01_02	2,10,934	9,171	3		
02_03	2,10,934	9,171	3		
03_04	2,10,934	9,171	3		
04_05	2,10,934	9,171	3		
05_06	6,32,803	27,513	8		
06_07	8,43,738	36,684	11	Morning shift 58 employees	Morning Shift 69 employees
07_08	8,43,738	36,684	11		
08_09	10,54,672	45,855	13		

Insights

Task 1 - What is the average duration of calls for each time bucket? ~ Analyzing the average call duration across different time buckets reveals that the call lengths remain relatively consistent throughout the day, with slight variations. The highest average call duration is observed between 10:00-11:00 AM and 19:00-20:00 PM, both averaging around 203 seconds per call. Conversely, the shortest average call duration occurs between 12:00-13:00 PM, with calls averaging approximately 193 seconds. Overall, the grand total average call duration across all time buckets is about 199 seconds, indicating a stable call handling time regardless of the hour. This consistency can aid in better shift planning and resource allocation.

Task 2 - Can you create a chart or graph that shows the number of calls received in each time bucket? ~ The distribution of call volumes across the day shows significant variation, with the highest number of calls received between 11 AM and 1 PM. The peak hour is 12 PM to 1 PM with 9,432 calls. The call volume gradually decreases in the evening, reaching the lowest point between 8 PM and 9 PM with only 2,870 calls. This indicates that staffing levels should be adjusted to ensure higher availability during peak hours to handle the increased call volume effectively

Task 3 - What is the minimum number of agents required in each time bucket to reduce the abandon rate to 10%? To reduce the abandon rate to 10%, the analysis reveals that we need to ensure a sufficient number of agents are available in each time bucket to handle the increased volume of call seconds effectively. The table provided indicates the necessary call seconds to meet a 90% answer rate, and the corresponding average daily call seconds required per time bucket.

- By examining the proportion of total call seconds and translating that into required employee counts/ employee hours count, we observe the following:
- The highest demand for agents is during the mid-day hours, with the peak time from 12 PM to 1 PM requiring 29 agents to manage the call volume.

- Late morning hours, such as 11 AM to 12 PM, also show high demand, necessitating 27 agents.
- Conversely, early morning and late evening hours require significantly fewer agents. For instance, the 8 PM to 9 PM slot only needs 10 agents, reflecting the lower call volume during these times.

This distribution highlights the need for strategic staffing to match peak times with the highest demand, ensuring an optimal agent-to-call ratio to maintain service levels and reduce the abandon rate to the desired 10%. Efficiently allocating agents based on these insights will help maintain customer satisfaction and operational efficiency.

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Task 4 - Propose a manpower plan for each time bucket throughout the day, keeping the maximum abandon rate at 10%.

This plan considers the distribution of calls throughout the day and night, the working hours of agents, and the need to account for unplanned leaves.

Key Insights:

1. **Morning Shift (6 AM - 3 PM)**:
    - This shift covers the highest call volume periods.
    - The required number of employees for the morning shift is 58, adjusted to 69 to account for 4 unplanned leaves per month.
    - This shift is broken down into two 4.5-hour segments to cover the 9-hour workday effectively.
2. **Evening Shift (3 PM - 9 PM):**
    - Call volumes decrease slightly in the evening, but still require significant manpower.
    - Initially, 40 employees are needed, adjusted to 48 to maintain service levels during leaves.
    - Employees are distributed to cover the peak times within this shift, ensuring a seamless transition from the morning shift.

3. **Night Shift (9 PM - 6 AM):**

    - Despite lower call volumes at night, there is still a need for a dedicated workforce to handle the 30% of calls made during this period.
    - The night shift requires 16 employees, adjusted to 19 for leaves.
    - This shift is also divided into two 4.5-hour segments to ensure coverage and account for other commitments.

Detailed Manpower Distribution:

- **Morning Shift (6 AM - 3 PM)**:

    - Covers 9 AM - 3 PM, with peak hours from 9 AM to 12 PM.
    - Allocates employees to ensure all calls are answered efficiently, adjusting for break times and other non-call activities.

- **Evening Shift (3 PM - 9 PM):**

    - Covers critical transition from afternoon to evening.
    - Employees are distributed to handle higher call volumes until 7 PM, then adjusted for the slight decrease in call volumes from 7 PM to 9 PM.

- **Night Shift (9 PM - 6 AM):**

    - Ensures coverage throughout the night, which is essential for maintaining customer satisfaction.
    - Employees are scheduled to manage call volumes effectively, even during lower call periods.

This manpower plan strategically allocates resources to ensure that customer service levels remain high throughout the day and night, reducing the abandon rate to a maximum of 10%. It also accounts for employees' working hours, breaks, and unplanned leaves, providing a robust solution for maintaining operational efficiency and customer satisfaction.

Additional Insights:

Current State of Employee Performance

The current analysis of call handling efficiency at ABC Insurance Company reveals that the average call duration is 198.62 seconds. This metric serves as a benchmark to evaluate the performance of individual employees. Upon closer examination, it has been found that 26 employees have an average call handling time significantly below this benchmark, especially for 8 employees with a difference of 40 seconds or more. This discrepancy indicates that these employees may not be engaging with customers sufficiently, potentially leading to higher abandonment rates and a decline in customer satisfaction.

Employees with Significantly Lower Call Durations:

The following employees have been identified for their shorter-than-average call durations:

Executives 21, Executives 26, Executives 31, Executives 35, Executives 36, Executives 53, Executives 63, Executives 8

These employees exhibit a consistent pattern of reduced talking periods, which may contribute to an increase in call abandonment rates. Ensuring that customers receive adequate attention and resolution during calls is crucial for maintaining service quality and satisfaction levels.

Moving Forward:

Implementing a performance improvement plan for these employees could help in enhancing their efficiency and ensuring that they meet the company's standards for call duration and customer interaction. This approach will not only help in balancing call efficiency but also in improving overall customer experience and reducing abandonment rates.

Tools for Enhancing ABC Insurance Company's Operations

AI Chatbots

- Handle routine queries and provide 24/7 support, reducing agent workload and improving customer satisfaction.

Sentiment Analysis

- Monitor customer emotions in real-time to quickly address issues and improve service quality.

Call Analytics

- Provide insights on call patterns and agent performance, helping to optimize processes and training.

Predictive Dialers

- Automatically dial numbers when agents are available, increasing efficiency and reducing idle time.

Voice Biometrics

- Authenticate customers using their voice, enhancing security and speeding up verification.

Robotic Process Automation (RPA)

- Automate repetitive tasks like data entry, freeing agents to focus on more complex issues.

Virtual Assistants for Agents

- Assist agents with real-time information and response suggestions, improving accuracy and reducing training time.

Results

- **Task 1 -** The average call duration is approximately 199 seconds, with the longest calls between 10-11 AM and 7-8 PM.
- **Task 2 -** The highest call volume is from 12-1 PM, requiring more staff during peak hours for efficient handling.
- **Task 3 -** To achieve a 10% abandon rate, the highest staffing need is 29 agents from 12-1 PM.
- **Task 4 -** The manpower plan ensures optimal staffing across shifts, with adjustments for unplanned leaves to maintain service levels.