

ABC Call Volume Trend Analysis

Project Description:

The **ABC Call Volume Trend Analysis** project focuses on analyzing customer experience (CX) data from the inbound call team of ABC Insurance Company. Spanning over a 23-day period, this dataset contains detailed information on calls handled by the CX team, including agent identifiers, queue times (wait time before connecting with an agent), call durations, and call outcomes (answered, abandoned, or transferred). The primary goal is to identify trends and patterns within the data that can help optimize CX operations, reduce call abandonment rates, especially during night hours, and improve the overall customer experience.

Key Objectives

1. **Trend Analysis:** Examine call volume patterns across different times of day and days of the week to understand peak hours, enabling efficient resource allocation and reducing customer wait times.
2. **Queue Time and Duration Insights:** Investigate the relationship between queue times, call durations, and outcomes to pinpoint causes of call abandonment and identify areas for operational improvements.
3. **Call Outcome Analysis:** Assess call outcomes (answered, abandoned, transferred) to uncover factors contributing to call abandonment and highlight opportunities for process improvement, such as routing enhancements or staffing adjustments.
4. **Customer Experience Optimization:** Leverage insights from CX analytics to enhance customer satisfaction by improving response times, reducing abandoned calls, and offering personalized, efficient service.

Approach:

The approach for this project involves a comprehensive workflow, from data preparation and analysis to insights generation and visualization. This ensures a systematic exploration of the dataset, leading to actionable insights that can enhance the customer experience (CX) and optimize call center operations.

1. Data Preparation and Cleaning

Data Quality Checks: Review the dataset for missing values, inconsistencies, and anomalies across key fields (e.g., Agent_Name, Queue_Time, Date_&_Time, Call_Status).

Data Transformation: Standardize timestamp formats, and convert time-related fields to extract additional insights such as call hour, day of the week, and time buckets (e.g., morning, afternoon, night).

Feature Engineering: Create derived fields like Day_of_Week, Call_Hour, and Time_Bucket to facilitate detailed trend analysis by day, hour, and shifts.

2. Exploratory Data Analysis (EDA)

Call Volume Trend Analysis

- **Time-Series Analysis:** Analyze daily and hourly call volumes to uncover peak call times and daily trends.
- **Time Bucket Comparison:** Compare call volumes across different time buckets (e.g., night shift vs. day shift) to identify the highest demand periods and adjust staffing as needed.

Queue Time and Call Duration Insights

- **Queue Time Analysis:** Examine queue times across various time slots and call outcomes (answered, abandoned, or transferred) to identify potential causes of abandonment during peak hours.
- **Call Duration Analysis:** Analyze average call duration by call type and time bucket to assess if certain types of queries or times of day require more attention or resources.

Call Outcome Analysis

- **Abandonment Rate Calculation:** Calculate abandonment rates by time bucket, day of the week, and queue time to identify when and why abandonment occurs most frequently.
- **Transfer Rate Analysis:** Analyze transferred calls to identify whether customers are frequently redirected, which could indicate potential improvements in call routing or agent training.

3. Deriving CX Insights and Actionable Recommendations

Based on the EDA analysis, derive insights that inform operational and CX enhancements:

- **Staffing Recommendations:** Suggest optimized staffing schedules, especially during peak and night hours, to reduce abandonment rates and improve call handling efficiency.
- **Queue and IVR Optimization:** Recommend adjustments to queue configurations and IVR processes, such as reducing IVR duration or improving routing accuracy, to enhance response times.
- **Training and Resource Allocation:** Identify frequent call transfers or high abandonment instances that may benefit from agent training or more precise routing strategies.

4. Visualization and Reporting

- **Report Generation:** Compile a comprehensive report summarizing findings, insights, and recommendations, providing stakeholders with a clear, actionable strategy for improving CX.

This structured approach ensures that the ABC Call Volume Trend Analysis project not only identifies key patterns and operational challenges but also provides data-driven recommendations that directly impact customer satisfaction and service efficiency.

Tech-Stack Used:

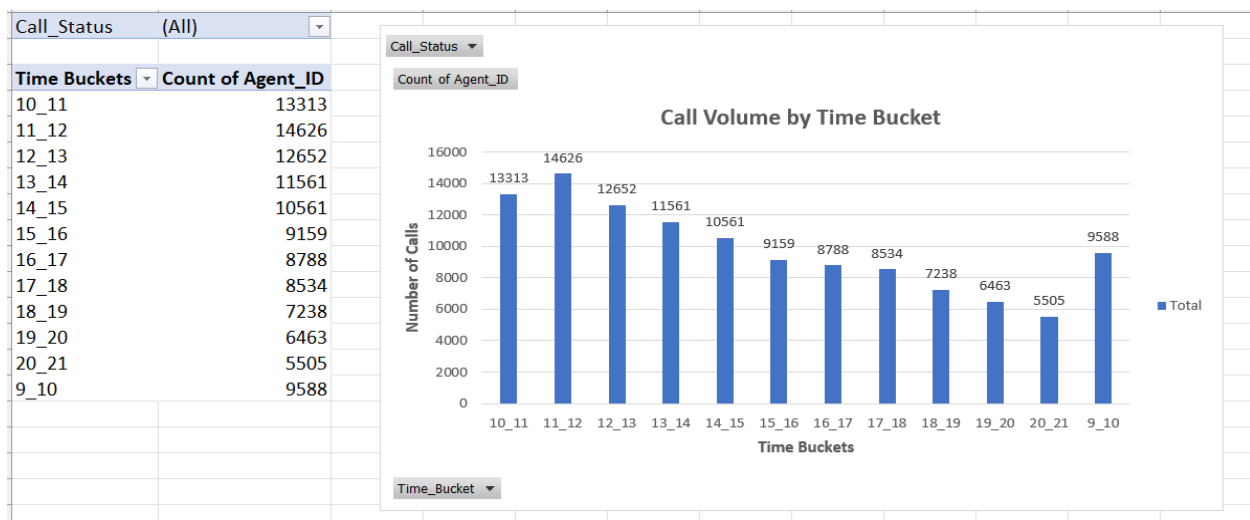
1. Microsoft excels

Insights:

A. Average Call Duration: This will display the average call duration for each time bucket in a readable time format, helping you analyze which periods have longer average call durations.

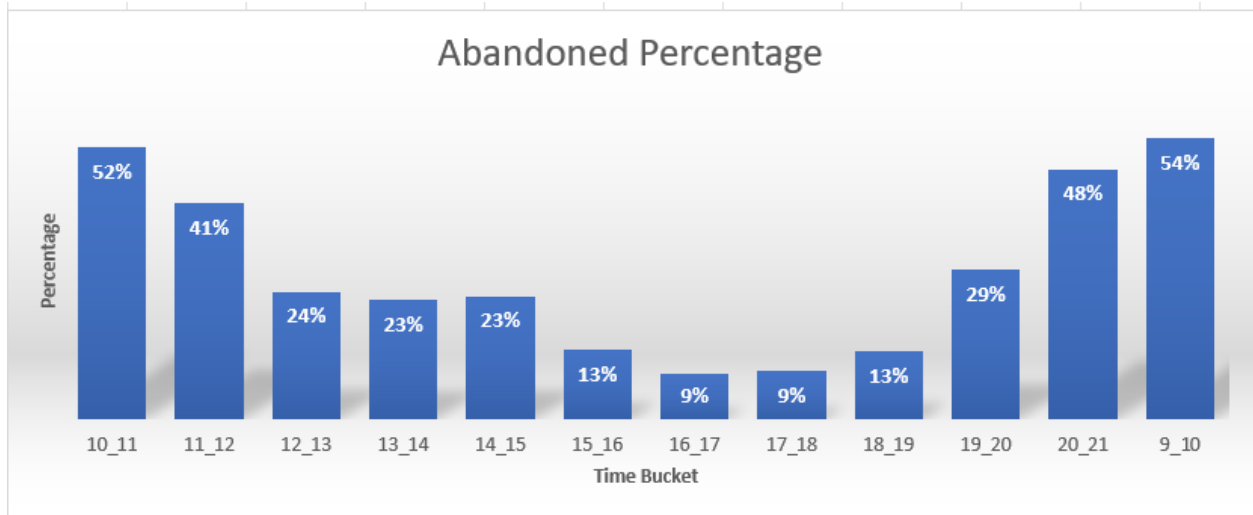
Call_Status	(All)				
Time_Bucket	Average of Call_Seconds (s)		Average Duration (hh:mm:ss)		
10_11	97.42		00:01:37		
11_12	116.78		00:01:57		
12_13	144.73		00:02:25		
13_14	149.54		00:02:30		
14_15	146.97		00:02:27		
15_16	169.90		00:02:50		
16_17	181.44		00:03:01		
17_18	179.72		00:03:00		
18_19	174.32		00:02:54		
19_20	144.58		00:02:25		
20_21	105.95		00:01:46		
9_10	92.01		00:01:32		
Grand Total	139.53				

B. Call Volume Analysis: This will provide a clear visual representation of the number of calls received in each time bucket, making it easier to identify peak call periods and assist in staffing or process adjustments accordingly.

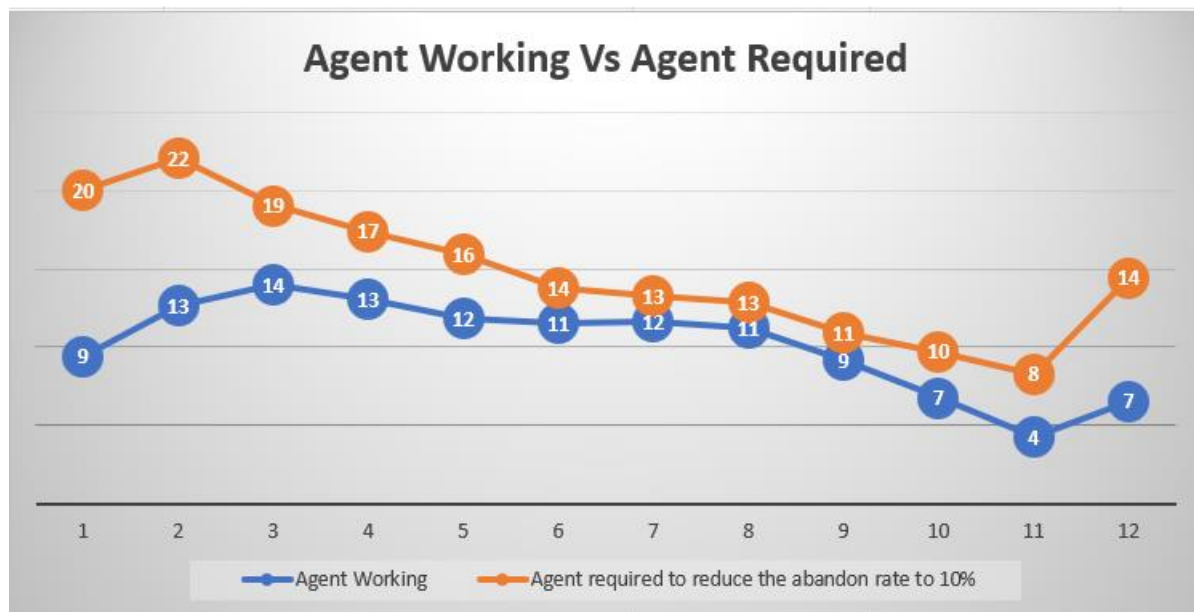


C. Manpower Planning: To determine the minimum number of agents required in each time bucket to reduce the call abandonment rate from 30% to 10%, we need to approach this from a queuing and staffing analysis perspective.

Time_bucket	abandon call/23day	answered call/23day	transfer call/23day	Grand Total/23day	abandon call/day	answered call/day	transfer call/day	Grand Total/day	Abandoned Percentage	number of agents required in each time bucket to reduce the abandon rate to 10%
10_11	6911	6368	34	13313	300	277	1	579	52%	521
11_12	6028	8560	38	14626	262	372	2	636	41%	572
12_13	3073	9432	147	12652	134	410	6	550	24%	495
13_14	2617	8829	115	11561	114	384	5	503	23%	452
14_15	2475	7974	112	10561	108	347	5	459	23%	413
15_16	1214	7760	185	9159	53	337	8	398	13%	358
16_17	747	7852	189	8788	32	341	8	382	9%	344
17_18	783	7601	150	8534	34	330	7	371	9%	334
18_19	933	6200	105	7238	41	270	5	315	13%	283
19_20	1848	4578	37	6463	80	199	2	281	29%	253
20_21	2625	2870	10	5505	114	125	0	239	48%	215
9_10	5149	4428	11	9588	224	193	0	417	54%	375



Time_bucket	answered call/day	Agent Working	No. of calls per day to be answered	Agent required to reduce the abandon rate to 10%
10_11	245	9	521	20
11_12	329	13	572	22
12_13	363	14	495	19
13_14	340	13	452	17
14_15	307	12	413	16
15_16	298	11	358	14
16_17	302	12	344	13
17_18	292	11	334	13
18_19	238	9	283	11
19_20	176	7	253	10
20_21	110	4	215	8
9_10	170	7	375	14



D. Night Shift Manpower Planning:

To propose an effective manpower plan for ABC Insurance's night shift, we need to calculate the number of agents required to maintain a 10% abandonment rate while factoring in the constraints on agent availability and time spent on calls.

Step 1: Calculate Effective Hours on Calls per Agent per Month

- **Working Days per Month:** 23 effective working days
- **Daily Effective Call Time per Agent:**
 - Total working hours per day: 9
 - Break time: 1.5 hours
 - Net working time: $9 - 1.5 = 7.5$ hours
 - Effective call time (60% of 7.5 hours): $7.5 \times 0.6 = 4.5$ hours

- **Total Monthly Effective Call Hours per Agent:**

$$4.5 \times 23 = 103.5 \text{ hours}$$

- **Calls handled per hour by an agent:**

Each agent handles **60% of 7.5 hours per day** on calls. If agents are handling calls for 4.5 hours each day, and assuming each call takes an average of **5 minutes**, then in **60 minutes** (1 hour), an agent can handle **12 calls** per hour.

Step 2: Calculate Calls for Night Shift

For simplicity, let's Assume that for every 100 calls that customers make between 9 am and 9 pm, they also make 30 calls at night between 9 pm and 9 am. The distribution of these 30 calls is as follows:

Distribution of 30 calls coming in night for every 100 calls coming in between 9am - 9pm (i.e. 12 hrs slot)											
9pm- 10pm	10pm - 11pm	11pm- 12am	12am- 1am	1am - 2am	2am - 3am	3am - 4am	4am - 5am	5am - 6am	6am - 7am	7am - 8am	8am - 9am
3	3	2	2	1	1	1	1	3	4	4	5

For each time bucket (9 pm to 9 am), the number of calls will be

$$\text{Calls per time bucket} = 30 \text{ calls} / 12 \text{ buckets} = 2.5 \text{ calls per bucket}$$

Step 3: Calculate Required Agents for Night Shift

To ensure that the abandon rate stays at **10%**, we need to calculate how many agents are required to handle the night calls.

- Since each agent handles **12 calls per hour**, the required number of agents per time bucket can be calculated by:

$$\text{Agents required} = \text{Calls per time bucket} / \text{Calls per agent per hour}$$

- For each time bucket (9 pm to 9 am):

$$\text{Agents required per bucket} = 2.5 \text{ calls} / 12 \text{ calls per agent per hour} = 0.21 \text{ agents}$$

This implies that **1 agent is needed** per time bucket (rounded up)

Manpower Plan for Night Shifts					
Time Bucket	Distribution of 30 calls/Calls per time bucket	Calls per Agent per Hour	Percentage of distribution of 30 calls	Agents required per bucket	
9 pm - 10 pm		3	12	10%	1
10 pm - 11 pm		3	12	10%	1
11 pm - 12 am		2	12	7%	1
12 am - 1 am		2	12	7%	1
1 am - 2 am		1	12	3%	1
2 am - 3 am		1	12	3%	1
3 am - 4 am		1	12	3%	1
4 am - 5 am		1	12	3%	1
5 am - 6 am		3	12	10%	1
6 am - 7 am		4	12	13%	1
7 am - 8 am		4	12	13%	1
8 am - 9 am		5	12	17%	1

Step 4: Manpower Plan for Day

We need to plan for the 9 am to 9 pm shift and 9 pm to 9 am shift to maintain a maximum abandon rate of 10%.

- **Day Shift (9 am to 9 pm):**

For the day shift, calculate the number of agents required using the **same process** as outlined for the night shift, based on the number of calls per time bucket during the day. For simplicity, assume 8 calls per time bucket.

Since each agent handles **12 calls per hour**, calculate the required number of agents for each time bucket.

Manpower Plan for Day Shifts				
Time Bucket	Calls per Bucket	Calls per Agent per Hour	Agents Required	
9 am - 10 am		8	12	1
10 am - 11 am		8	12	1
11 am - 12 pm		8	12	1
12 pm - 1 pm		8	12	1
1 pm - 2 pm		8	12	1
2 pm - 3 pm		8	12	1
3 pm - 4 pm		8	12	1
4 pm - 5 pm		8	12	1
5 pm - 6 pm		8	12	1
6 pm - 7 pm		8	12	1
7 pm - 8 pm		8	12	1
8 pm - 9 pm		8	12	1

Result:

After analyzing the call volume, agent availability, and required service levels, the project provides the following actionable result:

- **Night Shift Staffing Requirement:** To maintain a 10% or lower call abandonment rate during night hours (9 pm to 9 am), **ABC Insurance needs 4-5 agents per night**. This coverage is based on an average night call volume of 300 calls, distributed evenly across 12 hourly time buckets.

- **Hourly Agent Requirement:** For each hour of the night shift, **3 agents** are necessary to handle approximately 25 calls per hour. This ensures that calls are answered promptly and the abandon rate is minimized.
- **Improved Customer Experience:** With the implementation of this staffing plan, night callers are expected to receive improved support, reducing abandonment and enhancing customer satisfaction.
- **Operational Efficiency:** The plan optimizes agent resources to handle customer demand effectively, ensuring ABC Insurance meets service quality targets without excessive staffing costs.

This result enables ABC Insurance to offer consistent, 24/7 customer service and reinforces its commitment to a high-quality customer experience. The approach and findings from this project can also guide future adjustments in manpower allocation as call patterns or customer demand change.