

ABC Call Volume Trend Analysis

Project Description

ABC Insurance Company receives a large volume of inbound calls from customers daily. With an increasing number of abandoned calls and no support during night hours, this project aims to:

- Analyse the pattern of incoming calls.
- Determine average call duration per time bucket.
- Visualize call distribution across the day.
- Plan manpower allocation to reduce call abandon rate from 30% to 10%.
- Extend the analysis to night shifts for improved customer experience.

Dataset Overview

The dataset provided includes:

- **Agent Name, ID**
- **Call Timestamps**
- **Call Durations (in seconds)**
- **Time Buckets** (hourly intervals like 9–10 AM, 10–11 AM, etc.)
- **Call Status**

Each record represents a single inbound call. The time bucket format simplifies hourly analysis.

Data Cleaning & Assumptions

Cleaning Performed:

- Replaced null in *Agent_Name*, *Agent_ID* columns by **abandon** (as *Call status* of these entries was abandon).
- Converted timestamps to Time format.
- Filtered calls between 9 AM to 9 PM for day analysis.

Key Assumptions:

- **Working Hours:** 9 hrs/day (7.5 effective hours, 1.5 hrs break).
- **60% of Time on Calls:** 4.5 hrs/day spent on calls.
- **Average Call Duration:** 139.53 seconds.
- **Calls per Agent/Day:** $(4.5 * 3600) \div 139.53 \approx 116 \text{ calls/day}$
- **Calls per Agent/Hour:** $116 \div 9 \approx 13 \text{ calls/hour}$

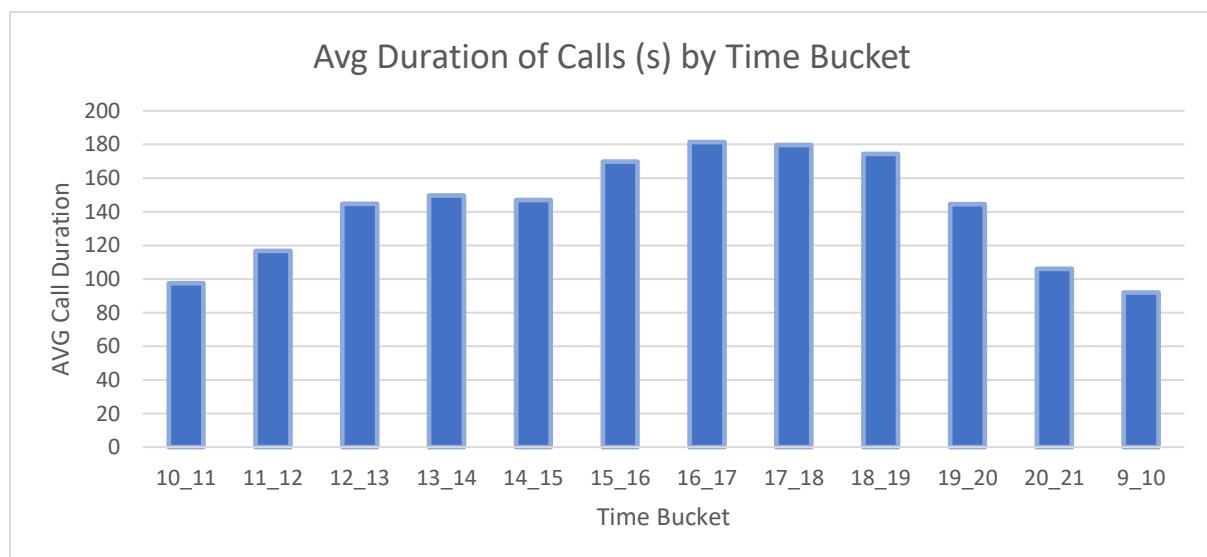
Task 1: Average Call Duration per Time Bucket

Determine the average duration of calls for each time bucket.

Approach:

- Grouped call data by hour buckets using **Pivot Table**.
- Calculated the mean call duration for each bucket.
- Plotted a bar chart to visualize the pattern.

Insights:



- Duration peaked between **3 PM to 6 PM**, reaching **180+ seconds**.

- Lowest durations were in the **morning (9–11 AM)** and **late evening (8–9 PM)**.

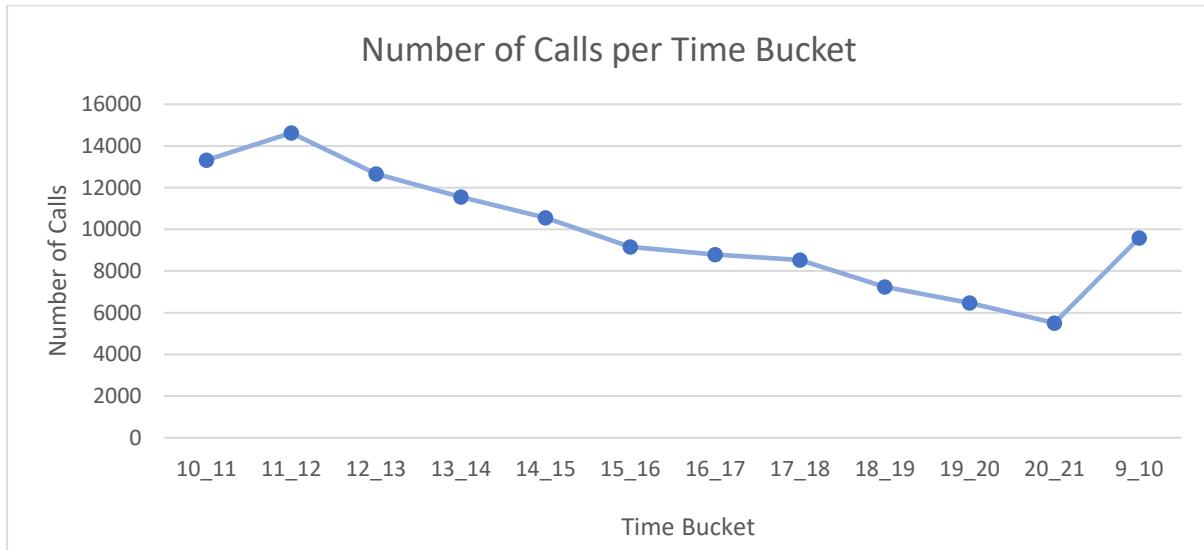
Task 2: Call Volume Analysis

Visualize the number of calls received in each hourly bucket.

Approach:

- Grouped the data by hourly time buckets using **Pivot Table**.
- Counted total calls in each.
- Plotted a line chart for trend observation.

Insights:



- Call volume peaked around **11 AM**, exceeding **14,000 calls**.
- Steady decline after lunch (1PM); lowest calls between **8–9 PM**.
- Noticeable spike again at **9–10 AM**, indicating start-of-day surge.

Task 3: Day Shift Manpower Planning

Plan agent allocation to answer 90% of incoming calls (reduce abandon rate to 10%).

Approach:

- Applied 90% service level to total calls per bucket.
- Agent capacity fixed at **13 calls/hour**.
- Used formula:

Agents Required=[90% of Calls in the hour / 13]

- Built a manpower table per hour bucket.

Insights:

Manpower Planning Table				
Time Buckets	Total Calls received per bucket	To be Answered calls(90%)	Agent capacity	Agents Required
10_11	13313	11982	13	922
11_12	14626	13163	13	1013
12_13	12652	11387	13	876
13_14	11561	10405	13	800
14_15	10561	9505	13	731
15_16	9159	8243	13	634
16_17	8788	7909	13	608
17_18	8534	7681	13	591
18_19	7238	6514	13	501
19_20	6463	5817	13	447
20_21	5505	4955	13	381
9_10	9588	8629	13	664
Grand Total	117988	106189	13	8168

- Required manpower is **highest between 10 AM – 1 PM**, with over **1000 agents/hour**.
- Least number of agents required between **8–9 PM** (~381).
- **Total Agents Required (Day Shift) = 8,168**

Task 4: Night Shift Manpower Planning

Propose a night shift manpower plan for 9 PM–9 AM, based on the assumption that night calls are 30% of day calls.

Approach:

- Total Day Calls: 117,988, so **Total Night Calls = 30% = 35,396**
- Used provided time distribution of night calls.

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	

- Calculated **Percentage of calls** per bucket (out of 30)
- Calculated calls per bucket (using Total Night calls & Percentage of calls per bucket).
- Applied **90%** service level.
- Used same agent capacity of **13 calls/hour**.

Night Calls Distribution

Time Bucke	30 Night calls	% of Night Call	Scaled Calls (out of 35396)
9-10 PM	3	10.00	3540
10-11 PM	3	10.00	3540
11-12 AM	2	6.67	2360
12-1 AM	2	6.67	2360
1-2 AM	1	3.33	1180
2-3 AM	1	3.33	1180
3-4 AM	1	3.33	1180
4-5 AM	1	3.33	1180
5-6 AM	3	10.00	3540
6-7 AM	4	13.33	4719
7-8 AM	4	13.33	4719
8-9 AM	5	16.67	5899
Total	30	100.00	35396



Insights:

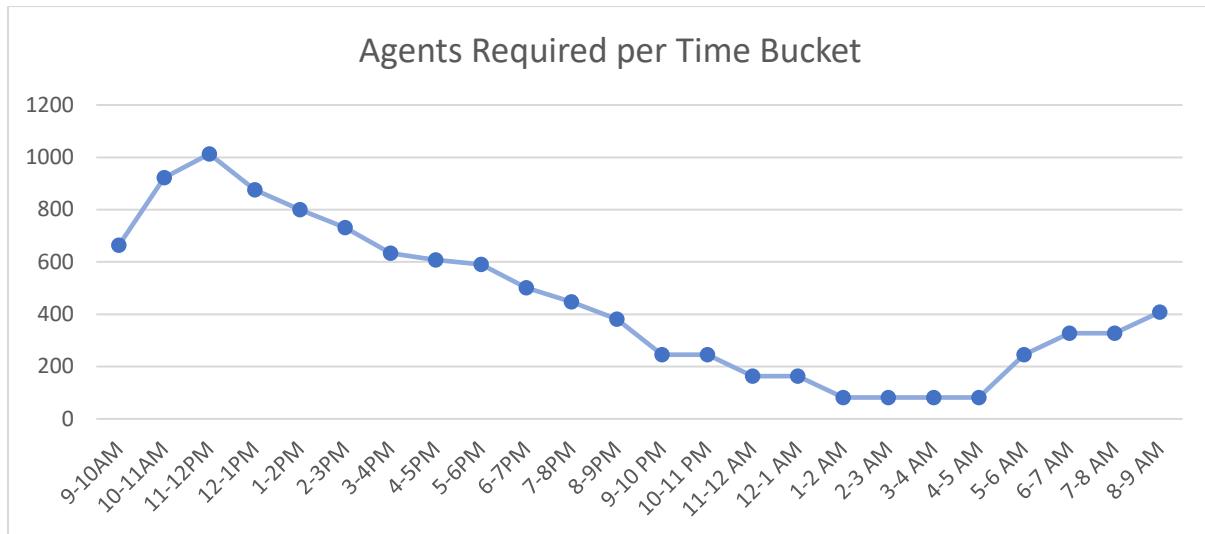
Manpower Planning (Night Shift)			
Time Buckle	Total Calls	Answered (90%)	Agents Required
9-10 PM	3540	3186	245
10-11 PM	3540	3186	245
11-12 AM	2360	2124	163
12-1 AM	2360	2124	163
1-2 AM	1180	1062	82
2-3 AM	1180	1062	82
3-4 AM	1180	1062	82
4-5 AM	1180	1062	82
5-6 AM	3540	3186	245
6-7 AM	4719	4247	327
7-8 AM	4719	4247	327
8-9 AM	5899	5309	408
Total	35396	31856	2450

- **6–9 AM** requires the most agents due to higher call volume.
- Minimal need between **1–5 AM** (only ~82 agents/hour).
- **Total Night Shift Agents Required = 2,450**

📌 Final Summary

Shift	Total Calls	To Be Answered (90%)	Agents Required
Day Shift	117,988	106,189	8,168
Night Shift	35,396	31,856	2,450
Total	153,384	138,045	10,618

📈 Recommendations



- Stagger agent shifts to cover peak hours more efficiently (**10 AM–1 PM, 6–9 AM**).
- **Introduce flexible night shift roles** to meet customer needs after-hours without overstaffing.
- Use this analysis to reduce call abandon rate from 30% to **target 10%**, improving customer satisfaction and service KPIs.

Link to Project: [Click Here](#)