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ABC Call Volume Trend Analysis

- **Project Description**:
  In this project, we will be diving into the world of Customer Experience (CX) analytics, specifically focusing on the inbound calling team of a company. The dataset spans 23 days and includes various details such as the agent's name and ID, the queue time (how long a customer had to wait before connecting with an agent), the time of the call, the duration of the call, and the call status (whether it was abandoned, answered, or transferred).

- **Approach:**
  The dataset is first processed to find duplicate values and missing values. After processing the data, the four major tasks were performed, the details of which are included in the report.

- **Tech stack used:**
  Microsoft excel was used for doing the tasks. Microsoft word was used for the report of the same.

- **Results:**
  1. **Importing dataset in excel:**

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	Agent_Name	Agent_ID	Customer_Phone_No	Queue_Time(Secs	Date_&_Time	Time	Time_Bucket	Duration(hh:mm:ss)	Call_Seconds (s	Call_Status	Wrapped_By	Ringing	IVR_Duration
2	Executives 42	1000042	98502XXXXX	2	01-01-2022	9.00	9_10	00:01:36	96.00	answered	Agent	YES	00:00:16
3	Executives 4	1000004	80595XXXXX	0	01-01-2022	9.00	9_10	00:02:20	140.00	answered	Agent	YES	00:00:26
4	Executives 65	1000065	70202XXXXX	0	01-01-2022	9.00	9_10	00:01:25	85.00	answered	AutoWrapped	YES	00:00:16
5	Executives 55	1000055	96104XXXXX	1	01-01-2022	9.00	9_10	00:01:31	91.00	answered	Agent	YES	00:00:25
6	Executives 21	1000021	82001XXXXX	0	01-01-2022	9.00	9_10	00:02:45	165.00	answered	Agent	YES	00:00:23
7	#N/A	#N/A	96424XXXXX	13	01-01-2022	9.00	9_10	00:00:00	0.00	abandon		YES	00:00:16
8	Executives 55	1000055	96737XXXXX	79	01-01-2022	9.00	9_10	00:01:25	85.00	answered	AutoWrapped	YES	00:00:13
9	#N/A	#N/A	96392XXXXX	60	01-01-2022	9.00	9_10	00:00:00	0.00	abandon		YES	00:00:17
10	Executives 42	1000042	90820XXXXX	52	01-01-2022	9.00	9_10	00:01:05	65.00	answered	Agent	YES	00:00:20
11	Executives 65	1000065	97410XXXXX	62	01-01-2022	9.00	9_10	00:03:00	180.00	answered	AutoWrapped	YES	00:00:44
12	Executives 4	1000004	70076XXXXX	52	01-01-2022	9.00	9_10	00:01:48	108.00	answered	Agent	YES	00:00:15
13	Executives 21	1000021	82505XXXXX	89	01-01-2022	9.00	9_10	00:03:06	186.00	answered	Agent	YES	00:00:16
14	#N/A	#N/A	97232XXXXX	120	01-01-2022	9.00	9_10	00:00:00	0.00	abandon		YES	00:00:40
15	Executives 55	1000055	96392XXXXX	45	01-01-2022	9.00	9_10	00:01:40	100.00	answered	AutoWrapped	YES	00:00:42
16	Executives 42	1000042	97471XXXXX	55	01-01-2022	9.00	9_10	00:01:15	75.00	answered	AutoWrapped	YES	00:00:19
17	#N/A	#N/A	77082XXXXX	16	01-01-2022	9.00	9_10	00:00:00	0.00	abandon		YES	00:00:18
18	#N/A	#N/A	95255XXXXX	44	01-01-2022	9.00	9_10	00:00:00	0.00	abandon		YES	00:00:17
19	Executives 4	1000004	79725XXXXX	88	01-01-2022	9.00	9_10	00:04:03	243.00	answered	AutoWrapped	YES	00:00:15
20	Executives 49	1000049	98344XXXXX	46	01-01-2022	9.00	9_10	00:04:10	250.00	answered	Agent	YES	00:00:19
21	Executives 50	1000050	96873XXXXX	64	01-01-2022	9.00	9_10	00:03:28	208.00	answered	Agent	YES	00:00:48
22	Executives 42	1000042	79899XXXXX	52	01-01-2022	9.00	9_10	00:02:34	154.00	answered		YES	00:00:26
23	Executives 65	1000065	95754XXXXX	67	01-01-2022	9.00	9_10	00:02:07	127.00	answered	AutoWrapped	YES	00:00:45
24	Executives 55	1000055	70546XXXXX	64	01-01-2022	9.00	9_10	00:03:11	191.00	answered	AutoWrapped	YES	00:00:40
25	Executives 21	1000021	97050XXXXX	47	01-01-2022	9.00	9_10	00:03:23	203.00	answered	Agent	YES	00:00:25
26	#N/A	#N/A	89680XXXXX	120	01-01-2022	9.00	9_10	00:00:00	0.00	abandon		YES	00:00:25
27	Executives 59	1000059	99954XXXXX	75	01-01-2022	9.00	9_10	00:02:30	150.00	answered	AutoWrapped	YES	00:00:21
28	Executives 16	1000016	90074XXXXX	71	01-01-2022	9.00	9_10	00:04:13	253.00	answered	Agent	YES	00:00:20
29	#N/A	#N/A	96048XXXXX	65	01-01-2022	9.00	9_10	00:00:00	0.00	abandon		YES	00:00:17
30	Executives 42	1000042	99971XXXXX	27	01-01-2022	9.00	9_10	00:00:44	44.00	answered	Agent	YES	00:00:16
31	Executives 65	1000065	63523XXXXX	36	01-01-2022	9.00	9_10	00:01:27	87.00	answered		YES	00:00:17
32	Executives 50	1000050	99824XXXXX	36	01-01-2022	9.00	9_10	00:01:16	76.00	answered	AutoWrapped	YES	00:00:17
33	Executives 42	1000042	93684XXXXX	50	01-01-2022	9.00	9_10	00:02:44	164.00	answered	Agent	YES	00:00:41
34	Executives 4	1000004	91057XXXXX	42	01-01-2022	9.00	9_10	00:03:25	205.00	answered	Agent	YES	00:00:46
35	Executives 21	1000021	62807XXXXX	0	01-01-2022	9.00	9_10	00:00:54	54.00	answered	AutoWrapped	YES	00:00:42

2. Removing Duplicates and handling missing values:

No duplicates were found in the dataset. The first two columns, viz, Agent_name and Agent_id contained #N/A values, however, these were not removed as they indicated that the calls were abandoned.

There were blanks in the wrapped_by column. These blanks were handled as follow:

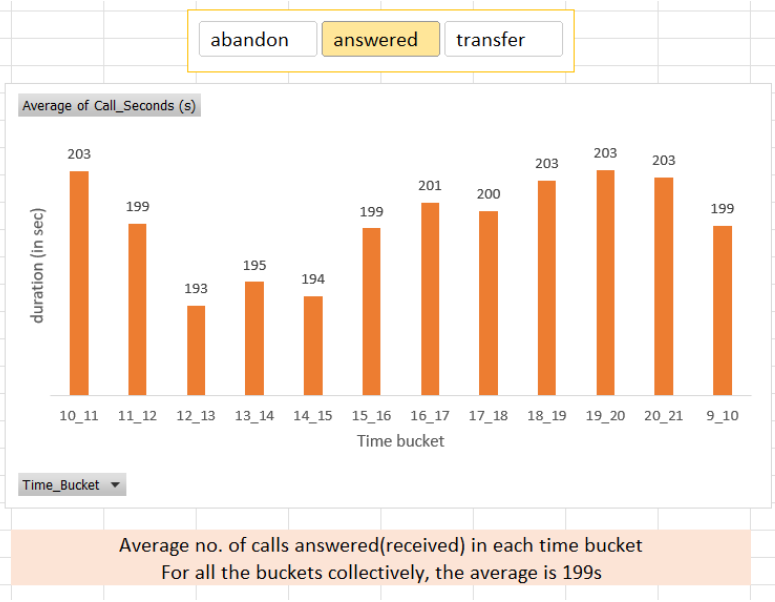
- For the blanks whose corresponding Agent_name / Agent_id were "#N/A", the values was set as "Abandoned calls".
- Rest of the blanks were replaced by the mode of the column, which came out to be "Agent".

Agent_Name	Agent_ID	Customer_Phone_No	Queue_Time(Secs)	Date_&_Time	Time	Time_Bucket	Duration(hh:mm:ss)	Call_Seconds (s)	Call_Status	Wrapped_By	Ringing	IVR_Duration
#N/A	#N/A	96424XXXXX	13	01-01-2022	9.00	9_10	00:00:00	0.00	abandon	Abandoned calls	YES	00:00:16
#N/A	#N/A	96392XXXXX	60	01-01-2022	9.00	9_10	00:00:00	0.00	abandon	Abandoned calls	YES	00:00:17
#N/A	#N/A	97232XXXXX	120	01-01-2022	9.00	9_10	00:00:00	0.00	abandon	Abandoned calls	YES	00:00:40
#N/A	#N/A	77082XXXXX	16	01-01-2022	9.00	9_10	00:00:00	0.00	abandon	Abandoned calls	YES	00:00:18
#N/A	#N/A	95255XXXXX	44	01-01-2022	9.00	9_10	00:00:00	0.00	abandon	Abandoned calls	YES	00:00:17
#N/A	#N/A	89680XXXXX	120	01-01-2022	9.00	9_10	00:00:00	0.00	abandon	Abandoned calls	YES	00:00:25
#N/A	#N/A	96048XXXXX	65	01-01-2022	9.00	9_10	00:00:00	0.00	abandon	Abandoned calls	YES	00:00:17
#N/A	#N/A	87782XXXXX	16	01-01-2022	9.00	9_10	00:00:00	0.00	abandon	Abandoned calls	YES	00:00:17
#N/A	#N/A	87782XXXXX	16	01-01-2022	9.00	9_10	00:00:00	0.00	abandon	Abandoned calls	YES	00:00:16
#N/A	#N/A	87782XXXXX	16	01-01-2022	9.00	9_10	00:00:00	0.00	abandon	Abandoned calls	YES	00:00:16
#N/A	#N/A	87782XXXXX	7	01-01-2022	9.00	9_10	00:00:00	0.00	abandon	Abandoned calls	YES	00:00:26
#N/A	#N/A	76229XXXXX	44	01-01-2022	9.00	9_10	00:00:00	0.00	abandon	Abandoned calls	YES	00:00:44
#N/A	#N/A	85532XXXXX	50	01-01-2022	9.00	9_10	00:00:00	0.00	abandon	Abandoned calls	YES	00:00:15
#N/A	#N/A	70076XXXXX	45	01-01-2022	9.00	9_10	00:00:00	0.00	abandon	Abandoned calls	YES	00:00:18

3. Analysis:

a) Average Call Duration:

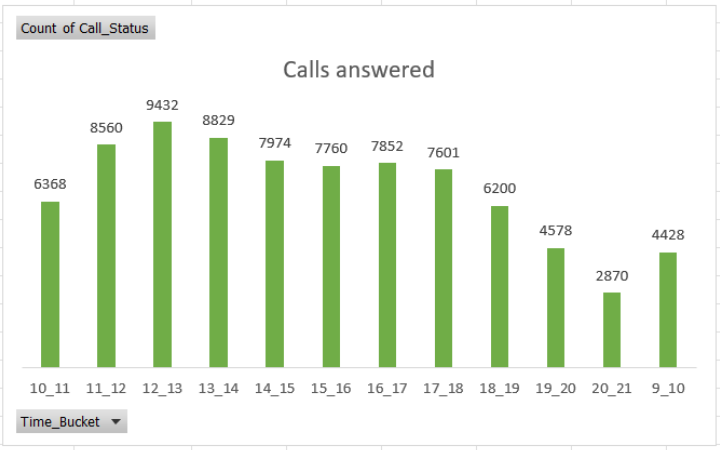
Time bucket	Average of Call_Seconds (s)
10_11	203
11_12	199
12_13	193
13_14	195
14_15	194
15_16	199
16_17	201
17_18	200
18_19	203
19_20	203
20_21	203
9_10	199
Grand Total	**199**



The average duration of calls for 23 days is 199 secs

b) Call Volume Analysis:

Count of Call_Status	Column Labels
Row Labels	answered
10_11	6368
11_12	8560
12_13	9432
13_14	8829
14_15	7974
15_16	7760
16_17	7852
17_18	7601
18_19	6200
19_20	4578
20_21	2870
9_10	4428



Over a period of 23 days, 9432 calls were answered in 12_13 time bucket.

The above column chart shows the number of calls answered in 23 days for each time bucket.

c) Manpower Planning:

An agent works for 6 days a week; On average, each agent takes 4 unplanned leaves per month; An agent's total working hours are 9 hours, out of which 1.5 hours are spent on lunch and snacks in the office. On average, an agent spends 60% of their total actual working hours (i.e., 60% of 7.5 hours) on calls with customers/users. The total number of days in a month is 30.

per day per agent	
Total working hours	9
time spent on break	1.5
actual working hours	7.5
avg. hours spent on calls	4.5
for 23 days per agent	
Total working hours	207
time spent on break	34.5
actual working hours	172.5
avg. hours spent on calls	103.5
avg duration of a call (in s)	199
Avg. no. of calls answered by an agent in 23 days	1872

Assumptions based insights

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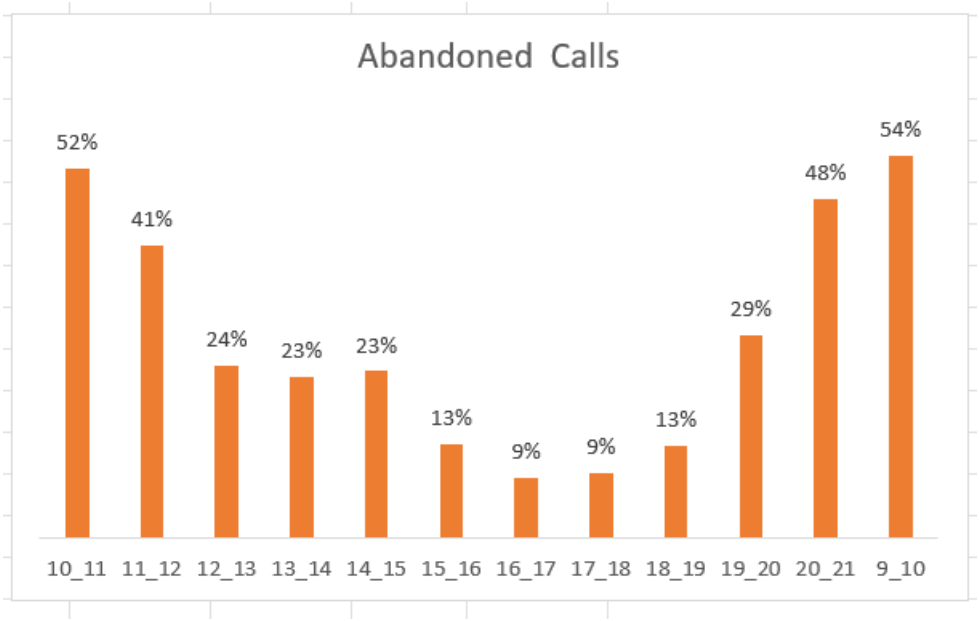

It can be seen that most calls (>50%) were abandoned on the beginning or in the end of the day.

for 23 days						
Time bucket	abandoned calls	Total calls	abandoned rate	% of calls to be answered	abandoned calls if rate is dropped to 10%	Man power required
10_11	6911	13313	52%	11981.7	1331.3	6
11_12	6028	14626	41%	13163.4	1462.6	7
12_13	3073	12652	24%	11386.8	1265.2	6
13_14	2617	11561	23%	10404.9	1156.1	6
14_15	2475	10561	23%	9504.9	1056.1	5
15_16	1214	9159	13%	8243.1	915.9	4
16_17	747	8788	9%	7909.2	878.8	4
17_18	783	8534	9%	7680.6	853.4	4
18_19	933	7238	13%	6514.2	723.8	3
19_20	1848	6463	29%	5816.7	646.3	3
20_21	2625	5505	48%	4954.5	550.5	3
9_10	5149	9588	54%	8629.2	958.8	5

The “Manpower required” column represents the number of additional agents needed to answer abandoned calls so that abandon rate drops down to 10%.

d) Night Shift Manpower Planning:

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

Distribution of calls between 9pm to 9am

Total calls coming in day	117988
Total calls coming at night	35396.4
no. of calls answered by an agent	1872

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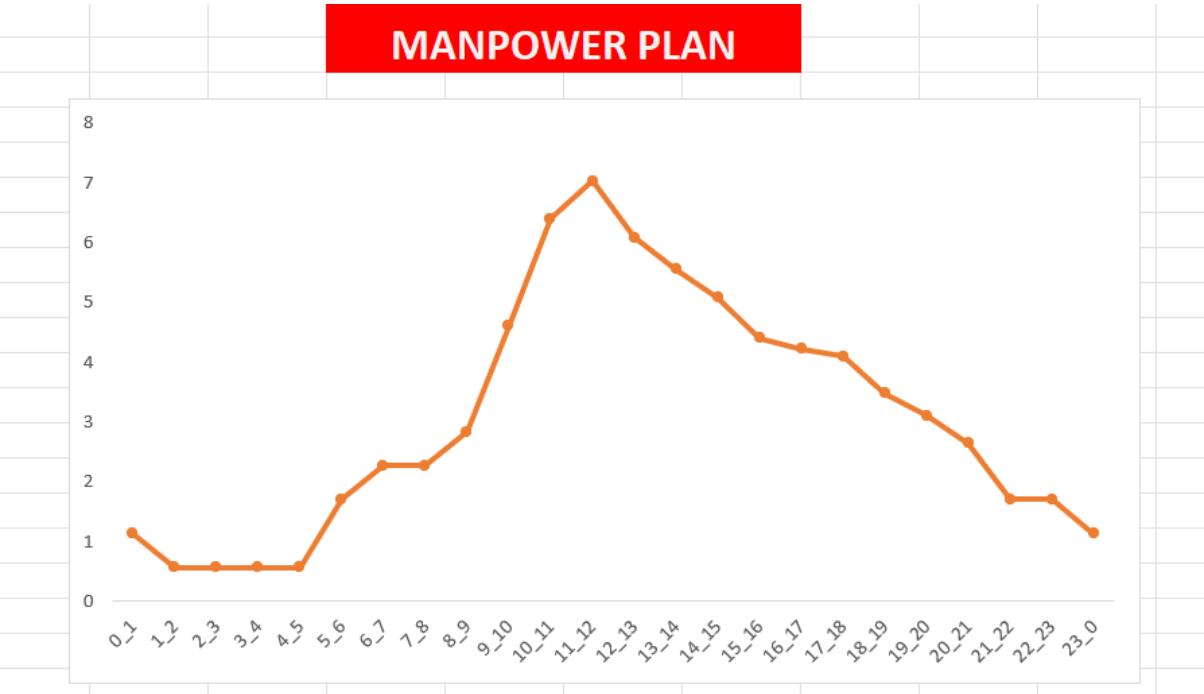
Time bucket	% of incoming calls (night)	Total incoming calls (night)	abandoned calls	Calls answered	Manpower required
22_23	10%	3540	354	3186	2
23_0	7%	2360	236	2124	1
0_1	7%	2360	236	2124	1
1_2	3%	1180	118	1062	1
2_3	3%	1180	118	1062	1
3_4	3%	1180	118	1062	1
4_5	3%	1180	118	1062	1
5_6	10%	3540	354	3186	2
6_7	13%	4720	472	4248	2
7_8	13%	4720	472	4248	2
8_9	17%	5899	590	5309	3
21_22	10%	3540	354	3186	2



Above is the manpower plan (day + night)

- Conclusion:
  The project helped me solve complex problems on man power needed to do the task. It was challenging and helped me strengthen my skills.

- Links:
  Mail me at: adityap.works@gmail.com
  To access my working excel sheet: click here