CALL CENTER ANALYSIS

-- Create Sql Query file for analysis of call center

-- Show Databases in system

Show databases;

```
1    -- Create Sql file for analysis of call center
2
3    -- Show Databases in system
4 •  Show databases;
5
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

Database
call_center_project
information_schema
library_management
mysql
performance_schema
sakila
sys
world

-- Drop if there exists any database of same name and datatype

drop database if exists call_center_project;

-- Create datatype Call Center project

create database call_center_project;

-- Use the database call center project

use call_center_project;

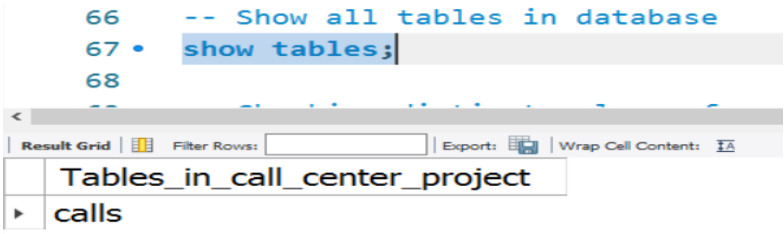
/ Query to Create table for analysis */*

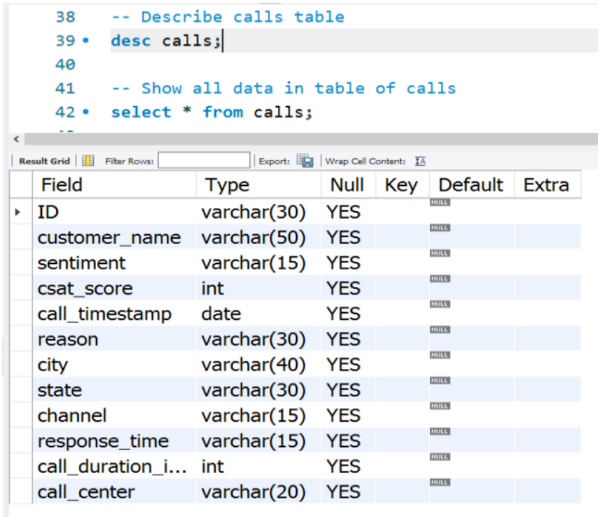
-- Create table calls if exists then drop it and create new table

drop table if exists calls;

```
create table calls(
        ID varchar(30),
        customer_name varchar(50),
        sentiment varchar(15),
        csat_score varchar(2) default NULL,
        call_timestamp varchar(10),
        reason varchar(30),
        city varchar(40),
        state varchar(30),
        channel varchar(15),
        response_time varchar(15),
        call_duration_in_minutes int,
        call_center varchar(20)
        );

-- Describe calls table
desc calls;

-- Show all data in table of calls
select * from calls;

-- if Sql query is in safe mode then make it zero to update it easily
set sql_safe_updates = 0;

-- Update calls date call timestamp to change in date format
update calls
set call_timestamp = str_to_date(call_timestamp, "%d-%m-%Y");

-- Alter datatype of call timestamp
```

```
alter table calls
change column call_timestamp call_timestamp date;

-- Update Customer Satisfaction Score in calls table
update calls
set csat_score = NULL where csat_score = 0.0;

-- Alter datatype Customer Satisfaction Score to integer
alter table calls
change column csat_score csat_score int;

-- After all updates activate safe updates to one to make file safe
set sql_safe_updates = 1;

-- Show all tables in database
show tables;
```





-- 1. Query for Checking distinct values of some columns:

select distinct sentiment from calls;

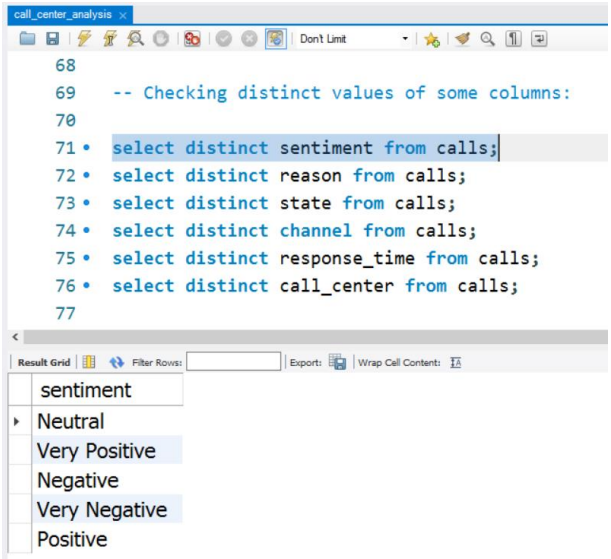
select distinct reason from calls;

select distinct state from calls;

select distinct channel from calls;

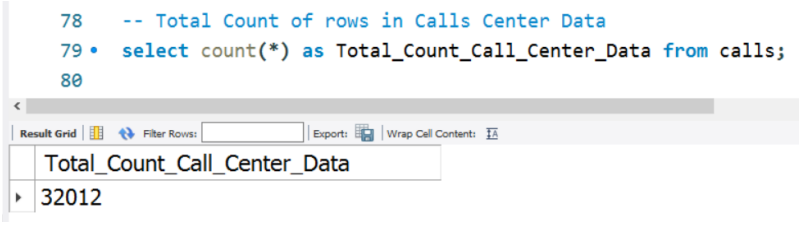
select distinct response_time from calls;

select distinct call_center from calls;



-- 2. Query for Total Count of rows in Calls Center Data

select count(*) as Total_Count_Call_Center_Data from calls;



3. /* The Count and Percentage from total from each of the distinct values we got from calls. To see the distribution of our calls among different columns. Let's see the some column:*/

3.a. / Query to see distribution of our calls for sentiment of Customers for call data and count Of those customers */*

```
select sentiment, count(*) as Total_Count_Per_Sentiment,
round(count(*)/(select count(*) from calls) * 100, 1) as Percentage
from calls
group by sentiment
order by 3 desc;
```

```
86 •  select sentiment, count(*) as Total_Count_Per_Sentiment,
87    round(count(*)/(select count(*) from calls) * 100, 1) as Percentage
88    from calls
89    group by sentiment
90    order by 3 desc;
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

sentiment	Total_Count_Per_Sentiment	Percentage
Negative	10750	33.6
Neutral	8508	26.6
Very Negative	5848	18.3
Positive	3814	11.9
Very Positive	3092	9.7

3.b. / Query to see distribution of our calls for reason of Customers for call data and count Of those customers */*

```
select reason, count(*) as Total_Count_per_reason,
round(count(*)/(select count(*) from calls) * 100, 1) as Percentage
from calls
group by reason
order by 3 desc;
```

```
92 •  select reason, count(*) as Total_Count_per_reason,
93    round(count(*)/(select count(*) from calls) * 100, 1) as Percentage
94    from calls
95    group by reason
96    order by 3 desc;
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

reason	Total_Count_per_reason	Percentage
Billing Question	22822	71.3
Service Outage	4598	14.4
Payments	4592	14.3

Answer: Here we can see that Billing Questions amount to a whooping 71% of all calls, with service outage and payment related calls both are 14.4% of all calls.

3.c. */* Query to see distribution of our calls for channel of Customers for call data and count Of those customers */*

```
select channel, count(*) as Total_Count_per_Channel,
round(count(*)/(select count(*) from calls) * 100, 1) as Percentage
from calls
group by channel
order by 3 desc;
```

```
102 •  select channel, count(*) as Total_Count_per_Channel,
103    round(count(*)/(select count(*) from calls) * 100, 1) as Percentage
104    from calls
105    group by channel
106    order by 3 desc;
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

channel	Total_Count_per_Channe	Percentage
Call-Center	10312	32.2
Chatbot	8025	25.1
Email	7293	22.8
Web	6382	19.9

3.d. / Query to see distribution of our calls of response time to Customers for call data according to Service Level Agreement and count Of those customers */*

```
select response_time, count(*) as Total_Count_per_Responce_Time,
round(count(*)/(select count(*) from calls) * 100, 1) as Percentage
from calls
group by response_time
order by 3 desc;
```

```
108 •  select response_time, count(*) as Total_Count_per_Responce_Time,
109    round(count(*)/(select count(*) from calls) * 100, 1) as Percentage
110    from calls
111    group by response_time
112    order by 3 desc;
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

response_time	Total_Count_per_Respor	Percentage
Within SLA	20036	62.6
Below SLA	7904	24.7
Above SLA	4072	12.7

3.e. / Query to see distribution of our calls for Call Center of call data and count Of those customers */*

```
select call_center, count(*) as Total_Count_per_Call_Center,
round(count(*)/(select count(*) from calls) * 100, 1) as Percentage
from calls
group by call_center
order by 3 desc;
```

```
114 •  select call_center, count(*) as Total_Count_per_Call_Center,
115    round(count(*)/(select count(*) from calls) * 100, 1) as Percentage
116    from calls
117    group by call_center
118    order by 3 desc;
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

call_center	Total_Count_per_Call_Ce	Percentage
Los Angeles/CA	13371	41.8
Baltimore/MD	10684	33.4
Chicago/IL	5263	16.4
Denver/CO	2694	8.4

3.f. / Query to see distribution of calls for each state by counting it. */*

```
select state, count(*) as Total_Count_per_State
round(count(*)/(select count(*) from calls)*100, 1) as Percentage
from calls group by state order by 2 desc;
```

```
120 •  select state, count(*) as Total_Count_per_State,
121    round(count(*)/(select count(*) from calls) * 100, 1) as Percentage
122    from calls group by state order by 2 desc;
123
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

state	Total_Count_per_State	Percentage
California	3542	11.1
Texas	3470	10.8
Florida	2741	8.6
New York	1724	5.4
Ohio	1135	3.5
Virginia	1130	3.5
District of Columbia	1074	3.4
Pennsylvania	993	3.1
Georgia	907	2.8

Result 27

Result: 51 rows has returned.

3.g. / Query to see distribution of all call records of call data according to Day. */*

-- Moving on, Which day has the most call?

```
select dayname(call_timestamp) as Day_of_call,
count(*) as num_of_calls from calls
group by Day_of_call
order by num_of_calls desc;
```

```
127 •  select dayname(call_timestamp) as Day_of_call,
128    count(*) as num_of_calls from calls
129    group by Day_of_call
130    order by num_of_calls desc;
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

Day_of_call	num_of_calls
Friday	5424
Thursday	5338
Wednesday	4324
Saturday	4285
Tuesday	4264
Monday	4217
Sunday	4160

Friday has the most number of calls while Sunday has the least.

-- 4. Aggregations :

- *4.a. Query for Minimum, Maximum and Average Customer Satisfaction score*

```
select min(csat_score) as Minimum_Csat_Score,
max(csat_score) as Maximum_Csat_Score,
avg(csat_score) as Average_Csat_Score
from calls where csat_score != 0; # Why csat_score != 0,
# MySql added 0 to blank rows. But the minimum is 1.
```

```
138 •  select min(csat_score) as Minimum_Csat_Score,
139    max(csat_score) as Maximum_Csat_Score,
140    avg(csat_score) as Average_Csat_Score
141    from calls where csat_score != 0; # Why csat_score != 0,
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

Minimum_Csat_Score	Maximum_Csat_Score	Average_Csat_Score
1	10	5.5438

- *4.b. Query for Earliest and Most Recent Call Timestamp(date)*

```
select min(call_timestamp) as earliest_date,
max(call_timestamp) as most_recent from calls;
```

```
144    -- Earliest and Most Recent Call Timestamp(date)
145
146 •  select min(call_timestamp) as earliest_date,
147    max(call_timestamp) as most_recent from calls;
148
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

earliest_date	most_recent
2020-10-01	2020-10-31

/* Result: 2020-01-01 is earliest date and 2020-01-31 is most recent date from calls data */

--4.c. Query for Minimum, Maximum and Average Call Duration in Minutes from Calls

```
select min(call_duration_in_minutes) as Minimum_Call_duration,
max(call_duration_in_minutes) as Maximum_Call_duration,
avg(call_duration_in_minutes) as Average_Call_duration
from calls;
```

```
152    -- Minimum, Maximum and Average Call Duration Minutes from Calls
153
154 •  select min(call_duration_in_minutes) as Minimum_Call_duration,
155    max(call_duration_in_minutes) as Maximum_Call_duration,
156    avg(call_duration_in_minutes) as Average_Call_duration
157    from calls;
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

Minimum_Call_duration	Maximum_Call_duration	Average_Call_duration
5	45	25.0122

--4.d. Query for Call center wise responce time and count of call records.

```
select call_center, response_time, count(*) as count_of_call_records
from calls
group by call_center, response_time
order by 1,3 desc;
```

```
163    -- Call center wise responce time and count of call records.
164
165 •  select call_center, response_time, count(*) as count_of_call_records
166    from calls
167    group by call_center, response_time
168    order by 1,3 desc;
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

call_center	response_time	count_of_call_records
Baltimore/MD	Within SLA	6653
Baltimore/MD	Below SLA	2674
Baltimore/MD	Above SLA	1357
Chicago/IL	Within SLA	3269
Chicago/IL	Below SLA	1310
Chicago/IL	Above SLA	684
Denver/CO	Within SLA	1684
Denver/CO	Below SLA	678
Denver/CO	Above SLA	332
Los Angeles/CA	Within SLA	8430
Los Angeles/CA	Below SLA	3242
Los Angeles/CA	Above SLA	1699

/ Here we are checking how many calls are within, below or above the Service-Level -Agreement time. For example we see that Chicago/IL call center has around 3269 calls Within SLA , and then Denver/CO has 684 calls below SLA. you get it.*/*

-- 4.e. Query for Average call Duration in minutes of each call center

select call_center,

avg(call_duration_in_minutes) as Average_call_duration

from calls group by call_center order by 2 desc;

```
175    -- Average call Duration in minutes of each call center
176
177 •  select call_center,
178    avg(call_duration_in_minutes) as Average_call_duration
179    from calls group by call_center order by 2 desc;
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

call_center	Average_call_duration
Chicago/IL	25.0384
Denver/CO	25.0371
Los Angeles/CA	25.0271
Baltimore/MD	24.9744

-- *4.f. Query for Average call Duration in minutes of each channel*

select channel,avg(call_duration_in_minutes) as Average_call_duration

from calls group by channel order by 2 desc;

```
182    -- Average call Duration in minutes of each channel
183
184 •  select channel,avg(call_duration_in_minutes) as Average_call_duration
185    from calls group by channel order by 2 desc;
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

channel	Average_call_duration
Email	25.0978
Web	25.0160
Call-Center	25.0030
Chatbot	24.9433

-- *4.g. Query for Count of Call records State wise*

select state, count(*) as Count_call_records from calls

group by 1 order by 2 desc;

```
187    -- Count of Call records State wise
188
189 •  select state, count(*) as Count_call_records from calls
190    group by 1 order by 2 desc;
```

state	Count_call_records
California	3542
Texas	3470
Florida	2741
New York	1724
Ohio	1135
Virginia	1130
District of Columbia	1074
Pennsylvania	993
Georgia	907

Result: 51 States are there of which some top are above in picture. Topmost Country is California with 3542 Total Call Records.

-- *4.h. Query for Count of Call records State and Reason wise*

select state, reason, count(*) as Count_call_records from calls

group by 1, 2 order by 1,3 desc;

```
192    -- Count of Call records State and Reason wise
193
194 •  select state, reason, count(*) as Count_call_records from calls
195    group by 1, 2 order by 1,3 desc;
```

state	reason	Count_call_records
Alabama	Billing Question	527
Alabama	Payments	103
Alabama	Service Outage	93
Alaska	Billing Question	93
Alaska	Service Outage	27
Alaska	Payments	23
Arizona	Billing Question	492
Arizona	Payments	111
Arizona	Service Outage	111
Arkansas	Billing Question	148
Arkansas	Payments	29
Arkansas	Service Outage	22

Result: Total 51 rows returned with required data.

-- *4.i. Query for Count of Call records State and Sentiment wise*

select state, sentiment, count(*) as Count_call_records from calls

group by 1,2 order by 1,3 desc;

```
197    -- Count of Call records State and Sentiment wise
198
199 •  select state, sentiment, count(*) as Count_call_records from calls
200    group by 1,2 order by 1,3 desc;
```

state	sentiment	Count_call_records
Alabama	Negative	261
Alabama	Neutral	193
Alabama	Very Negative	126
Alabama	Positive	74
Alabama	Very Positive	69
Alaska	Negative	45
Alaska	Neutral	32
Alaska	Very Negative	27
Alaska	Positive	24
Alaska	Very Positive	15
Arizona	Negative	227
Arizona	Neutral	197

Result : 250 rows are returned.

-- 4.j. Query for Average Customer Satisfaction Score(Csat_Score) for each State

```
select state, avg(csat_score) as Average_Csat_Score from calls
group by state order by 2 desc;
```

```
202    -- Average Customer Satisfaction Score(Csat_Score) for each State
203
204 •  select state, avg(csat_score) as Average_Csat_Score from calls
205    group by state order by 2 desc;
```

state	Average_Csat_Score
Vermont	6.5000
North Dakota	6.3030
Rhode Island	6.1250
Wyoming	6.0000
Massachusetts	5.8929
Mississippi	5.8824
Hawaii	5.8727
Idaho	5.7969
Louisiana	5.7617
Washington	5.7293
Utah	5.7158
Illinois	5.7057

Result: 51 rows returned.

-- 4.k. Query for Average Call Duration Minutes for each State

```
select state, avg(call_duration_in_minutes) as Average_Call_Duration_in_Minutes
from calls group by state order by 2 desc;
```

```
207    -- Average Call Duration Minutes for each State
208
209 •  select state, avg(call_duration_in_minutes) as Average_Call_Duration_in_Minutes
210    from calls group by state order by 2 desc;
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

state	Average_Call_Duration_i
Rhode Island	27.7879
Delaware	26.3415
Hawaii	26.2770
Idaho	26.1131
Illinois	26.0301
Montana	25.9176
Kansas	25.8869
Minnesota	25.7925
South Dakota	25.7802
Michigan	25.7692
Connecticut	25.7640
Wisconsin	25.5512

Result 24

Result: 51 rows returned.

Note:

-- 1055 error only full group by then replace it by ''

```
SELECT @@sql_mode;
SET local sql_mode=(SELECT REPLACE(@@sql_mode, 'ONLY_FULL_GROUP_BY', ''));
```

4.l. / query for the maximum call duration each day and then sort by it.*/*

```
select call_timestamp,
max(call_duration_in_minutes) over(partition by call_timestamp) as
maximum_call_duration_in_minutes from calls
group by call_timestamp order by 2 desc;
```

```
217    /* query the maximum call duration each day and then sort by it.*/
218
219 •  select call_timestamp,
220    max(call_duration_in_minutes) over(partition by call_timestamp) as
221    maximum_call_duration_in_minutes from calls
222    group by call_timestamp order by 2 desc;
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

call_timestamp	maximum_call_duration_
2020-10-04	45
2020-10-22	45
2020-10-26	41
2020-10-13	39
2020-10-03	37
2020-10-14	37
2020-10-21	37
2020-10-30	37
2020-10-09	35
2020-10-12	35
2020-10-25	34
2020-10-16	31

Result: 31 rows returned.

/* Here we see that for example on Oct 4th the maximum call duration was 45 minutes

long while on Oct 17th it was 12 minutes long.*/

Findings:

1. At "32,012", Call-Center had the highest Total Calls at 10,312 and higher than Web, which had the lowest Total Calls at 6,382. Customers preferred to call the Call center, rather than using the Web or E-mail. This could be because they can get INSTANT response to their queries instead of the waiting time it would take to get a response via the E-mail. Call-Center accounted for 32.20% of Total Calls.

2. The Response Time "Within SLA" had 20,036 Total Calls, "Above SLA" had 4,072, and "Below SLA" had 7,904.

3. 71% of the Total Calls were from customers who called to make inquiries on "Billing".

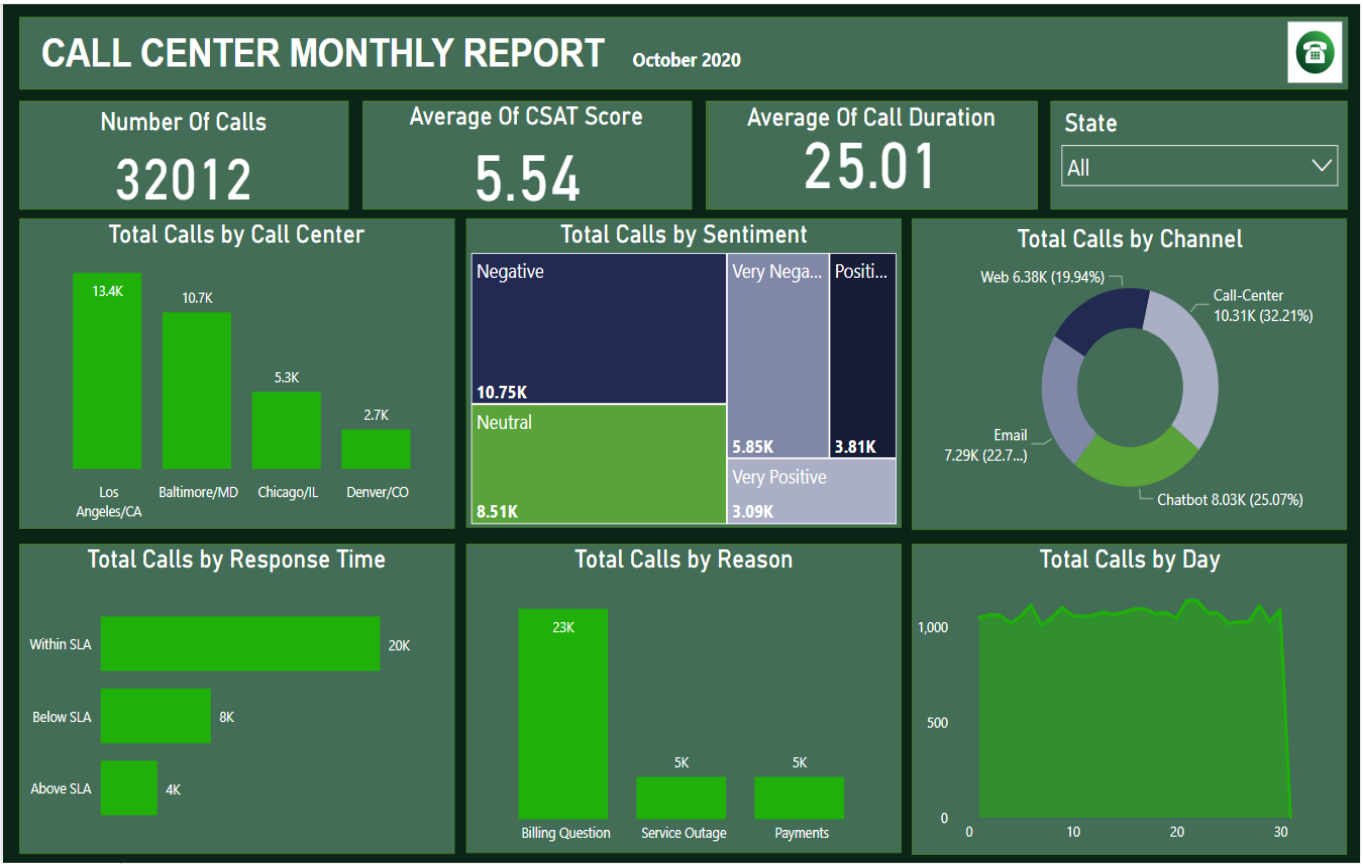
4. Over 17,000 callers were negative/very negative about the service they got over the month, possibly due to the fact that they were over-charged.

5. Average Customer Satisfaction Score for Whole Call Record Data is 5.5438. And Average Customer Satisfaction Score Statewise is highest for Vermont is 6.5.

6. Los Angeles/CA Call Center had the Highest Total Calls at 13,371 (41.8%) and Denver/CO had the lowest Total Calls at 2,694 (8.4%).

7. It is highly recommended that the organization looks into the rate at which customers are being charged for services.

Dashboard


CALL CENTER MONTHLY REPORT
October 2020
Number Of Calls
32012
Average Of CSAT Score
5.54
Average Of Call Duration
25.01
State
All
Total Calls by Call Center
13.4K
10.7K
5.3K
2.7K
Los Angeles/CA
Baltimore/MD
Chicago/IL
Denver/CO
Total Calls by Sentiment
Negative
10.75K
Very Nega...
5.85K
Positi...
3.81K
Neutral
8.51K
Very Positive
3.09K
Total Calls by Channel
Web 6.38K (19.94%)
Call-Center
10.31K (32.21%)
Email
7.29K (22.7...)
Chatbot 8.03K (25.07%)
Total Calls by Response Time
Within SLA
20K
Below SLA
8K
Above SLA
4K
Total Calls by Reason
23K
5K
5K
Billing Question
Service Outage
Payments
Total Calls by Day
1,000
500
0
0
10
20
30