# CRM Call Center Service Analysis

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Understanding the Entity Relationship Diagram

- **Task 1.1.** In the first part of Task 1, we will focus on using psql to **present average service time across different dimensions** found in CRM call center logs and CRM events

- **Task 1.2.** Subsequently, we will use Tableau to dive deeper into outstanding anomalies and explore other tables within the data set with the **objective of uncovering correlations that affect service time and improving CRM processes and performance**
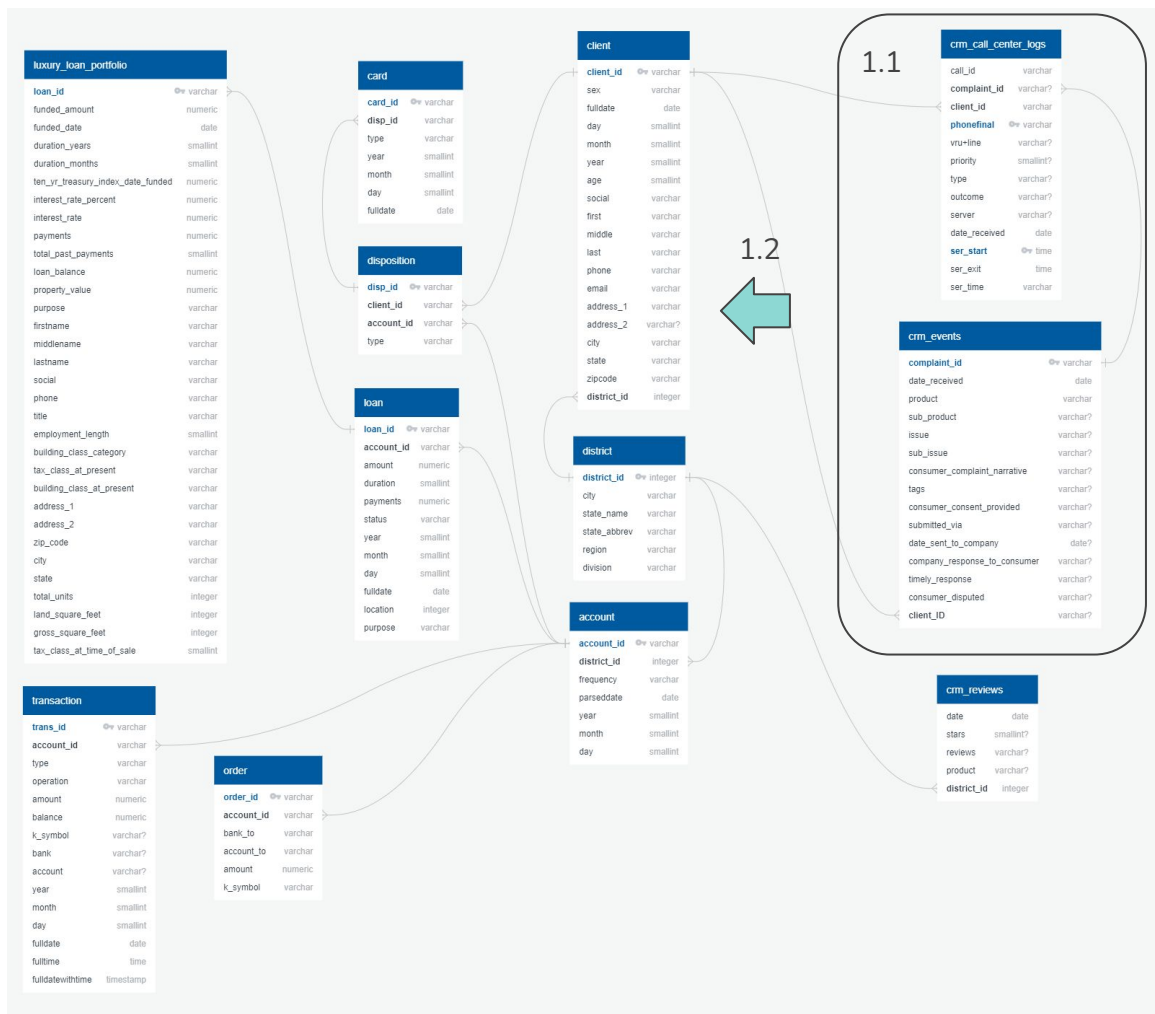
Measuring server performance

Relying only on server productivity to measure performance might lead to misleading results

Average service time per server

```
server      | average_service_time | count
------------+----------------------+-------
BENSION     | 00:12:45.59          |   100
GILI        | 00:12:43.693333      |    75
MIKI        | 00:12:39.796875      |   128
KAZAV       | 00:12:25.088398      |   181
MORIAH      | 00:12:17.041667      |   120
ANAT        | 00:12:09.71          |   100
TOVA        | 00:12:07.139665      |   179
BASCH       | 00:11:58.085714      |   105
AVIDAN      | 00:11:56.8           |   100
MICHAL      | 00:11:46.156522      |   115
DORIT       | 00:11:44.485437      |   103
NO_SERVER   | 00:11:44.06          |    50
SHLOMO      | 00:11:37.909091      |    55
SHARON      | 00:11:37.088608      |   158
YIFAT       | 00:11:36.896104      |   154
ELI         | 00:11:10.152174      |    46
STEREN      | 00:11:05.196262      |   107
IDIT        | 00:11:02.526946      |   167
YITZ        | 00:11:00.538462      |   143
DARMON      | 00:10:34.186047      |    43
AVNI        | 00:10:19.655405      |   148
NAAMA       | 00:10:06.290323      |    31
ZOHARI      | 00:09:27.05814       |    86
(23 rows)
```

- **Server productivity** is a key metric in assessing the performance of a server. The less amount of time taken to resolve a request, the more productive the server is

- Among the servers who resolved at least 20 complaints, the **slowest server (Bension) took on average 35% more time than the fastest (Zohari) to resolve a request**

Company response breakdown

```
company_response_to_consumer | bension | zohari
-----------------------------+---------+--------
Closed with explanation      |      69 |     49
Closed with monetary relief  |      14 |     19
Closed with non-monetary relief |   8 |      9
Closed without relief        |       4 |      4
Closed with relief           |       4 |      4
Closed                       |       1 |      1
Untimely response            |       0 |      0
In progress                  |       0 |      0
(8 rows)
```

Hour of day breakdown

```
hour_of_day | bension | zohari
------------+---------+--------
          9 |      16 |      7
         10 |      12 |      6
         11 |      14 |      8
         12 |      16 |     18
         13 |      15 |     11
         14 |       7 |     17
         15 |       7 |      6
         16 |      13 |     13
         17 |         |
```

- Zohari's high productivity could be partially due to more requests closed with relief i.e. loss to the company (Z: 35%, B: 25%) , and more quick mid-day calls between 12pm-3pm (Z: 53%, B: 38%)

Recommendation: Use a scorecard approach to measure server performance, with metrics having different weightage e.g. server productivity, customer rating, % complaints resolved without relief

Measuring company response performance

Closing complaints without relief may result in higher service time and increased disputes

Company response breakdown by disputes

```
company_response_to_consumer   | disputed_average_service_time | not_disputed_average_service_time | disputed | not_disputed
-------------------------------+-------------------------------+-----------------------------------+----------+-------------
Closed without relief          | 00:13:22.565217               | 00:11:02.065574                   |       23 |           61
Closed with explanation        | 00:12:05.289116               | 00:11:26.134779                   |      294 |         1291
Closed with monetary relief    | 00:11:50.425                  | 00:11:36.405759                   |       40 |          382
Closed with relief             | 00:08:31.769231               | 00:11:48.416667                   |       13 |           72
Closed with non-monetary relief| 00:11:22.290323               | 00:11:59.531646                   |       31 |          158
(5 rows)
```

- On average, a complaint closed without relief nor explanation is more 10% more likely to be disputed. These disputes also take up 15% more service time (~1 minute) than the average call.

Issues closed without relief

```
              issue              | disputes
---------------------------------+----------
Account opening, closing, or management |  3
Deposits and withdrawals         |    2
Closing/Cancelling account       |    2
Credit card protection / Debt protection | 2
Identity theft / Fraud / Embezzlement | 2
Late fee                         |    2
Credit line increase/decrease    |    1
Credit reporting                 |    1
APR or interest rate             |    1
Forbearance / Workout plans      |    1
(10 rows)
```
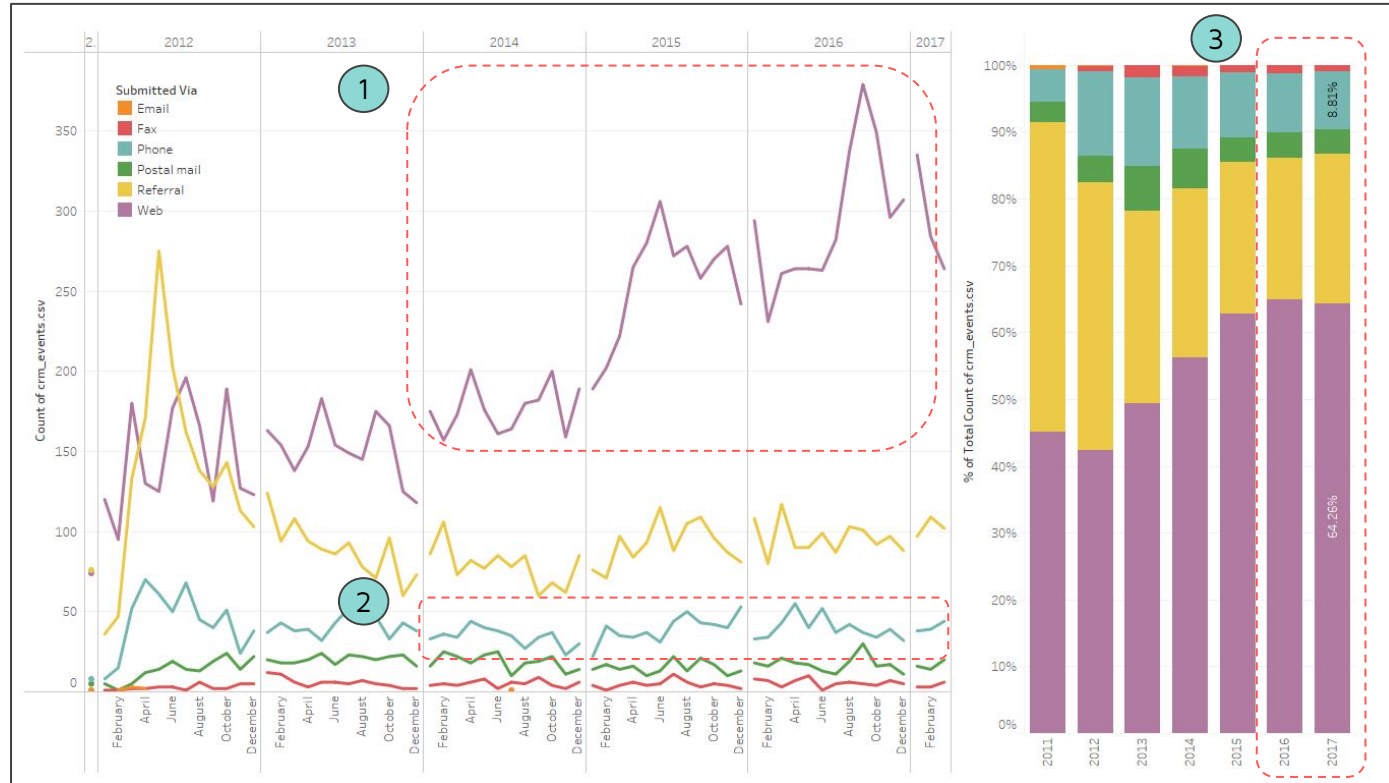
Recommendation: Consider placing more emphasis on providing explanations for all issues. Issues closed with explanation have lower service time and lower possibility of disputes

Are CRM call centers becoming obsolete?

Over the past few years, complaints are increasingly submitted via web rather than phone

Complaint breakdown by channel submitted

1. The number of web submissions have increased by 3x over the last 3 years

2. Meanwhile, the number of phone submissions have remained static

3. As a result, the proportion of phone submissions has shrunk by 6% (2013: 15%, 2017Q1: 9%). **With 64% of the complaints now submitted via web, it seems like CRM call centers might become obsolete in the near future**

Understanding the advantages of phone resolution

Employ CRM call center resources strategically to minimize payouts and disputes

Company response by channel submitted

Company Response To Consumer	Submitted Via	
	Phone	Web
Closed	1.56%	0.96%
Closed with explanation	66.11%	61.01%
Closed with monetary relief	17.47%	23.83%
Closed with non-monetary relief	7.96%	9.29%
Closed with relief	3.33%	2.59%
Closed without relief	3.49%	2.26%
Untimely response	0.08%	0.07%

Consumer disputed by channel submitted

Consumer Disputed	Submitted Via	
	Phone	Web
No	83.06%	78.47%
Yes	16.94%	21.53%

- Phone resolutions will likely incur higher direct costs than resolving web submissions due to longer service time per customer i.e. lower productivity

- However, phone resolutions, due to their interactive nature, are:

  - Less likely to result in monetary relief paid out (Phone: 17%, Web: 24%)

  - Less likely to result in customer disputes (Phone: 17%, Web: 22%)

Recommendation: Consider using existing CRM call center resources for proactive outbound calls - reserved for high priority customers or high-stake complaints e.g. high potential relief amounts

Reduce the call abandonment rate

Currently, 37% of calls are abandoned, likely resulting in poor customer sentiment

Example of possible back-up phone number to store

Phone Number Called From	Client Id	Priority	Outcome	Phone Stored	Phone Stored = Phone Called?		
					Null	False ⌅	True
555-264-8818	Null	1	HANG	Null	0.05		
	C00006750	0	AGENT	617-236-4068		22.77	

- Customers might call from a number that is different from what was stored on CRM

- This presents an opportunity for alternative numbers to be stored or original numbers to be replaced, subject to customer consent *(301 alternative numbers found in CRM call logs i.e. 13% of clients)*

Example of scenario where callback can be initiated

Phone Number Called From	Client Id	Priority	Outcome	Phone Stored	Phone Stored = Phone Called?		
					Null	False ⌅	True
546-999-5216	Null	Null	Null	Null	14.03		
	C00001124	0	AGENT	546-999-5216			12.30

- Customers might abandon the call after waiting for too long

- Where the phone number called from matches the phone stored, the bank can either (1) initiate a callback for high priority clients or (2) have an option for customers in the call to request for callback *(600 priority-0 calls were abandoned i.e. 15%)*

Recommendation: Consider storing alternative numbers and proactively initiating a callback to reduce call abandonment rate and improve customer sentiment