Information Technology Institute

TELECOM CHURN ANALYSIS

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Introduction

Customer churn refers to the phenomenon of customers ceasing to do business with a company or brand. In the context of the telecommunication industry, churn occurs when customers end their subscription with a particular telecom service provider and switch to another provider or terminate the service altogether. Churn can be a significant problem for companies as it can result in lost revenue, decreased market share, and increased costs associated with acquiring new customers to replace those who have left.
In this report initial conceptualization for the graduation project requirements for the Power BI Track at the Information Technology Institute. Our project focuses on designing a Data Model, creating a Database and data Warehouse, Analyze the service performance of a telecom company within the telecommunications field. We selected this field due to its paramount importance, as the ability to share and receive information is essential for the smooth functioning of modern society. Telecommunication serves as the foundation of today's digital environment.

Impotence of Data Analysis in Telecommunication Field

In the telecommunications industry, data collection and analysis play a crucial role in driving business success and maintaining a competitive edge. Here's a summary of the key points in the text:

1. Tracking Telecom KPIs:

   Telecom analytics involve tracking critical data points such as call volume, call duration, network traffic, and user behavior. Segmentation of customers based on factors like age, gender, and usage levels allows companies to predict customer cancellations and understand potential reasons for churn.

2. Network Optimization:

   Telecom analytics helps companies access the overall performance of their networks. Rapid responses to market demand changes and network improvements can enhance a telecom company's competitiveness.

3. Personalization and Targeted Marketing:

   By analyzing telecommunications data, companies can gain insights into customer profiles and preferences. This information enables personalized marketing strategies, leading to higher conversion rates, improved customer retention, increased sales volume, and more effective pricing strategies.

4. Fraud Detection:

   Telecom analytics aids in identifying and preventing fraudulent activities, even in seemingly standard data such as call records, device data, and location information. Detecting anomalies in data can minimize financial losses and protect the company's reputation.

In essence, telecom analytics is indispensable for understanding customer behavior, optimizing network performance, staying competitive, and mitigating risks, ultimately contributing to the long-term success of telecom companies in a saturated market.

Project Value:

The objective of this project was to examine the rate at which customers discontinue using a business's product or service, known as the Customer Churn Rate, and identify the key factors that influence it. Additionally, the project aims to evaluate the satisfaction level of customers with the call service.

In the telecommunications industry, the churn rate serves as a crucial performance metric, allowing companies to forecast future revenue trends and gauge overall customer satisfaction. By understanding why customers leave and how many are departing, businesses can comprehend the implications of customer loss beyond mere revenue, such as the expenses associated with acquiring new customers through marketing and sales efforts.

In the telecommunications sector, churn rates are determined by dividing the number of customers who cancel their accounts in a given month by the total number of customers at the start of that month, and then multiplying the result by 100.

The significance of churn rate can be summarized as follows:

- Enhance Customer Retention: Retaining existing customers is far more cost-effective than acquiring new ones. Acquiring new customers typically costs five times more than retaining current ones.
- Increase Customer Lifetime Value: Customer churn rate directly impacts the customer lifetime value (LTV). Higher LTV indicates greater value of customers to the business

This project aims to address several questions that will assist decision-makers in the telecommunications industry. Some of these questions include:

1. What is the churn rate for the business's customers?
2. What are the underlying causes of customer churn?
3. What strategies can be employed to reduce customer churn?
4. Which factors influence the customer satisfaction regarding the call service?

Dataset Description:

Data Source

This data was collected from IBM sample And Kaggle.

This data contains five Tables:

Tables Description:

Table Name	Description	Num or column	Num of row	Memory Size	Data Type
#Demographic Table	Demographic Data about Customer	9	7043	346 + KB	Int64 (4), String (5)
#Services Table	Data about services for Customer	30	7043	1390+ KB	Int64 (10), Object (20)
#Status Table	Customer status	12	7043	495+ KB	Int64 (7), Object (5)
Location Table	Location Data of Customer	9	7043	624+ KB	Float64 (3), Int64 (1), Object (5)
Population Table	Population Data for Locations	3	1671	39.3 KB	Int64 (3)
Call center	Data about Calls to Call Center	11	5000	394.4+KB	Time (2) Date (1) Int64 (2) Object (6)

Demographic:

Column	Description	Data Type	Null Value	Categories	Note
Customer ID	A unique ID that identifies each customer	Text			
Gender	The customer's gender: Male, Female	Text		Male, Female	
Age	The customer's current age, in years.	Int			
Married	Indicates if the customer is married: Yes, No	Text		Yes, No	
Dependents	Indicates if the customer has dependents or not.	Text		Yes, No	
Number of Dependents	Indicates the number of dependents that live with the customer (dependents could be children, parents, grandparents, etc.)	Int			
Count		Text		1	
Under 30	Indicates the age of Customer is under 30 years.	Int		Yes, No.	Related to Age
Senior Citizen	Indicates the customer's Age is over 65	Int		Yes, No	

Status Table

Column	Description	Data Type	Null Value	Categories	Note
Status ID	Uniquely identifier for each row	Text			
Customer Status	Indicates the status of the customer at the end of the quarter	Text		Churned, Stayed, or Joined.	
Churn Label	If the customer churned, then the label is yes, else no.	Text		Yes, No	
Churn Category	A high-level category for the customer's reason for churning, which is asked when they leave the company	Text	5174	Attitude, Competitor, Dissatisfaction, Other, Price	Directly related to Churn Reason
Churn Reason	A customer's specific reason for leaving the company, which is asked when they leave the company	Text	5174		Directly related to Churn Category

Service Table:

Column Name	Description	Data Type	Null value	Categories	Note
Service ID	which represents a unique identifier for each Customer has a service.	Text	_	_	
Offer	Identifies the last marketing offer that the customer accepted, if applicable.	Text	3877	None, Offer A, Offer B, Offer C, Offer D, and Offer E.	The 'none' value indicates that there is no applicable offer
Phone Service	This column indicates whether the customer is subscribed to the PhoneService.	Text	_	Yes No	-
Multiple Lines	indicates whether the customer is subscribed to MultipleLines.	Text	_	No Yes No phone service	This services depend on PhoneService
Internet Service	indicates whether the customer is subscribed to the InternetService .	Text	_	Fiber optic DSL No	-
Online Security	indicates whether the customer is subscribed to the	Text	_	No Yes No internet service	This services depend on Internet Service
Online Backup	indicates whether the customer is subscribed to the OnlineBackup.	Text	_	No Yes No internet service	This services depend on InternetService
Device Protection	indicates whether the customer is subscribed to the DeviceProtection .	Text	_	No Yes No internet service	This services depend on Internet Service
Tech Support Streaming TV	indicates whether the customer is subscribed to the TechSupport StreamingTV .	Text	_	No Yes No internet service	This services depend on Internet Service

Streaming Movies	indicates whether the customer is subscribed to the Streaming Movies	Text	_	No Yes No internet service	This services depend on Internet Service
Streaming Music	indicates whether the customer is subscribed to the Streaming Music	Text	_	No Yes No internet service	This services depend on Internet Service
Unlimited Data	indicates whether the customer is subscribed to the Unlimited Data	Text	_	No Yes No internet service	This services depend on Internet Service
There is Null value in next Columns:					
Referred a Friend	Indicates whether the customer has referred a friend/family member or not.		Text	Yes, No	
Number of Referrals	Indicates the number of times the customer has referred a friend or family member to this company to date.		Int		Directly related to Referred a Friend
Contract type	Indicates the customer's current contract type		Text	Month-to-Month, One Year, Two Year.	
Payment Method	Indicates how the customer pays their bill		Text	Bank Withdrawal, Credit Card, Mailed Check.	
Paperless Billing	Indicates if the customer has chosen paperless billing: Yes, No.		Text		Yes, No
Avg Monthly Long Distance Charges:	Indicates the customer's average long distance charges, calculated to the end of the quarter specified above.		float64	-	-
Avg Monthly GB Download:	Indicates the customer's average download volume in gigabytes, calculated to the end of the quarter specified above.		int	-	-

Total Refunds:	Indicates the customer's total refunds, calculated to the end of the quarter specified above.	float	-	-
Total Extra Data Charges:	Indicates the customer's total charges for extra data downloads above those specified in their plan, by the end of the quarter specified above.	int	-	-
Total Revenue	Sum of Total Charges Total Refunds Total Extra Data Charges Total Long Distance Charges	float	-	-
Total Long Distance Charges:	Indicates the customer's total charges for long distance above those specified in their plan, by the end of the quarter specified -above.	float	-	-
-Tenure in Months: Indicates the total	amount of months that the customer has been with the company by the end of the quarter specified above.	int	-	-

Population Table:

Column Name	Description	Data Type	Categories	Note
ID	unique ID that identifies each row.	int	-	-
Zip Code	The zip code of the customer's primary residence.	Int	-	-
Population	A current population estimate for the entire Zip Code area.	int	-	-

Location Table:

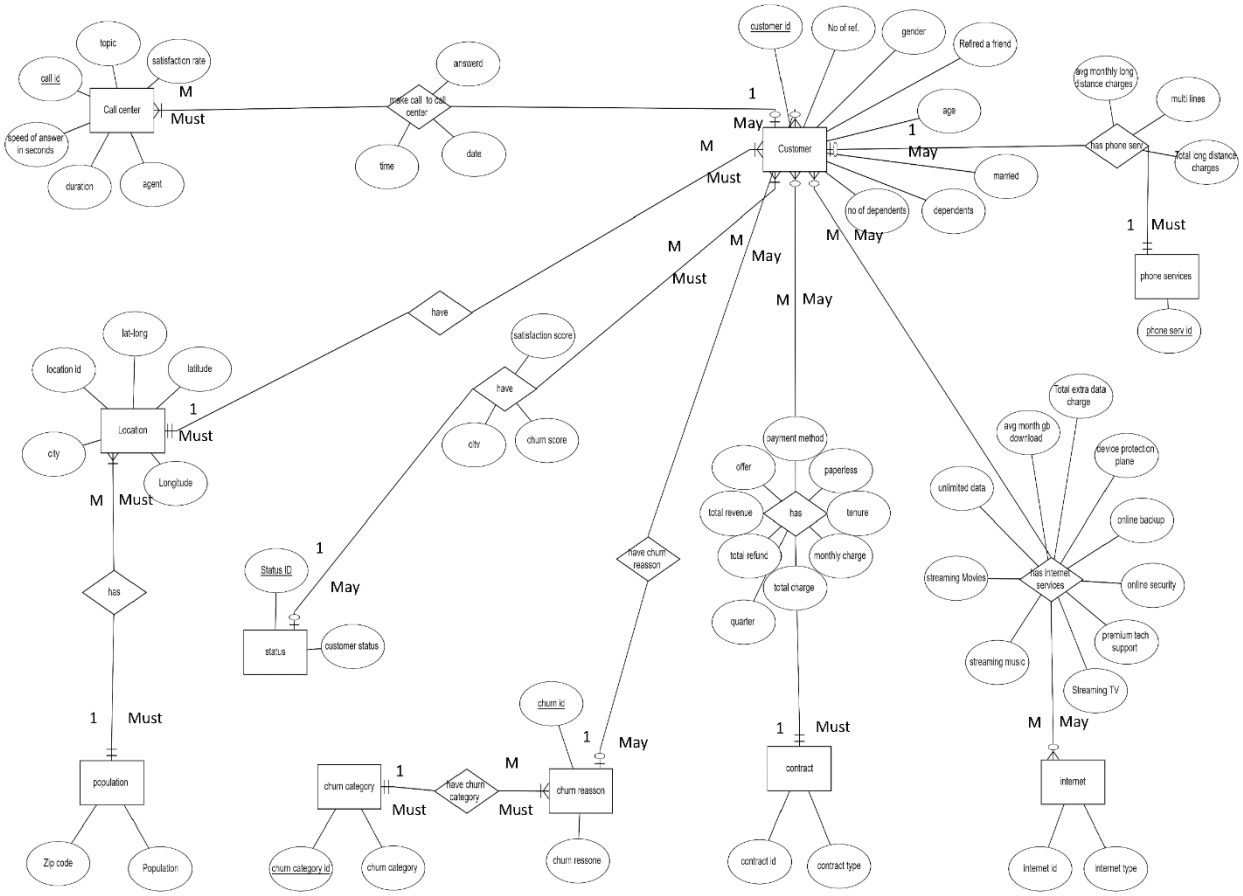
Column Name	Description	Data Type	Categories	Note
Location ID	A unique ID that identifies each customer Location	Text	-	-
Country	The country of the customer's primary residence	Text	United States	-
State	The state of the customer's primary residence.	Text	California	-
City	The city of the customer's primary residence.	Text	Los, Angeles, Inglewood Whittier, Pico Rivera, Los Alamitos, Sierra Madre, Pasadena and more	-
Zip Code	The zip code of the customer's primary residence.	Int	-	It is ad forging key for population table
Latitude	The latitude of the customer's primary residence.	Float	-	-
Longitude	The longitude of the customer's primary residence.	float	-	-

Telecom Company Call-Center-Dataset:

Columns	Description	Data Type	Categories	Note
Call Id	which represents a unique identifier for each Calling.	Text	_	
Agent	Contains the name of the employee who handled this call.	Text	Jim, Martha, Diane, Dan, Becky, Greg, Joe, Stewart	
Date	Contains the date of the call.	datetime	_	
Time	Contains the time of calles	Datetime	_	
Topic	Contains the type of issue or problem that the customer wanted to address	Object	Streaming Technical Support Payment related Contract related Admin Support	
Answered	Indicates whether the customer's call was answered or not.	Object	Yes, No	
Resolved	Indicates whether the issue was resolved during the call or not.	object	Y N	
Speed of answer in seconds	Represents the speed at which the call was answered, measured in seconds.	float64	_	There is null value because the agent not answered
Avg Talk Duration	Represents the average duration of the call.	datetime	_	There is null value because the agent not answered
Satisfaction rating	Measures the level of customer satisfaction.	float64	From 0 to 5	null value no answer

Database:

ERD Diagram:



Our ERD consists of:

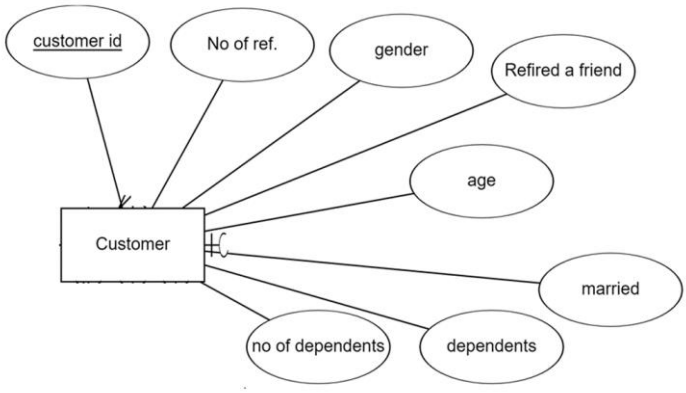
1. Main Entities:
    a. Customers.
    b. Phone Services.
    c. Internet Service.
    d. Contract.
    e. Churn Reason.
    f. Churn Category
    g. Status.
    h. Location.
    i. Population.
    j. Call Center.

2. Main Relatioships :
    a. Customers - Phone Services Relationship.
    b. Customers - Internet Service Relationship.

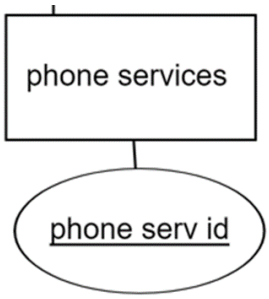
c. Customers - Contract Relationship.
d. Customers - Churn Reason Relationship.
e. Churn Reason - Churn Category Relationship.
f. Customers - Status Relationship.
g. Customers - Location Relationship.
h. Location - Population Relationship.
i. Customers – Call Center Relationship.

Main Entities:

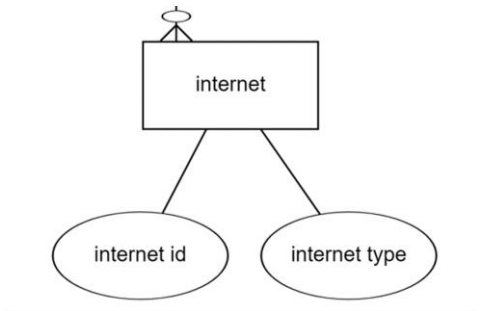
a. Customers is a strong Entity Consisting of 8 simple attributes:
   - Customer ID
   - Age.
   - Gender.
   - Married.
   - Dependents.
   - Number of Dependents.
   - Refels.
   - Number of refers.



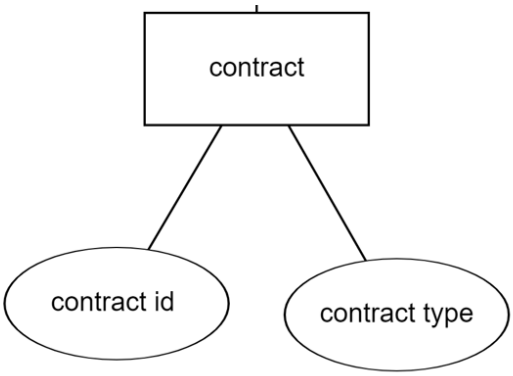
b. Phone Services is a strong Entity Consisting of 1 simple attribute.
    - Phone Services.



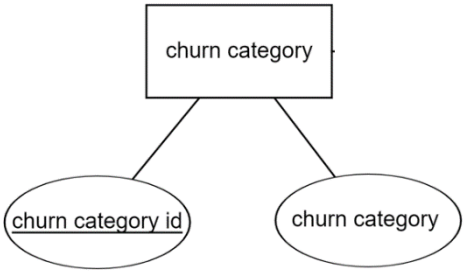
c. Internet Service Strong Entity Consists of 2 simple attributes
    - Internet ID.
    - Internet Type.



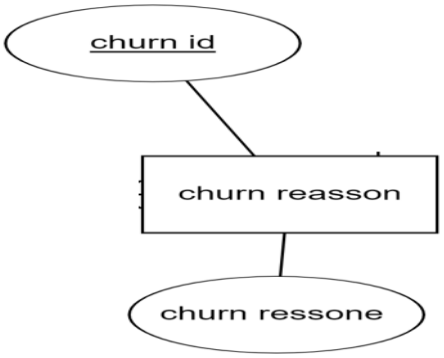
d. Contract is a strong Entity Consisting of 2 simple attributes.
    - Contract ID.
    - Contract Type.



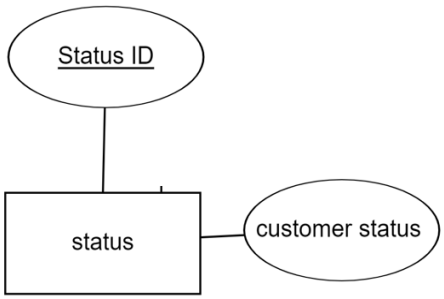
e. Churn Reason strong Entity Consists of 2 simple attributes.
   - Churn ID.
   - Churn Reason.



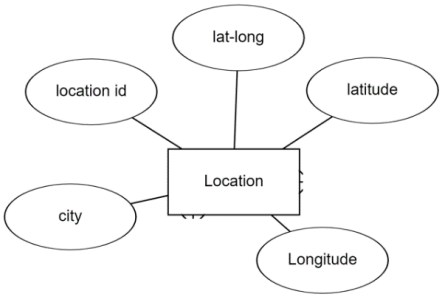
f. Churn reason Category is strong Entity Consists of 2 simple attributes
   - Churn Category ID.
   - Churn Category.



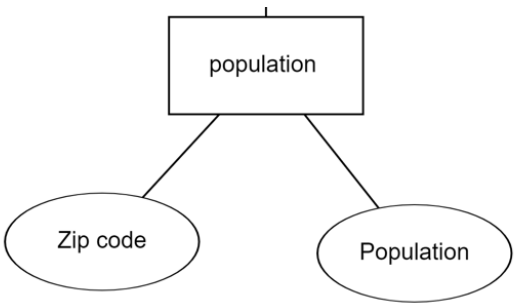
g. Status strong Entity Consists of 2 simple attributes
   - Status ID.
   - Customer Status.



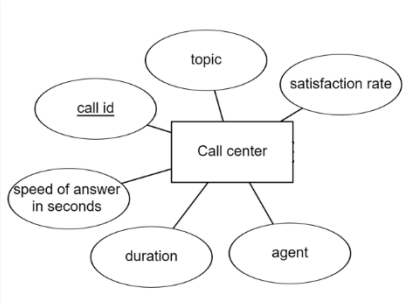
h. Location is a strong Entity Consists of 5 simple attributes.
   - Location ID.
   - Lat – Long.
   - Latitude.
   - Longitude
   - City



i. Population is strong Entity Consists of 2 simple attributes.
   - Zip Code.
   - Population.

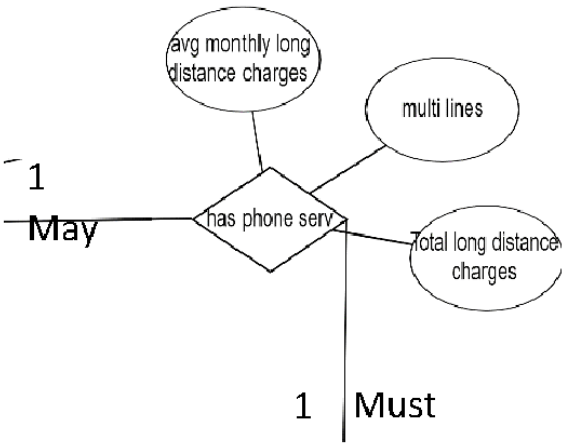


j. Call Center is a strong Entity Consisting of 6 simple attributes.
   - Call ID
   - Agent.
   - Topic.
   - Duration.
   - Satisfaction Rate.
   - Speed of answer in Seconds



Main Relationships

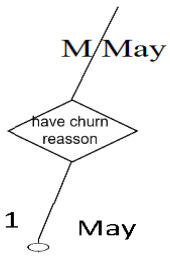
1. Customers - Phone Services Relationship.
    a. Degree: Binary.
    b. Cardinality 1:1
    c. Participation: May : Must
    d. Attributes on Relationship:
        - Avg Monthly Long Distance Charge.
        - Multi Lines.
        - Total Long Distance Charge.



2. Customers - Internet Service Relationship.
    a. Degree: Binary.
    b. Cardinality: M:M
    c. Participation: May : May
    d. Attributes on Relationship.
        - Total extra data charge.
        - Streaming TV.
        - Device protection plane.
        - Streaming Music.
        - Online backup.
        - Streaming Movies.
        - Online security.
        - Unlimited Data.
        - Premium tech support.
        - Avg monthly GB Downloaded

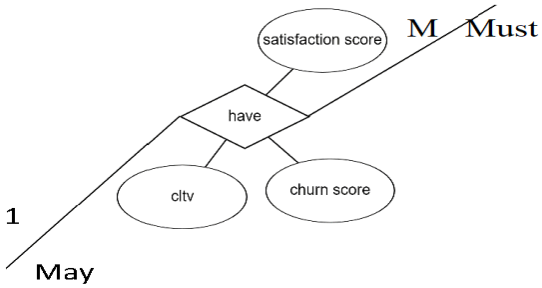
3. Customers - Contract Relationship.
    a. Degree: Binary.
    b. Cardinality: 1:M
    c. Participation: May : Must
    d. Attributes on Relationship
        - Payment Method.
        - Total Refund.
        - Paperless.
        - Total Revenue.
        - Tenure.
        - Streaming Movies.
        - Monthly Charge.
        - Offer.
        - Total Charge.
        - Quarter

4. Customers - Churn Reason Relationship.
    a. Degree: Binary.
    b. Cardinality: 1:M
    c. Participation: May : May
    d. There is no Attributes on Relationship

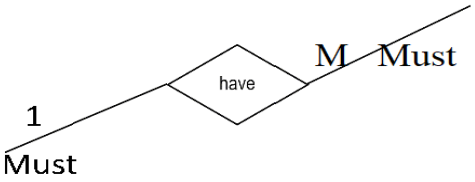


5. Churn Reason - Churn Category Relationship.
    a. Degree: Binary.
    b. Cardinality: 1:M
    c. Participation: Must : Must
    d. There is no Attributes on Relationship

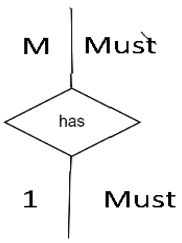
6. Customers - Status Relationship.
    a. Degree: Binary.
    b. Cardinality: 1:M
    c. Participation: May Must
    d. Attributes on Relationship
        - Satisfaction Score
        - Churn Score.
        - CLTV



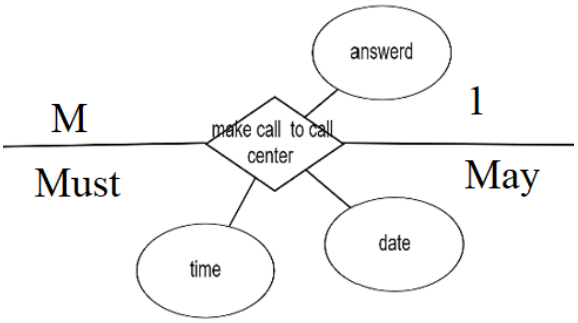
7. Customers - Location Relationship.
    a. Degree: Binary.
    b. Cardinality 1:M
    c. Participation: Must : Must
    d. There is no Attributes on Relationship



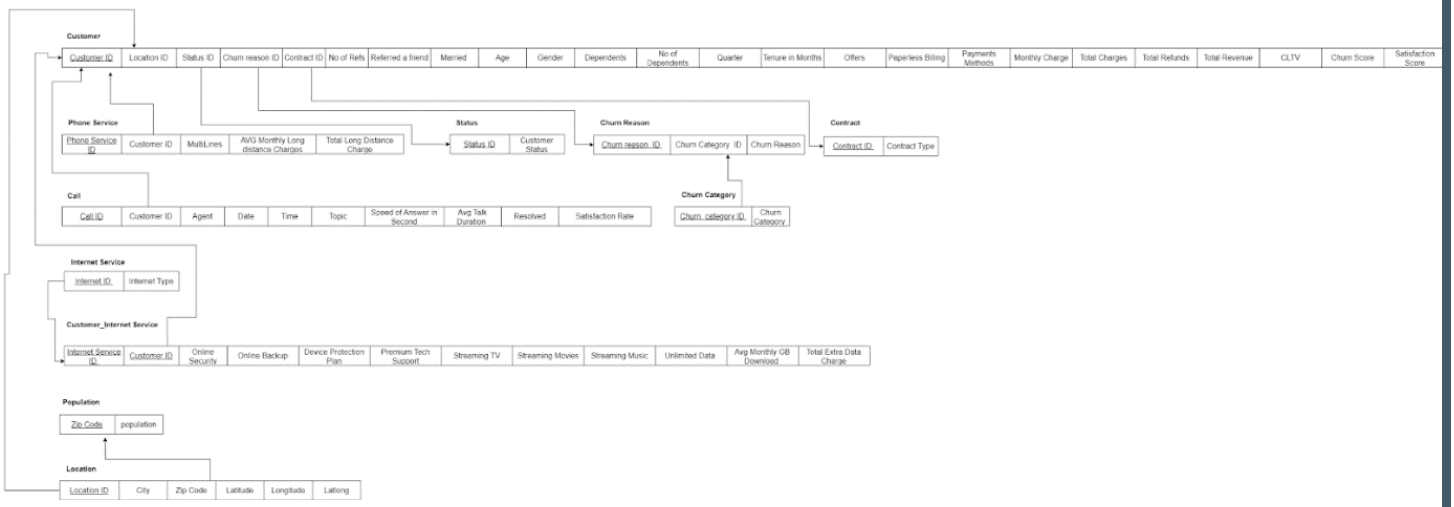
8. Location - Population Relationship.
    a. Degree: Binary.
    b. Cardinality: 1:M
    c. Participation: Must : Must
    d. There is No Attributes on Relationship



9. Customers – Call Center Relationship.
    a. Degree: Binary.
    b. Cardinality: M:1
    c. Participation: Must : May
    d. Attributes on Relationship
        - Answerd
        - ii. Date.
        - iii. Time



Mapping:



Contract:

Contract ID PK, Contract type.

No	Column	Data Type	Constraint
1	Contract_ID	INT	PRIMARY KEY
2	Contract_Type	VARCHAR(50)	CHECK Contract type is Month-to-Month, One Year, Two Year.

Status Table

Status ID PK, Customer Status.

No	Column	Data Type	Constraint
1	Status ID	INT	PRIMARY KEY
2	Customer_Status	VARCHAR(10)	CHECK Customer Status is Churned, Stayed, or Joined.

Customers

Customer ID PK, Location ID FK, Status ID FK, Churn reason ID FK, Contract ID FK, Number of refs, Referred a friend, Gender, Age, Married, Dependents, Number of Dependents, Quarter, Tenure in Months, Offer, Paperless Billing, Payment Method, Monthly Charge, Total Charges, Total Refunds, Total Revenue, CLTV, Churn Score, Satisfaction Score, Join Date.

Customers & Location

Relation between Customers and Locations is many to one, must from both sides. A customer must have one location, and the location must belong to one or many customers. So, the PRIMARY KEY of the “one” table Locations will be added as a FOREIGN KEYin the “many” Table Customers.

Customers & Status

The relation between Customers and Status is one to many, must from the Customers side and may from the Status side. A customer must have one status, and the status may belong to one or many customers. So, the PRIMARY KEY of the “one” table Status will be added as a FOREIGN KEYin the “many” Table Customers. Also, the relation attributes will go to the “many” Table Customers. Relation attributes are:
CLTV, Churn Score, and Satisfaction Score.

Customers & Churn Reasons

The relation between Customers and Churn Reasons is one to many, may from both sides. A customer may be churned so in this case he/she will have one churn reason, and the Churn Reasons may belong to one or many customers. So, the PRIMARY KEY of the “one” table Churn Reasons will be added as a FOREIGN KEYin the “many” Table Customers.

Customers & Contracts

The relation between Customers and Contracts is one to many, must from the Customer's side and may from the Contracts side. A customer must have a contract, and the contract may belong to one or many customers. So, the PRIMARY KEY of the “one” table Contracts will be added as a FOREIGN KEYin the “many” Table Customers.

No	Column	Data Type	Constraint
1	Customer_ID	Int	PRIMARY KEY
2	Location_ID	Int	FOREIGN KEY
3	Status_ID	Int	FOREIGN KEY
4	Churn_Reason_ID	Int	FOREIGN KEY
5	Contract_ID	Int	FOREIGN KEY
6	Number_Of_ Referrals	Int	DEFAULT will be 0
7	Referred_A_Friend	BIT	CHECK it is 0, or 1 DEFAULT will be 0
8	Gender	Varchar(10)	CHECK it is Male or Female DEFAULT will be Male
9	Married	BIT	CHECK it is 0, or 1 DEFAULT will be 0
10	Age		CHECK Age between 18 & 120.
11	Dependents	BIT	CHECK it is 0, or 1 DEFAULT will be 0
12	Number_Of_Dependents	Int	DEFAULT will be 0
13	Offer	Varchar(10)	CHECK it is A,B,C,D,E, or

			None. Default None
14	Paperless_Billing	BIT	CHECK it is 0, or 1 DEFAULT will be 0
15	Payment_Method	Varchar(50)	CHECK it is Bank Withdrawal, Credit Card, Mailed Check.
16	Churn_Score	Int	CHECK Churn Score between 0 and 100
17	Satisfaction_Score	Int	CHECK Satisfaction Score between 1 and 5
18	Quarter	Varchar(10)	
19	CLTV	Int	
20	Tunure_In_Month	Int	
21	Monthly_Charge	Float	
22	Total_Charges	Float	
23	Total_Refunds	Float	
24	Total_Revenue	Float	

Internet Service

Internet Service ID PK, Internet Type.

No	Column	Data Type	Constraint
1	Internet_Service_ID	INT	PRIMARY KEY
2	Internet_Type	VARCHAR(50)	CHECK Internet Type is DSL, or Fiber optic, or Cable.

Customer Internet Service

(Internet Service ID FK, Customer ID FK) PK, Online Security, Online Backup, Device Protection Plan, Premium Tech Support, Streaming TV, Streaming Movies, Streaming Music, Unlimited Data, Avg Monthly GB Download, Total Extra Data Charges.

Customers & Internet Service

The relation between Customers and Internet Service is many to many, may from both sides. A customer may have one or more Internet Services, and the Internet Service may belong to one or many customers. So, we will create a new table Customer Internet Service that contains Customers & Internet Service PRIMARY KEYs as a composite key (Internet Service ID FK, Customer ID FK) PK. Also, the relation attributes will be added to the new table. The relation attributes are:
Online Security, Online Backup, Device Protection Plan, Premium Tech Support, Streaming TV, Streaming Movies, Streaming Music, Unlimited Data, Avg Monthly GB Download, Total Extra Data Charges.

No	Column	Data Type	Constraint
1	Internet Service ID	INT	FOREIGN KEY
2	Customer ID	INT	FOREIGN KEY
3	(Internet Service ID, Customer ID)		PRIMARY KEY
4	Online Security	BIT	CHECK it is 0, or 1 DEFAULT will be 0
5	Online Backup	BIT	CHECK it is 0, or 1 DEFAULT will be 0
6	Device Protection Plan	BIT	CHECK it is 0, or 1 DEFAULT will be 0
7	Premium Tech Support	BIT	CHECK it is 0, or 1 DEFAULT will be 0
8	Streaming TV	BIT	CHECK it is 0, or 1 DEFAULT will be 0
9	Streaming Movies	BIT	CHECK it is 0, or 1 DEFAULT will be 0
10	Streaming Music	BIT	CHECK it is 0, or 1 DEFAULT will be 0
11	Unlimited Data	BIT	CHECK it is 0, or 1 DEFAULT will be 0

Phone Service

The relation between Customer & Phone Service is one to one .The customer May have Phone service and the phone service Must have Customer so get PRIMARY KEY from Customer and put it in Phone service as Foreign key.
Phone Service ID PK, Customer ID FK, Multiple Lines, average monthly Long-Distance Charges, Total Long-Distance Charges.

No	Column	Data Type	Constraint
1	Phone_Service_ID	Int	PRIMARY KEY
2	Customer_Id	Int	FOREIGN KEY
3	Multiple_Lines	Bit	CHECK it is 0, or 1 DEFAULT will be 0
4	Avg_Monthly_Long_ Distance_Charges	decimal(10,3)	CHECK it is greater or equal than 0
5	Total_Long_Distance _Charges	decimal(10,3)	CHECK it is greater than or equal 0

Location

The relation between Location and Population is one from Population side to many from Location side, So the Primary of Population will be FOREIGN KEYin Location. Location Must have Zip Code and Population Must Zip Code in Location.
(Location ID PK, Zip code FK, Latitude, Longitude, Latlong, City).

No	Column	Data Type	Constraint
1	Location_ID	Integer	PRIMARY KEY
2	City	Varchar(15)	
3	ZipCode	Integer	FOREIGN KEY
4	Latitude	FLOAT	
5	Longitude	FLOAT	

Population

Zip code PK, Population

No	Column	Data Type	Constraint
1	Zipcode_ID	Integer	PRIMARY KEY
2	Population_Num	Integer	CHECK it be greater than 0

Call

The relation between Customer and Call is one to many. The customer has many calls, but there is one Customer for one call. The Customer may have Call but Call Must have Customer.
(Call ID PK, Customer ID FK, Date, Time, Topic, Agent, Resolved, Speed of answer, Duration, Answered,Avg_Talk_Duration, Satisfaction rate)

No	Column	Data Type	Constraint
1	Call_ID	INT	PRIMARY KEY
2	Customer_ID	INT	FOREIGN KEY
3	Agent	Varchar(50)	
4	Date_Of_Call	Date	
5	Time_Of_Call	Time	
6	Resolved	BIT	CHECK it is 0, or 1 DEFAULT will be 0
7	Answered	BIT	CHECK it is 0, or 1 DEFAULT will be 0
8	Topic	Varchar(50)	CHECK Topic is Contract related,Technical Support, Payment related, Admin Support, Streaming.

9	Speed_Of_Answer_In_Seconds	INT	CHECK it is greater than 0.
10	Duration	TIME	
11	Satisfaction_Rating	INT	CHECK between 1 and 5

Churn Category

(Churn Category ID PK, Churn Category)

No	Column	Data Type	Constraint
1	Churn_Category_ID	INT	PRIMARY KEY
2	Churn_Category	VARCHAR(50)	CHECK Churn Category is Competitor, Dissatisfaction, Price, Attitude, Other.

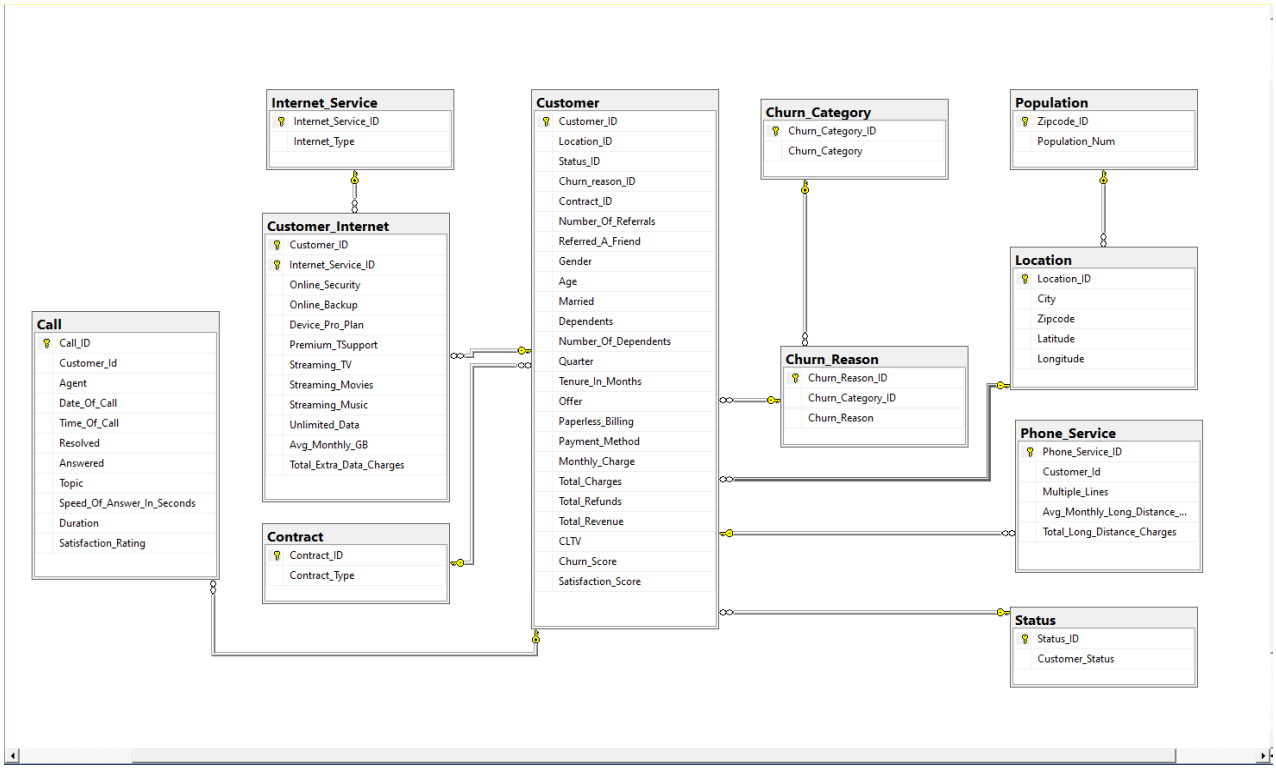
Churn Reason

The relation between Churn Category and Churn Reason is one to many. The Churn Category has many reasons but one reason has one Churn Category. The reason must have Category and Category must has Reason, so the PRIMARY KEY of Churn Category in Churn Reason as foreign key
(Churn reason ID PK, Churn Category ID FK, Churn Reason).

No	Column	Data Type	Constraint
1	Churn_reason_ID	INT	PRIMARY KEY
2	Churn_Category_ID	INT	FOREIGN KEY
3	Churn_Reason	VARCHAR(50)	CHECK Churn Reason is Competitor offered more data, Competitor made better offer, Limited range of services, Extra data charges, Competitor had better devices, Don't know, Service dissatisfaction, Lack of affordable download/upload, speed, Product dissatisfaction, Long distance charges, Poor expertise of online support, Attitude of support person, Network reliability, Competitor offered higher download, speeds, Moved, Price too high, Attitude of service provider, Poor expertise of phone support, Deceased, Lack of self-service on Website.

Create database by SQL Server:

Database Diagram:



Customer table:

```
CREATE TABLE  Customer(
Customer_ID int PRIMARY KEY,
Location_ID int FOREIGN KEY REFERENES Location(Location_ID),
Status_ID int FOREIGN KEY REFERENES Status(Status_ID),
Churn_reason_ID int FOREIGN KEY references Churn_Reason(Churn_Reason_ID),
Contract_ID int FOREIGN KEY references Contract(Contract_ID),
Number_Of_Referrals int Default 0,
Referred_A_Friend bit Default 0 CHECK(Referred_A_Friend in (0,1)),
Gender varchar(10) Default 'Male' CHECK(Gender in ('Famale','Male')),
Age int CHECK(Age between 18 and 120),
Married bit Default 0 CHECK(Married in (0,1)),
Dependents bit Default 0 CHECK(Dependents in (0,1)),
Number_Of_Dependents int Default 0,
Quarter varchar(10),
Tenure_In_Months int,
Offer varchar(10) CHECK(Offer in ('A','B','C','D','E','None')),
Paperless_Billing bit Default 0 CHECK(Paperless_Billing in (0,1)) ,
Payment_Method varchar(50) Default 'Bank_Transfe' CHECK
(Payment_Method in ('Bank Withdrawal', 'Credit Card', 'Mailed Check')),
Monthly_Charge Decimal,
Total_Charges Decimal,
Total_Refunds Decimal,
Total_Revenue Decimal,
CLTV Decimal,
Churn_Score int CHECK(Churn_Score between 0 and 100),
Satisfaction_Score int CHECK(Satisfaction_Score between 1 and 5));
```

Population Table:

```
CREATE TABLE  Population (
Zipcode_ID int PRIMARY KEY ,
Population_Num int check (Population_Num>0 ));
```

Location table:

```
CREATE TABLE  Location (
Location_ID int IDENTITY  PRIMARY KEY ,
City Varchar(50) ,
Zipcode int FOREIGN KEY REFERENES Population(Zipcode_ID),
Latitude FLOAT,
Longitude FLOAT
);
```

Contract Table:

```
CREATE TABLE  Contract (
   Contract_ID INT PRIMARY KEY,
   Contract_Type VARCHAR(50) CHECK  (Contract_Type IN ('Month-to-Month', 'One Year', 'Two Year')) );
```

Status Table:

```
CREATE TABLE  Status (
   Status_ID INT PRIMARY KEY,
   Customer_Status VARCHAR(50) CHECK (Customer_Status IN ('Churned', 'Stayed', 'Joined')) );
```

Churn Category Table :

```
CREATE TABLE  Churn_Category(
Churn_Category_ID INT PRIMARY KEY ,
Churn_Category VARCHAR(50) CHECK (Churn_Category IN
('Competitor','Dissatisfaction','Price', 'Attitude', 'Other')));
```

Churn Reason:

```
CREATE TABLE  Churn_Reason(
   Churn_Reason_ID INT PRIMARY KEY,
   Churn_Category_ID INT,
   Churn_Reason VARCHAR(150) CHECK (
      Churn_Reason IN (
         'Competitor offered more data', 'Competitor made better offer',
         'Limited range of services', 'Extra data charges', 'Competitor had better devices',
         'Dont know', 'Service dissatisfaction', 'Lack of affordable download/upload speed',
         'Product dissatisfaction', 'Long distance charges', 'Poor expertise of online support',
         'Attitude of support person', 'Network reliability', 'Competitor offered higher download speeds',
         'Moved', 'Price too high', 'Attitude of service provider', 'Poor expertise of phone support',
         'Deceased', 'Lack of self-service on Website')));
```

Internet Service:

```
CREATE TABLE  Internet_Service (
   Internet_Service_ID INT PRIMARY KEY,
   Internet_Type VARCHAR(50) CHECK
            (Internet_Type IN ('Cable', 'DSL', 'Fiber optic')) ;
```

Phone Service:

```
CREATE TABLE  Phone_Service (
Phone_Service_ID int PRIMARY KEY ,
Customer_Id int FOREIGN KEY REFERENES Customer(Customer_ID)  ,
Multiple_Lines bit Default 0 check (Multiple_Lines in(0,1)) ,
Avg_Monthly_Long_Distance_Charges decimal(10,3) CHECK
(Avg_Monthly_Long_Distance_Charges >= 0),
Total_Long_Distance_Charges decimal(10,3) CHECK
(Total_Long_Distance_Charges >= 0) );
```

Customer Internet:

```
CREATE TABLE  Customer_Internet (
            Customer_ID int FOREIGN KEY REFERENES Customer(Customer_ID),
            Internet_Service_ID int FOREIGN KEY REFERENES Internet_Service(Internet_Service_ID),
            PRIMARY KEY (Customer_ID, Internet_Service_ID),
   Online_Security bit Default 0 CHECK(Online_Security in (0,1)),
   Online_Backup bit Default 0 CHECK(Online_Backup in (0,1)),
            Device_Pro_Plan bit Default 0 CHECK(Device_Pro_Plan in (0,1)),
            Premium_TSupport bit Default 0 CHECK(Premium_TSupport in (0,1)),
            Streaming_TV bit Default 0 CHECK(Streaming_TV in (0,1)),
            Streaming_Movies bit Default 0 CHECK(Streaming_Movies in (0,1)),
            Streaming_Music bit Default 0 CHECK(Streaming_Music in (0,1)),
            Unlimited_Data bit Default 0 CHECK(Unlimited_Data in (0,1)),
            Avg_Monthly_GB int Default 0,
   Total_Extra_Data_Charges int Default 0,
);
```

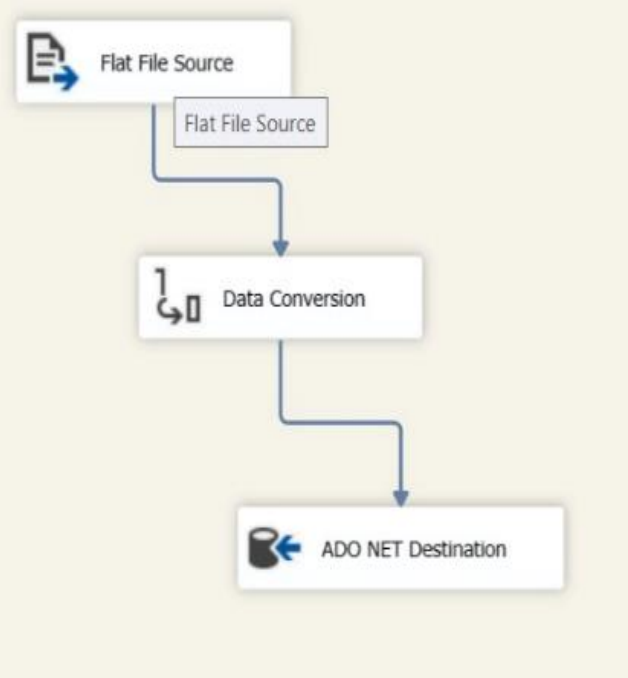
Call Table:

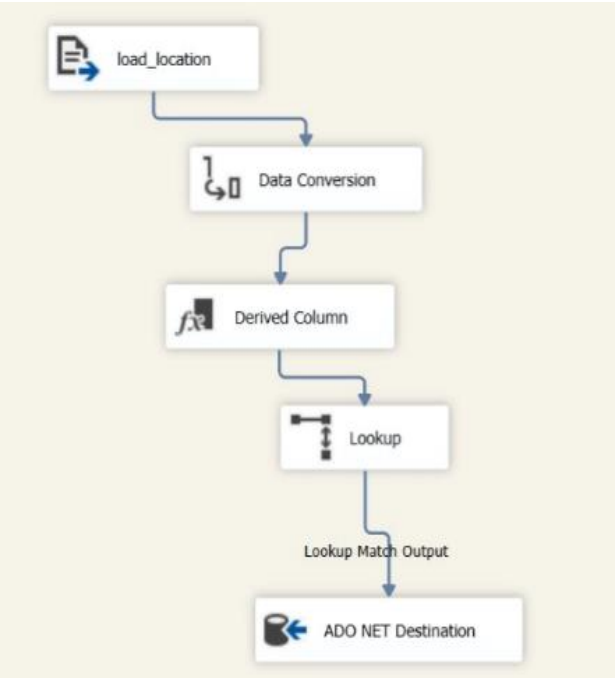
```
CREATE TABLE  Call(
Call_ID int PRIMARY KEY ,
Customer_Id INT FOREIGN KEY REFERENES Customer (Customer_ID),
Agent VARCHAR(50),
Date_Of_Call DATE ,
Time_Of_Call TIME,
Resolved bit Default 0 CHECK(Resolved in (0,1)),
Answered bit Default 0 CHECK(Answered in (0,1)),
Topic varchar(50)  CHECK(Topic in
('Contract related','Technical Support', 'Payment related', 'Admin Support', 'Streaming')),
Speed_Of_Answer_In_Seconds int CHECK (Speed_Of_Answer_In_Seconds >= 0),
Duration Time ,
Satisfaction_Rating int CHECK (Satisfaction_Rating BETWEEN 1 AND 5) )
```

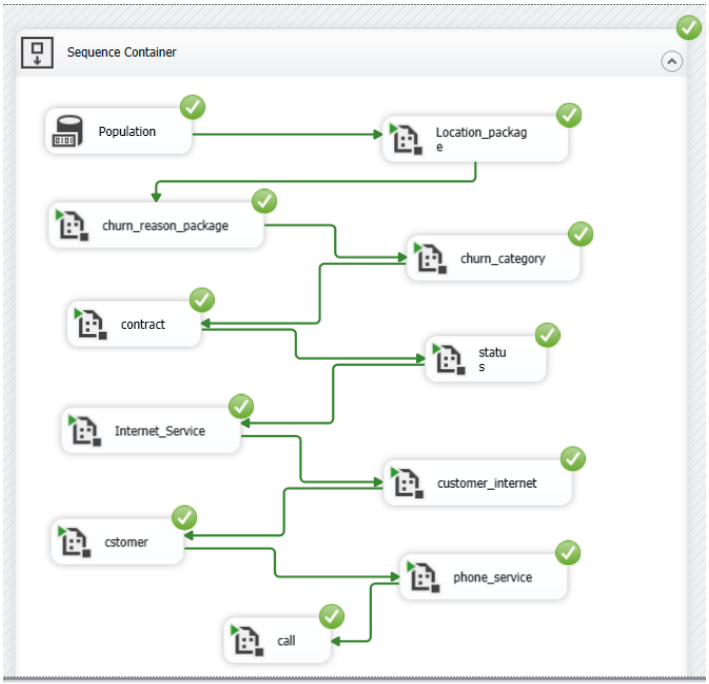
ETL:

Steps of SQL Server Integration Services:

1. Prepare Database Connection Manager.
2. Make Data Flow Work Container.
3. Prepare Connections from Flat files to every Columns and Table in Database
4. Gathering every Data Flow unit in on Sequence Container working in parallel to avoid any data error or not Completing integration







Procedure:

Agent calls Summary

```
Create PROC Agent_calls_Summary as
SELECT
    Agent AS "Agent Name",
    SUM(CASE WHEN answered = 1 THEN 1 ELSE 0 END) AS "Number of answered
calls",
    SUM(CASE WHEN answered = 0 THEN 1 ELSE 0 END) AS "Number of Dropped
calls",
        Count(answered) AS "Total of calls",
        SUM(CASE WHEN Resolved = 1 THEN 1 ELSE 0 END) AS "Total Resolved"
FROM Call
GROUP BY Agent;
```

Calls Summary By Agent

```
CREATE PROC calls_Summary_By_Agent @Agent_Name varchar(50) as
SELECT
    Agent AS "Agent Name",
    SUM(CASE WHEN answered = 1 THEN 1 ELSE 0 END) AS "Number of answered
calls",
    SUM(CASE WHEN answered = 0 THEN 1 ELSE 0 END) AS "Number of Dropped
calls",
        Count(answered) AS "Total of calls",
        SUM(CASE WHEN Resolved = 1 THEN 1 ELSE 0 END) AS "Total Resolved"
FROM Call
WHERE Agent = @Agent_Name
GROUP BY Agent;
```

Calls Summary By Topic:

```
CREATE PROC calls_Summary_By_Topic   @Topic_Name varchar(100) as
SELECT
    Agent AS "Agent Name",
    SUM(CASE WHEN answered = 1 THEN 1 ELSE 0 END) AS "Number of answered
calls",
    SUM(CASE WHEN answered = 0 THEN 1 ELSE 0 END) AS "Number of Dropped
calls",
        Count(answered) AS "Total of calls",
        SUM(CASE WHEN Resolved = 1 THEN 1 ELSE 0 END) AS "Total Resolved",Topic
FROM Call
WHERE Topic in(@Topic_Name)
GROUP BY Agent,Topic
order by Agent;
```

why exactly did customers churn?

```
Create PROC Top_Churn_Reason_Percentage as
SELECT TOP 5
    Churn_Reason,Churn_Category,
    ROUND(COUNT(Customer_ID) *100 / SUM(COUNT(Customer_ID)) OVER(), 1) AS
churn_percentage
FROM
    Customer as c, Status as stat, Churn_Category as cat, Churn_Reason as r

WHERE
    Customer_Status = 'Churned' and c.Status_ID = stat.Status_ID and
        cat.Churn_Category_ID = r.Churn_Category_ID and c.Churn_reason_ID =
r.Churn_reason_ID
GROUP BY
Churn_Reason,
Churn_Category
ORDER BY churn_percentage DESC;
```

What offers did churned customers have?

```
CREATE PROC Churned_Customer_Distribution_By_Offer as
SELECT
    Offer,
    ROUND(COUNT(cust.Customer_ID) * 100.0 / SUM(COUNT(cust.Customer_ID))
OVER(), 1) AS churned
FROM
    Customer as Cust
        join Status as Stat on cust.Status_ID = stat.Status_ID
WHERE
    Customer_Status = 'Churned'
GROUP BY
Offer
ORDER BY
churned DESC;
```

Did churners have premium tech support?

```
CREATE PROCEDURE Churners_Premium_TSupport
AS
BEGIN

SELECT
    ci.Premium_TSupport,
    COUNT(c.Customer_ID) AS Churned,
    ROUND(COUNT(c.Customer_ID) *100.0 / SUM(COUNT(c.Customer_ID)) OVER(),1) AS
Churn_Percentage
FROM
    Customer_Internet ci, Customer c, Status s
WHERE
     c.Customer_ID = ci.Customer_ID and c.Status_ID = s.Status_ID and
s.Customer_Status = 'Churned'
GROUP BY ci.Premium_TSupport
ORDER BY Churned DESC;

END
```

Which cities have the highest churn rates?

```
CREATE PROCEDURE Cities_Churn_Rates
AS
BEGIN
SELECT
    l.City,
    COUNT(c.Customer_ID) AS Churned,
    CEILING(COUNT(CASE WHEN s.Customer_Status = 'Churned' THEN c.Customer_ID
ELSE NULL END) * 100.0 / COUNT(c.Customer_ID)) AS Churn_Rate
FROM
    location l , Customer c, Status s
WHERE c.Location_ID = l.Location_ID and c.Status_ID = s.Status_ID
GROUP BY
    l.City
HAVING
    COUNT(c.Customer_ID)  > 30
AND
    COUNT(CASE WHEN s.Customer_Status = 'Churned' THEN c.Customer_ID ELSE NULL
END) > 0
ORDER BY
    Churn_Rate DESC;
END
```

Which cities have the highest churn rates?

```
CREATE PROCEDURE Cities_Highest_Churn_Rates
AS
BEGIN
SELECT
    TOP 4 l.City,
    COUNT(c.Customer_ID) AS Churned,
    CEILING(COUNT(CASE WHEN s.Customer_Status = 'Churned' THEN c.Customer_ID
ELSE NULL END) * 100.0 / COUNT(c.Customer_ID)) AS Churn_Rate
FROM
    location l , Customer c, Status s
WHERE c.Location_ID = l.Location_ID and c.Status_ID = s.Status_ID
GROUP BY
    l.City
HAVING
    COUNT(c.Customer_ID)  > 30
AND
    COUNT(CASE WHEN s.Customer_Status = 'Churned' THEN c.Customer_ID ELSE NULL
END) > 0
ORDER BY
    Churn_Rate DESC;
END
```

Insert statements for procedure here

```
CREATE PROCEDURE InsertCustomer
       @Customer_ID int,
       @Location_ID int,
       @Status_ID int,
       @Churn_reason_ID int,
           @Contract_ID int,
           @Number_Of_Referrals int,
           @Referred_A_Friend bit,
           @Gender varchar(10),
           @Age int,
           @Married bit,
           @Dependents bit,
           @Number_Of_Dependents int,
           @Quarter varchar(10),
           @Tenure_In_Months int,
           @Offer varchar(10),
           @Paperless_Billing bit,
           @Payment_Method varchar(50),
           @Monthly_Charge Float,
           @Total_Charges Float,
           @Total_Refunds Float,
           @Total_Revenue Float,
           @CLTV Float,
           @Churn_Score int,
           @Satisfaction_Score int
AS
BEGIN

       INSERT INTO Customer
              (Customer_ID, Location_ID, Status_ID, Churn_reason_ID,
Contract_ID, Number_Of_Referrals,
                        Referred_A_Friend, Gender, Age, Married, Dependents,
Number_Of_Dependents, Quarter,
                        Tenure_In_Months, Offer, Paperless_Billing,
Payment_Method, Monthly_Charge, Total_Charges,
                        Total_Refunds, Total_Revenue, CLTV, Churn_Score,
Satisfaction_Score)
       VALUES
              (@Customer_ID, @Location_ID, @Status_ID, @Churn_reason_ID,
@Contract_ID, @Number_Of_Referrals,
                        @Referred_A_Friend, @Gender, @Age, @Married,
@Dependents, @Number_Of_Dependents, @Quarter,
                        @Tenure_In_Months, @Offer, @Paperless_Billing,
@Payment_Method, @Monthly_Charge, @Total_Charges,
                        @Total_Refunds, @Total_Revenue, @CLTV, @Churn_Score,
@Satisfaction_Score)
END
```

Update status:

```
Create Procedure Update_Status @Status varchar(50), @Customer_ID int as
begin
if ( @Status ='Churned')
begin
update Customer Set Status_ID = 3 where Customer_ID = @Customer_ID
end
else if ( @Status ='Stayed')
begin
update Customer Set Status_ID = 2 where Customer_ID = @Customer_ID
end
else if ( @Status ='Joined')
begin
update Customer Set Status_ID = 1 where Customer_ID = @Customer_ID
end
end
drop procedure dbo.Update_Status


Execute dbo.Update_Status 'Joined', 1
```

How much revenue was lost to churned customers?,

```
CREATE PROCEDURE Revenue_of_ChurnedCustomer
as
begin
SELECT Customer_Status,
COUNT(Customer_ID) AS customer_count,
ROUND((SUM(Total_Revenue) * 100.0) / SUM(SUM(Total_Revenue)) OVER(), 1) AS
Revenue_Percentage
FROM Customer, Status where Customer.Status_ID = Status.Status_ID
GROUP BY Customer_Status;
End
```

What internet type did customer status have?

```
create procedure InternetType_for_Status @Customer_Status varchar(50) as
begin
SELECT
    Internet_Type,
    COUNT(Customer.Customer_ID) AS Count_Customer,
    ROUND(COUNT(Customer.Customer_ID) * 100.0 /
SUM(COUNT(Customer.Customer_ID)) OVER(), 1) AS Status_Precentage
FROM
    Internet_Service, Customer, Status, Customer_Internet
WHERE
  Customer.Customer_ID = Customer_Internet.Customer_ID and
  Customer_Internet.Internet_Service_ID = Internet_Service.Internet_Service_ID
and
  Customer.Status_ID = Status.Status_ID and
  Status.Customer_Status = @Customer_Status
GROUP BY
Internet_Type
ORDER BY
Count_Customer DESC;
end
```

What Internet Type did churners have?

```
create procedure InternetType_ChurnCategory @Churn_Category varchar(50) as
begin
SELECT
    Internet_Type,
    Churn_Category,
    ROUND(COUNT(Customer.Customer_ID) * 100.0 /
SUM(COUNT(Customer.Customer_ID)) OVER(), 1) AS Churned_Percentage
FROM
    Internet_Service,Customer_Internet, Churn_Category, Churn_Reason
,Customer, Status
WHERE
         Customer.Customer_ID = Customer_Internet.Customer_ID and
     Customer_Internet.Internet_Service_ID =
Internet_Service.Internet_Service_ID and
         Customer.Status_ID = Status.Status_ID and
         Customer.Churn_reason_ID = Churn_Reason.Churn_Reason_ID and
         Churn_Reason.Churn_Category_ID = Churn_Category.Churn_Category_ID and
     Status.Customer_Status = 'Churned' and
     Churn_Category.Churn_Category = @Churn_Category
GROUP BY
Internet_Type,
Churn_Category
ORDER BY Churned_Percentage DESC
end;
```

Churn Reason:

```
create proc churnreason @category varchar(50)
as
begin
SELECT
  cr.Churn_Reason,  ca.Churn_Category ,
  ROUND(SUM(cu.Total_Revenue),0)AS Churned_Revenue ,
   CEILING((COUNT(Customer_ID) * 100.0) / SUM(COUNT(Customer_ID)) OVER()) AS
Churn_Percentage
FROM
  Customer cu , Churn_Category ca  , Status s , Churn_Reason cr
 WHERE
 cu.Churn_reason_ID = cr.Churn_Reason_ID and  s.Status_ID =cu.Status_ID
   and ca.Churn_Category_ID=cr.Churn_Category_ID and s.Customer_Status =
'Churned'
  and ca.Churn_Category =@category
GROUP BY
  cr.Churn_Reason ,ca.Churn_Category
  end
```

Update the old offer from the customer's table.

```
CREATE PROCEDURE sp_DeleteAndUpdateOfferForCustomer
(
    @old_offer_name varchar(10) ,
        @new_offer_name varchar(10)
)
AS
BEGIN

    DELETE FROM Customer
    WHERE Offer =  @old_offer_name

    UPDATE Customer
    SET Offer =  @new_offer_name
END
GO
```

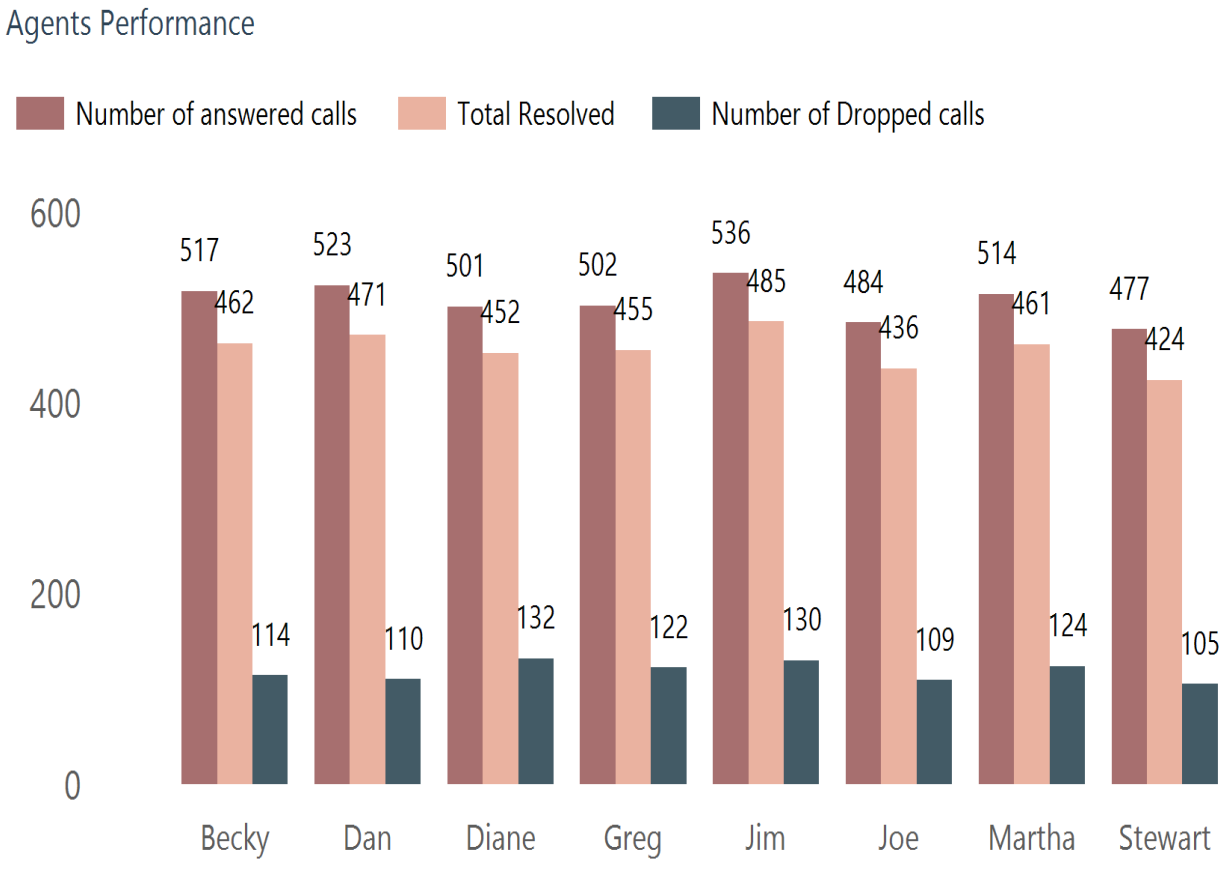
What Customer status by age ?

```
create proc customer_det @age1 int , @age2 int
as
begin
SELECT
    age ,Gender , Customer_Status ,
    COUNT(Customer_ID) AS No_customer
FROM
Customer cu  , Status s
WHERE

 s.Status_ID=cu.Status_ID
 --and Age between @age1 and @age2

GROUP BY
   age ,Gender , Customer_Status
ORDER BY
    age ;
end

create proc sp_contract
 as
 begin
 SELECT
Contract.Contract_Type,
Customer.Payment_Method,
Round (SUM(Customer.Total_Charges),2) AS Total_charge ,
Round (Avg(Customer.Total_Revenue),2) AS Avg_Revenue
FROM
Contract INNER JOIN  Customer
ON Contract.Contract_ID = Customer.Contract_ID
GROUP BY Contract.Contract_Type,  Customer.Payment_Method
ORDER BY  Contract.Contract_Type
End
```

SSRS

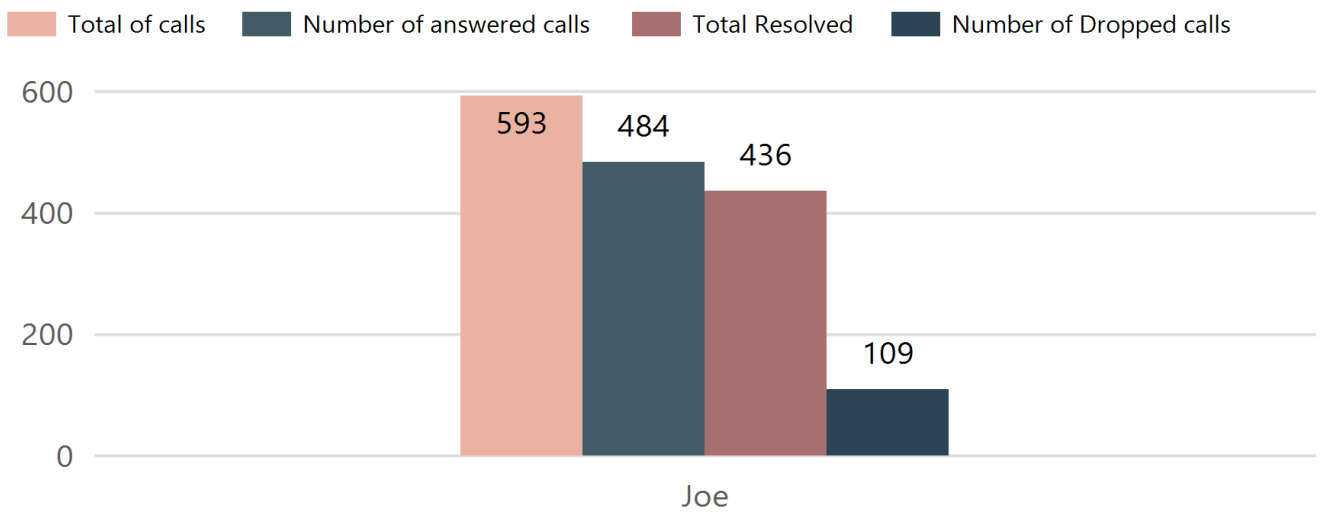
Agent Calls Summary

Agent Name	Total of calls	Number of answered calls	Number of Dropped calls	Total Resolved
Becky	631	517	114	462
Dan	633	523	110	471
Diane	633	501	132	452
Greg	624	502	122	455
Jim	666	536	130	485
Joe	593	484	109	436
Martha	638	514	124	461
Stewart	582	477	105	424



Calls Summary By Agent: Joe

Total of calls	Number of answered calls	Total Resolved	Number of Dropped calls
593	484	436	109

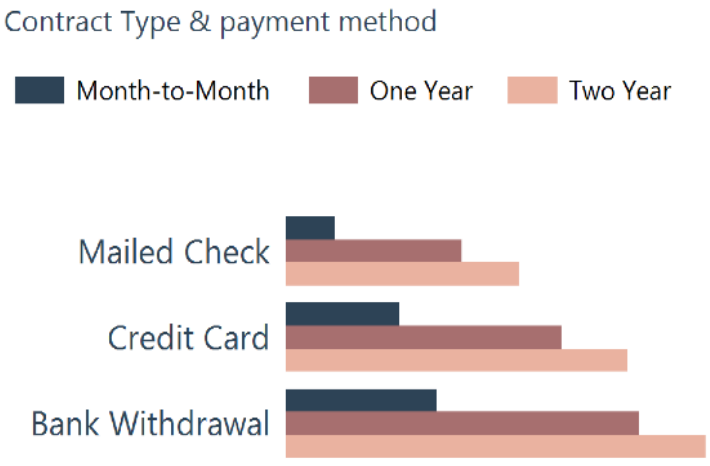


Calls Summary By Topic: Admin Support

Total of calls	Number of answered calls	Number of Dropped calls	Total Resolved
121	100	21	90
108	87	21	80
134	108	26	103
130	105	25	94
142	116	26	106
120	93	27	87
114	92	22	83
107	94	13	80
976	**795**	**181**	**723**

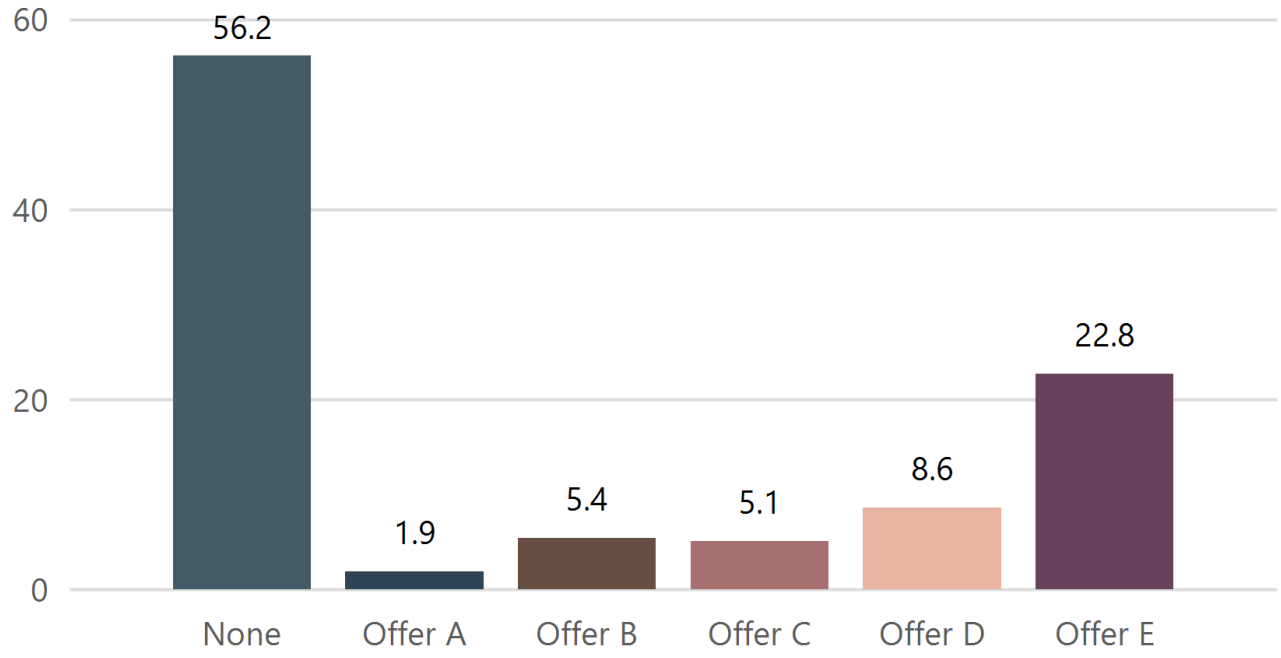
Contract with payment method

Contract Type	Payment Method	Total charge	Avg Revenue
Month-to-Month	Bank Withdrawal	3362265.45	1945.34
Month-to-Month	Credit Card	1227565.65	1455.36
Month-to-Month	Mailed Check	108210.6	639.69
One Year	Bank Withdrawal	2755055.85	4536
One Year	Credit Card	1742795.94	3533.51
One Year	Mailed Check	134140.2	2263.61
Two Year	Bank Withdrawal	3577016.35	5386.92
Two Year	Credit Card	3010379.75	4387.37
Two Year	Mailed Check	143305.45	2993.48



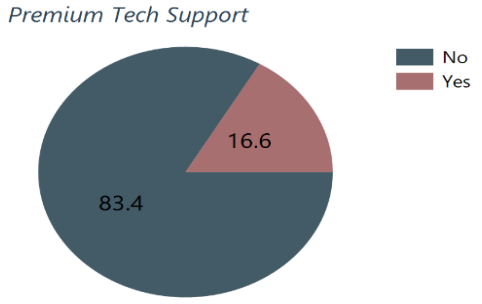
Churned Customer Distribution By Offer

Offer	Churned
None	56.20
Offer E	22.80
Offer D	8.60
Offer B	5.40
Offer C	5.10
Offer A	1.90

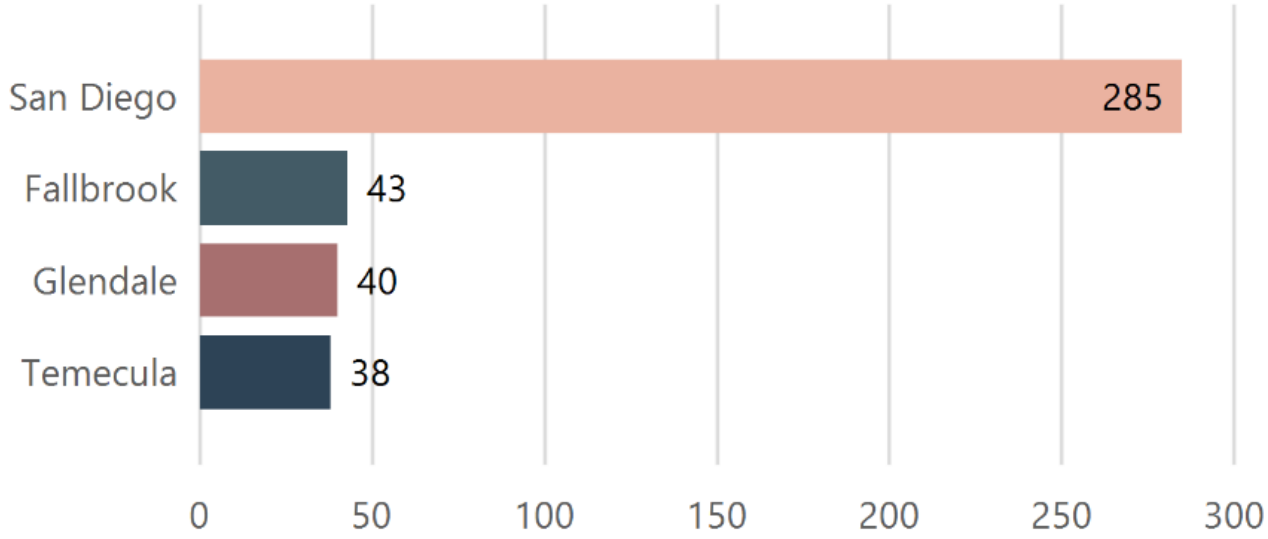


Did churners have premium tech support?

Premium Tech Support	*Churned*	*Churn Percentage*
No	1559	83.40
Yes	310	16.60



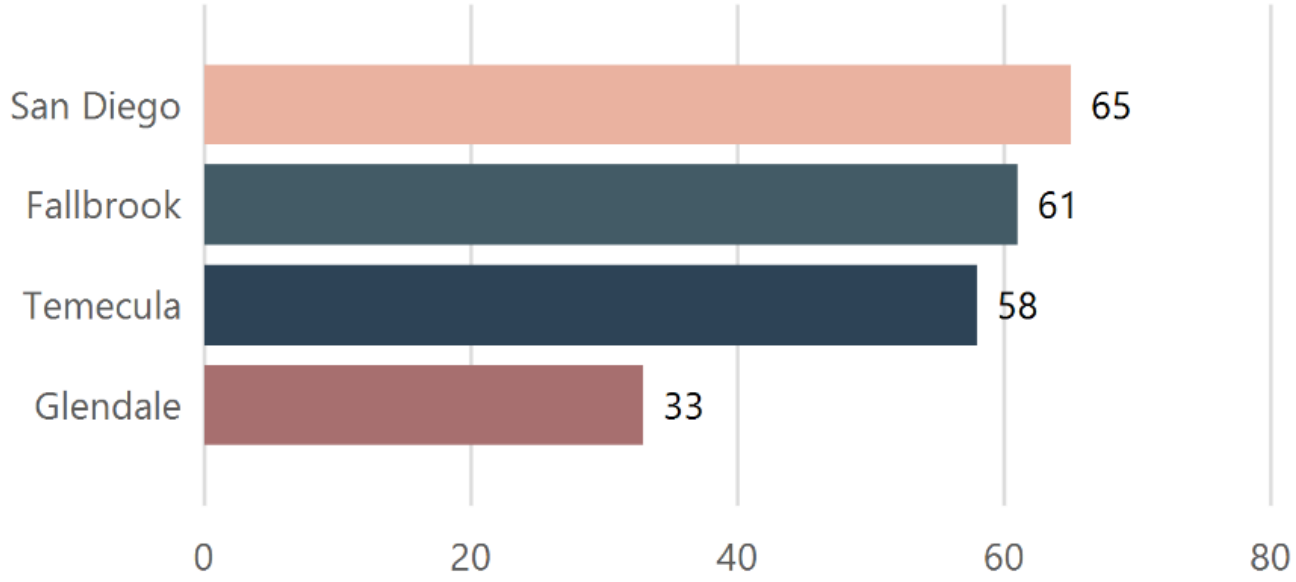
Cities have the highest churners



Which cities had the highest churn rates?

City	*Churned*	*Churn Rate*
San Diego	285	65
Fallbrook	43	61
Temecula	38	58
Glendale	40	33
Escondido	51	32
San Francisco	104	30
Berkeley	32	29
Stockton	44	28
Los Angeles	293	27
San Jose	112	26
Riverside	32	25
Oakland	52	25
Long Beach	60	25
Sacramento	108	25
Fresno	61	22
Bakersfield	39	6

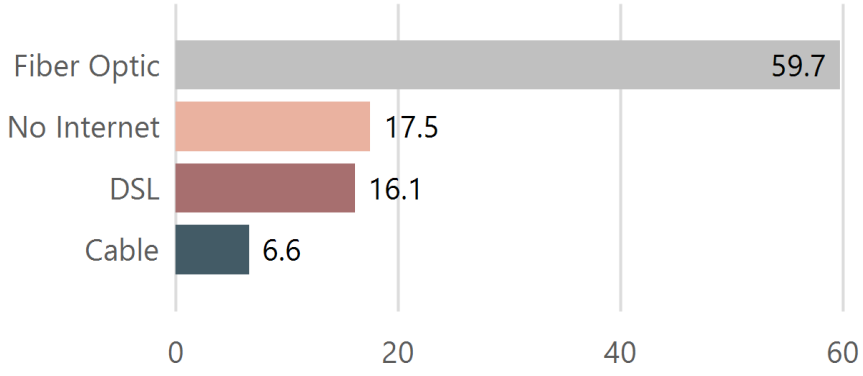
Cities have the highest churn rates



Internet Type Price category Churners have

Internet Type	Churn Category	Churned Percentage
Fiber Optic	Price	59.7
No Internet	Price	17.5
DSL	Price	16.1
Cable	Price	6.6

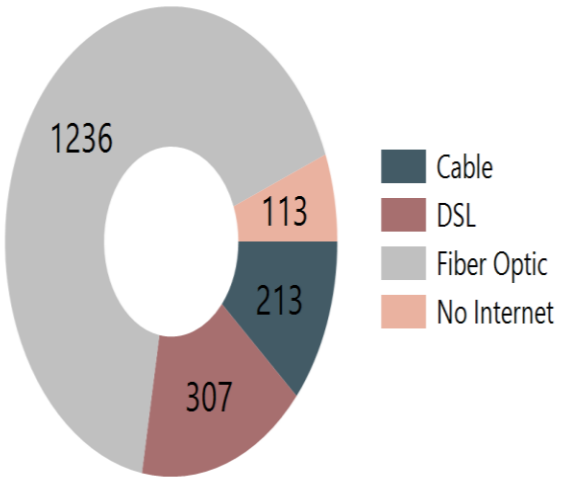
Churned Precentage of Price category by Internet Type



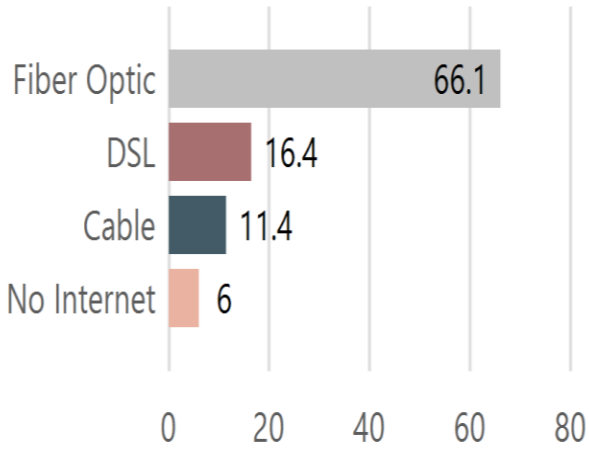
What Internet Type Did Churned Customer Have?

Internet Type	Count Customer	Status Precentage
Fiber Optic	1236	66.1
DSL	307	16.4
Cable	213	11.4
No Internet	113	6.0

No of Customer by Churned Status for Internet Type

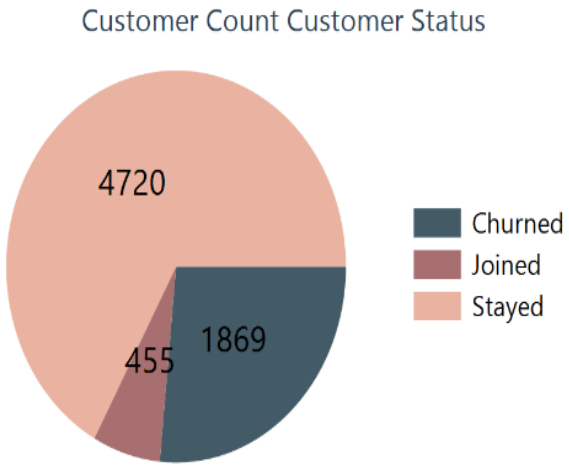


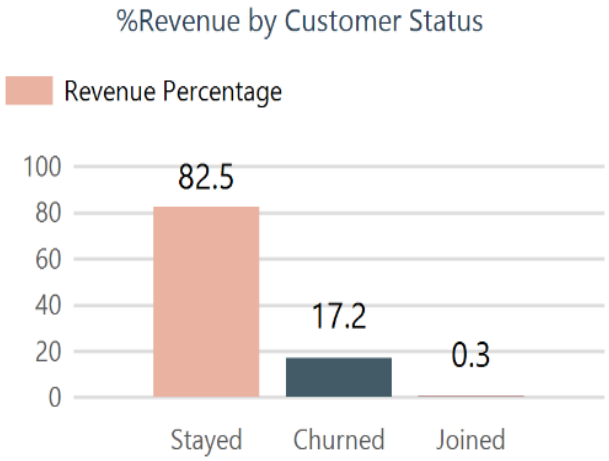
Status Precentage for Churned Status for Internet Type



Revenue Lost Due to Churned Customers

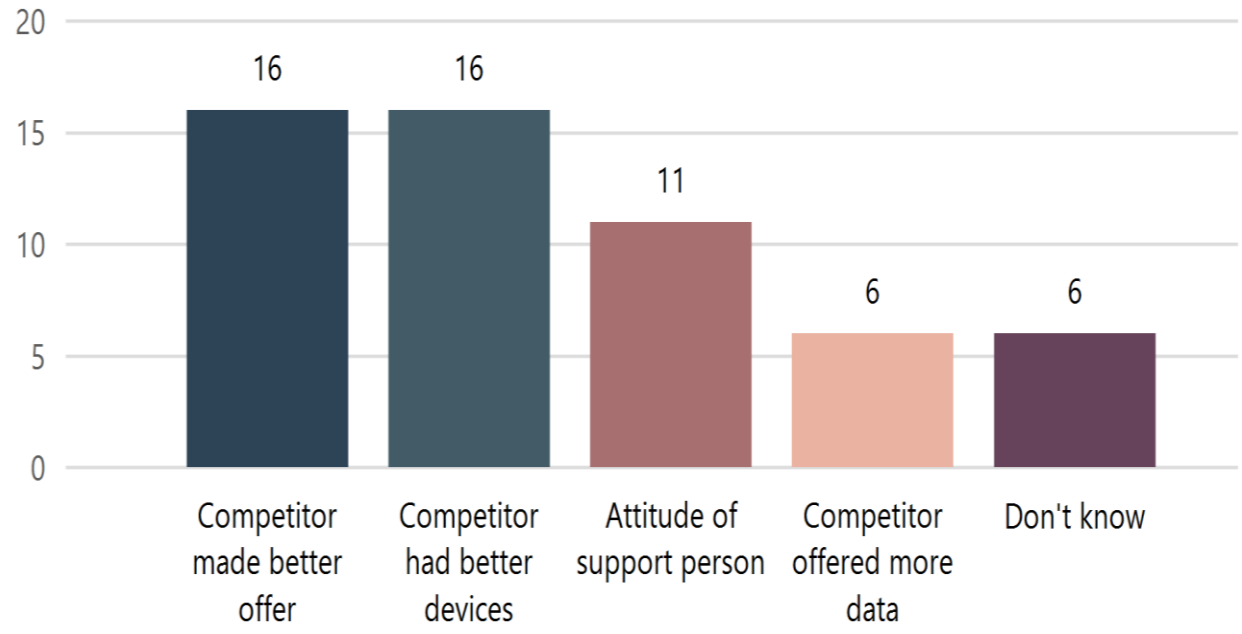
Customer Status	Customer Count	Revenue Percentage
Churned	1869	17.20
Joined	455	0.30
Stayed	4720	82.50





Top Churn Reason Percentage

Churn Reason	Churn Category	Churn Percentage
Competitor made better offer	Competitor	16
Competitor had better devices	Competitor	16
Attitude of support person	Attitude	11
Competitor offered more data	Competitor	6
Don't know	Other	6

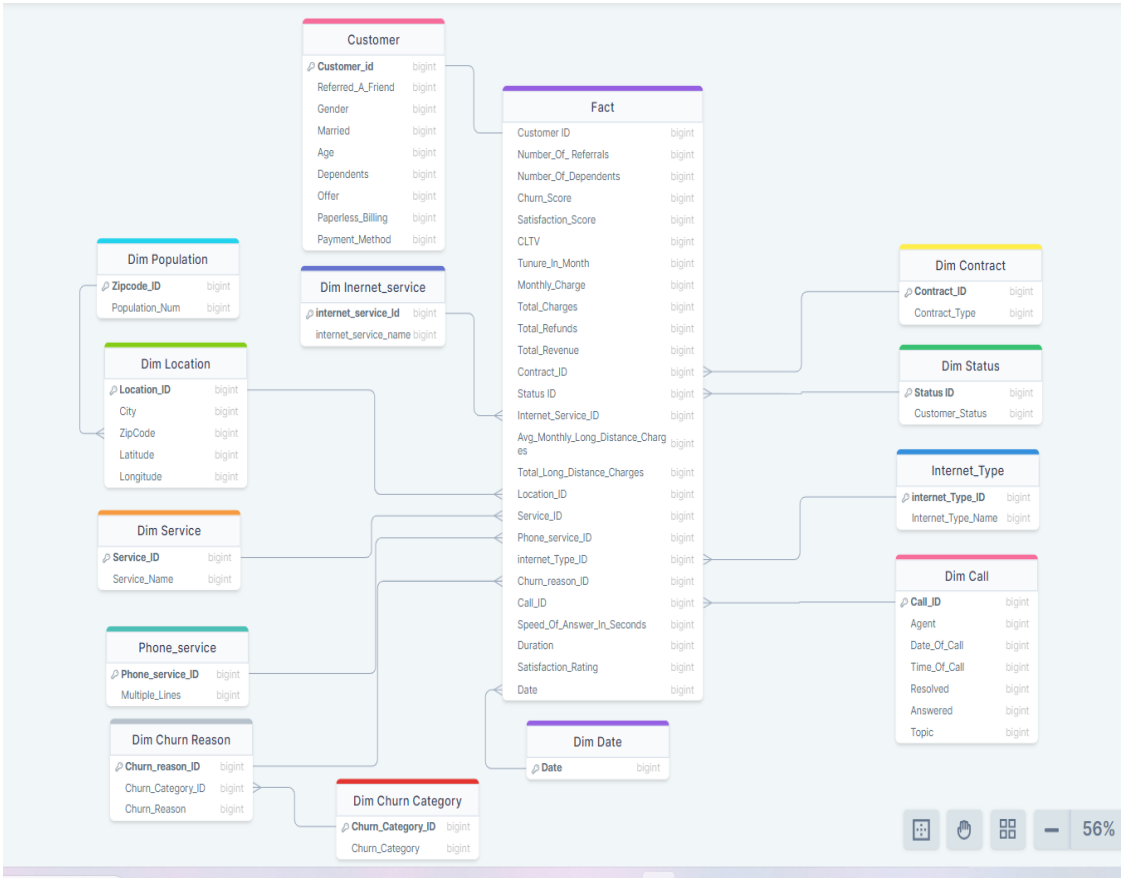


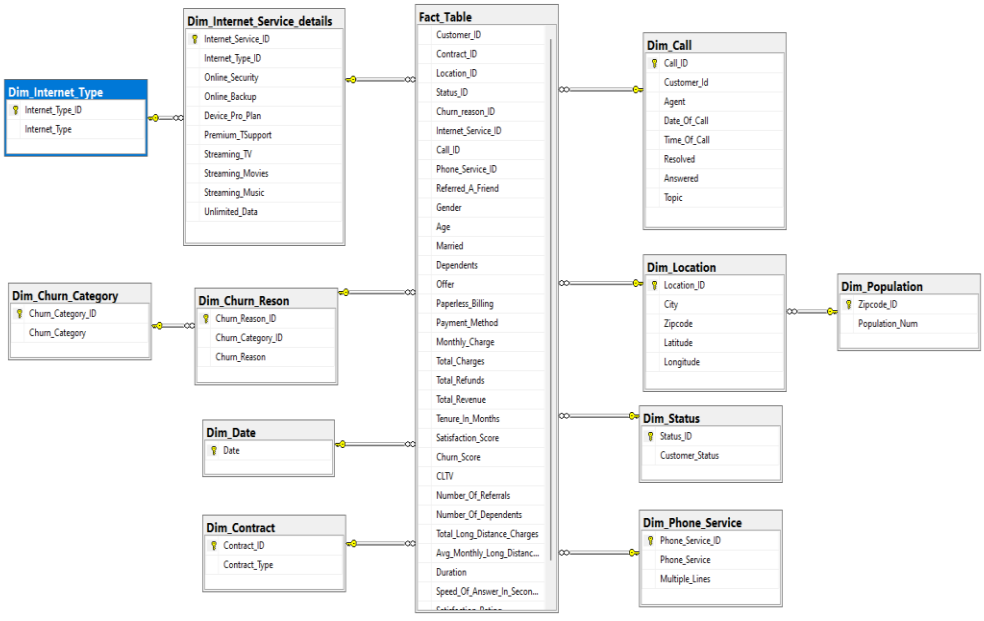
Customer Status with age between 30 & 35

Customer Status	No customer	age	Gender
Churned	12	19	Female
Joined	6	19	Female
Stayed	47	19	Female
Churned	6	19	Male
Joined	9	19	Male
Stayed	47	19	Male
Churned	18	20	Female
Joined	3	20	Female
Stayed	47	20	Female
Churned	12	20	Male
Joined	6	20	Male
Stayed	41	20	Male
Churned	20	21	Female
Joined	7	21	Female
Stayed	48	21	Female
Churned	16	21	Male
Joined	5	21	Male
Stayed	44	21	Male
Churned	14	22	Female
Joined	3	22	Female
Stayed	42	22	Female
Churned	13	22	Male
Joined	9	22	Male
Stayed	49	22	Male
Churned	16	23	Female
Joined	4	23	Female
Stayed	60	23	Female
Churned	13	23	Male
Joined	4	23	Male
Stayed	49	23	Male

DWH:

DWH Diagram





Customer_Services_Internet_Service_details

```
CREATE TABLE  new_Customer_Services_Internet_Service_details (
Service_ID INT PRIMARY KEY,
Internet_Service_ID int,
Online_Security      bit ,
Online_Backup bit,
Device_Pro_Plan bit,
Premium_TSupport bit,
Streaming_TV bit,
Streaming_Movies bit,
Streaming_Music bit,
Unlimited_Data bit
)

BULK INSERT new_Customer_Services_Internet_Service_details
FROM "C:\Users\HP\Desktop\grad\6- DWH\new DWH\new_Customer_Services_Internet_Service_details.csv"
WITH
(
      FORMAT='CSV',
      FIRSTROW=2
)
GO
```

Dim_Phone_Service_ID

```
CREATE TABLE  Dim_Phone_Service_ID (
Phone_Service_ID INT PRIMARY KEY,
Phone_Service bit,
Multiple_Lines bit
)

BULK INSERT Dim_Phone_Service_ID
FROM "C:\Users\HP\Desktop\grad\6- DWH\new DWH\Dim_Phone_Service _ID.csv"
WITH
(
      FORMAT='CSV',
      FIRSTROW=2
)
GO
```

Dim_Phone_Service

```
CREATE TABLE  Dim_Phone_Service (
Customer_ID          INT PRIMARY KEY,
Phone_Service_ID int FOREIGN KEY(Phone_Service_ID) REFERENCES Dim_Phone_Service_ID(Phone_Service_ID)
)
BULK INSERT Dim_Phone_Service
FROM "C:\Users\HP\Desktop\grad\6- DWH\new DWH\Dim_Phone_Service .csv"
WITH( FORMAT='CSV'
, FIRSTROW=2 ) GO
```

Create Fact Table

```
SELECT
Customer.Customer_ID,
Customer.Contract_ID,
Customer.Location_ID,
Customer.Status_ID,
Customer.Churn_reason_ID,
GP.dbo.new_Customer_Services_Internet_Service.Service_ID 'Internet_Service_ID',
Call.Call_ID,
GP.dbo.Dim_Phone_Service.Phone_Service_ID,
Customer.Referred_A_Friend,
Customer.Gender,
Customer.Age,
Customer.Married,
Customer.Dependents,
Customer.Offer,
Customer.Paperless_Billing,
Customer.Payment_Method,
Customer.Monthly_Charge,
Customer.Total_Charges,
Customer.Total_Refunds,
Customer.Total_Revenue,
Customer.Tenure_In_Months,
Customer.Satisfaction_Score,
Customer.Churn_Score,
Customer.CLTV,
Customer.Number_Of_Referrals,
Customer.Number_Of_Dependents,
Phone_Service.Total_Long_Distance_Charges,
Phone_Service.Avg_Monthly_Long_Distance_Charges,
Call.Duration,
Call.Speed_Of_Answer_In_Seconds,
Call.Satisfaction_Rating,
Call.Date_Of_Call

INTO [DWH - Test2].[dbo].[Fact_Table]
FROM GP.dbo.Customer

full join  [GP].[dbo].[Customer_Internet]
            on Customer.Customer_ID = [Customer_Internet].[Customer_ID]
full join GP.dbo.Internet_Service
            on Customer_Internet.Internet_Service_ID =Internet_Service .Internet_Service_ID
full join [GP].[dbo].[Contract]
            on [GP].[dbo].[Contract].[Contract_ID] = Customer.Contract_ID
full join [GP].[dbo].[Status]
            on Customer.Status_ID = Status.Status_ID
 full join GP.dbo.call
            on GP.dbo.call.Customer_Id = Customer.Customer_ID
 full join GP.dbo.Churn_Reason
            on GP.dbo.Churn_Reason.Churn_Reason_ID = Customer.Churn_reason_ID
full join GP.dbo.Churn_Category
            on Churn_Category.Churn_Category_ID = Churn_Reason.Churn_Category_ID
full join GP.dbo.Location
            on GP.dbo.Location.Location_ID = Customer.Location_ID
```

```
full join [GP].[dbo].[Population]
        on GP.dbo.Location.Zipcode = [GP].[dbo].[Population].[Zipcode_ID]
full join [GP].[dbo].[phone_service]
        on Customer.Customer_ID = phone_service.Customer_Id
 join GP.dbo.new_Customer_Services_Internet_Service
        on GP.dbo.new_Customer_Services_Internet_Service.Customer_ID=Customer.Customer_ID
full join GP.dbo.new_Customer_Services_Internet_Service_details
        on
GP.dbo.new_Customer_Services_Internet_Service_details.Service_ID=GP.dbo.new_Customer_Services_Internet_Service.Service
_ID
join [GP].[dbo].[Dim_Phone_Service]
        on [GP].[dbo].[Dim_Phone_Service].Customer_ID = Customer.Customer_ID
```

Population

```
SELECT  *
INTO [DWH - Test2].[dbo].[Dim_Population]
FROM  GP.dbo.Population

ALTER TABLE Dim_Population ADD CONSTRAINT PK_Population_Constraint PRIMARY KEY (Zipcode_ID);
```

Location

```
SELECT  *
INTO  [DWH - Test2].[dbo].[Dim_Location]
FROM  GP.dbo.Location
ALTER TABLE Dim_Location ADD CONSTRAINT PK_Location_Constraint  PRIMARY KEY (Location_ID);

ALTER TABLE Dim_Location ADD CONSTRAINT FK_Location_Constraint  FOREIGN KEY(Zipcode) REFERENCES
 Dim_Population(Zipcode_ID);
```

Dim_Phone_Service

```
SELECT  *
INTO  [DWH - Test2].[dbo].[Dim_Phone_Service]
FROM  [GP].[dbo].[Dim_Phone_Service_ID]

ALTER TABLE Dim_Phone_Service ADD CONSTRAINT PK_Phone_Service_Constraint  PRIMARY KEY (Phone_Service_ID);
```

Dim Churn Category

```
CREATE TABLE  [DWH - Test2].[dbo].[Dim_Churn_Category](
Churn_Category_ID INT ,
Churn_Category VARCHAR(50)
 constraint PK_Churn_Category_Constraint PRIMARY KEY(Churn_Category_ID))

 insert into [DWH - Test2].[dbo].[Dim_Churn_Category]
 select * from [GP].[dbo].[Churn_Category]
```

Dim Churn Reason

```
CREATE TABLE  [DWH - Test2].[dbo].[Dim_Churn_Reson](
Churn_Reason_ID INT ,
Churn_Category_ID INT,
Churn_Reason VARCHAR(150)
            constraint PK_Churn_Reason_Constraint  PRIMARY KEY(Churn_Reason_ID),
            constraint FK_Churn_Category_Constraint  FOREIGN KEY(Churn_Category_ID)
            references Dim_Churn_Category (Churn_Category_ID) )

insert into [DWH - Test2].[dbo].[Dim_Churn_Reson]
select * from [GP].[dbo].Churn_Reason
```

Dim_Internet_Service_details

```
CREATE TABLE  Dim_Internet_Service_details (
Internet_Service_ID int,
Internet_Type_ID int,
Online_Security      bit ,
Online_Backup bit,
Device_Pro_Plan bit,
Premium_TSupport bit,
Streaming_TV bit,
Streaming_Movies bit,
Streaming_Music bit,
Unlimited_Data bit
constraint Pk_Dim_Internet_Service_details_Constraint  PRIMARY KEY(Internet_Service_ID)
)

insert into [DWH - Test2].[dbo].[Dim_Internet_Service_details]
select * from [GP].[dbo].[new_Customer_Services_Internet_Service_details]
```

Internet Type

```
SELECT  [Internet_Service_ID] as 'Internet_Type_ID'
    ,[Internet_Type]
INTO [DWH - Test2].[dbo].[Dim_Internet_Type]
FROM  [GP].[dbo].[Internet_Service]

ALTER TABLE Dim_Internet_Type ADD CONSTRAINT PK_Internet_Type_Constraint  PRIMARY KEY (Internet_Type_ID);

ALTER TABLE Dim_Internet_Service_details ADD CONSTRAINT FK_Internet_Type_ID  FOREIGN KEY(Internet_Type_ID)
REFERENCES Dim_Internet_Type(Internet_Type_ID);
```

Dim Date

```
CREATE TABLE  [DWH - Test2].[dbo].[Dim_Date](Date Date PRIMARY KEY)
BULK INSERT  [DWH - Test2].[dbo].[Dim_Date]
FROM "C:\Users\HP\Desktop\grad\6- DWH\Final DWH\Dim Date.csv"
WITH
(
      FORMAT='CSV',
      FIRSTROW=2
)
GO
```

Dim_Contract

```
SELECT  *
INTO [DWH - Test2].[dbo].[Dim_Contract]
FROM  [GP].[dbo].[Contract]

ALTER TABLE Dim_Contract ADD CONSTRAINT PK_Contract_Constraint  PRIMARY KEY (Contract_ID);
```

Dim_Status

```
SELECT  *
INTO [DWH - Test2].[dbo].[Dim_Status]
FROM  [GP].[dbo].[Status]

ALTER TABLE Dim_Status ADD CONSTRAINT PK_Status_Constraint  PRIMARY KEY (Status_ID);
```

Dim_Call

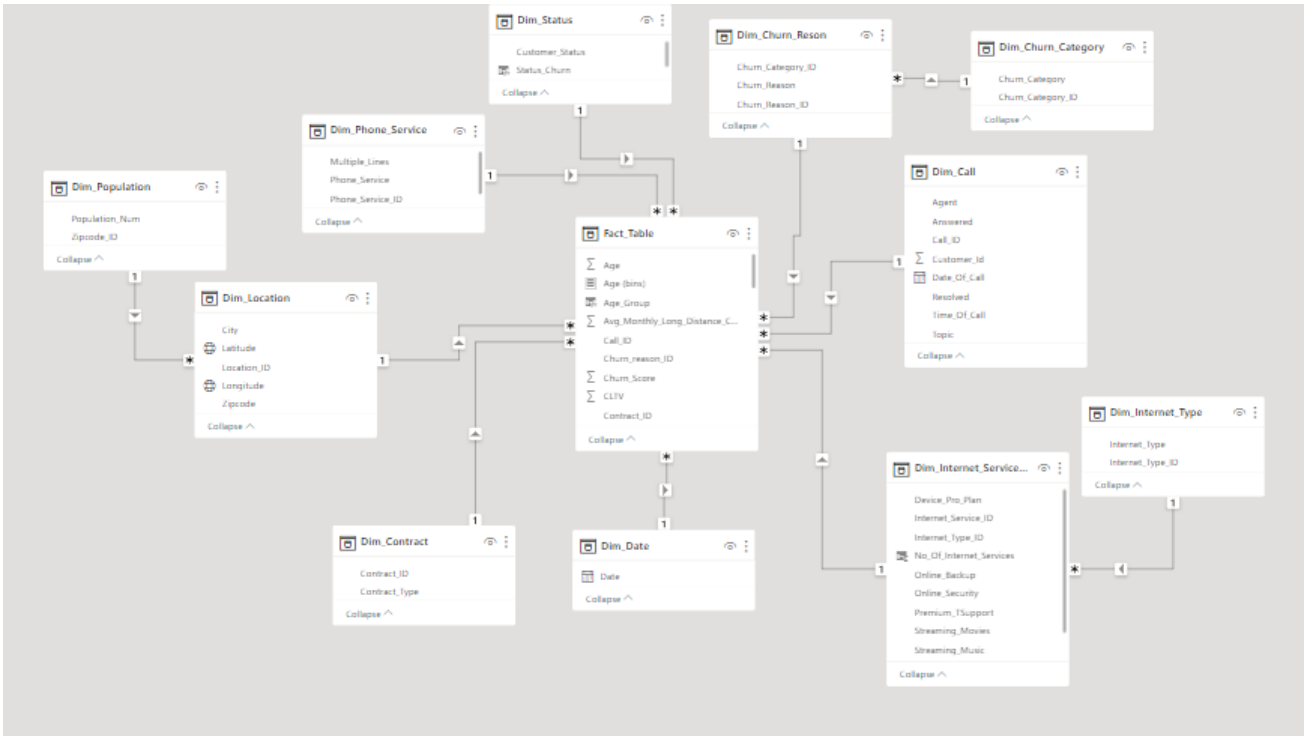
```
SELECT  call.Call_ID
              ,call.Customer_Id
    ,call.Agent
    ,call.Date_Of_Call
    ,call.Time_Of_Call
    ,call.Resolved
    ,call.Answered
    ,call.Topic
INTO [DWH - Test2].[dbo].[Dim_Call]
FROM  [GP].[dbo].[Call]

ALTER TABLE Dim_Call ADD CONSTRAINT PK_Call_Constraint  PRIMARY KEY (Call_ID);
```

Fact Table Constraints

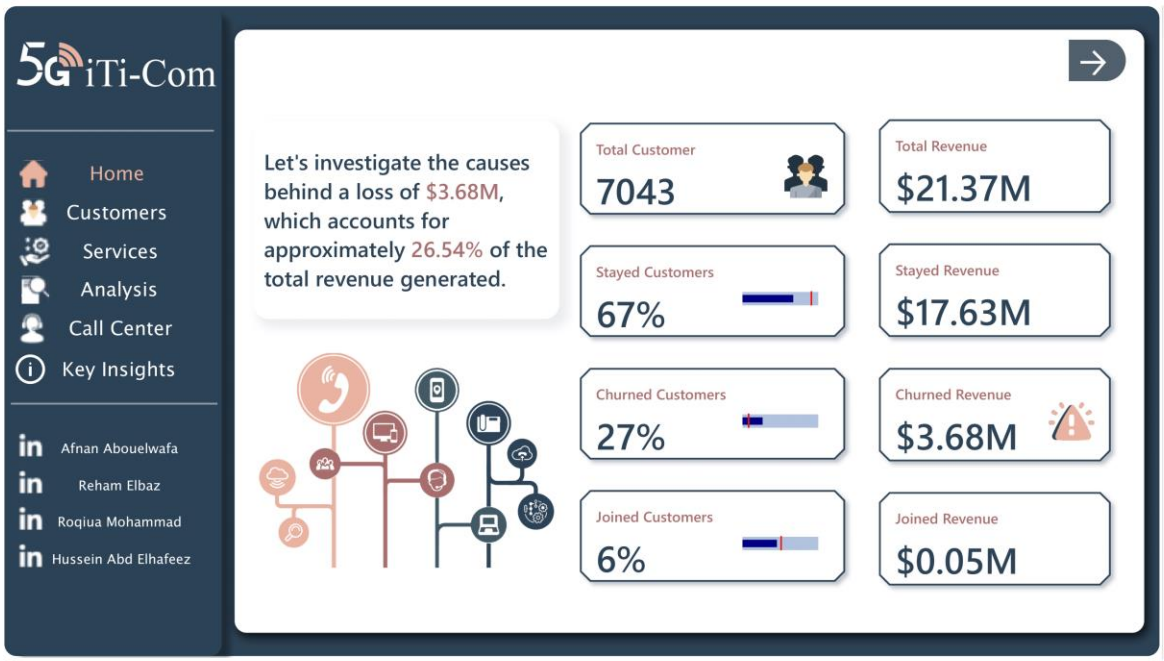
```
ALTER TABLE Fact_Table ADD CONSTRAINT FK_Contract_Constraint  FOREIGN KEY(Contract_ID) REFERENCES
Dim_Contract(Contract_ID);

ALTER TABLE Fact_Table ADD CONSTRAINT FK_Location_Constraint_Fact_Table  FOREIGN KEY(Location_ID) REFERENCES
Dim_Location(Location_ID);
ALTER TABLE Fact_table ADD CONSTRAINT FK_Status_Constraint  FOREIGN KEY(Status_ID) REFERENCES Dim_Status(Status_ID);
 ALTER TABLE Fact_Table ADD CONSTRAINT FK_Reason_Constraint  FOREIGN KEY(Churn_reason_ID) REFERENCES
Dim_Churn_Reson(Churn_reason_ID);
ALTER TABLE Fact_Table ADD CONSTRAINT FK_Call_Constraint FOREIGN KEY(Call_ID) REFERENCES Dim_Call(Call_ID);
ALTER TABLE Fact_Table ADD CONSTRAINT FK_Internet_Service_Constraint FOREIGN KEY(Internet_Service_ID) REFERENCES
Dim_Internet_Service_details(Internet_Service_ID);

ALTER TABLE Fact_Table ADD CONSTRAINT FK_Phone_Service_Constraint FOREIGN KEY(Phone_Service_ID) REFERENCES
Dim_Phone_Service(Phone_Service_ID);
ALTER TABLE Fact_Table ADD CONSTRAINT FK_Date_Call_Constraint FOREIGN KEY(Date_Of_Call) REFERENCES Dim_Date(Date);
```

Power BI:

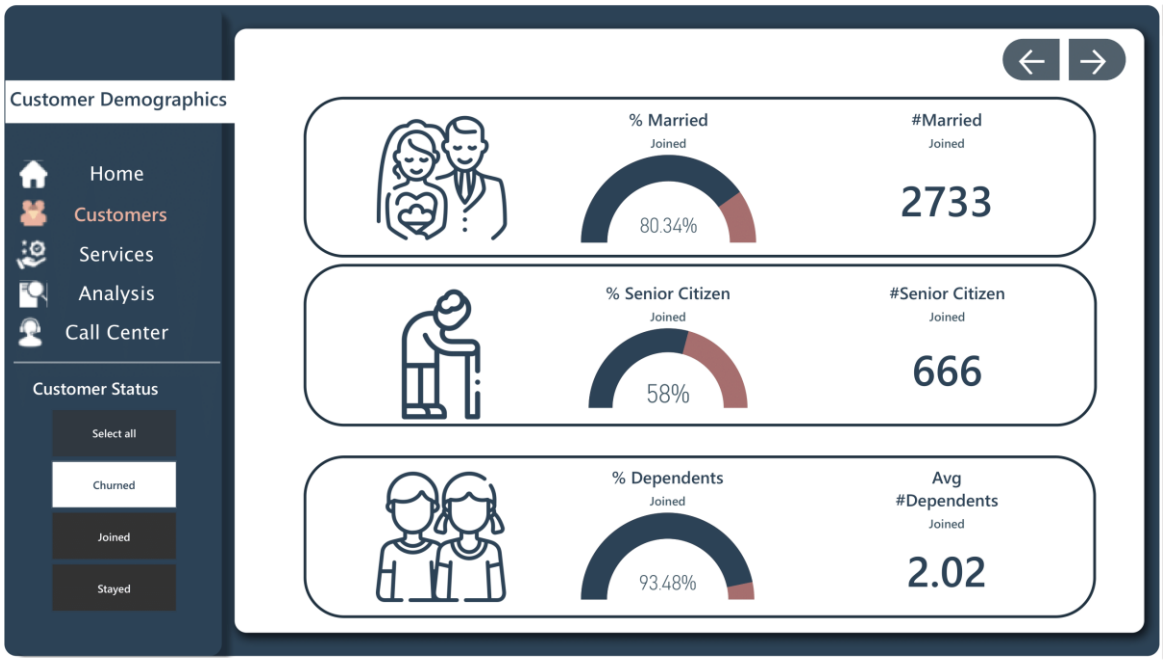
Data Modeling:



Dashboards:


5G iTi-Com
Home
Customers
Services
Analysis
Call Center
Key Insights
Afnan Abouelwafa
Reham Elbaz
Roqiua Mohammad
Hussein Abd Elhafeez
Let's investigate the causes behind a loss of $3.68M, which accounts for approximately 26.54% of the total revenue generated.
Total Customer
7043
Total Revenue
$21.37M
Stayed Customers
67%
Stayed Revenue
$17.63M
Churned Customers
27%
Churned Revenue
$3.68M
Joined Customers
6%
Joined Revenue
$0.05M

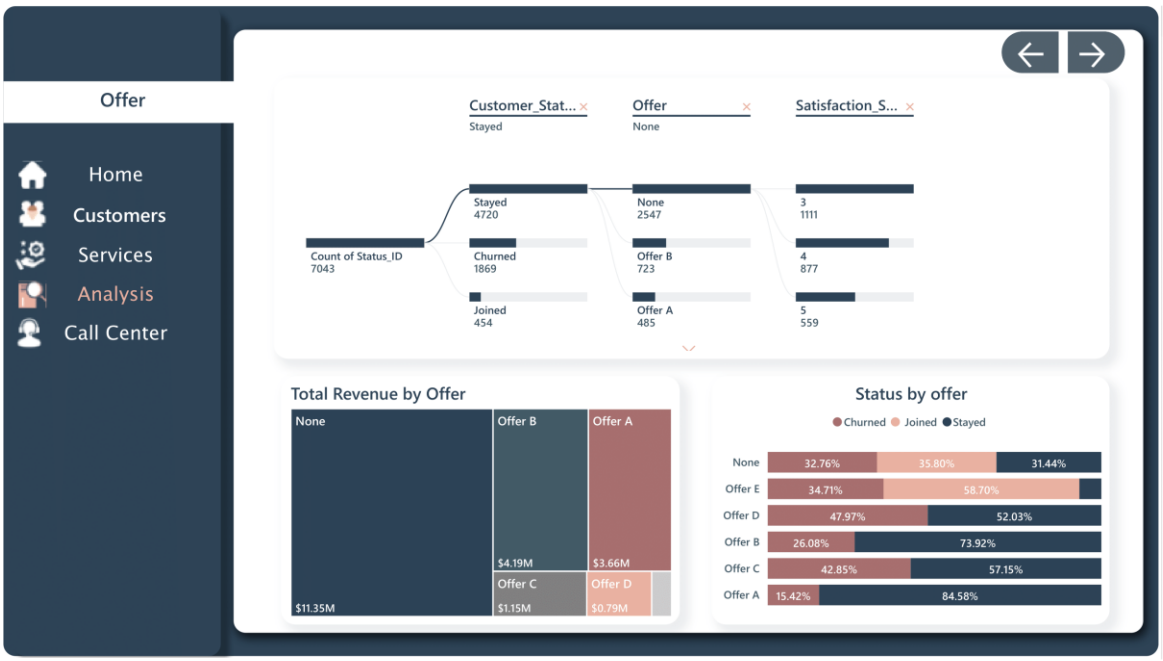

Customer General Info
Home
Customers
Services
Analysis
Call Center
Status by Gender
Churned Joined Stayed
2K
1K
0K
Male
Female
Gender
No of Customer by Status
100%
Stayed
4.72K
Churned
1.87K
Joined
0.45K
9.6%
No of Customers by Age & Status
Churned
42.87
AVG Age
Joined
49.74
AVG Age
Stayed
45.58
AVG Age
800
600
400
200
10
20
30
40
50
60
70
80

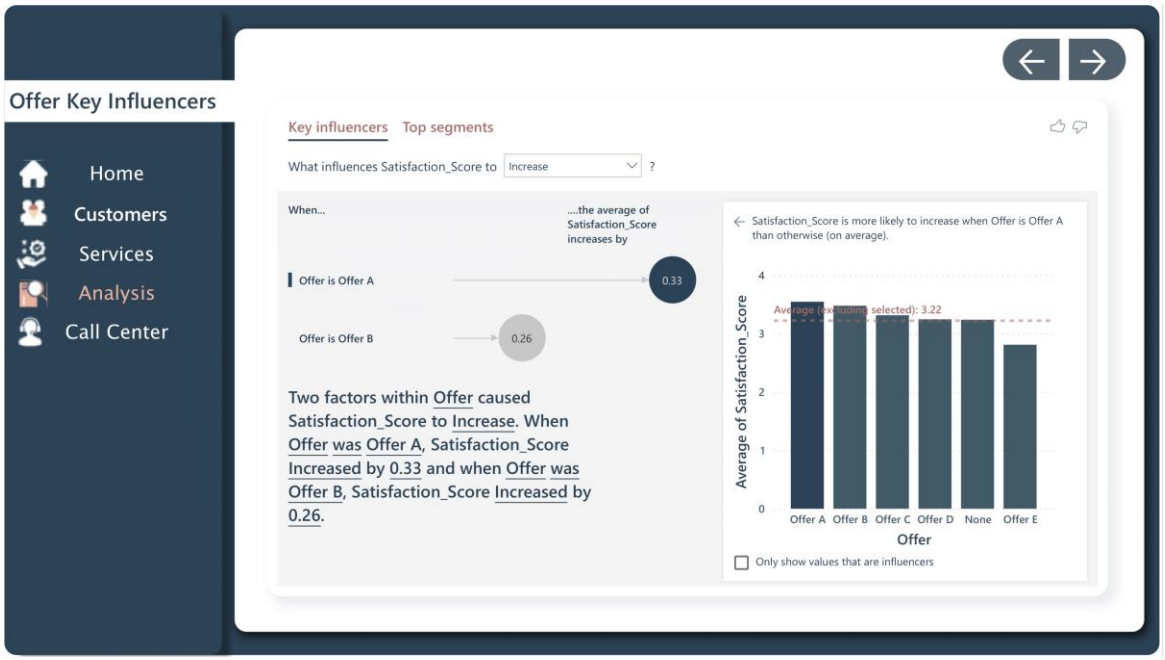

Customer Demographics
Home
Customers
Services
Analysis
Call Center
Customer Status
Select all
Churned
Joined
Stayed
% Married
Joined
80.34%
#Married
Joined
2733
% Senior Citizen
Joined
58%
#Senior Citizen
Joined
666
% Dependents
Joined
93.48%
Avg #Dependents
Joined
2.02


Customers Value & Risk
Home
Customers
Services
Analysis
Call Center
Current Customers Churn Risk
2K (36.24%)
3K (63.76%)
High Risk
Low Risk
Current Customers Value
2K (47.53%)
3K (52.47%)
High Value
Low Value
Top 10 Cities with High Risk Customers
Sacramento
San Francisco
Oakland
San Jose
Fresno
CALIFORNIA
Bakersfield
Los Angeles
San Diego
©2023 TomTom
Microsoft Azure


Services
Home
Customers
Services
Analysis
Call Center
Age Group
All
Contract Type
All
Gender
All
Churn Score by No of Internet Services
Avg of Churn Risk
66.22
63.03
61.22
60.09
59.11
54.12
51.04
Customers Value by No of Internet Services
Avg of Customers Value
26.64%
26.97%
33.76%
40.80%
46.57%
59.34%
66.22%
No of Internet Service VS Customer Status
Churned Joined Stayed
1 50.22% 15.15% 34.63%
2 40.77% 50.30%
3 38.27% 58.58%
4 30.57% 66.02%
5 28.21% 70.58%
6 20.81% 78.14%
7 11.35% 88.43%
8 95.11%
Internet Service VS Customer Status
Churned Joined Stayed
Unlimited Data 31.65% 63.62%
Streaming Movi... 29.94% 68.27%
Streaming TV 30.07% 68.12%
Streaming Music 29.26% 68.65%
Device Protecti... 22.50% 76.18%
Online Backup 21.53% 76.25%
Premium Tech S... 15.17% 82.53%
Online Security 14.61% 83.11%

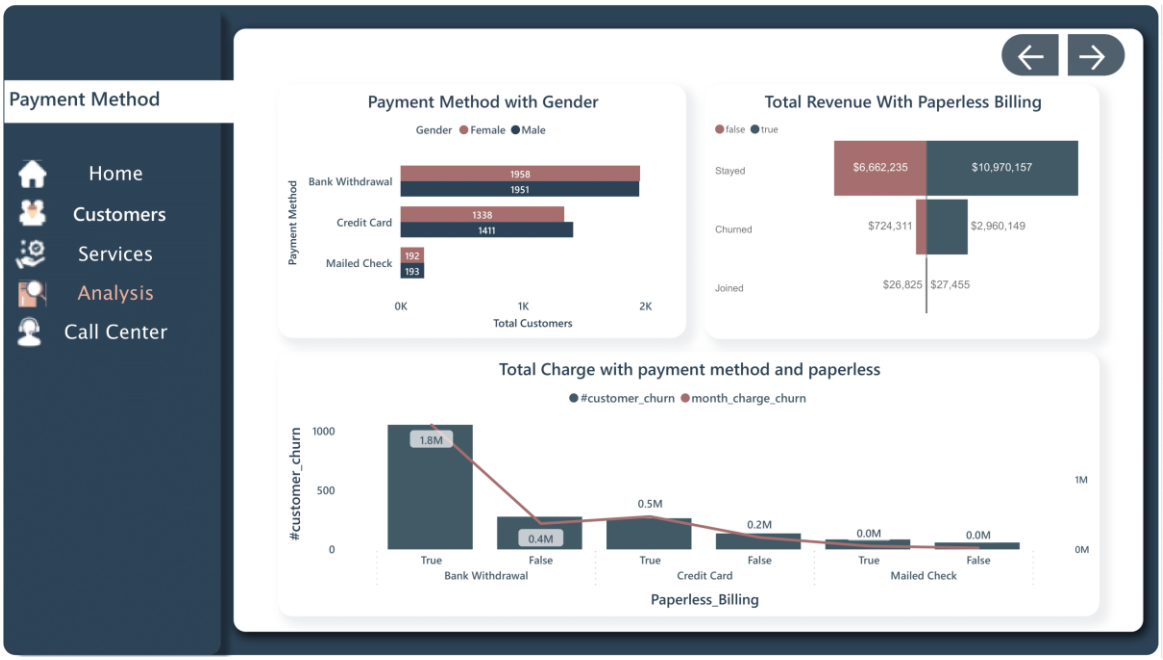

Services Details
Home
Customers
Services
Analysis
Call Center
Age Group
All
Contract Type
All
Gender
All
Internet_Servi...
High Risk Customers
5797
Unlimited Data
1164
Streaming Movies
703
Streaming TV
Internet_Servi...
High Value Customers
12196
Unlimited Data
2086
Streaming Movies
1547
Streaming TV
Internet Type VS Customer Status
Churned Joined Stayed
Fiber Optic 40.72% 55.95%
DSL 18.58% 74.46%
Cable 25.66% 67.59%
No Internet 11.93% 80.67%
Phone Service VS Churn
Churned Joined Stayed
Multiple Lines 45 850 2076
No Multiple Lines 371 849 2170
No Phone Service 38 170 474
0 500 1,000 1,500 2,000


Offer
Home
Customers
Services
Analysis
Call Center
Customer_Stat...
Stayed
Offer
None
Satisfaction_S...
Count of Status_ID
7043
Stayed
4720
Churned
1869
Joined
454
None
2547
Offer B
723
Offer A
485
3
1111
4
877
5
559
Total Revenue by Offer
None
$11.35M
Offer B
$4.19M
Offer A
$3.66M
Offer C
$1.15M
Offer D
$0.79M
Status by offer
Churned
Joined
Stayed
None
32.76%
35.80%
31.44%
Offer E
34.71%
58.70%
Offer D
47.97%
52.03%
Offer B
26.08%
73.92%
Offer C
42.85%
57.15%
Offer A
15.42%
84.58%


Offer Key Influencers
Home
Customers
Services
Analysis
Call Center
Key influencers
Top segments
What influences Satisfaction_Score to
Increase
?
When...
....the average of Satisfaction_Score increases by
Offer is Offer A
0.33
Offer is Offer B
0.26
Two factors within Offer caused Satisfaction_Score to Increase. When Offer was Offer A, Satisfaction_Score Increased by 0.33 and when Offer was Offer B, Satisfaction_Score Increased by 0.26.
Satisfaction_Score is more likely to increase when Offer is Offer A than otherwise (on average).
Average (excluding selected): 3.22
Average of Satisfaction_Score
Offer A
Offer B
Offer C
Offer D
None
Offer E
Offer
Only show values that are influencers

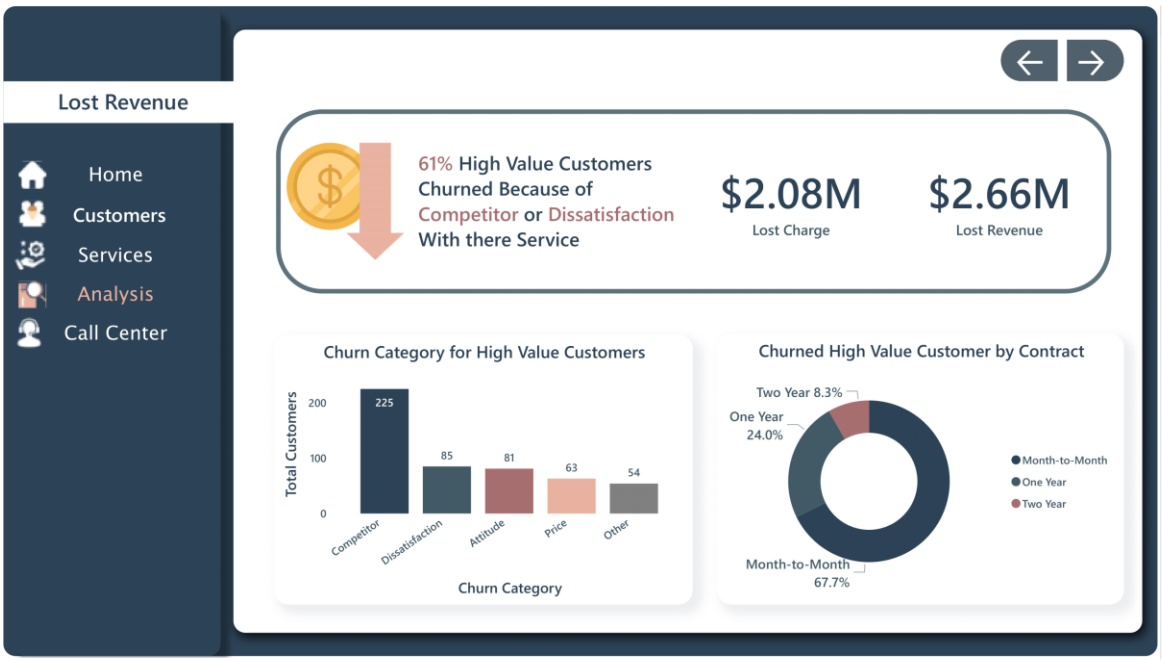

Tenure
Home
Customers
Services
Analysis
Call Center
Gender
All
Age Group
All
Churn Score & Tenure
Avg of Churn Risk
70
60
50
0
20
40
60
80
Customers Value & Tenure
Avg of Customers Value
80%
60%
40%
20%
0
50
Tenure by Total Customers
Tenure
1-12
2.2K
12-24
1.0K
24-36
0.8K
36-48
0.8K
48-60
0.8K
60-72
1.4K
0K
1K
2K
Tenure by Churn Risk
High Risk
Low Risk
1-12
34.28%
65.72%
12-24
35.37%
64.63%
24-36
39.79%
60.21%
36-48
37.25%
62.75%
48-60
35.62%
64.38%
60-72
35.13%
64.87%
32.39
Average of Tenure
72
Maximum Tenure
29
Median Tenure


Contract
Home
Customers
Services
Analysis
Call Center
Contract Type
Joined Customers
Joined Customers Target
Churned Customers
Churned Customers %
Month-to-Month
408
41%
1655
One Year
24
2%
166
Two Year
22
2%
48
Contract Type With Gender
Month-to-Month
One Year
Two Year
Gender
Male
792
945
1818
Female
758
938
1792
0
500
1000
1500
2000
Total customer by Contract_Type and Age_Group
Month-to-Month
over 60
20-30
40-50
30-40
50-60
Two Year
over 60
20-30
40-50
50-60
30-40
One Year
over ...
20-30
40-50
30-40
50-60


Payment Method
Home
Customers
Services
Analysis
Call Center
Payment Method with Gender
Gender Female Male
Payment Method
Bank Withdrawal
Credit Card
Mailed Check
1958
1951
1338
1411
192
193
0K
1K
2K
Total Customers
Total Revenue With Paperless Billing
false true
Stayed
Churned
Joined
$6,662,235
$10,970,157
$724,311
$2,960,149
$26,825
$27,455
Total Charge with payment method and paperless
#customer_churn month_charge_churn
#customer_churn
1000
500
0
1M
0M
1.8M
0.4M
0.5M
0.2M
0.0M
0.0M
True
False
Bank Withdrawal
Credit Card
Mailed Check
Paperless_Billing

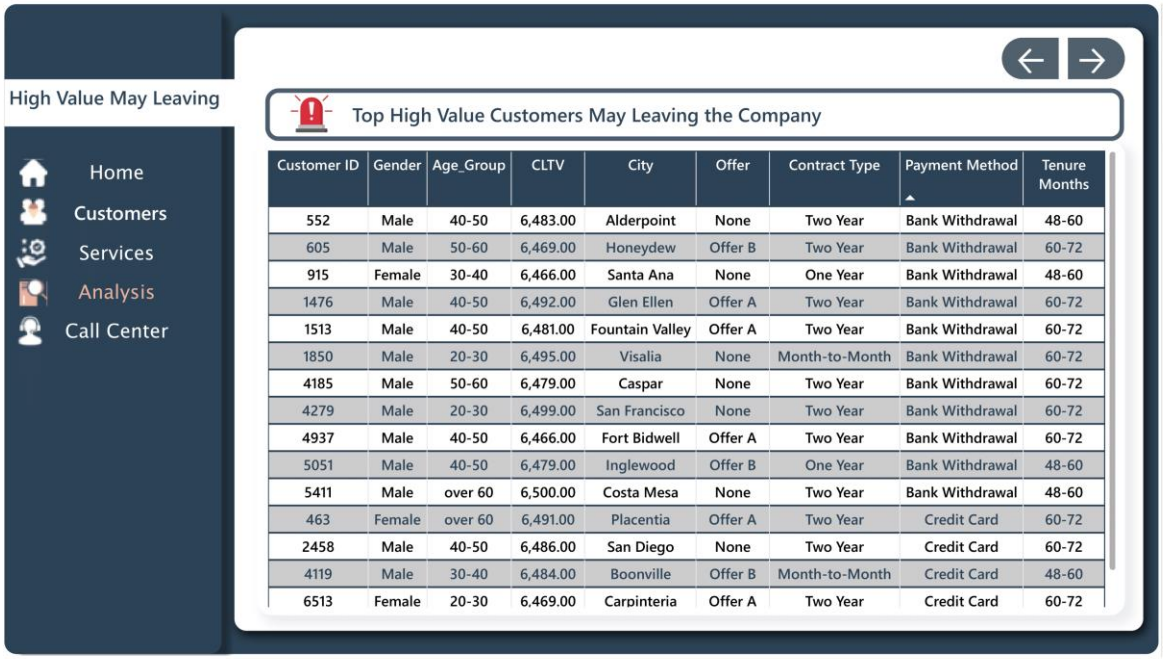

Revenue
Home
Customers
Services
Analysis
Call Center
Revenue by Contract
Month-to-Month One Year Two Year
0.34M (9.12%)
0.86M (23.3%)
2.49M (67.58%)
Revenue by Customers Age
Churned Stayed Joined
Age
20-30
30-40
40-50
50-60
over 60
28.84%
35.56%
35.61%
26.62%
32.80%
40.58%
27.15%
33.91%
38.94%
31.08%
33.97%
34.95%
47.79%
31.08%
21.13%
0%
50%
100%
Revenue %
Revenue by Gender
Female Male
Stayed
Churned
Joined
$8,793,055
$8,839,337
$1,733,474
$1,950,986
$25,834
$28,446
Revenue by Tenure
Churned Joined Stayed
$1.6M
$2.2M
$3.6M
1-12
12-24
24-36
36-48
48-60
60-72
Tenure Group


Services Revenue
Home
Customers
Services
Analysis
Call Center
Contract Type
All
Gender
All
Age Group
All
Internet Services Revenue in Risk
9.9M
5.6M
High Risk
Low Risk
Phone Service Revenue in Risk
9.3M
5.3M
High Risk
Low Risk
Multiple Lines Revenue
Multiple Lines
No Multiple ...
$6.68M (32.83%)
$13.66M (67.17%)
Revenue by Internet Type
Charned
Stayed
Fiber Optic
$3M
$9M
DSL
$4M
Cable
No Internet
Internet Services Revenue
Unlimited Data
$13.4M
Streaming Movies
$10.4M
Streaming TV
$10.2M
Online Backup
$10.1M
Device Protectio...
$10.1M
Streaming Music
$9.3M
Premium Tech S...
$8.8M
Online Security
$8.7M
Phone Service Revenue
95.20%
No
Yes
Revenue Internet Service
89.77%
10.23%
No
Yes


Lost Revenue
Home
Customers
Services
Analysis
Call Center
61% High Value Customers Churned Because of Competitor or Dissatisfaction With there Service
$2.08M
Lost Charge
$2.66M
Lost Revenue
Churn Category for High Value Customers
Total Customers
200
100
0
225
85
81
63
54
Competitor
Dissatisfaction
Attitude
Price
Other
Churn Category
Churned High Value Customer by Contract
Two Year 8.3%
One Year 24.0%
Month-to-Month 67.7%
Month-to-Month
One Year
Two Year

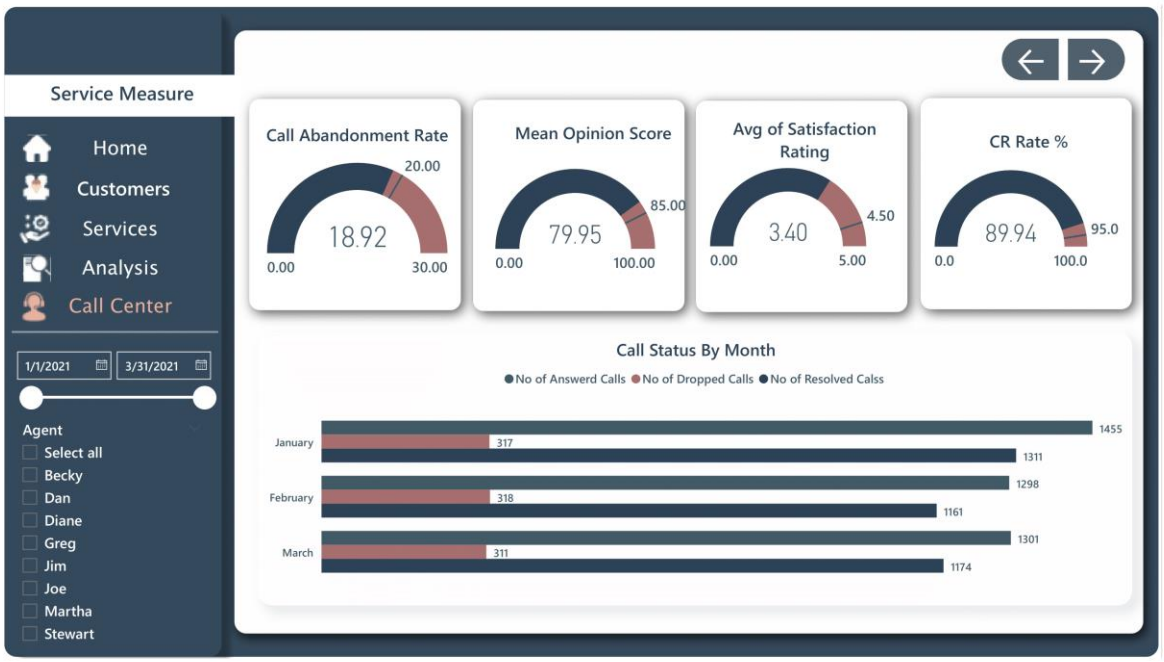

Churn Category
Home
Customers
Services
Analysis
Call Center
Churn Category
Competitor
Churn Reason
Churned Customers
1869
Competitor
841
Dissatisfaction
321
Attitude
314
Price
211
Other
182
Competitor had better devices
313
Competitor made better offer
311
Competitor offered more data
117
Competitor offered higher dow...
100


Churn Reason
Home
Customers
Services
Analysis
Call Center
Gender
All
Age Group
All
Loss Revenue By Top 10 Reason
Total_revenue_Churn
0.5M
0.0M
0.58M
0.40M
0.26M
0.20M
Churn_Reason
Loss Charge by Top 5 Reason
Charge
2M
1M
0M
451.4K
450.8K
310.5K
231.2K
200.7K
1644.7K
Top 5 Churn Reason
Total
Top 10 Reason for leaving
Churn Reason
Competitor had better devices
Competitor made better offer
Attitude of support person
Don't know
Competitor offered more data
Competitor offered higher downloa...
Attitude of service provider
Price too high
Product dissatisfaction
313
311
220
130
117
100
94
78
77
0
50
100
150
200
250
300
Churned Customers



Customer ID	Gender	Age_Group	CLTV	City	Offer	Contract Type	Payment Method	Tenure Months
552	Male	40-50	6,483.00	Alderpoint	None	Two Year	Bank Withdrawal	48-60
605	Male	50-60	6,469.00	Honeydew	Offer B	Two Year	Bank Withdrawal	60-72
915	Female	30-40	6,466.00	Santa Ana	None	One Year	Bank Withdrawal	48-60
1476	Male	40-50	6,492.00	Glen Ellen	Offer A	Two Year	Bank Withdrawal	60-72
1513	Male	40-50	6,481.00	Fountain Valley	Offer A	Two Year	Bank Withdrawal	60-72
1850	Male	20-30	6,495.00	Visalia	None	Month-to-Month	Bank Withdrawal	60-72
4185	Male	50-60	6,479.00	Caspar	None	Two Year	Bank Withdrawal	60-72
4279	Male	20-30	6,499.00	San Francisco	None	Two Year	Bank Withdrawal	60-72
4937	Male	40-50	6,466.00	Fort Bidwell	Offer A	Two Year	Bank Withdrawal	60-72
5051	Male	40-50	6,479.00	Inglewood	Offer B	One Year	Bank Withdrawal	48-60
5411	Male	over 60	6,500.00	Costa Mesa	None	Two Year	Bank Withdrawal	48-60
463	Female	over 60	6,491.00	Placentia	Offer A	Two Year	Credit Card	60-72
2458	Male	40-50	6,486.00	San Diego	None	Two Year	Credit Card	60-72
4119	Male	30-40	6,484.00	Boonville	Offer B	Month-to-Month	Credit Card	48-60
6513	Female	20-30	6,469.00	Carpinteria	Offer A	Two Year	Credit Card	60-72

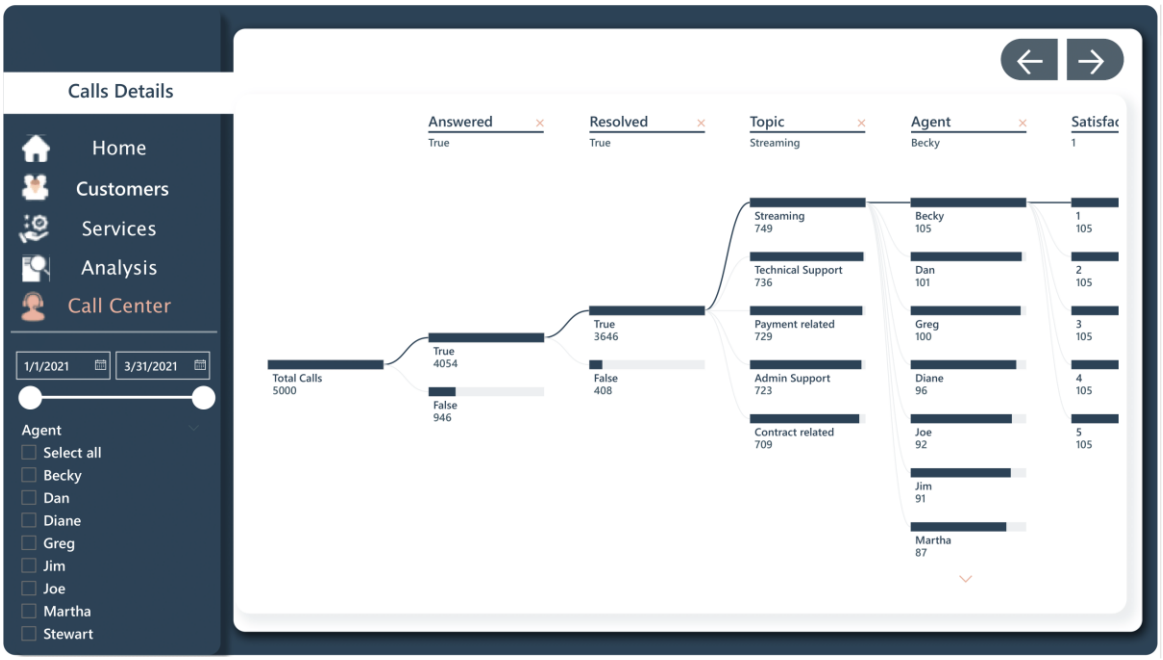

Calls Summary
Home
Customers
Services
Analysis
Call Center
1/1/2021
3/31/2021
Agent
Select all
Becky
Dan
Diane
Greg
Jim
Joe
Martha
Stewart
Total Calls
5000
Answered
4054
Resolved
3646
Dropped...
946
Agents
8
Service Level by Date of Call
Service Level
95
90
85
80
75
70
65
60
Jan 2021
Feb 2021
Mar 2021
Date of Call


Service Measure
Home
Customers
Services
Analysis
Call Center
1/1/2021
3/31/2021
Agent
Select all
Becky
Dan
Diane
Greg
Jim
Joe
Martha
Stewart
Call Abandonment Rate
20.00
18.92
0.00
30.00
Mean Opinion Score
85.00
79.95
0.00
100.00
Avg of Satisfaction Rating
4.50
3.40
0.00
5.00
CR Rate %
95.0
89.94
0.0
100.0
Call Status By Month
No of Answerd Calls
No of Dropped Calls
No of Resolved Calss
January
317
1455
1311
February
318
1298
1161
March
311
1301
1174


Call Measure
Home
Customers
Services
Analysis
Call Center
1/1/2021
3/31/2021
Agent
Select all
Becky
Dan
Diane
Greg
Jim
Joe
Martha
Stewart
Max Answer Speed
60
125
0
250
Avg Speed Answer
60.00
67.52
0.00
120.00
AHT
3.00
3.76
0.00
5.00
Max Duration of Calls
5
7
0
12
Total Call by Contract Type
1.12K (22.34%)
1.31K (26.24%)
2.57K (51.42%)
Month-to-Month
Two Year
One Year
Total Call by Age
4K
2K
0K
Total Call
1170
1083
952
916
879
5000
over 60
20-30
40-50
30-40
50-60
Total


Calls Topics Summary
Home
Customers
Services
Analysis
Call Center
1/1/2021
3/31/2021
Agent
Select all
Becky
Dan
Diane
Greg
Jim
Joe
Martha
Stewart
Count of Calls by Topic
100%
Streaming
1022
Technical Support
1019
Payment related
1007
Admin Support
976
Contract related
976
95.5%
Answered / Dropped/ Resolved Calls by Topic
Answered Calls
Dropped Calls
Resolved Calls
Streaming
47.83%
42.29%
Payment related
47.12%
41.99%
Technical Support
45.87%
41.94%
Admin Support
46.79%
42.55%
Contract related
46.82%
42.08%
Answered / Resolved / Dropped Calls by Date
Answered Calls
Resolved Calls
Dropped Calls
60
40
20
0
Jan 2021
Feb 2021
Mar 2021
Date of Call


Agents Summary
Home
Customers
Services
Analysis
Call Center
1/1/2021
3/31/2021
Agent
Select all
Becky
Dan
Diane
Greg
Jim
Joe
Martha
Stewart
Agent Occupancy Rate
71.49
0
95.0
100
Agent Utilization
67.94
0.00
80.00
100.00
Answered / Resolved / Dropped Calls by Agent
Answered Calls
Resolved Calls
Dropped Calls
Calls
Agent
Jim
Dan
Becky
Martha
Greg
Diane
Joe
Stewart


Calls Details
Home
Customers
Services
Analysis
Call Center
1/1/2021
3/31/2021
Agent
Select all
Becky
Dan
Diane
Greg
Jim
Joe
Martha
Stewart
Answered
True
Resolved
True
Topic
Streaming
Agent
Becky
Total Calls
5000
True
4054
False
946
True
3646
False
408
Streaming
749
Technical Support
736
Payment related
729
Admin Support
723
Contract related
709
Becky
105
Dan
101
Greg
100
Diane
96
Joe
92
Jim
91
Martha
87


Churn Minimization
Home
Customers
Services
Analysis
Call Center
Key Insights
Referrals
Only 19.37% of customers who referred a friend(s) have churned.
Recommendation
Referral bonuses should be given as this will drive growth, and increase the loyalty of customers.
Churn Reasons
Due to the staff's attitude, the company experienced a revenue loss of $580k from churned customers.
Recommendation
Customer relation training for support persons and service providers.
Contract
88.55% of churned customers are on a Month to Month payment contract.
Recommendation
Aggressively market and incentivize one and two-year plans.
Offer
43.77% of churned customers have offer(s).
Recommendation
Existing Offers should be reviewed as it does not help prevent customers from churning.
Internet Type
66.13% of churned customers have Fiber Optic internet.
Recommendation
Improve fiber optic internet service. This would reduce churn due to competitors and dissatisfaction.

Dax Measures:

Customer has Dependents:

```
#Customer has Dependents = CALCULATE(COUNT(Fact_Table[Customer_ID]),
Fact_Table[Dependents] = TRUE())

Total Dependents = CALCULATE(COUNT(Fact_Table[Customer_ID]),
ALLEXCEPT(Fact_Table,Fact_Table[Dependents]), Fact_Table[Dependents]= TRUE())

Total Num of dependents = CALCULATE(SUM(Fact_Table[Number_Of_Dependents]),
ALLEXCEPT(Fact_Table,Fact_Table[Number_Of_Dependents]))

%Dependents = ([#Customer has Dependents]/ [Total Dependents])

AVG Dependents = CALCULATE(AVERAGE(Fact_Table[Number_Of_Dependents]),
Fact_Table[Dependents]= TRUE())
```

Customer Referred a friend:

```
Total Num of Referred a Freind =
CALCULATE(Count(Fact_Table[Customer_ID]),ALLEXCEPT(Fact_Table,
Fact_Table[Referred_A_Friend]), Fact_Table[Referred_A_Friend]= TRUE())

Total Num of Refferals =
CALCULATE(SUM(Fact_Table[Number_Of_Referrals]),ALLEXCEPT(Fact_Table,
Fact_Table[Number_Of_Referrals]))

Num of Refferals = CALCULATE(sum(Fact_Table[Number_Of_Referrals]))

Num of Reffered by Status =
CALCULATE(COUNT(Fact_Table[Customer_Id]),FILTER(Fact_Table,Fact_Table[Referred
_A_Friend] = TRUE()))

% Referred a freind = ( [Num of Reffered by Status] /[Total Num of Referred a
Freind] )

%Referrerals = ([Num of Reffered by Status] / [Total Num of Refferals])
```

Senior Citizen:

```
#Senior Citizen = CALCULATE(COUNT(Fact_Table[Customer_ID]), Fact_Table[Age] >=
65)

%Senior Citizen = [#Senior Citizen] / [Total SeniorCitizen]

Total SeniorCitizen = CALCULATE(COUNT(Fact_Table[Customer_ID]),
ALLEXCEPT(Fact_Table,Fact_Table[Age]) ,Fact_Table[Age] >= 65)
```

Customer Married:

```
Num of married = CALCULATE(COUNT(Fact_Table[Customer_Id]), Fact_Table[Married]
= TRUE())

Total Num of married =
CALCULATE(COUNT(Fact_Table[Customer_Id]),ALLEXCEPT(Fact_Table,Fact_Table[Marri
ed]),Fact_Table[Married] = TRUE())

%Married = ( [Num of married] / [Total Num of married])
```

Total Customers without filter effected:

```
Total Customer =
CALCULATE(COUNT(Fact_Table[Customer_ID]),ALLEXCEPT(Fact_Table,
Fact_Table[Status_ID]))
```

Total Customers:

```
Total_Customers = count(Fact_Table[Customer_ID])
```

Average Age:

```
AVG Age = AVERAGE(Fact_Table[Age])
```

Total Num of customer by status:

```
Total_Joiend = CALCULATE(COUNT(Fact_Table[Customer_ID]), Fact_Table[Status_ID]
= 1)

Total_Stayed = CALCULATE(COUNT(Fact_Table[Customer_ID]),Fact_Table[Status_ID]
= 2)

Total_Charners =
CALCULATE(COUNT(Fact_Table[Customer_ID]),Fact_Table[Status_ID] = 3)

This special measure to link it with Slicer:

Count Customer by status =
CALCULATE(COUNT(Fact_Table[Customer_Id]),ALLEXCEPT(Fact_Table,Fact_Table[Statu
s_ID]) ,FILTER(Fact_Table,Fact_Table[Status_ID] =
SELECTEDVALUE((Fact_Table[Status_ID]))))
```

Total Churn Rate by status:

```
Total Churn Rate = ([Count Customer by status] / [Total Customer])
```

Customer Churn Risk:

First Calculate Avg Churn Risk:

```
Avg Churn Risk = CALCULATE(AVERAGE(Fact_Table[Churn_Score]))
```

Second add Columns Measure for churn risk:

```
Curn_Risk = SWITCH( TRUE(), Fact_Table[Churn_Score] <
AVERAGE(Fact_Table[Churn_Score]), "Low","High")
```

Third Calculate Num of high risk and low risk:

```
High Risk = CALCULATE(COUNT(Fact_Table[Customer_ID]),Fact_Table[Status_ID] <>
3, Fact_Table[Curn_Risk] ="High")

Low Risk = CALCULATE(COUNT(Fact_Table[Customer_ID]), Fact_Table[Status_ID] <>
3 , Fact_Table[Curn_Risk] = "Low")
```

Customer Value:

First calculate column measure Normalize columns:

```
Norm_Tenure = VAR xi = Fact_Table[Tenure_In_Months]  VAR mnx =
MIN(Fact_Table[Tenure_In_Months]) VAR mxx = MAX(Fact_Table[Tenure_In_Months])
RETURN round(DIVIDE(xi-mnx, mxx-mnx),5)

Norm_No_Referrals = VAR xi = Fact_Table[Number_Of_Referrals]  VAR mnx =
MIN(Fact_Table[Number_Of_Referrals]) VAR mxx =
MAX(Fact_Table[Number_Of_Referrals]) RETURN round(DIVIDE(xi-mnx, mxx-mnx),5)

Norm_Monthly_Charge = VAR xi = Fact_Table[Monthly_Charge] VAR mn =
min(Fact_Table[Monthly_Charge]) VAR mx = max(Fact_Table[Monthly_Charge])
RETURN round(DIVIDE(xi-mn,mx-mn),5)
```

Second Calculate measure for value rating:

```
Value_Rating =
round(((0.33*Fact_Table[Norm_No_Referrals])+(0.33*Fact_Table[Norm_Tenure])+(0.
33*Fact_Table[Norm_Monthly_Charge])),5)
```

Third Calculate column measure for Customer value:

```
Customer_Value = SWITCH( TRUE(), Fact_Table[Value_Rating] <
AVERAGE(Fact_Table[Value_Rating]), "Low", "High")
```

Finally Calculate measure for num of High value and Low value:

```
High Value = CALCULATE(COUNT(Fact_Table[Customer_ID]),Fact_Table[Status_ID] <>
3, Fact_Table[Customer_Value] = "High")

Low Value = CALCULATE(COUNT(Fact_Table[Customer_ID]), Fact_Table[Status_ID] <>
3, Fact_Table[Customer_Value] = "Low")
```

Status Revenue:

```
Charners_Revenue = Calculate(sum(Fact_Table[Total_Revenue]),
Fact_Table[Status_ID]=3)

Joined_Revenue = Calculate(sum(Fact_Table[Total_Revenue]),
Fact_Table[Status_ID]=1)

Stayed_Revenue = Calculate(sum(Fact_Table[Total_Revenue]),
Fact_Table[Status_ID]=2)
```

Revenue Churn Rish high & low:

```

Revenue_High_Risk = Calculate(sum(Fact_Table[Total_Revenue]),
Fact_Table[Status_ID]<>3,Fact_Table[Curn_Risk]="High")

Revenue_Low_Risk = Calculate(sum(Fact_Table[Total_Revenue]),
Fact_Table[Status_ID]<>3 ,Fact_Table[Curn_Risk]="Low")
```

No of Customer has Internet and Phone service:

```
Internet No = CALCULATE(sum(Fact_Table[Total_Revenue]),
Fact_Table[Has_Internet]="No")

Internet Yes = CALCULATE(sum(Fact_Table[Total_Revenue]),
Fact_Table[Has_Internet]="Yes")

phone no = CALCULATE(sum(Fact_Table[Total_Revenue]),
Fact_Table[Has_Phone]="No")

phone yes = CALCULATE(sum(Fact_Table[Total_Revenue]),
Fact_Table[Has_Phone]="Yes")
```

Churn Precent:

```
Churn_Percent = [Total_Charners]/[Total_Customers]
```

No of customer has some internet services:

```
Device_Pro_Plan_Churners = Calculate(count(Fact_Table[Customer_ID]),
Fact_Table[Status_ID]=3, Dim_Internet_Service_details[Device_Pro_Plan])

Device_Pro_Plan_Cust = Calculate(count(Fact_Table[Customer_ID]),
Dim_Internet_Service_details[Device_Pro_Plan])

Online_Backup_Churners = Calculate(count(Fact_Table[Customer_ID]),
Fact_Table[Status_ID]=3, Dim_Internet_Service_details[Online_Backup])
```

Agent Occupancy Rate:

```
Agent Occupancy Rate = ((SUM(Fact_Table[Duration_Off_Calls])/480)/26)/1.71*100
```

Agent Utilization:

```
Agent Utilization =
DIVIDE(
    COUNTROWS(
        FILTER(
            Fact_Table,
            Fact_Table[Speed_Of_Answer_In_Seconds] <= 60
        )
    ),
    COUNTROWS(Fact_Table)
)*100
```

Call Abandonment Rate:

```
No of Dropped Calls =
COUNTROWS(
    FILTER(
        Dim_Call,
        Dim_Call[Answered] = False
    )
)

Call Abandonment Rate (%) = [No of Dropped Calls]/[Total Calls]*100
```

Average of Speed Answer(ASA)

```
Averg of Speed Answer(ASA) = (
        SUMX(
            FILTER(Fact_Table, RELATED(Dim_Call[Answered]) = TRUE),
            Fact_Table[Speed_Of_Answer_In_Seconds]
        )/COUNTROWS ( FILTER(Fact_Table, RELATED(Dim_Call[Answered]) = TRUE))

    )
```

Service Level:

```
No of Resolved Calss = COUNTROWS(
    FILTER(
        Dim_Call,
        Dim_Call[Resolved] = True
    )
)

No of Answerd Calls =
COUNTROWS(
    FILTER(
        Dim_Call,
        Dim_Call[Answered] = True
    )
)


Total Calls = count(Dim_Call[Call_ID])

CR Rate = ([No of Resolved Calss]/[No of Answerd Calls])*100

Service Level = ([No of Answerd Calls] / [Total Calls] )*100
```

Number of Satisfied Responses:

```
Number of Satisfied Responses =
 COUNTROWS(
 FILTER(
 Fact_Table,
 Fact_Table[Satisfaction_Rating] >= 3
)
)
```

Total Number of Responses:

```
Total Number of Responses = COUNTROWS(
        FILTER(
            Fact_Table,
            Fact_Table[Satisfaction_Rating] >=1
        )
    )
```

CSAT AVG Score (Mean Opinion Score (MOS)):

```
CSAT AVG Score (Mean Opinion Score (MOS)) = [Number of Satisfied
Responses]/[Total Number of Responses] *100
```

Number of Agents:

```
Number of Agents = DISTINCTCOUNT(Dim_Call[Agent])
```

Total Duration:

```
Total Duration = SUM(Fact_Table[Duration_Off_Calls])
```

AHT:

```
AHT = [Total Duration]/[No of Answerd Calls]
```

Column Measure:

```
Age_Group = SWITCH(
                    TRUE(),
                            Fact_Table[Age]<=30 ,"20-30",
                            Fact_Table[Age]<=40 ,"30-40",
                            Fact_Table[Age]<=50 ,"40-50",
                            Fact_Table[Age]<=60 ,"50-60",
                            "over 60"
)

Has_Internet = SWITCH (
        Fact_Table[Internet_Service_ID],
        400000000, "No",
       "Yes"
        )

Has_Phone = SWITCH (
        Fact_Table[Phone_Service_ID],
        0, "No",
       "Yes"
        )

Norm_CLTV = VAR xi = Fact_Table[CLTV]  VAR mnx = MIN(Fact_Table[CLTV]) VAR mxx
= MAX(Fact_Table[CLTV]) RETURN round(DIVIDE(xi-mnx, mxx-mnx),5)

Tenure_Group = SWITCH(
                    TRUE(),
                            Fact_Table[Tenure_In_Months]<=12 ,"1-12",
                            Fact_Table[Tenure_In_Months]<=24 ,"12-24",
                            Fact_Table[Tenure_In_Months]<=36 ,"24-36",
                            Fact_Table[Tenure_In_Months]<=48 ,"36-48",
                            Fact_Table[Tenure_In_Months]<=60 ,"48-60",
                            "60-72"
)
```

Sum of CLTV:

```
cltv_churn = CALCULATE(SUM(Fact_Table[CLTV]),Dim_Status[Status_ID]=3)

cltv_join = CALCULATE(SUM(Fact_Table[CLTV]),Dim_Status[Status_ID]=1)

Cltv_stay = CALCULATE(SUM(Fact_Table[CLTV]),Dim_Status[Status_ID]=2)
```

Churn high value:

```
churn_high = [#customer_churn]*.04

churn_high_value =
Calculate(count(Fact_Table[Customer_ID])*.4,Fact_Table[Customer_Value]="high"
, Fact_Table[Status_ID]=3)
```

Precent Status:

```
percent_churn = ROUND([#customer_churn]/[total_no_customer],2)

percent_join = ROUND([#customer_join]/[total_no_customer],2)

percent_stay = ROUND([#customer_stay]/[total_no_customer],2)
```

Precent Customer Value:

```
percent_low_value = [customer_low_value]/[#customer_churn]

percent_value high = [customer_highvalue_low_risk]/[#customer_churn]
```

Total Charge:

```
totalmonth_charge = sum(Fact_Table[Total_Charges])

Total_charge_churn =
CALCULATE(SUM(Fact_Table[Total_Charges]),Dim_Status[Status_ID]=3)

total_charge_high_low =
Calculate(sum(Fact_Table[Total_Charges]),Fact_Table[Status_ID]=3,Fact_Table[Cu
stomer_Value]="low")

total_charge_high_value =
Calculate(sum(Fact_Table[Total_Charges]),Fact_Table[Status_ID]=3,Fact_Table[Cu
stomer_Value]="high")

month_charge_churn =
CALCULATE([totalmonth_charge],Dim_Status,Dim_Status[Customer_Status]="churned"
)
```

Total Revenue:

```
Total_revenue = Sum(Fact_Table[Total_Revenue])
```

Key Influence:

```
Bank Withdrawal =
Calculate(SUM(Fact_Table[Customer_ID]),Dim_Status[Status_ID]=3,Fact_Table[Payment_Method]="Bank Withdrawal")

Competitor_Churn_Category =
Calculate(SUM(Fact_Table[Customer_ID]),Dim_Status[Status_ID]=3,Dim_Churn_Category[Churn_Category_ID]=1)

Fiber_optic =
CALCULATE(sum(Fact_Table[Customer_ID]),Dim_Status[Status_ID]=3,Dim_Internet_Type[Internet_Type]="Fiber Optic")

intrnet_key =
CALCULATE(sum(Fact_Table[Customer_ID]),Dim_Status[Status_ID]=3,Dim_Internet_Service_Churners[Internet_Service_Name]="Online_Security")

month_to_month_contract =
Calculate(sum(Fact_Table[Customer_ID]),Dim_Contract[Contract_ID]=1,Dim_Status[Status_ID]=3)

Offer =
CALCULATE(sum(Fact_Table[Customer_ID]),Dim_Status[Status_ID]=3,Fact_Table[Offer]="None")

Premium_TSupport =
CALCULATE(COUNT(Fact_Table[Customer_ID]),Fact_Table[Status_ID]=3,Dim_Internet_Service_details[Premium_TSupport]=FALSE())

Single =
CALCULATE(sum(Fact_Table[Customer_ID]),Dim_Status[Status_ID]=3,Fact_Table[Married]=FALSE())
```

SVG:

```
_PieChart_churn =
// Derived from Martens
    // Values
        VAR Percentage =  [#customer_churn]/[total_no_customer]// value has to
be >= 0 and <=1
        VAR Colour = "#435B66"
        VAR CirclePercent = 180 - (IF(Percentage > .9999, .9999, Percentage) *
360)
        VAR ShortDistance = if(CirclePercent < 0, 1,0)
        VAR Radians = RADIANS(CirclePercent)
        VAR XArcEnd = sin(Radians)*.8
        VAR YArcEnd = cos(Radians)*.8
    // svg string
        VAR svgHeader =
    "data:image/svg+xml;utf8,<svg width='60' height='60'
xmlns:svg='http://www.w3.org/2000/svg' xmlns='http://www.w3.org/2000/svg'
viewBox='-1 -1 2 2'>"
        VAR BackgroundArc ="<path d='M 0 -.8 A 0.8 0.8 0 1 1 "&sin(RADIANS(-
179.99))*.8&" "& cos(RADIANS(-179.99))*.8&"  L 0 0 z'
fill='lightsteelblue'></path>"
        VAR Arc ="<path d='M 0 -.8 A 0.8 0.8 0 " & ShortDistance & " 1 " &
XArcEnd & " " & YArcEnd & "  L 0 0 z' fill='" & Colour & "'></path>"
        VAR svgFooter = "</svg>"
    return svgHeader & BackgroundArc & Arc & svgFooter
Measursvg_contract =
VAR MAXPlan = [plan_customer]
VAR MAXActual = [#customer_join]
VAR MAXTarget = [profit_no_customer]
VAR AXISRANGE = MAXX(
    {
        MAXPlan,
        MAXActual,
        MAXTarget
    },
    [Value]
)
VAR TRACKWIDTH = MAXPlan/AXISRANGE*100
VAR PERCENTAGEFILL = MAXActual/AXISRANGE
VAR PERCENTAGETARGET = MAXTarget/AXISRANGE
RETURN "data:image/svg+xml;charset=utf-8, <svg
xmlns='http://www.w3.org/2000/svg' xmlns:xlink='http://www.w3.org/1999/xlink'
width= '110' height= '60' display= 'block' viewBox='-2 -2 70 70'
overflow='visible'>
      <path id='track' fill='none' stroke='lightsteelblue' d='M10,55 a45,45 0
1 1 90,0' stroke-width='20' />
      <path id='fill' fill='none'
stroke="&IF(PERCENTAGEFILL<0.50,"'#435B66'",IF(PERCENTAGEFILL<0.65,"'435B66'",
"'435B66'"))&" d='M10,55 a45,45 0 1 1 90,0' stroke-width='20' stroke-
dasharray='141.3717' stroke-dashoffset="&"'"&(1-PERCENTAGEFILL) *
(PI()*45)&"'"&"></path> <path id='target' fill='none' stroke='red' d='M0,55
L20,55' stroke-width='4' transform='rotate("&PERCENTAGETARGET*180&" 55
55)'/><text x='35' y='55' font-weight='bold' >"&FORMAT(PERCENTAGEFILL,
"0%")&"</text>
    </svg>" //Target Marker = Percent of Total * 180 degrees; Gauge Fill =
Percent of Total * пr
```

Summary:

To sum up, telecom companies suffer from substitution because of their highly competitive industry. Our company provided us with several data in order to understand the reason behind "Why customers are churning?". Analysis showed that the most important factors that affect churning are; offers, month-to-month payment contracts, and staff's attitude. Especially when they are regressed together, they create a higher churning rate. If the managerial team can target customers who are located in the intersection point of these attributes and variables, they can manage to tackle the churning problem.

I. Churn Reasons

Due to the staff's attitude, the company experienced a revenue loss of $580k from churned customers.

Recommendation

- Customer relation training for support persons and service providers.

II. Referrals

Only 19.37% of customers who referred a friend(s) have churned.

Recommendation

- Referral bonuses should be given as this will drive growth, and increase the loyalty of customers.

III. Contract:

88.55% of churned customers are on a Month-to-Month payment contract.

Recommendation

- Aggressively market and incentivize one and two-year plans.

IV. Offer:

43.77% of churned customers have offer(s).

Recommendation

- Existing Offers should be reviewed as it does not help prevent customers from churning.

V. Internet Type:

66.13% of churned customers have Fiber Optic internet.

Recommendation

- Improve fibre optic internet service. This would reduce churn due to competitors and dissatisfaction.

VI. Call Centre:

a) Calls Part:

1. 18.92 % of Calls Volume are Dropped →(Calls Appendant Rate)
2. 81.08 % of Call Volume are Answered →(Service Level)
3. 89.93 % of answered Calls are Solved →(+Ve Call Resolution (CR) Rate)
4. 10.07 of answered Calls not Solved → (-Ve Call Resolution (CR) Rate)

Recommendation

- Training for Agents to Handel and answered Calls fast.
- Give them more Training on Problem solving and complains

b) Satisfaction Score

1. AVG Satisfaction Score is 3.40, Target Score is 4.5 (out of 5)

Recommendation:

- Improve and Enhance the Service to Get more Customer Satisfaction and Loyalty

c) Agents

1. AVG Speed Answer is 67.52 Sec, Target is 60 Sec.
2. AVG Handling Time is 3.76 Mints, Target is 3 Mints.
3. AVG Agent Occupancy Rate is 71.49 %, Target is 95%
4. AVG Agent Utilization is 67.94% Target is 80%

Recommendation

- Enhance The ability of the Agent by Training to handle Calls Faster.
- Increase the Number of Customer to push Agent's performance or
- Downsize Number of Agents and more Training to Get the target of handling and Answer
- And Agent Utilization.

d) Contracts

1. Month To Month Contract Have the Higher Rate of Cals 51.40 % of Total Calls.

Recommendation:

- Enhance the Contract Specification.

Conclusions:

The analysis of churn reasons and customer data has provided several key findings that can guide the company's efforts to reduce churn and enhance customer satisfaction:

- **Staff's Attitude:** The company experienced a significant revenue loss due to the staff's attitude, which negatively impacted customer retention. To address this issue, it is recommended to provide comprehensive customer relation training for support personnel and service providers. Improving the interactions between staff and customers is crucial in retaining customers.

- **Referrals:** The data shows that only 19.37% of customers who referred friends have churned. This indicates that referral programs can drive growth and increase customer loyalty. To capitalize on this, the company should consider implementing referral bonuses to incentivize customers to refer their friends and acquaintances.

- **Contract Types:** A substantial 88.55% of churned customers were on a Month-to-Month payment contract. To reduce churn, it is recommended to aggressively market and incentivize one and two-year plans. Encouraging longer-term commitments can lead to greater customer retention.

- **Offer Utilization:** 43.77% of churned customers had offers, but these offers did not effectively prevent customer churn. It is recommended that the company reviews and potentially revamps its existing offers to ensure they align better with customer needs and preferences.

- **Internet Type:** The data shows that 66.13% of churned customers had Fiber Optic internet. To mitigate churn caused by competitors and dissatisfaction, it is essential to improve the quality and service of the Fiber Optic internet offering. Ensuring that customers have a positive experience with this service can contribute to greater customer retention.

- **Call Centre Efficiency:** The analysis of the call centre performance revealed several areas that require improvement. Specifically:

- ✓ **Calls Part:** Dropped calls, call answering rates, call resolution rates, and unresolved calls all need attention. It is recommended to provide extensive training for agents to handle and answer calls promptly. Furthermore, additional training on problem-solving and complaint resolution is necessary to enhance the overall customer experience.

- ✓ **Satisfaction Score:** The average satisfaction score falls short of the target. To improve customer satisfaction and loyalty, it is crucial to enhance service quality and address customer concerns more effectively.

- ✓ **Agents:** Average speed of answer, handling time, agent occupancy rate, and agent utilization all need improvement to meet target levels. It is recommended to enhance agent abilities through training to handle calls more efficiently. Options include increasing the number of customers to boost agent performance or downsizing the number of agents while providing more training to meet handling and answering targets.

- ✓ **Contracts**: Month-to-Month contracts have the highest rate of calls (51.40% of total calls). The company should consider enhancing contract specifications to better align with customer preferences and reduce the volume of Month-to-Month contracts.

In summary, by addressing the above recommendations, the company can improve customer satisfaction, enhance its service offerings, and employ more efficient practices in the call centre. This, in turn, will help reduce customer churn and result in a more loyal and satisfied customer base, ultimately leading to increased revenue and business growth.