Telecom Analysis Project

Our Team

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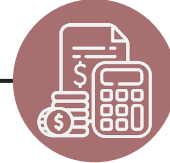**in**   Roqiua Mohammad
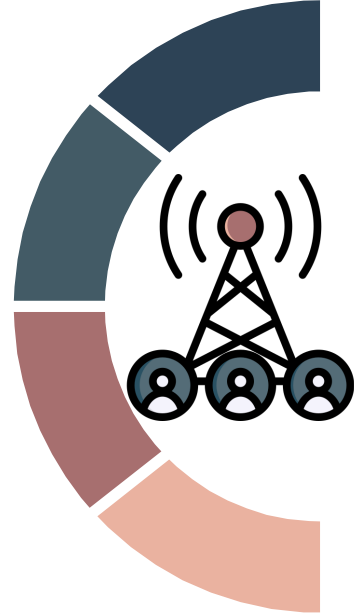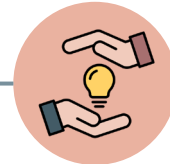
Table of Content
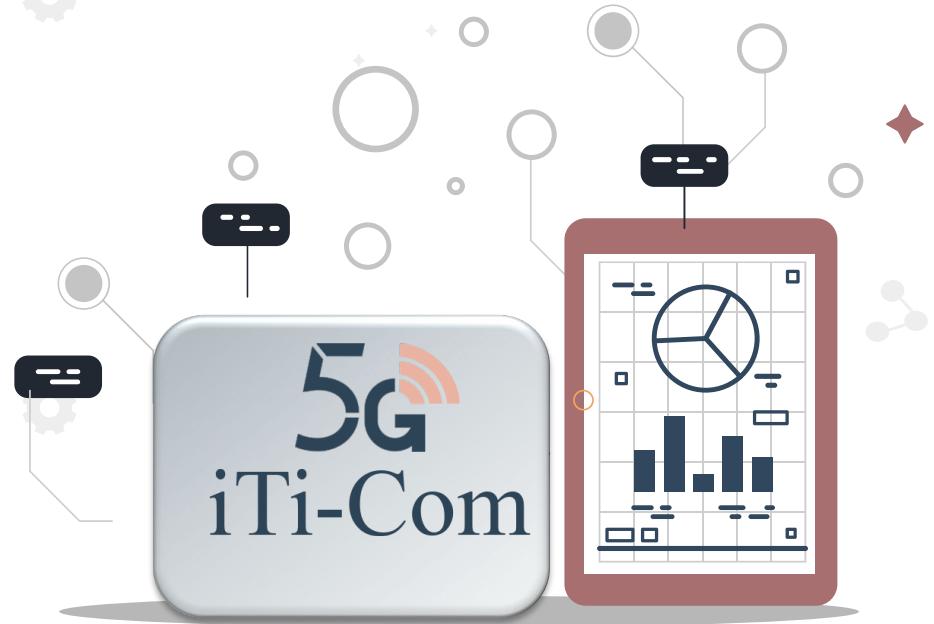
Introduction

Telecom companies have two options:
• They either play a cost game which they have to cut charges.
• Or they have to play the premium game and offer bundles or promotions in order not to lose customers.

Introduction

➤ This graduation project endeavors to delve deep into the intricacies of telecom churn, with a specific focus on uncovering the reasons behind customer attrition.

➤ By gaining insights into the drivers of churn , the reasons behind this phenomenon are multi-faceted and can range from dissatisfaction with services, competitive offers from rival providers, or shifts in customer preferences.

➤ We aim to provide valuable knowledge to telecom companies, empowering them to take proactive steps to reduce churn rates and, in turn, enhance their overall performance.

problem statement

What are we Doing wrong ?

What is the churn rate for the business's customers

What are the underlying causes of customer churn?

What strategies can be employed to reduce customer churn?

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

Dataset

Data Set

- Data Source This data was collected from IBM sample And Kaggle. This data contains five Table

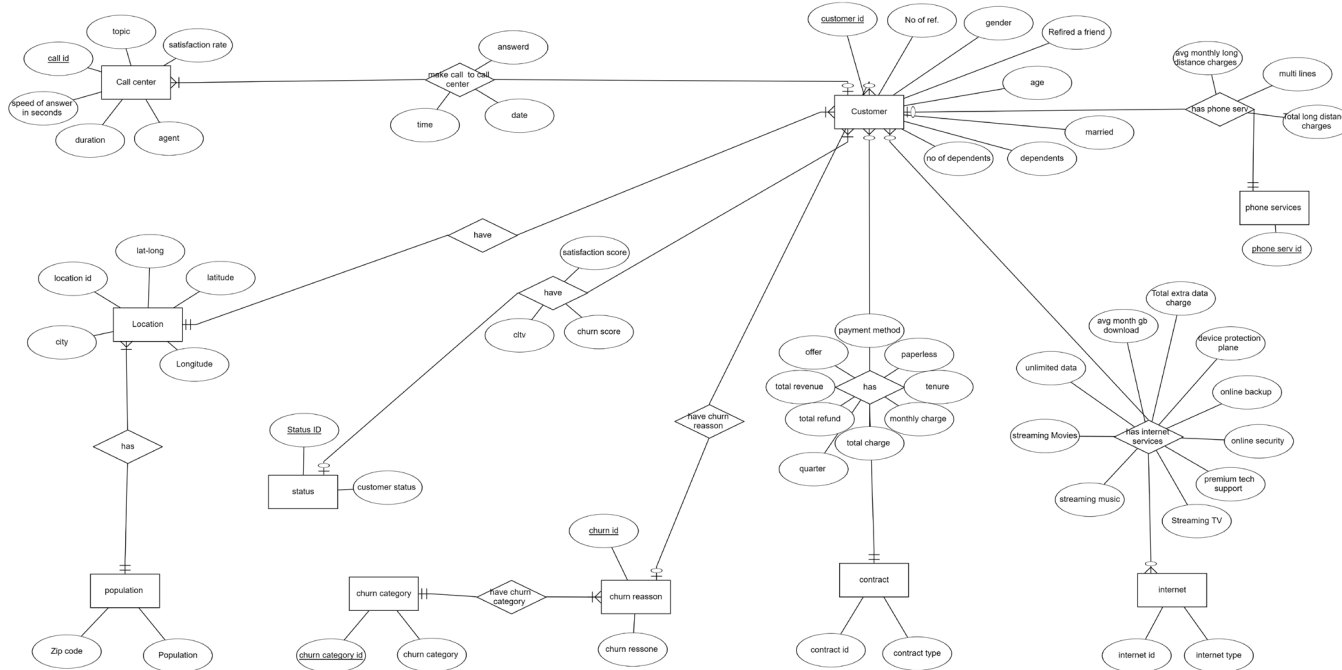| Table Name	Description
Demographic Table	Demographic Data about Customer
Services Table	Data about services for Customer
Status Table	Customer status
Location Table	Location Data of Customer
Population Table	Population Data for Locations
Call center	Data about Calls to Call Center

ERD
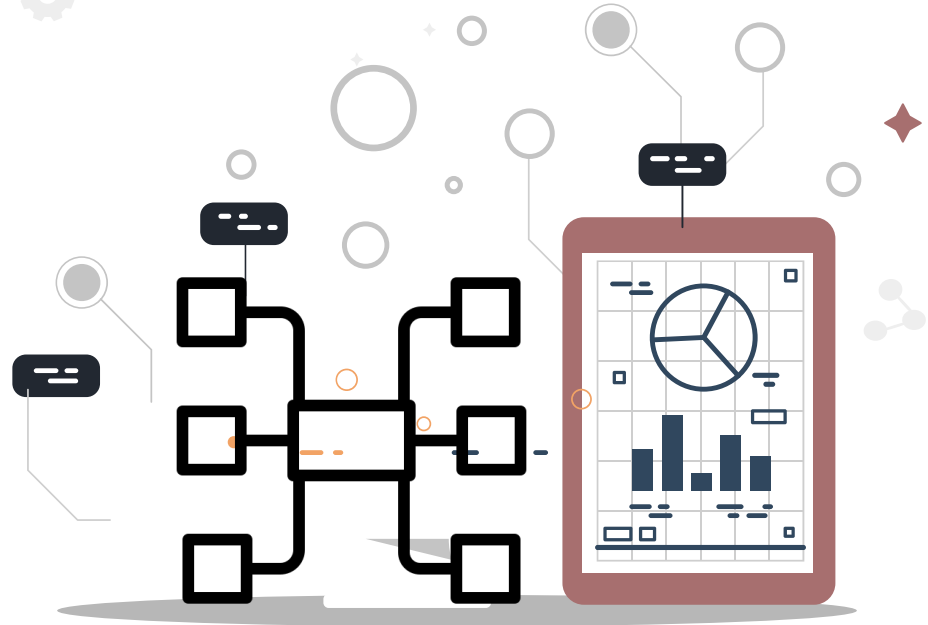
ERD

- Data Source This data was collected from IBM sample And Kaggle. This data contains five Table

Mapping

Customer

Customer ID	Location ID	Status ID	Churn reason ID	Contract ID	No of Refs	Referred a friend	Married	Age	Gender	Dependents	No of Dependents	Quarter	Tenure in Months

Offers	Paperless Billing	Payments Methods	Monthly Charge	Total Charges	Total Refunds	Total Revenue	CLTV	Churn Score	Satisfaction Score

Phone Service

Phone Service ID	Customer ID	MultiLines	AVG Monthly Long distance Charges	Total Long Distance Charge

Status

Status ID	Customer Status

Churn Reason

Churn reason ID	Churn Category ID	Churn Reason

Contract

Contract ID	Contract Type

Call

Call ID	Customer ID	Agent	Date	Time	Topic	Speed of Answer in Second	Avg Talk Duration	Resolved	Satisfaction Rate

Churn Category

Churn category ID	Churn Category

Internet Service

Internet ID	Internet Type

Customer_Internet Service

Internet Service ID	Customer ID	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 Charge

Population

Zip Code	population

Location

Location ID	City	Zip Code	Latitude	Longitude	Latlong

1. Customers

Customer_ID (PK)	Location_ID (FK)	Status_ID (FK)	Churn_Reason_ID (FK)	Contract_ID (FK)	…………………

2. Location

Location_ID (PK)	ZipCode (FK)	City	Latitude	Longitude

3. Population

Zipcode_ID (PK)	Population_Num

Relation between **Locations** and **Customers** is **one to many.**

The relation between **Population** and **Location** is **one to many,** one from Population side to many from Location side.

1. Customers

Customer_ID (PK)	Location_ID (FK)	Status_ID (FK)	Churn_Reason_ID (FK)	Contract_ID (FK)	…………..

4. Status

Status ID (PK)	Customer_Status

5. Contract

Contract_ID (PK)	Contract_Type

The relation between **Customers** and **Status** is **one to many**.

The relation between **Customers** and **Contract** is **one to many**.

1. Customers

Customer_ID (PK)	Location_ID (FK)	Status_ID (FK)	Churn_Reason_ID (FK)	Contract_ID (FK)	…………..

6. Churn Reason

Churn_reason_ID (PK)	Churn_Category_ID (FK)	Churn_Reason

7. Churn Category

Churn_Category_ID (PK)	Churn_Category

The relation between **Customers** and **Churn Reasons** is **one to many**.

The relation between **Churn Category** and **Churn Reason** is **one to many.**

1. Customers

Customer_ID (PK)	Location_ID (FK)	Status_ID (FK)	Churn_Reason_ID (FK)	Contract_ID (FK)	……………

8. Internet Service

Internet_Service_ID (PK)	Internet_Type

9. Customer Internet Service

Internet Service ID (FK)	Customer ID (FK)	Online Security	Online Backup	Streaming TV	…………….

The relation between **Customers** and **Internet Service** is **many to many. May from both sides**. create a new table Customer Internet Service that contains Customers & Internet Service PRIMARY KEYs as a composite key. Also, the relation attributes will be added to the new table.

1. Customers

Customer_ID (PK)	Location_ID (FK)	Status_ID (FK)	Churn_Reason_ID (FK)	Contract_ID (FK)	…………..

10. Phone Service

Phone_Service_ID (PK)	Customer_ID (FK)	Multiple_Lines	Avg_Monthly_Long_Distance_Charges	Total_Long_Distance_Charges

Relation between **Customer & Phone Service** is **one to one**.
May from **Customers, Must** from **Phone Service**.
PK Of customer will be a foreign key in Phone Service.

1. Customers

Customer_ID (PK)	Location_ID (FK)	Status_ID (FK)	Churn_Reason_ID (FK)	Contract_ID (FK)	…………..

11. Call

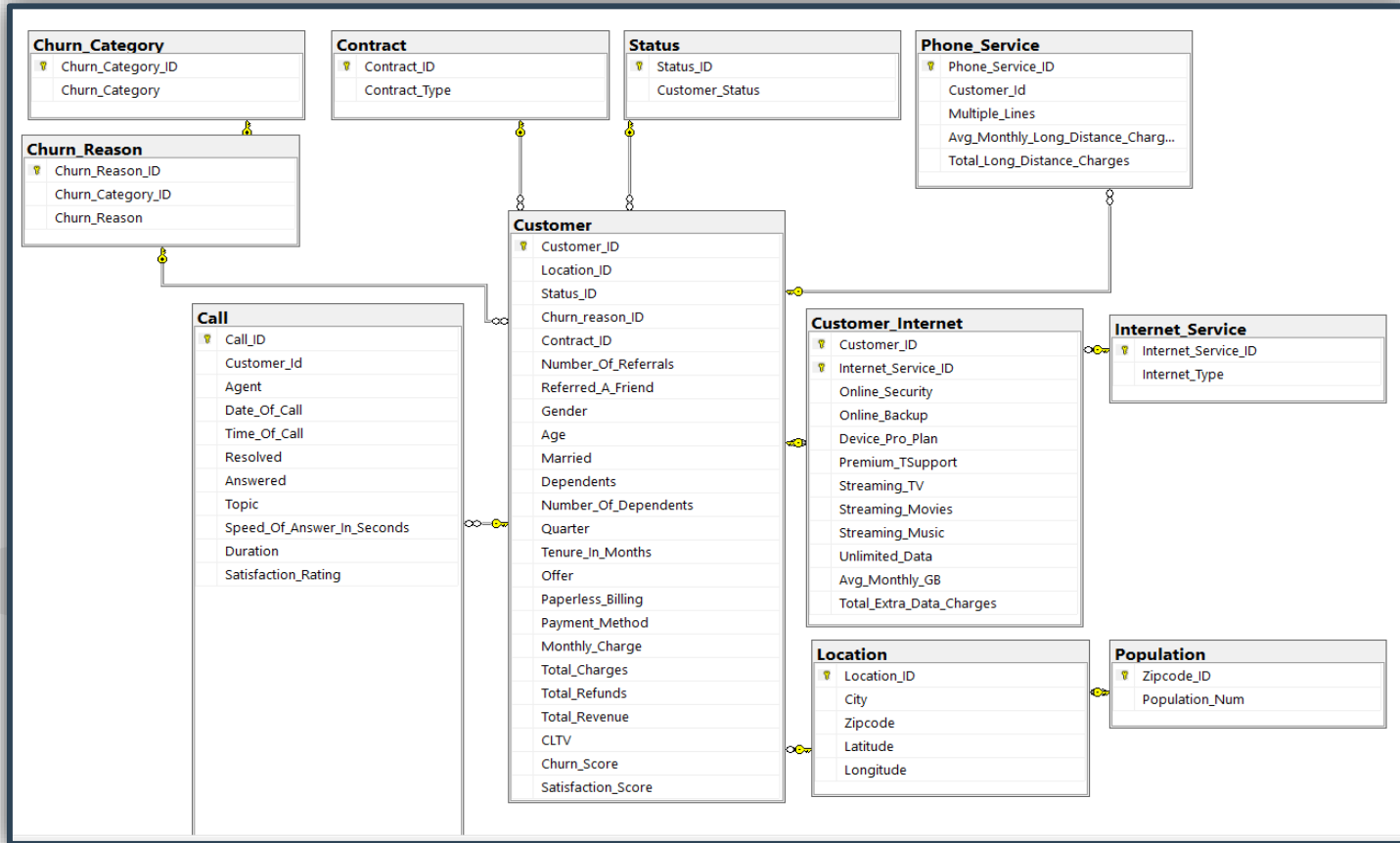| Call_ID (PK)	Customer_ID (FK)	Agent	Date_Of_Call	Time_Of_Call	Resolved	Answered	……….

The relation between **Customers** and **Call** is **one to many**. The customer has **many calls**, but there is **one Customer** for one call.
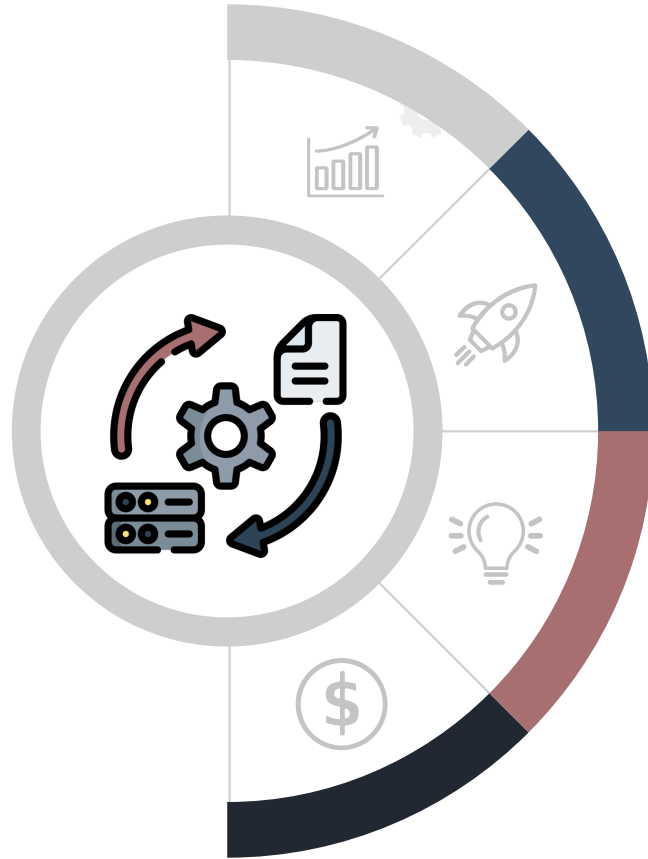
Database

Database Diagram

Churn_Category
- Churn_Category_ID
- Churn_Category

Contract
- Contract_ID
- Contract_Type

Status
- Status_ID
- Customer_Status

Phone_Service
- Phone_Service_ID
- Customer_Id
- Multiple_Lines
- Avg_Monthly_Long_Distance_Charg...
- Total_Long_Distance_Charges

Churn_Reason
- Churn_Reason_ID
- Churn_Category_ID
- Churn_Reason

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

Call
- Call_ID
- Customer_Id
- Agent
- Date_Of_Call
- Time_Of_Call
- Resolved
- Answered
- Topic
- Speed_Of_Answer_In_Seconds
- Duration
- Satisfaction_Rating

Customer_Internet
- Customer_ID
- Internet_Service_ID
- Online_Security
- Online_Backup
- Device_Pro_Plan
- Premium_TSupport
- Streaming_TV
- Streaming_Movies
- Streaming_Music
- Unlimited_Data
- Avg_Monthly_GB
- Total_Extra_Data_Charges

Internet_Service
- Internet_Service_ID
- Internet_Type

Location
- Location_ID
- City
- Zipcode
- Latitude
- Longitude

Population
- Zipcode_ID
- Population_Num

SQL Server Integration Services

01

Sequence container on Control Flow (Transaction Option Required)

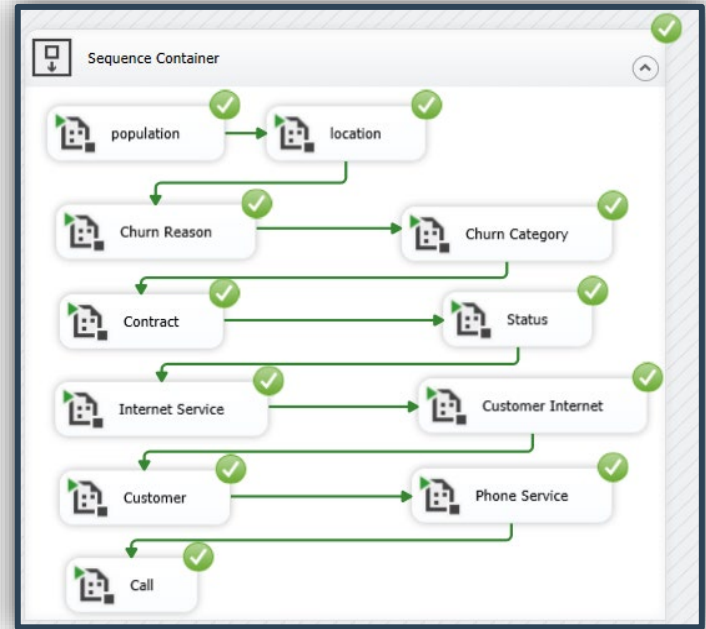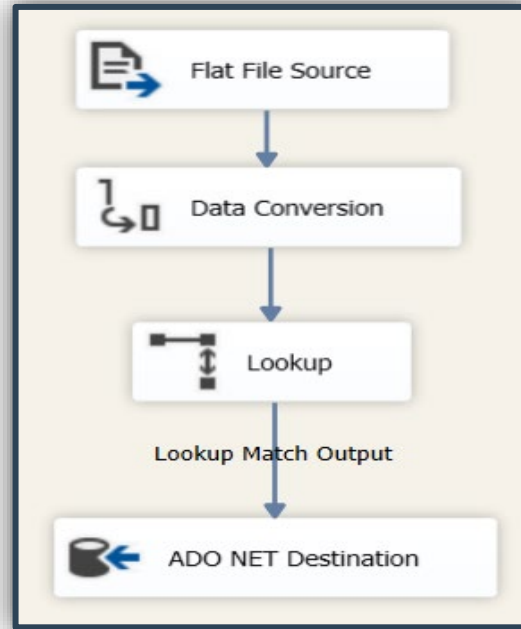02

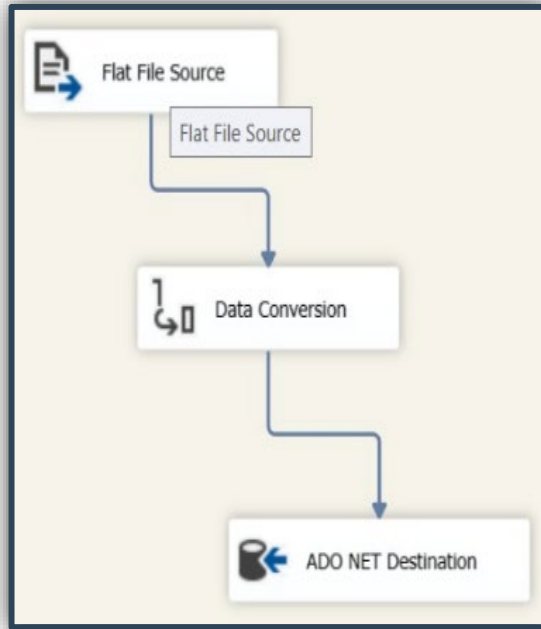Package Task for each csv file.

03

In each Package: Flat File Source, Data Conversion, Lookup for foreign keys, ADO NET Destination (Database).
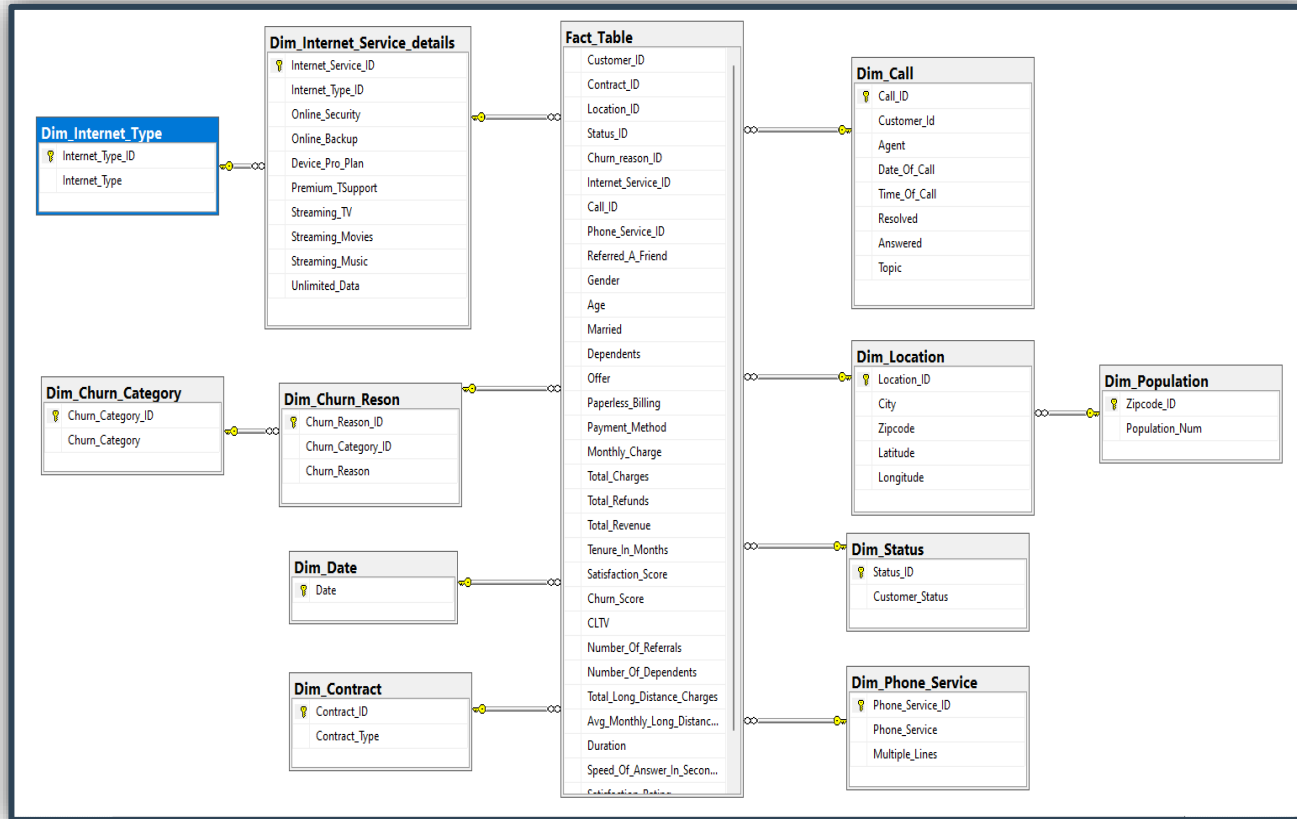
04

Execute Sequence Container.
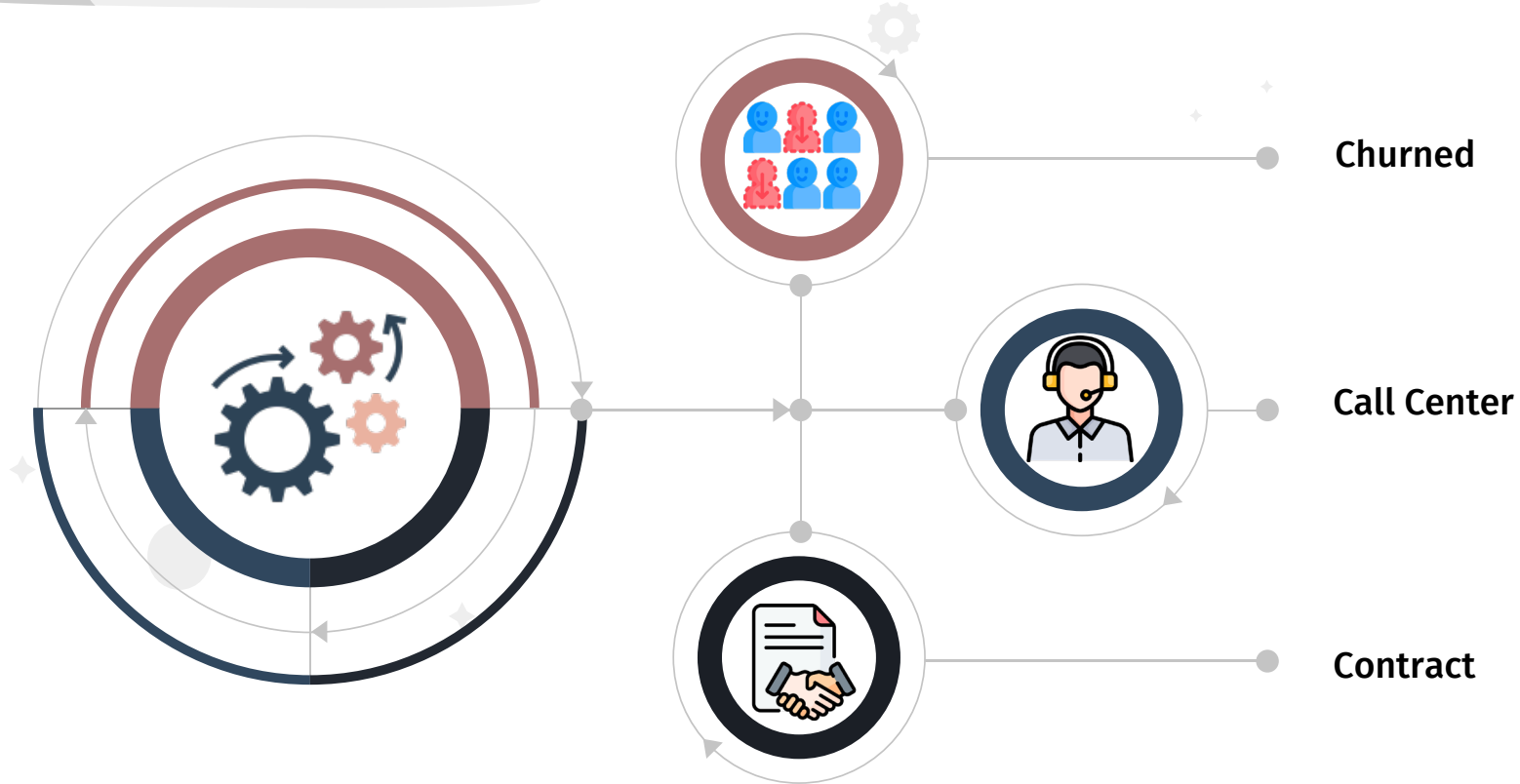
SSIS

Data Warehouse

DWH Diagram

Dim_Internet_Service_details
- Internet_Service_ID
- Internet_Type_ID
- Online_Security
- Online_Backup
- Device_Pro_Plan
- Premium_TSupport
- Streaming_TV
- Streaming_Movies
- Streaming_Music
- Unlimited_Data

Dim_Internet_Type
- Internet_Type_ID
- Internet_Type

Fact_Table
- Customer_ID
- Contract_ID
- Location_ID
- Status_ID
- Churn_reason_ID
- Internet_Service_ID
- Call_ID
- Phone_Service_ID
- Referred_A_Friend
- Gender
- Age
- Married
- Dependents
- Offer
- Paperless_Billing
- Payment_Method
- Monthly_Charge
- Total_Charges
- Total_Refunds
- Total_Revenue
- Tenure_In_Months
- Satisfaction_Score
- Churn_Score
- CLTV
- Number_Of_Referrals
- Number_Of_Dependents
- Total_Long_Distance_Charges
- Avg_Monthly_Long_Distanc...
- Duration
- Speed_Of_Answer_In_Secon...
- Satisfaction_Rating

Dim_Call
- Call_ID
- Customer_Id
- Agent
- Date_Of_Call
- Time_Of_Call
- Resolved
- Answered
- Topic

Dim_Location
- Location_ID
- City
- Zipcode
- Latitude
- Longitude

Dim_Population
- Zipcode_ID
- Population_Num

Dim_Churn_Category
- Churn_Category_ID
- Churn_Category

Dim_Churn_Reson
- Churn_Reason_ID
- Churn_Category_ID
- Churn_Reason

Dim_Status
- Status_ID
- Customer_Status

Dim_Date
- Date

Dim_Contract
- Contract_ID
- Contract_Type

Dim_Phone_Service
- Phone_Service_ID
- Phone_Service
- Multiple_Lines

Procedures & SSRS

Churned

Call Center

Contract

Call Center Reports

The Question

What is calls saummry of agent?

Input

Agent Name

```sql
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;
```

	Agent Name	Number of answered calls	Number of Dropped calls	Total of calls	Total Resolved
1	Diane	501	132	633	452

SSRS

Agent Name: Diane [View Report]

| 1 | of 1 | 100% | Find | Next |

Agent Calls Summary

Agent Name	Total of calls	Number of answered calls	Number of Dropped calls	Total Resolved
Diane	633	501	132	452

Agents Performance

Legend:
- Number of answered calls
- Total Resolved
- Number of Dropped calls

Chart values:
- Number of answered calls: 501
- Total Resolved: 452
- Number of Dropped calls: 132

Diane

```sql
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;
```

Input

Topic Name

	Agent Name	Number of answered calls	Number of Dropped calls	Total of calls	Total Resolved	Topic
1	Becky	87	27	114	78	Contract related
2	Dan	101	22	123	91	Contract related
3	Diane	92	31	123	82	Contract related
4	Greg	90	24	114	83	Contract related

Calls Summary By Topic: Contract related

Agent Name	Total of calls	Number of answered calls	Number of Dropped calls	Total Resolved	Precentage Total Solved
Becky	114	87	27	78	11.00%
Dan	123	101	22	91	12.83%
Diane	123	92	31	82	11.57%
Greg	114	90	24	83	11.71%
Jim	145	121	24	110	15.51%
Joe	103	84	19	75	10.58%
Martha	128	107	21	98	13.82%
Stewart	126	107	19	92	12.98%
	976	**789**	**187**	**709**	

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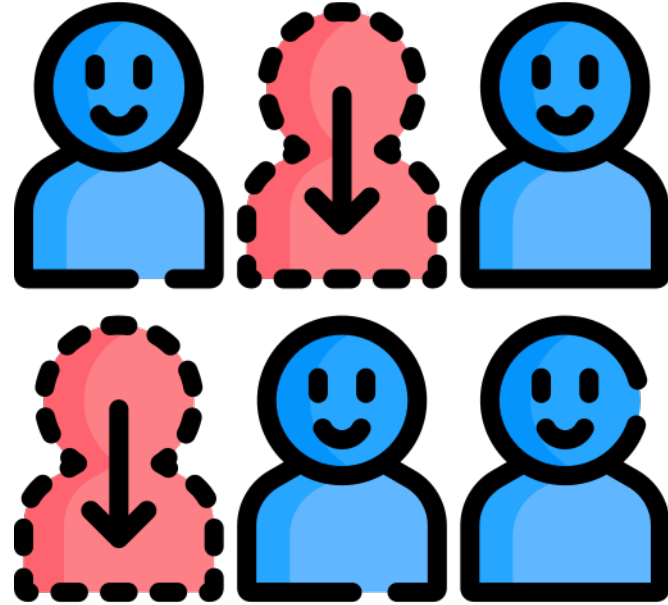
```sql
Create PROC Top_Churn_Reason_Percentage as
SELECT TOP 5
    Churn_Reason,Churn_Category,
    ROUND(COUNT(Customer_ID) *100 / SUM(COUNT(Customer_ID)) OVER(), 1) AS churn_percentage
FROM
    Customer as c, Status as stat, Churn_Category as cat, Churn_Reason as r

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;
```

	Churn_Reason	Churn_Category	churn_percentage
1	Competitor made better offer	Competitor	16
2	Competitor had better devices	Competitor	16
3	Attitude of support person	Attitude	11
4	Competitor offered more data	Competitor	6
5	Don't know	Other	6

SSRS

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
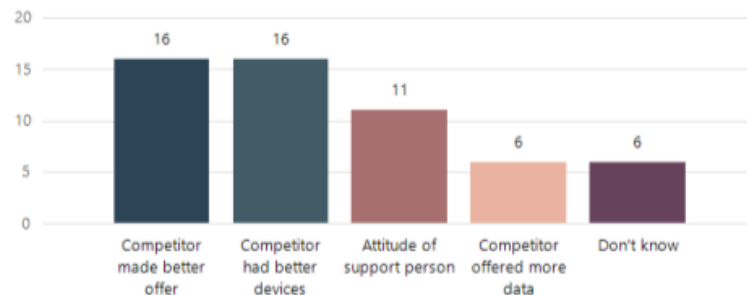
```sql
CREATE PROCEDURE Churners_Premium_TSupport
AS
BEGIN
SELECT
    ci.Premium_TSupport,
    COUNT(c.Customer_ID) AS Churned,
    ROUND(COUNT(c.Customer_ID) *100.0 / SUM(COUNT(c.Customer_ID)) OVER(),1) AS Churn_Percentage
FROM
    Customer_Internet ci, Customer c, Status s
WHERE
    c.Customer_ID = 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
```

	Premium_TSupport	Churned	Churn_Percentage
1	0	1559	83.400000000000
2	1	310	16.600000000000
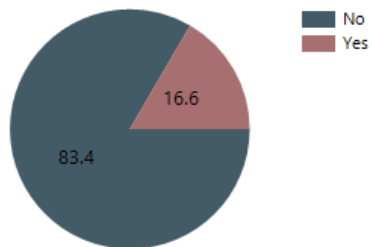
Contract Reports

```
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
```

	Contract_Type	Payment_Method	Total_charge	Avg_Revenue
1	Month-to-Month	Bank Withdrawal	3362255.45	1946.21
2	Month-to-Month	Credit Card	1227565.65	1455.36
3	Month-to-Month	Mailed Check	108210.6	639.69
4	One Year	Bank Withdrawal	2755055.85	4536
5	One Year	Credit Card	1742795.94	3533.51
6	One Year	Mailed Check	134140.2	2263.61
7	Two Year	Bank Withdrawal	3577016.35	5386.92
8	Two Year	Credit Card	3010379.75	4387.37
9	Two Year	Mailed Check	143305.45	2993.48

SSRS

Contract with payment method

Contract Type	Payment Method	Total charge	Avg Revenue	
Month-to-Month	Bank Withdrawal	3362255.45	1946.21	▼
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	▲

Contract Type & payment method

■ Month-to-Month   ■ One Year   ■ Two Year

Mailed Check

Credit Card

Bank Withdrawal
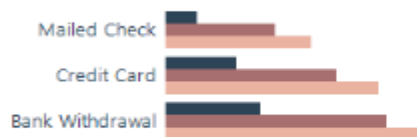
Power BI

Data Modeling
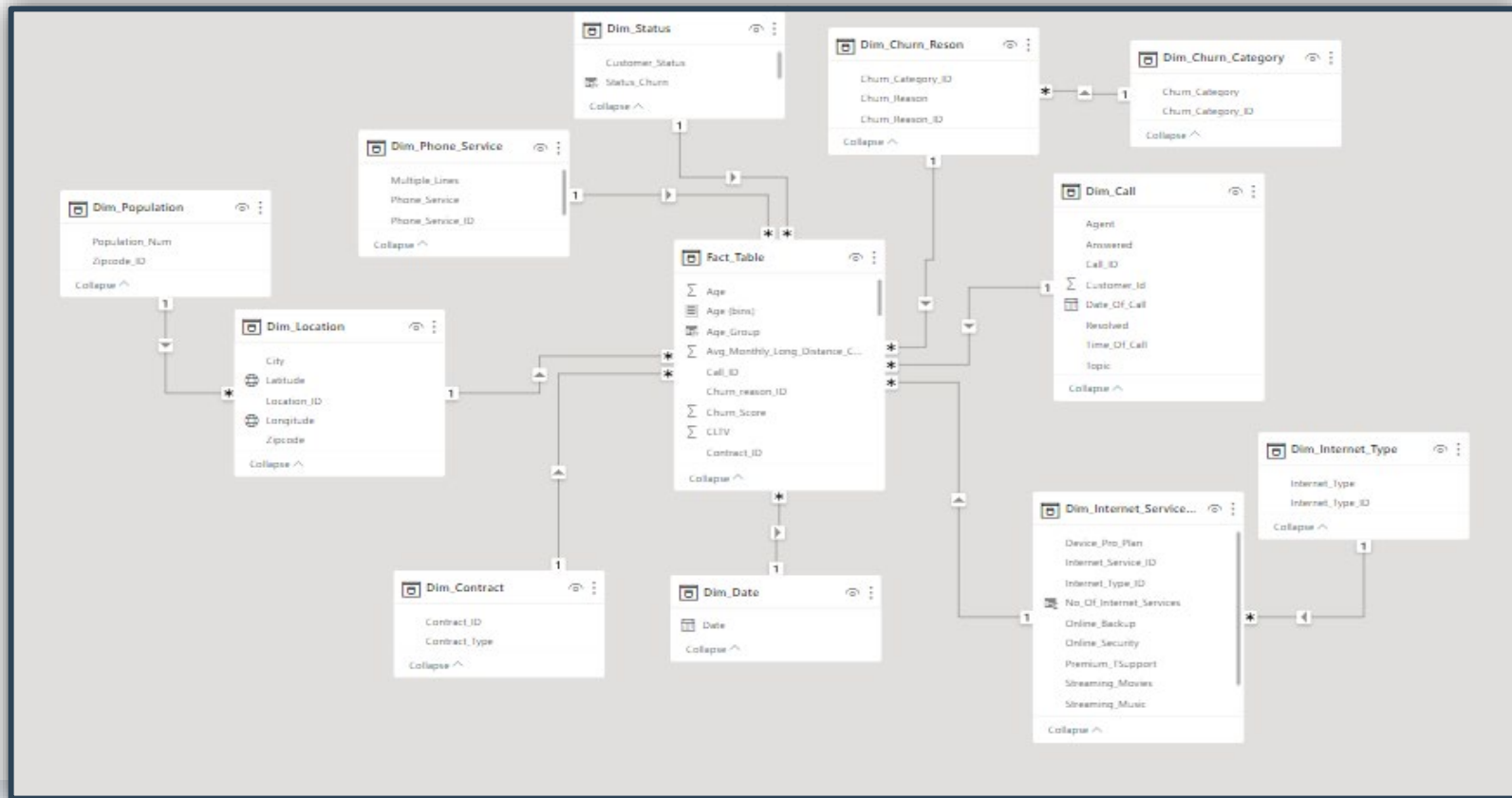
Dashboards

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
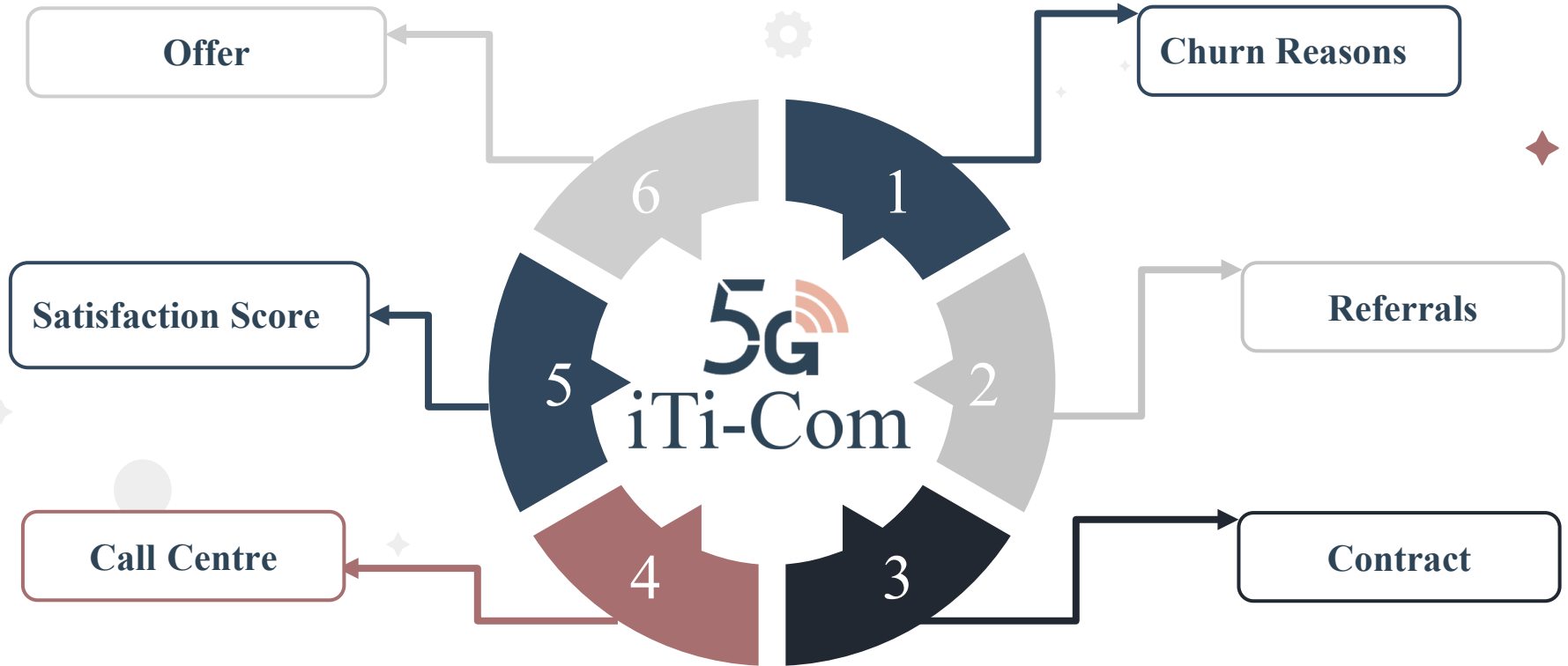27%

Churned Revenue
$3.68M

Joined Customers
6%

Joined Revenue
$0.05M

Insights

Insights

Offer

Churn Reasons

Satisfaction Score

Referrals

Call Centre

Contract

6

1

5

2

4

3

5G
iTi-Com

Insights

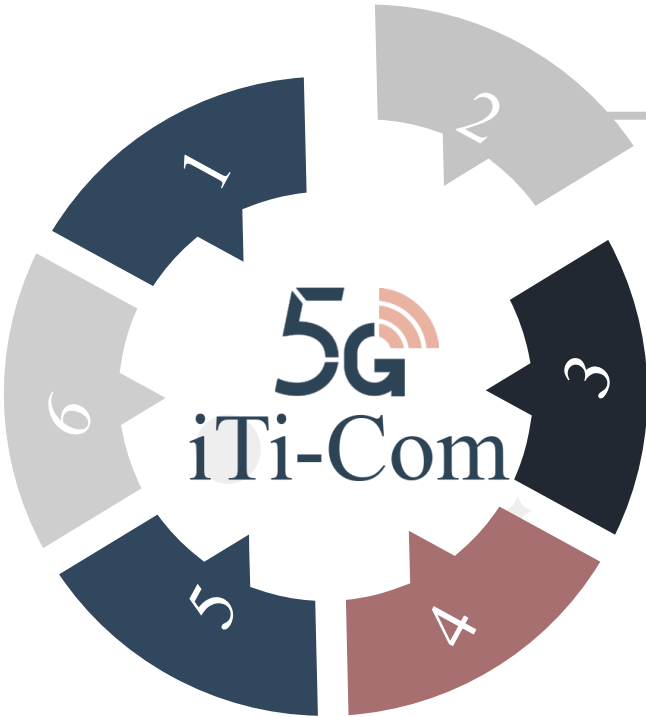**Churn Reasons**

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

Recommendation
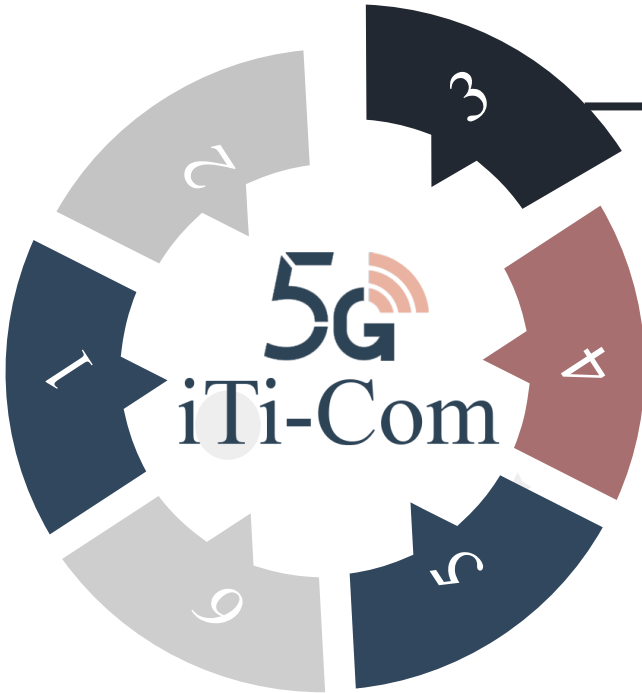➢ Customer relation training for support persons and service providers

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1
2
3
4
5
6

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, but also increase the loyalty of customers.

Insights

Contract

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

> Recommendation

Aggressively market and incentivize one and two-year plans.

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Insights

Call Centre

1. Calls Appendant Rate →**18.92%** of Calls Volume are Dropped.
2. Service Level → **81.08%** of Call Volume are Answered.
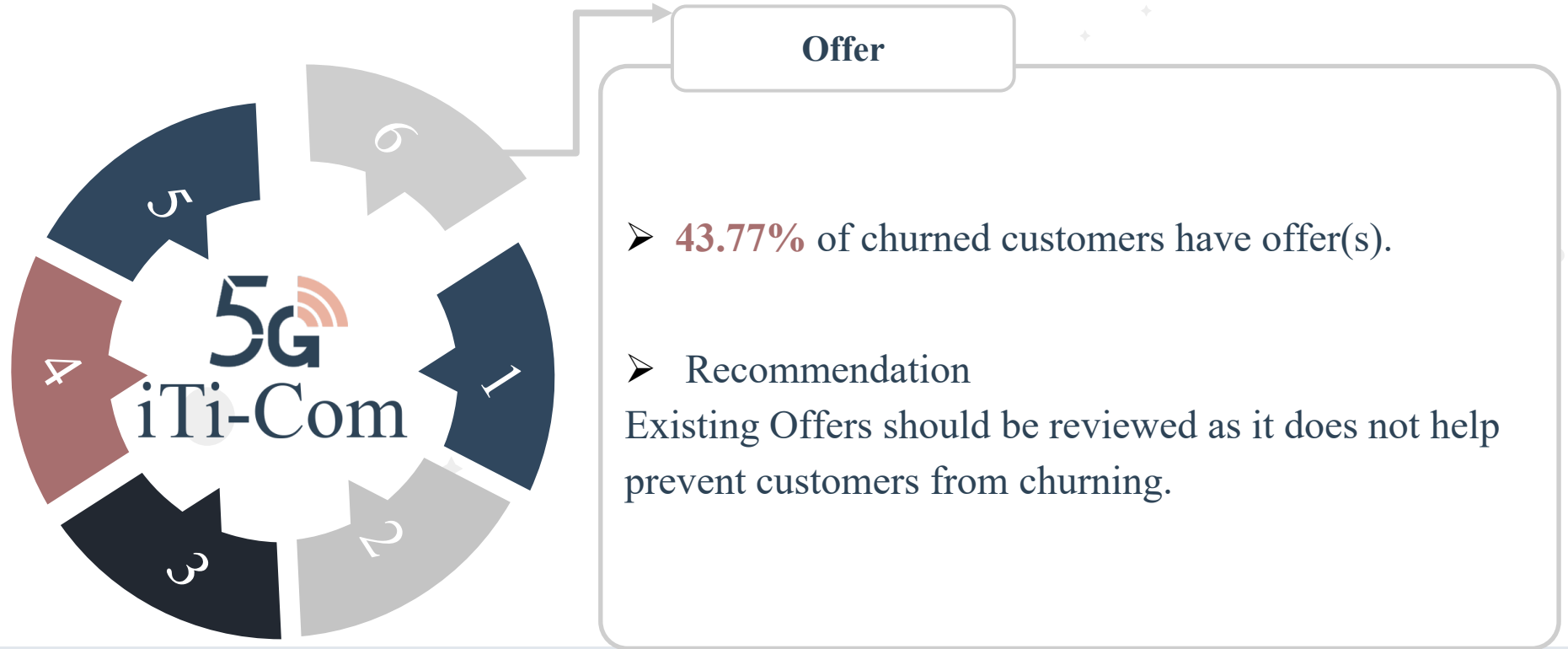3. Call Resolution (CR) Rate → **89.93%** of answered Calls are Solved

➢ Recommendation

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

Insights

Satisfaction Score

➢ 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

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Insights

Offer

➤ **43.77%** of churned customers have offer(s).

➤ Recommendation

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

Our Project Story

TIMELINE

Pre Project & Planning

Data Base

Data Warehouse

Power Bi

Documentation

Finish & Submit

25 September

4 October

9 October

11 October

15 October

20 October

Thank You