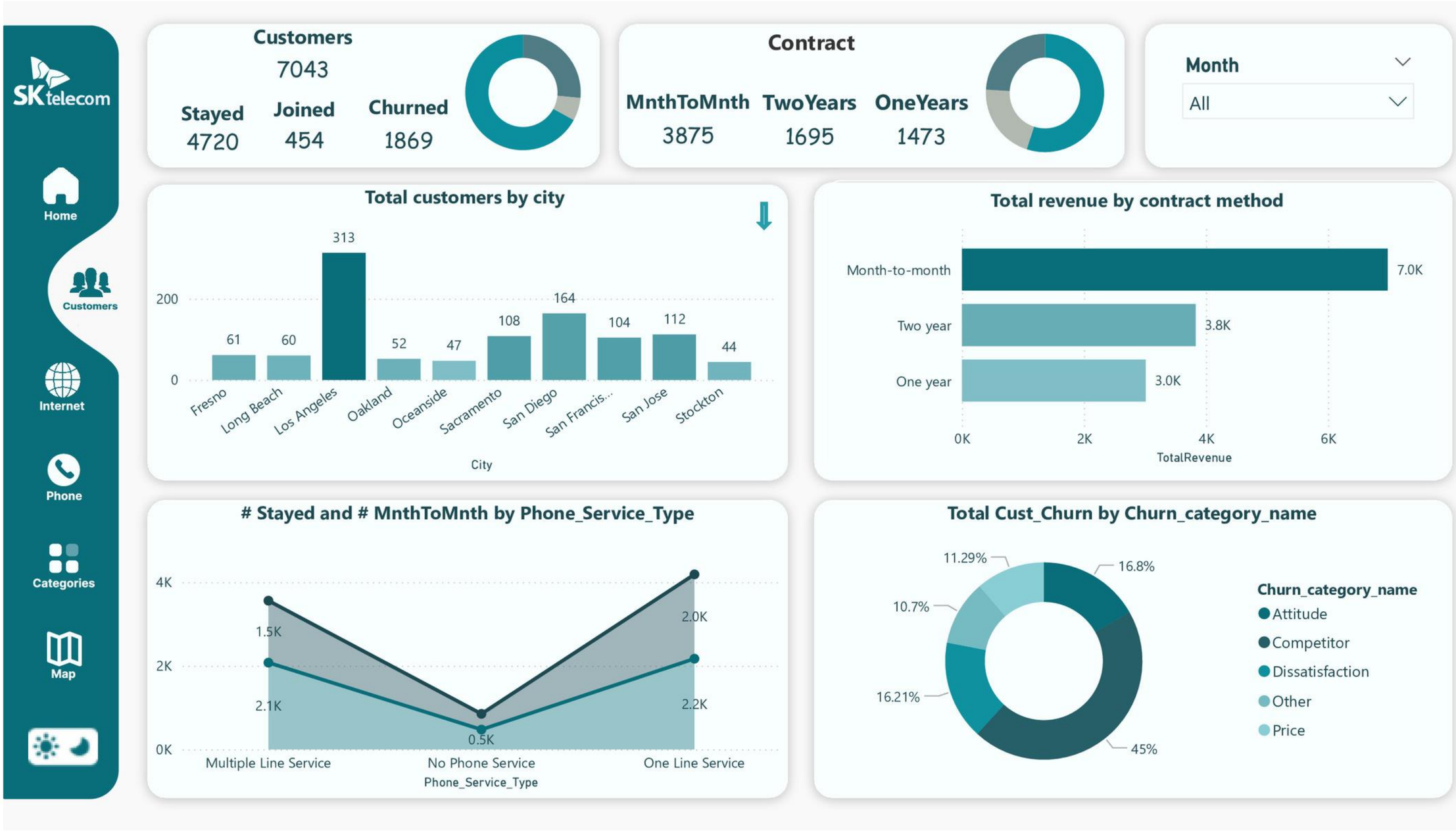
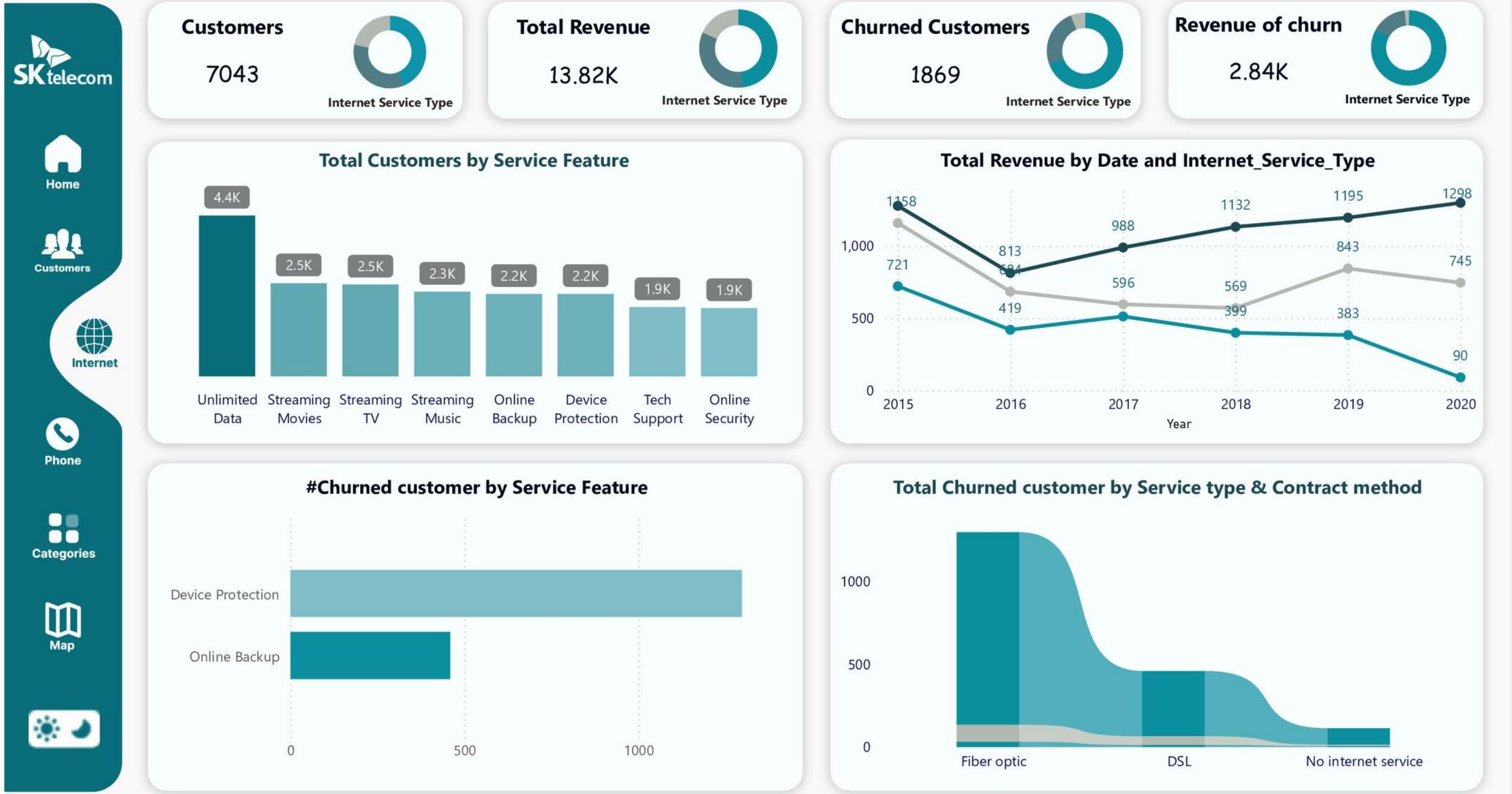
Overview (White Mode)

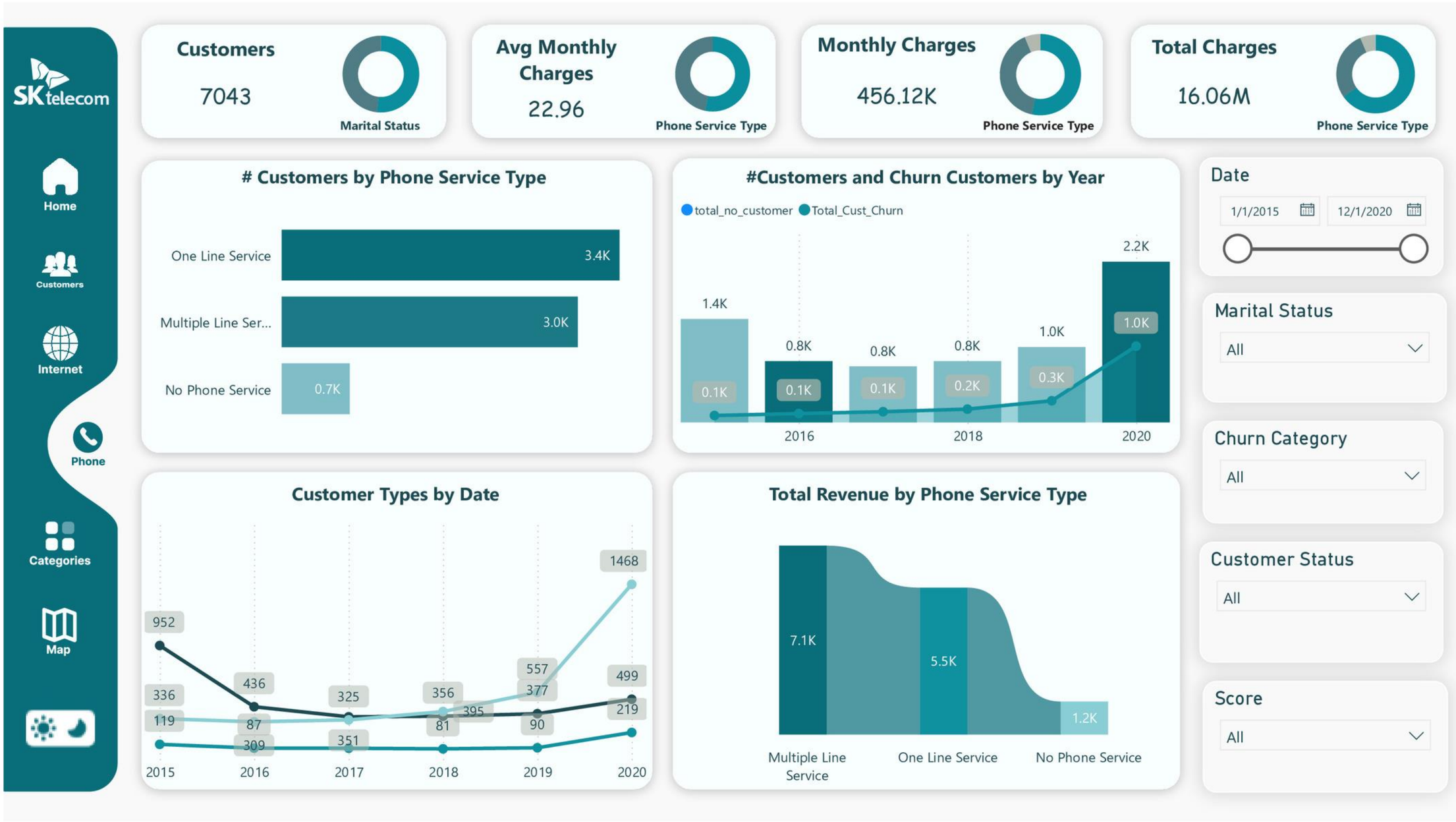
Customer (White Mode)



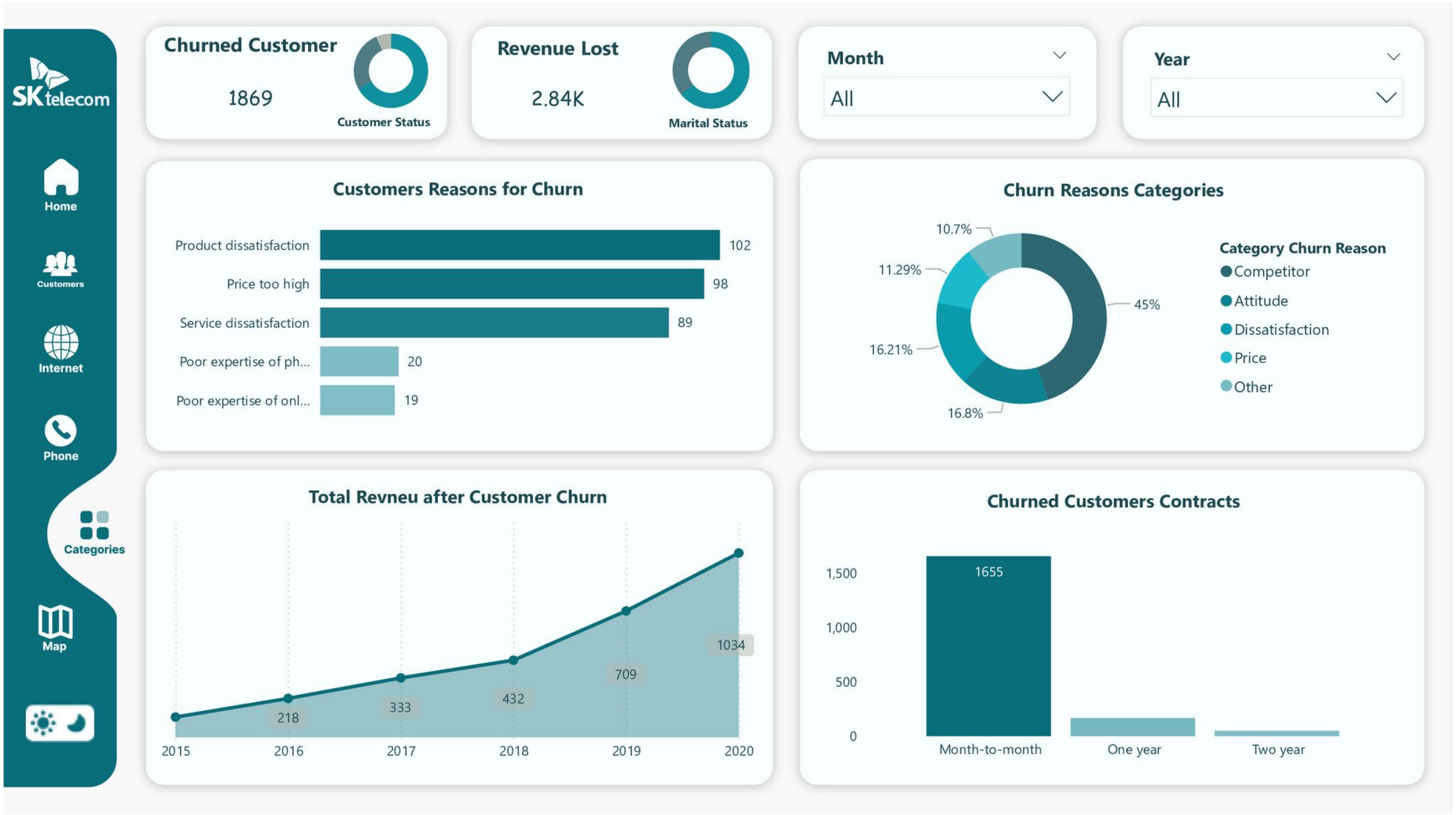
Internet Service (White Mode)



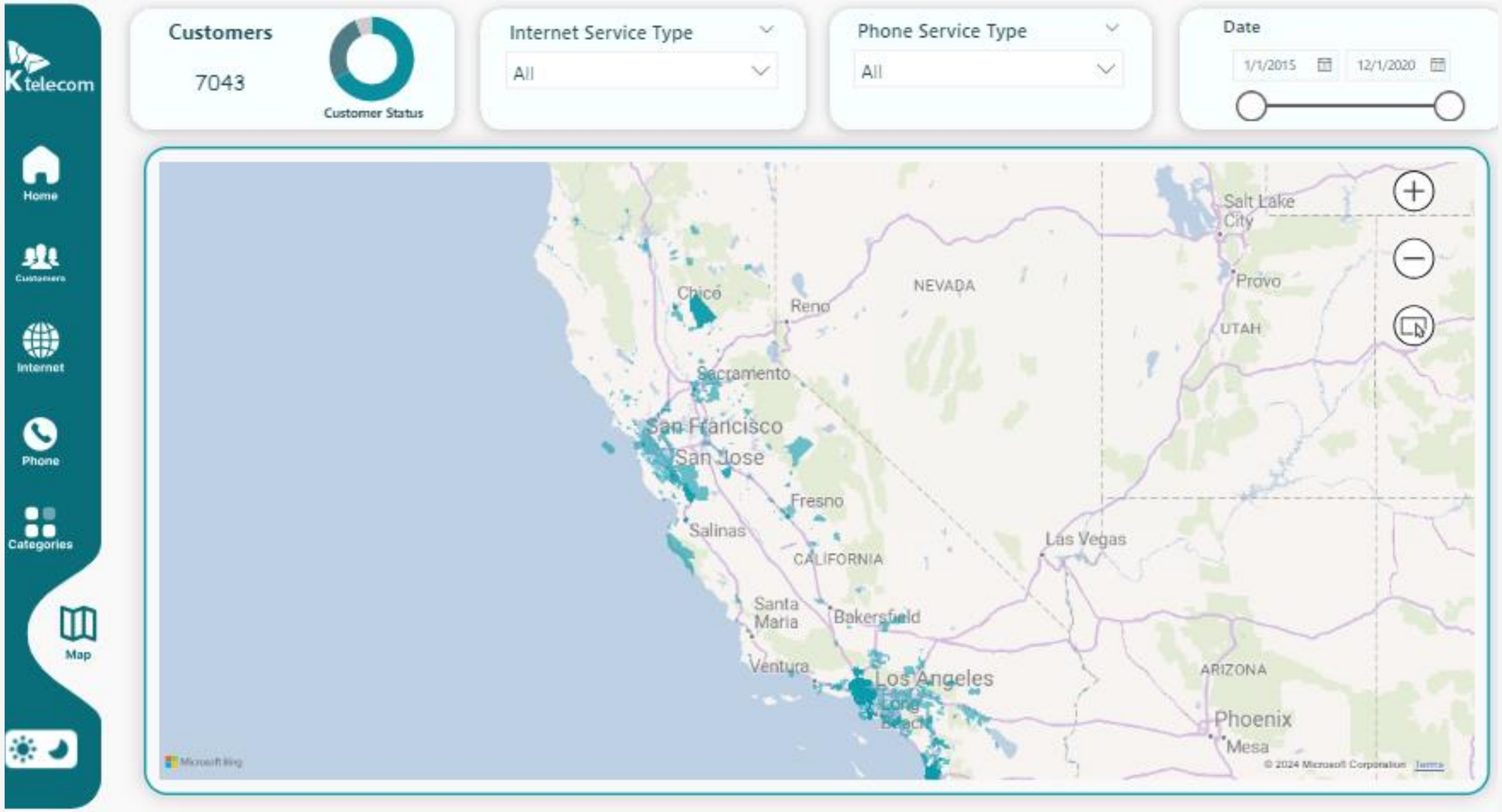
Phone Service (White Mode)



Category (White Mode)



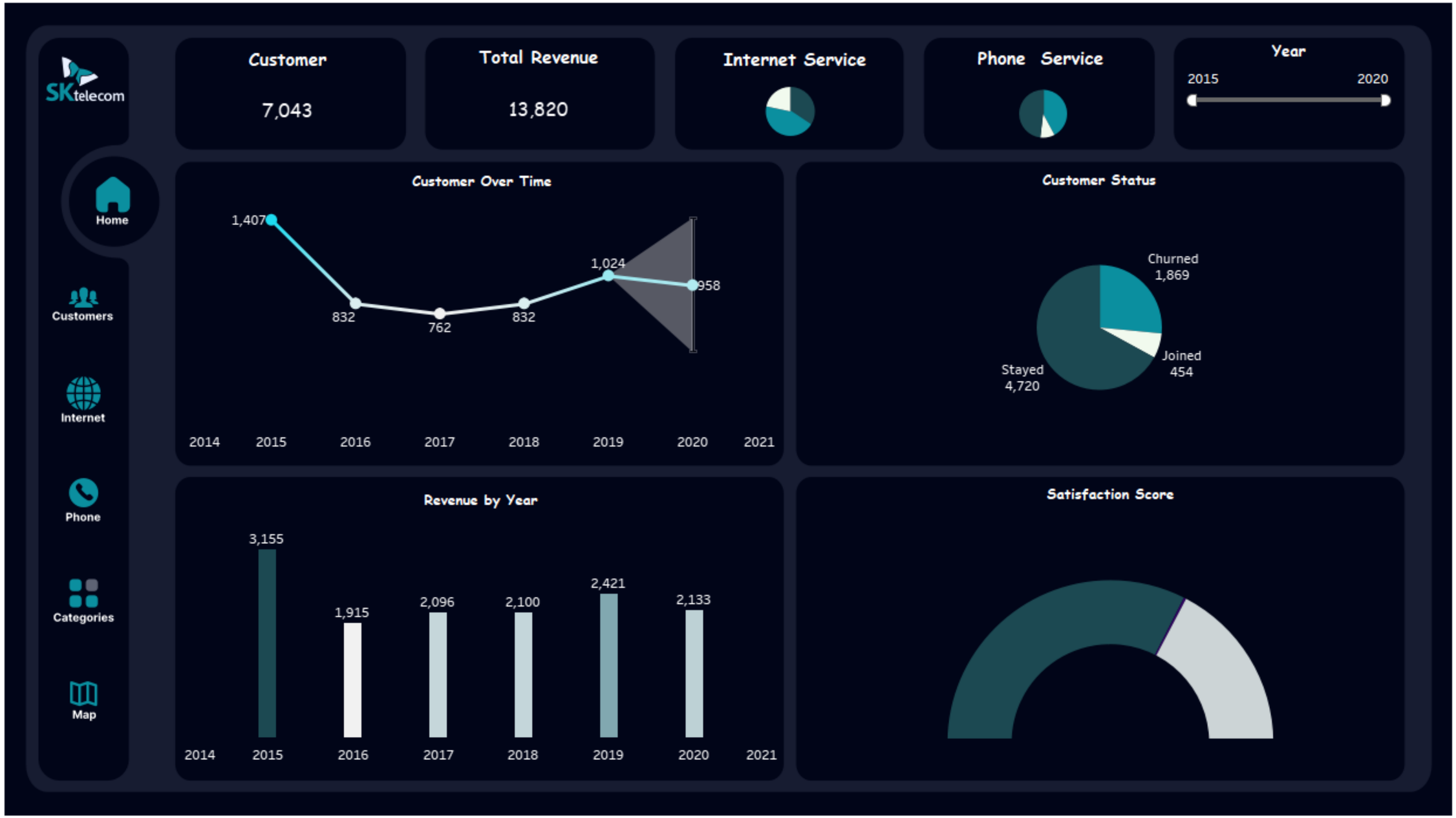
Map (White Mode)



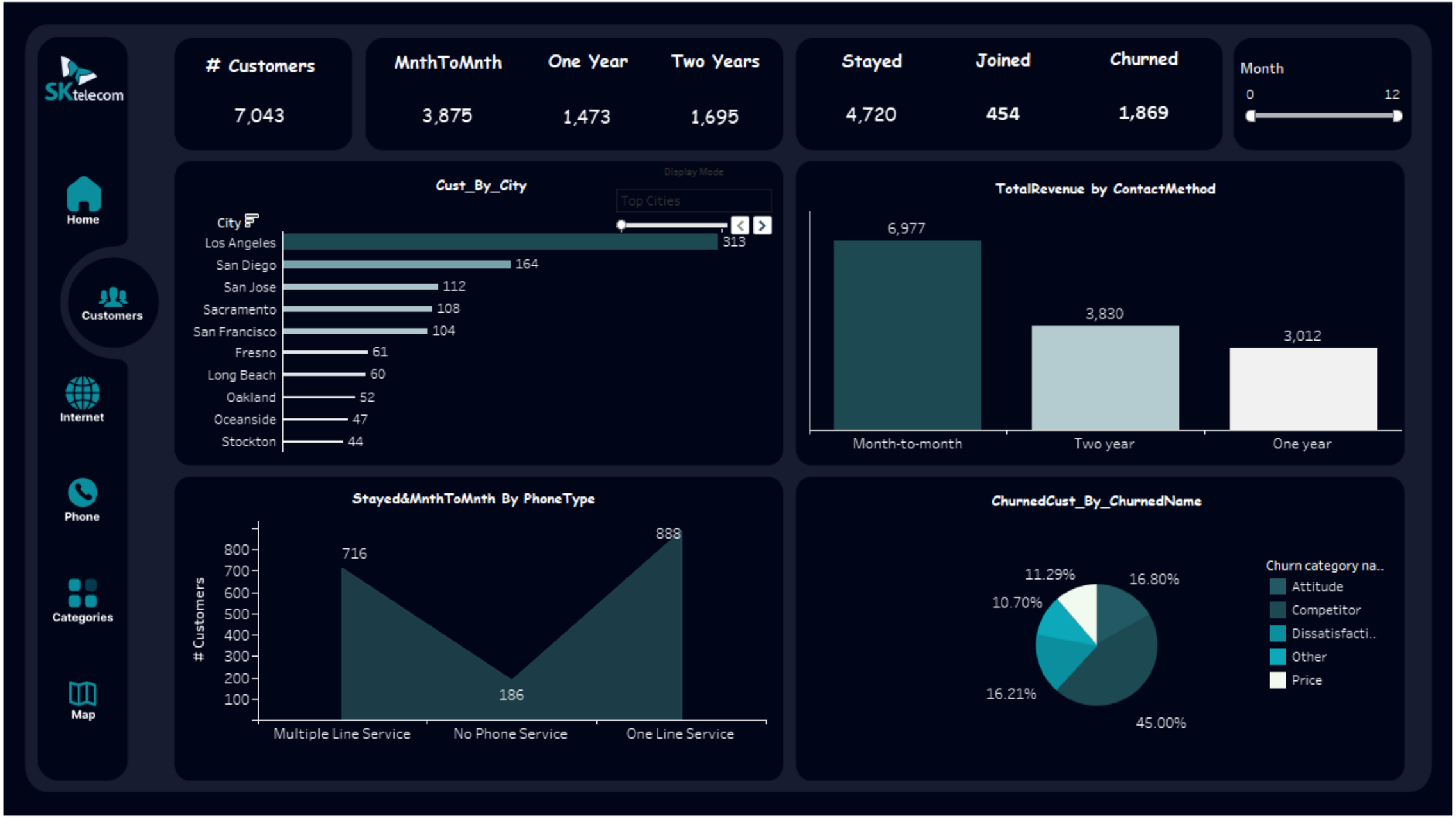
Overview (Dark Mode)

Tableau Analysis

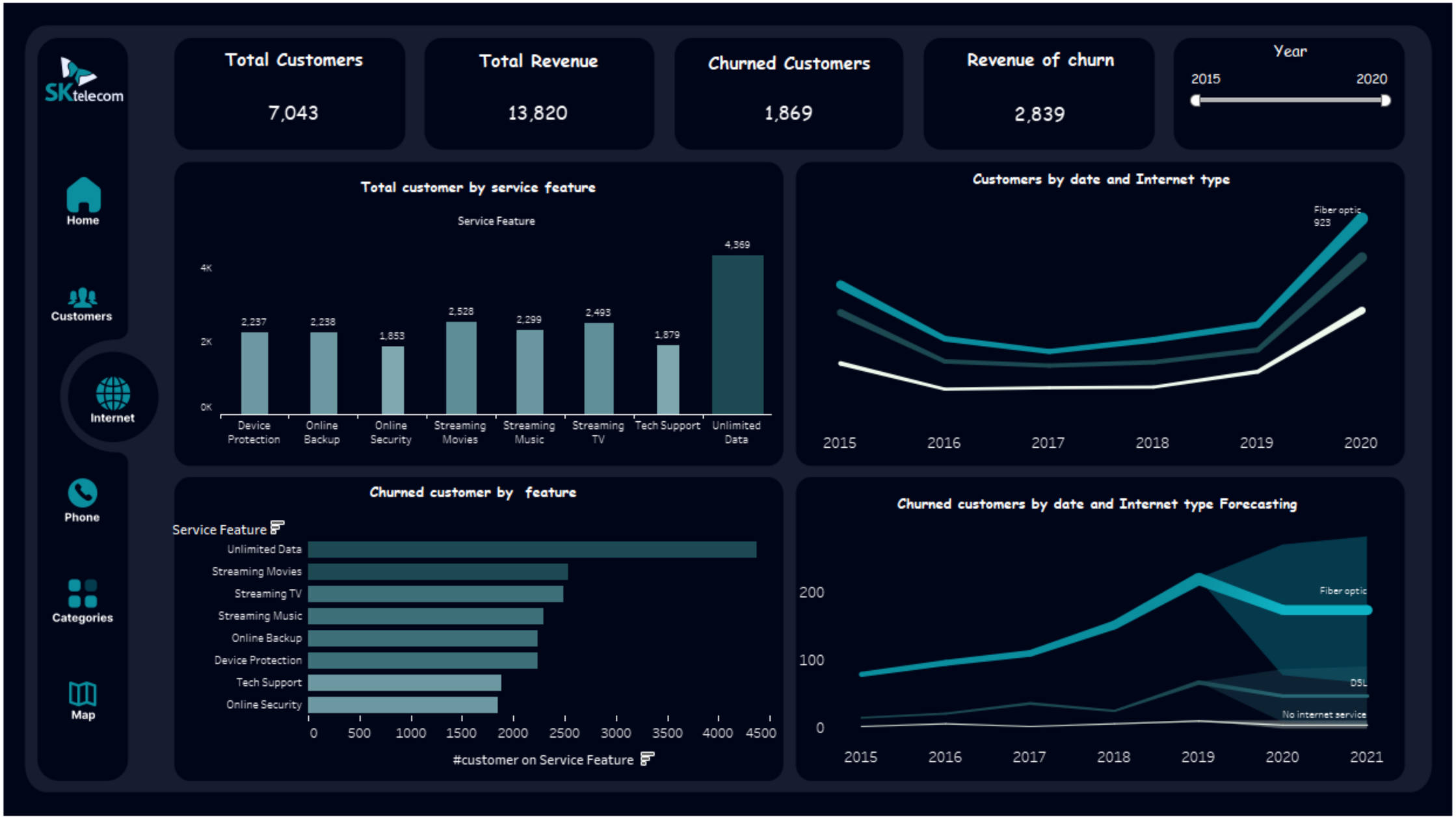
Overview


SKtelecom
Customer
7,043
Total Revenue
13,820
Internet Service
Phone Service
Year
2015
2020
Home
Customers
Internet
Phone
Categories
Map
Customer Over Time
1,407
832
762
832
1,024
958
2014
2015
2016
2017
2018
2019
2020
2021
Customer Status
Churned
1,869
Joined
454
Stayed
4,720
Revenue by Year
3,155
1,915
2,096
2,100
2,421
2,133
2014
2015
2016
2017
2018
2019
2020
2021
Satisfaction Score

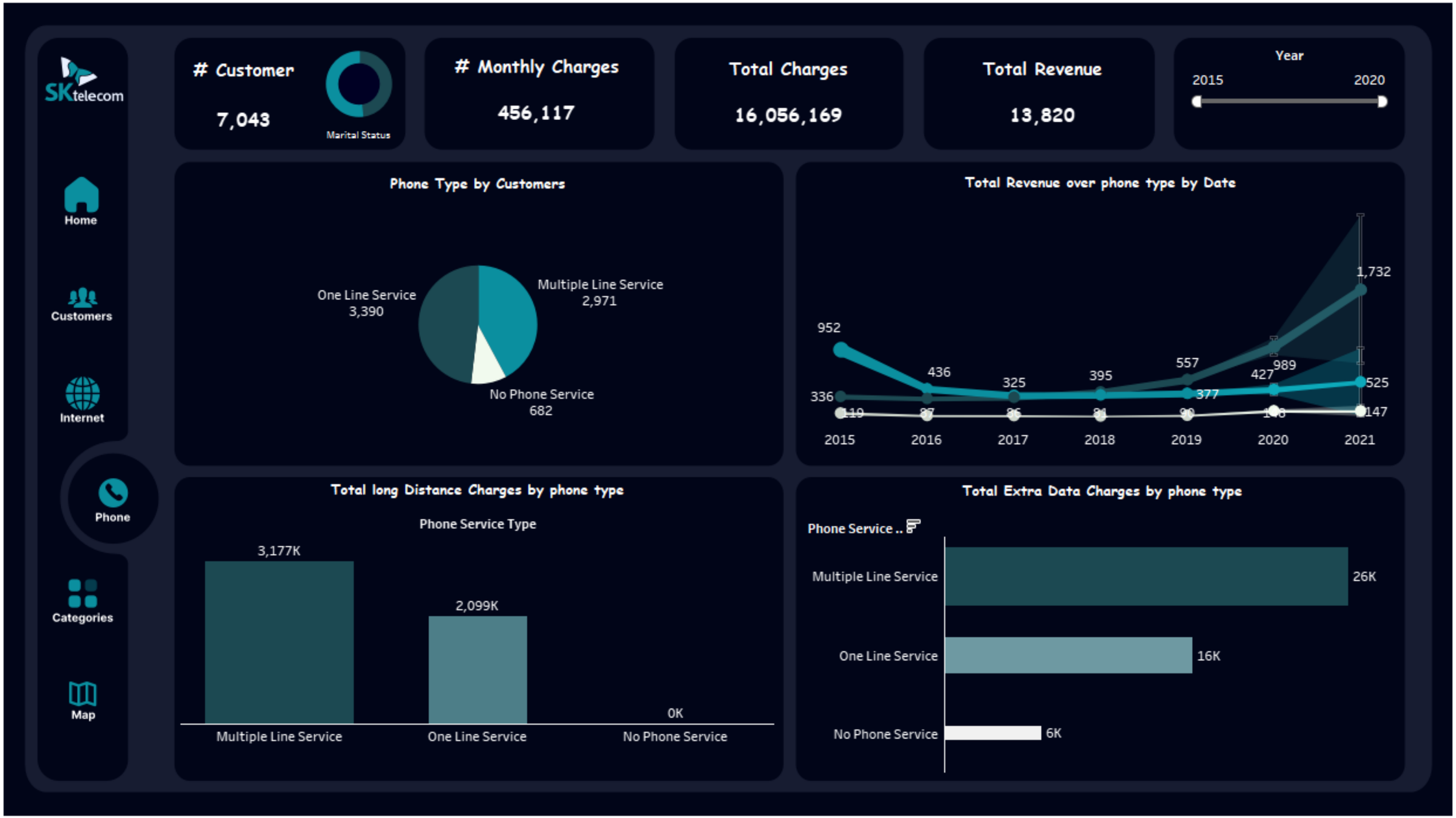
Customer


SKtelecom
Home
Customers
Internet
Phone
Categories
Map
Customers
7,043
MnthToMnth
3,875
One Year
1,473
Two Years
1,695
Stayed
4,720
Joined
454
Churned
1,869
Month
0
12
Cust_By_City
Display Mode
Top Cities
City
Los Angeles 313
San Diego 164
San Jose 112
Sacramento 108
San Francisco 104
Fresno 61
Long Beach 60
Oakland 52
Oceanside 47
Stockton 44
TotalRevenue by ContactMethod
6,977
3,830
3,012
Month-to-month
Two year
One year
Stayed&MnthToMnth By PhoneType
Customers
800
700
600
500
400
300
200
100
716
186
888
Multiple Line Service
No Phone Service
One Line Service
ChurnedCust_By_ChurnedName
11.29%
16.80%
10.70%
16.21%
45.00%
Churn category na..
Attitude
Competitor
Dissatisfacti..
Other
Price

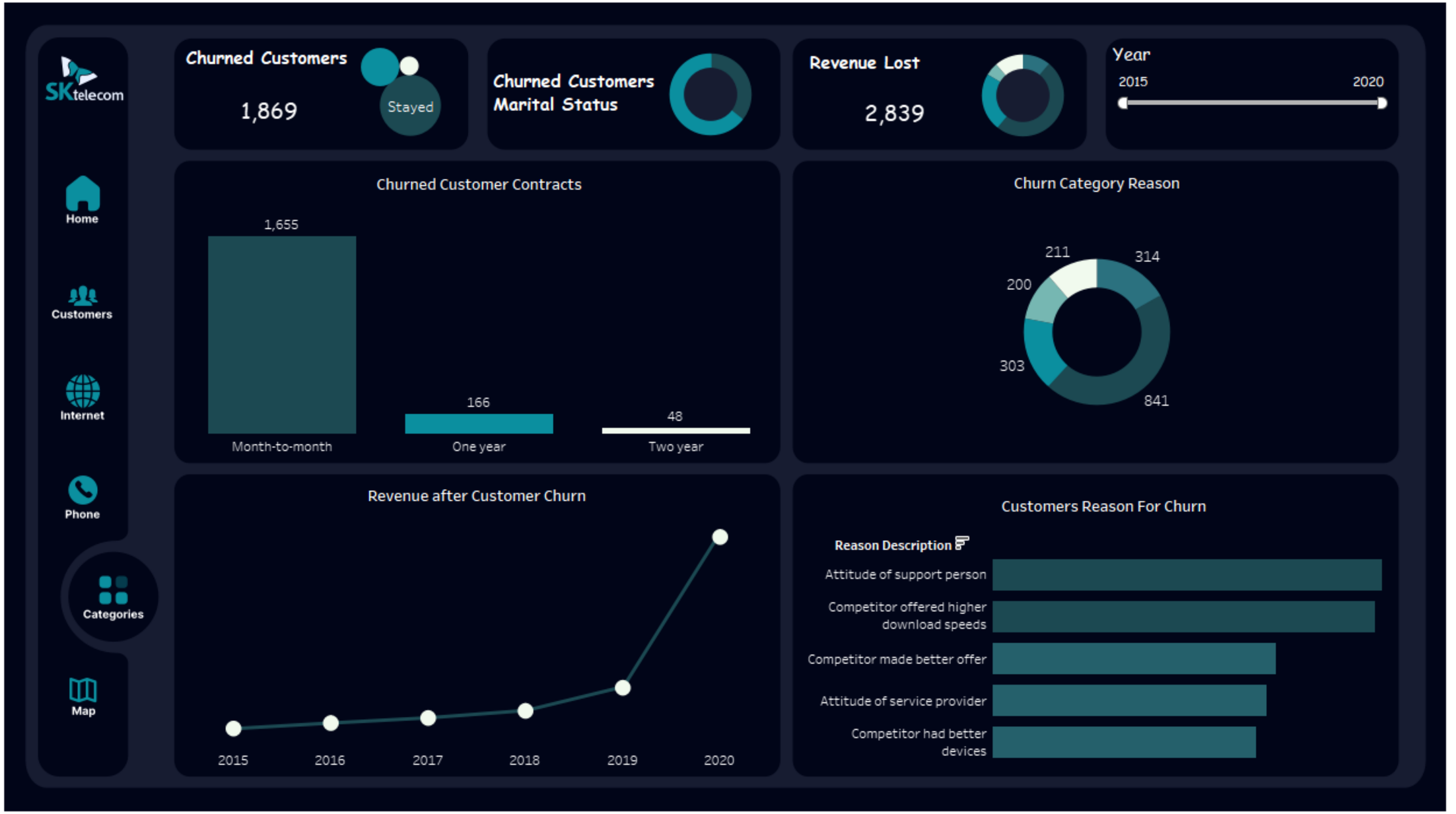
Internet Service



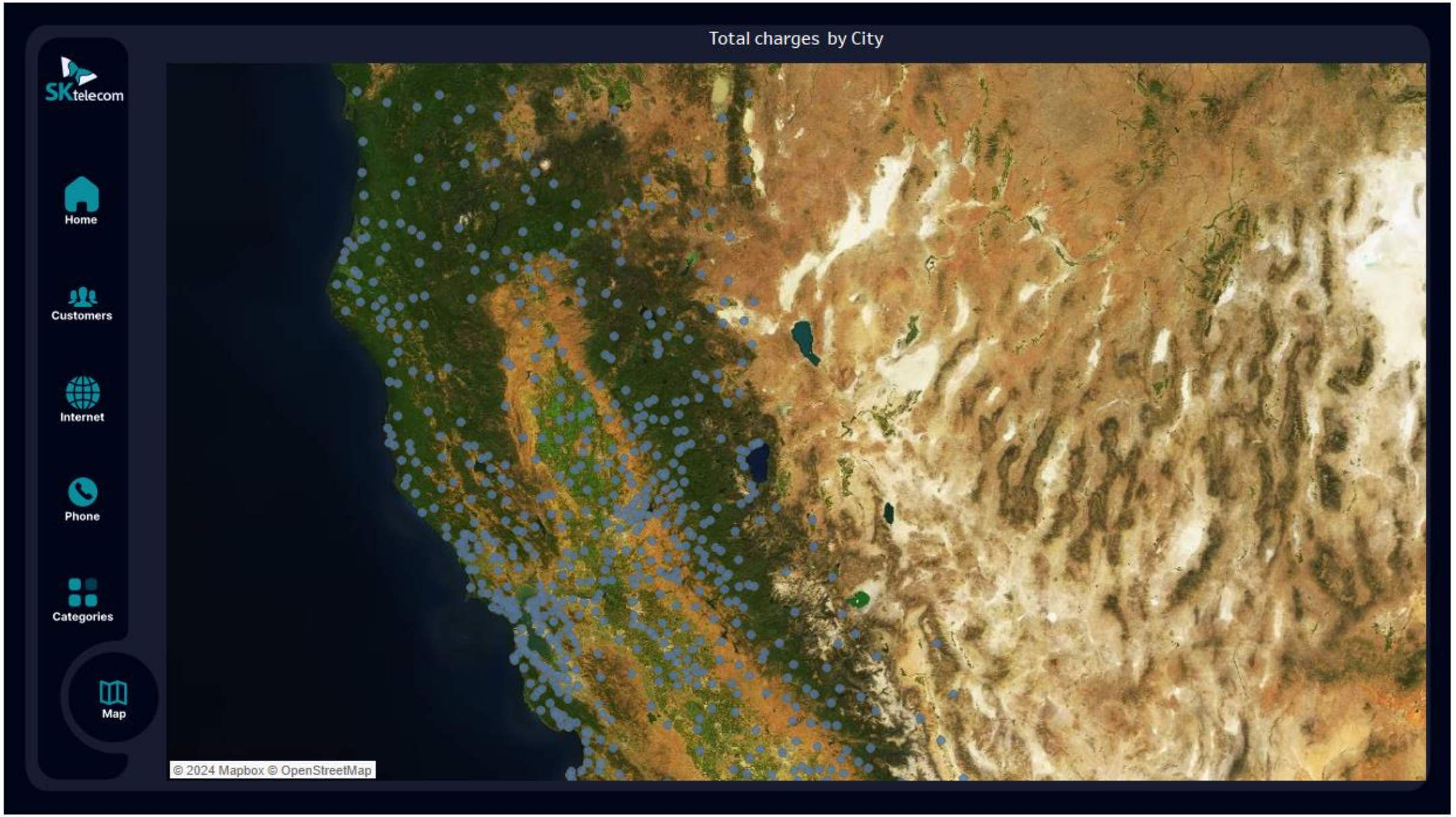
Phone Service



Category


SKtelecom
Home
Customers
Internet
Phone
Categories
Map
Churned Customers
1,869
Stayed
Churned Customers
Marital Status
Revenue Lost
2,839
Year
2015
2020
Churned Customer Contracts
1,655
166
48
Month-to-month
One year
Two year
Churn Category Reason
211
314
200
303
841
Revenue after Customer Churn
2015
2016
2017
2018
2019
2020
Customers Reason For Churn
Reason Description
Attitude of support person
Competitor offered higher download speeds
Competitor made better offer
Attitude of service provider
Competitor had better devices

Map


Total charges by City
SKtelecom
Home
Customers
Internet
Phone
Categories
Map
© 2024 Mapbox © OpenStreetMap

Database Design

Collecting and understanding data ensures a clear foundation. Cleaning enhances accuracy, and an ERD organizes the structure. Creating SQL tables and transferring data supports efficient analysis and decision-making.

01 Data Collection

02 Understanding the data

03 Data Cleaning

04 Design entity relation diagram (ERD)

05 Modeling and Mapping

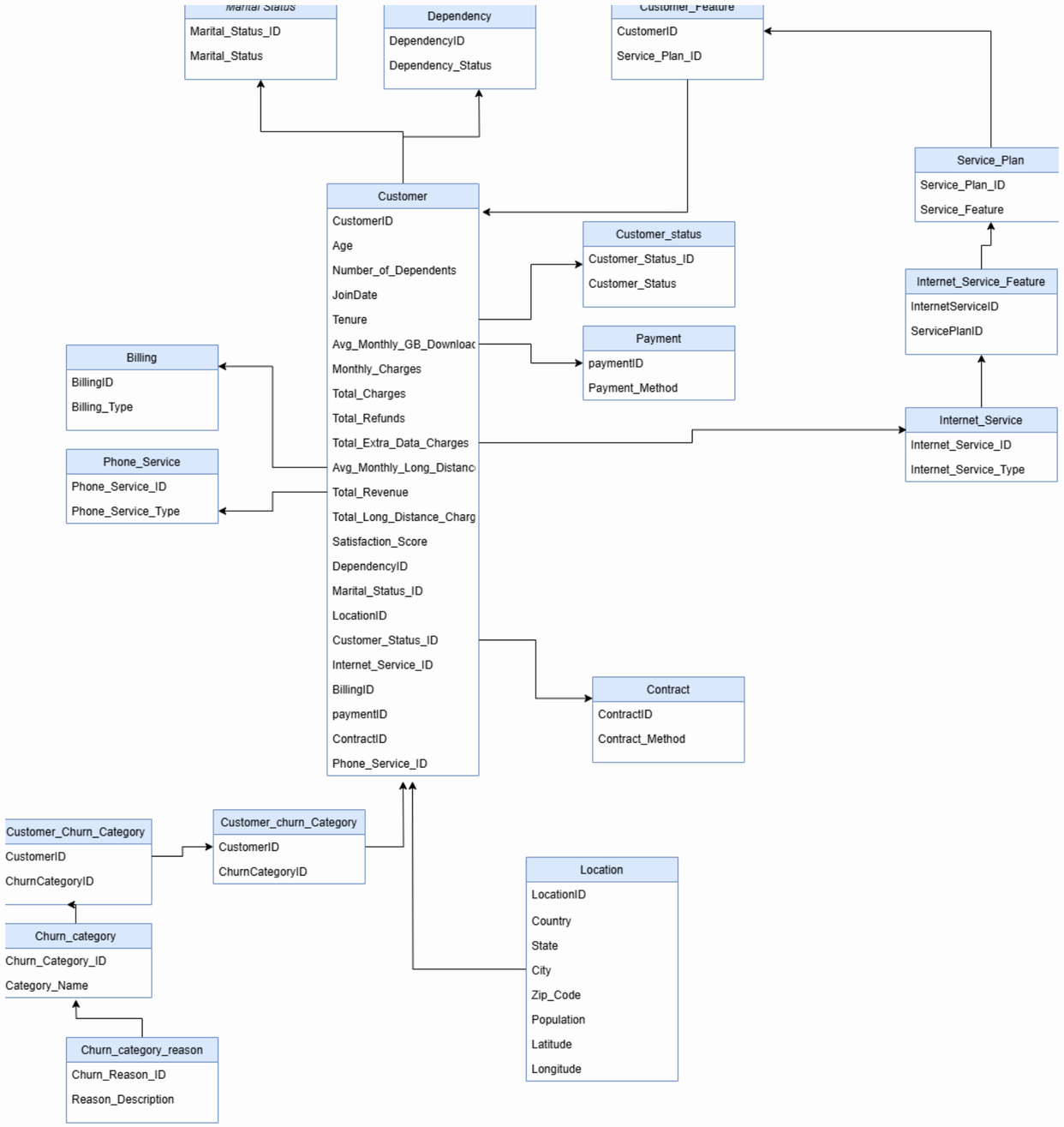
06 Creating Data Base Using SQL

07 Transferring the data into SQL

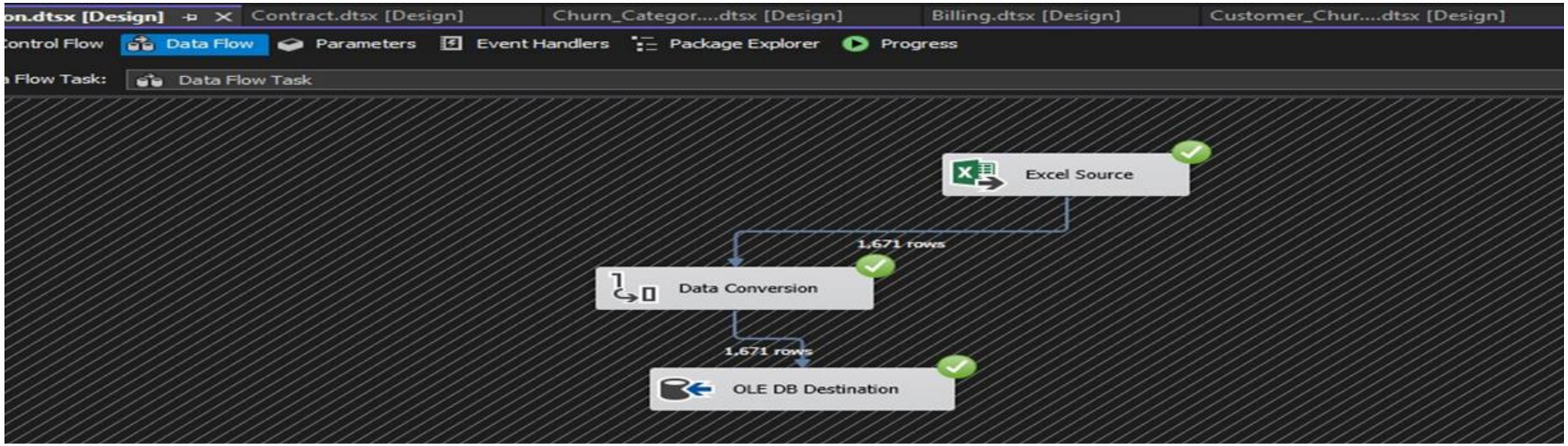
ERD

Telecom ERD
Satisfaction Score
TotalExtraData Charges
AvgMonthly LongDistance Charges
Total LongDistance Charges
TotalRevenue
TotalRefunds
TotalCharges
Monthly Charges
AvgMonth Download
#OfDependent
Dependent Status
DependencyID
Dependency
HAS
Customer
CustomerID
Age
JoinDate
Tenure
Marital Status
MaritalStatus ID
Marital Status
City
ZipCode
State
Country
Location
Population
Latitude
Longitude
Contract
Billing
BillingID
BillingType
Customer Status
Customer StatusID
Customer Status
Phone Service
PhoneService ID
PhoneService Type
Payment
PaymentID
Payment Method
Churn Reason
ChurnReason ID
Reason Description
Churn Category
ChurnCategory ID
CategoryName
Internet Service
InternetService ID
InternetService Type
Service Plan
ServicePlanID
ServiceFeature

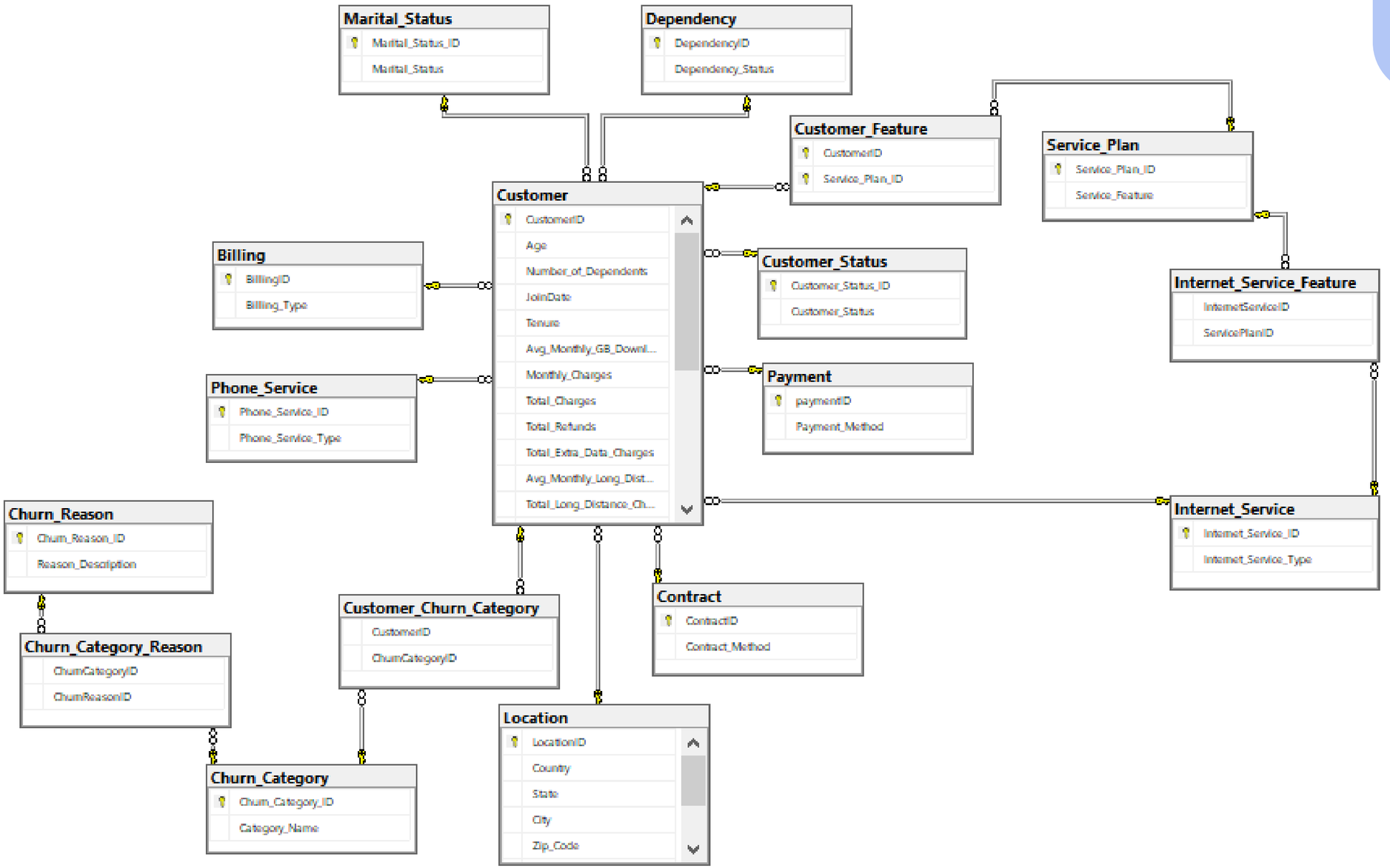
Mapping


Marital_Status_ID
Marital_Status
Dependency
DependencyID
Dependency_Status
CustomerID
Service_Plan_ID
Service_Plan
Service_Plan_ID
Service_Feature
Customer
CustomerID
Age
Number_of_Dependents
JoinDate
Tenure
Avg_Monthly_GB_Downloac
Monthly_Charges
Total_Charges
Total_Refunds
Total_Extra_Data_Charges
Avg_Monthly_Long_Distanc
Total_Revenue
Total_Long_Distance_Charg
Satisfaction_Score
DependencyID
Marital_Status_ID
LocationID
Customer_Status_ID
Internet_Service_ID
BillingID
paymentID
ContractID
Phone_Service_ID
Customer_status
Customer_Status_ID
Customer_Status
Payment
paymentID
Payment_Method
Billing
BillingID
Billing_Type
Phone_Service
Phone_Service_ID
Phone_Service_Type
Internet_Service_Feature
InternetServiceID
ServicePlanID
Internet_Service
Internet_Service_ID
Internet_Service_Type
Contract
ContractID
Contract_Method
Customer_Churn_Category
CustomerID
ChurnCategoryID
Customer_churn_Category
CustomerID
ChurnCategoryID
Churn_category
Churn_Category_ID
Category_Name
Churn_category_reason
Churn_Reason_ID
Reason_Description
Location
LocationID
Country
State
City
Zip_Code
Population
Latitude
Longitude

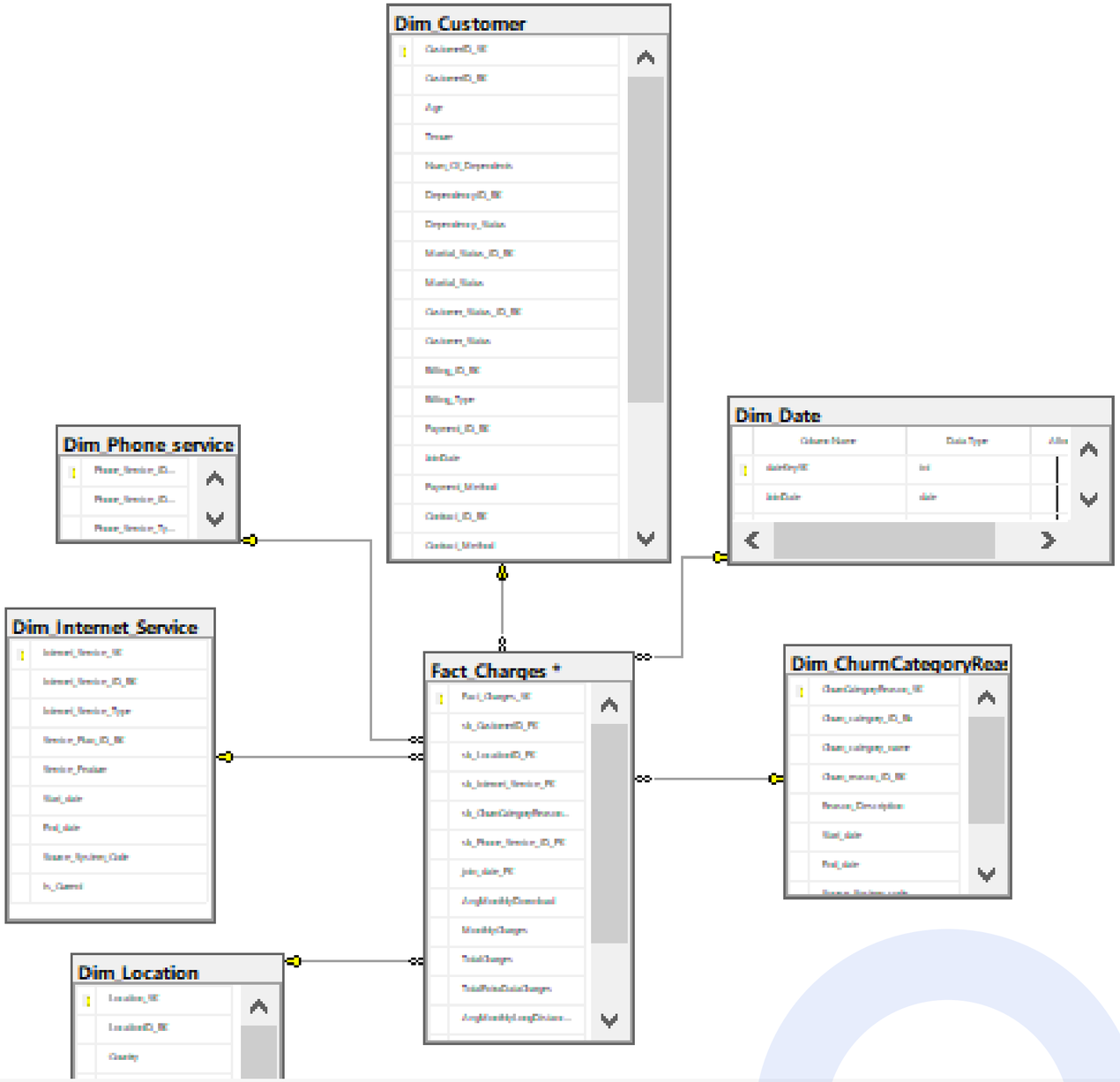
Transfer data to SQL



Database Diagram



DWH Diagram


Dim_Customer
Dim_Phone service
Dim_Date
Dim_Internet_Service
Fact_Charges *
Dim_ChurnCategoryReas
Dim_Location

Creating DWH using SQL

```sql
CREATE DATABASE TelecomDWH;
USE TelecomDWHS;

CREATE TABLE DimCustomer (
    CustomerID INT PRIMARY KEY,
    CustomerName NVARCHAR(255),
    Gender CHAR(1),
    SeniorCitizen BIT,
    Partner BIT,
    Dependents BIT,
    Tenure INT
);

CREATE TABLE Dim_Phone_Service (
    PhoneServiceID INT PRIMARY KEY,
    PhoneServiceType NVARCHAR(255),
    MultipleLines BIT
);

CREATE TABLE Dim_Internet_Service (
    InternetServiceID INT PRIMARY KEY,
    InternetServiceType NVARCHAR(255),
    OnlineSecurity BIT,
    OnlineBackup BIT,
    DeviceProtection BIT,
    TechSupport BIT,
    StreamingTV BIT,
    StreamingMovies BIT
);

CREATE TABLE Dim_Location (
    LocationID INT PRIMARY KEY,
    City NVARCHAR(255),
    State NVARCHAR(255),
    Country NVARCHAR(255),
    ZipCode NVARCHAR(10)
);
```

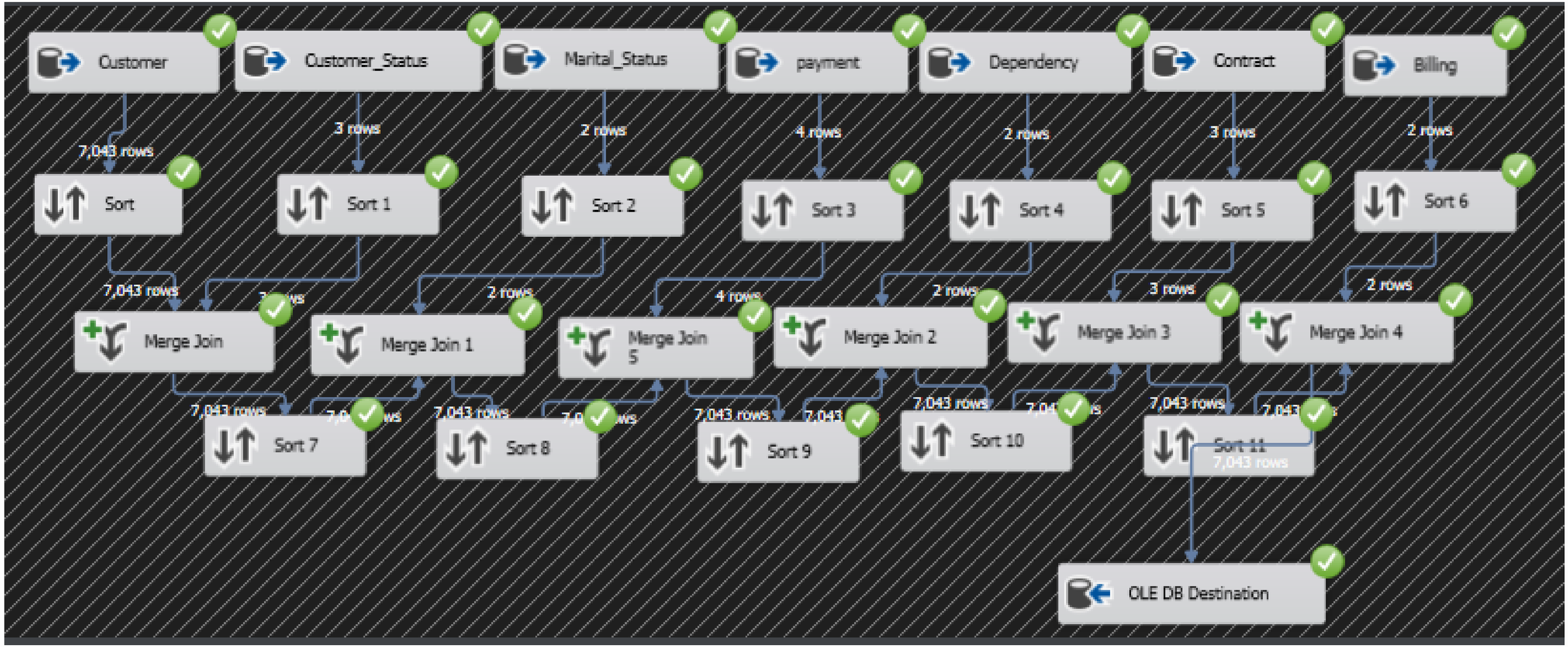
```sql
CREATE TABLE Dim_Date (
    DateID INT PRIMARY KEY,
    FullDate DATE,
    Year INT,
    Quarter INT,
    Month INT,
    Day INT,
    Weekday NVARCHAR(50)
);

CREATE TABLE Dim_ChurnCategoryReason (
    ChurnCategoryID INT PRIMARY KEY,
    ChurnCategory NVARCHAR(255),
    ChurnReason NVARCHAR(255)
);

CREATE TABLE Fact_Charges (
    ChargeID INT PRIMARY KEY,
    CustomerID INT,
    DateID INT,
    PhoneServiceID INT,
    InternetServiceID INT,
    LocationID INT,
    ChurnCategoryID INT,
    MonthlyCharges DECIMAL(10, 2),
    TotalCharges DECIMAL(10, 2),
    FOREIGN KEY (CustomerID) REFERENCES DimCustomer(CustomerID),
    FOREIGN KEY (DateID) REFERENCES Dim_Date(DateID),
    FOREIGN KEY (PhoneServiceID) REFERENCES Dim_Phone_Service(PhoneServiceID),
    FOREIGN KEY (InternetServiceID) REFERENCES Dim_Internet_Service(InternetServiceID),
    FOREIGN KEY (LocationID) REFERENCES Dim_Location(LocationID),
    FOREIGN KEY (ChurnCategoryID) REFERENCES Dim_ChurnCategoryReason(ChurnCategoryID)
);
```

ETL Process Overview

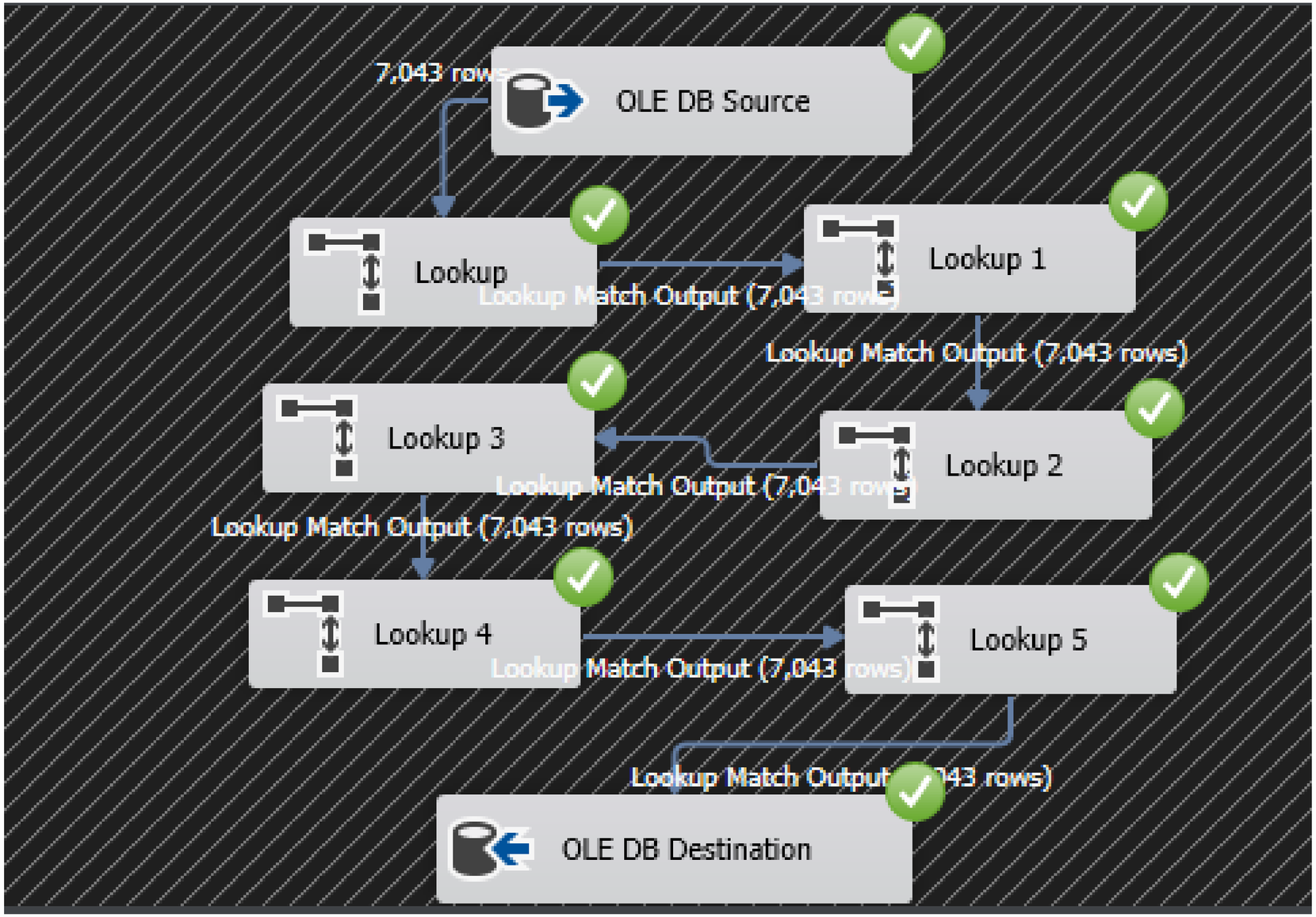
To facilitate the analysis of SK’s customer churn data, an ETL (Extract, Transform, Load) process was implemented. This process transforms the data from Data Base into a structured SQL Server Data Warehouse (DWH). The following tables were created in the DWH to organize the data effectively:

- Date
- Customer
- Fact
- category
- Location
- Internet_Service
- Phone_Service

ETL Process


Customer
Customer_Status
Marital_Status
payment
Dependency
Contract
Billing
7,043 rows
3 rows
2 rows
4 rows
2 rows
3 rows
2 rows
Sort
Sort 1
Sort 2
Sort 3
Sort 4
Sort 5
Sort 6
7,043 rows
2 rows
4 rows
2 rows
3 rows
2 rows
Merge Join
Merge Join 1
Merge Join 5
Merge Join 2
Merge Join 3
Merge Join 4
7,043 rows
7,043 rows
7,043 rows
7,043 rows
7,043 rows
Sort 7
Sort 8
Sort 9
Sort 10
Sort 11
7,043 rows
OLE DB Destination

ETL Process


7,043 rows
OLE DB Source
Lookup
Lookup Match Output (7,043 rows)
Lookup 1
Lookup Match Output (7,043 rows)
Lookup 2
Lookup Match Output (7,043 rows)
Lookup 3
Lookup Match Output (7,043 rows)
Lookup 4
Lookup Match Output (7,043 rows)
Lookup 5
Lookup Match Output
OLE DB Destination

ANALYZING DATA

inspects, cleans, transforms, and models data to extract insights and support decision-making

VISUALIZATION

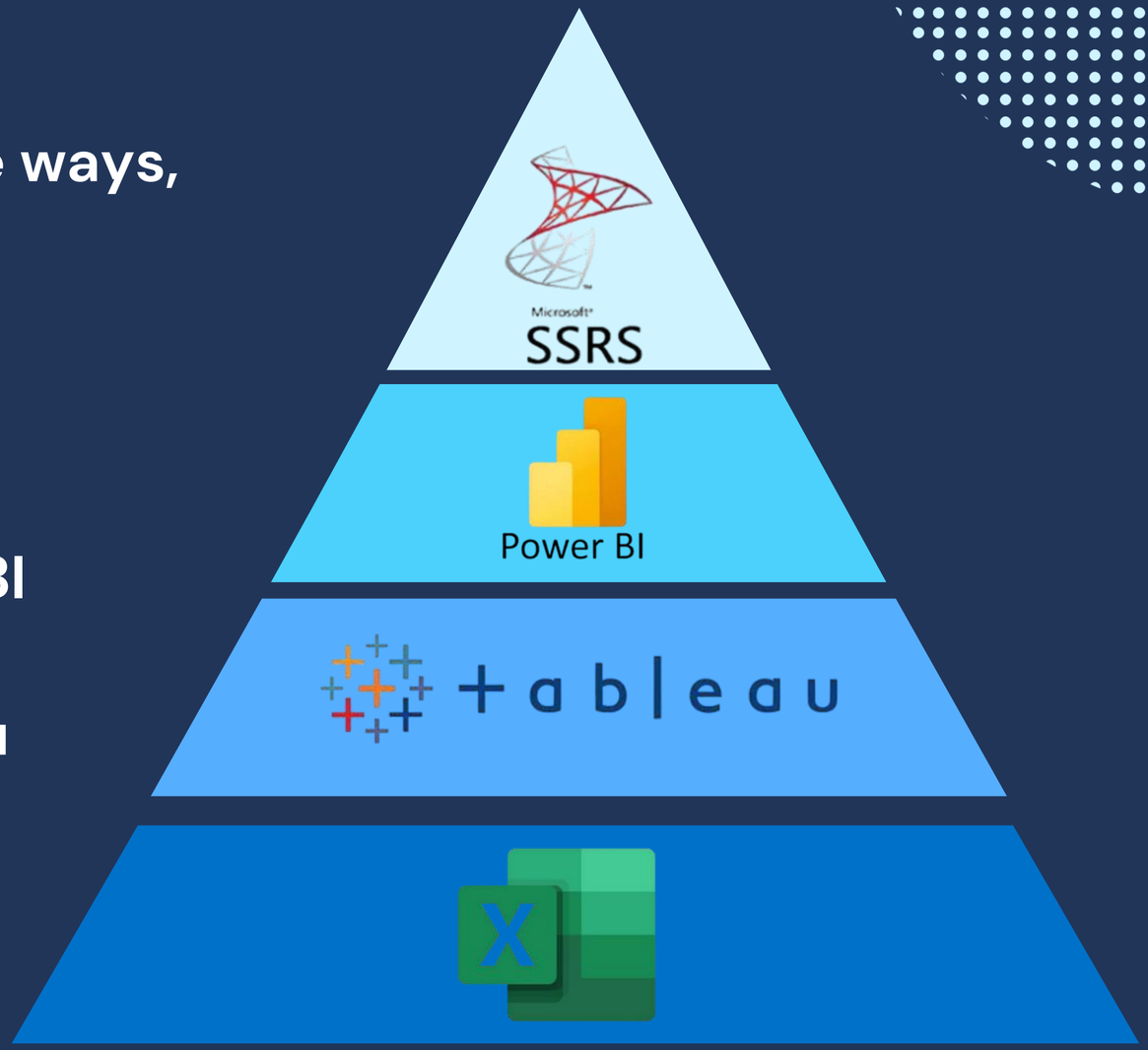
We can analyze data in multiple ways, such as:

01 SSAS and SSRS

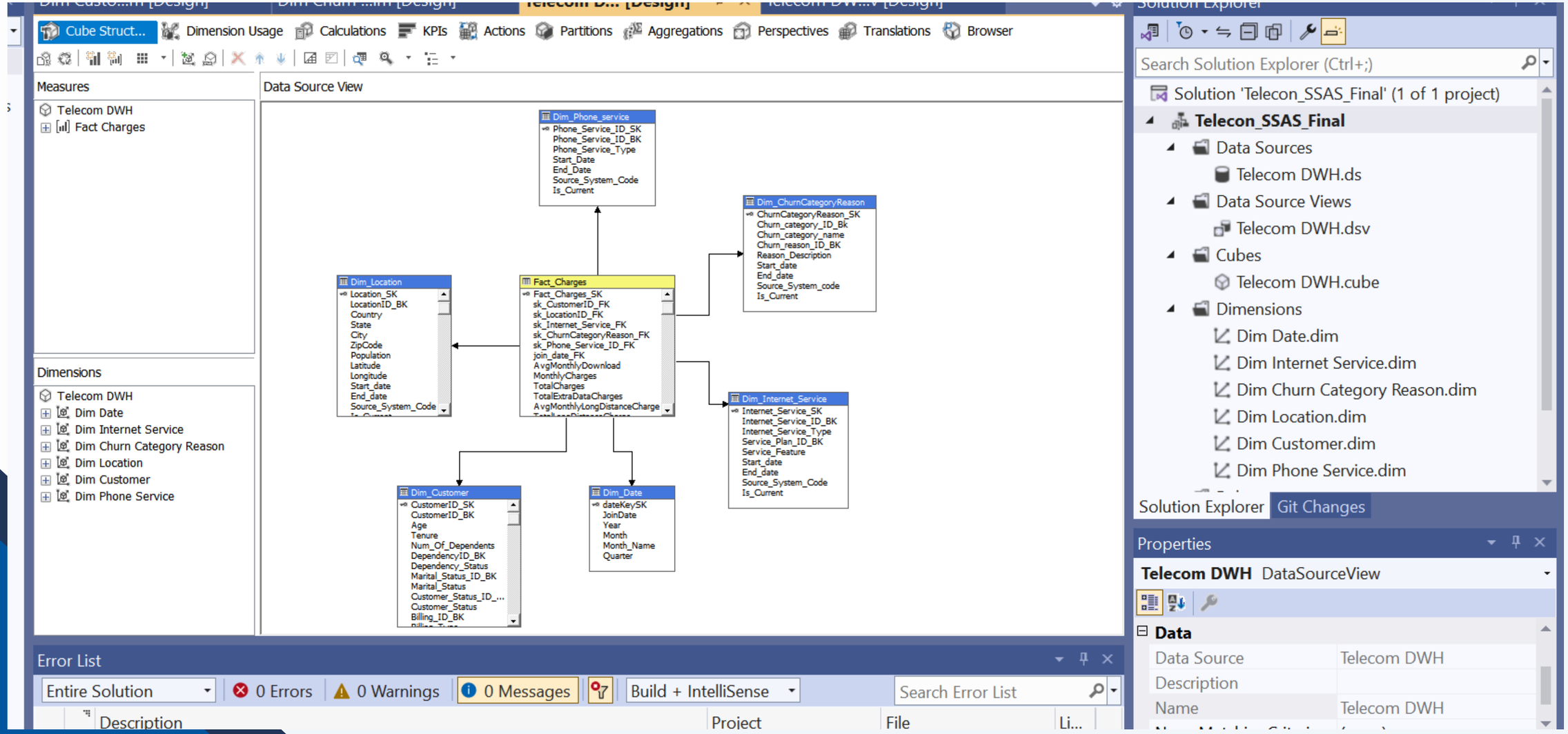
02 visualization using Power BI

03 visualization using Tableau

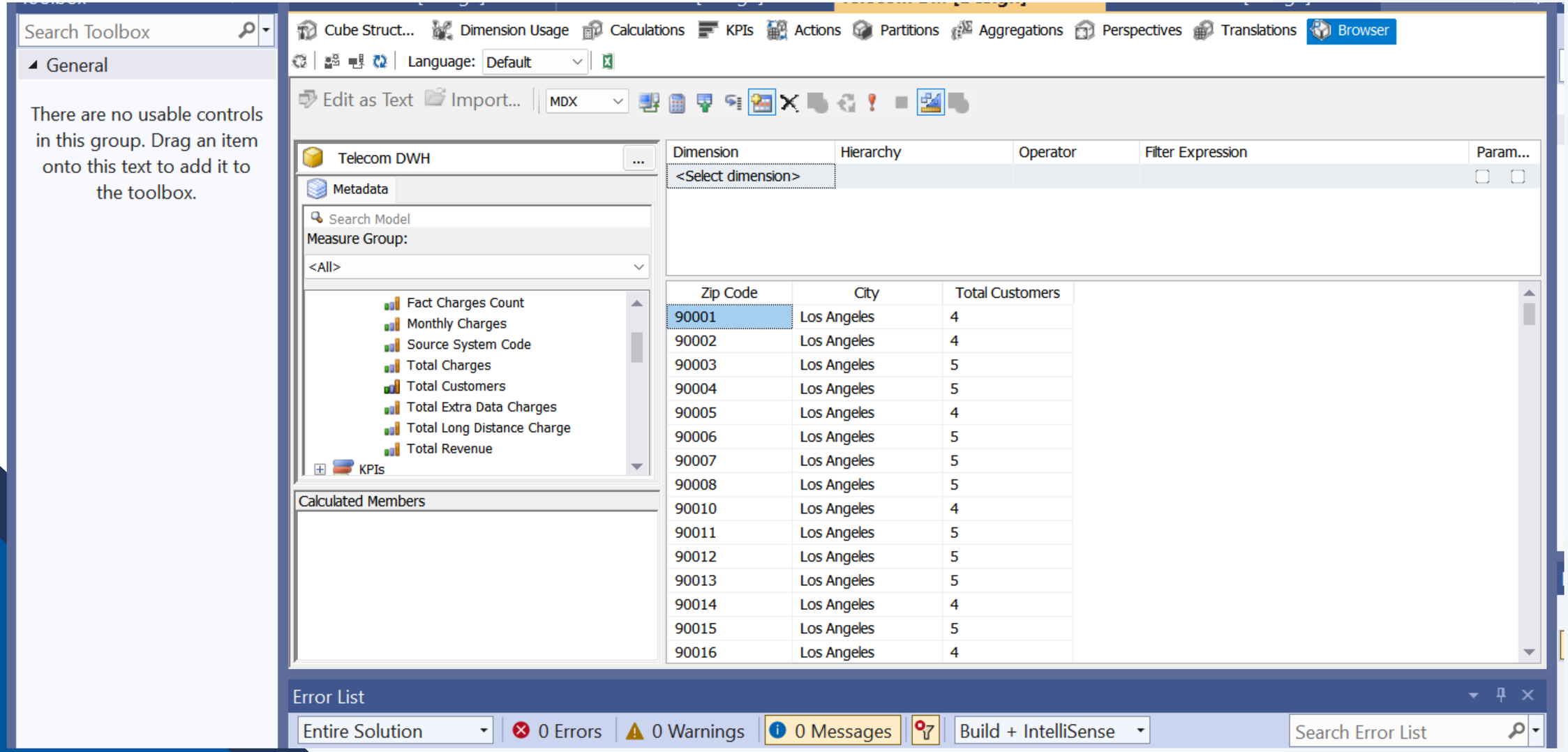
04 visualization using Excel



SSAS (CUBE STRUCTURE)

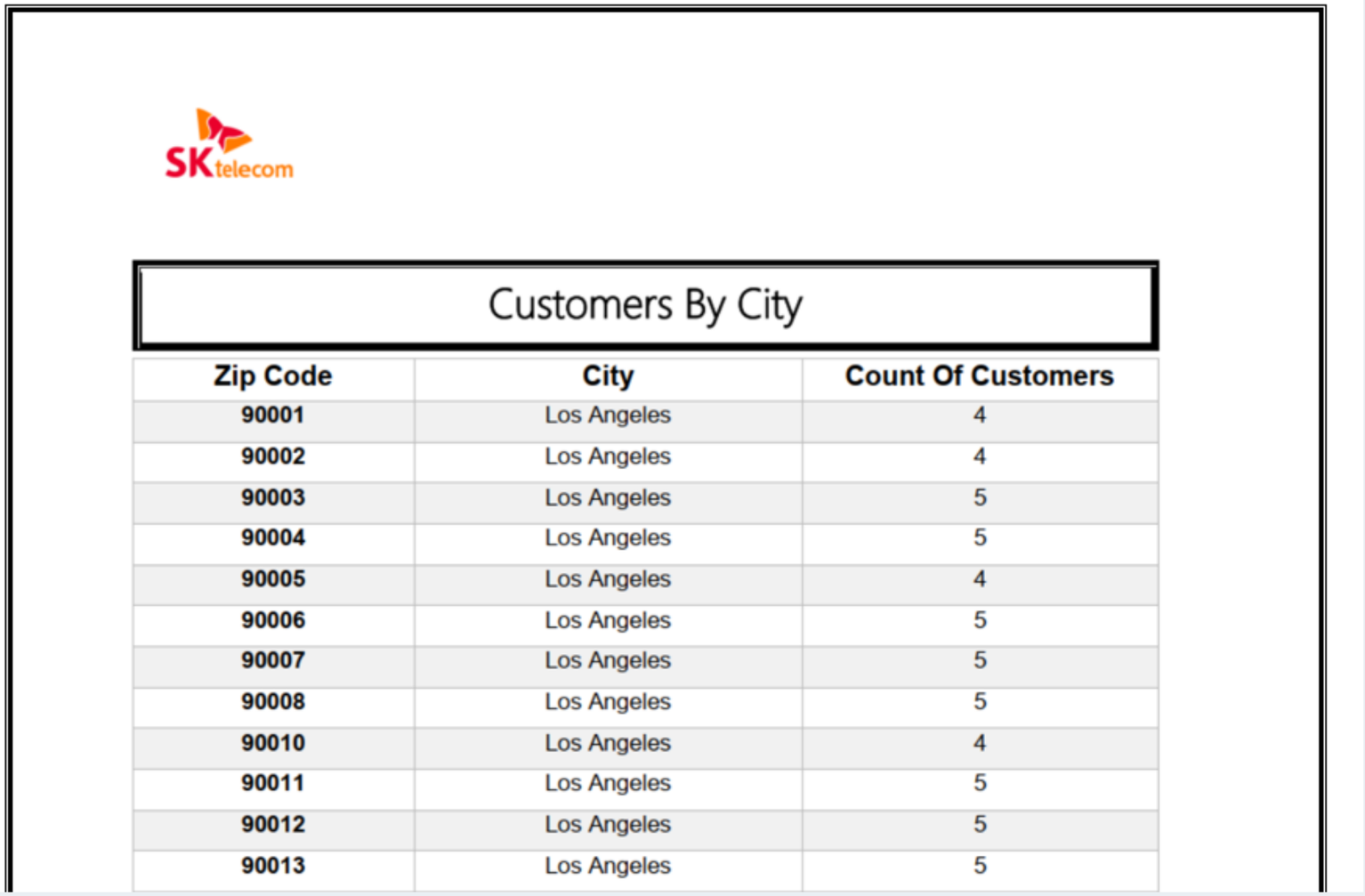


SSAS (CUBE BROWSER)



CUSTOMERS BY CITY

SSRS (Report)



Customers By City

Zip Code	City	Count Of Customers
90001	Los Angeles	4
90002	Los Angeles	4
90003	Los Angeles	5
90004	Los Angeles	5
90005	Los Angeles	4
90006	Los Angeles	5
90007	Los Angeles	5
90008	Los Angeles	5
90010	Los Angeles	4
90011	Los Angeles	5
90012	Los Angeles	5
90013	Los Angeles	5

PHONE SERVICE BY CUSTOMER OVER EVERY CITY

SSRS - Report

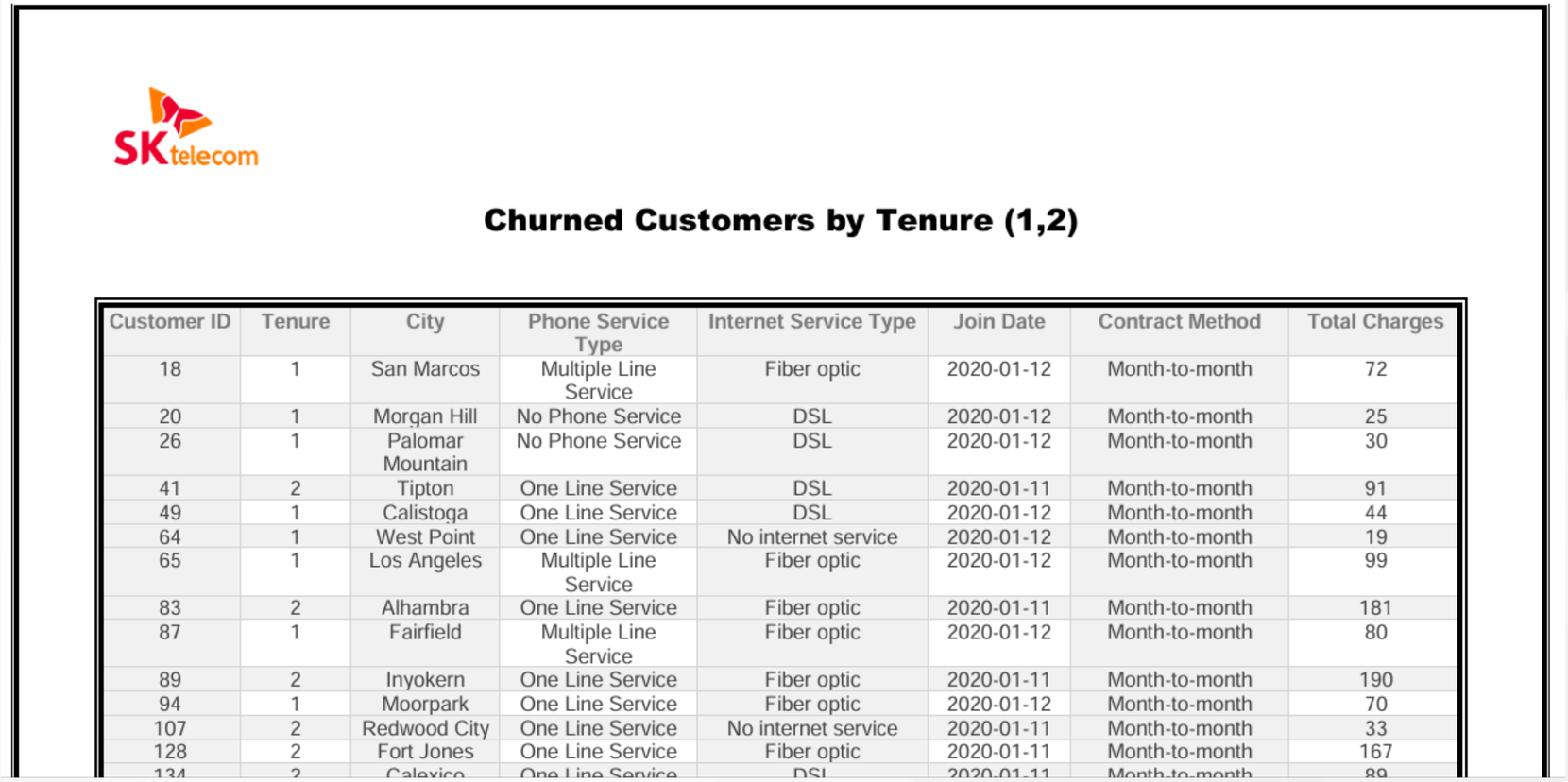
SKtelecom

Phone service by City over customer

		Multiple Line Service	No Phone Service	One Line Service	Total
Acampo	95220	3	0	1	4
Acton	93510	2	1	1	4
Adelanto	92301	3	0	2	5
Adin	96006	0	1	3	4
Agoura Hills	91301	2	2	1	5
Aguanga	92536	1	0	3	4
Ahwahnee	93601	1	0	3	4
Alameda	94501	1	0	3	4
	94502	1	1	2	4
Alamo	94507	2	1	1	4
Albany	94706	3	0	1	4
Albion	95410	2	0	2	4
Alderpoint	95511	2	1	1	4
Alhambra	91801	1	0	3	4
	91803	0	1	4	5
Aliso Viejo	92656	2	0	2	4
Alleghany	95910	0	0	4	4
Alpaugh	93201	2	1	1	4
Alpine	91901	2	0	3	5

CHURNED CUSTOMERS BY TENURE(1,2)

SSRS (REPORT)

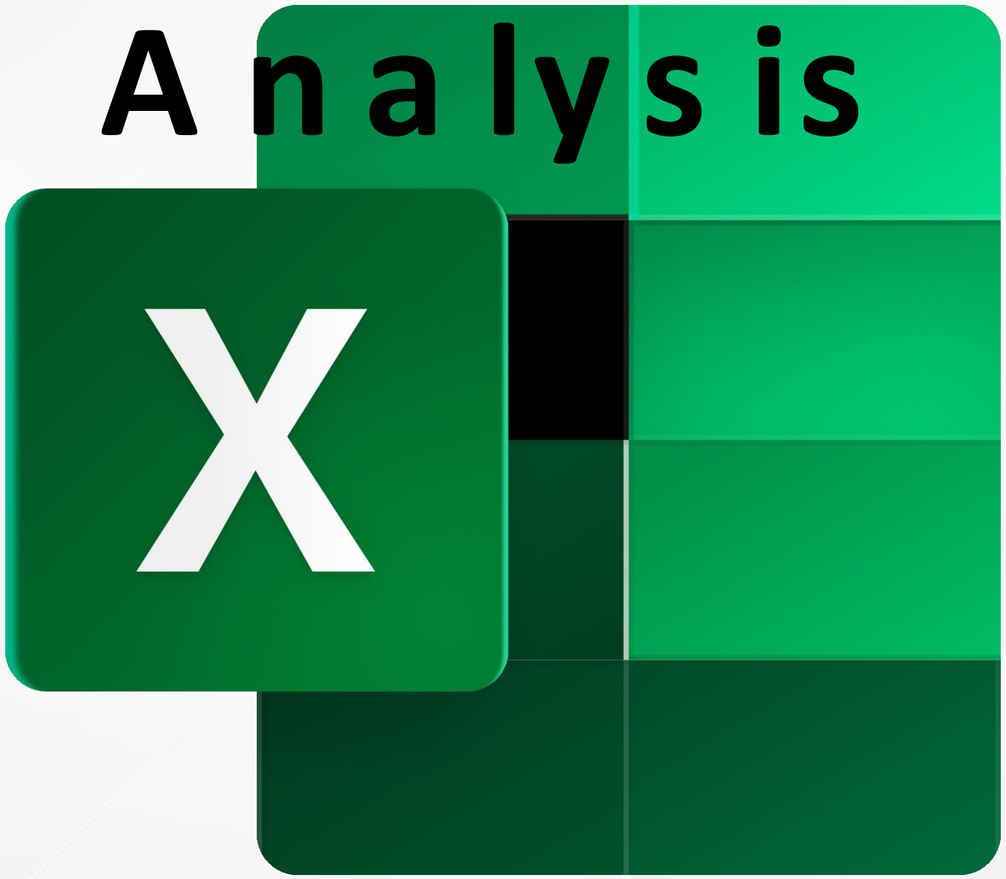


SKtelecom

Churned Customers by Tenure (1,2)

Customer ID	Tenure	City	Phone Service Type	Internet Service Type	Join Date	Contract Method	Total Charges
18	1	San Marcos	Multiple Line Service	Fiber optic	2020-01-12	Month-to-month	72
20	1	Morgan Hill	No Phone Service	DSL	2020-01-12	Month-to-month	25
26	1	Palomar Mountain	No Phone Service	DSL	2020-01-12	Month-to-month	30
41	2	Tipton	One Line Service	DSL	2020-01-11	Month-to-month	91
49	1	Calistoga	One Line Service	DSL	2020-01-12	Month-to-month	44
64	1	West Point	One Line Service	No internet service	2020-01-12	Month-to-month	19
65	1	Los Angeles	Multiple Line Service	Fiber optic	2020-01-12	Month-to-month	99
83	2	Alhambra	One Line Service	Fiber optic	2020-01-11	Month-to-month	181
87	1	Fairfield	Multiple Line Service	Fiber optic	2020-01-12	Month-to-month	80
89	2	Inyokern	One Line Service	Fiber optic	2020-01-11	Month-to-month	190
94	1	Moorpark	One Line Service	Fiber optic	2020-01-12	Month-to-month	70
107	2	Redwood City	One Line Service	No internet service	2020-01-11	Month-to-month	33
128	2	Fort Jones	One Line Service	Fiber optic	2020-01-11	Month-to-month	167
134	2	Calexico	One Line Service	DSL	2020-01-11	Month-to-month	89

Excel Analysis



Excel Dashboards

Our Project got through

Select Data Set

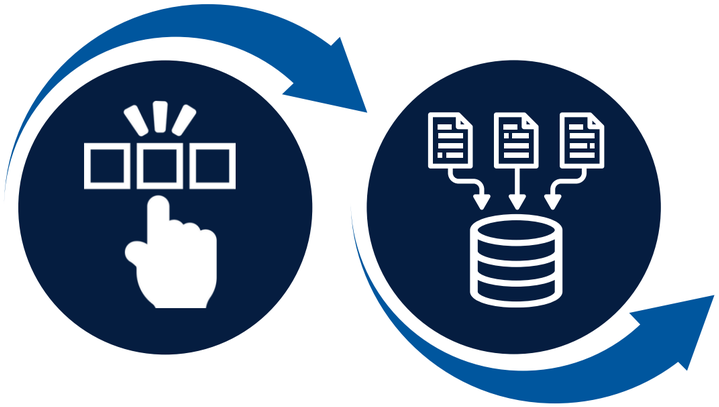
Telecom_Churn from Kaggle

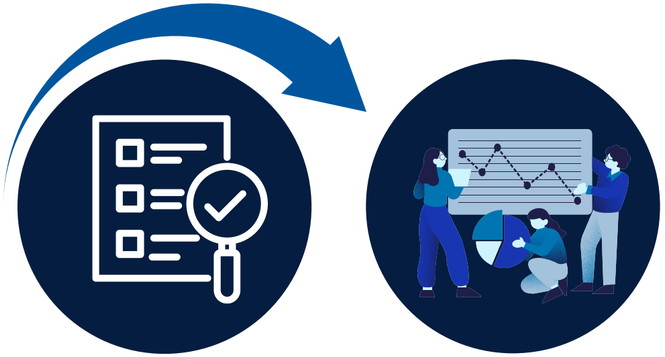
Create Database

Design ERD & tables and Transform dataset from Excel to database with SSIS

Create DWH

Design Data warehouse with star Schema and Transform database to DWH with SSIS





Data Analysis

Analysis data with SSAS create cubes and generate Reports with SSRS

Data Cleaning & Transformation

Cleaning data in power query Load transformation

Visualization

analyze data in multiple ways:- Using Power BI, Tableau and Excel

SK telecom

Thank You