

# **PROJECT FINAL REPORT**

**TEKSUS TELECOMMUNICATIONS  
DATABASE SYSTEM**

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**IST 659 – M002(FALL 2019)**



# PROJECT SUMMARY

Teksus Telecommunications, a company with diverse set of telecommunication products and services wants to leverage its customer data, for gaining actionable insights to boost its sales and try and create a monopoly in the industry using targeted marketing and on the fly services. The firm provides services such as internet services (wireline & wireless), Cable TV, telephone & mobile services, Voice over IP and over the top (OTT) video streaming services similar to video on demand.

Currently, majority of the billing & customer related data is handled physically, and the firm is planning on going digital on all its data sources. This transition will not only bring all data sources together but will also make data available on the go. This project will additionally help in creating better actionable marketing insights due to all forms of data integrated at one place, which will be used by leadership teams for running marketing campaigns.

For instance, data collected while creating a new account for a customer will include customer location data in form of address, this geographic and demographic data will be further used to understand which population and what areas are already exposed to what products, which will be used to market the products accordingly where required. A geographic area where majority of the population is above 50 years of age might not go for OTT video streaming services but might use Cable TV or telephone services. On the contrary, areas near an educational university will have students in huge numbers where the OTT services and VOIP services might become popular as some international students might want to make international calls where VOIP will come into picture.

## DESIGNED SOLUTION:

- The sales representative will create an account either at the store or by going to an individual's house where all the customer and product related data will be collected and stored in the database in account, customer location and product-subscription table.
- Customer opting to subscribe to the services online through the website will also be asked for similar data which will be further integrated in the same database.
- The database development team will further organize and store the clean data in the CRM database.
- The Chief Data Office (CDO) team will maintain the database structure integrity and maintain various users who are accessing the database.
- The reporting teams will create relevant dashboards and reports using customer-location and other relevant tables which will be used further by the leadership team to understand the market conditions and make decisions accordingly.
- These insights will be shared to the sales teams to try and gather more customers efficiently.
- The marketing teams will use the data to create automated relevant emails and improve customer relationship services.
- Incase of events like Superbowl, Thanksgiving and other events the marketing teams will bring new products and services with competitive price structures.

# ENTITY & ATTRIBUTE GLOSSARY

<b>DATA OBJECT:</b> <b>TEKCRMDB</b>	This customer relationship management database stores all tables and data used for generating reports for marketing campaigns and sales.
<b>Account</b>	This table stores all primary account holder details and assigned account identifier.
<u>acct_id</u>	<b>PRIMARY KEY:</b> This is a unique ID assigned to each new account holder to identify a unique customer.
acct_fname	This is the first name of the account holder.
acct_lname	This is the last name of the account holder.
acct_eff_dt	The start date of the account.
acct_end_dt	The account closing date used for historical data analysis.
acct_cust_sgmnt_cd	This element defines the segmentation of a customer. H = House, O = Organization, E = Educational Institution, I = Individual
load_dt_tm	Timestamp at which the account was loaded in the system.
updt_dt_tm	Timestamp at which the account was updated in the system.
<b>Billing</b>	This table stores the billing data associated to each account.
<u>billing_id</u>	<b>PRIMARY KEY:</b> This is a unique ID assigned to each new monthly generated bill for an account.
acct_id	<b>FOREIGN KEY:</b> Associated with the PK of Account table. (Many billing_ids can have one acct_id)
billing_address	Address of the customer where the bill is to be posted. (might be different from address where service is provided)
billing_payment_mode	The payment mode used by the customer (C-Credit, D-Debit, CA-Cash)
billing_amount	The generated bill amount for each month.
billing_eff_dt	The date of each month from which billing was started for the account.
billing_end_dt	The date of each month till the account was billed.
load_dt_tm	Timestamp at which the billing_id was loaded in the system.
updt_dt_tm	Timestamp at which the billing_id was updated in the system.

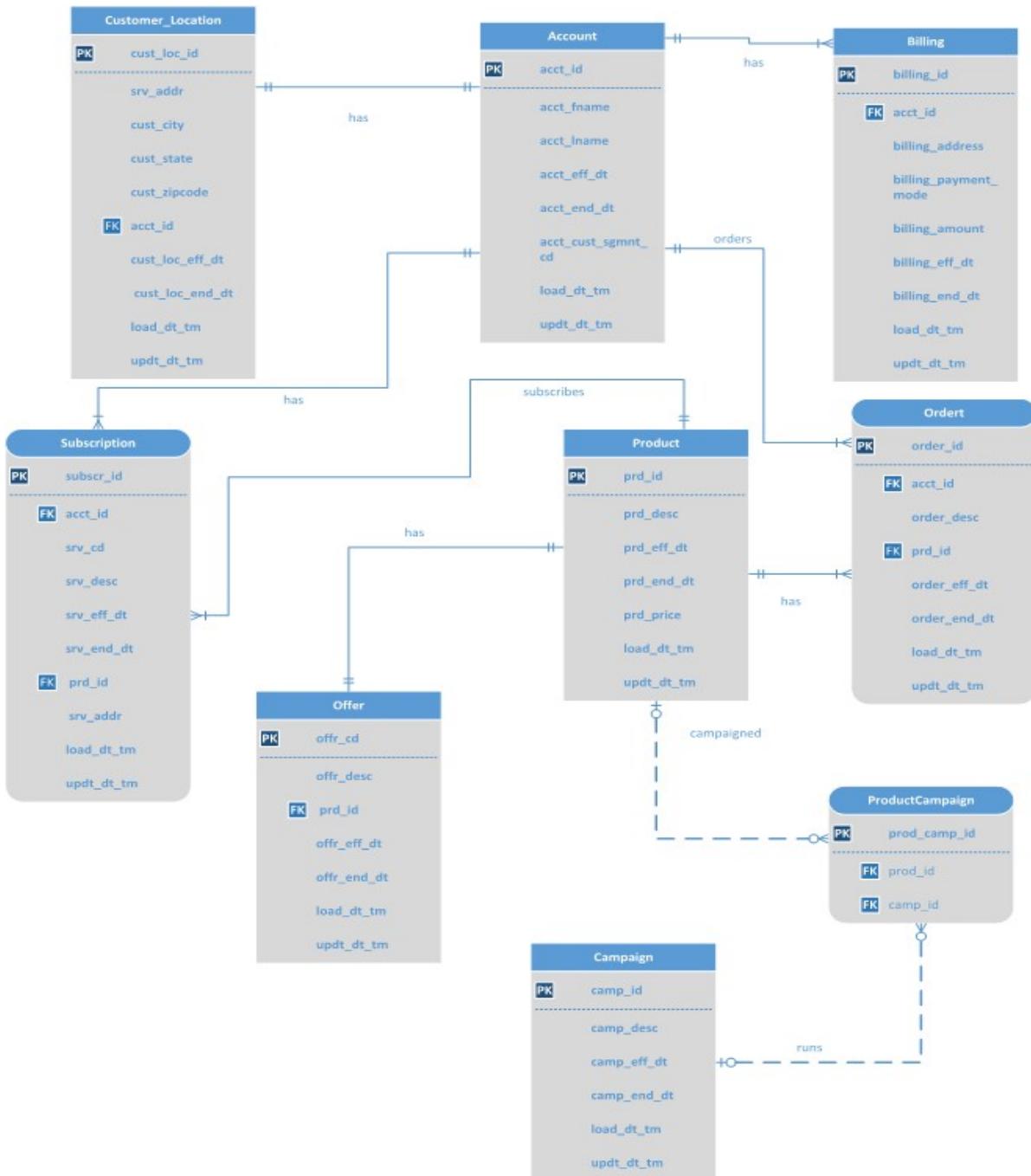
<b>Subscription</b>	This table stores the product-subscription related data of an account holder.
<u>subscr_id</u>	<b>PRIMARY KEY:</b> This is a surrogate key generated for every unique account-product subscription combination.
acct_id	<b>FOREIGN KEY:</b> This is associated to PK of the Account table. (Many subscr_ids can have one acct_id)
srv_cd	This classifies the type of service customer has subscribed. M = Mobile Services, T = Telephone services, IW = Internet Wirelines, IWL = Internet Wireless, CT = Cable TV, OTT = Over the Top, VOIP = Voice over IP
srv_desc	Description of the service code(srv_cd)
srv_eff_dt	Start date of the subscription(>=acct_eff_dt)
srv_end_dt	End date of the subscription(<=acct_end_dt)
prd_id	<b>FOREIGN KEY:</b> This is associated to the PK of the Product table which identifies the subscribed product. (One prd_id may be associated to multiple subscr_ids)
srv_addr	This is the street address where the service is provided.
load_dt_tm	Timestamp at which the subscr_id was loaded in the system.
updt_dt_tm	Timestamp at which the subscr_id was updated in the system.
<b>Product</b>	This table stores the product information offered by the firm.
<u>prd_id</u>	<b>PRIMARY KEY:</b> This is a unique ID assigned to each new product.
prd_desc	This is the description of the prd_id.
prd_eff_dt	This is the date from which the product was available for subscription.
prd_end_dt	This is the date from which the product was made obsolete and closed for subscription.
prd_price	This is the set price of the product.
load_dt_tm	Timestamp at which the prd_id was loaded in the system.
updt_dt_tm	Timestamp at which the prd_id was updated in the system.
<b>Offer</b>	This table stores the information of all the available offers on a product.
<u>offr_cd</u>	<b>PRIMARY KEY:</b> This is a unique code assigned to each offer given on a product.

offr_desc	This is the description of the offr_cd.
prd_id	<b>FOREIGN KEY:</b> This is associated to the PK of Product table. (One product must have one offer only)
offr_eff_dt	The date from which the offer was valid on a product.
offr_end_dt	The date at which the offer validity expired on a product.
load_dt_tm	Timestamp at which the offr_cd was loaded in the system.
upd_dt_tm	Timestamp at which the offr_cd was updated in the system.
<b>Order</b>	This table stores all the order information placed by an account holder. <b>NOTE:</b> A new order is placed for every new product/service purchased by an account holder.
<u>order_id</u>	<b>PRIMARY KEY:</b> This is a unique ID assigned to each order placed by an account holder.
acct_id	<b>FOREIGN KEY:</b> This is associated to the Account table. (One acct_id might be associated to multiple order_id)
order_desc	This is the description of order or any other details added by the customer.
prd_id	<b>FOREIGN KEY:</b> This is associated to the Product table. (One order_id is associated to one prd_id only)
order_eff_dt	This is the date when the order was placed.
order_end_dt	This is the date when the order was closed.
load_dt_tm	Timestamp at which the order_id was loaded in the system.
upd_dt_tm	Timestamp at which the order_id was updated in the system.
<b>Customer_Location</b>	This table stores all the location details of a customer.
<u>cust_loc_id</u>	<b>PRIMARY KEY:</b> This is a unique ID assigned to each customer location which considers a combination of account name and service address
srv_addr	This is the street address where the service is provided.
cust_city	This is the city where the service is provided.
cust_state	This is the state of the cust_loc_id(e.g. NY,MA)
cust_zipcode	This is the zipcode where the service is provided.
acct_id	<b>FOREIGN KEY:</b> This is associated to the Account table. (One acct_id is associated to one cust_loc_id only)

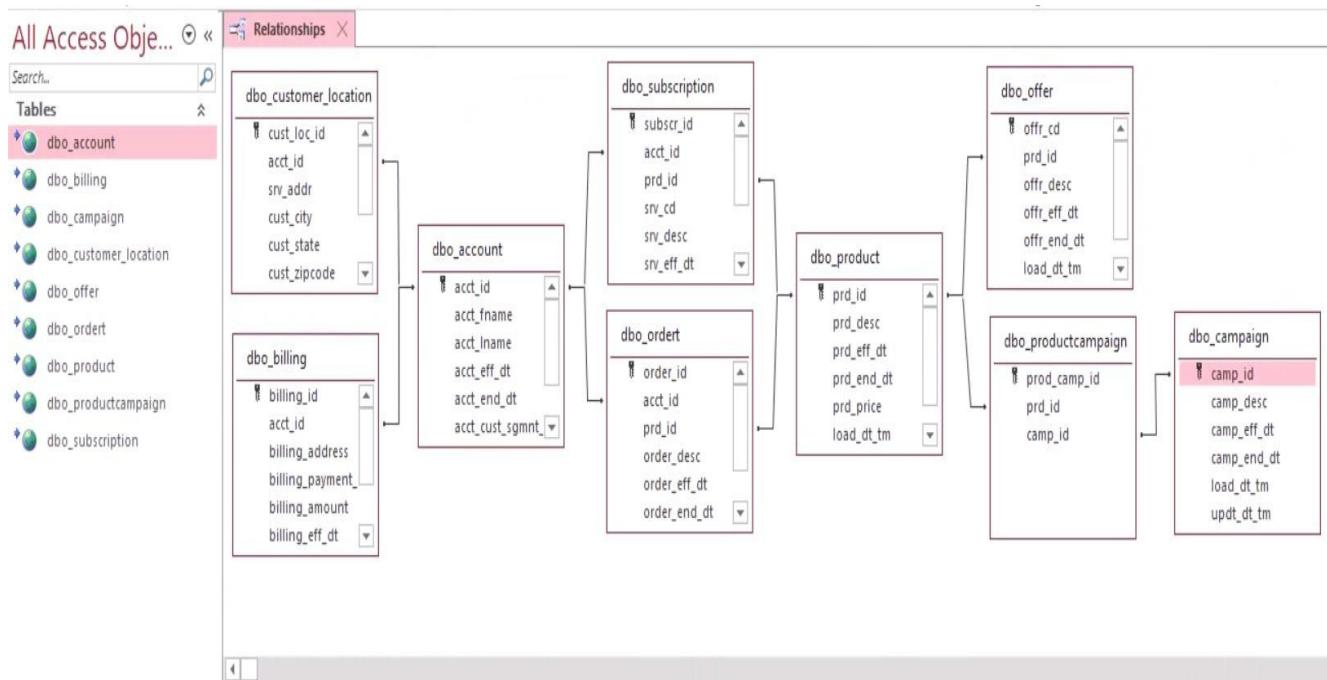
cust_loc_eff_dt	This is the date from which the customer location of the account holder was valid.
cust_loc_end_dt	This is the date from which the validity of the customer location expired.
load_dt_tm	Timestamp at which the cust_loc_id was loaded in the system.
updt_dt_tm	Timestamp at which the cust_loc_id was updated in the system.
<b>Campaign</b>	This table stores all the marketing campaigns details.
<u>camp_id</u>	<b>PRIMARY KEY:</b> This is a unique ID assigned to each new campaign.
camp_desc	This is the description of the campaign.
camp_eff_dt	This is the date when the campaign started.
camp_end_dt	This is the date when the campaign ended.
load_dt_tm	Timestamp at which the camp_id was loaded in the system.
updt_dt_tm	Timestamp at which the camp_id was updated in the system.
<b>ProductCampaign</b>	This table stores product & campaign related data.
prod_camp_id	<b>PRIMARY KEY:</b> This is a surrogate key which is generated for a combination of prod_id & camp_id.
prod_id	<b>FOREIGN KEY:</b> This is associated to the PK of Product table.
camp_id	<b>FOREIGN KEY:</b> This is associated to the PK of Campaign table.

# RELATIONAL DATA MODEL

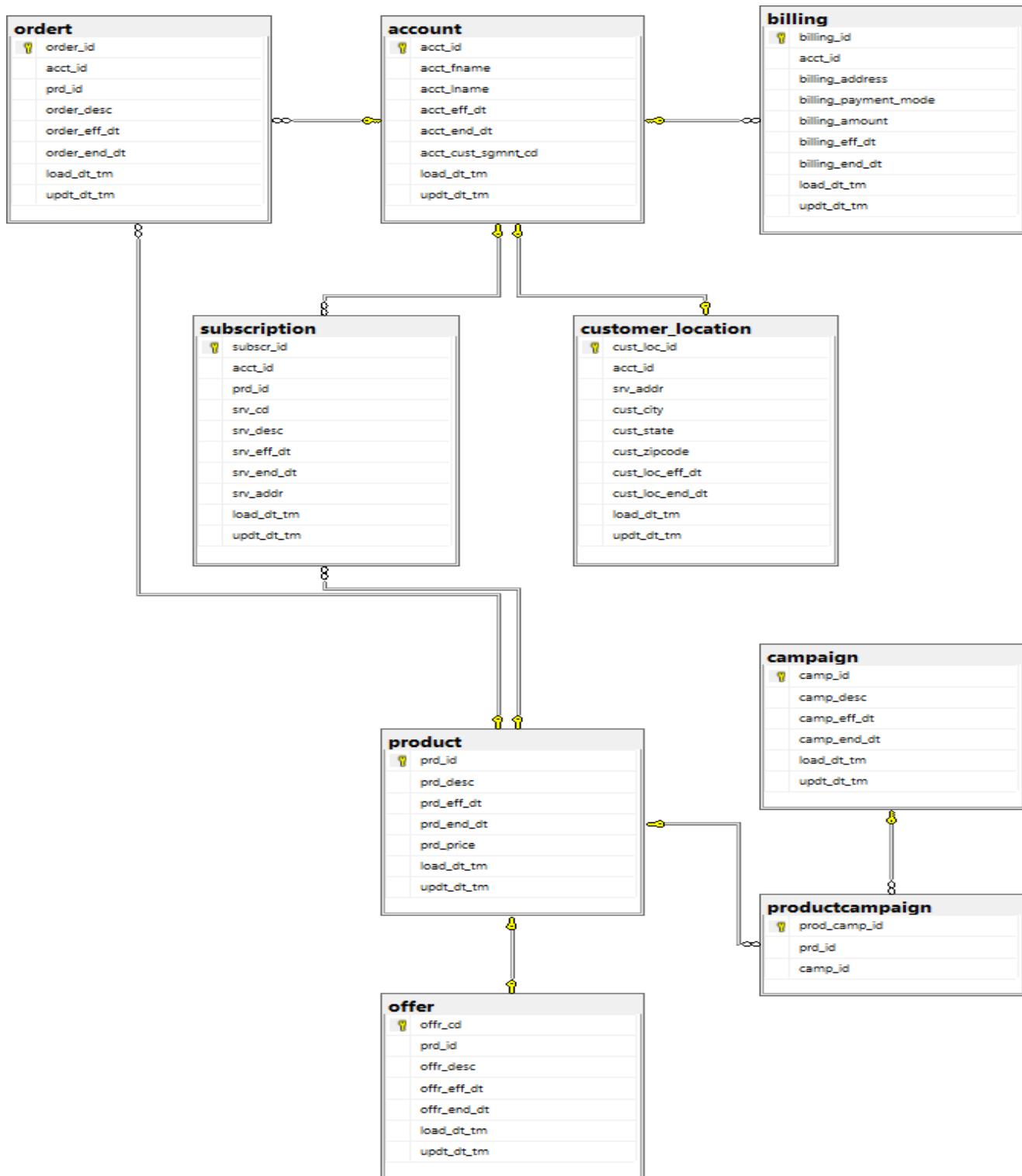
Entity Relationship Diagram in Visio:



## Entity Relationship Diagram in MS Access:



## Entity Relationship Diagram in Microsoft SQL Server:



## Create Queries:

```

USE [IST659_M002_automek]

/* DROP STATEMENTS
DROP TABLE productcampaign;
DROP TABLE ordert;
DROP TABLE offer;
DROP TABLE subscription;
DROP TABLE customer_location;
DROP TABLE billing;
DROP TABLE campaign;
DROP TABLE product;
DROP TABLE account;
*/
*****CREATE STATEMENTS*****
CREATE TABLE account
(
    acct_id      INT NOT NULL,
    acct_fname   VARCHAR(20) NOT NULL,
    acct_lname   VARCHAR(20) NOT NULL,
    acct_eff_dt  DATE NOT NULL,
    acct_end_dt  DATE NOT NULL,
    acct_cust_sgmnt_cd CHAR(1) NOT NULL CHECK(acct_cust_sgmnt_cd IN('H','O','E','I')),
    load_dt_tm   DATETIME NOT NULL,
    updt_dt_tm   DATETIME NOT NULL,
    CONSTRAINT account_PK PRIMARY KEY(acct_id)
)
;

CREATE TABLE product
(
    prd_id      INT NOT NULL,
    prd_desc    VARCHAR(50) NOT NULL,
    prd_eff_dt  DATE NOT NULL,
    prd_end_dt  DATE NOT NULL,
    prd_price   DECIMAL(5,2) NOT NULL,
    load_dt_tm   DATETIME NOT NULL,
    updt_dt_tm   DATETIME NOT NULL,
    CONSTRAINT product_PK PRIMARY KEY(prd_id)
)
;

```

```

CREATE TABLE campaign
(
    camp_id INT NOT NULL,
    camp_desc VARCHAR(50) NOT NULL,
    camp_eff_dt DATE NOT NULL,
    camp_end_dt DATE NOT NULL,
    load_dt_tm DATETIME NOT NULL,
    updt_dt_tm DATETIME NOT NULL,
    CONSTRAINT campaign_PK PRIMARY KEY(camp_id)
)
;

CREATE TABLE billing
(
    billing_id INT NOT NULL,
    acct_id INT NOT NULL,
    billing_address VARCHAR(50) NOT NULL,
    billing_payment_mode VARCHAR(2) NOT NULL CHECK(billing_payment_mode IN('C','D','CA')),
    billing_amount DECIMAL(5,2) NOT NULL,
    billing_eff_dt DATE NOT NULL,
    billing_end_dt DATE NOT NULL,
    load_dt_tm DATETIME NOT NULL,
    updt_dt_tm DATETIME NOT NULL,
    CONSTRAINT billing_PK PRIMARY KEY(billing_id),
    CONSTRAINT billing_FK FOREIGN KEY(acct_id) REFERENCES account(acct_id)
)
;

CREATE TABLE customer_location
(
    cust_loc_id INT NOT NULL,
    acct_id INT NOT NULL UNIQUE,
    srv_addr VARCHAR(50) NOT NULL,
    cust_city VARCHAR(20) NOT NULL,
    cust_state VARCHAR(2) NOT NULL,
    cust_zipcode INT NOT NULL,
    cust_loc_eff_dt DATE NOT NULL,
    cust_loc_end_dt DATE NOT NULL,
    load_dt_tm DATETIME NOT NULL,
    updt_dt_tm DATETIME NOT NULL,
    CONSTRAINT cloc_PK PRIMARY KEY(cust_loc_id),
    CONSTRAINT cloc_FK FOREIGN KEY(acct_id) REFERENCES account(acct_id)
)
;

```

```

CREATE TABLE subscription
(
    subscr_id INT NOT NULL,
    acct_id     INT NOT NULL,
    prd_id     INT NOT NULL,
    srv_cd VARCHAR(4) NOT NULL CHECK(srv_cd IN('M','T','IW','IWL','CT','OTT','VOIP')),
    srv_desc VARCHAR(50) NOT NULL,
    srv_eff_dt DATE NOT NULL,
    srv_end_dt DATE NOT NULL,
    srv_addr VARCHAR(50) NOT NULL,
    load_dt_tm   DATETIME NOT NULL,
    updt_dt_tm   DATETIME NOT NULL,
    CONSTRAINT subscription_PK PRIMARY KEY(subscr_id),
    CONSTRAINT subscription_FK_acct FOREIGN KEY(acct_id) REFERENCES account(acct_id),
    CONSTRAINT subscription_FK_prd FOREIGN KEY(prd_id) REFERENCES product(prd_id),
    CONSTRAINT unique_subscription UNIQUE(acct_id,prd_id)
)
;

CREATE TABLE offer
(
    offr_cd VARCHAR(10) NOT NULL,
    prd_id INT NOT NULL UNIQUE,
    offr_desc VARCHAR(50) NOT NULL,
    offr_eff_dt DATE NOT NULL,
    offr_end_dt DATE NOT NULL,
    load_dt_tm   DATETIME NOT NULL,
    updt_dt_tm   DATETIME NOT NULL,
    CONSTRAINT offer_PK PRIMARY KEY(offr_cd),
    CONSTRAINT offer_FK FOREIGN KEY(prd_id) REFERENCES product(prd_id)
)
;

CREATE TABLE ordert
(
    order_id INT NOT NULL,
    acct_id     INT NOT NULL,
    prd_id     INT NOT NULL,
    order_desc VARCHAR(50) NOT NULL,
    order_eff_dt DATE NOT NULL,
    order_end_dt DATE NOT NULL,
    load_dt_tm   DATETIME NOT NULL,
    updt_dt_tm   DATETIME NOT NULL,
    CONSTRAINT order_PK PRIMARY KEY(order_id),
    CONSTRAINT order_FK_acct FOREIGN KEY(acct_id) REFERENCES account(acct_id),
    CONSTRAINT order_FK_prd FOREIGN KEY(prd_id) REFERENCES product(prd_id),
    CONSTRAINT unique_order UNIQUE(acct_id,prd_id)
)
;

```

```

CREATE TABLE productcampaign
(
    prod_camp_id INT NOT NULL,
    prd_id INT,
    camp_id INT,
    CONSTRAINT productcampaign_PK PRIMARY KEY(prod_camp_id),
    CONSTRAINT productcampaign_FK_campaign FOREIGN KEY(camp_id) REFERENCES campaign(camp_id),
    CONSTRAINT productcampaign_FK_prd FOREIGN KEY(prd_id) REFERENCES product(prd_id)
)
;

/*********************INSERT STATEMENTS******************/


INSERT INTO account VALUES(315000,'Aditya','Tornekar','2019-11-26','9999-12-31','E',CURRENT_TIMESTAMP,CURRENT_TIMESTAMP);
INSERT INTO account VALUES(315001,'Harshita','Ved','2019-11-25','9999-12-31','E',CURRENT_TIMESTAMP,CURRENT_TIMESTAMP);
INSERT INTO account VALUES(315002,'Vaibhav','Kulkarni','2018-10-10','9999-12-31','I',CURRENT_TIMESTAMP,CURRENT_TIMESTAMP);
INSERT INTO account VALUES(315003,'Rahul','Raichand','2018-11-22','2019-11-25','H',CURRENT_TIMESTAMP,CURRENT_TIMESTAMP);
INSERT INTO account VALUES(315004,'Akash','Kandarkar','2019-10-01','9999-12-31','I',CURRENT_TIMESTAMP,CURRENT_TIMESTAMP);
INSERT INTO account VALUES(315005,'Sonam','Dawani','2019-11-15','9999-12-31','O',CURRENT_TIMESTAMP,CURRENT_TIMESTAMP);
INSERT INTO account VALUES(315006,'Anit','Gupta','2019-11-15','9999-12-31','O',CURRENT_TIMESTAMP,CURRENT_TIMESTAMP);
INSERT INTO account VALUES(315007,'Vivek','Sharma','2018-11-22','9999-12-31','I',CURRENT_TIMESTAMP,CURRENT_TIMESTAMP);
INSERT INTO account VALUES(315008,'Amey','Sawant','2018-11-22','9999-12-31','E',CURRENT_TIMESTAMP,CURRENT_TIMESTAMP);
INSERT INTO account VALUES(315009,'Tushar','Khaire','2019-05-05','9999-12-31','I',CURRENT_TIMESTAMP,CURRENT_TIMESTAMP);

select * from account;

INSERT INTO product VALUES(101,'Teksus Mobility Prepaid','2015-01-01','9999-12-31',30,CURRENT_TIMESTAMP,CURRENT_TIMESTAMP);
INSERT INTO product VALUES(102,'Teksus Mobility Postpaid','2015-01-01','9999-12-31',70,CURRENT_TIMESTAMP,CURRENT_TIMESTAMP);
INSERT INTO product VALUES(103,'Teksus Wireline Telephone','2015-01-01','9999-12-31',50,CURRENT_TIMESTAMP,CURRENT_TIMESTAMP);
INSERT INTO product VALUES(104,'Teksus Internet Wireline','2016-12-25','9999-12-31',40,CURRENT_TIMESTAMP,CURRENT_TIMESTAMP);
INSERT INTO product VALUES(105,'Teksus Internet Wireless','2015-12-25','9999-12-31',60,CURRENT_TIMESTAMP,CURRENT_TIMESTAMP);
INSERT INTO product VALUES(106,'Teksus Cable TV','2015-01-01','9999-12-31',40,CURRENT_TIMESTAMP,CURRENT_TIMESTAMP);
INSERT INTO product VALUES(107,'Teksus Over The Top Service','2019-01-01','9999-12-31',10,CURRENT_TIMESTAMP,CURRENT_TIMESTAMP);
INSERT INTO product VALUES(108,'Teksus Voice Over IP','2015-01-01','9999-12-31',30,CURRENT_TIMESTAMP,CURRENT_TIMESTAMP);

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INSERT INTO product VALUES(109,'Teksus Thanksgiving Phone+Plan','2018-11-22','9999-12-
31',30,CURRENT_TIMESTAMP,CURRENT_TIMESTAMP);
INSERT INTO product VALUES(110,'Teksus Superbowl Cable','2016-01-01','9999-12-
31',20,CURRENT_TIMESTAMP,CURRENT_TIMESTAMP);

select * from product;

INSERT INTO campaign VALUES(20150,'Wireline & Mobility Campaign','2014-10-01','2015-05-
05',CURRENT_TIMESTAMP,CURRENT_TIMESTAMP);
INSERT INTO campaign VALUES(20151,'Teksus Prepaid Campaign','2014-10-01','2015-05-
05',CURRENT_TIMESTAMP,CURRENT_TIMESTAMP);
INSERT INTO campaign VALUES(20152,'Teksus Internet Campaign','2015-10-01','2015-05-
05',CURRENT_TIMESTAMP,CURRENT_TIMESTAMP);
INSERT INTO campaign VALUES(20161,'Internet Wireline Campaign','2016-10-01','2016-12-
31',CURRENT_TIMESTAMP,CURRENT_TIMESTAMP);
INSERT INTO campaign VALUES(20162,'Superbowl Campaign','2015-10-01','2016-02-
15',CURRENT_TIMESTAMP,CURRENT_TIMESTAMP);
INSERT INTO campaign VALUES(20190,'OTT Pivot Campaign','2018-10-01','2019-05-
05',CURRENT_TIMESTAMP,CURRENT_TIMESTAMP);
INSERT INTO campaign VALUES(20191,'OTT Campaign Stage2','2019-05-20','2019-11-
25',CURRENT_TIMESTAMP,CURRENT_TIMESTAMP);

select * from campaign;

INSERT INTO billing VALUES(23100,315000,'1048 Lancaster Avenue,Syracuse,NY','D',40,'2019-11-
26','2019-11-30',CURRENT_TIMESTAMP,CURRENT_TIMESTAMP);
INSERT INTO billing VALUES(23101,315001,'Park Drive,Boston,MA','D',40,'2019-11-25','2019-11-
30',CURRENT_TIMESTAMP,CURRENT_TIMESTAMP);
INSERT INTO billing VALUES(23102,315002,'Euclid Avenue,Syracuse,NY','C',30,'2018-10-10','2018-
10-31',CURRENT_TIMESTAMP,CURRENT_TIMESTAMP);
INSERT INTO billing VALUES(23103,315002,'Euclid Avenue,Syracuse,NY','C',30,'2018-11-01','2018-
11-30',CURRENT_TIMESTAMP,CURRENT_TIMESTAMP);
INSERT INTO billing VALUES(23104,315002,'Euclid Avenue,Syracuse,NY','C',30,'2018-12-01','2018-
12-31',CURRENT_TIMESTAMP,CURRENT_TIMESTAMP);
INSERT INTO billing VALUES(23105,315002,'Euclid Avenue,Syracuse,NY','C',30,'2019-01-01','2019-
01-31',CURRENT_TIMESTAMP,CURRENT_TIMESTAMP);
INSERT INTO billing VALUES(23106,315002,'Euclid Avenue,Syracuse,NY','C',30,'2019-02-01','2019-
02-28',CURRENT_TIMESTAMP,CURRENT_TIMESTAMP);
INSERT INTO billing VALUES(23107,315002,'Euclid Avenue,Syracuse,NY','C',30,'2019-03-01','2019-
03-31',CURRENT_TIMESTAMP,CURRENT_TIMESTAMP);
INSERT INTO billing VALUES(23108,315002,'Euclid Avenue,Syracuse,NY','C',30,'2019-04-01','2019-
04-30',CURRENT_TIMESTAMP,CURRENT_TIMESTAMP);
INSERT INTO billing VALUES(23109,315002,'Euclid Avenue,Syracuse,NY','C',30,'2019-05-01','2019-
05-31',CURRENT_TIMESTAMP,CURRENT_TIMESTAMP);
INSERT INTO billing VALUES(23110,315002,'Euclid Avenue,Syracuse,NY','C',30,'2019-06-01','2019-
06-30',CURRENT_TIMESTAMP,CURRENT_TIMESTAMP);
INSERT INTO billing VALUES(23111,315002,'Euclid Avenue,Syracuse,NY','C',30,'2019-07-01','2019-
07-31',CURRENT_TIMESTAMP,CURRENT_TIMESTAMP);
INSERT INTO billing VALUES(23112,315002,'Euclid Avenue,Syracuse,NY','C',30,'2019-08-01','2019-
08-31',CURRENT_TIMESTAMP,CURRENT_TIMESTAMP);
INSERT INTO billing VALUES(23113,315002,'Euclid Avenue,Syracuse,NY','C',30,'2019-09-01','2019-
09-30',CURRENT_TIMESTAMP,CURRENT_TIMESTAMP);
INSERT INTO billing VALUES(23114,315002,'Euclid Avenue,Syracuse,NY','C',30,'2019-10-01','2019-
10-31',CURRENT_TIMESTAMP,CURRENT_TIMESTAMP);

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INSERT INTO billing VALUES(23115,315002,'Euclid Avenue,Syracuse,NY','C',30,'2019-11-01','2019-11-30',CURRENT_TIMESTAMP,CURRENT_TIMESTAMP);
INSERT INTO billing VALUES(23116,315003,'Sumner Avenue,Syracuse,NY','CA',40,'2018-11-22','2018-11-30',CURRENT_TIMESTAMP,CURRENT_TIMESTAMP);
INSERT INTO billing VALUES(23117,315003,'Sumner Avenue,Syracuse,NY','CA',40,'2018-12-01','2018-12-31',CURRENT_TIMESTAMP,CURRENT_TIMESTAMP);
INSERT INTO billing VALUES(23118,315003,'Sumner Avenue,Syracuse,NY','CA',50,'2019-01-01','2019-01-31',CURRENT_TIMESTAMP,CURRENT_TIMESTAMP);
INSERT INTO billing VALUES(23119,315003,'Sumner Avenue,Syracuse,NY','CA',50,'2019-02-01','2019-02-28',CURRENT_TIMESTAMP,CURRENT_TIMESTAMP);
INSERT INTO billing VALUES(23120,315003,'Sumner Avenue,Syracuse,NY','CA',50,'2019-03-01','2019-03-31',CURRENT_TIMESTAMP,CURRENT_TIMESTAMP);
INSERT INTO billing VALUES(23121,315003,'Sumner Avenue,Syracuse,NY','CA',50,'2019-04-01','2019-04-30',CURRENT_TIMESTAMP,CURRENT_TIMESTAMP);
INSERT INTO billing VALUES(23122,315003,'Sumner Avenue,Syracuse,NY','CA',50,'2019-05-01','2019-05-31',CURRENT_TIMESTAMP,CURRENT_TIMESTAMP);
INSERT INTO billing VALUES(23123,315003,'Sumner Avenue,Syracuse,NY','CA',50,'2019-06-01','2019-06-30',CURRENT_TIMESTAMP,CURRENT_TIMESTAMP);
INSERT INTO billing VALUES(23124,315003,'Sumner Avenue,Syracuse,NY','CA',50,'2019-07-01','2019-07-31',CURRENT_TIMESTAMP,CURRENT_TIMESTAMP);
INSERT INTO billing VALUES(23125,315003,'Sumner Avenue,Syracuse,NY','CA',50,'2019-08-01','2019-08-31',CURRENT_TIMESTAMP,CURRENT_TIMESTAMP);
INSERT INTO billing VALUES(23126,315003,'Sumner Avenue,Syracuse,NY','CA',50,'2019-09-01','2019-09-30',CURRENT_TIMESTAMP,CURRENT_TIMESTAMP);
INSERT INTO billing VALUES(23127,315003,'Sumner Avenue,Syracuse,NY','CA',50,'2019-10-01','2019-10-31',CURRENT_TIMESTAMP,CURRENT_TIMESTAMP);
INSERT INTO billing VALUES(23128,315003,'Sumner Avenue,Syracuse,NY','CA',50,'2019-11-01','2019-11-25',CURRENT_TIMESTAMP,CURRENT_TIMESTAMP);
INSERT INTO billing VALUES(23129,315004,'Ostrom Avenue,Syracuse,NY','D',30,'2019-10-01','2019-10-31',CURRENT_TIMESTAMP,CURRENT_TIMESTAMP);
INSERT INTO billing VALUES(23130,315004,'Ostrom Avenue,Syracuse,NY','D',30,'2019-11-01','2019-11-30',CURRENT_TIMESTAMP,CURRENT_TIMESTAMP);
INSERT INTO billing VALUES(23131,315005,'120 Westcott,Syracuse,NY','D',50,'2019-11-15','2019-11-30',CURRENT_TIMESTAMP,CURRENT_TIMESTAMP);
INSERT INTO billing VALUES(23132,315006,'121 Westcott,Syracuse,NY','D',50,'2019-11-15','2019-11-30',CURRENT_TIMESTAMP,CURRENT_TIMESTAMP);
INSERT INTO billing VALUES(23133,315007,'Madison Avenue,New York,NY','D',30,'2018-11-22','2018-11-30',CURRENT_TIMESTAMP,CURRENT_TIMESTAMP);
INSERT INTO billing VALUES(23134,315007,'Madison Avenue,New York,NY','D',30,'2018-12-01','2018-12-31',CURRENT_TIMESTAMP,CURRENT_TIMESTAMP);
INSERT INTO billing VALUES(23135,315007,'Madison Avenue,New York,NY','D',30,'2019-01-01','2019-01-31',CURRENT_TIMESTAMP,CURRENT_TIMESTAMP);
INSERT INTO billing VALUES(23136,315007,'Madison Avenue,New York,NY','D',30,'2019-02-01','2019-02-28',CURRENT_TIMESTAMP,CURRENT_TIMESTAMP);
INSERT INTO billing VALUES(23137,315007,'Madison Avenue,New York,NY','D',30,'2019-03-01','2019-03-31',CURRENT_TIMESTAMP,CURRENT_TIMESTAMP);
INSERT INTO billing VALUES(23138,315007,'Madison Avenue,New York,NY','D',30,'2019-04-01','2019-04-30',CURRENT_TIMESTAMP,CURRENT_TIMESTAMP);
INSERT INTO billing VALUES(23139,315007,'Madison Avenue,New York,NY','D',30,'2019-05-01','2019-05-31',CURRENT_TIMESTAMP,CURRENT_TIMESTAMP);
INSERT INTO billing VALUES(23140,315007,'Madison Avenue,New York,NY','D',30,'2019-06-01','2019-06-30',CURRENT_TIMESTAMP,CURRENT_TIMESTAMP);
INSERT INTO billing VALUES(23141,315007,'Madison Avenue,New York,NY','D',30,'2019-07-01','2019-07-31',CURRENT_TIMESTAMP,CURRENT_TIMESTAMP);
```

```

INSERT INTO billing VALUES(23142,315007,"Madison Avenue,New York,NY","D",30,"2019-08-01","2019-08-31",CURRENT_TIMESTAMP,CURRENT_TIMESTAMP);
INSERT INTO billing VALUES(23143,315007,"Madison Avenue,New York,NY","D",30,"2019-09-01","2019-09-30",CURRENT_TIMESTAMP,CURRENT_TIMESTAMP);
INSERT INTO billing VALUES(23144,315007,"Madison Avenue,New York,NY","D",30,"2019-10-01","2019-10-31",CURRENT_TIMESTAMP,CURRENT_TIMESTAMP);
INSERT INTO billing VALUES(23145,315007,"Madison Avenue,New York,NY","D",30,"2019-11-01","2019-11-30",CURRENT_TIMESTAMP,CURRENT_TIMESTAMP);
INSERT INTO billing VALUES(23146,315008,"808 Westcott,Syracuse,NY","D",40,"2018-11-22","2018-11-30",CURRENT_TIMESTAMP,CURRENT_TIMESTAMP);
INSERT INTO billing VALUES(23147,315008,"808 Westcott,Syracuse,NY","D",40,"2018-12-01","2018-12-31",CURRENT_TIMESTAMP,CURRENT_TIMESTAMP);
INSERT INTO billing VALUES(23148,315008,"808 Westcott,Syracuse,NY","D",40,"2019-01-01","2019-01-31",CURRENT_TIMESTAMP,CURRENT_TIMESTAMP);
INSERT INTO billing VALUES(23149,315008,"808 Westcott,Syracuse,NY","D",40,"2019-02-01","2019-02-28",CURRENT_TIMESTAMP,CURRENT_TIMESTAMP);
INSERT INTO billing VALUES(23150,315008,"808 Westcott,Syracuse,NY","D",40,"2019-03-01","2019-03-31",CURRENT_TIMESTAMP,CURRENT_TIMESTAMP);
INSERT INTO billing VALUES(23151,315008,"808 Westcott,Syracuse,NY","D",40,"2019-04-01","2019-04-30",CURRENT_TIMESTAMP,CURRENT_TIMESTAMP);
INSERT INTO billing VALUES(23152,315008,"808 Westcott,Syracuse,NY","D",40,"2019-05-01","2019-05-31",CURRENT_TIMESTAMP,CURRENT_TIMESTAMP);
INSERT INTO billing VALUES(23153,315008,"808 Westcott,Syracuse,NY","D",40,"2019-06-01","2019-06-30",CURRENT_TIMESTAMP,CURRENT_TIMESTAMP);
INSERT INTO billing VALUES(23154,315008,"808 Westcott,Syracuse,NY","D",40,"2019-07-01","2019-07-31",CURRENT_TIMESTAMP,CURRENT_TIMESTAMP);
INSERT INTO billing VALUES(23155,315008,"808 Westcott,Syracuse,NY","D",40,"2019-08-01","2019-08-31",CURRENT_TIMESTAMP,CURRENT_TIMESTAMP);
INSERT INTO billing VALUES(23156,315008,"808 Westcott,Syracuse,NY","D",40,"2019-09-01","2019-09-30",CURRENT_TIMESTAMP,CURRENT_TIMESTAMP);
INSERT INTO billing VALUES(23157,315008,"808 Westcott,Syracuse,NY","D",40,"2019-10-01","2019-10-31",CURRENT_TIMESTAMP,CURRENT_TIMESTAMP);
INSERT INTO billing VALUES(23158,315008,"808 Westcott,Syracuse,NY","D",40,"2019-11-01","2019-11-30",CURRENT_TIMESTAMP,CURRENT_TIMESTAMP);
INSERT INTO billing VALUES(23159,315009,"800 Lancaster Avenue,Syracuse,NY","CA",30,"2019-05-05","2019-05-31",CURRENT_TIMESTAMP,CURRENT_TIMESTAMP);
INSERT INTO billing VALUES(23160,315009,"800 Lancaster Avenue,Syracuse,NY","CA",30,"2019-06-01","2019-06-30",CURRENT_TIMESTAMP,CURRENT_TIMESTAMP);
INSERT INTO billing VALUES(23161,315009,"800 Lancaster Avenue,Syracuse,NY","CA",30,"2019-07-01","2019-07-31",CURRENT_TIMESTAMP,CURRENT_TIMESTAMP);
INSERT INTO billing VALUES(23162,315009,"800 Lancaster Avenue,Syracuse,NY","CA",30,"2019-08-01","2019-08-31",CURRENT_TIMESTAMP,CURRENT_TIMESTAMP);
INSERT INTO billing VALUES(23163,315009,"800 Lancaster Avenue,Syracuse,NY","CA",30,"2019-09-01","2019-09-30",CURRENT_TIMESTAMP,CURRENT_TIMESTAMP);
INSERT INTO billing VALUES(23164,315009,"800 Lancaster Avenue,Syracuse,NY","CA",30,"2019-10-01","2019-10-31",CURRENT_TIMESTAMP,CURRENT_TIMESTAMP);
INSERT INTO billing VALUES(23165,315009,"800 Lancaster Avenue,Syracuse,NY","CA",30,"2019-11-01","2019-11-30",CURRENT_TIMESTAMP,CURRENT_TIMESTAMP);

SELECT * FROM billing;

```

```

INSERT INTO customer_location VALUES(900100,315000,'1048 Lancaster
Avenue,Syracuse,NY','Syracuse','NY',13210,'2019-11-26','9999-12-
31',CURRENT_TIMESTAMP,CURRENT_TIMESTAMP);
INSERT INTO customer_location VALUES(900101,315001,'Park
Drive,Boston,MA','Boston','MA',02215,'2019-11-25','9999-12-
31',CURRENT_TIMESTAMP,CURRENT_TIMESTAMP);
INSERT INTO customer_location VALUES(900102,315002,'Euclid
Avenue,Syracuse,NY','Syracuse','NY',13210,'2018-10-10','9999-12-
31',CURRENT_TIMESTAMP,CURRENT_TIMESTAMP);
INSERT INTO customer_location VALUES(900103,315003,'Sumner
Avenue,Syracuse,NY','Syracuse','NY',13210,'2018-11-22','2019-11-
25',CURRENT_TIMESTAMP,CURRENT_TIMESTAMP);
INSERT INTO customer_location VALUES(900104,315004,'Ostrom
Avenue,Syracuse,NY','Syracuse','NY',13210,'2019-10-01','9999-12-
31',CURRENT_TIMESTAMP,CURRENT_TIMESTAMP);
INSERT INTO customer_location VALUES(900105,315005,'120
Westcott,Syracuse,NY','Syracuse','NY',13210,'2019-11-15','9999-12-
31',CURRENT_TIMESTAMP,CURRENT_TIMESTAMP);
INSERT INTO customer_location VALUES(900106,315006,'121
Westcott,Syracuse,NY','Syracuse','NY',13210,'2019-11-15','9999-12-
31',CURRENT_TIMESTAMP,CURRENT_TIMESTAMP);
INSERT INTO customer_location VALUES(900107,315007,'Madison Avenue,New York,NY','New
York','NY',10017,'2018-11-22','9999-12-31',CURRENT_TIMESTAMP,CURRENT_TIMESTAMP);
INSERT INTO customer_location VALUES(900108,315008,'808
Westcott,Syracuse,NY','Syracuse','NY',13210,'2018-11-22','9999-12-
31',CURRENT_TIMESTAMP,CURRENT_TIMESTAMP);
INSERT INTO customer_location VALUES(900109,315009,'800 Lancaster
Avenue,Syracuse,NY','Syracuse','NY',13210,'2019-05-05','9999-12-
31',CURRENT_TIMESTAMP,CURRENT_TIMESTAMP);

select * from customer_location;

INSERT INTO subscription VALUES(700100,315000,104,'IW','Internet Wireless Services','2019-11-
26','9999-12-31','1048 Lancaster Avenue,Syracuse,NY',CURRENT_TIMESTAMP,CURRENT_TIMESTAMP);
INSERT INTO subscription VALUES(700101,315001,104,'IW','Internet Wireless Services','2019-11-
25','9999-12-31','Park Drive,Boston,MA',CURRENT_TIMESTAMP,CURRENT_TIMESTAMP);
INSERT INTO subscription VALUES(700102,315002,101,'M','Mobile Services','2018-10-10','9999-12-
31','Euclid Avenue,Syracuse,NY',CURRENT_TIMESTAMP,CURRENT_TIMESTAMP);
INSERT INTO subscription VALUES(700103,315003,106,'CT','Cable TV Services','2018-11-22','9999-
12-31','Sumner Avenue,Syracuse,NY',CURRENT_TIMESTAMP,CURRENT_TIMESTAMP);
INSERT INTO subscription VALUES(700104,315003,107,'OTT','Over the top services','2019-01-
01','9999-12-31','Sumner Avenue,Syracuse,NY',CURRENT_TIMESTAMP,CURRENT_TIMESTAMP);
INSERT INTO subscription VALUES(700105,315004,109,'M','Mobile Services','2019-10-01','9999-12-
31','Ostrom Avenue,Syracuse,NY',CURRENT_TIMESTAMP,CURRENT_TIMESTAMP);
INSERT INTO subscription VALUES(700106,315005,103,'T','Telephone Services','2019-11-15','9999-
12-31','120 Westcott,Syracuse,NY',CURRENT_TIMESTAMP,CURRENT_TIMESTAMP);
INSERT INTO subscription VALUES(700107,315006,103,'T','Telephone Services','2019-11-15','9999-
12-31','121 Westcott,Syracuse,NY',CURRENT_TIMESTAMP,CURRENT_TIMESTAMP);
INSERT INTO subscription VALUES(700108,315007,101,'M','Mobile Services','2018-11-22','9999-12-
31','Madison Avenue,New York,NY',CURRENT_TIMESTAMP,CURRENT_TIMESTAMP);
INSERT INTO subscription VALUES(700109,315008,104,'IW','Internet Wireless Services','2018-11-
22','9999-12-31','808 Westcott,Syracuse,NY',CURRENT_TIMESTAMP,CURRENT_TIMESTAMP);
INSERT INTO subscription VALUES(700110,315009,107,'OTT','Over the top services','2019-05-
05','9999-12-31','800 Lancaster Avenue,Syracuse,NY',CURRENT_TIMESTAMP,CURRENT_TIMESTAMP);

```

```

INSERT INTO subscription VALUES(700111,315009,110,'CT','Cable TV Services','2019-05-05','9999-12-31','800 Lancaster Avenue,Syracuse,NY',CURRENT_TIMESTAMP,CURRENT_TIMESTAMP);

select * from subscription;

INSERT INTO ordert VALUES(400100,315000,104,'Internet Wireless Services','2019-11-26','2019-11-26',CURRENT_TIMESTAMP,CURRENT_TIMESTAMP);
INSERT INTO ordert VALUES(400101,315001,104,'Internet Wireless Services','2019-11-25','2019-11-25',CURRENT_TIMESTAMP,CURRENT_TIMESTAMP);
INSERT INTO ordert VALUES(400102,315002,101,'Mobile Services','2018-10-10','2018-10-10',CURRENT_TIMESTAMP,CURRENT_TIMESTAMP);
INSERT INTO ordert VALUES(400103,315003,106,'Cable TV Services','2018-11-22','2018-11-22',CURRENT_TIMESTAMP,CURRENT_TIMESTAMP);
INSERT INTO ordert VALUES(400104,315003,107,'Over the top Services','2019-01-01','2019-01-01',CURRENT_TIMESTAMP,CURRENT_TIMESTAMP);
INSERT INTO ordert VALUES(400105,315004,109,'Mobile Services','2019-10-01','2019-10-01',CURRENT_TIMESTAMP,CURRENT_TIMESTAMP);
INSERT INTO ordert VALUES(400106,315005,103,'Telephone Services','2019-11-15','2019-11-15',CURRENT_TIMESTAMP,CURRENT_TIMESTAMP);
INSERT INTO ordert VALUES(400107,315006,103,'Telephone Services','2019-11-15','2019-11-15',CURRENT_TIMESTAMP,CURRENT_TIMESTAMP);
INSERT INTO ordert VALUES(400108,315007,101,'Mobile Services','2018-11-22','2018-11-22',CURRENT_TIMESTAMP,CURRENT_TIMESTAMP);
INSERT INTO ordert VALUES(400109,315008,104,'Internet Wireless Services','2018-11-22','2018-11-22',CURRENT_TIMESTAMP,CURRENT_TIMESTAMP);
INSERT INTO ordert VALUES(400110,315009,107,'Over the top Services','2019-05-05','2019-05-05',CURRENT_TIMESTAMP,CURRENT_TIMESTAMP);
INSERT INTO ordert VALUES(400111,315009,110,'Cable TV Services','2019-05-05','2019-05-05',CURRENT_TIMESTAMP,CURRENT_TIMESTAMP);

select * from ordert;

INSERT INTO offer VALUES('MP100FF',101,'Mobility Prepaid-10$ OFF','2015-01-01','2015-02-01',CURRENT_TIMESTAMP,CURRENT_TIMESTAMP);
INSERT INTO offer VALUES('BOGOPOST',102,'Mobility Postpaid-BuyOneGetOneLine','2015-01-01','2015-02-01',CURRENT_TIMESTAMP,CURRENT_TIMESTAMP);
INSERT INTO offer VALUES('WT50OFF',103,'Wireline Telephone-5$ OFF','2015-01-01','2015-02-01',CURRENT_TIMESTAMP,CURRENT_TIMESTAMP);
INSERT INTO offer VALUES('IWL50FF',104,'Internet Wireline-5$ OFF','2016-12-25','2017-01-30',CURRENT_TIMESTAMP,CURRENT_TIMESTAMP);
INSERT INTO offer VALUES('IWS50OFF',105,'Internet Wireless-5$ OFF','2015-12-25','2016-01-30',CURRENT_TIMESTAMP,CURRENT_TIMESTAMP);
INSERT INTO offer VALUES('CT50OFF',106,'Cable TV-5$ OFF','2015-01-01','2015-02-01',CURRENT_TIMESTAMP,CURRENT_TIMESTAMP);
INSERT INTO offer VALUES('OTTFREE',107,'Over The Top Service-FirstMonthFree','2019-01-01','2019-02-01',CURRENT_TIMESTAMP,CURRENT_TIMESTAMP);
INSERT INTO offer VALUES('VOIP5$OFF',108,'Voice Over IP-5$ OFF','2015-01-01','9999-12-31',CURRENT_TIMESTAMP,CURRENT_TIMESTAMP);
INSERT INTO offer VALUES('THANKSPH',109,'Thanksgiving GetPhone&Plan','2018-10-22','2018-11-22',CURRENT_TIMESTAMP,CURRENT_TIMESTAMP);
INSERT INTO offer VALUES('BOWLCT5',110,'Superbowl Cable-5$ OFF','2016-01-01','2016-02-01',CURRENT_TIMESTAMP,CURRENT_TIMESTAMP);

select * from offer;

```

```
INSERT INTO productcampaign VALUES(10000,101,20150);
INSERT INTO productcampaign VALUES(10001,102,20150);
INSERT INTO productcampaign VALUES(10002,103,20150);
INSERT INTO productcampaign VALUES(10003,101,20151);
INSERT INTO productcampaign VALUES(10004,104,20152);
INSERT INTO productcampaign VALUES(10005,105,20152);
INSERT INTO productcampaign VALUES(10006,104,20161);
INSERT INTO productcampaign VALUES(10007,110,20162);
INSERT INTO productcampaign VALUES(10008,107,20190);
INSERT INTO productcampaign VALUES(10009,107,20191);
INSERT INTO productcampaign VALUES(100010,106,NULL);
INSERT INTO productcampaign VALUES(100011,108,NULL);
INSERT INTO productcampaign VALUES(100012,109,NULL);

select * from productcampaign;

*****DATABASE POPULATED*****
```

## BUSINESS RULES

- A new order is placed for every new product/service purchased by an account holder.
- Subscription is processed after account opening and subscription is closed before account closing.
- An account holder must have at least one subscribed product.
- A product with different offer will be considered as a different product.

# USERS & MAJOR DATA QUESTIONS

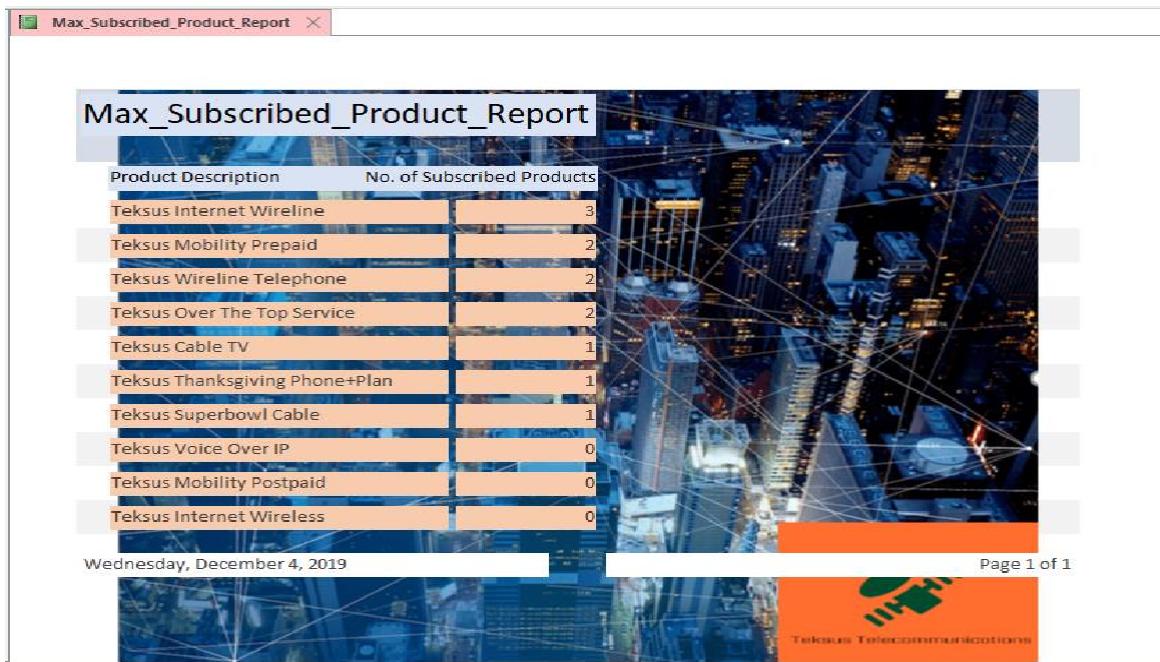
- **Chief Data Office Team:** These people have all the access on all the tables as they are the people responsible for maintaining the database and further the data warehouse as well. The CDO team will be working on data questions like is the database tuned and is data integrity maintained across the system. This team also provides relevant access to the below mentioned users.
- **Developers:** Data integration engineers who will populate the data have read only access for understanding the system and thus creating new tables. The developers will query database to understand the new business cases. For instance, if a new government policy is implemented due to which the ethnicity of a customer is to be encrypted, then the developers need to check the whole database for related columns.
- **Read-Write User:** This user is created mostly for manipulating data in the table. This virtual user has more access than the Developers, as it has Write access as well on the database. This user will only be able to check and answer the production performance in some dummy table if required.
- **Marketing Users:** These users might be divided into two parts i.e. one inside the organization and teams outsourced for carrying out marketing operations. These users can query database using read only access to answer questions such as:

## 1) Which product is most subscribed?

This is an important question as it gives the marketing team the product usage statistics at any given point of time.

```
SELECT Count(subscription.prd_id),
       Max(product.prd_desc) AS MaxOfprd_desc
  FROM product
 LEFT JOIN subscription
    -- left join so that all products are included even if not subscribed by a customer
   ON product.prd_id = subscription.prd_id
 GROUP BY product.prd_id
 ORDER BY Count(subscription.prd_id) DESC;
```

		Results	Messages
		(No column name)	MaxOfprd_desc
1	3		Teksus Internet Wireline
2	2		Teksus Mobility Prepaid
3	2		Teksus Wireline Telephone
4	2		Teksus Over The Top Service
5	1		Teksus Cable TV
6	1		Teksus Thanksgiving Phone+Plan
7	1		Teksus Superbowl Cable
8	0		Teksus Voice Over IP
9	0		Teksus Mobility Postpaid
10	0		Teksus Internet Wireless

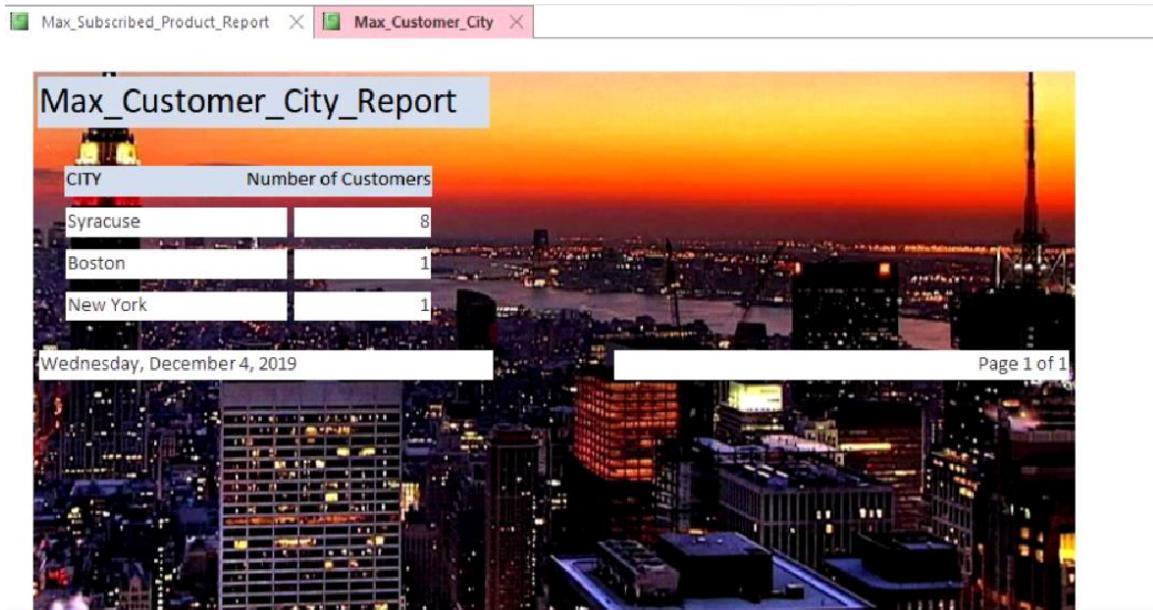


## 2) Which city has the maximum number of customers?

This question answers the geographical categorization of customers.

```
SELECT cust_city, count(*) as Number_of_Customers
FROM customer_location
GROUP BY cust_city
ORDER BY count(*) DESC;
```

Results		Messages
	cust_city	Number_of_Customers
1	Syracuse	8
2	Boston	1
3	New York	1



**3) What is the preferred billing option? (D-Debit, CA-Cash, C-Credit)**

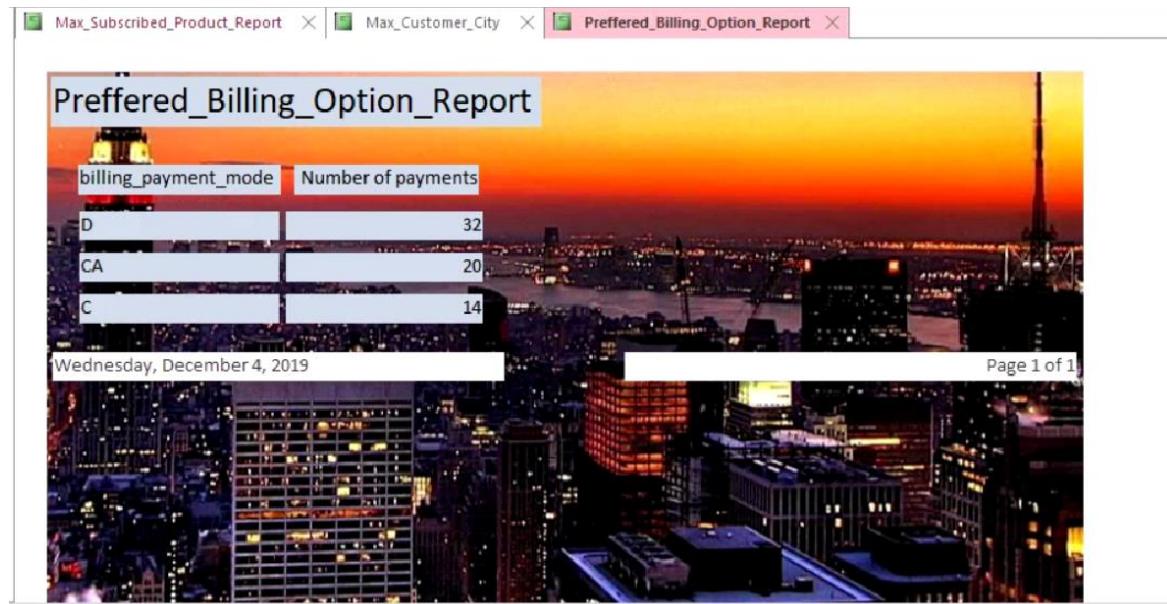
This question answers the customer payment preference which is useful for any future offers to be provided on certain payment mode.

```
SELECT billing_payment_mode, count(*)  
FROM billing  
GROUP BY billing_payment_mode  
ORDER BY count(*) DESC;
```

32 % ▾

Results Messages

	billing_payment_mode	(No column name)
1	D	32
2	CA	20
3	C	14



- 4) What geographic location(city) has customers who use certain product more frequently?

This question answers which products are to be targeted in a location which is relatively less exposed to a certain product.

```
SELECT C.CUST_CITY,P.PRD_DESC,COUNT(*) FROM CUSTOMER_LOCATION C
INNER JOIN SUBSCRIPTION S
ON C.ACCT_ID = S.ACCT_ID
INNER JOIN PRODUCT P
ON P.PRD_ID = S.PRD_ID
GROUP BY C.CUST_CITY,P.PRD_DESC
ORDER BY COUNT(*) DESC;
```

	CUST_CITY	PRD_DESC	(No column name)
1	Syracuse	Teksus Internet Wireline	2
2	Syracuse	Teksus Over The Top Service	2
3	Syracuse	Teksus Wireline Telephone	2
4	Syracuse	Teksus Superbowl Cable	1
5	Syracuse	Teksus Thanksgiving Phone+Plan	1
6	New York	Teksus Mobility Prepaid	1
7	Syracuse	Teksus Mobility Prepaid	1
8	Syracuse	Teksus Cable TV	1
9	Boston	Teksus Internet Wireline	1

Location-Product Report

CITY	PRODUCT DESCRIPTION	COMBINATION COUNT
Syracuse	Teksus Internet Wireline	2
Syracuse	Teksus Over The Top Service	2
Syracuse	Teksus Wireline Telephone	2
Syracuse	Teksus Superbowl Cable	1
Syracuse	Teksus Thanksgiving Phone+Plan	1
New York	Teksus Mobility Prepaid	1
Syracuse	Teksus Mobility Prepaid	1
Syracuse	Teksus Cable TV	1
Boston	Teksus Internet Wireline	1

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## 5) Products with highest price and associated offers?

This question gives the offer available on a product at any point of time.

```
SELECT P.PRD_DESC,P.PRD_PRICE,O.OFFR_DESC
FROM PRODUCT P
INNER JOIN OFFER O
ON P.PRD_ID = O.PRD_ID
WHERE PRD_END_DT > CURRENT_DATE --TO CHECK VALID PRODUCTS, WHICH ARE NOT EXPIRED
ORDER BY P.PRD_PRICE DESC; --Max priced products to be listed first
--NOTE: This report was ran after the trigger was executed for expired products
```

	PRD_DESC	PRD_PRICE	OFFR_DESC
1	Teksus Mobility Postpaid	70.00	Mobility Postpaid-BuyOneGetOneLine
2	Teksus Internet Wireless	60.00	Internet Wireless-5\$ OFF
3	Teksus Wireline Telephone	50.00	Wireline Telephone-5\$ OFF
4	Teksus Cable TV	40.00	Cable TV-5\$ OFF
5	Teksus Internet Wireline	40.00	Internet Wireline-5\$ OFF
6	Teksus Thanksgiving Phone+Plan	30.00	Thanksgiving GetPhone&Plan
7	Teksus Mobility Prepaid	30.00	Mobility Prepaid-10\$ OFF
8	Teksus Superbowl Cable	20.00	Superbowl Cable-5\$ OFF
9	Teksus Over The Top Service	10.00	Over The Top Service-FirstMonthFree

PRODUCT DESCRIPTION	PRD PRICE	OFFER DESCRIPTION
Teksus Mobility Postpaid	70	Mobility Postpaid-BuyOneGetOneLine
Teksus Internet Wireless	60	Internet Wireless-5\$ OFF
Teksus Wireline Telephone	50	Wireline Telephone-5\$ OFF
Teksus Cable TV	40	Cable TV-5\$ OFF
Teksus Internet Wireline	40	Internet Wireline-5\$ OFF
Teksus Thanksgiving Phone+Plan	30	Thanksgiving GetPhone&Plan
Teksus Mobility Prepaid	30	Mobility Prepaid-10\$ OFF
Teksus Superbowl Cable	20	Superbowl Cable-5\$ OFF
Teksus Over The Top Service	10	Over The Top Service-FirstMonthFree

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The above questions are important for Marketing teams to understand the market trend and customer behavior and then to figure out the population to be targeted.

- **Reporting Team:** This team has read only access and will use some indicator elements for generating fast reports for better understanding of real time situations and making future projections. This team helps marketing team with questions like, which product can give best ROI in upcoming future?
- **Data-lake Team:** This team will store historical data for better regression analysis and checking historic patterns. This team can question any projection data as this team has all the data from all domains of the organization and has read access on various other databases as well.
- **Customers:** These are the end users and are provided GUI for interacting with the database to check billing details, promocode options on new products & checking order history and status.

# INTERFACES: FORMS & REPORTS

## FORMS:

- 1) **Customer Location Form:** Used for data manipulation in customer location table.

The screenshot shows a Microsoft Access form titled "Customer Location Form". The form displays a list of 10 records. The fields shown are:

cust_loc_id	acct_id	srv_addr	cust_city	cust_state	cust_zipcode	cust_loc_eff_dt	cust_loc_end_dt
900100	315000	1048 Lancaster Avenue, Syracuse, NY	Syracuse	NY	13210	2019-11-26	9999-12-31

Record: 1 of 10 | No Filter | Search

- 2) **Account\_Subscription\_Product Form:** Used to view combined data of account holder's subscribed product details.

The screenshot shows a Microsoft Access form titled "Account\_Subscription\_Product Form". The form displays account details and a grid of subscribed products.

Account Details:

acct_id	315009
acct_fname	Tushar
acct_lname	Khaire

Subscribed Product:

subscr_id	acct_id	dbo_subscription_prd_id	srv_cd	srv_desc	dbo_product_prd_id	prd_desc
700110	315009	107	OTT	Over the top services	107	Teksus Over The Top Service
700111	315009	110	CT	Cable TV Services	110	Teksus Superbowl Cable
*						

Record: 10 of 10 | No Filter | Search

**3) Subscription Form: Used to manipulate data in Subscription table.**

Customer Location Form X Subscription Form X

### Subscription Form

subscr_id	700100
acct_id	315000
prd_id	104
srv_cd	IW
srv_desc	Internet Wireless Services
srv_eff_dt	2019-11-26
srv_end_dt	9999-12-31
srv_addr	1048 Lancaster Avenue,Syracuse,NY

Record: 1 of 12 | No Filter | Search

---

**4) Account Form: Used to manipulate data in Account table.**

Account Form X

### Account Form

acct_id	315000
acct_fname	Aditya
acct_lname	Tornekar
acct_eff_dt	2019-11-26
acct_end_dt	9999-12-31
acct_cust_sgmnt_cd	E
load_dt_tm	11/27/2019 12:08:28 AM
updtt_dt_tm	11/27/2019 12:08:28 AM

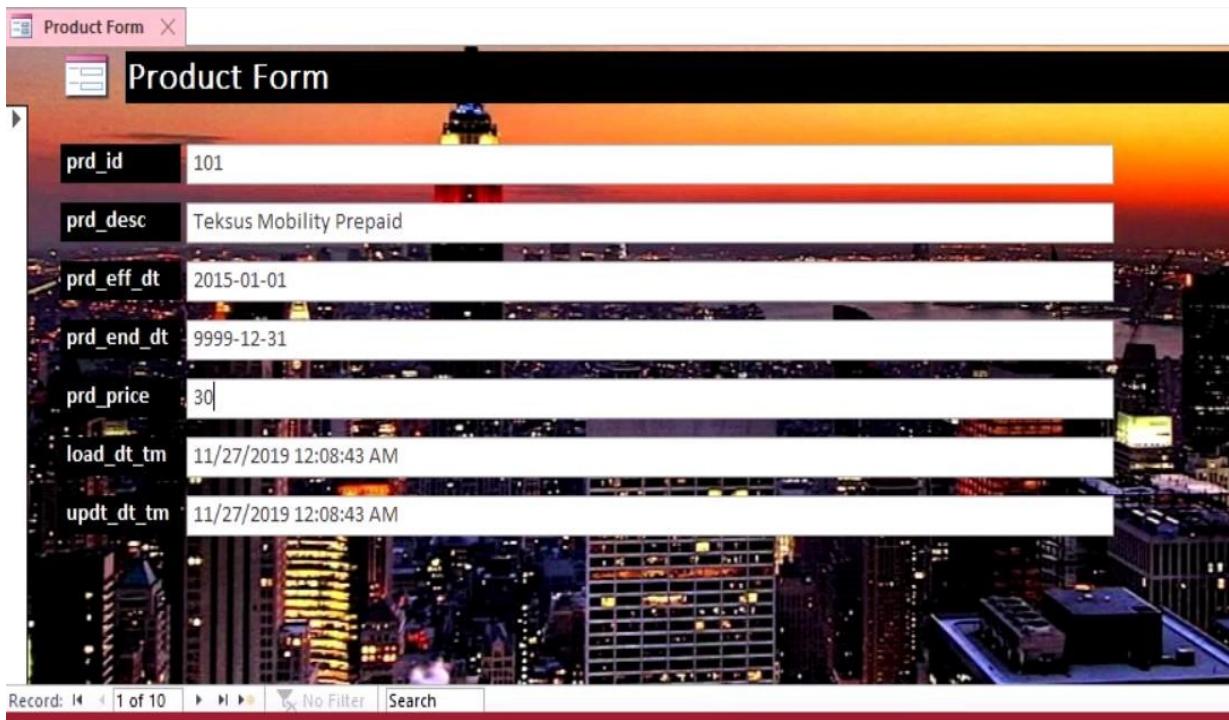
Record: 1 of 10 | No Filter | Search

5) Product Form: Used to manipulate data in Product table.

Product Form

prd_id	101
prd_desc	Teksus Mobility Prepaid
prd_eff_dt	2015-01-01
prd_end_dt	9999-12-31
prd_price	30
load_dt_tm	11/27/2019 12:08:43 AM
updtt_dt_tm	11/27/2019 12:08:43 AM

Record: 14 | 1 of 10 | < > >> No Filter | Search

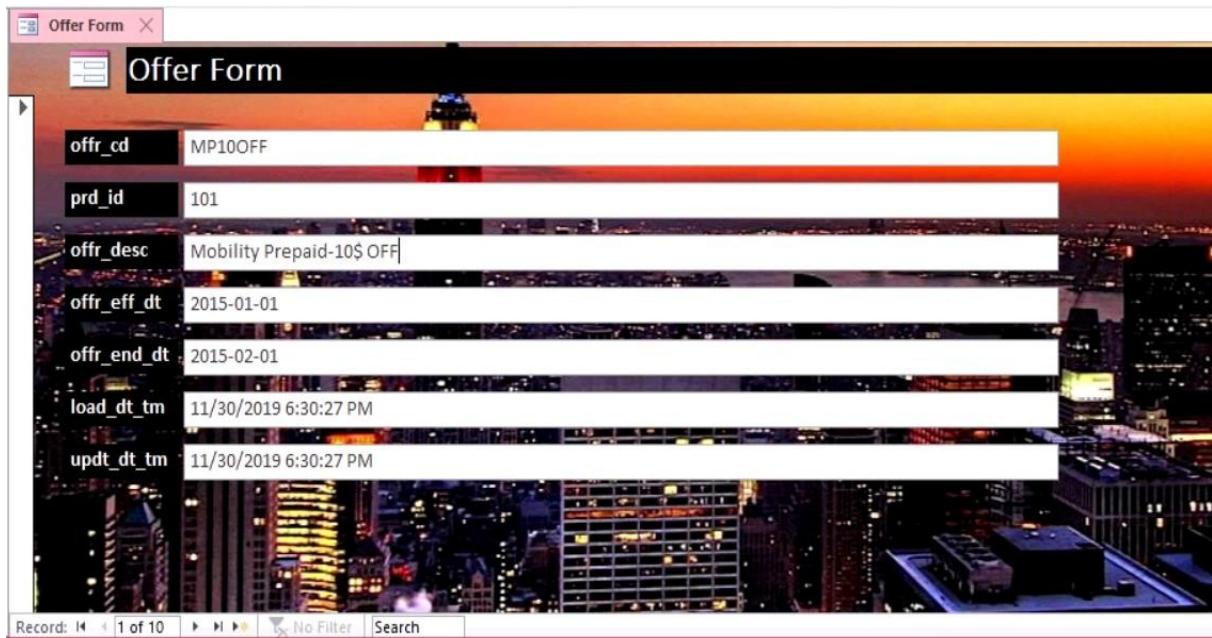


6) Offer Form: Used to manipulate data in Offer table.

Offer Form

otfr_cd	MP10OFF
prd_id	101
otfr_desc	Mobility Prepaid-10\$ OFF
otfr_eff_dt	2015-01-01
otfr_end_dt	2015-02-01
load_dt_tm	11/30/2019 6:30:27 PM
updtt_dt_tm	11/30/2019 6:30:27 PM

Record: 14 | 1 of 10 | < > >> No Filter | Search



7) Campaign Form: Used to manipulate data in campaign table.

Campaign Form

camp_id	20150
camp_desc	Wireline & Mobility Campaign
camp_eff_dt	2014-10-01
camp_end_dt	2015-05-05
load_dt_tm	11/27/2019 12:29:34 AM
updtt_dt_tm	11/27/2019 12:29:34 AM

Record: 14 | 1 of 7 | Next | No Filter | Search |

8) Order Form: Used to manipulate data in Order table.

Order Form

order_id	400100
acct_id	315000
prd_id	104
order_desc	Internet Wireless Services
order_eff_dt	2019-11-26
order_end_dt	2019-11-26
load_dt_tm	11/30/2019 5:58:19 PM
updtt_dt_tm	11/30/2019 5:58:19 PM

Record: 14 | 1 of 12 | Next | No Filter | Search |

- 9) Billing Form: Used to manipulate data in Billing table. (Write access only for organization)

Billing Form

billing_id	23100
acct_id	315000
billing_address	1048 Lancaster Avenue,Syracuse,NY
billing_payment_mode	D
billing_amount	40
billing_eff_dt	2019-11-26
billing_end_dt	2019-11-30
load_dt_tm	11/30/2019 5:01:44 PM
updtt_dt_tm	11/30/2019 5:01:44 PM

Record: 14 < 1 of 66 > No Filter | Search

- 10) Product\_Campign Association Form: This form enables us to view the productcampaign table data

Product&Campaign Association Form

prod_camp_id	10000
prd_id	101
camp_id	20150

Record: 14 < 1 of 13 > No Filter | Search

## REPORTS:

### 1) Max Subscribed Product Report: Reports number of subscribers for a product

Max\_Subscribed\_Product\_Report

Product Description	No. of Subscribed Products
Teksus Internet Wireline	3
Teksus Mobility Prepaid	2
Teksus Wireline Telephone	2
Teksus Over The Top Service	2
Teksus Cable TV	1
Teksus Thanksgiving Phone+Plan	1
Teksus Superbowl Cable	1
Teksus Voice Over IP	0
Teksus Mobility Postpaid	0
Teksus Internet Wireless	0

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Teksus Telecommunications

### 2) Customer City Report: Reports number of customers in a given city

Max\_Subscribed\_Product\_Report

Max\_Customer\_City\_Report

CITY	Number of Customers
Syracuse	8
Boston	1
New York	1

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**3) Preferred Billing Option Report: Reports preferred bill payment option statistics**

The screenshot shows a report titled "Preferred\_Billing\_Option\_Report". At the top, there are three tabs: "Max\_Subscribed\_Product\_Report", "Max\_Customer\_City", and "Preferred\_Billing\_Option\_Report". The main content area displays a horizontal bar chart with the following data:

billing_payment_mode	Number of payments
D	32
CA	20
C	14

Below the chart, the date "Wednesday, December 4, 2019" is displayed. In the bottom right corner, it says "Page 1 of 1". The background of the report features a photograph of a city skyline at night.

**4) Location Product Report: Reports product-location usage combination count**

The screenshot shows a report titled "Location-Product Report". At the top, there are two tabs: "Location-Product" and "Location-Product Report". The main content area displays a table with the following data:

CITY	PRODUCT DESCRIPTION	COMBINATION COUNT
Syracuse	Teksus Internet Wireline	2
Syracuse	Teksus Over The Top Service	2
Syracuse	Teksus Wireline Telephone	2
Syracuse	Teksus Superbowl Cable	1
Syracuse	Teksus Thanksgiving Phone+Plan	1
New York	Teksus Mobility Prepaid	1
Syracuse	Teksus Mobility Prepaid	1
Syracuse	Teksus Cable TV	1
Boston	Teksus Internet Wireline	1

Below the table, the date "Thursday, December 12, 2019" is displayed. In the bottom right corner, it says "Page 1 of 1". The background of the report features a photograph of a city skyline at night.

**5) Product Offers Report: Reports product price and offer available on a product**

The screenshot shows a software interface with two tabs at the top: "Product-Offers" and "Product-Offers-Report". The "Product-Offers-Report" tab is active, displaying a report titled "Product-Offers-Report". The report contains a table with three columns: "PRODUCT DESCRIPTION", "PRD PRICE", and "OFFER DESCRIPTION". The table lists nine products with their respective prices and offer details. The background of the report area features a city skyline at night.

PRODUCT DESCRIPTION	PRD PRICE	OFFER DESCRIPTION
Teksus Mobility Postpaid	70	Mobility Postpaid-BuyOneGetOneLine
Teksus Internet Wireless	60	Internet Wireless-5\$ OFF
Teksus Wireline Telephone	50	Wireline Telephone-5\$ OFF
Teksus Cable TV	40	Cable TV-5\$ OFF
Teksus Internet Wireline	40	Internet Wireline-5\$ OFF
Teksus Thanksgiving Phone+Plan	30	Thanksgiving GetPhone&Plan
Teksus Mobility Prepaid	30	Mobility Prepaid-10\$ OFF
Teksus Superbowl Cable	20	Superbowl Cable-5\$ OFF
Teksus Over The Top Service	10	Over The Top Service-FirstMonthFree

Thursday, December 12, 2019

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# TRIGGER:

The below trigger updates the offer table elements after a product is updated as expired in the database. Below elements in offer table are updated by trigger execution:

**offr\_end\_dt:** This should be updated when a product expires as the offer is no longer valid on expired product

**offr\_desc:** This is updated with “PRODUCTEXPIRED” keyword appended at the end of the existing offer description

**upd\_dt\_tm:** This is to be updated as it reflects the recent update timestamp on any record

```

CREATE TRIGGER updateOfferStatus
ON product
FOR INSERT,UPDATE
AS
IF @ROWCOUNT >=1
BEGIN
    UPDATE OFFER
    SET offr_end_dt = offrprd.prd_end_dt,
        offr_desc = offr_desc + 'PRODUCTEXPIRED',
        upd_dt_tm = CURRENT_TIMESTAMP
    --Setting offer end date,offer description and update date-time as
    --the offer no longer exists as product has expired.
    FROM
    (
    SELECT prd.prd_id,prd.prd_end_dt
    FROM product prd
    INNER JOIN OFFER offr
    ON offr.prd_id = prd.prd_id
    WHERE prd.prd_end_dt < CAST(CURRENT_TIMESTAMP as date)
    ) offrprd
    WHERE offrprd.prd_id = OFFER.prd_id
END;

```

The screenshot shows the SQL Query window with the trigger definition. The trigger is named 'updateOfferStatus' and is defined on the 'product' table. It triggers on both 'INSERT' and 'UPDATE' operations. The trigger body begins with an IF statement to check if any rows were affected. If so, it updates the 'OFFER' table. The update statement sets three columns: 'offr\_end\_dt' to the value from 'offrprd.prd\_end\_dt', 'offr\_desc' to its current value plus 'PRODUCTEXPIRED', and 'upd\_dt\_tm' to the current timestamp. A comment explains that this updates the offer end date, description, and update date-time when the offer no longer exists as the product has expired. The update is performed against a derived table that selects 'prd\_id' and 'prd\_end\_dt' from the 'product' table and joins it with the 'OFFER' table on 'prd\_id'. The WHERE clause in the derived table ensures that only products with an end date before the current timestamp are selected. Finally, the WHERE clause in the update statement links the selected products with the offers in the 'OFFER' table.

# BEFORE TRIGGER EXECUTION:

The below screenshots show the data before product expiry is updated in the database.

```
SELECT * from product;
```

82 %

	prd_id	prd_desc	prd_eff_dt	prd_end_dt	prd_price	load_dt_tm	upd_dt_tm
2	102	Teksus Mobility Postpaid	2015-01-01	9999-12-31	70.00	2019-11-27 00:08:42.930	2019-11-27 00:08:42.930
3	103	Teksus Wireline Telephone	2015-01-01	9999-12-31	50.00	2019-11-27 00:08:42.930	2019-11-27 00:08:42.930
4	104	Teksus Internet Wireline	2016-12-25	9999-12-31	40.00	2019-11-27 00:08:42.930	2019-11-27 00:08:42.930
5	105	Teksus Internet Wireless	2015-12-25	9999-12-31	60.00	2019-11-27 00:08:42.930	2019-11-27 00:08:42.930
6	106	Teksus Cable TV	2015-01-01	9999-12-31	40.00	2019-11-27 00:08:42.930	2019-11-27 00:08:42.930
7	107	Teksus Over The Top Service	2019-01-01	9999-12-31	10.00	2019-11-27 00:08:42.930	2019-11-27 00:08:42.930
8	108	Teksus Voice Over IP	2015-01-01	9999-12-31	30.00	2019-11-27 00:08:42.933	2019-11-27 00:08:42.933
9	109	Teksus Thanksgiving Phone+Plan	2018-11-22	9999-12-31	30.00	2019-11-27 00:08:42.933	2019-11-27 00:08:42.933
10	110	Teksus Superbowl Cable	2016-01-01	9999-12-31	20.00	2019-11-27 00:08:42.933	2019-11-27 00:08:42.933

Query executed successfully. | ist-s-students.syr.edu (12.... | AD\autornek (110)

```
SELECT * from offer;
```

82 %

	offr_cd	prd_id	offr_desc	offr_eff_dt	offr_end_dt	load_dt_tm	upd_dt_tm
2	BOWLCT5	110	Superbowl Cable-\$ OFF	2016-01-01	2016-02-01	2019-11-30 18:30:26.983	2019-11-30 18:30:26.983
3	CT5OFF	106	Cable TV-\$ OFF	2015-01-01	2015-02-01	2019-11-30 18:30:26.980	2019-11-30 18:30:26.980
4	IWL5OFF	104	Internet Wireline-\$ OFF	2016-12-25	2017-01-30	2019-11-30 18:30:26.980	2019-11-30 18:30:26.980
5	IWS5OFF	105	Internet Wireless-\$ OFF	2015-12-25	2016-01-30	2019-11-30 18:30:26.980	2019-11-30 18:30:26.980
6	MP10OFF	101	Mobility Prepaid-10\$ OFF	2015-01-01	2015-02-01	2019-11-30 18:30:26.980	2019-11-30 18:30:26.980
7	OTTFREE	107	Over The Top Service-FirstMonthFree	2019-01-01	2019-02-01	2019-11-30 18:30:26.980	2019-11-30 18:30:26.980
8	THANKSPH	109	Thanksgiving GetPhone&Plan	2018-10-22	2018-11-22	2019-11-30 18:30:26.983	2019-11-30 18:30:26.983
9	VOIP5\$OFF	108	Voice Over IP-\$ OFF	2015-01-01	9999-12-31	2019-11-30 18:30:26.980	2019-11-30 18:30:26.980
10	WT5OFF	103	Wireline Telephone-\$ OFF	2015-01-01	2015-02-01	2019-11-30 18:30:26.980	2019-11-30 18:30:26.980

Query executed successfully. | ist-s-students.syr.edu (12.... | AD\autornek (110)

# AFTER TRIGGER EXECUTION:

After product table(expiry) is updated the trigger updates the offer table.

```

update product
set prd_end_dt = '2019-12-01',
    upd_dt_tm = CURRENT_TIMESTAMP
where prd_id = 108
  
```

82 %

Messages

```

(1 row affected)

(1 row affected)
  
```

Results

	offr_cd	prd_id	offr_desc	offr_eff_dt	offr_end_dt	load_dt_tm	upd_dt_tm
1	BOGOPOST	102	Mobility Postpaid-BuyOneGetOneLine	2015-01-01	2015-02-01	2019-11-30 18:30:26.980	2019-11-30 18:30:26.980
2	BOWLCT5	110	Superbowl Cable-5\$ OFF	2016-01-01	2016-02-01	2019-11-30 18:30:26.983	2019-11-30 18:30:26.983
3	CT5OFF	106	Cable TV-5\$ OFF	2015-01-01	2015-02-01	2019-11-30 18:30:26.980	2019-11-30 18:30:26.980
4	IWL5OFF	104	Internet Wireline-5\$ OFF	2016-12-25	2017-01-30	2019-11-30 18:30:26.980	2019-11-30 18:30:26.980
5	IWS5OFF	105	Internet Wireless-5\$ OFF	2015-12-25	2016-01-30	2019-11-30 18:30:26.980	2019-11-30 18:30:26.980
6	MP100FF	101	Mobility Prepaid-10\$ OFF	2015-01-01	2015-02-01	2019-11-30 18:30:26.980	2019-11-30 18:30:26.980
7	OTTFREE	107	Over The Top Service-FirstMonthFree	2019-01-01	2019-02-01	2019-11-30 18:30:26.980	2019-11-30 18:30:26.980
8	THANKSPH	109	Thanksgiving GetPhone&Plan	2018-10-22	2018-11-22	2019-11-30 18:30:26.983	2019-11-30 18:30:26.983
9	VOIP5\$OFF	108	Voice Over IP-5\$ OFF\$ PRODUCTEXPIRED	2015-01-01	2019-12-01	2019-11-30 18:30:26.980	2019-12-02 22:22:48.510
10	WT5OFF	103	Wireline Telephone-5\$ OFF	2015-01-01	2015-02-01	2019-11-30 18:30:26.980	2019-11-30 18:30:26.980

Query executed successfully. | ist-s-students.syr.edu (12.... | AD\autornek (110)