Logical Data Model

Introduction :-

First we had to make some changes and improvements to the conceptual data model which are explained and presented in the last part of this report. Then we identify all the attributes in old and new entities and assign them the primary (PK) and foreign keys (FK) and make relationships with them in Erwin to make a full LDM. We identified each variable and the data types that this LDM could be used to design the database in Access or Oracle database management systems.

Introduction to the Terms Used in LDM :-

Elements :- Elements in the data model are named entities. This is any distinguishable object that presents part of the database. It can be related to any object in the real world such as: a car, a customer (person), a policy, a company, etc. with respective attributes that are relevant to the software system.

Properties of entities can have values:
- Name
- Description of the meaning and significance
- Weather entity is dependent or non-dependent
- List of attributes (Car entity: year, manufacturer, model, mileage, owner, licence, book of maintenance) with properties (data type, size, is it required or not).
- The attributes (or attribute) are used to precisely identify an entity (primary key – PK, foreigner key – FK, …)
- Constraints of individual or combined attributes values (e.g. date of issue of new policy can't be prior to renewal date of policy)
- Rules to grant permission to users or user groups to access the entity
- Expected number of entity instances and expected growth rate

Additional:
- List of attributes to be indexed to optimize access time
- List of attributes to be encrypted or compressed
- Weather entity should become a database view or a table
- Weather entity should become a materialized view
- List of database triggers to be implemented for that entity.

Relations :-

Relationship - Designates logical association between entities, with cardinality of the participant entities: one-to-one, one-to-many, or many-to-many relationships. Relationships can be identifying or non-identifying (identifying A-B; existence of B depends on existence of A).

Generalization/specialization – Indicates an "is a" relationship between entities. For example department entity is a generalization of different types of departments; at the same time vehicle insurance department or travel insurance department is specialization of department entity.

Aggregation - is an abstraction that turns relationships between entities into an aggregate entity, rarely used. Example: "customer-insurance advisor -date" can be an aggregate entity called Appointment.

Constraints - The database normalization technique is used to impose restrictions on data models that are based on dependencies between entities and their attributes. Normalization is used with the goal objective to avoid duplication of information in order to safeguard the consistency (integrity) of the data.

Data types - When we assign attributes to entities with primary keys and foreign keys do the normalization, we identify each attribute with the data type for each data management system.

Business Rules, Attributes, Data types and Primary/Foreign Keys :-

This section of the report identifies all of the attributes, data types and primary and foreign keys for our system LDM.

Table Number	Entity Type	Business Rules
•1	•T13_CUSTOMER	•Records all the personal details about the customer
•2	•T13_INSURANCE_COMPANY	•Details of the Insurance organization giving the insurance cover
•3	•T13_MEMBERSHIP	•Records details of customer membership, clubs, societies
•4	•T13_OFFICE	•Records details of different office locations
•5	•T13_POLICY_RENEWABLE	•Records details of due date of insurance policy
•6	•T13_CLAIM_SETTLEMENT	•Records details of settlement made on claims
•7	•T13_COVERAGE	•Records all terms and conditions in regard to the policy
•8	•T13_STAFF	•Records details of employees
•9	•T13_PRODUCT	•Records details of the products offered by insurance company
•10	•T13_INSURANCE_POLICY	•Records details of Insurance agreement
•11	•T13_INSURANCE_POLICY_COVERAGE	•Records agreement and coverage details
•12	•T13_VEHICLE	•Records details of Vehicle model, cost and registration
•13	•T13_VEHICLE_SERVICE	•Records details of different vehicle services offered
•14	•T13_PREMIUM_PAYMENT	•Records details of customer cost of payments
•15	•T13_NOK	•Records details of the next of kin
•16	•T13_RECEIPT	•Details of premium payments to customer
•17	•T13_APPLICATION	•Records details of the insurance cover requested by customer
•18	•T13_DEPARTMENT	•Records details of the various departments
•19	•T13_CLAIM	•Records details of customer claims in case of an incident
•20	•T13_INCIDENT_REPORT	•Records details of the individual incident
•21	•T13_INCIDENT	•Records details of the accident, theft, fire, etc.
•22	•T13_QUOTE	•Records details of customer potential cost of the insurance product

ATTRIBUTES AND DATA TYPES

ATTRIBUTE	DATA TYPE
Incident_Id	VARCHAR(20) NOT NULL
Incident_Type	VARCHAR(50) NULL
Incident_Date	DATE NOT NULL
Description	VARCHAR(1000) NULL
CUST_Id	VARCHAR(15) NOT NULL
CUST_FNam	VARCHAR(15) NOT NULL
CUST_LName	VARCHAR(15) NOT NULL
CUST_DOB	DATE NOT NULL
CUST_Gender	CHAR(2) NOT NULL
CUST_Address	VARCHAR(35) NOT NULL
CUST_MOB_Number	BIGINT NOT NULL
CUST_Email	VARCHAR(25) NULL
CUST_Passport_Number	VARCHAR(20) NULL
CUST_Marital_Status	CHAR(12) NULL

CUST_PPS_Number	INTEGER NULL
Company_Name	VARCHAR(70) NOT NULL
Company_Address	VARCHAR(400) NULL
Company_Contact_Number	bigint NUL
Company_Fax	bigint NULL
Company_Email	VARCHAR(50) NULL
Company_Website	VARCHAR(50) NULL
Company_Location	VARCHAR(50) NULL
Company_Department_Name	VARCHAR(50) NULL
Company_Office_Name	VARCHAR(50) NULL
Department_Name	VARCHAR(50) NOT NULL
Department_ID	VARCHAR(50) NOT NULL
Department_Staff	VARCHAR(50) NOT NULL
Vehicle_Service_Company_Name	VARCHAR(10) NOT NULL
Vehicle_Service_Address	VARCHAR(200) NULL
Vehicle_Service_Contact	VARCHAR(200) NULL

Company_Name	VARCHAR(70) NOT NULL
Company_Address	VARCHAR(400) NULL
Company_Contact_Number	bigint NUL
Company_Fax	bigint NULL
Company_Email	VARCHAR(50) NULL
Company_Website	VARCHAR(50) NULL
Company_Location	VARCHAR(50) NULL
Company_Department_Name	VARCHAR(50) NULL
Company_Office_Name	VARCHAR(50) NULL
Department_Name	VARCHAR(50) NOT NULL
Department_ID	VARCHAR(50) NOT NULL
Department_Staff	VARCHAR(50) NOT NULL
Vehicle_Service_Company_Name	VARCHAR(10) NOT NULL
Vehicle_Service_Address	VARCHAR(200) NULL
Vehicle_Service_Contact	VARCHAR(200) NULL

Incident_Type	CHAR(50) NULL
Incident_Inspector	VARCHAR(20) NULL

Incident_Cost	INTEGER NULL
Incident_Report_Description	VARCHAR(1000) NULL
Premium_Payment_Id	VARCHAR(20) NOT NULL
Premium_Payment_Amount	INTEGER NOT NULL
Premium_Payment_Schedule	DATE NOT NULL
Payment_Status	VARCHAR(20) NOT NULL
Receipt_Id	VARCHAR(20) NOT NULL
Time	DATE NOT NULL
Cost	INTEGER NOT NULL
Application_Status	CHAR(8) NOT NULL
Coverage	VARCHAR(50) NOT NULL
Agreement_id	VARCHAR(20) NOT NULL
Department_Name	VARCHAR(20) NULL
Start_Date	DATE NULL
Expiry_Date	DATE NULL
Policy_Renewable_Id	VARCHAR(20) NOT NULL
Date_Of_Renewal	DATE NOT NULL

Type_Of_Renewal	CHAR(15) NOT NULL
Membership_Id	VARCHAR(20) NOT NULL
Membership_Type	CHAR(15) NOT NULL
Organisation_Contact	VARCHAR(20) NULL
Quote_Id	VARCHAR(20) NOT NULL
Issue_Date	DATE NOT NULL
Valid_From_Date	DATE NOT NULL
Valid_Till_Date	DATE NOT NULL
Description	VARCHAR(100) NULL
Product_Id	VARCHAR(20) NOT NULL
Coverage_Level	VARCHAR(20) NOT NULL
Staff_Id	VARCHAR(200) NOT NULL
Staff_Fname	VARCHAR(100) NULL
Staff_LName	VARCHAR(100) NULL
Staff_Adress	VARCHAR(200) NULL
Staff_Contact	BIGINT NULL
Staff_Gender	CHAR(2) NULL
Staff_Marital_Status	CHAR(8) NULL
Staff_Nationality	CHAR(15) NULL

Staff_Qualification	VARCHAR(20) NULL
Staff_Allowance	bigint NULL
Staff_PPS_Number	bigint NULL
Nok_Id	VARCHAR(20) NOT NULL
Nok_Name	VARCHAR(20) NULL
Nok_Phone_Number	BIGINT NULL
Nok_Address	VARCHAR(200) NULL
Nok_Gender	CHAR(10) NULL
Nok_Marital_Status	CHAR(8) NULL
Product_Number	VARCHAR(200) NOT NULL
Product_Price	INTEGER NULL
Product_Type	CHAR(40) NULL
Office_Name	VARCHAR(200) NOT NULL
Contact_Information	VARCHAR(200) NOT NULL
Office_Leader	VARCHAR(200) NOT NULL
Address	VARCHAR(200) NOT NULL
Admin_Cost	INTEGER NULL
Staff	VARCHAR(50) NULL
Coverage_Id	VARCHAR(20) NOT NULL

Coverage_Amount	INTEGER NOT NULL
Coverage_Type	CHAR(30) NOT NULL
Coverage_Description	VARCHAR(400) NULL
Coveage_Terms	VARCHAR(50) NULL
Agreement_id	VARCHAR(20) NOT NULL
Claim_Id	VARCHAR(20) NOT NULL
Claim_Amount	INTEGER NOT NULL
Damage_Type	VARCHAR(20) NOT NULL
Date_Of_Claim	DATE NOT NULL
Claim_Status	CHAR(10) NOT NULL
Claim_Settlement_Id	VARCHAR(20) NOT NULL
Amount_Paid	INTEGER NOT NULL
Date_Settled	DATE NOT NULL

Graphical presentation of LDM :-