Part B: Logical Data Model

Introduction

Part B of this report includes design of logical data model for vehicle insurance company ABC Ltd.

We need some changes and improvements to the conceptual data model in part A of this report. Identify all the attributes in old and new entities. Assigned the primary (PK) and foreign keys (FK) and made relationships with them in ER diagram to make a full LDM. Identifying useful variables and data types for this logical data model using the MSQL workbench.

Introduction of terms used for constructing LDM

Elements

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 Or 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: 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 relationship between entities into an aggregate entity, rarely used. Example: "customer-insurance advisor -date" can be an aggregate entity called Appointment.

Data types

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

Table 6: Example of data types in MYSQL DMS

Entity type	Attributes	Data type
G1_CUSTOMER	G1_FIRST_NAME	varchar (size)
	G1_LAST_NAME	varchar (size)
	G1_DATE_OF_BIRTH	Date

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. For better understanding table number and rules are been given below.

Table 7: Table number entity type

Table Number	Entity Type	Business Rules
1	G1_CUSTOMER	Records all the personal details about the customer
2	G1_APPLICATION	Records details of the insurance cover requested by customer
3	G1_QUOTE	Records details of customer potential cost of the insurance product
4	G1_INSURANCE_POLICY	Records details of Insurance agreement
5	G1_PREMIUM	Records details of customer cost of payments
6	G1_VEHICLE	Records details of Vehicle model, cost and registration
7	G1_CLAIM	Records details of customer claims in case of an incident
8	G1_SETTLEMENT	Records details of settlement made on claims
9	G1_STAFF	Records details of employees
10	G1_DEPARTMENT	Records details of the various departments
11	G1_OFFICE	Records details of different office locations
12	G1_MEMBERSHIP	Records details of customer membership, clubs, societies
13	G1_SERVICE	Records details of different vehicle services offered
14	G1_NOK	Records details of the next of kin
15	G1_COMPANY	Details of the Insurance organization giving the insurance cover
16	G1_TERMS_CONDITIONS	Records all terms and conditions in regard to the policy
17	G1_RECEIPT	Details of premium payments to customer
18	G1_VEHICLE_INSURANCE _DEPARTMENT	Records details of vehicle insurance cover

Table 8: Abbreviation table of attributes names used in LDM

LDM Attributes	Column Names Abbreviations
G1_CUST_ID	CUSTOMER_IDENTIFICATION
G1_CUST_FNAME	CUSTOMER_FIRST_NAME
G1_CUST_LNAME	CUSTOMER_LAST_NAME
G1_CUST_DOB	CUSTOMER_DATEOFBIRTH
G1_CUST_PPS_NUMBER	CUSTOMER_PERSONALPUBLICSERVICE_NUMBER
G1_STAFF_FNAME	STAFF_FIRSTNAME
G1_STAFF_LNAME	STAFF_LASTNAME
G1_STAFF_PPS_NUMBER	STAFF_PERSONALPUBLICSERVICE_NUMBER
G1_ADMIN_COST	ADMINISTRATION_COST
G1_NOK_ID	NEXTOFKIN_IDENTIFICATION

Table-LDM 1: G1_CUSTOMER

Attributes	Data Type	Primary and Foreign Keys	Explanation
G1_CUST_ID	INT	PK	The CUSTOMER attributes record all the essential personal details of the customer. The CUST_ID is the unique primary key.
G1_CUST_FNAME	VARCHAR (10)		
G1_CUST_LNAME	VARCHAR (10)		
G1_CUST_DOB	DATE		
G1_CUST_GENDER	ENUM('M','F')		
G1_CUST_ADDRESS	VARCHAR2(20)		
G1_CUST_MOB_NUMBER	INT		
G1_CUST_EMAIL	VARCHAR (20)		
G1_CUST_PASSPORT_NUMBER	VARCHAR (20)		
G1_CUST_MARITAL_STATUS	VARCHAR (20)		
G1_CUST_PPS_NUMBER	INT		

Table-LDM 2: G1_Application

Attributes	Dat a Type	Primary and Foreign Keys	Explanation
G1_APPLICATION_ID	INT	PK	The APPLICATION attributes record all the essential application details of the customer. The APPLICATION_ID is the unique primary key and the CUST_ID is a foreign key linking the table back to the entity type CUSTOMER.
G1_CUST_ID	INT	FK	
G1_VEHICLE_ID	INT		
G1_COVERAGE	VARCHAR (80)		

Table-LDM 3: G1_QUOTE

Attributes	Data Type	Primary and Foreign Keys	Explanation
G1_QUOTE_ID	INT	PK	The QUOTE attributes record all the essential quotation details of the customer. The QUOTE_ID is the unique primary key and APPLICATION_ID and is a foreign key linking the table back to the respective entities
G1_APPLICATION_ID	INT	FK	
G1_ISSUE_DATE	DATE		
G1_VALID_FROM_DATE	DATE		
G1_VALID_TILL_DATE	DATE		
G1_DESCRIPTION	VARCHAR (200)		
G1_PRODUCT_ID	VARCHAR (20)		
G1_COVERAGE_LEVEL	VARCHAR (20)		

Table-LDM 4: G1_INSURANCE_POLICY

Attributes	Data Type	Primary and Foreign Keys	Explanation
G1_AGREEMENT_ID	INT	PK	The INSURANCE POLICY attributes record all the essential policy details of the customer. The AGREEMENT_ID is the unique primary key , and APPLICATION_ID are linked to the other corresponding entities through their foreign keys.
G1_APPLICATION_ID	INT	FK	
G1_DEPARTMENT _NAME	VARCHAR (20)		
G1_POLICY_NUMBER	INT		
G1_START_DATE	DATE		
G1_EXPIRY_DATE	DATE		
G1_TERM_CONDITION_DESCRIPTION	VARCHAR(500)		

Table-LDM 5: G1_PREMIUM

Attributes	Data Type	Primary and Foreign Keys	Explanation
G1_PREMIUM_PAYMENT_ID	INT	PK	The PREMIUM_PAYMENT attributes record all the essential policy premium payments details of the customer. The PREM_PAYMENT_ID is the unique primary key and the CUST_ID is the Foreign key linking table to CUSTOMER entity.
G1_CUST_ID	INT	FK	
G1_POLICY_NUMBER	INT		
G1_PREMIUM_PAYMENT_SCHEDULE	DATE		
G1_PREMIUM_PAYMENT_AMOUNT	INT		

Table-LDM 6: G1_ VEHICLE

Attributes	Data Type	Primary and ForeignKeys	Explanation
G1_VEHICLE_ID	INT	PK	The VEHICLE attributes record all the essential VEHICLE details belonging to the customer. The VEHICLE_ID is the unique primary key is the foreign key linking table to CUSTOMER entity.
G1_CUST_ID	INT	FK	
G1_POLICY_ID	INT		
G1_DEPENDENT_NOK_ID	INT		
G1_VEHICLE_REGISTRATION_NUMBER	INT		
G1_VEHICLE_VALUE	INT		
G1_VEHICLE_TYPE	VARCHAR (20)		
G1_VEHICLE_SIZE	INT		
G1_VEHICLE_NUMBER_OF_SEAT	INT		
G1_VEHICLE_MANUFACTURER	VARCHAR (20)		
G1_VEHICLE_ENGINE_NUMBER	VARCHAR (20)		
G1_VEHICLE_CHASIS_NUMBER	VARCHAR (20)		
G1_VEHICLE_NUMBER	VARCHAR (20)		
G1_VEHICLE_MODEL_NUMBER	VARCHAR (20)		

Table-LDM 7: G1_CLAIM

Attributes	Data Type	Primary and Foreign Keys	Explanation
G1_CLAIM_ID	INT	PK	The CLAIM attributes record all the essential CLAIM details of the customer in case of an incident. The CLAIM_ID is the unique primary key and the CUST_ID is foreign key linking table to CUSTOMER entity.
G1_CUST_ID	INT	FK	
G1_CLAIM_AMOUNT	INT		
G1_INCIDENT_ID	INT		
G1_DAMAGE_TYPE	VARCHAR (20)		
G1_DATE_OF_CLAIM	DATE		
G1_CLAIM_STATUS	VARCHAR (20)		

Table-LDM 8: G1_SETTLEMENT

Attributes	Data Type	Primary and Foreign Keys	Explanation
G1_CLAIM_SETTLEMENT_ID	INT	P K	The CLAIM_SETTLEMENT attributes record all the essential claim settlement details of the customer after an incident. The CLAIM_SETTLEMENT_ID is the unique primary key and CLAIM_ID are the foreign keys that link the table to the corresponding entity.
G1_CLAIM_ID	INT	FK	
G1_DATE_SETTLED	DATE		
G1_AMOUNT_PAID	INT		

Table-LDM 9: G1_STAFF

Attributes	Data Type Oracle	Primary and Foreign Keys	Explanation
G1_STAFF_ID	INT	PK	The STAFF attributes record all the essential staff details working in the insurance company. The STAFF_ID is the unique primary key and the COMPANY_NAME is a foreign key linking the table back to the entity type COMPANY.
G1_STAFF_FNAME	VARCHAR (20)		
G1_STAFF_LNAME	VARCHAR (20)		
G1_STAFF_ADDRESS	VARCHAR (20)		
G1_STAFF_CONTACT	INT		
G1_STAFF_GENDER	ENUM('M','F')		
G1_STAFF_MARITAL_STATUS	ENUM('Single','Married','Divorced','Widow')		
G1_STAFF_NATIONALITY	VARCHAR (20)		
G1_STAFF_QUALIFICATION	VARCHAR (20)		
G1_STAFF_ALLOWANCE	INT		
G1_STAFF_PPS_NUMBER	INT		

Table-LDM 10: G1_ DEPARTMENT

Attributes	Data Type	Primary and Foreign Keys	Explanation
G1_DEPARTMENT_NAME	VARCHAR (20)	PK	The DEPARTMENT attributes record all the essential company department details within the insurance company. The DEPARTMENT_NAME is the unique primary key and the COMPANY_NAME is a foreign key linking the table back to the entity type COMPANY.
G1_IPC_ID	INT	FK	
G1_OFFICE	VARCHAR (200)		
G1_CONTACT_INFORMATION	VARCHAR (200)		
G1_DEPARTMENT_STAFF	VARCHAR (200)		
G1_DEPARTMENT_LEADER	VARCHAR (200)		

Table-LDM 11: G1_OFFICE

Attributes	Data Type	Primary and Foreign Keys	Explanation
G1_OFFICE_NAME	VARCHAR (20)	PK	The OFFICE attributes record all the essential office details within the insurance company. The OFFICE_NAME is the unique primary key and the DEPARTMENT_NAME and COMPANY_NAME are foreign keys linking the table back to the respective entity types.
G1_OFFICE_LEADER	VARCHAR (20)		
G1_CONTACT_INFORMATION	VARCHAR (20)		
G1_ADDRESS	VARCHAR (200)		
G1_ADMIN_COST	INT		
G1_STAFF	VARCHAR (200)		

Table-LDM 12: G1_ MEMBERSHIP

Attributes	Data Type	Primary and Foreign Keys	Explanation
G1_MEMBERSHIP_ID	INT	PK	The MEMBERSHIP attributes record all the essential membership details available for insured customer. The MEMBERSHIP_ID is the unique primary key and the CUST_ID is a foreign key linking the table back to the entity type CUSTOMER.
G1_MEMBERSHIP_TYP	VARCHAR (20)		
G1_ORGANISATION_CONT	INT		
ACT			

Table-LDM 13: G1_ SERVICE

Attributes	Data Type	Primary and Foreign Keys	Explanation
G1_VEHICLE_SERVICE	VARCHAR (20)	PK	The VEHICLE_SERVICE attributes record all the essential vehicle services offered to insured customer details. The VEHICLE_SERVICE is the unique primary key and ipc_ID are linked to the other corresponding entities.
G1_IPC_ID	INT	FK	
G1_VEHICLE_SERVICE_ADDRESS	VARCHAR (200)		
G1_VEHICLE_SERVICE_CONTACT	INT		
G1_VEHICLE_SERVICE_INCHARGE	VARCHAR (20)		
G1_VEHICLE_SERVICE_TYPE	VARCHAR (20)		

Table-LDM 14: G1_NOK

Attributes	Data Type	Primary and Foreign Keys	Explanation
G1_NOK_ID	INT	PK	The NOK attributes record information on the next of kin details. NOK_ID is the unique primary key here. AGREEMENT_ID are foreign keys linking back information to their respective entities.
G1_AGREEMENT_ID	INT	FK	
G1_NOK_NAME	VARCHAR (20)		
G1_NOK_ADDRESS	VARCHAR (20)		
G1_NOK_PHONE_NUMBER	INT		
G1_NOK_MARITAL_STATUS	ENUM('Single','Married','Divorced','Widow')		
G1_NOK_GENDER	ENUM('M','F')		

Table-LDM 15: G1_COMPANY

Attributes	Data Type	Primary and Foreign Keys	Explanation
G1_COMPANY_ NAME	VARCHAR (20)	PK	The INSURANCE COMPANY attributes record all the essential company details of the customer. The COMPANY_ID is the unique primary key
G1_DEPARTMENT_NAME	VARCHAR (20)	PK	
G1_COMPANY_ADDRESS	INT		
C G1_OMPANY_CONTACT_NUMBER	INT		
G1_COMPANY_FAX	VARCHAR (20)		
G1_COMPANY_ EMAIL	VARCHAR (20)		
G1_COMPANY _WEBSITE	VARCHAR (20)		
G1_COMPANY _LOCATION	VARCHAR (20)		
G1_COMPANY DEPARTMENT_NAME	VARCHAR (20)		
G1_COMPAN_ OFFICE_NAME			

Table-LDM 16: G1_TERMS_CONDITIONS

Attributes	Data Type	Primary and Foreign Keys	Explanation
G1_COVERAGE_ID	INT	PK	The COVERAGE attributes record all the essential coverage details of the insurance policy to the customer. The COVERAGE_ID is the unique primary key and the COMPANY_NAME is a foreign key linking the table back to the entity type COMPANY.
G1_COVERAGE_AMOUNT	INT		
G1_COVERAGE_TYPE	VARCHAR (20)		
G1_COVERAGE_LEVEL	VARCHAR (20)		
G1_PRODUCT_ID	INT		
G1_COVERAGE_DESCRIPTION	VARCHAR (20)		
G1_COVERAGE_TERMS	VARCHAR (200)		

Table-LDM 17: G1_RECEIPT

Attributes	Data Type	Primary and Foreign Keys	Explanation
G1_RECEIPT_ID	INT	PK	The RECEIPT attributes record all the essential payments done by CUSTOMERS to Insurance company. The RECEIPT_ID is the unique primary key and PREMIUM_PAYMENT_ID and are Foreign keys linking table to their respective entities.
G1_PREMIUM_PAYMENT_ID	INT	FK	
G1_COST	INT		
G1_TIME	DATE		

Table-LDM 18: G1_INSURANCE_POLICY_COVERAGE

Attributes	Data Type	Primary and Foreign Keys	Explanation
G1_IPC_ID	INT	PK	The INSURANCE_POLICY_COVERAGE records details of the Vehicle policy that entails Terms Conditions of the Contract. AGREEMENT_ID is the unique primary key and COVERAGE_ID is the Foreign key linking this table to COVERAGE ENTITY
G1_AGREEMENT_ID	VARCHAR (20)	FK	
G1_IPC_CLAIM_DATE	DATE		
G1_IPC_CLAIM_REASON	VARCHAR(200)		