Case Study

Edition 1.0
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Technical Contributors and Reviewers

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Preface

Profile

Before You Begin This Case Study

Before you begin this case study, you should have the following qualifications:

- Basic Knowledge on Hibernate Spring Spring Boot and Microservices

Case Study – Traffic Management System

1. Business Scenario

Our Bangalore traffic police want to create a Traffic Management System (TMS) that helps in maintaining Offence information. And also help RTO to include new vehicle information, owner information and old/scrapped vehicles.

The scope of this project is limited to offence details. The functionalities include the following:

1. The Traffic Policeman should be allowed to add offence details against a vehicle and notify the RTO.
2. The Traffic Police Department should be able to clear the offence and notify the RTO.
3. This includes generation of reports to display owner and vehicle details as well as reports to show offence history against the vehicle and its owner.
4. The project also provides for an efficient notification system for communication between the various actors involved.
5. Other functionalities of a typical traffic management system (i.e. seizing/releasing vehicles, etc) do not come under the purview of this project.

Team is retained to

- Create a UML Design
- Design the UI Screens
- Implementation of the SRS Given through Java Coding

Please go ahead and read the problem statement below.

2. Business Process in the application:

1. Vehicle

6. As the scope of this project is limited to offence details, an XML file containing all information regarding vehicle should be imported, parsed and data should be mapped to the database by RTO officer.
   a. File can contain information about new vehicle, old and new owner (in case of transfer of vehicle ownership) or scrapped vehicle.

b. All data in the file should be validated before entering into database like primary key, unique and not null constraints.

c. When the vehicle has crossed 15 years from the date of manufacture it should be marked as Old or not in use if there is no offence marked against it.

d. If any offence details found against the vehicle, the transfer should not be allowed and an error should be generated.

2. Offence

Addition of new offence

a. Traffic Police Man should be authorized to select a particular vehicle and add the offence details against it.

b. He should be allowed to select the offence type only from the predefined offences.

c. When he selects a particular offence its corresponding penalty should automatically be displayed.

d. While adding the offence details the owner's details should also be displayed.

e. RTO should be informed about the offence so that the vehicle is ceased.

f. Here are the predefined offences and their respective penalty.

No.	Nature Of offence	Type of vehicles	Compounding fee (Rs)
1	General offences	All vehicles	100
2	Driving vehicles without valid licence	All vehicles	300
3	Driving at excessive speed	All vehicles	200

4	Driving dangerously	All vehicles	500
5	Racing and trials of speed without permission	All vehicles	300
6	Talking on mobile phone while driving	All vehicles	200
7	Driving uninsured vehicle	All vehicles	300
8	Driving when mentally or physically unfit to drive	All vehicles	100

Clearing a Offence

a. When the appropriate fine is paid the traffic police department should clear the offence by marking it paid.

b. The same detail should be sent to RTO department, so that the vehicle is released.

3. REPORT GENERATION

RTO REPORT: The RTO report generated by RTO officer will contain details of owner and vehicle.

OFFENCE REPORT Based On Vehicle : The offence report generated only by clerk will contain the complete offence history against a particular vehicle with its owner details.

OFFENCE REPORT Based On Type of Offences : The offence report generated only by clerk will contain the complete offences based on Type.

OFFENCE REPORT Based On Date Range : The offence report generated only by clerk will contain the complete offences based on Date Range.

Architecture

```
                    ┌──────────────┐
                    │    USER      │
                    └──────┬───────┘
                           ↕
        ┌──────────────────────────────────────┐
        │          PRESENTATION LAYER           │
        └──────────┬────────────────┬───────────┘
                   ↕                 ↕
        ┌──────────────────┐   ┌──────────────────┐
        │  BUSINESS LAYER  │↔│   SERVICE LAYER   │
        └────────┬─────────┘   └─────────┬────────┘
                 ↕                        ↕
        ┌──────────────────────────────────────┐
        │            DATA ACCESS LAYER          │
        └──────────────────┬───────────────────┘
                           ↕
        ┌──────────────────────────────────────┐
        │               DATA LAYER              │
        └──────────────────────────────────────┘
```
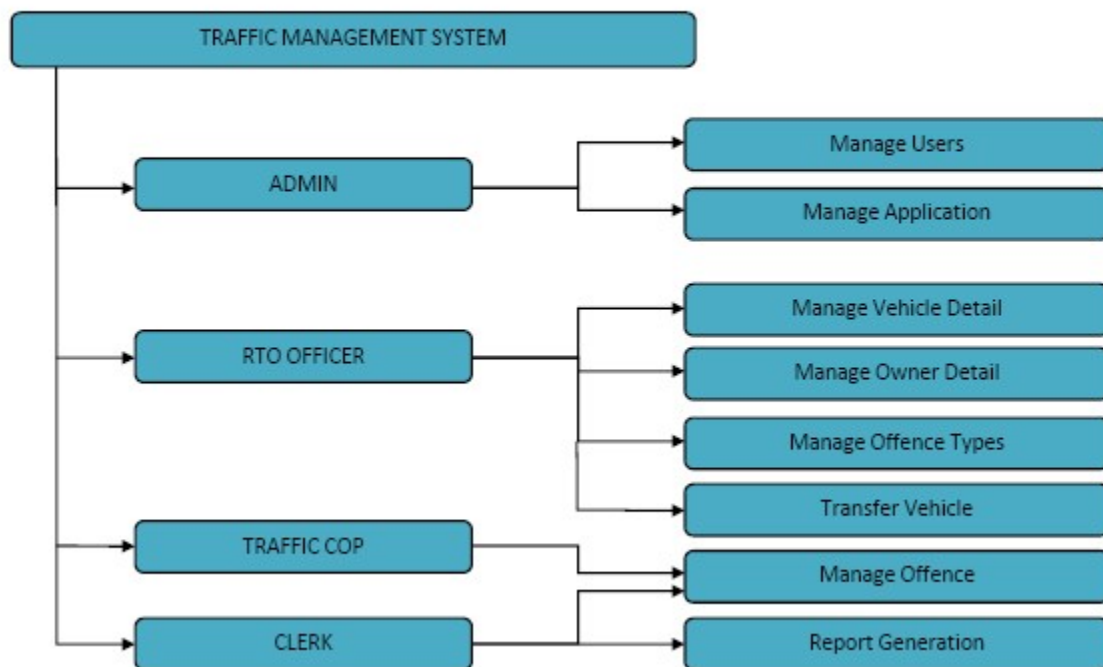
Activities (User wise)

```
TRAFFIC MANAGEMENT SYSTEM
│
├──► ADMIN ──────────┬──► Manage Users
│                    └──► Manage Application
│
├──► RTO OFFICER ────┬──► Manage Vehicle Detail
│                    ├──► Manage Owner Detail
│                    ├──► Manage Offence Types
│                    └──► Transfer Vehicle
│
├──► TRAFFIC COP ────────► Manage Offence
│
└──► CLERK ──────────────► Report Generation
```
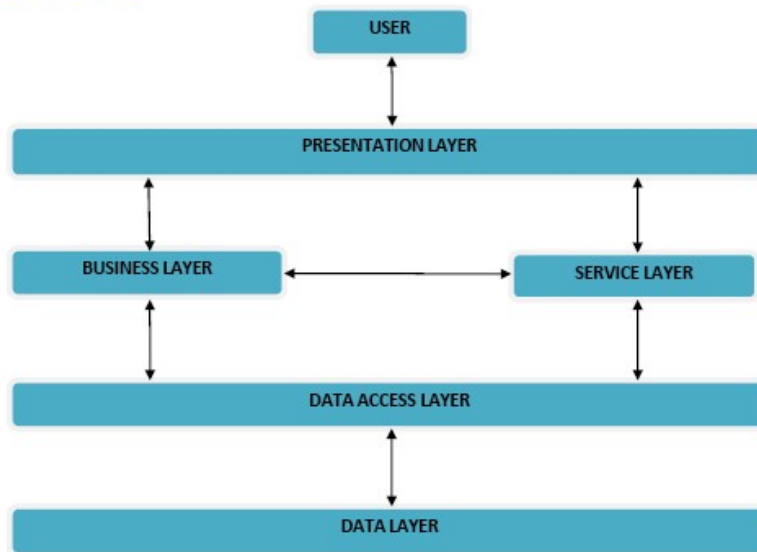
DATABASE SCHEMA

1. TM_VEHICLEDETAILS

SI.NO	Field Name	Data Type	Description
1.	VEH_ID	VARCHAR2()	System generated
2.	VEH_TYPE	VARCHAR2()	NOT NULL
3.	ENGINE_NO	VARCHAR2()	UNIQUE KEY
4.	MODEL_NO	VARCHAR2()	NOT NULL
5.	VEH_NAME	VARCHAR2()	NOT NULL
6.	VEH_COLOR	VARCHAR2()	
7.	MANUFACTURER_NAME	VARCHAR2()	NOT NULL
8.	DATE_OF_MANUFACTURE	DATE	NOT NULL
9.	NO_OF_CYCLINDERS	NUMERIC	
10.	CUIBIC_CAPACITY	NUMERIC	
11.	FUEL_USED	VARCHAR2()	

2. TM_OWNERDETAILS

SI.NO	Field Name	Data Type	Description
1.	OWNER_ID	VARCHAR2()	PRIMARY KEY
2.	FNAME	VARCHAR2()	NOT NULL
3.	LNAME	VARCHAR2()	NOT NULL
4.	DATEOFBIRTH	VARCHAR2()	NOT NULL
5.	LANDLINE_NO	NUMERIC	
6.	MOBILE_NO	NUMERIC	
7.	GENDER	VARCHAR2()	NOT NULL
8.	TEMP_ADDR	VARCHAR2()	
9.	PERM_ADDR	VARCHAR2()	NOT NULL
10.	PINCODE	NUMERIC()	NOT NULL
11.	OCCUPATION	VARCHAR2()	
12.	PANCARD_NO	VARCHAR2()	NOT NULL
13.	ADD_PROOF_NAME	VARCHAR2()	NOT NULL

3. TM_REGISTRATIONDETAILS

SI.NO	Field Name	Data Type	Description
1.	APP_NO	VARCHAR2()	PRIMARY KEY
2.	VEH_NO	VARCHAR2()	UNIQUE
3.	VEH_ID	VARCHAR2()	FOREIGN KEY FROM TM_VEHICLEDETAILS
4.	OWNER_ID	VARCHAR2()	FOREIGN KEY FROM TM_OWNERDETAILS
5.	DATE_OF_PURCHASE	DATETIME	NOT NULL
6.	DISTRUBUTER_NAME	VARCHAR2()	NOT NULL

4. TM_OFFENCE

SI.NO	Field Name	Data Type	Description
1.	OFFENCE_ID	VARCHAR2()	SYSTEM GENERATED
2.	OFFENCE_TYPE	VARCHAR2()	NOT NULL
3.	VEH_TYPE	VARCHAR2()	NOT NULL
4.	PENALTY	NUMERIC	NOT NULL

5. OFFENCE_DETAILS

SI.NO	Field Name	Data Type	Description
1.	VEH_NO	VARCHAR2()	FOREIGN KEY FROM TM_REGDETAILS
2.	TIME	DATETIME	NOT NULL
3.	PLACE	VARCHAR2()	NOT NULL
4.	OFFENCE_ID	VARCHAR2()	FOREIGN KEY FROM TM_OFFENCE
5.	REPORTED_BY	VARCHAR2()	NOT NULL

6. TM_USER

SI.NO	Field Name	Data Type	Description
1.	USERNAME	VARCHAR2()	PRIMARY KEY
2.	PASSWORD	VARCHAR2()	NOT NULL
3.	ROLENAME	VARCHAR2()	NOT NULL , FK Ref to TM_ROLES_MASTER

7. TM_ROLE

SI.NO	Field Name	Data Type	Description
1.	ROLENAME	VARCHAR2()	PRIMARY KEY
2.	ROLEDESC	VARCHAR2()	NOT NULL

Use Case-Diagram
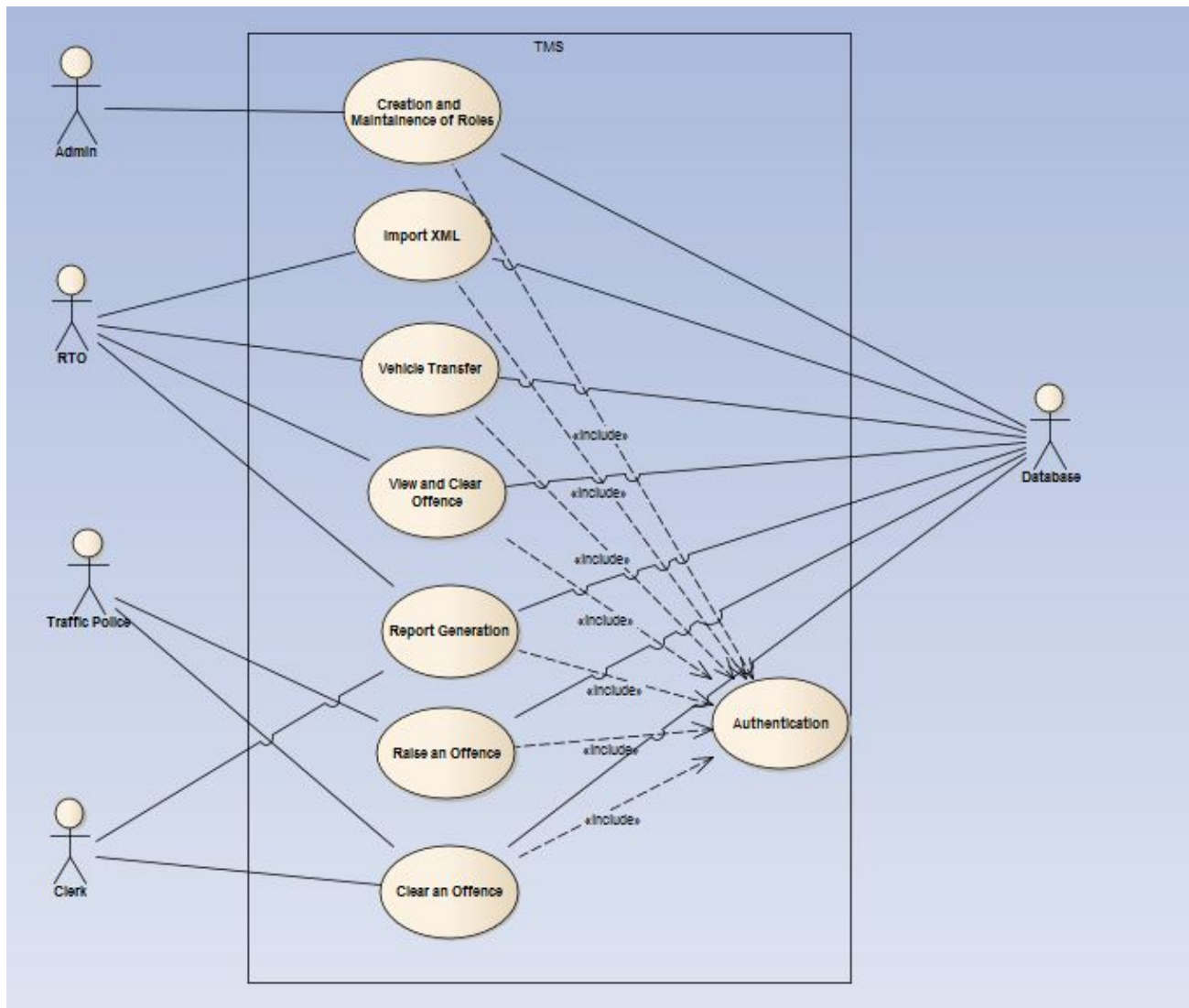
3. Tools to be used for development:

- Visual Studio Code

- Oracle 11g database

- OJET Framework

2. Guidelines to the instructors:

Step 1

After teaching them the basics and UML-Diagram. Let them design an UML-Diagram for the above problem. It might go in cycle and the facilitator helps the participants to design an UML diagram buy giving the comments and feedbacks. Task: Help the participants to design a similar design.

Step 2

Once the basic design is approved by the facilitator, The team can go ahead and start the implementation. Components to be monitored

- Creation of Classes

- Creation of Database Structure

- Feed Data

- Create other objects
    - User Interface Designs
    - Implementations of Classes Based on Presentation Layer, Business Layer, And Persistence Layer

Review to be done by the facilitator at this stage (it goes in cycle, till it reaches the expected out cum)

Step 3 – Role Play

- Let the team present their design.

- Note Down comments/ideas by other team and facilitator

- Keeping these ideas as base, team has to list down the activities that can facilitate the Traffic Management Service.

Step 4 – Validate

All learning objectives defined above for the Java should have been met. If not revisit and ensure the learning objectives are met for the Java

3. <u>**Estimated duration for completing the project:**</u>

6 hrs