

Vehicle Management System (VMS)

1. **Project Overview:** This is a Vehicle Management System that efficiently manages all the aspects of vehicle-related operations, including vehicle tracking, driver management, bookings, geofencing, maintenance and expense tracking.

2. Possible Entities:

1. Users
2. Permissions
3. Vehicle Groups
4. Vehicles
5. Customers
6. Drivers
7. Bookings
8. Geofence Events
9. Income/Expense
10. Maintenance
11. Maintenance Parts
12. Parts Inventory
13. Fuel
14. Reminders
15. Tracking
16. Email Templates
17. Settings
18. SMTP Configuration

3. Schemas:

Note: The attributes are just imagination based on the figma design.

1. Users

Attributes	Data Types	Indexed?	PK	FK
user_id	INT	Yes	Yes	-
name	VARCHAR(255)	-	-	-
email	VARCHAR(255)	-	-	-
username	VARCHAR(255)	-	-	-
password	VARCHAR(255)	-	-	-

2. Permissions

Attributes	Data Types	Indexed?	PK	FK
permission_id	INT	Yes	Yes	-
user_id	INT	Yes	-	Yes (users)
entity_name	VARCHAR(255)	-	-	-
can_view	BOOLEAN	-	-	-
can_edit	BOOLEAN	-	-	-
can_add	BOOLEAN	-	-	-
can_delete	BOOLEAN	-	-	-

3. VehicleGroups

Attributes	Data Types	Indexed?	PK	FK
group_id	INT	Yes	Yes	-
group_name	VARCHAR(255)	Yes	-	-

4. Vehicles

Attributes	Data Types	Indexed?	PK	FK
vehicle_id	INT	Yes	Yes	-
registration_number	VARCHAR(255)	Yes	-	-
name	VARCHAR(255)	-	-	-
model	VARCHAR(255)	-	-	-
chassis_no	VARCHAR(255)	-	-	-
engine_no	VARCHAR(255)	-	-	-
manufacturer	VARCHAR(255)	-	-	-
vehicle_type	VARCHAR(100)	-	-	-
status	ENUM	-	-	-
registration_expiry_date	DATE	-	-	-
vehicle_group_id	INT	Yes	-	Yes (vehicle_groups)

vehicle_image	VARCHAR(255)	-	-	-
mileage_per_litre	DECIMAL(5,2)	-	-	-
gps_api_username	VARCHAR(255)	-	-	-
gps_api_password	VARCHAR(255)	-	-	-
api_url	VARCHAR(255)	-	-	-

5. Customers

Attributes	Data Types	Indexed?	PK	FK
customer_id	INT	Yes	Yes	-
name	VARCHAR(255)	-	-	-
mobile	VARCHAR(20)	-	-	-
email	VARCHAR(255)	-	-	-
address	TEXT	-	-	-

6. Drivers

Attributes	Data Types	Indexed?	PK	FK
driver_id	INT	Yes	Yes	-
name	VARCHAR(255)	-	-	-
mobile	VARCHAR(20)	-	-	-
age	INT	-	-	-
license_no	VARCHAR(255)	Yes	-	-
license_expiry_date	DATE	-	-	-
experience_years	INT	-	-	-
joining_date	DATE	-	-	-
address	TEXT	-	-	-
status	ENUM	-	-	-
driver_photo	VARCHAR(255)	-	-	-
driver_document	VARCHAR(255)	-	-	-

7. Bookings

Attributes	Data Types	Indexed?	PK	FK
booking_id	INT	Yes	Yes	-
customer_id	INT	Yes	-	Yes (customers)
vehicle_id	INT	Yes	-	Yes (vehicles)
driver_id	INT	Yes	-	Yes (drivers)
trip_type	VARCHAR(100)	-	-	-
trip_start_location	VARCHAR(255)	-	-	-
trip_end_location	VARCHAR(255)	-	-	-
trip_start_date	DATE	-	-	-
trip_end_date	DATE	-	-	-
approx_total_km	DECIMAL(10,2)	-	-	-
total_amount	DECIMAL(10,2)	-	-	-
trip_status	ENUM	-	-	-

8. GeofenceEvents

Attributes	Data Types	Indexed?	PK	FK
geofence_event_id	INT	Yes	Yes	-
vehicle_id	INT	Yes	-	Yes (vehicles)
geo_name	VARCHAR(255)	-	-	-
geo_event	ENUM	-	-	-
event_time	TIMESTAMP	-	-	-

9. IncomeExpenses

Attributes	Data Types	Indexed?	PK	FK
transaction_id	INT	Yes	Yes	-
vehicle_id	INT	Yes	-	Yes (vehicles)
type	ENUM	-	-	-
date	DATE	-	-	-
description	TEXT	-	-	-
amount	DECIMAL(10,2)	-	-	-

10. PartsInventory

Attributes	Data Types	Indexed?	PK	FK
part_id	INT	Yes	Yes	-
part_name	VARCHAR(255)	-	-	-
description	TEXT	-	-	-
stock	INT	-	-	-
status	ENUM	-	-	-

11. Maintenance

Attributes	Data Types	Indexed?	PK	FK
maintenance_id	INT	Yes	Yes	-
vehicle_id	INT	Yes	-	Yes (vehicles)
start_date	DATE	-	-	-
end_date	DATE	-	-	-
service_details	TEXT	-	-	-
vendor_name	VARCHAR(255)	-	-	-
total_cost	DECIMAL(10,2)	-	-	-
maintenance_status	ENUM	-	-	-

12. MaintenanceParts

Attributes	Data Types	Indexed?	PK	FK
maintenance_part_id	INT	Yes	Yes	-
maintenance_id	INT	Yes	-	Yes (vehicles)
part_id	INT	Yes	-	Yes (parts_inventories)
quantity	INT	-	-	-

13. Fuel

Attributes	Data Types	Indexed?	PK	FK
fuel_id	INT	Yes	Yes	-
vehicle_id	INT	Yes	-	Yes (vehicles)
driver_id	INT	Yes	-	Yes (drivers)
fill_date	DATE	-	-	-
quantity	DECIMAL(10,2)	-	-	-
odometer_reading	DECIMAL(10,2)	-	-	-
amount	DECIMAL(10,2)	-	-	-
comments	TEXT	-	-	-

14. Reminders

Attributes	Data Types	Indexed?	PK	FK
reminder_id	INT	Yes	Yes	-
vehicle_id	INT	Yes	-	Yes (vehicles)
reminder_date	DATE	-	-	-
message	TEXT	-	-	-

15. Tracking

Attributes	Data Types	Indexed?	PK	FK
tracking_id	INT	Yes	Yes	-
vehicle_id	INT	Yes	-	Yes (vehicles)
history_tracking	JSON	-	-	-
live_location	TEXT	-	-	-

16. EmailTemplate

Attributes	Data Types	Indexed?	PK	FK
template_id	INT	Yes	Yes	-
template_name	VARCHAR(255)	Yes	-	-

template_content	TEXT	-	-	-
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17. Settings

Attributes	Data Types	Indexed?	PK	FK
setting_id	INT	Yes	Yes	-
company_name	VARCHAR(255)	-	-	-
address	TEXT	-	-	-
invoice_prefix	VARCHAR(50)	-	-	-
currency_prefix	VARCHAR(10)	-	-	-
api_key	VARCHAR(255)	-	-	-
service_name	VARCHAR(255)	-	-	-
date_format	VARCHAR(50)	-	-	-
logo	VARCHAR(255)	-	-	-
invoice_terms	TEXT	-	-	-

18. SMTPConfiguration

Attributes	Data Types	Indexed?	PK	FK
smtp_id	INT	Yes	Yes	-
host	VARCHAR(255)	-	-	-
auth	BOOLEAN	-	-	-
username	VARCHAR(255)	-	-	-
password	VARCHAR(255)	-	-	-
secure_type	ENUM	-	-	-
port	INT	-	-	-
email_from	VARCHAR(255)	-	-	-
reply_to	VARCHAR(255)	-	-	-

4. Entity Relationship Diagram (ERD)

- **Directory:** root/diagrams/ERD/VMS_ERD.pdf

- **Google Draw Link:**

https://docs.google.com/drawings/d/1-MjBpQfqXzzkcGdPOpZ_xrsNHFQG24lkjvLfdtqshy0/edit?usp=sharing

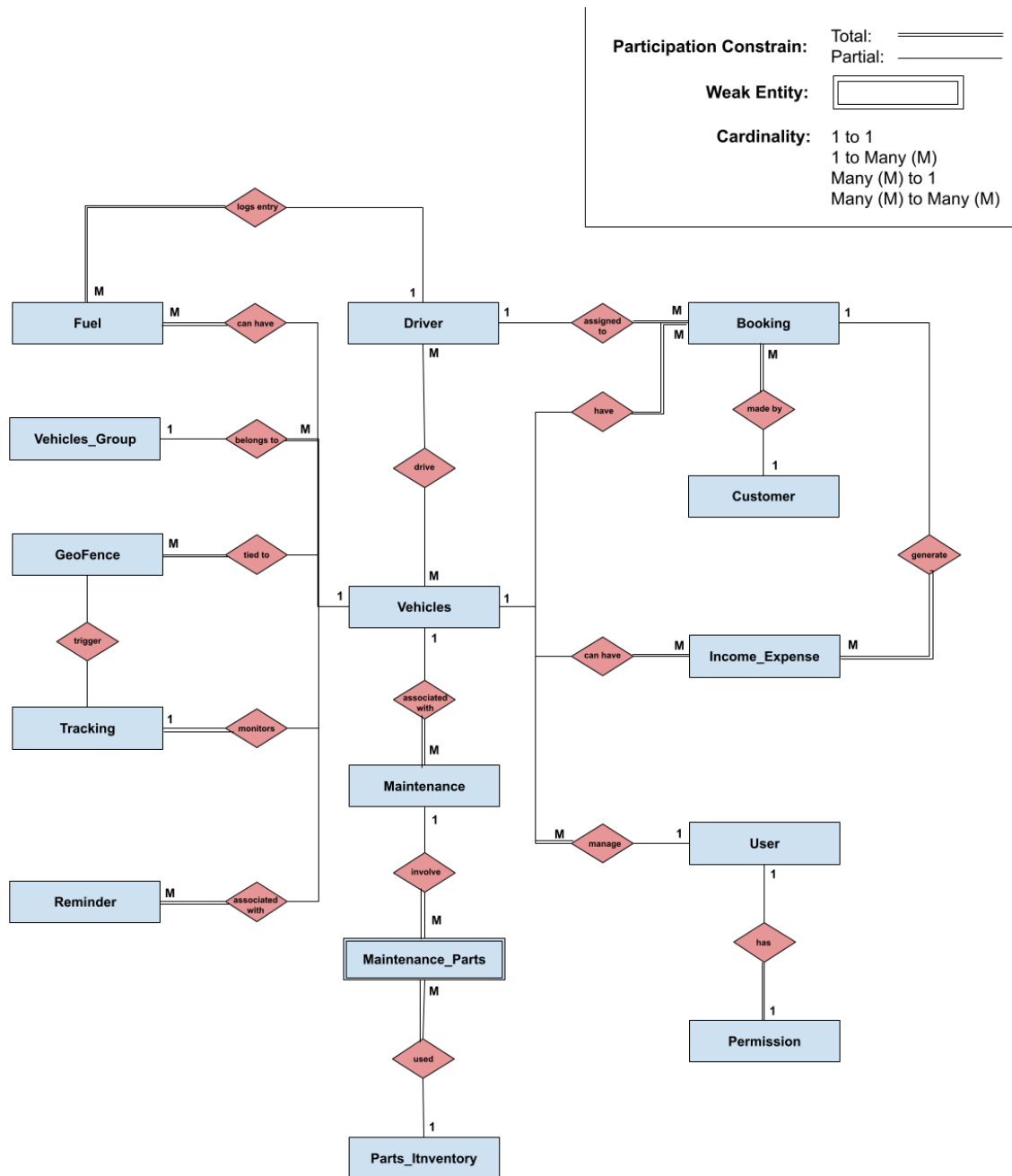


Figure: ERD of VMS

5. Data Flow Diagram

- **Directory:** root/diagrams/DFD/VMS_Context_Level_Diagram.pdf
- **Google Draw Link:**
<https://docs.google.com/drawings/d/1ojXcYALvts0DZ9lvhOrlGbAS-dnsKIV58rZUGNod-70/edit?usp=sharing>

Context Level DFD (0 Level) for Vehicles Management System

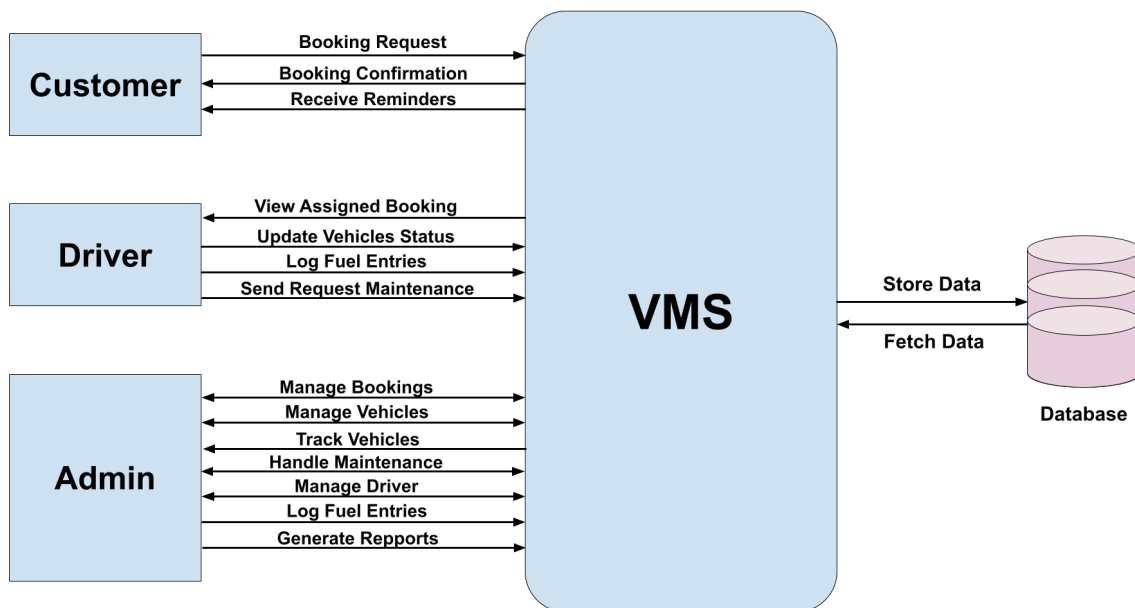


Figure: 0 Level Diagram for VMS

6. SQL Script:

- **Directory:** [root/sql/vms_db_schema.sql](#)

In conclusion, the **Vehicle Management System (VMS)** database model organizes vehicles, bookings, maintenance, and fuel records efficiently. It ensures clear relationships between entities, supporting scalability and data integrity. This model provides a solid structure for smooth and effective Vehicle Management.