Project Design Document

Team 14 : Hire Truck
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Introduction

The project design document plays a crucial role in any software development project, as it provides a blueprint for the entire project, from conception to delivery. It serves as a roadmap for the development team, ensuring that everyone is aligned on the project's direction and objectives.

This project design document provides a comprehensive overview of the project's goals and objectives, as well as the scope and requirements. It also includes the project's architecture, design patterns, data models, and other technical specifications that guide the development process. This document captures the key project concepts and keeps track of important design decisions. With this document, the development team can stay aligned on the project's objectives and work towards the successful delivery of the project.

System Overview

Lorry/Truck owners are individuals who own trucks used for transporting shipping containers and loads to the port, unloading them, and returning empty to their base station. These trucks are commonly referred to as "Empty Return Trucks".Cargo Carriers, on the other hand, are individuals or businesses who hire trucks from Lorry/Truck owners at a price or amount to ferry their materials, loads, or containers from their base location or customer's location to the port. They pay the Lorry/Truck owners a fee for this service.

The purpose of this project is to address the issue of truck owners charging customers for a two-way trip due to empty return trips. To solve this problem, we aim to design an end-to-end solution via a responsive web-application. This solution will connect truck owners with customers who need to transport goods via the same return route as the truck, making the return trip profitable for the truck owner. The solution will provide a better price-point for both truck owners and customers, making logistics easier and providing better revenue for the truck owners.

The MERN-based web application is designed to have two types of users, Truck Owners and Cargo Carriers. The application accepts inputs from the users and stores them in a database. The website also includes a dashboard for both truck owners and cargo carriers.When a Cargo Carrier enters their pickup and drop-off location and details of their goods, the matching algorithm is triggered, and the available trucks are displayed. The Cargo Carrier can choose the truck that best suits their needs and make a booking through the web application. The matching algorithm takes into account various factors such as the size of the goods, the distance to be traveled, and the availability of the trucks.The web application also allows Truck Owners to view their booking history, upcoming bookings, and earnings. They can also update their availability and other details on their dashboard.

Truck owners can earn additional income by utilizing the app because it connects them with potential buyers who need their services. This can increase the number of jobs they get and the income they earn from each job. Additionally, the app provides tools to help truck owners manage their business more efficiently, such as tracking their earnings, expenses, and schedule,by just interacting with the website interface.By reducing fuel wastage, truck owners can save the environment.The app helps drivers earn extra income by matching them with more jobs and ensuring that they receive fair compensation for their services. This can be especially beneficial for drivers who may not have steady employment or who are looking for additional sources of income.

Design Overview:

Architectural design

1. <u>Authentication Module</u>:

- The Authentication Module is responsible for handling user authentication and registration.
- It includes functions to verify user credentials, register new users, and handle user sessions.
- The module also communicates with the Database Module to retrieve and update user information.

2. <u>Freight Owner Dashboard Module</u>:

- The Freight Owner Dashboard Module provides a dashboard for freight owners after successful authentication.
- It includes functions to display currently listed trucks available for hire, and an option to generate a new ticket request for goods delivery by truck.

- When a new ticket request is generated, the module sends a notification to the Truck Owner Dashboard Module, indicating the availability of a new job.

3. Truck Owner Dashboard Module:

- The Truck Owner Dashboard Module provides a dashboard for truck owners after successful authentication.
- It includes functions to display currently listed trucks, and an option to generate a new truck for hire.
- When a new truck is generated, the module sends a notification to the Freight Owner Dashboard Module, indicating the availability of a new truck for hire.

4. Notification Module:

- The Notification Module is responsible for handling notifications between the Freight Owner Dashboard Module and the Truck Owner Dashboard Module.
- It receives notifications from the Freight Owner Dashboard Module when a new ticket request is generated, and forwards them to the Truck Owner Dashboard Module.
- It also receives notifications from the Truck Owner Dashboard Module when a new truck is generated, and forwards them to the Freight Owner Dashboard Module.

5. Database Module:

- The Database Module is responsible for storing and retrieving all data related to the Hire Truck Project.
- It includes functions to store and retrieve user information, truck information, and job information.
- The other modules depend on the Database Module to store and retrieve information.

These modules work together to achieve the desired functionality of the Hire Truck Project. Here's how they collaborate with each other:

- When a user logs in or registers, the Authentication Module verifies their identity against the user database in the Database Module.
- Based on the user type (freight owner or truck owner), the user is directed to their appropriate dashboard (Freight Owner Dashboard Module or Truck Owner Dashboard Module).

- The Freight Owner Dashboard Module provides a way for freight owners to generate a new ticket request for goods delivery by truck, and sends a notification to the Notification Module when a new ticket request is generated.
- The Notification Module receives the notification from the Freight Owner Dashboard Module, and forwards it to the Truck Owner Dashboard Module.
- The Truck Owner Dashboard Module provides a way for truck owners to generate a new truck for hire, and sends a notification to the Notification Module when a new truck is generated.
- The Notification Module receives the notification from the Truck Owner Dashboard Module, and forwards it to the Freight Owner Dashboard Module.
- All modules communicate with the Database Module to store and retrieve information as needed.

In conclusion, by breaking down the Hire Truck Project into these modular components and designing them to work together, we can achieve a scalable and efficient system that meets the requirements of both freight owners and truck owners.

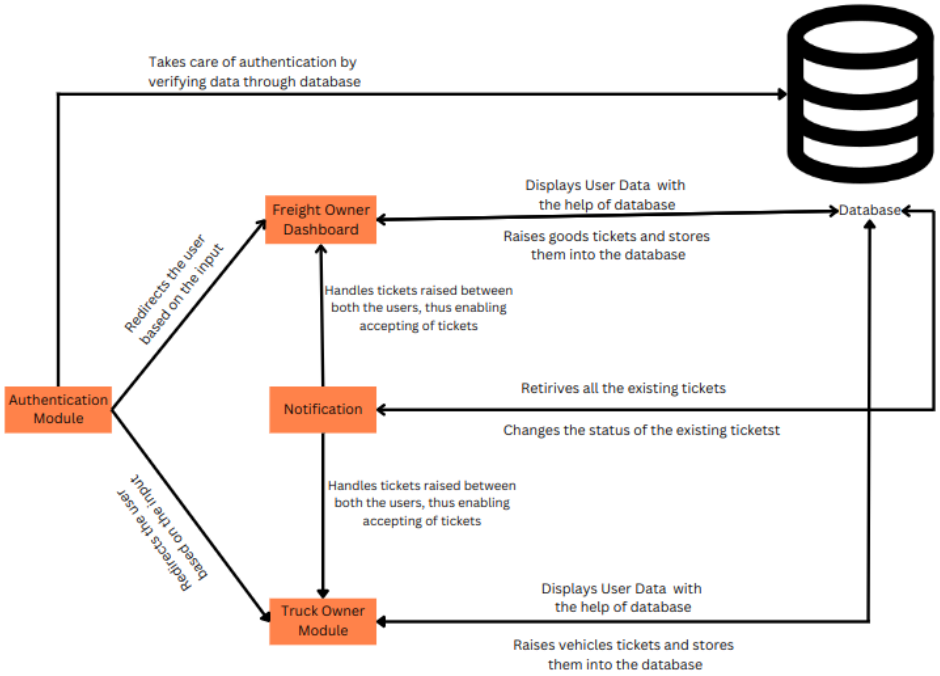


Fig 1.1 Architectural Design

System interfaces

User Interface

- A user can first decide to choose his position as a freight owner/ truck owner.

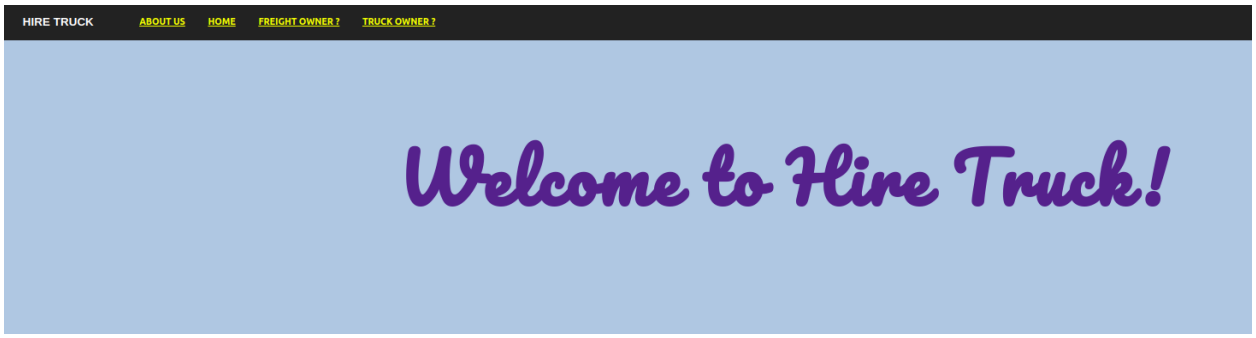


Fig 2.1. Showcasing the option provided to the user

- The users are then redirected to Signup/Register pages for the respective ones.

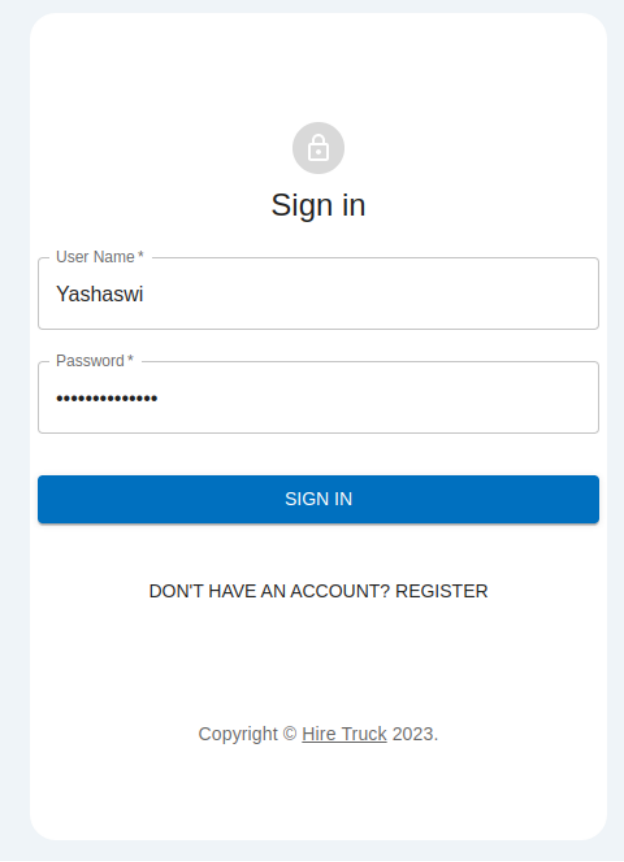


Fig 2.2 The UI showcasing Sign In page

- The user is then redirected to their respective dashboards

Business Details

Company Name	
Company Type	Pvt Ltd
Registration Date	01-01-2023
Registration No	
TIN	
GST No	
Office Address	
Office Pincode	
State	
Email	
Phone	
Fax No#	

Vehicle Details

No of Vehicles owned	50	Load types handled	Cement, Iron, Aggregates
Vehicle Registration No	TS CP4444	Regular Transport Route	Mumbai to Hyderabad
Vehicle Type	Lorry	Max Volume, wt	200Kg,
Vehicle Registration Date	01-01-2015	Axle	Multi Axles
Age of the Vehicle	10 yrs	Transmission Type	Manual
Chassis No		Type	EV
Pollution Valid	yes	Layover	ok
Insurance validity Date		Max Layover	2 days

Business Details

Company Name	
Company Type	Pvt Ltd
Registration Date	01-01-2023
Registration No	
TIN	
GST No	
Office Address	
Office Pincode	
State	
Email	
Phone	
Fax No#	

Freight Details

Load types handling	Cement, iron
Regular Transport	Gujarat, Guwahati
Monthly Volume	500 tons
Yearly Volume	50 MT
No of Vehicles needed	10-20 / month
Types of Vehicles needed	Lorry, tipper, containers, Multi axle

Fig 2.3, 2.4 Dashboard for different users

- Each user is allowed to raise tickets or accept tickets. If it is a freight owner, they are allowed to raise tickets with the goods they want to be transported, and other details as well.

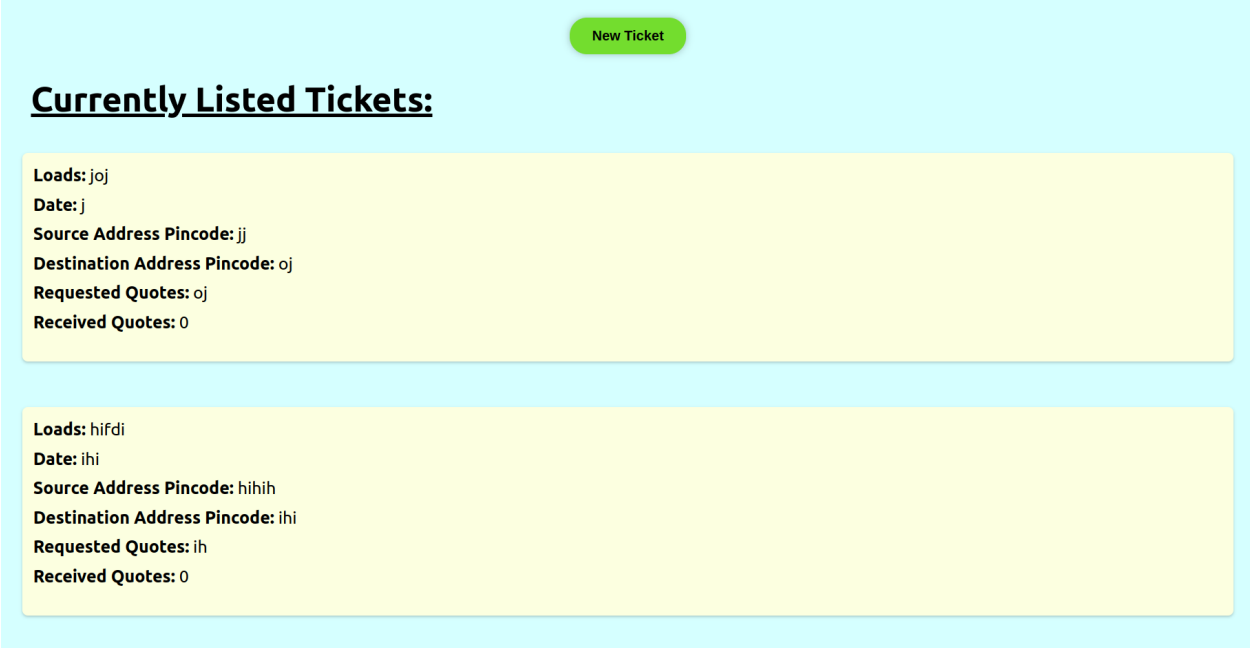


Fig 2.5 Figure showing available tickets raised by Freight Owners

- A similar interface is provided for Truck owners to submit their tickets. And through this, the opposite user gets to accept the quotes or ask for the quotes given the details.
- Note that the details used in all the cases are subject to change, some of them might be deleted, or might be added depending on validation.
- Note that the UI/UX images used here are obtained by the client and offer a rough estimation of the actual UI/UX of the project.

APIs

No APIs have been used till now in our project.

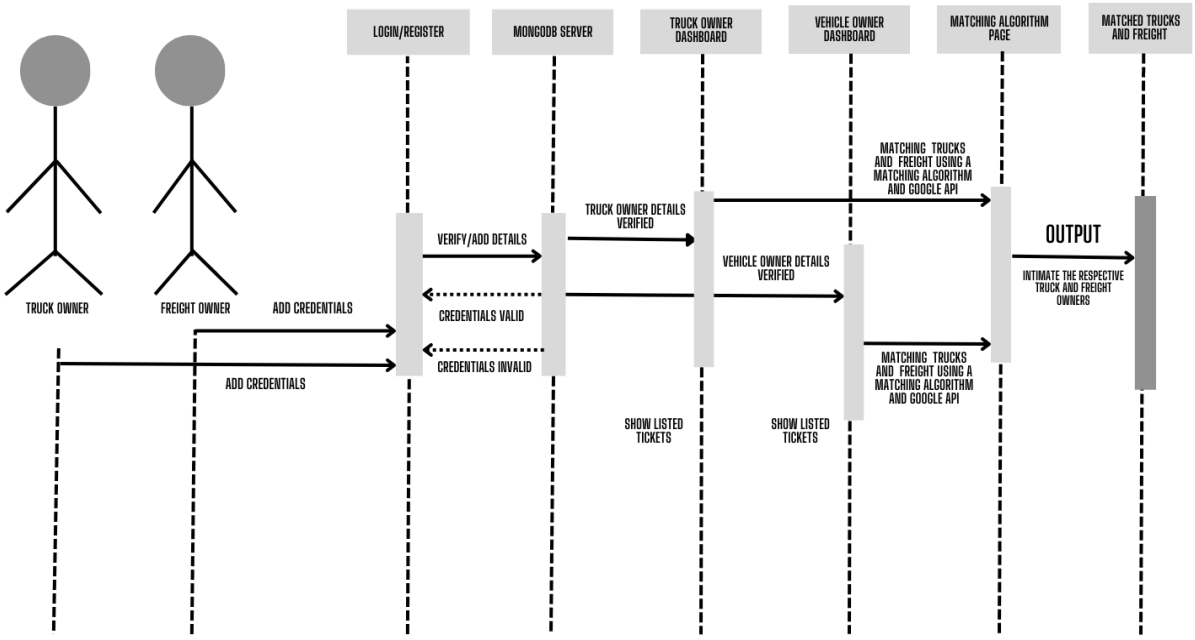
We plan on using Google-Maps API or a similar API like Route4Me or Faze APIs for our matching algorithm of Trucks to Freight owners.

Model


Usertype
Username
Usertype
regitertruckowner
extractuserdetails
registerfreightowner
loginfreightowner
logintruckowner
is either
Freight Owner
companyName
companytype
registrationNumber
registrationdate
GSTNO
office address
officePincode
State
emailID
phone number
faxNumber
userName
password
tin
contact
addFreightDetails
Truck Owner
companyName
companytype
registrationNumber
registrationdate
GSTNO
office address
officePincode
State
emailID
phone number
faxNumber
userName
password
tin
contact
addTruckDetails
1
N
1
N
Freight_Details
username
load_type
source_address_pincode
destination_address_pincode
requested_quotes
recieved_quotes
vehicle_req
dateOfShipment
extractFreightDetails
Truck_Details
username
vehicle_reg_no
vehicle_age
vehicle_type
vehicle_reg_date
pollution_valid
vehicle_req
load_type_handled
max_volume
regular_transport_route
axle
transmission_type
vehicle_spec
max_layover
return_truck_load_offerrs
quotation_sent
booking_done
extracttruckdetails

Usertype	Class state ● What type of user it is i..e Truck owner or freight owner. Class behavior ● registration and Login ● Extract User details
Freight Owner	Class state ● has various details like username,password,company name,company type,registration number of the freight Owner Class behavior ● adds the various freight owner details to the database
Truck Owner	Class state ● has various details like username,password,company name,company type,registration number of the Truck Owner Class behavior ● adds the various Truck owner details to the database
Freight Details	Class state ● has various details like load type,vehicle requirement of the freight Class behavior ● extracts freight details
Truck Details	Class state ● has various details like load type,vehicle requirement of the truck Class behavior ● extracts truck details

Sequence Diagram(s)



A single sequence diagram including all use-cases implemented till now for the Hire-Truck Project.

Design Rationale

The client has been crisp clear on the expected design structure, and being able to draw analogies from similar gig-working companies, there has been no major issues that led to any design changes through the product design. The team has gone through a systematic approach to problem solving on what the customer/client needs from the product.

For example a minor issue while designing the project was :
Ticket Request System: For freight owners, a ticket request system is necessary to generate new requests for the delivery of goods by truck. It must be designed in a way that allows easy creation and tracking of requests while ensuring that it is secure and cannot be tampered with.

Resolution for the same:

JWT is used to create secure tickets that contain user information and other details related to the delivery of goods by truck. The ticket requesting system generates a new ticket using JWT, which is then sent to the relevant parties involved in the delivery process.Middleware is used to ensure that the user has valid authentication credentials before they can create a new ticket. The middleware checks the validity of the JWT and verifies that the user has the necessary permissions to create a new ticket. This ensures that only authorized users can create tickets and that the system remains secure.

Overall, the use of JWT and middleware is an effective solution for creating a secure and efficient ticket requesting system for the Hire Truck Project. It ensures that the system remains secure and can only be accessed by authorized users while allowing for easy creation and tracking of delivery requests.

Clear conceptualization can be done when the designers/developers conduct clear and thorough research and analysis of the details in need. For example, during our project, on thorough research, one realized that there are different types of Vehicles for different types of goods. Therefore, we realized that we needed to involve that in the product development. This also meant that we as developers need to validate it while raising/accepting tickets. It is our job to ensure that a coal mining truck does not end up carrying petrol. Such a clear idea can be attained through thorough research as discussed above.Having such a clear concept of what is needed ensures that the client and customer receives the perfect product.