

# **Software Design Document**

Supply Chain Management in Logistics Management  
LinkLogistix

Version 1.0

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**LinkLogistix**

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Revisions

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1.0	Aditi Goyal, Nistha Singh, Advay Agrawal	Initial Release	10/27/23

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# 1. Introduction

## 1.1 Purpose

The Software Design Document describes the architecture and system design for LinkLogistix, a road trip planning website. LinkLogistix is designed to help travelers plan and oversee their trip. This document is intended for Project Managers, Software Engineers, and anyone else who will be involved in the implementation of the system.

## 1.2 Scope

This document describes the implementation details of the LinkLogistix (LLX). LLX will consist of six major components: Supplier Registration and Management, Transportation, Warehousing and storage, Inventory Management, Order fulfillment, Demand Forecasting, and Reverse Logistics. Each of the components will be explained in details in this Software Design Document.

## 1.3 Definitions, Acronyms and Abbreviations

Acronym	Meaning
SCM	Supply Chain Management
SDD	Software Design Document
OS	Operating System
API	Application Programming Interface
LLX	LinkLogistix

## 1.4 References

-Google Maps JavaScript API

-Bootstrap React

-Anastasov, Nick. "Making Your First Web App with React." *Tutorialzine*, 22 Apr. 2015, [tutorialzine.com/2015/04/first-webapp-react](https://tutorialzine.com/2015/04/first-webapp-react).

-Mead, Andrew. "The Complete React Web Developer Course (with Redux)." *Udemy*, May 2018, [www.udemy.com/react-2nd-edition/](https://www.udemy.com/react-2nd-edition/).

-Njeri, Rachael. "React Apps with the Google Maps API and Google-Maps-React." *Scotch*, Oct. 2018, [scotch.io/tutorials/react-apps-with-the-google-maps-api-and-google-maps-react](https://scotch.io/tutorials/react-apps-with-the-google-maps-api-and-google-maps-react).

-Ackah, Beverly, Hirji, Shaila, Wirtz Frederick "Software Requirement Specification" Oct.2018, <https://docs.google.com/document/d/1aLGIXoLIEamAil1PFfOe-jgGSpmQ2hZ8G58vHGNznX4/edit?usp=sharing>

## 2. System Overview

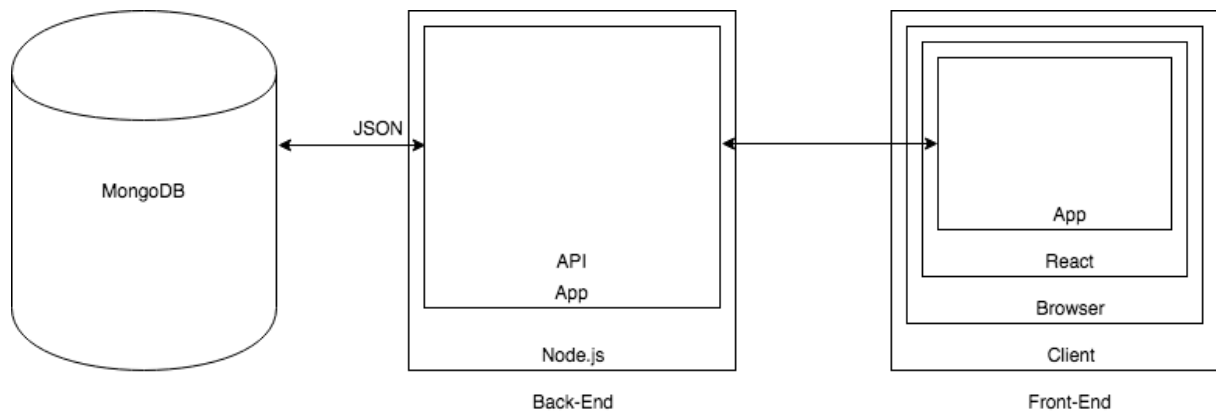


FIGURE 1

Figure 1 above represents the architectural structure we have chosen for the development of the LLX. The backend will be in charge of communicating and pulling information from all the APIs the LLX system is dependent on. We decided to go with NodeJS as our framework as it provides fast, efficient and tight coupling between the client and the server amongst other additional features. NodeJS is also highly scalable which will allow the system to grow further and accommodate a wider range of customers.

The LLX system will also be storing information like Supplier names and prices, shortest routes, warehouse locations, inventory and stock, etc. Storing these details will enable our system to be more efficient in the long run as we can visit the database for same route trips and just make real time updates on the time duration of the trip. Saving route details will also allow the system to suggest trips to users based on other users with similar preferences. Storing user information will enable the system to maintain user profile and keep records of their trips.

Additionally, by following this architecture and structure, we can further extend, if we wish, the RTA system into being a mobile application since the backend will be all set.

## 3. System Components

### 3.1 Decomposition Description

#### Top Down Details

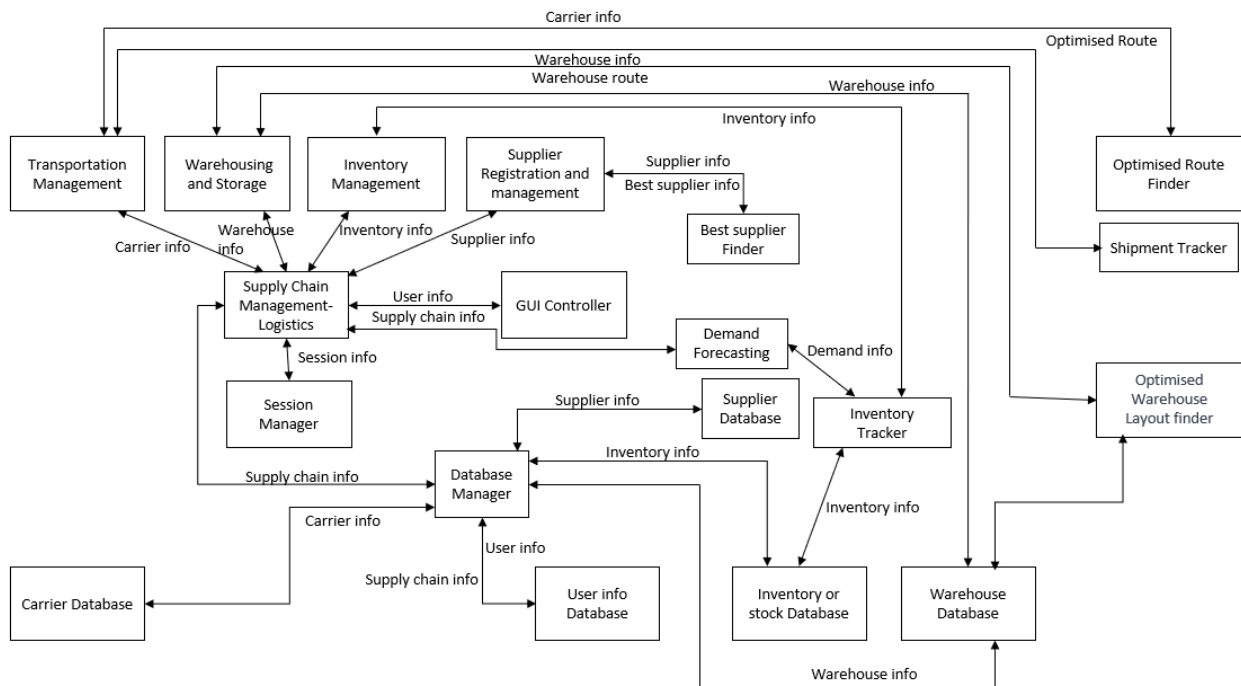


FIGURE 2

Figure 2 above shows a top down description of how the web application of LLX is expected to work and how components will interact with one another. The Supply Chain Management- Logistics module is the main component. The Transportation Management Module is used for shipment route optimization where the most cost effective carriers (transportation providers) and routes are selected using carrier info from the Carrier Database using the Optimized route finder. Inventory Management Module dynamically monitors and updates stock levels based on the results of demand forecasting and present stock levels using data from the Inventory Database. It also notifies when stock levels fall below a certain threshold. Demand forecasting uses algorithms, recent trends and historical data to predict future demand. Warehousing and storage module manages storage facilities, layouts, and inventory retrieval processes. Its main job is Warehouse Layout Optimization where it determines the best configuration for efficient storage and retrieval, for which it uses the Optimized warehouse layout finder, which uses data from the Warehouse database. The Supplier Registration and Management module designed to centralize and streamline the process of enrolling new suppliers, as well as to oversee the ongoing relationship, performance metrics, and interactions with existing suppliers. It finds the best supplier (using Best Supplier Finder), who is most cost effective while having best quality of product. The session manager is for logging in, logging out, and authenticating users. The Supply Chain Management- Logistics module can get and update user profiles that are saved with the database manager. It can also access the data saved in all databases. Finally, the GUI controller, shows how the user interacts with the LLX website.

## 3.2 Dependency Description

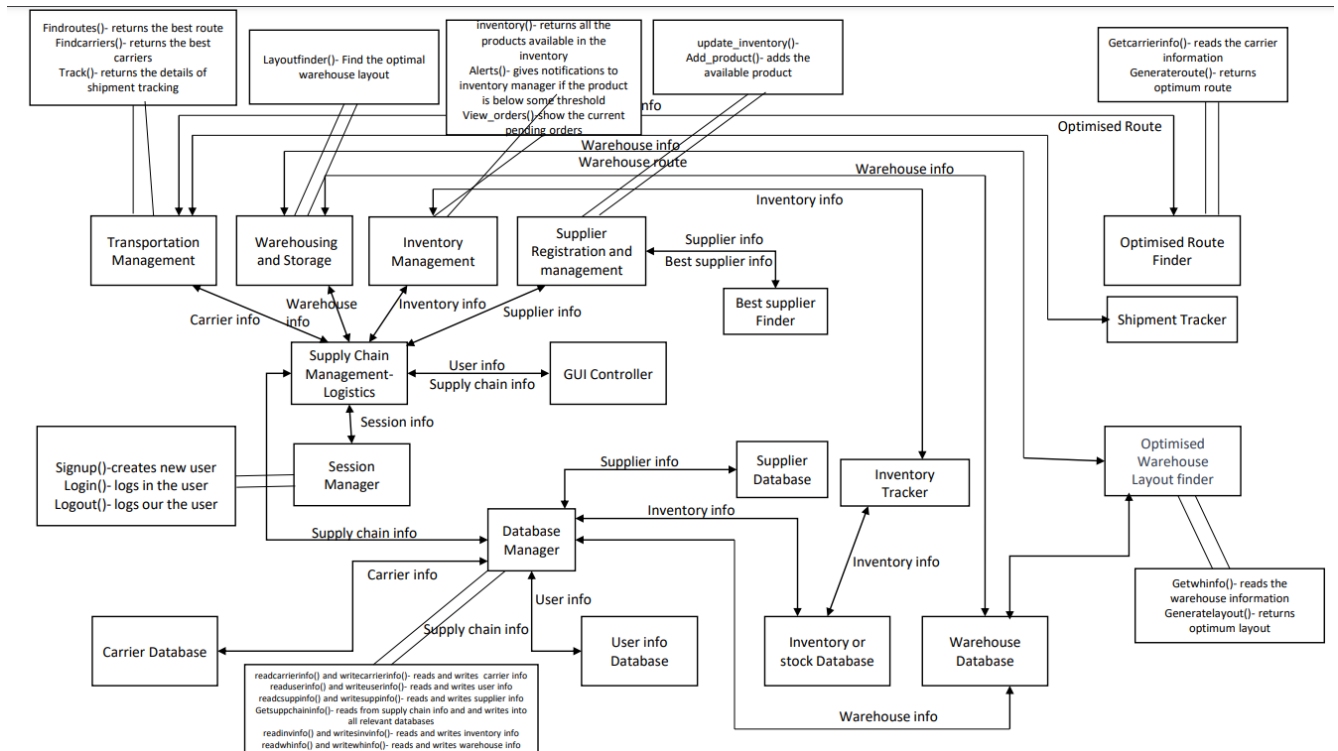


FIGURE 3

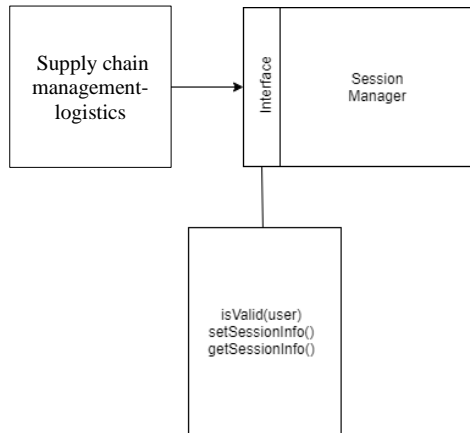
The Supply Chain Management Supplier Relationship Dependency involves the reliance on specific suppliers for the timely delivery of raw materials or products. The quality, lead times, and reliability of suppliers can significantly impact the efficiency of the entire supply chain.

Transportation Mode Dependency involves the choice of transportation modes (e.g., trucking, shipping, air freight) can affect transit times, costs, and the overall distribution network. Dependency on a particular mode can have implications for service levels and cost optimization.

Warehouse and Distribution Center Dependency involves Managing the flow of goods through warehouses and distribution centers is critical. Dependency on these facilities' locations and capacities affects inventory management and order fulfillment.

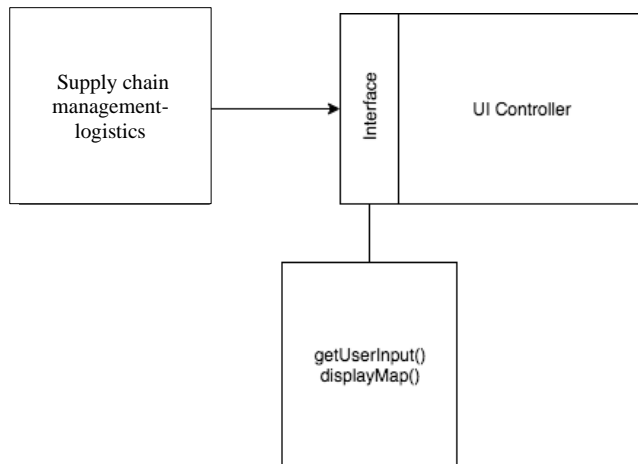
## 3.3 Interface Description

### 3.3.1 Trip Planner to Session Manager Interface





### 3.3.2 Trip Planner to UI Controller Interface



### 3.4 Module Interfaces

the diagram we briefly touched on in Software engineering.

### 3.5 User Interfaces (GUI)

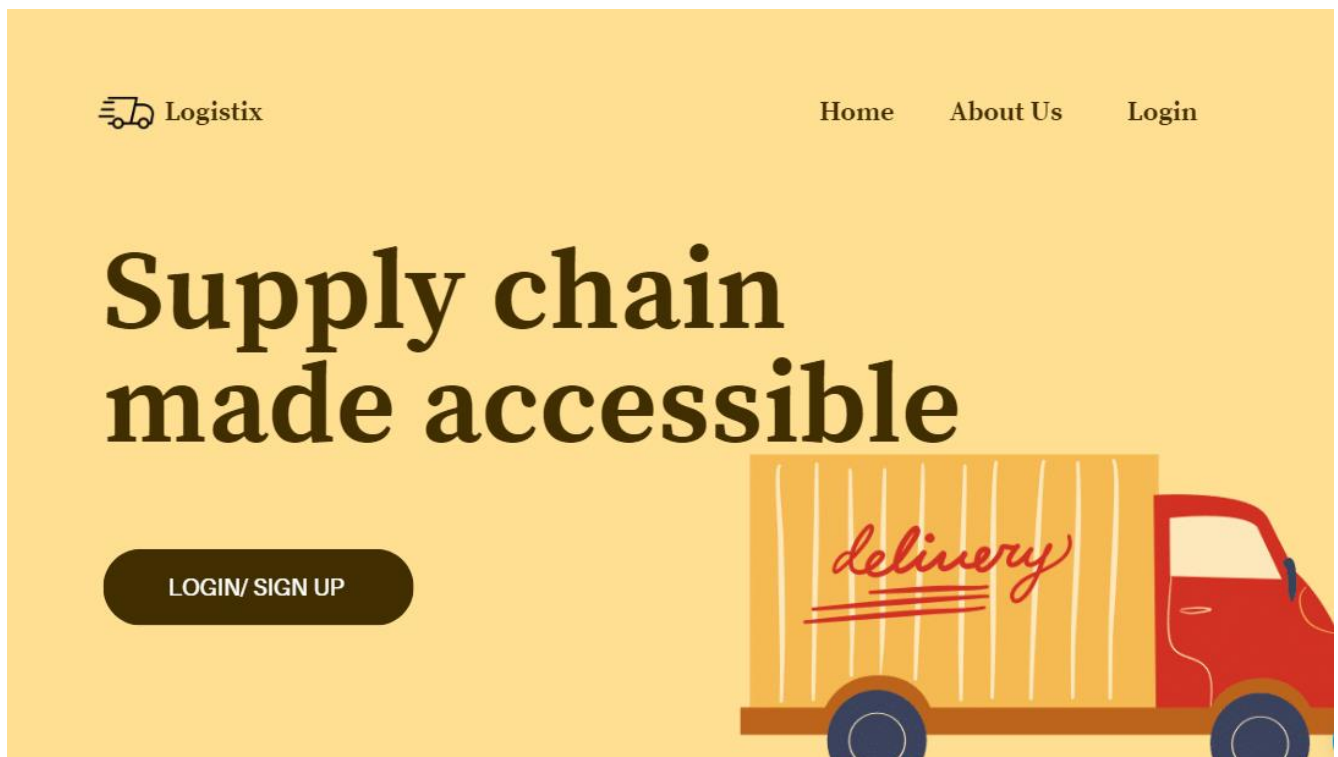


Figure 1 - Landing Page

Supply Chain Management

LoginSign Up

Login

Username

Username

Password

Password

Login

Figure 2- Login page

Supply Chain Management

LoginSign Up

Sign Up

Username

Username

Password

Password

Confirm Password

Confirm Password

Role

User

Sign Up

Already have an account? [Log In](#)

Figure 3- Sign up page

Supply Chain Management

Logout

Login successfull!

Dashboard

Add Product

Figure 4- Supplier Dashboard

# Add Product to Inventory

Product Name

Quantity

Threshold

Add Product

Figure 5 – Add Product (for supplier)

Supply Chain Management

Logout

Login successfull!

# Dashboard

View Orders

Figure 6 – User Dashboard

Supply Chain Management

Log

# View Orders

Go Back

<b>Customer Name:</b> advay <b>Products:</b> apple,banana,orange <b>Status:</b> processing
<b>Customer Name:</b> advay <b>Products:</b> dukh,dard,peeda <b>Status:</b> processing
<b>Customer Name:</b> user <b>Products:</b> apple,grape <b>Status:</b> processing
<b>Customer Name:</b> user <b>Products:</b> apple,grape <b>Status:</b> processing
<b>Customer Name:</b> user <b>Products:</b> apple,grape <b>Status:</b> processing
<b>Customer Name:</b> user <b>Products:</b> grape,grape

Figure 7 – View Orders

Create Order

Figure 8 – Create Order Button

Supply Chain ManagementLogout

Create Order

Customer Name

Customer Name

Products (comma-separated)

Products (comma-separated)

Create Order

Figure 9 – Create Order Page

Supply Chain ManagementLogout

Login successful!

Dashboard

View InventoryView Alerts

Figure 10- Inventory Manager Dashboard

Supply Chain ManagementLogout

InventoryGo Back

Product Name	Quantity	Threshold
apple	231	2
grape	0	4
Bags	5	1

Figure 11- View Inventory

Supply Chain ManagementLogout

Inventory AlertsGo Back

- Inventory alert: grape is below the threshold!

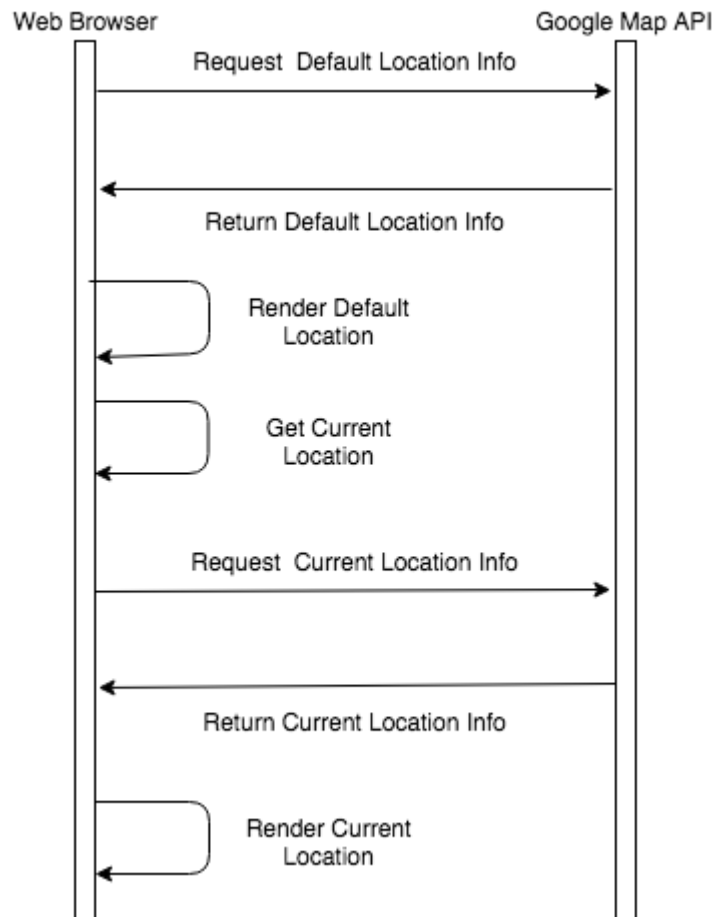
Figure 12- Inventory Alerts

# 1. Detailed Design

## 1.1 Module Detailed Design

### 1.1.1 Mark Current Location

#### Sequence Diagrams



#### Pseudocode

Browser shows default location on google maps

    Request default location information with google's api

    Google returns default location

Uses browser to get current location

Request current location information from google api

Google's API returns current locations info

Browsers renders current location

### 1.3 RTM

Requirement ID	Requirement Description	Test Cases	Test Status
REQ-1	User can create an account using his credentials and get a password	TC001	Completed
REQ-2	User can login using his credentials.	TC002	Completed
REQ-3	User can add or remove the required products	TC003	Completed
REQ-4	User can add only those products which are available in the inventory	TC003	Completed
REQ-5	Inventory manager can view all available products at any given time	TC008	Completed
REQ-6	Inventory manager gets an alert of goods that are low in stock	TC007	Completed
REQ-7	Suppliers can add to the inventory by supplying products after being approved	TC009	Pending
REQ-8	Inventory manager can view all supplier details	TC009	Pending
PE-1	All Web pages generated by the system shall be fully downloadable	-	Completed
PE-2	Responses to queries shall take no longer than 7 seconds	TC005	Completed
SE-1	Users shall be required to log in and they should be redirected to the home page	TC001, TC002	Completed
SE-2	The passwords shall be saved in hashed format	TC001, TC002	Completed







