High Level Design (HLD)

Super Mall Web Application

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Document Version Control

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Contents

Abstract

This high-level design document outlines the Super Mall Web Application, a platform designed to allow merchants to manage their shop's offers, products, and location. Users can browse through different categories, view shop details, compare product costs and features, and make purchases. The document provides an in-depth analysis of the project's problem statement, proposed solution, technical requirements, and design details.

1 Introduction

1.1 Why this High-Level Design Document?

The purpose of this document is to provide a comprehensive understanding of the Super Mall Web Application's design and architecture. It serves as a reference for the development team, stakeholders, and other involved parties, ensuring a clear vision and shared understanding of the project.

The HLD will:

- Present all of the design aspects and define them in detail
- Describe the user interface being implemented
- Describe the hardware and software interfaces
- Describe the performance requirements
- Include design features and the architecture of the project
- List and describe the non-functional attributes like:
    - Security
    - Reliability
    - Maintainability
    - Portability
    - Reusability
    - Application compatibility
    - Resource utilization
    - Serviceability

1.2 Scope

The Super Mall Web Application aims to bridge the gap between rural towns and the global market by providing a platform for merchants to advertise and sell their products. Users can access a wide range of commodities, compare prices and features, and make informed purchasing decisions. This document covers the design aspects of both the admin and user modules.

1.3 Definitions

Term	*Super Mall Web Application*
Admin	Authorized personnel responsible for managing the Super Mall Web Application, including shop details and offers.
Database	Collection of all the information monitored by this system
User	Individuals who utilize the Super Mall Web Application to browse and make purchases.

2 General Description

2.1 Product Perspective

The Super Mall Web Application functions as an independent platform that connects merchants and users. It integrates with databases to store product information, user data, and transaction details, ensuring a seamless interaction and efficient transaction processing.

2.2 Problem statement

Rural towns often struggle to reach a wider customer base for their commodities. The Super Mall Web Application aims to address this problem by providing a platform where merchants can advertise and sell their products to a global audience, expanding their reach and improving business prospects.

2.3 PROPOSED SOLUTION

The proposed solution is the development of the Super Mall Web Application. It enables merchants to create and manage shop details, offers, and products. Users can browse products by category, compare costs and features, and make purchases. The application focuses on providing a secure and user-friendly platform for both merchants and users.

2.4 FURTHER IMPROVEMENTS

While the initial implementation fulfills the core requirements, future enhancements can be considered to enhance the Super Mall Web Application's functionality. Potential improvements include incorporating user reviews and ratings, implementing personalized recommendations, and integrating with popular payment gateways for seamless transactions.

2.5 Technical Requirements

The Super Mall Web Application utilizes the following technologies:

MongoDB: A NoSQL database for efficient storage and retrieval of product information, shop details, and user data.

Express: A web application framework that handles routing and server-side logic.

HTML: It is a Hyper text markup language used to design the basic structure of website.

CSS: It is cascading style sheet used to modify html content in website to make it look dynamic.

JS: Standard web development technologies for designing and building the user interface and interactivity.

Node.js: A JavaScript runtime environment that enables server-side development.

- These can be battery powered or solar powered.

- UGVs' should be equipped with proper computing power to process the images or video of anomalies it had detected.

2.6 Data Requirements

The Super Mall Web Application requires the storage and management of various data types, including shop details, product information, user profiles, and transaction history. MongoDB's flexible document-based structure is utilized to store and retrieve this data efficiently.

There are numerous image file formats out there and some of them is used to build our super mall web application.

- **JPEG -** Joint photographic experts' groups
- **PNG** — portable network graphics
- **SVG** — Scalable Vector Graphics

- JPEG is a lossy format meaning that the image is compressed to make a smaller file but this loss is not noticeable.
- PNG are a lossless image format; these files are able to handle up to 16 million colours unlike the 256 colours supported by GIF.
- A Scalable Vector Graphic (SVG) is a unique type of image format. Unlike other varieties, SVGs don't rely on unique pixels to make up the images you see. Instead, they use 'vector' data.

2.7 Tools used

My project super mall web application is creaed by the help of mern stack which includes various types of tools, modules & coding skills like javascript, database connectivity, express, node etc. Some tules used are mentioned below:

MongoDB is a NoSQL database that provides a flexible and scalable way to store and retrieve data. It uses a document-based model, allowing developers to store data in JSON-like documents. MongoDB is well-suited for handling large volumes of data and provides powerful querying and indexing capabilities.

Express is a minimalist web application framework for Node.js. It provides a set of tools and features that simplify the development of web applications, such as routing, middleware support, and handling HTTP requests and responses. Express is lightweight and flexible, allowing developers to build robust APIs and server-side functionality.

Node.js is a JavaScript runtime environment that allows developers to execute JavaScript code outside of a web browser. It uses an event-driven, non-blocking I/O model, making it highly scalable and efficient for building server-side applications. Node.js enables developers to use JavaScript on both the frontend and backend, creating a unified development environment.

By combining these technologies, It enables features for developers to build end-to-end web applications using JavaScript. Node.js provides the runtime environment for server-side logic, Express handles the backend routing and APIs, MongoDB stores the application's data, andhtml and css powers the frontend user interface. This combination offers a seamless and efficient development experience, as developers can work with a single language throughout the entire application stack.

2.8 Constraints

The Super Mall Web Application should be designed to handle a moderate level of user traffic and concurrent transactions without compromising performance.
The development process should adhere to budgetary and timeline constraints defined for the project.

2.9 Assumptions

Users have basic internet connectivity and access to a web browser to utilize the Super Mall Web Application.

The Super Mall Web Application will be compatible with popular web browsers, ensuring widespread accessibility.

3 Design Details

3.1 Process Flow

The Super Mall Web Application follows the following process flow:

Admin login and authentication.
Admin manages shop details, offers, and products.
Users browse products by category.
Users view shop details, offers, and compare product costs and features.

3.2 Event log

The Super Mall Web Application includes an event logging mechanism to track and analyze user actions. Events such as login attempts by users or customers.

Initial Step-By-Step Description:

1. The System identifies at what step logging required
2. The System should be able to log each and every system flow.
3. Developer can choose logging method. You can choose database logging/ File logging as well.
4. System should not hang even after using so many loggings. Logging just because we can easily debug issues so logging is mandatory to do.

3.3 Error Handling

My web application incorporates error handling mechanisms to handle exceptions gracefully. User-friendly error messages are displayed when appropriate, and detailed error logs are maintained for troubleshooting and issue resolution.

4 Performance

Performance optimization is a crucial aspect of the Super Mall Web Application. Techniques such as caching, database indexing, code optimization, and load balancing are employed to ensure optimal response times, scalability, and high availability.

4.1 Reusability

Code components and modules are designed with reusability in mind to promote efficient development and maintenance. Modular code practices, adherence to design patterns, and clear documentation facilitate code reuse across different sections of the Super Mall Web Application.

4.2 Application Compatibility

The Super Mall Web Application is designed to be compatible with popular web browsers and devices. Responsive design principles and compatibility testing ensure consistent user experiences across various platforms and screen sizes.

4.3 Resource Utilization

Efficient utilization of system resources is a consideration in the design and implementation of the Super Mall Web Application. Techniques such as memory management, optimized queries, and proper resource allocation are employed to maximize resource efficiency.

4.4 Deployment

The Super Mall Web Application is deployed to a production environment following industry best practices. Server configuration, security measures, performance optimizations, and automated deployment processes are implemented to ensure a smooth and reliable deployment.

5 Dashboards

5.1 KPIs (Key Performance Indicators)

1. Number of active shops
2. Customer satisfaction ratings
3. Shop performance metrics (e.g., number of products sold, revenue per shop)
4. Product popularity and demand (e.g., most viewed products, most purchased products)
5. Website traffic metrics (e.g., unique visitors, page views)
6. Average response time for user interactions (e.g., page loading time, search query response time)

6 Conclusion

In conclusion, the Super Mall Web Application is a platform that enables merchants to manage their shop's offers, products, and location, while providing users with a comprehensive shopping experience. This high-level design document has provided an overview of the project's problem statement, proposed solution, technical requirements, and design details. It serves as a valuable resource for the development team, stakeholders, and other parties involved in the Super Mall Web Application project.

7 References

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