Project Design Phase-II

Technology Stack (Architecture & Stack)

Date	10-4-2025
Team ID	SWTID1743605259
Project Name	ShopEZ
Maximum Marks	4

Technical Architecture:

The technical architecture of the **ShopEZ WebApp** replicates a real-time e-commerce shopping and management system, built using the **MERN stack (MongoDB, Express.js, React.js, Node.js)**. This architecture follows a modular and scalable approach, ensuring flexibility, maintainability, and efficient handling of concurrent user interactions across different roles—customers, admins, and sellers (future scope).

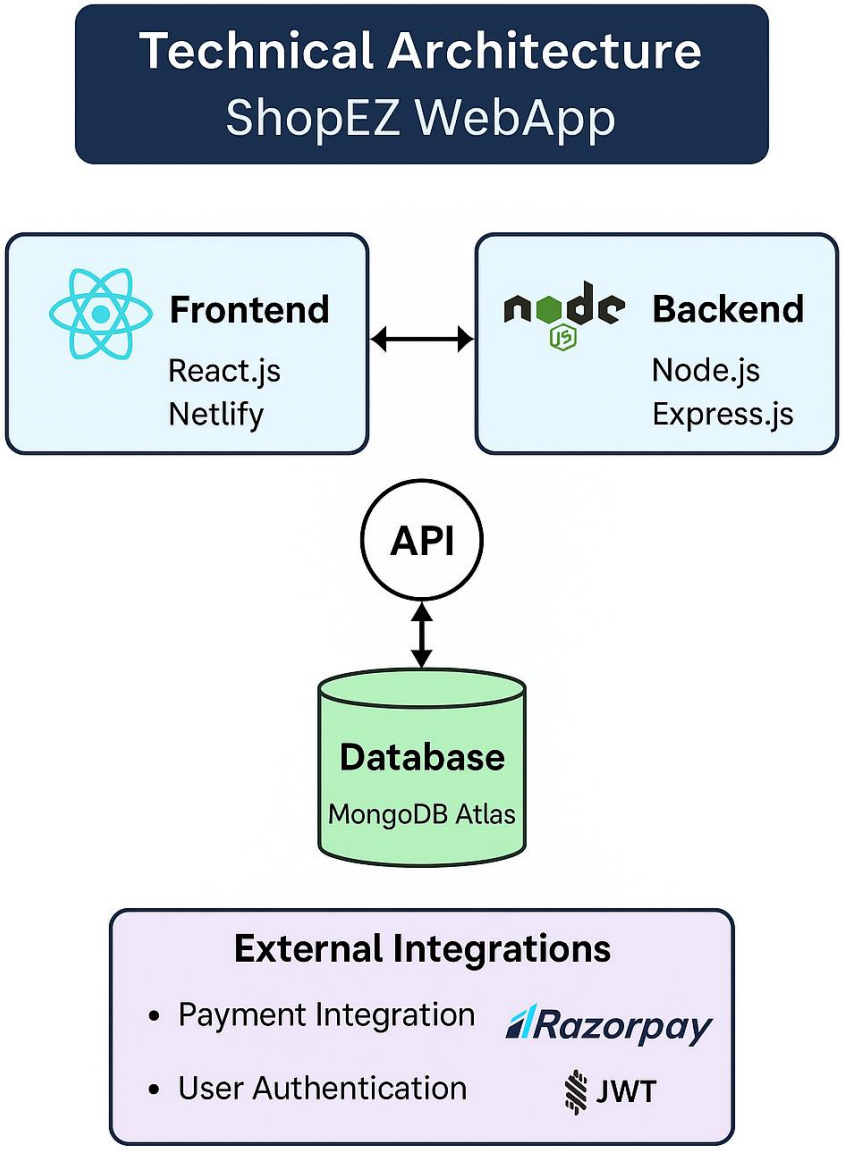
The **frontend** is developed using **React.js** and hosted on **Netlify**, providing fast, secure, and continuous deployment. It offers a responsive and intuitive UI that supports dynamic rendering of components like product catalogs, shopping carts, and checkout modules, while ensuring seamless user interactions.

The **backend** is built with **Node.js and Express.js**, deployed on **Render**, and serves as the core logic hub. It handles user management, order processing, admin controls, product management, and secure API communications with external services.

MongoDB Atlas, a cloud-hosted NoSQL database, is used as the central data store. It ensures high availability, scalable data access, and security for managing product inventories, user data, order details, and admin operations.

This architecture effectively simulates a real-world e-commerce ecosystem, optimized for performance, real-time interaction, and easy future integration of seller functionalities.

- **Modular architecture** separating frontend, backend, and database
- **Hosted frontend on Netlify**, **backend on Render**, **database on MongoDB Atlas**
- **Secure payment integration** using Razorpay
- **User authentication and role management** using JWT



Technical Architecture
ShopEZ WebApp

Components & Technologies:

S.No	Component	Description	Technology
1.	User Interface	Web-based UI for customers and admins	HTML, CSS, Tailwind CSS, React.js
2.	Application Logic - User Management	Authentication, registration, role-based access	Node.js, Express.js, JWT
3.	Application Logic - Order Processing	Cart, checkout, payment processing	Node.js, Express.js
4.	Application Logic - Admin Panel	Product & category management, order tracking, user monitoring	Node.js, Express.js
5.	Database	Stores users, products, orders, admin details	MongoDB (NoSQL)
6.	Cloud Database	Cloud-hosted database for scalability and availability	MongoDB Atlas
7.	File Storage	Product images and user-uploaded assets	Cloudinary
8.	External API - Payment Gateway	Secure payment processing	Razorpay API
9.	External API - Location Services	Delivery optimization (future integration)	Google Maps API

Application Characteristics:

S.No	Characteristics	Description	Technology
1.	Open-Source Frameworks	Modern stack for frontend and backend	React.js, Node.js, Express.js (MERN)
2.	Security Implementations	JWT-based auth, secure APIs, encrypted payments	JWT, HTTPS, Razorpay
3.	Scalable Architecture	Modular services for handling growth and user load	Node.js + MongoDB on cloud
4.	Availability	Cloud hosting for continuous uptime and failover handling	Netlify, Render, MongoDB Atlas
5.	Performance	Optimized rendering, fast APIs, local caching support	Redis (optional), IndexedDB, CDN