Project Design Phase-II

TechnologyStack(Architecture&Stack)

Date	20-06-2025
Team ID	**LTVIP2025TMID55453**
Project Name	Shopsmart:Your Digital Grocery Store Experience
MaximumMarks	4

TechnicalArchitecture:

Thetechnicalarchitectureofthe **Shopsmart:Your Digital Grocery Store Experience** replicatesareal time commerc shoppingandmanagementsystem,builtusingthe**MERNstack(MongoDB,Express.js, React.js,Node.js)**.Thisarchitecturefollowsamodularandscalableapproach,ensuring flexibility,maintainability,andefficienthandlingofconcurrentuserinteractionsacross different roles—customers, admins, and sellers (future scope).

The**frontend**isdevelopedusing**React.js**andhostedon**Netlify**,providingfast,secure,and continuous deployment. It offers a responsive and intuitive UI that supports dynamic renderingofcomponentslikeproductcatalogs,shoppingcarts,andcheckoutmodules,while ensuring seamless user interactions.

The**backend**isbuiltwith**Node.jsandExpress.js**,deployedon**Render**,andservesasthe core logic hub. It handles user management, order processing, admin controls, product management, and secure API communications with external services.

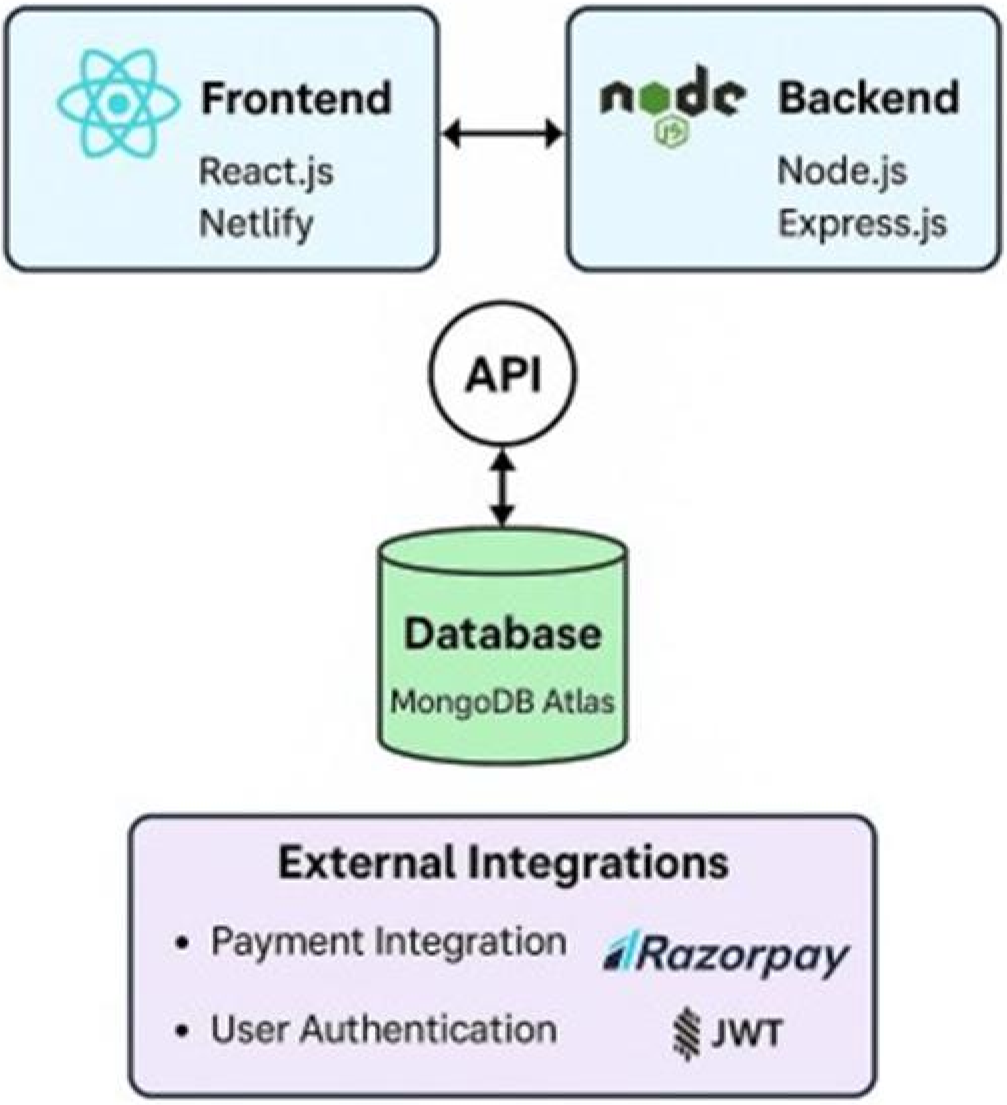
MongoDBAtlas,acloud-hostedNoSQLdatabase,isusedasthecentraldatastore.Itensures high availability, scalable data access, and security for managing product inventories, user data,orderdetails,andadminoperations.

Thisarchitectureeffectivelysimulatesareal-worlde-commerceecosystem,optimizedfor performance, real-time interaction, and easy future integration of seller functionalities.

- **Modulararchitecture**separatingfrontend,backend,anddatabase
- **HostedfrontendonNetlify**,**backendonRender**,**databaseonMongoDBAtlas**•

SecurepaymentintegrationusingRazorpay

- **Userauthenticationandrolemanagement**usingJWT



Technical Architecture

Components& Technologies:

S.No	Component	Description	Technology
1.	User Interface	Web-basedUIforcustomers andadmins	HTML,CSS, TailwindCSS, React.js
2.	Application Logic - User Management	Authentication,registration, role based access	Node.js, Express.js,JWT
3.	ApplicationLogic- Order Processing	Cart,checkout,paymentprocessing	Node.js, Express.js
4.	ApplicationLogic- Admin Panel	Product& category management,ordertracking, user monitoring	Node.js, Express.js

5.	Database	Storesusers,products, orders,admin details	MongoDB (NoSQL)
6.	Cloud Database	Cloud-hosteddatabasefor scalability and availability	MongoDB Atlas
7.	File Storage	Product images and user-uploadedassets	Cloudinary
8.	ExternalAPI-PaymentGateway	Securepaymentprocessing	RazorpayAPI
9.	External API - LocationServices	Deliveryoptimization (futureintegration)	GoogleMapsAPI

ApplicationCharacteristics:

S.No	Characteristics	Description	Technology
1.	Open-Source Frameworks	Modernstackforfrontend andbackend	React.js, Node.js, Express.js(MERN)
2.	Security Implementations	JWT-basedauth,secure APIs,encryptedpayments	JWT,HTTPS,Razorpay
3.	Scalable Architecture	Modularservicesfor handlinggrowthanduser load	Node.js + MongoDBon cloud
4.	Availability	Cloudhostingfor continuousuptimeand failover handling	Netlify,Render, MongoDBAtlas
5.	Performance	Optimized rendering, fast APIs,localcachingsupport	Redis(optional), IndexedDB,CDN