Project Design Phase-II

Technology Stack (Architecture & Stack)

Date	25 June 2025
Team ID	LTVIP2025TMID53966
Project Name	BookNest: Where Stories Nestle
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Maximum Marks	4 Marks

Technical Architecture

BookNest is a modern, MERN stack-based online book store built for scalability, performance, and user satisfaction. The architecture includes a **React-based frontend**, **Node.js/Express.js backend**, **MongoDB** for data storage, and integrates essential services like authentication, inventory, and order processing. The system is modular and ready for cloud deployment with future integrations like recommendation engines and secure payment gateways.

Table 1: Technology Stack Components

S.No	Component	Description	Technology / Service Used
1	User Interface	Web UI for readers to browse, search, and purchase books	React.js, HTML5, CSS3, JavaScript
2	Application Logic-1	User registration, login, authentication, session management	Node.js, Express.js, JWT
3	Application Logic-2	Book browsing, filtering, category selection, cart, checkout	Node.js, Express.js

4	Database	Data storage for users, books, orders, inventory	MongoDB, Mongoose
5	Cloud Database	(Optional) Cloud-hosted MongoDB for scalability	MongoDB Atlas
6	File Storage	Book cover images, author photos	Local filesystem, (optionally AWS S3)
7	External API-1	(Optional) Payment gateway integration	Stripe API, Razorpay API
8	External API-2	(Optional) Email notifications for orders	Nodemailer, SendGrid
9	**Recommendation Engine**	(Future) Personalized book suggestions	Python (Flask API), TensorFlow, Scikit-learn
10	Infrastructure	Deployment, containerization, and scaling	Docker, Heroku, AWS EC2, Nginx

Table 2: Application Characteristics

S.No	Characteristics	Description	Technology / Approach Used
1	Open-Source Frameworks	Built entirely on open-source tools for community support and rapid development	React.js, Node.js, Express.js, MongoDB
2	Security Implementations	Secure authentication and data protection mechanisms	JWT, Helmet, CORS, OWASP practices
3	Scalable Architecture	Modular services with REST APIs, cloud-deployable structure	Docker, AWS, MongoDB Atlas, Microservices (future)
4	Availability	High availability through cloud deployment and load balancing	AWS EC2, Heroku, MongoDB Atlas, Nginx
5	Performance	Optimized backend queries, fast API responses, and image delivery via CDN	MongoDB indexing, Redis (future), Cloudflare CDN