Requirement Analysis
Technology Stack (Architecture & Stack)

Date	20 July 2025
Team ID	PNTT2025TMID09656
Project Name	ShopEZ: E-commerce Application
Maximum Marks	4 marks

Technical Architecture:

Table-1 : Components & Technologies:

S.No	Component	Description	Technology
1	User Interface	Web-based interface for customers to browse products, manage carts, and checkout; and an admin interface for product and order management. This includes User Authentication, Cart, Products, Profile, and Admin dashboard.	HTML, CSS, JavaScript (React.js / Angular / Vue.js)
2	Application Logic-1	Handles core user functionalities like authentication (registration, login), product catalog display, search, filtering (Effortless Product Discovery), and shopping cart management.	Node.js, Express.js
3	Application Logic-2	Manages order processing (Seamless Checkout Process), payment gateway integration, inventory updates, and personalized recommendations for a Personalized Shopping Experience.	Node.js, Express.js
4	Application Logic-3	Implements seller-specific features such as Efficient Order Management for Sellers, product upload, order tracking, user management, and insightful analytics for Business Growth via the Admin Dashboard.	Node.js, Express.js
5	Database	Stores all application data, including collections for Users, Cart, Orders, and Products.	MongoDB (NoSQL for flexible schema) / PostgreSQL / MySQL

6	Cloud Storage	For storing product images and other media assets.	AWS S3 / Google Cloud Storage
7	External API-1	Integration with payment gateways for secure online transactions (e.g., Stripe, PayPal).	Stripe API / PayPal API / Razorpay
8	External API-2	Integration with shipping and logistics services for order fulfillment (e.g., tracking, calculated shipping costs).	Third-party Shipping APIs (e.g., FedEx, UPS, DHL)
9	Infrastructure (Server / Cloud)	Application deployment and hosting for scalability and availability.	AWS / Google Cloud Platform / Microsoft Azure (EC2, S3, RDS, Kubernetes, Docker)

Table-2: Application Characteristics:

S.No	Characteristics	Description	Technology
1	Open-Source Frameworks	Frontend and backend frameworks, and CSS libraries used for development to create the user-friendly interface.	React.js / Angular / Vue.js, Node.js, Express.js, Bootstrap, Tailwind CSS
2	Security Implementations	Measures to protect user data, ensure secure checkout processes, and prevent common web vulnerabilities for a secure online shopping experience.	SSL encryption, secure payment gateways, JWT for authentication, OWASP best practices, input validation, bcrypt for password hashing.
3	Scalable Architecture	Justification for the architecture's ability to handle increasing user traffic and product data. This includes handling peak shopping seasons and business growth.	3-tier or Microservices architecture with RESTful APIs, Load Balancers, Horizontal Scaling, Containerization (Docker, Kubernetes).

4	**Availability**	**Ensuring the e-commerce application is consistently accessible to users, minimizing downtime for seamless shopping.**	**Cloud-based deployment (e.g., AWS, GCP), load balancing, redundant databases, failover mechanisms.**
5	**Performance**	**Design considerations for fast loading times, responsive product discovery, and quick checkout processes.**	**Caching (Redis), CDN for static assets, image optimization, asynchronous operations, database indexing.**

References:

- React.js Documentation
- Node.js Best Practices
- Express.js Documentation
- MongoDB Documentation
- https://medium.com/the-internal-startup/how-to-draw-useful-technical-architecture-diagrams-2d20c9fda90d
- https://www.aalpha.net/articles/what-technology-stack-is-used-for-ecommerce-projects/
- https://unogeeks.com/full-stack-e-commerce-website/
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