**Technical Requirements Document (TRD)**

**Project Title:** E-Commerce Application  
**Version:** 1.0  
**Date:** [Insert Date]  
**Prepared By:** [Insert Name]

**1️⃣ Document Purpose**

This document captures the technical architecture, system specifications, and integration points required for the successful development, deployment, and maintenance of the E-Commerce Application.

**2️⃣ System Overview**

* Develop a **responsive, scalable, and secure web-based E-Commerce platform**.
* Support customer-facing storefront and backend admin operations.
* Ensure seamless integration with third-party services like payment gateways and notification systems.

**3️⃣ Technology Stack**

| **Category** | **Technology** |
| --- | --- |
| Front-End | React.js / Angular / Vue.js |
| Back-End | Node.js / Java Spring Boot / .NET Core |
| Database | MySQL / PostgreSQL / MongoDB |
| Payment Gateway | Razorpay / PayU / Stripe |
| Hosting / Cloud | AWS / Azure / Google Cloud |
| Notifications | Twilio / AWS SNS / Email API |
| Deployment & CI/CD | Jenkins / GitLab CI / Azure DevOps |
| Containerization | Docker / Kubernetes (optional) |
| Source Code Control | Git / GitHub / GitLab |

**4️⃣ Infrastructure Requirements**

| **Item** | **Requirement** |
| --- | --- |
| Cloud Hosting | Auto-scaling server environment. |
| Database Hosting | Managed database service preferred. |
| SSL Certificates | HTTPS enforcement with TLS 1.2+. |
| Load Balancer | Required for traffic distribution. |
| CDN | For static content delivery (e.g., CloudFront). |
| Backup & Recovery | Daily automated backups; 7-day retention. |
| Monitoring Tools | AWS CloudWatch / Azure Monitor / ELK Stack. |

**5️⃣ Integration Requirements**

| **Integration Point** | **Description** |
| --- | --- |
| Payment Gateway | API integration for payments (e.g., Razorpay). |
| SMS Gateway | For OTPs, order notifications. |
| Email Gateway | Order confirmations, account emails. |
| Third-Party Analytics | Google Analytics, Tag Manager integration. |

**6️⃣ Security Requirements**

* **Data Encryption:**  
  All sensitive data must be encrypted in transit (HTTPS) and at rest.
* **Authentication:**  
  JWT-based authentication for APIs; secure password storage using bcrypt.
* **Authorization:**  
  Role-based access control for Admin modules.
* **PCI-DSS Compliance:**  
  Adherence to PCI-DSS guidelines for handling payment data.
* **Logging & Monitoring:**  
  Log all critical operations with restricted access.

**7️⃣ Application Architecture**

* **Architecture Style:** Microservices (Optional) or Monolithic (Initial Phase).
* **Deployment Model:** Cloud-hosted (AWS / Azure).
* **Data Flow:** User → Front-End → API Gateway → Back-End Services → Database.

Include a high-level architecture diagram in actual documentation.

**8️⃣ Performance & Scalability**

* Must handle 10,000+ concurrent users.
* API response times ≤ 1 second for 95% of requests.
* Product pages must load within 3 seconds.

**9️⃣ Backup and Disaster Recovery**

* **Daily backups** of databases and media storage.
* **Disaster recovery plan** to restore services within 4 hours after critical failure.
* Replication across multiple availability zones.

**🔟 Compliance Requirements**

* GDPR compliance for user data (if operating in applicable regions).
* Adherence to local e-commerce regulations (as applicable).
* Regular security audits.

**1️⃣1️⃣ Non-Functional Requirements**

| **Category** | **Requirement** |
| --- | --- |
| Uptime | 99.9% |
| Reliability | Failover mechanisms for key services. |
| Maintainability | Modular codebase, documented APIs. |
| Portability | Cloud-agnostic containerized deployment (optional). |

**1️⃣2️⃣ Approval**

| **Name** | **Role** | **Signature** | **Date** |
| --- | --- | --- | --- |
| [Solution Architect] | Architect |  |  |
| [Project Manager] | PM |  |  |
| [IT Security Head] | Reviewer |  |  |