**Project Design Phase**

**Solution Architecture**

|  |  |
| --- | --- |
| Date | 20 February 2026 |
| Team ID | LTVIP2026TMIDS35287 |
| Project Name | DocSpot – Seamless Appointment Booking System |
| Maximum Marks | 4 Marks |

**Solution Architecture:**

Solution architecture defines the overall structure of the system and explains how different components interact to solve the identified problem.

For DocSpot, the architecture bridges the gap between healthcare appointment management problems and a scalable digital solution.

**Goals of the Solution Architecture:**

* Identify the best technical solution for managing appointments digitally.
* Define system structure, components, and interactions.
* Describe functional and non-functional requirements.
* Ensure scalability, security, and maintainability.
* Provide clear guidelines for implementation and deployment.

**Architecture Overview (Three-Tier Architecture)**

DocSpot follows a Three-Tier Architecture:

1. **Presentation Layer (Frontend)**

* Developed using HTML, CSS, JavaScript (React if used).
* Provides user interface for:
  + Patients
  + Doctors
  + Admin
* **Features:**
  + Registration & Login
  + Doctor Search
  + Appointment Booking
  + Dashboard views

**2. Application Layer (Backend)**

* Built using Node.js & Express.js.
* Handles:
  + Business logic
  + Authentication (JWT)
  + Role-based access control
  + Appointment slot validation
  + API communication

**3. Data Layer (Database)**

* MongoDB database.
* Stores:
  + User details
  + Doctor information
  + Appointment records
* Ensures data consistency and integrity.

**4. Solution Architecture Flow**

1. User logs into the system.
2. Frontend sends request to backend APIs.
3. Backend validates data and processes logic.
4. Database stores or retrieves appointment information.
5. Response is sent back to frontend for display**.**

**5.Security Architecture**

* Password hashing using bcrypt
* JWT-based authentication
* Role-based authorization
* Input validation & error handling
* Secure API endpoints

**6. Scalability & Future Enhancement**

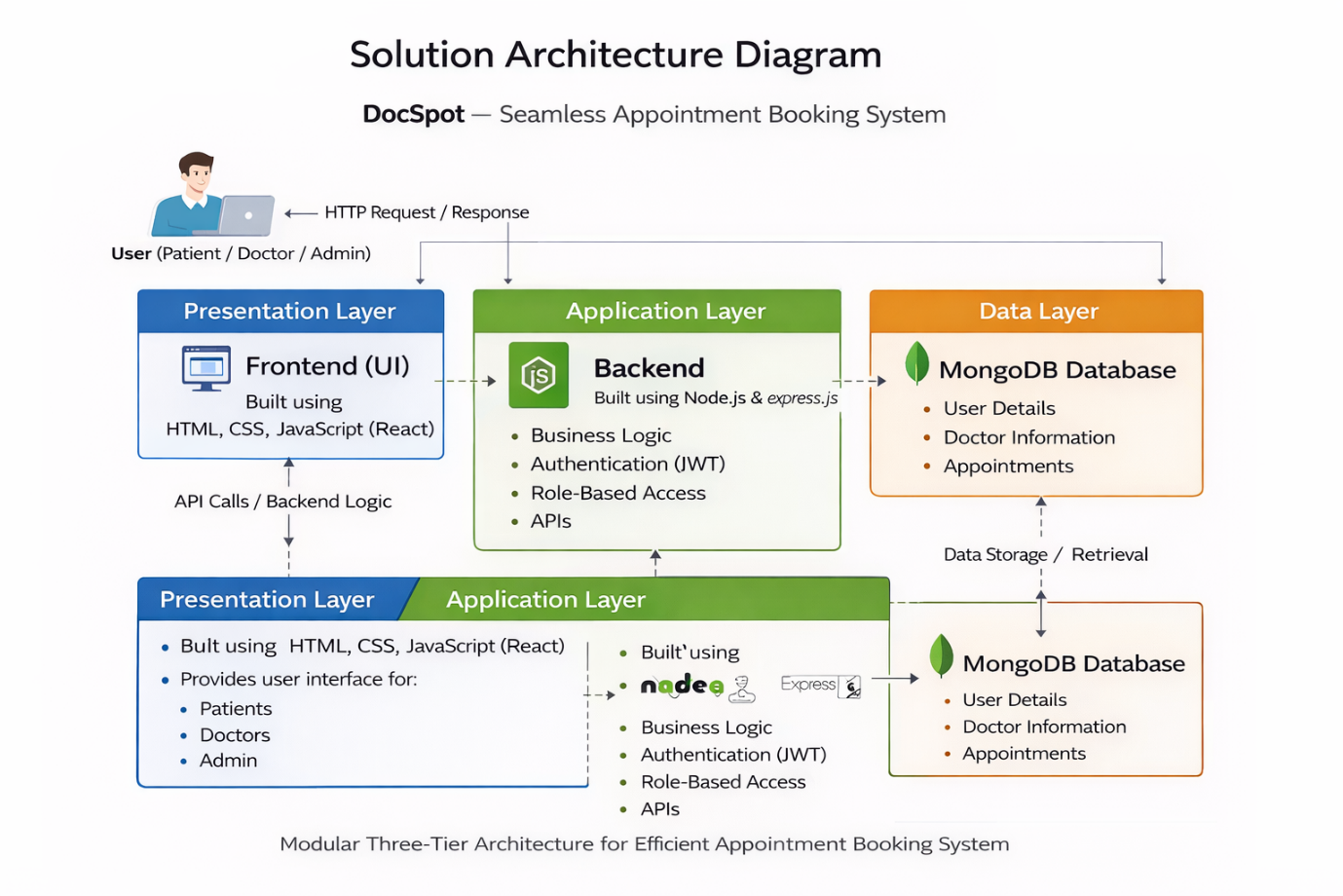
* Can support multiple clinics and hospitals.
* Cloud deployment ready.
* Modular structure allows:
  + Online payments
  + Video consultation
  + SMS/email notifications
  + Mobile app integration

**Conclusion**

The DocSpot solution architecture ensures:

✔ Efficient appointment management  
✔ Reduced manual errors  
✔ Improved patient experience  
✔ Secure and scalable system design  
✔ Clear separation of concerns using three-tier architecture

**Example - Solution Architecture Diagram:**

****