CS 331 (Software Engineering Lab)

Assignment 4

II. Application Components of AssistX

1. User Interface (Client Layer)
This component provides the front-end interface through which customers and administrators interact with the system. It enables users to register, log in, submit support queries, track ticket status, and view responses. Administrators can access dashboards, monitor escalated issues, and manage system activities.

2. API Gateway
The API Gateway acts as the single entry point for all incoming client requests. It routes requests to the appropriate backend services, enforces authentication and authorization policies, and ensures secure and efficient communication between client and services.

3. User Management Service
This service manages user registration, login authentication, role assignment (Customer/Admin), and session tracking. It ensures secure access control and maintains user account information.

4. AI Query Processing Service
This is the core intelligence module of AssistX. It processes user queries using NLP techniques such as intent detection, classification, and sentiment analysis. Based on the analysis, it generates automated responses using the knowledge base.

5. Ticket Management Service
This service controls the complete lifecycle of support tickets. It creates tickets from user queries, updates their status (Open, Pending, Resolved), and maintains ticket history for tracking and auditing purposes.

6. Escalation Service
When the AI service cannot confidently resolve a query, this service escalates the ticket to a human administrator. It applies priority rules and manages escalation queues to ensure timely resolution.

7. Notification Service
This component sends automated notifications such as email or SMS alerts. It informs users about ticket updates and alerts administrators regarding new escalations.

8. Knowledge Base Service
The Knowledge Base stores FAQs, support articles, and documentation. It provides search and retrieval functionality to assist the AI service in generating accurate responses.

9. Dashboard and Reporting Module
This module provides analytical insights for administrators. It displays statistics such as total queries, resolved tickets, pending cases, and escalation trends. It can also generate structured reports for performance evaluation.

10. Database Layer
The database layer stores persistent data including user details, tickets, responses, logs, and system records. Depending on architectural design, each service may maintain its own database or share a centralized database.