Project Design Phase-II

Technology Stack (Architecture & Stack)

Date: 27 JUNE 2025

Team ID: LTVIP2025TMID52721

Project Name:

EDUTUTOR-AI-PERSONALIZED-LEARNING-WITH-GENERATIVE-LMS-INTEGRATION

Maximum Marks: 4 Marks

Technical Architecture

The deliverable includes the architectural diagram, customer journey map, and detailed information as per the following structure.

Table-1: Technology Stack

S.No	Component	Description	Technology Used
1	Application Logic - 1	Quiz Generation and Personalized Learning Logic	Python (Flask / FastAPI)
2	Application Logic - 2	Speech-to-Text for student input	IBM Watson STT
3	Application Logic - 3	AI Assistant for Query Handling	IBM Watson Assistant
4	Database	Stores User Data, Quiz Data, Results	MySQL + MongoDB
5	Cloud Database	Cloud-based secure storage of data	IBM DB2, IBM Cloudant
6	File Storage	File storage for reports, resources	IBM Cloud Object Storage
7	External API - 1	Weather-based insights	IBM Weather API
8	External API - 2	Student Identity Verification	Aadhar API
9	Machine Learning Model	Personalized Recommendation Engine	OpenAI GPT-4
10	Infrastructure (Server/Cloud)	Application Deployment and Hosting	IBM Cloud Foundry / Kubernetes

Table-2: Application Characteristics

S.No	Characteristics	Description	Technology Used
1	Open-Source Frameworks	Backend and Frontend frameworks	Flask / FastAPI, ReactJS
2	Security Implementations	Access Controls, Encryption	OAuth2, SHA-256, IAM, OWASP
3	Scalable Architecture	Microservices-based modular and scalable system	Docker, Kubernetes
4	Availability	Load Balancing and Fault Tolerance	IBM Cloud Load Balancer, Distributed Serve
5	Performance	Caching and CDN for optimized performance	Redis, IBM CDN

Customer Journey Map

Stage 1: Awareness

- Student/Teacher discovers EduTutor AI via web or recommendation.

Stage 2: Onboarding

- User logs in using Google authentication.

- Syncs Google Classroom or uploads course details.

Stage 3: Engagement

- Students access personalized quizzes and study resources.

- Teachers track student progress via dashboard.

Stage 4: Interaction

- Students interact with AI Assistant for doubts.

- Real-time feedback provided using AI models.

Stage 5: Evaluation

- Student's performance evaluated automatically.

- Reports and analytics generated.

Stage 6: Continuous Learning

- Personalized recommendations offered for improvement.

- Teachers update content or quizzes based on analytics.

References

- https://c4model.com/

- https://developer.ibm.com/patterns/ai-powered-backend-system-for-order-processing-during-pandemics/

- https://www.ibm.com/cloud/architecture

- https://aws.amazon.com/architecture

- https://medium.com/the-internal-startup/how-to-draw-useful-technical-architecture-diagrams-2d20c9fda90d