Project Design Phase-II
Technology Stack (Architecture & Stack)
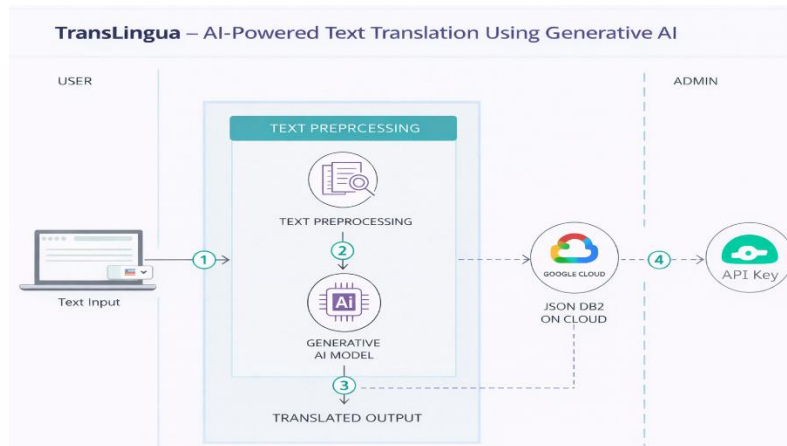
Date	31 January 3035
Team ID	LTVIP2026TMIDS91514
Project Name	TransLingua – AI-Powered Multi-Language Translator
Maximum Marks	4 Marks

Technical Architecture:

The Deliverable shall include the architectural diagram as below and the information as per the table1 & table 2

Example: Order processing during pandemics for offline mode

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

Guidelines:

   The TransLingua system architecture is designed for real-time text translation using Generative AI and Google Cloud APIs. The local application handles user input, text processing, and output display, while the cloud infrastructure performs the core translation using external AI services. The system communicates with third-party APIs through secure connections to access machine learning models for accurate language translation. No permanent data storage is used, as all processing occurs dynamically in memory, ensuring fast performance and user privacy. This architecture provides a scalable and efficient solution for AI-powered text translation.

Table-1 : Components & Technologies:

S.No	Component	Description	Technology
1	User Interface	Interface where users enter text and view translated output (web application)	HTML, CSS, JavaScript / Streamlit / Python UI
2	Application Logic-1	Text input processing and request handling	Python
3	Application Logic-2	API communication and translation processing	Google Cloud Translation API
4	Application Logic-3	Response formatting and output display logic	Python
5	Database	No permanent database used; real-time processing only	Not Applicable
6	Cloud Database	No cloud database required for this project	Not Applicable
7	File Storage	Temporary memory storage during processing	Local Memory (RAM)
8	External API-1	AI translation service for multilingual text conversion	Google Cloud Translation API
9	External API-2	Authentication and API key management	Google Cloud Platform Services
10	Machine Learning Model	Generative AI model for language translation	Google Generative AI / NLP Model
11	Infrastructure (Server / Cloud)	Application runs locally and connects to cloud services	Local System + Google Cloud Platform

Table-2: Application Characteristics:

S.No	Characteristics	Description	Technology
1	Open-Source Frameworks	Open-source frameworks used for building the translation application and interface	Python, Streamlit / Flask
2	Security Implementations	Secure API authentication, encrypted communication, and access control for protecting user data	HTTPS Encryption, Google Cloud IAM, API Key Security
3	Scalable Architecture	Cloud-based architecture allows scaling to handle multiple translation requests efficiently	Google Cloud Platform (Cloud APIs)
4	Availability	High availability ensured through reliable cloud services and distributed infrastructure	Google Cloud Infrastructure
5	Performance	Optimized for fast response time and real-time translation processing	Google Cloud Translation API, Efficient Python Processing

References:

https://cloud.google.com/translate/docs

https://ai.google.dev/

https://www.ibm.com/topics/natural-language-processin

https://nlp.stanford.edu/projects/moses/

https://docs.python.org/3/