Project Design Phase-II
Technology Stack (Architecture & Stack)

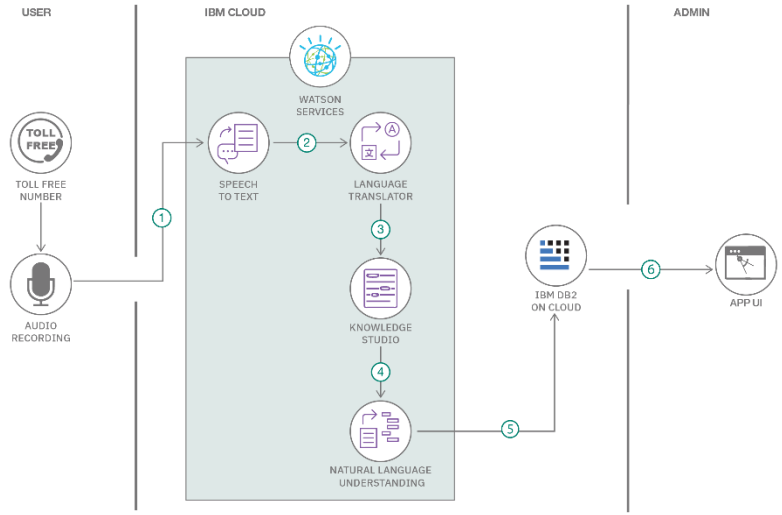
Date	25 June 3035
Team ID	LTVIP2025TMID43747
Project Name	TrafficTelligence Advanced Traffic Volume Estimation With Machine Learning
Maximum Marks	4 Marks

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:

Technical Architecture:

This system estimates traffic volume in real time using video feeds and machine learning models. Data flows from user input or camera devices into an ML model hosted on a cloud-based server, and the results are visualized via a user-friendly dashboard.

Table-1 : Components & Technologies:

S.No	Component	Description	Technology
1.	User Interface	Web-based dashboard to display traffic analysis results	HTML, CSS, JavaScript, React JS
2.	Application Logic-1	Backend to manage request flow and serve predictions	Python, Flask
3.	Application Logic-2	Backend to manage request flow and serve predictions	OpenCV, Python
4.	Application Logic-3	ML model inference for vehicle detection	TensorFlow / PyTorch
5.	Database	Stores user data and historical traffic data	MongoDB / MySQL
6.	Cloud Database	Cloud-hosted storage of real-time and aggregated data	Cloud-hosted storage of real-time and aggregated data
7.	File Storage	Stores uploaded video feeds and processed images	AWS S3 / Google Cloud Storage
8.	External API-1	Real-time weather data to correlate with traffic volume	OpenWeatherMap API
9.	External API-2	Google Maps API integration for location-based traffic insights	Google Maps API
10.	Machine Learning Model	Detects and counts vehicles from video streams	CNN-based YOLOv5 or Faster R-CNN models
11.	Infrastructure (Server / Cloud)	ML model and app hosted on cloud for scalability	AWS EC2 / GCP Compute Engine / Kubernetes

Table-2: Application Characteristics:

S.No	Characteristics	Description	Technology
1.	Open-Source Frameworks	Used for development and model training	Flask, OpenCV, TensorFlow, React
2.	Security Implementations	Authentication, API keys, encrypted data, access control	HTTPS, JWT, OAuth2, IAM, Firewalls

S.No	Characteristics	Description	Technology
3.	Scalable Architecture	Microservices-based deployment and Dockerized services	Docker, Kubernetes
4.	Availability	High availability using load balancing and cloud redundancy	AWS Load Balancer, Multi-zone Deployment
5.	Performance	Real-time inference, optimized APIs, use of cache and efficient DB queries	Redis, Nginx, Indexed Queries

References:

https://c4model.com/

https://developer.ibm.com/patterns/online-order-processing-system-during-pandemic/

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