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

Date	26 June 2025
Team ID	LTVIP2025TMID60884
Project Name	Revolutionizing Liver Care: Predicting Liver cirrhosis using Advanced Machine Learning Techniques.
Maximum Marks	4 Marks

Technical Architecture:

The technical architecture supports a scalable, AI-driven, cloud-native healthcare platform that enables patient registration, remote monitoring, real-time liver health analysis, and doctor-patient interactions. It integrates machine learning, secure health data storage, APIs (like Aadhaar for identity verification), and cloud services to ensure performance, availability, and patient data security. Example: Order processing during pandemics for offline mode

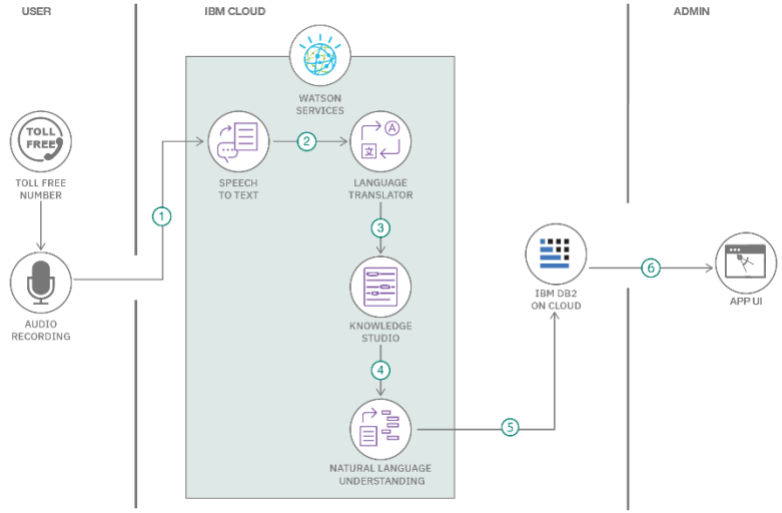

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Table-1 : Components & Technologies:

S.No	Component	Description	Technology
1.	User Interface	Patient & doctor interfaces via web/mobile	HTML, CSS, JavaScript / Angular Js / React Js etc.
2.	Application Logic-1	Core backend logic for registration, appointments, report.	Java / Python
3.	Application Logic-2	Convert doctor voice notes to text in HER.	IBM Watson STT service
4.	Application Logic-3	Virtual Liver health assistant and symptoms checker.	IBM Watson Assistant
5.	Database	Structure and unstructured data storage for health profile and logs.	MySQL, NoSQL, etc.
6.	Cloud Database	Cloud- Native data base service for secure medical data	IBM DB2, IBM Cloudant etc.
7.	File Storage	Upload, Store, and manage lab reports, prescription.	IBM Block Storage or Other Storage Service or Local Filesystem
8.	External API-1	Sync with wearable health device APIs for vitals.	IBM Weather API, etc.
9.	External API-2	Aadhaar verification identity validation	Aadhaar API, etc.
10.	Machine Learning Model	Liver diseases prediction and personalized health risk scoring.	Object Recognition Model, etc.
11.	Infrastructure (Server / Cloud)	Cloud deployment, containerised services scalable compute.	Local, Cloud Foundry, Kubernetes, etc.

Table-2: Application Characteristics:

S.No	Characteristics	Description	Technology
1.	Open-Source Frameworks	Core development using open-source tools React.	React.js, Flask, FastAPI, Rasa, TensorFlow
S.No	**Characteristics**	**Description**	**Technology**
2.	Security Implementations	End-to-end encryption, access control, compliance standards	SHA-256, JWT, OAuth 2.0, IAM, HIPAA, OWASP Top 10
3.	Scalable Architecture	Microservices deployed on containers with dynamic scaling	Docker, Kubernetes, 3-tier RESTful architecture
4.	Availability	Load-balanced services with redundant cloud infrastructure	IBM Load Balancer, Multi-zone deployments
5.	Performance	Low-latency APIs, caching and optimized model inference	Redis, Cloud CDN, FastAPI async support