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

Date	22 June 2025
Team ID	LTVIP2025TMID54806
Project Name	LearnHub: Your Center For Skill Enhancement
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
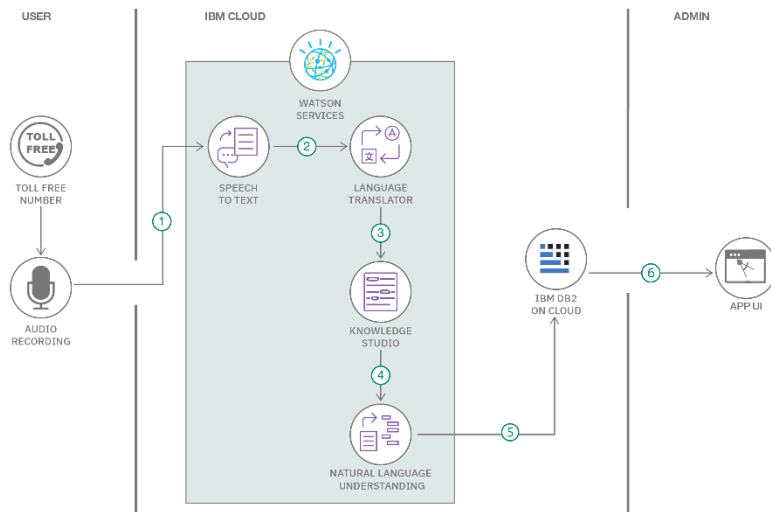
Guidelines:

Include all the processes (As an application logic / Technology Block)
Provide infrastructural demarcation (Local / Cloud)
Indicate external interfaces (third party API's etc.)
Indicate Data Storage components / services
Indicate interface to machine learning models (if applicable)

Table-1 : Components & Technologies:

S.No	Component	Description	Technology Used
1	**User Interface**	Web-based UI for students, teachers, and admin interactions	React.js, HTML, CSS, JavaScript, Bootstrap
2	**Application Logic – 1**	Handles routing, API calls, course logic, and business operations	Node.js, Express.js
3	**Application Logic – 2**	Role-based login, user sessions, and secure access handling	JWT (JSON Web Token), bcrypt.js
4	**Application Logic – 3**	Chat system between students and teachers/admins *(future enhancement)*	Socket.io *(planned)*
5	**Database**	Stores users, courses, enrollments, roles, and learning progress	MongoDB
6	**Cloud Database**	Cloud-hosted scalable NoSQL storage	MongoDB Atlas
7	**File Storage**	For uploading media content (course images/videos/screenshots) *(optional)*	Local filesystem or Cloudinary *(optional)*
8	**External API – 1**	Location/IP tracking features *(future enhancement)*	IPInfo API *(optional)*

9	External API – 2	Not used in the current version	—
10	**Machine Learning Model**	Not applicable in this version	—
11	**Infrastructure**	Hosting frontend and backend on cloud platforms	Render (Backend), Vercel / Netlify (Frontend)

Table-2: Application Characteristics:

S.No	Characteristics	Description	Technology Used
1	**Open-Source Frameworks**	Core frameworks and libraries used in full-stack app development	React.js, Node.js, Express.js, MongoDB
2	**Security Implementations**	Implements secure user access, encrypted credentials, and token-based sessions	bcrypt.js, JWT, Helmet (Express middleware)
3	**Scalable Architecture**	Modular, layered design with separation of concerns (frontend, backend, database)	MERN Stack (3-tier architecture)
4	**Availability**	Deployed on cloud infrastructure ensuring high uptime and global accessibility	Render, MongoDB Atlas

5	**Performance**	Fast user interactions, asynchronous API calls, and optimized data handling	React, Axios, MongoDB