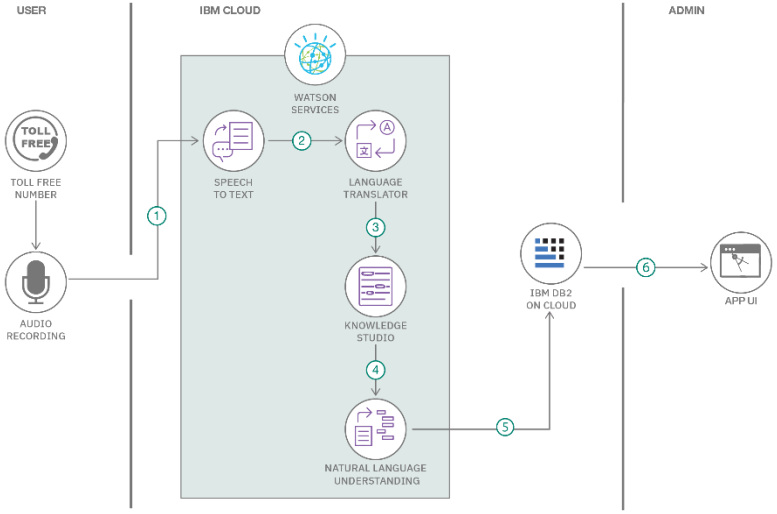
Project Design Phase-II
Technology Stack (Architecture & Stack)

Date	27 October 2023
Team ID	Team 590895
Project Name	Chatconnect - A Real-Time Chat And Communication App
Maximum Marks	4 Marks



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
1.	User Interface	The user interface (UI) is the visual and interactive part of the app that users interact with. It includes screens, buttons, text, and all elements for user interaction.	Android's UI components, XML layout files, and potentially a UI framework like Jetpack Compose.
2.	Application Logic-1	This component contains the core logic of the chat application, such as handling user authentication, managing real-time chat, and facilitating interactions between different parts of the app.	Java or Kotlin programming language for Android development and firebase for user authentication.
3.	Application Logic-2	This involves logic related to features like calls (audio/video), and voice messages. It handles the real-time communication aspects of your app.	WebRTC for audio and video communication, audio recording and playback libraries for voice messages.
4.	Application Logic-3	Application Logic-3 could encompass other important features like profile management, reporting, blocking, and user verification.	Java or Kotlin code specific to these features and Firebase for features like reporting and blocking.
5.	Database	The database stores user data, chat messages, and other structured information used by the app.	Firebase Realtime Database for real-time data synchronization.
6.	Cloud Database	The cloud database is likely an extension of the database component, used to store data in the cloud for backup and accessibility from multiple devices.	Firebase Cloud Firestore
7.	File Storage	File storage is used to store user-uploaded media such as images and videos.	Firebase Cloud Storage or a similar cloud-based file storage service.
8.	Machine Learning Model	Purpose of Machine Learning Model	Object Recognition Model, etc.
9.	Infrastructure (Server / Cloud)	Application Deployment on Local System / Cloud Local Server Configuration: Cloud Server Configuration :	Local, Cloud Foundry, Kubernetes, etc.

Table-2: Application Characteristics:

S.No	Characteristics	Description	Technology
1.	Open-Source Frameworks	List the open-source frameworks used	Technology of Opensource framework
2.	Security Implementations	Security is crucial for protecting user data and privacy. Security implementations involve measures to secure user authentication, data transmission, storage, and the overall application infrastructure.	HTTPS for secure data transmission. Firebase Authentication or OAuth for user authentication. End-to-end encryption for chat messages (Signal Protocol). Security libraries like OWASP for addressing common security vulnerabilities.
3.	Scalable Architecture	In a 3-tier architecture, the application is divided into three layers: presentation (UI), application logic, and data storage. Each tier can be scaled independently. Microservices architecture breaks down the application into smaller, independent services, each responsible for a specific function or feature.	Presentation Tier: Utilizes Android UI components for user interfaces. Application Logic Tier: Implements scalable logic using Java or Kotlin, often employing load balancers. Data Storage Tier: Utilizes scalable databases like Firebase Realtime Database or Cloud Firestore.
4.	Availability	Availability ensures that your chat application is accessible to users as much as possible, minimizing downtime and disruptions.	Load balancers for distributing traffic. Redundant server deployments across multiple data centers or regions. Monitoring and alerting systems (e.g., Prometheus, Grafana) for proactive issue identification and resolution.
5.	Performance	Performance characteristics include the app's speed, responsiveness, and ability to handle high volumes of concurrent users. It is vital for a smooth and efficient user experience.	Caching mechanisms (e.g., Redis) to reduce database load. Content delivery networks (CDNs) for fast media content delivery. Optimized algorithms and data structures for efficient real-time communication.

References:

https://c4model.com/

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

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