SOFTWARE DESIGN LAB

for HERMES

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Date: September 29, 2021

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I. Hermes

1. Description

Hermes is a highly scalable real-time chat application available to many users around the world. It offers a medium of connection between people and creates an online platform to have casual conversations as well as manage industrial teams. Hermes offers a slew of features that enables an environment where groups and individuals can have formal or informal conversations with increased productivity.

2. Features

Important features of Hermes are as follows:

2.1. User Dashboard

- This is the home page that is reached after successful authentication.
- Users can access their personal chats as well as their groups through the user dashboard/home page

2.2. Group/One-to-One Text and voice chat

- Users will be able to communicate with each other via text messaging or voice calls in a group or a one-to-one communication.

2.3. Channels

- Each group can have a separate focus group known as a 'channel' for a specific subject of communication .

2.4. Permissions

- These are privileges that can be assigned to a set of people in a particular group.

2.5. Roles

- These are identities given to a subset of members in a group.
- Each role can have an associated set of permissions.

2.6. Events Scheduler & Calendar

- Each user has a personalized calendar for each group they are part of. Events can be created which are associated with a set of roles. If a given user has a role for which the event is created, the event is visible on their calendar, and the user will get notifications regarding the event

3. Objectives

The purpose of the application is to help connect many people to create an online virtual community to share ideas, work, or casual purposes. It is a collaboration platform where individuals or different teams within an organization can discuss and share ideas. It offers a means to create a productive environment for professionals, and at the same time, it can also be utilized as an application for a casual conversation among individuals/groups.

This application aims to make collaboration and interaction between individuals/employees/peers hassle free and as interactive as possible to simulate a work/casual environment due to the advent of the era of COVID.

4. Software Requirements

- OS (Android 8 and above, iOS 9 and above)
- Front-end technologies (Flutter, Dart)
    1. We use Flutter for the development on User Interface mainly because it is a cross platform, i.e the application is compatible with various OS such as android,apple etc.
    2. We use Dart in order to implement the logic of the front end of the application after taking data from API(JSON) and converting it to other datatypes that will be used in the UI.
- Back-end technologies (Node, MongoDB)
    1. MongoDB is a NoSql database.
    2. MongoDB has been preferred as it can accept changes to the structure of the database. This feature becomes particularly important as one of our non-functional requirements includes scalability, making our database susceptible to changes at the logical level. MongoDB is designed in such a way that it can be easily scaled out horizontally.
    3. Messages sent on Hermes can be of varying sizes, and it is inefficient to store it in a fixed-length schema such as in a relational database. Moreover, data stored in Hermes have an Object-Oriented nature, which is inherently supported by NoSQL databases like MongoDB. MongoDB also supports various backend languages, including Node.js.

4. Our server is going to be developed using a Node.js framework. Node.js is an asynchronous event-driven JavaScript runtime. It doesn't use multi-threading, making it suitable for performance-critical applications, as there are no thread synchronization overheads. Moreover, thread-based networking is relatively inefficient and difficult to use. Node.js is suitable for web-based media exchange as it uses HTTP at its core, which ensures low latency and reliable delivery of media.

5. Hardware Requirements

- 2GB+ ram
- Quad-core Mobile Processor (1.5GHz+ Clock Rate)
- 200MB+ storage
- Mobile interface (touchscreen + microphone + speaker)
- Working internet connectivity (1 Mbps+ connections)

6. Data Flow Diagram

The Level-0, Level-1 and Level-2 data flow diagrams are as follows:

6.1. Level 0

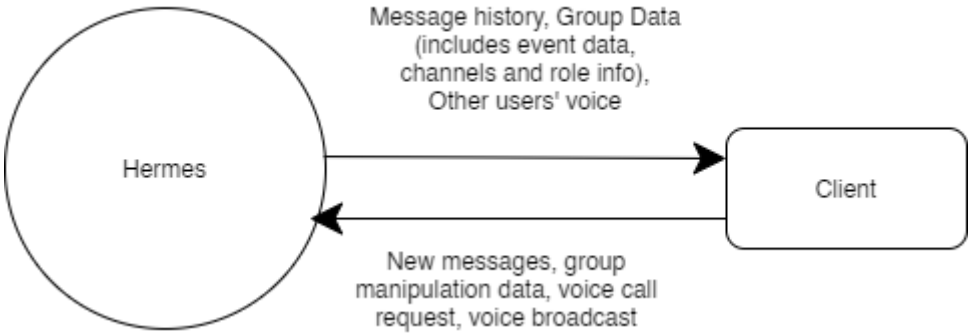

Figure I.1.: Level-0 Data Flow Diagram

6.2. Level 1

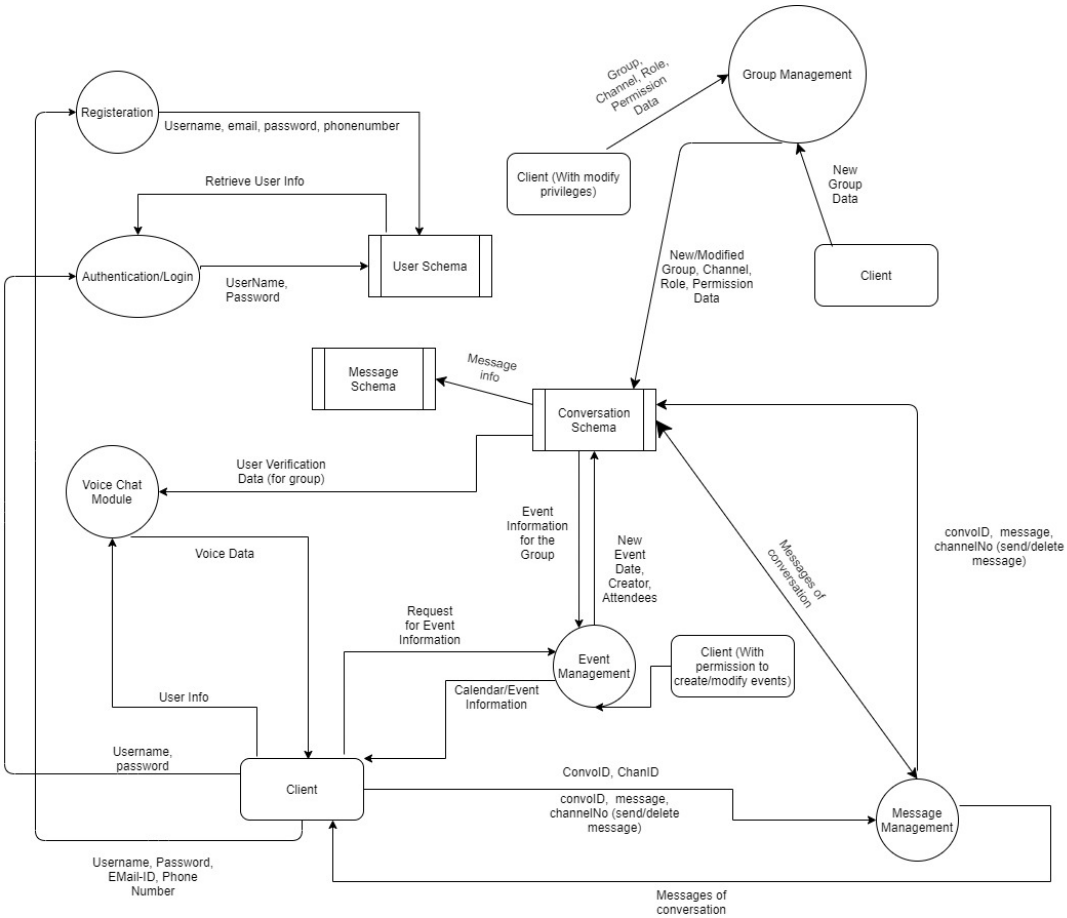

Figure I.2.: Level-1 Data Flow Diagram

6.3. Level 2

Login/Authentication and Registration Module

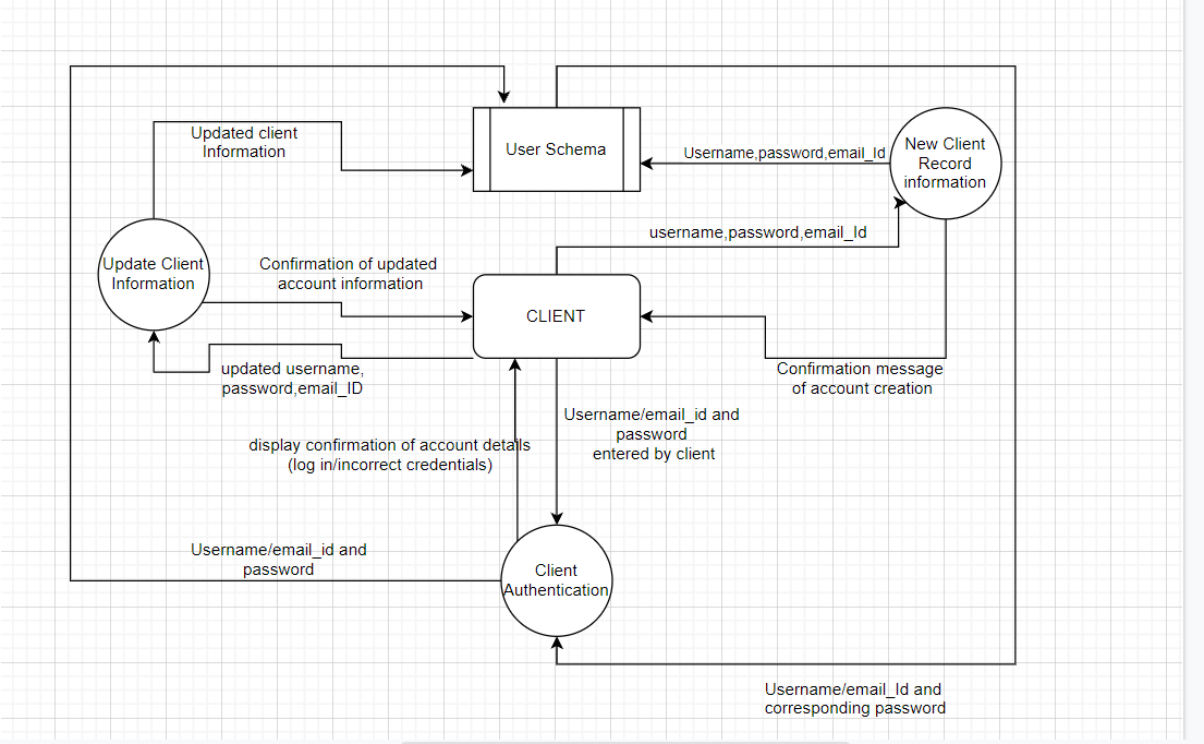

Figure I.3.: Level-2 DFD: Login and Registration

Message Management Module

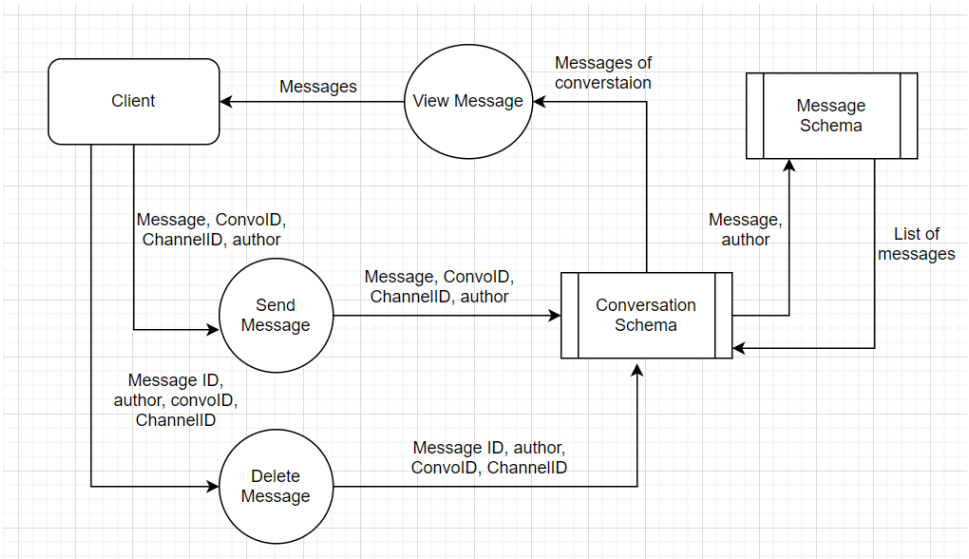

Figure I.4.: Level-2 DFD: Message Management

Group Management Module

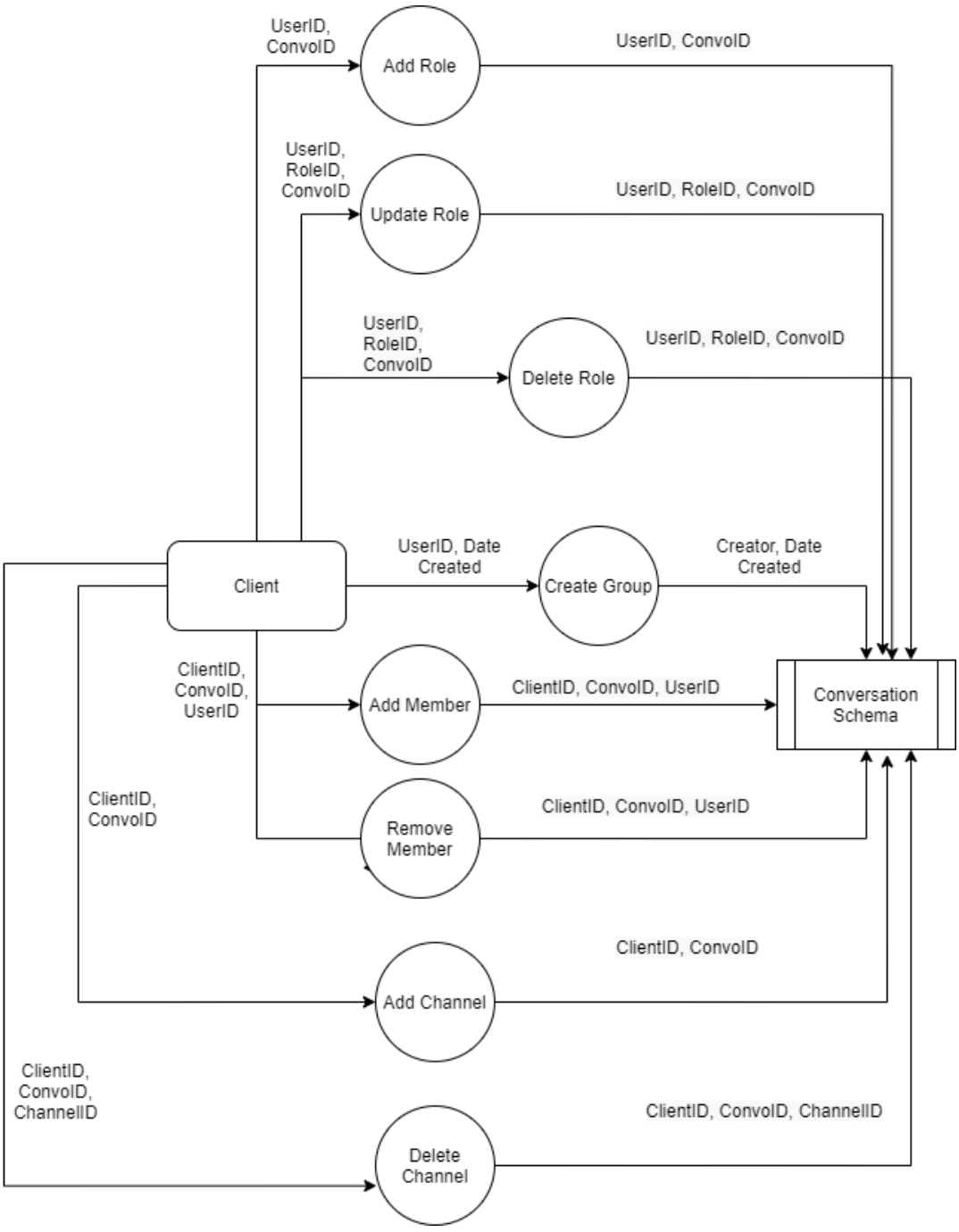

Figure I.5.: Level-2 DFD: Group Management

Event Management Module

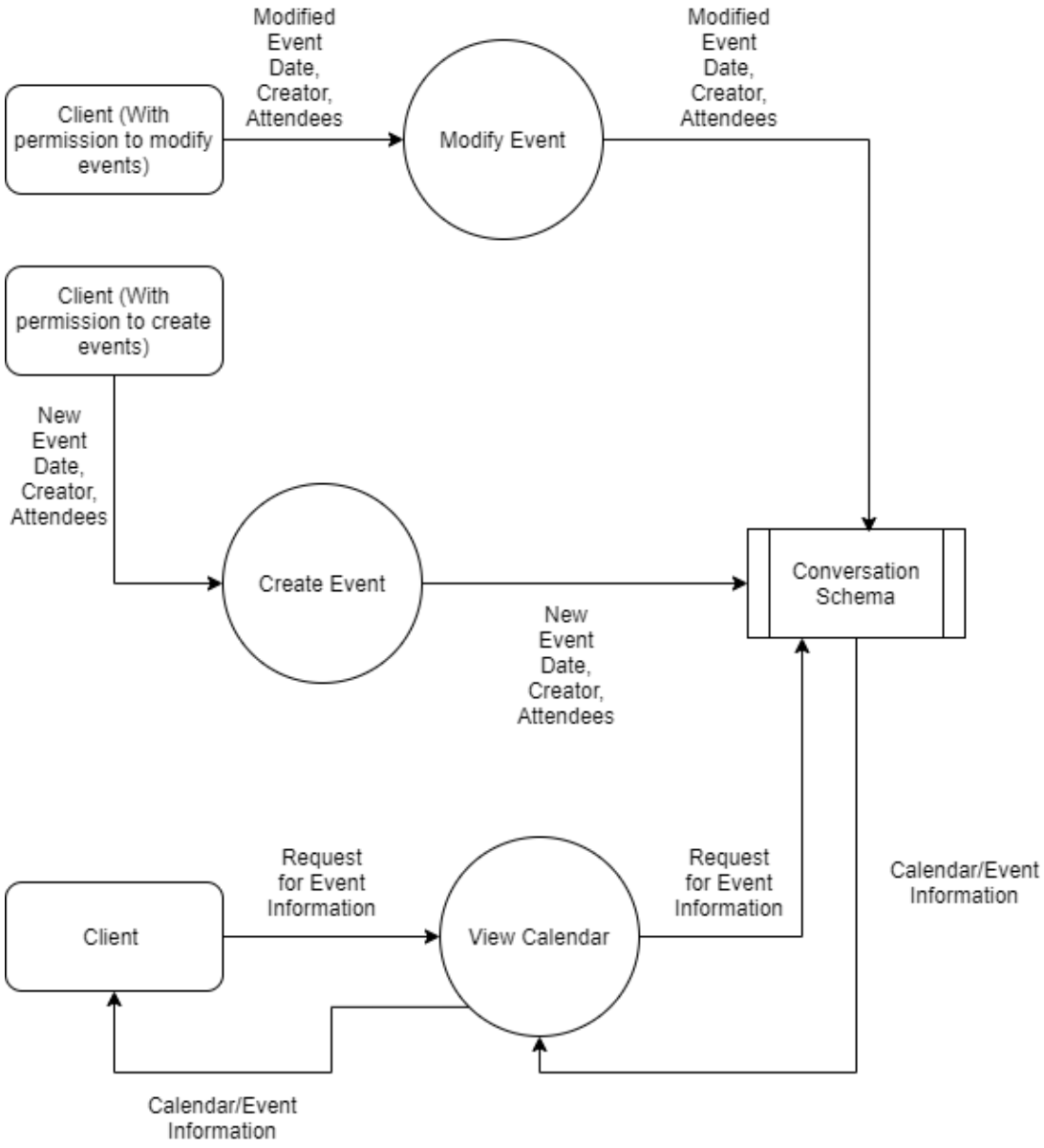

Figure I.6.: Level-2 DFD: Event Management

Voice Chat Module

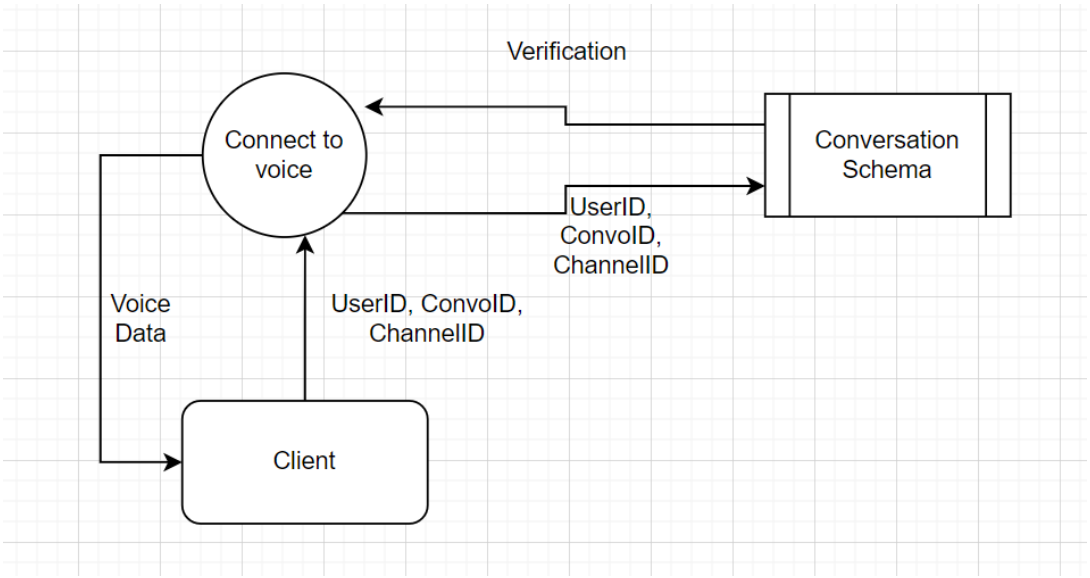

Figure I.7.: Level-2 DFD: Voice Chat