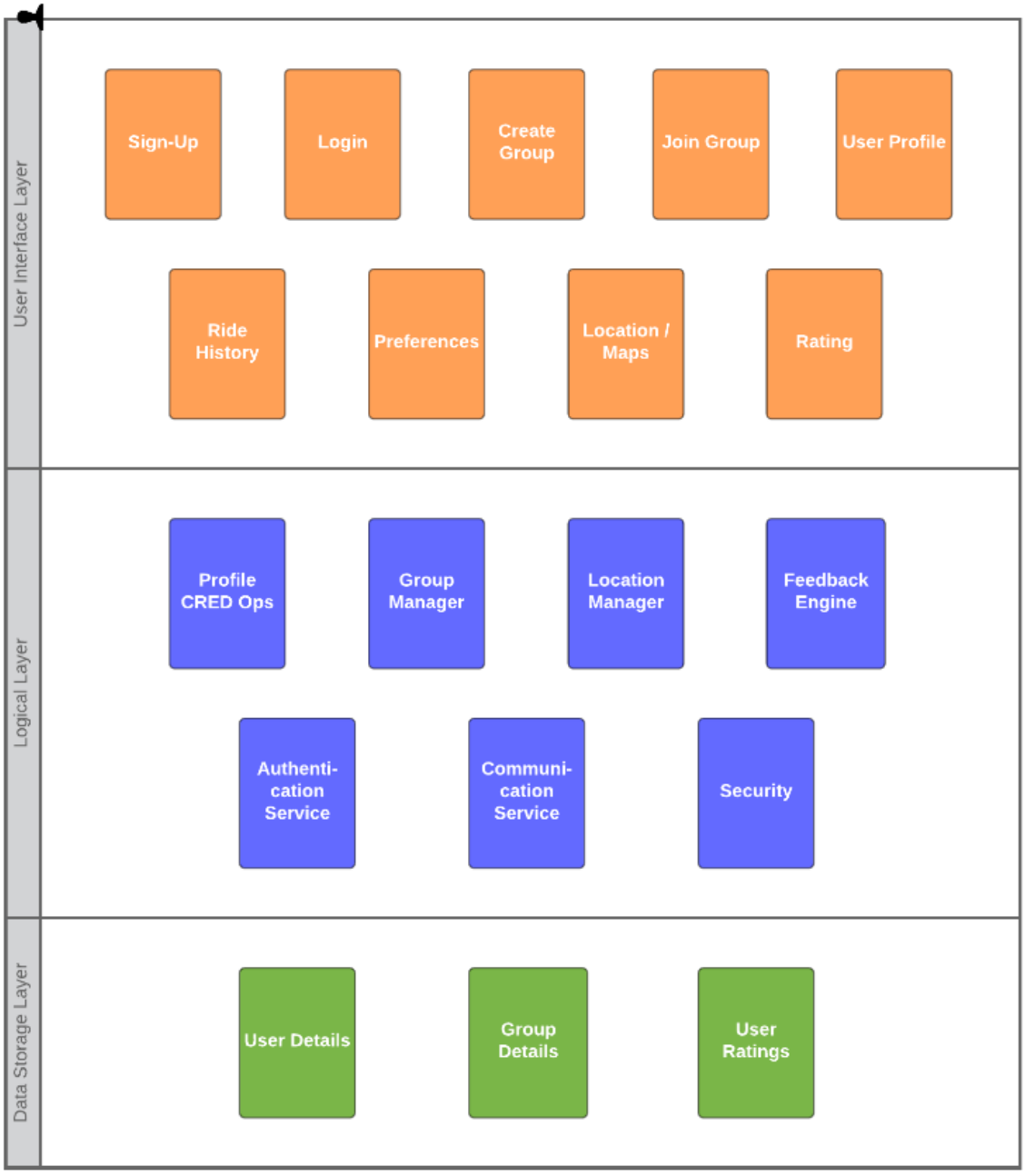
Functional Architecture Description

Group 4

Architecture Diagram for Under (Journey Sharing Application)



Functional architecture of the system has been divided into following three layers:

1. User Interface Layer

This layer entails the GUI of the application. Components in this layer are accessible to all users. Main components of this layer are:

1.1. Sign-Up - User gets a button to sign-up into the application when he / she opens the application for the first time. User has to enter a name, valid email address and set a password to create an account.

1.2. Login - User gets this option when he/she is either a first-time user or has logged out of the application. Users have to enter their registered email id and password to login into the application.

1.3. Location / Maps - This is the landing page of the application (if the user is logged in). Current location of the user on the map of the area is displayed on the screen. Users can navigate through the map and select her / his destination by either tapping on the any location or by searching it in the search bar.

1.4. Create Group - This option is displayed to the user after a destination location is entered. A group with users details and destination is created.

1.5. Join Group - This option is displayed to the user after a destination location is entered. A list of available and eligible groups displaying the destination location, remaining capacity in the group, preferences and mode of transport is displayed.

1.6. User Profile - This option can be accessed by using the hamburger menu from the left. It leads to the page containing the user details(name, preferences, ratings). These details will be encrypted and stored locally on the user's device.

1.7. Ride History - This option can be accessed by using the hamburger menu from the left. Users can access the details of the past rides using this button. This button is disabled for now and the functionality can be implemented in future works.

1.8. Preferences - This option can be accessed by using the hamburger menu from the left. Users can set / update any special preferences such as number of minimum people, presence of males / females, etc using this option.

1.9. Rating - Users are prompted to rate their fellow travellers out of five at the end of each trip.

2. Logical Layer

This layer is the core of the system and does all the processing and computing. This layer consists of the following major components:

2.1. Profile CRED Ops - This component handles the operations on the user's profile such as creation, editing and deletion.

2.2. Group Manager - This component contains the logic behind creation, management and deletion of the groups. It is also responsible for managing the join / leave requests while the journey is in progress, communicating with the group leader and dynamic assignment of the group leader if the current one leaves / goes out of range.

2.3. Location Manager - Following tasks are handled by this component:
    2.3.1. Getting current location of the user
    2.3.2. Getting destination location of the user
    2.3.3. Setting the meeting point for all the users in the group
    2.3.4. Route to starting point / meeting point
    2.3.5. Displaying map of the of the area in both online and offline mode
    2.3.6. Route optimisation
    2.3.7. Navigation from starting to destination location for all the users

2.4. Feedback Engine - Feedbacks from the fellow travellers are collected and aggregated here. This component is initiated after the completion of each trip.

2.5. Authentication Service - Authenticates the user's credentials while logging in. It also handles the authorisation of the users by group leader to join any particular group.

2.6. Communication Service - Services to send / receive requests to / from other devices is handled by this component. It also keeps track of the availability / range of the members in the lifetime of the group. Functionality of this component is achieved by implementing a peer-to-peer network.

2.7. Security - User's details are encrypted and stored in their device itself. The information does not leave the device and hence does not pose any security threat.

3. Data Storage Layer

3.1. User Details - User information such as name, age, gender, address are taken as input from the user and stored on her / his device in the encrypted format.

3.2. Group Details - Whenever a user creates / joins a group, it's details such as group ID, group state, member IDs of the members of the group are stored on the device. This information is then also stored in the Under central service as a backup in case peer-to-peer connection breaks. This information is deleted from both devices and the central service after the group is deleted.

3.3. User Ratings - Each user is assigned some rating by their fellow travellers. This information is stored on the user's device and on the central service. Rating of the users is deleted from the central service after it is successfully updated on the user's device (i.e. when the device has a proper internet connection).