**TRACEABILITY MATRIX**

R1: System should allow registration of users with codice fiscale and personal data (age, gender, blood type)

* UserRegistrationService

R2: System should collect and store date of the registered users

* UserDataCollectionService

R3: System should allow registration of third party with valid ID

* ThirdPartyRegistrationService

R4: System should pass requests from third party to individual based on codice fiscale

R5: System should make the requested data available to the third party only if the individual approves the request

* IndividualDataRequestService

R6: System should be able to retrieve data based on category

R7: System should be able to accept or refuse a request based on the size of data

* DataSetRequestService

R8: System should allow subscription for data requests from third party

R9: System should send requested data as soon as they are produced

* DataSetSubscriptionService

R10: System should allow subscription for elderly people by entering personal preferences (thresholds for health parameters)

* AutomatedSOSserviceRegistration

R11: Monitor health parameters of subscribed elderly people continuously

R12: Call an ambulance only when health parameters go below threshold

* HealthDataMonitoringService
* AmbulanceCallingService

R13: System should allow registration of run organizers

* RunOrganizerRegistrationService
* RunSetupService

R14: System should allow creating an enrollment process

R15: System should allow run participants to enroll for a run

* RunEnrollmentService

R16: system should create a view of the map with all run participants positions

R17: system should allow spectators to have access to the view

* RunSpectatorViewService

**IMPLEMENTATION**

**Component Description with relevant services**

This section explains in detail the strategy for the implementation of the complete Data4Help application along with AutomatedSOS and Track4Run services. As we have seen before, the application is divided into 8 components, where each component has a set of services that helps in its interaction with other components and in satisfying the functionalities of the system. All the components and the services it deals with are described below.

1.REGISTRATION COMPONENT

This component consists of *UserRegistrationService* and *ThirdPartyRegistrationService.* Both the services involve in the registration process of the two main clients of the system (i.e.) User and Third Party. The separation of the clients in the system is important for the application to differentiate the clients during the data request process which shall be discussed in the upcoming components.

2.LOGIN COMPONENT

This component consists of *UserLoginService, ThirdPartyLoginService* and *SessionService.* These services involve in the login procedure of the clients and handle their respective sessions. It takes care of authorized access and keeps the functionalities disjoint. Also it works with the Registration Component indirectly to make use of the credentials provided at the time of registration

3.PREFERENCES COMPONENT

This component consists of *GetPreferenceService* and *SetPreferenceService.* These services help in fetching and setting of user preferences with respect to their data collection. These services come of use while collecting data from the wearable and also while data requests are being made by third parties.

4.DATA COLLECTION COMPONENT

This component consists of *UserDataCollectionService* and *DataAggregationService*. Both the services help in collecting various data from the user with the help of wearable and in finally sending the aggregated data to the database.

5. DATA REQUEST COMPONENT

This component consists of *IndividualDataRequestService*, *DataSetRequestService* and *DataSetSubscriptionService.* These services come into play when the Third-Party user requests for individual specific data or anonymized data sets. It also takes care of subscriptions made by Third-Party users for data sets.

6.AUTOMATED SOS COMPONENT

This consists of *AutomatedSOSRegistrationService*, *HealthDataMonitoringService* and *AmbulanceCallingService.* These services form the value added, AutomatedSOS functionality of the application. *AutomatedSOSRegistrationService* takes care of subscription of the user for the SOS service by taking in various health parameters and their respective thresholds. *HealthDataMonitoringService* continuously monitors the health parameters and interacts with *AmbulanceCallingService* when the data goes beyond specified thresholds and makes sure of an ambulance arriving at user location with a response time of 5 minutes. It interfaces with external ambulance calling facility for the same.

7.RUN ORGANIZATION COMPONENT

This component forms the next value added, Track4Run functionality of the application. It consists of *RunOrganizerRegistrationService, RunSetupService ,RunEnrollmentService , RunSpectatorViewService* and *MapService.* The first two services deals with the registration of the run organizer and the setup process for the run including, setting up the run path which interacts with external maps facility using the *MapService.* The enrollment of the run participants is done by the *RunEnrollmentService*  and *RunSpectatorViewService* takes care of getting positional data of the participants during the run to create a map view for the spectators.

8.DATABASE COMPONENT

This component handles all services related to fetching and transmitting data to the system database. It consists of *DataAccessService* and *DataTransmissionService* which work predominantly with most of the other components in the application. This is the most crucial component in the system and will be external to the application, hosted in an outside data server.

**Dependencies among components**

Implementation of the components followed by integration needs to take into consideration, the dependencies among the components. The various links between components, including the interfaces between the external facilities are discussed below

1.The basic data functionality satisfied by the Data collection component interfaces with the external wearable facility to collect the data from the user.

2. To store the collected data from the user, the Data collection component interfaces with the Databases component. This sets base for all the other components of the system to interact with the Databases component to fetch data for their respective functionalities.

3. Registration and Login components are indirectly linked in the sense that they both make work with client credentials for identification and authorization. Their implementation is better to be done in parallel to set up client profiles and data segregation.

4.Data Request component is dependent on the Databases component to fetch the requested data. Moreover, it needs Registration and Login components to differentiate Third-Party from User to complete the data request process.

5. Preferences component is linked to Data collection component which helps in collecting data from the user based on the preferences set and aggregating the collected data to be stored in the database.

6.AutomatedSOS component is linked to Databases component to fetch the health parameters and respective thresholds. It interfaces with the external ambulance facility to call an ambulance and the GPS to get the user’s location.

7.Run Organization component is dependent on the external Maps facility to set up a path and also to create a spectator view for the run

The dependencies are further explained with the help of the diagram below

**Implementation Strategy**