The use of multimodal paths, including the best alternative for each transport mode, seems to be one of the most effective ways to tackle congestion and other negative effects of urban mobility. Of course, the possibility to choose the best path, once taking into account the real-time situation of traffic and transit services, is one of the necessary conditions for a successful policy. Therefore the enhancements of the new generation of personal travel information systems are: support of multi-modal routing, real-time information about traffic conditions (in both private and public transport systems), personalized routing advice (i.e. advice that is tailored to the personal preferences of the traveller), and natural language processing and mobile app using.

Taking this approach, Advanced Traveller Information Systems (ATIS) are going to include trip planners ability to identify the best alternatives on multimodal networks (as well as multiservice transit networks with rail, metro, tram, bus and pedestrian) by using real-time data and by providing information for each alternative: travel time, monetary cost, arrival times and other service characteristics. Through an advanced trip planner, the user can easily access organized information to compare the different alternatives for a rational choice of transport modes.

Advanced trip planners reduce the uncertainty about routes and timetables that is one of the main reasons for rejecting transit as a travel mode. The use of real-time data is crucial when the traveller is constrained by an arrival time at destination, and it is another one of the key features of new ATIS. The availability of real-time information allows a continuous en-route check, warning travellers about particular problems (e.g. delays and disruptions) and suggesting new alternatives from any current position. Two of the most recent features in ITS seem to support the development of these of types of tools: access to open-data and smart-phone characteristics that allow the tracking of a traveller's location on the network. This paper presents an advanced trip planner named **Lazio Mobility** developed by University of Rome "Tor Vergata" and Studio Hangloose Srl designed for mobile applications. It gives dynamic real-time information to support the traveller in his/her dynamic choice of the best path on a multimodal network.

The app provides personalized real time multimodal information starting from open data sets and using only open source software.

The app user can be informed about traffic and transit condition near his/her position or near a desired Point Of Interest (POI) using functions Traffic condition informer and Transit condition informer. Traffic condition informer uses the position of the requesting client, available through the client function Client position, speed, direction, transport mode, and the road network data stored in a geodatabase for an extract information on average speed and traffic flow on nearby the user or a specific POI.

The road network database, built starting from a static OpenStreetMap road network, is continuously updated using Real time traffic information open-data. Transit condition informer uses the position of requesting client and the data supplied by function Real time transit data integrator, which uses real time transit data to process information on stops waiting time, irregularity and disruptions of transit services nearby the user or a specific POI.

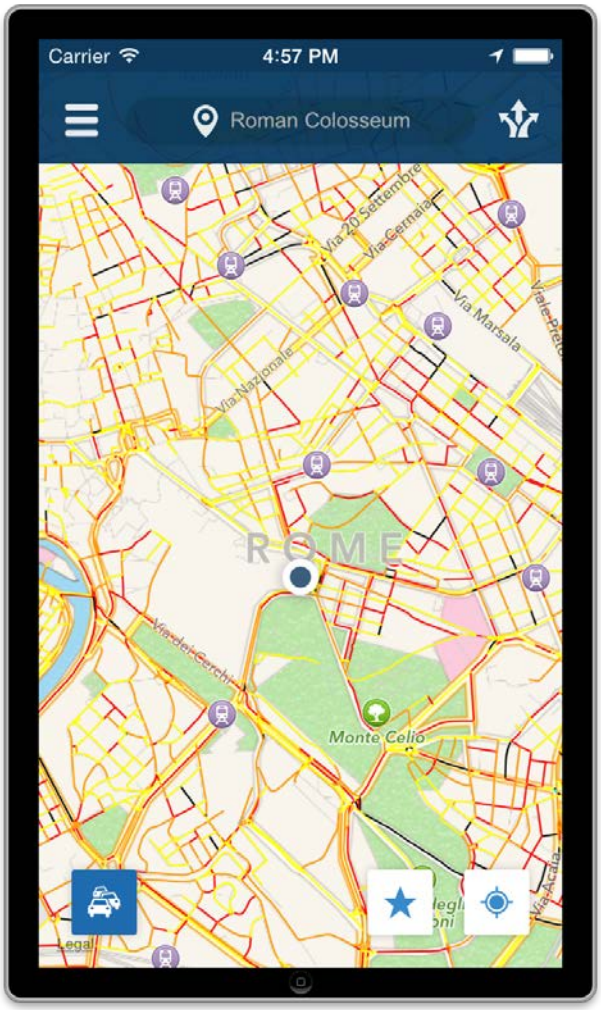

Figure 1: Traffic condition informer

Figure 2: Transit condition informer

The client function named Multimodal User O/D query & route guidance allows the user to request a multimodal Origin/Destination routing. A set of path choices, made up of different multimodal real time paths that satisfy the user requirements in terms of origin, destination and desired departure or arrival time, level of service attributes such as travel time, cost, arrival time to destination, CO_2 produced, are elaborated; each path is summarized and sent to the user in client function Multimodal route informer, which also permits users to choose his/her “best” path.

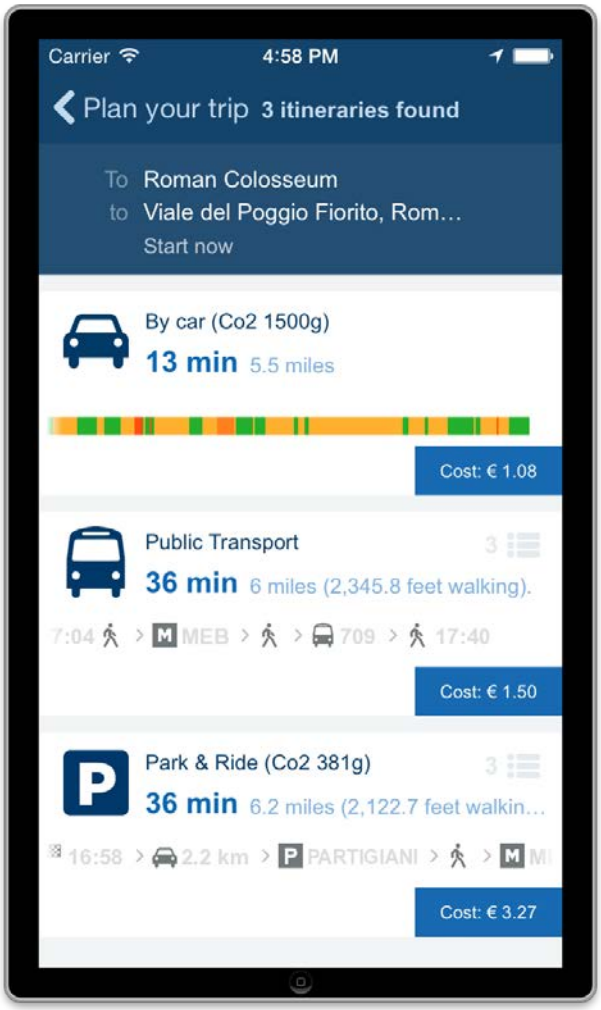

Fig. 3: Multimodal route informer

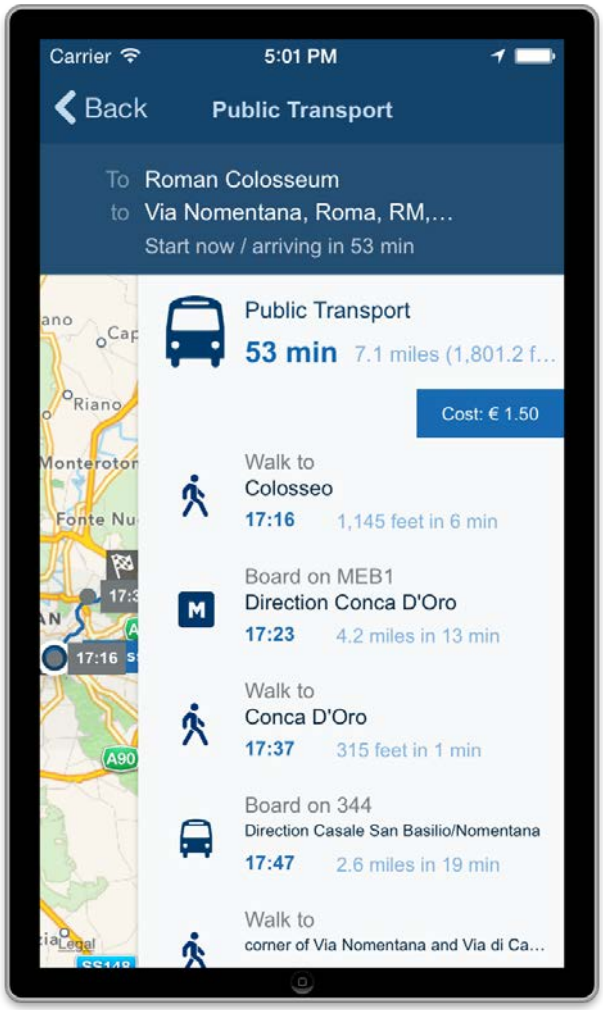

Fig. 4: Transit route details with real time information

The Real time traffic information is open-data provided from the Rome Province authority every 10 minutes and containing data on mean speed and car flows for the main road network. GTFS transit schedule data and Real time transit data and supplied by Rome mobility Agency through some specific web services. Users through usage of the Lazio mobility app provide crowd-sourcing information.

An aggregator of information related to mobility in the Latium Region was created inside the app, with a search of the most important sources of information and news. Where possible the data is geolocalised in order to contextualize any warnings in the *multimodal route informer and user choice Recorders*.

Through the native system available in most mobile devices, the user is able to receive push notifications. These notifications can also be used in case the user is not actively using the app.

The proposed functional architecture is entirely based on open-source software integrated with proprietary scripts built in Perl language. The database server used is PostgreSQL 9.2 with PostGIS 2.0 extension for GIS functionality. The car route planner is made with the pgRouting 2.0 library for PostgreSQL database while transit routes, static and real time, are built with a customized version of OpenTripPlanner version 0.9