LIFE+10 ENV/IT/000389

INTEGREEN

Action 4: Implementation & Integration

P.4.1.5

Public web interface prototype

Project Coordinating Beneficiary	Municipality of Bolzano
Project Associated Beneficiary n.2	TIS innovation park (TIS)
Project Associated Beneficiary n.3	Austrian Institute of Technology (AIT)

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[1] **PU** = Public; **CO** = Confidential (for members of the consortium only, including the European Commission); **RE** = Restricted, i.e. only a selected target of stakeholders defined by project consortium and validated by European Commission can access to the document. The final dissemination level will be defined in cooperation between the INTEGREEN consortium and the European Commission.

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1 Introduction

1.1 Purpose of the document

The purpose of this document is to present the final version of the public web interface prototypes, i.e. the applications destined to local travelers developed as a function of the results of the requirements' analysis and design activities of the front-end layer of the INTEGREEN Supervisor Centre [1] - [2]. The high-level design of this upper part of the central architecture is reported for the sake of completeness in Figure 1.

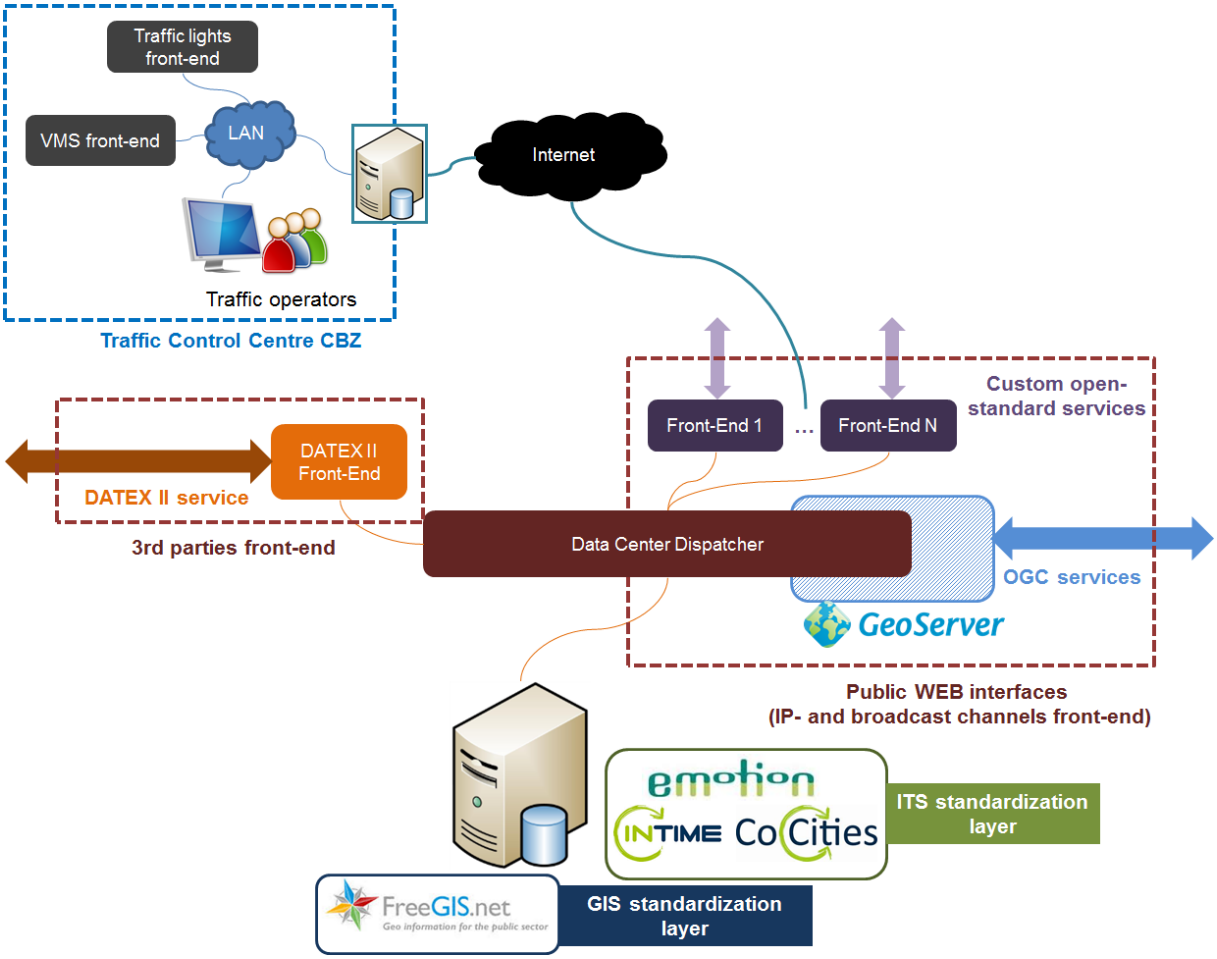

Figure 1: The high-level design architecture of the front-end layer of INTEGREEN.

1.2 Document structure

The document is structured in one single chapter presenting not only the basic functionalities of the new end-users applications prototypes developed in the scope of the project but also the set of real-time traffic and travel information (RTTI) services that are already at disposal of the local travelers and that could be enhanced in the immediate future of the new data and information made available through the INTEGREEN project.

2 Prototype description

2.1 Demonstrative applications developed by INTEGREEN

In INTEGREEN, the plan is one side to introduce two **demonstrative applications**, i.e.:

- "**BZTraffic**", which is going to present the elaborated traffic conditions as well as some inputs concerning the environmental situation in the city thanks to the advanced monitoring system which will be introduced;
- "**BZBus**", which is going to present the current positions of the urban bus fleet in Bolzano thanks to the interface with the AVM system of SASA.

Both applications have been developed in partnership with the local external assistance companies Madeincima, which has covered the professional design of the graphical user interface (GUI), and Ethical Software, which has supported the software development. The applications are more specifically "web applications", written in HMTL5 language, which gives the advantage to properly visualize the displayed information on any device with Internet connection.

It is worth to remember the specific web application destined to traffic operators called "**BZAnalytics**" will be included as well in this applications suite. The prototype of this application is presented in P4.1.4 [3].

2.1.1 BZTraffic – real-time traffic conditions in the city of Bolzano

Local travelers can access this application at the link http://traffic.bz.it. The logo of the application is presented in Figure 2.

Figure 2: The logo of the application BZTraffic.

The application is very simple. On the top right the user can select the preferred language (available options are Italian, German and English). Since the souce code is released as

open source, interested developers may want to look and run the code, which is available in the online repository accessible through the link “Fork me on Github”.

On the top of the map, the user can locate his / her position (in case he is using a device with GPS receiver), refresh the map in order to look for more updates information, or increase / decrease the zoom of the map. Travel times are presented through the standard color codes (green = flowing traffic; yellow = delayed traffic; red = congested traffic). From the bottom menu, the user can moreover jump from one end-user application to the other.

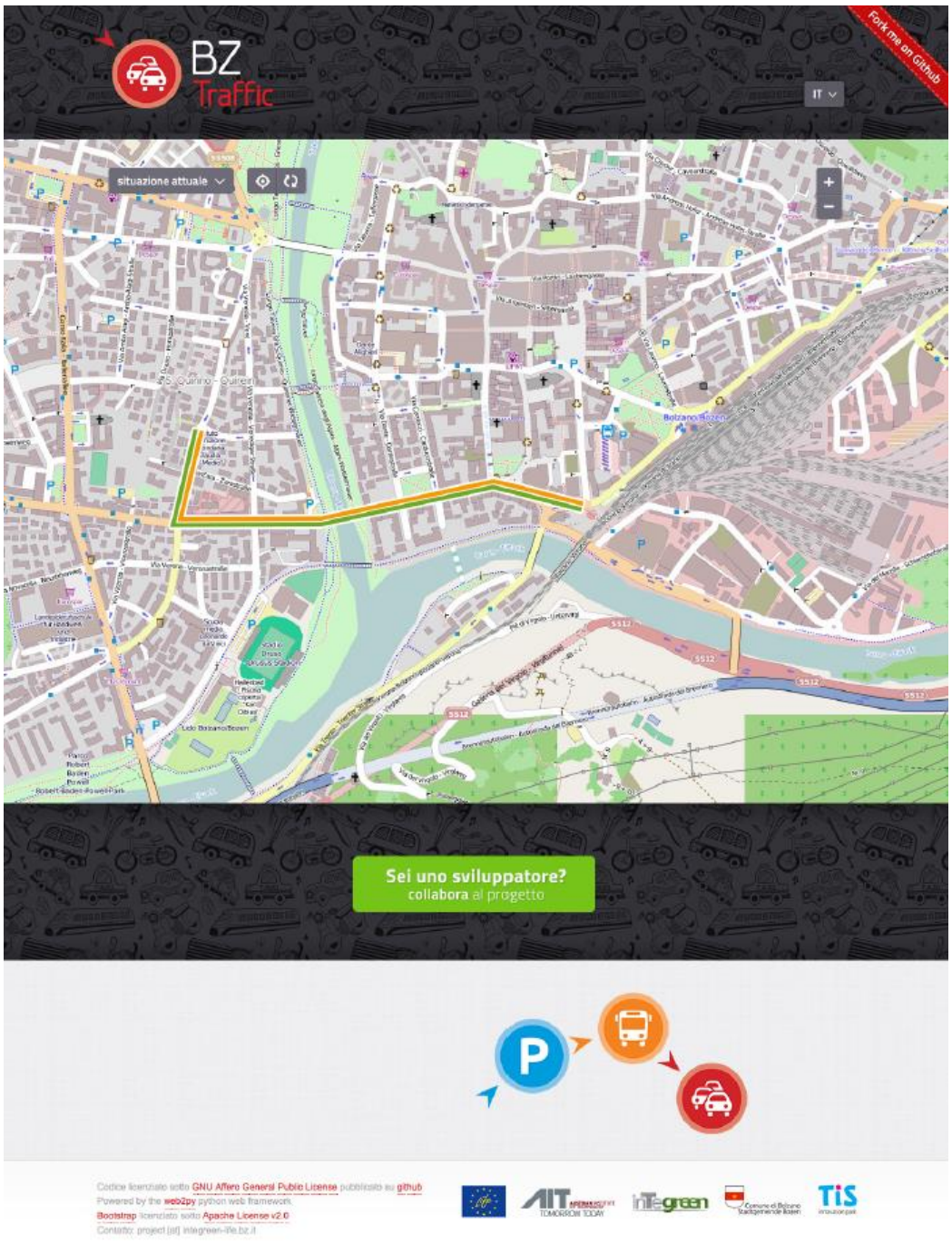

Figure 3: The main visualization of the application BZTraffic.

By clicking on a specific link, the user can visualize the current travel time, which is directly compared to the typical travel time with a bicycle.The user can check the traffic conditions in the opposite direction (if available) by clicking on a proper button.

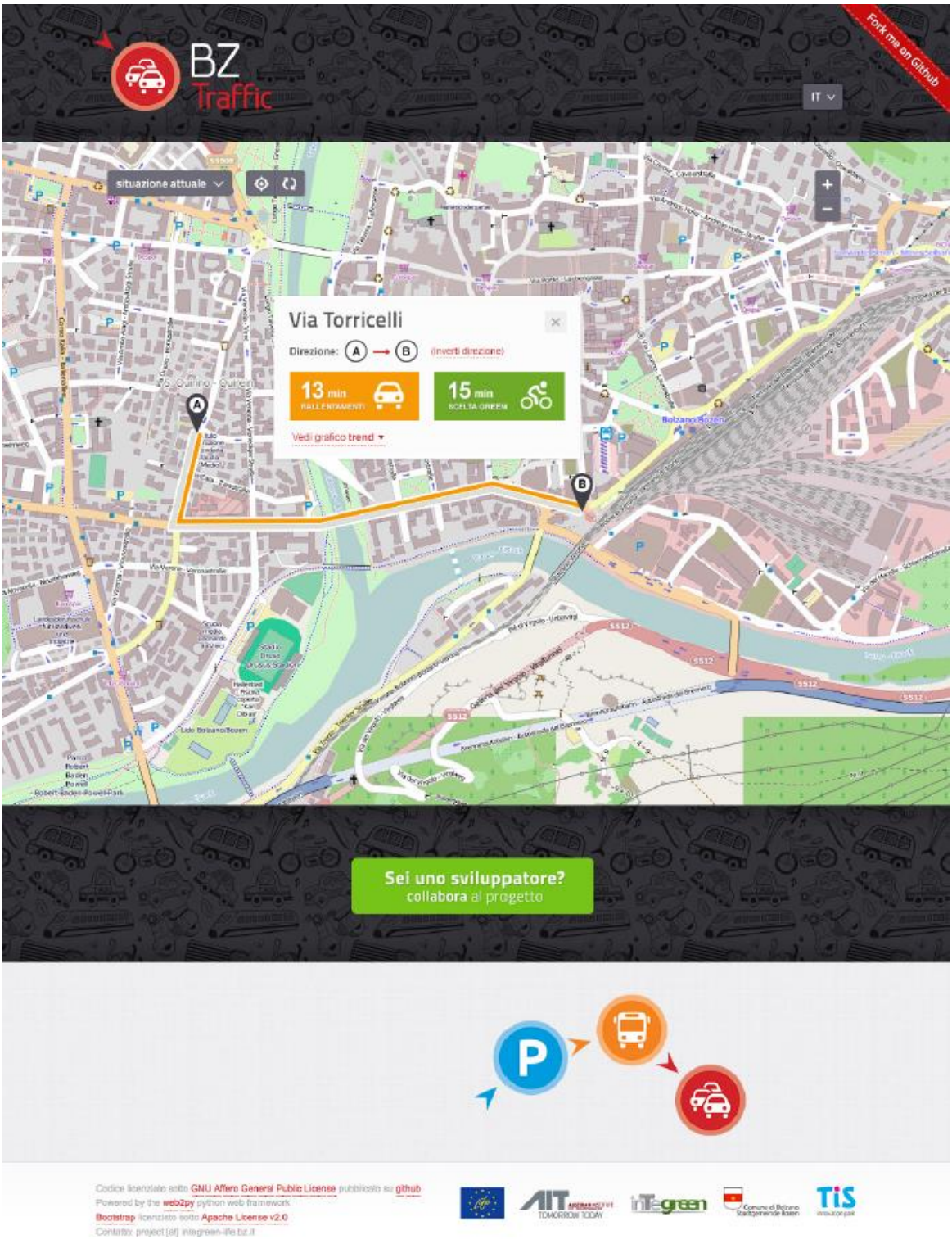

Figure 4: The details associated to a monitored link in the application BZTraffic.

The user has moreover the option to visualize some plots related to historical travel times data. In particular the situation of today is compared to the trend in the last month. In this way, a user can understand if the current traffic situation is the “normal” one, and eventually adapt his travel plan in the temporal domain.

Figure 5: The visualization of historical travel times associated to a monitored link in the application BZTraffic.

On a mobile device, the visualization looks like follows:

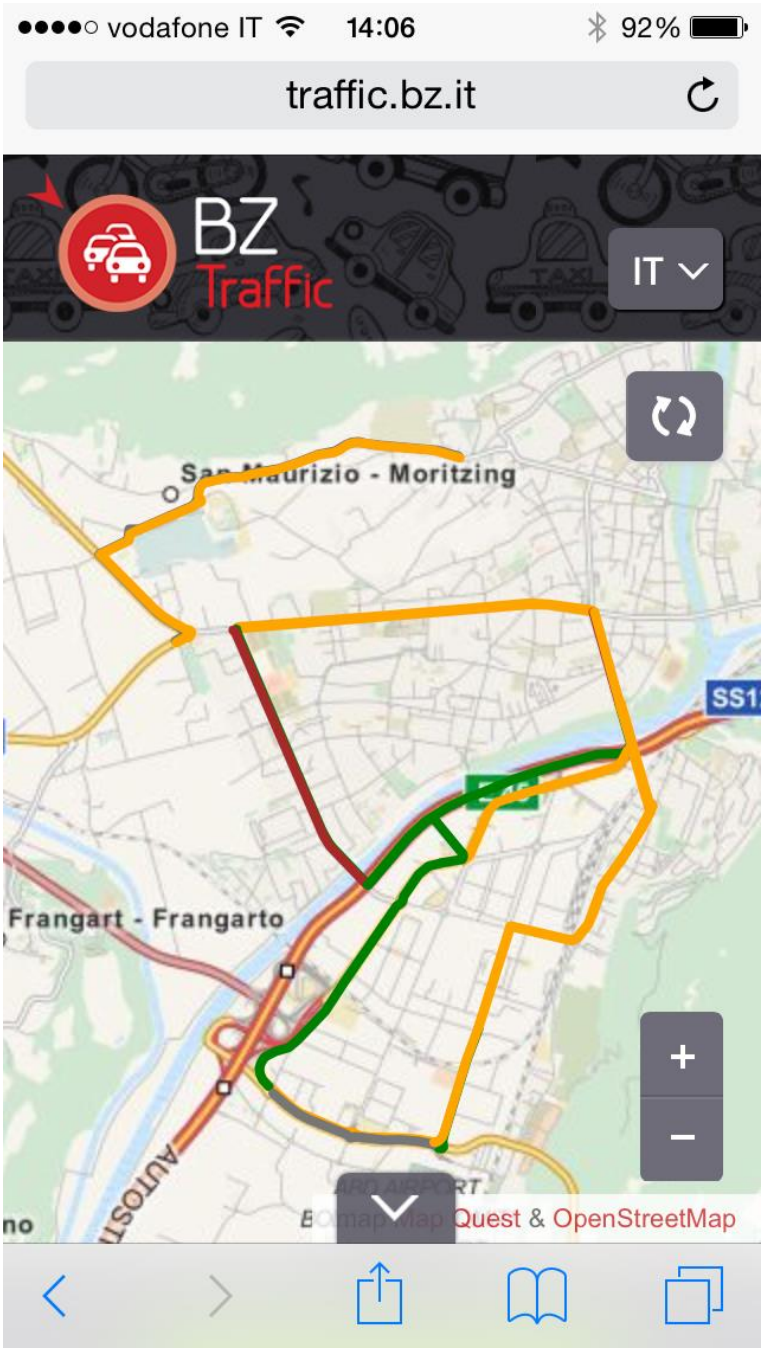

Figure 6: Main visualization of the application BZTraffic on a mobile device.

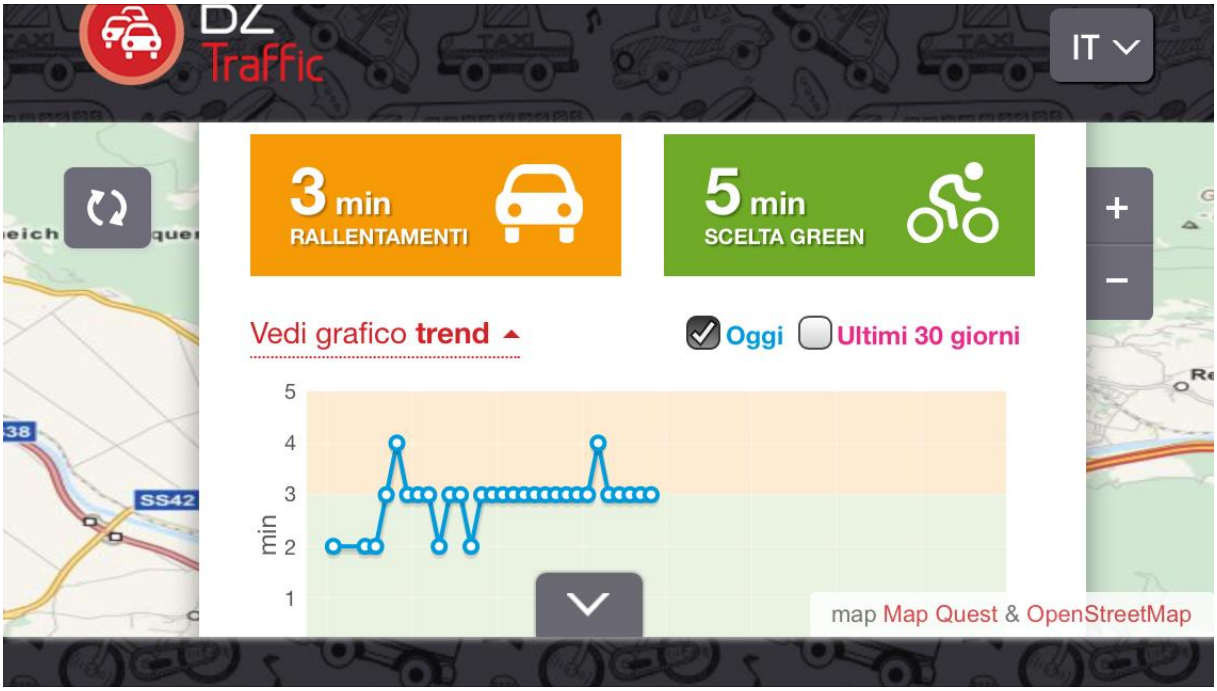

Figure 7: Tooltip visualization of the application BZTraffic on a mobile device.

2.1.2 BZBus – real-time positions of buses in Bolzano

Local travelers can access this application at the link http://bus.bz.it. The logo of the application is presented in Figure 8.

Figure 8: The logo of the application BZBus.

The GUI is very similar to BZTraffic. The main difference is the presence of a panel on the left that the users can use in order to select / deselect the lines of interest. Together with the lines, even the buses traveling on that lines (characterized by the same color) are not visualized any more.

Figure 9: The main visualization of the application BZBus.

A possible option is for example to visualize or not the buses traveling on extra-urban lines.

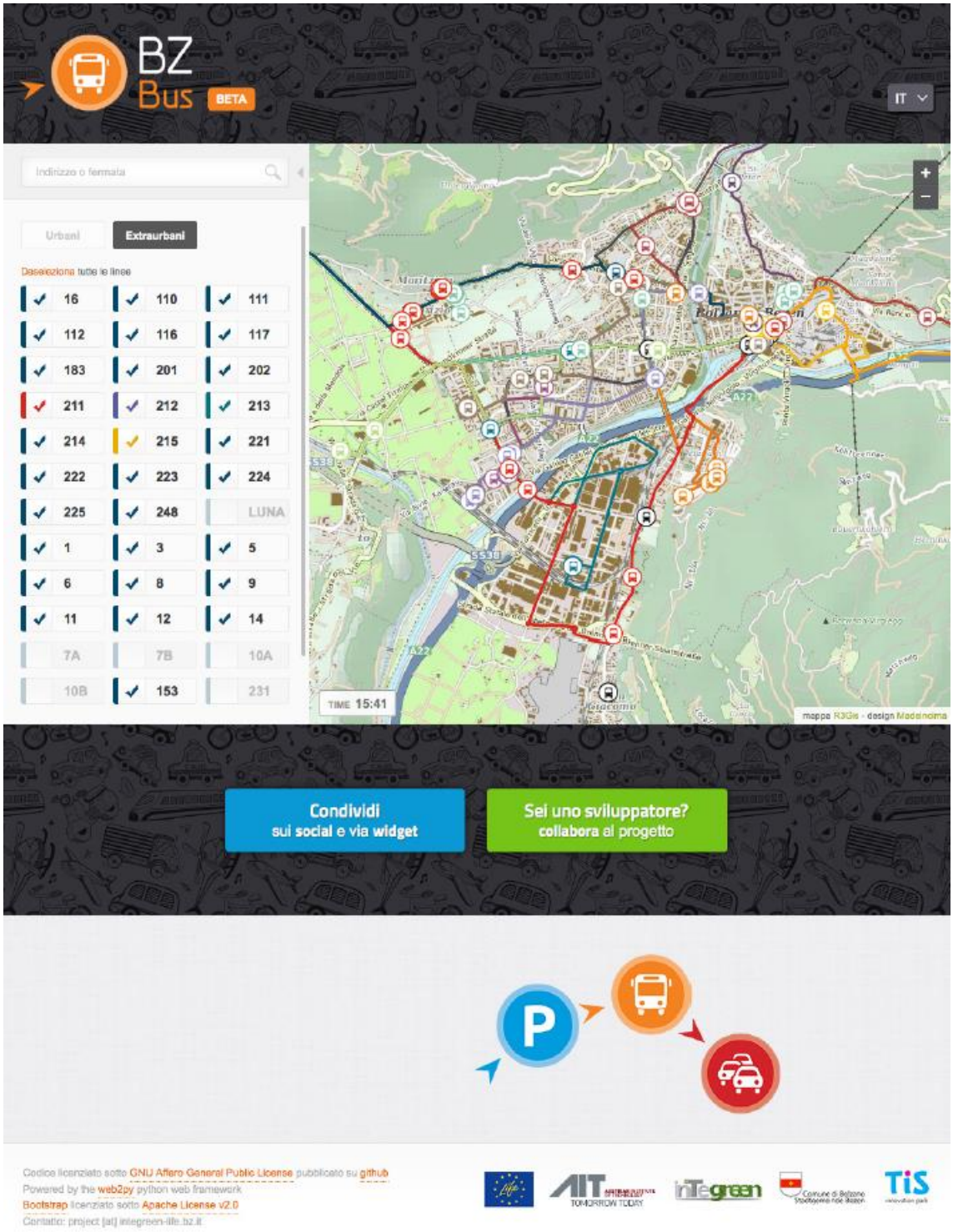

Figure 10: The selection of extraurban lines in the application BZBus.

By clicking on a specific bus, it is possible to get the estimated arrivals at the next bus stops. Similarly, by clicking on a bus stop (which can be visualized only at a certain level of zoom), a user can see the next transits of the buses, together with their estimated time of arrivals.

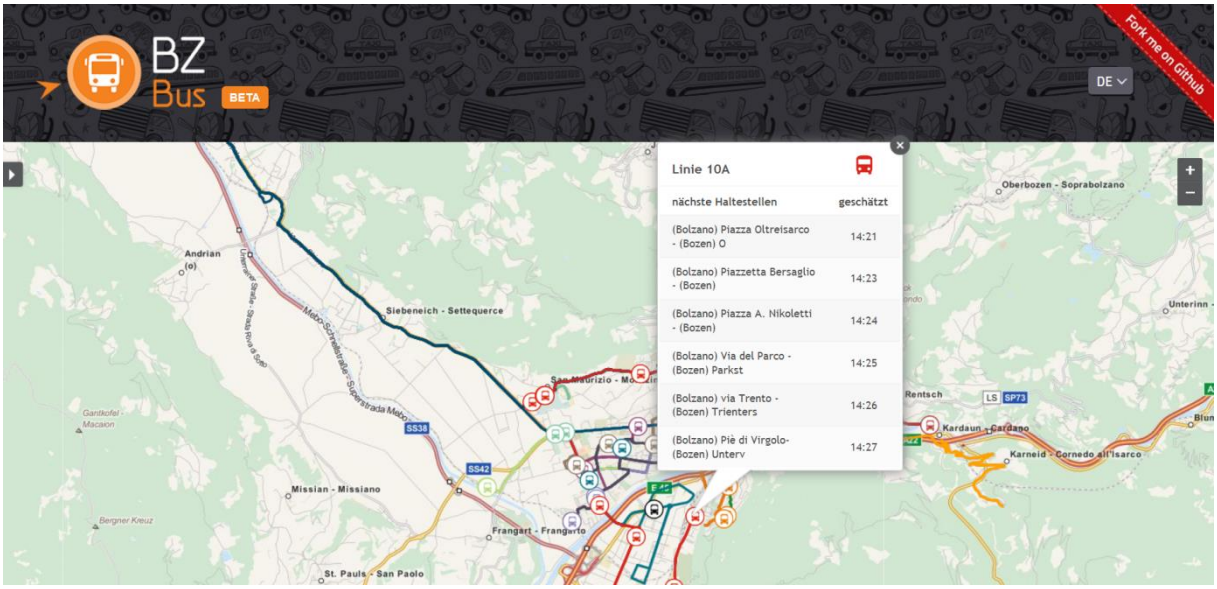

Figure 11: The tooltip associated to a bus in the application BZBus.

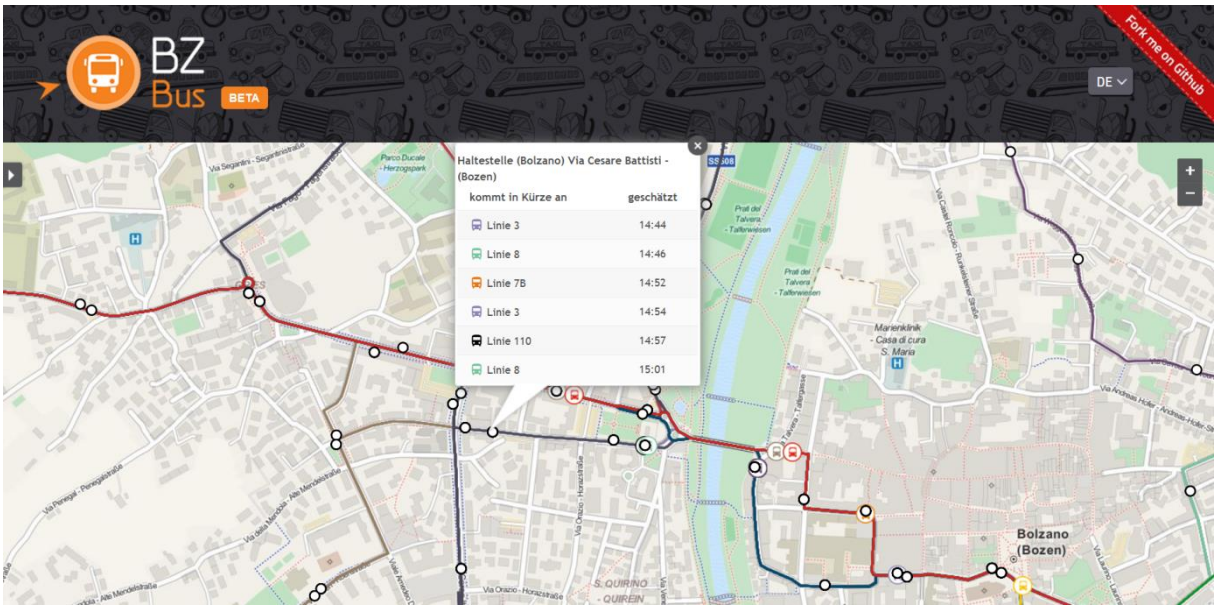

Figure 12: The tooltip associated to a bus stop in the application BZBus.

On a mobile device, the visualization of the application looks like in the following figures. It is important to underline that in this case the visualization of the left panel can be opened or closed, as indicated.

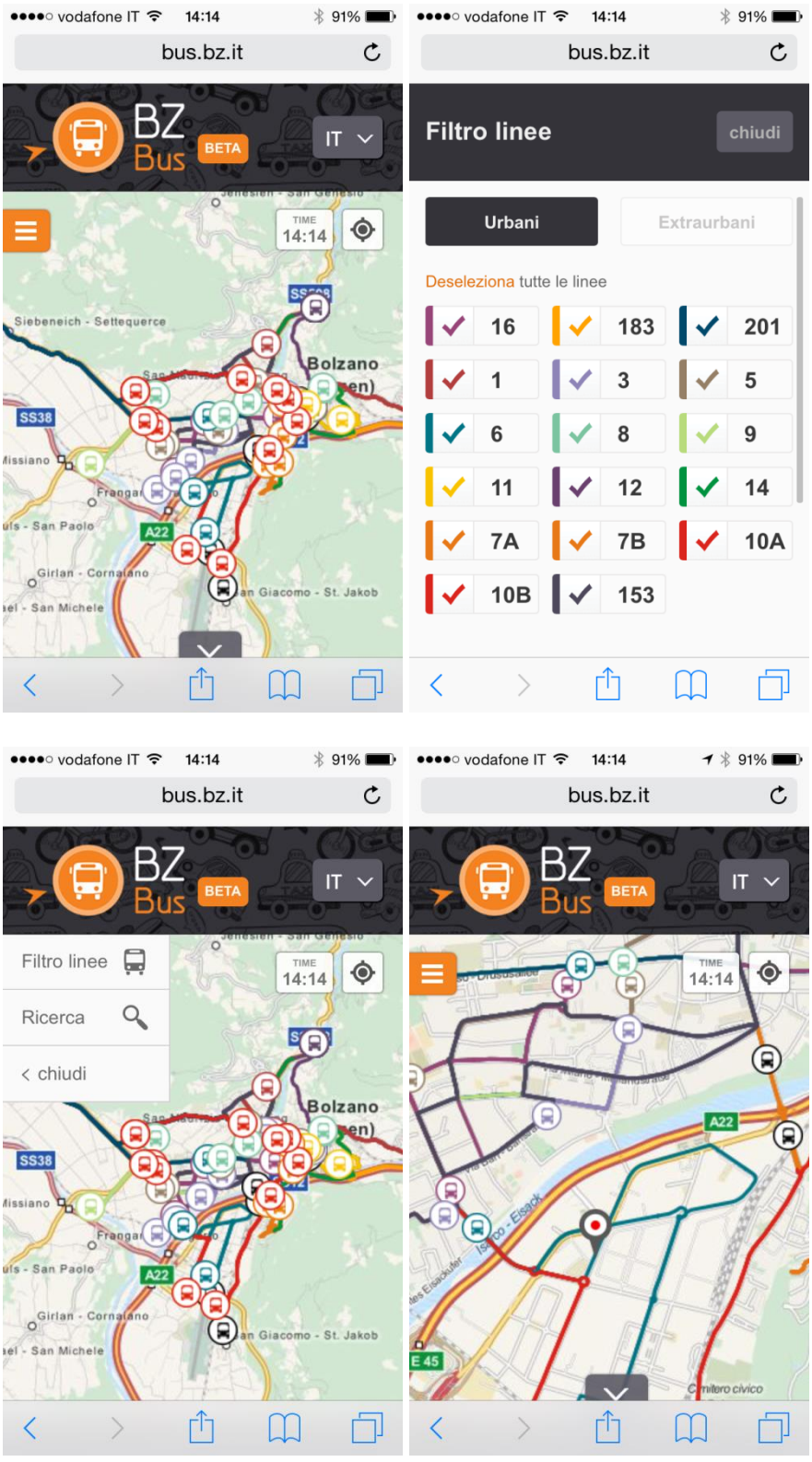

Figure 13: The visualization of the BZBus application on a mobile device.

2.2 Demonstrative applications already in use

In D.3.1.2 [3] the cooperation between INTEGREEN and another initiative of the Municipality of Bolzano, named “Bolzano Traffic” and financed by the local ERDF program has been widely presented. An extensive set of applications has been first introduced thanks to the cooperation of several local partners, and continuously improved during the trial phase of the project.

2.2.1 BZParking – real-time (and predicted) parking information service

BZ Parking (http://parking.bz.it) is a demonstrative HTML5 application implemented by TIS and other local companies which will present not only the current parking lots availability in the main parking areas of the city but also a short term forecast of how conditions will evolve. This functionality will be particularly useful for tourists evaluating the best trip options for reaching Bolzano from a surrounding valley. This application is going to be the first of a set of web applications directly managed by the Municipality of Bolzano, that will extended thanks to INTEGREEN as illustrated in the next paragraph. Even the particular **choice of the logo** has been defined in order to underline this kind of long-term strategy, and the **graphical user interface** (GUI) defined for this application will be used as reference even for the development of the future ones.

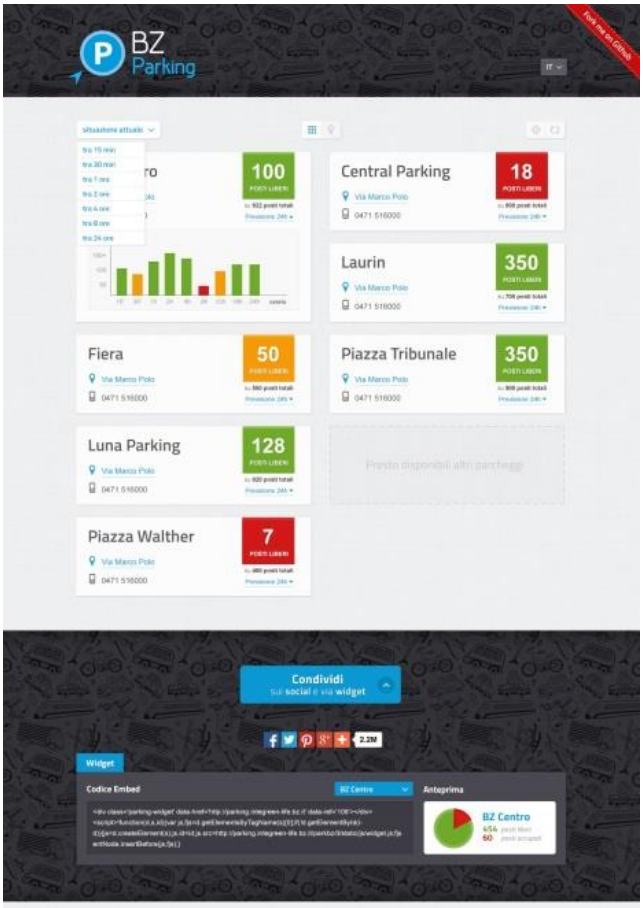

Figure 14: The BZParking application.

2.2.2 SASAbus – urban public transportation service

SASAbus is an application available both as HTML5 and Android which provides static information about the urban public transportation service offered by SASA as well as the **real-time locations of the buses**, so that users can immediately check their expected arrival time in correspondence of certain bus stops. The application is going to integrate information provided by the Supervisor Centre such as the **real-time occupancy of the parking areas**, so that it will be possible for users to dynamically check the opportunity for park & ride trip options, or **traffic information**, in order to better estimate the time of arrival of buses at the next scheduled bus stops.

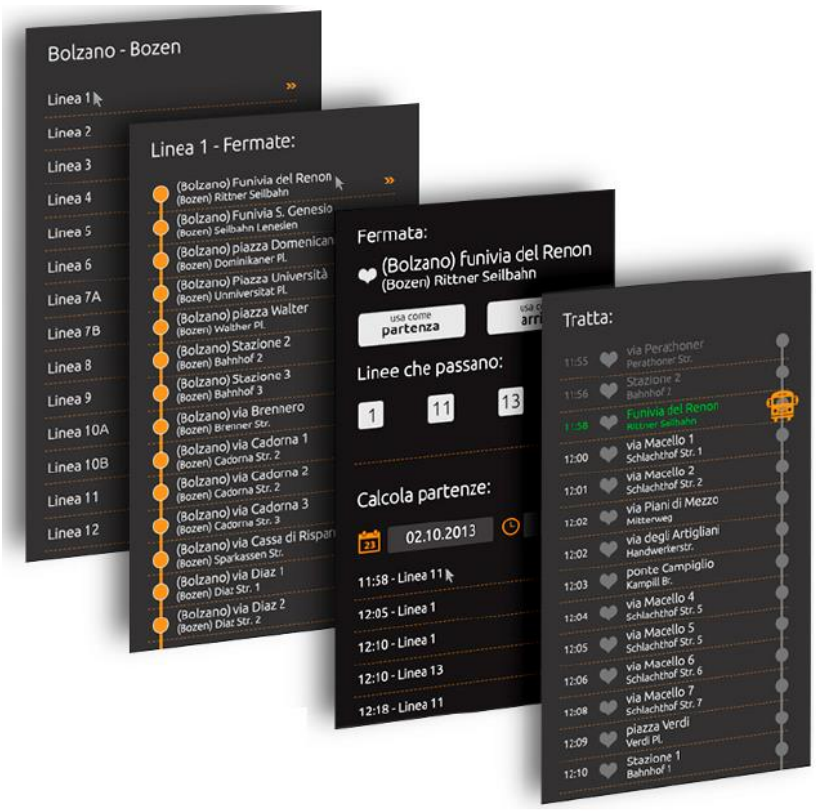

Figure 15: The SASAbus application [4].

2.2.3 South Tyrol Suggests – personalized and context-aware recommender

South Tyrol Suggest is an Android application which is the result of the research activities carried out in the past years by the **Faculty of Computer Science of the University of Bolzano** which has been further improved thanks to the synergy created in the "Bolzano Traffic" project. The application is technically a mobile **context-aware recommendation system**, i.e. a system capable to recommend POIs in the local area (e.g. events, tourist attractions, public services, etc.) as a function of the specific preferences of the user and the particular boundary conditions (e.g. meteorological conditions and forecasts, parking availability, but also specific trip details, e.g. alone or with friends, free time or business trip, etc.) [5]. The

innovations added through this project have been mainly two:

- an **extension of the recommendation model**, with the introduction of its capability to take into account even real-time parking information in the dynamic evaluation of the context condition;

- the **creation of a real-time multi-modal routing functionality** that the end-user can access once she/he wants to get more information about how to reach a specific POI. The suggested mode and route is suggested with the aim to provide the most environmental alternative to the user, but also with the possibility for him/her to evaluate alternative modal options (Figure 16). The back-end side of this functionality is investigated by another research team of the faculty, which has the objective to take into account as well the dynamic traffic information provided by the Supervisor Centre.

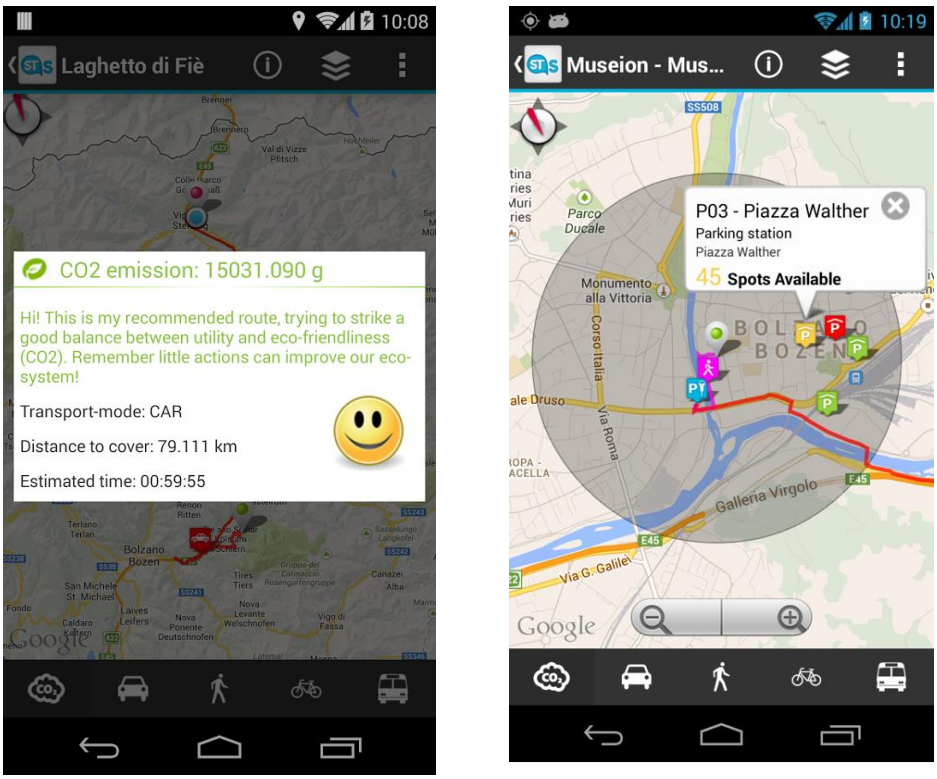

Figure 16: The South Tyrol Suggest application.

The research work covered in this project could be therefore further promoted thanks to the variety of additional data and information collected by the INTEGREEN system, which could continuously improve the efficacy of the recommendation model as well as of the routing engine outputs. This work can have the potential to enable in a reasonable short-term the **first advanced cooperative services** in South Tyrol.

2.2.4 Co-Cities – a pan European RTTI application demonstrator

Co-Cities applications are available for both Android and iOS devices , and are demonstrative services developed within the EU Co-Cities project [6]- [7] that have been extended in order to include the RTTI provided by the data providers in Bolzano. This inclusion has been particularly simple on top of the front-end layer prototype first developed in Bolzano Traffic and later extended in INTEGREEN. At present, the application includes again the real-time parking data as well the information given by SASA concerning the urban public transportation service (Figure 17). The advantage of this application is that a traveler could use it in a certain number of European cities (i.e. the pilot areas of the project), without the need / issue to discover the local application(s) providing the RTTI needed for organizing a trip in an unknown area.

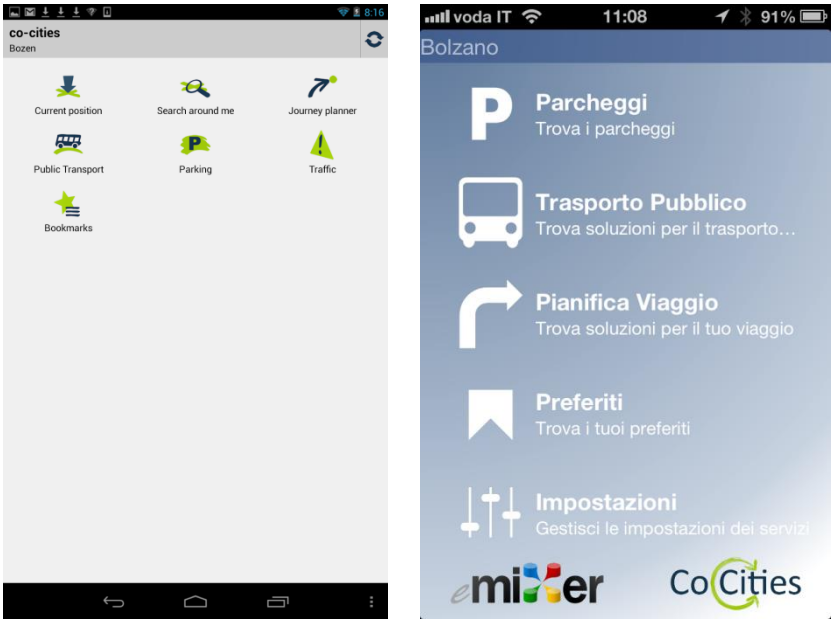

Figure 17: The demonstrative Co-Cities applications.

Several activities can be built on top of the experimental activities carried out in INTEGREEN. Not only the applications can deliver to travellers much more information, in particular in the traffic domain, but the feedbacks and notifications can be actively integrated in the Supervisor Centre and actively taken into account in order to generate and/or validate the traffic information and events that are published.

2.2.5 Other services under implementation

Other service providers will also multiply the visibility of the local RTTI. For example, through the cooperation with some private companies and local tourist organizations, real-time traffic and public transport information related to the city of Bolzano is going to be published respectively:

- in the **TVs of the hotel rooms**, and more generally automatically transmitted on one or more **local TV channels**;

- on **next-generation touch screen totems** to be installed in a futuristic bus stop which will be installed near Walther Square, one of the city locations with the highest visibility from occasional travelers such as tourists.

Further cooperation is in plan with **media partners**, **tourist operators** and **traffic information distributors partners**, so that they can further distribute the available information on existing Internet-based and broadcast channels. All this work of channels activation will be significantly endorsed by the plenty of detailed information gathered by the INTEGREEN system.

Conclusions

The report has briefly presented the two end-users applications developed in the scope of the INTEGREEN project, namely:

- **BZTraffic** (http://traffic.bz.it), which users can use in order to check the real-time conditions of traffic in the city, with the possibility to improve their travel decisions in terms of spatial / temporal routing as well in terms of switching to another travel mode;

- **BZBus** (http://bus.bz.it), which users can access in order to improve their travel experience with the urban public transportation service.

These applications, together with the application BZParking (http://parking.bz.it) for the visualization of current and predicted occupancy in the parking areas of the city, provide today a broad set of mobility services for local travelers, which complement the initial one developed in the complementary initiative of the Municipality of Bolzano “Bolzano Traffic” (hereby briefly presented as well).

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