D.3.1.1 Multimodal Transport Design

Document Control Sheet

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EXECUTIVE SUMMARY

STEP-UP faces the lack of a real sustainable mobility planning by promoting the multimodality in the Programme area. The geographical characteristics of some areas i.e. presence of islands and rural areas, make also integrate connections necessary with focus on inland connections to the coast. Moreover, existing transport connections are often inefficient to answer modern life needs and manage touristic flows mostly during peak season. STEP-UP will transfer the ICT/ITS applications also during low season in other scenarios (e.g. info-mobility system).

STEP-UP solution uses different transport modes and combines them to provide a seamless solution. The mobility platform has great potential: it will be ready to collect and integrate other services such as booking&ticket purchase and moreover, including territorial information.

STEP-UP will involve decision makers, practitioners of the intermodal mobility transport and will sustain the capitalization of initiatives as leverage for a sustainable development of the passenger mobility in the EUSAIR Region. The overall project objectives are

- promote multimodal passenger mobility;
- facilitate the access to the services offered;
- combine in a global vision transport and tourism aspects;
- capitalize efforts and the outputs reached from INTERMODAL project.

The specific objectives are:

1. improve the multimodal travel planner platform adding new local travel planner;
2. share experiences to avoid/reduce common technical and organizational problems thanks the foreseen training sessions;
3. plan the feasibility studies allowing each partner to analyze specific topics and critical points;
4. creating new business models to guarantee the sustainability of the project.

The project foresees six pilot sites (three in Italian Programme area and three in Croatian one in order to highlight the cross-border approach adopted; see § **Errore. L'origine riferimento non è stata trovata.**) in which STEPUP objectives will find operative realization. End-user, both citizens and tourists, will be able to have benefits in terms of a better travel planning (more sustainable and with less time spent finding best solutions).

The STEP-UP platform will be relevant both for small trips within the same city (e.g. from the city centre to the city-airport) or within two near cities (e.g. from one located to the coast to villages located inland) and for longer travels across the Adriatic Sea between Italy and Croatia for tourist or working purposes. Since Croatia joined to EU, commercial relationship between these two countries has increased a lot.

INTRODUCTION

1.1   Purpose of this document

The objective of the document is to describe the main services and elements involved for a real multimodal transport design (Cap. 5) including guidelines on public transportation and events/POIs that characterized the involved territory. Specifically, these technical recommendations allow to create a common environment where mobility data and local information on main events are gathered within STEP-UP platform to display complete information for an easy trip.

Actually, this document shows at first the state of the art in STEP-UP consortium to define the baseline to build actions for concrete achievements: multimodal travel planner as a tool to support interregional trip to discover and promote the territory. The guidelines for the implementation of methods defined by the central system for interfacing each local Travel Planner. The data collection, especially on mobility, guarantees the interoperability and the multimodal travel solutions across the Regions.

This document shows the procedure to collect

- mobility data (ferries, planes, trains and long haul lines)

- environment data (events, Point of Interests)

to include in the STEP-UP platform.
Benchmarking on actual status in Europe highlighting best use cases, potential competitors will support the definition of the Concept and high level architecture. This specific task is fundamental to improve the proposed solution avoiding the current obstacles and barriers (at market, political, technical, commercial level).

1.2   Structure of this document

The document includes the following chapters:

- Chapter 1, an introduction which includes the objective, the structure of the report and the target audience;

- Chapter 2, includes the state of the art among STEP-UP partners;

- Chapter 3, includes a benchmarking on use-cases at European level, how to improve the current mobility scenario taking experiences from potential competitors;

- Chapter 4, includes the pilot sites description with focus on the main goals, challenges and impact;

- Chapter 5, includes the high level of architecture highlighting components, services and modules required for the scope;

- Chapter 6, includes guidelines for a common vision on multimodal transport design and methods for data collection;

- Chapter 7, includes links Annex.

1.3 Target audience

The target audience of this report is the STEP-UP partners and their technicians (if necessary) to allow performing of the STEP-UP platform.

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2 State of the art in STEP-UP partners

Below information coming from each STEP-UP partner regarding the availability of transport data and the how useful information for end-users is displayed.

For more details about the situation of each partner, please refers to the Chapter 7

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Annex .

STEP-UP -Generic Information						
The following grid provides useful information for WP3 and WP4 activities						
Legend — AV Available, UD Under development, NA Not available, PA Partially available	Partners	Marche Region (IT) - Lead Partner	Emilia-Romagna Region (IT)	Municipality of Lecce (IT)	County of Split-Dalmatia (HR)	City of Sibenik (HR)	Zadar airport (HR)
1 -Generic Data about Public Transport		SoA	SoA	SoA	SoA	SoA	SoA
Nr. of local public transport operators		5	4	9	3	1	3
Nr. of local private transport operators			305	150	543	8	
Volume of the fleet		2810	3000	500	1290	72	4512
Nr. of passenger carried per year		45.500.000	279.803.262	150.000.000	50.320.576	887.176	586.403 PAX
Intermodals points		PA	PA	PA	PA	PA	AV
Do you have a web portal for publishing events, news about territory? **(if YES or PA, specify more details following the schema below)**		AV	AV	AV	AV	AV	AV
Do you have a regional travel planner available on web? **(if YES or PA, specify more details following the schema below)**		AV	AV	AV	PA	NA	NA
Do you have a local travel planner available on web? **(if YES or PA, specify more details following the schema below)**		AV	NA	AV	NA	NA	NA
Is the web site for the events the same portal used for the travel planner?		PA	PA	AV	NA	PA	AV

The analysis of the data collected during this first important step, tells about the situation in the involved areas:

- in any involved territory there is a tourism web portal to publish events of the territory. Nevertheless, there isn't an available back-office system (DBMS – Database Management System) for a direct interfacing through web-services. For this reason and to be fair among all partners, this project will adopt and implement another solution well described in the paragraph §6.2.

- Marche Region, Municipality of Lecce and Emilia-Romagna Region have a multimodal travel planner web based. Zadar airport has a web portal where public bus timetables from Zadar to Zadar airport and back are published. City of Sibenik gives information through three different web portal, the first one takes into account only long haul lines, the other ones give information regarding only private means (car or bike).

- GTFS files are available only for Local Public Transport provided by Marche Region, Emilia-Romagna Region, Municipality of Lecce.

- Italian partners have the possibility to share mobility data.

3 Use cases at European level

In most cities the transport modes operate independently from one another creating an intricate network of transport mode operators. The complexity of using unconnected sustainable transportation modes, each one with separate tickets, payment, booking and mobile apps, discourages many people to take advantage from them.

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However, there are cities where different transport companies decided to cooperate and they created a network of interconnected modal transport.

In this chapter some of these cooperations are reported as well as a description of the type of collaboration implemented is described.

WHIM (https://whimapp.com/), is an application that allows people to access a wide variety of transport options, from taxi to car rental, from public transport until bike sharing. Thanks to an intelligent personal assistant the app synchronizes the calendar of the user and suggests the best way to participate to every event. This is a complete MaaS with any kind of integration because it allows to do everything with a single application, from planning the journey, displaying real time information, to the payment of the ticket. Furthermore, users can choose a payment mode "pay-as-you-go" or buy a tailored package, the monthly fees vary depending on how much transportation is needed.

Whit Whim the customers can order transportation from point A to point B by using a combination of trams, buses, taxis, car rental and car-sharing services so that the user can travel without any worries.

Moovel (https://www.moovel-group.com/en) is an application to integrate different types of transport to go from point A to point B in a fast and simple way. Moovel provides data for public transit, including bus, train, subway, light rail, streetcar and more.

It gathers different mobility operators in order to create a transparent and intelligent transport network. In this way Moovel establishes a link between urban public transport and individual mobility, comparing different modes of transport based on time and cost. Depending on the city, it offers different functions such as: quick access to the user's favorite destinations or transit stops, clear information about next transit arrival times, search functionality to choose the best rout, real time transit data, view of all the stops and stations close to the user current location, view of all upcoming departures from a specific stop or station, link to buy bus or train subscriptions, check if a bus or train is overcrowded.

TRIPGO (https://skedgo.com/home/tripgo/) is an application to plan trips with any combination of transport modes. It compares and combines any transport mode like train, bus, taxi, subway, metro, cab, tram, v-sharing, own vehicles. With TripGo users can schedule their ride, check fare and timetable, bus and train tickets, transportation direction and get live service alerts.

Hannovermobil (https://shop.gvh.de/index.php/), with a single app it is possible to buy a paperless tickets, have real-time information of buses and trams, timetables or display directly a connection from two points , have a price preview (the current fares are displayed directly next to the connection), know where users are geolocated (including as well the surrounding dynamically generated and maps), have real time news (schedule changes, special transportations or detours). It also allows to save stations, addresses, positions or connections as favorites for faster information, to save connection requests in the calendar and keep an overview. Finally it provides call-a-taxi and call-a-bus services and such services can be booked directly via the App.

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Rome2Rio (https://www.rome2rio.com/it/) is an application to plan multimodal trips around the word. It compare different price and timetable of different modes of transport like train, plane, long haul line, local public transport (bus, tram, metro), ride sharing, car sharing, private car, taxi, ship. With this application it is possible to take information about travel planner solutions and it is possible to buy a ticket and validate it. If users can not buy a ticket directly from the Rome2Rio platform, they will be redirect to the operator website.

Google Transit Maps (https://www.google.it/maps), provides route planner to allowed users to find the right direction with public transportation (train, local public transport, long haul bus), private car, taxi or bike. Google has partnered globally with over 800 public transportation providers to adopt GTFS data. GTFS data are used by Google to provide multimodal travel information to the end users.

Application	Integration type				Mode
	Multimodal Travel planner[1]	**Integration Ticketing[2]**	**Integration Payment[3]**	**Pack[4]**	
Moovel	X				Bus, tram, car rental, train, Uber
GoTrip	X				train, bus, taxi, subway, metro, cab, tram, v-sharing, own vehicles
Hannovermobil	X	X	X		Bus, train, taxi, car sharing, car rental
WHIM	X	X	X	X	Car rental, bike sharing, bus, train, taxi
Rome2Rio	X				Train, plane, long haul line, local public transport (bus, tram, metro), ride sharing, car sharing, private car, ship, taxi
Google Transit	X				Train, local public transport, long haul bus, private car, taxi, bike

4 Pilot sites description

Hereafter the six pilot sites descriptions. For more details about theme, please refers to the Chapter 7

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[1] Multimodal Travel Planner

[2] When one smart card can be used to access all the modes taking part in the service
[3] When one single invoice is issued for all of the customer's mobility needs
[4] When customers can pre-pay for specific amounts (in time or distance) of each service tailored towards their needs

Annex

4.1   Pilot #1: Marche Region

Marche Region extends over an area of 9,694 square kilometers of the central Adriatic slope between Emilia-Romagna to the north, Tuscany and Umbria to the west, and Lazio and Abruzzo to the south, the entire eastern boundary is formed by the Adriatic Sea.

Thanks to its excellent geographic position, Marche Region can be reached in different ways:

-   By plane from international airports (i.e. Munich, Brussels) Raffaello Sanzio (located in Ancona). The airport can be reached by local bus or by car via the highway;
-   By train. The region is served by railway transport system that covers 386 kilometers of lines. It directly connects all cities within Adriatic sea; moreover the main Italian cities (i.e. Milan and Rome) are linked to Ancona through the high speed train connection;
-   By bus. Marche is an Italian central region, for this reason the available long distance buses that operate from the north to the south of Italy can move people in our area.
-   By ferry. Ancona, the capital city of the Region, is characterized by an important RO/PAX port (for passengers and goods). From the port of Ancona is possible to travel to other countries like Croatia and Greece.

Its strategical geographic position and the three major interchange HUBs (airport, port and train station) should ensure that the city of Ancona is considered a strategic starting point for tourists and residents to travel across Europe.

Actually, the lack of a single multimodal information system and the difficulty to display transport information, discourage users to start their travel from Ancona or using public transport (like train or bus) to reach the interchange HUBs.

Since 2007 the Region has activated a web-based system for searching LPT lines and timetables available at this link **http://orari.trasporti.marche.it** .

This system allowed to have all transport data from 5 different transport operators within Marche region. All data are periodically published in the Marche cloud and this guarantees updated data available to the user on web regional platform.

The current situation improves the previous scenario where each single transport operator provided such information on its personal website without any integration to the others.

The main objective of the Marche pilot is overcoming the limits of previously web-based system and including other transport modes (for example train and ferry) for a wider European connection. Marche

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Region aims at creating a single multimodal and cross-border travel planner in order to facilitate at first the access to the transport network and on the other side attract more demand thanks to the inclusion of events and points of interest. It is important to offer easy and complete information for a high quality users' experience avoiding the proliferation of web applications.

4.2 Pilot #2: Emilia-Romagna Region

The area involved in the pilot project is the Adriatic coast of Emilia-Romagna. It includes: 11 Municipalities with tourist interest, 3,455 hotel accommodation facilities, 200 campsites, 1,600 beach resorts, 41.9 million tourist presences in 2017, 6.9 million arrivals in 2017, € 50 average daily expense per capita.

During the project two pilot projects will be tested:

a) particular segment included in the selected territory: La Valmarecchia (Rimini's backcountry).

This territory is far few tens of kilometers from the Romagna coast, includes dozens of places of particular beauty represented by historic hamlets and medieval villages, positioned on the Apennine hills. E.g. Verucchio and San Leo, with fortresses of the Malatesta and Montefeltro seigneuries, villages certified at national level and candidates for UNESCO heritage, and included in the national initiative "Borghi Viaggio italiano".

The initiatives for touristic valorization of these places clash with the problems due to their scarce accessibility, mainly caused by the lack of or absence, in some periods, of the public transport. Especially during the summer, when the numerous events (high-level cultural events too) are organized, which attract considerable flows of tourists, the access into this territory by hundreds private cars is a serious problem of pollution and impact on urban quality and residents accessibility.

The pilot action envisaged by the project therefore foresees the identification of alternative transport solutions (intermodality), aimed at facilitating the access of tourists by limiting the use of private cars, thus contributing to the enhancement of these places and their better use.

b) throughout the area: an integration between tourist services and public transport (train, bus, bike, hotel, sun umbrella) "from the city to the beach without the car in a click".

The problem: in the involved area, tourist mobility occurs at 90% by private car increasing traffic with negative consequences:

- road and highway blocks during the transfer from the cities to the coast
- traffic along the main venues on the coast means a myriad of vehicles that "must" reach the accommodation and park in less and less available spaces. The relationship between

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parking areas and cars is proportionally inverse: cars increase but the parking areas are the same.

For this reason, vehicles circulate much longer than necessary, producing nitrogen oxide pollution (57% of total pollution) and altering the climate (39% of total carbon monoxide emissions).

- - The trains are insufficient and often inadequate for low service frequencies and the difficulty of finding suitable services to the stations.

- Public transport means are inadequate and slowed down due to the high private traffic.

As result, the quality of health and life of citizens and tourists is compromised.

The challenge is modify the model of the tourist mobility offer: ferry, train, bus and bicycle.

4.3   Pilot #3: Municipality of Lecce

The city of Lecce has a surface of 238,93 km² and 95.067 inhabitants. It is the capital city of the province of Salento and its main activity is represented by the cultural tourism. Tourist flows are increasing at a fast pace with an encouraging growth in the number of tourists from abroad.

Concerning the infrastructures available in terms of regional, national and international accessibility, Lecce can be reached in 30 minutes from the Brindisi airport which counts 2 million passengers per year. The airport in Bari is 90 minutes by car far from Lecce and receives an average of 3,6 million passengers per year.

The majority of incoming people reach the area by car via the highway also thanks to the good connection made available by the Scandinavian-Mediterranean TEN-T corridor (Bari and Taranto are approx. 60-90 minutes far).

Maritime connections are also possible through (i) the Port of Taranto which is an intermodal hub for mainly cargo transports throughout Europe and between the Mediterranean Sea and the Near/ Middle / Far East and the rest of the world; (ii) the Port of Brindisi which is a freight and tourist port and receives about 250.000 passengers per year connecting Italy with Albania and Greece. It is also connected to the Italian cities of Catania and Sorrenio in the Tyrrenian Sea and (iii) the Port of Otranto which connects Italy with Albania and Greece as well.

Since 2015, the city provided to the users a regional multimodal travel planner, called Apuliamoving (**http://www.apuliamoving.it/tp/INFOCITY/home/index**) to make easier door to door solutions. Currently, multimodal solutions provided to the users refer to urban bus and national railway transportation.

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The general objective of the pilot is to strengthen the competitiveness of the territory by providing the city with an integrated system including information and mobility services, which may favor, on the one hand, the increase of users flows to the city and on the other hand, "green" mobility with a low environmental impact. The project plans to deploy an innovative platform for the provision of advanced services and other utilities, which can also generate revenues to ensure the self-sustainability of the initiative over time.

4.4   Pilot #4: County of Split-Dalmatia

Realization of this project will improve the existing mobility infrastructure which will consequently lead to increased utilization of the electric vehicle network and positively affect on the reduction of the carbon dioxide emissions derived from road traffic.

Additionally, the realization of the project will have a positive impact on increasing the mobility of passengers within the Split-Dalmatia county (local population and tourists) using public transport network. Marginalized areas within the county (such as Dalmatian Zagora) will become more accessible and suitable for the life of local population and development of tourism activities.

Including and implementing additional tourist information for the purpose of expanding mobility services (e-roaming) enables additional visibility and promotion of multimodal transportation across the county (electric vehicles network).

4.5   Pilot #5: City of Sibenik

The pilot site for City of Šibenik covers Zadar and Split airports. Zadar airport is an international airport serving city of Zadar, Croatia. It is located in Zemunik Donji, 8 km from the centre of Zadar and about 70 km from city of Šibenik. Zadar airport is currently connected with 34 different mayor airports across the Europe which can be reached by 12 different airlines. Concerning the mobility and passenger needs, there is a public transport bus that drives from airport to Zadar centre and vice versa. Bus transport table is available on airport's official website. There are also taxi and rent a car services (18 of them) available at airport terminal. A paid parking lot with the places intended for buses is also at disposal next to airport terminal.

Split airport is an international airport serving city of Split, Croatia. It is located at the very exit from the small town of Kaštela, near Split. It is at 20 km distance from Split, and about 55 km from city of Šibenik. It is currently connected with more than 45 different mayor airports across the Europe, depending on the season, which can be reached by 48 different airlines. Concerning the mobility there is a direct bus line for passengers to/from Split which is organized in cooperation with "Pleso prijevoz" firm. Bus

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transport timetable is available on firm's website. Taxi, rent a car services and a paid parking lot with the places intended for buses is also at disposal.

There isn't any kind of public transportation from Zadar and Split airport to city of Šibenik and vice versa. In order to get from Zadar airport to Šibenik, passengers have to take the bus to Zadar main bus station and get the intercity bus to Šibenik. The similar is with Split airport. In order to get to Šibenik, passengers have to take the local bus to Split or Trogir and catch the intercity bus to Šibenik from there.

Infrastructure provides a lot of possibilities for Zadar and Split airport to connect with city of Šibenik. There is a highway that connects all three of the cities. The highway exits/entrances are just next to both airports. There is also a fast road that runs from Zadar airport all the way to Zadar city and Zadar sea port called "Gaženica". The similar is with Split. There is a fast road that connects Split airport with Split main bus station and city center. Split main bus station is next to Split sea port and terminal. So there is also a possibility for three cities to connect with sea transport. Furthermore, there is a state road that connects Šibenik, Zadar and Split airports which has no tolls. It is a few kilometres longer than highway and takes more time to get from one place to another.

 Since Zadar and Split airport are located relatively close to Šibenik, a lot of local residents and tourists use it as a starting point to travel to other european destinations. In order to get to Zadar and Split airport, citizens currently have to use their own private cars, pay for taxi or take a rent a car. The same is with tourists that land in Zadar and Split airports and want to visit Šibenik. There is no public transport available that connects Šibenik with both airports. There is also a lack of private owned transfer companies that could possibly connect Šibenik with airports in vicinity. So this pilot project and business model development within the project is a great opportunity for companies to expand their offer. Because of the vicinity of both airports it can be said that Šibenik has two international airports. This is also a great opportunity for three cities to connect with direct bus lines and offer their residents and visitors 3 different multimodal points including airports, main bus stations and sea ports. Furthermore, Šibenik main bus station has no official website so it is hard for visitors and local residents to find the real time information on how to get from one place to another compare the prices and choose the best offer.

4.6   Pilot #6: Zadar airport

Zadar County spreads across a total of 7.276,23 km², and is located in the centre part of Croatian Adriatic sea coast. For the most part it spreads in Southern Croatia (Dalmatia) and some of it is located in upland Croatia. By the year 2011. Zadar County had 170.017 inhabitants (Zadar County development strategy). Favourable traffic geographic position, good traffic connection with state transport corridors, as well as continuous investment in road infrastructure and Zadar positioning on the national traffic map make Zadar one of the best transport-connected cities in Croatia, at least as far as road traffic is concerned.

Zadar region, by being tourism-oriented region, is characterised by the seasonality of traffic flows. Official records (Zadar touristic community statistics) for year 2017 show that a total of 1.808.200 visits

were reported in the region, with heavy increase in the summer season. Airport Zadar passenger data support this: during 2017. January traffic amounted to 1.345 passengers, while August record show 123.348 passengers total. Airport Zadar tallied a total of 589.468 passengers over 2017. with the majority of passengers during summer season.

Moreover, port Gaženica is another important transport nodal point, its infrastructure (internal roads and highway connection, terminal, bus station, and gully gates up to 15 meters) provided the conditions for simultaneous boarding and unloading of passengers and cars, for six ferries on local lines of length 50150 meters, three ships in the international navigation of 150-200 meters long, and three ships on 250-400 meter long cruises, as well as the possibility of accepting RO-RO ships at the same gates.

Lack of any railroad means of transportation presents a big setback for further upgrading the situation. This is especially important for cargo transport, but also for passenger one on a larger scale.

Passengers landing in Zadar Airport have two main public transport services at their disposal. First of is a bus line organized with Liburnija (public bus service provider). Bus line operates regularly and according to flight schedules and connect the Airport with Zadar. Taxi services are also provided and near the Airport, with services running 0-24h. Airport also has rent-a-car service providers nearby with total of 93 parking spaces reserved just for rent-a-car.

Regarding the ITS solutions, in 2014. Croatian government started a new action plan for the following period, focusing on, among other, ITS to improve Schengen area safety and passenger flow. It included a number of IT solutions, with concrete measures to increase the passenger terminal, implement security cameras etc.

Still, some difficulties arise and can be efficiently removed by smaller infrastructural upgrades. Passenger flow can be improved by resolving the problem of slower security check for EU passengers. Furthermore, Airport can improve information distribution to accommodate passengers better and to increase the speed of intermodal transition. Cooperation with other transport service providers also could prove beneficial in the long journey.
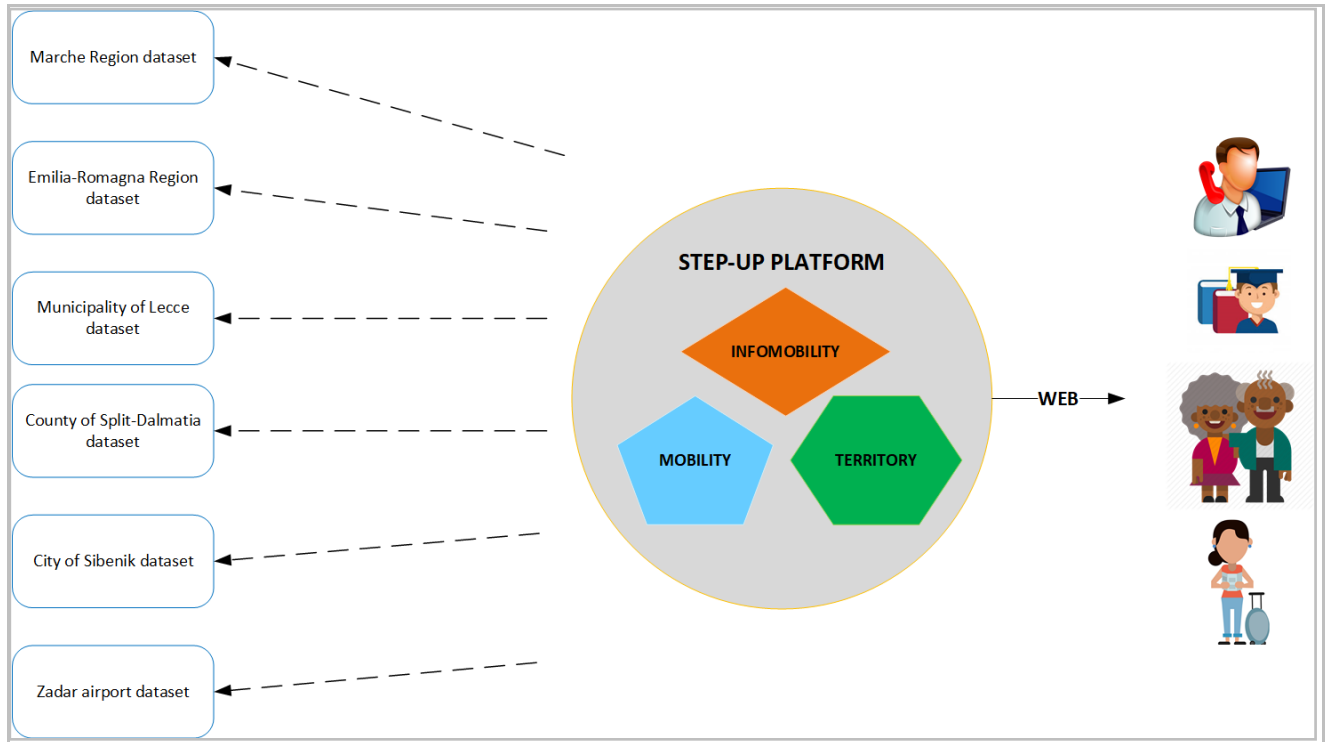
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5 High Level Of Architecture

The logical architecture is represented by the schema above where the STEP-UP web portal integrates the local mobility data through standard interfaces, GTFS[5]. In this way, STEP-UP consortium follows the European guidelines on the innovative approach in terms of interoperability and integration, MaaS (Mobility as a Service) approach. STEP-UP wants to follow this roadmap and each partner can maintain their own autonomy in terms of: data, organization, network, data centre, DBs, structures, etc but they are the possibility to be part of an harmonized and sustainable system.

STEP-UP capitalizes two different projects, INTERMODAL and TISAR realized in the previous framework. This solution improved the previous projects taking into consideration the key aspects and the main results including other aspects, useful for travelling: updated or real-time information on mobility and useful information on territory (Events and Point of Interests). STEP-UP will be able to converge in a single platform all these important aspects: transport, territory, useful information.

The STEP-UP web portal will be accessible from the end users at any-time. The portal and all data should be visualized to allow a good user experience for: searching multimodal travel solutions across countries, looking for interesting events in the involved territory and updated information

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[5] https://developers.google.com/transit/gtfs/reference/

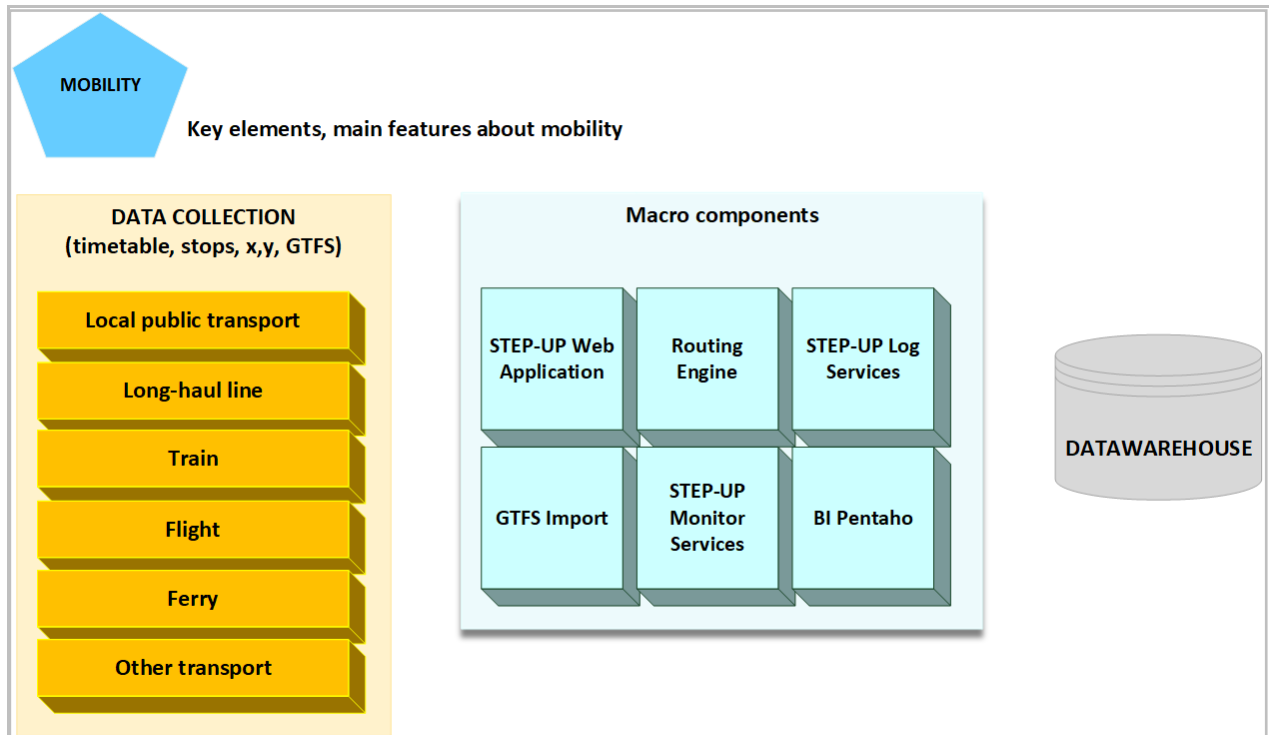D.3.1.1 – Multimodal Transport Design

Figure 2: Key elements about mobility aspect

The mobility sub-system is the core element of the STEP-UP platform responsible for the multi-trips across STEP-UP countries. It is able to merge all mobility data about several transport means to provide useful solutions for the passengers, according to their needs (time of arrival, departure point/address, no more than 1km by foot, etc.).

On one hand, the data collection activity is the first step that gathers different transport data (according to the availability). Operative data: local public transport (urban, suburban), long-haul line, train, flight, ferry, v-sharing, etc. **GTFS is the only accepted format. All partners are responsible to provide updated GTFS data, for each timetable variation, at least until the end of the project.** It is very important collecting GTFS data well-formed. Without relevant and appropriate data the final solution could be adversely affected.

On the other hand, the datawarehouse (backbone, local data and information layer) will be well performed to guarantee high performance and guaranteeing data security.

Gathered data has to be transformed/handled to offer a very high mobility service to all end-users for their multimodal trips (for work or leisure). To reach this scope, a variety of sub-components have to be designed and realized. The main ones are listed below:

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- STEP-UP Web Application: Step-Up web portal where user can take information about tuorism or transport. The web portal includes Google Maps used by Google API (https://developers.google.com/maps/documentation/javascript/get-api-key) to allow the travel solution diplaying useful for end users.

- STEP-UP Log Services: logging services about requests that coming from the system

- Routing Engine: routing engine using to find the best trip solutions is OTP (Open Trip Planner). OTP is a Travel Planning system based on:

  o GTFS for transport data

  o OpenStreetMap (OSM) for transport network, this cartography is used by routing engine for trip calcolation

- GTFS import: feed services to transport data system

- STEP-UP Monitor Services: services for monitoring system

- BI Pentaho: Business Intelligence Module. Production and consulation report.

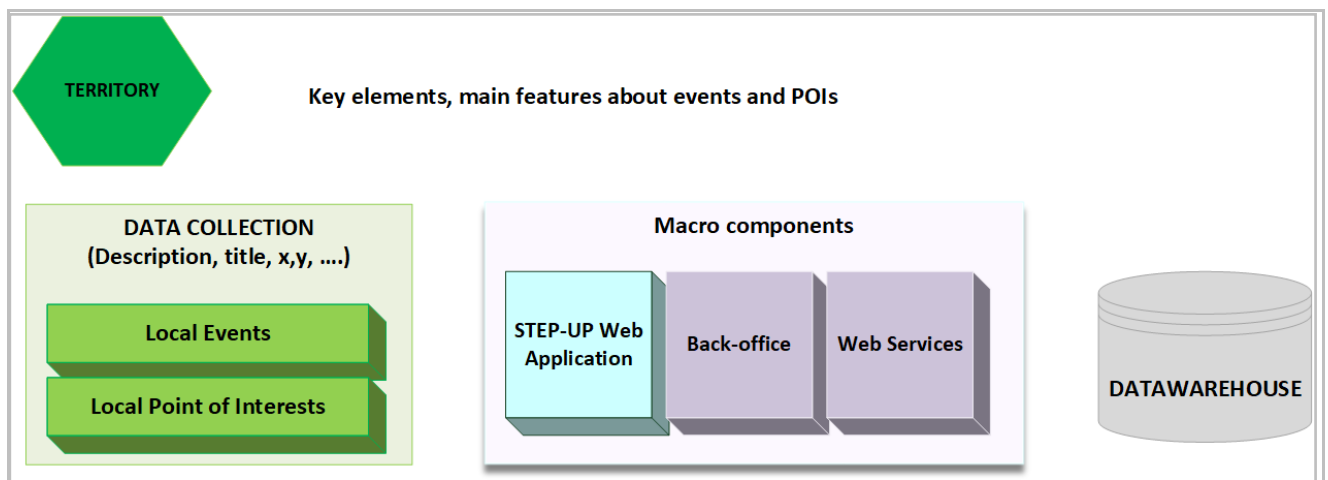For more information about transport data collection, see Chapter 6.1.

Figure 3: Key elements about territory

The territory sub-system is the key element of the STEP-UP platform responsible for the visualization and integration of specific data about involved territory: local events and POIs available within STEP-UP countries.

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Gathered data has to be transformed/handled by Back-Office (§6.2.1) to offer complete information about territory for a good user experience.

The main features involved are:

- STEP-UP Web Application: is the same platform described in the previous sub-system and it is able to provide information about tourism or transport

- Back-office: Customer Management System (CMS) to manage Points of interest and Events

- Web Services: services for information provision of POI and Events. In a first step will be used the back-office system, in a second step will be analyzed the integration between existing back-end system already used by each local partner and the Step-Up platform through the use of standard APIs.
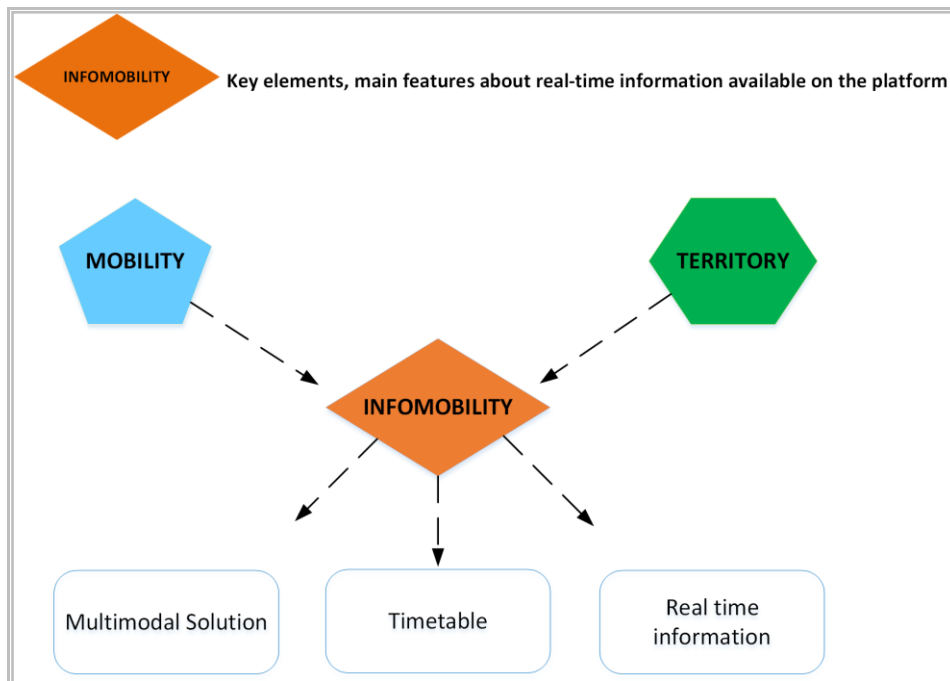
Figure 3: Key elements about infomobility

This third sub-system is responsible to merge data provided by two sub-systems previously described. STEP-UP aims at reaching an high level of user experience to make easier the trips across territories. For this reason the platform provided within this project builds its infrastructures and architecture as modular, sustainable, interoperable as possible offering updated information according to the data availability of each partner.

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This sub-system offers to the end-users the following categories of information:

- Multimodal solutions

- Timetable

- Real time information, where applicable and available

6 Guidelines for a common vision on multimodal transport design

6.1 Public Transportation

This paragraph defines how to collect the local public transport data. These data are necessary to allow the mobility within the city. This information is included in the STEP-UP platform and all partners must send their data to the LP to start the first implementing phase. The standard used to collect local public transport data is GTFS - General Transit Feed Specification. Smart approaches such as interfacing to these agencies' or companies' web services, could be taken into account in order to give high efficiency to the whole system. Below the links of the format specifications used:

- General Transit Feed Specification Reference

  https://developers.google.com/transit/gtfs/reference

- The document explains the types of files that comprise a GTFS transit feed and defines the fields used in all of those files.

  https://developers.google.com/transit/gtfs/examples/

6.1.1 Feed Files

agency.txt	One or more transit agencies that provide the data in this feed.
stops.txt	Individual locations where vehicles pick up or drop off passengers.
routes.txt	Transit routes. A route is a group of trips that are displayed to riders as a single service.
trips.txt	Trips for each route. A trip is a sequence of two or more stops that occurs at specific time.
stop_times.txt	Times of vehicle arrivals at and departures from individual stops for each trip.
calendar.txt	Dates for service IDs using a weekly schedule. Specify when service starts and ends, as well as days of the week where service is available.

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calendar_dates.txt	Exceptions for the service IDs defined in the calendar.txt file. If calendar_dates.txt includes ALL dates of service, this file may be specified instead of calendar.txt.
shapes.txt	Rules for drawing lines on a map to represent a transit organization's routes.
frequencies.txt	This table is intended to represent schedules that don't have a fixed list of stop times. When trips are defined in frequencies.txt, the trip planner ignores the absolute values of the arrival_time and departure_time fields for those trips in stop_times.txt. Instead, the stop_times table defines the sequence of stops and the time difference between each stop.

6.1.2   Field Definitions

The field definitions per each feed file are reported below specifying if fields are optional or mandatory (the same information can be collected on the internet).

The minimum set of information required to import the data of main axes into the STEP-UP portal is characterized by bold and mandatory fields. The maximum set of data managed to import the main axes into the STEP-UP portal is characterized by bold fields both mandatory and optional. The other fields will not be either managed or used.

Legend:

- ✓ **_Minimum set of data:_** bold AND mandatory field

- ✓ **_Maximum set of data:_** bold AND optional/mandatory field

6.1.2.1   Agency.txt

FIELD	OPTIONAL	TYPE
Agency_id	**YES**	**Varchar(50)**
Agency_name	**NO**	**Varchar(255)**
Agency_url	NO	Varchar(255)
Agency_timezone	NO	Varchar(255)
Agency_lang	YES	Varchar(255)
Agency_phone	YES	Varchar(255)
Agency_Fare_URL	YES	Varchar(255)

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6.1.2.2 Stops.txt

FIELD	OPTIONAL	TYPE
stop_id	**NO**	**Varchar(50)**
Stop_code	**YES**	**Varchar(20)**
Stop_name	**NO**	**Varchar(40)**
Stop_desc	YES	Varchar(255)
Stop_lat	**NO**	**Float**
Stop_lon	**NO**	**float**
Zone_id	YES	Varchar(255)
Stop_url	YES	Varchar(255)
Location_type	YES	Varchar(255)
Parent_station	YES	Varchar(255)
Stop_timezone	YES	Varchar(255)
Wheelchair_boarding	YES	Varchar(255)

6.1.2.3 Routes.txt

FIELD	OPTIONAL	TYPE
Route_id	**NO**	**Varchar(32)**
Agency_id	**YES**	**Varchar(50)**
Route_short_name	**NO**	**Varchar(40)**
Route_long_name	**NO**	**Varchar(250)**
Route_desc	YES	Varchar(255)
Route_type	**NO**	**Varchar(4)**
Route_url	YES	Varchar(255)
Route_color	YES	Varchar(255)

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Route_text_color	YES	Varchar(255)

6.1.2.4   Trips.txt

FIELD	OPTIONAL	TYPE
Route_id	**NO**	**Varchar(32)**
Service_id	**NO**	**Varchar(20)**
Trip_id	**NO**	**Varchar(50)**
Trip_headsign	**YES**	**Varchar(255)**
Trip_short_name	**YES**	**Varchar(40)**
Direction_id	**YES**	**Varchar(3)**
Block_id	YES	Vachar(1)
Shape_id	**YES**	**Varchar(32)**
Wheelchair_accessible	YES	Varchar(1)

6.1.2.5   Stop_times.txt

FIELD	OPTIONAL	TYPE
Trip_id	**NO**	**Varchar(50)**
Arrival_time	**NO**	**int**
Departure_time	**NO**	**int**
Stop_id	**NO**	**Varchar(50)**
Stop_sequence	**NO**	**Int**
Stop_headsign	YES	Varchar(255)
Pickup_type	YES	Varchar(3)
Drop_off_type	YES	Varchar(3)
Shape_dist_traveled	YES	float

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6.1.2.6   Calendar.txt

FIELD	OPTIONAL	TYPE
Service_id	NO	Varchar(20)
Monday	NO	Boolean
Tuesday	NO	Boolean
Wednesday	NO	Boolean
Thursday	NO	Boolean
Friday	NO	Boolean
Saturday	NO	Boolean
Sunday	NO	Boolean
Start_date	NO	Varchar(8)
End_date	NO	Varchar(8)

6.1.2.7   Calendar_dates.txt (optional)

FIELD	OPTIONAL	TYPE
Service_id	NO	Varchar(20)
date	NO	Varchar(8)
Exception_Type	NO	Varchar(3)

6.1.2.8   Shapes.txt (optional)

FIELD	OPTIONAL	TYPE
Shape_id	NO	Varchar(32)
Shape_pt_lat	NO	Float
Shape_pt_lon	NO	float

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Shape_pt_sequence	NO	Int
Shape_dist_traveled	YES	float

6.1.2.9   Frequencies.txt (optional)

FIELD	OPTIONAL	TYPE
Trip_id	NO	Varchar(50)
Start_time	NO	int
End_time	NO	Varchar(8)
Headway_secs	NO	int
Exact_times	YES	Varchar(1)

6.2   Events/POIs

After a deep analysis on the ITS level used in each pilot site infrastructure, the result is not an homogenous scenarios. Thus, according both to the requirements defined in the AF and the partners' needs it will be made available to all partners a web-based system (Back-Office) to manage information of the territory.

However, it will be also analyzed other possibilities for the integration between back-end systems installed in the local partner IT and the Step-Up platform using standard APIs.

6.2.1   Back-Office general description

Data entry process about data concerning tourist information (Points of Interest – POI and Events) into the Step-Up platform will be handled by the project partners through the Back-Office system provided for this scope.

This Back Office will be installed in the Cloud of Marche Region and it will be accessible via web page and specific account (username and password) assigned to each project partner. The partners can manage and display their own data, while the coordinator of the Step-Up platform will be able to list all consortium data.

In the Back-Office, the partners will have the possibility to:

- View the related list of POIs and Events;
- Modify or delete their POIs and Events;

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- Create new POIs and Events.

The creation of POIs and Events requires a minimum set of information that are reported below.

Create a POI

The mandatory fields for the creation of a POI are:

Field name	Field type	Field description
Name	Free text	It indicates the name of the POI, i.e. "Zadar Airport"
(Sub) Typology	Menu	It allows you to choose the type of POI, i.e. "airports"
Description	Free text	It is the description of the POI, i.e. "The airport is located in the municipality of Zemonico , 8 km from the railway station of the city of Zadar ..."
Address	Free text	It indicates the address of the POI, i.e. "Ul . Jurja Bijankinija"
Address number	Number	I.e. "9"
Town	Free text	It indicates the municipality where the POI is located, i.e. "ZemunikDonji"
Country	Menu	It allows you to specify in which country the POI is located, i.e. "Croatia"
Latitude	Number	It is automatically calculated from the address, i.e. "44.0361"
Longitude	Number	It is automatically calculated from the address, i.e. "15.4347"
Visible	Flag	It allows the partner to indicate the visibility on the Step-Up platform
Visible from	Date	It allows to set from which date the POI must be visible on the platform, i.e. "20/09/2018"
Visible to	Date	It allows to set up the date until the POI has to be visible on the platform, i.e. "24/12/2018"
Multimedia resource: vetretpoi	Image	Image (PNG, JPG, GIF, BMP) size: 700x250 pixels.
Multimedia resource: vetquapoi	Image	Image (PNG , JPG, GIF, BMP) size: 700x546 pixels.
Multimedia resource: galpoi	Image	Image (PNG, JPG, GIF, BMP) size: 960x500 pixels . You can entry from a minimum of 1 to a maximum of 6 of this type of images.

Create an Event

The mandatory fields for the creation of an event are:

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Field name	Field type	Field description
Name	Free text	It indicates the name of the event, i.e. "Garden Festival"
(Sub) Typology	Menu	It allows to choose the type of event, i.e. "Music"
Description	Free text	It is the description of the event, i.e. "The Garden Festival is an unmissable event that gathers young people from all over Europe: on a large outdoor stage divided into international artists' areas they reunite and give their best to make everyone dance..."
Address	Free text	It indicates the address of the event, i.e. "Ul. Petrića Glava"
Adress number	Number	I.e. "34"
Town	Free text	It indicates the municipality where the event takes place, i.e. "Tisno"
Country	Menu	It allows you to specify in which country the event takes place, i.e. "Croatia"
Latitude	Number	It is automatically calculated from the address, i.e. "44.0361"
Longitude	Number	It is automatically calculated from the address, i.e. "15.4347"
Start date	Date	It is the start date of the event, i.e. "03/07/2018"
End date	Date	It is the end date of the event, i.e. "10/07/2018"
Visible	Flag	It allows the partner to indicate the visibility on the Step-Up platform
Visible from	Date	It allows to set from which date the Event must be visible on the platform, i.e. "15/06/2018"
Visible to	Date	It allows to set up the date until the POI has to be visible on the platform, i.e. "24/12/2018"
Multimedia resource: vetreteve	Image	Image (PNG , JPG , GIF , BMP) size: 700x250 pixels.
Multimedia resource: vetquaeve	Image	Image (PNG , JPG , GIF , BMP) size: 700x546 pixels.
Multimedia resource: galeve	Image	Image (PNG , JPG , GIF , BMP) size: 960x500 pixels. You can entry from a minimum of 1 to a maximum of 6 of this type of images.

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6.3   Marche cloud account

To manage the back-office data and to save transport data (GTFS file), each partner will have the possibility to access to the Marche Region information system. The credentials will be communicated via e-mail.

7 Annex

7.1   Pilot description details

For a full comprehension of the pilots and to maintain the information provided by each demonstrator, hereafter, the authentic versions of the pilots descriptions.

Pilot #1: Marche Region, *Italy*

Background description

Marche Region extends over an area of 9,694 square kilometers of the central Adriatic slope between Emilia-Romagna to the north, Tuscany and Umbria to the west, and Lazio and Abruzzo to the south, the entire eastern boundary is formed by the Adriatic Sea.

Thanks to its excellent geographic position, Marche Region can be reached in different ways:

- By plane from international airports (i.e. Munich, Brussels)thanks to the Raffaello Sanzio airport (located in Ancona). The airport can be reached by local bus or by car via the highway;

- By train. The region is served by rail transport system that covered 386 kilometers of lines. It connects directly all cities of Adriatic sea; moreover the main Italian cities (i.e. Milan and Rome) are linked to Ancona through the high speed train connection.

- By bus. Marche is an Italian central region, for this reason the available long distance buses that operate from the north to the south of Italy can move people in our area.

- By ferry. Ancona, the capital city of the Region, is covered by an important RO/PAX port (for passengers and goods). From the port of Ancona it is possible to travel to other countries like Croatia and Greece.

Its strategical geographic position and the three major interchange HUBs (airport, port and train station) should ensure that the city of Ancona is considered a strategic starting point for tourists and residents to travel across Europe.

Actually, the lack of a single multimodal information system and the difficulty to display transport information, discourage users to start their travel from Ancona or using public transport (like train or bus) to reach the interchange HUBs.

Since 2007 the Region has activated a web-based system for searching LPT lines and timetables available at this link **http://orari.trasporti.marche.it**

This system allowed to have all transport data from 5 different transport operators within Marche region. All data are periodically published in the Marche cloud and this guarantees updated data available to the user on web regional platform.

The current situation improves the previous scenario where each single transport operator provided such information on its personal websites without any interoperability connection to the others.

D.3.1.1 – Multimodal Transport Design

The main objective of the Marche pilot is overcome the limits of previously web-based system and include other transport modes (for example train and ferry) for a wider European connection. Marche Region aims at creating a single multimodal and cross-border travel planner in order to facilitate at first the access to the transport network and on the other side attract more demand thanks to the inclusion of events and points of interest. It is important to give easy and complete information for a high quality users' experience avoiding the proliferation of web applications.

Challenges:

- The general objective of the pilot project is improving the sustainable mobility within the Region. Moreover, it wants to increase trips from and to the Region according to the users' needs: tourists, commuters, residents, students,…

- encourage the use of public transport with multimodal travel solutions;

- improve the infomobility system
    - give more information on public transport such as timetable, delays, news…;

- allow the multimodal transport with different transport modes thanks to different mobility operators

- improve the tourism providing a platform where people can consult events and POIs of the territory

- allow the easy access to the transport data;

- optimize time for searching information and purchasing travel tickets, making easier and more reliable the use of e-tickets and payment modes.

Goals/scopes:

- **integrate into a single platform** useful data for the provision of mobility services that acts as a hub for the data and information collection from different sources / subsystems already implemented (i.e. AVM), booking and ticketing.

- Integrate mobility and tourist environment to guarantee a complete offer to the end users (citizen and tourist) including events, point of interests, useful information, etc.

- Realize an integrated and multimodal e-ticketing system at regional level

- Allow a single payment transaction for a regional multimodal travel solution

- Attract more demand

- Reduce maintenance costs

Topic:

- Infomobility platform
    - Real time information on transport and territory

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        o   Multimodal Travel planner

        o   Events and points of interest

- Information on travel cost

- Web platform for end users to give a complete solution within Marche region including the main long distance means for interregional and cross-border trips.

Impacts:

1) Increase the quality perceived by the users

2) Increase the efficiency of the public transport offered to the users

3) Improve the multimodality between different modes of transport

4) Improve tourism through the Adriatic sea

5) Reduce the use of cars and increase the use of public transport

6) Reduce traffic flow

7) Flexibility of fare policy and data monitoring

8) Promote fare integration

9) Promote the interoperability

10) More trips by bus and less incidents by cars

Pilot #2: Emilia-Romagna, *Italy*

Background description

The area involved in the pilot project: The Adriatic coast of Emilia-Romagna

11 Municipalities with tourist interest

3,455 hotel accommodation facilities

200 campsites

1,600 beach resorts

41.9 million tourist presences in 2017

6.9 million arrivals in 2017

€ 50 average daily expense per capita

During the project two pilot projects will be tested:

a) **particular segment included in the selected territory: La Valmarecchia (Rimini's backcountry).**

This territory a few tens of kilometres of the Romagna coast, includes dozens of places of particular beauty represented by historic hamlets and medieval villages, positioned on the

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Apennine hills. E.g. Verucchio and San Leo, with fortresses of the Malatesta and Montefeltro seigneuries, villages certified at national level and candidates for UNESCO heritage, and included in the national initiative "Borghi Viaggio italiano".

The initiatives of touristic valorization of these places clash with the problems due to their scarce accessibility, mainly caused by the lack or absence, in some time slots, of the availability of public transport. Especially during the numerous events and high-level cultural events being organized in this territory, especially during the summer, which attract considerable flows of tourists, the access of hundreds of private cars is a serious problem of pollution and impact on urban quality and residents.

The pilot action envisaged by the project therefore foresees the identification of alternative solutions of intermodality, aimed at facilitating the access of tourists by limiting the use of the private cars, thus contributing to the enhancement of these places and their better use.

b) **throughout the area: an integration between tourist services and public transport (train, bus, bike, hotel, beach umbrella) "from the city to the beach without the car with a click".**

Arrivi (mil) di autoveicoli ai caselli autostradali dell'Emilia Romagna
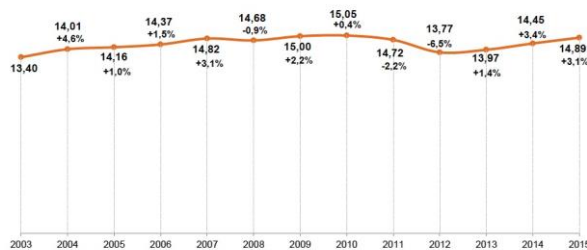
The problem:

Tourist mobility occurs, in the area indicated, at 90% by private car traffic and with negative consequences:

- tracks and road and highway blocks during the transfer from the cities to the coast.

- the car traffic once arrived in the localities of the coast splits into a myriad of vehicles that "must" arrive at the hotel or the beach resort and have to park in less and less available spaces. The relationship between parking areas and cars is in inverse proportion: cars increase and parking areas cannot increase.

    For this reason, motor vehicles circulate much longer than necessary, producing nitrogen oxide pollution (57% of total pollution) and altering the climate (39% of total carbon monoxide emissions).

- The trains are insufficient and often inadequate because of the frequencies too far from each other and the difficulty of finding suitable services to the stations.
- Public road transport means are inadequate and slowed down precisely by having to travel through private traffic.

As a result the quality of health and life of resident citizens and tourists is compromised.
The challenge: change the model of tourist mobility: ferry, train, bus and bicycle.

Challenges:	Goals/scopes:
Considering the shortcomings expressed continue to be missing: • a platform that can be used by citizens and tourists to plan their trips. • Integration of services and modes of transport a) The development of the experimentation of 4 Pillars has not been realized, organizing transfers from the cities to the coast with trains and bicycles available on the spot "from the city to the beach without the car with a click". The problem: • An experimentation in a disadvantaged area dedicated to tourism: the Valmarecchia (inland of Rimini) for example has never been carried out.	•Demonstrate that with alternative ways of transport, time and quality of tourist travel are gained, especially by having a platform that can be used by citizens and tourists. • Demonstrate that a disadvantaged area can increase its performances thanks to a better planning and intermodal integration.

Topic:

The project will involve public transport companies on rail (TPER and Trenitalia) of public road transport (Start and Bonelli) and bike sharing. The associations of hotel and beach resorts. Local authorities.

Impacts:

The pilot project as a whole will demonstrate to the public and private stakeholders the advantages of the innovative approach as compared to the continuity of the old model that leads to collapse.

Pilot #3: Municipality of Lecce, *Italy*

Background description

The city of Lecce has a surface of 238,93 km² and 95.067 inhabitants. It is the capital city of the province of Salento and its main activity is represented by the cultural tourism. Tourist flows are increasing at a fast pace with an encouraging growth in the number of tourists from abroad. Concerning the infrastructures available in terms of regional, national and international accessibility, Lecce can be reached in 30 minutes from the Brindisi airport which counts 2 million passengers per year. The airport in Bari is 90 minutes by car far from Lecce and receives an average of 3,6 million passengers per year.

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The majority of incoming people reach the area by car via the highway also thanks to the good connection made available by the Scandinavian-Mediterranean TEN-T corridor (Bari and Taranto are approx. 60-90 minutes far).

Maritime connections are also possible through (i) the Port of Taranto which is an intermodal hub for mainly cargo transports throughout Europe and between the Mediterranean Sea and the Near/ Middle / Far East and the rest of the world; (ii) the Port of Brindisi which is a freight and tourist port and receives about 250.000 passengers per year connecting Italy with Albania and Greece. It is also connected to the Italian cities of Catania and Sorrento in the Tyrrenian Sea and (iii) the Port of Otranto which connects Italy with Albania and Greece as well.

Since 2015, the city provided to the users a regional multimodal travel planner, called Apuliamoving (**http://www.apuliamoving.it/tp/INFOCITY/home/index**) to make easier door to door solutions. Currently, multimodal solutions provided to the users refer to urban bus and national railway transportation.

Challenges:

- The general objective of the project is to strengthen the competitiveness of the territory by providing the city with an integrated system including information and mobility services, which may favour, on the one hand, the increase of users flows to the city and on the other hand, "green" mobility with a low environmental impact. The project plans to deploy an innovative platform for the provision of advanced services and other utilities, which can also generate revenues to ensure the self-sustainability of the initiative over time.

- Improve accessibility and inadequacy of public passenger transportation

- Better management of tourist during high peaks (summer period)

- Enabling the city to offer smart services (booking and ticketing)

Goals/scopes:

- Support the users' trip planning – *pre-trip* (citizen, tourist, visitor, etc.) suggesting the most suitable and green means of transport according to their needs and interests both to reach the city and to move in it (special attention to the vulnerable users' needs).

- Implement innovative services to support mobility such as **Smart Parking**, to allow the user to be informed in real-time through an App on the free parking spaces at urban level, be guided (navigator) to a free parking lot and, if necessary, book or to extend the parking period.

- **integrate a single platform** for the provision of mobility services that acts as a hub for the data and

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• Urban parking areas optimization through smart and integrated systems.	information collection from different sources / subsystems already implemented; booking and ticketing. • Integrate mobility and tourist environment to guarantee a complete offer to the end users (citizen and tourist) including events, point of interests, useful information, etc.

Topic:
- Infomobility platform
    - Real time information on transport and territory
    - Multimodal Travel planner
    - Events and point of interest
- Smart parking solution
- Booking and ticketing system
- Web platform for end users to give a complete solution within smart city of Lecce including the main long distance means for interregional and cross-border trips

Impacts:

Hereafter the main impacts:
- Social and environmental impact
    - Low emission
    - Traffic jam reduction
    - Improve of public transportation (such as network, service reliability, reduction of the waiting time at the bus stop)
    - Involving of different kind of users (students, commuters, vulnerable people, tourists, etc)
- Technical impact
    - Smart parking optimitazion
    - Improvement of IoT Improvement of the IoT network, cooperative-ITS;

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- o Integrate new solutions that are at different levels of maturity.
  - o New ICT solutions thanks to the introduction of innovative services such as e-ticketing, booking and infomobility
- Political impact
  - o Number of actions introduced at political level that support the next steps for the realization of Sustainable Urban Mobility Planning (SUP)

Pilot #4: SPLIT – DALMATIA COUNTY, Croatia

Background description

Realization of this project will improve the existing mobility infrastructure which will consequently lead to increased utilization of the electric vehicle network and positively affect on the reduction of the carbon dioxide emissions derived from road traffic.

Additionally, the realization of the project will have a positive impact on increasing the mobility of passengers within the Split-Dalmatia county (local population and tourists) using public transport network. Marginalized areas within the county (such as Dalmatian Zagora) will become more accessible and suitable for the life of local population and development of tourism activities.

Including and implementing additional tourist information for the purpose of expanding mobility services (e-roaming) enables additional visibility and promotion of multimodal transportation across the county (electric vehicles network).

Challenges:

- Lack of multimodal travel planner and tourist information which could be accessed through the development of various information platforms such as mobile apps
- Social and economic challenges which could be solved through integrated transport solutions
- Lack of transport demand management tools can be solved by using the appropriate transport models and with development of electric vehicle network.

Goals/scopes:

- Establishment of publicly accessible network of electric vehicles charging stations throughout the county (emphasis on its inland) – development of e-mobility
- Increase the availability of car sharing and bike sharing systems
- Integration of publicly available services and increasing spatial mobility of local population and tourists
- Development of an efficient and accessible service and information platforms

Topic:

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Realization and implementation of the project primarily enhances mobility within the county as the main objective and leads to a better information system development. Also, as a leader of WP3, Split-Dalmatia County will improve visibility and promotion (emphasis on relevant tourist information and multimodal transportation) across the Split-Dalmatia county, especially in its inland – Dalmatian Zagora.

Impacts:

The main impact of project implementation is related to socioeconomic changes caused by increased transport mobility and by increased visibility of county in tourism processes. It is also possible to see the economic changes caused by the use of more rational and more cost-effective transport systems such as car and bike sharing system or network of electric vehicles. The implementation of the project provides technical progress (especially in the county's inland) which should be visible in increasing of the transport infrastructure quality.

Pilot #5: City of Šibenik, *Croatia*

Background description

The pilot site for City of Šibenik is Zadar and Split airports. Zadar airport is an international airport serving city of Zadar, Croatia. It is located in Zemunik Donji, 8 km from the centre of Zadar and about 70 km from city of Šibenik. Zadar airport is currently connected with 34 different mayor airports across the Europe which can be reached by 12 different airlines. Concerning the mobility and passenger needs, there is a public transport bus that drives from airport to Zadar centre and vice versa. Bus transport table is available on airport's official website. There are also taxi and rent a car services (18 of them) available at airport terminal. A paid parking lot with the places intended for buses is also at disposal next to airport terminal.

Split airport is an international airport serving city of Split, Croatia. It is located at the very exit from the small town of Kaštela, near Split. It is at 20 km distance from Split, and about 55 km from city of Šibenik. It is currently connected with more than 45 different mayor airports across the Europe, depending on the season, which can be reached by 48 different airlines. Concerning the mobility there is a direct bus line for passengers to/from Split which is organized in cooperation with "Pleso prijevoz" firm. Bus transport timetable is available on firm's website. Taxi, rent a car services and a paid parking lot with the places intended for buses is also at disposal.

There isn't any kind of public transportation from Zadar and Split airport to city of Šibenik and vice versa. In order to get from Zadar airport to Šibenik, passengers have to take the bus to Zadar main bus station and get the intercity bus to Šibenik. The similar is with Split airport. In order to get to

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Šibenik, passengers have to take the local bus to Split or Trogir and catch the intercity bus to Šibenik from there.

Infrastructure provides a lot of possibilities for Zadar and Split airport to connect with city of Šibenik. There is a highway that connects all three of the cities. The highway exits/entrances are just next to both airports. There is also a fast road that runs from Zadar airport all the way to Zadar city and Zadar sea port called "Gaženica". The similar is with Split. There is a fast road that connects Split airport with Split main bus station and city center. Split main bus station is next to Split sea port and terminal. So there is also a possibility for three cities to connect with sea transport. Furthermore, there is a state road that connects Šibenik, Zadar and Split airports which has no tolls. It is a few kilometres longer than highway and takes more time to get from one place to another.

Since Zadar and Split airport are located relatively close to Šibenik, a lot of local residents and tourists use it as a starting point to travel to other european destinations. In order to get to Zadar and Split airport, citizens currently have to use their own private cars, pay for taxi or take a rent a car. The same is with tourists that land in Zadar and Split airports and want to visit Šibenik. There is no public transport available that connects Šibenik with both airports. There is also a lack of private owned transfer companies that could possibly connect Šibenik with airports in vicinity. So this pilot project and business model development within the project is a great opportunity for companies to expand their offer. Because of the vicinity of both airports it can be said that Šibenik has two international airports. This is also a great opportunity for three cities to connect with direct bus lines and offer their residents and visitors 3 different multimodal points including airports, main bus stations and sea ports. Furthermore, Šibenik main bus station has no official website so it is hard for visitors and local residents to find the real time information on how to get from one place to another compare the prices and choose the best offer.

Challenges:	Goals/scopes:
• Lack of multimodal travel planner	• App or website as a central point for real time transport information and travel planning
• Lack of one central point for user transport information	• Different transport services for users to choose
• Lack of direct bus lines to Zadar and Split airport	• Direct pilot bus lines from Šibenik to Zadar and Split airports and vice versa

Topic:
The pilot project will include different stakeholders and external experts through different modules of the pilot. City of Šibenik will detect critical points and most efficient way for establishing intermodal connections to Zadar and Split airports. After the realization of feasibility study, mobility data will be collected in order to check the adaptability of systems used. A platform will be designed as added value for end users and new intermodal links to Zadar and Split airports will be established for better

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passenger flow management. Thanks to professional training from PP3 a better management of transport data is expected in a final phase of pilot project.

Impacts:

The project will have an impact on improving citizens and tourist mobility between city of Šibenik and Zadar and Split airport. As a result, more citizens are expected to use Zadar and Split airport services and more tourists are expected to visit Šibenik throughout the year. Also, better transport connections will improve the mobility of local citizens and increase the standard of living. On technical level, new services will be developed and be available for users to use. Thanks to professional training and creation of new job profiles, companies will be able to offer a variety of new services which contributes to political and social impact of project.

❖ **New service connecting airports with City of Sibenik**

❖ **Increasing tourist mobility**

❖ **Reduce CO2 emissions**

❖ **Extending tourists season**

❖ **Creating new jobs**

Pilot #6: Zadar region, Croatia

Background description

Zadar County spreads across a total of 7.276,23 km², and is located in the centre part of Croatian Adriatic sea coast. For the most part it spreads in Southern Croatia (Dalmatia) and some of it is located in upland Croatia. By the year 2011. Zadar County had 170.017 inhabitants (Zadar County development strategy). Favourable traffic geographic position, good traffic connection with state transport corridors, as well as continuous investment in road infrastructure and Zadar positioning on the national traffic map make Zadar one of the best transport-connected cities in Croatia, at least as far as road traffic is concerned.

Zadar region, by being tourism-oriented region, is characterised by the seasonality of traffic flows. Official records (Zadar touristic community statistics) for year 2017 show that a total of 1.808.200 visits were reported in the region, with heavy increase in the summer season. Airport Zadar passenger data support this: during 2017. January traffic amounted to 1.345 passengers, while August record show 123.348 passengers total. Airport Zadar tallied a total of 589.468 passengers over 2017. with the majority of passengers during summer season.

Moreover, port Gaženica is another important transport nodal point, its infrastructure (internal roads and highway connection, terminal, bus station, and gully gates up to 15 meters) provided the conditions for simultaneous boarding and unloading of passengers and cars, for six ferries on local lines of length 50150 meters, three ships in the international navigation of 150-200 meters long, and three ships on 250-400 meter long cruises, as well as the possibility of accepting RO-RO ships at the same gates.

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Lack of any railroad means of transportation presents a big setback for further upgrading the situation. This is especially important for cargo transport, but also for passenger one on a larger scale.

Passengers landing in Zadar Airport have two main public transport services at their disposal. First of is a bus line organized with Liburnija (public bus service provider). Bus line operates regularly and according to flight schedules and connect the Airport with Zadar. Taxi services are also provided and near the Airport, with services running 0-24h. Airport also has rent-a-car service providers nearby with total of 93 parking spaces reserved just for rent-a-car.

Regarding the ITS solutions, in 2014. Croatian government started a new action plan for the following period, focusing on, among other, ITS to improve Schengen area safety and passenger flow. It included a number of IT solutions, with concrete measures to increase the passenger terminal, implement security cameras etc.

Still, some difficulties arise and can be efficiently removed by smaller infrastructural upgrades. Passenger flow can be improved by resolving the problem of slower security check for EU passengers. Furthermore, Airport can improve information distribution to accommodate passengers better and to increase the speed of intermodal transition. Cooperation with other transport service providers also could prove beneficial in the long run.

Challenges:

- Lack of public transport information (incoming passengers are not provided with enough information about possibilities of public transport usage in Zadar County)

- Meeting all Schengen border control requirements

- Insufficient promotion of green ways of transport (City of Zadar and Zadar County are still not taking advantage of their geographical layout which is very suitable for ecological ways of transport such as bike rides)

- Lack of information about local points of interest (incoming passengers are

Goals/scopes:

- Providing all passengers and visitors of Zadar Airport with accurate, updated and reliable information about public transport timetables, fares and any kind of data that could be of interest for all participants in transport between Zadar Airport, main bus station, Port Gaženica and City of Zadar. Zadar Airport in cooperation with local public transport providers will make all the information available through informative kiosk installed in arriving area at Zadar Airport.

- Harmonization of Zadar Airport`s border and security controls with Schengen regulations. Zadar Airport will install all the necessary signage (information boards, etc) depending on the instructions from legal

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not provided with information about main tourist attractions, events and manifestations in Zadar and its surroundings)

authorities when Croatia enters the Schengen border control system.

- Popularization of green ways of transport which are possible and suitable in places such as Zadar. That kind of transport should be promoted and advertised by sending pop-up notifications and banners to visitors who are using the informative kiosk at the given moment.

- Availability of all information about points of interest for visitors and passengers and promotion of the cheapest and the most effective way of getting there. Zadar Airport will cooperate with Zadar County Tourist Board and Zadar Tourist Board in order to provide accurate information which will be available through installed informative kiosks.

- Making easier to get around the Zadar airport both for incoming and outgoing passengers. Via informative kiosks all the incoming and outgoing passengers will have an opportunity to search, find and understand all the processes at the airport.

Topic:

Goals and scopes which are mentioned above should provide passengers and visitors will following information;

- daily, monthly and seasonal timetables for all public buses heading towards and from Zadar Airport and for all bus routes that will be provided by Liburnija (public bus service provider) in city, suburban and island transport with all the details about individual and carnet tickets and monthly pass

- a clock on the display that will inform passengers how much time is left until next bus drive to Zadar since bus schedule is made only to be in accordance with regular flights

- ferry timetables from port Gaženica to islands in Zadar archipelago

- timetable of all ferry and boat rides from Zadar to other towns at Adriatic coast

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- border control signage and equipment in accordance with Schengen criteria
- possibility of calculating the cheapest, the fastest and the greenest way of getting somewhere
- interactive maps of City of Zadar and Zadar County with all the active routes available
- "plan a journey" option which will provide a possibility for all passengers to enter desired departure and arriving point and find out which route is the fastest one or which one is with fewest changes
- passengers and visitors will also be informed by pop-up banners about Šibenik-Zadar Airport-Šibenik bus route which is a part of this project or ferry line from Port Gaženica to City of Ancona in Italy during the peak of the season and maybe throughout the whole year round
- there will be an option to choose a green journey planner which will offer bike ride or walking as a recommended way of getting around the city. On that way passengers will be advised to use Zadar`s Nextbike system which offers public bike rent on four locations in Zadar
- Users will have an option to check which park & ride and park & walk are available. On that way all the passengers should be encouraged to park their cars outside of the old town
- In case the distance between point A and point B less than 2 kilometres the system will advise users to walk it
- Availability of using "Zadar smart city" system which should be implemented by City of Zadar in years to come
- List of all car hire companies at Zadar Airport
- List and locations of all nearby petrol stations
- All tourist attractions, national parks and other sights in Zadar and its surroundings that could be of interest will be listed to find out all the details such as admission fee, working hours and any other information related to those points of interest
- notifications about all festivals, exhibitions and other manifestations and events in Zadar and nearby places
- Interactive map of Zadar Airport with all needed information
- list of FAQ with all the answers regarding liquids, check-in process, personal documents, border control etc.
- information about all hotels in Zadar which is important for all the outgoing passengers on the delayed or cancelled flights
- possibility of subscribing to receive all traffic, tourist and flight notifications

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Impacts:

Zadar Airport`s participation should be a small step forward in making and presenting Zadar region as a county with developed multimodal transport system which will be of use for locals, tourists, environment and all other participants. Positive outcomes will be visible on different levels. The best possible outcome would be that, by creating a necessity for (transport) services, service providers will see a potential in the passenger market, and thus, step by step, contribute to general development of the County.

All public participants such as City of Zadar, Zadar County, Zadar Airport, Liburnija and Jadrolinija (public sea shipping company) should be encouraged to work more on development of multimodal transport system. Harmonization of air, road and sea transport should be one of main goals for local government in order to provide seamless move for people and goods.

As a result of this project social awareness about benefits of multimodal transport will be raised on higher level. Both tourists and locals should reduce their dependence as the major mode of ground transportation and increase use of public transport. Besides that, through all provided information about tourist attractions, airport procedures etc. passengers will be better informed how to get around the sights and see the most during their vacation.

The technical level is yet to be improved as the development process of multimodal transport is going on. Synchronization and automatization of all public transport services (buying tickets, real time notifications, non-cash payment, etc) should be approved by all public transport companies in order to establish modern technological solutions which should make multimodal transport more convenient to use.

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