

REQUIREMENTS AND USER NEEDS FOR AN OPEN TRAVEL INFORMATION PLATFORM IN CITIES IN EUROPE, CHINA AND BRAZIL

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ABSTRACT

The VIAJEO project is supported by the European Commission and is designing, demonstrating and validating an open platform which will facilitate data sharing and exchange from different sources and provide data processing and management to support a variety of services. The project will integrate the open platform with local components and demonstrate its applications in four cities: Athens, São Paulo, Beijing and Shanghai.

The open platform is been defined as a well-described set of core processes accessible via published open external interfaces which are accessible by external parties and thus supporting open competition between providers of functional components and traffic information services.

To identify the requirements to the open platform it was necessary to investigate the current status and planned developments for traffic and transport data at the test sites as well as identifying the requirements of local transport planners and authorities for overall traffic and transport planning and management. Also, the needs of end users for personalised traffic information were taken into consideration.

The investigation was carried out in Work Package 2 of the VIAJEO project and resulted in detailed descriptions of existing and planned systems and a number of service-oriented use

cases reflecting the needs of transport planners and end users.

INTRODUCTION

Today, collecting and processing traffic data as well as disseminating traffic information is dominated by proprietary systems which makes it difficult, if not impossible, to share data across different systems and thereby limiting the competition between different providers of traffic information services.

The VIAJEO project is supported by the European Commission and addresses this issue by defining an open platform consisting of a collection of standardised interfaces providing access to the core functionalities of the platform as well as allowing data and processed information to be interchanged between different traffic and transport centres.

Within the project the open platform will be demonstrated at four test sites: Athens, Beijing, Shanghai and Sao Paolo. In an effort to minimize the required proprietary core functionalities at each test site, as many of the existing, proprietary interfaces of the existing processes as possible are to be replaced by interfaces following commonly agreed European or international standards.

The three year project began in September 2009 and with four different sites and the development work necessary, a wide range of activities need to be carried out in VIAJEO, and a work package structure was created.

Work Package 1 (WP1) is concerned with project coordination while WP2 (the focus of this paper) deals with the investigation of the current situation at the test sites. WP3 and WP4 are concerned with developing the architecture of the common platform and designing and implementing the open platform at each of the demo cities respectively. The actual demo site preparation and demonstration are carried out in WP6 and WP7. The last two work packages are WP5 (validation and impact assessment) and WP8 (dissemination).

At the time of writing, the project is running on schedule with WP2 and WP3 finalised and the test sites being busy preparing for the full scale demonstrations that are planned to begin with the installation of the necessary hardware and software in September this year.

WORK PACKAGE 2: INVESTIGATION

The first objective of Work Package 2 was to investigate which systems are currently available and which systems are planned be implemented in the test sites in the future. Not

only the functionality of the specific processes is important here, but also if any mandatory international or local standards are in place at the test sites.

The second objective of Work Package 2 was to identify the needs of local transport planners and authorities for overall traffic and transport planning and management, as well as the needs of end users for personalised redelivery of traffic information.

The work of the investigation was divided into five different tasks described in more detail below. To ensure that the investigations were completed in a uniform manner, guidelines for each investigation were prepared. The intention was to have the test sites follow these guidelines to ensure compatibility of the information gathered.

Information on current and planned systems and the standard used

This task deals with the collection of information on existing systems at each test site as well as new developments and already planned extensions to the existing systems. The information has been collected through interviews with local partners and other organisations at each test site.

To ensure that the results of the information gathering were readily usable for WP3 a ‘service diagram’ to show existing and planned services in a harmonized way was developed in collaboration with the WP3 leader (see figure 1 below).

The service diagram consists of modules ordered into five layers (data collection, processing, applications, services and devices) with data transfer interfaces between the layers. A numbering system of modules and interfaces was also suggested to make it easier to refer to specific modules and interfaces.

At this stage it was not possible to determine exactly what modules and interfaces of each service diagram are to be included in the open platform. This will become clear as WP3 progresses.

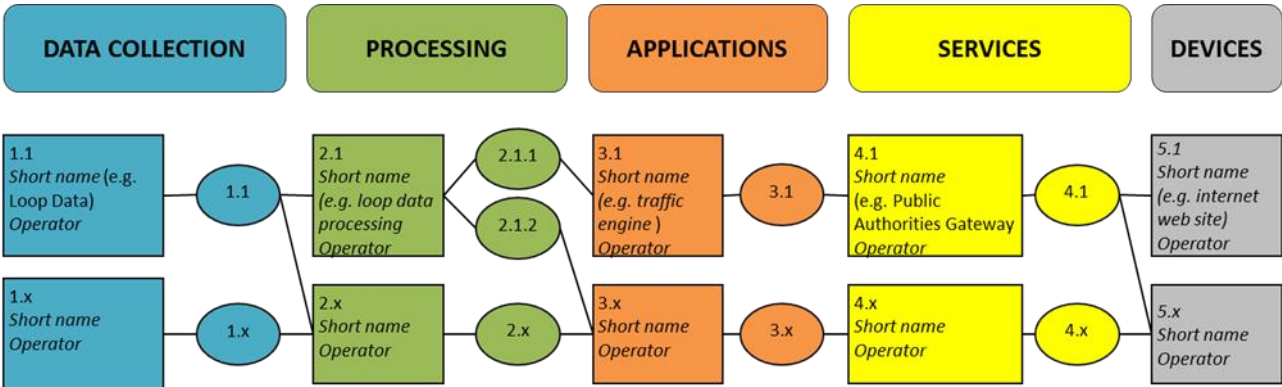


Figure 1: The five layers of the service diagram. Squares indicate modules and circles indicate interfaces

The results of the investigation show that the data exchange interfaces of existing system relies heavily on proprietary formats and not international or national standards. Also, a wide range of different communication methods are used at the test sites which makes the task of designing open standardised interfaces a challenging one.

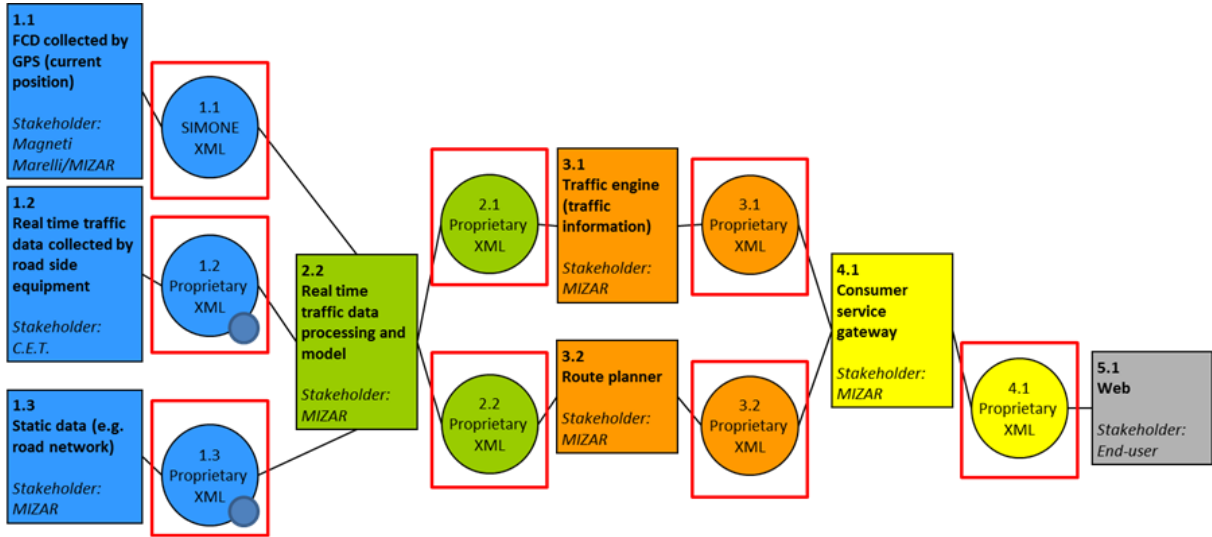


Figure 2: An example of a service diagram from the Athens test site, a web-based real-time journey planner. Red squares mark interfaces that are going to be developed in the project and where a blue circle and a red square are present, an existing interface is going to be extended during the project.

The investigation revealed that a significant amount of transport data is gathered in each of the four test sites, but this data is in general not shared by the different organisations responsible for collecting data.

End user survey

The objective of this task was to gather information about the views of end users. The task was to analyse their attitude towards existing information services and their need for further personalised delivery of information through focus group meetings.

The results of the investigation show that; end users require information on actual travel times, incidents that will affect their travels, and guidance when incidents occur. They require it on a wide range of devices, but most important is it, that the information is reliable and up-to-date.

An outspoken demand in both Beijing and Shanghai is arrival times for busses, but because of the sever congestion in China time tables for busses have little practical use and arrival times

must thus be based on real time traffic information.

Below is a table (table 1) consisting of all the user needs identified through the surveys conducted at the test sites. The lack of an ‘X’ may for some needs indicate that the service is already in place as end users did not consider stating a preference for existing services but only for further improvements.

End user needs			Relevant demo sites			
Number	Category	Short definition	Athens	São Paulo	Beijing	Shanghai
1	Public transport users and car drivers	More complete information	X		X	X
2	Public transport users and car drivers	More correct information	X			X
3	Public transport users and car drivers	More timely information	X		X	X
4	Public transport users and car drivers	Information on SMS to mobile phone	X	X	X	
5	Public transport users and car drivers	Information through radio broadcast	X		X	
6	Public transport users and car drivers	Information via Email to personal mobile with access to the web	X			
7	Public transport users and car drivers	Information via internet		X	X	
8	Public transport users and car drivers	Information regarding specific geographical areas	X	X	X	X
9	Public transport users and car drivers	Information via enquiry hotlines			X	
10	Public transport users and car drivers	Personalised information, possibility to select which information to receive			X	X
11	Public transport users and car drivers	Interactive selection of which information to receive			X	X
12	Public transport users	Estimated travel times of public transport	X	X	X	

13	Public transport users	Public transport timetables available online and at stops	X	X	X	
14	Public transport users	Accurate public transportation arrival times	X	X	X	X
15	Public transport users	Information about occurred incidents affecting public transport (accidents, etc. for buses, closed stations for trains, etc.)	X	X		X
16	Public transport users	Information on displays in stations and bus stops	X		X	X
17	Public transport users	Information in the bus on arrival time at next stop				X
18	Public transport users	Better visibility of bus stops			X	X
19	Car drivers	Estimated travel times for car drivers	X	X	X	
20	Car drivers	Real time information regarding incidents such as accidents, strikes, closed roads due to public works, etc.	X	X	X	X
21	Car drivers	Park & Ride information	X		X	X
22	Car drivers	Information via VMS and DMS systems	X		X	
23	Car drivers	Information through personal navigation system	X		X	X
24	Cross modal	Best travel route based on real time traffic information	X	X	X	X
25	Cross modal	Information on most environmental route	X		X	

26	Cross modal	Information on most environmental friendly transport mode	X			
27	Visitors	Information in other languages than the official language	X	X	X	

Table 1: The user needs identified during the investigation of WP2.

Transport planner survey

In this task information about the needs of transport planners were gathered, and both planners concerned with public transport and planners focusing on the road network were targeted. The task was to identify what data, methodologies, and tools transport planners needed to plan and manage local transport. This was done through individual interviews with high level decision makers, who could provide insight into the strategic visions, and with lower level civil servants with knowledge of the more technical part of the information gathering.

Although there will be an open interface to provide data for transport planners the Viajeo demonstration in São Paulo will not directly provide data to transport planners. Also, in Beijing it was decided that interviews with transport planners would not be relevant for the project, as there will be no demonstrations targeted transport planners. Therefore no investigations of transport planner needs were carried out in São Paulo or Beijing.

The investigation showed, that the most basic requirement for the transport planners is to know about the actual traffic situation at all times. The transport planners also expressed that more and better cooperation between traffic information providers would be useful.

Table 2 below shows an overview of all the identified transport planners needs.

Transport planner needs			Relevant demo sites			
Number	Category	Short definition	Athens	São Paulo	Beijing	Shanghai
28	Road transport planner	Multi system cooperation between providers of traffic information	X			X

29	Road transport planner	Road traffic congestion information	X			X
30	Road transport planner	Traffic congestion causes				X
31	Road transport planner	Countermeasures analyses				X
32	Road transport planner	Real-time road traffic condition	X			X
33	Road transport planner	Vehicle fleet and type composition				X
34	Road transport planner	Information on traffic flows	X			
35	Road transport planner	Tools to conduct speed measurements and occupation of lanes	X			
36	Public transport planner	Information on freight transport in the city centre	X			
37	Public transport planner	Multi system cooperation between providers of traffic information	X			

Table 2: The transport planner needs identified during the investigation of WP2.

Gap analysis

The open platform is set to overcome current challenges concerning the integration of distributed data sources for dynamic content by allowing standardised access by implementing interfaces according to current European or de facto standards used or predominant within the ITS industry in Europe.

The Greek national standards are, as Greece is a part of the European Union, not conflicting with specific European standards.

The investigation in Sao Paulo revealed, that currently no relevant national standard are implemented which would have to be considered within the VIAJEO project.

As Shanghai and Beijing are both Chinese sites, the Chinese national standards apply to both of them and need to be taken into account. Today, a multiplicity of current Chinese national standards exist in the field of ITS. However, all of those standards are currently still in draft

status and hence will still change over time.

Summing up the status in the test sites, the gap analysis has to come to the conclusion, that currently no regional standards are relevant for the design of the VIAJEO platform and the interfaces included therein as China is currently developing a multiplicity of standards, many based on European and international approaches, and Brazil does not feature any relevant national regulations.

As a result, the Gap Analysis shows no gaps between the national Standards (as there are no relevant ones) and suitable European standards. Thus, the VIAJEO platform will be defined on basis of European and international standards only.

Requirements formulation

Lastly, WP2 has formulated requirements for data collection, processing and dissemination. This was done by preparing a list of service oriented use cases, which reflects the needs of transport planners and end users and outlines which features the services demonstrated by the project will have at each test.

The WP 2 leader formulated all use cases and they were in turn accepted by the test sites. The use cases presented were selected on the basis of the planned demonstrations at the individual sites. This means that the use cases do not reflect all the requirements of end users and transport planners but only the needs which can be satisfied by the planned demonstrations.

The open platform facilitates the implementation of a range of traffic information services by setting up the exchange network of real-time and static traffic and transport data and by providing basic functionalities in terms of traffic modelling, forecast etc. The use cases do not focus on the open platform though but are service oriented instead. They outline which features the services demonstrated by the project will have.

Use cases		
Number	Description	User needs covered
1	Real time bus arrival information on displays at bus stops	2, 3, 14, 16
2	Web-based cross modal route planner (based on both real time and historic data)	2, 3 ,4, 6, 7, 8, 10, 12, 13, 14, 19, 21, 24, 25, 26, 27
3	Park & Ride information via VMS and Internet	7, 21, 22

4	Public transport planner using traffic model to plan public transport (smart cards)	
5	Dynamic assignment of taxis	This use case covers the needs of professional drivers and a taxi dispatch centre. Their needs have not been uncovered in the investigation but the service match needs 1, 2, 3, 19, 23, 24 of car drivers
6	Traffic alerts for taxi drivers	This use case covers the needs of professional drivers and a taxi dispatch centre. Their needs have not been uncovered in the investigation but the service match needs 1, 2, 3, 19, 23, 25 of car drivers
7	Traffic information to end users	1, 2, 3, 4, 6, 7, 8, 10, 11, 12, 15, 19, 20, 27
8	Processed traffic information and indicators to transport and traffic planners	29, 31, 32
9	Selection and payment of public transport	
10	Real time bus operation	29, 31, 32
11	Accessing web-based cross modal planner on the bus	17
12	Traffic environmental monitoring and traffic related emission model simulating air quality	29, 32
13	Dynamic route planner (based on both real time and historic data)	2, 3, 6, 7, 8, 10, 11, 19, 20, 24, 27 (2-11 are only covered for car drivers and not public transport users)
14	Traffic information to car drivers	1, 2, 3, 6, 7, 8, 10, 11, 19, 20, 27 (1-11 are only covered for car drivers and not public transport users)

Table 3: An overview of use cases with indication of which user needs they cover

CONCLUSION

The aim of Work Package 2 of the VIAJEO project was to provide information to the VIAJEO project about the current situation at the test sites; not only the current systems running, but also the planned new implementations that are being considered. Also the needs of end users and transport planners were uncovered for the benefit of the subsequent work packages in order for especially the demonstration work packages to evaluate their planned

demonstrations against actual expressed needs.

The investigations of standards, current and planned systems, and the gap analysis will especially be useful for Work Package 3 when searching for common ground for the open platform. The requirement formulation will offer support all the way through the project as it summarizes the required features of the demonstrated services.

To complete the investigative tasks in a conform manner, the Work Package 2 leader prepared guidelines for each investigation and sent them to the test site leaders and the task leaders at each site. Even though some dialogue between the Work Package 2 leader and the test site leaders were necessary (particularly regarding information on current and planned systems) this strategy was successful. Especially the focus group meeting proved to be a very effective way of getting information on the needs of end users.

The results of the 2nd work package have been compiled into a report which is available for download from the project website; <http://www.viajeo.eu/en/publications>.