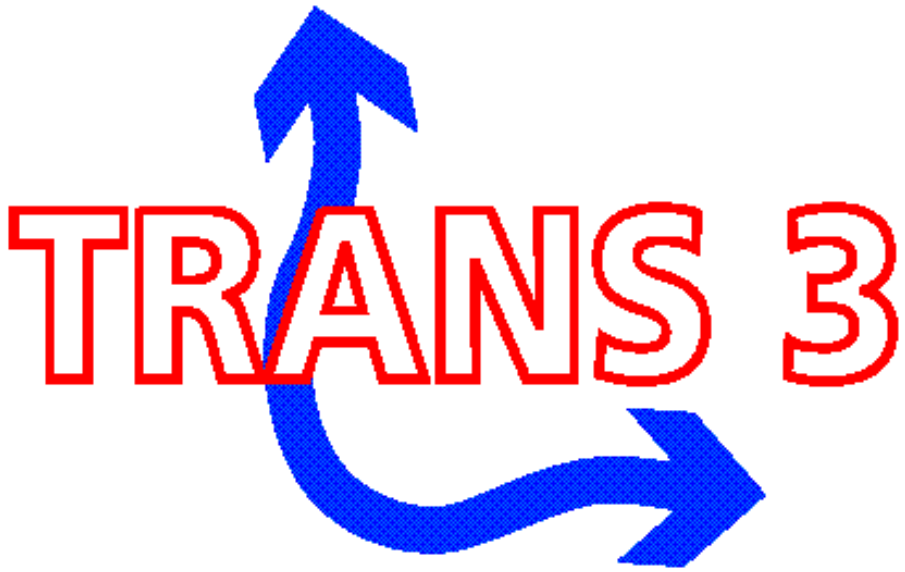


TRANS 3
Introduction and operation of a multimodal travel information service for transport

Christian Egeler, dipl. Ing. ETH,
RAPP AG Engineers and Planners

Conference paper STRC 2002
Session Real Time

STRC | 2nd Swiss Transport Research Conference
Monte Verità / Ascona, March 20-22, 2002

TRANS 3
Introduction and operation of a multimodal travel information service for transport

Christian Egeler
Traffic Telematics Department
RAPP AG Engineers and Planners
Basel, Switzerland

Phone: +41 -61 335 78 14
Fax: +41 -61 335 77 00
eMail: christian.egeler@rapp.ch

Abstract

A great number of systems gather and process traffic data. The need for traffic information has increased in the last years as a consequence to the existing congestion problems. The available route computation services do mostly not respect real-time data and are mono-modal. TRANS 3, a research project in the fifth framework programme of the European Union, includes available real-time data and the offered service TransBasel is multi- and inter-modal.

The service is offered to the users under www.transbasel.com and www.transbale.com in French, German and English. It covers regional transportation in the tri-national agglomeration of Basel extending over France, Germany and Switzerland and is free of charge. The user is able to compare the estimated travel times for following modes or modal combinations:

- Private car
- Public Transport
- Private car and public transport
- Pedestrian
- Bicycle
- Bicycle and public transport

Beside of the route computation the used real-time data is displayed directly in a special section. Two web-cams are showing the traffic state on the Swiss Motorway. An extensive collection of links to traffic related sites in the agglomeration complete a comprehensive pre-trip travel information service.

The introduction of a multi- and especially of an inter-modal route computation proved to be a challenge, more than just combining the existing and highly successful mono-modal services (e.g. public transport timetables). Many rules had to be included in the route computation process to issue sensible results from the users perspective. The tri-national challenge was underestimated as the three countries each have several transport operators.

Keywords

TRANS 3 – Transbasel -Pre-trip – travel information – multi-modal – inter-modal – 2nd Swiss Transport Research Conference – STRC 2002 – Monte Verità

1. Introduction

In recent years the increasing need to improve mobility and combat congestion problems have caused a rapid development of new traffic information technologies. A great number of systems is already deployed to optimise the traffic data collection and processing. Today the possibility to access these data by the public gives the users the opportunity to inform themselves about the current traffic situation and the attractiveness of the different modes of transport available.

Currently these data are mostly not used for this purpose. Many mono-modal offers are available on the internet, but comparing the different modes is lavish and for inter-modal journeys very difficult.

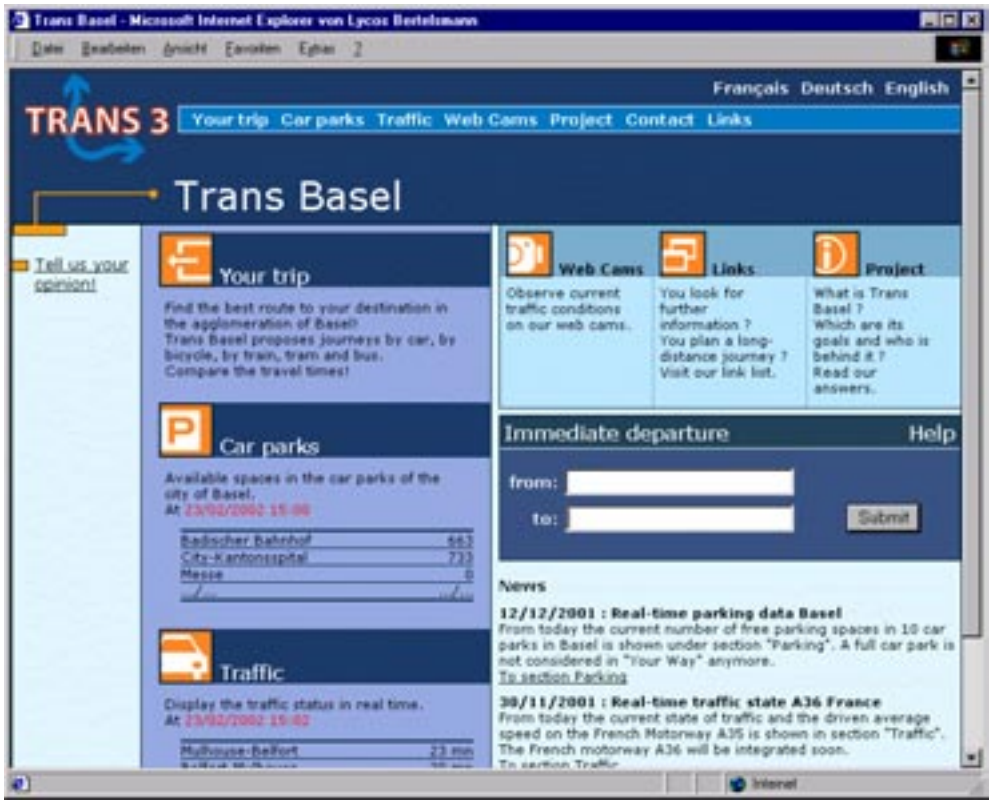
TRANS 3 is a research project in fifth framework programme of the European union. The main project aim is to introduce and operate the multi- and intermodal pre-trip travel information system "TransBasel" for the tri-national agglomeration of Basel.

2. TRANS 3 - THE PROJECT

2.1 Scope

TRANS 3 is a research project in the IST-Programme of the fifth framework programme of the European Union. TRANS-3 trials a multi- and intermodal pre-trip travel information service based on real-time and estimated traffic data for regional transportation in the tri-national agglomeration of Basel extending over France, Germany and Switzerland. The service is offered to the users under www.transbasel.com and www.transbale.com in French, German and English. It is free of charge.

Figure 1 The multi- and inter-modal service is available under www.transbasel.com



A tri-national consortium[1] with representation of transport authorities, road and public transport operators, and technology providers has set up the real time service. For the trial period, the consortium also operates the service.

2.2 Tri-national agglomeration Basel

The project covers the tri-national agglomeration of Basel (TAB) spreading over France, Germany and Switzerland. Some 700'000 inhabitants live in this area of a diameter of 30km.

Trips between the different countries are quite common for all sort of trips (business, shopping, leisure etc.). Some public transport lines also cross the border.

There are about 30'000 commuters per day travelling from France and about 20'000 from Germany to Switzerland every morning. The bicycle mode plays an important role within the city of Basel (17% modal split) and neighbouring villages.

2.3 Consortium Members

Institutions represented in the Consortium:

Switzerland: RAPP AG, R.Keller & Partner AG, Rosenthaler + Partner AG, Basler Verkehrsbetriebe BVB, Swiss Federal Railways SBB, Polizei- und Militärdepartement Basel-Stadt, Bau- und Um-weltschutzdirektion Kanton Basel-Landschaft, Swiss Federal Roads Office, Wirtschafts- und Sozialdepartement Kanton Basel-Stadt, Bundesamt für Raumentwicklung.

Germany: Landratsamt Lörrach

France: Carte Blanche Conseil, Société des Autoroutes Paris-Rhin-Rhône

[1] see 2.3

3. TRANSBASEL - THE SERVICE

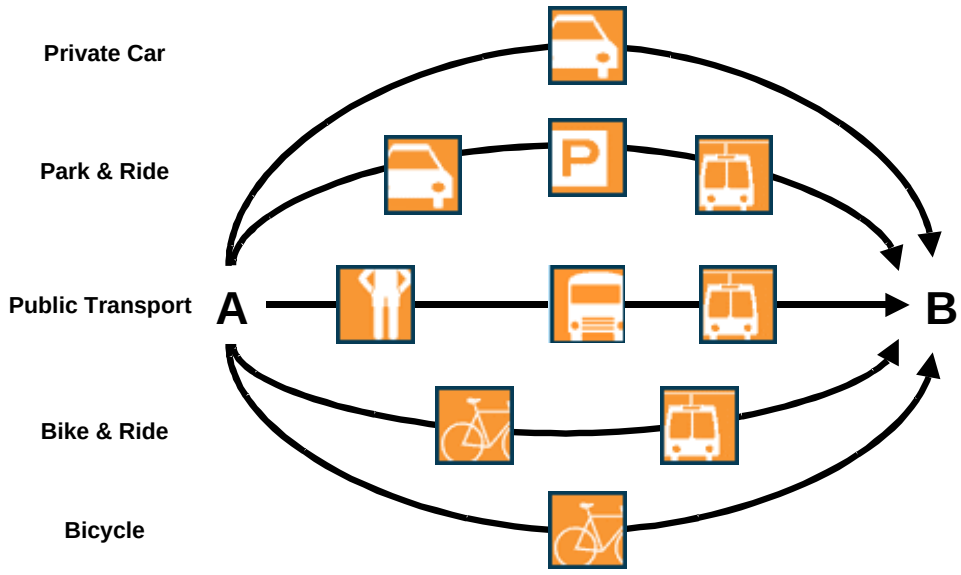
3.1 Your way

3.1.1 Description

The main service offered to the users is a pre-trip travel information tool to compare the travel times using different modes. For a traveller's origin-destination pair, and a given departure or arrival time, the service will propose best routes and associated travel times for following modes or modal combinations:

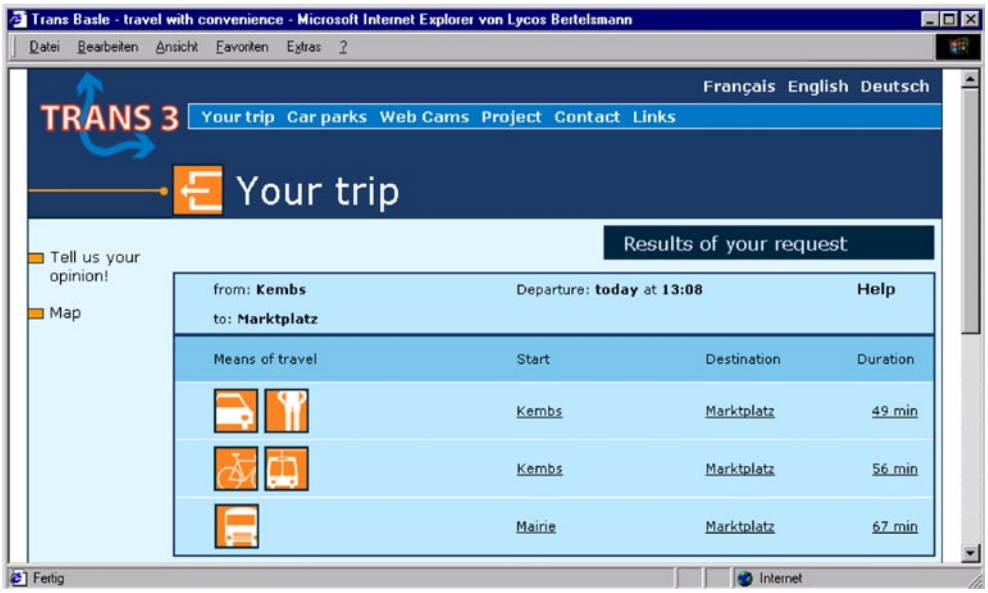
- Private car
- Public Transport
- Private car and public transport
- Pedestrian
- Bicycle
- Bicycle and public transport

Figure 2 Transbasel proposes journeys by several modes



The travel times will be according the day-time of travelling. For private cars historic data, where available also real-time data is used to compute the travel times.

Figure 3 Comparison of computed routes

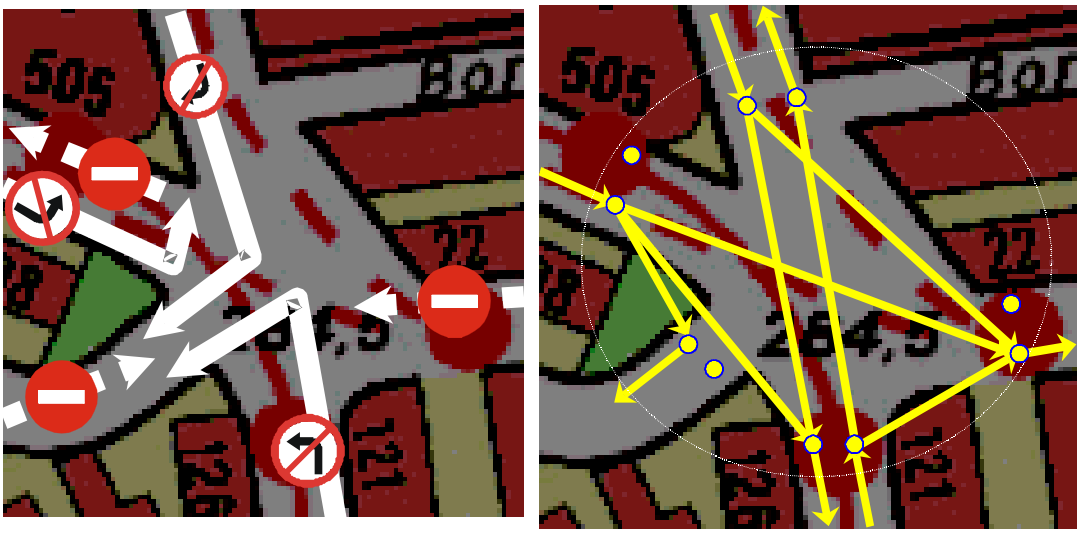


3.1.2 Base network

For the route computation a multi-modal network is used. For public transport all stops and all available lines have been included. The network for private cars, pedestrians and bicycle cover all the main routes in the agglomeration and consist of around 4'000 links (streets) and 1'500 nodes (intersections) to enter the network.

The network is described by links for each mode and direction. Road intersections with turn restrictions are composed of incoming and outgoing access points for each street leading to/from the intersection. Allowed turns are represented by internal links between an incoming and an outgoing access point. Road intersections with no turn restrictions only have one common access point (no internal links).

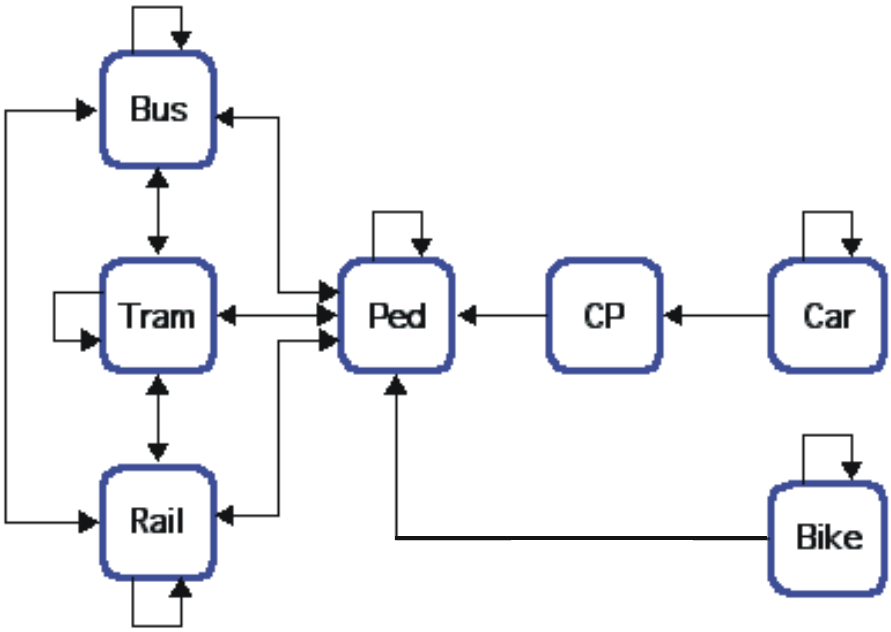
Figure 4 A road intersection and its representation in the network



In intersections with turn restrictions for cars, the pedestrian and bicycle mode have a central node which allows every turn - and reduces the amount of necessary internal links.

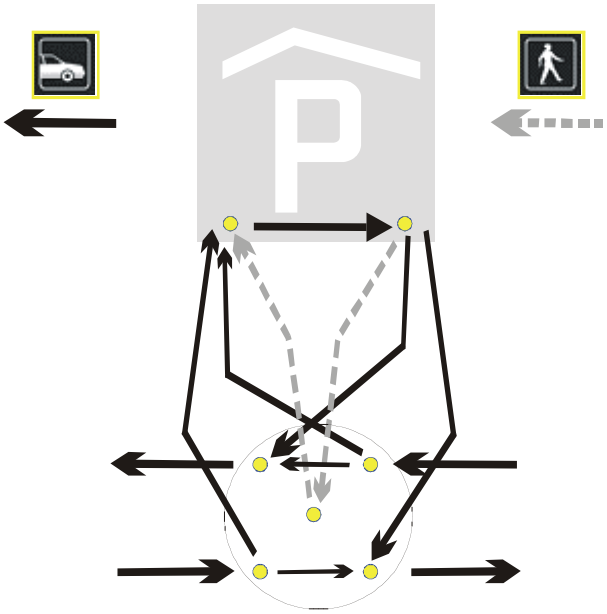
Special pedestrian links allow a transfer from individual transport to public transport. At all public transport stops it is possible to change from pedestrian and bicycle mode to public transport and from public transport to pedestrian mode.

Figure 5 Inter-modal rules for the route computation



A change from car to public transport is only possible at designated parking areas. Therefore around 30 parking areas are included in the network.

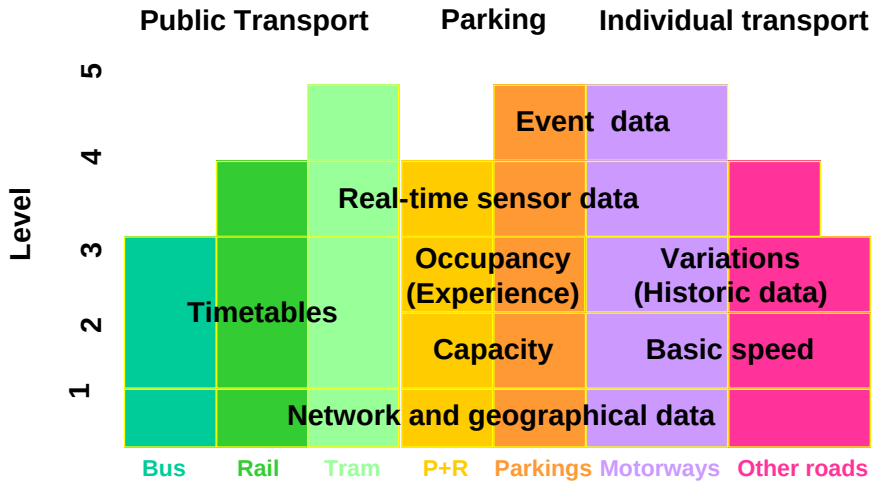
Figure 6 Connection of parking areas to the network



3.1.3 Travel times

The travel times used for the route computation are based on several layers. In individual transport a basic travel time is assigned to each link. These basic data is completed by variations according to week day and hour. At the moment four different levels are assigned: free and normal flow, morning peak, evening peak.

Figure 7 The data structure of Transbasel



The capacities and historic variations in occupying are the main layers for the parking mode. For public transport the timetables are represent these two layers. For all data suppliers also real-time data and event data can be assigned to network components and will be used in the route computation.

3.2 Real-time data & Webcams

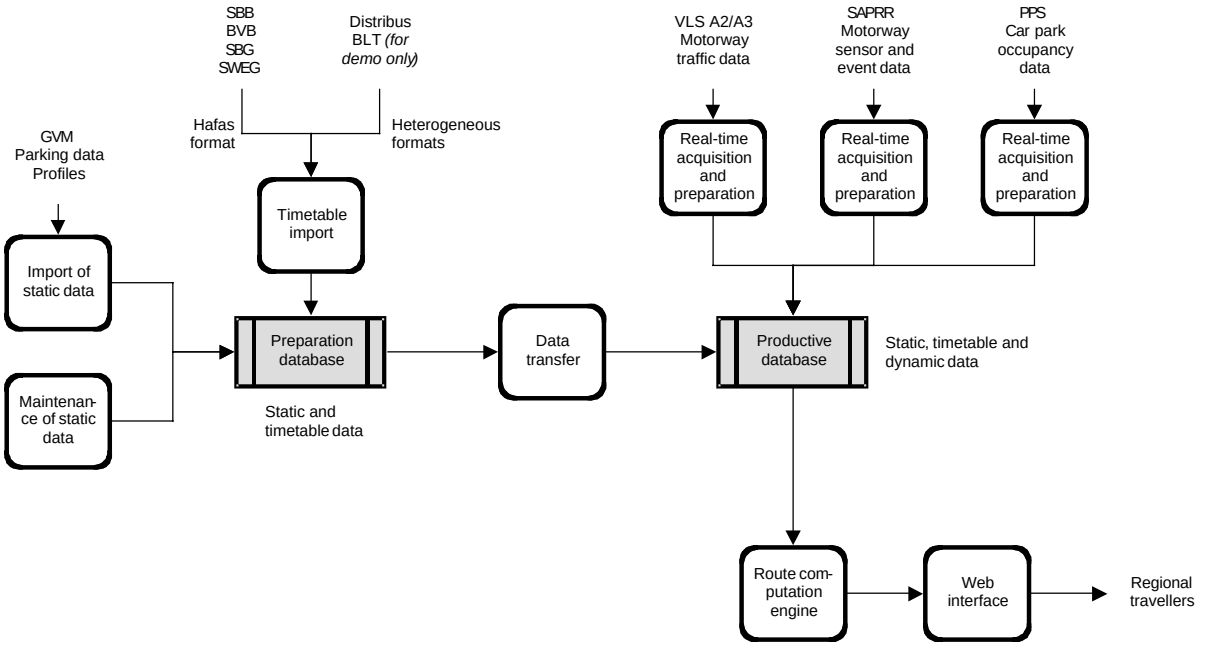
Real-time data used for the route computation is displayed in a special section of the site. For the start of the service the parking occupancy of all city parkings in Basel and the average speed as well as events on the French motorways A35/36 are automatically displayed.

Two webcams on the Swiss motorway A2 show the traffic state of this road with a average daily traffic of more than 100'000 vehicles.

In a second phase real-time data gathered by the section control system Basel (A2/A3) will be included into Transbasel as soon as it is available.

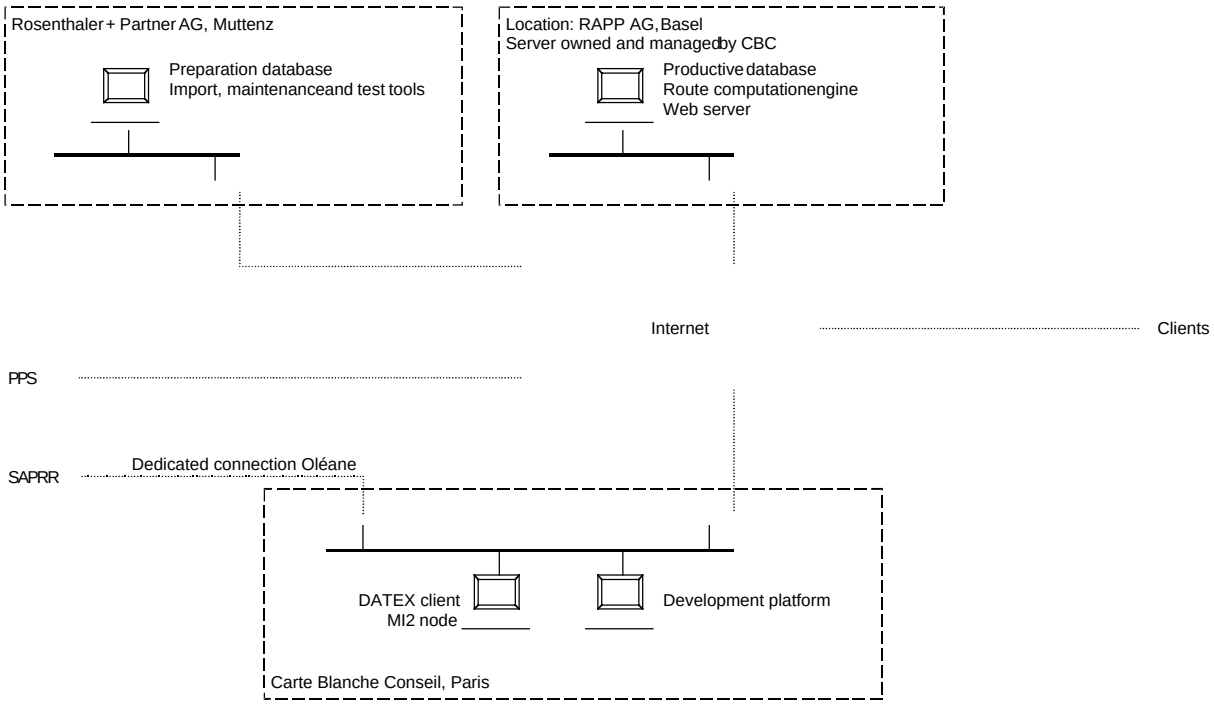
3.3 System architecture

Figure 8 Functional architecture



The system architecture is illustrated below. The system is composed of three subsystems. The Data Acquisition System is connected to the various real-time information sources. It centralises the real-time information and transmits it to the Computation System. The Computation System manages a dynamic database, and a static database containing timetables and static network information. It operates the route computation and the travel time prediction tool, regularly updating the expectional values held in the dynamic database. It answers the requests coming from the Internet Server. The Internet Server delivers the travel information to the users.

Figure 9 System architecture



The system will be implemented in the trial region. Computation System and Internet Server will be doubly implemented, a copy for fallback, maintenance and development being localised in Paris.

4. Current situation

4.1 First experiences

The introduction of a multi- and especially of an intermodal route computation is a challenge. It goes far beyond just combining the existing and highly successful mono-modal services (e.g. public transport timetables). Many rules had to be included in the route computation process to issue sensible results from the users perspective.

The number of data suppliers and therefore necessary meetings and agreements required considerable resources. The integration of real-time data and of the timetables of public transport has proven to be a major problem as different data structures and formats had to be combined and specific protocols had to be used. Interfaces to another parties have not been planned for most existing systems. The internal networks of authorities and transport operators are normally protected from external access.

The different structure of the network based road data and the timetable based public transport data resulted lead in the beginning to problems in combining the data for the route computation.

The tri-national challenge was underestimated as the three countries each have several transport operators. The realisation of the website in 3 languages increased the complexity further.

The development of a business model for a sustainable operation of the service after the trial period is ongoing and will be included in the final documents.

4.2 Evaluation aspects

The evaluation and validation of the service is ongoing and will be published in TRANS 3 deliverables available from June on the web-site of TRANS 3.

For evaluation following User Groups will be distinguished:

- Operators of road and public transport networks, and transport terminals
- Public authorities concerned with regional transport policy

- Operators of TRANS 3 service
- Target Users

The target users will looked at considering additionally:

- Purpose of travel:
  - Commuter
  - Journeys for leisure and shopping
  - Professional journeys
  - Business travellers
  - Tourists
- Mode availability
  - Users with only PT available
  - Users with bicycle available
  - Users with all modes
  - Users with only car available

The expected impacts which have to be validated are

- Use of an alternative route / parking
- Use of an alternative travel mode
- Change time of departure
- Trip substitution / Change of destination (leisure)

An measurable impact on road traffic / PT usage is expected to be small during the pilot, therefore will not be evaluated.

An Interest Group Panel will be created for collecting the experiences of interest groups. Two questionnaires will be issued to them, one at/before the start of the service and one after the start.

Selected target users will form an User Panel which will form one of the main validation sources. Beside of two questionnaires also direct contact is planned to members. The User Panel will test the service before the start is announced publicly.

A short questionnaire will be offered on the service web-site itself.

Another important source for the evaluation of the service is the usage of the web-site and the offered services.

In the first test phase the staff of participating partners was used to validate the computed travel times and user-friendliness of the offered service.