



## MULTIMODAL JOURNEY PLANNING SERVICES

Multimodal travel information services, such as journey planners, inform travellers about the details of their travel as well as about the best means of transport. They therefore contribute to intensifying the use of public transport. While high-quality information systems already exist for local and regional areas, cross-border information is lagging behind. This can be attributed to the fact that travel information systems are limited to local, regional or national means of transport, and only a small amount of cross-border data is integrated.

The LinkingDanube project addresses this problem by linking the largely isolated systems across borders. LinkingDanube stands for "Linking transnational, multimodal traveller information and journey planners for environmentally-friendly mobility in the Danube region". The project is supported by the INTERREG Danube Transnational Programme of the EU.

The project has brought together public institutions and transport providers from six different Danube Region countries to enable linking services across borders. LinkingDanube was launched in Vienna on 1st January 2017 and has a duration of 2.5 years.

LinkingDanube contributes to the European Danube Region Strategy (EUSDR) goal of Priority Area 1B, targeted on the improvement of Mobility and Multimodality – with focus on rail, road and air links to better connect citizens, to enable greater multimodality and better connected transport links. One of the most important goals of EUSDR is the territorial cohesion that should be achieved by good links between urban and rural areas as well as fair and affordable access to infrastructure and services.

While data exchange has been the focus of the approaches in past research initiatives, LinkingDanube is building on the concept of "linking services" as defined in Delegated Regulation 2017/1926 supplementing Directive 2010/40/EU of the European Parliament and of the Council with regard to the provision of EU-wide multimodal travel information services. Through a common, open application programming interface (OpenAPI), the services can communicate with one another and exchange routing results without integrating the other ones data.

### MISSION

LinkingDanube aims at improving the end user experience of travellers in cities as well as rural areas in the Danube Region. By linking existing traveller information services through Open API it will enhance the availability and access to transnational journey planning. Thus it will open up the path to transport on demand in remote areas and foster the use of sustainable transport modes.

### THE LINKING DANUBE CONCEPT FOR DISTRIBUTED JOURNEY PLANNING

One main output is the LinkingDanube Concept on transnational, multimodal journey planning services for environmentally friendly modes in the Danube Region. The concept presents general aspects to be considered when linking traveller information services, an introduction to the CEN/TC 278 standard "Public transport – Open API for distributed journey planning" and its use within LinkingDanube as well as the project use cases, the system architecture and content specifications.

The Concept is based on findings of comprehensive state-of-the-art analyses and will align the specifications and recommendations on technical, organisational and legal level of WP3 Concept Development and WP4 Rural Area Integration. The concept serves as input both for the technical development work within LinkingDanube as well as for uptake by project externals aiming at implementing transnational journey planning services.

The CEN/TC 278 standard “Public transport – Open API for distributed journey planning” is used for the concept development. The following messages according to the OpenAPI standard will be used:

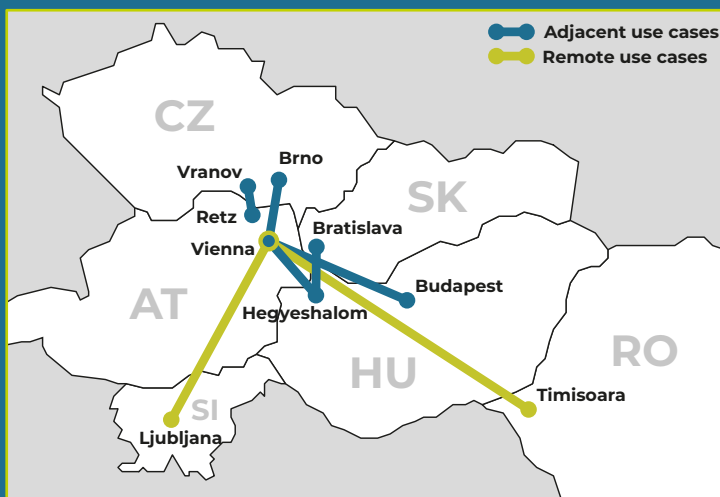
- 🌀 Location information
- 🌀 Exchange points
- 🌀 Trip request
- 🌀 Distributed journey planning

The LinkingDanube transnational journey planner aims at becoming a link between existing national journey planners and to rely on the information that those provide in order to offer extended trip planning solutions going beyond the coverage of any single local journey planner.

## STATE-OF-THE-ART ANALYSIS OF EXISTING JOURNEY PLANNERS

A central focus of LinkingDanube is the development of a concept for transnational multimodal journey planners in order to integrate the advantages of hub-to hub-routing with local routing for cross-border regions and the elaboration of technical specifications for interface and data exchange.

This concept shall build on existing structures in the partner countries, enhancing existing journey planners instead of creating a completely new structure. For this to be achieved, an initial collection and display of the status quo was provided by the partners in order to determine actual use cases and participating systems.

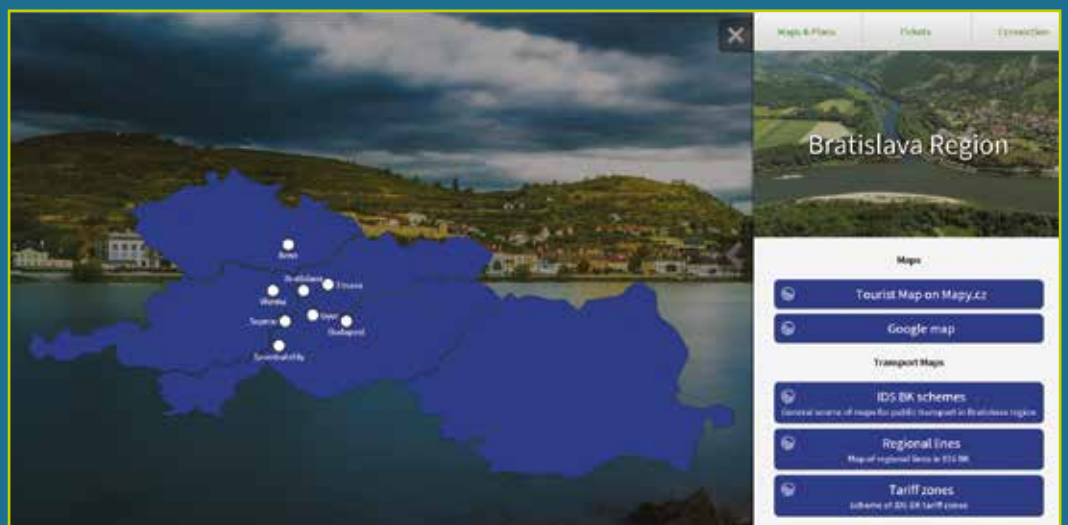


This analysis shows that there are 16 services available in total, some of them subject to restrictions. Based on the identified services, the most relevant were picked and several interconnection use cases have been selected and described. The following figure shows two basic kinds of use cases. Blue lines depict adjacent use cases, meaning that the services to be linked share a common border or overlap. Green lines show remote use cases which interconnect two systems without common border.

## DANUBE SCOUT

A central tool (app and web-service) – named Danube Scout – providing an overview of traveller information services in the Danube region and available on-demand transport services will be developed.

The Danube Scout will be a comprehensive overview application for traveller information services in the Danube Region.



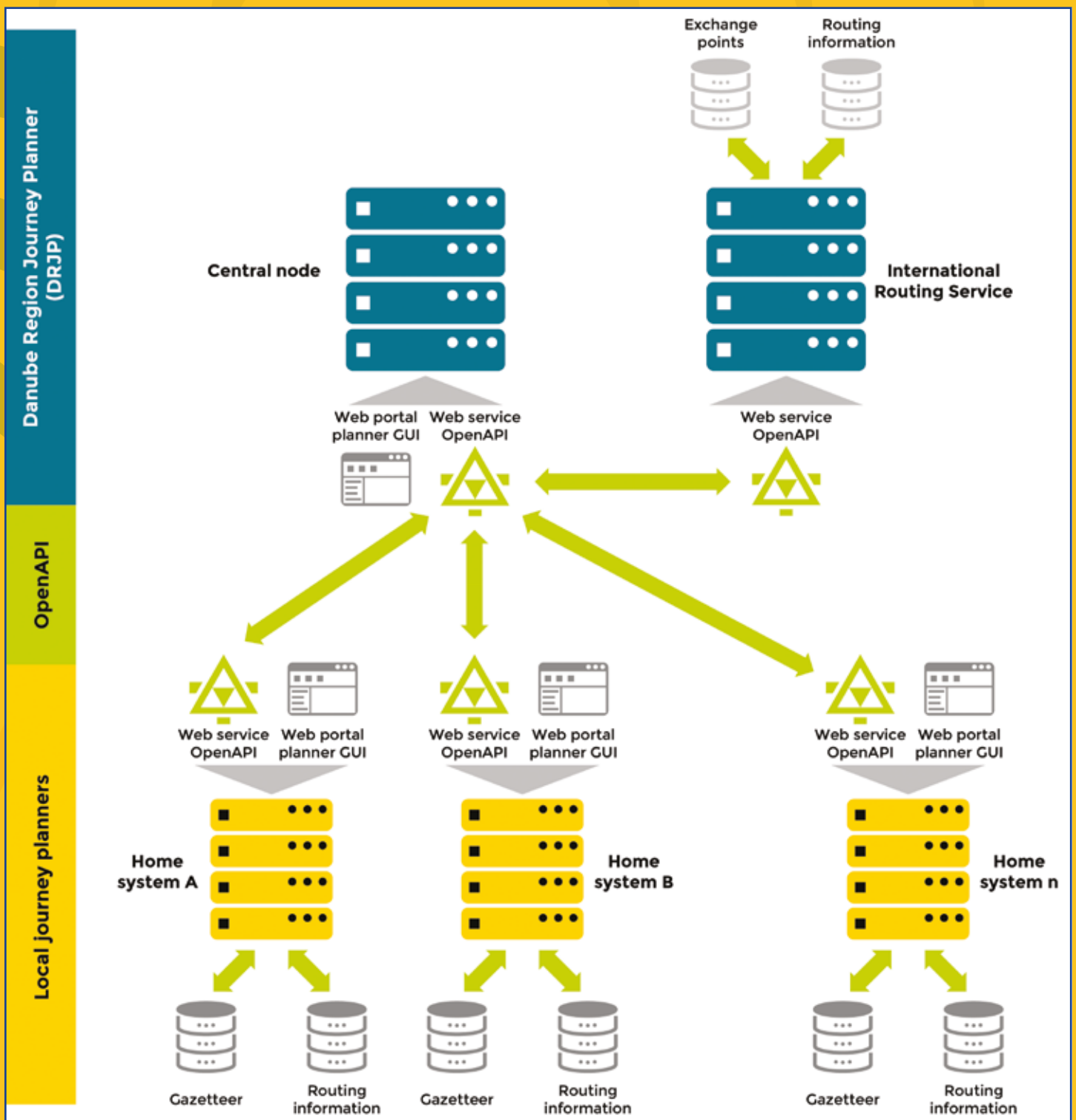
Regional and local services will be displayed and can provide their data to targeted user groups. Travellers, cross-border commuters and other end users will be offered information from various national sources, thereby making the Danube Scout a one-stop shop for traveller information services, available as mobile app and web service. A first layout and framework for Danube Scout has been drafted.

# SYSTEM ARCHITECTURE FOR THE DANUBE REGION JOURNEY PLANNER

The system architecture to be followed in LinkingDanube closely relates to the concept of a central-distributed journey planner that is described in the final draft version of the Technical Specification “Public Transport – Open API for Distributed Journey Planning” which has been prepared by the Technical Committee CEN/TC 278 (2017). It consists of one central entity containing the major part of the intelligence and a set of distributed (i.e. decentralised) national journey planners.

In this way the LinkingDanube system – henceforth called Danube Region Journey Planner (DRJP) – aims at becoming a link between existing national journey planners and to rely on the information that those provide in order to offer extended trip planning solutions going beyond the coverage of any single local journey planner. The Danube Region Journey Planner is connected to a web service via OpenAPI interface, which allows sending back the combined routing result to the linked local systems. The common OpenAPI interface will be integrated into the local journey planners in order to exploit the full functionality of the DRJP.

The main entities within the whole DRJP environment are the Central Node (CN), providing the necessary logic to manage the request and the International Routing Service (IRS), which is needed to generate routes between remote coverage areas of different local journey planners (meaning that they do not share a common border). With this setup, the DRJP represents the link between the Local Journey Planners (LJP).



## LinkingDanube - Linking transnational, multimodal traveller information and journey planners for environmentally-friendly mobility in the Danube Region

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