

Technical starting point of LinkingAlps

Summary of the Journey Planners ex-ante analysis

Summary

1. Introduction
2. Methodology
3. Main features of the participating Journey Planners (JPs)
4. Issues and challenges for the development of the distributed system

Introduction

- The first activity of the LinkingAlps project consisted in **analysing the current features of the local Journey Planners** involved in the project **and the uptake of innovations** such as the Open Journey Planning API
- The action intended to gather and summarize the basic technical information on the 6 participating systems as the **basis for the interoperability of the OJP services** and the **implementation of the distributed system**



Methodology 1/2

The analysis was carried out through specific steps:

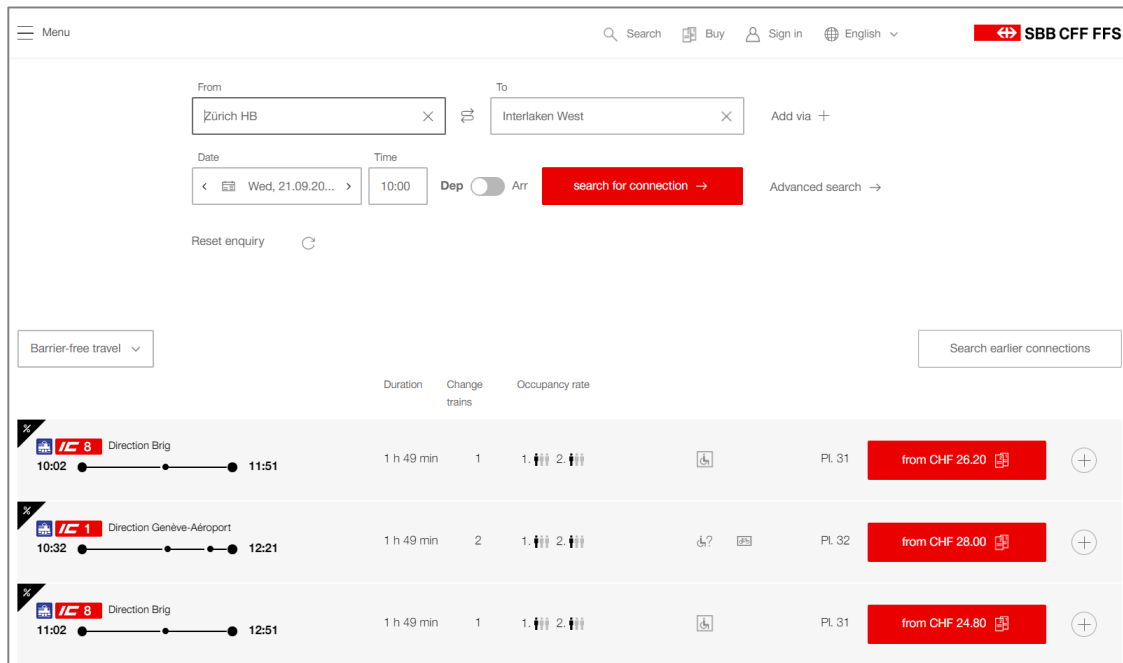
- 1. Identification of the relevant aspects and features needed for the interoperability of OJP services and for information exchange**
- 2. Design of a questionnaire** to collect information about the identified aspects from the JPs
- 3. Collection of the requested information**
- Assessment and analysis of the responses to provide a **conceptual knowledge** about:
 - what information existing JPs can offer/process
 - what information can be queried via OJP schemas
 - current gaps and interoperability issues

Methodology 2/2

Most of the investigated features were selected and described with reference to the OJP Schema as defined in the Open API for Distributed Journey Planning (CEN/TS 17118:2017) and concern information about:

- 1. Transport modes** – PT modes and sub-modes, transfer, private, individual and continuous modes
- 2. Requests options** – types of O/D pair requests, O/D search optimization and filtering criteria, accessibility info, stop requests, fares and tickets info, location for start and end of a trip
- 3. Geographical details** – base map, stop and route paths representation, IDs for network elements (stop codes), geographical coverage, provided languages
- 4. System Architecture** – data exchange formats, API requests and compliance with Open API, output message formats, data transfer protocols
- 5. Data governance** – data owners, data providers, data update frequency

Participating JPs - SBB









Menu Search Buy Sign in English SBB CFF FFS

From Zürich HB To Interlaken West Add via +

Date Wed, 21.09.20... Time 10:00 Dep Arr search for connection → Advanced search →

Reset enquiry

Barrier-free travel Search earlier connections

	Duration	Change trains	Occupancy rate			
 Direction Brig 10:02 — 11:51	1 h 49 min	1	1: 1 2: 2		PL 31	from CHF 26.20
 Direction Genève-Aéroport 10:32 — 12:21	1 h 49 min	2	1: 1 2: 2		PL 32	from CHF 28.00
 Direction Brig 11:02 — 12:51	1 h 49 min	1	1: 1 2: 2		PL 31	from CHF 24.80

Modes: Rail, tram, metro, bus, water, cableway / walking
Private, individual, continuous, hiking modes foreseen

Requests: O/D point to point requests + via routing

Search criteria: dep/arr time, mode, connection type, min transfer time, accessibility (restricted/free barrier trips)

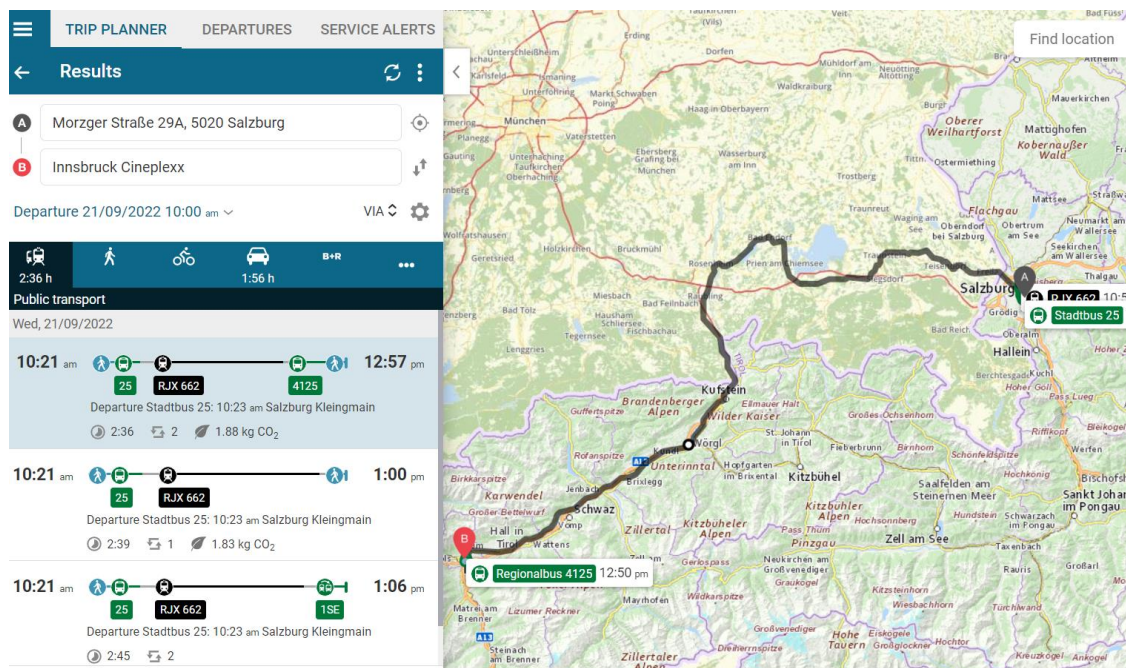
Info: expected events, tickets, stop timetables, CO₂ savings

Geographical coverage: national + greater areas outside CH + international trains, OSM base map, trip start/end as stops/addresses/POIs, network IDs from FOT public DB

System Architecture: new OJP service already under development based on EFA engine, NeTex and SIRI as data exchange formats, XML/JSON as output

Data Governance: stop DB daily updated, timetables weekly updated

Participating JPs - VAO



The screenshot shows a trip planner interface. At the top, there are tabs for 'TRIP PLANNER', 'DEPARTURES', and 'SERVICE ALERTS'. Below that, the 'Results' section shows a route from 'Morzger Straße 29A, 5020 Salzburg' (Point A) to 'Innsbruck Cineplexx' (Point B) on 'Wed, 21/09/2022' at '10:00 am'. The route is displayed on a map of the Alpine region, showing a path through Salzburg, Kufstein, and Innsbruck. Below the map, there are three public transport options listed with their departure times, durations, and CO2 emissions.

Departure	Mode	Arrival	Duration	CO2
10:21 am	Public transport (Stadtbus 25, RJX 662, 4125)	12:57 pm	2:36	1.88 kg CO2
10:21 am	Public transport (Stadtbus 25, RJX 662)	1:00 pm	2:39	1.83 kg CO2
10:21 am	Public transport (Stadtbus 25, RJX 662, 1SE)	1:06 pm	2:45	2 kg CO2

Modes: Rail, tram, metro, bus, water, cableway / walking, park and ride, bike and ride, bike hire

Individual: walk, cycle, car. **Continuous:** DRT

Requests: O/D point to point requests + via routing

Search criteria: dep/arr time, mode, stops, min # of transfers, direct connection, fastest/shortest path

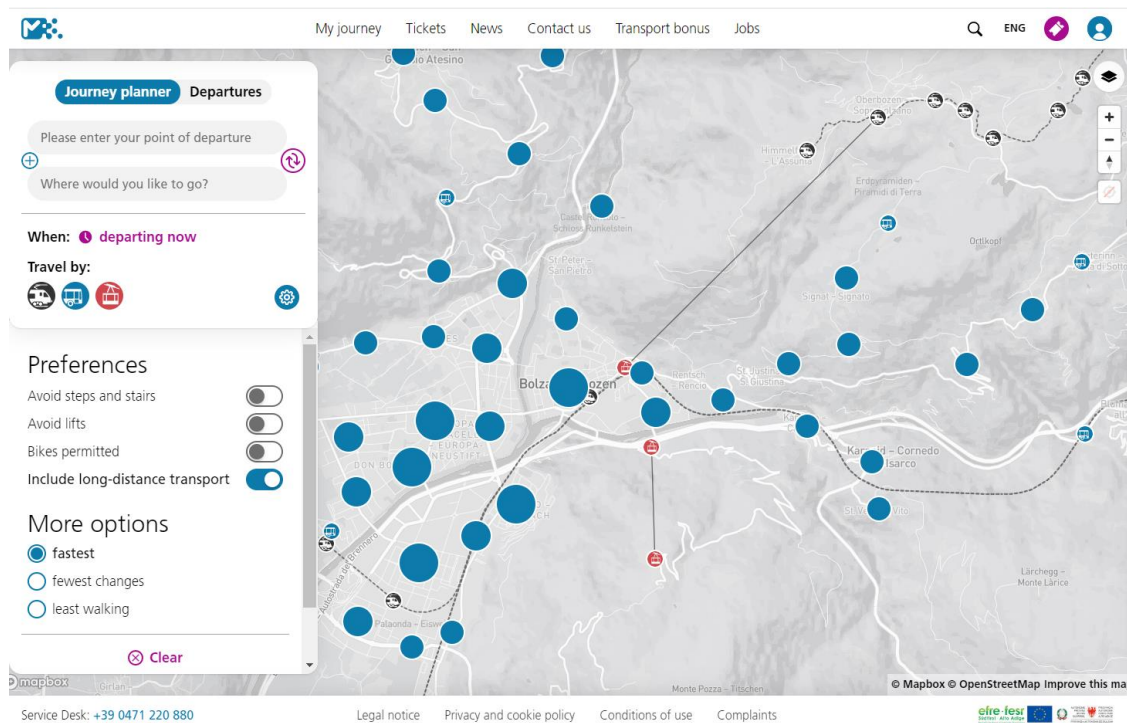
Info: accessibility, expected events, tickets, stop timetables

Geographical coverage: national + buffer around AT + LD trains, Graph Integration Platform, trip start/end as stops/addresses/POIs/point on a map, AT unique stop IDs

System Architecture: XML/JSON as output, HTTP REST data transfer protocol

Data Governance: timetables daily updated, addresses monthly updated, network graph updated every 2 months

Participating JPs – STA suedtirolmobil



Modes: Rail, bus, cableway / walking
Private and individual modes foreseen

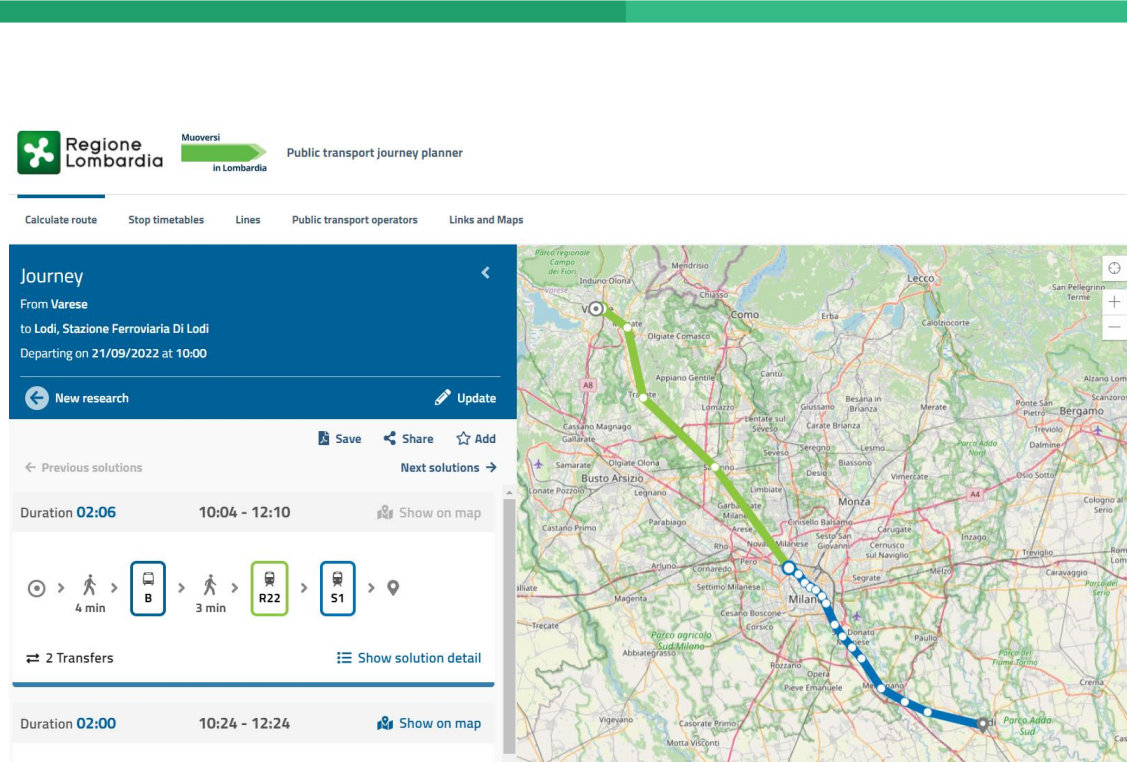
Requests: O/D point to point and departures requests (RT)
Search criteria: dep/arr time, min # of transfers, fastest path, shortest walking distance, stair/elevators exclusion
Info: modes, operators, accessibility (accidents/disruption), tickets, stop timetables

Geographical coverage: Bolzano province + South Tyrol, other Tyrol areas and Trentino (rail services), OSM base map, trip start/end as stops/addresses/POIs/point on a map/ user position, GlobalIDs for network elements

System Architecture: NeTEx, SIRI, GTFS and GTFS-R as data exchange formats, XML/JSON as output

Data Governance: data weekly updated (or on demand)

Participating JPs – ARIA Muoversi in Lombardia



Modes: Rail, tram, metro, bus, water, cableway / walking on pre-defined footpath (routing on a map not available)

Requests: O/D point to point requests

Search criteria: dep/arr time, mode, min transfer time, max # of transfers

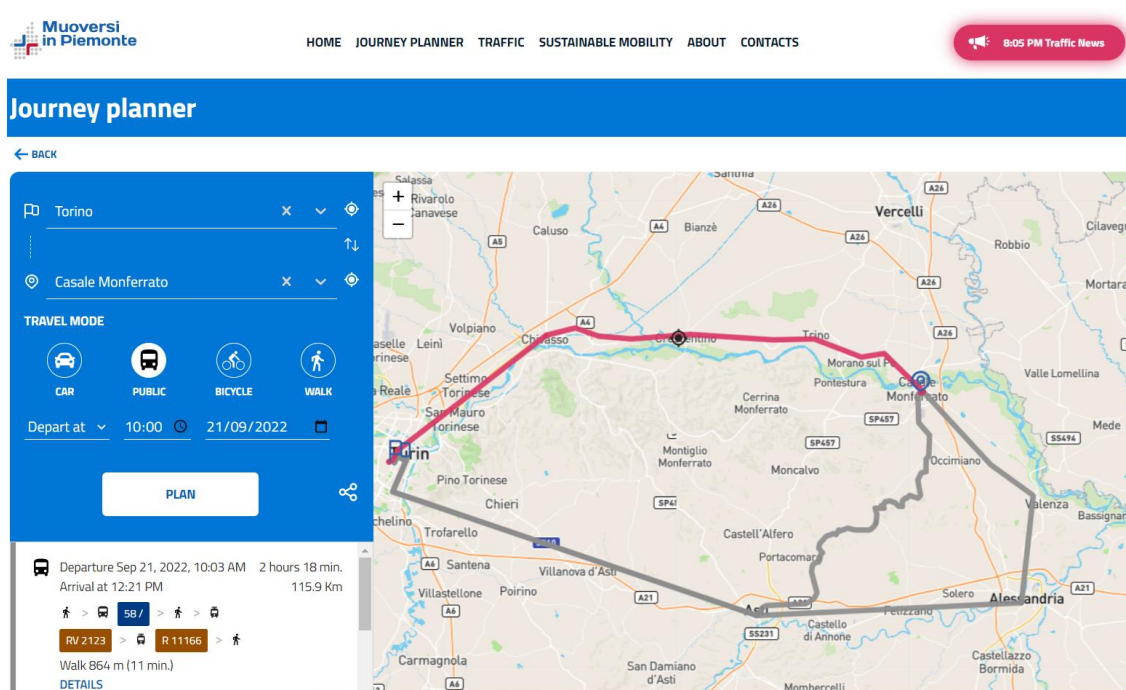
Info: stop timetables. No accessibility info available

Geographical coverage: regional (Lombardia) + LD trains, OSM base map for results representation, trip start/end as stops/addresses/POIs, unique numeric stop IDs

System Architecture: GTFS as data exchange format, JSON as output, HTTP REST data transfer protocol

Data Governance: timetables updated for relevant changes. Data provided by several transport operators in many different formats

Participating JPs – CMTo/5T Muoversi in Piemonte



Muoversi in Piemonte HOME JOURNEY PLANNER TRAFFIC SUSTAINABLE MOBILITY ABOUT CONTACTS 8:05 PM Traffic News

Journey planner

← BACK

Torino ×

Casale Monferrato ×

TRAVEL MODE

CAR PUBLIC BICYCLE WALK

Depart at 10:00 21/09/2022

PLAN

Departure Sep 21, 2022, 10:03 AM 2 hours 18 min.
Arrival at 12:21 PM 115.9 Km

RV 2123 > R 11166 >

Walk 864 m (11 min.)

DETAILS

Modes: Rail, tram, metro, bus / walking

Individual: walk, cycle, car

Requests: O/D point to point requests

Search criteria: dep/arr time, mode

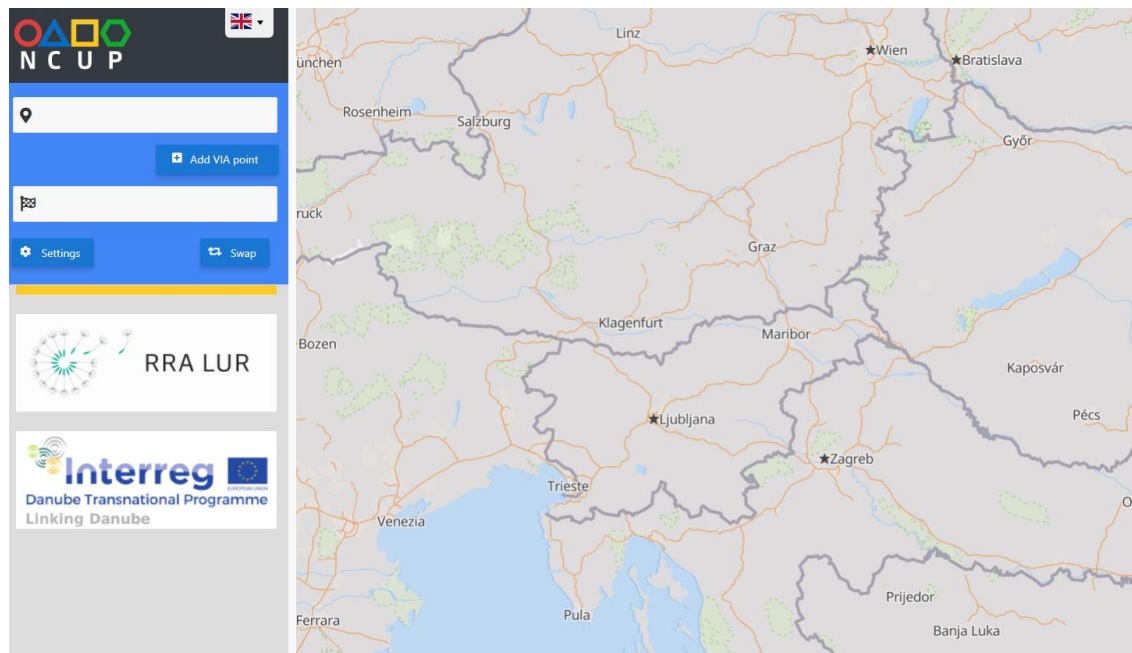
Info: stop timetables. No accessibility info available

Geographical coverage: regional (Piemonte) + part of Lombardia, OSM base map, trip start/end as stops/addresses/POIs/point on a map, local stop IDs

System Architecture: GTFS as data exchange format, XML/JSON as output, HTTP REST data transfer protocol

Data Governance: data monthly or 3 times/year updated. Data provided by several transport operators

Participating JPs – RRA LUR AtoB



Modes: Rail, bus / walking, cycling

Individual: walk, cycle

Requests: O/D point to point requests

Search criteria: not available

Info: times for intermediate stops. No accessibility info

Geographical coverage: national, OSM base map, trip start/end as addresses/point on a map, ordered numbers as network IDs

System Architecture: GTFS as data exchange format (NeTex foreseen), XML/JSON as output, HTTP REST data transfer protocol

Data Governance: JP pilot version developed within the Linking Danube Interreg Project

Main issues towards the distributed system 1/2

- The 6 JPs present different levels of development, coverage and deployment
- Main **information gaps**:
 - ✓ **Fares and tickets** information provided only by 3 JPs
 - ✓ **Real Time data** provided only by 3 JPs
 - ✓ **Accessibility information** for special needs users provided by 3 JPs, other accessibility information (e.g. road works, service disruption) only by 2 JPs
- Interoperability issues are mainly related to the **PT network representation**:
 - ✓ All JPs use **different types of identifiers** (national stop IDs, GlobalIDs, local numeric stop IDs)
 - ✓ **Network stops** are **modelled in different ways** (4 JPs differentiate stops by hierarchy levels)
 - ✓ 2 JPs do not manage **real geometries for routes** paths (routing on a map not available)
 - ✓ **Different languages** required to indicate trip O/D (3 JPs require their native language)
 - ✓ **Different data quality levels** and data **update frequencies**

Main issues towards the distributed system 2/2

- Main **system architecture** issues:
 - ✓ Most JPs support **GTFS formats**, but some of them are **switching to more standardized formats**
 - ✓ **JSON** is the only output message content format used by all JPs
- **Compliance with the 7 standardized Open API requests:**
 - ✓ Only the **Location Information Request** with the function of matching text input against possible O/D locations is supported by all JPs
 - ✓ **Open API Trip request** is supported by 3 JPs, while the others support it with proprietary functionalities
 - ✓ **Trip Info request** only supported by 1 JP, 3 JPs support it with proprietary functionalities
 - ✓ **Stop event request** only supported by 1 JP, 2 JPs support it with proprietary functionalities
 - ✓ **Exchange Points request** only supported by 1 JP
 - ✓ **Fare request and Multipoint Trip request** not supported

Thank you for your attention

Tiziana Delmastro
tiziana.delmastro@linksfoundation.com