

International routing on the example of Linking Alps

Online-Meet-Up

12th September 2024

Agenda

- Overview
- Solutions
 - International trips with OJP (via demo App)
 - Demo of the active systems
 - Multi languages
 - Exchange points
- Challenges
- Discussion

Who is speaking to you today?



- **Petra Soderqvist,**
Policy Officer at
the European
Commission, DG
MOVE



- **Nicole Hampel,**
Expert at
AustriaTech for
Digital Mobility
Services



- **Luka Krevs,**
CEO at Realis



- **Andreas Glauser,**
Business Analyst
at SKI+



- **Roberto Cavaliere,**
Subject Matter
Expert for AI and
mobility solutions
at NOI



- **Serena Barassi,**
IT consultant at
ARIA



- **Stefan Mayr,**
Managing
Director of VAO



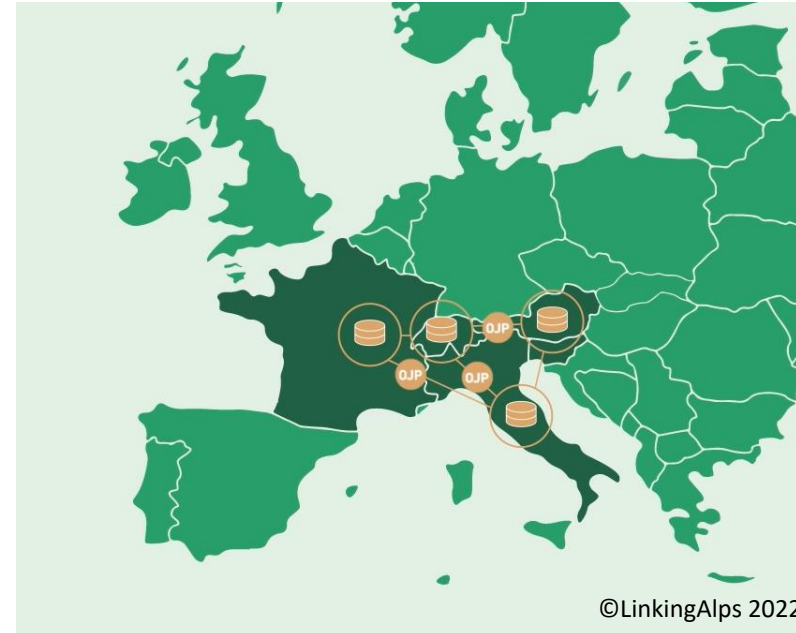
- **Christine Matt,**
Business
Development at
SKI+

Introduction

Nicole Hampel, Expert at AustriaTech

LinkingAlps

- INTERREG Alpine Space Program
- 2019 – 2022
- ...implements **transnational mobility information services based on a decentralised network of linked journey planners in the Alpine Region**
- ...**prepares for an operative service** after the end of the project (working towards „technological readiness“)
- ...further **develops the approach** from a central-distributed to a fully distributed architecture
- ...**installs a viable organisational and operational architecture** for linking services in the Alpine region
- ...develops a **framework strategy for an harmonised implementation** across Europe
- ...**reaches out to future adopters** with implementation support to create leverage for an Alpine wide application



14 Project Partners

6 Alpine Space Countries

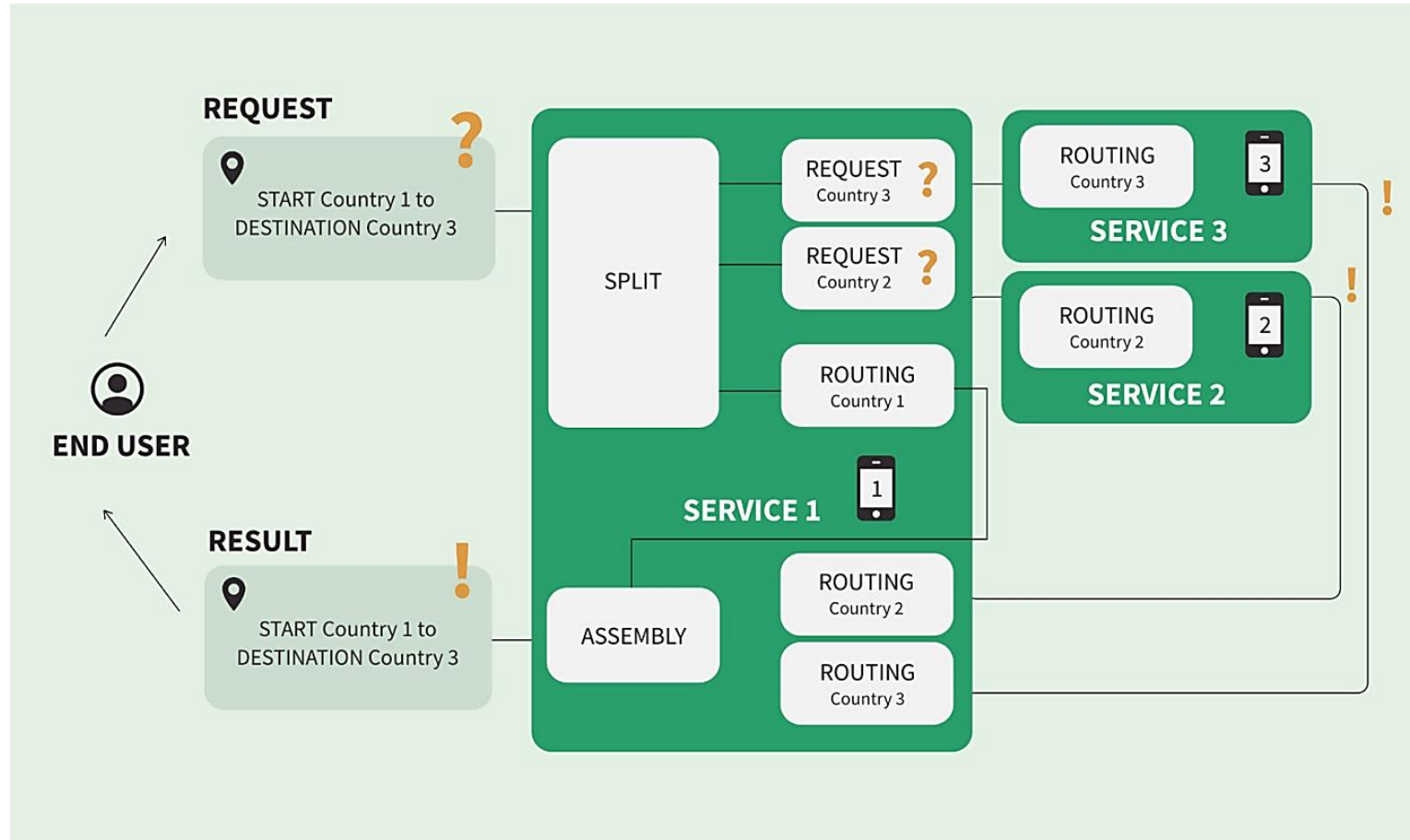
6 Existing travel information services/ journey planners

LinkingAlps Beta Phase 2023/2024

- Further development of the LinkingAlps service and friendly-user tests

- **Objectives**
- Data/service availability via OJP-APIs
 - complete set of public transport offers is accessible, including long-distance
 - the minimum level of quality needs to be defined
- Improvement of quality (incl. definition of quality)
- Performance
- Multilanguage service provision
- Dealing with routes covered by more than one operator

Linking of Services approach



International trips with OJP

Luka Krevs, CEO at Realis

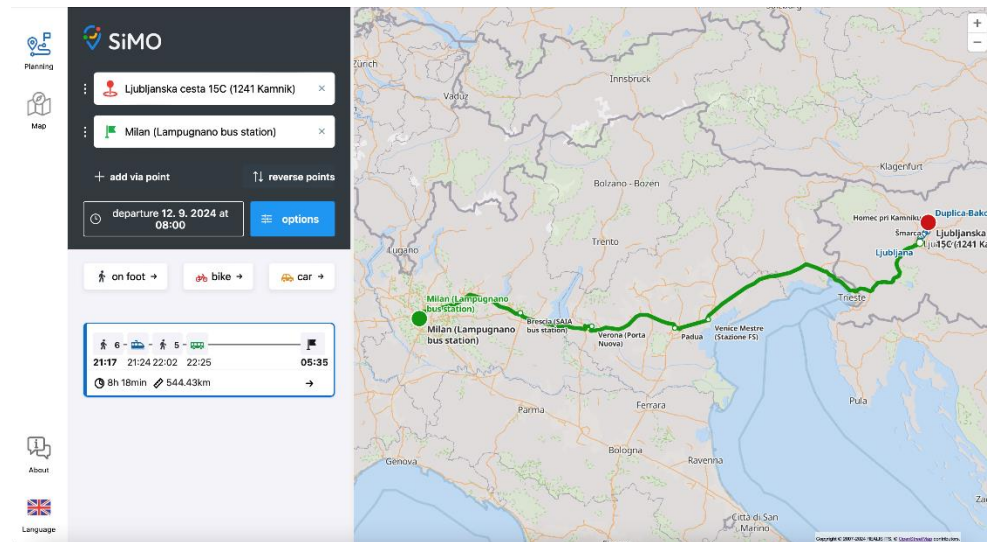
Expectations & Challenges

- Expectations
 - Ideal quick route from A to B
 - Multiple transport modes
 - Seamless door to door routing
 - Fast responsive system
 - Excellent data quality
- Challenges
 - Aligning all the systems
 - Using standards
 - Common understanding of standards
 - Transition points between the systems
 - Sourcing of international itineraries for buses and trains
 - Data quality
 - Distributed system performance

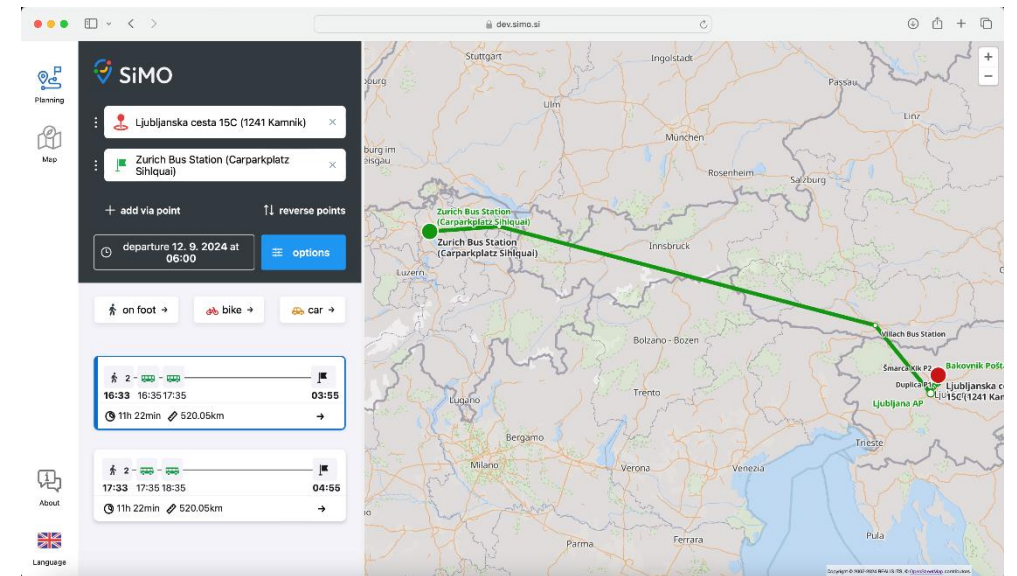


Data quality comparison - example

Detailed link geometry



Straight lines connecting the stops



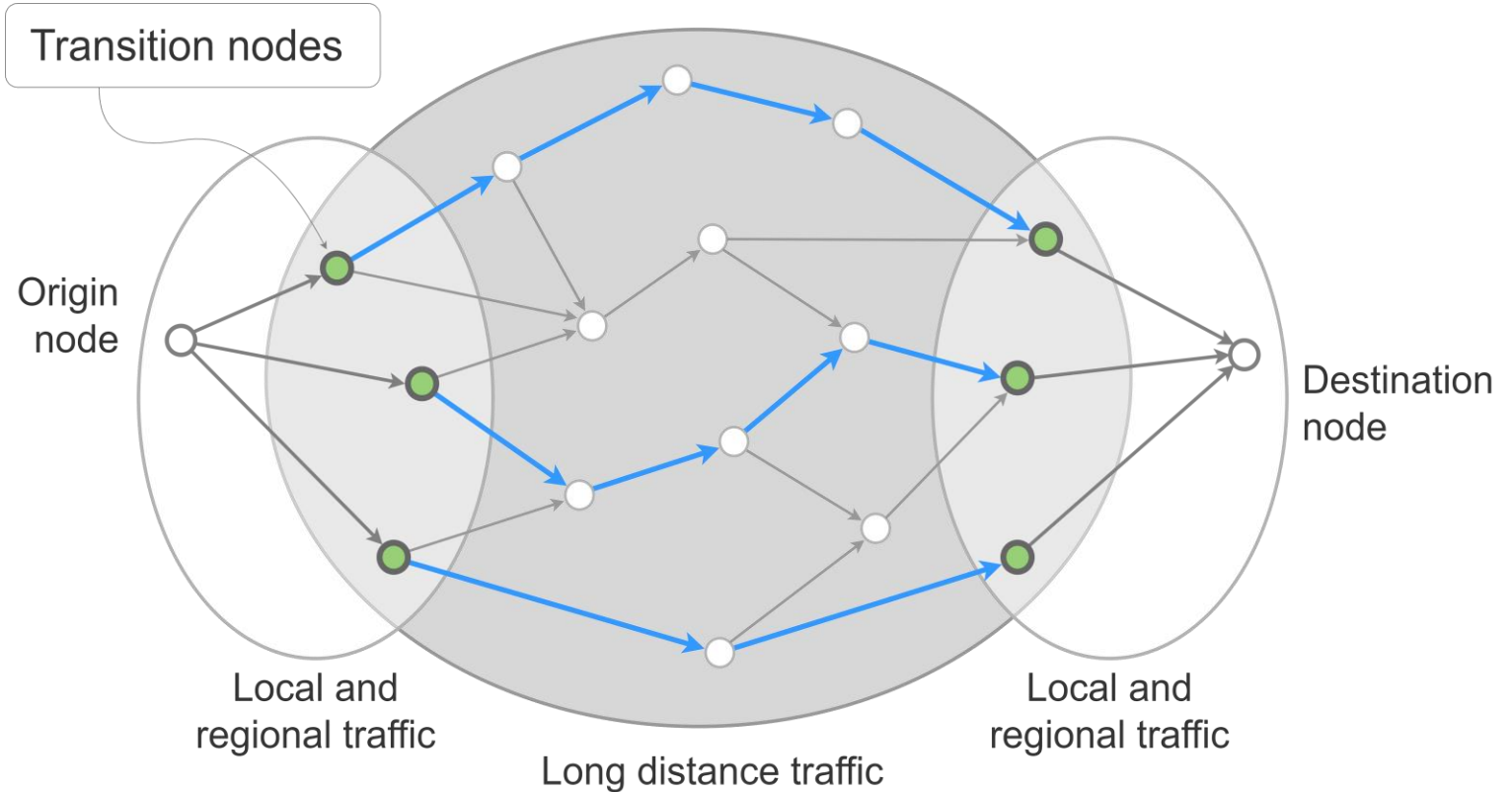
The screenshot displays the SiMO application interface. On the left, a sidebar contains navigation icons for 'Planning' and 'Map'. The main area shows a map of Central Europe with a highlighted route connecting various cities. The sidebar includes a search bar with a red pin icon, a departure time of '12. 9. 2024 at 06:00', and an 'options' button. Below the search bar, there are controls for 'add via point' and 'reverse points'. A 'LAST SEARCHES' section shows a message: 'You don't have any recent searches at the moment. Here will be displayed all your recent searches.' The map shows cities such as Spittal an der Drau, Villach, Klagenfurt, Maribor, Jesenice, Velenje, Kranj, Celje, Varaždin, Ljubljana, Gorizia, Trieste, Novo mesto, Zagreb, Karlovac, Sisak, and Rijeka. The bottom right corner of the map area contains the copyright notice: 'Copyright © 2007-2024 REALIS ITS, © OpenStreetMap contributors.'

Demo of the active systems

Andreas Glauser, Business Analyst at SKI+

How does the active system work

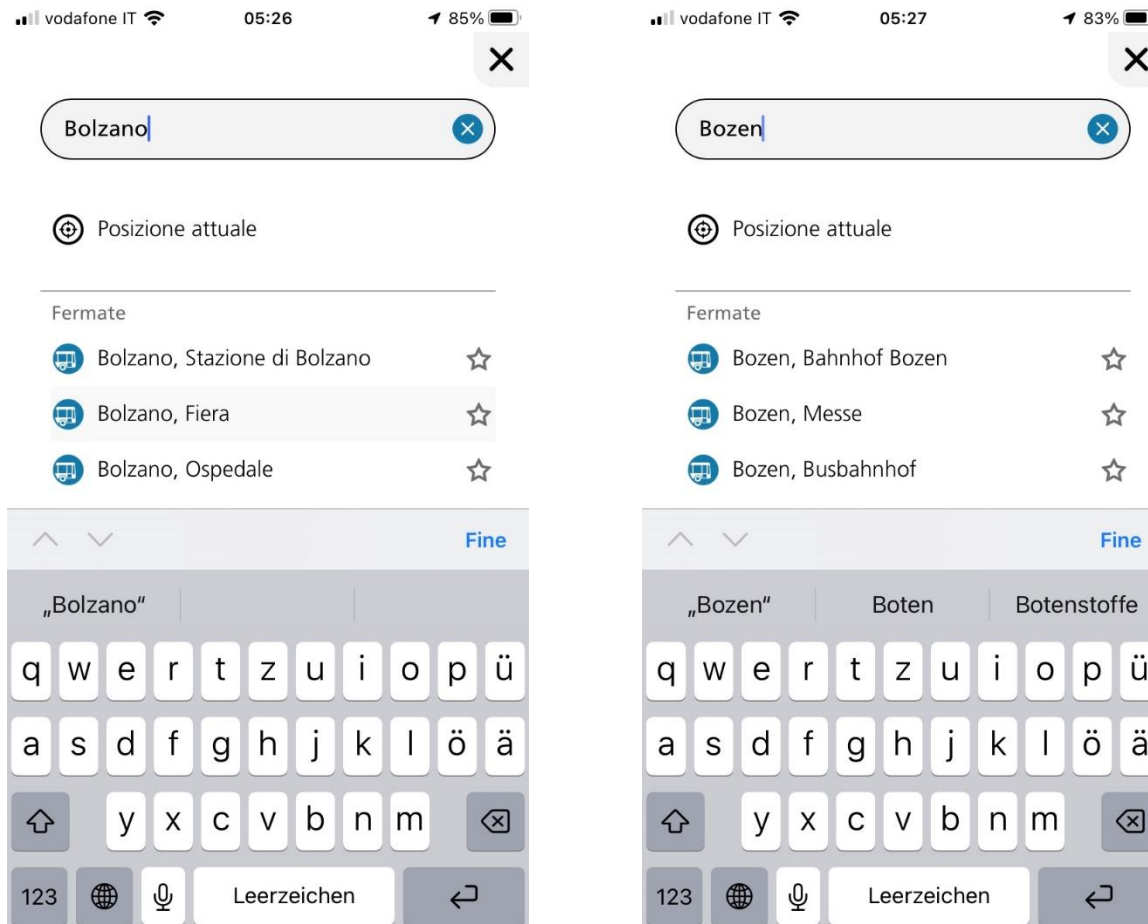
- The trip leg - trunk leg - trip leg of a journey, adapted from CEN/TC 278 2017 Public transport — Open API for distributed journey planning
- LA Exchange Points = Transition nodes



Multi languages

Roberto Cavaliere,
Subject Matter Expert for AI and mobility solutions at NOI

Use case description



User aims to have from a journey planning application an **easy way to find the locations** he / she is looking for.

Ideally, **multiple languages** should be supported. This allows the user to make searches in his / her preferred language and to find quickly the location he / she is looking for.

This is particularly important for a multi-language region like the **South Tyrol, Italy**.

- Three official languages (Italian, German, Ladin)
- Millions of tourists / year coming from all around the world (→ English to be supported)

Detail of OJP request



Active System

Give me all locations in Italian language by considering as keyword «Bolzano»



Give me all locations in German language by considering as keyword «Bozen»



Front-end application

Detail of OJP request

Location Information Request (LIR) service

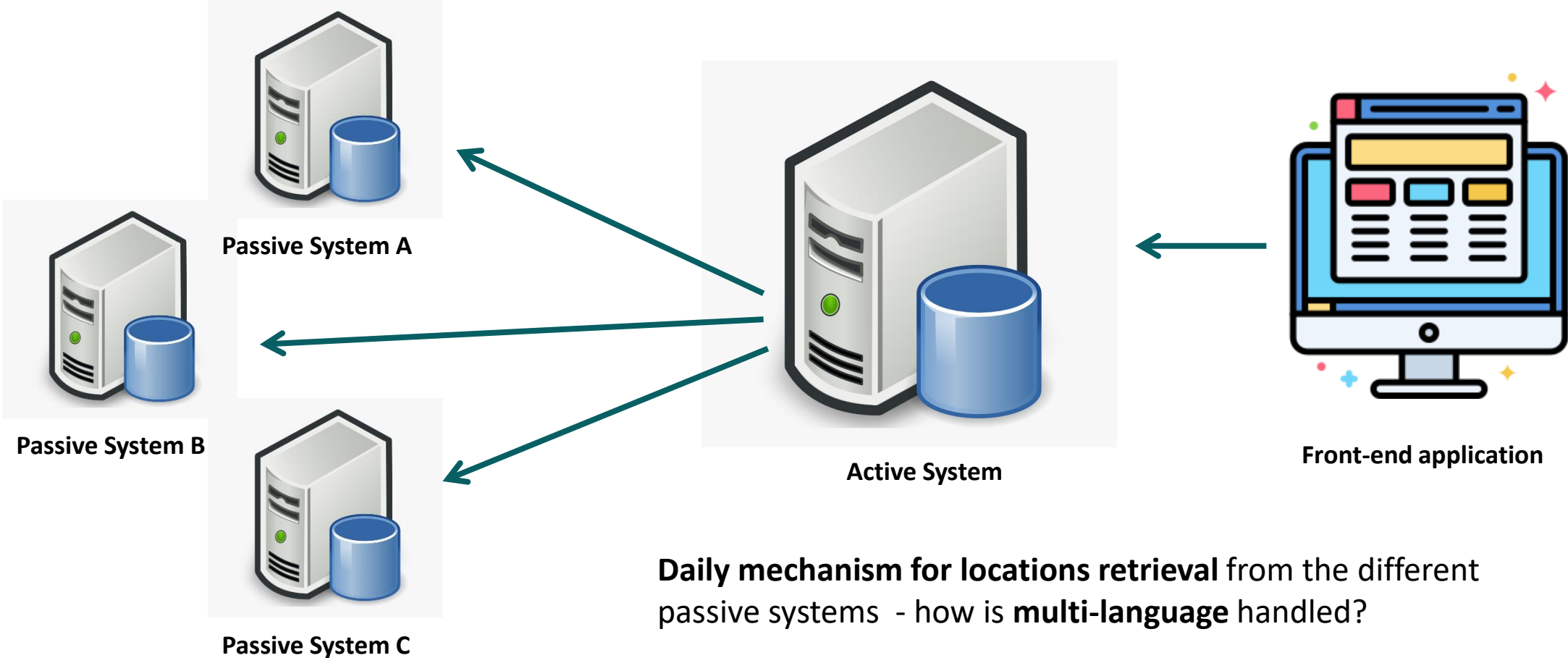
```
<OJPRequest>
  <ServiceRequest>
    <ServiceRequestContext>
      <Language>it</Language>
    </ServiceRequestContext>
    <RequestTimestamp>2024-09-05T05:54:54.815Z</RequestTimestamp>
    <RequestorRef>PassiveSystemSTA</RequestorRef>
    <ojp:OJPLocationInformationRequest>
      <RequestTimestamp>2024-09-05T05:54:54.816Z</RequestTimestamp>
      <MessageIdentifier>ML_1a</MessageIdentifier>
      <ojp:InitialInput>
        <ojp:LocationName>Bolzano</ojp:LocationName>
      </ojp:InitialInput>
      <ojp:Restrictions>
        <ojp:Type>stop</ojp:Type>
        <ojp:NumberOfResults>1</ojp:NumberOfResults>
        <ojp:IncludePtModes>true</ojp:IncludePtModes>
      </ojp:Restrictions>
    </ojp:OJPLocationInformationRequest>
  </ServiceRequest>
</OJPRequest>
</OJP>
```

← Language request

← Text search

← Type of locations requested

Active system implementation (1)



Active system implementation (2)

- Complexity: **not all passive systems support multi-language** functionality yet
 - Solution:
 - Import of all available locations in the available languages (if multi-language functionality supported)
 - Import all available locations and set them as “***language = unknown***” (if multi-language functionality not supported)
 - Information about which passive system supports which language is an information that must be currently hard-coded in the active system

Implementation (1) – without language



Active System

*Give me all locations by considering as keyword «Bolzano» (**no language set**)*



*Search among **all locations available**, independently from their languages (more similar results to keyword are returned)*



Front-end application

Implementation (1) – with language



Active System

*Give me all locations by considering as keyword «Bolzano» (**language set**)*



*Search among **all locations available**, independently from their languages (more similar results to keyword are returned, more weight given to locations in the requested language)*



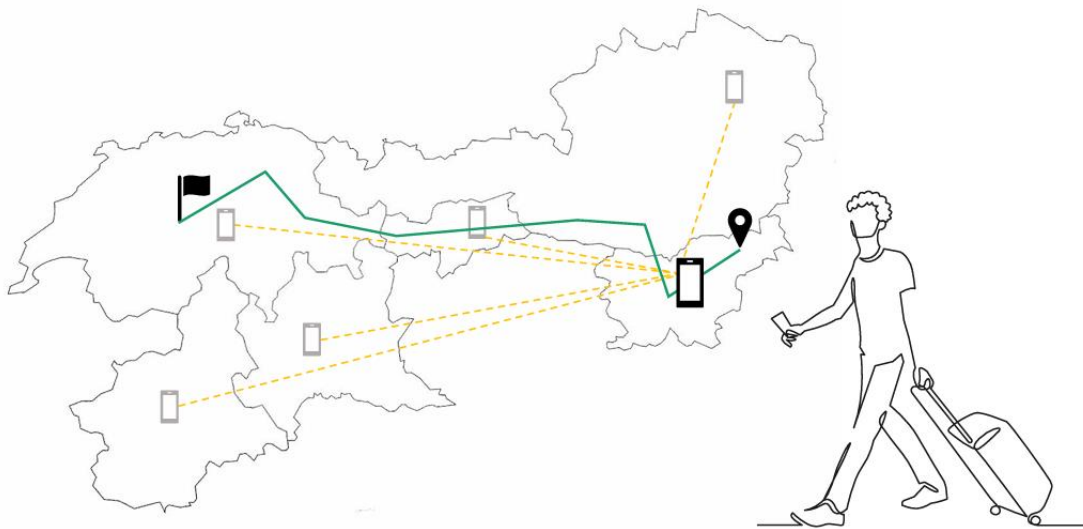
Front-end application

Exchange points

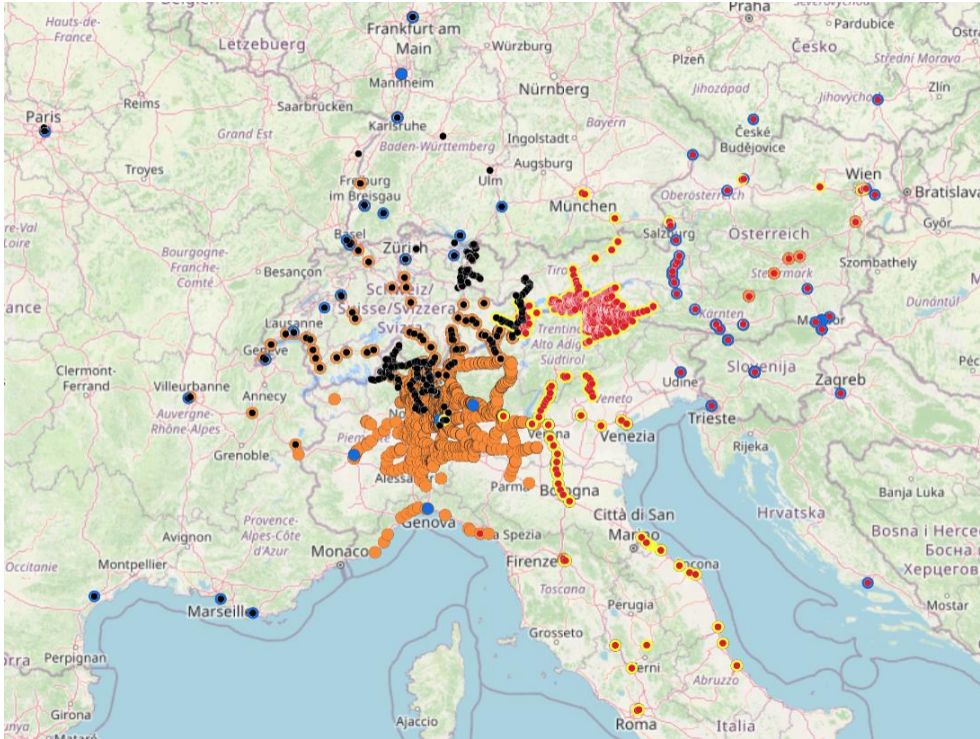
Serena Barassi, IT consultant at ARIA

EP: What they are and what they are used for

Definition: according to the CEN/TS 17118:2018, Exchange Points (EP) are “the boundary points where the trip calculation is handed over to the next journey planning system”, therefore fundamental for the journey calculation. This includes regional stops which match with stops for long distance or regional stops from adjacent regions. Exchange Points are mainly but not exclusively located at borders and in bigger cities.



EP: How they were defined and chosen in Linking Alps



- Linking Alps uses a “**static approach**” to identify Exchange Points
- The identification of exchange points was done by looking for stops and stations used by multiple service providers
- All the stops were located on a map and, using **GIS** functionality, every LA responding system chose the most significant “points”
- Starting from thousands of stops, the analysis led to the identification of **95 Exchange Points**, refined over time

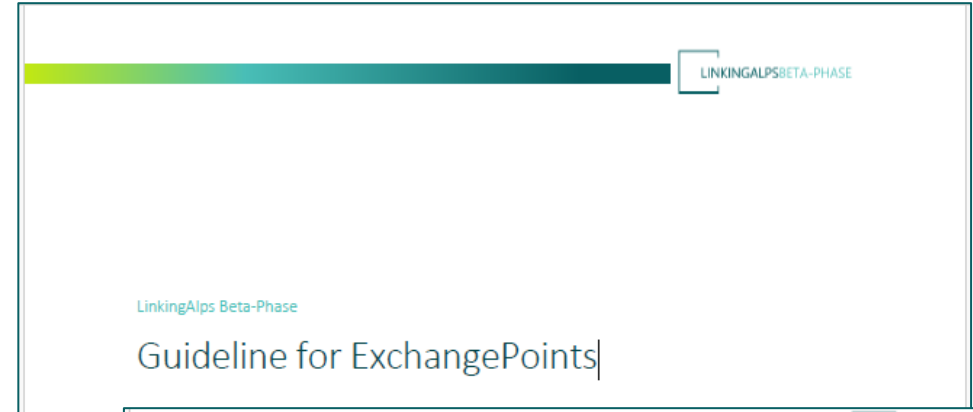
EP: How they are managed in Linking Alps

- Exchange Points are described in a **shared table**
- Each Point has a “**steward**” that is the system responsible for encoding the point (usually, the system in which the point is located) and almost two “**destination areas**”
- Each system must return all the EPs of the shared table:
 - More points? (e.g. other projects) They should have another private code
 - Less points? (e.g. seasonal stops) It should be notified in the shared table
- To ensure interoperability “LA-ExchangePoint-ID” should be **aligned** between systems and **stable**

LinkingAlps EP_ID (ojp:PrivateCode)	Station NAME (ojp:StopPlaceName)	STEWARD	DESTINATION_AREAS	LONGITUDE	LATITUDE	MAIN_MODE	AVAILABLE (T/F)
ch:1:slويد:3000	Zürich HB	SBB	ARIA;DE;SBB;VAO	8,54021	47,378122	~Train~	T
it:ITC4::67397:	MILANO, Stazione Centrale	ARIA	ARIA;SBB;STA;5T	9,202969	45,484921	~Train~	T
SI:SI032:StopPlace:1127365:	Maribor AP	ATOB	VAO;HU;CRO	15,655788	46,559530	~Bus~	T
it:22021:36:1:40020	Malles Venosta, Stazione di Malles	STA	STA;SBB;VAO	10,548305	46,683885	~Bus~	T
at:vor:StopPlace:at-49-1349:	Wien Hauptbahnhof	VAO	VAO;ARIA;(SBB)	16,376413	48,185188	~Train~	T

EP: Impacts of a new responding OJP system in LA

- Adding a new responding OJP system, means adding potential **new Exchange Points**
- To facilitate this process and ensure a common approach, “**Guidelines for ExchangePoints**” have been defined
- The new system should:
 - Check the **shared table** of the existing Exchange Points to check for those of interest
 - Propose the addition of **new points**, which will be verified by the other systems involved
 - Provide all the points with the **correct ID** in the Exchange Point Request



LINKINGALPSBETA-PHASE

Content

1. Purpose and Introduction	3
2. Basis for modelling ExchangePoints	3
3. Required parameter fields for EPs	4
4. Transfer at ExchangePoint	4
5. Example ExchangePoint	4
6. Explaining the XSD of an EP	6
7. Abbreviations	7

Challenge: Identification of the Exchange Points: how to move from a static approach to a dynamic approach?

Challenges

Stefan Mayr, Managing Director of VAO

VAO – who we are & what we do

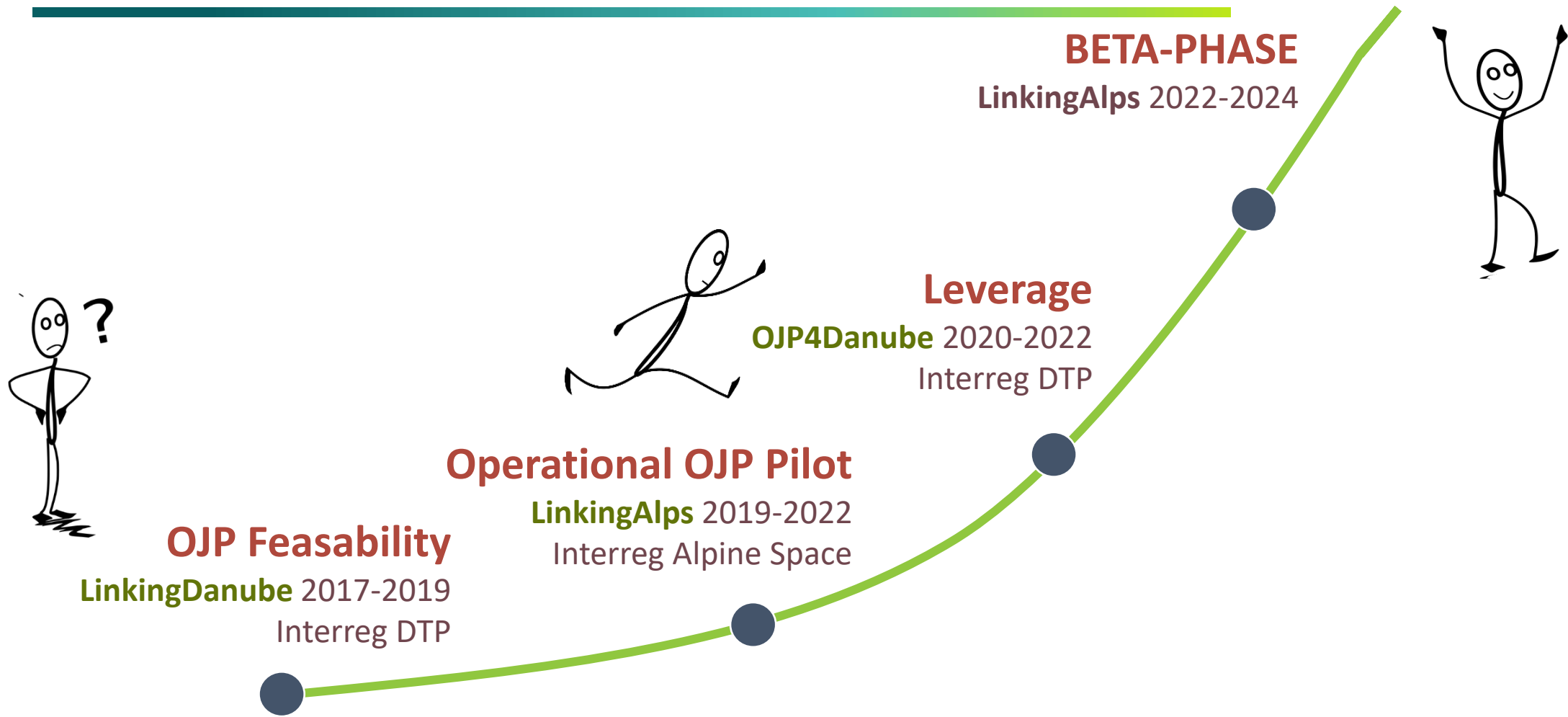
We are

- **multimodal routing platform** for whole of Austria
- **integrator** of various trusted / public **data pools** (static & dynamic)
- **service provider** for various kinds of services (WebApps, Apps, ReSt-API, etc)
- **white-label** and on the B2B market (brand of customers)
- mainly publicly owned

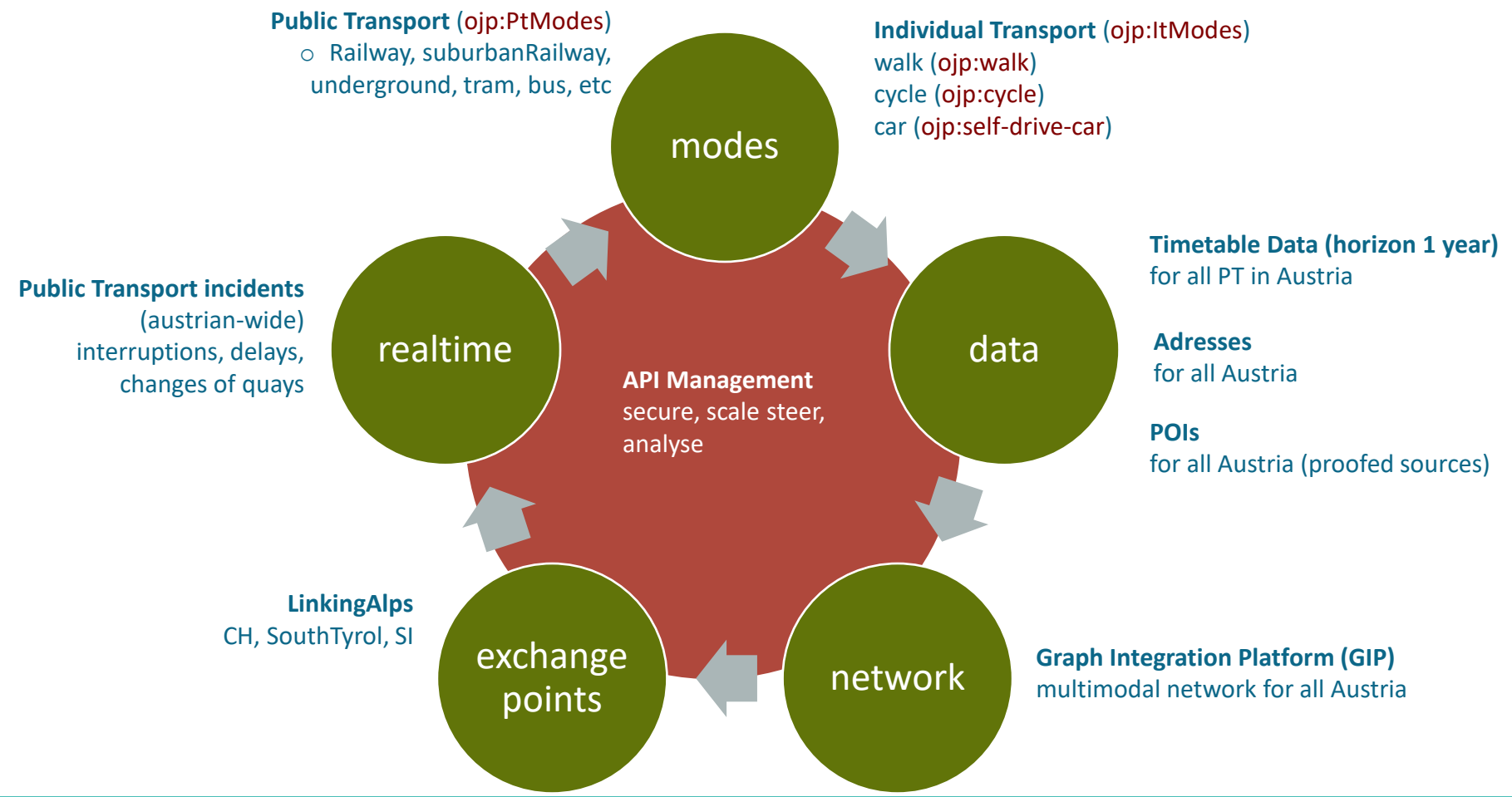
What we do

- **run, operate and manage** the platform for actual and future demand
- **ensure** the availability & proper performance and scalability of the services
- **provide** a national routing service in a neutral and discrimination-free way
- **inform** about **the current traffic condition** on the road and the public transport network through our services
- **develop** solutions for integration of different modes, providers, data pools, interfaces
- **use** synergies and provide common services
- **cooperate** as project partner in national and international mobility projects

VAO & OJP - Recap



VAO Results – Passive Node



VAO – who we are & what we do

Strategical

- **Fulfilment of legal provisions:** OJP API that is conform with Del. Reg. EU 2017/1926
- **Interoperability:** OJP API is compatible with **LinkingAlps Profile**
- **Operational integration:** OJP API is integrated into the VAO architecture/environment (data feeds, updates, ...)
- **Ability to secure and manage the service: API Management** for OJP passive system (precondition for providing access)

Strategical

- **Data provision: VAO Exchange Points published** with mobility data platform of the **Mobiliätsverbände Österreich (MVO)** – data provision in standardized formats from Austrian public transport authorities
- **Open Access to the service: as “OJP Start” – free access** according to “VAO start conditions” (limited in size, unlimited in content and quality) (**planned after the Beta-Phase**)
- We operate a **passive node in Austria**
- We have a business model in Austria (pay per click) which is not compatible with other partners
- What is the **potential** of transborder routing?
- Focussing on the **USPs** (Quality, Network etc.)

Relevant links

- [NAP monitoring web interface \(imet.gr\)](https://www.imet.gr/)
- <https://napcore.eu/>
- <https://github.com/motis-project/motis>
- [GitHub - MobilityData/mobility-database-catalogs: The Catalogs of Sources of the Mobility Database](https://github.com/MobilityData/mobility-database-catalogs)
- <https://mobilitydatabase.org/>

National Access points by country:

- Austria:
 - <https://data.mobilitaetsverbuende.at/de/data-sets>
- Croatia:
 - <https://www.promet-info.hr/en/datasets?search=netex>
- Italy
 - <https://nap-1926.it/nap/mmtis/public/catalog/Dataset>
- Slovenia:
 - https://nap.si/en/dataset_list?group=a2507641-e440-89e4-ab0c-26a8e8598c19
- South Tyrol:
 - <https://opendatahub.com/>
- Switzerland:
 - <https://opentransportdata.swiss/>

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- matej.vovk@gov.si
- [NCUP - Slovenian National Traffic Management Centre](#)



Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

Bundesamt für Verkehr BAV

- andreas.glauser@sbb.ch
- <https://opentransportdata.swiss/de/>
- <https://www.bav.admin.ch/bav/de/home.html>

sta

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