OPEN JOURNEY PLANNER (OJP) SWITZERLAND PROFILE

Customer Information System Task (SKI) - SKI+ Team
https://transportdatamanagement.ch

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Document information

Description	This document contains information, assessments and explanations about the Swiss Open Journey Planner Profile which is to be used by the SKI+ team on behalf of the FOT (Federal Office of Transport).
Target group	People who use or wish to use data and APIs with the OJP standard in order to design, develop and test business applications.
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Change history

Version	Status	Change	By	Valid from
0.1	Draft	Draft standard	A. Glauser	2022-11-01
0.2	Revision	FOT notes and corrections	A. Döbeli	2022-11-24
0.3	Conclusion	By SKI+ OJP Team	A. Glauser	2022-11-30
1.0	Binding	First brief description of the standard	A. Glauser	2023-01-01

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1 Open Journey Planner: what is this about?

This document describes the Open Journey Planner Profile of Switzerland (**OJP Profile Switzerland** for short) which was developed according to the **CEN OJP standard version 1.0**. The standard was adopted by the EU in Delegated Regulation 2017/1926 as a dedicated standard for travel information. It explains how the OJP service is applied and its content based on the basic data used. This document does not include a complete description of the CEN OJP standard but describes its structure and how the service can be integrated. For further information, please refer to the sources provided.

Please note, OJP has two meanings:

1. It refers to the CEN/TS 17118 "**Open API for Distributed Journey Planning**" standard that was declared mandatory for the member states of the European Union in Delegated Regulation (EU 2017/1926).
2. It refers to the "**Open Journey Planner**" routing backend system for calculating routes by public transport (PT), walking routes and other mobility services which the SKI office implemented and continues to develop on behalf of the FOT in accordance with the standard referred to in Section 1. The open OJP API is available at openmobilitydata.swiss

2 Description and context

Open Journey Planner comprises various services that can be used for multimodal journey planner systems and can be accessed via a standardised API (see general description of Open Journey Planner). The main service it offers is routing between two places. This service requires an origin and a destination as its input (e.g. coordinates, stops, addresses or points of interest "POI"). OJP then computes possible connections between the two locations. Routing currently includes public transport connections including real-time data and walking routes as well as sharing offers and motorised individual transport (MIT). Routing is non-discriminatory, i.e. no mode of transport or operator is given preference over any other.

The following table provides an overview of the requests (services) defined in the CEN OJP standard. The "Supported" column indicates whether the services are supported by Open Journey Planner Switzerland.

Service name	Service in OJP CEN/TS 17118:2017	Supported
OJPLocationInformation	"LocationInformation" is used for querying information about stops, POIs and other objects such as charging stations, rental bicycles, etc.	Yes
OJPTrip	"TripRequest" is used for a request from an origin to a destination stop or coordinate.	Yes
OJPStopEvent	The "Departure Board" returns the departures or arrivals at a specific stop, similar to a display board.	Yes

OJPTripInfo	"TripInformation" can be used to request detailed information about a trip with the "JourneyRef".	Yes
OJPExchangePoints	With "ExchangePoints", the possible connection stops to adjacent systems can be queried.	Yes
OJPMultiPointTrip	"MultiPointTrip" is mainly required when calculating trips across multiple systems because the routes have to be calculated via different "ExchangePoints".	Yes
OJPFare	"Fare" can be used to request price information which is not yet supported.	No

The following sequence diagram describes the correct procedure to execute a TripRequest. First, the StopPlaceRef of the origin and the destination are fetched from the responding system (RS) via a LIR in order to create the request correctly:

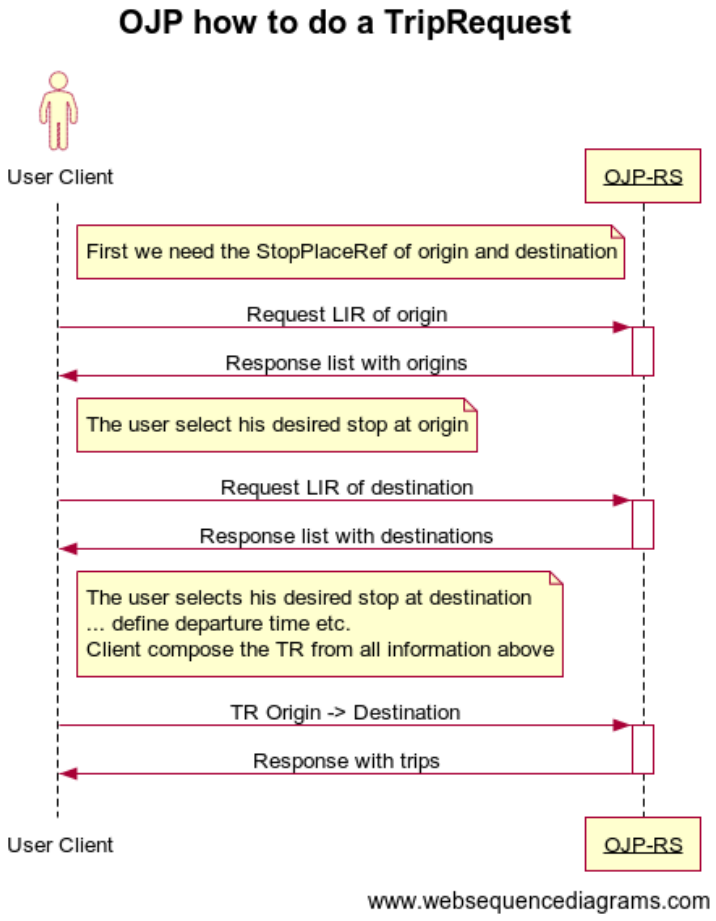

Figure 1 Sequence diagram for a TripRequest

3 Who is responsible for the standard and for Open Journey Planner Switzerland?

The Open Journey Planner system is being set up and operated by the SBB SKI+ team on behalf of the Federal Office of Transport (FOT). Currently, the passive system is in productive operation, while a test instance is available to the active system.

The use of the CEN OJP standard as the protocol for trip requests is regulated in the EU by Delegated Regulation 2017/1926. CEN is responsible for the standard. Under its direction, the "CEN TC 278 WG3 278 SG8 OJP" group is continuing to develop the standard. SKI+ is actively working on this standard and continuously contributing new proposals that emerge from the current and specific implementation of the systems. In addition to the description of the CEN OJP standard, which is available for a fee, it also produces documents that are available free of charge and published on GitHub. CEN OJP version 2.0, which SKI+ will use in the future, will be published in 2023.

4 Key websites

Description	Link
Discussion basis for a NADIM standardisation concept	https://transportdatamanagement.ch/content/uploads/2022/08/Diskussionsgrundlage-Standardisierung-NADIM.pdf
Underlying datasets	https://opentransportdata.swiss/de/group
Open Journey Planner Cookbook	https://opentransportdata.swiss/de/cookbook/open-journey-planner-ojp/
LinkingAlps website	https://www.alpine-space.org/projects/linkingalps/en/home
LinkingAlps profile	https://github.com/openTdataCH/ojpch/tree/main/doc/profile
SKI+ demo app	https://github.com/openTdataCH/ojp-demo-app-src
Test data for the passive and active LinkingAlps systems	https://github.com/openTdataCH/ojp-soapui-tests

5 Underlying technologies and standards

REST services encrypted with HTTPS, XSD schema data, XML requests and responses.

Detailed information and resources relating to the CEN OJP standard can be found at the following links:

Description	Link
CEN website	https://www.cencenelec.eu/about-cen/
Description of CEN OJP standard 1.0	http://www.normes-donnees-tc.org/wp-content/uploads/2017/01/TC_278_WI_00278420_E-RS-170118-final3.pdf
XSD files with meta description of the possible requests and responses for OJP 1.0	http://www.normes-donnees-tc.org/wp-content/uploads/2017/01/OJP-xsd_CEN-2016.zip
Forum on CEN OJP standard 1.0	https://forum.vdv.de/viewforum.php?f=88
GitHub of the XSD files for checking the XML requests and responses	https://github.com/VDVde/OJP

6 Use of the standard

Under the CEN OJP standard, both end users (e.g. developers of travel information apps) and route planning systems from other regions can send travel requests. The CEN OJP standard is thus not only used for customer information but also for the data exchange between individual route planning systems (see Section 9 Assessment).

End users and other systems can send requests to Switzerland's passive system as well as its active system and thus indirectly also to the long-distance transport server (see Section 7) which was implemented as part of LinkingAlps. To help you get started with app development, SKI+ published an open source demo app on GitHub.

7 Switzerland datasets

The following datasets are used as the basis for Open Journey Planner Switzerland:

1. The timetable is updated weekly with the transport companies' data which is available here and read in via the HRDF format.
2. OeBB timetable data is currently transferred to a separate OJP server. This server currently functions as a long-distance transport server which creates connections between the individual regions if they are not directly adjacent to each other.
3. All real-time data is imported into the OJP service.
4. All data for the routing of pedestrian, bicycle and car routes is imported from Open Street Map into the OJP service.
5. Other means of transport such as rental bicycles, e-scooters and car-sharing services are also integrated. More details here.

Information about the querying process and further datasets available in OJP format can be found on the open data platform.

8 Evaluation of the CEN OJP standard

Rough, qualitative evaluation or assessment by the SKI+ team[1]

P1 international	+++	Delegated Regulation (EU) 2017/1926 recommends the standard for EU member states.
P2 open	++	All the information about the individual services is publicly accessible and can thus be implemented. For cross-border connections, with the LinkingAlps service for example, it is necessary to coordinate the ExchangePoint IDs which is only possible through contact with the participating systems.
P3 simple	++	The request/response data exchange in XML is at the same URL for all services. XSD files specify all OJP messages and can also be used to verified them.
P4 established	+	There are multiple projects aiming at a supra-regional journey planner in Europe (EU-Spirit, Danube and LinkingAlps).
P5 evolving	+++	The standard is continuously being extended to include new modes of transport. These are to be consolidated in version 2.0 and the cross-regional linkages are to be standardised through better algorithm descriptions.
P6 quality	++	The SBB data is of good quality. Other providers are often not up to date and do not offer real-time information.
P7 compliant	+++	It basically corresponds to Transmodel but deviates from the specifications in the naming of some objects.
P8 succinct	+++	The descriptions are often insufficient, especially for the additional parameters, and it has been shown that the data fields are not used in the same way by all system integrators.

9 Assessment

CEN OJP is the interface standard the EU intends to use for distributed journey planning. It is primarily used between individual travel planners and may not be suitable for communicating directly with devices that do not have their own business logic. The standard is currently being extended to better support intermodal routing (OJP 2.0). We believe it is crucial for OJP to allow a transition to the distribution aspects and to integrate the protocols that make sense there (OSDM, TOMP, TRIAS). OJP only goes as far as providing price information (OJPFare) and availability (OJPAvailability). These two services, if available, are offered directly by the mobility providers, while OJP is a

[1] The eight principles are further explained in the NADIM standardisation concept. Key: 0 = not fulfilled, + = low, ++ = medium, +++ = high fulfilment of the principle.

service that is offered centrally and independently of mobility providers. With the refinement request, OJP 2.0 will offer the option to selectively optimise trips. We think it is important that the process sequences in the context of OJP be well described and the relevant paradigms be understood by the users. OJP is loosely based on Transmodel.

The OJP supports journey planning from stops, coordinates and other existing objects.

10 Specifications and recommendations

OJP should be used for planning intermodal journeys and for the arrival and departure display at stops. Especially in a distributed context, within Europe, the interoperable OJP protocol should be used.

OJP offers price information, availabilities and refinements. Providers are requested to support this, or else a conversion between the relevant OJP services and the distribution services is offered as a service or as open source software.

For travel information in Switzerland, the profile below should be used.

11 Switzerland profile

To connect a responsive or distributive system to the Swiss Open Journey Planner, CEN OJP standard version 1.0 and the LinkingAlps profile must be observed. The Open Journey Planner service is available at the terms and conditions available here.

The messages of any systems offering OJP services must correspond to the XSD schemas and be encoded with UTF-8. Transmissions must be encrypted with HTTPS TLS 1.3. Depending on future developments, an upgrade could be forced to other/newer signing procedures that use certificates. The OJP profile for Switzerland is also used for data transmission between responding and distributing systems using HTTPS REST. To connect to the service, a unique and unambiguous API key/ID must be used to identify and manage access for specific users (groups). The API key can be obtained here. The key must be embedded in the header (bearer token) of the request.

The following extensions have been implemented in Open Journey Planner Switzerland, adding functionality compared to the CEN OJP standard. Details can be found in the Cookbook. Here is a list of the extensions:

1. Sharing modes
2. Hikes
3. Private vehicle routing with cars and bicycles
4. Multimodal routing with car sharing, e-scooters and rental bikes