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# **Technical specification for the establishment of a Slovenian national profile for NeTEx**

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REPUBLIKA SLOVENIJA  
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## Information about the project

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# 1 NeTEx - exchange of network and timetable data

NeTEx (<http://www.netex-cen.eu>) is a CEN technical standard for the exchange of public transport information in the form of XML documents based on the W3C XML Schema. The XML Schema is based on the Transmodel abstract model (<http://www.transmodel-cen.eu>), which contains generic concepts and data structures for public transport and can be used for the exchange of many different types of data between passenger information systems, including data describing stops, infrastructure facilities, timetables and fares. Such data can be used by both public transport operational management systems and user systems for journey planning, etc. (<https://en.wikipedia.org/wiki/NeTEx>).

## 2 European profile for NeTEx

The Passenger Information European Profile (EPIP) is described in the technical specification [SIST-TS CEN/TS 16614-4:2020](#) Public transport - Network and Timetable Exchange (NeTEx) - Part 4: Passenger Information European Profile. EPIP has received a lot of attention from public transport IT developers since 2017, who are implementing it in journey planning software solutions.

The technical specification was developed in the context of expert groups on:

- Transmodel (<http://www.transmodel-cen.eu>), which operates under the auspices of CEN ITS WG3 Transmodel (Reference Data Model, <https://www.itsstandards.eu/pt>), and
- NeTEx (<http://netex-cen.eu>), which operates under the auspices of CEN ITS WG3 NeTEx (Network and Timetable Exchange, <https://www.itsstandards.eu/pt>).

The Technical Specification is the starting point for the preparation of the NeTEx National Profiles. Typical examples of EPIP applications are:

- providing station data
- providing data for timetable output
- providing data for the Trip Planner
- providing data for a route mapping application on an (interactive) map

EPIP is a subset of the two parts of NeTEx (the full NeTEx consists of three parts), namely:

- NeTEx Part 1 (Public transport - Network and Timetable Exchange (NeTEx) - Part 1: Public transport network topology exchange format, CEN TS 16614-1:2014), in
- NeTEx Part 2 (Public transport - Network and Timetable Exchange (NeTEx) - Part 2: Public transport scheduled timetables exchange, CEN TS 16614-2:2014).

EPIP represents an agreed minimum of concepts and data structures for the exchange of public transport data and includes all known forms of public transport (*air, bus, trolleybus, coach, funicular, metro, tram, cableway, rail, water, ferry, lift, other*). In addition to forms of public transport, those related to public transport (*walk, car, taxi, cycle, drt, movingWalkway, through*) are also supported. As a point of interest, at the suggestion of Norway, "snow" (e.g. snowmobile) will be added.

EPIP does not yet include the concepts for fares, which are already defined in the third part of NeTEX (Public transport - Network and Timetable Exchange (NeTEX) - Part 3: Public transport fares exchange format, CEN TS 16614-3:2016). It is possible to integrate the fare description in an EPIP-based data exchange, but it should be taken into account that over time it will be necessary to adapt to the fare profile for which there is an initiative as "complementary and separate European Fare Profile". We can also expect an extension of the EPIP with the Accessibility Profile (accessibility concepts for passengers with disabilities). These extensions refer to (a) new technical specification documents and (b) XML Schemas (XSD). Due to the modularity of the XML Schemas, these extensions will not break the existing documents produced under EPIP, they will only need to be extended with references to the new schemas and use additional XML elements.

### 3 Slovenian profile for NeTEX

To implement the national profile for NeTEX, we need the following documents:

- [SIST-TS CEN/TS 16614-4:2020](#) Public transport - Network and timetable data exchange (NeTEX) - Part 4: European travel information profile (Public transport - Network and Timetable Exchange (NeTEX) - Part 4: Passenger Information European Profile) is a technical specification describing the European Profiles for Passenger Information
- [SIST-TS CEN/TS 16614-1:2020](#), Public transport - Network and Timetable Exchange (NeTEX) - Part 1: Public transport network topology exchange format is the technical specification for the description of the elements of the topology of a public transport network.
  - The "white paper" [NeTEX-Network-WhitePaper\\_1.08](#) describes the NeTEX network concept in a more polite way.
- [SIST-TS CEN/TS 16614-2:2020](#), Public transport - Network and Timetable Exchange (NeTEX) - Part 2: Public transport scheduled timetables exchange format, is a technical specification for the description of the elements of public transport scheduled timetables.
  - The "white paper" [09.NeTEX-Timetable-WhitePaper\\_1.05](#) describes the NeTEX timetable concept in a more polite way (an example of a Slovenian timetable is also included).
- [SIST-TS CEN/TS 16614-3:2020](#) Public transport - Network and Timetable Exchange (NeTEX) - Part 3: Public transport fares exchange format
- The XML schemas for NeTEX are available in the GitHub repository (<https://github.com/NeTEX-CEN/NeTEX>). We propose to clone the repository locally using the Git client to ensure that the schema versions are always up-to-date during development. For EPIP we will use the schemas in the *xsd* folder. The *xsd* folder contains a lot of schemas due to the optimised modular structure of NeTEX. The input schema for most real

examples is [NeTEx\\_publication.xsd](#). "Publication" in this context refers to the publication of PPP data (e.g. stops, timetables). The example XML documents described in the following section explain the practical use of the reference to this schema (in the XML document header).

- [Examples of XML documents](#) (including a Slovenian example) in the GitHub repository (subfolder functions).

### 3.1 Concepts in the Slovenian national profile for NeTEx

The basic concepts for EPIP are described in the data dictionary in [SIST-TS CEN/TS 16614-4:2020](#) Public transport - Network and Timetable Exchange (NeTEx) - Part 4: Passenger Information European Profile.

The main concepts for describing the topology of a public transport network are:

- **ROUTE**: is an ordered list of discrete locations as ROUTE POINTS that geographically define a single route through the road (or rail) network. A ROUTE may pass through the same waypoint more than once. A ROUTE LINK can be used to link ROUTE POINTS on a route.
- **JOURNEY PATTERN**: is defined as an ordered list of SCHEDULED STOP POINTS (i.e. points where passengers board and alight) and TIMING POINTS (i.e. points to which timing information for timetable generation is referenced) on a particular ROUTE, describing the operating pattern of a public transport vehicle. A JOURNEY PATTERN may pass through the same point more than once.
- **TIMING PATTERN**: the sequence of TIMING POINTs for each JOURNEY PATTERN defines the TIMING PATTERN (green in the figure). The sequence of SCHEDULED STOP POINTS (from JOURNEY PATTERN) defines the SERVICE PATTERN. SERVICE PATTERN (= variant of ROUTE) is a subset of JOURNEY PATTERN consisting of a sequence of stops (STOP POINT).



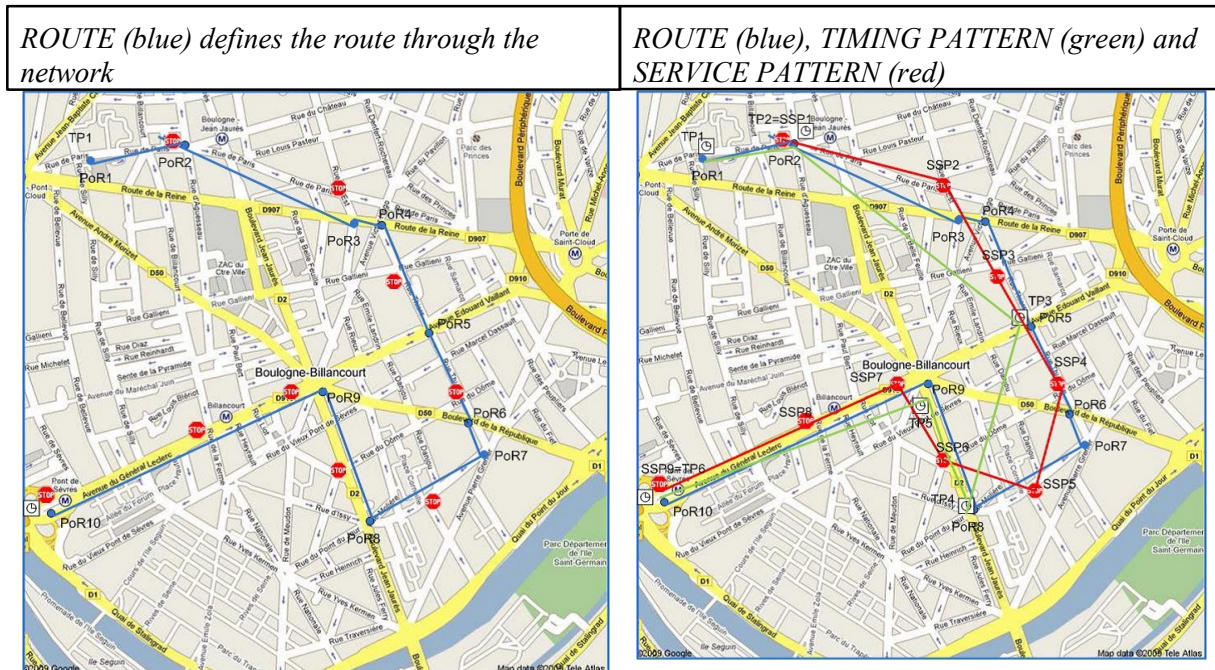


Figure 1: Difference between the concepts ROUTE, TIMING PATTERN and SERVICE PATTERN

A LINE is usually defined as a set of ROUTEs with a public label (name, number). ROUTEs are usually very similar from a topological point of view, being variants of the basic ROUTE with some variations. Two ROUTEs using the same infrastructure path (or parallel paths) but with opposite orientation usually belong to the same LINE.

### 3.2 NeTeX document XML

An XML document is a physical record of JPP data used for the exchange between senders and receivers of EPIP-compliant data.

It is recommended that the name of the XML document be written as follows:

- The document name (prefix) is NETEX\_PI
- EPIP main version; currently 01
- ISO 3166-1 country code
- Name of the sender (use NAP if the data comes from a national access point)
- Document type (LINE, NETWORK or STOP)
  - LINE: the document contains a description of one line
    - if LINE is selected, the line code (with less than 15 characters; letters (upper and lower case), numbers and "-") follows
  - NETWORK: the document contains a description of two or more lines
  - STOP: the document contains a description of all stops
- Date of creation (YYYYMMDD)
- All fields are separated by "\_"

Examples:

- NETEX\_PI\_01\_SI\_IJPP\_LINE\_K66\_20200329.XML
- NETEX\_PI\_01\_SI\_IJPP\_NETWORK\_20200201.XML



- NETEX\_PI\_01\_SI\_NAP\_STOP\_20200115.XML

The initial element in the XML document is `PublicationDelivery`:

```
<PublicationDelivery
version="2.0:EU_PI-1.0"
xmlns="http://www.netex.org.uk/netex"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xmlns:gml="http://www.opengis.net/gml/3.2"
xmlns:siri="http://www.siri.org.uk/siri"
xsi:schemaLocation="http://www.netex.org.uk/netex
NeTEx_publication.xsd">

<PublicationTimestamp>2019-03-
26T12:00:00.2Z</PublicationTimestamp>
<ParticipantRef>IJPP</ParticipantRef>
<Description>Timetable details</Description>
<dataObjects>
...
</dataObjects>
</PublicationDelivery>
```

The document header consists of the `PublicationDelivery`, `PublicationTimestamp` and `ParticipantRef`.

The element `PublicationDelivery` represents the document header where `version` identifies the version of the NeTEx XSD.

Primer: `version="2.0:EU_PI-1.0"`

The version is written according to the following rule:

- "2.0" means NeTEx XSD version 2.0 (current valid version)
- ":" is a punctuation mark
- EU\_PI stands for European Passenger Information EPIP compliant
- "-" is a punctuation mark
- "1.0" means the EPIP version (subversion is always 0)

The `PublicationTimestamp` element shall contain the timestamp record of the document record with a time zone; for example "2019-03-26T12:00:00.2Z".

The `ParticipantRef` element contains a record of the system that provided the XML document; for example "IJPP". The `Description` element contains an arbitrary description of the content of the document; for example "Timetable data". This element is optional.

If the XML element has no content (is empty) and is optional, it shall not be printed. Entries of the form `<Description></Description>` or `<Description/>` are not allowed in EPIP. This applies to all elements.

The `<dataObjects>` element contains a `CompositeFrame` or a `GeneralFrame`.

Frames are used to logically group data in an XML document. Data is grouped according to its meaning and function, e.g. station data, transport network data, timetable data, calendar data, etc.

### 3.2.1 CompositeFrame

CompositeFrame is a container for <frames>, which are the object carriers for JPP information:

Name	EPIP frame type
<u>ResourceFrame</u> - a framework for general information, e.g. organisations such as public transport managers and operators, responsibilities for data, equipment, etc.	EU_PI_COMMON
<u>SiteFrame</u> - a framework for information about stops, points of interest (POIs).	EU_PI_STOP
<u>ServiceFrame</u> - information about the public transport network, routes, routes, scheduled stops, etc.	EU_PI_NETWORK
<u>TimetableFrame</u> - information on actual journeys (trips) including departure times, waiting times, etc.	EU_PI_TIMETABLE
<u>ServiceCalendarFrame</u> - information on timetable regimes (journey calendars, day types and their links).	EU_PI_CALENDAR

The frame type shall be recorded as part of the frame identifier (id) for all frames. The example below shows a composite of the frames from the table above within a CompositeFrame.

Example:

```
<dataObjects>
  <CompositeFrame
    id="SI:SI0:CompositeFrame:EU_PI_LINE_OFFER-79ca1d92-
      a333-470e-8
      6f7-8a5a09e607fb:IJPP"
```



```

created="2019-03-26T12:00:00.2Z"
changed="2019-03-26T12:10:00.2Z">
<frames>
  <ResourceFrame
    id="SI:SI0:ResourceFrame:EU_PI_TIMETABLE_62f901
    cd-8700-473d-9ea9-1726cd8b3148:IJPP"
    version="any">
    ...
  </ResourceFrame>
  <SiteFrame
    id="SI:SI0:EU_PI_STOP-4fe4fde0-2c41-4fb3-97d0-
    bf6680790ac
    b:IJPP" version="any">
    ...
  </SiteFrame>
  <ServiceFrame
    id="SI:SI0:ServiceFrame:EU_PI_NETWORK-b5a5da53-
    e88e-402d-
    bc6d-60e061c944ac:IJPP" version="any">
    ...
  </ServiceFrame>
  <TimetableFrame
    id="SI:SI0:TimetableFrame:EU_PI_TIMETABLE-
    2b3ddb63-b170-4
    3c1-a219-1db0afceede:IJPP" version="any">
    ...
  </TimetableFrame>
  <ServiceCalendarFrame
    id="SI:SI0:ServiceCalendarFrame:EU_PI_CALENDAR-
    5d55f3b0-b
    369-45cc-a4c0-3d1a4e0ced64:IJPP" version="any">
    ...
  </ServiceCalendarFrame>

```

Each frame must have at least an `id` and a `version` attribute.

An example of an `id` record is

```
id="SI:SI0:CompositeFrame:EU_PI_LINE_OFFER_79ca1d92-a333-470e-86f7-8a5a09e607fb:IJPP"
```

where `SI` is the country code, `:` is the punctuation mark, `SI0` is the NUTS region code, `EU_PI_LINE_OFFER_79ca1d92-a333-470e-86f7-8a5a09e607fb` consists of three parts separated by `"_"`:

- prefix, which is always `"EU_PI"` according to EPIP,
- a type which may be `'LINE_OFFER'` (containing data for a single line and should contain the frame types `EU_PI_COMMON`, `EU_PI_STOP`, `EU_PI_NETWORK`, `EU_PI_CALENDAR` and `EU_PI_TIMETABLE`) or `'NETWORK_OFFER'` (containing data for a single line and should contain the frame types `EU_PI_COMMON`, `EU_PI_STOP`, `EU_PI_NETWORK`, `EU_PI_CALENDAR` and `EU_PI_TIMETABLE`)

information on all lines and should contain the EU\_PI\_COMMON frame types,

EU\_PI\_CALENDAR , EU\_PI\_STOP, EU\_PI\_NETWORK and  
EU\_PI\_TIMETABLE)

- the version identifier, which is the agreed GUID in Slovenia; for example  
79ca1d92-a333-470e-86f7-8a5a09e607fb

The version attribute has the value "any" if the version is unknown or if the system does not support versioning. If the system supports versioning, then the version is written as a number that increments with each subsequent version.

The optional attributes `created` and `changed` contain a timestamp and a time zone; example `created="2019-03-26T12:00:00.2Z"` and `changed="2019-03-26T12:10:00.2Z"`.

The `created` and `changed` attributes can be used for all frames and elements containing an `id` and a version.

### 3.2.2 ResourceFrame

[The ResourceFrame](#) is used to exchange common reference data such as organisations (managers, operators, control centres), transport modes, devices, day types (modes), calendars, equipment, vehicle types, etc. The EPIP identifies this frame with the type `EU_PI_COMMON`, which is also embedded in the identifier (`id`) of this frame.

The example below shows the content of the `<organisations>` element where `<Operator>` contains the details of the carrier (operator).

Example:

```
<ResourceFrame
  id="SI:SI0:ResourceFrame:EU_PI_COMMON-62f901cd-8700-473d-9ea9-1726cd8b3148:IJPP"
  version="any">
  <organisations>
    <Operator id="SI:SI0:Operator:138485bf-02e2-4991-8407-de3638db8f2e:IJPP"
      version="any"
      created="2019-01-25T10:00:10.2Z" changed="2019-02-26T11:12:09.2Z">
      <PublicCode>A15</PublicCode>
      <CompanyNumber>SI.A15</CompanyNumber>
      <Name>Nomago d.o.o.</Name>
      <ShortName>Nomago</ShortName>
      <ContactDetails>
        <Email>contact@nomago.si</Email>
        <Phone>386 1 12 34 567</Phone>
        <Fax>386 1 23 45 678</Fax>
        <Url>www.nomago.si</Url>
      </ContactDetails>
      <OrganisationType>operator</OrganisationType>
    </Operator>
  </organisations>
</ResourceFrame>
```

- [The OrganisationType](#) element may contain the following values: `authority`, `operator`, `railOperator`, `railFreightOperator`, `statutoryBody`, `facilityOperator`, `travelAgent`, `servicedOrganisation`, `other`.

### 3.2.3 SiteFrame

[SiteFrame](#) is used to share information about JPP infrastructure (facilities) such as stations, points of interest (POI), including navigation information, routes between platforms at the station, station point facilities, accessibility for passengers with restrictions, etc.

According to the IJPP, a `stop` is a group of nearby `stop points` that share the same name and represent their geographical centre of gravity. A `stop point` is a point that represents the physical location or centre of gravity of the area (platform) where passengers (usually) board a JPP vehicle. A `stop point` and a `stop point` according to IJPP, in NeTEx, are best described by the concepts [StopPlace](#) and [Quay](#).

NeTEx (EPIP)	IJPP
<a href="#">StopPlace</a>	Bus stop
<a href="#">Quay</a>	Station point

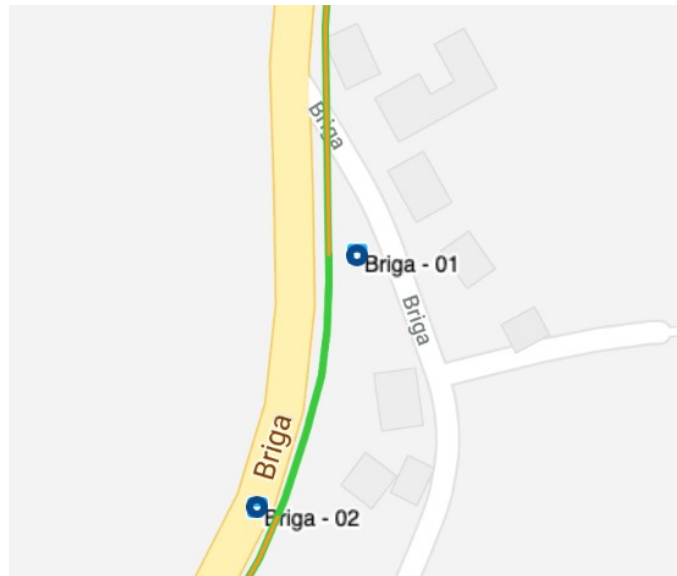
`StopPlace` is described in NeTEx as *"version of a named place where public transport may be accessed. May be a building complex (e.g. a station) or an on-street location."* A `Quay` is described in NeTEx as: *"a place such as platform, stance, or quayside where passengers have access to PT vehicles, Taxi cars or other means of transportation. A QUAY may contain other sub QUAYS. ... The physical point of access to transport is always a QUAY. ... A Monomodal STOP PLACE shall have at least one QUAY, and shall not contain any other STOP PLACE; all the QUAYS of a Monomodal STOP PLACE shall be used for the same transport mode."*

NeTEx makes a conceptual distinction between a physical stop and a timetable stop: *"A STOP PLACE represents physical stop or station. Note that a STOP PLACE is a distinct concept from the representation of the stop in a timetable - the SCHEDULED STOP POINT. The two can be connected using a STOP ASSIGNMENT."*

When a stop is dedicated to a single modality (e.g. bus), the `STOP PLACE` attribute `TypeOfPlaceRef` should be written with the value `"monomodalStopPlace"`. If the stop is a multi-modal stop (e.g. bus and train), the attribute `TypeOfPlaceRef` shall have the value `'generalStopPlace'`.

The picture below shows the Briga stop with two stop points (Briga 01 and Briga 02). Briga 01 is located in the direction of travel towards Kočevje and Briga 02 in the direction of Petrina.





In NeTeX and in accordance with EPIP, we describe the Briga stations in the SiteFrame as follows:

```
<StopPlace
  id="SI:SI0:MonomodalStopPlace:350271b3-c0cd-43e0-a244-940f744b4875:IJPP"
  version="any">
  <Name lang="en">Briga</Name>
  <PrivateCode>137331</PrivateCode>
  <placeTypes>
    <TypeOfPlaceRef ref="monomodalStopPlace"/>
  </placeTypes>
  <PostalAddress version="any"
    id="SI:SI0:PostalAddress:f2b0c577-7bf8-41fa-8602-4fc6f9a17a13:IJPP">
    <CountryRef ref="en"/>
    <Town>Kostel</Town>
    <Suburb>Briga</Suburb>
  </PostalAddress>
  <TransportMode>bus</TransportMode>
  <StopPlaceType>busStation</StopPlaceType>

  <quays>
    <!-- Briga 01 station point towards Kočevje -->
    <Quay id="SI:SI0:Quay:8c04eca3-f85d-436a-b260-2c68cb796275:IJPP"
      version="any">
      <Name lang="en">Briga 01</Name>
      <PrivateCode>1123727</PrivateCode>
      <Centroid>
        <Location>
          <Longitude>45.5192007018308</Longitude>
          <Latitude>14.8585977816623</Latitude>
        </Location>
      </Centroid>
      <TransportMode>bus</TransportMode>
      <QuayType>busStop</QuayType>
    </Quay>
    <!-- Briga 02 station point Petrina -->
    <Quay id="SI:SI0:Quay:9f973440-c9ae-4ed6-9b65-73257c0f69e8:IJPP"
      version="any">
      <Name lang="en">Briga 02</Name>
      <PrivateCode>1123726</PrivateCode>
      <Centroid>
        <Location>
          <Longitude>45.5186810628936</Longitude>
          <Latitude>14.8583048258544</Latitude>
        </Location>
      </Centroid>
      <TransportMode>bus</TransportMode>
```

```
<QuayType>busStop</QuayType>
</Quay>
</quays>
</StopPlace>
```

The [TransportMode](#) element can contain the following values: air (planes and helicopters), bus (bus that stops on the road, e.g. city bus), cableway (gondola or any cableway transport), coach (regular bus, intercity bus), funicular (gondola or funicular with rails, e.g. funicular to Ljubljana Castle), metro, rail (train, tourist train), taxi (*taxi, e.g. as an alternative transport*, tram, water (water transport).

The record contains data that can be extracted from the IJPP. The mapping of data for stop from IJPP to StopPlace in NeTeX is as follows:

NeTeX (EPIP)	Description (after IJPP)
Name	Name
PrivateCode	ID
TypeOfPlaceRef = monomodalStopPlace TypeOfPlaceRef = generalStopPlace	road only or rail only road and rail
CountryRef = en	for all stops in Slovenia
Town	Municipality
Suburb	Settlement
TransportMode	Type of stop ()
StopPlaceType (modality: )	Designation (classification of stop: e.g. onstreetBus)

The mapping of the data for a station point from IJPP to Quay to NeTeX is as follows:

NeTeX (EPIP)	IJPP
Name	Stop.name + Code
PrivateCode	ID
Longitude	Geometry
Latitude	Geometry
TransportMode	Type of stop
QuayType	Stop.code

### 3.2.4 ServiceFrame

[ServiceFrame](#) is used to exchange a basic description of the JPP network; stations, routes and vehicle paths, including stops and connections and timings.

The initial element in this frame is the [ROUTE](#) description, which has associated ROUTE POINTS that define the physical course of the route (curve) through the infrastructure network. The initial version of the Slovenian example of the IJPP to NeTeX (EPIP) conversion includes the ROUTE element.

The example below shows a [RoutePoint](#) record, which is a specialisation of [Point](#):

```
<ServiceFrame
  id="SI:SI0:ServiceFrame:EU_PI_NETWORK-b5a5da53-e88e-402d-bc6d-60e061c944ac:IJPP"
  version="any">
  <routePoints>
    <!-- physical point on the vehicle's route -->
    <!-- Kočevje 01 -->
    <RoutePoint id="SI:SI0:RoutePoint:a1012d22-3071-4c33-88d8-4ec45b1a65dc:IJPP"
      version="any">
      <Name>Point on the road near the Kočevje 01 stop</Name>
      <!--
      <Location>
        <Longitude>45.6469677312326</Longitude>
        <Latitude>14.8708799162306</Latitude>
      </Location>
      -->
      <projections>
        <PointProjection
          id="SI:SI0:PointProjection:a1012d22-3071-4c33-88d8-4ec45b1a65dc:IJPP"
          version="any">
          <ProjectToPointRef
            ref="SI:SI0:ScheduledStopPoint:31a6e9a7-2bf3-435e-b4b0-c81d90573c7e:IJPP"/>
          </PointProjection>
        </projections>
      </RoutePoint>
    <!-- Briga 02 -->
    <RoutePoint id="SI:SI0:RoutePoint:26dc0b94-9707-4585-a5b9-07ce1c00ade1:IJPP"
      version="any">
      <Name>Point on the road near/at Briga 02</Name>
      <projections>
        <PointProjection
          id="SI:SI0:PointProjection:fed7d708-034e-4d4b-9d1c-c72785d564ab:IJPP"
          version="any">
          <ProjectToPointRef ref="SI:SI0:ScheduledStopPoint:f4b45779-18c6-4b50-b007-
            de767c03a62d:IJPP"/>
          </PointProjection>
        </projections>
      </RoutePoint>
    <!-- Petrina 00 -->
    <RoutePoint id="SI:SI0:RoutePoint:9f46e3e2-59e4-4b7f-b152-e3bf9dbc680c:IJPP"
      version="any">
      <Name>Point on the road near/at Petrina 00</Name>
      <projections>
        <PointProjection version="any"
          id="SI:SI0:PointProjection:94db3803-2443-46b7-a5a4-aaa41183eb94:IJPP">
          <ProjectToPointRef ref="SI:SI0:ScheduledStopPoint:25918af1-e3cd-4c52-9b83-
            efa75ccf90c8:IJPP"/>
          </PointProjection>
        </projections>
      </RoutePoint>
    <!-- add RoutePoint Briga 01-->
    <!-- add RoutePoint Petrina 01-->
    <!-- add RoutePoint Petrina 02-->
  </routePoints>
```

A [RoutePoint](#) may also contain a geographical location that is not in the same location as a [StopPlace](#) from a [Quay](#). The [RoutePoint](#) may be

also a geometric point for the physical location (`ScheduledStopPoint`) where the passenger enters or leaves the vehicle within the timetable, which is described by `ProjectToPointRef`. The number of waypoints is typically greater than the number of scheduled stoppoints if we also describe intermediate waypoints where the vehicle turns, etc.

The next element connects the `RoutePoints` into a sequence of `RoutePoints` that run along a `Line`. The `Line` is described inside the `lines` element.

```
<!-- physical routes of the
vehicle -->
<routes>
  <Route id="SI:SI0:Route:ab4b8f67-334f-4230-a600-e88c1b6591cb:IJPP" version="any"
created="2018-02-06T15:23:29+00:00" changed="2018-03-01T10:16:50+00:00">
  <Name>Kočevje - Petrina</Name>
  <LineRef ref="SI:SI0:Line:aeee0047-4a54-47b2-955c-3e8156623092:IJPP"/>
  <DirectionType>outbound</DirectionType>
  <pointsInSequence>
    <!-- Kočevje 01 -->
    <PointOnRoute version="any"
order="1">
      id="SI:SI0:PointOnRoute:a1012d22-3071-4c33-88d8-4ec45b1a65dc:IJPP"
      <RoutePointRef ref="SI:SI0:RoutePoint:a1012d22-3071-4c33-88d8-
4ec45b1a65dc:IJPP"/>
    </PointOnRoute>
    <!-- Briga 02 -->
    <PointOnRoute version="any"
order="2">
      id="SI:SI0:PointOnRoute:ff8e8a08-12d0-40e5-aff0-dc1ea089acc9:IJPP"
      <RoutePointRef ref="SI:SI0:RoutePoint:26dc0b94-9707-4585-a5b9-
07ce1c00adel:IJPP"/>
    </PointOnRoute>
    <!-- Petrina 00 -->
    <PointOnRoute version="any"
order="3">
      id="SI:SI0:RoutePoint:c82d5ce4-68af-4891-babb-1f750feb0d91"
      <RoutePointRef ref="SI:SI0:RoutePoint:9f46e3e2-59e4-4b7f-b152-
e3bf9dbc680c:IJPP"/>
    </PointOnRoute>
  </pointsInSequence>
</Route>
  <!-- add Route Petrina - Kočevje -->
  <!-- ... -->
</routes>
<!-- lines -->
<lines>
  <Line id="SI:SI0:Line:aeee0047-4a54-47b2-955c-3e8156623092:IJPP" version="any"
created="2018-02-06T15:23:29+00:00" changed="2018-03-01T10:16:50+00:00"
status="active">
  <Name>Petrina - Kočevje</Name>
  <TransportMode>bus</TransportMode>
  <PublicCode>PRA181003</PublicCode>
  <PrivateCode>18836</PrivateCode>
  <OperatorRef ref="SI:SI0:Operator:138485bf-02e2-4991-8407-de3638db8f2e:IJPP"/>
</Line>
</lines>
```

The next element `scheduledStopPoints` is a list of all points ([ScheduledStopPoint](#)) that appear in the timetable. Each `ScheduledStopPoint` is associated with a `StopPlace` and a `Quay` in the `PassengerStopAssignment` element.

```
<scheduledStopPoints>
  <!-- outbound/inbound Kočevje 01 -->
  <ScheduledStopPoint
version="any"/>
    id="SI:SI0:ScheduledStopPoint:31a6e9a7-2bf3-435e-b4b0-c81d90573c7e:IJPP"
  <!-- outbound Briga 02 -->
```

```

        <ScheduledStopPoint
          id="SI:SI0:ScheduledStopPoint:f4b45779-18c6-4b50-b007-de767c03a62d:IJPP"
version="any"/>
        <!-- outbound Petrina 00 -->
        <ScheduledStopPoint
          id="SI:SI0:ScheduledStopPoint:25918af1-e3cd-4c52-9b83-efa75ccf90c8:IJPP"
version="any"/>
        <!-- inbound Petrina 02 -->
        <ScheduledStopPoint
          id="SI:SI0:ScheduledStopPoint:f5ee9f7e-35dc-4887-9034-8868855c3b5c:IJPP"
version="any"/>
        <!-- inbound Briga 01 -->
        <ScheduledStopPoint
          id="SI:SI0:ScheduledStopPoint:af4aa6ab-c693-4fa2-a81c-f55b494103aa:IJPP"
version="any"
        />
    </scheduledStopPoints>

    <stopAssignments>
        <!-- outbound/inbound Kočevje 01 -->
        <PassengerStopAssignment
          id="SI:SI0:PassengerStopAssignment:a1012d22-3071-4c33-88d8-4ec45b1a65dc:IJPP"
          version="any" order="0">
            <ScheduledStopPointRef ref="SI:SI0:ScheduledStopPoint:31a6e9a7-2bf3-435e-b4b0-
c81d90573c7e:IJPP"/>
            <StopPlaceRef ref="SI:SI0:MonomodalStopPlace:8439d29e-ce1c-4be9-b84f-
f4982540acbb:IJPP"/>
            <QuayRef ref="SI:SI0:Quay:666ab121-5843-410a-b43c-e0acada9c041:IJPP"/>
        </PassengerStopAssignment>
        <!-- outbound Briga 02 -->
        <PassengerStopAssignment
          id="SI:SI0:PassengerStopAssignment:ff8e8a08-12d0-40e5-aff0-dc1ea089acc9:IJPP"
          version="any" order="0">
            <ScheduledStopPointRef ref="SI:SI0:ScheduledStopPoint:f4b45779-18c6-4b50-b007-
de767c03a62d:IJPP"/>
            <StopPlaceRef ref="SI:SI0:MonomodalStopPlace:350271b3-c0cd-43e0-a244-
940f744b4875:IJPP"/>
            <QuayRef ref="SI:SI0:Quay:9f973440-c9ae-4ed6-9b65-73257c0f69e8:IJPP"/>
        </PassengerStopAssignment>
        <!-- outbound Petrina 00 -->
        <PassengerStopAssignment
          id="SI:SI0:PassengerStopAssignment:ff56132f-d028-4247-bec6-2e1cb8eb1a9f:IJPP"
          version="any" order="0">
            <ScheduledStopPointRef ref="SI:SI0:ScheduledStopPoint:ff56132f-d028-4247-bec6-
2e1cb8eb1a9f:IJPP"/>
            <StopPlaceRef ref="SI:SI0:MonomodalStopPlace:42d93737-680c-45f9-8030-
ab0eb5a8912a:IJPP"/>
            <QuayRef ref="SI:SI0:Quay:b55885ca-6c25-4333-acea-93fbd3a08ebc:IJPP"/>
        </PassengerStopAssignment>
        <!-- inbound Petrina 02 -->
        <PassengerStopAssignment
          id="SI:SI0:PassengerStopAssignment:3f8d30a4-86cb-4a1d-b06f-a6f62fb01a3f:IJPP"
          version="any" order="0">
            <ScheduledStopPointRef ref="SI:SI0:ScheduledStopPoint:3f8d30a4-86cb-4a1d-b06f-
a6f62fb01a3f:IJPP"/>
            <StopPlaceRef ref="SI:SI0:MonomodalStopPlace:42d93737-680c-45f9-8030-
ab0eb5a8912a:IJPP"/>
            <QuayRef ref="SI:SI0:Quay:a38ca3aa-c66a-4973-9e33-46fa969d0fd1:IJPP"/>
        </PassengerStopAssignment>
        <!-- inbound Briga 01 -->
        <PassengerStopAssignment
          id="SI:SI0:PassengerStopAssignment:206ebb42-faf9-4a32-bf8b-66289999b948:IJPP"
          version="any" order="0">
            <ScheduledStopPointRef ref="SI:SI0:ScheduledStopPoint:206ebb42-faf9-4a32-bf8b-
66289999b948:IJPP"/>
            <StopPlaceRef ref="SI:SI0:MonomodalStopPlace:350271b3-c0cd-43e0-a244-
940f744b4875:IJPP"/>
            <QuayRef ref="SI:SI0:Quay:8c04eca3-f85d-436a-b260-2c68cb796275:IJPP"/>
        </PassengerStopAssignment>
    </stopAssignments>

```

The next element `journeyPatterns` contains a `ServiceJourneyPattern`, which contains a `pointsInSequence` (attribute `order`) sequence of entry and exit points (`ScheduledStopPoint`) with attributes relevant to the passenger, grouped in a `StopPointInJourneyPattern` element. Thus, stop points where exit is not allowed are described by `<ForAlighting>>false</ForAlighting>` and stop points where entry is not allowed are described by `<ForBoarding>>false</ForBoarding>`. Each `ServiceJourneyPattern` element corresponds to one journey on the line or timetable. A `ServiceJourneyPattern` is a journey of a vehicle on which passengers board and alight at stop points.

```
<journeyPatterns>
  <!-- Ride 3 Kočevje - Petrina -->
  <ServiceJourneyPattern
    id="SI:SI0:JourneyPattern:bbb4ec20-05f3-47a7-afec-5c005d8e5a35:IJPP"
    version="any">
    <Name>Kočevje - Petrina</Name>
    <PrivateCode>97586</PrivateCode>
    <RouteRef ref="SI:SI0:Route:ab4b8f67-334f-4230-a600-e88c1b6591cb:IJPP"/>
    <DirectionType>outbound</DirectionType>
    <pointsInSequence>
      <!-- Kočevje 01 -->
      <StopPointInJourneyPattern
        id="SI:SI0:StopPointInJourneyPattern:ffa9b166-9838-4906-a204-
a0c372e76855:IJPP"
        version="any" order="1">
        <ScheduledStopPointRef ref="SI:SI0:ScheduledStopPoint:31a6e9a7-2bf3-435e-
b4b0-c81d90573c7e:IJPP"/>
        <ForAlighting>>false</ForAlighting>
      </StopPointInJourneyPattern>
      <!-- Briga 02 -->
      <StopPointInJourneyPattern
        id="SI:SI0:StopPointInJourneyPattern:ffa9b166-9838-4906-a204-
a0c372e76856:IJPP"
        version="any" order="2">
        <ScheduledStopPointRef ref="SI:SI0:ScheduledStopPoint:f4b45779-18c6-4b50-
b007-de767c03a62d:IJPP"/>
        </StopPointInJourneyPattern>
      <!-- Petrina 00 -->
      <StopPointInJourneyPattern
        id="SI:SI0:StopPointInJourneyPattern:ffa9b166-9838-4906-a204-
a0c372e76857:IJPP"
        version="any" order="3">
        <ScheduledStopPointRef ref="SI:SI0:ScheduledStopPoint:ff56132f-d028-4247-
bec6-2e1cb8eb1a9f:IJPP"/>
        <ForBoarding>>false</ForBoarding>
      </StopPointInJourneyPattern>
    </pointsInSequence>
  </ServiceJourneyPattern>
</journeyPatterns>
<!-- add Ride 1 Petrina - Kočevje -->
</ServiceFrame>
```

This terminates the `ServiceFrame`. For a complete timetable description, now only the journey modes and journey times are missing (according to IJPP these are "journey descriptions").

The timetables are described within the `ServiceCalendarFrame` and the timetable descriptions within the `TimetableFrame`.

### 3.2.5 ServiceCalendarFrame

Timetables are inherently reusable components because they can be described as

independent of the actual regimes. The actual dates are assigned to the schedules in a [ServiceCalendarFrame](#) (service calendar) which defines groups of days (e.g. "weekday"), individual days (e.g. "Wednesday 2015-09-17") with corresponding day type assignments (e.g. "17 September 2015 is a day of type 'weekday' "). By using different calendars, the timetable can be persistent and can be reused for different schedules.

The following example shows the contents of a `ServiceCalendarFrame`. The `ServiceCalendar` element describes the total period of validity of all modes. The `DayType` element describes each mode and its properties, such as the days of the week when the mode is running. If for a regime described in this way (`DayType`) we also define an operating period (`OperatingPeriod`), we can associate `DayType` with `OperatingPeriod` in the `dayTypeAssignments` element.

```
<ServiceCalendarFrame
  id="SI:SI0:ServiceCalendarFrame:EU_PI_CALEDAR-5d55f3b0-b369-45cc-a4c0-
3d1a4e0ced64:IJPP"
  version="any">
  <Name lang="en">Modes 2019</Name>
  <ServiceCalendar id="SI:SI0:ServiceCalendar:942d29c7-f1c0-4cff-a291-
b392ff2406ff:IJPP"
    version="any">
    <!-- min/max of total operating days/periods -->
    <FromDate>2019-01-03</FromDate>
    <ToDate>2019-12-25</ToDate>
  </ServiceCalendar>
  <dayTypes>
    <DayType id="SI:SI0:DayType:942d29c7-f1c0-4cff-a291-b392ff2406ff:IJPP"
version="any"
    created="2015-03-17T14:37:12.OZ" changed="2016-11-28T19:33:29.OZ">
    <Name lang="en">Driving on school days (areas referred to in Article 8(5), Art.
Rules on school carols. for primary schools)</Name>
    <ShortName lang="en">Š1</ShortName>
    <PrivateCode>903</PrivateCode>
    <properties>
      <PropertyOfDay>
        <DaysOfWeek>Monday Tuesday Wednesday Thursday Friday</DaysOfWeek>
      </PropertyOfDay>
    </properties>
  </DayType>
</dayTypes>
  <operatingPeriods>
    <OperatingPeriod id="SI:SI0:OperatingPeriod:82a42c7e-d83f-4d29-9769-
1c12e8a22264:IJPP"
      version="any">
      <FromDate>2019-01-03T00:00:00.2Z</FromDate>
      <ToDate>2019-06-24T00:00:00.2Z</ToDate>
    </OperatingPeriod>
    <OperatingPeriod id="SI:SI0:OperatingPeriod:c61f888d-9f08-43a1-a82e-
c4630188bc40:IJPP"
      version="any">
      <FromDate>2019-09-01T00:00:00.2Z</FromDate>
      <ToDate>2019-12-25T00:00:00.2Z</ToDate>
    </OperatingPeriod>
  </operatingPeriods>
  <dayTypeAssignments>
    <!-- Each DayTypeAssignment assigns a Date or an OperatingPeriod to the DayType -->
    <DayTypeAssignment
      id="SI:SI0:DayTypeAssignment:942d29c7-f1c0-4cff-a291-b392ff2406ff-1:IJPP"
      version="any" order="1">
      <OperatingPeriodRef ref="SI:SI0:OperatingPeriod:82a42c7e-d83f-4d29-9769-
1c12e8a22264:IJPP"/>
      <DayTypeRef ref="SI:SI0:DayType:942d29c7-f1c0-4cff-a291-b392ff2406ff:IJPP"/>
    </DayTypeAssignment>
    <DayTypeAssignment
      id="SI:SI0:DayTypeAssignment:942d29c7-f1c0-4cff-a291-b392ff2406ff-2:IJPP"
```



```

        version="any" order="2">
        <OperatingPeriodRef ref="SI:SI0:OperatingPeriod:c61f888d-9f08-43a1-a82e-
c4630188bc40:IJPP"/>
        <DayTypeRef ref="SI:SI0:TimeTable:942d29c7-f1c0-4cff-a291-b392ff2406ff:IJPP"/>
        </DayTypeAssignment>
    </dayTypeAssignments>
</ServiceCalendarFrame>

```

### 3.2.6 TimetableFrame

[TimetableFrame](#) is used to describe individual journeys of a timetable where the `OperatorRef`, the `JourneyPatternRef` and the `DayTypeRef` are linked in the `VehicleJourney` container and the `ServiceJourney` element. A sequence (passingTimes) of stop points (`TimetabledPassingTime`) is a timetabled list of stop points (`StopPointInJourneyPatternRef`) with `ArrivalTime` and `DepartureTime`, which are the result of a planning process and are published in the timetable.

The example below shows the contents of a `TimetableFrame`.

```

<TimetableFrame
  id="SI:SI0:TimetableFrame:EU_PI_TIMETABLE-2b3ddb63-b170-43c1-a219-1db0afceede:IJPP"
  version="any">
  <vehicleJourneys>
    <ServiceJourney id="SI:SI0:ServiceJourney:ea3247da-47f7-4eab-9f9b-
f5e29b362f47:IJPP"
      version="any">
      <Name>Ride 3</Name>
      <TransportMode>bus</TransportMode>
      <TransportSubmode>
        <!-- PR = localBus -->
        <BusSubmode>localBus</BusSubmode>
      </TransportSubmode>
      <dayTypes>
        <DayTypeRef ref="SI:SI0:DayType:942d29c7-f1c0-4cff-a291-b392ff2406ff:IJPP"/>
      </dayTypes>

      <JourneyPatternRef ref="SI:SI0:JourneyPattern:bbb4ec20-05f3-47a7-afec-
5c005d8e5a35:IJPP"/>
      <OperatorRef ref="SI:SI0:Operator:138485bf-02e2-4991-8407-de3638db8f2e:IJPP"/>

      <passingTimes>
        <TimetabledPassingTime>
          <!-- Outbound Kočevje 01 -->
          <StopPointInJourneyPatternRef
ref="SI:SI0:StopPointInJourneyPattern:ffa9b166-9838-4906-a204-a0c372e76855:IJPP"/>
          <DepartureTime>14:15:00.2Z</DepartureTime>
        </TimetabledPassingTime>
        <TimetabledPassingTime>
          <!-- Outbound - Briga 02 -->
          <StopPointInJourneyPatternRef
ref="SI:SI0:StopPointInJourneyPattern:ffa9b166-9838-4906-a204-a0c372e76856:IJPP"/>
          <ArrivalTime>14:33:00.2Z</ArrivalTime>
          <DepartureTime>14:33:00.2Z</DepartureTime>
        </TimetabledPassingTime>
        <TimetabledPassingTime>
          <!-- Outbound - Petrina 00 -->
          <StopPointInJourneyPatternRef
ref="SI:SI0:StopPointInJourneyPattern:ffa9b166-9838-4906-a204-a0c372e76857:IJPP"/>
          <ArrivalTime>14:48:00.2Z</ArrivalTime>
        </TimetabledPassingTime>
        <!-- add Ride 1 (Petrina - Kočevje) -->
      </passingTimes>
    </ServiceJourney>
  </vehicleJourneys>
</TimetableFrame>

```

```
</ServiceJourney>  
</vehicleJourneys>  
</TimetableFrame>
```

### 3.3 Examples of NeTEx XML compliant documents with Slovenian profile for NeTEx

Example used in previous chapters to explain:  
[NETEX\\_PI\\_01\\_SI\\_IJPP\\_LINE\\_K66\\_20190329.xml](#).

The data schema of the national IJPP standard contains data structures that can be aligned with the NeTEx technical specification, as the IJPP standard has been influenced by previous projects in Slovenia (AVRIS, SIJPRO), which were inspired by previous versions of the TC 278 standard EN 12896-1:2016. The history of the development of the IJPP Standard is described on the Transmodel project website (<http://www.transmodel-cen.eu/implementations/slovenia>).