

Moving Europe towards a sustainable and
safe railway system without frontiers.

Testing procedure for timetable data

Telematics TSI - Technical document - B17

Version 4.0

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A. Document management

A.1 Document properties

- File name: ERA_TD_B17.docx
- Subject and document type: Telematics TSI - Technical document - B17
- Author: European Railway Agency
- Version: 4.0

A.2 Change management

Updates to this technical document shall be subject to Change Control Management procedure managed by the Agency pursuant:

- the applicable requirements in the reference TSI
- Art. 23(2) of the Agency Regulation

If necessary, working groups are created in line with Art. 5 of the Agency Regulation.

A.3 Configuration management

A new version of the document will be created if new changes are considered following the Change Control Management Process led by ERA.

More specifically:

- if there is a change in the requirements which influences the implementation
- if information is added to or deleted from the technical document
- adding test cases to the field checking in messages or databases.

Modifications will have to be highlighted, so they can be easily identified.

Disclaimer:

Specific legal references to technical documents and legal acts shall be revised after the enter into force of the Telematics TSI. In some sections this text can be highlighted.

A.4 Availability

The version in force of this document is available on Agency's Gitlab repository. Any printed copy is uncontrolled.

A.5 Application and actors in the scope

Date of entry into force of reference TSI.

This document applies to all the actors in the scope of the reference TSI.

A.6 Document history

Table 1 - Document history

Version	Date	Comments
4.0	10.06.2025	Initial version for Telematics TSI

B. Acronyms, definitions and external references

B.1 Acronyms

Table 2 – Acronyms

<i>ABBREVIATION</i>	<i>FULL TEXT</i>
CA	Certification Authority
CEN	European Committee for Standardisation
CENELEC	European Committee for Electrotechnical Standardisation
CER	The Community of European Railway and infrastructure companies
EC	European Commission
EEA	European Economic Area
EEC	European Economic Community
EIM	European Rail Infrastructure Managers
EN	European standard
ERA	European Union Agency for Railways also called “the Agency”
ESO	European Standardisation Organisation
EU	European Union
IM	Infrastructure Manager
INF	Infrastructure
ISO	International Organisation for Standardisation
MS	EU or EEA Member State
NAP	National access point
NSA	National Safety Authority
PKI	Public key infrastructure
PRM	Person with Disabilities or Person with Reduced Mobility
RA	Registration Authority
RFU	Recommendation for Use
RINF	Register of Infrastructure
RISC	Railway Interoperability and Safety Committee
RU	Railway Undertaking
SC	Standard Committee
SS	Subsystem
TC	Technical Committee
TR	Technical Report
TS	Technical Specification

<i>ABBREVIATION</i>	<i>FULL TEXT</i>
TSI	Technical Specification for Interoperability
UIC	International Union of Railways (Union Internationale des Chemins de Fer)

B.2 Definitions

Terms contained in this document are defined in the ERA Ontology.

B.3 External references

The referenced documents listed in Table 2 are indispensable for the application of this document:

- For dated references, only the edition cited applies;
- For undated references, if any, the latest edition of the referenced document (including any amendments) applies.

Table 2 Reference documents

<i>Id</i>	<i>Title</i>	<i>Doc ID, Edition</i>	<i>Date</i>	<i>Author/ Publisher</i>
[1]	Directive 2012/34/EU of The European Parliament and of The Council establishing a single European railway area.	Directive 2012/34/EU	21/11/2012	EC
[2]	DIRECTIVE (EU) 2016/797 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 11 May 2016 on the interoperability of the rail system within the European Union (Recast)	Directive (EU) 2016/797	11/06/2016	EC
[3]	Commission Implementing Regulation on a technical specification relating to the telematics subsystem of the rail system in the European Union for interoperability of data sharing in rail transport and repealing Regulations (EU) No 454/2011 and (EU) No 1305/2014	COMMISSION REGULATION (EU) No	XX/XX/25	EU
[4]	Telematics TSI TD-103– ANNEX D.2: APPENDIX C – REFERENCE FILES	ERA_Technical_Document_TAF-TD-103	Xx/xx/25	ERA

1. References

See section B.3.

2. Introduction

Chapter 1.5 of the Telematics TSI documents the essential requirements for Data Quality. This is a prerequisite for effective data exchange and comprises the following elements:

- › Completeness
- › Accuracy
- › Consistency
- › Timeliness

The document describes how these data quality requirements can be met, the data structures for the data exchange of timetable data and the test procedures to be applied.

2.1. High-level quality requirements

The provider of the timetable data will be responsible for the correctness of the data and must verify that it is in compliance with the technical specifications stipulated for that data. This means that the data must not only be complete and conform to the metadata requirements (syntax-level), but must also be accurate, timely and consistent for the receiving application to effectively import the message. This requires two distinct levels of validation, as described below:

2.1.1. Level 1 Compliance Checking

As the timetable datasets are defined using WC3 XSDs according to Recommendation 28, the schema contain all metadata needed for strict Level 1 compliance checking. This syntactical-level check validates the interchange, or part of it, for compliance with the schema. It includes validation for field lengths, data types, codification (where enumerations exists), presence or absence of required data, valid payload entries where defined and the order of data transmitted. The schema validation is more robust and provides a higher level of compliance checking than traditional EDI.

The XSD metadata provides a perfect solution to meet the needs for Completeness and some of the Accuracy requirements as defined above.

As a minimum, Level 1 Compliance Checking shall be implemented.

2.1.2. Level 2 Application Validation

According to the Telematics TSI the data provider must ensure a data quality assurance check using their own resources. Data quality assurance includes comparison of data from reference file databases provided as part of the TSI plus, where applicable, logic checks to assure the timeliness and continuity of data and messages.

Data must be of high quality if they are fit for their intended uses, which means they

- › Are Error free: accessible, accurate, timely, complete, consistent with other sources, etc., and

Possess desired features: relevant, comprehensive, proper level of detail, easy-to-read, easy-to-interpret, etc.

For example, while the Schema can validate that a Company Ident contains 4 alphanumeric characters, it cannot assess the validity of that code against a common reference file. It is therefore up to the sender to assure that the information is valid in his own application before generating the data. The receiver must also perform the same validity check before the data is imported into his system. Additionally, Level 2 Application Validation should also provide consistency and timeliness checks according to the requirements defined by the target application.

This level of validation is a function of the internal systems as it presupposes that the necessary reference data are in place and applied consistently in the senders' systems.

3. Scope

The scope is defined by chapter 4.2 – timetable data of the telematics TSI. It covers the data exchange of the timetable data, used to build journey planning systems of other railway undertakings or 3rd parties.

4. Rights & obligations, actors

4.1. Rights and obligations

The Telematics TSI sets an obligation for each RU to make available all timetable data of the passenger services operated by it.

4.1.1. Who?

The obligation is on the European licensed RUs.

For trains operated by a single RU (sole carrier in Telematics glossary) the obligation is on that RU.

For trains operated by a chain of successive RUs (joint carriers in Telematics glossary) the obligation is by default on each RU for the part of journey operated by that RU, unless they commonly agree that only one of the RUs will make available the timetable of the whole train (that RU will be called information provider for the train)

For trains operated by a Business Unit, i.e. a grouping of RUs which makes a joint service offer under a single brand (e.g. Eurostar, Lyria) but which is not legally an RU, the timetable data must be made available as in the previous case (each RU by default, or only one information provider)

4.1.2. To whom?

The timetable data are made available in non discriminatory way to all railway undertakings, third parties and public bodies. All actors subject to the Telematics regulation must have access to the same content with the same timeliness and accuracy. The RU as the owner of the timetable data is allowed to require a formal contract with the receiver of the data (third party). The data must be released under the same conditions for all actors in a fair and transparent manner.

4.1.3. Which services?

Only those available for purchase by the public. Therefore there is no obligation to make available data concerning charter trains, pilgrim trains, special trains for journeys of authorities, trains for movement of troops, etc.

In which way ?

The Telematics TSI obliges the RUs to make available their timetables on the national access point (NAP), not to send them to anybody.

4.1.4. When?

The TAP makes reference to the “annual timetable”. The yearly frequency of timetable production is stated by Commission Decision (2002/844/EC) of 23 October 2002, which sets the change of working timetable at midnight on the second Saturday in December.

The annual timetable must be made available at least two months before that deadline, but only for those services over which the RU has sole control, i.e. full legal and commercial freedom to decide them. If the services are subject e.g. to the approval of a Public Transport Authority, making them available can be delayed as long as the approval is pending.

The “annual timetable” should be read as “a 12 months’ timetable must be made available”. However if the RUs have intermediate timetable changes, they can update the timetable data according to the Telematics TSI requirements, at least 7 days before those timetable changes take effect.

It is also to be noted that the Telematics TSI requires that timetable data must be kept available at least for 12 months after such data have expired.

4.1.5. What?

Though the title of Telematics TSI Basic Parameter 4.2.1 is “Exchange of timetable data”, not only timetable data *stricto sensu* must be made available in form of XML files following the standards

CEN/TS 16614 (NeTEx), but also data concerning all stations mentioned in the timetable data as departure, stop, via station, border point or destination of a train must be made available in form of those XML files by station managers.

4.2. Actors

The actors in the domain of timetables are mainly the RUs, in the many different roles they can play.

As carrier, an RU can be (see definitions in the glossary):

- › Joint carrier
- › Sole carrier.

As company subject to Telematics, an RU can be:

- › Information provider
- › Reservation provider.

On the other side the RUs, as well as third parties, Ticket Vendors or Public Transport Authorities, can benefit of the timetable exchange system as Data users.

5. Content of data

Chapter 5 of this technical document explains the standards used and gives some guidelines on how to use these standards. the Basic Parameter 4.2.22 of Telematics suggests also standards for the exchange of timetable data with other modes of transport, in particular the European Norms EN 12896 “Transmodel”, CEN/TS 16614 (NeTEx) and “SIRI”.

For the timetable data provision uses two different messages:

- /PublicationDelivery/dataObjects/CompositeFrame/frames/ServiceFrame for the transfer of “schedule data” which (in general) is train data.
- /PublicationDelivery/dataObjects/CompositeFrame/frames/StaticFrame for the transfer of “static data” which is location data for railway stations.

The structure of these messages is defined by the European standardisation organisations.

5.1. Specification of timetable and location data

The message elements ServiceFrame and StaticFrame are specified in the standard CEN/TS 16614 (NeTEx). This document describes the message structures to be used and its data content.

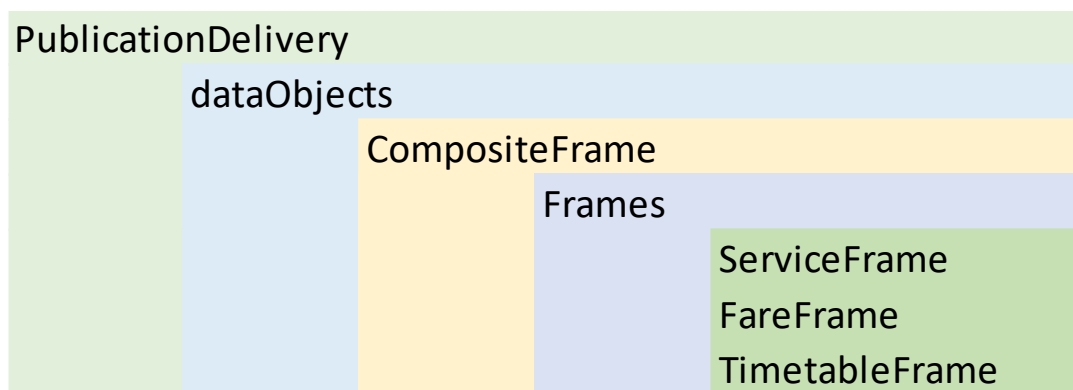
NeTEx allows a variety of different ways to codify a train and its data. To simplify the use of these messages, the following sections of this chapter will give a practical guide to the most relevant details of the messages and describe a recommended way to use them.

5.2. General introduction to XML data deliveries

XML is a text based data format (not a binary one), though the syntax is to a certain extent human readable. (based on European profile).

5.3. Usage of ServiceFrame

The overall structure to be used to provide the timetable data in NeTEx is



Summary of the elements used in the element ServiceFrame:

ScheduledStopPoints List of Scheduled stop points (e.g. train stations)

Summary of the elements used in the element TimetableFrame:

vehicleJourneys/ServiceJourney Journey of a train

vehicleJourneys/ServiceJourney/TransportMode specification of the transport mode

vehicleJourneys/ServiceJourney/TransportSubMode specification of the transport submode

vehicleJourneys/ServiceJourney/trainNumbers reference to the train numbers

vehicleJourneys/ServiceJourney/parts parts of the train (e.g. Journey parts operated with a different train characteristics)

vehicleJourneys/ServiceJourney/calls calls of the train

vehicleJourneys/ServiceJourney/facilities

facilities provided on the train

5.3.1. Basic principles of train variants

5.3.1.1. Minimum representation of a train

In the following examples, details given include facilities, information about reservation and pricing and information about stops with traffic restrictions.

Please note: The available facilities on a train have to be given explicitly in the message.

Facts / situation	NeTEx
A train (no service mode is specified) with number 596 and the service provider DB AG (1080).	<pre><!-- PRD+596+1080' --> <ServiceJourney version="any" id="596" changed="2022-01-26T09:51:00" dataSourceRef="uic:0060"> <TransportMode>rail</TransportMode> <OperatorRef versionRef="EXTERNAL " ref="uic:1080">DBAG</OperatorRef> <trainNumbers> <TrainNumberRef version="any" ref="410"/> </trainNumbers></pre>
The operation days are December 15th, 16th, 17th, 18th and 20th (but not 19th).	<pre><ServiceCalendarFrame id="uic:SKDUPD_basic_example" version="any"> <operatingPeriods> <!-- POP+273:2003-12-15/2003-12- 20::111101' --> <UicOperatingPeriod id="uic:SKDUPD_basic_example_operatingperiod" version="any"> <FromDate>2003-12- 15T12:00:00</FromDate> <ToDate>2003-12- 20T12:00:00</ToDate> <ValidDayBits>111101</ValidDayBits> </UicOperatingPeriod> </operatingPeriods> </ServiceCalendarFrame></pre>
Facility First class available	<pre>/PublicationDelivery/dataObjects/CompositeFrame /frames/TimetableFrame/vehicleJourneys/ ServiceJourney/parts/JourneyPart/facilities: <ServiceFacilitySet version="any" id="1@F4"> <!-- SER+4' --> <TypeOfFacilityRef versionRef="EXTERNAL " ref="F4"/></pre>
Facility Second class available	<pre>/PublicationDelivery/dataObjects/CompositeFrame /frames/TimetableFrame/vehicleJourneys/ ServiceJourney/parts/JourneyPart/facilities: <ServiceFacilitySet version="any" id="1@F5"> <!-- SER+5' --> <TypeOfFacilityRef versionRef="EXTERNAL " ref="F5"/></pre>

from Munich (008020347) dep. 12:34	<pre> /PublicationDelivery/dataObjects/CompositeFrame /frames/TimetableFrame/vehicleJourneys/ ServiceJourney/calls <!-- POR+008020347+*1234' --> <Call version="any" id="1" order="1"> <ScheduledStopPointRef version="any" ref="uic: 008020347">Munich</ScheduledStopPointRef> <Arrival> <ForAlighting>false</ForAlighting> </Arrival> <Departure> <Time>12:34:00</Time> </Departure> </Call> </pre>
via Frankfurt (008011068) arr. 16:08, dep. 16:13	<pre> /PublicationDelivery/dataObjects/CompositeFrame /frames/TimetableFrame/vehicleJourneys/ ServiceJourney/calls <!-- POR+008011068+1608*1613' --> <Call version="any" id="1" order="1"> <ScheduledStopPointRef version="any" ref="uic: 008011068"> Frankfurt </ScheduledStopPointRef> <Arrival> <Time>16:08:00</Time> </Arrival> <Departure> <Time>16:13:00</Time> </Departure> </Call> </pre>
to Berlin Ostbahnhof (008007817) arr. 20:33.	<pre> /PublicationDelivery/dataObjects/CompositeFrame /frames/TimetableFrame/vehicleJourneys/ ServiceJourney/calls <!-- POR+008007817+2033' --> <Call version="any" id="1" order="1"> <ScheduledStopPointRef version="any" ref="uic:008007817">Berlin Ostbahnhof </ScheduledStopPointRef> <Arrival> <Time>20:33:00</Time> </Arrival> <Departure> <ForBoarding>false</ForBoarding> </Departure> </Call> </pre>

5.3.1.2. *days of operation*

Facts / situation	NeTEx
Days of operation can be given with a list of 1's and 0's (1 means "train operates"). In this case the number of days within the given period has to be equal to the number of given 0 and 1	<pre> <UicOperatingPeriod id="uic:SKDUPD_basic_example_operatingperiod" version="any"> <!-- POP+273:2003-12-15/2003-12-20::111101'--> <FromDate>2003-12-15T12:00:00</FromDate> </pre>

(e.g. the period 2003-12-15/2003-12-20 needs to be specified by 6 digits 0 and 1).	<pre> <ToDate>2003-12-20T12:00:00</ToDate> <ValidDayBits>111101</ValidDayBits> </UicOperatingPeriod> /PublicationDelivery/dataObjects/CompositeFrame /frames/TimetableFrame/vehicleJourneys /ServiceJourney <dayTypes> <DayTypeRef ref="uic:SKDUPD_basic_example_operatingperiod"/> </dayTypes> </pre>
--	---

5.3.1.3. Service mode / service brand

Facts / situation	NeTEx
<p>There are two levels within the SKDUPD message for the specification of the travel service: the first one is the service mode in PRD segment. The service mode is mandatory when the mean of transport is not train (Service mode 37, which is the default).</p> <p>The second level is optional and specifies the service brand. This information is delivered in the PDT segment.</p> <p>Both levels codes are in the same code list B.4.7009. Codes from 3 through 37 design service modes, the codes from 47 upwards design service brand codes.</p> <p>The example on the right uses the code value 51 to indicate that the train is an ICE.</p>	<pre> /PublicationDelivery/dataObjects/ CompositeFrame/frames/TimetableFrame /vehicleJourneys/ServiceJourney <TransportMode>rail</TransportMode> <TransportSubmode> <RailSubmode>longDistance</RailSubmode> </TransportSubmode> <!-- PDT++:::51::: ' --> <TypeOfProductCategoryRef versionRef="EXTERNAL " ref="51">ICE</TypeOfProductCategoryRef> <!-- PRD+596:::37+1080' --> <TypeOfServiceRef versionRef="EXTERNAL " ref="37">Train</TypeOfServiceRef> </pre>

Given the subtle difference between the service mode and the service brand, and the fact that both use codes belonging to code list B.4.7009, it is useful to provide additional practical examples.

The minimum level is:

Facts / situation	NeTEx
<p>Service 596 provided by DB.</p> <p>Since Service mode is not specified, this service is a train.</p>	<pre> /PublicationDelivery/dataObjects/ CompositeFrame/frames/TimetableFrame /vehicleJourneys/ServiceJourney <ServiceJourney version="any" id="1" changed="2022-01-26T09:51:00" dataSourceRef="uic:0060"> <!-- PRD+596+1180' --> <OperatorRef versionRef="EXTERNAL " ref="uic:1180">DB AG</OperatorRef> </pre>

	<pre> <trainNumbers> <TrainNumberRef version="any" ref="1"/> </trainNumbers> ... <trainNumbers> <TrainNumber version="any" id="1"> <ForAdvertisement>596</ForAdvertisement> </TrainNumber> </trainNumbers> </pre>
--	---

The next level would be to explicitly define the service as a train:

Facts / situation	NeTEx
Service 596, a train, provided by DB	<pre> /PublicationDelivery/dataObjects/ CompositeFrame/frames/TimetableFrame /vehicleJourneys/ServiceJourney <ServiceJourney version="any" id="1" changed="2022-01-26T09:51:00" dataSourceRef="uic:0060"> <!-- PRD+596+1180' --> <OperatorRef versionRef="EXTERNAL " ref="uic:1180">DB AG</OperatorRef> <trainNumbers> <TrainNumberRef version="any" ref="1"/> </trainNumbers> <TransportMode>rail</TransportMode> ... <trainNumbers> <TrainNumber version="any" id="1"> <ForAdvertisement>596</ForAdvertisement> </TrainNumber> </trainNumbers> </pre>

Adding a service brand gives an even better description of the service:

Facts / situation	NeTEx
<p>Service 596, provided by DB. Since Service mode is not specified, this service is a train</p> <p>Service brand: Intercity</p>	<pre> PublicationDelivery/dataObjects/ CompositeFrame/frames/TimetableFrame /vehicleJourneys/ServiceJourney <ServiceJourney version="any" id="1" changed="2022-01-26T09:51:00" dataSourceRef="uic:0060"> <!-- PRD+596+1180' --> <!-- PDT++:::63:::' --> <TypeOfProductCategoryRef versionRef="EXTERNAL " ref="63">Intercity</TypeOfProductCategoryRef> ... </pre>

	<pre> <OperatorRef versionRef="EXTERNAL " ref="uic:1180">DB AG</OperatorRef> <trainNumbers> <TrainNumberRef version="any" ref="1"/> </trainNumbers> <TransportMode>rail</TransportMode> ... <trainNumbers> <TrainNumber version="any" id="1"> <ForAdvertisement>596</ForAdvertisement> </TrainNumber> </trainNumbers> </pre>
--	--

An even more detailed description classifies this train as an intercity train, which is a generic term (not necessarily identical to the service brand “Intercity”):

Facts / situation	NeTEx
Service 596, an intercity train, provided by DB Service brand: Intercity	<pre> PublicationDelivery/dataObjects/ CompositeFrame/frames/TimetableFrame /vehicleJourneys/ServiceJourney <ServiceJourney version="any" id="1" changed="2022-01-26T09:51:00" dataSourceRef="uic:0060"> <!-- PRD+596:::9+1180' --> <!-- PDT++:::63:::' --> <TypeOfProductCategoryRef versionRef="EXTERNAL " ref="63">Intercity</TypeOfProductCategoryRef> <TypeOfServiceRef versionRef="EXTERNAL " ref="9">Intercity</TypeOfServiceRef> ... <OperatorRef versionRef="EXTERNAL " ref="uic:1180">DB AG</OperatorRef> <trainNumbers> <TrainNumberRef version="any" ref="1"/> </trainNumbers> <TransportMode>rail</TransportMode> ... <trainNumbers> <TrainNumber version="any" id="1"> <ForAdvertisement>596</ForAdvertisement> </TrainNumber> </trainNumbers> </pre>

The trains using the service brand “Eurocity” are also classified as intercity trains:

Facts / situation	NeTEx
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Service 696, an intercity train, provided by DB Service brand: Eurocity	PublicationDelivery/dataObjects/ CompositeFrame/frames/TimetableFrame /vehicleJourneys/ServiceJourney <pre> <ServiceJourney version="any" id="1" changed="2022-01-26T09:51:00" dataSourceRef="uic:0060"> <!-- PRD+696:::9+1180' --> <!-- PDT++:::50:::' --> <TypeOfProductCategoryRef versionRef="EXTERNAL " ref="50">Eurocity</TypeOfProductCategoryRef> <TypeOfServiceRef versionRef="EXTERNAL " ref="9">Intercity</TypeOfServiceRef> ... <OperatorRef versionRef="EXTERNAL " ref="uic:1180">DB AG</OperatorRef> <trainNumbers> <TrainNumberRef version="any" ref="1"/> </trainNumbers> <TransportMode>rail</TransportMode> ... <trainNumbers> <TrainNumber version="any" id="1"> <ForAdvertisement>696</ForAdvertisement> </TrainNumber> </trainNumbers> </pre>
--	---

If the service is not a train, it is mandatory to use data element 7009:

Facts / situation	NeTEx
Service 596, a bus, provided by DB	PublicationDelivery/dataObjects/ CompositeFrame/frames/TimetableFrame /vehicleJourneys/ServiceJourney <pre> <ServiceJourney version="any" id="1" changed="2022-01-26T09:51:00" dataSourceRef="uic:0060"> <!-- PRD+596:::32+1180' --> <TypeOfServiceRef versionRef="EXTERNAL " ref="32">Bus</TypeOfServiceRef> ... <OperatorRef versionRef="EXTERNAL " ref="uic:1180">DB AG</OperatorRef> <trainNumbers> <TrainNumberRef version="any" ref="1"/> </trainNumbers> <TransportMode>rail</TransportMode> ... <trainNumbers> <TrainNumber version="any" id="1"> <ForAdvertisement>696</ForAdvertisement> </TrainNumber> </trainNumbers> </pre>

A more detailed description of a replacement bus:

Facts / situation	NeTEx
Service 596, a bus, provided by DB Service brand: Replacement bus	<pre> PublicationDelivery/dataObjects/ CompositeFrame/frames/TimetableFrame /vehicleJourneys/ServiceJourney <ServiceJourney version="any" id="1" changed="2022-01-26T09:51:00" dataSourceRef="uic:0060"> <!-- PRD+596:::32+1180' --> <!-- PDT++:::162:::' --> <TypeOfProductCategoryRef versionRef="EXTERNAL" ref="162">Replacement Bus</TypeOfProductCategoryRef> <TypeOfServiceRef versionRef="EXTERNAL " ref="32">Bus</TypeOfServiceRef> ... <OperatorRef versionRef="EXTERNAL " ref="uic:1180">DB AG</OperatorRef> <trainNumbers> <TrainNumberRef version="any" ref="1"/> </trainNumbers> <TransportMode>rail</TransportMode> <trainNumbers> <TrainNumber version="any" id="1"> <ForAdvertisement>696</ForAdvertisement> </TrainNumber> </trainNumbers> </pre>

5.3.2. Service relationships

For international services, the association descriptions chosen by the different affected railways must be consistent. An international train may not be displayed from one railway as a service number change and from the other railway as a coach group.

It must be noted that associations are between schedules rather than between physical trains.

For example, for a connection to schedule A100 valid every day of the week there may be two A100 schedules, one for the Monday- Friday, and the other for Saturday-Sunday.

When a relationship says that the association to schedule A100 happens at location X, then X must be in schedule A100's itinerary (not in a schedule connected to A100).

5.3.2.1. Coach groups attached to trains

Coach groups do not run independently. They need a train to which they are coupled. A coach group can add only very distinct information to a train, which are in detail:

- information of a service-, information- or reservation provider who is assigned only to the coach group,
- a running period (effectively a subset of the period of the trains to which the coach group is coupled),

- special facilities and services,
- references to the trains, i.e. the information that this coach group is coupled to several trains.

All other information is defined in the train data record itself and is inherited by the coach group from the train. A coach group has no own arrival or departure times, no special platform information, no additional stops.

The itinerary of a coach group in SKDUPD is restricted to the stops where it is coupled to, or disconnected from, a train, and to the stops where special facilities or services are added to, or removed from, the coach group schedule. The reference of a coach group to the train(s) to which it is coupled, is a “connect to”-reference.

The reference is unidirectional: a train does not reference the coach groups which are coupled to it.

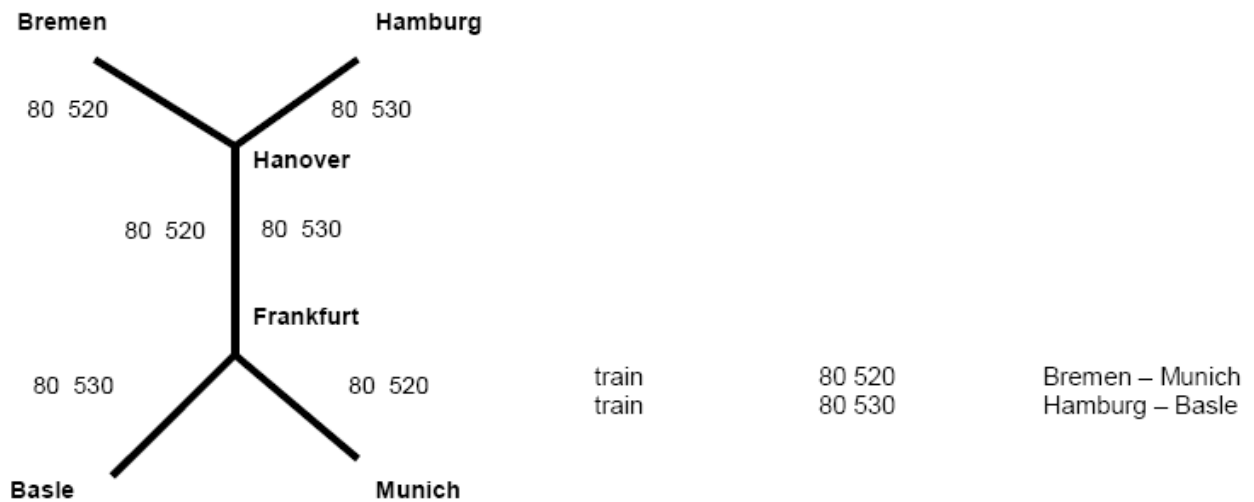
The trains do not inherit any of the properties of the coach group. When calculating the travel advice the coach group data have to be attached to the given pulling trains. While attaching the coach group to the referenced pulling train it must be ensured that the connection date/time, connection station code and the connecting train number match this information from the referencing coach group.

A whole example of the joining and splitting of trains is available in the NeTEx repository in the file TAP_SKDUPD_example2.2_Coach_Group.xml.

5.3.2.2. Joining to, splitting from

Facts / situation	NeTEx
Service Number 530, which is a train (default) from DB AG (1080)	<pre> <vehicleJourneys> <ServiceJourney version="any" id="e1:530" changed="2022-01-26T09:51:00" dataSourceRef="uic:0060"> <OperatorRef versionRef="EXTERNAL" ref="uic:1080">DB</OperatorRef> <trainNumbers> <TrainNumberRef version="any" ref="e1:530"/> </trainNumbers> </ServiceJourney> </pre>
days of operation	<pre> <DepartureTime>06:57:00</DepartureTime> <!-- POP+273:2003-12-15/2003-12-20::111101' --> <dayTypes> <DayTypeRef ref="e1:530"/> </dayTypes> </pre>
start station: Hamburg	<pre> <Call version="any" id="e1:530_1" order="1"> <!-- POR+008001071+*0824' --> <ScheduledStopPointRef version="any" ref="uic: 008001071">Hamburg</ScheduledStopPointRef> <Arrival> <ForAlighting>false</ForAlighting> </Arrival> <Departure>08:24:00</Departure> </Call> </pre>
in Hanover is joining with (8)above train 80 520	<pre> <JourneyPart version="any" id="e1:520@008013552+008011068" order="2"> <!-- POR+008013552++' RFR+AUE:520' RLS+13+6' --> <ParentJourneyRef version="any" ref="e1:530"/> </pre>

	<pre> <MainPartRef version="any" ref="e1:530@005103865+005433124"/> <TrainNumberRef version="any" ref="e1:520"/> <FromStopPointRef version="any" ref="uic:008013552">Hannover</FromStopPointRef> <ToStopPointRef version="any" ref="uic:008011068">Frankfurt</ToStopPointRef> <StartTime>09:42:00</StartTime> <EndTime>12:00:00</EndTime> <PurposeOfJourneyPartitionRef versionRef="EXTERNAL" ref="joining_to"/> </JourneyPart> </pre>
<p>in Frankfurt</p> <p>is splitting from (11) above train 80 520</p>	<pre> <JourneyPart version="any" id="e1:530@008011068+008500010" order="2"> <!-- POR+008011068++' RFR+AUE:520' RLS+13+8' --> <ParentJourneyRef version="any" ref="e1:530"/> <MainPartRef version="any" ref="e1:520@008011068+008500010"/> <TrainNumberRef version="any" ref="e1:520"/> <FromStopPointRef version="any" ref="uic:008011068">Frankfurt</FromStopPointRef> <ToStopPointRef version="any" ref="uic:008500010">Basel</ToStopPointRef> <StartTime>12:05:00</StartTime> <EndTime>14:55:00</EndTime> <PurposeOfJourneyPartitionRef versionRef="EXTERNAL" ref="splitting_from"/> </JourneyPart> </pre>
<p>destination station: Basel</p> <p>Between Hannover and Frankfurt both trains run under different numbers combined with the same times.</p>	<pre> <Call version="any" id="e1:530_1" order="1"> <!-- POR+008001071+*0824' --> <ScheduledStopPointRef version="any" ref="uic:008500010">Basel</ScheduledStopPointRef> <Arrival> <ForAlighting>false</ForAlighting> </Arrival> <Departure>14:55:00</Departure> </Call> </pre>



At 12:00 in Frankfurt arrive two trains, 520 and 530, from Hanover at the same time

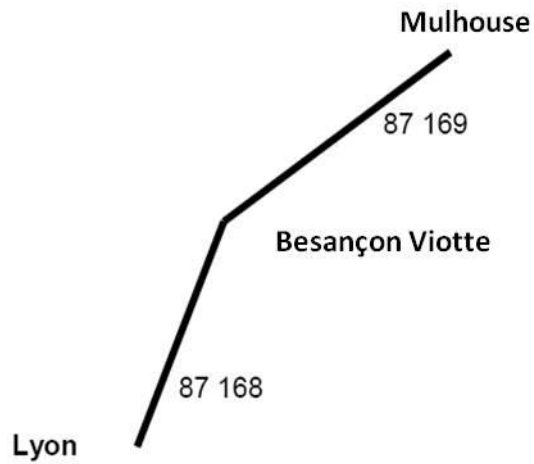
While joining a train to the referenced other one it must be ensured that the connection date/time, connection station code and the connecting train number match this information from the referencing train. Same is applicable for splitting.

5.3.2.3. Connecting to

Facts / situation	NeTEx
Service Number 168, which is a train (37) from SNCF (1187)	<pre> <ServiceJourney version="any" id="eos:VJ_1187_168"> <Description>168 Lyon - Besancon</Description> <PublicCode>168</PublicCode> <OperatorRef ref="1187"/> <DepartureTime>14:34:00</DepartureTime> ... </pre>
days of operation	<pre> <ServiceCalendarFrame id="eos:VJ_1187_168_Calendar" version="any"> <operatingPeriods> <UicOperatingPeriod id=" eos:VJ_1187_168_Calendar " version="any"> <!-- POP+273:2003-12-15/2003-12- 20::111101' --> <FromDate>2003-12-15T00:00:00</FromDate> <ToDate>2003-12-20T23:59:59</ToDate> <ValidDayBits>111101</ValidDayBits> </UicOperatingPeriod> </operatingPeriods> </ServiceCalendarFrame> </pre>
start station: Lyon	<pre> <Call version="any" id="41" order="1"> <!-- POR+008772202+*1434' --> <ScheduledStopPointRef version="any" ref="uic: 008772202">Lyon</ScheduledStopPointRef> <Arrival> <ForAlighting>false</ForAlighting> </Arrival> <Departure> <Time>14:34:00</Time> </Departure> </Call> </pre>
- is connecting (6) at station Besancon Viotte to service number to train 87 169	<pre> <ServiceJourneyInterchange version="any" id="eos:SJI_1187_168"> <Description>Connection to Mulhouse</Description> <ConnectionRef version="any" ref="eos:VJ_1187_169"/> <StaySeated>true</StaySeated> <Planned>true</Planned> <Guaranteed>true</Guaranteed> <Advertised>none</Advertised> <StandardTransferTime>PT0M</StandardTransferTime> <noticeAssignments> <NoticeAssignment> <Notice> <Text>Train number change</Text> </Notice> </NoticeAssignment> </noticeAssignments> <!-- POR+008771800+1717 --> <FromPointRef version="any" xsi:type="ScheduledStopPointRefStructure" ref="eos:SSP_05_fr_Besancon"/> </pre>

	<pre> <ToPointRef version="any" xsi:type="ScheduledStopPointRefStructure" ref="sncf:SSP_100_fr_Besancon"/> <FromJourneyRef version="any" ref="eos:VJ_1187_168"/> <ToJourneyRef ref="eos:VJ_1187_169"/> </ServiceJourneyInterchange> </pre>
Service Number 169, which is a train (37) from SNCF (1187)	<pre> <ServiceJourney version="any" id="eos:VJ_1187_169"> <Description>169 Besancon - Mulhouse</Description> <PublicCode>169</PublicCode> <OperatorRef ref="1187"/> <DepartureTime>17:19:00</DepartureTime> </pre>
days of operation	<pre> <ServiceCalendarFrame id="eos:VJ_1187_169_Calendar" version="any"> <operatingPeriods> <UicOperatingPeriod id="eos:VJ_1187_169_Calendar" version="any"> <!-- POP+273:2003-12-15/2003-12- 20::111101' --> <FromDate>2003-12-15T00:00:00</FromDate> <ToDate>2003-12-20T23:59:59</ToDate> <ValidDayBits>111101</ValidDayBits> </UicOperatingPeriod> </operatingPeriods> </ServiceCalendarFrame> </pre>
start station: Besancon Viotte	<pre> <Call version="any" id="41" order="1"> <!-- POR+008771800+*1719' --> <ScheduledStopPointRef version="any" ref="uic:008771800">Besancon Viotte</ScheduledStopPointRef> <Arrival> <Time>17:17:00</Time> </Arrival> <Departure> <Time>17:19:00</Time> </Departure> </Call> </pre>
destination station: Mulhouse.	<pre> <Call version="any" id="41" order="1"> <!-- POR+008718206+1900' --> <ScheduledStopPointRef version="any" ref="uic:008718206">Mulhouse</ScheduledStopPointRef> <Arrival> <Time>19:00:00</Time> </Arrival> </Call> </pre>

Train 168 will run from Besançon Viotte as train 87 169. The first station of the second train has to be the same station as the last station of the first train



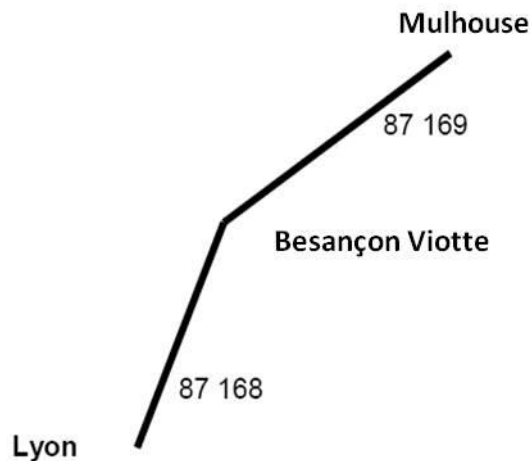
The difference towards the following “Service number change” is that, in case of “Connecting to”, the composition of the train can change.

While connecting a train to the referenced other one it must be ensured that the connection date/time, connection station code and the connecting train number match these information from the referencing train.

5.3.2.4. Service number change

Facts / situation	EDIFACT
Service Number 168, which is a train (37) from SNCF (1187)	PRD+000168:::37+1187
days of operation	POP+273:2003-12-15/2003-12-20::111101'
start station: Lyon	POR+008772202+*1434
at station Besançon Viotte	POR+008771800+1717
is changing (12) the service number to train 87 169	RFR+AUE:000169:::1187RLS+13+12
Service Number 169, which is a train (37) from SNCF (1187)	PRD+000169:::37+1187
days of operation	POP+273:2004-03-13/2004-03-28::1111...
start station: Besançon Viotte	POR+008771800+*1719
- destination station: Mulhouse	POR+008718206+1900

Train 168 will run from Besançon Viotte under a new number. The first station of the second train has to be the same station as the last station of the first train



The difference towards the previous “Connecting to” is that, in case of “Service number change”, the composition of the train cannot change.

While changing the service number of a train to the referenced other one it must be ensured that the connection date/time, connection station code and the connecting train number match these information from the referencing train.

5.3.2.5. Connecting - Timing between services

Facts / situation	NeTEx
At station LUXEMBOURG the passenger has the possibility to change (code 7, code table B.4.9143, ERA Directory of Passenger Code Lists) to train 2896 (service provider CFL=0082) direction KOELN HBF. The connection is normally guaranteed (code X02, code table B.4.4049, ERA Directory of Passenger Code Lists) in 4 minutes.	<pre> <Call version="any" id="100" order="8"> <!--POR+008200100+1650' RFR+AUE:2896:::0082' RLS+13+7' TCE+4+X02'--> <ScheduledStopPointRef version="any" ref="uic: 008200100">LUXEMBOURG</ScheduledStopPointRef> <Arrival> <Time>16:50:00</Time> </Arrival> </Call> ... <journeyInterchanges> <ServiceJourneyInterchange version="any" id="5+008200100+2896"> <!-- POR+008014008+2135*2137+3*3' --> <StaySeated>false</StaySeated> <!-- RLS+13+7' TCE+4+X02' --> <ConnectionCertainty>normallyGuaranteed</ConnectionCertainty> <MinimumTransferTime>PT4M</MinimumTransferTime> <!-- relationship: (7 = timing between services) --> <FromPointRef version="any" ref="uic:008200100"/> <ToPointRef version="any" ref="uic:008200100"/> <ToVisitNumber>1</ToVisitNumber> <FromJourneyRef version="any" ref="100"/> <!-- RFR+AUE: 2896' --> <ToJourneyRef versionRef="EXTERNAL" ref="2896"/> </ServiceJourneyInterchange> </pre>

The codes of code table B.4.4049 represent special cases of connection certainty/uncertainty, based on comparison of the connection time available (CTA, interval between scheduled arrival of the first train and scheduled departure of the second) and the minimum connection time in that station (MCT).

When no code is used, the connection is normally guaranteed if $CTA \geq MCT$ and not guaranteed if $CTA < MCT$.

“normallyGuaranteed” means that the connection is normally guaranteed, even though $CTA < MCT$ (e.g. when the second train always leaves from the same platform where the first arrives).

“notGuaranteed” means that the connection is normally not guaranteed, even though $CTA \geq MCT$ (e.g. when the first train has often delays).

“guaranteed” and “neverGuaranteed” mean that the connection is respectively always guaranteed or not, independently from the comparison between CTA and MCT.

Coach groups schedules do not have connecting times, they depend only on the trains!

5.3.3. Details of services

5.3.3.1. Stops with traffic restrictions

For a 'boarding only' stop an arrival time is not necessary, nor is the departure time necessary for a 'alighting only' stop, for a 'technical' stop no time at all is necessary when designated as "passage".

A schedule may start and/or end at a location that is a technical stop.

Facts / situation	NeTEx
InterCityExpress 596 is running from Munich (008020347) to Berlin Ostbahnhof (008007817). If traffic restrictions apply to the service (it is not possible to enter or leave the train at certain stops) this information is delivered in special data elements:	<pre> <Call version="any" id="1" order="1"> <!-- POR+008020347+*1234' --> <ScheduledStopPointRef version="any" ref="uic: 008020347">Munich</ScheduledStopPointRef> <Arrival> <ForAlighting>false</ForAlighting> </Arrival> <Departure> <Time>12:34:00</Time> </Departure> </Call> </pre>
The station Stuttgart (008029034) is open for boarding only.	<pre> <Call version="any" id="1" order="1"> <!-- POR+008029034+1447*1451' --> <ScheduledStopPointRef version="any" ref="uic: 008029034">Stuttgart</ScheduledStopPointRef> <Arrival> <Time>14:47:00</Time> <ForAlighting>false</ForAlighting> </Arrival> <Departure> <Time>14:51:00</Time> </Departure> </Call> </pre>
The station Frankfurt/Main (008011068) is a technical stop, not to be published, no boarding or alighting.	<pre> <Call version="any" id="1" order="1"> <!-- POR+008011068+1608*1613' --> <ScheduledStopPointRef version="any" ref="uic: 008011068"> Frankfurt/Main</ScheduledStopPointRef> <Arrival> <Time>16:08:00</Time> <ForAlighting>false</ForAlighting> </Arrival> <Departure> <Time>16:13:00</Time> <ForBoarding>false</ForBoarding> </Departure> </Call> </pre>
The station Fulda (008005637) is open only for alighting.	<pre> <Call version="any" id="1" order="1"> <!-- POR+008005637+1710*1712' --> <ScheduledStopPointRef version="any" ref="uic: 008005637"> Fulda</ScheduledStopPointRef> <Arrival> <Time>17:10:00</Time> </pre>

	<pre> </Arrival> <Departure> <Time>17:12:00</Time> <ForBoarding>false</ForBoarding> </Departure> </Call> </pre>
The station Braunschweig (008013241) is a stop only by request.	<pre> <Call version="any" id="1" order="1"> <!-- POR+008013241+1858*1900++230' --> <ScheduledStopPointRef version="any" ref="uic: 008005637"> Fulda</ScheduledStopPointRef> <RequestStop>true</RequestStop> <Arrival> <Time>18:58:00</Time> </Arrival> <Departure> <Time>19:00:00</Time> </Departure> </Call> </pre>
Destination station Berlin Ostbahnhof	<pre> <Call version="any" id="1" order="13"> <!-- POR+008007817+2033' --> <ScheduledStopPointRef version="any" ref="uic: 008007817"> Berlin Ostbahnhof </ScheduledStopPointRef> <Arrival> <Time>20:33:00</Time> </Arrival> <Departure> <ForBoarding>false</ForBoarding> </Departure> </Call> </pre>

5.3.3.3. *Time zone crossings*

Arrival and departure times are given in local times!

Facts / situation	NeTEx
<p>An international train (brand code 68) with number 310 is running from Fuentes de Oñoro (007133016) dep. 06:36 to Vilar Formoso (009449460) arr. 05:40. The times are given in local times, although the times are descending. All stations in TAP/TAF Locations Common Reference Database (CRD) are dedicated to a time zone, thus the correct duration can be calculated. In this example the train is running 4 minutes.</p>	<pre> <ServiceJourney version="any" id="1" changed="2022-01-26T09:51:00" dataSourceRef="uic:0094"> <!-- PRD+1:13:2:9:::Classic train+0094' --> <Name>Classic Train</Name> <TransportMode>rail</TransportMode> <TransportSubmode> <RailSubmode>longDistance</RailSubmode> </TransportSubmode> <trainNumbers> <TrainNumberRef version="any" ref="1"/> </trainNumbers> <calls> <Call version="any" id="1" order="1"> <!-- POR+007133016+*0636+' --> <ScheduledStopPointRef version="any" ref="uic: 007133016"> Fuentes de Oñoro</ScheduledStopPointRef> <Departure> <Time>06:36:00+01:00</Time> </Departure> </Call> <Call version="any" id="1" order="2"> <!-- POR+009449460+0540+' --> <ScheduledStopPointRef version="any" ref="uic: 009449460">Vilar Formoso</ScheduledStopPointRef> <Arrival> <Time>05:40:00+00:00</Time> </Arrival> </Call> </pre>

5.3.3.4. *Pricing and reservation details*

Facts / situation	NeTEx
<p>TGV Sud-Est (code 73) number 9261 from service provider SNCF (1187) is running from PARIS GARE DE LYON (008768600) to LAUSANNE (008501120). To access this train, a reservation is compulsory and it is booked via global price (IRT). This is indicated in the PRD segment with 13 (reservation compulsory) and 2 (global price) in the appropriate data elements.</p>	<pre> <parts> <JourneyPart version="any" id="7@008768600+008501120" order="2"> <Description>14-34</Description> <FromStopPointRef version="any" ref="uic:008768600"/> <ToStopPointRef version="any" ref="uic:008501120"/> <StartTime>07:44:00</StartTime> <EndTime>11:37:00</EndTime> <PurposeOfJourneyPartitionRef versionRef="EXTERNAL" ref="facilities"/> <facilities> <ServiceFacilitySet version="any" id="7@005513862+005341638@E122"> <BrandingRef versionRef="EXTERNAL" ref="73"/> </pre>

	<pre> <ServiceReservationFacilityList>reservationsC ompulsory</ServiceReservationFacilityList> <!-- R11 TafTsi B.4.7037: 13 reservation compulsory --> <UicProductCharacteristicList>allInclusivePri ce</UicProductCharacteristicList> <!-- Tariff 2 TafTsi B.4.7139: 2 Train with Market Price --> </ServiceFacilitySet> </facilities> </JourneyPart> </parts> <calls> <Call version="any" id="7" order="1"> <!--POR+008101003+*0744+'--> <ScheduledStopPointRef version="any" ref="uic:008768600">PARIS GARE DE LYON</ScheduledStopPointRef> <Departure> <Time>07:44:00</Time> </Departure> </Call> <Call version="any" id="7" order="2"> <!--POR++008771513+++17' TRF+4'--> <ScheduledStopPointRef version="any" ref="uic:008771513">FRASNE</ScheduledStopPointRef> <Note>Border Point</Note> </Call> <Call version="any" id="7" order="3"> <!--POR++008771591+++17' TRF+4'--> <ScheduledStopPointRef version="any" ref="uic:008771591">VALLORBE</ScheduledStopPointRef> <Note>Border Point</Note> </Call> <Call version="any" id="7" order="4"> <!--POR++008501120+1137*+'--> <ScheduledStopPointRef version="any" ref="uic:008501120">LAUSANNE</ScheduledStopPointRef> <Arrival> <Time>11:37:00</Time> </Arrival> </Call> </pre>
<p>Price and reservation details on sections of the itinerary – The global price (code 2) including reservation compulsory (code 13) are valid from stop 1 to stop 2. The TCV (NRT) price (code 1) including No reservation (code 19) is valid from stop 2 to stop 3.</p>	<pre> <parts> <JourneyPart version="any" id="7@008768600+008501120" order="1"> <Description>Paris-Vallorbe</Description> <FromStopPointRef version="any" ref="uic:008768600"/> <ToStopPointRef version="any" ref="uic:008771513"/> <StartTime>07:44:00</StartTime> <EndTime>11:37:00</EndTime> <PurposeOfJourneyPartitionRef versionRef="EXTERNAL" ref="facilities"/> <facilities> <ServiceFacilitySet version="any" id="7@008768600+008771513@E73"> <!-- PDT++73:::13:::2' ' --> <BrandingRef versionRef="EXTERNAL" ref="73"/> </pre>


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        <ServiceReservationFacilityList>reservationsC
ompulsory</ServiceReservationFacilityList>
        <!-- B.4.7037: 13 reservation
compulsory -->
        <UicProductCharacteristicList>allInclusivePri
ce</UicProductCharacteristicList>
        <!-- Tariff 2 TafTsi B.4.7139: 2
Train with Market Price -->
        </ServiceFacilitySet>
        </facilities>
        </JourneyPart>
        <JourneyPart version="any"
id="7@008771591+008501120" order="2">
        <Description>Vallorbe-Lausanne</Description>
        <FromStopPointRef version="any"
ref="uic:008771591"/>
        <ToStopPointRef version="any"
ref="uic:008501120"/>
        <StartTime>07:44:00</StartTime>
        <EndTime>11:37:00</EndTime>
        <PurposeOfJourneyPartitionRef
versionRef="EXTERNAL" ref="facilities"/>
        <facilities>
        <ServiceFacilitySet version="any"
id="7@008771591+008501120@E73">
        <!-- PDT++73:::13:::2' ' -->
        <BrandingRef versionRef="EXTERNAL" ref="73"/>
        <ServiceReservationFacilityList>reservationsP
ossible</ServiceReservationFacilityList>
        <!-- R11 TafTsi B.4.7037: 13
reservation possible -->
        <UicProductCharacteristicList>trainWithTcvAnd
MarketPrice</UicProductCharacteristicList>
        <!-- Tariff 2 B.4.7139: 4 Train with
TCV and Market Price -->
        </ServiceFacilitySet>
        </facilities>
        </JourneyPart>
</parts>
        <calls>
        <Call version="any" id="7" order="1">
        <!--POR+008101003+*1042+'-->
        <ScheduledStopPointRef version="any"
ref="uic:008768600">PARIS GARE DE
LYON</ScheduledStopPointRef>
        <Departure>
        <Time>07:44:00</Time>
        </Departure>
        </Call>
        <Call version="any" id="7" order="2">
        <!--POR++008771513+++17' TRF+4'-->
        <ScheduledStopPointRef version="any"
ref="uic:008771513">FRASNE</ScheduledStopPointRef>
        <Note>Border Point</Note>
        </Call>
        <Call version="any" id="7" order="3">
        <ScheduledStopPointRef version="any"
ref="uic:008771591">VALLORBE</ScheduledStopPointRef>
        <Arrival>
        <Time>11:37:00</Time>

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	<pre> </Arrival> <Departure> <Time>11:39:00</Time> </Departure> <Note>Border Point</Note> </Call> <Call version="any" id="7" order="4"> <!--POR++008501120+1137* ' --> <ScheduledStopPointRef version="any" ref="uic:008501120">LAUSANNE</ScheduledStopPointRef> <Arrival> <Time>11:56:00</Time> </Arrival> </Call> </calls> </ServiceJourney> </pre>
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When a service is offered for international or foreign sale it is essential to indicate the pricing system, because this allows to look in the corresponding tariff data to determine the fare(s) at which the service can be sold.

5.3.3.5. Information provider

If there is one railway responsible for delivering data for a complete train this responsible railway can be specified in the message as information provider. Nevertheless an alternative preferable method to indicate who is the provider for a train is described in chapter 6.2

Facts / situation	NeTEx
<p>TGV Sud-Est 9261 from service provider SNCF (OperatorRef "uic:1187") is running from PARIS GARE DE LYON to LAUSANNE. The information provider for this is SNCF (dataSourceRef="uic:1187"), no other deliveries for this train will be taken into account</p>	<pre> <ServiceCalendarFrame id="uic:Information_Provider" version="any"> <operatingPeriods> <UicOperatingPeriod id="uic: Information_Provider " version="any"> <!-- POP+273:2021-12-12/2021-12- 20::11111111' --> <FromDate>2021-12- 12T00:00:00</FromDate> <ToDate>2022-12- 12T23:59:59</ToDate> <ValidDayBits>111111111</ValidDayBits> </UicOperatingPeriod> </operatingPeriods> </ServiceCalendarFrame> <ServiceJourney version="any" id="7" changed="2022-01-26T09:51:00" dataSourceRef="uic:1187"> <!-- PRD+9261:::Tariff and reservation+1187' --> <Name>Tariff and Reservation</Name> <TransportMode>rail</TransportMode> <TransportSubmode> <RailSubmode>highSpeedRail</RailSubmode> </TransportSubmode> <TypeOfProductCategoryRef versionRef="EXTERNAL " ref="37">Train</TypeOfProductCategoryRef> </pre>

	<pre> <TypeOfServiceRef versionRef="EXTERNAL" ref="73">TGV</TypeOfServiceRef> <!-- --> <DepartureTime>07:44:00</DepartureTime> <!-- POP+273:2003-12-15/2003-12- 20::111101' --> <dayTypes> <DayTypeRef ref="uic:Information_Provider"/> </dayTypes> <OperatorRef versionRef="EXTERNAL" ref="uic:1187">SNCF</OperatorRef> </pre>
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5.3.3.6. Service Facilities

The facilities of a train have to be given explicitly in the message. The data harmonisation/ quality requirements from TELEMATICS TSI chapter 1.5 must be strictly applied for trains where multiple service providers are involved, e.g. cross-border trains or trains with coach groups.

Facts / situation	NeTEx
Table B.4.9039 of ERA Directory of Passenger Code Lists gives a list of all possible service facilities. EC 90 provides a restaurant (code 9).	<pre> <JourneyPart version="any" id="7@008301700+008507000" order="1"> <Description>Milano-Bern</Description> <FromStopPointRef version="any" ref="uic:008301700"/> <ToStopPointRef version="any" ref="uic:008507000"/> <StartTime>08:10:00</StartTime> <EndTime>11:56:00</EndTime> <PurposeOfJourneyPartitionRef versionRef="EXTERNAL" ref="facilities"/> <facilities> <ServiceFacilitySet version="any" id="7@008301700+008507000@E73"> <BrandingRef versionRef="EXTERNAL" ref="37"/> <CateringFacilityList>restaurant</CateringFacilityList> </ServiceFacilitySet> </facilities> </JourneyPart> </pre>
The train runs from MILANO (008301700) via BERN (008507000) and STRASBOURG (008721202) to LUXEMBOURG (008200100).	<pre> <calls> <Call version="any" id="7" order="1"> <!--POR+008301700+*0810+'--> <ScheduledStopPointRef version="any" ref="uic:008301700">MILANO</ScheduledStopPointRef> <Departure> <Time>08:10:00</Time> </Departure> </Call> <Call version="any" id="7" order="2"> <!--POR+008507000+1156*1204'--> <ScheduledStopPointRef version="any" ref="uic:008507000">BERN</ScheduledStopPointRef> <Arrival> <Time>11:56:00</Time> </Arrival> <Departure> <Time>12:04:00</Time> </Departure> </Call> </calls> </pre>

	<pre> </Call> <Call version="any" id="7" order="3"> <!--POR+008721202+1444*1446'--> <ScheduledStopPointRef version="any" ref="uic:008721202">STRASBOURG</ScheduledStopPointRef> <Arrival> <Time>14:44:00</Time> </Arrival> <Departure> <Time>14:46:00</Time> </Departure> </Call> <Call version="any" id="7" order="4"> <!--POR+008200100+1650'--> <ScheduledStopPointRef version="any" ref="uic:008200100">LUXEMBOURG</ScheduledStopPointRef> <Arrival> <Time>16:50:00</Time> </Arrival> </Call> </calls> </pre>
Bicycle transport (code 26) is available only from BERN (stop index 2) to LUXEMBOURG (stop index 4).	<pre> <JourneyPart version="any" id="7@008507000+008200100" order="2"> <Description>Bern-Strasbourg</Description> <FromStopPointRef version="any" ref="uic:008507000"/> <ToStopPointRef version="any" ref="uic:008200100"/> <StartTime>12:04:00</StartTime> <EndTime>14:44:00</EndTime> <PurposeOfJourneyPartitionRef versionRef="EXTERNAL" ref="facilities"/> <facilities> <ServiceFacilitySet version="any" id="7@008507000+008200100@E73"> <!-- PDT++73:::13:::2' ' --> <BrandingRef versionRef="EXTERNAL" ref="73"/> <CateringFacilityList>restaurant</CateringFacilityList> <LuggageCarriageFacilityList>cyclesAllowed</LuggageCarriageFacilityList> </ServiceFacilitySet> </facilities> </JourneyPart> </pre>
The first class facility (code 4) is available only from MILANO (stop index 1) to STRASBOURG (stop index 3) Friday and Saturday (weekdays 5 and 6).	<pre> <ServiceCalendarFrame id="uic:SKDUPD_example_7_Tariff_and_Reservation" version="any"> <dayTypes> <DayType version="any" created="2022-02-15T09:30:46.0Z" id="uic:FridaySaturday"> <Name>Friday and Saturday</Name> <properties> <PropertyOfDay> <DaysOfWeek>Friday Saturday</DaysOfWeek> </PropertyOfDay> </properties> </DayType> </dayTypes> <JourneyPart version="any" id="7@008301700+008507000" order="1"> <Description>Milano-Bern</Description> <FromStopPointRef version="any" ref="uic:008301700"/> </pre>

	<pre> <ToStopPointRef version="any" ref="uic:008507000"/> <StartTime>08:10:00</StartTime> <EndTime>11:56:00</EndTime> <PurposeOfJourneyPartitionRef versionRef="EXTERNAL" ref="facilities"/> <facilities> <ServiceFacilitySet version="any" id="7@008301700+008507000@E73"> <BrandingRef versionRef="EXTERNAL" ref="37"/> <CateringFacilityList>restaurant</CateringFacilityList> <accommodations> <Accommodation id="7@008301700+008507000@E73@Accommodation" version="any"> <validityConditions> <AvailabilityCondition id="7@008301700+008507000@E73@Accommodation@FrSa" version="any"> <dayTypes> <DayTypeRef ref="uic:FridaySaturday"/> </dayTypes> </AvailabilityCondition> </validityConditions> <FareClass>firstClass</FareClass> </Accommodation> </accommodations> </ServiceFacilitySet> </facilities> </JourneyPart> </pre>
--	--

5.3.3.7. Description of special services

Facts / situation	NeTEx
EC 90 provides trolley service (code 25).	<pre> <JourneyPart version="any" id="7@008301700+008507000" order="1"> <Description>Milano-Bern</Description> <FromStopPointRef version="any" ref="uic:008301700"/> <ToStopPointRef version="any" ref="uic:008507000"/> <StartTime>08:10:00</StartTime> <EndTime>11:56:00</EndTime> <PurposeOfJourneyPartitionRef versionRef="EXTERNAL" ref="facilities"/> <facilities> <ServiceFacilitySet version="any" id="7@008301700+008507000@E73"> <BrandingRef versionRef="EXTERNAL" ref="37"/> <CateringFacilityList>restaurant trolley</CateringFacilityList> </pre>
The train runs from MILANO (008301700) via BERN (008507000) and STRASBOURG (008721202) to	<pre> <calls> <Call version="any" id="7" order="1"> <!--POR+008301700+*0810+'--> <ScheduledStopPointRef version="any" ref="uic:008301700">MILANO</ScheduledStopPointRef> <Departure> <Time>08:10:00</Time> </Departure> </Call> <Call version="any" id="7" order="2"> <!--POR+008507000+1156*1204+'--> </pre>

LUXEMBOUR G (008200100)	<pre> <ScheduledStopPointRef version="any" ref="uic:008507000">BERN</ScheduledStopPointRef> <Arrival> <Time>11:56:00</Time> </Arrival> <Departure> <Time>12:04:00</Time> </Departure> </Call> <Call version="any" id="7" order="3"> <!--POR+008721202+1444*1446'--> <ScheduledStopPointRef version="any" ref="uic:008721202">STRASBOURG</ScheduledStopPointRef> <Arrival> <Time>14:44:00</Time> </Arrival> <Departure> <Time>14:46:00</Time> </Departure> </Call> <Call version="any" id="7" order="4"> <!--POR+008200100+1650'--> <ScheduledStopPointRef version="any" ref="uic:008200100">LUXEMBOURG</ScheduledStopPointRef> <Arrival> <Time>16:50:00</Time> </Arrival> </Call> </Call> </Call> </Call> </Call> </calls> </pre>
Meal at the seat (code 38) is served only from BERN (stop index 2) to LUXEMBOUR G (stop index 4).	<pre> <JourneyPart version="any" id="7@008721202+008200100" order="3"> <Description>Bern-Luxembourg</Description> <FromStopPointRef version="any" ref="uic: 008507000"/> <ToStopPointRef version="any" ref="uic:008200100"/> <StartTime>12:04:00</StartTime> <EndTime>16:50:00</EndTime> <PurposeOfJourneyPartitionRef versionRef="EXTERNAL" ref="facilities"/> <facilities> <ServiceFacilitySet version="any" id="7@008507000+008200100@E73"> <!-- PDT++73:::13:::2' ' --> <BrandingRef versionRef="EXTERNAL" ref="73"/> <CateringFacilityList>restaurant mealAtSeat</CateringFacilityList> </ServiceFacilitySet> </facilities> </JourneyPart> </pre>
Service for business people (code 29) is available only from MILANO (stop index 1) to STRASBOUR G (stop	<pre> <DayType version="any" created="2022-02-15T09:30:46.0Z" id="uic:MondayThursday"> <Name>Friday and Saturday</Name> <properties> <PropertyOfDay> <DaysOfWeek>Monday Tuesday Wednesday Thursday</DaysOfWeek> </PropertyOfDay> </properties> </DayType> ... <JourneyPart version="any" id="7@008301700+008200100" order="2"> </pre>

index 3) Monday till Thursday (weekdays 1 to 4).	<pre> <Description>Bern-Strasbourg</Description> <FromStopPointRef version="any" ref="uic:008301700"/> <ToStopPointRef version="any" ref="uic:008721202"/> <StartTime>12:04:00</StartTime> <EndTime>14:44:00</EndTime> <PurposeOfJourneyPartitionRef versionRef="EXTERNAL " ref="facilities"/> <facilities> <ServiceFacilitySet version="any" id="7@008301700+008721202@E73"> <BrandingRef versionRef="EXTERNAL " ref="73"/> <accommodations> <!-- ASD+29+273:2003-12-15/2003-12-20+1234' --> <Accommodation id="7@008301700+008507000@E73@Accommodation" version="any"> <validityConditions> <AvailabilityCondition id="7@008301700+008507000@E73@Accommodation@MoTh" version="any"> <dayTypes> <DayTypeRef ref="uic:MondayThursday"/> </dayTypes> </AvailabilityCondition> </validityConditions> <PassengerCommsFacilityList>businessServices</PassengerCommsFacil ityList> </ServiceFacilitySet> </facilities> </JourneyPart> </pre>
--	---

The data harmonisation/ quality requirements from TELEMATICS TSI chapter 1.5 must be strictly applied for trains with multiple information providers.

5.3.3.8. Via stations for the NRT - series

These stations are used to associate a particular schedule with a particular NRT series in TD B.1. Where they are necessary for the identification of this association, their inclusion is mandatory.

The data harmonisation/ quality requirements from TAP TSI chapter 4.2.18 must be strictly applied for all trains and in particular for trains with multiple information providers.

Facts / situation	NeTEx
<p>An IC 90 runs from BERLIN ZOO to HAMBURG HBF without any intermediate stop.</p> <p>Departure station BERLIN ZOO</p>	<pre> <ServiceJourney version="any" id="7" changed="2022-01-26T09:51:00" dataSourceRef="uic:1185"> <!-- PRD+90::: +1080' --> <TransportMode>rail</TransportMode> <TransportSubmode> <RailSubmode>international</RailSubmode> </TransportSubmode> <TypeOfProductCategoryRef versionRef="EXTERNAL " ref="9">Intercity</TypeOfProductCategoryRef> <TypeOfServiceRef versionRef="EXTERNAL " ref="63">IC</TypeOfServiceRef> <DepartureTime>08:10:00</DepartureTime> </pre>

If the train runs via Wittenberge, the station WITTENBERGE has to be included with the passing time in the itinerary of the train (code 92). The train do not stop at this station – passage (code 4).	<pre> <ScheduledStopPointRef version="any" ref="uic: 008027317"> WITTENBERGE </ScheduledStopPointRef> <Arrival> <ForAlighting>false</ForAlighting> <Time>09:00:00</Time> </Arrival> <Departure> <ForBoarding>false</ForBoarding> <Time>09:00:00</Time> </Departure> </pre>
Arrival station HAMBURG HBF	<pre> <Call version="any" id="7" order="4"> <!--POR+008001071+1050'--> <ScheduledStopPointRef version="any" ref="uic: 008001071"> HAMBURG HBF</ScheduledStopPointRef> <Arrival> <Time>10:50:00</Time> </Arrival> </Call> </pre>

5.3.3.9. Border stations for the NRT – series

See chapter 5.3.3.8 . The same is true for border stations.

Facts / situation	NeTEx
EC 90 from runs from KARLSRUHE HBF to STRASBOURG VILLE.	<pre> <ServiceJourney version="any" id="7" changed="2022-01-26T09:51:00" dataSourceRef="uic:1185"> <!-- PRD+90:..... +1080' --> <TransportMode>rail</TransportMode> <TransportSubmode> <RailSubmode>international</RailSubmode> </TransportSubmode> <TypeOfProductCategoryRef versionRef="EXTERNAL" ref="9">Intercity</TypeOfProductCategoryRef> <TypeOfServiceRef versionRef="EXTERNAL" ref="63">IC</TypeOfServiceRef> <DepartureTime>08:10:00</DepartureTime> ... <trainNumbers> <TrainNumberRef version="any" ref="90">EC 90</TrainNumberRef> </trainNumbers> </pre>
Departure station KARLSRUHE HBF	<pre> <Call version="any" id="7" order="1"> <!--POR+ 008014228+*0810+'--> <ScheduledStopPointRef version="any" ref="uic: 008014228"> KARLSRUHE HBF</ScheduledStopPointRef> <Departure> <Time>08:10:00</Time> </Departure> </Call> </pre>

<p>The station Kehl (Gr) is indicated as a border station (code 17). That's the border station in the SNCF file TCVS according to B.1. The train does not stop at this station – passage (code 4).</p>	<pre><ScheduledStopPointRef version="any" ref="uic:008721291">KEHL(GR)</ScheduledStopPointRef> <Arrival> <ForAlighting>false</ForAlighting> <Time>10:00:00</Time> </Arrival> <Departure> <ForBoarding>false</ForBoarding> <Time>10:00:00</Time> </Departure></pre>
<p>Arrival station STRASBOURG VILLE.</p>	<pre><Call version="any" id="7" order="4"> <!--POR+008721202+1020'--> <ScheduledStopPointRef version="any" ref="uic:008721202">STRASBOURG</ScheduledStopPointRef> <Arrival> <Time>10:20:00</Time> </Arrival> </Call></pre>

5.4. Locations data

The current version of Telematics TSI requires that each RU publishes its timetable data in NeTEx format together with station data in NeTEx format. The stations provided in the station data file must be at least all stations referred to in the Timetable.

But the TELEMATICS TSI itself states, in chapter 1.2, that:

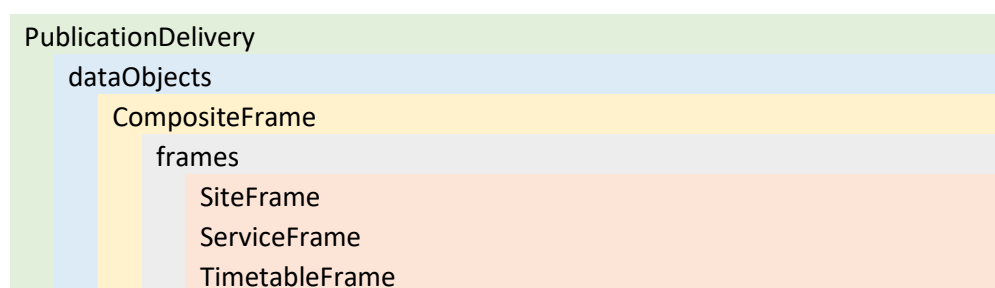
“1.The Agency shall maintain a common central repository as a single source of common Union rail data for telematics. The repository shall be made available to the public and shall store the following information:

(c) - common reference data referred to in Article 9, managed by the Agency”.

The locations database will be unique and centralised, with different parts of the content defined by different actors (National Entities, Infrastructure Managers, Railway Undertakings) according to well defined governance rules (see “ERA TD 103 – Reference files).

5.4.1. Location data

Summary of the elements to be used in NeTEx for the location data:



The following examples give details of the necessary station data, and of the minimum data necessary to build a location specification for the locations referred to in the schedules.

Facts / situation	NeTEx
Station code 008102801 for station (code 29) name WIEN PRATERSTERN with country code AT for Austria.	<pre> <scheduledStopPoints> <!-- ALS+29+008102801: WIEN PRATERSTERN' --> <ScheduledStopPoint version="any" id="uic:008102801"> <Name lang="de"> WIEN PRATERSTERN</Name> <CountryRef ref="at"/> </ScheduledStopPoint> </pre>

5.4.1.1. Pedestrian link between two nearby stations

The aim of this function is to connect stations for the search algorithm in electronic travel information systems.

The traveller sometimes has to leave one station and get another train in a nearby station.

The time given for the pedestrian transfer should be enough for a traveller with luggage not familiar with the local geography.

The transfer time should be given in both directions (A to B and B to A).

Facts / situation	NeTEx
Definition of the station (code 29) Eurostar terminal in Paris Nord	<pre> <ScheduledStopPoints> <!-- ALS+29+008727101:Paris Nord Eurostar' --> <ScheduledStopPoint version="any" id="uic:008727101"> <Name lang="de">Paris Nord Eurostar </Name> <CountryRef ref="fr"/> </ScheduledStopPoint> </pre>
The time needed to transfer from Paris Nord Eurostar to Paris Nord Banlieue is 5 minutes	<pre> <SiteConnection version="any" id="008727101"> <Name>Paris Nord Eurostar to Paris Nord Banlieue</Name> <TransferDuration> <!-- MES+5:MIN' --> <DefaultDuration>PT5M</DefaultDuration> </TransferDuration> <BothWays>true</BothWays> <From> <ScheduledStopPointRef version="any" ref="uic: 008727101"/> </From> <To> <ScheduledStopPointRef version="any" ref="uic: 008727103"/> </To> </SiteConnection> </pre>

5.4.1.2. Definition of substations

A substation is a part of a station. For example, part of a station can be dedicated to high speed traffic, another to regional traffic and another to urban traffic.

The station Paris Nord has parts: Paris Nord Eurostar, Paris Nord Grandes Lignes and Paris Nord Banlieue.

Please notice that the specification of a substation does not include a possible pedestrian link. Normally you have to include an additional pedestrian link (in both directions) for a substation relation (see 5.4.1.1).

Facts / situation	NeTEx
Definition of station (code 29) Paris Nord	<pre> <ScheduledStopPoint version="any" id="uic2:008727100" dataSourceRef="uic:1187"> <ValidBetween> <FromDate>2018-09-07T00:00:00</FromDate> <ToDate>2999-12-31T23:59:59</ToDate> </ValidBetween> <Name lang="en">Paris Nord</Name> <StopType>railStation</StopType> <CountryRef ref="fr"/> </ScheduledStopPoint> </pre>

<p>Paris Nord Eurostar is a child/part of Paris Nord (code 14)</p> <p>Paris Nord Grandes Lignes is a child/part of Paris Nord (code 14)</p> <p>As a child/part of Paris Nord (code 14)</p>	<pre> <stopAreas> <StopArea version="any" id="uic:008727100" dataSourceRef="uic:1187"> <ValidBetween> <FromDate>2018-09- 07T00:00:00</FromDate> <ToDate>2999-12- 31T23:59:59</ToDate> </ValidBetween> <Name lang="en">Paris Nord</Name> <Description>grouping of five stops as Paris Nord</Description> <members> <ScheduledStopPointRef version="any" ref="uic:008727100"/> <ScheduledStopPointRef version="any" ref="uic:008727101"/> <ScheduledStopPointRef version="any" ref="uic:008727102"/> <ScheduledStopPointRef version="any" ref="uic:008727103"/> </members> </StopArea> </stopAreas> </pre>
--	--

5.4.1.3. Definition of cities

In the timetables context, a 'city' is an abstract set of physical stations. used by electronic travel information systems to build itineraries.

A city cannot be referenced by trains or other services

The user of a timetable information system does not normally know all stations in a city. And the timetable information system will return the available train and the corresponding station.

An example of this function usage is Paris. The important railway stations are located in a circle and are not connected by a direct line. That means that a train stops in one of the stations, only one of them.

The opposite example is the city of Hamburg. In Hamburg all important stations for long distance trains are located on one line. Most of the trains stop at all these stations and allow interchanges between them. Therefore a metastation might not be necessary for Hamburg. But it could facilitate the timetable search if a metastation is defined.

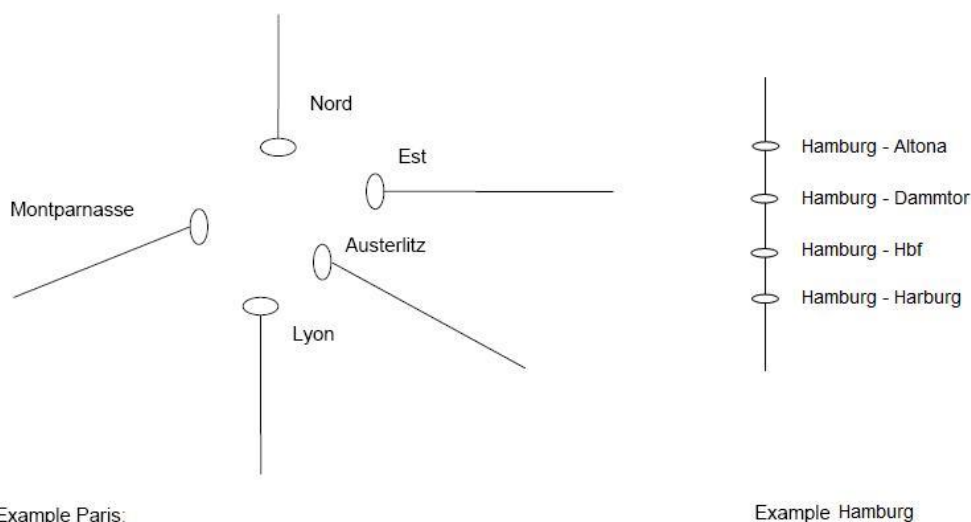


Figure 1 - Illustration of metastations

Example Paris:

Facts / situation	NeTEx
Definition of the city (code 26) Paris	<pre> <tariffZones> <TariffZone version="any" id="uic:008775000" responsibilitySetRef="0087"> <Name lang="fr">Paris</Name> <Description>Paris AGglomeration of stations</Description> <members> <ScheduledStopPointRef version="any" ref="uic:008711300">PARIS EST</ScheduledStopPointRef> <ScheduledStopPointRef version="any" ref="uic:008727100">PARIS NORD</ScheduledStopPointRef> </members> </TariffZone> </tariffZones> </pre>
Reference to Paris Nord	<pre> <ScheduledStopPointRef version="any" ref="uic:008727100">PARIS NORD</ScheduledStopPointRef> </pre>
Reference to PARIS AUSTERLITZ	<pre> <ScheduledStopPointRef version="any" ref="uic:008754700 ">PARIS AUSTERLITZ</ScheduledStopPointRef> </pre>

5.4.1.4. Station name synonyms

It is possible to give different names to stations and locations.

Facts / situation	NeTEx
Definition of the station (code 29) KOELN HBF	<pre> <ScheduledStopPoint version="any" id="uic:008015458"> <!-- Narrative: Declares the timetable stop --> </pre>

	<code><Name lang="de">KOELN HBF</Name></code>
Reference to COLOGNE, language French	<pre> <ScheduledStopPoint version="any" id="uic:008015458"> <!-- Narrative: Declares the timetable stop --> <alternativeTexts> <!-- Narrative: Translatiosn of name - -> <AlternativeText attributeName="Name" version="any" id="uic:008015458" useForLanguage="fr" order="1"> <!-- IFT+AGW:::FR+ COLOGNE' --> <Text lang="fr">COLOGNE</Text> </AlternativeText> </pre>
Reference to KEULEN, language Dutch.)	<pre> <ScheduledStopPoint version="any" id="uic:008015458"> <!-- Narrative: Declares the timetable stop --> <alternativeTexts> <!-- Narrative: Translatiosn of name - -> <AlternativeText attributeName="Name" version="any" id="uic:008015458" useForLanguage="fr" order="1"> <!-- IFT+AGW:::FR+ COLOGNE' --> <Text lang="nl">KEULEN</Text> </AlternativeText> </pre>

5.4.1.5. Links between stations

Facts / situation	NeTEx
<p>The time needed to transfer from Connolly to Dublin Ferryport is 60 minutes</p> <p>There is a link from Connolly to Dublin Ferryport</p> <p>The link can be made by bus</p>	<pre> <connections> <Connection version="any" id="006070025+006002562" dataSourceRef="uic:1183"> <ValidBetween> <FromDate>2021-11-17T00:00:00</FromDate> <ToDate>2999-12-31T23:59:59</ToDate> </ValidBetween> <TransferDuration> <!-- MES+60:MIN' --> <DefaultDuration>PT60M</DefaultDuration> </TransferDuration> <BothWays>true</BothWays> <From> <TransportMode>bus</TransportMode> <ScheduledStopPointRef version="any" ref="uic:006070025"/> </From> <To> <!-- SER+103' --> <TransportMode>bus</TransportMode> <ScheduledStopPointRef versionRef="EXTERNAL" ref="uic:006002562"> Dublin Ferryport</ScheduledStopPointRef> </To> </Connection> </pre>

5.4.1.6. Country Information

If the message contains locations in one country only, the global FrameDefaults segment can be used to identify the country where the location is located.

Country Information

This segment is accepted once per message.

To specify country-related information: summer or winter time, currency and language(s). At this level, the segment defines the country applicable for all locations listed thereafter.

Example	<pre> <FrameDefaults> <DefaultCodespaceRef ref="uic_be"/> <DefaultLocale> <TimeZone>UTC+1</TimeZone> <SummerTimeZoneOffset>+2</SummerTimeZoneOffset> <SummerTimeZone>UTC+2</SummerTimeZone> <languages> <LanguageUsage> <Language>fr</Language> <LanguageUse>allUses</LanguageUse> </LanguageUsage> <LanguageUsage> <Language>n1</Language> <LanguageUse>allUses</LanguageUse> </LanguageUsage> </languages> </DefaultLocale> </FrameDefaults> </pre>
---------	---

All locations listed are:

- Country BE
- Summer time offset +2 hour to UTC
- Winter time offset +1 hour to UTC

If the file contains locations in more than one country, the alternative level segment is preferred and must be used for each location.

Station specific country Information

At this level, the segment defines the country if different from the default country specified in the FrameDefaults.

```

<ScheduledStopPoint version="any" id="uic: 008866654">
  <!-- Narrative: Declares the timetable stop -->
  <!-- ALS+29+008866654:AUBANGE' -->
  <Name lang="fr">AUBANGE</Name>
  <!-- CNY+BE' -->
  <CountryRef ref="be"/>
</ScheduledStopPoint>

```

5.4.1.7. *Time zone information*

All arrival and departure times in messages are expressed in local time. It is possible to include time zones

6. Process

6.1. How to make data available

The Telematics TSI sets an obligation on all RUs to make available the timetable data in the format according to CEN TS 16614 (NeTEx). For simplicity of editing, in this chapter the term “deliver” will be used in the sense of “make available”, and “delivery of a resource” will indicate the operation of making a resource available. The term “deliver” does not imply any obligation of “sending” data to single users or central repositories.

6.1.1. Common rules

The following rules apply to the delivery of all types of data (not only of timetables data, but also of tariff and other).

Each RU delivers its own data to the national access point (NAP), where at least the following quality checks will be made on the data delivered.

- Correct formatting of the data
- Use only of codes present in the ERA Directory of code lists
- Use only of location codes present in the locations database
- Logical checks specific to each type of data
- Cross checks between elements contained in different files of a same or more delivery(ies)
- Correct use of the file naming conventions.

Each RU has to undergo a quality check for every new release of its timetable data and has to perform the corrections or further checks suggested, before delivering the timetable data to the NAP.

The following rules focus on the aspect that the data must present at the interface of the server. How the data are managed internally to every RU (prepared in static way, extracted dynamically from a database, etc.) is the choice of each RU.

6.1.2. Specific rules for the timetable data

The timetable data can be modified at any time. According to regulation (EU) 2012/34/EU, art. 43 major change happens at midnight on the second Saturday in December (official annual timetable change date), and the TAP requires that the new data valid from December are delivered at least two months in advance. Changes taking place during the year must be delivered at least 7 days in advance or if the railway undertaking is aware about the changes.

Since in the timetable data it is possible to define initial and final validity date of all services, there is no need of having two coexisting files in proximity of a change, with different time validity. It is possible to have at any time only one release of timetable on the server of each RU, by use of the “rolling window” technique (each delivery containing the timetable valid from the date of delivery to as long as the RU is able to plan in advance).

In the same way, though the access to timetable data may be subject to conditions (authorised use, payment), there are no reasons to differentiate the delivery per different user, therefore it is possible at any time to make available by an RU only one version of its current timetable data. This implies that each new delivery contains complete timetables, not only deltas.

Since every timetable delivery of an RU must consist of timetable and location data, the modification of one of them could affect the other, thus before making available a new release the RU must make sure that the whole set is complete and correct. The timetable data must be kept always aligned, and therefore submitted to the quality check tool and delivered on the NAP in the form of a single compressed file. The name of the compressed file can be attributed at will; a suggested naming convention, allowing to understand visually the content of the file, is the following:

RailTimetable_cccc_YYYYMMnnn

where:

cccc is the organisation code of the RU delivering the data

YYYYMM are the year and month when the data are delivered

nnn is the sequential release number of the delivery in month MM of year YYYY

When an RU has generated its new timetable files, it must compress them in a zip file and submit it to their quality check tool.

Old releases of timetable data must be kept in the Archive area of the NAP by law for at least 12 months after the date they have expired.

6.2. How to integrate data from multiple RUs

In the case of a train operated by multiple carriers, a user wanting to create the complete schedule of a train must make use of the “Connecting to” option present in the timetable of one carrier, as described in 9.2.4, and find in the timetable of the referenced successive carrier the following section of the train.

7. Data quality

7.1. Security rules

The timetable data do not present any special confidentiality issue, and do not require special security rules.

The RU making them available on the NAP must only adopt the standard precautions in order to:

- control that only authorised users can access the data, each of them possibly only to the section of data to which he/she is granted access;
- control that authorised users can only perform the allowed operations, and nobody unauthorised can modify the data.

7.2. Quality checks

The quality of data must be considered under different viewpoints:

7.2.1. Formal and logical checks

The Agency/the NAP will make available a standard tool (either a standalone package to be distributed to the RUs, or a central service accessible on line), that will perform all reasonable checks on the timetable data of a single RU, such as:

- Correct use of the file naming conventions
- Correct use of the XML-syntax
- Use only of codes present in the ERA Directory of code lists
- Use only of location codes present in the locations database
- Logical checks as detailed in Appendix D.

The RU should make available its own timetable data only after having passed the checks of the tool.

7.2.2. Completeness and correctness

If an RU does not include at all a train in its timetable delivery, or includes a train with wrong parameters but not as wrong as to be detected by the logical checks (e.g. arrival time in a station just few minutes earlier or later than the correct time), these are errors that cannot be detected in advance.

Only if a user of the data or the NAP detects the error, by comparison with correct data found elsewhere (e.g. on a journey planner provided by the RU on its official website, or on the official timetable posters displayed in stations), the RU can be obliged to amend the data and possibly sanctioned for non compliance with telematics TSI.

7.2.3. Organisational failures

If an RU :

- does not make available its timetable within the deadlines set up in the Telematics TSI, without a valid justification (transport services over which the RU does not have sole control, or change that was not known to the RU seven or more days in advance of it taking effect), or
- does not keep available the previous timetable version at least for 12 months after such data have expired

the NEB detects the error and possibly sanctions the RU for non compliance with Telematics TSI

7.2.4. Integration errors between timetables

In the case of a train operated by more than one carrier, the data quality requires not only that each carrier makes available its own data without errors, but also that those data can be correctly integrated in one single train for use in journey planners.

The method to integrate data if the timetables are made available separately by all carriers is described in chapter 7.2.

Nevertheless it is strongly recommended to adopt instead the principle of the “information provider”, i.e. only one of the carriers provides the data of the complete train. To this scope it is also strongly recommended that the agreements on which carrier will be information provider be taken already in the phase of the FTE, when the agreements to cooperate an international train are made.

The Governance Entity will maintain a table showing which is the information provider for all those trains that will be managed under this regime. This table will avoid the risk that for a same co-operated train more than one RU declares to be info provider of the whole train.

If a train operated by more than one carrier is not managed under the regime of information provider, each participating carrier must only include in its timetable delivery the part of the journey for which it is the carrier.

Each participating carrier, apart from the last one, must make use of the “Connecting to” option described in 6.3.2.3, to indicate how the train continues to run under the following carrier.

7.2.5. *Integration errors between timetables and tariffs*

In order to allow authorised users to match the timetable data and the tariff data of one or more RUs, to provide correct and complete information to the customers, it is essential that timetable data are delivered complete of all elements that are needed for the matching.

The most basic need is the correct inclusion of all the stops of the service. When a service is offered for international or foreign sale it is important to indicate the pricing system, as indicated in 6.3.3.4. If the service is to be sold at NRT or Special Offer fares, all stations used in the route description and all border points must be included in the schedule of the service, even if they are not stops of the train.

7.3. **Test procedures for the timetable data quality check**

7.3.1. *Blocking errors*

(submitted timetable MUST be corrected before publishing it to the NAP)

- A.1) The XML does not validate against the NeTEx XML scheme version, used for the timetable publication.
- A.2) The departure time of a service from a station is earlier than the arrival time in the same station
- A.3) The arrival time of a service in a station is earlier than the departure time from the previous station, taking into account possible time zone difference, date variation or different summer time rules
- A.4) The departure time from the origin station or an intermediate station of a service is missing
- A.5) The arrival time in the destination station or an intermediate station of a service is missing
- A.6) The passing time in a routing station or border point station of a service is missing
- A.7) A service has only one stop
- A.8) A service stops two consecutive times at the same station
- A.9) The coach group is not referenced to at least one train.
- A.10) A location code for a stop refers to a grouping of stations (city).

7.3.2. *Potential errors*

(submitted timetable MUST be checked; if potential errors are confirmed to be correct values it can be notified to the Registry)

Case	Error	Suggested actions for the data users
B.1)	A service is running below the minimum speed between two consecutive stations (a)	The low speed is probably due to works on the line. The train can be sold
B.2)	A service is running above the maximum speed between two consecutive stations (b)	Check reasons with the originating RU before opening the train to sales
B.3)	A section-related facility or service extra is defined for a service at a single stop	Sell the train without the facility or service
B.4)	A service is defined but never operates	It could be a placeholder for later operation of the train. Do not display in journey planner nor sell
B.5)	A service is waiting at a stop for more than the maximum stop time (c)	Same as B.2
B.6)	A service takes more than the maximum leg time between two stops (d)	Same as B.2
B.7)	A service stops two non consecutive times at the same station	It can happen in special cases. The train can be sold
B.8)	A service is duplicated with another identical service	Only display in journey planner and sell one of the identical services
B.9)	It must be avoided using contradictory descriptions such as an <code><TransportMode>rail</TransportMode></code> and a brand name <code>TypeOfServiceRef versionRef="EXTERNAL" ref="163" /></code> (Rail replacement bus)	Same as B.2
B.10)	Connection of a service to another one occurs at a badly reference stop (arriving train refers to FR12345 but connected departing train refers to FR98765)	References to stops must be harmonized and corrected
B.11)	Connection of a service to another one occurs at a badly referenced time (arriving train refers to FR12345 with arrival time 09:25 but connected departing train refers to FR12345 with departure time 09:07)	References to times must be harmonized and corrected
B.12)	Connection of a service to another one occurs to a badly referenced service (arriving train refers to FR12345 with service number 8012345 but connected departing train refers to FR12345 with departing service number 8098765)	References to services must be harmonized and corrected
B.13)	Stops' reference data of a service are not harmonised with NRT stations, via stations and zones	References to stops must be harmonized with NRT and corrected

B.14	Stops' reference data of a service are not harmonised with IRT stations, via stations and zones	References to stops must be harmonized with IRT and corrected
B.15	Services facilities provided by multiple RUs are contradicting or not harmonized (RU2 for a service indicates PRM compartment whereas RU1 and RU 3 not)	Service facilities must be harmonized and corrected

When a user downloads the timetable data of an RU from the NAP, it is free to (re)submit those data to a data quality check tool.

If the data quality check shows blocking errors, the user can ask the originating RU for correction of the errors, and in case of no or slow correction can escalate to the NAP.

If the quality check shows potential errors, it has to be assumed that the originating RU has declared those potential errors as correct values.

In this case, according to the type of potential error, the user is suggested to do the actions as described in column "Suggested actions for the data users" of the table.

7.3.3. Remarks:

- (a) The minimum speed is the minimum average speed normally acceptable at which a service runs between two consecutive stations, defined per service brand.

The speed is calculated as Distance / Time.

The Distance between locations is calculated from the geo-coordinates of the locations. If the coordinates of one or both locations are not available, the coordinates of a next or previous location are used. If the system is not able to find one or both coordinates, this validation rule is skipped.

The Time is calculated as difference between the departure time from the first station and the arrival time in the second station.

- (b) The maximum speed is the maximum average speed normally acceptable at which a service runs between two consecutive stations, defined per service brand.

For speed calculation see remark (a)

- (c) the maximum stop time is the maximum duration of a stop of a service in a station normally acceptable, defined per service brand

- (d) the maximum leg time is the maximum duration of the journey of a service between two consecutive stops normally acceptable, defined per service brand

8. Governance aspects

8.1. Organisational steps for RUs to get started

1. An RU that has not been producing until now its timetable data in NeTEx format, once it has its Company code according to TD B.8 (see TAP IT Specifications Overview on how to get a Company code), will need first to contact the Governance Entity who will offer its services, according to a Chart Agreement to be signed between the two.
2. The Governance Entity will then make available to the new RU services such as:
 - The Regulation, Technical Documents and IT Specifications
 - Reference data (country codes, company codes, location codes, different code lists)
 - Data quality Management
 - Registry (locations of resources, notifications of changes,...)
 - Etc.
3. The RU will define the address of an FTP server where to make available its timetable data, and will define the access rules (terms and conditions of use of the data, conditions for downloading)
4. The RU will inform accordingly the Registry and the Governance Entity
5. The RU will organise the access filters to the server where its data are made available, so that only authorised users can download the (part of) data they are allowed to
6. The RU will sign agreements with such authorised users to make official what was negotiated (login/Password for FTP servers and addresses, conditions of use)

8.2. Organisational steps for Third Parties to get started

1. A Third Party (TP) (e.g. a Ticket Vendor or an Authorised Public Body) can be authorised to download the timetable data of one or more RUs. In order to identify the TP in a unique and standard way, it must contact the Governance Entity, who attributes to the TP a registration code (if not yet attributed) and offers its services, according to a Chart Agreement to be signed between the two
2. The Governance Entity will make available to the TP services such as:
 - The Regulation, Technical Documents and IT Specifications
 - Reference data (country codes, company codes, location codes, different code lists)
 - Data quality Management
 - Registry (locations of resources, notifications of changes,...)
 - Etc.
3. The TP will contact whichever RU it wants to get the timetable data from, and sign an agreement to make official what was negotiated (data that can be downloaded, login/Password for FTP servers and addresses, terms and conditions of use of the data, conditions for downloading)
4. The TP will organise its internal procedures so that the downloaded data are used strictly in accordance to the conditions set out in the agreement, and not passed to external actors unless so authorised by the agreement

For all other governance information of general character that can apply to all IT Specifications, see the “TAP IT Specifications Overview”.

Appendix A - Glossary

Term	Explanation
Alighting	The act by which a passenger gets out of a train
Attributing system	A reservation system performing the function of receiving reservation requests and sending replies
Boarding	The act by which a passenger gets on a train
Booking	The operation of obtaining the reservation of an accommodation on a train
Border station	A station that coincides with a Tariff border point
Carrier	Means the contractual railway undertaking with whom the passenger has concluded a transport contract or a series of successive railway undertakings which are liable on the basis of such a contract (1)
City	See Metastation
Coach group	Group of one or more coaches that do not run for the whole route of a train. They can be pulled by a single train but only for part of its route, or they can be pulled by one train for part of their route and then be disconnected from that train and coupled to another
Couple (a coach (group))	Attach a coach group to a pulling train
CRD	Common Repository Domain listing in machine readable format the rail locations used in the data exchange
CTA	Connection Time Available - interval between scheduled arrival of the first train and scheduled departure of the second
Data user	A stakeholder authorised to download the timetable data of one or more RUs, under usage conditions
Days of operation	A conventional representation used to indicate in which days of a given time period a service is present or not. It consists of a string of as many digits as there are days in the given time period, with value 1 for the days when the service is present and value 0 for the others). When the time period is one week, for patterns repeated equally every week, it is possible to use the alternative representation of the “working week” (see)
Disconnect (a coach (group))	Detach a coach group from one pulling train that continues its journey, because the coach group has reached its final destination or because it must be coupled to another train
Distribution channel	Means the method (such as ticket office machine, on-train media, public web services, telesales, mobile ticketing) by which a service (information, ticket sale, ticket refund, response to complaints, etc.) is provided to the passenger by a railway undertaking (1). Complementary info : the service can be provided to the passenger by a railway undertaking directly or through a distributor and/or a travel distribution enabler and/or a retailer
DQM	Data Quality Management
FTE (Forum Train Europe)	A series of meetings (normally two per year) where the European RUs and IMs plan the International trains for the following year
Global price	A modality of establishing the price of a rail ticket where it includes in a single undifferentiated amount the contract of carriage, the reservation and any possible supplement. It is the kind of pricing used for IRTs. (synonym : Market price)
IFOPT	Identification of Fixed Objects in Public Transport IFOPT defines a model and identification principles for the main fixed objects related to public access to Public Transport (e.g. stop points, stop areas, stations, connection links, entrances, etc.)
Information provider	The RU making available the timetable of a whole train
IRT (Integrated Reservation Ticket)	Ticket which is issued as an international or national ticket and in which a compulsory reservation is integrated (2)
Itinerary segment	Section of the route of a train, usually defined in order to describe service elements and facilities that are available for only part of the route.

	Synonym : travel segment
Joining to	The operation by which two trains, having run separately until now, meet in a station and are there coupled to each other to continue the journey together but keeping each its original train number
Joint carrier	Means a carrier linked by a cooperation agreement to one or more other carriers for the operation of a transport service (1)
MCT	Minimum Connection Time (between two platforms in a station)
Metastation	A grouping of rail locations that must be collectively considered by a journey planner, when the user inserts the name of the meta station (synonym : City)
Multiple variation	A service that is described with more than one POP segment
NEB (National Enforcement Body)	Organisations designated by each member State, according to art. 30 of Regulation 1371/2007, to guarantee its good application. The list of NEBs is on http://ec.europa.eu/transport/passengers/rail/rail_en.htm
NRT (Non-integrated Reservation Ticket)	Ticket which is issued as a national or international coupon without a reservation integrated with it for journeys for which reservations are not required (2)
Operator	The carrier operating a train for (part of) its route
Passenger type	A code, and the corresponding definition, identifying the characteristics of one or more rail passengers (e.g. Adult, Senior, Family group). Valid values are listed in ERA Code list B.4.5261
Product	Means a type of train with determined types of services (e.g. high speed, bicycle storage places, PRM accommodation, couchette and/or sleeping cars, dining cars, take-away facilities, etc.) which are linked to relevant prices and may be linked to specific conditions (1)
Pulling Train	The train to which a coach group is coupled
Registry	A tool made available by the Governance Entity to keep track of all resources made available by resource producers, that the authorised resource consumers can consult to find at which address the resource can be found and by which method it can be accessed
Reservation provider	The railway company, which is responsible for the reservation of a train
Routing station	A station where a train passes by without stopping, that is included in the schedule of that train to help match the timetable data to the tariff data
RU (Railway Undertaking)	Means any public or private undertaking the principal business of which is to provide services for the transport of goods and/or passengers by rail, with a requirement that the undertaking must ensure traction; this also includes undertakings which provide traction only (1)
Schedule	The timetable data related to a specific train, with its origin, transit and destination stations and the corresponding times of departure, arrival and passage
Service brand	A code, and the corresponding definition, identifying a commercial family of trains (e.g. AVE, Thalys, RailJet). Valid values are listed in ERA Code list B.4.7009 (together with Service modes)
Service extra	A code, and the corresponding definition, identifying a service offered by an RU on board of its trains (e.g. lunch, movies). Valid values are listed in ERA Code list B.4.7161
Service facility	A code, and the corresponding definition, identifying an accommodation available on a train (e.g. First-class seats, Second-class sleeper T4) or a utility available in a station (e.g. Metro connection, Bus connection). Valid values are listed in ERA Code list B.4.9039
Service mode	A code, and the corresponding definition, identifying a generic type of train (e.g. Intercity, Regional) or a transport mode different from Train (e.g. Bus, Ship). Valid values are listed in ERA Code list B.4.7009 (together with Service brands)
Service number	The number identifying a given transport service (train or coach group) offered in the timetable of an operator
Service provider	The responsible entity providing any services linked to the transport of passengers". The service provider is responsible for the terms and conditions and for the fares valid on the service and is often identical with the operating carrier
Single variation	A service that is described with only one POP segment

SIRI	<p>Service Interface for Real Time Information</p> <p>SIRI is an XML protocol to allow distributed computers to exchange real-time information about public transport services and vehicles.</p> <p>SIRI is based on the Transmodel abstract model for public transport information</p>
Sole carrier	Means a carrier that operates a transport service independently of other carriers (1)
Splitting from	The operation by which two trains, having run until now coupled to each other but with different train numbers, stop in a station and are divided from each other to continue separately their journeys keeping each its original train number
Substation	A substation is a part of a station. For example, part of a station can be dedicated to high speed traffic, another to regional traffic and another to urban traffic
Tariff border point	A conventional location used to indicate where the responsibility of the passenger is passed from one RU to the next one in case of successive carriers
TCV (Tarif Commun Voyageurs)	A commercial agreement by various carriers to allow use of NRT tickets on the trains they operate
Timetable	A structured list of data describing the transport services offered to the public by a transport company (in this case a Railway Undertaking) during a given time period
Time zone	A region on Earth that has a uniform standard time
Transmodel	TRANSMODEL is a reference data model for Public Transport operations developed within several European projects. It is published as CEN standard EN12896.
Working week	A conventional representation used to indicate in which days of a week a service is present or not, as an alternative to the generic method of the “days of operation” (see). The days from Monday to Sunday are indicated with the digits 1 to 7, and only the digits corresponding to the days when the service is present are listed)

(1) : from the TAP glossary

(2) : from the CIT glossary