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Javni prevoz - Referenčni podatkovni model - 10. del: Alternativni načini

Public transport - Reference data model - Part 10: Alternative Modes

Öffentlicher Verkehr - Datenreferenzmodell - Teil 10: Alternative Modi

Transports publics - Modèle de données de référence - Partie 10 : Modes alternatifs

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Public transport - Reference data model - Part 10: Alternative Modes

Transports publics - Modèle de données de référence -
Partie 10 : Modes alternatifs

Öffentlicher Verkehr - Datenreferenzmodell - Teil 10:
Alternative Modi

This European Standard was approved by CEN on 18 September 2022.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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European foreword

This document (EN 12896-10:2022) has been prepared by Technical Committee CEN/TC 278 “Intelligent Transport Systems”, the secretariat of which is held by NEN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by May 2023, and conflicting national standards shall be withdrawn at the latest by May 2023.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights. This document supersedes CEN/TS 17413:2019.

In comparison with the previous edition, the following technical modifications have been made:

This new publication takes into account the revision of the conceptual model by the project team TC278 PT0303 working on the implementation of the 'alternative modes' model.

EN12896-10, complementing the series of EN12896-x, establishes the semantic reference for the alternative modes data domain and thus facilitates the integration of these modes into the overall mobility environment, in particular into multimodal travel services (e.g., trip planning systems).

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

The European Delegated Regulation EU 1926/2017 requires the publication of information related to the alternative modes of transport, in particular by means of data exchange standards derived from Transmodel (EN12896). Based on the conceptual data model published by CEN TS 17413 (already based upon Transmodel) a data exchange format is elaborated as NeTEx – Part 5. Transmodel – Part 10 concerns the alternative modes aspects and completes the Transmodel eco-system ensuring coherence between the semantic model (Transmodel) and its implementation (as NeTEx/SIRI).

Public Transport Reference Data Model (EN12896) - Part 10 introduces extensions of Transmodel v6.

Most of them have been elaborated within CEN TC278 WG17 and published as CEN TS 17413:2019. The implementation of this model as NeTEx-Part 5 generates further refinements of the conceptual model.

EN12896-10 includes both achievements and creates a coherent set of standards (Transmodel-NeTEx-SIRI).

The series is composed of the following documents:

- *Public transport – Reference data model – Part 1: Common concepts;*
- *Public transport – Reference data model – Part 2: Public transport network;*
- *Public transport – Reference data model – Part 3: Timing information and vehicle scheduling;*
- *Public transport – Reference data model – Part 4: Operations monitoring and control;*
- *Public transport – Reference data model – Part 5: Fare management;*
- *Public transport – Reference data model – Part 6: Passenger information;*
- *Public transport – Reference data model – Part 7: Driver management;*
- *Public transport – Reference data model – Part 8: Management information & statistics; and*

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— *Public transport – Reference data model – Part 9: Informative documentation* [CEN/TR].

Together these create version 6 of the European Standard EN 12896, known as “Transmodel”.

According to the CEN-CENELEC Internal Regulations, the national standards organisations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Türkiye and the United Kingdom.

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Introduction

This document presents the following items:

- Rationale for the Transmodel Standard;
- Use of the Transmodel Standard;
- Applicability of the Transmodel Standard;
- Conformance Statement;
- Transmodel Origins;
- Reference to the Previous Version and Other Documents.

The data structures represented in Part 1 are generic patterns that are referenced by different other parts.

Part 2 of this European Standard presents space-related data structures.

Part 3 presents time-related data structures referring to the time-related Tactical Planning Components and to Vehicle Scheduling.

Part 4 presents data referring to daily operations (i.e., to operational days), different from those planned for day types (space-related data structures and tactical planning components) and including operational raw data referring to operations follow-up.

Part 5 presents fares structures including sales, validation and control.

Part 6 presents Passenger Information (planned and real-time).

Part 7 presents Driver Management including Driver Scheduling (day-type related driver schedules), Rostering (ordering of driver duties into sequences according to some chosen methods) and Driving Personnel Disposition (assignment of logical drivers to physical drivers and recording of driver performance).

Part 8 presents Management Information and Statistics.

Part 9 presents the Informative documentation.

Part 10 (this part) presents the data structures for alternative modes.

EN 12896-10:2022 (E)**1 Scope****1.1 General Scope of the Standard**

The main objective of the present standard is to present the Reference Data Model for Public Transport, based on:

- the Reference Data Model, EN12896, known as Transmodel V6,

incorporating the requirements of

- EN 15531-1 to -3 and TS 15531-4 and -5: Service interface for real-time information relating to public transport operations (SIRI),
- TS 16614-1 to 5: Network and Timetable Exchange (NeTEx).

A particular attention is drawn to the data model structure and methodology:

- the data model is described in a modular form in order to facilitate the understanding and the use of the model,
- the data model is entirely described in UML.

In particular, a Reference Data Model kernel is described, referring to the data domain:

- Network Description: routes, lines, journey patterns, timing patterns, service patterns, scheduled stop points and stop places.

Furthermore, the following functional domains are considered:

- Timing Information and Vehicle Scheduling (runtimes, vehicle journeys, day type-related vehicle schedules)
- Passenger Information (planned and real-time)
- Fare Management (fare structure, sales, validation, control)
- Operations Monitoring and Control: operating day-related data, vehicle follow-up , control actions
- Management Information and Statistics (including data dedicated to service performance indicators).
- Driver Management:
 - Driver Scheduling (day-type related driver schedules),
 - Rostering (ordering of driver duties into sequences according to some chosen methods),
 - Driving Personnel Disposition (assignment of logical drivers to physical drivers and recording of driver performance).

This part corresponds to the Transmodel V6.0 Alternative Modes

The data modules dedicated to cover most functions of the above domains are specified.

Several concepts are shared by the different functional domains. This data domain is called “Common Concepts”.

1.2 Functional Domain Description

The different functional domains taken into account in the present standard and of which the data have been represented as the reference data model are described in “Public Transport Reference Data Model - Part 1: Common Concepts”.

They are:

- Public Transport Network and Stop Description
- Timing Information and Vehicle scheduling
- Passenger information
- Fare Management
- Operations monitoring and control
- Management information
- Personnel Management: Driver Scheduling, Rostering, Personnel Disposition.

The aspects of multi-modal operation and multiple operators’ environment are also taken into account.

The functional domains related to the present document are described in chapter 5 below.

1.3 Particular Scope of this Document

This document defines new modes in a reference data model, in order to allow integration of these modes into urban multimodal travel services (e.g., trip planning systems).

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2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 12896-1, *Public transport - Reference data model - Part 1: Common concepts*

EN 12896-2, *Public transport - Reference data model - Part 2: Public transport network*

EN 12896-3, *Public Transport — Reference Data Model — Part 3: Timing Information and Vehicle Scheduling*

EN 12896-4, *Public Transport — Reference Data Model — Part 4: Operations Monitoring and Control*

EN 12896-5, *Public Transport — Reference Data Model — Part 5: Fare Management*

3 Terms and definitions

3.1 General Terms and definitions

The following generic terms (extract based on Transmodel) are used.

3.1.1

attribute

property of an entity.

3.1.2

conceptual data model

description of a real-world domain in terms of entities, relationships and attributes in an implementation independent manner in order to provide a structure on which the rest of the development of an application system can be based.

3.1.3

conceptual level

in the context of data modelling, the conceptual data model.

3.1.4

database

collection of data; often used in the sense of the physical implementation of a data model.

3.1.5

data domain

data structure made up of data related to each other, through the fact that there is a functional area or group of functions using this data set as a whole.

3.1.6

data model

description of a real-world domain in terms of data and relationships.

3.1.7

entity

object (data) that has its own existence (as opposed to an attribute).

3.1.8

fare management

all activities related to the collection of money from passengers.

3.1.9

function

activity.

3.1.10

functional area

arbitrarily defined set of activities used to define the objectives and limits of the data model.

3.1.11

interoperability

ability of (sub)systems to interact with other (sub)systems according to a set of predefined rules (interface).

3.1.12

logical data model

data design that takes into account the type of database to be used but which does not consider means of utilisation of space or access.

3.1.13

logical level

in the context of data modelling, the logical data model.

3.1.14

object-oriented data model

data structure expressed according to principles that allow for a direct implementation as an object-oriented database, where information is represented in form of objects, i.e., respecting the principle of encapsulation meaning in particular that each data is accessed or modified through operations (methods) belonging to it.

3.2 Domain specific terms and definitions

3.2.1

access mode

a characterisation of the traveller movement (e.g., walking, cycling, etc) enabling the traveller to reach public transport or to carry out a whole trip.

3.2.2

alternative mode

any publicly advertised mode of operation different from the conventional mode of operation, in particular vehicle sharing, vehicle rental and vehicle pooling.

3.2.3

car pooling

- vehicle pooling applied to cars, consisting in sharing a privately owned car for a trip between a defined driver who is already engaged in the trip and at least another traveller.

3.2.4

car rental

vehicle rental applied to cars, consisting in making car(s) available at specified agencies with the constraint to bring them back at specified agencies.

3.2.5

car sharing

vehicle sharing applied to cars consisting, the short-term use of a vehicle for a specific journey or time where the car might be taken from and parked at different places in the urban area.

EN 12896-10:2022 (E)**3.2.6****conventional mode**

legacy mode of operation which is provided as a scheduled and/or flexible publicly advertised transport offer relying on a set of features: drivers are employees; the fleet is owned by an operator or an authority; the network topology is defined well in advance and is based on lines and journey patterns.

Note 1 to entry: the distinction between alternative and conventional mode of operation relies on the fact that one or more of the conditions as above may not be fulfilled. Moreover, the difference is in the mode of operation rather than the way the traveller is served.

3.2.7**cycle rental**

vehicle rental applied to cycles, consisting in making cycle(s) available at specified agencies with the constraint to bring them back at specified agencies.

3.2.8**cycle sharing**

vehicle sharing applied to cycles consisting of short-term cycle rental where the cycle can be taken from and parked at different places in the urban area.

3.2.9**flexible transport mode**

passenger transport operation linked to a fixed network/schedule but offering flexibility, in order for instance, to optimise the service or to satisfy passenger demand.

3.2.10**mobility service**

alternative mode of transport service available over a widespread area, for example car-pooling, rental, etc..

3.2.11**operational service**

activities performed by actors in charge of operation of a service.

3.2.12**park and ride**

activity allowing travellers to transfer between personal/alternative mode and conventional mode.

3.2.13**park and ride facility**

location dedicated to travellers allowing them a modal transfer, in particular to leave/pick up their personal vehicles before/after a trip on public transport.

3.2.14**personal mode**

private mode of operation excluding any publicly advertised use.

3.2.15**public transport**

any means of transport advertised and available for use by the general public.

3.2.16**scheduled mode**

passenger transport operation following a fixed schedule and fixed routes.

3.2.17**taxi**

type of vehicle pooling operation where the vehicle is driven by a driver providing services to travellers for commercial reasons.

3.2.18**taxi stand**

A set of spots where any taxi is able to safely stop for a short period of time to load passengers.

3.2.19**traveller information provision**

activity consisting in the provision of information on the rules/conditions related to a traveller service and concerning the available transportation means.

3.2.20**traveller service**

activity (in general, initiated by users) in view of facilitating/enabling a trip.

3.2.21**walking mode**

walking is considered as access mode so the traveller walks to a stop to get to the transport option.

3.2.22**vehicle pooling**

particular mode of operation of a privately-owned vehicle consisting in sharing the vehicle for a trip between a defined driver who is already engaged in the trip and at least another traveller.

3.2.23**vehicle rental**

particular mode of operation of a vehicle fleet (in general privately owned) consisting in making it available at specified agencies with the constraint to bring them back at specified agencies.

3.2.24**vehicle sharing**

short term vehicle rental where the vehicle can be taken from and parked at different places in the urban area, often without the constraint of bringing the vehicle back to a dedicated specific location.

3.2.25**vehicle with driver**

vehicle operating on demand such as a taxi, chauffeured car or dispatched mini-cab.

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4 Abbreviations

CCAM	cooperative, connected and automated mobility
EU	European Union
GDF	geographic data files
GNSS	global navigation satellite system
INSPIRE	infrastructure for spatial information in Europe
ITS	intelligent transport systems
MaaS	mobility as a service
U-ITS	urban ITS

5 Functional description of the alternative modes

5.1 Introduction

This document describes an extension of the Public Transport Reference Data Model, known as Transmodel (EN12896), which provides definitions and a conceptual data model for the "conventional transport" domain. This clause provides a clarification as regards the "conventional transport mode" vs. "alternative transport mode".

5.2 Categorisation of modes of transport

'Mode' is any means of transport used or available. It is split into 'vehicle mode' and 'access mode'.

'Vehicle mode' is a characterisation of the public transport operation according to the means of transport, e.g., bus, tram, metro, train, ferry, ship, or bicycle.

'Access mode' (e.g., walking, cycling, private car driving, etc) is a characterisation of the traveller movement (e.g., walk, bicycle, etc) enabling them to reach the 'vehicle mode' or to carry out a whole trip.

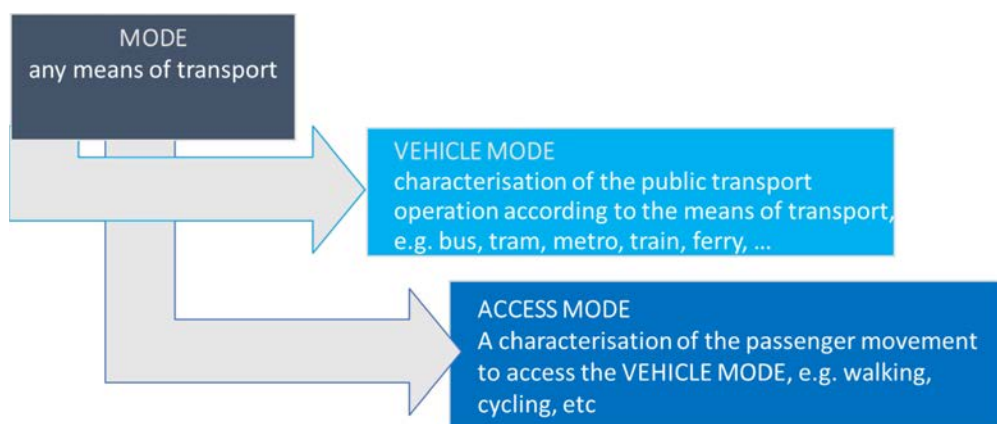


Figure 1 — Categorisation of transport modes

A distinction is made between 'vehicle mode' and 'vehicle type'. Each 'vehicle mode' may correspond to a range of 'vehicle types' (e.g. to the 'vehicle mode' 'bus' may correspond 'standard', 'articulated, minibus', 'double-deck' buses).

A further, finer categorisation of transport modes is provided by the concept of 'submode', which is a variant of a 'mode'. For example, for the mode 'rail', possible submodes are 'international rail' or 'domestic rail'; for the mode 'bus', the example of submode is 'regional bus', for the mode 'car', examples of submodes are 'electric car', 'conventional car', 'self-driven car'.

This document takes over these normative definitions and provides a further clarification as regards the term 'public transport'.

For this document 'public transport' has to be understood as any means of transport, advertised and available for use by the general public.

5.2.1 Alternative mode of operation

5.2.1.1 Overview

Modes and submodes being defined as 'transport means' may be characterised in terms of types of operation, i.e., ways they are operated.

This document distinguishes the following types of 'mode of operation':

- conventional mode of operation: the legacy mode of operation which is provided as a scheduled and/or flexible *publicly advertised* flexible transport offer. This mode of operation is either following a fixed schedule and fixed routes or linked to a fixed network/schedule but offering flexibility, in order for instance, to optimise the service or to satisfy passenger demand;
- alternative mode of operation: any *publicly advertised mode of operation different from the conventional mode of operation*, in particular vehicle sharing, vehicle rental and vehicle pooling; and
- personal mode of operation: a private mode of transport *excluding any publicly advertised use*.

The scope of Transmodel is the conventional mode of operation, including both scheduled and flexible mode of operation. The distinction between alternative and conventional mode of operation relies on the fact that a conventional mode relies on a set of features: drivers are employees and the fleet is owned by an operator or an authority and the network topology is defined well in advance and is based on lines and journey patterns; whereas the alternative modes may not fulfil one or more of these features.

This document concerns the alternative mode of operation.