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BSI Standards Publication

Public transport — Network and Timetable Exchange (NeTEx)

Part 4: Passenger Information European Profile

bsi.

National foreword

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CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

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European foreword

This document (CEN/TS 16614-4:2020) has been prepared by Technical Committee CEN TC 278 “Intelligent transport systems”, the secretariat of which is held by NEN.

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 presents a Passenger Information European Profile of the European Technical Specification known as “NeTEx”. NeTEx provides a framework for specifying communications and data exchange protocols for organizations wishing to exchange scheduled Information relating to public transport operations.

NeTEx is made up of three parts defining a single European Standard, which provides a complete exchange format for public transport networks, timetable description and fare information.

- Part 1 is the description of the public transport network topology exchange format. It also contains use cases shared with part 2, and modelling rules and the description of a framework shared by all parts.
- Part 2 is the description of the scheduled timetables exchange format.
- Part 3 is the description of the fare information exchange format.

Part 1 is fully standalone, Parts 2 and 3 rely on Part 1.

The XML schema can be downloaded from http://netex-cen.eu, along with available guidance on its use, example XML files, and case studies of national and local deployments.

This document is highly technical, and special care has been taken on keeping the text readable. This has been done through a set of editorial rules enhancing usual CEN writing rules:

- To avoid confusion with usual wording, Transmodel terms are in capital letters (JOURNEY PATTERN for example).
- To avoid confusion with usual wording, attribute names are in bold/italic style and use camelcase style with no spaces (***JourneyPattern*** for example).
- To avoid confusion with usual wording, attribute types are in italic style and use camelcase style with no spaces (*TypeOfEntity* for example).

According to the CEN/CENELEC Internal Regulations, the national standards organisations of the following countries are bound to announce this document: 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, Turkey and the United Kingdom.

Introduction

Public transport services rely increasingly on information systems to ensure reliable, efficient operation and widely accessible, accurate passenger information. These systems are used for a range of specific purposes: setting schedules and timetables; managing vehicle fleets; issuing tickets and receipts; providing real-time information on service running, and so on.

This document specifies a Profile of Network and Timetable Exchange (NeTEx) for public transport. NeTEx is intended to be used to exchange information between Public Transport organisation systems containing scheduled public transport data. It can also be seen as a complement to the SIRI (Service Interface for Real-time Information) standard (EN 15531 series), as SIRI needs reference data exchanged in the scope of NeTEx before any possible real-time exchange.

Well-defined, open interfaces have a crucial role in improving the economic and technical viability of public transport Information Systems of all kinds. Using standardized interfaces, systems can be implemented as discrete pluggable modules that can be chosen from a wide variety of suppliers in a competitive market, rather than as monolithic proprietary systems from a single supplier. Interfaces also allow the systematic automated testing of each functional module, vital for managing the complexity of increasing large and dynamic systems. Furthermore, individual functional modules can be replaced or evolved, without unexpected breakages of obscurely dependent functions.

NeTEx improves a number of features of public transport information and service management:

- Interoperability – the standard will facilitate interoperability between information processing systems of the transport operators by:
    - introducing common architectures for message exchange;
    - introducing a modular set of compatible information services for real-time vehicle information;
    - using common data models and schemas for the messages exchanged for each service;
    - introducing a consistent approach to data management.
- Technical advantages include the following: reusing a common communication layer shared with SIRI for all the various technical services enables cost-effective implementations, and makes the standard readily extensible in future.

A profile is an ancillary document to the standard which specifies additional rules for implementation in a given context. The profile contains information such as:

- Details of the objects used in an exchange.
- Details on the options proposed by the standard.
- Details on optional elements.
- Precision on the identifier codes to be used.
- Advice on grouping elements.

The reason for having a detailed profile specification is that it facilitates implementation. A developer intending to implement a certain service or type of service in a given environment need only implement the smaller set of options and parameters specified in the profile, and is given a number of additional rules that restrict or simplify the required processing of data.

This European Passenger Information Profile (EPIP) for NeTEx is for exchanging passenger information; it describes a minimal information set to feed passenger information services in a

European wide and multimodal context. It covers basic network and timetable data as explained further below.

Profiles – a Rationale

Standards are by their nature and definition, consensus documents. In the case of the CEN and ISO standards, and more particularly in the field of traffic applications, these are established at an international level, with a significant number of different stakeholders involved in their development and discussion. This means that CEN and ISO standards take into account requirements that are far beyond many local implementations of such standards. Implementing a standard for a complex data model (such as that for transport) represents a significant investment, so care is taken to achieve a comprehensive and well abstracted solution and standards are written to have with the longest possible life and stability.

These factors tend to result in standards documents being large and detailed, consequently requiring significant effort to read and understand – and this is certainly the case for Transmodel and NeTEx. It may also be difficult to see how the standard can best applied in practice, since there are many subtle choices to make out of all the possibilities and there is insufficient space to include extensive examples in the formal documentation.

Another cause of complexity is that standards such as NeTEx and SIRI (since they were developed to harmonise different national standards), include features and options whose purpose is to ensure compatibility with the different systems developed in specific countries. For example, SIRI includes services dedicated to the advanced management of connection guarantees, as implemented in the German VDV standard, but used only in a few countries such as Switzerland and Germany; NeTEx also includes features to help compatibility with practices peculiar to particular countries, such as are found in the French NEPTUNE, British TransXChange, Swedish NOPTIS, etc. standards.

In addition, local or national specificities may require the specific use of a specific data sets and specific identifier systems for particular information. For example, the UK has a national system for the identification of stops (NaPTAN), which is naturally required to be used within NeTEx and SIRI exchanges, but which is not relevant for other European countries except in a few cross-border services.

Finally, some elements proposed by the standards are optional and relevant only for a particular business context: so that it needs to be decided if these items are relevant for a particular implementation or not.

A profile is intended to address some of the above issues by offering a predefined set of choices for use in specific context, and setting out additional explicit rules that help to simplify implementation.

Additionally, a profile can be accompanied by the definition of specific testing procedures to assess the conformance of the implemented solution with the profile.

A profile remains fully compliant with the standard; it merely implements a subset, using a well-defined code system.

From a practical point of view, profiles can be seen as a set of implementation guidelines; instead of having to face the challenge of analysing the whole standard, discovering the relevant parts for a given application, and then adjusting optional values and parameters for the intended application, a profile

can be specified to address the needs of a particular application and then used for any subsequent similar initiatives.

The European Passenger Information Profile (EPIP)

The EPIP focuses on information relevant for feeding passenger information services, it therefore excludes operational information that is not relevant for this purpose. Fare information, apart from basic Tariff zones, though relevant for passengers, is also considered as out of scope, but will be addressed by a future separate profile.

Typical use cases for the Passenger Information Profile are:

- provision of data to a journey planner.
- provision of data to a mapping tool to show the network on a map (possibly interactive).
- provision of data to timetable printing/visualisation tools.
- provision of data to a stop or line finder.

The profile has been designed to be as concise as possible and to focus on the data elements needed to fulfil the EC's *Priority action A of ITS-Directive*.

- This means that features specific to a particular country will not in general not be included (the profile is designed to be sharable across Europe, and data sets compliant with it are expected to be usable by any NeTEx conformant passenger information system in Europe).
- Each country may also define a further national NeTEx Profile (for internal use nationally), extending the European profile and providing additional information.
- In the interests of simplicity, a number of the more complex features specific to certain modes have also been omitted from the formal profile, for example boarding position on train platforms.
- The EPIP is divided into three parts:
- **Common core elements** that are shared by the two other profile parts given in this document and that may also be reused later on by other future profiles (Fare Profile, Accessibility Profile, etc.)
- **Stop Profile**, describing the STOP PLACEs and their hierarchy.
- **Network and Timetables Profile**, describing the network topology and all related timing information (timetables).

Dividing the profile into three parts allows for a modular implementation, with a minimal overlap between separate documents and their corresponding components. The modularisation also facilitates the separate exchange of stop data from that of timetable and other information (but it is, of course, still possible to exchange them together). One of the reasons for this partition is that there are more and more countries developing separate national or regional stop database registries who require the ability to exchange only the stop description.

The EPIP supports certain common features that are important in a European context:

- The ability to exchange translations of text elements in multiple alternative national languages.
- Basic accessibility information about sites and services.

Data consistency and Quality

One of the goals of a profile is to simplify and enhance interoperability. However, mere syntactic compliance with the EPIP profile alone will not guarantee interoperability; the data being exchanged must also be of good quality, that is, complete and self-consistent as data, -- and correspond to the external reality it is meant to be describing.

The profile therefore also includes a set of consistency and quality checking rules. Following these rules will not, of course, necessarily guarantee the absolute quality of any dataset (nor will it validate the data against the real-world), but will prevent many of the basic quality issues that are commonly encountered. A number of rules may be controlled automatically, thus for example, it is possible to check that a SERVICE JOURNEY has PASSING TIMEs for each stop, and that these are plausibly spaced; but other quality measures cannot necessarily be checked. For example, the lack of a STOP PLACE name can be detected, as can the use of a duplicate, but not whether it is actually the correct one in use in the real-world.

NeTEx versions

The EPIP is specified for the revised version 1.1 of NeTEx, issued in 2019. It may also be used with the original version 1.0 of NeTEx, issued in 2014, though certain elements are of course lacking.

If recourse to the NeTEx specification is needed, it is strongly recommended that the 1.1 version is used as it contains numerous clarifications and corrections to the original 1.0 document.

1 Scope

This document is a profile of CEN/TS 16614 series. It focuses on information relevant to feed passenger information services and excludes operational and fares information.

NeTEx is dedicated to the exchange of scheduled data (network, timetable and fare information) based on Transmodel V6 (EN 12986) and SIRI (CEN/TS 15531-4/5 and EN 15531-1/2/3) and supports information exchange of relevance to public transport services for passenger information and AVMS systems.

As for most data exchange standards, defining subsets of data and dedicated rules for some specific use case is of great help for implementers and for the overall interoperability. This subset is usually called profile and this profile targets passenger information as only use case.

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, *Road transport and traffic telematics - Public transport - Reference data model (Transmodel) Parts 1 to 9*

CEN/TS 16614-1, *Network and Timetable Exchange (NeTEx) - Network description*

CEN/TS 16614-2, *Network and Timetable Exchange (NeTEx) - Timing information*

CEN/TS 16614-3, *Network and Timetable Exchange (NeTEx) - Fare description*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 12896 (Transmodel V6) and CEN/TS 16614 (NeTEx) and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at https://www.iso.org/obp
- IEC Electropedia: available at http://www.electropedia.org/

3.1
attribute
property of an entity

3.2
conceptual data model
description of a real-world domain in terms of entities, relationships and attributes, in an implementation independent manner

Note 1 to entry: It should provide a structure on which the rest of the development of an application system can be based.