



BSI Standards Publication

# Public transport — Network and Timetable Exchange (NeTEx)

Part 3: Public transport fares exchange format

**National foreword**

This Published Document is the UK implementation of CEN/TS 16614-3:2016.

The UK participation in its preparation was entrusted to Technical Committee EPL/278, Intelligent transport systems.

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

© The British Standards Institution 2016.  
Published by BSI Standards Limited 2016

ISBN 978 0 580 90066 2

ICS 35.240.60

**Compliance with a British Standard cannot confer immunity from legal obligations.**

This Published Document was published under the authority of the Standards Policy and Strategy Committee on 31 March 2016.

**Amendments/corrigenda issued since publication**

Date	Text affected
------	---------------

---

TECHNICAL SPECIFICATION  
 SPÉCIFICATION TECHNIQUE  
 TECHNISCHE SPEZIFIKATION

**CEN/TS 16614-3**

March 2016

ICS 35.240.60

English Version

**Public transport - Network and Timetable Exchange  
 (NeTEx) - Part 3: Public transport fares exchange format**

Transport public - Echange des données de réseau et d'horaires (NeTEx) - Partie 3 : Format d'échange d'informations voyageurs concernant le réseau de transport public

Öffentlicher Verkehr - Netzwerk und Fahrplan Austausch (NeTEx) - Teil 3: Austauschformat für die Fahrkartenauskunft des öffentlichen Verkehrs

This Technical Specification (CEN/TS) was approved by CEN on 17 August 2015 for provisional application.

The period of validity of this CEN/TS is limited initially to three years. After two years the members of CEN will be requested to submit their comments, particularly on the question whether the CEN/TS can be converted into a European Standard.

CEN members are required to announce the existence of this CEN/TS in the same way as for an EN and to make the CEN/TS available promptly at national level in an appropriate form. It is permissible to keep conflicting national standards in force (in parallel to the CEN/TS) until the final decision about the possible conversion of the CEN/TS into an EN is reached.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.



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

**CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels**

## Contents

Page

European foreword.....	5
Introduction .....	6
1 Scope.....	7
1.1 General.....	7
1.2 Fares scope .....	7
1.3 Transport modes.....	7
1.4 Compatibility with existing standards and recommendations .....	8
2 Normative references .....	8
3 Terms and definitions .....	8
4 Symbols and abbreviations .....	25
5 Use Cases for Fare Exchange .....	25
5.1 Purpose.....	25
5.2 Business context.....	25
5.2.1 Fare planning process .....	25
5.3 Actors and use case types.....	31
5.3.1 General.....	31
5.3.2 Use Cases for Fare Policy .....	33
5.3.3 Use Cases for Organisation of Fare Policy Usage .....	33
5.4 Excluded Use Cases .....	33
5.5 Use Cases .....	34
5.5.1 Collection of Use Cases .....	34
6 Generic Physical Model and XSD mapping rules.....	61
7 Public Transport Fares – Conceptual and physical data model .....	61
7.1 Conceptual Model overview .....	61
7.1.1 Functional Domains .....	61
7.1.2 Data Model Overview.....	63
7.1.3 Main Concepts .....	65
7.2 Fare Model dependencies .....	70
7.2.1 NeTEx Part3 Use Case Version Frames.....	74
7.2.2 Fare Frame.....	75
7.3 Reusable Fare Components.....	92
7.3.1 Fare Zone .....	92
7.3.2 Fare Facility .....	112
7.4 Fare Structure.....	114
7.4.1 Fare Structure – Model dependencies .....	114
7.4.2 Common Fare Structure.....	115
7.4.3 Geographical Fare Structure .....	122
7.4.4 Time Fare Structure .....	132
7.4.5 Quality Fare Structure .....	140
7.4.6 Fare Structure Element.....	150
7.4.7 Distance Matrix Element .....	178
7.4.8 Validable & Controllable Elements.....	191
7.5 Access Rights Description .....	202
7.5.1 Access Right Parameters .....	204

7.5.2	Fare Product.....	314
7.6	Pricing.....	356
7.6.1	Fare Calculation Parameters .....	356
7.6.2	Fare Price.....	371
7.6.3	Fare Table.....	382
7.7	Sales Description .....	400
7.7.1	Fare Sales Distribution .....	400
7.7.2	Fare Travel Document .....	411
7.7.3	Fare Sales Package .....	418
8	Sales Transactions.....	440
8.1	General .....	440
8.2	Sales Transaction – Model dependencies .....	440
8.3	Sales Transaction Frame – Conceptual MODEL .....	443
8.3.1	Sales Transaction Frame – Physical Model.....	444
8.3.2	Sales Transaction Frame – Attributes and XSD.....	444
8.3.3	Fare Contract.....	445
8.3.4	Retail .....	456
8.3.5	Sales Transaction.....	461
Annex A	(normative) Extensions to NeTEx Part1 & 2.....	475
A.1	Introduction .....	475
A.2	Enhancement to Part 1 Model.....	475
A.2.1	Organisation delegation relationship .....	475
A.2.2	Alternative Name Package .....	476
A.2.3	Booking Arrangements.....	478
A.2.4	Booking Arrangements.....	479
A.2.5	Generic Assignment Package.....	479
A.2.6	Generic Layer Model.....	481
A.2.7	Generic Validity Condition Model.....	485
A.3	Enhancement to Part 2 Model.....	486
A.3.1	Vehicle Journey Assignment.....	486
A.4	Alignment of Part 1 and Part 2 Attributes .....	489
A.4.1	Part 1 - Framework –Version 2 Validity MODEL.....	489
A.4.2	Part 1 – Framework – Responsibility MODEL.....	492
A.4.3	Part 1 – Framework – Location MODEL.....	494
A.4.4	Part 1 – Framework – Reusable Components MODEL.....	500
A.4.5	Part 1 – Network Description MODEL .....	513
A.4.6	Part 1 – Tactical Planning Components MODEL .....	519
A.4.7	Part 1 – Fixed Objects MODEL .....	530
A.4.8	Part 2 – Journeys, Times & Service MODEL .....	547
Annex B	(informative) ERA – TAP TSI annexes B1, B2 and B3 mapping.....	562
B.1	Summary of mapping of B1 (NRT) fares.....	562
B.2	Summary of mapping of B2 (IRT) fares .....	562
B.3	Summary of mapping of B3 (Special) fares .....	563
Annex C	(informative) NeTEx Passenger Information Query model .....	564
C.1	PiQuery.....	564
C.1.1	PI Query dependencies.....	564
C.1.2	PiQuery.....	568
Annex D	(informative) How to go from a trip (from NeTEx Part1&2) to a fare ?.....	610
D.1	Passenger Trip.....	610
D.1.1	Passenger Trip Model .....	610

<b>D.1.2 Passenger Fare Model</b> .....	<b>618</b>
<b>Annex E (informative) Proposed model for Parking Tariff</b> .....	<b>622</b>
<b>E.1 Parking Tariff</b> .....	<b>622</b>
<b>E.1.1 Parking Tariff – Conceptual MODEL</b> .....	<b>622</b>
<b>Bibliography</b> .....	<b>627</b>

Currently in preview, click buy full version

## European foreword

This document (CEN/TS 16614-3:2016) 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 [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

This document presents Part 3 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.

This Technical Specification is made up of three parts defining a single European Standard series, which provides a complete exchange format for public transport network, 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 timetable exchange format.
- Part 3 is the description of the fare information exchange format.

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

The XML schema can be downloaded from [www.netex.org.uk](http://www.netex.org.uk), along with available guidance on its use, example XML files, and case studies of national and local deployments.

NOTE This document is highly technical, and a special care has been taken to keep the text readable. In particular a set of formatting conventions is followed that enhance the usual CEN writing rules in order to distinguish references to elements of the formal models within text:

- Transmodel terms and NeTEx conceptual model elements are in capital letters (JOURNEY PATTERN for example).
- NeTEx physical model names are in bold italic font and use camelcase style with no spaces (***JourneyPattern*** for example).
- NeTEx physical model 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 organizations of the following countries are bound to announce this Technical Specification: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, 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; publicising fares, issuing tickets and receipts; providing real-time information on service running, and so on.

The first two parts of the European Technical Specification NeTeX specifies a Network and Timetable Exchange for Public Transport. It is intended to be used to exchange data relating to scheduled public transport between the systems of PT organizations. It can also be seen as complementary to the SIRI (Service Interface for Real-time Information) standard, as SIRI needs a prior exchange of reference data from NeTeX's scope to provide the necessary context for the subsequent exchange of real-time data.

This European Technical Specification (NeTeX – Part 3) specifies exchanges of Public Transport fares between systems and organisations. It is a complement to the Parts 1 and 2 in the sense that it uses a subset of concepts defined there.

Well-defined, open interfaces have a crucial role in improving the economic and technical viability of Public Transport Information Systems of all kinds. Using standardised 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 insecurely dependent function.

This standard will improve 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: (i) introducing common architectures for message exchange; (ii) introducing a modular set of compatible information services, (iii) using common data models and schemas for the messages exchanged for each service; and (iv) introducing a consistent approach to data management.

Technical advantages include the following: a modular reusing of 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.

## 1 Scope

### 1.1 General

NeTEx is dedicated to the exchange of scheduled data (network, timetable and fare information). It is based on Transmodel V5.1 (EN 12986), IFOPT (EN 28701) and SIRI (CEN/TS 15531-4, CEN/TS 15531-5 and EN 15531-1, EN 15531-2, EN 15531-3<sup>1</sup>) and supports the exchange of information of relevance for passenger information about public transport services and also for running Automated Vehicle Monitoring Systems (AVMS).

**NOTE** NeTEx is a refinement and an implementation of Transmodel and IFOPT; the definitions and explanations of these concepts are extracted directly from the respective standard and reused in NeTEx, sometimes with adaptations in order to fit the NeTEx context. Although the data exchanges targeted by NeTEx are predominantly oriented towards provisioning passenger information systems and AVMS with data from transit scheduling systems, it is not restricted to this purpose and NeTEx can also provide an effective solution to many other use cases for transport data exchange.

### 1.2 Fares scope

This Part 3 of NeTEx, is specifically concerned with the exchange of fare structures and fare data, using data models that relate to the underlying network and timetable models defined in Part 1 and Part 2 and the Fare Collection data model defined in Transmodel V5.1. See the use cases below for the overall scope of Part 3. In summary, it is concerned with data for the following purposes:

- (i) To describe the many various possible fare structures that arise in public transport (for example, flat fares, zonal fares, time dependent fares, distance based fares, stage fares, pay as you go fares, season passes, etc., etc.).
- (ii) To describe the fare products that may be purchased having these fare structures and to describe the conditions that may attach to particular fares, for example if restricted to specific groups of users, or subject to temporal restrictions. These conditions may be complex.
- (i) To allow actual price data to be exchanged. Note however that NeTEx does not itself specify pricing algorithms or how fares should be calculated. This is the concern of Fare Management Systems. It may be used to exchange various parameters required for pricing calculations that are needed to explain or justify a fare.
- (iii) To include the attributes and the text descriptions necessary to present fares and their conditions of sale and use to the public.

NeTEx should be regarded as being 'upstream' of retail systems and allows fare data to be managed and integrated with journey planning and network data in public facing information systems. It is complementary to and distinct from the 'downstream' ticketing and retail systems that sell fares and of the control systems that validate their use. See 'Excluded Use Cases' below for further information on the boundaries of NeTEx with Fare Management Systems.

### 1.3 Transport modes

All mass public transport modes are taken into account by NeTEx, including train, bus, coach, metro, tramway, ferry, and their submodes. It is possible to describe airports, air journeys, and air fares, but there has not been any specific consideration of any additional requirements that apply specifically to air transport.

---

<sup>1</sup> Under development