PD ISO/TR 17185-2:2015

BSI Standards Publication

Intelligent transport systems — Public transport user information

Part 2: Public transport data and interface standards catalogue and cross references

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National foreword

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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.

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Published by BSI Standards Limited 2015

ISBN 978 0 580 89941 6
ICS 03.220.01; 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 December 2015.

Amendments/corrigenda issued since publication

Date	Text affected

PD ISO/TR 17185-2:2015

TECHNICAL REPORT

ISO/TR 17185-2

First edition
2015-12-01

Intelligent transport systems — Public transport user information —

Part 2: Public transport data and interface standards catalogue and cross references

Systèmes intelligents de transport — Informations destinées aux utilisateurs des transports publics —

Partie 2: Données sur les transports publics, et catalogue des normes relatives aux interfaces et références croisées

Reference number
ISO/TR 17185-2:2015(E)

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Foreword

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The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2. www.iso.org/directives

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For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information

The committee responsible for this document is ISO/TC 204, *Intelligent transport systems.*

ISO 17185 consists of the following parts, under the general title *Intelligent transport systems — Public transport user information*:

— *Part 1: Standards framework for public information*

— *Part 2: Public transport data and interface standards catalogue and cross references*

— *Part 3: Use cases for journey planning systems and their inter-operation*

Introduction

With the multiple standards that are deployed around the world to provide passenger information, ISO/TC 204 sees a need to identify the range of information provision available to the public. Some of the standards comprise messages and/or services that cover the full scope of the public transport planning and operations enterprise, while others address a narrow scope of passenger information, such as schedule information or bus arrival time prediction.

ISO/TC 204 saw a need to create a catalogue that shows the range and extent of the collection of standards and specifications available. Furthermore, the group identified a need to show the similarities and differences among these standards and specifications for several reasons, for example:

— to match like concepts and messages,

— to understand the overlaps, differences and missing requirements,

— to extend narrow-based standards using the concepts and interfaces developed by the enterprise-based standards.

This Technical Report will be beneficial for all ISO/CEN member countries, as well as non-member countries. It will be a valuable catalogue to help understand the content of the currently available national and regional standards (identified in ISO 17185 Part 1), such as Transmodel, TCIP, Korean ATIS and Japanese ATIS. The intention is that, by deploying these existing national and regional standards from other countries or regions, duplication of cost and time in developing new standards and specifications can be avoided. For those countries that do not have surface public transport information standards, this approach allows the mix and match of standards from different regions, as well as rapid development and deployment that can enhance the usability and convenience of public transport anywhere in the world.

This Technical Report is intended to be fully consistent with those currently available national and regional standards which may be related to international surface public transport. It is designed to serve as a look-up table for developers for the terminology used in different regions for the same concept. For example, the term “trip” in TCIP and GTFS is called “service journey” in Transmodel. This catalogue will expose the differences in language for developers who need to translate data from one standard to another. Principally, this Technical Report, and its scope and approach, will help lower the barriers for developers who need to mix standards; for countries that need to choose the best approach to deploy public transport systems; and, ultimately, for the public wanting a seamless public transport experience wherever they travel.

As Andrew S. Tanenbaum said, “The nice thing about standards is that you have so many to choose from”.[1)] This report fully endorses that principle.

1) *Computer Networks*, 2nd ed., p. 254

TECHNICAL REPORT **ISO/TR 17185-2:2015(E)**

Intelligent transport systems — Public transport user information —

Part 2: Public transport data and interface standards catalogue and cross references

1 Scope

This Technical Report compares and contrasts public transport standards that were developed by different regions and countries. It uses the CEN Transmodel classes as a reference to compare standard data concept descriptions of public transport user information. The purpose of this Technical Report is to understand the concepts described by existing standards and specifications that cover public transport passenger information.

2 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

NOTE Equivalent TCIP or Transmodel term is identified for reference.

2.1
attribute
property of an entity

[SOURCE: CEN EN12896; p. 16 (ref 1), modified — Note 1 has been added.]

Note 1 to entry: Equivalent terms in TCIP / Transmodel: data element (TCIP).

2.2
class
concept within [a] system being modelled

[SOURCE: The Unified Modeling Language Reference Manual; p. 185 (ref 3), modified — Notes 1 and 2 have been added.]

Note 1 to entry: Equivalent terms in TCIP / Transmodel: data concept [US TCIP].

Note 2 to entry: Similar to entity, represents a set of objects with similar behaviour and properties.

2.3
data concept
any of a group of data dictionary structures (i.e., object class, property, value domain, data element concept, data element, data frame, message, interface dialogue, association) referring to abstractions or things in the natural world that can be identified with explicit boundaries and meaning and whose properties and behavior [sic]all follow the same rules

[SOURCE: ISO 14817, p. 3 (ref 4), modified — Note 1 has been added.]

Note 1 to entry: Equivalent terms in TCIP / Transmodel: object, class, entity (Transmodel); data element, data frame (TCIP).

2.4
data element
atomic piece of information related to a person, place, thing, or concept (for example, CPT-PersonFirstName and CPT-Footnote)

[SOURCE: APTA-TCIP-S-01 3.0.3; p. 32 (ref 2), modified — Note 1 has been added.]

Note 1 to entry: Equivalent Terms in TCIP / Transmodel: attribute (Transmodel).

2.5
data frame
grouping of data elements primarily for the purpose of referring to a group with a single name, and thereby efficiently reusing groups of data elements that commonly appear together (as an ASN.1 SEQUENCE, SEQUENCE OF or CHOICE) in a TCIP message

[SOURCE: APTA-TCIP-S-01 3.0.3; p. 32 (ref 2), modified — Notes 1 and 2 have been added.]

Note 1 to entry: Equivalent Terms in TCIP / Transmodel: Sub model (as in a "diagram") in Transmodel [CEN-Transmodel].

Note 2 to entry: This data concept type may also be used to specify groups of data elements for other purposes as well. A data frame may contain other data frames as well as data elements.

2.6
dialog
ordered sequence of message exchanges between two or more entities

[SOURCE: APTA-TCIP-S-01 3.0.3; p. 33 (ref 2), modified — Notes 1 and 2 have been added.]

Note 1 to entry: Equivalent Terms in TCIP / Transmodel: no equivalent in Transmodel.

Note 2 to entry: The rules of the exchange are defined by a dialog pattern. Messages specific to the type of exchange are specified by the dialog.

2.7
entity
object (data) that has its own existence (as opposed to an attribute)

[SOURCE: The Unified Modeling Language Reference Manual; p. 16 (ref 3), modified — Notes 1 and 2 have been added.]

Note 1 to entry: Equivalent Terms in TCIP / Transmodel: data concept (TCIP).

Note 2 to entry: Similar to object and class.

2.8
message
grouping of data elements and/or data frames intended to be transmitted as a complete package of information in one direction

[SOURCE: APTA-TCIP-S-01 3.0.3; p. 39 (ref 2), modified — Note 1 has been added.]

Note 1 to entry: Equivalent Terms in TCIP / Transmodel: no equivalent in Transmodel.

2.9
object
discrete entity with a well-defined boundary and identity that encapsulates state and behavior; an instance of a class

[SOURCE: The Unified Modeling Language Reference Manual; p. 360 (ref 3), modified — Notes 1 and 2 have been added.]

Note 1 to entry: Equivalent Terms in TCIP / Transmodel: data concept (TCIP).

Note 2 to entry: Similar to class and equivalent to an entity.

3 Abbreviated terms

ADPU	Application Protocol Data Unit (in the context of smart cards)
APTA	American Public Transportation Association
ATIS	Advanced Traveller Information System
CEN	Comité Européen de Normalization
CFMS	Contactless Fare Media System
csv	Comma separated values
EU	European Union
GTFS	General Transit Feed Specification (formally known as the Google Transit Feed Specification)
ID	Identification or identifier
IEC	International Electrotechnical Commission
IFOPT	Identification of Fixed Objects in Public Transport, a preliminary CEN Technical Specification, CEN standard, EN 28701:2009, that provides a Reference Data Model for describing the main fixed objects required for public access to Public transport.
ISO	International Organization for Standardization
ISO/TC 204	ISO Technical Committee 204 on Intelligent transport systems
N/I	Not included
NeTEx	NeTwork and Timetable Exchange. (CEN/TS 16614-, –2, –3). A CEN Technical Specification in XML, based on Transmodel v6 and IFOPT, providing exchange messages for space- and fare-, time-related data.
NTCIP	National Transportation Communications for Intelligent Transportation System Protocol (US Intelligent Transportation System standards body)
Pi	Passenger information
PICC	Proximity Integrated Circuit Card
PICS	Profile Implementation Conformance Statement
PRL	Profile Requirements List
PT	Public Transport
PTV	Public Transport Vehicle
SIRI	Service Interface for Real Time Information (EN 15531–1 to 3 and TS15531–4 and 5). A CEN protocol in XML, based on Transmodel that specifies services about public transport real-time services and vehicles, such as vehicle monitoring, stop monitoring, and more.
SQL	Sequential Query Language
TBT	Technical Barriers to Trade

TCIP	Transit Cooperative Interface Profiles
UML	Unified Modelling Language
UTC	Coordinated Universal Time
UTFS	Universal Transit Fare System
WSDL	Web Services Descriptive Language
XML	Extensible Markup Language

4 Objectives from a data catalogue and cross reference document

The objectives of this catalogue are to:

— Facilitate and promote international cooperation in the area of world-wide public transport (PT) standard activities.

— Encourage the PT industry to adopt a coherent and consistent reference data model standard for PT where PT operators will benefit from a larger market base, lowering costs and enhancing inter-operability among the systems they procure.

— Enhance economic trade by enabling standards to apply across country boundaries.

— Support PT to build interoperable applications that will work across country boundaries.

In addition, there are many countries that do not have national standards for traveller information. It is hoped that this catalogue will define the scope of functions that are currently defined, and the areas needing further work to support PT passengers.

5 Methodology

5.1 Business plan and survey

This Technical Report was conceived in 2006 as part of a business plan and an initial survey (see Annex A). The business plan included the following:

— Purpose of developing a data catalogue of worldwide standards on public transportation information.

— Benefits to national standards bodies.

— Justification for the data catalogue.

— Project work plan.

— Resources needed.

In addition, a survey for collecting information was attached to the business plan. The survey results are described in this Technical Report.

5.2 Public transport standards typology

As part of earlier discussions between CEN TC 278 WG 3 and ISO TC 204 (from 2000 to 2002), a set of criteria was defined to compare the TCIP and Transmodel standards. Three measures were defined:

— Equivalence: implies the elements are the same.

— Similarity: elements are similar, that is they overlap in some areas and differ in others.

— Difference: elements are different and are not reconcilable.

In this context, an element was described as a "data element or attribute, or data concept or entity". However, the purpose of the two standards is fundamentally different and, over the ensuing years, they have moved further apart in terms of their use and application.

In partitioning standards, ISO and other standards bodies are developing "abstract" versus "implementation" standards. Furthermore, wide adoption of internet standards and information technology best practices has helped modularize standards into different classes.

Table 1 — Information service standards' typology

	Service invocation (method)	**Information transfer**
Implementation specifications [how]	**Interface:** TCIP Protocol Interface Compliance Specification (Protocol Requirements List) (Volume IV) / NTCIP 2306 Center to Center Web Services SIRI NeTEx Korean ATIS	**Encoding:** TCIP XML Schema (Volume III) SIRI XML Schema NeTEx GTFS
Abstract model [what]	**Behaviour:** TCIP Building Blocks (patterns) (Volume I) SIRI NeTEx	**Content:** Transmodel SIRI NeTEx TCIP Data Dictionary/ Data Frames/ Data Messages / Dialogs (Annexes A – D)

Generally, the difference between an abstract model and implementation specification is "*what* is the domain?" versus "*how* is it designed and implemented?" The abstract model describes the content (semantics), logical relationships and completeness of the business domain, while the implementation specification documents describe the design for a specific technology based on how a part of the domain will be implemented. For example, there are several ways of invoking an exchange to acquire data (such as, SQL, web services and messaging services) and there are several encoding formats to access the data, including comma separated value file format (csv), XML or protocol buffer.

The reason to segment the standards space into the various categories is to illustrate the differences between the content, behaviour and implementation approaches of these standards. Transmodel, which is used as the reference model, is not a standard that can be implemented out of the box. It is an abstract data model whose data concepts (and the relationships between the data concepts) help users understand the business rules that apply to implementable standards. Transmodel captures the domain rules in a logical, consistent manner.

Given this classification framework, Transmodel is positioned as an abstract model that describes the semantics and business rules. Other standards, like TCIP, are implementation standards that include syntax (data formats) and some semantics. TCIP also includes behavioural specifications, that is, how information is exchanged in a business to business messaging environment. Most implementation standards, like TCIP, do not explicitly define a data model which describes entities/objects, logical relationships and business rules consistent with data modelling methodology. By mapping the implementation standards to an abstract standard, the implementation standard achieves the benefits of the semantic inter-operability of the data model.

The detailed mapping creates a catalogue on several levels of resolution. These include the following:

— typology (abstract/implementation; semantic/behaviour);

— business area;

— data concept;

— data concept attribute.

In addition, some responses of the survey included conformance and testing approaches, approaches to handling data versioning and measuring data quality. In many cases, conformance statements and tests are similar since the base standards upon which the public transport standard is based are the same, for example, XML. For that reason, conformance approaches show the similarities and collaborative methods that an implementer may use to integrate multiple message standards.

6 Public transport standard description results

6.1 Public transport standard overview

The survey included 10 sections. The sections requested three types of information: general information on the standards and its lineage; detailed information on the content of the standard with respect to a reference standard; and conformance and quality/versioning requirements associated with implementation of the standard. Specifically, the 10 topics addressed were as follows:

1. Name.
2. Standard type (see Table 1).
3. Scope.
4. History and ongoing maintenance schedule.
5. Methodology and approach to development.
6. Business areas covered (mapping to Transmodel and TCIP business areas).
7. Conformance and interoperability with other standards (e.g. XML, IEEE 1512).
8. Conformance provisions.
9. Handling of data version (temporal aspects of data).
10. Handling of data quality (metadata aspects).

The reference standard that was used as the cross reference was Transmodel because it provides a comprehensive abstract model of the PT data across most business areas, including data semantics and business rules. Some standards go beyond Transmodel (such as TCIP), however, only in a few areas.

6.2 Mapping of Transmodel artefacts to regional standards

6.2.1 Areas mapped to Transmodel

Although the detailed data concept and attribute mapping only covers PT passenger information, some standards include many more business areas. This clause includes four areas where elements of Transmodel are mapped to regional standards:

— General information (no mapping);

— Business areas (includes all business areas beyond the scope of this Technical Report);

— Data concepts and attributes;

— Conformance.

6.2.2 General standard information

The general information related to each standard incorporated in the catalogue included the following questions.

1. What is the standard name?
2. What type is the standard? Semantics/message/abstract/implementation?
3. What is the scope of the standard?
4. What year was the standard published?
5. Has the standard been implemented?
6. Who published the standard?
7. What was the methodology used to develop the standard?
8. Please list a short history of the development process:
9. Please describe the ongoing maintenance:

China	
What is the standard name?	Data Bus Interface Communication Specification of Intelligent Service Terminal for City Bus and Trolley-Bus Data Communication Protocol between Intelligent Service Terminal for City Bus and Trolley-Bus and Control Center
What type is the standard? Semantics/message/abstract/implementation?	Data format, data frame, message frame, public transport information gathering/ publishing/ exchanging between intelligent service terminal and expansion of peripheral as well as control centre.
What is the scope of the standard?	Data Bus Interface Communication Specification of Intelligent Service Terminal for City Bus and Trolley-Bus defines the system construction, interface specification between intelligent service terminal and expansion of peripheral for city bus and trolley-Bus. Data Communication Protocol between Intelligent Service Terminal for City Bus and Trolley-Bus and Control Center defines the communication protocol, communication connection, message handling, data format, information gathering/ publishing/ exchanging between intelligent service terminal on the city/trolley-Bus and control centre.
What year was the standard published?	Data Bus Interface Communication Specification of Intelligent Service Terminal for City Bus and Trolley-Bus: cd Data Communication Protocol between Intelligent Service Terminal for City Bus and Trolley-Bus and Control Center: 2012/11/05
Has the standard been implemented?	Data Communication Protocol between Intelligent Service Terminal for City Bus and Trolley-Bus and Control Center: implemented since 2013/04/01 Data Communication Protocol between Intelligent Service Terminal for City Bus and Trolley-Bus and Control Center: will be implemented in 37 transit cities this year.
Who published the standard?	Data Communication Protocol between Intelligent Service Terminal for City Bus and Trolley-Bus and Control Center: implemented since 2013/04/01 Data Communication Protocol between Intelligent Service Terminal for City Bus and Trolley-Bus and Control Center: will be implemented in 37 transit cities this year.
What was the methodology used to develop the standard?	Defining the public transport information communication and interface specification between intelligent service terminal and expansion of peripheral as well as control centre for city bus and trolley-Bus.
Please list a short history of the development process:	Proposed in February 2013, started on November 2013, form the draft in 2014 and now collecting advices.

China	
Please describe the ongoing maintenance:	Collect advice from the industry to update the standard.

Japan	
What is the standard name?	Standards for Public Transport Information
What type is the standard? Semantics/message/abstract/implementation?	Data format for gathering/publishing/exchanging public transport information
What is the scope of the standard?	Defining the elements and attributes of data format for gathering/publishing/exchanging public transport information
What year was the standard published?	XML1.1ver. 2006
Has the standard been implemented?	Approx. 150 high way bus operators have adopted since 2006
Who published the standard?	Ministry of Land, Infrastructure and Transport
What was the methodology used to develop the standard?	Defining the elements and attributes of data format for static and real-time public transport information
Please list a short history of the development process:	Start study data format in 1997 First field trials to provide bus static information in Yokohama (1997) and Okinawa (2000) Field trials to provide static and real-time information in Sapporo (2000), Gifu/Hiroshima (2002), Nagoya (2004), Kyoto (2005) and Fukuoka/Ooita (2006) Large scale field trials have been carried out in 150 high way bus operators since 2006
Please describe the ongoing maintenance:	Reviewing field trial results and planning for improvements of data format

Korea	
What is the standard name?	Technical Regulation of Bus Information Exchanges (C2C)
What type is the standard? Semantics/message/abstract/implementation?	Messages for exchanging between bus information centers
What is the scope of the standard?	Defining the messages and protocols of information for exchanging bus manage centers (local governments)
What year was the standard published?	"Enacted by MLTM in November 2005
Has the standard been implemented?	Revised in March 2010"
Who published the standard?	Yes. Approx. 60 bus operators have adopted since 2004
What was the methodology used to develop the standard?	Ministry of Land, Transport and Maritime Affairs
Please list a short history of the development process:	Consensus
Please describe the ongoing maintenance:	"MLTM & standardization organization have been studied interfaces and data format since 2000.

US – Transit Communications Interface Profiles	
What is the standard name?	APTA TCIP-S-001 3.0.0, APTA Standard for Transit Communications Interface Profiles
What type is the standard? Semantics/message/abstract/implementation?	Semantics and Message
What is the scope of the standard?	
What year was the standard published?	2006
Has the standard been implemented?	
Who published the standard?	American Public Transportation Association
What was the methodology used to develop the standard?	Consensus
Please list a short history of the development process:	Initially developed by NTCIP (1400 Series), Later replaced by APTA version which incorporated additional material.

US – Transit Communications Interface Profiles	
Please describe the ongoing maintenance:	

NEPTUNE –AFNOR French Ticketing Codification	
What is the standard name?	Profil d'echange NEPTUNE – AFNOR French Ticketing Codification reference NF P 99–506
What type is the standard? Semantics/message/abstract/implementation?	data and message format linked to a data model (Transmodel 4.1 and IFOPT)
What is the scope of the standard?	This data exchange profile has the objective to describe precisely all the data elements necessary for a thorough description of the public transport offer (space and time-related data) in order to be able to present this information to the users in a homogeneous way, independently from the media (internet, paper) and also to exchange this information between multimodal information systems.
What year was the standard published?	2009
Has the standard been implemented?	yes, around 50 (reference implementation together with the software CHOUETTE www.chouette.mobi)
Who published the standard?	AFNOR
What was the methodology used to develop the standard?	standard based on an UML data model and XSD/XML for the data exchange structure and protocol
Please list a short history of the development process:	This standard is based on the European specification TRIDENT (2002), based on Transmodel V4.1. The current version incorporates several features of the IFOPT standard (EN 28701) such as equipment, accessibility and stop typology.
Please describe the ongoing maintenance:	maintenance in ensured by the working group in charge of this particular topic (gt7 of AFNOR CN03)

Service Interface for Realtime Information (SIRI CEN)	
What is the standard name?	Service Interface for Realtime Information (SIRI) EN 15531–1 — Business case EN 15531–2 — Communication EN 15531–3 — Services TS 15531–4 - Facility monitoring service TS 15531–5 - Situation exchange service
What type is the standard? Semantics/message/abstract/implementation?	Data and message format linked to a data model (Transmodel 5.1)
What is the scope of the standard?	SIRI is an exchange format for real-time information about PT services, vehicles, events and facilities. SIRI defines very broadly the concept of real time as being any changes to the information introduced after the timetable publication (SIRI's information scope being limited to one single day). The most widely known SIRI service provides the estimated passing time at a specific stop (Stop Monitoring Service. But SIRI offers many other services: General Messaging Service, Vehicle Monitoring Service, Situation Exchange, Facility Monitoring, Production Timetable Service, Estimated Timetable Service, Stop Timetable Service, Connection Timetable Service and Connection Monitoring Service.
What year was the standard published?	2006
Has the standard been implemented?	Yes, all over Europe, and also worldwide (US, Israel…)
Who published the standard?	CEN TC278/WG3/SG7
What was the methodology used to develop the standard?	Conceptual model relying on Transmodel. SIRI offers a set of Web services (SOAP) for accessing the information. Initially targeted exchanges are mainly inter-system communication (AVMS to passenger information system for example), and SIRI 2 (2014) has completed it with the ability to communicate with end user's devices (mainly mobile phones and web browsers).

Service Interface for Realtime Information (SIRI CEN)	
Please list a short history of the development process:	To provide operators and manufacturers a standard framework to exchange data concerning public transport real time information, CEN TC278/WG3/SG7 decided to launch the SIRI project (Service Interface for Real-time Information) in 2004. It now replaces national standard like RTIG, VDV453, etc.
Please describe the ongoing maintenance:	Maintenance in ensured by CEN TC278/WG3/SG7

Network and Timetable Exchange (NeTEx CEN)	
What is the standard name?	Network and Timetable Exchange CEN/TS 16614–1 Network description CEN/TS 16614–2 Timing information CEN/TS 16614–3 Fare description
What type is the standard? Semantics/message/abstract/implementation?	Data and message format linked to a data model (Transmodel 6)
What is the scope of the standard?	NeTEx is an XML based exchange format and a set of services dedicated to scheduled public transport data. It is based on Transmodel and IFOPT and designed for most public transport business needs, covering passenger information systems, planning systems, AVMS (Automated Vehicle Monitoring Systems) and fare management systems. NeTEx is divided into three parts: • Part 1: network topology (networks, lines, routes, stops, connections and geographic element, etc.). NeTEx Part 1 also provides a framework and reusable objects used by all the other parts. • Part 2: timing information (vehicle journeys passing times, day types, calendars, etc.). • Part 3: Description of the tariff offer (fare product, access rights, usage parameters, prices, etc.).
What year was the standard published?	2014
Has the standard been implemented?	Fast starting implementation (France, Italy, Germany, Netherlands, etc.)
Who published the standard?	CEN TC278/WG3/SG9
What was the methodology used to develop the standard?	Conceptual mode relying on Transmodel. NeTEx shares is communication protocol with SIRI and offers a set of Web services (SOAP) for accessing the information and also a REST based lite access.
Please list a short history of the development process:	To provide operators and manufacturers a European wide standard framework to exchange data concerning public transport scheduled information, CEN TC278/WG3/SG7 decided to launch the NeTEx project in 2009.
Please describe the ongoing maintenance:	Maintenance in ensured by CEN TC278/WG3/SG9

6.2.3 Mapping of business areas

The survey included comparison of each regional standard's business processes relative to Transmodel. The Transmodel business processes include the following:

— network description;

— versions, validity and layers;

— tactical planning;

— schedules and versions;

— vehicle scheduling;

— driver scheduling;

— personnel disposition;

— rostering;

— passenger information;

— operations monitoring and control;

— fare collection;

— management information;

— multimodal operation in public transport;

— multimodal operators' environment.

The business area definitions are described in Transmodel [CEN-Transmodel, pp., 18-204].

Most of the standards are narrowly scoped or segmented into many sets of standards. Similar to Transmodel, TCIP is broadly scoped and provides similar if not of slightly broader scope. Table 2 shows the relationship of the standards included in this catalogue compared to Transmodel's business areas. A more detailed comparison between Transmodel and TCIP detailed business processes is included in Annex C.

Table 2 — Business areas compared to Transmodel

Transmodel business package	US-TCIP	Japan	US-CFMS	AFNOR	Korea	GTFS	SIRI	NeTEx
network description	Spatial Data Management Processes	Not Included (N/I)	N/I	X	N/I	N/I	N/I	X
versions, validity and layers	(Limited) Data Configuration	N/I	N/I	X	N/I	N/I	X	X
tactical planning	Scheduling Process	N/I	N/I	X	N/I	N/I	N/I	X
schedules and versions	Scheduling Process	N/I	N/I	X	N/I	N/I	X	X
vehicle scheduling	Scheduling Process	N/I	N/I	N/I	N/I	N/I	N/I	X
driver scheduling	Personnel and Work Assignment Process	N/I	N/I	N/I	N/I	N/I	N/I	N/I
personnel disposition	Personnel and Work Assignment Process	N/I	N/I	N/I	N/I	N/I	N/I	N/I
Rostering	Personnel and Work Assignment Process	N/I	N/I	N/I	N/I	N/I	N/I	N/I
passenger information	Customer Information Process	YES	N/I	X	X	X	X	X
operations monitoring and control	PTV Operations Process	YES	N/I	N/I	X	X	X	N/I
fare collection	Fare Collection (this portion not balloted)	N/I	yes – limited	X	N/I	N/I	N/I	X
management information	Data Repository Operations Process (limited)	YES	N/I	N/I	N/I	N/I	N/I	N/I
multimodal operation in public transport	Limited (covered in related business areas)	N/I	N/I	X	N/I	N/I	X	X
multimodal operators' environment	Limited (covered in related business areas)	N/I	N/I	X	N/I	N/I	X	X
operations management [a]	Security and Incident Management Process	N/I	N/I	N/I	N/I	N/I	X	N/I
	Onboard Vehicle Systems Interactions	N/I	N/I	N/I	N/I	N/I	N/I	N/I
	Transit Signal Priority	N/I	N/I	N/I	N/I	N/I	N/I	N/I

[a] Incident management is partly included in operations management

6.2.4 Mapping of data concepts and attributes

Data concepts or "classes" are clearly described by Transmodel. They are more difficult to extract from messaging standards. Topological concepts like STOP POINT are defined by messaging standards in a manner similar to Transmodel. For example, a stop point is described by Transmodel as "A POINT where passengers can board or alight from vehicles" [CEN-Transmodel, 247]. Messaging standards use almost the same description of the topological point. However, there are messages such as Bus Location Information (BusLocationInfo, Korea TR Message) where the definition is a reflection of attributes rather than a conceptual description. More specifically, a one to one data concept mapping is difficult and needs to be defined as a Transmodel Class and Attribute correlation in most cases. To that end, the mapping between specific Transmodel classes and data concepts are not included in this Technical Report, but defined as a detailed Class-Attribute mapping.

The attribute mappings are listed in Annex B.

Mapping of each regional standard is included in a separate Annex as follows:

— Annex C: Korean ATIS;

— Annex D: TCIP;

— Annex E: Japanese ATIS;

— Annex F: GTFS;

— Annex G: NeTEx. (Note that NeTEx is entirely based on Transmodel/IFOPT.);

— Annex H: SIRI.

Additionally, Annex I contains definitions of Transmodel classes that are related to the provision of public transport information. Although many of the concepts are not used by other international standards, they augment the vocabulary of entities available to describe public transport services.

6.2.5 Description of conformance

Standards conformance testing shows how a system or implementation meets the requirements of the standard. As illustrated in Table 1, a standard may be based on or constrain another standard, and may in turn also be constrained. Similarly, many data messaging standards use multiple standards to describe the semantics, behaviour, coding structure and syntax defined by other standards. Description of conformance includes the conformance statement which details the requirements for implementation, and one or more base standards upon which the conformance rests. For example, many data messaging standards now use web services which are based on XML (XML schema) and Web Services Descriptive Language (WSDL). For each standard in the catalogue, Table 3 includes the conformance statement (if available), and the base standard(s) used to specify the data/message.

Table 3 — Conformance

Standard name	Conformance statement	Base standard
GTFS	Meets the requirements in the GTFS files as described by "File Requirements" https://developers.google.com/transit/gtfs/reference	ObjectType for GTFS-realtime CSV for GTFS
Japan	Specification for standard data format for public transport information.	XML
Korea	Technical Regulation of BUS Information Exchanges (C2C)	ASN.1
NEPTUNE -AFNOR	http://www.chouette.mobi/wp-content/uploads/CHOUETTE_Validation_resume-glossaire-1.pdf http://www.chouette.mobi/neptune-validation/v20/fr/	XML Schema

Table 3 *(continued)*

Standard name	Conformance statement	Base standard
NeTEx	Conformance requirements are specified for France (not available online for now). Tools will be soon available within CHOUETTE: http://www.chouette.mobi/	XML/XSD SOAP (with WSDL) REST and JSON
SIRI	"Conformance requirements are specified (for France): http://www.normes-donnees-tc.org/wp-content/uploads/2014/05/Profil_Siri_IDF_V2-4-STIF-20130712.pdf Reference implementation is available: http://www.chouette.mobi/"	XML/XSD SOAP (with WSDL) REST and JSON
US- CFMS	Part 5 of the Standard, Compliance Certification and Testing.	XML for messages between an Agency Central System or sub system and a Regional Central System (clearinghouse). — ISO/IEC 14443 for PICC to card reader communications. — ISO 7816 for PICC ADPU commands. — ISO 3166 for country codes.
US-TCIP	Provide Profile Requirements List (PRL) or Profile Implementation Conformance Statement (PICS) describing tailoring performed (within allowed parameters). Provide all mandatory parameters in messages, and optional parameters as specified in the PICS/PRL. Messages must conform to the TCIP XML Schema, and those of other related standards (e.g. XML). Messages must be sent and received according to the requirements in the pattern definitions for the specified dialog patterns, or according to specified requirements for file transfers. Specified message attributes must be provided.	XML Schema

A range of European standards are based on Transmodel: VDV 452 (Germany), NOPTIS (Sweden), NEPTUNE (France), TransXchange (UK). The mapping may be found in the NeTEx documentation.

7 Assessment

Since this analysis reviewed PT standards of which all or part dealt with the passenger information business area, this review shows only a small slice of their common elements. The areas of greatest commonality included topological concepts such as STOP POINT, ROUTE, LINE, and BLOCK, their physical coordinates (POINT), and the scheduled and estimated time (arrival/departure) associated with the stop point (DATE PASSING TIMES and ESTIMATED PASSING TIME). Additionally, the agency (AUTHORITY or OPERATOR) and the vehicle tracked (VEHICLE and VEHICLE DETECTING) are critical elements to assign to the physical, topological and service concepts.

The concepts mapped to the Transmodel classes and associated attributes that are listed in Table 4. (Note: since NeTEx is an implementation of Transmodel, only the data concept mappings to the other standards are included in the table.)

Table 4 — Mapping to Transmodel classes and attributes

Transmodel class	Transmodel attributes	Standard mapping
ACTUAL VEHICLE EQUIPMENT		SIRI, NeTEx
AUTHORITY or OPERATOR	AuthorityID, authorityName, authorityRef	GTFS, TCIP, SIRI, NeTEx
alightingActivity		GTFS, NeTEx
BEACON POINT, ACTIVATION POINT		Korea ATIS, NeTEx
BLOCK	identifier reference blockRef	GTFS, TCIP, SIRI, NeTEx
boardingActivity		GTFS, NeTEx, NeTEx
CONNECTION LINK	from stop fromStopRef, duration (several types)	GTFS, SIRI, NeTEx
COURSE OF JOURNEYS	id	SIRI, NeTEx

Table 4 *(continued)*

Transmodel class	Transmodel attributes	Standard mapping
DATA SYSTEM		SIRI, NeTEx
DATED BLOCK		SIRI, NeTEx
DATED PASSING TIMES		TCIP, KOREA ATIS, SIRI, NeTEx
DATED VEHICLE JOURNEY		SIRI, NeTEx
DESTINATION DISPLAY		SIRI, NeTEx
DAY OF WEEK		GTFS, NeTEx
DAY TYPE		GTFS, TCIP, NeTEx
DETECTED DIRECTION		TCIP, NeTEx
DETECTED OPERATION		TCIP, NeTEx, NeTEx
DIRECTION		GTFS, SIRI, NeTEx
ESTIMATED PASSING TIME	ESTIMATED ARRIVAL TIME, ESTIMATED DEPARTURE TIME, EXPECTED WAIT TIME	KOREA ATIS, TCIP, SIRI, NeTEx
FOOTNOTE		TCIP, SIRI, NeTEx
JOURNEY PATTERN	POINT IN JOURNEY PATTERN(:POINT(Id)):TIMETABLED PASSING TIME (timetabled departure time, timetabled arrival time, timetabled waiting time) FOOTNOTE:FOOTNOTE ASSIGNMENT JOURNEY PATTERN:SERVICE PATTERN:STOP POINT IN JOURNEY PATTERN:STOP POINT JOURNEY PATTERN:SERVICE PATTERN:STOP POINT IN JOURNEY PATTERN:STOP POINT JOURNEY PATTERN:VEHICLE JOURNEY:DAY TYPE	TCIP, SIRI, NeTEx
LINE id	lineId, lineRef, lineLongName, lineShortName, description	JAPAN ATIS, GTFS, SIRI, NeTEx
LINK DISTANCE	routeLinkDistance	GTFS, NeTEx
LINK SEQUENCE	sequence	GTFS, NeTEx
LOCATION	coordinate	GTFS, SIRI, NeTEx
MEAN PASSENGER WAIT TIME	duration	GTFS, NeTEx
MODE		GTFS, NeTEx
MONITORED VEHICLE JOURNEY		TCIP, SIRI, NeTEx
NETWORK VERSION	Name	GTFS, TCIP, NeTEx
ROUTE		TCIP, NeTEx
OBSERVED PASSING TIME		SIRI, NeTEx
PASSENGER QUERY	(id)	TCIP, NeTEx
PASSING TIME TIMETABLED ARRIVAL TIME	arrivalTime, departureTime	GTFS, TCIP, NeTEx
PASSING TIME	id, alight, reboard	TCIP, SIRI, NeTEx
PERIOD	endTime, *startTime, startDate, endDate*	GTFS, NeTEx
PLACE	Start of, End of	TCIP, NeTEx
POINT	ID, name, Coordinates, location attribute coordinates	GTFS, JAPAN ATIS KOREA ATIS, TCIP, SIRI, NeTEx
POINT IN JOURNEY PATTERN		TCIP, NeTEx
PT TRIP		TCIP, NeTEx
RIDEs IN PT TRIP		TCIP, NeTEx
ROUTE	Id, DIRECTION, NAME	TCIP, GTFS, KOREA ATIS, JAPAN ATIS, SIRI, NeTEx
ROUTE LINK	DISTANCE linkDistance	GTFS, NeTEx
ROUTE PROJECTION	identifier reference routeRef	GTFS, NeTEx

Table 4 *(continued)*

Transmodel class	Transmodel attributes	Standard mapping
SEQUENCE	stopSequence	GTFS, NeTEx
SERVICE JOURNEY		SIRI, NeTEx
SERVICE JOURNEY INTERCHANGE	Duration minimumTransferTime, advertised	GTFS, SIRI, NeTEx
SERVICE PATTERN	(Id)	KOREA ATIS, NeTEx
STOP PLACE ELEMENT	(Identifier of) (will be Assigned to a SCHEDULED STOP POINT) stopPlaceId	GTFS, NeTEx
STOP PLACE	StopPointCode, Description, name	GTFS, NeTEx
STOP POINT	ID, NAME, for alighting, for boarding	GTFS, KOREA ATIS, TCIP, JAPAN ATIS, SIRI, NeTEx
STOP POINT IN JOURNEY PATTERN	NAME	TCIP, SIRI, NeTEx
TARGET PASSING TIME		SIRI, NeTEx
TIMETABLE VERSION		SIRI, NeTEx
TRANSPORT MODE		TCIP, SIRI, NeTEx
TRIP OPTIMIZATION QUERY	OPTIMIZATION MODE, PASSENGER QUERY (PLACE-destination, origin)	TCIP, NeTEx
TRIP PATTERN	Id, (Ordered list of PT TRIPs)	TCIP, NeTEx
TYPE OF EVENT	Description, id	JAPAN ATIS, KOREA ATIS, NeTEx
TYPE OF SERVICE		SIRI, NeTEx
VALIDITY CONDITION	conditionId, conditionRef	GTFS, SIRI, NeTEx
VEHICLE DETECTING	Id, time stamp, type,	JAPAN ATIS, KOREA ATIS, SIRI, NeTEx
VEHICLE JOURNEY	identifier vehicleJourneyId, vehicleJourneyRef	GTFS, SIRI, NeTEx
VEHICLE	Id, vehicle registration number	JAPAN ATIS, KOREA ATIS, NeTEx
VERSION		SIRI, NeTEx
VERSION FRAMEs:	NETWORK VERSION FRAME, TIMETABLE VERSION FRAME	TCIP, SIRI, NeTEx

Annex A
(informative)

Business plan and survey: Detailed mapping of Transmodel and regional standards

A.1 Purpose and need for a catalogue of worldwide standards on public transport information

The purpose of this business plan is to justify the need for and develop program elements for developing a catalogue of worldwide standard on public transport information. The catalogue will not only list the standards that address public transport information concepts and exchange, but will also compare these standards with respect to a reference data model, list of attributes, conformance, extensibility, and maintenance. In particular, this project will enable ISO/TC 204, as well as the worldwide public transport industry, to assess the consistency and coherence of existing public transport information standards with a high level conceptual view. A significant obstacle to promulgating standards in the international arena is the absence of a reference that ensures that regionally deployed standards may be exchanged among systems of different national "flavours". This effort will provide a baseline that describes the similarities, differences, sameness and inconsistencies between existing regional and national public transport standards and a reference standard. In developing the catalogue, the worldwide public transport industry will adopt a model from which future regional and international standards may be deployed.

The selection of the standard reference model is an important consideration. To date, there are few national or regional models that have been widely adopted with the breadth and scope to meet the needs of ISO/TC 204. Transmodel (Transmodel), developed by the European Union (CEN TC 278 WG 3), is the most comprehensive and widely accepted model throughout Europe and, as such, should be used as the baseline by which other regional and national standards efforts are compared. While it has been validated for a large number of public transport operators in Europe, this effort will show Transmodel's strengths and weaknesses with respect to its global applicability. In showing its relevance to PT practice, Transmodel may be promulgated as an ISO standard.

A.2 Benefits by region

The benefits to each of the participating national standard bodies are significant. Since a project such as this effort requires commitment and resources from each participant, each participant was asked about the benefits that they expect to derive from such an effort. This section includes benefit statements from many major national stakeholders. Among the delegations included are:

- Canada;
- France;
- Ireland;
- Japan;
- Korea;
- Norway;
- South Africa;
- United Kingdom;

- United States.

A.2.1 Canada benefits statement

This project would be an important source of input for a project now getting underway in Canada. In Quebec, some studies and experiments have been undertaken to define interoperability in the exchange of information amongst various public transit authorities in different regions. However, for now, this work cannot be characterized as standards development work. A new project with this as a goal is now under development. A detailed description of the similarities and differences between TCIP and Transmodel would be a significant benefit tor this project. It would also be beneficial to establish some comparisons with road network information systems that already exist and to review the lessons learned from their implementation.

A.2.2 France benefits statement

(1) Follow-up of the worldwide acceptance of Transmodel (or parts of it) in order to preserve to the extent possible the investment already made:

— The investment made by the French Ministry of Transport, over a decade to develop the Reference Data Model for Public Transport, now brings recognized benefits for the French Public Transport community with several information systems based on this norm; this investment shall be preserved and any new data model extensions shouldn't be contradictory to the current reference;

— The French Standardisation Mirror Group recognizes the importance of technical exchanges at the ISO level, particularly before the revision of the current version in year 2011, in order to be aware of / to collect the needs of other countries and to disseminate the norm worldwide.

(2) Partition of Transmodel into submodels / profiles: the existence of a User's Guide presenting profiles for particular Use Cases may be useful for Transmodel users, provided this work is generic.

The following Use Cases have been cited as being of interest:

— Tactical planning of operations (elaboration of driver / vehicle schedules),

— Operations follow-up (follow up of drivers' work / vehicle performance),

— Passenger information (provision of planned and actual timetables),

— Passenger information (trip planning and passenger guidance – in particular guidance of Visually Impaired Persons),

— Passenger information /safety and security aspects – guidance for passengers and various emergency management and first responders (police, assistance, help, etc.) through complex stops,

— Fare collection (sales of fare products, follow-up of sales and consumption of fare products).

Several Use Cases will rely not only on Transmodel, but also on the technical specification IFOPT (Identification of Fixed Objects in Public Transport) developed within CEN TC278 WG3, in particular on the Stop Place Model.

Potential Use Cases that extend Transmodel have been identified as being of interest to France:

— Demand responsive systems,

— Vehicle fleet management.

A.2.3 Ireland benefits statement

The work of creating the catalogue is of great importance in facilitating inter-operability of many transport-related systems and the secure sharing of data.

A.2.4 Japan benefits statement

The standard public transport information data format has been developed in Japan by the Ministry of Land, Infrastructure and Transport, The major purpose is efficient information provision to the public transport users. The real-time information and fixed information become easily available to the public transport users by using this standard data format. Currently, it is mainly used in bus operators to exchange data efficiently between bus operators and information providers, in addition to the information provision to the bus users. There are several bus operators who even provide real time transfer information between other transport modes.

A main purpose of the standardization of the information data format is efficiency improvement of the information exchange among bus operators and information providers.

The enhancement of information contents, such as access information for the physically handicapped person, real-time transfer information, the route guide, etc. is being planned.

Without having standard basic reference model, developing the standards is time consuming and the confirmation of the optimal solution could not easily be examined.

If the reference basic models based on the Transmodel (Transmodel) are defined and become available, the efficiency of the standardization work will be improved.

Moreover, with referring to those similar existing standards in other nations and regions, the standard development work can be simplified and work load can be decreased, and the standards can be developed in shorter time frame.

A.2.5 Korea benefits statement

We (Korea) have developed and are developing various Public Transport (PT) standards for obtaining interoperability in the PT domain. But due to the lack of a basic reference model for these standards, we have perpetrated inconsistency and conflicts among our standards as well as our standardization activities. In this situation, we need a reference framework standard or specification that provides a foundation for coordinating and understanding of our ongoing standardization efforts. PT objects are the representations of real world actors in the domain of public transit, if we make a general reference standard that includes PT actors (objects/classes), their attributes and relationships in the ISO level, the anticipated benefits are as follows:

— enable an understanding of the contents and meaning of the data across domains and thus promote the sharing of data among different applications;

— promote the efficient, effective and economic use of PT information and associated hardware and software systems;

— contribute to a unified approach to addressing world-wide PT problems.

A.2.6 Norway benefits statement

Norway supports a standards catalogue on Public Transport (PT) information. PT is already, and will also in the future, be a very important part of the worldwide effort to reduce the emissions from individual road transport. To increase the use of PT, the availability, reliability and the quality of PT services has to be improved. New Information and Communication Technologies (ICT) as well as information exchange between PT systems will build the basis for such improvements.

Lots of resources have already been spent to achieve interoperability in regional PT systems. This also includes the Norwegian interoperable electronic ticketing systems now being implemented as well as a national and multi-modal travel planner for public transport. Information exchange is a key word here and a standards catalogue on information exchange will be used as valuable input to the continuous work on developing and improving PT ICT services.

A.2.7 South Africa benefits statement

This project will assist South Africa who is in the stage of adopting a number of ITS standards. There are a number of large ITS projects not only in Public Transport but in traffic management and traffic control as well that are currently being planned and implemented.

A catalogue of nature will assist the country with very stretched resources to quickly identify and access appropriate standards for adoption and implementation.

A.2.8 United Kingdom benefits statement

The UK view is that Transmodel is a universally applicable data reference model, and the proposed catalogue is expected to endorse that view and to provide indications of where other local data models (where they exist in any formal sense) might be mapped to Transmodel. It will also provide a basis for the many information systems that have no data model to recognize the modelling structure which is implicit in those systems, mapping them to the concepts in Transmodel. In so doing the work to create the catalogue will help to provide an extended international validation of Transmodel (and an indication of any areas which require further development to meet needs and approaches not previously identified elsewhere) - and it is expected to secure a worldwide commitment to the adoption and maintenance and enhancement of Transmodel as a universal data reference model for public transport - thereby capitalizing on the considerable European investment that has already been made in it over the past 15-years.

A.2.9 United States benefits statement

A standards catalogue will enable the US transit industry to measure the scope and details of TCIP with respect to standards being developed world-wide. A significant outcome would be a detailed description of the similarities and differences between TCIP and Transmodel. A preliminary analysis has shown that Transmodel is richer in describing the semantics (meaning) and relationships among data concepts, while TCIP is richer in describing the attributes of the data concepts and more formal in describing syntax (format and organization) of messages and dialogs. Interoperability requires both formal semantic, syntactic message descriptions, and a defined sequence for exchanging messages. The US transit industry will benefit from a conceptual view of transit data as described by Transmodel, a conceptual view that defines referential integrity rules and validity checks that are associated with a semantic model.

A.3 Justification for ISO work

This effort will result in significant benefits for international standards development. The effort will:

— Facilitate and promote international cooperation in the area of worldwide public transport standard activities.

— Encourage the PT industry to adopt a coherent and consistent Reference Data Model standard for PT where operators will benefit from a larger market base, lowering costs and enhancing interoperability among the systems they procure.

— Enhance economic trade by enabling standards to apply across country boundaries.

— Support PT to build interoperable applications that will work across country boundaries.

A.4 Project work plan

The Project work plan (hereafter referred to as the Plan) addresses the tasks required to develop a catalogue of worldwide standards on public transport information. The Plan consists of education, outreach and technical analysis. The education and outreach effort will focus on articulating the objectives and benefits of the effort for the PT industry and soliciting input from national delegations. The technical analysis effort will focus on comparing the various national information exchange

standards with Transmodel, as well as summarizing information related to other categories of standard development practice.

— Task 1: Outreach/Education:

  — Develop materials that explain the purpose, objectives and benefits of the project to recruit participation by national delegations.

  — Identify contact persons in national delegations who will assume responsibility for participating in the effort.

  — Invite and offer one or more workshops on Transmodel and method for comparing it with a public transport information exchange standard. (This activity should be paired with the output from Task 2).

  — Provide technical assistance from Transmodel experts.

— Task 2: Scope of mapping:

  — For the purpose of prioritizing resources, identify target business areas for analysis.

  — Develop and approve criteria and methods for analysis.

  — Select validation and analysis teams.

  — Update survey (see Annex B for preliminary survey).

— Task 3: Mapping regional standards:

  — Acquire survey results from national / regional standard experts. (Note: each national body should complete survey on their national / regional standard.)

  — Support delegations in completing surveys, particularly in comparing data concepts and attributes from their standard to Transmodel.

  — Collect and compile surveys.

  — Analyze and validate findings.

  — Discuss and approve analysis in working group.

— Task 4: Impacts on Transmodel and regional standards:

  — Document findings in draft Technical Report (see Annex A for catalogue outline).

  — Submit new project (working draft).

  — Review comments on new project.

  — Submit committee draft.

  — Review comments on committee draft.

  — Prepare presentation(s).

  — Present to ISO/TC 204 and other national standard bodies as needed.

— Task 5: Alternatives to harmonize Transmodel and regional standards:

  — Describe alternative approaches for harmonizing worldwide standards.

  — Develop a report on the alternative approaches and a plan for moving forward.

  — Working group considers Plan for moving forward.

A.5 Deliverables

- Task 1
  - outreach flyer (benefits and objectives)
  - workshop materials
- Task 2
  - survey and instructions
  - criteria and methods paper
- Task 3
  - survey submittals (and compiled surveys)
  - survey analysis (presentation / paper)
- Task 4
  - executive presentation on Technical Report
  - draft Technical Report catalogue (new project)
  - respond to new project comments
  - draft Technical Report catalogue (committee draft)
  - respond to committee draft comments
  - publish final Technical Report catalogue
- Task 5
  - harmonization options report
  - plan for moving forward

A.6 Schedule

	4/08	7/08	10/08	1/09	4/09	7/09	10/09	1/10	1/10	4/10	7/10	10/10	1/11
Task\Month	0	3	6	9	12	15	18	21	24	27	30	33	36
Task 1 workshops	x		x		x								
Task 1 Tech Asst													
Task 2 Criteria													
Task 3 Complete Survey													
Task 3 Analysis													
Task 4 TR draft													
Task 4 NP													
Task 4 CD													
Task 4 TR final													x
Task 5 Options Report													
Task 5 Plan													

A.7 Resources needed

This section describes the types of contributions requested of national and regional delegations as well as the skills of individuals allocated to the effort. The resources needed to achieve this effort may be substantial depending on the number of standards that are submitted for inclusion in the catalogue.

A.7.1 Contributions from national delegations

Contributions from the delegations include:

- Identify applicable standards that meet the criteria for inclusion in the catalogue.
- Assign individual responsibility for participation in meetings and discussions.
- Assign individual responsibility for completing survey (see experience and expertise of volunteers for skill set requirements).
- Complete survey (see Annex B).
- Review ISO/TC 204 validation and analysis.
- Review Technical Report.
- Participate in alternatives report and plan for moving forward discussions.

This list does not preclude a delegation from offering additional services and contributions. Some delegations may not have resources for fully completing the survey. However, it is worthwhile to

identify related national standards that fall within the scope of catalogue (sections 1 through 3 of the survey) even if resources are not available to complete survey sections 4 and 5.

In applying ISO policy, the descriptions and analysis will be documented in English.

A.7.2 Experience and expertise of participants

The persons assigned to the two major roles should represent their national delegations. The individual assigned responsibility for completing the survey should understand their national information standards and be familiar with Transmodel functional requirements, data concepts and attributes. In addition, it would be helpful if they are familiar with how to transform a conceptual data model to an implementation representation. Transmodel and ISO/TC 204 experts will be available to provide technical support as needed.

A.8 Survey for catalogue data collection

1. Contact information

Contact Name
Contact Address
Country (Developed Standard)
Contact Email

2. Development process information

What is the standard name?
What type is the standard? [semantics/message/abstract/implementation]
What is the scope of the standard?
What year was the standard published?
Has the standard been implemented?
Who published the standard?
What was the methodology used to develop the standard?
Please list a short history of the development process.
Please describe the ongoing maintenance.

3. Business area comparison

Please associate and compare your standard's business processes to the Transmodel. list all that apply. Add new cells to your standard business processes that are not covered by Transmodel.

Transmodel Business Package
Network Description
Versions, Validity And Layers
Tactical Planning
Schedules and Versions
Vehicle Scheduling
Driver Scheduling
Personnel Disposition
Rostering
Passenger Information
Operations Monitoring And Control
Fare Collection
Management Information
Multimodal Operation in Public Transport
Multimodal Operators' Environment

4. Data concept comparison

Please associate and compare your standard's data concepts/entities/classes to the Transmodel. List all that apply. Add new cells to your standard data concepts that are not covered by Transmodel.

(See data concept list in database/spreadsheet.)

5. Attribute comparison

Please associate and compare your standard's attributes to the Transmodel. list all that apply. Add new cells to your standard attributes that are not covered by Transmodel.

(See attribute list in database/spreadsheet.)

6. Conformance requirements

Please list Conformance Requirements for the standard
Please list base standards used (e.g., XML)

Annex B
(informative)

US transit communications interface profiles comparison to Transmodel high level business areas

The high level business area comparison shows the similarities between Transmodel and TCIP across all business areas. The detailed topics are grouped into different categories. Table B.1 shows the detailed subprocesses that are mapped from TCIP to Transmodel. In the first two columns the bolded lettering signifies the high level process while the subprocesses are included below the process names. For example, the TCIP Spatial Data Management Process contains four subprocesses: Data Creation or Collection; Maintenance and Management of Spatial Data; Geoprocessing; and Data Output and Distribution. Transmodel's similar or equivalent Network Description subprocesses include:

- Elements of Topology;
- Infrastructure Description;
- Restrictions;
- Combined Diagram on Topology;
- Additional Aspects to Point;
- Generic Network Concepts;
- Combined Diagram on Generic Network Concepts;
- Network Linear Features;
- Combined Diagram on Network Linear Features;
- Projection;
- GDF Interface.

The last column describes the differences between the two standards.

Table B.1 — TCIP and Transmodel high level business area comparison

TCIP Business Processes	Transmodel Requirements and Business Packages	Comparison between TCIP/Transmodel
Spatial Data Management Process Data Creation or Collection Maintenance and Management of Spatial Data Geoprocessing Data Output and Distribution (based on geographic standards such as ISO 19100- series and OGC/GML, including the Location Referencing Message Specification and GML's GeoSpatial One-Stop specifications)	**Network description** Elements of Topology Infrastructure Description Restrictions Combined Diagram on Topology Additional Aspects to Point Generic Network Concepts Combined Diagram on Generic Network Concepts Network Linear Features Combined Diagram on Network Linear Features Projection GDF Interface	TCIP based on ISO 19100- series abstract and implementation standards. Transmodel interfaces with GDF and defines a similar spatial abstract model (although not as complete) as the ISO 19100-series standards. CEN IFOPT contains information on geo-spatial information related to public transport domain-specific locations.
(The **Data Configuration Management** includes similar procedures related to managing version "tables" such as metadata associated with "rows".	**Versions, validity and layers** Version Frames Versions Other Aspects Combined Diagram on Versions Explicit Versions	Transmodel and TCIP both enable versioning of artefacts or entities.

Table B.1 *(continued)*

TCIP Business Processes	Transmodel Requirements and Business Packages	Comparison between TCIP/Transmodel
Scheduling Process Data Gathering for Schedule Writing Developing Scheduling Products Distributing Scheduling Products	**Tactical planning** components Days Journeys Standard Times Journey Times Driver Trips Interchanges Timing Computation of a Journey **Schedules and versions** Main Types of Schedules and Versions Combined Schedules and Versions **Vehicle scheduling** Tactical Resource Planning Resources for Tactical Planning Vehicle Planning Vehicle Requirements	The relevant content of TCIP is similar, which does not support the route groupings.
Personnel and Work Assignment Management Process Operator Assignment Definition Pick Process Distribution of Bound Assignments Changes to Operator Assignments	**Driver scheduling** Duties Other Aspects of Duties Personnel disposition Driver Assignments Driver Accounting Rostering Roster Matrices Roster Cycles Roster Designs Roster Assignments	Similar in scope

Table B.1 *(continued)*

TCIP Business Processes	Transmodel Requirements and Business Packages	Comparison between TCIP/Transmodel
Asset Management Process PTV Pull In to Garage Fuelling/Servicing Cleaning Scheduled Service and Inspections Unscheduled Maintenance Overhaul/Contactor/Manufacturer Maintenance Garage Parking Management & Vehicle Assignment Pull Out Subprocess En Route Failures Synchronization/Calibration		Not included in Transmodel
Customer Information Process Customer Information Subprocesses Customer Pretrip Planning Itinerary Generation Other Planning Data Printed Planning Material Customer Information-Station/Stop Subprocess Inform Passengers Subprocess Customer Information – Ongoing Subprocess Customer Complaints Inform Customers Ongoing Subprocess – Lost and Found Customer Information Ongoing Subprocess – Customer Subscriptions and Profiles	**Passenger information** Provision of Information Spatial Information Timetable Information Passenger Trip Planning Estimation of Trip Duration Other Information	TCIP supports distribution of marketing materials and lost/found processes.

Table B.1 *(continued)*

TCIP Business Processes	Transmodel Requirements and Business Packages	Comparison between TCIP/Transmodel
PTV Operations Process Preparation for Vehicle Operations Normal PTV Operations Exceptions to Normal Operations Close Out of Normal Operations Non PTV Closeouts Security and Incident Management Process Management Planning Management Process Preparation Stage Management Process Incident Detection, Classification, and Verification Stage Notification Stage Response Stage Recovery Stage Follow Up Stage	**Operations monitoring and control** Dated Operational Plans Resource Detection and Monitoring Vehicle Assignments Monitored Operations Control Actions Events Messages	Although TCIP covers a broader scope in its process description, it covers the same scope as Transmodel with respect to data concepts.
Revenue and Fare Collection Process	**Fare collection**	Not reviewed
Data Repository Operations Process Data Storage Data Validation Data Integration Reporting and Archiving Data Distribution	**Management information** Service Journey Performance Recorded Use of Services Multi-modal Operation in Public Transport Domain Definition and Limits Network Description Resource Management Vehicle Coupling Operations Other Aspects	TCIP covers the requirements of the data repository, not the content, whereas Transmodel covers the performance data and its representation. TCIP covers many of the Transmodel concepts in other business processes although not as conceptual models.
Transit Signal Priority Process		Not covered by Transmodel

Table B.1 *(continued)*

TCIP Business Processes	Transmodel Requirements and Business Packages	Comparison between TCIP/Transmodel
	Multi-modal operation in public transport Network Description Resource Management Vehicle Coupling Operations Other Aspects	TCIP covers many of these elements in other business processes.
	Multiple operators' environment Owners and Users of Resources and Network Information from Different Sources Interchanges Fare Collection Functions	TCIP covers some of these elements in other areas such as owners/users of resources within the data frames and messages.

Annex C
(informative)

Korea ATIS Class-Attribute comparison to Transmodel

This Annex provides a mapping of Transmodel to the Korean ATIS standard.

Table C.1

TM Class Name	TM Definition	TM Sub-type of	TM Key	TM Attribute	TM Opt	Korea Standard Class Name	Korea Standard Attribute	Compare
BEACON POINT	A POINT where a beacon or similar device to support the automatic detection of vehicles passing by is located.	ACTIVATION POINT				NodeZoneID	ID	
ESTIMATED PASSING TIME	Time data, calculated from the latest available input, about when a public transport vehicle will pass a particular POINT IN JOURNEY PATTERN on a specified MONITORED VEHICLE JOURNEY. These are mainly used to inform passengers about expected times of arrival	DATED PASSING TIME	.	EXPECTED ARRIVAL TIME	Y	AccesspointArrivalTime	seconds	
POINT	A 0-dimensional node of the network used for the spatial description of the network. POINTs may be located by a LOCATION in a given LOCATING SYSTEM.		#	ID	N	LastBITIdentify	ID	
ROUTE	An ordered list of located POINTs defining one single path through the road (or rail) network. A ROUTE may pass through the same POINT more than once.		#	ID	N	SubRouteIdentity RouteGuide	ID	
ROUTE			.	NAME	Y	SubRouteName	NAME(OPTION)	
STOP POINT	A POINT where passengers can board or alight from vehicles.		.	FOR ALIGHTING	Y	BITIdentify	ID	
STOP POINT			.	FORBOARDING	Y	BITIdentify	ID	
TYPE OF EVENT	A classification of EVENTs (e.g. ALARMs, INCIDENTs) according to their cause of effect.		#	ID	N	IncidentType	code	Break down, Accident, emergency, incident in vehicle, control, permit
VEHICLE	A public transport vehicle used for carrying passengers.		#	ID	N	PTVehicleID	ID	
VEHICLE DETECTING	An activity consisting in the identification of a vehicle at a certain time by a detection device and of collecting crude data such as an absolute location of the vehicle.		#	ID	N	PTVehicleCoordinate	GPS Data(OPTION)	
VEHICLE DETECTING			.	TIMESTAMP	N	PTVehicleCollectedTime	TIME(OPTION)	

Annex D
(informative)

TCIP Class-Attribute comparison to Transmodel

This Annex provides a mapping of Transmodel classes to TCIP messages/frames and data elements. Descriptions of each column are:

— Transmodel Class: the name of the concept or a derived concept from the data model.

— Transmodel diagram number: Data model that shows the relationships among Transmodel entities.

— TCIP Message or Frame: The message that conveys a concept or service.

— TCIP Data Element: A TCIP attribute that is part of a message.

— Comparison / Comment: Describes how Transmodel maps to the TCIP concept.

Six TCIP Messages and Frames were used to compare TCIP Passenger Information concepts to Transmodel. They include:

— ATIS:BoardingInstructions (message).

— PIItineraryFareSub (frame).

— PIScheduleAdherenceCountdown (message).

— PiTextTimetable (message).

— PiTripItineraryListSub (frame).

— SubRoute (frame).

— PiTripItineraryList (message).

Each TCIP attribute of a message or frame is mapped to a Transmodel class. Since TCIP is rich in attributes and Transmodel in entities, Transmodel concepts are captured within its data model. A *derived* relationship implies that the Transmodel concept may be understood through the relationship between entities rather than a single entity.

Table D.1

Transmodel Class	Transmodel diagram number	TCIP Message or Frame	TCIP Data Element	Comparison / Comment
<derived>	D.48 PASSENGER TRIPS	PiTripItineraryListSub	cost	Derived from fare collection; summary based on each leg and transfer business rules (rights) — see Prices, D.54; (depends on fare structure); relate to journey pattern
ACCESS LINK	D.48 Passenger Trips	ATIS:BoardingInstructions	Other information (getTransfer, furtherData)	Derived from D.48 Passenger Trips (from ACCESS LINK and/or CONNECTION LINK)
AUTHORITY or OPERATOR	D60	PiTextTimetable	agencyID	(refer to D.60 Responsibility of Service)
AUTHORITY or OPERATOR	D60	ATIS:BoardingInstructions	Agency information (agencyName, agencyID)	[refer to D.60 Responsibility of Service]
DATED PASSING TIMES	D41, D47	PIScheduleAdherenceCountdown	tolerance	May be derived from OBSERVED PASSING TIME and ESTIMATED PASSING TIME/ TARGET PASSING TIME depends what "tolerance" is meant. Might be an additional attribute of ESTIMATED PASSING TIME
DETECTED DIRECTION	D14 or D41	PIScheduleAdherenceCountdown	routeDirection	
DETECTED OPERATION	D41	PIScheduleAdherenceCountdown	available-seats	
DETECTED OPERATION (event, etc.)	D.48 PASSENGER TRIPS	SubRoute	other info: prime mode, otherEvents, traffic, weather, events, startTime, endTime, estimatedCost	
ESTIMATED PASSING TIME:estimated arrival time	D.48 PASSING TIMES	PIScheduleAdherenceCountdown	nextArrivalCurrentLocation	For the next stop in the POINT IN JOURNEY PATTERN
ESTIMATED PASSING TIME:estimated departure time	D41, D47	PIScheduleAdherenceCountdown	estimated-departure	
ESTIMATED PASSING TIME:expected wait time	D41, D47	PIScheduleAdherenceCountdown	nextArrivalCountdown	Next vehicle to arrive at stop and ESTIMATED PASSING TIME: expected wait time
FOOTNOTE	D46,D22	PIScheduleAdherenceCountdown	bulletins	text assigned either to a JOURNEY PATTERN or to a COMMON SECTION or to a POINT IN JOURNEY PATTERN and defined for specific VALIDITY CONDITIONS
FOOTNOTE:FOOTNOTE ASSIGNMENT:JOURNEY PATTERN	D.48 PASSING TIMES	PiTextTimetable	Note information (route-text)	see FOOTNOTE
JOURNEY PATTERN:MONITORED VEHICLE JOURNEY:ESTIMATED PASSING TIME(expected arrival time, expected departure time, expected waiting time)	D41, D47	ATIS:BoardingInstructions	Situational Status information (estimatedDelay, overallStatus)	Refer to D.41 Detection and Monitoring; D47
JOURNEY PATTERN:POINT IN JOURNEY PATTERN(:POINT(Id)):TIMETABLED PASSING TIME (timetabled departure time, timetabled arrival time, timetabled waiting time)	D.48 PASSING TIMES	PiTextTimetable	Trip time information (timepointID, timepointName, times)	

Table D.1 *(continued)*

Transmodel Class	Transmodel diagram number	TCIP Message or Frame	TCIP Data Element	Comparison / Comment
JOURNEY PATTERN:POINT IN JOURNEY PATTERN:TIMETABLED PASSING TIME (timetabled departure time, timetabled arrival time, timetabled waiting time)	D47	ATIS:BoardingInstructions	Timing information (boardingTime, departureTime, arrivalTime)	
JOURNEY PATTERN:SERVICE PATTERN:STOP POINT IN JOURNEY PATTERN:STOP POINT	IFOPT - Stop Point Assignment	ATIS:BoardingInstructions	Stoppoint information (platformNumber, gateNumber, stoppoint)	(which is equal to the POINT IN JOURENY PATTERN)
JOURNEY PATTERN:VEHICLE JOURNEY:DAY TYPE	D25-26	PiTextTimetable	Service Day Information (day-types, day-type-description)	(refer to D.26-D.27)
MONITORED VEHICLE JOURNEY	D41	PIScheduleAdherenceCountdown	vehicle	Assigned to a vehicle (see assignment diagram, see Figure 42 on right hand side)
n/a	IFOPT - Stop Point Assignment	PIScheduleAdherenceCountdown	gate-bay	BOARDING POSITION (in IFOPT) connected to a STOP POINT
n/a	D.48 PASSING TIMES	PIScheduleAdherenceCountdown	comment	
n/a	D.48 PASSENGER TRIPS	PiTripItineraryListSub	maps	
n/a	D.48 PASSING TIMES	PiTextTimetable	Other data (map, other-info)	
NETWORK VERSION:ROUTE	D40	PiTextTimetable	Schedule Version information (schedule-identifier)	may be also TIMTABLE VERSION (id) (if timetable for OPERATING DAY — the PRODUCTION PLAN (id))
PASSENGER QUERY (id): FARE QUERY	D.45 PASSENGER QUERY	PIItineraryFareSub	Result of a trip itinerary request (piTripItinerarySub)	
PLACE (end of)	D.48 PASSENGER TRIPS	SubRoute	destination	
PLACE (start of)	D.48 PASSENGER TRIPS	SubRoute	origin	
PT TRIP	D.48 PASSENGER TRIPS	TCIP PiTripItineraryList	TCIP PiTripItineraryList	
PT TRIP	D.48 PASSENGER TRIPS	PiTripItineraryListSub	estimatedTravelTime	Derived from the PT TRIP, first STOP POINT and the PASSING TIME (TIMETABLED or TARGET) at this point with the time constraint given by the user
PT TRIP	D.48 PASSENGER TRIPS	PiTripItineraryListSub	startTime, endTime	This is derived from the PT TRIP, the SERVICE JOURNEYs, and the PASSING TIMEs (TIMETABLED or TARGET or even ESTIMATED if available)
PT TRIP	D.48 PASSENGER TRIPS	PiTripItineraryListSub	distance	This is derived from the global length of the PT TRIP (lengths of the different RIDEs and CONNECTION LINKs)

Table D.1 *(continued)*

Transmodel Class	Transmodel diagram number	TCIP Message or Frame	TCIP Data Element	Comparison / Comment
RIDEs IN PT TRIP	D49	SubRoute	estimatedTravelTime	Can be computed from PT TRIP segments and origin and destination ACCESS LINKs
ROUTE	D14	PIScheduleAdherenceCountdown	Route	(connected to JOURNEY PATTERN: SERVICE PATTERN:STOP POINT IN JOURNEY PATTERN:STOP POINT)
ROUTE(ID) OR LINE(name)	D.48 PASSENGER TRIPS; D.49 Mean Trip Duration	ATIS:BoardingInstructions	Route information (routeName)	
ROUTE(id):DIRECTION	D14	PiTextTimetable	Route Information (route, direction)	which is equivalent to a JOURNEY PATTERN:SERVICE PATTERN:STOP POINT IN JOURNEY PATTERN (refer to D.14 Routes and D.15 Journey Patterns)
SERVICE PATTERN(Id)	D47	PIScheduleAdherenceCountdown	trip	
STOP POINT	D2	PIScheduleAdherenceCountdown	Stoppoint	(or RECORDED STOP, connected to OBSERVED PASSING TIME:ESTIMATED PASSING TIME)
STOP POINT IN JOURNEY PATTERN	D47	PIScheduleAdherenceCountdown	nextArrivalCurrentLocationName	
STOP POINT IN JOURNEY PATTERN(name)	D15, D47	PIScheduleAdherenceCountdown	destination	
TRANSPORT MODE	D57	PiTextTimetable	mode	
TRANSPORT MODE	D.48 PASSENGER TRIPS	PiTripItineraryListSub	mode	
TRIP OPTIMIZATION QUERY: OPTIMIZATION MODE	D.45 PASSENGER QUERY	PiTripItineraryListSub	preference (TripPreferences):selectionCriteria --	
TRIP OPTIMIZATION QUERY: OPTIMIZATION MODE	D.45 PASSENGER QUERY	PiTripItineraryListSub	preferredRoadType	
TRIP OPTIMIZATION QUERY: OPTIMIZATION MODE	D.45 PASSENGER QUERY	PiTripItineraryListSub	specialAbilities	
TRIP OPTIMIZATION QUERY: OPTIMIZATION MODE	D.45 PASSENGER QUERY	PiTripItineraryListSub	amenities: [at stops or on vehicle]	
TRIP OPTIMIZATION QUERY: OPTIMIZATION MODE	D.45 PASSENGER QUERY	PiTripItineraryListSub	constraints (TripConstraints): modes; needs; vehicleRestrictions; otherNeeds; vehicleNeeds	
TRIP OPTIMIZATION QUERY: PASSENGER QUERY	D.48 PASSENGER TRIPS	PiTripItineraryListSub	TripRequest	A solution is one or more TRIP PATTERNs from/to PLACES. There are isomorphic issues with the model because the TRIP PATTERN may be from PLACE to PLACE, or served by one or more PT TRIPs.
TRIP OPTIMIZATION QUERY: PASSENGER QUERY: PLACE (destination)	D.48 PASSENGER TRIPS	PiTripItineraryListSub	destination	

Table D.1 *(continued)*

Transmodel Class	Transmodel diagram number	TCIP Message or Frame	TCIP Data Element	Comparison / Comment
TRIP OPTIMIZATION QUERY: PASSENGER QUERY:PLACE (origin = STOP POINTs)	D.48 PASSENGER TRIPS	PiTripItineraryListSub	origin	
TRIP PATTERN (Ordered list of PT TRIPs)	D.48 PASSENGER TRIPS	SubRoute	ordered set of segments	
TRIP PATTERN:Id	D.48 PASSENGER TRIPS	SubRoute	Name	
USER PROFILE	D52	PiTripItineraryListSub	Profile (customer profile) How many travellers; Rider characteristics; Where to respond to request; Fare Constraints; What type of fare media; Location of fare transaction (pre-pay vs. on-board)	User profile, commercial profiles. See in Fare Collection D.52 Usage Parameters.
VERSION FRAMEs: NETWORK VERSION FRAME, TIMETABLE VERSION FRAME	D21	PIScheduleAdherenceCountdown	metadata	VERSION FRAMES describe groupings of versioned objects originating from the same DATA SYSTEM and belonging to the same TYPE OF FRAME (Examples of VERSION FRAMEs: NETWORK VERSION FRAME, TIMETABLE VERSION FRAME, etc.). Explicit frames modelling is enhanced in NETEx.

Annex E
(informative)

Japanese ATIS Class-Attribute comparison to Transmodel

This Annex provides a mapping of Transmodel classes to Japanese ATIS class-attributes.

Table E.1

TM Class	TM Definition	TM Attribute	Japanese Standard Class Name	Japanese Standard Attribute
LINE	A group of ROUTEs which is generally known to the public by similar name or number.	ID NAME	Service line/route	ID Name Pronunciation Type Average waiting time One way Code Destination ID
LOCATION	The position of a POINT with a reference to a given LOCATING SYSTEM.	COORDINATE_1 COORDINATE_2 COORDINATE_3	Section line coordinates	Coordinate#1 Coordinate#2 Coordinate#3
MEAN PASSENGER WAIT TIME	An estimated mean waiting time for a passenger at a SCTOP POINT, used to calculate the approximate duration of a trip. This value is estimated from the mean interval between vehicles on a JOURNEY PATTERN or a COMMON SECTION.	DURATION	Average waiting time	Unit in minute It is half of an average interval of train/bus services.
NETWORK VERSION	A set of network data (and other data logically related to these) to which the same VALIDITY CONDITIONs have been assigned.	NAME	Last updated date	YYYY-MM-DD YYYY: Year MM: Month (1 through 12: add 0 on top of it if it is one digit) DD: Day (1 through 31: add 0 on top of it if it is one digit)
PASSING TIME	Time data concerning public transport vehicle passing a particular POINT; e.g. arrival time, departure time, waiting time.	ID ALIGHT AND REBOARD	Bus stop arrival/ departure/ passing time	hh:mm:ss:sss hh: hour mm: minute ss: second , can be omitted sss: mili second , can be omitted
POINT	A 0-dimensional node of the network used for the spatial description of the network. POINTs may be located by a LOCATION in a given LOCATING SYSTEM.	ID NAME	Section physical route station/stop#1	Station/Stop ID

Table E.1 *(continued)*

TM Class	TM Definition	TM Attribute	Japanese Standard Class Name	Japanese Standard Attribute
ROUTE	An ordered list of located POINTs defining one single path through the road (or rail) network. A ROUTE may pass through the same POINT more than once.	ID NAME	Line/Route	Service line/route ID: Eight digit, alphabet and/or number Name of line/route: Name of service line/route Pronunciation of name of line/route Type: Type of train/bus Examples: Air flight, Shinkansen, Sleeping car/express, Express, Rapid, Rapid express, Local, Connecting bus, City bus, Boat, Street car, LRT, BRT Average waiting time: Unit is minute It is half of an average interval of train/bus services Route name: Example) Tokaidosen One way: Put circle if it is one way service line/route Individual code: Operator's internal use number, if used. Leave blank, if not used. Destination ID: Eight digit, alphabet and/or number. Can be left blank
STOP POINT	A POINT where passengers can board or alight from vehicles.	FOR ALIGHTING FOR BOARDING	Service station/Bus stop	Station/bus stop ID: Nine digit, alphabet and/or number Time: Travel time from previous station/bus stop (unit:minute) Put zero in starting station/bus stop Put -1 in section dividing station/bus stop where train/bus does not stop at there. No get-in/on: Put circle in the station/bus stop where no get-in/on service is provided. Disregard in the starting station/bus stop. No get-off: Put circle in the station/bus stop where no get-off service is provided Disregard in the ending station/bus stop. Route ID: Describe route ID (Eight digit, alphabet and/or number) regarding point-on-the-route information. It is updated or changed when train/bus passes through different station/bus stop. Destination number: Describe destination ID (Eight digit, alphabet and/or number) regarding destination information. It is updated or changed when train/bus passes through different station/bus stop.

Table E.1 *(continued)*

TM Class	TM Definition	TM Attribute	Japanese Standard Class Name	Japanese Standard Attribute
TYPE OF EVENT	A classification of EVENTs (e.g. ALARMs, INCIDENTs) according to their cause of effect.	ID DESCRIPTION NAME	Incident	Occurrence day/time Occurrence section Affected section Direction Cause Status Alternative transport Description Expected resumption
VEHICLE	A public transport vehicle used for carrying passengers.	ID VEHICLE REGISTRATION NUMBER	Vehicle number	Type ID
VEHICLE DETECTING	An activity consisting in the identification of a vehicle at a certain time by a detection device and of collecting crude data such as an absolute location of the vehicle.	ID TIME STAMP TYPE	Bus location	Information sent time: Time real time data was transmitted from vehicle in accordance with ISO 8601 hh:mm:ss:sss hh: hour mm: minute ss: second, can be omitted sss: mili second , can be omitted Positon data time stamp: Time the vehicle passed certain designated point in accordance with ISO 801 hh:mm:ss:sss hh: hour mm: minute ss: second , can be omitted sss: mili second , can be omitted Station/bus stop ID: Nine digit, alphabet and/or number Longitude: Describe longitude n accordance with international standards and should be integral decimal numbers describing down to 1/1000 second value. Example; 130deg50min39sec -à (130X3600+50X60+39)X1000=471039000 Latitude: Describe latitude in accordance with international standards and should be integral decimal numbers describing down to 1/1000 second value. Example; 33deg53min52sec -à(33X3600+53X60+52)X1000=12203200

Annex F
(informative)

General Transit Feed Specification (GTFS) Class-Attribute comparison to Transmodel

This Annex provides a mapping of Transmodel classes to GFTS fields.[5] This comparison is excerpted from.[6]

Table F.1

GTFS-agency.txt	A GTFS-*agency* corresponds to the Transmodel concept of AUTHORITY. The original version of GTFS supported one agency is allowed per file, i.e. there was no notion of multiple providers. It has now been refined to allow multiple agencies. Transmodel in fact distinguishes between an OPERATOR and an AUTHORITY, and OPERATIONAL UNIT, allowing the attribution of services to operators in multi operator timetables (as say on UK Rail, or London Buses). However the AGENCY can be used for the authority for practical purposes. Inclusion of a time-zone is needed in GTFS because GTFS-stop times don t use full UTC times (i.e. indicate time zone). Given the complex interlocking of European time zones we would propose using UTC for all purposes. Language and URL are useful presentation related attributes.		
TM Equivalent	**GTFS Field Name**	**GTFS Type**	**GTFS Description**
AUTHORITY Identifier ***authorityId***	**agency_id**	agencyId (String)	Uniquely identifies a transit agency. A transit feed may represent data from more than one agency. The agency_id is dataset unique. This field is optional for transit feeds that only contain data for a single agency.
AUTHORITY NAME ***authorityName***	**agency_name**	*string*	Name of the transit agency. Example: TriMet
(agencyUrl)	**agency_url**	*url*	Fully qualified URL for agency Example: http://trimet.org
(authority-Timezone)	**agency_-timezone**	*timezone*	Time zone where the transit agency is located. See https://en.wikipedia.org/wiki/List_of_tz_zones Example(s): America/Los_Angeles
(authorityLang)	**agency_lang**	*lang*	two-letter ISO 639-1 code for the primary language used by this transit agency. This setting defines capitalization rules and other language-specific settings for all text contained in this transit agency's feed. Please refer to http://www.loc.gov/standards/iso639-2/php/code_list.php for a list of valid values.
(authority-PhoneNumber)	**agency_phone**	*string*	A single voice telephone number for the specified agency. This field is a string value that presents the telephone number as typical for the agency's service area. It can and should contain punctuation marks to group the digits of the number. Dialable text (for example, TriMet's "503-238-RIDE") is permitted, but the field must not contain any other descriptive text.

Table F.1 *(continued)*

GTFS-stops.txt Table (STOP PLACE)	The GTFS-*stops.txt* file provides a basic STOP PLACE model, similar to that of IFOPT. Transmodel distinguishes between the SCHEDULED STOP POINT - the timetable reference to a stop - and the physical stop, which may be either a STOP PLACE (i.e. Station, pair of stops or other named grouping) or a specific point of access such as a pole, platform or gangway i.e. QUAY. (In IFOPT a QUAY may be further subdivided by a BOARDING POINT). A SCHEDULED STOP POINT can be assigned to a STOP PLACE and or QUAY very often this assignment is assumed, that is implicit in the use of the same identifier for both the SCHEDULED STOP POINT and the STOP PLACE, but may be explicit and dynamic (e.g. in the case of a bus stop that moves temporarily, or train platform change. Stops can have a complex relation to each other, e.g. in bus and train stations, and to cities and towns. Large stops such a Train platform may have a substructure (e.g. be used as separate platforms, or have boarding points). IFOPT has added to Transmodel a more elaborated representation of an interchange with distinct concepts of STOP PLACE, ACCESS SPACE, QUAY, and BOARDING POINT. The original GTFS had no grouping mechanism for stops. Since 2008 stops may be linked to a single parent each, this allows a GTFS-stop to also be used as a STOP AREA, or STOP PLACE. (If it is used as a stop are it cannot be used as an access point as well). The GTFS-stop has no mode (i.e. on cannot tell whether it is a bus or train). There are thus two types of GTFS-*stop*, as station (i.e. AREA, or STOP PLACE.		
TM Equivalent	**GTFS Field Name**	**GTFS Type**	**GTFS Description**
Identifier of STOP PLACE ELEMENT (will be Assigned to a SCHEDULED STOP POINT) ***stopPlaceId***	**stop_id**	stopId (String)	ID that uniquely identifies a stop. Multiple routes may use the same stop. **Example(s):** S81NATHIST
stopCode	**stop_code**	string	Contains short text or a number that uniquely identifies the stop for passengers. Stop codes are often used in phone-based transit information systems or printed on stop signage to make it easier for riders to get a stop schedule or real-time arrival information for a particular stop. The stop_code field should only be used for stop codes that are displayed to passengers. For internal codes, use stop_id. This field should be left blank for stops without a code.
stopPlace-Name	**stop_name**	string	**T**he name of a stop. A name that people will understand in the local and tourist vernacular. **Example(s):** 81 St-Museum of Natural History
StoPlace-Description	**stop_desc**	string	Description of a stop. Please provide useful, quality information. Do not simply duplicate the name of the stop. **Example(s):** The 81 St-Museum of Natural History stop is located at the southwest corner of the intersection at West 81st St. and Central Park West. The stop is two blocks south of the American Museum of Natural History.
POINT ***coordinates***	**stop_lat**	WGS 84 geodetic datum.	The latitude of a stop. The field value should contain a WGS 84 geodetic datum. **Example(s):** 40.781969
POINT ***coordinates***	**stop_lon**	WGS 84 geodetic datum.	The longitude of a stop. The field value should contain a WGS 84 geodetic datum. **Example(s):** 73.972011
TARIFF ZONE ***tarrifZoneRef***	**zone_id**	zoneId (String)	The fare zone for a stop. Zone IDs are required if you want to provide fare information using fare_rules.txt. **Example(s):** 2
(stopUrl)	**stop_url**	url	The URL of a web page about a particular stop. This should be different from the **agency_url** and the **route_url** fields.

Table F.1 *(continued)*

StopPlace	**Location_type**	enum	Identifies whether this stop ID represents a stop or station. If no location type is specified, or the location_type is blank, stop IDs are treated as stops. Stations may have different properties from stops when they are represented on a map or used in trip planning. The location type field can have the following values: **0** or blank - Stop. A location where passengers board or disembark from a transit vehicle. **1** - Station. A physical structure or area that contains one or more stop.
parentStopPlaceElement	**Parent_station**	string	For stops that are physically located inside stations, the **parent_station** field identifies the station associated with the stop. To use this field, stops.txt must also contain a row where this stop ID is assigned location type=1.

GTFS-routes.txt (LINE / ROUTE)	The GTFS *routes.txt* table holds LINE attributes such as the name of the line or route. The GTFS-*route* entity is in effect a Transmodel LINE, (as opposed to a Transmodel ROUTE) an arbitrary group of ROUTEs which is generally known to the public by a similar name or number. The GTFS-trips i.e. vehicle journeys of a LINE follow similar but not necessarily exactly the same service patterns. Because it is concerned with computing and managing timetables and other data sets, Transmodel separates out the distinct information layers underpinning a vehicle journey. In particular, the infrastructure nodes and links (ROAD ELEMENTS and RAIL ELEMENTS); the directional ROUTE, ROUTE LINKS and ROUTE POINTs over the infrastructure; the SERVICE PATTERN (the sequence of stops used when traversing a route in a particular direction, possibly as subset of the overall route); the JOURNEY PATTERN (the service pattern with timing information added) and VEHICLE JOURNEYs (An instance of a journey at a particular time which follows a JOURNEY PATTERN). The Transmodel approach allows a large degree of reuse of elements and also preserves structural data that may be of use other applications, e.g. scheduling or AVL systems. Most of this is irrelevant to GTFS and the final schedule for passengers, but can be useful when fusing data sets. At the service or route level the operational profile is described largely textually.		
TM Equivalent	**GTFS Field Name**	**GTFS Type**	**GTFS Description**
LINE ***lineId***	**route_id**	routeId (String)	An ID that uniquely identifies a route. **Example(s):** R17X
AUTHORITY ***authorityRef***	**agency_id**	*nmtoken*	An agency for the specified route. This value is referenced from the agency.txt file. Use this field when you are providing data for routes from more than one agency.
LINE name ***lineShortName***	**route_short_name**	*string*	Short name of a route. This will often be the route number or route character(s). If the route does not have a short name, please use an empty string as the value for this field. **Example(s):** f the route full name is **17-NW 21st Ave/St Helens Rd**, then provide **17** as the **route_short_name** value.
LINE long name ***lineLongName***	**route_long_name**	*string*	Full name of a route. This name will often include the route's destination or stop. If the route does not have a long name, please use an empty string as the value for this field. **Example(s):** If the route full name is **17-NW 21st Ave/St Helens Rd**, then please provide **NW 21st Ave/St Helens Rd** as the **route_long_name** value.
LINE textual description ***description***	**route_desc**	*string*	A description of a route. Please provide useful, quality information. Do not simply duplicate the name of the route. **Example(s):** A trains operate between Inwood-207 St, Manhattan and Far Rockaway-Mott Avenue, Queens at all times. Also from about 6AM until about midnight, additional A trains operate between Inwood-207 St and Lefferts Boulevard (trains typically alternate between Lefferts Blvd and Far Rockaway.

Table F.1 *(continued)*

MODE ***mode*** *European usage would Separate out light rail from Tram? Add Coach and AIR ??*	**route_type**	***0*** *- Tram* ***1*** *- Subway* ***2*** *- Rail* ***3*** *- Bus* ***4*** *- Ferry* ***5*** *- CableCar* ***6*** *- Gondola* ***7*** *- Funicular*	The type of transportation used on a route. Valid values for this field are: **Example(s):** **0** - Tram, Streetcar, Light rail. Any light rail or street level system within a metropolitan area. **1** - Subway, Metro. Any underground rail system within a metropolitan area. **2** - Rail. Used for intercity or long-distance travel. **3** - Bus. Used for shorthand long-distance bus routes. **4** - Ferry. Used for shorthand long-distance boat service. **5** - Cable car. Used for street-level cable cars where the cable runs beneath the car. **6** - Gondola, Suspended cable car. Typically used for aerial cable cars where the car is suspended from the cable. **7** - Funicular. Any rail system designed for steep inclines. **+++**
(lineURL)	**route_url**	***url***	Contains the URL of a web page about that particular route. This should be different from the **agency_url**. The value must be a fully qualified URL that includes **http://** or **https://**, and any special characters in the URL must be correctly escaped. See http://www.w3.org/Addressing/URL/4_URI_Recommentations.html for a description of how to create fully qualified URL values.
(lineColourURL)	**route_color**	***hexValue***	Defines a color that corresponds to a route. The color must be provided as a hexadecimal number. If the **route_color** makes overlaid text difficult to read, specify a contrasting text color with the **route_text_color** field.
(lineText ColourURL)	**route_text_color**	***hexValue***	Can be used to specify a legible color to use for text drawn against a background of **route_color**.

Trips.txt (VEHICLE JOURNEY)	The GTFS *trips* entity, describes and individual that is a scheduled journey of a vehicle. Note that in Transmodel the term TRIP is used for the itinerary of the passenger, not the vehicle. The inclusion of ***Block*** allows journey planners to infer whether a change is needed on certain route topologies, e.g. circular routes. The Shape element, corresponding to a TransXChange Route/ Track allows the project ion of a specific path on a map from a route.		
TM Equivalent	**GTFS Field Name**	**GTFS Type**	**GTFS Description**
VEHICLE JOURNEY identifier ***vehicleJourneyId/***	**trip_id**	tripId (String)	An ID that identifies a trip. **Example(s):**1AWE
LINE identifier reference ***lineRef***	**route_id**	routeId (String)	ID that uniquely identifies a route. This value is referenced from the routes.txt file. **Example(s):** R17X
VALIDITY CONDITION identifier reference ***(conditionRef)***	**service_id**	serviceId (String)	ID that uniquely identifies a set of dates when service is available for one or more routes. This value is referenced from the calendar.txt file. **Example(s):** WE
DESTINATION DISPLAY ***destinationDisplay***	**trip_headsign**	string	The text that appears on a sign in the vehicle that identifies the trip's destination to passengers. **Example(s):** Montgomery Park

Table F.1 *(continued)*

DIRECTION ***direction***	**direction_id**	directionEn um	**Optional**. The **direction_id** field contains a binary value that indicates the direction of travel for a trip. Use this field to distinguish between bi-directional trips with the same route_id. This field is not used in routing; it provides a way to separate trips by direction when publishing time tables. You can specify names for each direction with the **trip_headsign** field. **0** - travel in one direction (e.g. outbound travel) **1** - travel in the opposite direction (e.g. inbound travel) For example, you could use the trip_headsign and direction_id fields together to assign a name to travel in each direction on trip "1234", the trips.txt file would contain these rows for use in time tables: trip_id, … , trip_headsign, direction_id 1234, … , to Airport,0 1234, … , to Downtown,1
BLOCK identifier reference ***blockRef***	**block_id**	blockId (String)	The block to which the trip belongs. A block consists of two or more sequential trips made using the same vehicle, where a passenger can transfer from one trip to the next just by staying in the vehicle. The **block_id** is dataset unique. **Example(s):** B1AWE
ROUTE PROJECTION identifier reference ***routeRef***	**shape_id**	shapeId (String)	An ID that defines a shape for the trip. This value is referenced from the shapes.txt file. The shapes.txt file allows you to define how a line should be drawn on the map to represent a trip.

GTFS-stop_times.txt (STOP IN SEQUENCE | CALL)	The GTFS *stop_times* entity aggregates a STOP IN SEQUENCE for a VEHICLE JOURNEY, aggregating with the TIMETABLED PASSING TIMES and a stop activity. This is a common practical view; used for example by the SIRI ***Call*** element for both planned and estimated timetables. The use of local time for the data type on times rather than UTC is unfortunate if there are cross timezone trips or variable summer time. We would propose using ITC on everything.		
TM Equivalent	**GTFS Field Name**	**GTFS Type**	**GTFS Description**
VEHICLE JOURNEY identifier ***vehicleJourney Ref***	**trip_id**	tripId (String)	ID that identifies a trip. This value is referenced from the trips.txt file. **Example(s):** 1AWE
PASSING TIME TIMETABLED ARRIVAL TIME ***arrivalTime***	**arrival_time**	HH:MM:SS local time	The arrival time at a specific stop for a specific trip on a route. The value should be expressed in HH:MM:SS local time after midnight of the day on which the trip begins. Please include all times for stops that are time points. Arrival times for the first and last stop in a trip are required. All other arrival times are optional and, if unavailable, may be represented with an empty string value. Stops without arrival times will be scheduled based on the nearest preceding timed stop. Do not interpolate stops **Example(s):** The following columns list stop times for a trip and the proper way to express those times in the **arrival_time** field: **Time arrival_time value** 08:10:00 A.M. 08:10:00 01:05:00 P.M. 13:05:00 07:40:00 P.M. 19:40:00 01:55:00 A.M. 25:55:00 **Note:** Trips that span multiple dates will have stop times greater than **24:00:00**. For example, if a trip begins at 10:30:00 p.m. and ends at 2:15:00 a.m. on the following day, the stop times would be **22:30:00** and **26:15:00**. Entering those stop times as **22:30:00** and **02:15:00** would not produce the desired results.

PASSING TIME TIMETABLED ARRIVAL TIME ***departureTime***	**departure_time**	HH:MM:SS local time	The departure time from a specific stop for a specific trip on a route. The value should be expressed in HH:MM:SS local time after midnight of the day on which the trip begins. If the departure and arrival times are identical, please duplicate the values in the **arrival_time** and **departure_time** fields. **Example(s):**The following columns list stop times for a trip and the proper way to express those times in the **departure_time** field: **Time departure_time value** 08:10:00 A.M. 08:10:00 01:05:00 P.M. 13:05:00 07:40:00 P.M. 19:40:00 01:55:00 A.M. 25:55:00
STOP PLACE ***StopPointCode***	**stop_id**	stopId (String)	An ID that uniquely identifies a stop. Multiple routes may use the same stop. This value is referenced from the stops.txt file. **Example(s):**S81NATHIST
SEQUENCE ***stopSequence***	**stop_sequence**	integer	The cardinal number that identifies the order of a stop on a particular trip. The first stop on the trip should have a **stop_sequence** of **1**; the second stop on the trip should have a **stop_sequence** of **2**, and so forth. **Example(s):**3
DESTINATION DISPLAY	**stop_headsign**	**string**	The text that appears on a sign that identifies the trip's destination to passengers. Use this field when the headsign changes between stops. If this headsign is associated with an entire trip, use trip_headsign instead.
Boarding *Activity* ***boardingActivity***	**pickup_type**	**0 -** Regularly scheduled pickup **1** - No pickup available **2** - Must phone agency to arrange pickup **3** - Must coordinate with driver to arrange pickup	Whether passengers are picked up at a stop as part of the normal schedule or whether a pickup at the stop is not available. This field also allows the transit agency to indicate that passengers must call the agency or notify the driver to arrange a pickup at a particular stop. Valid values for this field are: The default value for this field is **0**.
Alighting *Activity* ***alightingActivity***	**drop_off_type**	**0** – Regularly scheduled drop off **1** – No drop off available **2** – Must phone agency to arrange drop off **3** – Must coordinate with driver to arrange drop of	Whether passengers are dropped off at a stop as part of the normal schedule or whether a drop off at the stop is not available. This field also allows the transit agency to indicate that passengers must call the agency or notify the driver to arrange a drop off at a particular stop. Valid values for this field are: (see values) The default value for this field is **0**.

LINK DISTANCE *routeLinkDistance*	**shape_dist_ traveled**	**decimal**	Positions a stop as a distance from the first shape point. The **shape_dist_ traveled** field represents a real distance traveled along the route in units such as feet or kilometers. For example, if a bus travels a distance of 5,25 kilometers from the start of the shape to the stop, the **shape_dist_traveled** for the stop ID would be entered as "5,25". The values used for **shape_dist_traveled** must increase along with **stop_sequence**: they cannot be used to show reverse travel along a route. The units used for **shape_dist_traveled** in the stop_times.txt file must match the units that are used for

GTFS-calendar.txt (VALIDITY CONDITION)	The GTFS-*calendar* specifies a PERIOD and DAY TYPE part of a Transmodel VALIDITY CONDITION it allows GTFS-*Service* period and day types to be specified. Thus a separate SERVICE is needed to associate a given calendar with a GTFS-Trip or trips. Service dates are assumed to start and end at midnight.		
TM Equivalent	**GTFS Field Name**	**GTFS Type**	**GTFS Description**
VALIDITY CONDITION *conditionId*	**service_id**	nmtoken	An ID that uniquely identifies a set of dates when service is available for one or more routes. **Example(s):** WE
DAY TYPE / DAY OF WEEK	**monday**	Binary o/1	Whether the service is valid for all Mondays. **Note:** May list exceptions for particular dates, such as holidays, in the calendardates.txt file.
DAY TYPE / DAY OF WEEK	**tuesday**	Binary o/1	Whether the service is valid for all Tuesdays.
DAY TYPE / DAY OF WEEK	**wednesday**	Binary o/1	Whether the service is valid for all Wednesdays.
DAY TYPE / DAY OF WEEK	**thursday**	Binary o/1	Whether the service is valid for all Thursdays.
DAY TYPE / DAY OF WEEK	**friday**	Binary o/1	Whether the service is valid for all Fridays.
DAY TYPE / DAY OF WEEK	**saturday**	Binary o/1	Whether the service is valid for all Saturdays.
DAY TYPE / DAY OF WEEK	**sunday**	Binary o/1	Whether the service is valid for all Sundays.
PERIOD *startDate*	**start_date**	YYYYMMDD	Start date for the service.
PERIOD *endDate*	**end_date**	YYYYMMDD	End date for the service. This date is included in the service interval.

GTFS-calendar_dates.txt (VALIDITY CONDITION)	The GTFS- *calendar_dates* table allows OPERATING DAYs to be specified as part of the VALIDITY CONDITION (i.e. GTFS-service). In particular it allows public holidays and exceptions to the regular day types to be expressed as specific calendar dates on which the service does or does not run. There are no public holiday day types, thus exceptions can be stated, but they must be explicitly repeated as dates each year. There is no text associated with the date so exceptions cannot be explained to the user e.g. as Christmas day or Holiday schedule - this has to be done in the textual service description.		
TM Equivalent	**GTFS Field Name**	**GTFS Type**	**GTFS Description**
VALIDITY CONDITION identifier *conditionId* l	**service_id**	serviceId (String)	ID that uniquely identifies a set of dates when service is available for one or more routes. **Example(s):** WE
DAY TYPE date *date*	**date**	YYYYMMDD	a particular date when service availability is different than the norm as indicated by the **exception_type**

DAY TYPE attribute ***exceptionType***	**exception_type**	**exceptionEnum** **1** - service has been added for the specified date. **2** - service has been removed for the specified date.	Indicates whether service is available on the date specified in the **date** field. For example, suppose a route has one set of trips available on holidays and another set of trips available on all other days. You could have one **service_id** that corresponds to the regular service schedule and another **service_id** that corresponds to the holiday schedule. For a particular holiday, you would use the calendar_dates file to add the holiday to the holiday **service_id** and to remove the holiday from the regular **service_id** schedule.

GTFS-fare_attributes.txt (FARE PRODUCT)	GTFS *Fare attributes* allows the expression of a basic fare product with simple FARE USAGE PARAMETERS and PAYMENT METHODS. This is a very basic PRICE GROUP compared with the many Fare models considered in Transmodel and the recent UK FareXchange study.		
TM Equivalent	**GTFS Field Name**	**GTFS Type**	**GTFS Description**
FARE ELEMENT identifier	**fare_id**	fareId (String)	**I**D that uniquely identifies a fare class. **Example(s):** b
FARE PRICE	**price**	Currency amount	The **price** field contains the fare price, in the unit specified by **currency_type.** **Example(s):** 1,75
(currency)	**currency_type**	ISO 4217 Currency type	The currency used to pay the fare. ISO 4217 alphabetical currency code http://www.iso.org/iso/prodsservices/popstds/currencycodeslist.html ISO 4217 Currency type **Example(s):** USD
PAYMENT METHOD ***payment-Method***	**payment_method**	**methodEnum** **0** - Fare is paid on board. **1** - Fare must be paid before boarding.	When the fare must be paid. Valid values for this field are:
FARE PARAMETER attribute (***transfers***)	**transfers**	**0** - No transfers permitted on this fare. **1** - Passenger may transfer once. **2** - Passenger may transfer twice. **(empty)** - If this field is empty, unlimited transfers are permitted.	The number of transfers permitted on this fare.

FARE PARAMETER attribute (***transfer-Duration)***	**transfer_duration**	seconds	The length of time in seconds before a transfer expires. **Example(s):** 4000

GTFS-fare_rules.txt (DISTANCE MATRIX)	The GTFS-*fare_ rules* allow a simple zonal TARIFF STRUCTURE to be expressed. Different fares for tariff zone to tariff zone fares can be stated this corresponds to a Transmodel DISTANCE MATRIX and PRICE TABLE of Transmodel. This is a relatively trivial subset from the many Fare models supported in Transmodel and considered in the recent UK FareXchange study. GTFS thus has a basic tariff zone structure, but not stage fares and there is no way to specify vehicle journey level availability conditions or complex Fare Product usage rules as are found for UK rail.		
TM Equivalent	**GTFS Field Name**	**GTFS Type**	**GTFS Description**
FARE STRUCTURE ELEMENT identifier ***fareId***	**fare_id**	fareId (String)	ID that uniquely identifies a fare class. This value is referenced from the fare_attributes.txt file. **Example(s):**b
LINE identifier reference ***lineRef***	**route_id**	routeId (String)	Route associated with the fare. Route IDs are referenced from the routes.txt file. If you have several routes with the same fare attributes, create a row in fare_rules.txt for each route. For example, if fare class "b" is valid on route "TSW" and "TSE", the fare_rules.txt file would contain these rows for the fare class: b,TSW b,TSE **Example(s):**TSW
TARIFF ZONE DISTANCE MATRIX identifier reference ***originRef***	**origin_id**	zoneId (String)	Origin zone ID associated with the fare. Zone IDs are referenced from the stops.txt file. If you have several origin IDs with the same fare attributes, create a row in fare_rules.txt for each origin ID. For example, if fare class "b" is valid for all travel originating from either zone "2" or zone "8", the fare_rules.txt file would contain these rows for the fare class: b, , 2 b, , 8 **Example(s):** 2
TARIFF ZONE DISTANCE MATRIX identifier reference ***destinationRef***	**destination_id**	zoneId (String)	Destination zone ID associated with the fare. Zone IDs are referenced from the stops.txt file. If you have several destination IDs with the same fare attributes, create a row in fare_rules.txt for each destination ID. For example, you could use the origin_Id and destination_Id fields together to specify that fare class "b" is valid for travel between zones 3 and 4, and for travel between zones 3 and 5, the fare_rules.txt file would contain these rows for the fare class: b, , 3,4 b, , 3,5 **Example(s):** 4
TARIFF ZONE identifier reference (***containsRef***)	**contains_id**	zoneId (String)	Associates the fare ID with all routes that pass through a specified location. The contains_ID field is a zone ID, referenced from the stops.txt file. For example, if fare class "c" is associated with all travel on the GRT route that passes through zone 6, the fare_rules.txt would contain this row: c,GRT,,,6 **Example(s):** 6

GTFS-shapes.txt ( )	The GTFS-shape allows the LINK PROJECTION of an individual VEHICLE JOURNEY on to a map LINK PROJECTION.		
TM Equivalent	**GTFS Field Name**	**GTFS Type**	**GTFS Description**

ROUTE PROJECTION identifier ***Route_ProjectionId***	**shape_id**	shapeId (String)	An ID that uniquely identifies a shape.
POINT location attribute ***coordinates***	**shape_pt_lat**	lat	Associates a shape point's latitude with a shape ID. The field value must be a valid WGS 84 latitude. Each row in shapes.txt represents a shape point in your shape definition. For example, if the shape "A_shp" has three points in its definition, the shapes.txt file would contain these rows to define the shape: A_shp,37.61956,122.48161,1 A_shp,37.64430,122.41070,2 A_shp,37.65863,122.30839,3
POINT location attribute ***coordinates***	**shape_pt_lon**	long	In shapes.txt represents a shape point in your shape definition. For example, if the shape "A_shp" has three points in its definition, the shapes.txt file would contain these rows to define the shape: A_shp,37.61956,122.48161,1 A_shp,37.64430,122.41070,2 A_shp,37.65863,122.30839,3
LINK SEQUENCE ***sequence***	**shape_pt_ sequence**	integer	Associates the latitude and longitude of a shape point with its sequence order along the shape. The first shape point in the shape definition should have a **shape_pt_sequence** of **1**, the second shape point should have a **shape_pt_sequence** of **2**, and so forth. You must use integer values.
ROUTE LINK / DISTANCE ***linkDistance***	**shape_dist_ traveled**	distance	When used in the shapes.txt file, the **shape_dist_traveled** field positions a shape point as a distance traveled along a shape from the first shape point. The **shape_dist_traveled** field represents a real distance traveled along the route in units such as feet or kilometers. The values used for **shape_dist_traveled** must increase along with **shape_pt_sequence**: they cannot be used to show reverse travel along a route. The units used for **shape_dist_traveled** in the shapes.txt file must match the units that are used for this field in the stop_times.txt file. For example, if a bus travels along the three points defined above for A_shp, the additional **shape_dist_traveled** values (shown here in kilometers) would look like this: A_shp,37.61956,122.48161,1,0 A_shp,37.64430,122.41070,2,6.8310 A_shp,37.65863,122.30839,3,15.8765

GTFS-frequency.txt ( )	GTFT-frequency is used to describe frequency based services. It allows a frequency to be specified, effectively generating a timetable from a single Vehicle journey. This is similar to the UK TransXChange ***Frequency*** Element, used to describe a service that occurs at a specified interval within a time window rather than running to an exact timetable.		
TM Equivalent	**GTFS Field Name**	**GTFS Type**	**GTFS Description**
VEHICLE JOURNEY identifier reference ***vehicleJourneyRef***	**trip_id**	tripId (String)	An ID that identifies a trip on which the specified frequency of service applies. Trip IDs are referenced from the trips.txt file.
PERIOD end ***startTime***	**start_time**	time	The time at which service begins with the specified frequency. For times occurring after midnight, enter the time as a value greater than 24:00:00 in HH:MM:SS local time for the day on which the trip schedule begins. E.g. 25:35:00.
PERIOD start ***endTime***	**end_time**	time	The time at which service changes to a different frequency (or ceases). For times occurring after midnight, enter the time as a value greater than 24:00:00 in HH:MM:SS local time for the day on which the trip schedule begins. E.g. 25:35:00.

Frequency Interval	**headway_secs**	secs	The time between departures from the same stop (headway) for this trip type, during the time interval specified by **start_time** and **end_time**. The headway value must be entered in seconds.

GTFS-transfers.txt ( )	The transfers file allows the specification of interchange rules. See discussion on interchange for limitations of this model.		
TM Equivalent	**GTFS Field Name**	**GTFS Type**	**GTFS Description**
CONNECTION LINK from stop ***fromStopRef***	**from_stop_id**	stopId (String)	Stop ID that identifies a stop or station where a connection between routes begins. Stop IDs are referenced from the stops.txt file. If the stop ID refers to a station that contains multiple stops, this transfer rule applies to all stops in that station.
CONNECTION LINK to stop ***toStopRef***	**to_stop_id**	stopId (String)	A stop ID that identifies a stop or station where a connection between routes ends. Stop IDs are referenced from the stops.txt file. If the stop ID refers to a station that contains multiple stops, this transfer rule applies to all stops in that station.
ADVERTISED, PLANNED, GUARANTEED INTERCHANGE ***transferType***	**transfer_type**	time	Specifies the type of connection for the specified (from_stop_id, to_stop_id) pair. Valid values for this field are: **0** or **(empty)** - This is a recommended transfer point between two routes. **1** - This is a timed transfer point between two routes. The departing vehicle is expected to wait for the arriving one, with sufficient time for a passenger to transfer between routes **2** - This transfer requires a minimum amount of time between arrival and departure to ensure a connection. The time required to transfer is specified by **min_transfer_time**. **3** - Transfers are not possible between routes at this location.
SERVICE JOURNEY INTERCHANGE Duration ***minimumTransfer Time***	**min_transfer_time**	secs	When a connection between routes requires an amount of time between arrival and departure (transfer_type=2), the **min_transfer_time** field defines the amount of time that must be available in an itinerary to permit a transfer between routes at these stops. The min_transfer_time must be sufficient to permit a typical rider to move between the two stops, including buffer time to allow for schedule variance on each route. The min_transfer_time value must be entered in seconds, and must be a non-negative integer.

Annex G
(informative)

NeTEx Class-Attribute comparison to Transmodel

This Annex provides a mapping of Transmodel classes to NeTEx attributes.[7] A range of European standards are based on Transmodel: VDV 452 (Germany), NOPTIS (Sweden), NEPTUNE (France) and TransXchange (UK). The mapping may be found in the NeTEx documentation.

Table G.1

TM Class Name	TM Definition	TM Attribute	TM Opt	NeTEx Class Name	NeTEx Attribute	Compare
ACCESS LINK	The physical (spatial) possibility for a passenger to access or leave the public transport system. This link may be used during a trip for:	DEFAULT DURATION	N	ACCESS LINK	DefaultDuration	Same
ACCESS LINK		DESCRIPTION	Y	ACCESS LINK	Description	Same
ACCESS LINK		DISTANCE	Y	ACCESS LINK	Distance	Same
ACCESS LINK		FREQUENT TRAVELLER DURATION	Y	ACCESS LINK	FrequentTravellerDuration	Same
ACCESS LINK		MOBILITY RESTRICTED TRAVELLER DURATION	Y	ACCESS LINK	MobilityRestrictedTravellerDuration	Same
ACCESS LINK		OCCASIONAL TRAVELLER DURATION	Y	ACCESS LINK	OccasionalTravellerDuration	Same
ACCESS LINK		SUITABLE FOR MOBILITY RESTRICTED	Y	ACCESS LINK	SuitableForMobilityRestricted	Same
ACCESS RIGHT IN PRODUCT	A VALIDABLE ELEMENT as a part of a PRE-ASSIGNED FARE PRODUCT, including its possible order in the set of all VALIDABLE ELEMENTs grouped together to define the access right assigned to that PRE-ASSIGNED FARE PRODUCT.	ID	N	ACCESS RIGHT IN PRODUCT	Id	Same
ACCESS RIGHT IN PRODUCT		ACCESS NUMBER	Y	ACCESS RIGHT IN PRODUCT	AccessNumber	Same
ACCESS RIGHT IN PRODUCT		LIMITED ACCESS NUMBER	Y	ACCESS RIGHT IN PRODUCT	LimitedAccessNumber	Same
ACCESS RIGHT IN PRODUCT		ORDER	Y	ACCESS RIGHT IN PRODUCT	Order	Same
ACCESS RIGHT PARAMETER ASSIGNMENT	The assignment of a fare collection parameter (referring to geography, time or quality) to an element of a fare system (access right, validated access, control device, etc.).	ID	N	ACCESS RIGHT PARAMETER ASSIGNMENT	Id	Same
ACCESS RIGHT PARAMETER ASSIGNMENT		TYPE OF ASSIGNMENT	N	ACCESS RIGHT PARAMETER ASSIGNMENT	TypeOfAssignment	Same

Table G.1 *(continued)*

TM Class Name	TM Definition	TM Attribute	TM Opt	NeTEx Class Name	NeTEx Attribute	Compare
ACCESS ZONE	A ZONE for which the duration to cover any ACCESS LINK to a particular STOP POINT is the same.			ACCESS ZONE		Same
ACCESSED FARE STRUCTURE ELEMENT	A validated use of a FARE STRUCTURE ELEMENT, composed of CONTROLLED ACCESSes.			ACCESSED FARE STRUCTURE ELEMENT		Same
ACCOUNTING PERIOD	A continuous interval between two OPERATING DAYs which will be used for accounting purposes.	NAME	Y	ACCOUNTING PERIOD	Name	Same
ACTIVATION POINT	A POINT where a control process is activated when a vehicle passes it. Equipment may be needed for the activation	CODE	N	ACTIVATION POINT	Code	Same
ACTIVATION POINT		TYPE OF ACTIVATION		ACTIVATION POINT	TypeOfActivation	Same
ACTUAL STOP POINT EQUIPMENT	An item of equipment of a particular type actually available at an individual STOP POINT (e.g. post, shelter, seats, information display).	UNITS	N	ACTUAL STOP POINT EQUIPMENT	Units	Same
ACTUAL VEHICLE EQUIPMENT	An item of equipment of a particular type actually available in an individual VEHICLE.	UNITS	N	ACTUAL VEHICLE EQUIPMENT	Units	Same
ADMINISTRATIVE ZONE	The area of a district, a region, a city, a municipality, or the area managed by an AUTHORITY.			ADMINISTRATIVE ZONE		Same
AMOUNT OF PRICE UNIT	A FARE PRODUCT consisting in a stored value of PRICE UNITs: an amount of money on an electronic purse, amount of units on a value card etc.	AMOUNT	N	AMOUNT OF PRICE UNIT	Amount	Same
AUTHORITY	The organisation under which the responsibility of organising the transport service in a certain area is placed.	NAME	N	AUTHORITY	Name	Same

Table G.1 *(continued)*

TM Class Name	TM Definition	TM Attribute	TM Opt	NeTEx Class Name	NeTEx Attribute	Compare
BEACON POINT	A POINT where a beacon or similar device to support the automatic detection of vehicles passing by is located.			BEACON POINT		Same
BLOCK	The work of a vehicle from the time it leaves a PARKING POINT after parking until its next return to park at a PARKING POINT. Any subsequent departure from a PARKING POINT after parking marks the start of a new BLOCK. The period of a BLOCK has to be cover	ID	N	BLOCK	Id	Same
BLOCK		FINISHING DURATION	Y	BLOCK	FinishingDuration	Same
BLOCK		PREPARATION DURATION	Y	BLOCK	PreparationDuration	Same
BOARDING AND ALIGHTING	The numbers of passengers boarding and alighting at a STOP POINT during a RECORDED STOP.	NUMBER OF ALIGHTERS	Y	BOARDING AND ALIGHTING	NumberOfAlighters	Same
BOARDING AND ALIGHTING		NUMBER OF BOARDERS	Y	BOARDING AND ALIGHTING	NumberOfBoarders	Same
BOARDING AND ALIGHTING		OCCUPANCY	Y	BOARDING AND ALIGHTING	Occupancy	Same
BREAK FACILITY	A canteen, cafe, kiosk or any place where drivers have toilet and refreshment facilities.	NAME	N	BREAK FACILITY	Name	Same
BREAK FACILITY				BREAK FACILITY		Same
CHARGING METHOD	A classification of FARE PRODUCTs according to the payment method and the account location: pre-payment with cancellation (throw-away), pre-payment with debit on a value card, pre-payment without consumption registration (pass), post-payment etc.	ID	N	CHARGING METHOD	Id	Same
CHARGING METHOD		DESCRIPTION	Y	CHARGING METHOD	Description	Same

Table G.1 *(continued)*

TM Class Name	TM Definition	TM Attribute	TM Opt	NeTEx Class Name	NeTEx Attribute	Compare
COMMERCIAL PROFILE	A category of users depending on their commercial relations with the operator (frequency of use, amount of purchase etc.), often used for allowing discounts.	ID	N	COMMERCIAL PROFILE	Id	Same
COMMERCIAL PROFILE		CONSUMPTION FACTOR	Y	COMMERCIAL PROFILE	ConsumptionFactor	Same
COMMERCIAL PROFILE		FINANCIAL FACTOR	Y	COMMERCIAL PROFILE	FinancialFactor	Same
COMMON SECTION	A part of a public transport network where the ROUTEs of several JOURNEY PATTERNs are going in parallel and where the synchronisation of SERVICE JOURNEYs may be planned and controlled with respect to commonly used LINKs and STOP POINTs. COMMON SECTIONs a	ID	N	COMMON SECTION	Id	Same
COMMON SECTION		DESCRIPTION	Y	COMMON SECTION	Description	Same
COMPLEX FEATURE	An aggregate of SIMPLE FEATUREs and/or other COMPLEX FEATUREs; e.g. a STOP AREA: combination of STOP POINTS; a train station: combination of SIMPLE FEATUREs (POINTs, LINKs) and COMPLEX FEATUREs (STOP AREAs).	ID	N	COMPLEX FEATURE	Id	Same
COMPLEX FEATURE PROJECTION	An oriented correspondence: - from one COMPLEX FEATURE in the source layer, - onto an entity in a target layer: e.g. POINT, COMPLEX FEATURE,			COMPLEX FEATURE PROJECTION		Same
CONNECTION LINK	The physical (spatial) possibility for a passenger to change from one public transport vehicle to another to continue the trip. Different times may be necessary to cover this link, depending on the kind of passenger.	DEFAULT DURATION	N	CONNECTION	DefaultDuration	Same
CONNECTION LINK		DESCRIPTION	Y	CONNECTION	Description	Same
CONNECTION LINK		DISTANCE	Y	CONNECTION	Distance	Same

Table G.1 *(continued)*

TM Class Name	TM Definition	TM Attribute	TM Opt	NeTEx Class Name	NeTEx Attribute	Compare
CONNECTION LINK		FREQUENT TRAVELLER DURATION	Y	CONNECTION	FrequentTravellerDuration	Same
CONNECTION LINK		MOBILITY RESTRICTED TRAVELLER DURATION	Y	CONNECTION	MobilityRestrictedTravellerDuration	Same
CONNECTION LINK		OCCASIONAL TRAVELLER DURATION	Y	CONNECTION	OccasionalTravellerDuration	Same
CONNECTION LINK		SUITABLE FOR MOBILITY RESTRICTED	Y	CONNECTION	SuitableForMobilityRestricted	Same
CONTRACT	A contract with a particular (but possibly anonymous) customer, ruling the consumption of transport services (and joint services). A CONTRACT may be designed for a fixed SALES PACKAGE (e.g. ticket) or to allow successive purchases of SALES PACKAGEs.	ID	N	CONTRACT	Id	Same
CONTRACT		TYPE	N	CONTRACT	Type	Same
CONTRACT		STATUS	N	CONTRACT	Status	Same
CONTROLLABLE ELEMENT	The smallest controllable element of public transport consumption, all along which any VALIDITY PARAMETER ASSIGNMENT remains valid.	ID	N	CONTROLLABLE ELEMENT	Id	Same
CONTROLLABLE ELEMENT		NAME	Y	CONTROLLABLE ELEMENT	Name	Same
CONTROLLABLE ELEMENT IN SEQUENCE	A CONTROLLABLE ELEMENT as a part of a FARE STRUCTURE ELEMENT, including its possible order in the sequence of CONTROLLABLE ELEMENTs grouped together to form that FARE STRUCTURE ELEMENT, and its possible quantitative limitation.	ID	N	CONTROLLABLE ELEMENT IN SEQUENCE	Id	Same
CONTROLLABLE ELEMENT IN SEQUENCE		ACCESS NUMBER	Y	CONTROLLABLE ELEMENT IN SEQUENCE	AccessNumber	Same
CONTROLLABLE ELEMENT IN SEQUENCE		FIRST IN SEQUENCE	Y	CONTROLLABLE ELEMENT IN SEQUENCE	FirstInSequence	Same
CONTROLLABLE ELEMENT IN SEQUENCE		LAST IN SEQUENCE	Y	CONTROLLABLE ELEMENT IN SEQUENCE	LastInSequence	Same

Table G.1 *(continued)*

TM Class Name	TM Definition	TM Attribute	TM Opt	NeTEx Class Name	NeTEx Attribute	Compare
CONTROLLABLE ELEMENT IN SEQUENCE		LIMITED ACCESS NUMBER	Y	CONTROLLABLE ELEMENT IN SEQUENCE	LimitedAccessNumber	Same
CONTROLLABLE ELEMENT IN SEQUENCE		ORDER	Y	CONTROLLABLE ELEMENT IN SEQUENCE	Order	Same
CONTROLLABLE ELEMENT PRICE	A set of all possible price features of a CONTROLLABLE ELEMENT: default total price, discount in value or percentage etc.	START DATE	N	CONTROLLABLE ELEMENT PRICE	StartDate	Same
CONTROLLABLE ELEMENT PRICE		DISCOUNT IN PERCENTAGE	Y	CONTROLLABLE ELEMENT PRICE	DiscountInPercentage	Same
CONTROLLABLE ELEMENT PRICE		DISCOUNT IN VALUE	Y	CONTROLLABLE ELEMENT PRICE	DiscountInValue	Same
CONTROLLABLE ELEMENT PRICE		PRICE	Y	CONTROLLABLE ELEMENT PRICE	Price	Same
COUPLED JOURNEY	A complete journey operated by a coupled train, composed of two or more VEHICLE JOURNEYs remaining coupled together all along a JOURNEY PATTERN. A COUPLED JOURNEY may be viewed as a single VEHICLE JOURNEY.			COUPLED JOURNEY		Same
COURSE OF JOURNEYS	A part of a BLOCK composed of consecutive VEHICLE JOURNEYs defined for the same DAY TYPE, all operated on the same LINE.	ID	N	COURSE OF JOURNEYS	Id	Same
COURSE OF JOURNEYS		FINISHING DURATION	Y	COURSE OF JOURNEYS	FinishingDuration	Same
COURSE OF JOURNEYS		PREPARATION DURATION	Y	COURSE OF JOURNEYS	PreparationDuration	Same
COURSE OF JOURNEYS		START TIME IN BLOCK	Y	COURSE OF JOURNEYS	StartTimeInBlock	Same
CREW BASE	A place where operating EMPLOYEEs (e.g. drivers) report on and register their work.	NAME	N	CREW BASE	Name	Same
DATA SYSTEM	The origin of operational data referring to one single responsibility. References to a data system are useful in an interoperated computer system.	ID	N	DATA SYSTEM	Id	Same

Table G.1 *(continued)*

TM Class Name	TM Definition	TM Attribute	TM Opt	NeTEx Class Name	NeTEx Attribute	Compare
DATA SYSTEM		USER	N	DATA SYSTEM	User	Same
DATA SYSTEM		VERSION	N	DATA SYSTEM	Version	Same
DATED BLOCK	The work of a vehicle on a particular OPERATING DAY from the time it leaves a PARKING POINT after parking until its next return to park at a PARKING POINT.	ID	N	DATED BLOCK	Id	Same
DATED PASSING TIME	A PASSING TIME on a particular OPERATING DAY.			DATED PASSING TIME		Same
DATED SPECIAL SERVICE	A SPECIAL SERVICE taking place on a particular OPERATING DAY. It may derive from a planned SPECIAL SERVICE, or be only occasional.	ID	N	DATED SPECIAL SERVICE	Id	Same
DATED SPECIAL SERVICE		CLIENT	Y	DATED SPECIAL SERVICE	Client	Same
DATED SPECIAL SERVICE		END TIME	N	DATED SPECIAL SERVICE	EndTime	Same
DATED SPECIAL SERVICE		START TIME	N	DATED SPECIAL SERVICE	StartTime	Same
DATED VEHICLE JOURNEY	A particular journey of a vehicle on a particular OPERATING DAY including all modifications possibly decided by the control staff.	ID	N	DATED VEHICLE JOURNEY	Id	Same
DATED VEHICLE JOURNEY		DEPARTURE TIME	N	DATED VEHICLE JOURNEY	DepartureTime	Same
DAY OF WEEK	A particular week day (from Monday to Sunday).	DAY	N	DAY OF WEEK	Day	Same
DAY TYPE	A type of day characterised by one or more properties which affect public transport operation. For example: weekday in school holidays.	ID	N	DAY TYPE	Id	Same
DAY TYPE		EARLIEST TIME	Y	DAY TYPE	EarliestTime	Same
DAY TYPE		LATEST TIME	Y	DAY TYPE	LatestTime	Same
DAY TYPE		NAME	Y	DAY TYPE	Name	Same
DEAD RUN	A non-service VEHICLE JOURNEY.			DEAD RUN		Same
DEAD RUN PATTERN	A JOURNEY PATTERN to be used for DEAD RUNs.			DEAD RUN PATTERN		Same

Table G.1 *(continued)*

TM Class Name	TM Definition	TM Attribute	TM Opt	NeTEx Class Name	NeTEx Attribute	Compare
DEFAULT DEAD RUN RUN TIME	The time taken to traverse a TIMING LINK during a DEAD RUN, for a specified TIME DEMAND TYPE. This time may be superseded by the JOURNEY PATTERN RUN TIME or VEHICLE JOURNEY RUN TIME if these exist.	DURATION	N	DEFAULT DEAD RUN RUN TIME	Duration	Same
DEFAULT INTERCHANGE	A quality parameter fixing the acceptable duration (standard and maximum) for an interchange to be planned between two STOP POINTs. This parameter will be used to control whether any two VEHICLE JOURNEYs serving those points may be in connection.	MAXIMUM DURATION	N	DEFAULT INTERCHANGE	MaximumDuration	Same
DEFAULT INTERCHANGE		STANDARD DURATION	Y	DEFAULT INTERCHANGE	StandardDuration	Same
DEFAULT SERVICE JOURNEY RUN TIME	The default time taken by a vehicle to traverse a TIMING LINK during a SERVICE JOURNEY, for a specified TIME DEMAND TYPE. This time may be superseded by the JOURNEY PATTERN RUN TIME or VEHICLE JOURNEY RUN TIME if these exist.	DURATION	N	DEFAULT SERVICE JOURNEY RUN TIME	Duration	Same
DELTA	A record of the detailed changes of a given ENTITY IN VERSION from one VERSION to the next one. A DELTA contains pairs of attributes' old values - new values.			DELTA		Same
DEPARTURE EXCHANGE	A CONTROL ACTION consisting in permuting at one POINT the departure times of two or several DATED VEHICLE JOURNEYs.	PERMUTATION DIRECTION	N	DEPARTURE EXCHANGE	PermutationDirection	Same
DEPARTURE LAG	A CONTROL ACTION consisting in gradually shifting a set of departures at one POINT. It allows a change of the timetable without abrupt variations in the intervals.	SHIFTING TIME VALUE	N	DEPARTURE LAG	ShiftingTimeValue	Same

Table G.1 *(continued)*

TM Class Name	TM Definition	TM Attribute	TM Opt	NeTEx Class Name	NeTEx Attribute	Compare
DESTINATION DISPLAY	An advertised destination of a specific JOURNEY PATTERN, usually displayed on a headsign or at other on-board locations.	ID	N	DESTINATION DISPLAY	Id	Same
DESTINATION DISPLAY		NAME	Y	DESTINATION DISPLAY	Name	Same
DETECTED OPERATION	An actual data detected in a VEHICLE DETECTING event: detection of an actual vehicle coupling, of an INCIDENT, of an actual relief, etc.	ID	N	DETECTED OPERATION	Id	Same
DIRECTION	A classification for the general orientation of ROUTEs.	ID	N	DIRECTION	Id	Same
DIRECTION		NAME	Y	DIRECTION	Name	Same
DISPLAY ASSIGNMENT	The assignment of one STOP POINT and one JOURNEY PATTERN to a PI FACILITY, specifying that information on this STOP POINT and this JOURNEY PATTERN will be provided (e.g. displayed, printed).	DISPLAY PRIORITY	Y	DISPLAY ASSIGNMENT	DisplayPriority	Same
DISTANCE MATRIX ELEMENT	A cell of an origin-destination matrix for TARIFF ZONEs or STOP POINTs , expressing a fare distance for the corresponding trip: value in km, number of fare units etc.	ID	N	DISTANCE MATRIX ELEMENT	Id	Same
DISTANCE MATRIX ELEMENT		DISTANCE	N	DISTANCE MATRIX ELEMENT	Distance	Same
DISTANCE MATRIX ELEMENT PRICE	A set of all possible price features of a DISTANCE MATRIX ELEMENT: default total price etc.	START DATE	N	DISTANCE MATRIX ELEMENT PRICE	StartDate	Same
DISTANCE MATRIX ELEMENT PRICE		PRICE	Y	DISTANCE MATRIX ELEMENT PRICE	Price	Same

Table G.1 *(continued)*

TM Class Name	TM Definition	TM Attribute	TM Opt	NeTEx Class Name	NeTEx Attribute	Compare
ENTITY	Any data instance to be managed in an operational Version Management System. When several data sources coexist (multimodality and/or interoperability), an ENTITY has to be related to a given DATA SYSTEM in which it is defined.	ID	N	ENTITY	Id	Same
ENTITY IN FRAME	The different ENTITies IN REPOSITORY which can be relevant for corresponding VERSION FRAMEs.			ENTITY IN FRAME		Same
ENTITY IN REPOSITORY	Any ENTITY name belonging to the repository. DAY TYPE, PROPERTY OF DAY, TIME BAND, VEHICLE TYPE, DUTY, etc., are relevant instances of ENTITY IN REPOSITORY in the context of Version Management.	NAME	N	ENTITY IN REPOSITORY	Name	Same
ENTITY IN VERSION	The ENTITies associated to a given VERSION. ENTITY IN VERSION is restricted by ENTITY IN TYPE OF FRAME.			ENTITY IN VERSION		Same
ESTIMATED PASSING TIME	Time data, calculated from the latest available input, about when a public transport vehicle will pass a particular POINT IN JOURNEY PATTERN on a specified MONITORED VEHICLE JOURNEY. These are mainly used to inform passengers about expected times of arrival	EXPECTED ARRIVAL TIME	Y	ESTIMATED PASSING TIME	ExpectedArrivalTime	Same
ESTIMATED PASSING TIME		EXPECTED DEPARTURE TIME	Y	ESTIMATED PASSING TIME	ExpectedDepartureTime	Same
ESTIMATED PASSING TIME		EXPECTED NON-STOP PASSING TIME	Y	ESTIMATED PASSING TIME	ExpectedNon-StopPassingTime	Same
ESTIMATED PASSING TIME		EXPECTED WAITING TIME	Y	ESTIMATED PASSING TIME	ExpectedWaitingTime	Same

Table G.1 *(continued)*

TM Class Name	TM Definition	TM Attribute	TM Opt	NeTEx Class Name	NeTEx Attribute	Compare
FARE DAY TYPE	A type of day used in the fare collection domain, characterised by one or more properties which affect the definition of access rights and prices in the fare system.	ID	N	FARE DAY TYPE	Id	Same
FARE DAY TYPE		NAME	Y	FARE DAY TYPE	Name	Same
FARE PRODUCT	An immaterial marketable element (access rights, discount rights etc.), specific to a CHARGING METHOD.	ID	N	FARE PRODUCT	Id	Same
FARE PRODUCT		NAME	Y	FARE PRODUCT	Name	Same
FARE PRODUCT		TYPE	N	FARE PRODUCT	Type	Same
FARE PRODUCT PRICE	A set of all possible price features of a FARE PRODUCT: default total price, discount in value or percentage etc.	START DATE	N	FARE PRODUCT PRICE	StartDate	Same
FARE PRODUCT PRICE		DISCOUNT IN PERCENTAGE	Y	FARE PRODUCT PRICE	DiscountInPercentage	Same
FARE PRODUCT PRICE		DISCOUNT IN VALUE	Y	FARE PRODUCT PRICE	DiscountInValue	Same
FARE PRODUCT PRICE		PRICE	Y	FARE PRODUCT PRICE	Price	Same
FARE SECTION	A subdivision of a JOURNEY PATTERN consisting of consecutive POINTs IN JOURNEY PATTERN, used to define an element of the fare structure.			FARE SECTION		Same
FARE STRUCTURE ELEMENT	A sequence or set of CONTROLLABLE ELEMENTs to which rules for limitation of access rights and calculation of prices (fare structure) are applied.	ID	N	FARE STRUCTURE ELEMENT	Id	Same
FARE STRUCTURE ELEMENT		NAME	Y	FARE STRUCTURE ELEMENT	Name	Same

Table G.1 *(continued)*

TM Class Name	TM Definition	TM Attribute	TM Opt	NeTEx Class Name	NeTEx Attribute	Compare
FARE STRUCTURE ELEMENT IN SEQUENCE	A FARE STRUCTURE ELEMENT as a part of a VALIDABLE ELEMENT, including its possible order in the sequence of FARE STRUCTURE ELEMENTs forming that VALIDABLE ELEMENT, and its possible quantitative limitation.	ID	N	FARE STRUCTURE ELEMENT IN SEQUENCE	Id	Same
FARE STRUCTURE ELEMENT IN SEQUENCE		ACCESS NUMBER	Y	FARE STRUCTURE ELEMENT IN SEQUENCE	AccessNumber	Same
FARE STRUCTURE ELEMENT IN SEQUENCE		LIMITED ACCESS NUMBER	Y	FARE STRUCTURE ELEMENT IN SEQUENCE	LimitedAccessNumber	Same
FARE STRUCTURE ELEMENT IN SEQUENCE		ORDER	Y	FARE STRUCTURE ELEMENT IN SEQUENCE	Order	Same
FARE STRUCTURE ELEMENT PRICE	A set of all possible price features of a FARE STRUCTURE ELEMENT: default total price, discount in value or percentage etc.	START DATE	N	FARE STRUCTURE ELEMENT PRICE	StartDate	Same
FARE STRUCTURE ELEMENT PRICE		DISCOUNT IN PERCENTAGE	Y	FARE STRUCTURE ELEMENT PRICE	DiscountInPercentage	Same
FARE STRUCTURE ELEMENT PRICE		DISCOUNT IN VALUE	Y	FARE STRUCTURE ELEMENT PRICE	DiscountInValue	Same
FARE STRUCTURE ELEMENT PRICE		PRICE	Y	FARE STRUCTURE ELEMENT PRICE	Price	Same
FARE VERSION	A set of fare collection data to which the same VALIDITY CONDITIONs have been assigned.			FARE VERSION		Same
FOOTNOTE	A text for informational purposes on exceptions in a LINE, a JOURNEY PATTERN, etc. The information may be usable for passenger or driver information.	ID	N	FOOTNOTE	Id	Same
FOOTNOTE		PUBLIC	Y	FOOTNOTE	Public	Same
FOOTNOTE		TEXT	N	FOOTNOTE	Text	Same

Table G.1 *(continued)*

TM Class Name	TM Definition	TM Attribute	TM Opt	NeTEx Class Name	NeTEx Attribute	Compare
FOOTNOTE ASSIGNMENT	The assignment of a FOOTNOTE showing an exception in a JOURNEY PATTERN, a COMMON SECTION, or a VEHICLE JOURNEY, possibly specifying at which POINT IN JOURNEY PATTERN the validity of the FOOTNOTE starts and ends respectively.	ID	N	FOOTNOTE ASSIGNMENT	Id	Same
FOOTNOTE ASSIGNMENT		MARK	N	FOOTNOTE ASSIGNMENT	Mark	Same
FREQUENCY OF USE:	The limits of usage frequency of a VALIDABLE ELEMENT for a specific period. There may be different tariffs applicable depending on how often the right is consumed during the period.	MAXIMAL FREQUENCY	Y	FREQUENCY OF USE:	MaximalFrequency	Same
GARAGE	A facility used for parking and maintaining vehicles. PARKING POINTs in a GARAGE are called GARAGE POINTs.	NAME	N	GARAGE	Name	Same
GARAGE POINT	A subtype of PARKING POINT located in a GARAGE.			GARAGE POINT		Same
GENERIC PARAMETER ASSIGNMENT	A VALIDITY PARAMETER ASSIGNMENT specifying generic access rights for a class of products (e.g. a time band limit – 7 to 10 a.m. – for trips made with a student pass).			GENERIC PARAMETER ASSIGNMENT		Same
GEOGRAPHICAL INTERVAL	A geographical interval specifying access rights for the FARE STRUCTURE ELEMENTs within the range of this interval: 0-5 km, 4-6 zones etc.	ID	N	GEOGRAPHICAL INTERVAL	Id	Same
GEOGRAPHICAL INTERVAL		END GEO VALUE	N	GEOGRAPHICAL INTERVAL	EndGeoValue	Same
GEOGRAPHICAL INTERVAL		START GEO VALUE	N	GEOGRAPHICAL INTERVAL	StartGeoValue	Same
GEOGRAPHICAL INTERVAL PRICE	A set of all possible price features of a GEOGRAPHICAL INTERVAL: default total price etc.	START DATE	N	GEOGRAPHICAL INTERVAL PRICE	StartDate	Same

Table G.1 *(continued)*

TM Class Name	TM Definition	TM Attribute	TM Opt	NeTEx Class Name	NeTEx Attribute	Compare
GEOGRAPHICAL INTERVAL PRICE		PRICE	Y	GEOGRAPHICAL INTERVAL PRICE	Price	Same
GEOGRAPHICAL STRUCTURE FACTOR	The value of a GEOGRAPHICAL INTERVAL or a DISTANCE MATRIX ELEMENT expressed by a GEOGRAPHICAL UNIT.			GEOGRAPHICAL STRUCTURE FACTOR		Same
GEOGRAPHICAL UNIT	A unit for calculating geographical graduated fares.	NAME	N	GEOGRAPHICAL UNIT	Name	Same
GROUP OF LINES	A grouping of lines which will be commonly referenced for a specific purpose.	ID	N	GROUP OF LINES	Id	Same
GROUP OF LINES		DESCRIPTION	Y	GROUP OF LINES	Description	Same
GROUP OF LINES		NAME	Y	GROUP OF LINES	Name	Same
GROUP OF LINK SEQUENCES	A grouping of LINK SEQUENCEs.	ID	N	GROUP OF LINK SEQUENCES	Id	Same
GROUP OF LINKS	A grouping of LINKs. E.g. one GROUP OF LINKs may be managed by a same AUTHORITY.	ID	N	GROUP OF LINKS	Id	Same
GROUP OF OPERATORS	A group of OPERATORs having for instance common schemes for fare collection or passenger information.	ID	N	GROUP OF OPERATORS	Id	Same
GROUP OF OPERATORS		CATEGORY	Y	GROUP OF OPERATORS	Category	Same
GROUP OF POINTS	A grouping of POINTs. The STOP AREA represents one of the most significant GROUPs OF POINTS.	ID	N	GROUP OF POINTS	Id	Same
GROUP OF SERVICES	A group of SPECIAL SERVICEs, often known to its users by a name or a number.	ID	N	GROUP OF SERVICES	Id	Same
GROUP OF TIMEBANDS	A grouping of TIME BANDs.	ID	N	GROUP OF TIMEBANDS	Id	Same

Table G.1 *(continued)*

TM Class Name	TM Definition	TM Attribute	TM Opt	NeTEx Class Name	NeTEx Attribute	Compare
GROUP OF TIMING LINKS	A set of TIMING LINKs grouped together according to the similarity of TIME BANDs which are relevant to them. There may be a GROUP OF TIMING LINKS which covers all TIMING LINKs, for use when different GROUPs OF TIMING LINKS are not needed.	ID	N	GROUP OF TIMING LINKS	Id	Same
GROUP OF TIMING LINKS		DESCRIPTION	Y	GROUP OF TIMING LINKS	Description	Same
IMPOSSIBLE MANOEUVRE	A specification of impossible move for a certain type of vehicle. It specifies from which INFRASTRUCTURE LINK to which other (adjacent) INFRASTRUCTURE LINK a certain VEHICLE TYPE cannot proceed, due to physical restrictions.			IMPOSSIBLE MANOEUVRE		Same
INFRASTRUCTURE LINK	A supertype including all LINKs of the physical network (e.g. RAILWAY ELEMENT).			INFRASTRUCTURE LINK		Same
INFRASTRUCTURE POINT	A supertype including all POINTs of the physical network (e.g. RAILWAY JUNCTION).			INFRASTRUCTURE POINT		Same
INTERCHANGE STATUS	The information about the actual status of a SERVICE JOURNEY INTERCHANGE on a specified OPERATING DAY. Recorded information on missed interchanges may be of particular interest.	CAUSE OF MISSED INTERCHANGE	Y	INTERCHANGE STATUS	CauseOfMissedInterchange	Same
INTERCHANGE STATUS		NUMBER OF PASSENGERS	Y	INTERCHANGE STATUS	NumberOfPassengers	Same
INTERCHANGE STATUS		STATUS	N	INTERCHANGE STATUS	Status	Same
JOURNEY MEETING	A time constraint for one or several SERVICE JOURNEYs fixing interchanges between them and/or an external event (e.g. arrival or departure of a feeder line, opening time of the theatre, etc.).	ID	N	JOURNEY MEETING	Id	Same
JOURNEY MEETING		EARLIEST TIME	Y	JOURNEY MEETING	EarliestTime	Same

Table G.1 *(continued)*

TM Class Name	TM Definition	TM Attribute	TM Opt	NeTEx Class Name	NeTEx Attribute	Compare
JOURNEY MEETING		LATEST TIME	Y	JOURNEY MEETING	LatestTime	Same
JOURNEY MEETING		REASON FOR MEETING	N	JOURNEY MEETING	ReasonForMeeting	Same
JOURNEY PART	A part of a VEHICLE JOURNEY created according to a specific functional purpose, for instance in situations when vehicle coupling or separating occurs.	ID	N	JOURNEY PART	Id	Same
JOURNEY PART		END TIME	Y	JOURNEY PART	EndTime	Same
JOURNEY PART		START TIME	Y	JOURNEY PART	StartTime	Same
JOURNEY PART COUPLE	Two JOURNEY PARTs of different VEHICLE JOURNEYs served simultaneously by a train set up by coupling their single vehicles.	ORDER	N	JOURNEY PART COUPLE	Order	Same
JOURNEY PATTERN	An ordered list of STOP POINTs and TIMING POINTs on a single ROUTE, describing the pattern of working for public transport vehicles. A JOURNEY PATTERN may pass through the same POINT more than once. The first point of a JOURNEY PATTERN is the origin. The	ID	N	JOURNEY PATTERN	Id	Same
JOURNEY PATTERN		NAME	Y	JOURNEY PATTERN	Name	Same
JOURNEY PATTERN LAYOVER	A time allowance at the end of each journey on a specified JOURNEY PATTERN, to allow for delays and for other purposes. This layover supersedes any global layover and may be superseded by a specific VEHICLE JOURNEY LAYOVER.	DURATION	N	JOURNEY PATTERN LAYOVER	Duration	Same
JOURNEY PATTERN RUN TIME	The time taken to traverse a TIMING LINK in a particular JOURNEY PATTERN, for a specified TIME DEMAND TYPE. If it exists, it will override the DEFAULT SERVICE JOURNEY RUN TIME and DEFAULT DEAD RUN RUN TIME.	DURATION	N	JOURNEY PATTERN RUN TIME	Duration	Same

Table G.1 *(continued)*

TM Class Name	TM Definition	TM Attribute	TM Opt	NeTEx Class Name	NeTEx Attribute	Compare
JOURNEY PATTERN WAIT TIME	The time a vehicle has to wait at a specific TIMING POINT IN JOURNEY PATTERN, for a specified TIME DEMAND TYPE. This wait time can be superseded by a VEHICLE JOURNEY WAIT TIME.	DURATION	N	JOURNEY PATTERN WAIT TIME	Duration	Same
LINE	A group of ROUTEs which is generally known to the public by a similar name or number.	ID	N	LINE	Id	Same
LINE		NAME	Y	LINE	Name	Same
LINE SHAPE	The graphical shape of a LINK obtained from a formula or other means, using the LOCATION of its limiting POINTs and depending on the LOCATING SYSTEM used for the graphical representation.	FORMULA	N	LINE SHAPE	Formula	Same
LINK	An oriented spatial object of dimension 1 with view to the overall description of a network, describing a connection between two POINTs.	ID	N	LINK	Id	Same
LINK		LENGTH	Y	LINK	Length	Same
LINK IN LINK SEQUENCE	The order of a LINK in a LINK SEQUENCE to which it belongs.	ORDER	N	LINK IN LINK SEQUENCE	Order	Same
LINK PROJECTION	An oriented correspondence - from one LINK of a source layer, - onto an entity in a target layer: e.g.			LINK PROJECTION		Same
LINK SEQUENCE	An ordered sequence either of POINTs or of LINKs, defining a path through the network.	ID	N	LINK SEQUENCE	Id	Same
LOCATING SYSTEM	The system used as reference for location and graphical representation of the network and other spatial objects.	NAME	N	LOCATING SYSTEM	Name	Same
LOCATION	The position of a POINT with a reference to a given LOCATING SYSTEM (e. g. coordinates).			LOCATION		Same

Table G.1 *(continued)*

TM Class Name	TM Definition	TM Attribute	TM Opt	NeTEx Class Name	NeTEx Attribute	Compare
LOCATION		COORDINATE_1	N	LOCATION	Coordinate_1	Same
LOCATION		COORDINATE_2	N	LOCATION	Coordinate_2	Same
LOCATION		COORDINATE_3	Y	LOCATION	Coordinate_3	Same
LOGICAL DRIVER	A theoretically available driver resource for an OPERATING DAY, foreseen to be monitored.	ID	N	LOGICAL DRIVER	Id	Same
LOGICAL VEHICLE	A theoretically available vehicle resource for an OPERATING DAY, foreseen to be monitored.	ID	N	LOGICAL VEHICLE	Id	Same
LOGICAL VEHICLE CANCELLATION	A CONTROL ACTION consisting in removing a LOGICAL VEHICLE from the production plan.			LOGICAL VEHICLE CANCELLATION		Same
LUGGAGE ALLOWANCE	The number and characteristics (weight, volume) of luggage that a holder of an access right is entitled to carry.	NUMBER OF LUGGAGE	Y	LUGGAGE ALLOWANCE	NumberOfLuggage	Same
LUGGAGE ALLOWANCE		VOLUME	Y	LUGGAGE ALLOWANCE	Volume	Same
LUGGAGE ALLOWANCE		WEIGHT	Y	LUGGAGE ALLOWANCE	Weight	Same
MEAN PASSENGER WAIT TIME	An estimated mean waiting time for a passenger at a STOP POINT, used to calculate the approximate duration of a trip. This value is estimated from the mean interval between vehicles on a JOURNEY PATTERN or a COMMON SECTION.	DURATION	N	MEAN PASSENGER WAIT TIME	Duration	Same
MEAN RUN TIME	An estimated value of the mean run time on a TIMING LINK, used to inform passengers on the mean duration of trips.	DURATION	N	MEAN RUN TIME	Duration	Same
MEETING RESTRICTION	A pair of INFRASTRUCTURE LINKs where vehicles of specified VEHICLE TYPEs are not allowed to meet.			MEETING RESTRICTION		Same

Table G.1 *(continued)*

TM Class Name	TM Definition	TM Attribute	TM Opt	NeTEx Class Name	NeTEx Attribute	Compare
MONITORED VEHICLE JOURNEY	A journey that is monitored as being operated by a LOGICAL VEHICLE. According to the monitoring system capabilities, a MONITORED VEHICLE JOURNEY may be related to a DATED VEHICLE JOURNEY, or only to a JOURNEY PATTERN.	ID	N	MONITORED VEHICLE JOURNEY	Id	Same
NETWORK VERSION	A set of network data (and other data logically related to these) to which the same validity period has been assigned.	NAME	Y	NETWORK VERSION	Name	Same
NORMAL DATED BLOCK	A DATED BLOCK identical to a long-terms planned BLOCK, possibly updated according to short-term modifications of the PRODUCTION PLAN decided by the control staff.			NORMAL DATED BLOCK		Same
NORMAL DATED VEHICLE JOURNEY	A DATED VEHICLE JOURNEY identical to a long-term planned VEHICLE JOURNEY, possibly updated according to short-term modifications of the PRODUCTION PLAN decided by the control staff.			NORMAL DATED VEHICLE JOURNEY		Same
OBSERVED PASSING TIME	The actual passing of a public transport vehicle at a pre-defined POINT during a MONITORED VEHICLE JOURNEY.	ACTUAL ARRIVAL TIME	Y	OBSERVED PASSING TIME	ActualArrivalTime	Same
OBSERVED PASSING TIME		ACTUAL DEPARTURE TIME	Y	OBSERVED PASSING TIME	ActualDepartureTime	Same
OBSERVED PASSING TIME		ACTUAL NON-STOP PASSING TIME	Y	OBSERVED PASSING TIME	ActualNon-StopPassingTime	Same
OBSERVED PASSING TIME		ACTUAL WAITING TIME	Y	OBSERVED PASSING TIME	ActualWaitingTime	Same
OFFENCE	A log entry providing data on a violation of fare rules.	ID	N	OFFENCE	Id	Same
OFFENCE		DESCRIPTION	Y	OFFENCE	Description	Same
OPERATING DAY	A day of public transport operation in a specific calendar. An OPERATING DAY may last more than 24 hours.	CALENDAR	N	OPERATING DAY	Calendar	Same
OPERATING DAY		DATE	N	OPERATING DAY	Date	Same

Table G.1 *(continued)*

TM Class Name	TM Definition	TM Attribute	TM Opt	NeTEx Class Name	NeTEx Attribute	Compare
OPERATING DAY		EARLIEST TIME	Y	OPERATING DAY	EarliestTime	Same
OPERATING DAY		LATEST TIME	Y	OPERATING DAY	LatestTime	Same
OPERATING DEPARTMENT	The operating department which administers certain LINEs.	NAME	N	OPERATING DEPARTMENT	Name	Same
OPERATING DEPARTMENT		TYPE OF OPERATION	Y	OPERATING DEPARTMENT	TypeOfOperation	Same
OPERATOR	A company providing public transport services.	NAME	N	OPERATOR	Name	Same
OPTIMIZATION MODE	A type of optimisation criteria used to select a trip proposal (e.g. minimum duration, distance, number of interchanges, amount of fare, etc.).	ID	N	OPTIMIZATION MODE	Id	Same
ORGANISATIONAL UNIT	A grouping of responsibilities in a public transport company for planning and control.	NAME	N	ORGANISATIONAL UNIT	Name	Same
OVERTAKING POSSIBILITY	A POINT or a LINK where vehicles of specified VEHICLE TYPEs are not allowed to overtake each other.			OVERTAKING POSSIBILITY		Same
PARKING POINT	A TIMING POINT where vehicles may stay unattended for a long time. A vehicle's return to park at a PARKING POINT marks the end of a BLOCK.			PARKING POINT		Same
PASSENGER QUERY	A request for a specific information on public transport, expressed during a PI TRANSACTION.	ID	N	PASSENGER QUERY	Id	Same
PASSING TIME	Time data concerning public transport vehicles passing a particular POINT; e.g. arrival time, departure time, waiting time.	ID	N	PASSING TIME	Id	Same
PASSING TIME		ALIGHT AND REBOARD	Y	PASSING TIME	AlightAndReboard	Same
PERIOD	A continuous interval of time between two OPERATING DAYs which will be used to define validities.	NAME	Y	PERIOD	Name	Same

Table G.1 *(continued)*

TM Class Name	TM Definition	TM Attribute	TM Opt	NeTEx Class Name	NeTEx Attribute	Compare
PI FACILITY	A public transport information facility, for instance, terminals (on street, at information desks, telematic…) or printed material (leaflets displayed at stops, booklets…).	ID	N	PI FACILITY	Id	Same
PI FACILITY		ADDRESS	Y	PI FACILITY	Address	Same
PI FACILITY		DESCRIPTION	Y	PI FACILITY	Description	Same
PI TRANSACTION	A connection of a passenger to the operator information system, directly or via an employee, including one or several queries.	ID	N	PI TRANSACTION	Id	Same
PI TRANSACTION		END DATE	Y	PI TRANSACTION	EndDate	Same
PI TRANSACTION		END TIME	Y	PI TRANSACTION	EndTime	Same
PI TRANSACTION		START DATE	Y	PI TRANSACTION	StartDate	Same
PI TRANSACTION		START TIME	Y	PI TRANSACTION	StartTime	Same
PI TRANSACTION		USER ID	Y	PI TRANSACTION	UserId	Same
PLACE	A geographic place of any type which may be specified as the origin or destination of a TRIP. A PLACE may be of dimension 0 (a POINT), 1 (a road section) or 2 (a ZONE).	ID	N	PLACE	Id	Same
PLACE		NAME	N	PLACE	Name	Same
POINT	A 0-dimensional node of the network used for the spatial description of the network. POINTs may be located by a LOCATION in a given LOCATING SYSTEM.	ID	N	POINT	Id	Same
POINT		NAME	Y	POINT	Name	Same
POINT IN JOURNEY PATTERN	A STOP POINT or TIMING POINT in a JOURNEY PATTERN with its order in that JOURNEY PATTERN.	ORDER	N	POINT IN JOURNEY PATTERN	Order	Same
POINT IN JOURNEY PATTERN		FOR ALIGHTING	Y	POINT IN JOURNEY PATTERN	ForAlighting	Same
POINT IN JOURNEY PATTERN		FOR BOARDING	Y	POINT IN JOURNEY PATTERN	ForBoarding	Same

Table G.1 *(continued)*

TM Class Name	TM Definition	TM Attribute	TM Opt	NeTEx Class Name	NeTEx Attribute	Compare
POINT IN LINK SEQUENCE	A POINT in a LINK SEQUENCE indicating its order in that particular LINK SEQUENCE.	ORDER	N	POINT IN LINK SEQUENCE	Order	Same
POINT ON LINK	A POINT on a LINK which is not needed for LINK definition, but may be used for other purposes, e.g. for purposes of AVM or PI, or for driver information.	ORDER	N	POINT ON LINK	Order	Same
POINT ON LINK		DISTANCE FROM START	Y	POINT ON LINK	DistanceFromStart	Same
POINT ON ROUTE	A ROUTE POINT used to define a ROUTE with its order on that ROUTE.	ORDER	N	POINT ON ROUTE	Order	Same
POINT PROJECTION	An oriented correspondence - from one POINT of a source layer, - onto an entity in a target layer: e.g. POINT, LINK, LINK	DISTANCE	Y	POINT PROJECTION	Distance	Same
PRE-ASSIGNED FARE PRODUCT	A FARE PRODUCT consisting of one or several VALIDABLE ELEMENTs, specific to a CHARGING METHOD.			PRE-ASSIGNED FARE PRODUCT		Same
PRICE GROUP	A grouping of prices, allowing the grouping of numerous possible consumption elements into a limited number of price references, or to apply grouped increase, in value or percentage.	ID	N	PRICE GROUP	Id	Same
PRICE UNIT	A unit to express prices: amount of currency, abstract fare unit, ticket unit or token etc.	ID	N	PRICE UNIT	Id	Same
PRICE UNIT		NAME	Y	PRICE UNIT	Name	Same
PRODUCTION PLAN	A reference version of production activities (service journeys, dead runs, duties...). CONTROL ACTIONs are described with reference to the PRODUCTION PLAN they amend.	ID	N	PRODUCTION PLAN	Id	Same

Table G.1 *(continued)*

TM Class Name	TM Definition	TM Attribute	TM Opt	NeTEx Class Name	NeTEx Attribute	Compare
PROPERTY OF DAY	A property which a day may possess, such as school holiday, weekday, summer, winter etc.	NAME	N	PROPERTY OF DAY	Name	Same
PROPERTY OF DAY		DESCRIPTION	Y	PROPERTY OF DAY	Description	Same
PT TRIP	A part of a trip starting from the first boarding of a public transport vehicle to the last alighting from a public transport vehicle. A PT TRIP consists of one or more RIDEs and the movements (usually walks) necessary to cover the corresponding CONNECTIO	ID	N	PT TRIP	Id	Same
PUBLIC SITE	A sub-type of SITE without any operational relationship to the public transport operator.			PUBLIC SITE		Same
PURPOSE OF EQUIPMENT PROFILE	A functional purpose which requires a certain set of equipment of different types put together in a VEHICLE EQUIPMENT PROFILE or STOP POINT EQUIPMENT PROFILE.	NAME	N	PURPOSE OF EQUIPMENT PROFILE	Name	Same
PURPOSE OF GROUPING	Functional purpose for which GROUPs of elements are defined. The PURPOSE OF GROUPING may be restricted to one or more types of the given object.	ID	N	PURPOSE OF GROUPING	Id	Same
PURPOSE OF JOURNEY PARTITION	Operational purpose requiring changing characteristics of a VEHICLE JOURNEY along its JOURNEY PATTERN, thus to create JOURNEY PARTs.	NAME	N	PURPOSE OF JOURNEY PARTITION	Name	Same
QUALITY STRUCTURE FACTOR	A factor influencing access rights definition or calculation of prices, based on the quality: traffic congestion threshold, early/late reservation etc.	ID	N	QUALITY STRUCTURE FACTOR	Id	Same
QUALITY STRUCTURE FACTOR		DESCRIPTION	Y	QUALITY STRUCTURE FACTOR	Description	Same

Table G.1 *(continued)*

TM Class Name	TM Definition	TM Attribute	TM Opt	NeTEx Class Name	NeTEx Attribute	Compare
QUALITY STRUCTURE FACTOR		NAME	Y	QUALITY STRUCTURE FACTOR	Name	Same
QUALITY STRUCTURE FACTOR		VALUE	Y	QUALITY STRUCTURE FACTOR	Value	Same
RAILWAY ELEMENT	A type of INFRASTRUCTURE LINK used to describe a railway network.			RAILWAY ELEMENT		Same
RAILWAY JUNCTION	A type of INFRASTRUCTURE POINT used to describe a railway network.			RAILWAY JUNCTION		Same
RELIEF OPPORTUNITY	A time in a BLOCK where a vehicle passes a RELIEF POINT. This opportunity may or may not be actually used for a relief.	TIME	N	RELIEF OPPORTUNITY	Time	Same
RELIEF POINT	A TIMING POINT where a relief is possible, i.e. a driver may take on or hand over a vehicle. The vehicle may sometimes be left unattended.			RELIEF POINT		Same
ROAD ELEMENT	A type of INFRASTRUCTURE LINK used to describe a road network			ROAD ELEMENT		Same
ROAD JUNCTION	A type of INFRASTRUCTURE POINT used to describe a road network.			ROAD JUNCTION		Same
ROUTE	An ordered list of located POINTs defining one single path through the road (or rail) network. A ROUTE may pass through the same POINT more than once.	ID	N	ROUTE	Id	Same
ROUTE		NAME	Y	ROUTE	Name	Same
ROUTE LINK	An oriented link between two ROUTE POINTs allowing the definition of a unique path through the network.	DISTANCE	Y	ROUTE LINK	Distance	Same
ROUTE POINT	A POINT used to define the shape of a ROUTE through the network.			ROUTE POINT		Same
ROUTE POINT		VIA_FLAG	N	ROUTE POINT	Via_Flag	Same

Table G.1 *(continued)*

TM Class Name	TM Definition	TM Attribute	TM Opt	NeTEx Class Name	NeTEx Attribute	Compare
SALE DISCOUNT RIGHT	A FARE PRODUCT allowing a customer to benefit from discounts when purchasing SALES PACKAGEs.			SALE DISCOUNT RIGHT		Same
SALE DISCOUNT RIGHT				SALE DISCOUNT RIGHT		Same
SALE DISCOUNT RIGHT				SALE DISCOUNT RIGHT		Same
SALE TRANSACTION	A SALE OF a FIXED PACKAGE or a SALE OF a RELOADABLE PACKAGE.	ID	N	SALE TRANSACTION	Id	Same
SALE TRANSACTION		TIME	Y	SALE TRANSACTION	Time	Same
SALES PACKAGE	A package to be sold as a whole, consisting of one or several FARE PRODUCTs materialised thanks to one or several TRAVEL DOCUMENTs. The FARE PRODUCTs may be either directly attached to the TRAVEL DOCUMENTs, or may be reloadable on the TRAVEL DOCUMENTs.	ID	N	SALES PACKAGE	Id	Same
SALES PACKAGE		TYPE	N	SALES PACKAGE	Type	Same
SALES PACKAGE ELEMENT	The assignment of a FARE PRODUCT to a TYPE OF TRAVEL DOCUMENT in order to define a SALES PACKAGE, realised as a fixed assignment (printing, magnetic storage etc.) or by the possibility for the FARE PRODUCT to be reloaded on the TYPE OF TRAVEL DOCUMENT.	NUMBER OF MEDIA	Y	SALES PACKAGE ELEMENT	NumberOfMedia	Same
SALES PACKAGE PRICE	A set of all possible price features of a SALES PACKAGE: default total price etc.	START DATE	N	SALES PACKAGE PRICE	StartDate	Same
SALES PACKAGE PRICE		PRICE	Y	SALES PACKAGE PRICE	Price	Same
SCHEDULE QUERY	A PASSENGER QUERY about public timetables.			SCHEDULE QUERY		Same
SEAT CLASS	A parameter indicating the quality of transport (e.g. 1st class or 2nd class).	ID	N	SEAT CLASS	Id	Same

Table G.1 *(continued)*

TM Class Name	TM Definition	TM Attribute	TM Opt	NeTEx Class Name	NeTEx Attribute	Compare
SERVICE JOURNEY	A passenger carrying VEHICLE JOURNEY for one specified DAY TYPE. The pattern of working is defined by the associated SERVICE JOURNEY PATTERN.			SERVICE JOURNEY		Same
SERVICE JOURNEY INTERCHANGE	The scheduled possibility for transfer of passengers between two SERVICE JOURNEYs at the same or different STOP POINTs.	ADVERTISED	Y	SERVICE JOURNEY INTERCHANGE	Advertised	Same
SERVICE JOURNEY INTERCHANGE		GUARANTEED	Y	SERVICE JOURNEY INTERCHANGE	Guaranteed	Same
SERVICE JOURNEY INTERCHANGE		MAXIMUM WAIT TIME	Y	SERVICE JOURNEY INTERCHANGE	MaximumWaitTime	Same
SERVICE JOURNEY INTERCHANGE		PRIORITY	Y	SERVICE JOURNEY INTERCHANGE	Priority	Same
SERVICE JOURNEY PATTERN	The JOURNEY PATTERN for a (passenger carrying) SERVICE JOURNEY.	TYPE OF SERVICE	Y	SERVICE JOURNEY PATTERN	TypeOfService	Same
SERVICE JOURNEY PATTERN INTERCHANGE	A recognised/organised possibility for passengers to change public transport vehicles using two STOP POINTs (which may be identical) on two particular SERVICE JOURNEY PATTERNs, including the maximum wait duration allowed and the standard to be aimed at. T	ADVERTISED	Y	SERVICE JOURNEY PATTERN INTERCHANGE	Advertised	Same
SERVICE JOURNEY PATTERN INTERCHANGE		GUARANTEED	Y	SERVICE JOURNEY PATTERN INTERCHANGE	Guaranteed	Same
SERVICE JOURNEY PATTERN INTERCHANGE		MAXIMUM DURATION	N	SERVICE JOURNEY PATTERN INTERCHANGE	MaximumDuration	Same
SERVICE JOURNEY PATTERN INTERCHANGE		PRIORITY	Y	SERVICE JOURNEY PATTERN INTERCHANGE	Priority	Same
SERVICE JOURNEY PATTERN INTERCHANGE		STANDARD DURATION	Y	SERVICE JOURNEY PATTERN INTERCHANGE	StandardDuration	Same
SERVICE LINK	A LINK between an ordered pair of STOP POINTs.			SERVICE LINK		Same

Table G.1 *(continued)*

TM Class Name	TM Definition	TM Attribute	TM Opt	NeTEx Class Name	NeTEx Attribute	Compare
SERVICE PATTERN	The subset of a JOURNEY PATTERN made up only of STOP POINTs IN JOURNEY PATTERN.	ID	N	SERVICE PATTERN	Id	Same
SERVICE SITE	A sub-type of SITE which is of specific interest for the operator (e.g. where a joint service or a joint fee is proposed).			SERVICE SITE		Same
SIMPLE FEATURE	An abstract representation of elementary objects related to the spatial representation of the network POINTs (0-dimensional objects), LINKs (1-dimensional objects) and ZONEs (2-dimensional objects) may be viewed as SIMPLE FEATUREs.	OBJECT ID	N	SIMPLE FEATURE	ObjectId	Same
SIMPLE FEATURE		OBJECT TYPE	N	SIMPLE FEATURE	ObjectType	Same
SITE	A well known PLACE to which a passenger may refer to indicate the origin or the destination of a TRIP.	ID	N	SITE	Id	Same
SITE		NAME	N	SITE	Name	Same
SPARE DUTY	A DUTY to which specific timed work has not yet been assigned.			SPARE DUTY		Same
SPECIAL SERVICE	A work of a vehicle that is not planned in a classical way i.e. that is generally not based on VEHICLE JOURNEYs using JOURNEY PATTERNs. It involves specific characteristics (such as specific access rights)and/or may be operated under specific circumstance	ID	N	SPECIAL SERVICE	Id	Same
SPECIAL SERVICE		CLIENT	Y	SPECIAL SERVICE	Client	Same
SPECIAL SERVICE		END TIME	N	SPECIAL SERVICE	EndTime	Same
SPECIAL SERVICE		START TIME	N	SPECIAL SERVICE	StartTime	Same

Table G.1 *(continued)*

TM Class Name	TM Definition	TM Attribute	TM Opt	NeTEx Class Name	NeTEx Attribute	Compare
SPECIFIC PARAMETER ASSIGNMENT	A VALIDITY PARAMETER ASSIGNMENT specifying practical parameters during a TRAVEL SPECIFICATION, within a given fare structure (e.g. the origin or destination zone in a zone-counting system).	ID	N	SPECIFIC PARAMETER ASSIGNMENT	Id	Same
SPECIFIC PARAMETER ASSIGNMENT		CLIENT	Y	SPECIFIC PARAMETER ASSIGNMENT	Client	Same
SPECIFIC PARAMETER ASSIGNMENT		END TIME	N	SPECIFIC PARAMETER ASSIGNMENT	EndTime	Same
SPECIFIC PARAMETER ASSIGNMENT		START TIME	N	SPECIFIC PARAMETER ASSIGNMENT	StartTime	Same
STAND-BY	A non-driving period of a driver's duty when (s)he must wait ready to take on any specified piece of work instantly.			STAND-BY		Same
STOP AREA	A group of STOP POINTs close to each other.	NAME	N	STOP AREA	Name	Same
STOP POINT	A POINT where passengers can board or alight from vehicles.	FOR ALIGHTING	Y	SCHEDULED STOP POINT	ForAlighting	Same
STOP POINT		FOR BOARDING	Y	SCHEDULED STOP POINT	ForBoarding	Same
STOP POINT EQUIPMENT PROFILE	Each instantiation of this entity gives the number of items of one TYPE OF EQUIPMENT a TYPE OF STOP POINT should contain for a given PURPOSE OF EQUIPMENT PROFILE. The set of instantiations for one TYPE OF STOP POINT and one purpose gives one complete 'pro	PROFILE	N	STOP POINT EQUIPMENT PROFILE	Profile	Same
STOP POINT EQUIPMENT PROFILE		UNITS	N	STOP POINT EQUIPMENT PROFILE	Units	Same
STOP POINT IN JOURNEY PATTERN	A POINT in a JOURNEY PATTERN which is a STOP POINT.	ORDER	N	STOP POINT IN JOURNEY PATTERN	Order	Same

Table G.1 *(continued)*

TM Class Name	TM Definition	TM Attribute	TM Opt	NeTEx Class Name	NeTEx Attribute	Compare
TARGET PASSING TIME	Time data about when a public transport vehicle should pass a particular POINT IN JOURNEY PATTERN on a particular DATED VEHICLE JOURNEY, in order to match the latest valid plan.	AIMED ARRIVAL TIME	Y	TARGET PASSING TIME	AimedArrivalTime	Same
TARGET PASSING TIME		AIMED DEPARTURE TIME	Y	TARGET PASSING TIME	AimedDepartureTime	Same
TARGET PASSING TIME		AIMED NON-STOP PASSING TIME	Y	TARGET PASSING TIME	AimedNon-StopPassingTime	Same
TARGET PASSING TIME		AIMED WAITING TIME	Y	TARGET PASSING TIME	AimedWaitingTime	Same
TARIFF STRUCTURE	A particular tariff, described by a combination of parameters.	ID	N	TARIFF STRUCTURE	Id	Same
TARIFF STRUCTURE		NAME	Y	TARIFF STRUCTURE	Name	Same
TARIFF ZONE	A ZONE used to define a zonal fare structure in a zone-counting or zone-matrix system.			TARIFF ZONE		Same
TIME ALLOWANCE	A fixed paid time allowed to perform certain activities to prepare for or to complete the work assigned either to a BLOCK, or to a DUTY, or to a DUTY PART, or to a STRETCH.	DURATION	N	TIME ALLOWANCE	Duration	Same
TIME BAND	A period in a day, significant for some aspect of public transport, e.g. similar traffic conditions or fare category.	END TIME	N	TIME BAND	EndTime	Same
TIME BAND		START TIME	N	TIME BAND	StartTime	Same
TIME DEMAND TYPE	An indicator of traffic conditions or other factors which may affect vehicle run or wait times. It may be entered directly by the scheduler or defined by the use of TIME BANDS.	ID	N	TIME DEMAND TYPE	Id	Same
TIME DEMAND TYPE		DESCRIPTION	Y	TIME DEMAND TYPE	Description	Same
TIME DEMAND TYPE		NAME	Y	TIME DEMAND TYPE	Name	Same

Table G.1 *(continued)*

TM Class Name	TM Definition	TM Attribute	TM Opt	NeTEx Class Name	NeTEx Attribute	Compare
TIME DEMAND TYPE ASSIGNMENT	The assignment of a TIME DEMAND TYPE to a TIME BAND depending on the DAY TYPE and GROUP OF TIMING LINKS.			TIME DEMAND TYPE ASSIGNMENT		Same
TIME INTERVAL	A time-based interval specifying access rights for the FARE STRUCTURE ELEMENTs within the range of this interval: 0-1 hour, 1-3 days etc.	ID	N	TIME INTERVAL	Id	Same
TIME INTERVAL		END	N	TIME INTERVAL	End	Same
TIME INTERVAL		START	N	TIME INTERVAL	Start	Same
TIME INTERVAL PRICE	A set of all possible price features of a TIME INTERVAL: default total price etc.	START DATE	N	TIME INTERVAL PRICE	StartDate	Same
TIME INTERVAL PRICE		PRICE	Y	TIME INTERVAL PRICE	Price	Same
TIME STRUCTURE FACTOR	The value of a TIME INTERVAL expressed by a TIME UNIT.			TIME STRUCTURE FACTOR		Same
TIME UNIT	A unit for calculating time-based graduated fares.	NAME	N	TIME UNIT	Name	Same
TIMETABLE VERSION	A set of timetable data (VEHICLE JOURNEYs and BLOCKs) to which the same VALIDITY CONDITIONs have been assigned.	NAME	N	TIMETABLE VERSION	Name	Same
TIMETABLED PASSING TIME	Long-term planned time data concerning public transport vehicles passing a particular POINT IN JOURNEY PATTERN on a specified VEHICLE JOURNEY for a certain DAY TYPE.	TIMETABLED ARRIVAL TIME	Y	TIMETABLED PASSING TIME	TimetabledArrivalTime	Same
TIMETABLED PASSING TIME		TIMETABLED DEPARTURE TIME	Y	TIMETABLED PASSING TIME	TimetabledDepartureTime	Same
TIMETABLED PASSING TIME		TIMETABLED WAITING TIME	Y	TIMETABLED PASSING TIME	TimetabledWaitingTime	Same
TIMING LINK	An ordered pair of TIMING POINTs for which run times may be recorded.			TIMING LINK		Same

Table G.1 *(continued)*

TM Class Name	TM Definition	TM Attribute	TM Opt	NeTEx Class Name	NeTEx Attribute	Compare
TIMING LINK IN JOURNEY PATTERN	The position of a TIMING LINK in a JOURNEY PATTERN. This entity is needed if a TIMING LINK is repeated in the same JOURNEY PATTERN, and separate information is to be stored about each iteration of the TIMING LINK.	ORDER	N	TIMING LINK IN JOURNEY PATTERN	Order	Same
TIMING PATTERN	The subset of a JOURNEY PATTERN made up only of TIMING POINTs IN JOURNEY PATTERN.	ID	N	TIMING PATTERN	Id	Same
TIMING POINT	A POINT against which the timing information necessary to build schedules may be recorded.	ALLOWED FOR WAIT TIME	Y	TIMING POINT	AllowedForWaitTime	Same
TIMING POINT IN JOURNEY PATTERN	A POINT in a JOURNEY PATTERN which is a TIMING POINT.	ORDER	N	TIMING POINT IN JOURNEY PATTERN	Order	Same
TIMING POINT IN JOURNEY PATTERN		WAIT POINT	N	TIMING POINT IN JOURNEY PATTERN	WaitPoint	Same
TRACE	A way to record the context of the changes occurred in a given ENTITY instance, as regards the authors, the causes of the changes, etc., possibly accompanied by a descriptive text.	ID	N	TRACE	Id	Same
TRAFFIC CONTROL POINT	A POINT where the traffic flow can be influenced. Examples are: traffic lights (lanterns), barriers.			TRAFFIC CONTROL POINT		Same
TRAIN	A vehicle composed of TRAIN ELEMENTs in a certain order, i.e. of wagons assembled together and propelled by a locomotive or one of the wagons.			TRAIN		Same
TRAIN		REVERSING DIRECTION	Y	TRAIN	ReversingDirection	Same

Table G.1 *(continued)*

TM Class Name	TM Definition	TM Attribute	TM Opt	NeTEx Class Name	NeTEx Attribute	Compare
TRAIN BLOCK	A composite train formed of several BLOCKs coupled together during a certain period. Any coupling or separation action marks the start of a new TRAIN BLOCK.	ID	N	TRAIN BLOCK	Id	Same
TRAIN BLOCK PART	The position of a vehicle BLOCK within a TRAIN BLOCK.	ORDER	N	TRAIN BLOCK PART	Order	Same
TRAIN BLOCK PART		END TIME	Y	TRAIN BLOCK PART	EndTime	Same
TRAIN BLOCK PART		MAIN BLOCK	N	TRAIN BLOCK PART	MainBlock	Same
TRAIN BLOCK PART		START TIME	Y	TRAIN BLOCK PART	StartTime	Same
TRAIN BLOCK PART		TYPE OF COUPLING	Y	TRAIN BLOCK PART	TypeOfCoupling	Same
TRAIN COMPONENT	A specification of the order of TRAIN ELEMENTs in a TRAIN.	ORDER	N	TRAIN COMPONENT	Order	Same
TRAIN ELEMENT	An elementary component of a TRAIN (e.g. wagon, locomotive).	ID	N	TRAIN ELEMENT	Id	Same
TRANSFERABILITY	The number and characteristics of persons entitled to use the public transport service instead of the original customer.	TRANSFERABILITY FACTOR	Y	TRANSFERABILITY	TransferabilityFactor	Same
TRANSPORT MODE	A characterisation of the operation according to the means of transport (bus, tram, metro, train, ferry, ship).	NAME	N	TRANSPORT MODE	Name	Same
TRAVEL DOCUMENT	A particular physical support (ticket, card…) to be held by a customer, allowing the right to travel or to consume joint-services, to proof a payment (including possible discount rights), to store a subset of the CONTRACT liabilities or a combination of	ID	N	TRAVEL DOCUMENT	Id	Same

Table G.1 *(continued)*

TM Class Name	TM Definition	TM Attribute	TM Opt	NeTEx Class Name	NeTEx Attribute	Compare
TURN STATION	A place (often a terminus) where a vehicle can reverse its direction (from a ROUTE to another of opposite DIRECTION).	ID	N	TURN STATION	Id	Same
TURN STATION		TURNAROUND DISTANCE	Y	TURN STATION	TurnaroundDistance	Same
TURNAROUND TIME LIMIT	The maximum time for which a vehicle may be scheduled to wait at a particular TIMING POINT (often included in a TURN STATION) without being returned to a PARKING POINT. A minimum time for a vehicle to turn its direction may also be recorded. This may be s	MAXIMUM DURATION	N	TURNAROUND TIME LIMIT	MaximumDuration	Same
TURNAROUND TIME LIMIT		MINIMUM DURATION	Y	TURNAROUND TIME LIMIT	MinimumDuration	Same
TYPE OF ALLOWANCE	A classification of additional paid times, including the information whether the allowance is given before or after the main activity.	ID	N	TYPE OF ALLOWANCE	Id	Same
TYPE OF ALLOWANCE		PRE OR POST	N	TYPE OF ALLOWANCE	PreOrPost	Same
TYPE OF EQUIPMENT	A classification of equipment items to be installed at stop points or onboard vehicles, for instance.	ID	N	TYPE OF EQUIPMENT	Id	Same
TYPE OF EQUIPMENT		DESCRIPTION	Y	TYPE OF EQUIPMENT	Description	Same
TYPE OF FRAME	A classification of VERSION FRAMEs according to a common purpose. E.g. line descriptions for line versions, vehicle schedules, operating costs. A TYPE OF FRAME is ruled by a unique TYPE OF VALIDITY.	ID	N	TYPE OF FRAME	Id	Same
TYPE OF FRAME		FROZEN	N	TYPE OF FRAME	Frozen	Same
TYPE OF FRAME		RULE FOR VERSIONS ID	Y	TYPE OF FRAME	RuleForVersionsId	Same

Table G.1 *(continued)*

TM Class Name	TM Definition	TM Attribute	TM Opt	NeTEx Class Name	NeTEx Attribute	Compare
TYPE OF JOURNEY PATTERN	A classification of JOURNEY PATTERNs used to distinguish other categories of JOURNEY PATTERN than SERVICE JOURNEY PATTERN and DEAD RUN PATTERN.	NAME	N	TYPE OF JOURNEY PATTERN	Name	Same
TYPE OF LINK	Classification of LINKs to express the different functional roles of a LINK.	ID	N	TYPE OF LINK	Id	Same
TYPE OF LINK SEQUENCE	A classification of LINK SEQUENCEs used to define the different functions a LINK SEQUENCE may be used for. E.g. ROUTE, JOURNEY PATTERN, road, TRIP PATTERN, border line etc.	NAME	N	TYPE OF LINK SEQUENCE	Name	Same
TYPE OF PI FACILITY	A classification of PI FACILITYs (e.g. stand-alone terminal, information desk, printed leaflet, etc.).	ID	N	TYPE OF PI FACILITY	Id	Same
TYPE OF POINT	A classification of POINTs according to their functional purpose.	NAME	N	TYPE OF POINT	Name	Same
TYPE OF POINT		DESCRIPTION	Y	TYPE OF POINT	Description	Same
TYPE OF PROJECTION	A classification of the projections according to their functional purpose, the source and target layers.	NAME	N	TYPE OF PROJECTION	Name	Same
TYPE OF SERVICE	A classification for VEHICLE JOURNEYs and SPECIAL SERVICEs to express some common properties of journeys to be taken into account in the scheduling and/or operations control process.	ID	N	TYPE OF SERVICE	Id	Same
TYPE OF SERVICE		DESCRIPTION	Y	TYPE OF SERVICE	Description	Same
TYPE OF SERVICE		NAME	Y	TYPE OF SERVICE	Name	Same
TYPE OF SITE	A classification of SITEs.	ID	N	TYPE OF SITE	Id	Same
TYPE OF STOP POINT	A classification of STOP POINTs, used for instance to characterize the equipment to be installed at stops (post, shelter, seats, etc.).	ID	N	TYPE OF STOP POINT	Id	Same

Table G.1 *(continued)*

TM Class Name	TM Definition	TM Attribute	TM Opt	NeTEx Class Name	NeTEx Attribute	Compare
TYPE OF TRAFFIC CONTROL POINT	A classification of TRAFFIC CONTROL POINTs.	ID	N	TYPE OF TRAFFIC CONTROL POINT	Id	Same
TYPE OF TRAIN ELEMENT	A classification of TRAIN ELEMENTs.	ID	N	TYPE OF TRAIN ELEMENT	Id	Same
TYPE OF TRAIN ELEMENT		SELF-PROPELLING	N	TYPE OF TRAIN ELEMENT	Self-Propelling	Same
TYPE OF TRAVEL DOCUMENT	A classification of TRAVEL DOCUMENTs expressing their general functionalities and local functional characteristics specific to the operator. Types of TRAVEL DOCUMENTs e.g. throw-away ticket, throw-away ticket unit, value card, electronic purse allowed	ID	N	TYPE OF TRAVEL DOCUMENT	Id	Same
TYPE OF TRAVEL DOCUMENT		NAME	Y	TYPE OF TRAVEL DOCUMENT	Name	Same
TYPE OF VALIDITY	A classification of the validity of TYPEs OF FRAME. E.g. VERSION FRAMES for schedules designed for DAY TYPEs; dated schedules.	ID	N	TYPE OF VALIDITY	Id	Same
TYPE OF VERSION	A classification of VERSIONs. E.g. shareability of ENTITies between several versions.	ID	N	TYPE OF VERSION	Id	Same
TYPE OF ZONE	A classification of ZONEs. E. TARIFF ZONE, ADMINISTRATIVE ZONE.	ID	N	TYPE OF ZONE	Id	Same
USAGE DISCOUNT RIGHT	A FARE PRODUCT allowing a customer to benefit from discounts when consuming VALIDABLE ELEMENTs.			USAGE DISCOUNT RIGHT		Same
USAGE PARAMETER	A parameter used to specify the use of a VALIDABLE ELEMENT or a FARE PRODUCT.	ID	N	USAGE PARAMETER	Id	Same
USAGE PARAMETER		TYPE	N	USAGE PARAMETER	Type	Same
USAGE PARAMETER PRICE	A set of all possible price features of a USAGE PARAMETER: discount in value or percentage etc.	START DATE	N	USAGE PARAMETER PRICE	StartDate	Same
USAGE PARAMETER PRICE		DISCOUNT IN PERCENTAGE	Y	USAGE PARAMETER PRICE	DiscountInPercentage	Same

Table G.1 *(continued)*

TM Class Name	TM Definition	TM Attribute	TM Opt	NeTEx Class Name	NeTEx Attribute	Compare
USAGE PARAMETER PRICE		DISCOUNT IN VALUE	Y	USAGE PARAMETER PRICE	DiscountInValue	Same
USER PROFILE	The social profile of a passenger, based on age group, education, profession, social status, sex etc., often used for allowing discounts: 18-40 years old, graduates, drivers, unemployed, women etc.	ID	N	USER PROFILE	Id	Same
USER PROFILE		AGE GROUP	Y	USER PROFILE	AgeGroup	Same
USER PROFILE		EDUCATION	Y	USER PROFILE	Education	Same
USER PROFILE		PROFESSION	Y	USER PROFILE	Profession	Same
USER PROFILE		SEX	Y	USER PROFILE	Sex	Same
USER PROFILE		SOCIAL STATUS	Y	USER PROFILE	SocialStatus	Same
VALIDABLE ELEMENT	A sequence or set of FARE STRUCTURE ELEMENTs, grouped together to be validated in one go.	ID	N	VALIDABLE ELEMENT	Id	Same
VALIDABLE ELEMENT		NAME	Y	VALIDABLE ELEMENT	Name	Same
VALIDABLE ELEMENT PRICE	A set of all possible price features of a VALIDABLE ELEMENT: default total price, discount in value or percentage etc.	START DATE	N	VALIDABLE ELEMENT PRICE	StartDate	Same
VALIDABLE ELEMENT PRICE		DISCOUNT IN PERCENTAGE	Y	VALIDABLE ELEMENT PRICE	DiscountInPercentage	Same
VALIDABLE ELEMENT PRICE		DISCOUNT IN VALUE	Y	VALIDABLE ELEMENT PRICE	DiscountInValue	Same
VALIDABLE ELEMENT PRICE		PRICE	Y	VALIDABLE ELEMENT PRICE	Price	Same
VALIDITY CONDITION	Condition used in order to characterise a given VERSION of a VERSION FRAME. A VALIDITY CONDITION consists of a parameter (e.g. date, TRIGGERING EVENT, etc.) and its type of application (e.g. for, from, until, etc.).	ID	N	VALIDITY CONDITION	Id	Same
VALIDITY CONDITION		TYPE OF APPLICATION	N	VALIDITY CONDITION	TypeOfApplication	Same

Table G.1 *(continued)*

TM Class Name	TM Definition	TM Attribute	TM Opt	NeTEx Class Name	NeTEx Attribute	Compare
VALIDITY PARAMETER ASSIGNMENT	An ACCESS RIGHT PARAMETER ASSIGNMENT relating a fare collection parameter to a theoretical FARE PRODUCT (or one of its components) or a SALES PACKAGE.			VALIDITY PARAMETER ASSIGNMENT		Same
VALIDITY PERIOD	A time limitation for validity of a FARE PRODUCT or a SALES PACKAGE. It may be composed of a standard duration (e.g. 3 days, 1 month) and/or fixed start/end dates and times.	START DATE	Y	VALIDITY PERIOD	StartDate	Same
VALIDITY PERIOD		START TIME	Y	VALIDITY PERIOD	StartTime	Same
VALIDITY PERIOD		END DATE	Y	VALIDITY PERIOD	EndDate	Same
VALIDITY PERIOD		END TIME	Y	VALIDITY PERIOD	EndTime	Same
VALIDITY RULE PARAMETER	A user defined VALIDITY CONDITION used by a rule for selecting versions. E.g. river level > 1,5 m and bad weather.	RULE_ID	N	VALIDITY RULE PARAMETER	Rule_Id	Same
VALIDITY TRIGGER	External event defining a VALIDITY CONDITION. E.g. exceptional flow of a river, bad weather, road closure for works.	ID	N	VALIDITY TRIGGER	Id	Same
VEHICLE	A public transport vehicle used for carrying passengers.	ID	N	VEHICLE	Id	Same
VEHICLE		VEHICLE REGISTRATION NUMBER	Y	VEHICLE	VehicleRegistrationNumber	Same
VEHICLE ASSIGNMENT	The assignment, or the cancellation of an assignment, of a physical VEHICLE to a LOGICAL VEHICLE. This assignment may be overridden by a further assignment.	ASSIGN OR CANCEL	N	VEHICLE ASSIGNMENT	AssignOrCancel	Same
VEHICLE DETECTING	An activity consisting of the identification of a vehicle at a certain time by a detection device and of collecting crude data such as an absolute location of the vehicle.	ID	N	VEHICLE DETECTING	Id	Same
VEHICLE DETECTING		TIMESTAMP	N	VEHICLE DETECTING	Timestamp	Same

Table G.1 *(continued)*

TM Class Name	TM Definition	TM Attribute	TM Opt	NeTEx Class Name	NeTEx Attribute	Compare
VEHICLE DETECTING		TYPE	N	VEHICLE DETECTING	Type	Same
VEHICLE EQUIPMENT PROFILE	Each instantiation of this entity gives the number of items of one TYPE OF EQUIPMENT a VEHICLE MODEL should contain for a given PURPOSE OF EQUIPMENT PROFILE. The set of instantiations for one VEHICLE MODEL and one purpose gives one complete 'profile'.	PROFILE	N	VEHICLE EQUIPMENT PROFILE	Profile	Same
VEHICLE EQUIPMENT PROFILE		UNITS	N	VEHICLE EQUIPMENT PROFILE	Units	Same
VEHICLE INCIDENT	An INCIDENT concerning LOGICAL VEHICLEs.			VEHICLE INCIDENT		Same
VEHICLE JOURNEY	The planned movement of a public transport vehicle on a DAY TYPE from the start point to the end point of a JOURNEY PATTERN on a specified ROUTE.	ID	N	VEHICLE JOURNEY	Id	Same
VEHICLE JOURNEY		DEPARTURE TIME	N	VEHICLE JOURNEY	DepartureTime	Same
VEHICLE JOURNEY LAYOVER	A time allowance at the end of a specified VEHICLE JOURNEY. This time supersedes any global layover or JOURNEY PATTERN LAYOVER.	DURATION	N	VEHICLE JOURNEY LAYOVER	Duration	Same
VEHICLE JOURNEY RUN TIME	The time taken to traverse a specified TIMING LINK IN JOURNEY PATTERN on a specified VEHICLE JOURNEY. This gives the most detailed control over times and overrides the DEFAULT SERVICE JOURNEY RUN TIME and JOURNEY PATTERN RUN TIME and the DEFAULT DEAD RUN	DURATION	N	VEHICLE JOURNEY RUN TIME	Duration	Same
VEHICLE JOURNEY WAIT TIME	The time for a vehicle to wait at a particular TIMING POINT IN JOURNEY PATTERN on a specified VEHICLE JOURNEY. This wait time will override the JOURNEY PATTERN WAIT TIME.	DURATION	N	VEHICLE JOURNEY WAIT TIME	Duration	Same

Table G.1 *(continued)*

TM Class Name	TM Definition	TM Attribute	TM Opt	NeTEx Class Name	NeTEx Attribute	Compare
VEHICLE MODEL	A classification of public transport vehicles of the same VEHICLE TYPE, e.g. according to equipment specifications or model generation.	ID	N	VEHICLE MODEL	Id	Same
VEHICLE SCHEDULE VERSION	The set of all BLOCKs defined for a specific DAY TYPE to which the same VALIDITY CONDITIONs have been assigned (usually defined for a specific GROUP OF LINEs).	ID	N	VEHICLE SCHEDULE VERSION	Id	Same
VEHICLE SERVICE	A workplan for a vehicle for a whole day, planned for a specific DAY TYPE. A VEHICLE SERVICE includes one or several VEHICLE SERVICE PARTs.	ID	N	VEHICLE SERVICE	Id	Same
VEHICLE SERVICE PART	A part of a VEHICLE SERVICE composed of one or more BLOCKs and limited by periods spent at the GARAGE managing the vehicle in question.	ID	N	VEHICLE SERVICE PART	Id	Same
VEHICLE TYPE	A classification of public transport vehicles according to the vehicle scheduling requirements in mode and capacity (e.g. standard bus, double-deck...).	ID	N	VEHICLE TYPE	Id	Same
VEHICLE TYPE		DESCRIPTION	Y	VEHICLE TYPE	Description	Same
VEHICLE TYPE		LENGTH	Y	VEHICLE TYPE	Length	Same
VEHICLE TYPE		NAME	Y	VEHICLE TYPE	Name	Same
VEHICLE TYPE		REVERSING DIRECTION	Y	VEHICLE TYPE	ReversingDirection	Same
VEHICLE TYPE		SEATING CAPACITY	Y	VEHICLE TYPE	SeatingCapacity	Same
VEHICLE TYPE		SELF-PROPELLED	Y	VEHICLE TYPE	Self-Propelled	Same
VEHICLE TYPE		SPECIAL PLACE CAPACITY	Y	VEHICLE TYPE	SpecialPlaceCapacity	Same
VEHICLE TYPE		STANDING CAPACITY	Y	VEHICLE TYPE	StandingCapacity	Same

Table G.1 *(continued)*

TM Class Name	TM Definition	TM Attribute	TM Opt	NeTEx Class Name	NeTEx Attribute	Compare
VEHICLE TYPE AT POINT	The number of vehicles of a specified VEHICLE TYPE which may wait at a specified POINT at any one time. If the capacity is 0, then that type of vehicle may not stop there.	CAPACITY	Y	VEHICLE TYPE AT POINT	Capacity	Same
VEHICLE TYPE PREFERENCE	The preference for the use of a particular VEHICLE TYPE for a SERVICE JOURNEY PATTERN, depending on the DAY TYPE and TIME DEMAND TYPE. The rank of preferences must be recorded. Different VEHICLE TYPEs may be given the same rank.	RANK	N	VEHICLE TYPE PREFERENCE	Rank	Same
VEHICLE WORK ASSIGNMENT	The assignment, or the cancellation of an assignment, of a LOGICAL VEHICLE to a planned work, represented as DATED BLOCKs or as DATED VEHICLE JOURNEYs. This assignment may be overridden by a further assignment.	ASSIGN OR CANCEL	N	VEHICLE WORK ASSIGNMENT	AssignOrCancel	Same
VERSION	A group of operational data instances which share the same VALIDITY CONDITIONs. A version belongs to a unique VERSION FRAME and is characterised by a unique TYPE OF VERSION. E.g. NETWORK VERSION for Line 12 starting from 2000-01-01.	ID	N	VERSION	Id	Same
VERSION		DATE	N	VERSION	Date	Same
VERSION		TIME	N	VERSION	Time	Same
VERSION		USER	N	VERSION	User	Same
VERSION FRAME	A set of VERSIONS referring to a same DATA SYSTEM and belonging to the same TYPE OF FRAME. A FRAME may be restricted by VALIDITY CONDITIONs.	ID	N	VERSION FRAME	Id	Same
WIRE ELEMENT	A type of INFRASTRUCTURE LINK used to describe a wire network.			WIRE ELEMENT		Same

Table G.1 *(continued)*

TM Class Name	TM Definition	TM Attribute	TM Opt	NeTEx Class Name	NeTEx Attribute	Compare
WIRE JUNCTION	A type of INFRASTRUCTURE POINT used to describe a wire network.			WIRE JUNCTION		Same
ZONE		ID	N	ZONE	Id	Same
ZONE		DESCRIPTION	Y	ZONE	Description	Same
ZONE		NAME	N	ZONE	Name	Same
ZONE PROJECTION	An oriented correspondence: - from one ZONE in a source layer, - onto a target entity : e.g. POINT,			ZONE PROJECTION		Same

Annex H
(informative)

Service Interface for Realtime Information (SIRI) Class-Attribute comparison to Transmodel

This Annex provides a mapping of Transmodel classes to SIRI attributes.[8] This comparison concerns SIRI Part 1-2-3 and is based on the comparison carried out 2006 (presented at ISO). The mapping of SIRI and Transmodel is available from www.predim.org/IMG/doc/COMP_SIRI_TRANSMODEL.doc

Table H.1

TM Class Name	TM Definition	Exact correspondence to TM attribute	SIRI Element	SIRI Attribute	SIRI Attribute type	SIRI UML multiplicity	Siri message documentation	TM correspondence indication; comments	Exact correspondence to TM class	SIRI specific - derived from TM (class/attribute)	Additional attribute without contradiction	SIRI extension to semantically equivalent TM class
ACTUAL VEHICLE EQUIPMENT	An item of equipment of a particular type actually available in an individual VEHICLE.		ServiceInfo	VehicleFeatureRef	VehicleFeatureCode	*		Instances of ACTUAL VEHICLE EQUIPMENT on the VEHICLE operating the journey.				X
ACTUAL VEHICLE EQUIPMENT			VehicleFeatureCode				Feature of Vehicle. E.g. Wheelchair access					X
BLOCK	The work of a vehicle from the time it leaves a PARKING POINT after parking until its next return to park at a PARKING POINT. Any subsequent departure from a PARKING POINT after parking marks the start of a new BLOCK. The period of a BLOCK has to be cover	id	BlockCode				Block that vehicle is running		X			
CONNECTION LINK	The physical (spatial) possibility for a passenger to change from one public transport vehicle to another to continue the trip. Different times may be necessary to cover this link, depending on the kind of passenger.	default duration	ConnectionLink	DefaultDuration	PositiveDurationType	0..1		Equivalent to the Default duration attribute of CONNECTION LINK.				

Table H.1 *(continued)*

TM Class Name	TM Definition	Exact correspondence to TM attribute	SIRI Element	SIRI Attribute	SIRI Attribute type	SIRI UML multiplicity	Siri message documentation	TM correspondence indication; comments	Exact correspondence to TM class	SIRI specific - derived from TM (class/attribute)	Additional attribute without contradiction	SIRI extension to semantically equivalent TM class
CONNECTION LINK			ConnectionLink	ConnectionLinkCode	ConnectionLinkCode	0..1		Siri specific (optional external identifier).			X	
CONNECTION LINK		frequent traveller duration	ConnectionLink	FrequentTravellerDuration	PositiveDurationType	0..1		Equivalent to the Frequent traveller duration attribute of CONNECTION LINK.				
CONNECTION LINK		mobility restricted traveller duration	ConnectionLink	ImpairedAccessDuration	PositiveDurationType	0..1		Equivalent to the Mobility restricted traveller duration attribute of CONNECTION LINK.				
CONNECTION LINK		occasional traveller duration	ConnectionLink	OccasionalTravellerDuration	PositiveDurationType	0..1		Equivalent to the Occasional traveller duration attribute of CONNECTION LINK.				
CONNECTION LINK			ConnectionLinkCode				(1) Identifier of connection link whose data participant is allowed to access (ConnectionLinkPermissions) (2) Identifier of the ConnectionLink or ConnectionArea for which data is to be returned. Associated with known feeder arrival and distributor departure stop points (TimetabledFeederArrival) (3) Identifies the Connection Link for which data is to be returned (TimetabledFeederArrivalCancellation)	CONNECTION LINK SIRI specific id			X	

Table H.1 *(continued)*

TM Class Name	TM Definition	Exact correspondence to TM attribute	SIRI Element	SIRI Attribute	SIRI Attribute type	SIRI UML multiplicity	Siri message documentation	TM correspondence indication; comments	Exact correspondence to TM class	SIRI specific - derived from TM (class/ attribute)	Additional attribute without contradiction	SIRI extension to semantically equivalent TM class
CONNECTION LINK			TimetabledFeederArrival	ConnectionLinkRef	ConnectionLinkCode	0..1	see the related item	Siri specific ID of the CONNECTION LINK for which information is being delivered.			X	
CONNECTION LINK			TimetabledFeederArrivalCancellation	ConnectionLineRef	ConnectionLinkCode	0..1	see the related item	Siri specific Id of the CONNECTION LINK for which information is being delivered.			X	
probably CONNECTION LINK			TargetedInterchange	DistributorConnectionLinkRef	ConnectionLinkCode	0..1	Identifier of connection Link	Probably CONNECTION LINK related to a particular STOP POINT. To be clarified.			X	
probably CONNECTION LINK			TargetedInterchange	DistributorConnectionLink	ConnectionLink	0..1	ConnectionLink over which interchange takes place.	Probably CONNECTION LINK related to a particular STOP POINT. To be clarified.			X	
CONNECTION LINK			ConnectionLink					Equivalent to CONNECTION LINK.	X			
COURSE OF JOURNEYS	A part of a BLOCK composed of consecutive VEHICLE JOURNEYs defined for the same DAY TYPE, all operated on the same LINE.	id	CourseOfJourneyCode				*		X			
COURSE OF JOURNEYS			DatedVehicleJourney	CourseOfJourneyRef	CourseOfJourneyCode	0..1		Dated COURSE OF JOURNEYS including the journey. Dated Courses of journeys are not explicit in Transmodel.				X

Table H.1 *(continued)*

TM Class Name	TM Definition	Exact correspondence to TM attribute	SIRI Element	SIRI Attribute	SIRI Attribute type	SIRI UML multiplicity	Siri message documentation	TM correspondence indication; comments	Exact correspondence to TM class	SIRI specific - derived from TM (class/attribute)	Additional attribute without contradiction	SIRI extension to semantically equivalent TM class
COURSE OF JOURNEYS			OperationalInfo	CourseOfJourneyRef	CourseOfJourneyCode	0..1	*	Dated COURSE OF JOURNEYS including the journey. Dated courses of journeys are not explicit in Transmodel.				X
DATA SYSTEM	The origin of operational data referring to one single responsibility. References to a data system are useful in an interoperated computer system.		ProgressInfo	DataSource	string	0..1	*		X			
DATED BLOCK	The work of a vehicle on a particular OPERATING DAY from the time it leaves a PARKING POINT after parking until its next return to park at a PARKING POINT.	id	DatedVehicleJourney	BlockRef	BlockCode	0..1		DATED BLOCK including the journey.		X		
DATED BLOCK	The work of a vehicle on a particular OPERATING DAY from the time it leaves a PARKING POINT after parking until its next return to park at a PARKING POINT.	id	OperationalInfo	BlockRef	BlockCode	0..1	*	ID of the DATED BLOCK the journey is part of.		X		
DATED PASSING TIME	A PASSING TIME on a particular OPERATING DAY.											

Table H.1 *(continued)*

TM Class Name	TM Definition	Exact correspondence to TM attribute	SIRI Element	SIRI Attribute	SIRI Attribute type	SIRI UML multiplicity	Siri message documentation	TM correspondence indication; comments	Exact correspondence to TM class	SIRI specific - derived from TM (class/attribute)	Additional attribute without contradiction	SIRI extension to semantically equivalent TM class
DATED PASSING TIME			AbstractMonitoredCall				CALL – SIRI (Candidate to add to TransModel) A visit by a VEHICLE to a specific STOP POINT as it follows the JOURNEY PATTERN of its VEHICLE JOURNEY. A VEHICLE may make more than one Call to the same stop in the course of a JOURNEY: different calls may typically be distinguished by a Visit Number count.	Extended meaning of DATED PASSING TIME from TM V5.				X
DATED PASSING TIME			DatedCall				Provides information about a call in a dated vehicle	Equivalent to a TARGET PASSING TIME for STOP POINTs that are TIMING POINTs IN JOURNEY PATTERN. Derived information for other STOP POINTs		X		
DATED PASSING TIME			DatedVehicleJourney	DatedCalls	DatedCall	2..*	see the related item	Calls operated by the journey.		X		
DATED PASSING TIME		expected arrival time + aimed arrival time + actual arrival time	MonitoredCall	ArrivalTimes	ArrivalTimes	1	see the related item					
DATED PASSING TIME		expected departure time + aimed departure time + actual departure time	MonitoredCall	DepartureTimes	DepartureTimes	1	see the related item					

Table H.1 *(continued)*

TM Class Name	TM Definition	Exact correspondence to TM attribute	SIRI Element	SIRI Attribute	SIRI Attribute type	SIRI UML multiplicity	Siri message documentation	TM correspondence indication; comments	Exact correspondence to TM class	SIRI specific - derived from TM (class/ attribute)	Additional attribute without contradiction	SIRI extension to semantically equivalent TM class
DATED PASSING TIME			OnwardCall				Information on a call at a stop after the current call.	Similar to ESTIMATED (or TARGET) PASSING TIME.				X
DATED PASSING TIME		aimed arrival time + expected arrival time	OnwardCall	AimedArrivalTimes	AimedArrivalTimes	0..1	*	Time arrival information on an onward call.				
DATED PASSING TIME		aimed departure time + expected departure time	OnwardCall	AimedDeparture-Times	AimedDeparture-Times	0..1	*	Time departure information on an onward call.				
DATED VEHICLE JOURNEY	A particular journey of a vehicle on a particular OPERATING DAY including all modifications possibly decided by the control staff.	id	DatedVehicle-Journey	DatedVehicleJourneyCode	DatedVehicleJourneyCode	0..1	*					
DATED VEHICLE JOURNEY			DatedTimetableVersion-Frame	DatedVehicleJourney	DatedVehicleJourney	0..*						X
DATED VEHICLE JOURNEY			DatedTimetableVersion-Frame	DatedVehicleJourneyInfo	DatedVehicleJourneyInfo	0..1		Default (unless overridden) information on journeys of the VERSION FRAME.				X
DATED VEHICLE JOURNEY			DatedVehicle-Journey					Equivalent to DATED VEHICLE JOURNEY.				X
DATED VEHICLE JOURNEY			DatedVehicle-Journey	ExtraJourney	boolean	0..1	Whether this journey is an addition to the plan Can only be used when both participants recognise the same schedule version. If omitted, defaults to false: the journey is not an addition	Whether it is a NORMAL DATED VEHICLE JOURNEY or not.		X		

Table H.1 *(continued)*

TM Class Name	TM Definition	Exact correspondence to TM attribute	SIRI Element	SIRI Attribute	SIRI Attribute type	SIRI UML multiplicity	Siri message documentation	TM correspondence indication; comments	Exact correspondence to TM class	SIRI specific - derived from TM (class/ attribute)	Additional attribute without contradiction	SIRI extension to semantically equivalent TM class
DATED VEHICLE JOURNEY			DatedVehicleJourney	Cancellation	boolean	0..1	Whether this journey is a Cancellation of a journey in the plan. Can only be used when both participants recognise the same schedule version. If omitted, defaults to false: Journey is not a Cancellation	Siri specific (may be derived if a JOURNEY CANCELLATION control action has been specified).			X	
DATED VEHICLE JOURNEY			DatedVehicleJourney	VehicleJourneyNote	nlString	0..1	/	Siri specific. Possible default values (see CallNote)			X	
DATED VEHICLE JOURNEY			DatedVehicleJourney	JourneyNote	nlString	0..1	Additional descriptive text associated with journey. Inherited property	Siri specific.			X	
DATED VEHICLE JOURNEY			DatedVehicleJourney	DatedVehicleJourneyInfo	DatedVehicleJourneyInfo	0..1		Default (unless overridden) information on journeys of the VERSION FRAME.				X
DATED VEHICLE JOURNEY		id	DatedVehicleJourneyCode				A reference to the dated vehicle journey that the vehicle is making.		X			
DATED VEHICLE JOURNEY			DatedVehicleJourneyInfo					Specific information on a DATED VEHICLE JOURNEY, or possible default values for a schedule.				X
DATED VEHICLE JOURNEY			DatedVehicleJourneyInfo	HeadwayService	boolean	0..1	Whether this is a Headway Service, that is one shown as operating at a prescribed interval rather than to a fixed timetable.	Siri specific.			X	

Table H.1 *(continued)*

TM Class Name	TM Definition	Exact correspondence to TM attribute	SIRI Element	SIRI Attribute	SIRI Attribute type	SIRI UML multiplicity	Siri message documentation	TM correspondence indication; comments	Exact correspondence to TM class	SIRI specific - derived from TM (class/attribute)	Additional attribute without contradiction	SIRI extension to semantically equivalent TM class
DATED VEHICLE JOURNEY			FramedVehicleJourneyRef				The FramedVehicleJourneyRef identifies a DatedVehicleJourney within the data horizon of the referencing system. In practice the OperationalDayType may be used as a unique qualifier of the Data Frame.	Information on a DATED VEHICLE JOURNEY associated with a MONITORED VEHICLE JOURNEY.				X
DATED VEHICLE JOURNEY		id	FramedVehicleJourneyRef	DatedVehicleJourneyRef	DatedVehicleJourneyCode	1	see the related item	ID of the DATED VEHICLE JOURNEY.				
DATED VEHICLE JOURNEY			InterchangeJourney	FramedVehicleJourneyRef	FramedVehicleJourneyRef	0..1	A reference to the dated vehicle journey that the vehicle is making, unique within data horizon of producer.	Information on a DATED VEHICLE JOURNEY associated with the concerned journey.		X		
DESTINATION DISPLAY	An advertised destination of a specific JOURNEY PATTERN, usually displayed on a headsign or at other on-board locations.											
DESTINATION DISPLAY		name	DatedVehicleJourneyInfo	DestinationDisplay	nlString	0..1	/	Text of the DESTINATION DISPLAY for the JOURNEY PATTERN covered by the journey.				
DIRECTION	A classification for the general orientation of ROUTEs.	id	DatedTimetableVersionFrame	DirectionRef	DirectionCode	1	*	ID of the DIRECTION object of the concerned VERSION FRAME.				

Table H.1 *(continued)*

TM Class Name	TM Definition	Exact correspondence to TM attribute	SIRI Element	SIRI Attribute	SIRI Attribute type	SIRI UML multiplicity	Siri message documentation	TM correspondence indication; comments	Exact correspondence to TM class	SIRI specific - derived from TM (class/attribute)	Additional attribute without contradiction	SIRI extension to semantically equivalent TM class
DIRECTION		id	DirectionCode				Identifier of direction of line that participant is allowed to access(LinePemissions) (2) Filter the results to include only vehicles going to the specified direction (VehicleMonitoringRequest) (3)Identifier of Direction of journey that is being deleted (VehicleActivityCancellation) (4)Filter for the feeder direction, for which data is to be supplied (ConnectionTimetableRequest)		X			
DIRECTION		id	EstimatedJourneyVersionFrame	DirectionRef	DirectionCode	1		ID of the DIRECTION object of the concerned VERSION FRAME.				
DIRECTION		id	EstimatedVehicleJourney	DirectionRef	DirectionCode	1		DIRECTION of the ROUTE followed by the journey.				
DIRECTION		id	InterchangeJourney	DirectionRef	DirectionCode	1	Identifier of the relative direction the vehicle is running along the line, for example, "in" or "out", "clockwise". Distinct from a destination	Information on the SERVICE JOURNEY arriving at the CONNECTION LINK.				

Table H.1 *(continued)*

TM Class Name	TM Definition	Exact correspondence to TM attribute	SIRI Element	SIRI Attribute	SIRI Attribute type	SIRI UML multiplicity	Siri message documentation	TM correspondence indication; comments	Exact correspondence to TM class	SIRI specific - derived from TM (class/ attribute)	Additional attribute without contradiction	SIRI extension to semantically equivalent TM class
DIRECTION	The assignment of one STOP POINT and one JOURNEY PATTERN to a PI FACILITY, specifying that information on this STOP POINT and this JOURNEY PATTERN will be provided (e.g. displayed, printed).	name	JourneyPatternInfo	DirectionName	nlString	0..1	Name of the relative direction the vehicle is running along the line, for example, "inbound" or "outbound"	DIRECTION of the ROUTE served by the JOURNEY PATTERN.				
DIRECTION	A cell of an origin-destination matrix for TARIFF ZONEs or STOP POINTs, expressing a fare distance for the corresponding trip: value in km, number of fare units etc.	id	MonitoredJourneyIdentity	DirectionRef	DirectionCode	0..1	*	DIRECTION of the ROUTE followed by the journey.				
DIRECTION		id	TimetabledFeederArrivalCancellation	DirectionRef	DirectionCode	1	*	Siri specific code for the direction of the feeder SERVICE JOURNEY. May be derived from DIRECTION of the ROUTE related to the feeder SERVICE JOURNEY if such information available.				
DIRECTION		id	VehicleJourneyIdentity	DirectionRef	DirectionCode	1	*	DIRECTION of the ROUTE followed by the journey.				

Table H.1 *(continued)*

TM Class Name	TM Definition	Exact correspondence to TM attribute	SIRI Element	SIRI Attribute	SIRI Attribute type	SIRI UML multiplicity	Siri message documentation	TM correspondence indication; comments	Exact correspondence to TM class	SIRI specific - derived from TM (class/ attribute)	Additional attribute without contradiction	SIRI extension to semantically equivalent TM class
ESTIMATED PASSING TIME	Time data, calculated from the latest available input, about when a public transport vehicle will pass a particular POINT IN JOURNEY PATTERN on a specified MONITORED VEHICLE JOURNEY. These are mainly used to inform passengers about expected times of arrival	expected arrival time	AimedArrivalTimes	ExpectedArrivalTime	dateTime	0..1	(1) Estimated time of arrival (cf. xxCall) (2) Estimated arrival time at the connection link (cf. MonitoredFeederArrival)	Expected arrival time attribute of an ESTIMATED PASSING TIME.				
ESTIMATED PASSING TIME		expected departure time	AimedDepartureTimes	ExpectedDepartureTime	dateTime	0..1	Estimated time of departure	Expected departure time attribute of an ESTIMATED PASSING TIME.				
ESTIMATED PASSING TIME		expected arrival time	ArrivalTimes	ExpectedArrivalTime	dateTime	0..1	Estimated time of arrival.	Expected arrival time attribute of an ESTIMATED PASSING TIME.				
ESTIMATED PASSING TIME		expected departure time	DepartureTimes	ExpectedDepartureTimes	dateTime	0..1	/	Expected departure time attribute of an ESTIMATED PASSING TIME.				
ESTIMATED PASSING TIME			EstimatedCall									X
ESTIMATED PASSING TIME		aimed arrival time	EstimatedCall	AimedArrivalTimes	AimedArrivalTimes	0..1						
ESTIMATED PASSING TIME		aimed departure time	EstimatedCall	AimedDepartureTimes	AimedDepartureTimes	0..1						

Table H.1 *(continued)*

TM Class Name	TM Definition	Exact correspondence to TM attribute	SIRI Element	SIRI Attribute	SIRI Attribute type	SIRI UML multiplicity	Siri message documentation	TM correspondence indication; comments	Exact correspondence to TM class	SIRI specific - derived from TM (class/ attribute)	Additional attribute without contradiction	SIRI extension to semantically equivalent TM class
ESTIMATED PASSING TIME			EstimatedVehicleJourney	EstimatedCalls	EstimatedCall	2..*						X
FOOTNOTE	A text for informational purposes on exceptions in a LINE, a JOURNEY PATTERN, etc. The information may be usable for passenger or driver information.		DatedVehicleJourneyInfo	LineNote	nlString	0..1	Message associated with delivery	Siri extension of FOOTNOTE. Transmodel cares with FOOTNOTEs for elements (e.g. JOURNEY PATTERN), not for a whole LINE.				X
JOURNEY PATTERN	An ordered list of STOP POINTs and TIMING POINTs on a single ROUTE, describing the pattern of working for public transport vehicles. A JOURNEY PATTERN may pass through the same POINT more than once. The first point of a JOURNEY PATTERN is the origin. The		DatedTimetableVersionFrame	JourneyPatternInfo	JourneyPatternInfo	0..1	*	JOURNEY PATTERN covered by default (unless overridden) by journeys of the VERSION FRAME.				X
JOURNEY PATTERN			DatedVehicleJourney	JourneyPatternInfo	JourneyPatternInfo	0..1	*	JOURNEY PATTERN covered by the journey.				X
JOURNEY PATTERN			EstimatedJourneyVersionFrame	JourneyPatternInfo	JourneyPatternInfo	0..1		JOURNEY PATTERN covered by default (unless overridden) by journeys of the VERSION FRAME.				X
JOURNEY PATTERN			EstimatedVehicleJourney	JourneyPatternInfo	JourneyPatternInfo	0..1		JOURNEY PATTERN covered by the journey.				X

Table H.1 *(continued)*

TM Class Name	TM Definition	Exact correspondence to TM attribute	SIRI Element	SIRI Attribute	SIRI Attribute type	SIRI UML multiplicity	Siri message documentation	TM correspondence indication; comments	Exact correspondence to TM class	SIRI specific - derived from TM (class/ attribute)	Additional attribute without contradiction	SIRI extension to semantically equivalent TM class
JOURNEY PATTERN			InterchangeJourney	JourneyPatternInfo	JourneyPatternInfo	0..1	see the related item	JOURNEY PATTERN and associated information.				X
JOURNEY PATTERN		id	JourneyPatternCode									
JOURNEY PATTERN			JourneyPatternInfo					JOURNEY PATTERN and associated information.				X
JOURNEY PATTERN		id	JourneyPatternInfo	JourneyPatternRef	JourneyPatternCode	0..1		Siri specific (optional external identifier).			X	
JOURNEY PATTERN		name	JourneyPatternInfo	PublishedLineName	nlString	0..1	Name or Number by which the line is known to the public	Public Name of the JOURNEY PATTERN. The JP name is the published name.				
JOURNEY PATTERN			MonitoredVehicleJourney	JourneyPatternInfo	JourneyPatternInfo	1	*	Information on the JOURNEY PATTERN covered by the monitored journey (possibly different from the dated journey).				X
JOURNEY PATTERN			TargetedVehicleJourney	JourneyPatternInfo	JourneyPatternInfo	*						X
JOURNEY PATTERN			TimetabledFeederArrivalCancellation	JourneyPatternInfo	JourneyPatternInfo	0..1	*	Information on the JOURNEY PATTERN along which the feeder SERVICE VEHICLE JOURNEY is running.				X
LINE	A group of ROUTEs which is generally known to the public by a similar name or number.	id	DatedTimetableVersionFrame	LineRef	LineCode	1		ID of the LINE object of the concerned VERSION FRAME.				
LINE		id	EstimatedJourneyVersionFrame	LineRef	LineCode	1		ID of the LINE object of the concerned VERSION FRAME.				
LINE		id	EstimatedVehicleJourney	LineRef	LineCode	0..1						

Table H.1 *(continued)*

TM Class Name	TM Definition	Exact correspondence to TM attribute	SIRI Element	SIRI Attribute	SIRI Attribute type	SIRI UML multiplicity	Siri message documentation	TM correspondence indication; comments	Exact correspondence to TM class	SIRI specific - derived from TM (class/ attribute)	Additional attribute without contradiction	SIRI extension to semantically equivalent TM class
LINE		id	InterchangeJourney	LineRef	LineCode	1	Identifier for the line	Information on the SERVICE JOURNEY arriving at the CONNECTION LINK.				
LINE		id	JourneyPatternInfo	ExternalLineRef	LineCode	0..1		ID of the LINE including the JOURNEY PATTERN.				
LINE		id	LineCode				Identifier for the line					
LINE		id	MonitoredJourneyIdentity	LineRef	LineCode	0..1	*	LINE of the covered ROUTE.				
LINE		id	VehicleJourneyIdentity	LineRef	LineCode	1	*	LINE containing the ROUTE covered by the JP of the journey.				
LINE		id	TimetabledFeederArrivalCancellation	LineRef	LineCode	1	*	Id of the LINE related to the ROUTE of the feeder SERVICE JOURNEY.				
LOCATION	The position of a POINT with a reference to a given LOCATING SYSTEM (e.g. coordinates).	coordinate 1, 2 3	Coordinates				Coordinates of points in a GML compatible format, as indicated by srsName attribute.		X			
LOCATION			Latitude				Latitude from equator. -90° (South) to +90° (North). Decimal degrees. e.g. 56,356					X
LOCATION			Location				Siri complex data type					X
LOCATION		coordinate n	Location	Coordinates		0..1	*	Alternative to latitude and longitude.				
LOCATION			Location	Latitude		0..1	*					X
LOCATION			Location	Longitude		0..1	*					X

Table H.1 *(continued)*

TM Class Name	TM Definition	Exact correspondence to TM attribute	SIRI Element	SIRI Attribute	SIRI Attribute type	SIRI UML multiplicity	Siri message documentation	TM correspondence indication; comments	Exact correspondence to TM class	SIRI specific - derived from TM (class/ attribute)	Additional attribute without contradiction	SIRI extension to semantically equivalent TM class
LOCATION			Longitude				Longitude from Greenwich Meridian.180° (East) to +180° (West). Decimal degrees. e.g. 2,356					X
MONITORED VEHICLE JOURNEY	A journey that is monitored as being operated by a LOGICAL VEHICLE. According to the monitoring system capabilities, a MONITORED VEHICLE JOURNEY may be related to a DATED VEHICLE JOURNEY, or only to a JOURNEY PATTERN.		DatedVehicleJourneyInfo	Monitored	boolean	0..1	/	Whether it is a MONITORED VEHICLE JOURNEY.		X		
MONITORED VEHICLE JOURNEY			EstimatedVehicleJourney									X
MONITORED VEHICLE JOURNEY		id	EstimatedVehicleJourney	EstimatedVehicleJourneyCode	EstimatedVehicleJourneyCode	0..1						
MONITORED VEHICLE JOURNEY			EstimatedVehicleJourney	VehicleJourneyName	nlString	0..1					X	
MONITORED VEHICLE JOURNEY			EstimatedVehicleJourney	JourneyNote	nlString	0..1		Siri specific.			X	
MONITORED VEHICLE JOURNEY			EstimatedVehicleJourney	Monitored	boolean	0..1		Whether it is a MONITORED VEHICLE JOURNEY.		X		
MONITORED VEHICLE JOURNEY		id	EstimatedVehicleJourneyCode									

Table H.1 *(continued)*

TM Class Name	TM Definition	Exact correspondence to TM attribute	SIRI Element	SIRI Attribute	SIRI Attribute type	SIRI UML multiplicity	Siri message documentation	TM correspondence indication; comments	Exact correspondence to TM class	SIRI specific - derived from TM (class/ attribute)	Additional attribute without contradiction	SIRI extension to semantically equivalent TM class
MONITORED VEHICLE JOURNEY			InterchangeJourney	Monitored	boolean	0..1	Flag indicating whether there is real-time information available for journey, if not present, not known.	Whether it is a MONITORED VEHICLE JOURNEY.		X		
MONITORED VEHICLE JOURNEY			MonitoredJourneyIdentity					Various information on a MONITORED VEHICLE JOURNEY.				X
MONITORED VEHICLE JOURNEY			MonitoredVehicleJourney				Provides real-time information about the vehicle journey along which a vehicle is running	Equivalent to MONITORED VEHICLE JOURNEY.				X
MONITORED VEHICLE JOURNEY		id	MonitoredVehicleJourney	MonitoredVehicleJourneyIdentity	MonitoredJourneyIdentity	1	*	Various information on the MONITORED VEHICLE JOURNEY.				
MONITORED VEHICLE JOURNEY			ProgressInfo					Information on a monitored journey.				X
MONITORED VEHICLE JOURNEY			ProgressInfo	Monitored	boolean	0..1		Whether it is a MONITORED VEHICLE JOURNEY.		X		
MONITORED VEHICLE JOURNEY			TargetedVehicleJourney									X
MONITORED VEHICLE JOURNEY		id	TargetedVehicleJourney	VehicleJourneyIdentity	VehicleJourneyIdentity	1						
OBSERVED PASSING TIME	The actual passing of a public transport vehicle at a pre-defined POINT during a MONITORED VEHICLE JOURNEY.	actual arrival time	ArrivalTimes	ActualArrivalTime	dateTime	0..1	Observed time of arrival.	Actual arrival time attribute of an OBSERVED PASSING TIME.				

Table H.1 *(continued)*

TM Class Name	TM Definition	Exact correspondence to TM attribute	SIRI Element	SIRI Attribute	SIRI Attribute type	SIRI UML multiplicity	Siri message documentation	TM correspondence indication; comments	Exact correspondence to TM class	SIRI specific - derived from TM (class/ attribute)	Additional attribute without contradiction	SIRI extension to semantically equivalent TM class
OBSERVED PASSING TIME		actual departure time	Departure-Times	ActualDeparture-Times	dateTime	0..1	/	Actual departure time attribute of an OBSERVED PASSING TIME.			X	
OBSERVED PASSING TIME			MonitoredCall				Information about a call at stop	A MONITORING OPERATION describing an OBSERVED PASSING TIME in progress.				X
OBSERVED PASSING TIME			PreviousCall				Information on a stop called at previously	Similar to OBSERVED PASSING TIME.				X
OPERATOR	A company providing public transport services.		OperatorCode				(1) Identifier of operator whose data participant is allowed to access (OperatorPermissions) (2) Operator of Journey (ServiceInfoGroup)				X	
OPERATOR			ServiceInfo	OperatorRef	OperatorCode	0..1	*	OPERATOR of which an ORGANISATIONAL UNIT operates the covered JOURNEY PATTERN.		X		
PASSING TIME	Time data concerning public transport vehicles passing a particular POINT; e.g. arrival time, departure time, waiting time.		AimedArrivalInfo				/	Various information on the arrival at the call.				X
PASSING TIME			AimedDepartureInfo					Various information on the departure from the call.				X
PASSING TIME			ArrivalTimes					Time arrival information on a call.				X
PASSING TIME			CallInfo					Various information on the call.				X

Table H.1 *(continued)*

TM Class Name	TM Definition	Exact correspondence to TM attribute	SIRI Element	SIRI Attribute	SIRI Attribute type	SIRI UML multiplicity	Siri message documentation	TM correspondence indication; comments	Exact correspondence to TM class	SIRI specific - derived from TM (class/attribute)	Additional attribute without contradiction	SIRI extension to semantically equivalent TM class
POINT	A 0-dimensional node of the network used for the spatial description of the network. POINTs may be located by a LOCATION in a given LOCATING SYSTEM.	name	ConnectionLink	StopPointName	nlString	0..1		POINT Name of the distributor STOP POINT of the CONNECTION LINK (the other being the feeder stop where the considered interchange takes place). It is assumed that the orientation of the CONNECTION LINKs is clarified in Siri		X		
POINT		name	JourneyPlaceCode				The identifier of the origin of the journey; used to help identify the vehicle journey on arrival boards.	Name of a POINT where a STOP POINT (e.g. origin) is located.				X
POINT		id	Location	id		0..1	Identifier	ID of the located point. Arbitrary ID.				
POINT		name	StopPointInSequence	StopPointNAme	nlString	0..1	Name of Stop	POINT Name of the STOP POINT that is STOP POINT IN JOURNEYPATTERN.		X		
ROUTE	An ordered list of located POINTs defining one single path through the road (or rail) network. A ROUTE may pass through the same POINT more than once.	id	JourneyPatternInfo	RouteRef	RouteCode	0..1		ROUTE served by the JOURNEY PATTERN.				
ROUTE		id	RouteCode				/					

Table H.1 *(continued)*

TM Class Name	TM Definition	Exact correspondence to TM attribute	SIRI Element	SIRI Attribute	SIRI Attribute type	SIRI UML multiplicity	Siri message documentation	TM correspondence indication; comments	Exact correspondence to TM class	SIRI specific - derived from TM (class/ attribute)	Additional attribute without contradiction	SIRI extension to semantically equivalent TM class
SERVICE JOURNEY INTERCHANGE	The scheduled possibility for transfer of passengers between two SERVICE JOURNEYs at the same or different STOP POINTs.		TargetedInterchange	Interchange-Code	Interchange-Code	0..1	Identifier of Journey Interchange.	Siri specific (optional external identifier) identifier of the SERVICE JOURNEY INTERCHANGE for a STOP POINT and a call.			X	
SERVICE JOURNEY INTERCHANGE		guaranteed	TargetedInterchange	Guaranteed	boolean	0..1	Whether the interchange is guaranteed. Default is false; interchange is not guaranteed	Equivalent to the Guaranteed attribute of SERVICE JOURNEY INTERCHANGE.				
SERVICE JOURNEY INTERCHANGE		advertised	TargetedInterchange	Advertised	boolean	0..1	Whether the interchange is advertised as a connection. Default is false.	Equivalent to the Advertised attribute of SERVICE JOURNEYINTERCHANGE.				
SERVICE JOURNEY INTERCHANGE			TimetabledFeederArrival	InterchangeRef	Interchange-Code	0..1	*	Siri specific ID of the SERVICE JOURNEY INTERCHANGE.			X	
SERVICE JOURNEY INTERCHANGE			TimetabledFeederArrival-Cancellation	InterchangeRef	Interchange-Code	0..1	*	Siri specific Id of the SERVICE JOURNEY INTERCHANGE.			X	
SERVICE JOURNEY	A passenger carrying VEHICLE JOURNEY for one specified DAY TYPE. The pattern of working is defined by the associated SERVICE JOURNEY PATTERN.		TimetabledFeederArrival	FeederJourney	Interchange-Journey	1	*	Information about the feeder SERVICE JOURNEY arriving at the CONNECTION LINK answering the user parameters as given in the request.		X		

Table H.1 *(continued)*

TM Class Name	TM Definition	Exact correspondence to TM attribute	SIRI Element	SIRI Attribute	SIRI Attribute type	SIRI UML multiplicity	Siri message documentation	TM correspondence indication; comments	Exact correspondence to TM class	SIRI specific - derived from TM (class/ attribute)	Additional attribute without contradiction	SIRI extension to semantically equivalent TM class
SERVICE JOURNEY			Timetabled-FeederArrival-Cancellation				Cancellation of previous connection. Each Timetabled-FeederArrivalCancellation describes the cancellation of a planned feeder connection. The text elements (line, direction) are for informative purposes only for the dispatcher, as the vehicle journey is uniquely referenced via the FeederVehicleJourneyRef.	Various information on a cancelled SERVICE JOURNEY initially planned to be a candidate to ensure an interchange.				X
SERVICE JOURNEY			Interchange-Journey				(1) Information about a feeder journey that arrives at a connection link. (2) The Feeder-Journey element is an instance of the InterchangeJourney structure that can be populated with information about the Feeder Journey. (3) Planned interchange from a feeder vehicle journey at a ConnectionLink	SERVICE JOURNEY arriving at a CONNECTION LINK and associated information (extended to a dated interchange).				X
SERVICE JOURNEY			Interchange-Journey	Vehicle-JourneyInfo	Vehicle-JourneyInfo	0..1	*	Various information on a journey.				X
SERVICE JOURNEY		id	TargetedInter-change	Distribu-torVehicle-JourneyRef	DatedVehi-cleJourney-Code	1	Identifies the distributor dated vehicle journey	ID of the distributor SERVICE JOURNEY.				

Table H.1 *(continued)*

TM Class Name	TM Definition	Exact correspondence to TM attribute	SIRI Element	SIRI Attribute	SIRI Attribute type	SIRI UML multiplicity	Siri message documentation	TM correspondence indication; comments	Exact correspondence to TM class	SIRI specific - derived from TM (class/ attribute)	Additional attribute without contradiction	SIRI extension to semantically equivalent TM class
STOP POINT	A POINT where passengers can board or alight from vehicles.		ConnectionLink	StopPointRef	StopPointCode	0..1		POINT ID of the distributor STOP POINT of the CONNECTION LINK (the other being the feeder stop where the considered interchange takes place). It is assumed that the orientation of the CONNECTION LINKs is clarified in Siri		X		
STOP POINT			AbstractMonitoredCall	StopPointRef	StopPointCode	0..1		POINT ID of the STOP POINT where the call takes place.		X		
STOP POINT			StopPointCode				Identifier of stop	Siri specific ID of the STOP POINT.			X	
STOP POINT			TargetedCall	StopPointRef	StopPointCode	0..1		POINT ID of the STOP POINT where the call takes place.		X		
STOP POINT		name	AbstractMonitoredCall	StopPointName	nlString	0..1		POINT Name of the STOP POINT where the call takes place.		X		
STOP POINT IN JOURNEY PATTERN	A POINT in a JOURNEY PATTERN which is a STOP POINT.	order	AbstractMonitoredCall	Order	Bearing	0..1		Order of the STOP POINT IN JOURNEY PATTERN.				
STOP POINT IN JOURNEY PATTERN			DatedCall	StopPointInSequence	StopPointInSequence	1	*	Derived information on the STOP POINT IN JOURNEY PATTERN where the call takes place.		X		
STOP POINT IN JOURNEY PATTERN			DatedVehicleJourneyIndirectRef	OriginRef	StopPointCode	1	/	POINT ID of the first STOP POINT IN JP within the JP covered.		X		
STOP POINT IN JOURNEY PATTERN			DatedVehicleJourneyIndirectRef	DestinationRef	StopPointCode	1	/	POINT ID of the last STOP POINT IN JP within the JP covered.		X		

Table H.1 *(continued)*

TM Class Name	TM Definition	Exact correspondence to TM attribute	SIRI Element	SIRI Attribute	SIRI Attribute type	SIRI UML multiplicity	Siri message documentation	TM correspondence indication; comments	Exact correspondence to TM class	SIRI specific - derived from TM (class/ attribute)	Additional attribute without contradiction	SIRI extension to semantically equivalent TM class
STOP POINT IN JOURNEY PATTERN			EstimatedCall	StopPointInSequence	StopPointInSequence	0..1		Derived information on the STOP POINT IN JOURNEY PATTERN where the call takes place.		X		
STOP POINT IN JOURNEY PATTERN			StopPointInSequence					Various information related to the STOP POINT IN JOURNEY PATTERN where the call takes place.				X
STOP POINT IN JOURNEY PATTERN			StopPointInSequence	StopPointRef	StopPointCode	1		POINT ID of the STOP POINT that is STOP POINT IN JOURNEYPATTERN.		X		
STOP POINT IN JOURNEY PATTERN		order	StopPointInSequence	Order	positiveInteger	0..1		Order of the STOP POINT IN JOURNEY PATTERN.				
STOP POINT IN JOURNEY PATTERN		order	TargetedCall	Order	positiveInteger	0..1						
STOP POINT IN JOURNEY PATTERN			TimetabledFeederArrival	StopPointInSequence	StopPointInSequence	0..1	*	Derived information on the STOP POINT IN JOURNEY PATTERN where the feeder SERVICE JOURNEY arrives.		X		
STOP POINT IN JOURNEY PATTERN			TimetabledFeederArrivalCancellation	StopPointInSequence	StopPointInSequence	0..1	*	Derived information on the STOP POINT IN JOURNEY PATTERN where the feeder SERVICE VEHICLE JOURNEY should arrive.		X		
STOP POINT IN JOURNEY PATTERN			VehicleJourneyInfo	OriginRef	JourneyPlaceCode	0..1	The identifier of the origin of the journey; used to help identify the vehicle journey on arrival boards.	POINT ID of the origin STOP POINT in JP.		X		

Table H.1 *(continued)*

TM Class Name	TM Definition	Exact correspondence to TM attribute	SIRI Element	SIRI Attribute	SIRI Attribute type	SIRI UML multiplicity	Siri message documentation	TM correspondence indication; comments	Exact correspondence to TM class	SIRI specific - derived from TM (class/ attribute)	Additional attribute without contradiction	SIRI extension to semantically equivalent TM class
STOP POINT IN JOURNEY PATTERN			VehicleJourney-Info	DestinationRef	DestinationCode	0..1	*	POINT ID of the destination STOP POINT in JP.		X		
TARGET PASSING TIME	Time data about when a public transport vehicle should pass a particular POINT IN JOURNEY PATTERN on a particular DATED VEHICLE JOURNEY, in order to match the latest valid plan.	aimed arrival time	AimedArrival-Times	AimedArrivalTime	dateTime	0..1	(1) Aimed Arrival Time at the connection link (2) Aimed Arrival Time in either the original or Production Timetable. Can be omitted at the end stop (cf. DatedCall)	Aimed arrival time attribute of a TARGET PASSING TIME.				
TARGET PASSING TIME		aimed departure time	AimedDepartureInfo	AimedDeparture-Time	dateTime	0..1	Departure Time in either the original or Production Timetable. .	Equivalent to the Aimed departure time attribute from TARGET PASSING TIME.				
TARGET PASSING TIME		aimed departure time	AimedDepartureTimes	AimedDeparture-Time	dateTime	0..1	Departure Time in either the original or Production Timetable.	Aimed departure time attribute of a TARGET PASSING TIME.				
TARGET PASSING TIME		aimed arrival time	ArrivalTimes	AimedArrivalTime	dateTime	0..1	*	Aimed arrival time attribute of a TARGET PASSING TIME.				
TARGET PASSING TIME		aimed departure time	DatedVehicle-JourneyIndirectRef	AimedDeparture-Time	dateTime	1	/	Departure time from this first point.				
TARGET PASSING TIME		aimed arrival time	DatedVehicle-JourneyIndirectRef	AimedArrivalTime	dateTime	1	/	Arrival time at this last point.		X		
TARGET PASSING TIME		aimed departure time	Departure-Times	AimedDeparture-Time	dateTime	0..1	*	Aimed departure time attribute of a TARGET PASSING TIME.				

Table H.1 *(continued)*

TM Class Name	TM Definition	Exact correspondence to TM attribute	SIRI Element	SIRI Attribute	SIRI Attribute type	SIRI UML multiplicity	Siri message documentation	TM correspondence indication; comments	Exact correspondence to TM class	SIRI specific - derived from TM (class/ attribute)	Additional attribute without contradiction	SIRI extension to semantically equivalent TM class
TARGET PASSING TIME		aimed arrival time	InterchangeJourney	AimedDeparture-Time	dateTime	0..1	(should be AimedArrivalTime) Existing definition: Additional descriptive text associated with journey. To be modified.	Aimed arrival time of the SERVICE JOURNEY arriving at the CONNECTION LINK.				
TARGET PASSING TIME			TargetedCall									X
TIMETABLE VERSION	A set of timetable data (VEHICLE JOURNEYs and BLOCKs) to which the same VALIDITY CONDITIONs have been assigned.	name	TimetableVersionCode									
TRAIN BLOCK	A composite train formed of several BLOCKs coupled together during a certain period. Any coupling or separation action marks the start of a new TRAIN BLOCK.	id	TrainBlockPart	TrainPartRef	TrainPartCode	0..1	*	ID of the train part.				
TRAIN BLOCK		id	TrainPartCode				Identifier of train block part					
TRAIN BLOCK PART	The position of a vehicle BLOCK within a TRAIN BLOCK.		MonitoredVehicleJourney	TrainBlockPart	TrainBlockPart	0..1	*	Information on the TRAIN BLOCK PART the journey is part of. Probably more a dated TRAIN BLOCK PART, not explicit in Transmodel				X

Table H.1 *(continued)*

TM Class Name	TM Definition	Exact correspondence to TM attribute	SIRI Element	SIRI Attribute	SIRI Attribute type	SIRI UML multiplicity	Siri message documentation	TM correspondence indication; comments	Exact correspondence to TM class	SIRI specific - derived from TM (class/ attribute)	Additional attribute without contradiction	SIRI extension to semantically equivalent TM class
TRAIN BLOCK PART			TrainBlockPart				Train block part that the vehicle represents	Similar to TRAIN BLOCK PART, although dated TRAIN BLOCK PARTs are not explicit in Transmodel.				X
TRANSPORT MODE	A characterisation of the operation according to the means of transport (bus, tram, metro, train, ferry, ship).	name	JourneyPatternInfo	VehicleMode	VehicleMode	0..1		No assignment of a TRANSPORT MODE to a JP in Transmodel.				X
TRANSPORT MODE		name	VehicleMode				A method of transportation such as bus, rail, etc.		X			
TYPE OF SERVICE	A classification for VEHICLE JOURNEYs and SPECIAL SERVICEs to express some common properties of journeys to be taken into account in the scheduling and/ or operations control process.		ProductCategoryCode				Product Category of journey – subdivides a transport mode. E.g. express, local	Similar to TYPE OF SERVICE. Marketing classification.				X
TYPE OF SERVICE			ServiceFeatureCode				Classification of service into arbitrary Service Features, e.g. school bus	Details on TYPE OF SERVICE. See also ProductCategoryRef				X
TYPE OF SERVICE			ServiceInfo	ProductCategoryRef	ProductCategoryCode	0..1		Similar to TYPE OF SERVICE. Marketing classification.				X

Table H.1 *(continued)*

TM Class Name	TM Definition	Exact correspondence to TM attribute	SIRI Element	SIRI Attribute	SIRI Attribute type	SIRI UML multiplicity	Siri message documentation	TM correspondence indication; comments	Exact correspondence to TM class	SIRI specific - derived from TM (class/ attribute)	Additional attribute without contradiction	SIRI extension to semantically equivalent TM class
VALIDITY CONDITION	Condition used in order to characterise a given VERSION of a VERSION FRAME. A VALIDITY CONDITION consists of a parameter (e.g. date, TRIGGERING EVENT, etc) and its type of application (e.g. for, from, until, etc.).		DataFrameCode				Unique identifier of data frame within participant service. Used to ensure that the DatedVehicleJourneyRef is Unique with the data horizon of the producer. Often the OperationalDayType is used for this purpose	A use of VALIDITY CONDITION, e.g. a DAY TYPE or other properties, used to specify the VERSION FRAME.	X			
VALIDITY CONDITION		id	FramedVehicleJourneyRef	DataFrameRef	DataFrameCode	1	*	A use of VALIDITY CONDITION, e.g. a DAY TYPE or other properties, used to specify the VERSION FRAME.				
VEHICLE	A public transport vehicle used for carrying passengers.	id	OperationalInfo	VehicleRef	VehicleCode	0..1	*	ID of the VEHICLE. Including complete TRAINs.		X		
VEHICLE		id	VehicleCode				/					
VEHICLE DETECTING	An activity consisting in the identification of a vehicle at a certain time by a detection device and of collecting crude data such as an absolute location of the vehicle.		MonitoredCall	VehicleLocationAtStop	Location	0..1	*	Location of a vehicle detecting, at the stop.		X		
VEHICLE DETECTING			ProgressInfo	VehicleLocation	Location	0..1	*	Location of a vehicle detecting.		X		

Table H.1 *(continued)*

TM Class Name	TM Definition	Exact correspondence to TM attribute	SIRI Element	SIRI Attribute	SIRI Attribute type	SIRI UML multiplicity	Siri message documentation	TM correspondence indication; comments	Exact correspondence to TM class	SIRI specific - derived from TM (class/ attribute)	Additional attribute without contradiction	SIRI extension to semantically equivalent TM class
VEHICLE JOURNEY	The planned movement of a public transport vehicle on a DAY TYPE from the start point to the end point of a JOURNEY PATTERN on a specified ROUTE.		DatedVehicleJourney	VehicleJourneyRef	DatedVehicleJourneyCode	0..1		ID of the parent VEHICLE JOURNEY, if it is a NORMAL DATED VEHICLE JOURNEY.		X		
VEHICLE JOURNEY			MonitoredVehicleJourney	VehicleJourneyInfo	VehicleJourneyInfo	1	*	Various information on a journey.				X
VEHICLE JOURNEY			ServiceInfo					Various information on a VEHICLE JOURNEY.				X
VEHICLE JOURNEY			TimetabledFeederArrivalCancellation	VehicleJourneyRef	FramedVehicleJourneyRef	1	*	Information on a DATED VEHICLE JOURNEY associated with the considered data frame		X		
VEHICLE JOURNEY			VehicleJourneyIdentity									X
VEHICLE JOURNEY			VehicleJourneyInfo					Various information on a journey. Monitored or interchange journey.				X
VEHICLE JOURNEY			VehicleJourneyInfo	JourneyNote	nlString	0..1	Additional descriptive text associated with journey.	Siri specific.			X	
VEHICLE JOURNEY			VehicleJourneyInfo	VehicleJourneyNote	nlString	0..1	/	Siri specific. Possible default values (see CallNote).			X	

Table H.1 *(continued)*

TM Class Name	TM Definition	Exact correspondence to TM attribute	SIRI Element	SIRI Attribute	SIRI Attribute type	SIRI UML multiplicity	Siri message documentation	TM correspondence indication; comments	Exact correspondence to TM class	SIRI specific - derived from TM (class/ attribute)	Additional attribute without contradiction	SIRI extension to semantically equivalent TM class
VERSION	A group of operational data instances which share the same VALIDITY CONDITIONs. A version belongs to a unique VERSION FRAME and is characterised by a unique TYPE OF VERSION. E.g. NETWORK VERSION for Line 12 starting from 2000-01-01.		VersionString						X		X	
VERSION FRAME	A set of VERSIONS referring to a same DATA SYSTEM and belonging to the same TYPE OF FRAME. A FRAME may be restricted by VALIDITY CONDITIONs.		DatedTimetableVersionFrame				A version of the timetable to run on a specified date. See DatedTimetableVersionFrame element.	A specialisation of VERSION FRAME, aimed at gathering DATED VEHICLE JOURNEYs sharing the same LINE and the same DIRECTION.				X
VERSION FRAME			DatedTimetableVersionFrame	VersionRef	TimetableVersionCode	0..1		Siri specific (optional external identifier).			X	
VERSION FRAME			EstimatedJourneyVersionFrame					A use of VERSION FRAME.				X
VERSION FRAME			EstimatedJourneyVersionFrame	VersionRef	TimetableVersionCode	0..1		Siri specific (optional external identifier).			X	

Annex I
(informative)

Related Transmodel Class definitions

This Annex includes definitions that are used to compare to other standard classes and attributes.

Table I.1

TM Class Name	TM Definition	TM Identified by
ABSENCE	An actual absence of an EMPLOYEE from work on a particular OPERATING DAY for a specified time.	OPERATING DAY, EMPLOYEE
ACCESS LINK	The physical (spatial) possibility for a passenger to access or leave the public transport system. This link may be used during a trip for:	PLACE, PLACE
ACCESS RIGHT IN PRODUCT	A VALIDABLE ELEMENT as a part of a PRE-ASSIGNED FARE PRODUCT, including its possible order in the set of all VALIDABLE ELEMENTs grouped together to define the access right assigned to that PRE-ASSIGNED FARE PRODUCT.	PRE-ASSIGNED FARE PRODUCT, VALIDABLE ELEMENT
ACCESS RIGHT PARAMETER ASSIGNMENT	The assignment of a fare collection parameter (referring to geography, time or quality) to an element of a fare system (access right, validated access, control device, etc.).	
ACCESS ZONE	A ZONE for which the duration to cover any ACCESS LINK to a particular STOP POINT is the same.	ZONE
ACCESSED FARE STRUCTURE ELEMENT	A validated use of a FARE STRUCTURE ELEMENT, composed of CONTROLLED ACCESSes.	FARE STRUCTURE ELEMENT, VALIDATED ACCESS
ACCOUNT ENTRY	A record of aggregated ACTIVITY LOG ENTRY data per WAGE TYPE, EMPLOYEE and COST CENTRE for one OPERATING DAY. This is used to transfer information on duties actually worked by drivers to an external accounting system.	EMPLOYEE, OPERATING DAY, TYPE OF WAGE
ACCOUNTING PERIOD	A continuous interval between two OPERATING DAYs which will be used for accounting purposes.	OPERATING DAY
ACTIVATED EQUIPMENT	An equipment activated by the passage of a vehicle at an ACTIVATION POINT or on an ACTIVATION LINK.	
ACTIVATION ASSIGNMENT	An assignment of an ACTIVATION POINT/LINK to an ACTIVATED EQUIPMENT related on its turn to a TRAFFIC CONTROL POINT. The considered ACTIVATION POINT/LINK will be used to influence the control process for that TRAFFIC CONTROL POINT (e.g. to fix priorities a	ACTIVATION LINK or ACTIVATION POINT, ACTIVATED EQUIPMENT
ACTIVATION LINK	A LINK where a control process is activated when a vehicle passes it.	ACTIVATION POINT, ACTIVATION POINT,
ACTIVATION POINT	A POINT where a control process is activated when a vehicle passes it. Equipment may be needed for the activation	POINT
ACTIVITY LOG ENTRY	A record giving information on the actual time worked in a STRETCH, or spent for a BREAK, by an EMPLOYEE on a specified OPERATING DAY. It includes data needed for accounting. The actual time worked may cover planned as well as unplanned activities.	EMPLOYEE, OPERATING DAY
ACTUAL STOP POINT EQUIPMENT	An item of equipment of a particular type actually available at an individual STOP POINT (e.g. post, shelter, seats, information display).	STOP POINT, TYPE OF EQUIPMENT
ACTUAL VEHICLE EQUIPMENT	An item of equipment of a particular type actually available in an individual VEHICLE.	TYPE OF EQUIPMENT, VEHICLE
ADMINISTRATIVE ZONE	The area of a district, a region, a city, a municipality, or the area managed by an AUTHORITY.	ZONE
ALARM	An EVENT alerting the staff in charge of operations control on a probable dysfunction: operational threshold exceeded (e.g. delay), emergency call, failure, etc.	
AMOUNT OF PRICE UNIT	A FARE PRODUCT consisting in a stored value of PRICE UNITs: an amount of money on an electronic purse, amount of units on a value card etc.	
ASSIGNED DUTY	A DUTY to which specific timed work has been assigned.	

Table I.1 *(continued)*

TM Class Name	TM Definition	TM Identified by
AUTHORITY	The organisation under which the responsibility of organising the transport service in a certain area is placed.	
BEACON POINT	A POINT where a beacon or similar device to support the automatic detection of vehicles passing by is located.	
BLACKLIST	A list of identified TRAVEL DOCUMENTs or CONTRACTs the validity of which has been cancelled temporarily or permanently, for a specific reason like loss of the document, technical malfunction, no credit on bank account, offences committed by the customer,	
BLOCK	The work of a vehicle from the time it leaves a PARKING POINT after parking until its next return to park at a PARKING POINT. Any subsequent departure from a PARKING POINT after parking marks the start of a new BLOCK. The period of a BLOCK has to be cover	
BOARDING AND ALIGHTING	The numbers of passengers boarding and alighting at a STOP POINT during a RECORDED STOP.	RECORDED STOP
BREAK	A period of time within a DUTY PART during which a driver is resting and is not responsible for a vehicle. This time will usually be spent at a BREAK FACILITY.	STRETCH
BREAK FACILITY	A canteen, cafe, kiosk or any place where drivers have toilet and refreshment facilities.	
CALL FOR MEANS	A MESSAGE of a controller sent to a PARKING POINT to ask for the disposal of resources in stand-by.	MESSAGE
CALL FOR REPAIRS	A MESSAGE of a controller sent to a GARAGE to ask for repair of a VEHICLE.	MESSAGE
CHANGE OF DRIVER	A CONTROL ACTION consisting in removing, at a certain point in time and space (in principle a RELIEF POINT), all work assigned to a LOGICAL DRIVER and of assigning it to another LOGICAL DRIVER.	
CHANGE OF JOURNEY PATTERN	A CONTROL ACTION consisting in assigning a new JOURNEY PATTERN (and the ROUTE supporting it) to a DATED VEHICLE JOURNEY.	
CHANGE OF JOURNEY TIMING	A CONTROL ACTION consisting in changing one or several characteristics of a DATED VEHICLE JOURNEY, in particular the departure time of the journey	
CHANGE OF VEHICLE	A CONTROL ACTION consisting in removing, at a certain point in time and space, all work assigned to a LOGICAL VEHICLE and of assigning it to another LOGICAL VEHICLE.	
CHARGING METHOD	A classification of FARE PRODUCTs according to the payment method and the account location: pre-payment with cancellation (throw-away), pre-payment with debit on a value card, pre-payment without consumption registration (pass), post-payment etc.	
COLUMN/DAY	A column in a ROSTER MATRIX which is related to an OPERATING DAY.	ROSTER MATRIX
COMMERCIAL PROFILE	A category of users depending on their commercial relations with the operator (frequency of use, amount of purchase etc.), often used for allowing discounts.	
COMMON SECTION	A part of a public transport network where the ROUTEs of several JOURNEY PATTERNs are going in parallel and where the synchronisation of SERVICE JOURNEYs may be planned and controlled with respect to commonly used LINKs and STOP POINTs. COMMON SECTIONs a	
COMPLEX FEATURE	An aggregate of SIMPLE FEATUREs and/or other COMPLEX FEATUREs; e.g. a STOP AREA: combination of STOP POINTS; a train station: combination of SIMPLE FEATUREs (POINTs, LINKs) and COMPLEX FEATUREs (STOP AREAs).	
COMPLEX FEATURE PROJECTION	An oriented correspondence: - from one COMPLEX FEATURE in the source layer, - onto an entity in a target layer: e.g. POINT, COMPLEX FEATURE,	

Table I.1 *(continued)*

TM Class Name	TM Definition	TM Identified by
CONNECTION LINK	The physical (spatial) possibility for a passenger to change from one public transport vehicle to another to continue the trip. Different times may be necessary to cover this link, depending on the kind of passenger.	STOP POINT, STOP POINT
CONTINUOUS DUTY	A type of DUTY in one part.	
CONTROL ACTION	An action resulting from a decision taken by the controller causing an amendment of the operation planned in the PRODUCTION PLAN.	
CONTRACT	A contract with a particular (but possibly anonymous) customer, ruling the consumption of transport services (and joint services). A CONTRACT may be designed for a fixed SALES PACKAGE (e.g. ticket) or to allow successive purchases of SALES PACKAGEs.	
CONTRACT EVENT	A log entry describing an event referring to the life of a CONTRACT: initial contracting, sales, validation entries, etc. A subset of a CONTRACT EVENT is often materialised on a TRAVEL DOCUMENT.	
CONTROL ENTRY	The description of a control action, i.e. the comparison of actual and current parameters (time, location…) to the access rights to which the holder of a TRAVEL DOCUMENT is entitled.	CONTROL DEVICE
CONTROL MEAN	A particular mean (control device or manual control procedure) used to control TRAVEL DOCUMENTs.	
CONTROL PARAMETER ASSIGNMENT	An ACCESS RIGHT PARAMETER ASSIGNMENT relating a fare collection parameter to a CONTROL ENTRY.	CONTROL ENTRY
CONTROL TYPE	A classification of passenger controls, e.g. entry, exit, en route or occasional controls.	
CONTROLLABLE ELEMENT	The smallest controllable element of public transport consumption, all along which any VALIDITY PARAMETER ASSIGNMENT remains valid.	
CONTROLLABLE ELEMENT IN SEQUENCE	A CONTROLLABLE ELEMENT as a part of a FARE STRUCTURE ELEMENT, including its possible order in the sequence of CONTROLLABLE ELEMENTs grouped together to form that FARE STRUCTURE ELEMENT, and its possible quantitative limitation.	CONTROLLABLE ELEMENT, FARE STRUCTURE ELEMENT
CONTROLLABLE ELEMENT PRICE	A set of all possible price features of a CONTROLLABLE ELEMENT: default total price, discount in value or percentage etc.	CONTROLLABLE ELEMENT
CONTROLLED ACCESS	A validated use of a CONTROLLABLE ELEMENT.	CONTROLLABLE ELEMENT, ACCESSED FARE STRUCTURE ELEMENT
COST CENTRE	A particular cost centre used for cost accounting.	
COUPLED JOURNEY	A complete journey operated by a coupled train, composed of two or more VEHICLE JOURNEYs remaining coupled together all along a JOURNEY PATTERN. A COUPLED JOURNEY may be viewed as a single VEHICLE JOURNEY.	
COURSE OF JOURNEYS	A part of a BLOCK composed of consecutive VEHICLE JOURNEYs defined for the same DAY TYPE, all operated on the same LINE.	
CREW BASE	A place where operating EMPLOYEEs (e.g. drivers) report on and register their work.	
CUSTOMER	An identified person or organisation involved in a fare process. There may be a CONTRACT between the CUSTOMER and the OPERATOR or the AUTHORITY ruling the consumption of services.	
DATA SYSTEM	The origin of operational data referring to one single responsibility. References to a data system are useful in an interoperated computer system.	
DATED BLOCK	The work of a vehicle on a particular OPERATING DAY from the time it leaves a PARKING POINT after parking until its next return to park at a PARKING POINT.	OPERATING DAY

Table I.1 *(continued)*

TM Class Name	TM Definition	TM Identified by
DATED PASSING TIME	A PASSING TIME on a particular OPERATING DAY.	
DATED SPECIAL SERVICE	A SPECIAL SERVICE taking place on a particular OPERATING DAY. It may derive from a planned SPECIAL SERVICE, or be only occasional.	OPERATING DAY
DATED VEHICLE JOURNEY	A particular journey of a vehicle on a particular OPERATING DAY including all modifications possibly decided by the control staff.	OPERATING DAY
DAY OF WEEK	A particular week day (from Monday to Sunday).	
DAY TYPE	A type of day characterised by one or more properties which affect public transport operation. For example: weekday in school holidays.	NETWORK VERSION
DEAD RUN	A non-service VEHICLE JOURNEY.	
DEAD RUN PATTERN	A JOURNEY PATTERN to be used for DEAD RUNs.	
DEBIT	A log entry providing data for a debiting action in case of post-payment or value card debiting.	
DEFAULT DEAD RUN RUN TIME	The time taken to traverse a TIMING LINK during a DEAD RUN, for a specified TIME DEMAND TYPE. This time may be superseded by the JOURNEY PATTERN RUN TIME or VEHICLE JOURNEY RUN TIME if these exist.	TIME DEMAND TYPE, TIMING LINK
DEFAULT INTERCHANGE	A quality parameter fixing the acceptable duration (standard and maximum) for an interchange to be planned between two STOP POINTs. This parameter will be used to control whether any two VEHICLE JOURNEYs serving those points may be in connection.	STOP POINT, STOP POINT
DEFAULT SERVICE JOURNEY RUN TIME	The default time taken by a vehicle to traverse a TIMING LINK during a SERVICE JOURNEY, for a specified TIME DEMAND TYPE. This time may be superseded by the JOURNEY PATTERN RUN TIME or VEHICLE JOURNEY RUN TIME if these exist.	TIME DEMAND TYPE, TIMING LINK
DELTA	A record of the detailed changes of a given ENTITY IN VERSION from one VERSION to the next one. A DELTA contains pairs of attributes' old values - new values.	
DEPARTURE EXCHANGE	A CONTROL ACTION consisting in permuting at one POINT the departure times of two or several DATED VEHICLE JOURNEYs.	
DEPARTURE LAG	A CONTROL ACTION consisting in gradually shifting a set of departures at one POINT. It allows a change of the timetable without abrupt variations in the intervals.	
DESIGN WEEK	A week viewed as a part of a ROSTER DESIGN with a specified order in that design.	ROSTER DESIGN
DESIGN WEEK ELEMENT	An element of a DESIGN WEEK representing a particular DAY OF WEEK to which a DUTY TYPE or REST may be assigned.	DESIGN WEEK
DESTINATION DISPLAY	An advertised destination of a specific JOURNEY PATTERN, usually displayed on a headsign or at other on-board locations.	
DETECTED OPERATION	An actual data detected in a VEHICLE DETECTING event: detection of an actual vehicle coupling, of an INCIDENT, of an actual relief, etc.	
DEVICE PARAMETER ASSIGNMENT	An ACCESS RIGHT PARAMETER ASSIGNMENT expressing the location (or other fixed parameters) of a CONTROL DEVICE.	CONTROL DEVICE
DIRECTION	A classification for the general orientation of ROUTEs.	
DISPLAY ASSIGNMENT	The assignment of one STOP POINT and one JOURNEY PATTERN to a PI FACILITY, specifying that information on this STOP POINT and this JOURNEY PATTERN will be provided (e.g. displayed, printed).	JOURNEY PATTERN, PI FACILITY, STOP POINT

Table I.1 *(continued)*

TM Class Name	TM Definition	TM Identified by
DISTANCE MATRIX ELEMENT	A cell of an origin-destination matrix for TARIFF ZONEs or STOP POINTs , expressing a fare distance for the corresponding trip: value in km, number of fare units etc.	
DISTANCE MATRIX ELEMENT PRICE	A set of all possible price features of a DISTANCE MATRIX ELEMENT: default total price etc.	DISTANCE MATRIX ELEMENT
DRIVER	An EMPLOYEE whose usual work is to drive a public transport vehicle.	
DRIVER ASSIGNMENT	An assignment of an EMPLOYEE to a ROW/DRIVER in a ROSTER MATRIX for a specified actual OPERATING DAY.	OPERATING DAY, ROW/DRIVER
DRIVER INCIDENT	An INCIDENT concerning LOGICAL DRIVERs.	
DRIVER SCHEDULE VERSION	The set of all DUTies defined for a specific DAY TYPE to which the same VALIDITY CONDITIONs have been assigned.	DAY TYPE
DRIVER TRIP	A planned non-driving movement of a driver within a DUTY PART. This may be necessary to reach the first SPELL in a STRETCH, between two SPELLs or after the last SPELL in a STRETCH. It may be entirely on foot or may use a SERVICE JOURNEY on a vehicle drive	TIMING POINT, TIMING POINT
DRIVER TRIP TIME	The time allowed for a driver to cover a particular DRIVER TRIP during a specified TIME BAND.	DRIVER TRIP, TIME BAND
DRIVING SPEL	A SPELL of driver work between reliefs during which (s)he is driving one vehicle.	
DUTY	The work to be performed by a driver on a particular DAY TYPE.	
DUTY PART	A continuous part of a driver DUTY during which (s)he is under the management of the company. A DUTY PART may include BREAKs.	
DUTY TYPE	A classification of a DUTY, in terms of working hours within the day.	
EMPLOYEE	An employee of the public transport company.	
ENTITY	Any data instance to be managed in an operational Version Management System. When several data sources coexist (multimodality and/or interoperability), an ENTITY has to be related to a given DATA SYSTEM in which it is defined.	DATA SYSTEM
ENTITY IN FRAME	The different ENTITies IN REPOSITORY which can be relevant for corresponding VERSION FRAMEs.	
ENTITY IN REPOSITORY	Any ENTITY name belonging to the repository. DAY TYPE, PROPERTY OF DAY, TIME BAND, VEHICLE TYPE, DUTY, etc, are relevant instances of ENTITY IN REPOSITORY in the context of Version Management.	
ENTITY IN VERSION	The ENTITies associated to a given VERSION. ENTITY IN VERSION is restricted by ENTITY IN TYPE OF FRAME.	ENTITY, VERSION
ESTIMATED PASSING TIME	Time data, calculated from the latest available input, about when a public transport vehicle will pass a particular POINT IN JOURNEY PATTERN on a specified MONITORED VEHICLE JOURNEY. These are mainly used to inform passengers about expected times of arrival	MONITORED VEHICLE JOURNEY, POINT IN JOURNEY PATTERN
EVENT	Any event affecting the public transport operation (production follow-up, management of information or the technical functioning), occurring on an OPERATING DAY and recorded in the system. An EVENT is generally causing a CONTROL ACTION.	
FARE DAY TYPE	A type of day used in the fare collection domain, characterised by one or more properties which affect the definition of access rights and prices in the fare system.	
FARE PRODUCT	An immaterial marketable element (access rights, discount rights etc), specific to a CHARGING METHOD.	CHARGING METHOD, FARE VERSION

Table I.1 *(continued)*

TM Class Name	TM Definition	TM Identified by
FARE PRODUCT PRICE	A set of all possible price features of a FARE PRODUCT: default total price, discount in value or percentage etc.	FARE PRODUCT
FARE QUERY	A PASSENGER QUERY about fares.	
FARE SECTION	A subdivision of a JOURNEY PATTERN consisting of consecutive POINTs IN JOURNEY PATTERN, used to define an element of the fare structure.	POINT IN JOURNEY PATTERN
FARE STRUCTURE ELEMENT	A sequence or set of CONTROLLABLE ELEMENTs to which rules for limitation of access rights and calculation of prices (fare structure) are applied.	
FARE STRUCTURE ELEMENT IN SEQUENCE	A FARE STRUCTURE ELEMENT as a part of a VALIDABLE ELEMENT, including its possible order in the sequence of FARE STRUCTURE ELEMENTs forming that VALIDABLE ELEMENT, and its possible quantitative limitation.	FARE STRUCTURE ELEMENT, VALIDABLE ELEMENT
FARE STRUCTURE ELEMENT PRICE	A set of all possible price features of a FARE STRUCTURE ELEMENT: default total price, discount in value or percentage etc.	FARE STRUCTURE ELEMENT
FARE VERSION	A set of fare collection data to which the same VALIDITY CONDITIONs have been assigned.	OPERATING DAY
FILL IN TIME	A non-productive period of driver time. This is either the result of the duty cutting procedure or is introduced to prolong a DRIVING SPELL to a minimum length.	DRIVING SPELL
FOOTNOTE	A text for informational purposes on exceptions in a LINE, a JOURNEY PATTERN, etc. The information may be usable for passenger or driver information.	FOOTNOTE
FOOTNOTE ASSIGNMENT	The assignment of a FOOTNOTE showing an exception in a JOURNEY PATTERN, a COMMON SECTION, or a VEHICLE JOURNEY, possibly specifying at which POINT IN JOURNEY PATTERN the validity of the FOOTNOTE starts and ends respectively.	
FREQUENCY OF USE:	The limits of usage frequency of a VALIDABLE ELEMENT for a specific period. There may be different tariffs applicable depending on how often the right is consumed during the period.	
GARAGE	A facility used for parking and maintaining vehicles. PARKING POINTs in a GARAGE are called GARAGE POINTs.	
GARAGE POINT	A subtype of PARKING POINT located in a GARAGE.	
GENERIC PARAMETER ASSIGNMENT	A VALIDITY PARAMETER ASSIGNMENT specifying generic access rights for a class of products (e.g. a time band limit – 7 to 10 a.m. – for trips made with a student pass).	
GEOGRAPHICAL INTERVAL	A geographical interval specifying access rights for the FARE STRUCTURE ELEMENTs within the range of this interval: 0-5 km, 4-6 zones etc.	GEOGRAPHICAL INTERVAL
GEOGRAPHICAL INTERVAL PRICE	A set of all possible price features of a GEOGRAPHICAL INTERVAL: default total price etc.	
GEOGRAPHICAL STRUCTURE FACTOR	The value of a GEOGRAPHICAL INTERVAL or a DISTANCE MATRIX ELEMENT expressed by a GEOGRAPHICAL UNIT.	DISTANCE MATRIX ELEMENT or GEOGRAPHICAL INTERVAL, GEOGRAPHICAL UNIT
GEOGRAPHICAL UNIT	A unit for calculating geographical graduated fares.	
GROUP OF LINES	A grouping of lines which will be commonly referenced for a specific purpose.	
GROUP OF LINK SEQUENCES	A grouping of LINK SEQUENCEs.	PURPOSE OF GROUPING

Table I.1 *(continued)*

TM Class Name	TM Definition	TM Identified by
GROUP OF LINKS	A grouping of LINKs. E.g. one GROUP OF LINKs may be managed by a same AUTHORITY.	PURPOSE OF GROUPING
GROUP OF OPERATORS	A group of OPERATORs having for instance common schemes for fare collection or passenger information.	PURPOSE OF GROUPING
GROUP OF POINTS	A grouping of POINTs. The STOP AREA represents one of the most significant GROUPs OF POINTS.	PURPOSE OF GROUPING
GROUP OF SERVICES	A group of SPECIAL SERVICEs, often known to its users by a name or a number.	
GROUP OF TIMEBANDS	A grouping of TIME BANDs.	
GROUP OF TIMING LINKS	A set of TIMING LINKs grouped together according to the similarity of TIME BANDs which are relevant to them. There may be a GROUP OF TIMING LINKS which covers all TIMING LINKs, for use when different GROUPs OF TIMING LINKS are not needed.	NETWORK VERSION
GROUP TICKET	The number and characteristics of persons entitled to travel in addition to the holder of an access right.	
IMPEDED TIME	The difference between the impeded and non-impeded passage of a LINK. It consists of slow down time, waiting time, and accelerating time.	MONITORED VEHICLE JOURNEY
IMPOSSIBLE MANOEUVRE	A specification of impossible move for a certain type of vehicle. It specifies from which INFRASTRUCTURE LINK to which other (adjacent) INFRASTRUCTURE LINK a certain VEHICLE TYPE cannot proceed, due to physical restrictions.	INFRASTRUCTURE LINK, INFRASTRUCTURE LINK, VEHICLE TYPE
INCIDENT	An unforeseen EVENT influencing the operation of the network.	
INFRASTRUCTURE LINK	A supertype including all LINKs of the physical network (e.g. RAILWAY ELEMENT).	LINK
INFRASTRUCTURE POINT	A supertype including all POINTs of the physical network (e.g. RAILWAY JUNCTION).	POINT
INTERCHANGE STATUS	The information about the actual status of a SERVICE JOURNEY INTERCHANGE on a specified OPERATING DAY. Recorded information on missed interchanges may be of particular interest.	OPERATING DAY, SERVICE JOURNEY INTERCHANGE
JOURNEY CANCELLATION	A CONTROL ACTION consisting in deleting a DATED VEHICLE JOURNEY from the last ordered plan.	
JOURNEY CREATION	A CONTROL ACTION consisting in adding a completely new DATED VEHICLE JOURNEY to the latest valid plan.	
JOURNEY MEETING	A time constraint for one or several SERVICE JOURNEYs fixing interchanges between them and/or an external event (e.g. arrival or departure of a feeder line, opening time of the theatre, etc.).	
JOURNEY PART	A part of a VEHICLE JOURNEY created according to a specific functional purpose, for instance in situations when vehicle coupling or separating occurs.	PURPOSE OF JOURNEY PARTITION, VEHICLE JOURNEY
JOURNEY PART COUPLE	Two JOURNEY PARTs of different VEHICLE JOURNEYs served simultaneously by a train set up by coupling their single vehicles.	JOURNEY PART, JOURNEY PART
JOURNEY PATTERN	An ordered list of STOP POINTs and TIMING POINTs on a single ROUTE, describing the pattern of working for public transport vehicles. A JOURNEY PATTERN may pass through the same POINT more than once. The first point of a JOURNEY PATTERN is the origin. The	ROUTE
JOURNEY PATTERN LAYOVER	A time allowance at the end of each journey on a specified JOURNEY PATTERN, to allow for delays and for other purposes. This layover supersedes any global layover and may be superseded by a specific VEHICLE JOURNEY LAYOVER.	JOURNEY PATTERN, TIME DEMAND TYPE
JOURNEY PATTERN RUN TIME	The time taken to traverse a TIMING LINK in a particular JOURNEY PATTERN, for a specified TIME DEMAND TYPE. If it exists, it will override the DEFAULT SERVICE JOURNEY RUN TIME and DEFAULT DEAD RUN RUN TIME.	JOURNEY PATTERN, TIME DEMAND TYPE, TIMING LINK

Table I.1 *(continued)*

TM Class Name	TM Definition	TM Identified by
JOURNEY PATTERN WAIT TIME	The time a vehicle has to wait at a specific TIMING POINT IN JOURNEY PATTERN, for a specified TIME DEMAND TYPE. This wait time can be superseded by a VEHICLE JOURNEY WAIT TIME.	TIME DEMAND TYPE, TIMING POINT IN JOURNEY PATTERN
LAYER	A VERSION FRAME designed for representing spatial objects belonging to the same functional structure, thanks to a specific LOCATING SYSTEM.	
LAYER VERSION	A specific VERSION of a LAYER. A projection uses two LAYER VERSIONs, one as source, the other as target.	LAYER
LINE	A group of ROUTEs which is generally known to the public by a similar name or number.	NETWORK VERSION
LINE SHAPE	The graphical shape of a LINK obtained from a formula or other means, using the LOCATION of its limiting POINTs and depending on the LOCATING SYSTEM used for the graphical representation.	LINK, LOCATING SYSTEM
LINK	An oriented spatial object of dimension 1 with view to the overall description of a network, describing a connection between two POINTs.	NETWORK VERSION
LINK IN LINK SEQUENCE	The order of a LINK in a LINK SEQUENCE to which it belongs.	LINK SEQUENCE
LINK PROJECTION	An oriented correspondence — from one LINK of a source layer — onto an entity in a target layer: e.g.	LINK, TYPE OF PROJECTION
LINK SEQUENCE	An ordered sequence either of POINTs or of LINKs, defining a path through the network.	TYPE OF LINK SEQUENCE
LOCATING SYSTEM	The system used as reference for location and graphical representation of the network and other spatial objects.	
LOCATION	The position of a POINT with a reference to a given LOCATING SYSTEM (e. g. coordinates).	LOCATING SYSTEM, POINT
LOGICAL DRIVER	A theoretically available driver resource for an OPERATING DAY, foreseen to be monitored.	OPERATING DAY
LOGICAL DRIVER CANCELLATION	A CONTROL ACTION consisting in removing a LOGICAL DRIVER from the production plan.	
LOGICAL DRIVER CREATION	A CONTROL ACTION consisting in: — creating a completely new LOGICAL DRIVER — assigning dated spells to this LOGICAL DRIVER.	
LOGICAL VEHICLE	A theoretically available vehicle resource for an OPERATING DAY, foreseen to be monitored.	OPERATING DAY
LOGICAL VEHICLE CANCELLATION	A CONTROL ACTION consisting in removing a LOGICAL VEHICLE from the production plan.	
LOGICAL VEHICLE CREATION	A CONTROL ACTION consisting in — creating a completely new LOGICAL VEHICLE — assigning DATED VEHICLE JOURNEYs to the new LOGICAL VEHICLE.	
LUGGAGE ALLOWANCE	The number and characteristics (weight, volume) of luggage that a holder of an access right is entitled to carry.	
MEAN PASSENGER WAIT TIME	An estimated mean waiting time for a passenger at a STOP POINT, used to calculate the approximate duration of a trip. This value is estimated from the mean interval between vehicles on a JOURNEY PATTERN or a COMMON SECTION.	COMMON SECTION or JOURNEY PATTERN, DAY TYPE, TIME BAND
MEAN RUN TIME	An estimated value of the mean run time on a TIMING LINK, used to inform passengers on the mean duration of trips.	DAY TYPE, TIME BAND, TIMING LINK
MEETING RESTRICTION	A pair of INFRASTRUCTURE LINKs where vehicles of specified VEHICLE TYPEs are not allowed to meet.	INFRASTRUCTURE LINK, INFRASTRUCTURE LINK, VEHICLE TYPE, VEHICLE TYPE,
MESSAGE	An information exchange between an EMPLOYEE (e.g. a controller), a LOGICAL DRIVER or a LOGICAL VEHICLE, used to inform about a CONTROL ACTION or an EVENT.	

Table I.1 *(continued)*

TM Class Name	TM Definition	TM Identified by
MONITORED OPERATION	An operational data monitored in a VEHICLE MONITORING event (e.g. monitoring a LOGICAL VEHICLE, coupled to others, as operating a planned TRAIN BLOCK).	
MONITORED SPECIAL SERVICE	A special service that is monitored as being operated by a LOGICAL VEHICLE.	
MONITORED VEHICLE JOURNEY	A journey that is monitored as being operated by a LOGICAL VEHICLE. According to the monitoring system capabilities, a MONITORED VEHICLE JOURNEY may be related to a DATED VEHICLE JOURNEY, or only to a JOURNEY PATTERN.	
NETWORK VERSION	A set of network data (and other data logically related to these) to which the same validity period has been assigned.	
NON-DRIVING SPELL	A SPELL of driver work, when a driver is performing some non-driving TASK or waiting on STAND-BY.	
NORMAL DATED BLOCK	A DATED BLOCK identical to a long-terms planned BLOCK, possibly updated according to short-term modifications of the PRODUCTION PLAN decided by the control staff.	BLOCK
NORMAL DATED VEHICLE JOURNEY	A DATED VEHICLE JOURNEY identical to a long-term planned VEHICLE JOURNEY, possibly updated according to short-term modifications of the PRODUCTION PLAN decided by the control staff.	VEHICLE JOURNEY
OBSERVED PASSING TIME	The actual passing of a public transport vehicle at a pre-defined POINT during a MONITORED VEHICLE JOURNEY.	MONITORED VEHICLE JOURNEY, POINT
OFFENCE	A log entry providing data on a violation of fare rules.	
OPERATING DAY	A day of public transport operation in a specific calendar. An OPERATING DAY may last more than 24 hours.	
OPERATING DEPARTMENT	The operating department which administers certain LINEs.	OPERATOR
OPERATOR	A company providing public transport services.	
OPTIMIZATION MODE	A type of optimisation criteria used to select a trip proposal (e.g. minimum duration, distance, number of interchanges, amount of fare, etc.).	
ORGANISATIONAL UNIT	A grouping of responsibilities in a public transport company for planning and control.	OPERATING DEPARTMENT
OVERTAKING POSSIBILITY	A POINT or a LINK where vehicles of specified VEHICLE TYPEs are not allowed to overtake each other.	INFRASTRUCTURE POINT, VEHICLE TYPE, VEHICLE TYPE
PARKING POINT	A TIMING POINT where vehicles may stay unattended for a long time. A vehicle's return to park at a PARKING POINT marks the end of a BLOCK.	
PASSENGER QUERY	A request for a specific information on public transport, expressed during a PI TRANSACTION.	
PASSING TIME	Time data concerning public transport vehicles passing a particular POINT; e.g. arrival time, departure time, waiting time.	
PAUSE	A period of paid driver time at the end of a SERVICE JOURNEY or during or after a DEAD RUN when the driver is responsible for the VEHICLE, but resting in the VEHICLE or in a designated BREAK FACILITY near the POINT where the VEHICLE has stopped.	VEHICLE JOURNEY
PERIOD	A continuous interval of time between two OPERATING DAYs which will be used to define validities.	OPERATING DAY
PI FACILITY	A public transport information facility, as for instance terminals (on street, at information desks, telematic…) or printed material (leaflets displayed at stops, booklets…).	

Table I.1 *(continued)*

TM Class Name	TM Definition	TM Identified by
PI TRANSACTION	A connection of a passenger to the operator information system, directly or via an employee, including one or several queries.	
PLACE	A geographic place of any type which may be specified as the origin or destination of a TRIP. A PLACE may be of dimension 0 (a POINT), 1 (a road section) or 2 (a ZONE).	
POINT	A 0-dimensional node of the network used for the spatial description of the network. POINTs may be located by a LOCATION in a given LOCATING SYSTEM.	NETWORK VERSION
POINT IN JOURNEY PATTERN	A STOP POINT or TIMING POINT in a JOURNEY PATTERN with its order in that JOURNEY PATTERN.	JOURNEY PATTERN
POINT IN LINK SEQUENCE	A POINT in a LINK SEQUENCE indicating its order in that particular LINK SEQUENCE.	LINK SEQUENCE
POINT ON LINK	A POINT on a LINK which is not needed for LINK definition, but may be used for other purposes, e.g. for purposes of AVM or PI, or for driver information.	LINK
POINT ON ROUTE	A ROUTE POINT used to define a ROUTE with its order on that ROUTE.	ROUTE
POINT PROJECTION	An oriented correspondence — from one POINT of a source layer — onto an entity in a target layer: e.g. POINT, LINK, LINK.	POINT, TYPE OF PROJECTION
PRE-ASSIGNED FARE PRODUCT	A FARE PRODUCT consisting of one or several VALIDABLE ELEMENTs, specific to a CHARGING METHOD.	
PRICE GROUP	A grouping of prices, allowing the grouping of numerous possible consumption elements into a limited number of price references, or to apply grouped increase, in value or percentage.	
PRICE UNIT	A unit to express prices: amount of currency, abstract fare unit, ticket unit or token etc.	
PRODUCTION PLAN	A reference version of production activities (service journeys, dead runs, duties...). CONTROL ACTIONs are described with reference to the PRODUCTION PLAN they amend.	OPERATING DAY
PROPERTY OF DAY	A property which a day may possess, such as school holiday, weekday, summer, winter etc.	
PT TRIP	A part of a trip starting from the first boarding of a public transport vehicle to the last alighting from a public transport vehicle. A PT TRIP consists of one or more RIDEs and the movements (usually walks) necessary to cover the corresponding CONNECTIO	
PUBLIC SITE	A sub-type of SITE without any operational relationship to the public transport operator.	
PURPOSE OF EQUIPMENT PROFILE	A functional purpose which requires a certain set of equipment of different types put together in a VEHICLE EQUIPMENT PROFILE or STOP POINT EQUIPMENT PROFILE.	
PURPOSE OF GROUPING	Functional purpose for which GROUPs of elements are defined. The PURPOSE OF GROUPING may be restricted to one or more types of the given object.	
PURPOSE OF JOURNEY PARTITION	Operational purpose requiring changing characteristics of a VEHICLE JOURNEY along its JOURNEY PATTERN, thus to create JOURNEY PARTs.	
QUALIFICATION	A specific knowledge or ability or experience, or a certified skill or education, which may be possessed by an EMPLOYEE and which may be necessary to work a DUTY. The qualification profiles given by all QUALIFICATIONs recorded for EMPLOYEEs are important	
QUALITY STRUCTURE FACTOR	A factor influencing access rights definition or calculation of prices, based on the quality: traffic congestion threshold, early/late reservation etc.	
RAILWAY ELEMENT	A type of INFRASTRUCTURE LINK used to describe a railway network.	

Table I.1 *(continued)*

TM Class Name	TM Definition	TM Identified by
RAILWAY JUNCTION	A type of INFRASTRUCTURE POINT used to describe a railway network.	
RECORDED PT TRIP	The actual PT trip undertaken by a passenger from an origin to a destination. Origin and destination of the trip may be expressed in terms of STOP POINTs, TARIFF ZONEs or FARE SECTIONs.	
RECORDED RIDE	A ride made by a passenger on a public transport vehicle from one STOP POINT to another, without intermediate alighting.	
RECORDED STOP	The recorded stop at a STOP POINT during actual service operation to possibly let passengers board or alight the vehicle.	
RELIEF OPPORTUNITY	A time in a BLOCK where a vehicle passes a RELIEF POINT. This opportunity may or may not be actually used for a relief.	BLOCK
RELIEF POINT	A TIMING POINT where a relief is possible, i.e. a driver may take on or hand over a vehicle. The vehicle may sometimes be left unattended.	
RESORPTION	A CONTROL ACTION consisting in progressively resorbing a delay on one DATED VEHICLE JOURNEY by rescheduling the departure times at one POINT of the following journeys. It is a way of maintaining regular intervals after a disturbance on a particular journey.	
RESPACING	A CONTROL ACTION consisting in respacing departure times at one POINT after a journey or a vehicle has been added or cancelled, in order to preserve the regularity of intervals.	
REST	A day off for a driver.	
RIDE	A part of a trip corresponding to the theoretical movement of a user (passenger, driver) on one and only one public transport vehicle, from one STOP POINT to another, on one JOURNEY PATTERN.	JOURNEY PATTERN, STOP POINT, STOP POINT
RIDE IN PT TRIP	A RIDE in a PT TRIP with its order in that PT TRIP.	PT TRIP, RIDE
ROAD ELEMENT	A type of INFRASTRUCTURE LINK used to describe a road network	
ROAD JUNCTION	A type of INFRASTRUCTURE POINT used to describe a road network.	
ROSTER CYCLE	A sequence pattern of WORK and REST where the WORK will be further specified by a particular DUTY TYPE. This pattern is used to assign DUTYs to (theoretically available) drivers in a way that meets the work rules and legal restrictions and is most preferable.	
ROSTER CYCLE ELEMENT	An element of a ROSTER CYCLE which represents a certain position in the ordered sequence of that cycle and to which a REST, WORK or DUTY TYPE may be assigned.	ROSTER CYCLE
ROSTER DESIGN	A roster building unit made up of a particular number of DESIGN WEEKs to each of which a different sequence pattern of DUTY TYPEs and REST will be assigned.	
ROSTER DESIGN IN MATRIX	A ROSTER DESIGN applied to construct a ROSTER MATRIX and the order of this design in the construction of that ROSTER MATRIX.	ROSTER MATRIX
ROSTER DESIGN TYPE	A classification of a ROSTER DESIGN which may describe the number of DESIGN WEEKs in that ROSTER DESIGN and the characteristics of the DUTY TYPEs assigned to the first DESIGN WEEK. The classification may be based on other criteria instead, depending on the	
ROSTER ELEMENT	An element in a ROSTER MATRIX identified by a ROW/DRIVER and a COLUMN/DAY in that matrix. As a result of the rostering process, a DUTY will be entered into this matrix element which will have to be worked by a theoretically available driver related to the	COLUMN/DAY, ROW/DRIVER

Table I.1 *(continued)*

TM Class Name	TM Definition	TM Identified by
ROSTER MATRIX	A duty plan consisting of a matrix with rows for (logical) drivers and columns for days of operation (or maybe vice versa).	TIMETABLE VERSION
ROUTE	An ordered list of located POINTs defining one single path through the road (or rail) network. A ROUTE may pass through the same POINT more than once.	NETWORK VERSION
ROUTE LINK	An oriented link between two ROUTE POINTs allowing the definition of a unique path through the network.	LINK, ROUTE POINT, ROUTE POINT
ROUTE POINT	A POINT used to define the shape of a ROUTE through the network.	POINT
ROW/DRIVER	A row in a ROSTER MATRIX which is related to a theoretically available driver.	ROSTER MATRIX
SALE DISCOUNT RIGHT	A FARE PRODUCT allowing a customer to benefit from discounts when purchasing SALES PACKAGEs.	
SALE TRANSACTION	A SALE OF a FIXED PACKAGE or a SALE OF a RELOADABLE PACKAGE.	OPERATING DAY
SALES PACKAGE	A package to be sold as a whole, consisting of one or several FARE PRODUCTs materialised thanks to one or several TRAVEL DOCUMENTs. The FARE PRODUCTs may be either directly attached to the TRAVEL DOCUMENTs, or may be reloadable on the TRAVEL DOCUMENTs.	FARE VERSION
SALES PACKAGE ELEMENT	The assignment of a FARE PRODUCT to a TYPE OF TRAVEL DOCUMENT in order to define a SALES PACKAGE, realised as a fixed assignment (printing, magnetic storage etc.) or by the possibility for the FARE PRODUCT to be reloaded on the TYPE OF TRAVEL DOCUMENT.	FARE PRODUCT, TYPE OF TRAVEL DOCUMENT
SALES PACKAGE PRICE	A set of all possible price features of a SALES PACKAGE: default total price etc.	SALES PACKAGE
SCHEDULE QUERY	A PASSENGER QUERY about public timetables.	
SEAT CLASS	A parameter indicating the quality of transport (e.g. 1st class or 2nd class).	
SERVICE JOURNEY INTERCHANGE	The scheduled possibility for transfer of passengers between two SERVICE JOURNEYs at the same or different STOP POINTs.	STOP POINT, STOP POINT, VEHICLE JOURNEY, VEHICLE JOURNEY
SERVICE JOURNEY PATTERN INTERCHANGE	A recognised/organised possibility for passengers to change public transport vehicles using two STOP POINTs (which may be identical) on two particular SERVICE JOURNEY PATTERNs, including the maximum wait duration allowed and the standard to be aimed at. T	SERVICE JOURNEY, SERVICE JOURNEY, STOP POINT, STOP POINT
SERVICE JOURNEY PATTERN	The JOURNEY PATTERN for a (passenger carrying) SERVICE JOURNEY.	
SERVICE JOURNEY	A passenger carrying VEHICLE JOURNEY for one specified DAY TYPE. The pattern of working is defined by the associated SERVICE JOURNEY PATTERN.	
SERVICE LINK	A LINK between an ordered pair of STOP POINTs.	LINK
SERVICE PATTERN	The subset of a JOURNEY PATTERN made up only of STOP POINTs IN JOURNEY PATTERN.	
SERVICE SITE	A sub-type of SITE which is of specific interest for the operator (e.g. where a joint service or a joint fee is proposed).	
SHORT TERM DAY TYPE ASSIGNMENT	A specification of a particular DAY TYPE which will be valid during a TIME BAND on an OPERATING DAY for a GROUP OF LINES. This assignment overrides the DAY TYPE which was generally chosen for this OPERATING DAY in the overall DAY TYPE assignment plan.	GROUP OF LINES, OPERATING DAY, TIME BAND
SIMPLE FEATURE	An abstract representation of elementary objects related to the spatial representation of the network. Points (0-dimensional objects), LINKs (1-dimensional objects) and ZONEs (2-dimensional objects) may be viewed as SIMPLE FEATUREs.	

Table I.1 *(continued)*

TM Class Name	TM Definition	TM Identified by
SITE	A well known PLACE to which a passenger may refer to indicate the origin or the destination of a TRIP.	
SPARE DUTY	A DUTY to which specific timed work has not yet been assigned.	
SPECIAL SERVICE	A work of a vehicle that is not planned in a classical way i.e. that is generally not based on VEHICLE JOURNEYs using JOURNEY PATTERNs. It involves specific characteristics (such as specific access rights)and/or may be operated under specific circumstances	
SPECIFIC PARAMETER ASSIGNMENT	A VALIDITY PARAMETER ASSIGNMENT specifying practical parameters during a TRAVEL SPECIFICATION, within a given fare structure (e.g. the origin or destination zone in a zone-counting system).	
SPELL	A continuous period in a STRETCH, when a driver is on duty on one vehicle or performing one other type of work.	
SPLIT DUTY	A type of duty in two parts separated by a period of unpaid time.	
STAND-BY	A non-driving period of a driver's duty when (s)he must wait ready to take on any specified piece of work instantly.	
STOP AREA	A group of STOP POINTs close to each other.	NETWORK VERSION
STOP POINT	A POINT where passengers can board or alight from vehicles.	POINT
STOP POINT EQUIPMENT PROFILE	Each instantiation of this entity gives the number of items of one TYPE OF EQUIPMENT a TYPE OF STOP POINT should contain for a given PURPOSE OF EQUIPMENT PROFILE. The set of instantiations for one TYPE OF STOP POINT and one purpose gives one complete 'pro	PURPOSE OF EQUIPMENT PROFILE, TYPE OF EQUIPMENT
STOP POINT IN JOURNEY PATTERN	A POINT in a JOURNEY PATTERN which is a STOP POINT.	SERVICE PATTERN
STRETCH	A period of a driver's DUTY during which (s)he is continuously working without a BREAK. PAUSEs during which (s)he remains responsible for the vehicle may be included.	
TARGET PASSING TIME	Time data about when a public transport vehicle should pass a particular POINT IN JOURNEY PATTERN on a particular DATED VEHICLE JOURNEY, in order to match the latest valid plan.	DATED VEHICLE JOURNEY, TIMING POINT IN JOURNEY PATTERN
TARIFF STRUCTURE	A particular tariff, described by a combination of parameters.	FARE VERSION
TARIFF ZONE	A ZONE used to define a zonal fare structure in a zone-counting or zone-matrix system.	ZONE
TASK	Any continuous piece of non-driving work, performed by a driver.	
TIME ALLOWANCE	A fixed paid time allowed to perform certain activities to prepare for or to complete the work assigned either to a BLOCK, or to a DUTY, or to a DUTY PART, or to a STRETCH.	BLOCK or DUTY or DUTY PART or SPELL or STRETCH, TYPE OF ALLOWANCE
TIME BAND	A period in a day, significant for some aspect of public transport, e.g. similar traffic conditions or fare category.	NETWORK VERSION
TIME DEMAND TYPE	An indicator of traffic conditions or other factors which may affect vehicle run or wait times. It may be entered directly by the scheduler or defined by the use of TIME BANDS.	NETWORK VERSION
TIME DEMAND TYPE ASSIGNMENT	The assignment of a TIME DEMAND TYPE to a TIME BAND depending on the DAY TYPE and GROUP OF TIMING LINKS.	DAY TYPE, GROUP OF TIMING LINKS, TIME BAND
TIME INTERVAL	A time-based interval specifying access rights for the FARE STRUCTURE ELEMENTs within the range of this interval: 0-1 hour, 1-3 days etc.	
TIME INTERVAL PRICE	A set of all possible price features of a TIME INTERVAL: default total price etc.	TIME INTERVAL

Table I.1 *(continued)*

TM Class Name	TM Definition	TM Identified by
TIME STRUCTURE FACTOR	The value of a TIME INTERVAL expressed by a TIME UNIT.	TIME INTERVAL, TIME UNIT
TIME UNIT	A unit for calculating time-based graduated fares.	
TIMETABLE VERSION	A set of timetable data (VEHICLE JOURNEYs and BLOCKs) to which the same VALIDITY CONDITIONs have been assigned.	
TIMETABLED PASSING TIME	Long-term planned time data concerning public transport vehicles passing a particular POINT IN JOURNEY PATTERN on a specified VEHICLE JOURNEY for a certain DAY TYPE.	POINT IN JOURNEY PATTERN, VEHICLE JOURNEY
TIMING LINK	An ordered pair of TIMING POINTs for which run times may be recorded.	LINK
TIMING LINK IN JOURNEY PATTERN	The position of a TIMING LINK in a JOURNEY PATTERN. This entity is needed if a TIMING LINK is repeated in the same JOURNEY PATTERN, and separate information is to be stored about each iteration of the TIMING LINK.	JOURNEY PATTERN
TIMING PATTERN	The subset of a JOURNEY PATTERN made up only of TIMING POINTs IN JOURNEY PATTERN.	
TIMING POINT	A POINT against which the timing information necessary to build schedules may be recorded.	POINT
TIMING POINT IN JOURNEY PATTERN	A POINT in a JOURNEY PATTERN which is a TIMING POINT.	TIMING PATTERN
TRACE	A way to record the context of the changes occurred in a given ENTITY instance, as regards the authors, the causes of the changes, etc., possibly accompanied by a descriptive text.	ENTITY IN VERSION
TRAFFIC CONTROL POINT	A POINT where the traffic flow can be influenced. Examples are: traffic lights (lanterns), barriers.	POINT
TRAIN	A vehicle composed of TRAIN ELEMENTs in a certain order, i.e. of wagons assembled together and propelled by a locomotive or one of the wagons.	VEHICLE
TRAIN BLOCK	A composite train formed of several BLOCKs coupled together during a certain period. Any coupling or separation action marks the start of a new TRAIN BLOCK.	
TRAIN BLOCK PART	The position of a vehicle BLOCK within a TRAIN BLOCK.	TRAIN BLOCK
TRAIN COMPONENT	A specification of the order of TRAIN ELEMENTs in a TRAIN.	TRAIN
TRAIN ELEMENT	An elementary component of a TRAIN (e.g. wagon, locomotive).	
TRANSFERABILITY	The number and characteristics of persons entitled to use the public transport service instead of the original customer.	
TRANSPORT MODE	A characterisation of the operation according to the means of transport (bus, tram, metro, train, ferry, ship).	
TRAVEL DOCUMENT	A particular physical support (ticket, card…) to be held by a customer, allowing the right to travel or to consume joint-services, to proof a payment (including possible discount rights), to store a subset of the CONTRACT liabilities or a combination of	
TRAVEL SPECIFICATION	The recording of a specification by a customer of parameters giving details of an intended consumption (e.g. origin and destination of a travel).	
TRIP OPTIMIZATION QUERY	A PASSENGER QUERY concerning an optimal TRIP proposal, according to a specified OPTIMIZATION MODE.	PLACE, PLACE
TRIP PATTERN	The spatial pattern of a complete movement of a passenger (or another person, e.g. driver) from one PLACE of any sort to another. A trip may consist of one PT TRIP and the corresponding movements (usually walks) to cover the necessary ACCESS LINKs and CON	PLACE

Table I.1 *(continued)*

TM Class Name	TM Definition	TM Identified by
TURN STATION	A place (often a terminus) where a vehicle can reverse its direction (from a ROUTE to another of opposite DIRECTION).	POINT ON ROUTE
TURNAROUND TIME LIMIT	The maximum time for which a vehicle may be scheduled to wait at a particular TIMING POINT (often included in a TURN STATION) without being returned to a PARKING POINT. A minimum time for a vehicle to turn its direction may also be recorded. This may be s	TIME DEMAND TYPE, TIMING POINT, TIMING POINT
TYPE OF ABSENCE	A category of ABSENCE of EMPLOYEEs from work. There are planned ABSENCEs like free days and long-term holidays, and actual ABSENCEs like illness, unplanned short-term holidays etc.	
TYPE OF ACTIVATION	A classification of real-time processes that are activated when vehicles passes an ACTIVATION POINT or an ACTIVATION LINK.	
TYPE OF ALLOWANCE	A classification of additional paid times, including the information whether the allowance is given before or after the main activity.	
TYPE OF EQUIPMENT	A classification of equipment items to be installed at stop points or onboard vehicles, for instance.	
TYPE OF EVENT	A classification of EVENTs (e.g. ALARMs, INCIDENTs) according to their cause of effect.	
TYPE OF FRAME	A classification of VERSION FRAMEs according to a common purpose. E.g. line descriptions for line versions, vehicle schedules, operating costs. A TYPE OF FRAME is ruled by a unique TYPE OF VALIDITY.	
TYPE OF JOURNEY PATTERN	A classification of JOURNEY PATTERNs used to distinguish other categories of JOURNEY PATTERN than SERVICE JOURNEY PATTERN and DEAD RUN PATTERN.	
TYPE OF LINK	Classification of LINKs to express the different functional roles of a LINK.	
TYPE OF LINK SEQUENCE	A classification of LINK SEQUENCEs used to define the different functions a LINK SEQUENCE may be used for. E.g. ROUTE, JOURNEY PATTERN, road, TRIP PATTERN, border line etc.	PURPOSE OF GROUPING
TYPE OF MESSAGE	A classification of MESSAGEs.	
TYPE OF PI FACILITY	A classification of PI FACILITYs (e.g. stand-alone terminal, information desk, printed leaflet, etc.).	
TYPE OF POINT	A classification of POINTs according to their functional purpose.	
TYPE OF PROJECTION	A classification of the projections according to their functional purpose, the source and target layers.	
TYPE OF QUERY	A classification of PASSENGER QUERYs.	
TYPE OF SERVICE	A classification for VEHICLE JOURNEYs and SPECIAL SERVICEs to express some common properties of journeys to be taken into account in the scheduling and/or operations control process.	
TYPE OF SITE	A classification of SITEs.	
TYPE OF STOP POINT	A classification of STOP POINTs, used for instance to characterize the equipment to be installed at stops (post, shelter, seats, etc.).	
TYPE OF TASK	A classification of TASKs.	
TYPE OF TRAFFIC CONTROL POINT	A classification of TRAFFIC CONTROL POINTs.	
TYPE OF TRAIN ELEMENT	A classification of TRAIN ELEMENTs.	

Table I.1 *(continued)*

TM Class Name	TM Definition	TM Identified by
TYPE OF TRAVEL DOCUMENT	A classification of TRAVEL DOCUMENTs expressing their general functionalities and local functional characteristics specific to the operator. Types of TRAVEL DOCUMENTs like e.g. throw-away ticket, throw-away ticket unit, value card, electronic purse allowing	FARE VERSION
TYPE OF VALIDITY	A classification of the validity of TYPEs OF FRAME. E.g. VERSION FRAMES for schedules designed for DAY TYPEs; dated schedules.	
TYPE OF VERSION	A classification of VERSIONs. E.g. shareability of ENTITies between several versions.	
TYPE OF WAGE	A classification used for wage accounting, which associates sums of work time recorded in ACCOUNT ENTRies to TIME BANDs relevant for accounting.	
TYPE OF ZONE	A classification of ZONEs. E. TARIFF ZONE, ADMINISTRATIVE ZONE.	
USAGE DISCOUNT RIGHT	A FARE PRODUCT allowing a customer to benefit from discounts when consuming VALIDABLE ELEMENTs.	
USAGE PARAMETER	A parameter used to specify the use of a VALIDABLE ELEMENT or a FARE PRODUCT.	
USAGE PARAMETER PRICE	A set of all possible price features of a USAGE PARAMETER: discount in value or percentage etc.	USAGE PARAMETER
USER PROFILE	The social profile of a passenger, based on age group, education, profession, social status, sex etc., often used for allowing discounts: 18-40 years old, graduates, drivers, unemployed, women etc.	
VALIDABLE ELEMENT	A sequence or set of FARE STRUCTURE ELEMENTs, grouped together to be validated in one go.	FARE VERSION
VALIDABLE ELEMENT PRICE	A set of all possible price features of a VALIDABLE ELEMENT: default total price, discount in value or percentage etc.	VALIDABLE ELEMENT
VALIDATED ACCESS	A validated use of a VALIDABLE ELEMENT, composed of ACCESSED FARE STRUCTURE ELEMENTs.	VALIDABLE ELEMENT, VALIDATION ENTRY
VALIDATION ENTRY	The result of the comparison between one or several CONTROL ENTRYs and the theoretical access rights attached to the TRAVEL DOCUMENT controlled, validating the right to consume and possibly providing a DEBIT or one or more OFFENCEs.	
VALIDATION PARAMETER ASSIGNMENT	An ACCESS RIGHT PARAMETER ASSIGNMENT relating a fare collection parameter to a VALIDATED ACCESS or one of its components.	CONTROLLED ACCESS
VALIDITY CONDITION	Condition used in order to characterise a given VERSION of a VERSION FRAME. A VALIDITY CONDITION consists of a parameter (e.g. date, TRIGGERING EVENT, etc) and its type of application (e.g. for, from, until, etc.).	LAYER or VERSION or VERSION FRAME
VALIDITY PARAMETER ASSIGNMENT	An ACCESS RIGHT PARAMETER ASSIGNMENT relating a fare collection parameter to a theoretical FARE PRODUCT (or one of its components) or a SALES PACKAGE.	CONTROLLABLE ELEMENT IN SEQUENCE
VALIDITY PERIOD	A time limitation for validity of a FARE PRODUCT or a SALES PACKAGE. It may be composed of a standard duration (e.g. 3 days, 1 month) and/or fixed start/end dates and times.	
VALIDITY RULE PARAMETER	A user defined VALIDITY CONDITION used by a rule for selecting versions. E.g. river level > 1,5 m and bad weather.	
VALIDITY TRIGGER	External event defining a VALIDITY CONDITION. E.g. exceptional flow of a river, bad weather, road closure for works.	
VEHICLE	A public transport vehicle used for carrying passengers.	

Table I.1 *(continued)*

TM Class Name	TM Definition	TM Identified by
VEHICLE ASSIGNMENT	The assignment, or the cancellation of an assignment, of a physical VEHICLE to a LOGICAL VEHICLE. This assignment may be overridden by a further assignment.	
VEHICLE DETECTING	An activity consisting in the identification of a vehicle at a certain time by a detection device and of collecting crude data such as an absolute location of the vehicle.	
VEHICLE EQUIPMENT PROFILE	Each instantiation of this entity gives the number of items of one TYPE OF EQUIPMENT a VEHICLE MODEL should contain for a given PURPOSE OF EQUIPMENT PROFILE. The set of instantiations for one VEHICLE MODEL and one purpose gives one complete 'profile'.	PURPOSE OF EQUIPMENT PROFILE, TYPE OF EQUIPMENT
VEHICLE INCIDENT	An INCIDENT concerning LOGICAL VEHICLEs.	
VEHICLE JOURNEY	The planned movement of a public transport vehicle on a DAY TYPE from the start point to the end point of a JOURNEY PATTERN on a specified ROUTE.	JOURNEY PATTERN, DAY TYPE
VEHICLE JOURNEY LAYOVER	A time allowance at the end of a specified VEHICLE JOURNEY. This time supersedes any global layover or JOURNEY PATTERN LAYOVER.	VEHICLE JOURNEY
VEHICLE JOURNEY RUN TIME	The time taken to traverse a specified TIMING LINK IN JOURNEY PATTERN on a specified VEHICLE JOURNEY. This gives the most detailed control over times and overrides the DEFAULT SERVICE JOURNEY RUN TIME and JOURNEY PATTERN RUN TIME and the DEFAULT DEAD RUN	TIMING LINK IN JOURNEY PATTERN, VEHICLE JOURNEY
VEHICLE JOURNEY WAIT TIME	The time for a vehicle to wait at a particular TIMING POINT IN JOURNEY PATTERN on a specified VEHICLE JOURNEY. This wait time will override the JOURNEY PATTERN WAIT TIME.	TIMING POINT IN JOURNEY PATTERN, VEHICLE JOURNEY
VEHICLE MODEL	A classification of public transport vehicles of the same VEHICLE TYPE, e.g. according to equipment specifications or model generation.	
VEHICLE MONITORING	An activity consisting in the assignment, at a certain time, of operational data to a monitored LOGICAL VEHICLE (e.g. that the vehicle is operating a certain MONITORED VEHICLE JOURNEY, or has passed at a certain OBSERVED PASSING TIME at a POINT).	LOGICAL VEHICLE
VEHICLE SCHEDULE VERSION	The set of all BLOCKs defined for a specific DAY TYPE to which the same VALIDITY CONDITIONs have been assigned (usually defined for a specific GROUP OF LINEs).	DAY TYPE
VEHICLE SERVICE	A workplan for a vehicle for a whole day, planned for a specific DAY TYPE. A VEHICLE SERVICE includes one or several VEHICLE SERVICE PARTs.	
VEHICLE SERVICE PART	A part of a VEHICLE SERVICE composed of one or more BLOCKs and limited by periods spent at the GARAGE managing the vehicle in question.	
VEHICLE TYPE	A classification of public transport vehicles according to the vehicle scheduling requirements in mode and capacity (e.g. standard bus, double-deck...).	
VEHICLE TYPE AT POINT	The number of vehicles of a specified VEHICLE TYPE which may wait at a specified POINT at any one time. If the capacity is 0, then that type of vehicle may not stop there.	INFRASTRUCTURE POINT, VEHICLE TYPE
VEHICLE TYPE PREFERENCE	The preference for the use of a particular VEHICLE TYPE for a SERVICE JOURNEY PATTERN, depending on the DAY TYPE and TIME DEMAND TYPE. The rank of preferences must be recorded. Different VEHICLE TYPEs may be given the same rank.	DAY TYPE, JOURNEY PATTERN, TIME DEMAND TYPE, VEHICLE TYPE
VEHICLE WORK ASSIGNMENT	The assignment, or the cancellation of an assignment, of a LOGICAL VEHICLE to a planned work, represented as DATED BLOCKs or as DATED VEHICLE JOURNEYs. This assignment may be overridden by a further assignment.	

Table I.1 *(continued)*

TM Class Name	TM Definition	TM Identified by
VERSION	A group of operational data instances which share the same VALIDITY CONDITIONs. A version belongs to a unique VERSION FRAME and is characterised by a unique TYPE OF VERSION. E.g. NETWORK VERSION for Line 12 starting from 2000-01-01.	
VERSION FRAME	A set of VERSIONS referring to a same DATA SYSTEM and belonging to the same TYPE OF FRAME. A FRAME may be restricted by VALIDITY CONDITIONs.	
WAGE INCREASE	An additional increase for special pursuits, e.g. dirt increase or aggravation circumstances.	
WAGE TYPE ASSIGNMENT	An assignment of a WAGE TYPE to a DAY TYPE and a TIME BAND.	DAY TYPE, TIME BAND
WIRE ELEMENT	A type of INFRASTRUCTURE LINK used to describe a wire network.	
WIRE JUNCTION	A type of INFRASTRUCTURE POINT used to describe a wire network.	
WORK	A day on duty for a driver.	
ZONE	A two-dimensional PLACE within the service area of a public transport operator (administrative zone, TARIFF ZONE, ACCESS ZONE, etc.).	TYPE OF ZONE
ZONE PROJECTION	An oriented correspondence: — from one ZONE in a source layer, — onto a target entity : e.g. POINT.	TYPE OF PROJECTION, ZONE

Bibliography

[1] Européen de Normalisation Comité (CEN), Reference Data Model For Public Transport, EN12896

[2] [US TCIP] Transit Communications Interface Profiles. APTA-TCIP-S-01 3.0.3, March 2010. American Public Transportation Association

[3] Rumbaugh J. The Unified Modeling Language Reference Manual. Addison-Wesley, Reading, MA, 1999

[4] ISO 14817, *Transport information and control systems — Requirements for an ITS central Data Registry and ITS Data Dictionaries*

[5] General T.F.S. February 2012. https://developers.google.com/transit/gtfs/reference

[6] Kizoom (Knowles, Nick and Miller, Peter). *A Transmodel based XML schema for the Google Transit Feed Specification With a GTFS / Transmodel comparison* [2008.12.29]. http://www.transmodel.org.uk/schema/doc/GoogleTransit/TransmodelForGoogle-09.pdf

[7] [CEN-NeTEx]Européen de Normalization Comité (CEN), Network and Timetable Exchange (NeTEx): 2014

CEN/TS 16614-1, *Public transport network topology exchange format*

CEN/TS 16614-2, *Public transport scheduled timetables exchange format*

CEN/TS 16614-3, *Public transport network fare information exchange format*

[8] Européen de Normalization C. (CEN) Service Interface for Realtime Information. SIRI, 2006

CEN/TS 15531-1, *Context and framework*

CEN/TS 15531-2, *Communication infrastructure*

CEN/TS 15531-3, *Functional service interfaces*

CEN/TS 15531-4, *Functional service interfaces: Facility monitoring*

CEN/TS 15531-5, *Functional service interfaces: Situation exchange*

[9] [Japan] *Standards for Public Transport Information*. XML1.1 ver. 2006. Ministry of Land, Infrastructure and Transport

[10] [Korea] *Technical Regulation of Bus Information Exchanges (C2C).* November 2005, revised April 2014. Ministry of Land, Infrastructure and Transport

[11] [NEPTUNE-AFNOR] Profil d'echange NEPTUNE - AFNOR reference NF P 99-506