BS ISO 17185-1:2014

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Intelligent transport systems — Public transport user information

Part 1: Standards framework for public information systems

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National foreword

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INTERNATIONAL STANDARD

ISO 17185-1

First edition
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Intelligent transport systems — Public transport user information —

Part 1: Standards framework for public information systems

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

Partie 1: Cadre pour les normes relatives aux systèmes d'information publique

Reference number
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Foreword

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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, *Intelligence 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 systems*

— *Part 2: Data and interface standards catalogue and cross reference*

— *Part 3: Use cases for journey planning systems and their interoperation*

Introduction

TC204 Intelligent Transport Systems, WG8, Public Transport and Emergency Services, have been discussing enhancement of surface public transport information provision to surface public transport users including international travellers around the world by using ITS technology.

WG8, Public Transport and Emergency Services, have been trying to harmonize current surface public transport information provision interface national and regional standards, mainly, the TRANSMODEL standard developed by CEN and the TCIP standard developed by the American Public Transportation Association in the USA. However, because these surface public transport information standards are widely accepted and used for system implementation in their regions, there is no perceived need or demand to harmonize them.

Because WG8's responsibility is to make surface public transport more convenient by realizing stress-free surface public transport user information provision, WG8 has reached the conclusion that it has to establish one International Standard (but not a technical report which has no binding rules) which is defining basic framework that will fit above current national and regional standards. The accepted national and regional standards (at this point in time, TCIP and TRANSMODEL) will be allowed to define the specific information interfaces such as data format, stop point numbering system, etc. that are necessary to the implementation of surface public transport information systems.

This part of ISO 17185 will be beneficial for all ISO/CEN member countries, as well as non-ISO/CEN member countries, because this part of ISO 17185 will be a valuable "text book" to detail basic framework, as well as highlight and encourage use of currently available national and regional standards such as TRANSMODEL, TCIP, and possibly others. The intention is that, by deploying these national and regional standards by other countries or regions, duplication of cost and time is avoidable. For those countries that do not have surface public transport information standards, this approach allows more rapid development and deployment of public transport systems that enhance usability and convenience.

This part of ISO 17185 is specifically set at a higher level and not aiming to harmonize currently available national and regional standards to allow the use of these robust standards which are set at various levels (for example, implementation specifications versus application level standards) but which also experience widespread acceptance in their regional standards. This part of ISO 17185 intends to establish a basic solid foundation for surface public transport user information provision framework and is specifically limited to this scope to avoid conflict with those currently available regional standards.

This part of ISO 17185 is intended to be fully consistent with those currently available national and regional standards which might be related to international surface public transport. In fact, in the case of international surface public transport, surface public transport operators already have transport-related information systems. However, it is not often the case that surface public transport users, including international travellers, are provided with static and real-time information including bus/train/tram locations appropriately and timely. This part of ISO 17185, and its scope and approach, will solve this issue by setting basic framework for surface public transport information provision while embracing existing national and regional standards.

INTERNATIONAL STANDARD **ISO 17185-1:2014(E)**

Intelligent transport systems — Public transport user information —

Part 1: Standards framework for public information systems

1 Scope

This part of ISO 17185 defines the framework for the realization of efficient public transport user information provision to surface public transport users including international worldwide travellers.

In the surface public transport user information provision area, a set of regional and national standards have already been established by related regional and national standardizing bodies.

This part of ISO 17185 defines basic framework for user information provision for surface public transport users, from the viewpoint that the surface public transport users should be provided with proper static and real-time information when it is most desired and effective. In order to realize the desirable information provision, surface public transport information has to be efficiently gathered, processed, and provided to surface public transport users in an appropriate way by using currently available regional standards.

This part of ISO 17185 does not aim to define a new part of ISO 17185 that supersedes current regional and national standards related to surface public transport. It aims to define the basic framework of surface public transport user information provision by esteeming existing regional standards and wisely using them.

This part of ISO 17185 does not aim to define specific information interfaces such as data format or a stop point numbering system. The currently available regional standards established by regional and national groups are suggested to be applied in that scope.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 17185-2, *Intelligent transport system — Public transport user information — Part 2: Data and interface standards catalogue and cross reference*

ISO 17185-3, *Intelligent transport system — Public transport user information — Part 3: Use cases for journey planning systems and their inter-operation*

3 Terms and definitions

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

3.1
data
reinterpretable representation of information in a formalized manner suitable for communication, interpretation, or processing

Note 1 to entry: Data can be processed by humans or by automatic means. [ISO/IEC 2382-1:1993, (01.01.02)]

Note 2 to entry: Adapted from ISO/IEC 15944.

3.2
database
collection of electronically stored descriptive records or content units (including facts, full texts, pictures, and sound) with a common user interface and software for the retrieval and manipulation of the data

Note 1 to entry: The units or records are usually collected with a particular intent and are related to a defined topic. A database can be issued on CD-ROM, diskette, or other direct-access method, or as a computer file accessed through dial-up methods or through the Internet.

Note 2 to entry: Licensed databases are counted separately even if access to several licensed database products is effected through the same interface.

Note 3 to entry: A common interface providing access to a packet of serials or digital documents, usually offered by a publisher or vendor, is also to be counted as database. Additionally, the single serials or digital documents are counted as serials or digital documents. [ISO 2789:2013, 2.3.10]

Note 4 to entry: Adapted from ISO 9707.

3.3
data model
graphical and/or lexical representation of data, specifying their properties, structure, and inter-relationships

Note 1 to entry: Adapted from ISO/IEC 11179.

3.4
entity
concrete or abstract thing that exists, did exist, or might exist, including associations among these things

EXAMPLE A person, object, event, idea, process, etc.

Note 1 to entry: An entity exists whether data about it are available or not. [ISO/IEC 2382-17:1999, (17.02.05)]

Note 2 to entry: Adapted from ISO/IEC 15944.

3.5
fare collection
all activities related to the collection of money from passengers

3.6
framework
structure expressed in diagrams, text, and formal rules which relates the components of a conceptual entity to each other

Note 1 to entry: Adapted from ISO 19439:2006, 3.3.

3.7
function
intended effect of a system, subsystem, product, or part

[SOURCE: EN 1325-1:1997]

Note 1 to entry: Functions should have a single definite purpose. Function names should have a declarative structure (e.g. “Validate telecommands”) and say “what” is to be done rather than “how”. Good naming allows design components with strong cohesion to be easily derived.

Note 2 to entry: Adapted from ISO 16091.

3.8
functional area
combination of groups and/or elements in a unit that can be used independently

Note 1 to entry: Adapted from ISO 16952.

3.9
IC
small piece of semiconductive material that contains interconnected electronic elements

Note 1 to entry: Adapted from ISO/IEC 2382-1.

3.10
logical data model
data design that takes into account the type of database to be used, but does not consider means of utilization of space or access

3.11
management information
information utilized by management or produced to serve a management function

Note 1 to entry: Adapted from ISO 6707-2.

Note 2 to entry: In this part of ISO 17185, this term means all activities allowing the company management to collect the information necessary to meet problem-solving needs. Data of operational systems are filtered and aggregated for this purpose and made available to the user interactively or in form of pre-defined reports and summaries. Such functions are, in principle, related to all functional areas of a company, with particular reference to the management of statistical results.

3.12
operations monitoring and control
all activities related to the transportation process, i.e. real-time functions related to the driving and transportation of passengers according to given instructions, including the monitoring of the driving process and its control in case of deviations, as well as all activities that support the driving process (traffic light priority, track switching, bay selection, advance/delay advice etc.)

Note 1 to entry: Such functions are often assisted by computer-aided tools known as Automated Vehicle Monitoring (AVM).

3.13
passenger information
activities related to informing the users either on the planned or on the actual transportation services

3.14
personnel disposition
activities related to the mid-term and short-term management of drivers

3.15
scheduling
method of controlling the timing of the execution of a scheduled activity within or represented by a managed object

Note 1 to entry: Adapted from ISO/IEC 10164.

Note 2 to entry: In this part of ISO 17185, this term means all activities related to the tactical planning of transportation, splitting into vehicle scheduling, driver scheduling, and rostering.

3.16
use case
sequence of actions that an actor (usually a person, but perhaps an external entity, such as another system) performs within a system to achieve a particular goal

Note 1 to entry: Adapted from ISO/TR 25102.

4 Symbols and abbreviated terms

AVL	automatic vehicle location
BISON	Beheer Informatie Standaarden OV Nederland, Netherlands public transport information standards management platform
CEN	European Committee for Standardization
DE	Germany
EU	European Union
GPS	global navigation system
IEC	international Electrotechnical Commission
IFOPT	identification of fixed objects in public transport, CEN published standard EN 28701
ISO	International Organization for Standardization
ITS	intelligent transport systems
NaPTAN	national public transport access nodes, GB national system for uniquely identifying all the points of access to public transport in GB
NEPTUNE	French standard (PR NF 99–506) for format describing public transport routes
NeTEx	network exchange, CEN TC278 WG3 standard currently in development with the goal to provide efficient European-wide standard for exchanging public transport schedules and related data
PT	public transport
RTPI	real-time passenger information
SIRI	service interface for real-time information, CEN technical specification (TS 15531)
TCIP	transit communications interface profiles, US standard developed by APTA for introducing advanced ITS technologies into PT to improve safety, security, and efficiency
Transmodel	CEN standard (EN 12896) for reference data model for public transport information which provides an abstract model of common public transport concepts and data structures that can be used to build many different kind of public transport information system, including for timetabling, fares, operational management, real-time data, journey planning, etc.
TransXChange	exchanging bus schedules and related data, GB nationwide standard

5 General Requirement

5.1 Importance of PT user information provision

PT service operator shall play an important role in surface transport as society fully depend upon privately owned cars that has their own limitations such as high environmental impact, increasing number of accidents related to aged drivers, and shrinking economy due to scattered population.

The issue of the current PT to be solved varies country to country or city to city, however, the following common vision can be observed. From the PT service operator's point of view, benefit/cost factor can

be kept high by deploying ITS technologies such as simple and efficient fare transaction device and priority traffic control signal system. From the PT user's (customer) point of view, PT use shall be more attractive than driving his/her own car by improving PT transport speed and reducing PT fare and by providing attractive PT user information to PT users.

When providing PT user information, it is important to understand that there are various types of customers and their needs vary between customer types. In local residents, there are two types of customers, one who does not know how to use PT and the the other who knows basic information and understands that PT is reliable transport that is on time and safe. Usually, a visitor is not familiar with local PT and expects physically and mentally friendly PT services. Therefore, PT user information provision framework shall be designed to accommodate those various needs.

Various PT information provision projects are under practical use, and the project status reports are commonly shared internationally to improve PT user information provision system continuously throughout the world.

There are several key issues concerning PT when creating "PT user"-friendly society, namely,

— attractive PT user information provision to potential PT users,

— attractive PT IC fare card system,

— efficient and attractive PT service timetabling and service routes,

— fare relationship between regional transit regulator and PT service operator, and

— reliable relationship between PT drivers and PT service operator by deploying ITS technologies.

Defining basic PT user information provision framework, which is commonly acceptable internationally, is indispensable for both of advanced and emerging countries where PT user information provision system improvements are needed.

The PT user information provision service architecture and required standards needed varies country to country. This part of ISO 17185 provides basic framework guidelines which shall be referred when such PT information provision system is implemented.

This part of ISO 17185 describes high-level basic framework requirements for PT user information provisions. For the detailed use cases and data and interface standards catalogues and cross reference, refer to ISO 17185-2 and ISO 17185-3.

5.2 Roles of PT user information

The functional roles of PT user information are summarized as follows. Although the scope of this part of ISO 17185 is PT user information provisions, all of the potential roles are listed for the reader's educational purposes.

— provide PT services using PT vehicles (track vehicles)

— provide planned service information

— provide passenger facility/infrastructure information

— provide real-time service information

— provide topographic and geographic information

— provide PT network information

— provide trip plans to customers

— provide information about disruptions to PT service

  — detours

  - delays
  - incidents
- provide (coordinated) transfer information (real-time, schedule)
- create data (data provider)
- collect data (e.g. asset information)
- process data (data processor)
- provide predictions
- translate data from one format to another/ or from one channel to another
- collate data (data collator)
- disseminate data
- validate data
- apply data to application
- fund information provision
- measure performance
- interface to other modes of transport
- integration of PT costumer information into intermodal travel planners
- other areas such as information use, access, service performance, quality, etc. can be added to this list.

5.3 Objectives of this standard

The objectives of ISO 17185 are defined as follows:

- Part 1 defines the high-level stakeholder roles and responsibilities and their PT user information exchanges.
- Part 2 defines data interface message comparison.
- Part 3 defines use cases for journey planning systems and their inter-operation where in the worldwide standards apply and it may include exchange of information using nomadic devices.

Overall, this part of ISO 17185 describes a framework to facilitate inter-operability of public transport-related information using different national/regional standards (The off-the-shelf use of standards).

This is accomplished by defining the high-level stakeholder roles and responsibilities and PT user information exchange, data, and interface message comparisons use cases.

5.4 High-level use cases

In this part of ISO 17185, the high-level use cases are defined to describe commonly applicable basic framework. The detailed use cases and translation between existing standards are defined in ISO 17185-2 and ISO 17185-3. For the basic actors of these high-level use cases, see 5.5.

5.4.1 Use case 1 - PT service operator to monitor, control, and inform customer and provide it to information provider (regional)

This aggregate function is commonly known as automatic vehicle location and real-time passenger information (AVL-RTPI). It has two functionalities: automatic vehicle location and passenger information. The aim of AVL is to continuously adapt public transport services to circumstances on the ground. AVL is taken into account by a key internal actor, which is the controller (an internal actor that appears in the model through its function). It has two functions: monitoring public transport and controlling public transport. The term "passenger information" here is limited to immediate information on the functioning of public transport services. Passenger information is limited to the production of information aimed at passengers; the delivery of this information is dealt by "Disseminate operating data" function.

5.4.2 Use case 2 - PT service operator to organize and plan public transport services

This aggregate function manages basic data, plans, and organizes the production of services and manages and maintains resources.

5.4.3 Use case 3 - PT service operator to manage human and physical resources

This aggregate function is responsible for the centralized management of human and physical resources, as opposed to "local management", which is carried out in vehicle depots and crew facilities. It is comprised of two independent components: central management of personnel and central management of rolling stock.

5.4.4 Use case 4 - PT service operator to organize shared services

This aggregate function enables the planning and organization of shared services, ranging from public transport to shared vehicle management such as private initiative carpooling.

5.4.5 Use case 5 - Information provider (regional) to get information from PT service operator and inform customer (transport user)

This aggregate function enables the provision of aggregated information of single- or multi-service operators to the customer and enables the value-added service to the customer for them to plan efficient public transport use.

5.4.6 Use case 6 - Inter-regional information provider to get information from information provider (regional) and inform customer (transport user)

This aggregate function enables the provision of aggregated information of single or multiple regional PT information to the customer and enables the inter-regional information provider to provide value-added inter-regional PT information to the inter-regional transport user such as worldwide traveller for them to plan efficient inter-regional public transport use.

5.4.7 Use case 7 - Transport regulator to regulate PT service operator

This is a function responsible by or under national law or regulation, enforcement of laws, administrative provision, and international agreements with respect to traffic and transport.

5.4.8 Use case 8 - Transport authority to plan, finance, tender, and contract PT services

This aggregate function enables transport authorities plan, finance, tender, and contract PT services. The PT operators provide scheduling and real-time information to the transport authority as arranged in the contract. The transport authorities declare common standards for data exchange and provide complete and up-to-date PT user information.

5.5 Roles and responsibilities of basic actors

In the basic regional PT user information provision system, five major basic actors are defined as shown in Figure 1. This is shown as a basic system framework as an example and in the actual system implementation phase, some of these actors shall be modified to fit to each country's service requirements and circumstances.

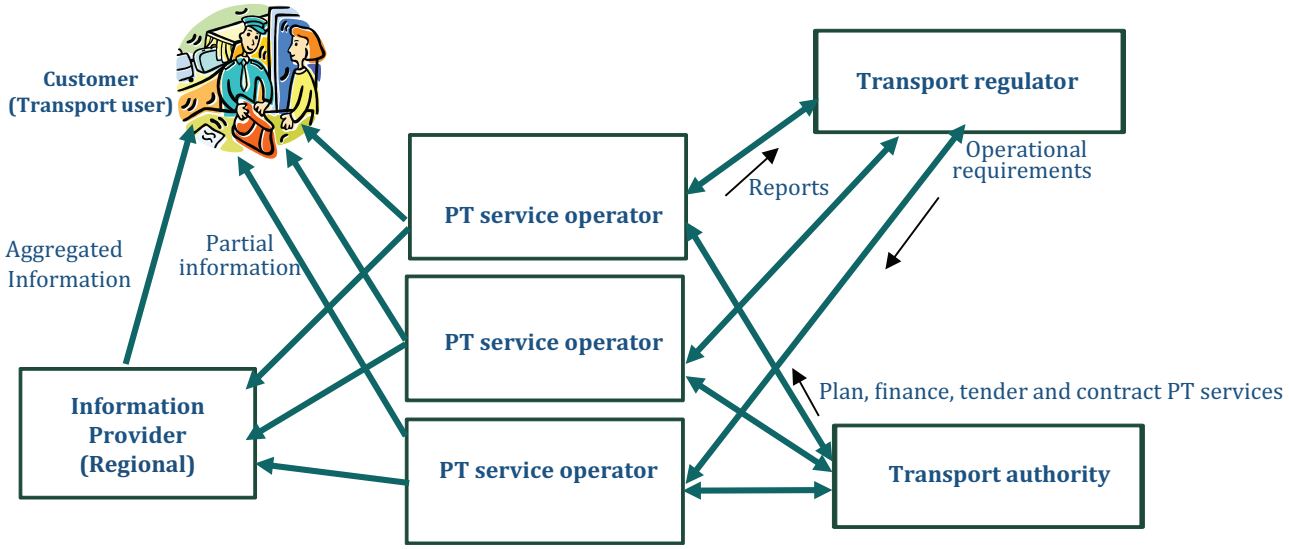

Figure 1 — Basic actors in regional PT user information provision

5.5.1 PT service operator

The PT service operator is an entity who operates PT service and in the PT user information provision system, its function is to provide accurate PT information to a customer. The customer shall access such information data directly or indirectly through information provider which is defined in 5.5.3. This entity is composed of the following sub-actors.

5.5.1.1 Transport service provider

The transport service provider is responsible for the following:

— the provision of transport services to a transport user (the customer). The services that are provided can be transport from one point to another and terminal services;

— the management and execution of the required transport operations.

5.5.1.2 Transport service manager

The transport service manager is responsible for

— the planning of the services to be provided, including price policy (if not committed to the guidelines of the Fare Authority),

— the publishing of information about available transport services,

— the customer relations (i.e. contact with the transport users). This includes formal agreements with customers; transport service provision; status reporting, etc., and

— the delegation of responsibilities for the fulfilment of transport needs to the Transport Operation Managers.

5.5.1.3 Transport operation manager

The transport operation manager is responsible for

— decision on how to fulfil the transport demand by means of one or more transport operations, e.g. transport from one point to another,

— the planning of the transport operations (resource utilization, time schedule, etc.) that can be carried out according to rules and regulations,

— the management of on-going transport operations, including monitoring and follow up of the transport operations carried out, and

— reporting related to transport operations (e.g. to authorities), etc.

5.5.2 Customer (transport user)

A customer is a human who use PT service. In some cases, a customer can provide his/her geographical position (such as GPS) data to service operator/information provider so that PT route guidance service can be provided by service operator and/or information provider.

The customer is responsible for

— defining the transport demand,

— finding the best transport alternative,

— transport planning, and

— the required transport follow up and re-planning.

5.5.3 Information provider (regional and inter-regional)

An information provider (regional and inter-regional) is an entity who gathers single or multiple modes and/or single or multiple service operator data and provides value-added PT information to customer.

It is responsible for the provision of travel information services to the PT users or others. This can be travel-planning services or additional information related to the travel plan.

This entity is also responsible for the provision of information services, e.g. portals, directories, and on-demand services.

5.5.4 Transport regulator

The transport regulator is an entity who regulates PT operational requirements and requests and receives operational reports from PT service operators.

It is responsible by or under national law for regulation, enforcement of laws, administrative provision and international agreements with respect to traffic and transport. They will, at least, be able to

— provide general information to the public and to individual actors about rules and regulation and desired behaviour,

— take care of a national information collection and processing, and

— decide on regulations.

5.5.5 Transport authority

In many European countries, transport authorities plan PT network services, finance, tender, and contract PT services. The contracted PT operators provide scheduling and real-time information to the

transport authority as arranged in the contract. The transport authorities declare common standards for data exchange and provide complete and up-to-date PT user information.

5.6 Basic functions of PT service operator

To encourage a PT user to use PT to make the society more environment-friendly, the public transport service operators or public transport information providers are encouraged to gather necessary real-time transport information and vehicle (such as bus/train/tram) location data, and to process them with static information, such as scheduling data, stop point data fare data, and impaired mobility data (such as access information for disabled person) and to provide them to public transport users in an appropriate way using appropriate measures such as the Internet through a smart mobile phone or information display boards at bus stops.

From the PT user information provision's point of view, the basic functions of a service operator can be described as shown in Figure 2. Whole service operator functions are different from country to county or city to city. The detailed use cases examples are shown in Figures 3 and 4 (French and US cases) for reader reference only.

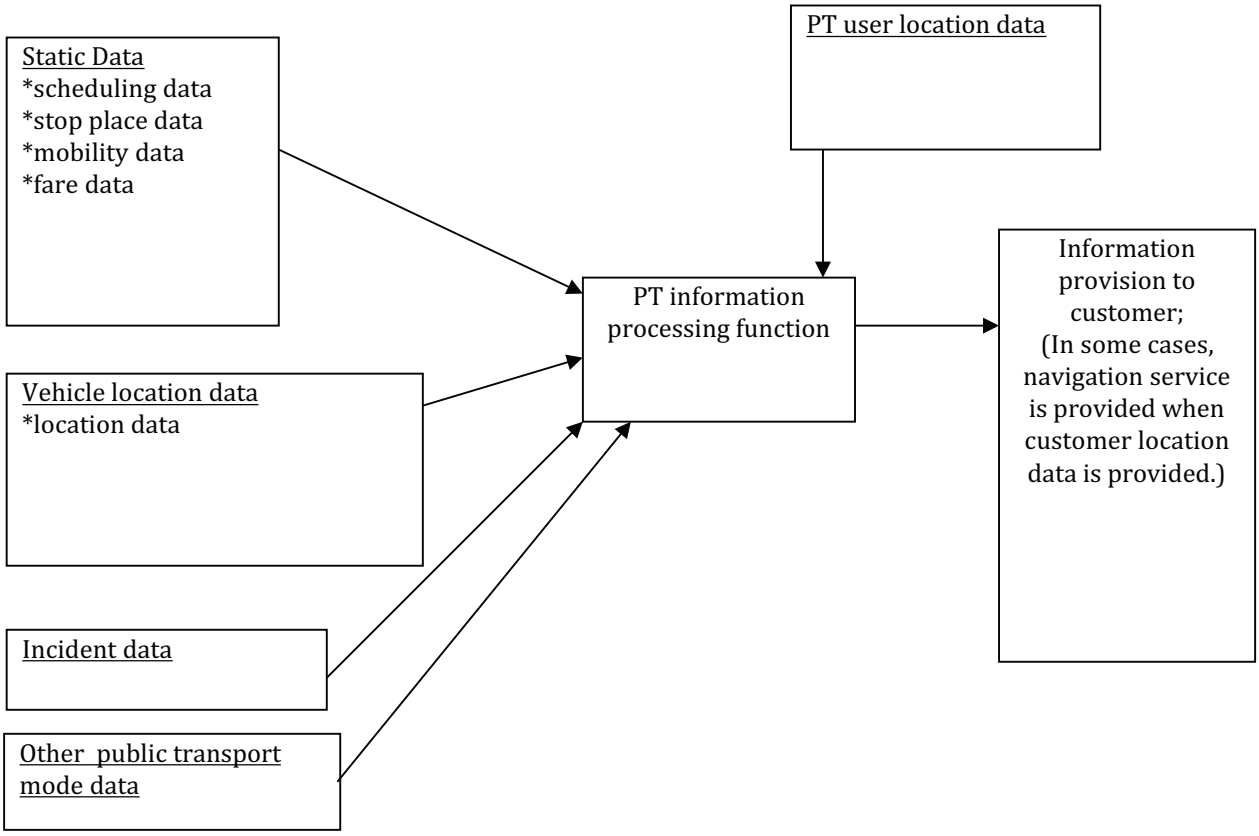

Figure 2 — Basic functions of PT service operator from PT user information provision's point of view (informative)

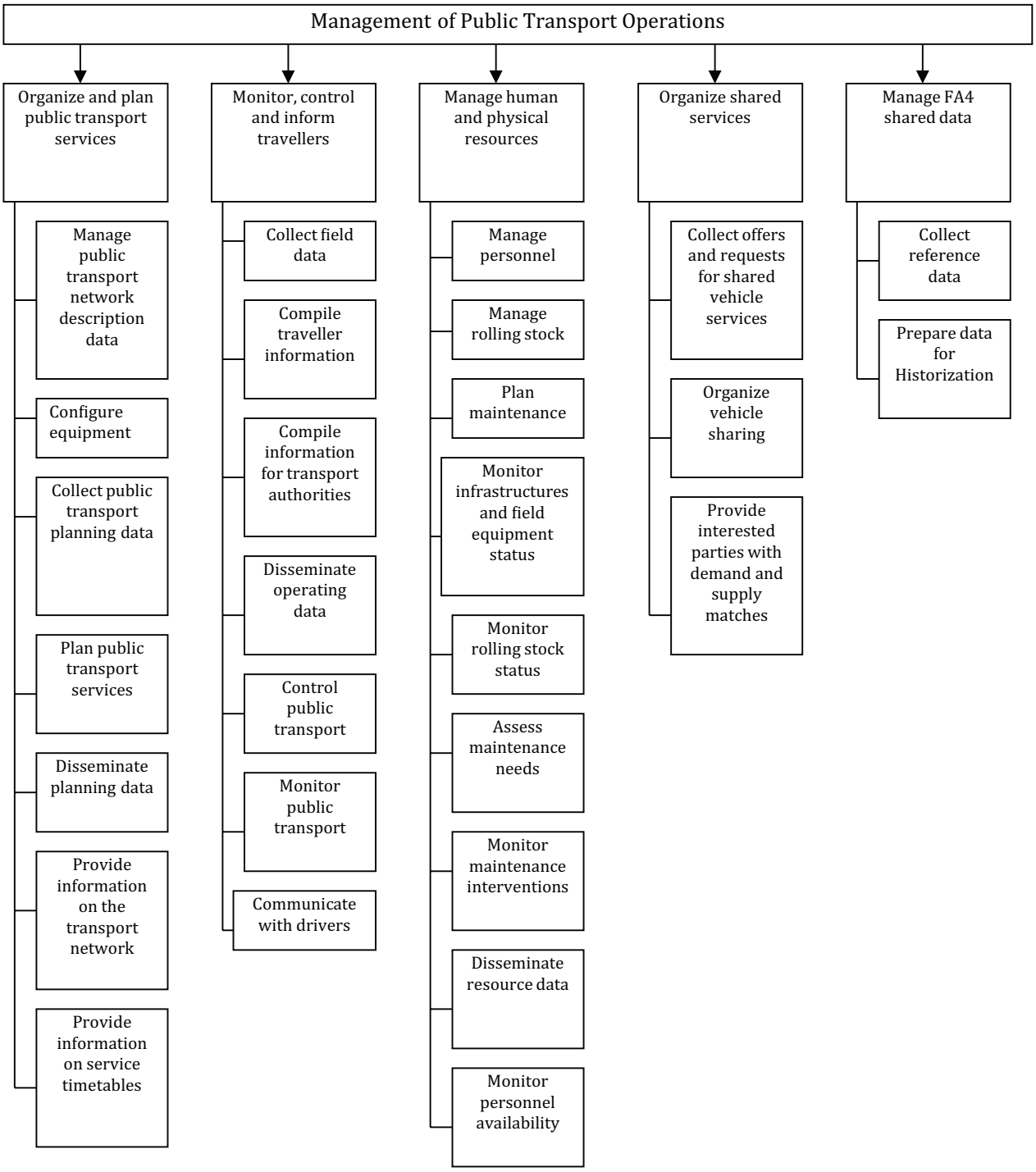

Figure 3 — French use cases example of PT service operator function (reference only)

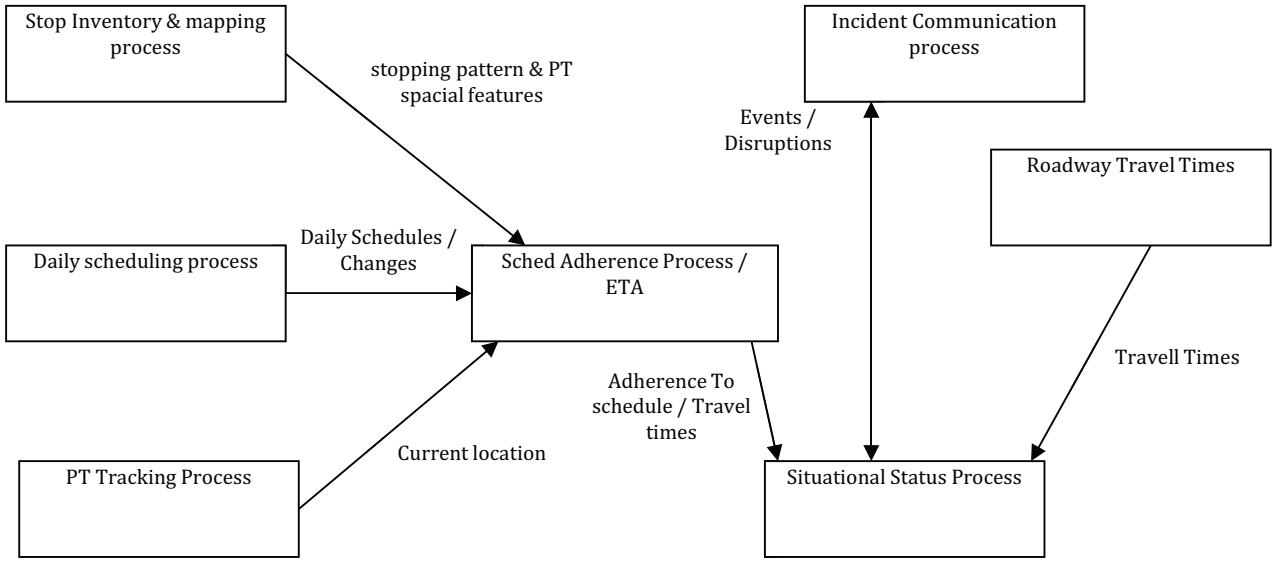

Figure 4 — US use cases example of PT service operator function (reference only)

The PT user information provision can be realized by combining static and real-time information through properly established data processing function. This part of ISO 17185 defines basic framework and details methodology of real-system implementation shall be complied with currently available regional standards.

The PT user information is either of information on the planned service or information on the actual service. The planned information is for days types. The actual information is for particular operating days and is constantly updated.

Normally, each service operator uses its own data format. However, it is recommended that regional common data format shall be used when frequent data exchanges are necessary between regional service operators/information providers. It is also recommended that the static data, such as scheduling, bus stops, and service route, are prepared in accordance with regional common data format. When the service operator does not use regional common data format, information provider entity shall perform data conversion function before processing with other service operators data in the same regional network in certain area.

The stop point numbering rule shall be defined in accordance with regional standards.

Preparing impaired mobility information (such as access information for disabled person) is a key issue for PT service operators. The regional government supports are needed in this area.

The real-time data such as AVL are usually gathered in accordance with PT service operator data format by ITS devices such as GPS, road-side unit, and on-board unit.

Incident data are usually stored in the vehicle management system of the PT operator.

Where applicable, a transport user's own location data can be sent to the PT service operator to get his/her route navigation service.

5.7 Basic function of information provider (regional and inter-regional)

Regional information provider shall basically have the function as shown in Figure 5.

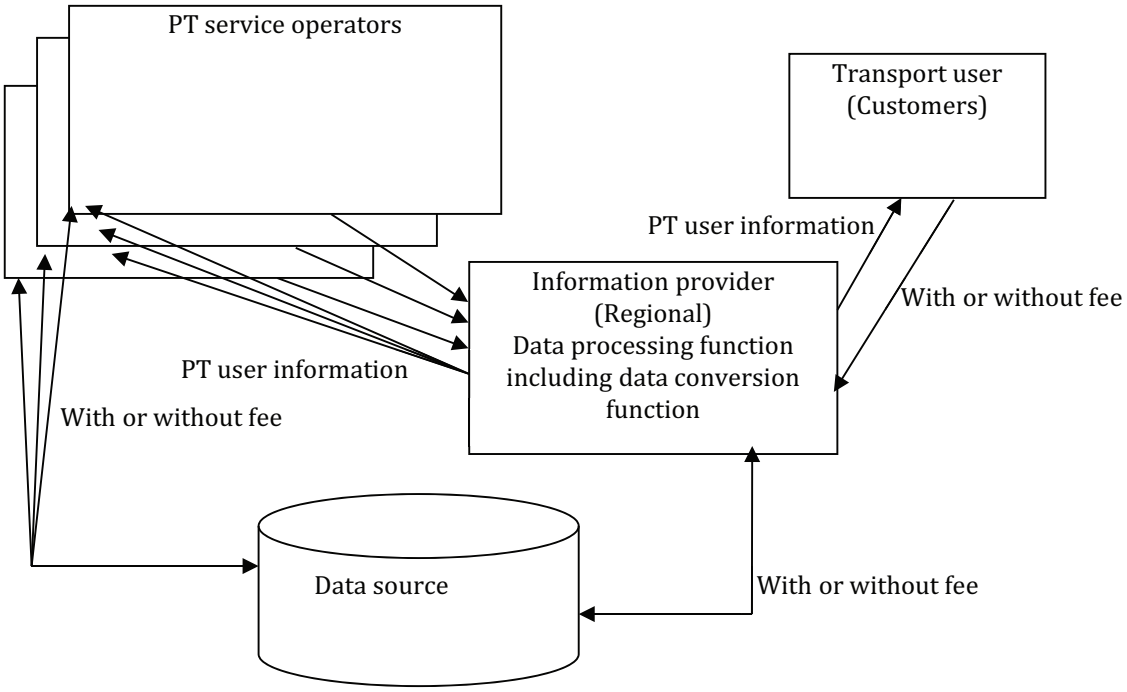

Figure 5 — Basic function of information provider (regional)

As shown in Figure 5, data sources are needed for a complete and user-friendly PT user information system. Data source shall include supporting information such as interchange information, such as length and time of foot path between stop points, stairs, escalators, lifts, and information for challenged people (or people with big suitcase, baby buggy, etc.), disruption information to escalators, lifts, blockages of corridors, access to stop points, etc., graphs for calculating pedestrian (and optional Park & Ride and Bike & Ride) routes from and to the PT station, disruption information for the foot path from and to the stations (plus optional Park & Ride, Bike, etc.), addresses, POIs, regional names, zoomable background maps for display.

Because all of the PT service operators on the same regional public transport network do not use the same regional common data format, one-stop user information service is not possible and, therefore, each transport user needs to access to the entire related PT service operator separately whenever a transport user needs to do so.

Therefore, a regional common data format is encouraged to be adopted by PT service operators so that information (regional) provider can provide convenient information services to transport users. The use of such normalized common data format can be imposed through contracts with PT service operator and/or information provider (regional).

In some countries, particularly in EU, heavy rail operators have their own exchange standard. Through regulations, there is a recommendation to use common data format (based on Transmodel) for "exchanges heavy rail-urban transport".

To realize one-stop PT user information service, regional common data format are encouraged to be used by all of the PT operators or information service providers (regional) have to establish PT-related common database for the same regional public transport network and have to prepare PT data conversion and data maintenance functions.

For inter-regional and international public transport user information provision services to the transport users (such as worldwide travellers), additional actor "inter-regional information provider" shall be adopted. Basic function of this entity is shown in Figure 6. The inter-regional information provider shall gather multiple regional information provider data and perform data format conversion service and provide multi-regional PT information to transport user.

To facilitate efficient inter-regional data conversion and data maintenance, the following rules are encouraged to be observed by all of regional PT user information providers:

a) When providing data to inter-regional information provider, regional PT data service identifier shall be added in a data header.

b) Data structure shall be configured in the following manner:

Regional PT data service identifier	Regional PT information data body

c) Regional PT data service identifier can be one or combination of the following items:

— name of region;

— name of country;

— name of regional standard;

— other.

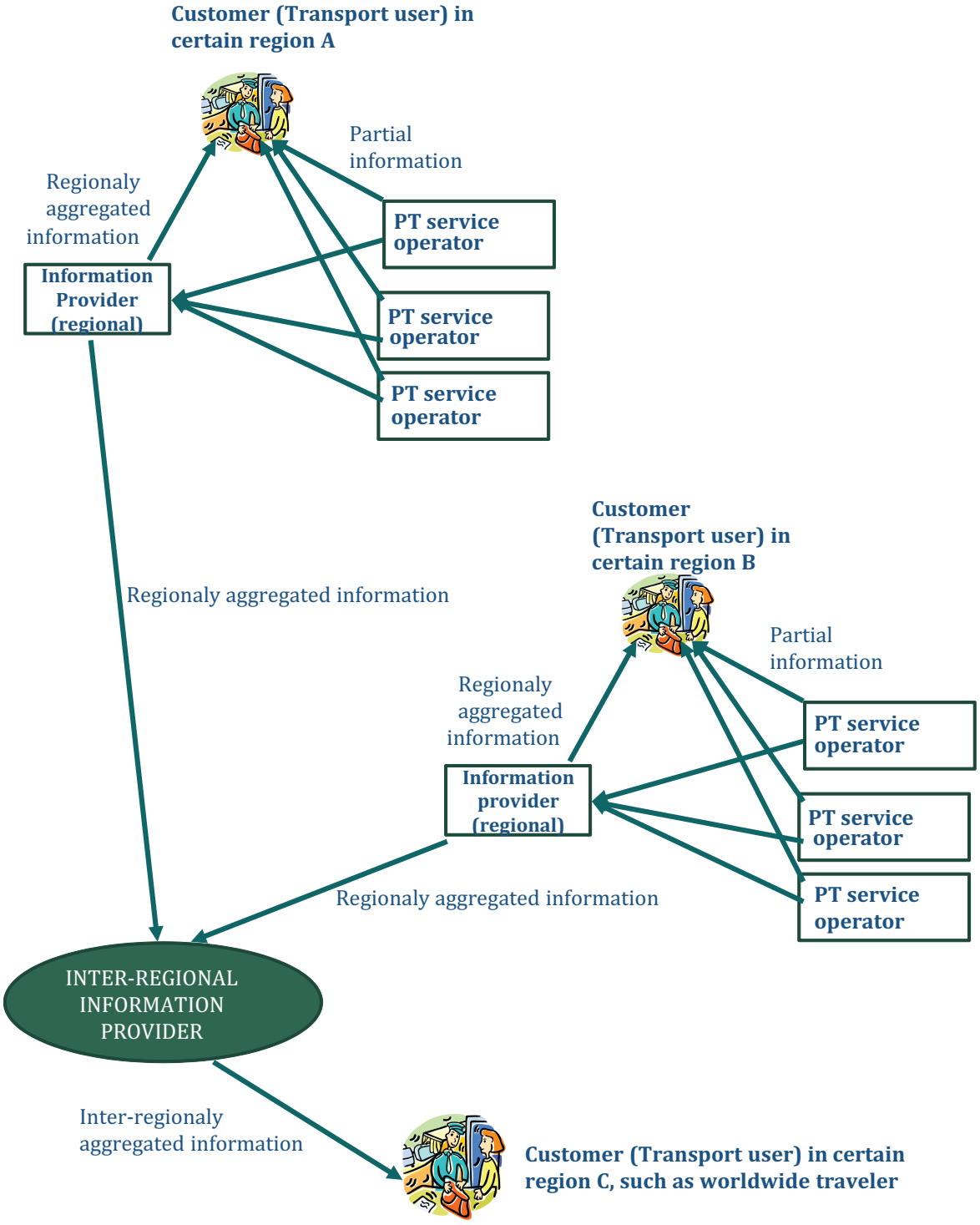

Figure 6 — Basic function of inter-regional information provider

5.8 Currently available regional standards

By understanding the relationship between this part of ISO 17185 and currently available regional standards, it is obvious that this part of ISO 17185 is encouraging more active usages and more active improvements of currently available regional standards for more efficient PT user information service system realization and implementation.

For a clear understanding of the relationship between this part of ISO 17185 and the currently available regional standards, the layer concept shown in Figure 7 is adopted.

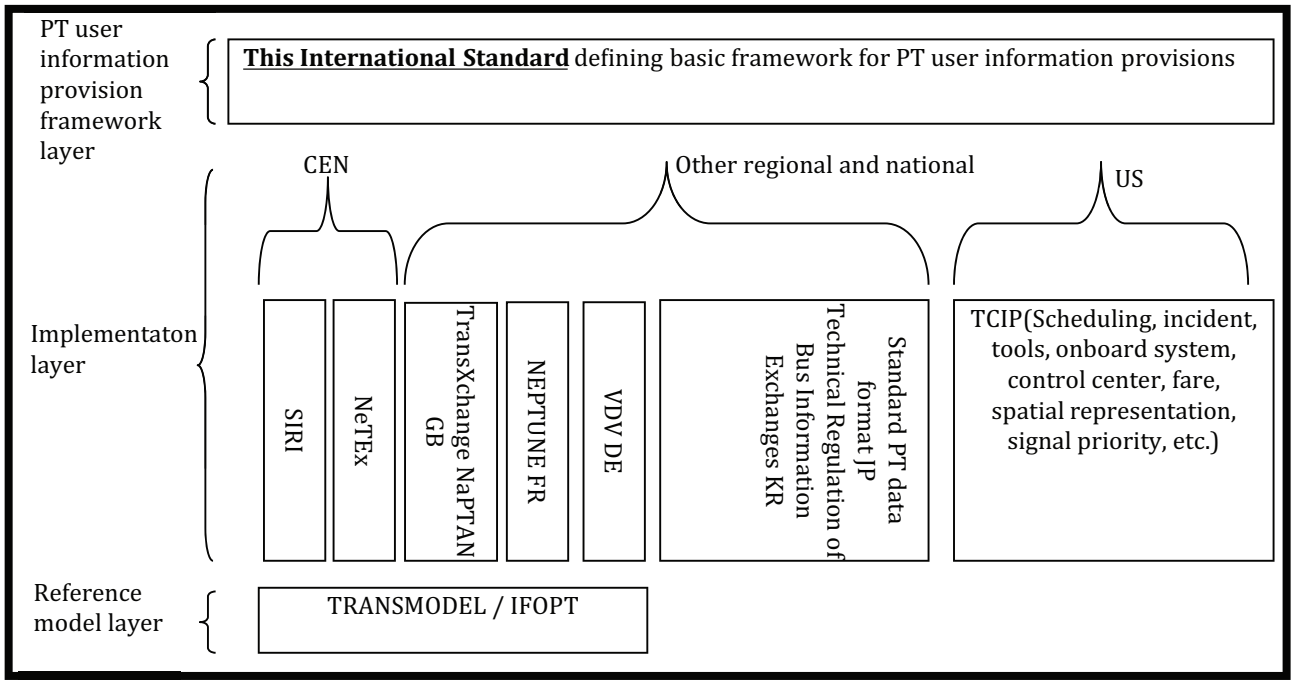

Figure 7 — Layer conceptual view of currently available regional and national standards

Because of the nature of origin and history of these regional and national standards, terms and definitions are somewhat different to each other. However, the meanings and usage of those words are basically the same. This part of ISO 17185 does not try to standardize or harmonize those terms and definitions but instead defines the basic relationship and conceptual view of these standards by using layer concept as shown in Figure 7.

Because the name and nature of those current regional standards might be new to readers of this part of ISO 17185, some of the standards are explained for better understanding purpose only. Readers of this part of ISO 17185 need to understand that these currently available regional and national standards are in constant development/improvement stages and latest issues shall be obtained and examined.

— Trasmodel is the European Norm EN 12896 Reference Data Model for Public transport. It covers most aspects of PT operation. It describes the semantics of the PT data for the domains: Network Description, Scheduling, Operations Monitoring and Control, Passenger information, Fare Collection, Personnel Disposition, and Management Information.

— IFOPT is a CEN published standard (EN 28701). IFOPT is complementary to Transmodel and defines a data model for the main fixed objects related to Public Transport (e.g. stop points, stop areas, stations, entrances, etc.). It also defines navigation paths through complex stop places. Its sub-models are Stop place model, POI model, Administrative model, Gazetteer/Topographical model, and parking model.

— SIRI is a CEN Technical Specification (TS 15531) on the way to become an EN. It specifies services, i.e. data exchange format and protocol for real-time PT data. It is based upon Transmodel as regards the exchanged data and their semantics. SIRI documentation is composed of five parts: Part 1: introduction, Part 2: communications infrastructure, Part 3: functional service interfaces, schema, white paper.

— NeTEx is a CEN Technical Specification under development, complementary to SIRI, specifying data exchange messages and protocol for planned (scheduled) data, mainly network (Part 1) and timetable (Part 2) data. Part 3 intends to define exchanges of fare data. NeTEx is based upon Transmodel and IFOPT.

— TCIP is a US standard developed by APTA and is for introducing advanced ITS technologies into PT to improve safety, security, and efficiency.

— The Japanese standard specification for inter PT/information provider data exchange data format: It provides implementation level specification for basic database of multi-modal, multi- PT operator system.

— Korean Technical Regulation of Bus Information Exchanges, the standard for Messages for exchanging between bus information centers.

Annex A
(informative)

Currently available regional and national standards

A.1 General

For implementation of actual public transport user information provision system, the currently available existing local and regional government standards shall be referred to.

The following standards are listed for informative purposes only and the reader of this part of ISO 17185 should review the latest issue of those standards and specifications.

A.1.1 EU region:

- CEN:
  - Transmodel EN 12896 http://www.transmodel.org/en/cadre1.html
  - IFOPT EN 28701 http://www.dft.gov.uk/naptan/ifopt/
  - SIRI TS 15531 http://user47094.vs.easily.co.uk/siri/
  - NeTEx under development http://user47094.vs.easily.co.uk/netex/
- GB:
  - TransXchange no number http://www.dft.gov.uk/transxchange/
  - NaPTAN no number http://www.dft.gov.uk/naptan/
- France:
  - Neptune PR NF P99-506 http://www.chouette.mobi/spip.php?rubrique61
- Germany:
  - VDV 451, 452, 455 http://www.vdv.de/oepnv-datenmodell.aspx
- Netherlands
  - BISON http://bison.connekt.nl/over_bison/

A.1.2 North American and Canadian region:

- USA:
  - TCIP APTA-TCIP-S-01 3.0.3

    http://www.apta.com/resources/standards/Pages/default.aspx

A.1.3 Asian region:

- Japan:
  - MLIT Specification for Standard Data Format for Public Transport Information no number

    http://www.mlit.go.jp/jidosha/busloca/ (Japanese language only)

http://www.mlit.go.jp/road/ITS/j-html/spot_dsrc/

— Korea

  — Technical Regulation of Bus Information Exchanges, the standard for Messages for exchanging between bus information centers

    http://dr.its.go.kr/dc_tech/dc_tech2.jsp (Korean language only)

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[5] ISO/IEC 2382-1:1993, *Information technology — Vocabulary — Part 1: Fundamental terms*

[6] ISO/TR 25100, *Intelligent transport systems — Systems architecture — Harmonization of ITS data concepts*

[7] ISO/TR 26999, *Intelligent transport systems — Systems architecture — Use of process-oriented methodology in ITS International Standards and other deliverables*

[8] EN 12896, *Transmodel of CEN*

[9] APTA-TCIP-S 01 3.0.3 TCIP of APTA, USA

[10] Specification for Standard Data Format for Public Transport Information of MLIT, Japan

[11] Technical Regulation of Bus Information Exchanges, the standard for Messages for exchanging between bus information centers of Korea

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