Annex 1
Project plan

1 Context

To operate most effectively, public transport systems increasingly need to exchange information with each other. This integration can be difficult when systems are provided by different suppliers. This difficulty is usually not for technical reasons, thanks to the widespread usage of relevant technologies but rather, because one system will often not understand the meaning of the data that is used by another.

This is the reason why a Public Transport Reference Data Model has been developed and was voted as a European Norm (EN 12896, known as Transmodel V5.1) in 2006, providing a standardised framework for defining and agreeing data structures for major business areas of Public Transport.

Developments since 2006 have created additional requirements. One of the most notable is the data model referring to the fixed objects for Public Transport, known as IFOPT.

IFOPT and Transmodel V5.1 have been taken into account in the elaboration of the TS NeTEx (Network and Timetable Exchange). Transmodel V5.1 with some supplementary requirements has been a building block of the TS SIRI. These developments have extracted parts of Transmodel and extended them.

The proposal takes into account the requirements found in:

— The draft Standardisation request (mandate) on Urban ITS, where the Transmodel specification is identified as part of the framework for the deployment of Intelligent Transport Systems in the field of road transport and for interfaces with other modes of transport,
— Rolling plan for ICT standardization 2016 highlights the Transmodel specification as essential to Urban ITS in D1 Action 12.
— Section 6.1 of the ITS action plan for the Deployment of Intelligent Transport Systems in Europe on optimal use of road, traffic and travel data which points out the importance of the promotion of the development of national multimodal door to door journey planners, taking due account of public transport alternatives, and their interconnection across Europe
— Section 3.3.8 on Intelligent Transport Systems (ITS) in the annual Union work programme for European standardisation for 2015, and
— The ITS directive (Directive 2010/40/EU) on the framework for the deployment of Intelligent Transport Systems, parctially in priority area II which requests the continuity of traffic and freight management ITS services

Furthermore in 2009 the “Rolling Plan on ICT Standardisation” considered that in “the in the context of Urban ITS and in the perspective of smart cities, there is a need to ensure that the existing standards are properly adapted for urban environment, notably to ensure a better impact on market solutions, via public procurement, building on insights and best practices from Civitas, POSSE and smart cities projects. The objective is to better connect existing networks, foster strong cooperation and creation of interoperable urban-inter-urban interfaces and foster more extensive use of all transport modes. For this, data formats need to be defined (including for new mobility services), as well as exchange protocols which need to be interoperable – mode to mode and intermodal and specify them. It will be considered whether a specific mandate in this area is needed. This mandate would enable the development of new standards, where appropriate (e.g. in the domain of traffic management, or city logistics) and harmonisation of existing standards (e.g. in the domain of multimodal information and smart ticketing), such as:
— Transmodel, the European Reference Data Model for Public Transport, CEN-TC278 ENV12896;
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IFOPT, EN 28701, a CEN Technical Standard defining a data model for the Identification of Fixed Objects in Public Transport (e.g. stop points, stop areas, stations, connection links, entrances, etc.);

SIRI, (CEN/TS 00278181-1 to 5), a European CEN technical standard defining Service Interface for Real-Time Information relating to public transport operations;

NetEx, a prCEN/ Technical Standard currently in development. It is based on Transmodel, extended with additional concepts from IFOPT and SIRI. NetEx is divided into three parts: Part 1 -Transport Network and Part 2 -Schedules Part 3 -Fares and data for AVL”.

Since 2009 several developments have taken place:

- NetEx Part 1–2–3 have been finalized and published,
- SIRI part 1-2-3 have now the status of an EN and
- Transmodel update has started, namely Transmodel V6
  - Part 1 (Common Concepts),
  - Part 2 (Public transport Network),
  - Part 3 (Timing Information and Vehicle Scheduling)

have been issued (2016).

Being the basis for the data exchange standards and a reference for data repositories, the Reference Data Model needs to be updated completely in order to form a coherent series of Public transport standards and to take into account the latest requirements, expressed by the Public Transport actors over the last six years.

CEN/TC 278 requests therefore the support of the EC to continue this task.

2 Objectives and impact

2.1 Objectives

The main objective of this proposal is to develop the Public Transport Reference Data Model, based on:

EN12896, Public Transport Reference Data Model (Transmodel V5.1), CEN EN 28701 (IFOPT), CEN EN 15531(SIRI), extensions introduced by the TS NetEx and ensure compatibility with NetEx and SIRI.

Particular attention will be drawn to the data model structure and methodology: the data model will be described in UML, in a modular form in order to facilitate the understanding and use of the model.

The following domains have already been considered as regards the renewal of EN12896:

- Common Concepts: data used in other domains, such as versions, responsibilities, organisations, calendars, or generic topological features (points, links, zones), etc.
- Network Description: routes, lines, journey patterns, timing patterns, service patterns, scheduled stop points and stop places, and associated fixed objects such as parkings, sites, but also equipment and facilities.
- Timing Information & Vehicle Scheduling: runtimes, vehicle journeys, day type-related vehicle schedules, vehicle services.

The corresponding documents have been issued:

- Public Transport Reference Data Model - Part 1: Common Concepts
The following documents will be issued in the present project:

  Part 4 concerns data related to the process of control of operations in real time, such as vehicle detecting and monitoring, events & control actions, messaging; this part will take into account SIRI and align with SIRI as far as possible;

- Public Transport Reference Data Model – Part 5: Fare Management.
  Part 5 concerns: fare structure, sales, validation & control of access rights. The achievements of Transmodel V5.1 and NeTEx will be taken into account.

  Part 6 concerns planned and real-time information provided to users of public transport: an update of the model according to the parts 1 to 4 is planned.

- Public Transport Reference Data Model – Part 7: Driver Management.
  Part 7 concerns: Driver Scheduling (day-type related driver schedules), Rostering (ordering of driver duties into sequences according to some chosen methods), Personnel Disposition (assignment of logical drivers to physical drivers and recording of driver performance).

- Public Transport Reference Data Model – Part 8: Management Information and Statistics.
  Part 8 concerns data used for statistics and registered data from which service quality indicators may be derived.

- A Technical Report will give informative and didactical material to users.

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

The following transport modes will be considered: bus, metro, tramway, trolleybus, ferry, coach, long distance rail.

### 2.2 Relevance

Interoperability between European Public transport Information Systems is one of the most important objectives for the standardisation groups.

Interoperability is achieved i.a. by standard interfaces between systems. For this reason CEN/TC 278/WG 3 (Public transport) has developed standard interfaces for data exchange: SIRI and NeTEx. These interfaces, as regards data structure are based upon the Reference Data Model for Public transport, i.e. EN12896 and IFOPT, i.e. EN28701. SIRI and NeTEx developers have pointed out and implemented several extensions of the data models Transmodel and IFOPT, due to new needs that appeared for the last years.

The coherence of the series of standards Transmodel/IFOPT on one hand and SIRI/NeTEx interfaces has to be kept. This is one important reason for the renewal of Transmodel.

Another aspect is the development of data bases. Information systems may be interfaced through standard interfaces, but if their data structure is very different from the data structures of the exchanged data, implementation of, sometimes costly, conversion is necessary. So, if a complete conformance of data models of the different information systems to the Reference Data Model is not required, the usage of Transmodel as a reference is. This is the second reason for the renewal of the Reference Data Model: the different information systems shall rely on an updated documentation of the reference in order to be able to communicate with other systems on a simple way, avoiding incompatibility of data concepts used.
Finally, multimodal information is also a particularly important objective. The implementation of Journey Planners at European level will require data exchanges that will rely on Transmodel (CEN/TC 278). The renewal of the part referring to Passenger Information (passenger queries and responses) may be cited as a third important argument for the renewal of the relevant parts of Transmodel.

In this context, I has to be mentioned that the European commission regulation EC 454/2011 (TAP TSI) is to use Transmodel and Transmodel-based data exchange standards for timetable exchanges between railway undertakings and other modes of transport.

Last developments (in particular NeTEx) show growing interest of ERA to contribute and to follow the development of the fare exchanges. The exchange of fare data between railways and with other modes of transport is an open point of the TAP TSI and could be closed with the revised Transmodel. ERA is has also actively followed updates of Transmodel Part 1, 2 and 3, in particular as regards the models concerning train operation. This stakeholder strongly supports the process of the update of the Reference Data Model.

Another important aspect represents the growing interest of the international standardisation for the European Reference Data Model for Public Transport. This model has been taken as a reference for different investigations (in particular as a reference for the mapping of the different international standards) within ISO TC204 WG8 (Public Transport).

ISO/TC 204/WG 3 (Geographic Data Bases) is currently envisaging to revise the GDF standard as regards the multimodal context (in car multimodal information), taking into account the updated version of Transmodel.

2.3 Indicators

Effectiveness: number of experts involved – number of meetings organized – number of comments received – realization of the time table for delivery

The execution of work in the project teams will be measured and controlled by the following performance indicators:

— Number of participants involved in the activity
— Number of meetings organised in relation to this activity
— Number of presentations made on the activity
— Project progress in relation to the schedule specified in this proposal
— Number of draft versions of the deliverables announced and promoted to the technical bodies and other stakeholders (potential stakeholders to be addressed are manufacturers and software developers, network operators, road authorities, ...)
— Number of comments received by type and percentage accepted or rejected and from which categories of stakeholder

Stakeholders’ engagement:

Stakeholders’ engagement: participation in different meetings and presentation of didactical material to different types of stakeholders (system suppliers, authorities, operators).

— Stakeholders will be involved via the working group national representatives: these groups involve in particular operators, authorities
— Stakeholders’ review: review by different types of experts of the data model and resolution of their comments: consulting groups in charge of important implementations and thus being in touch with real scale projects are reviewers of the data model within CEN but also in the different countries.

As regards long distance rail, ERA representatives are observers of CEN/TC 278/WG 3.
Dissemination Results:
- Public conferences, at least one per year, will be provided;
- Number of external presentations to the wider community and liaison with industry and other associations over the period of the activity as well as the liaison work performed and contributions to other related standards activities will take place: members of the current CEN/ TC 278/WG 3 are already performing this, but need further input,

The deliverables will be developed through the regular CEN channels, which will ensure openness and transparency.

We also wish to create a good set of explanatory documentation, which can be used to help disseminate the standard.

2.4 Impact

The proposed tasks will contribute to:
- Better interoperability of Public transport information systems
- Simplicity and coherence of between data exchange standards and data base implementations
- Reduction of costs for data base implementation
- Uniqueness of concepts used for different functional domains
- Facility of communication between different stakeholders (e.g. operators and authorities)
- Simplicity of an integrated Public transport information system architecture.

However, the impact of a conceptual standard (is it implemented? Is referenced?) is usually not known until sometime after the completion and delivery of the deliverables. The different other measurements are possible (such as stakeholder involvement) and are already addressed by the indicators above.

2.5 SMEs

According to the method of operation of CEN, based upon a network of national standardization bodies, is geared towards involving all parties concerned, including SMEs and societal stakeholders.

The following European stakeholder organizations are member of CEN/TC 278
- ANEC, the European Consumer Voice in Standardization
- ECOS, the European Environmental Citizens Organisation for Standardisation
- SBS, Small Business Standards

As member of CEN/TC 278 they can participate in CEN/TC 278 and its Working Groups and have access to all CEN/TC 278 documents.

3 Description of the tasks

3.1 Introduction

This section describes the proposed tasks that concern a sequential development of the different parts. Each task splits into the following subtasks:
- collection of new requirements,
- integration of the requirements into the data model
- update and publication of the documentation for comments
- comments resolution & publication of final documentation.

3.2 Scope

Task 1: Operations Monitoring and Control.
This task will take into account in particular, the SIRI specification “Situation Exchange” model, results of the ESBF project and DATEX II relevant parts

Deliverable: EN 12896-4 "Public Transport - Reference Data Model – Part 4: Operations Monitoring and Control"

Scope: Conceptual model for data related to the process of control of operations in real time, such as vehicle detecting and monitoring, events & control actions, messaging

Task 2: Fare Management

This task will take into account NeTEx additional requirements referring to Information on fares

As regards long distance rail and the sub-domain “validation and control” requirements of UIC-standard (918-4) may give some additional requirements that will need to be considered.

Deliverable: EN 12896-5 - “Public Transport - Reference Data Model – Part 5: Fare Management”

Scope: Conceptual data model for fare structure, sales, validation & control of access rights

Task 3: Passenger Information

This task will take into account the additional requirements formulated in the informative annex to NeTEx Part 3 (query model). Also SIRI SM will have to be considered and Open Journey Planning (OJP) relevant parts.

Deliverable: EN12896-6 - “Public Transport - Reference Data Model – Part 6: Passenger Information”

Scope: Conceptual data model for planned and real-time information provided to users of public transport for passive and “on-request” information. Concerns also queries and responses for “on-request” information.

Task 4: Driver Management

This task will have to identify new requirements and issue a model compatible with other parts.

Deliverable: EN 12896-7 “Public Transport - Reference Data Model – Part 7: Driver Management”

Scope: Conceptual data model for Driver Scheduling (day-type related driver schedules), Rostering (ordering of driver duties into sequences according to some chosen methods), Personnel Disposition (assignment of logical drivers to physical drivers and recording of driver performance)

Task 5: Management Information and Statistics

This task will integrate new requirements if identified through contacts with PT authorities that require specific indicators and thus specific raw data. Links with the Operational Raw Data project have to be established (OpRa).

Deliverable: EN 12896-8 “Public Transport - Reference Data Model – Part 8: Management Information and Statistics”

Scope: Conceptual data model for data used for statistics and registered data from which service quality indicators may be derived

Task 6: Dissemination activities

This task consists of participation in conferences and workshops and the enhancement of the Transmodel Web site.

Link with other activities in CEN/TC 278/WG 3 is needed, in particular in case with of extension of the data exchange standard with new requirements.

Deliverable: CEN Technical Report with informative documentation and didactical material

Scope: Overall Data Dictionary & presentations of the model
3.3 Workplan & Milestones

The work plan for all deliverables is as follows:

<table>
<thead>
<tr>
<th></th>
<th></th>
<th>Start (s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Signature of contract between CEN and the EC</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Call for experts and selection of the experts for the Project Team. Signed contract to start work</td>
<td>S+4</td>
</tr>
<tr>
<td>2</td>
<td>Work plan for the Project Team</td>
<td>S+5</td>
</tr>
<tr>
<td>3</td>
<td>Draft for TC review</td>
<td>S+24</td>
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<tr>
<td>4</td>
<td>End of TC review (interim report)</td>
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<tr>
<td>5</td>
<td>Final draft ready for Formal Vote</td>
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<tr>
<td>6</td>
<td>Start Formal Vote (FV) in TC 278</td>
<td>S+33</td>
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<tr>
<td>7</td>
<td>End FV</td>
<td>S+35</td>
</tr>
<tr>
<td>8</td>
<td>Published deliverables Task 1-6</td>
<td>S+38</td>
</tr>
<tr>
<td>9</td>
<td>Final report</td>
<td>S+40</td>
</tr>
</tbody>
</table>

3.4 Deliverables

The deliverables are defined as follows:

**Interim report (S + 26)**

An interim report at S + 24 (or earlier if achievable) in the form of a progress report describing the work performed so far and including a first draft of the main deliverables.

**Final report (S + 40)**

A final Project Report including published deliverables EN Part 4-5-6-7-8 and the CEN technical report.

4 Execution of the different tasks

4.1 Organization & relationship (TC, WGs, project team, NSBs, subcontracting,..).

The team members work in the spirit of consensus formation within the project. Once a consensus is reached, the solutions are periodically presented by the expert to their national standardization groups.

The project team reports to CEN/TC 278/WG 3:

- CEN/TC 278
- WG 3
- Public Transport
- Project team

4.2 Staff members

NEN, as the secretariat of CEN/TC 278 will be in charge of:

- Overall management of the PT and general support to the PT;
- Organization of the selection of experts;
— Maintaining contracts with experts;
— Financial administration project team;
— Support to the project team in providing access to published standards and other documentation;
— Accommodation of the consensus trajectory;
  o organize committee meetings (online and physical)
  o engage European stakeholder in the work
  o maintain public website of CEN/TC 278 containing information of the proposed work
  o organize commenting rounds and ballots
  o organize comment resolution meetings
— Project management development CEN deliverables
— Gathering comments from the wider CEN membership on preliminary drafts for input into the draft deliverables ready for Formal Vote (final deliverable of the contract);
— Support in the editing of the final deliverable.
— Reporting to the European Commission;
— Coordination of work between CEN/TC 278 and CEN/CENELEC Management Centre (CCMC)

4.3 Subcontracting to external organizations

4.3.1 Project teams

The drafting of the documents requires specialized expertise which is not available to standardization managers as permanently employed by CEN and its member. This is the justification for the Commission financial support.

To employ such specialized experts by a CEN member would be expensive and not economically viable considering the very specific area of specialization that is required for the execution of this contract. To engage the services of the appropriate specialist experts from the market is more cost-effective. This sub-contracting also enables the quick availability of the drafts to enter the consensus building and validation processes, which are CEN’s core business.

The management and administration of the consensus building and validation process with the aim to publish the end results as a standards deliverable is the responsibility of the CEN National Standards Body

CEN has a standard methodology to select specialized experts which are called Project Teams in compliance with the FPA rules. Project Team experts are selected by a selection panel from the applications received as a result of an open Call for Experts. The open call refers to the expertise required for being eligible for participation in the Project Team.

For this Project Team experts should have specific expertise and knowledge, which will be the main criterion for their selection and which is described in detail below:

— Transmodel V5.1 / IFOPT
— Transmodel v6 Part 1 – 2 – 3
— NeTEx (in particular Part 3 data model)
— SIRI (in particular SX-service and associated data model)
— UML methodology and associated modelling tool (Enterprise Architect)
— Good knowledge of public transport domains:
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- Task 1: operations monitoring & control
- Task 2: fare management (in particular the control & validation process)
- Task 3: passenger information
- Task 4: driver scheduling
- Task 5: management Information

The team is intended to be composed of 5 – 8 experts with the following roles, each with specific expertise requirements:

**PT LEADER / GROUP COORDINATOR**
The PT leader will be responsible for the formal reporting to NEN, for moderating the work in the PT in order to achieve reasonable consensus inside the PT, and act as the interface to the ‘parent body’ CEN/ TC 278/WG 3 and liaises with other external groups. Provides initial input for the tasks; revises/ validates the final output, and is able to assist if necessary the MODEL ADMINISTRATOR.

- Has experience in technical coordination of EU projects
- Technical knowledge in data modelling
- Standards: Transmodel/NeTEx, SIRI.

**MODEL ADMINISTRATOR**
Assists the GROUP COORDINATOR, integrates model proposals into the EA tool, disseminates model within the group, proposes attributes, provides figures for documentation and meeting reports; checks the coherence text/model for documentation, leads the Informative Documentation task (Task 6).

Knowledge of:

- UML Enterprise Architect tool
- Standards: Transmodel/NeTEx, SIRI

**DATA MODELER 1** (Task 1, 4, 5, partly 6)
Leads the modelling in assigned domains (Operations Monitoring & Control + Driver Scheduling); produces change request descriptions; provides proposed/accepted model to MODEL ADMINISTRATOR ; provides text for documentation, participates in modelling the domain Management Information & Statistics. Participates in the Informative Documentation task (Task 6).

Knowledge of:

- ESBF, DATEX II and SIRI relevant parts (Task 1),
- Operational Raw data requirements (Task 5).
- Has knowledge in Driver Scheduling methods and systems (Task4).
- Knowledge of requirements for long distance rail operation is helpful (UIC standards).

**DATA MODELER 2 (assistant modeler)** (Task 1, 4, 5)
Assists modeler 1 & revises models in assigned domains (in particular Operations Monitoring & Control and/or Driver Scheduling), collects /proposes attributes; revises text in assigned domains (Task 1-6). Participates in the Informative Documentation task (Task 6).

Knowledge of:

- at least one of the following projects: ESBF, DATEX II, SIRI relevant parts. (Task 1).

**DATA MODELER 3** (Task 2, 3, 5)
leads the modelling in assigned domains (Fare Management and Passenger Information); produces change
request descriptions; provides proposed/accepted model to MODEL ADMINISTRATOR; provides text for
documentation, participates in modelling the domain Management Information & Statistics (Task 5).
Participates in the Informative Documentation task (Task 6).

Knowledge of:

— UIC standard (Task 2),
— NeTex (in particular the Query Model)/Open Journey Planning requirements (Task 3).
— Operational Raw data requirements (Task 5).

DATA MODELER 4 (assistant modeler) (Task 2, 3, 5)
Assists modeler 3, revises models in assigned domains (in particular Fare Management and Passenger
Information), collects/proposes attributes; revises text in assigned domains (Task 1-6)

Knowledge of:

— at least one of the following standards: UIC standard (Task 2), NeTex (in particular the Query Model)-
  Task 3,
— Open Journey Planning requirements (Task 3).

EDITOR
At least one PT experts will be assigned the role editor and will be responsible for preparing and updating the
deliverable(s) in accordance with the CEN regulations. Experience with and knowledge of the CEN editing rules
is a prerequisite.

WEB & DISSEMINATION MANAGER
At least one PT experts will be assigned to administer the web site, produce and publish
dissemination/didactical materials.

4.3.2 Foreseen travels

— Project team meetings (all PT members): approximately 9-12
— Participation conferences (Project leader + Model administrator): approximately 3
— Liaison with other CEN groups (Project leader): approximately 6