

Evolving TransXChange & NaPTAN with respect to European Standards

Briefing Paper for the Public Transport Coordination Group (PTIC)

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Version 0.4 (Draft), 10 February 2009

Abstract

The National Public Transport Access Nodes (NaPTAN) and National Public Transport Gazetteer (NPTG) are established data models within the UK. Together they facilitate the exchange of stop and topographical data for all transport modes in both XML and CSV formats. NaPTAN and NPTG underpin the provision of coherent transport information within the UK.

Based on the CEN Transmodel standard for public transport, TransXChange provides a layered electronic representation, in XML format, of timetable data including operator, routes and timing information. TransXChange is being successfully used for electronic bus service registration (EBSR) and for the provision of data to journey planning and automated vehicle location (AVL) systems.

Some recent and upcoming CEN standardisation work, in the areas of stop and timetable data exchange, is relevant to these established UK standards and can be perceived as enhancements to them:

- ▶ The CEN "Identification of Fixed Objects in Public Transport" (IFOPT) Technical Specification offers valuable enhancements to NaPTAN, particularly around the modelling of transport interchanges;
- ▶ The new CEN work just starting on a general Network & Timetable Exchange standard (NeTeX) adds value to TransXChange, including elements needed for the exchange of rail timetable information.

This paper provides a recap of the current NaPTAN, NPTG and TransXChange standards, illustrating the value that they already provide as well as the shortcomings that may be a constraint in the future. This then provides the case, for PTIC's consideration, for the enhancements that could be provided by IFOPT and NeTeX.

Actions Required

- ▶ Consider whether additional features from IFOPT would be useful as extensions to NaPTAN.
- ▶ Consider whether strategically it would be beneficial to undertake a longer term harmonisation of NaPTAN with IFOPT.
- ▶ Assess the importance, current status and potential impact of the new NeTeX work.
- ▶ Consider whether the proposed NeTeX features would be useful as extensions to TransXChange.
- ▶ Ensure ATOC is aware of NeTeX work.

Brief Recap of Current UK Stop & Timetable data standards

Stop Data

For **stop data**, the UK has an established data model, database and processes, NaPTAN, for exchanging all stop data for all UK modes in both XML and CSV formats. This is complemented by the NPTG which provides two essential auxiliary functions: firstly a system of **administrative** regions within which to manage distributed data exchange (as is needed for a dataset that is collected from many parties), and secondly, a **topographical** model which relates stops to towns, cities and other destinations. NaPTAN also provides cross-tabulation with stop identifiers used in mode-specific datasets such as TIPLOCs (rail) and coach stop identifiers.

Timetable Data

For **timetable** data, the UK has developed TransXChange, an XML format based on the CEN Transmodel standard model for public transport. This provides a layered electronic representation of a timetable including operator, line, routes, common timing information, and individual journey information. It also supports some operational attributes for example, block and duty crew references, and some registration elements peculiar to the UK. TransXChange is now supported by all the leading UK scheduling and journey planning product suppliers and is being used successfully for Electronic Bus Service Registration (EBSR) by VOSA and for general purpose data exchange of schedules, for example to provision journey planners and AVL systems. Over time, TransXChange is positioned to supersede ATCO.CIF, the legacy CSV format which is still in widespread use. TransXChange does not cover fares.

TransXChange is currently used mainly for bus journeys. Although it is possible to represent simple train timetables in TransXChange, it lacks a number of important features needed for full support of rail journeys, such as coupled journeys, in which trains join or split. The current UK standard for train data is Rail.cif, a legacy CSV provided by ATOC. Rail.cif has support for rail fares and fare routing.

Together these stop & timetable datasets underpin many different UK information services.

Related initiatives

In addition to the CEN IFOPT and NeTeX work discussed in the rest of this note, the need to create new electronic travel information services has led to a number of initiatives in Europe and elsewhere, of direct or indirect relevance. These include:

- ▶ **UIC** - International Union of Railways has established EDIFACT standards for exchanging rail station and timetable data. The European Rail Authority (ERA) is interested in establishing a common XML standard for stops and timetables that could be used to exchange rail and other mode data between rail and other mode operators. This would support the core UIC timetable data elements.
- ▶ The proprietary **Google Transit Format Specification** (GTFS) format introduced in 2007 is now also being used to export data in a CSV format to Google. It uses a simpler conceptual model that is insufficient for “back office” scheduling purposes and operating real-time systems, but adequate for many purposes, - and also has a few additional attributes that are useful (*see separate PTIC paper*).
- ▶ The UK rail industry has a **Station data base** and XML exchange format managed by National Rail Enquiries (NRE) that covers some facility and basic accessibility data corresponding to parts of IFOPT.
- ▶ The Geographic Information System (GIS) community is running several initiatives to extend the standard GIS models to include richer transport feature sets. For example; the **Geographic Data Format** (GDF) group has been gestating a Transmodel compatible transport network description model for some years, and the program of the new EU program **INSPIRE** includes some features that overlap with some existing parts of IFOPT. The Ordnance Survey’s **Integrated Transport Network** (ITN) includes road and pedestrian networks and Transport Direct has extended this to include cycle path information, including bus and cycle lanes (*see separate PTIC paper on INSPIRE*).

NeTeX can be seen as an attempt to draw a number of these threads together into common European exchange format based on Transmodel.

Stop Data – NaPTAN & IFOPT

IFOPT proposes a European Standard model for Stops – a “Euro NaPTAN”. IFOPT can be seen as an evolution of NaPTAN – NaPTAN having been a principal design input – that extends Transmodel to describe physical interchanges in detail, and that adds a number of functional areas, such as points of interest, parking and accessibility attributes.

Summary of IFOPT

IFOPT is made up of four sub models:

- ▶ **Stop Place Model:** Describes the detailed structure of an interchange, that is any station, airport, stop, ferry port, etc, (in Transmodel/IFOPT jargon termed a “Stop Place”), including physical points of access to vehicles, the paths between the points, and accessibility limitations.
- ▶ **Point of Interest Model:** Describes the structure of a Point Of Interest including physical points of access, i.e. entrances. It also provides a model for a Point Of Interest Classification hierarchy – a means of providing taxonomy of different types of Point of Interest relevant for journey planning.
- ▶ **Gazetteer / Topographical Model:** Provides a topographical representation of the settlements (cities, towns, villages etc) between which people travel, including individual addresses. It is used to associate Stop and Station elements with the appropriate topographic names and concepts to support the functions of journey planning, stop finding, etc.
- ▶ **Administrative Model.** Provides an organisational model for assigning responsibility to create and maintain data as a collaborative process involving distributed stakeholders. Includes namespace management to manage the decentralised issuing of unique identifiers.

The Stop Place Model is the mandatory part of the Fixed Object standard. The other models are ancillary.

Additional Function of IFOPT over NaPTAN

IFOPT has a number of additional features that could be considered for use in NaPTAN.

Stop Place Model

The most fundamental purpose of a stop place model - to name and locate stations, entrances and platforms - is already covered by NaPTAN. IFOPT extends the stop model in a number of different ways:

- ▶ IFOPT includes a detailed model for describing the **accessibility** of an interchange to different classes of mobility impaired user.
 - NaPTAN does not represent accessibility, but NRE has coverage of some accessibility aspects for UK rail using the ATOC Station schema. TfL and other PTEs have datasets created using various models. Organisations such as directenquiries.com specialise in accessibility data management.
 - IFOPT includes a detailed model for describing the **opening times** of a station or stop. NaPTAN has only a mechanism for describing suspension/opening of a station.
 - The NRE station dataset has semi-structured data for most UK rail stations.
- ▶ IFOPT includes a model for describing the **physical paths** through an interchange, including availability constraints and accessibility. Thus it can include detailed navigation information, such as one-way passages, steps, etc. This can be used to provide more advanced journey planning and real-time advice.
 - NaPTAN only has points representing entrances, platforms and halls.
- ▶ IFOPT includes a model for describing the nature and relationship of **parking** to transport interchanges. This can be used to provide more advanced journey planning and real-time advice.

- ▶ As well as improving journey planning, a detailed parking model could also be useful for tying together real-time parking data from UTMIC and DATEX2 with travel advice services.
- ▶ IFOPT includes a model for describing the **station equipment** and **facilities** available in stations such as seating, waiting rooms, ticket machines etc.
 - ▶ None of these are covered by NaPTAN. (There are partial datasets available for UK rail using the ATOC Station schema).
- ▶ IFOPT includes a model for describing the **normal delays** that may take place in an interchange such as check-in, security, immigration, baggage reclaim, congestion, etc, including different profile values for different times of day. This can be used to provide more advanced journey planning and real-time advice.
 - ▶ Transport Direct has such interchange data for major UK airports.
- ▶ IFOPT includes a model for describing the stopping positions of vehicles within an interchange. This can be used to provide data to operational systems.
- ▶ NaPTAN includes some UK specific elements – for example the stop types

The IFOPT model is designed so that it can be used with a sparse or a full dataset– so it should be possible to render current NaPTAN data in an IFOPT format as a partially populated dataset.

Point of Interest Model

IFOPT includes a detailed model for describing different types of the **Points of interest** in a country, including their names, locations, relationship to topographic places and transport stops, and their entrances.

- ▶ The UK already has commercially available datasets such as POINTX that use proprietary schemas to represent some aspects of POIs – name location and classification. A number of authorities have built up their own POI databases including transport related data. There is not a standard UK format.

Topographical model

IFOPT includes a model for describing interchange at various different levels:

- ▶ NPTG already covers much of this function.
- ▶ IFOPT has an address model that is less relevant to the UK which has a widely used Postcode model that fulfils a similar function

Administrative Model

IFOPT includes a model for organizing the datasets for decentralized collection and update.

- ▶ NPTG already covers most of this function.

Implications for the UK

The existence of IFOPT draws out some key implications for the UK:

- ▶ There is potentially useful function in IFOPT that could be used to inform the enhancement of the NaPTAN data model and additional travel data that could be collected in the UK.
- ▶ A formal mapping of NaPTAN to an official UK IFOPT profile models would allow users to use it as an alternative format to use with tools that support IFOPT or to exchange the additional data elements. This should be accompanied by examples of existing NaPTAN data expressed in an IFOPT based schema.
- ▶ Some of the additional functions in IFOPT will require appropriate tools to be viable (for example to capture complex navigation paths).
- ▶ Companies involved in accessibility data management could benefit from such standards.

Time Table Data – TransXChange & NeTeX

NeTeX is a new project that proposes a European Standard format for Timetable Exchange. Like TransXChange, NeTeX can be seen as an implementation as an XML exchange format & protocols of a subset of Transmodel concerned with timetables and related function. Its main inputs will be existing national standards, such as TransXChange, and the European national equivalents of NaPTAN (e.g. Trident/Chouette from France). It is being undertaken by a new subgroup (SG9) of CEN TC 278 WG3.

Summary of NeTeX

The proposed scope of NeTeX is

- ▶ **Stop and Station data:** Like TransXChange, NeTeX will need to be able to exchange and reference the stops and stations used in timetables. A reuse of an XML representation of IFOPT is proposed for this. This model should support UIC location attributes and could also support GTFS stop attributes.
- ▶ **Timetable Model:** Detailed description of scheduled journeys for all mode types, including elements needed for Rail. It will include extensions to Transmodel already in TransXChange such as Frequency based services and Flexible (i.e. DRT) services. It will also include accessibility and facilities information that is not in TransXChange.
- ▶ **Timing & Operational data:** The NeTeX model is intended to be a full “back-office” representation that may include data elements such as journey patterns, timing links, and other underlying information that is not visible to the passenger but is essential for preparing schedules and provisioning AVL & operational systems. TransXChange has many of these elements but there may be useful additions from the NeTeX work
- ▶ **Basic Fare Model:** It is proposed that there should be a basic fare model that would include tariff zone elements built over the stop model that would support most types of fare model. For the UK this might be a useful way of arriving at an implementation of a simple “FareXChange” model.

The next SG9 NeTeX meeting in Munich in March will review and refine this scope.

Implications for the UK

The NeTeX work potentially fills a number of known gaps in the UK and may be of particular interest to the UK rail industry and to UK suppliers aiming to have a European strategy.

- ▶ ATOC may wish to be involved in NeTeX to ensure the rail coverage meets UK requirements.
- ▶ NeTeX work could be used to inform TransXChange evolution.
- ▶ NeTeX could be used to encourage the use of Transmodel worldwide and for example be positioned as the XML based version of GTFS.

References

New Work Item proposal CEN TC 278 WG3 SG9 Network & Timetable Exchange (NeTeX):
http://transxchange.org.uk/netex/InitialScope_v2.5.pdf

PTIC

The Public Transport Information Coordination Group (PTIC) is a community enterprise, created and operated collaboratively by ATCO, RTIG and Traveline, with the active participation of DfT Transport Direct.

Its purpose is to provide coordination on UK activities relating to the compilation and presentation of public transport information, whether to the public or for operational purposes.

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