

NeTEx extension for New Modes

(CEN PT0303)

Scope and overview

(Sep 2020, Ver. 0.4)

Introduction

NeTEx (Network Timetable Exchange) defines a standard for exchanging public transport passenger information data in XML format. The functional scope of NeTEx is divided into three parts, each covering a functional subset of the CEN Transmodel conceptual model for Public Transport Information, [T1], [T2], [T3].

Part 1 describes the fixed Network (stops, routes, lines, etc.); **Part 2** is mainly focused on Timetables and **Part 3** covers Fare data. All three parts use the same framework of reusable components, versioning mechanism, validity conditions, support to allow the uniquely identification of data elements in a global context, etc., defined in Part 1. NeTEx also includes container elements called "VERSION FRAMES" to group data into coherent sets for efficient exchange.

NeTEx deliverables comprise

- (i) a CEN Specification document (in three parts),
- (ii) a data model in the standard UML modelling language
- (iii) an accompanying XML schema providing a formal electronic description that can be used by data processing software.

Data in NeTEx format is encoded as XML documents that must conform exactly to the schema – standard XML validator tools can check conformance automatically. The schema can also be used to create bindings to different programming languages, automating part of the implementation process for creating software that supports NeTEx formats. Some example XML document encoding different data sets and exchange functions are provided along with the schema.

In effect, documents in NeTEx format are computer files that can be exchanged by a wide variety of protocols (http ftp, email, portable media, etc). In addition, a SIRI based protocol is specified for use by online web services. The common SIRI framework is used to describe a specific NeTEx/data service (SIRI-NX) with specialized messages that can be used to request and return messages containing data in NeTEx format, as well as publish/subscribe messages for push distribution. The SIRI-NX responses return a NeTEx XML document that satisfies the request criteria (and also conforms to the NeTEx schema). There is a WSDL binding for this SIRI NeTEx service to make it easy to implement services and service clients as http requests.



A NeTEx service need only implement those elements of relevance to its business objectives – extraneous elements present in the binding can be ignored. Parties using NeTEx for a particular purpose will typically define a “PROFILE” to identify the elements that must be present and the code sets to be used to identify them, for example a French NeTEx profile has been defined that specifies the use of NeTEx for the exchange of NeTEx data.

Whereas TAP/TSI uses optimized flat files that aggregate different fare conditions and prices into a small number of records with dense semantics, NeTEx uses a parameterized approach, with discrete atomic elements that may be combined in many different ways and a ready-made library of almost all known fare conditions. This gives a high level of reuse, and richer semantics, that is, the ability to capture more complex conditions and additional types of fare - but requires a greater effort to understand in the first place. NeTEx uses a uniform design style and coding conventions, which, once grasped, helps to reduce the learning curve

Recently, a **Part 4** has been defined describing the European Profile for NeTEx, focusing on information relevant to feed passenger information services and excluding operational and fares information.

NeTEx extension for New Modes Scope

The NeTEx extension for New Modes addresses the development of a data exchange format dedicated to the publication of data concerning 'Alternative Modes' (as requested in EU COMMISSION DELEGATED REGULATION (EU) 2017/1926 of 31 May 2017). This work will generate Net **Part 5** focusing on (but not a limitation to) car sharing, cycle sharing, carpooling, car/cycle rental. It is primarily oriented towards static data (describing the service that is offered and associated infrastructure, more than its current running status). The corresponding real-time information is provided by SIRI.

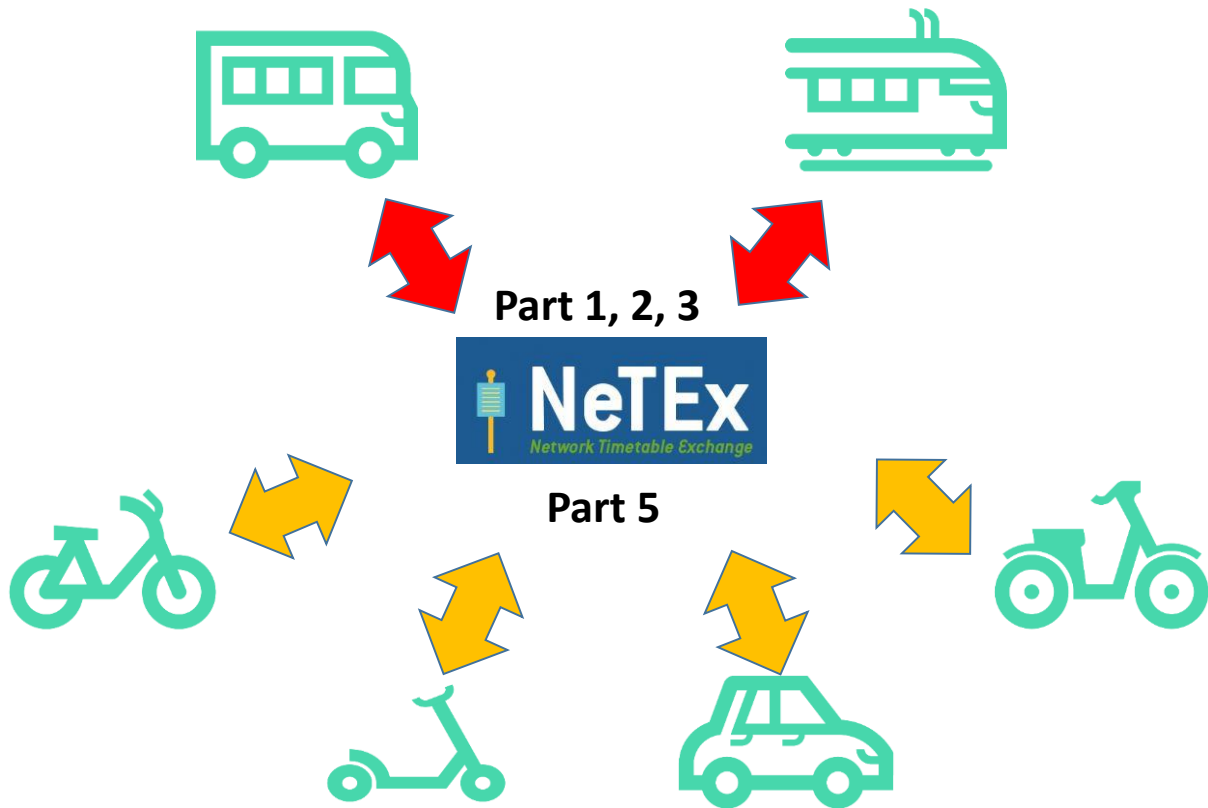


Figure 1- NeTEx transport modes exchange data

This NeTEx extension is based on the Transmodel extension for New Modes (Transmodel is the data model, and NeTEx the exchange protocol). Additional input (GBFS, DATEX II, OCPI, MDS, etc.) will also be taken into account.

NeTEx already covers a lot of the needs to describes new modes (Site, Location, Role, Connection, Trip, Journey, Vehicle Type, Parking, Passing Time, etc.). Therefore, New Modes will mostly reuse concepts and will just add a few attributes and concept to the existing ones. The lines below provide details about where most of the changes will occur.

Mode of transport and modes of operation

Transport Mode are enhanced to be able to describe vehicle used in New Modes (bicycle, scooters, etc.). SubModes are enhanced to be able to clearly describe the Modes of Operation (Vehicle Pooling, Vehicle Sharing, Rental, etc.).

Fleet of vehicles

The concept of Feet of vehicle is added (in relation with Organisation, Sevices, Vehicle and Vehicle Type, etc.).



New mode services and associated online/mobile access

Services are enhanced to cover Sharing Service, Pooling Service (including chauffeured car and taxi) and Rental Services. Online and mobile access to the service are fully described.

Meeting points

Meeting points (i.e. pick-up and drop of points for carpooling, but also any point to meet your vehicle) are added as an equivalent of Public Transport Scheduled Stop Point dedicated to new modes. They can be free, use a dedicated infrastructure (for example a car-pooling area) or located at an existing Site (via a NeTEx Assignment).

Single Journey, running only once (can be planed, even a short time ahead)

The Vehicle Journey concept is enhanced to a Single Journey concept allowing a Journey running only once on a specific day (not associated Day Type or Calendar). Moreover, the Single Journey does not require a Line.

Parking

Parking are enhanced in order to fully cover the need of New Modes: places (bays) dedicated to carpooling drivers, parking for bikes, dedicated to vehicle sharing, meeting points in parkings, taxi stand, etc.

Connections (multimodal)

Connections are enhanced to be able to cover connection with New Modes (between legacy public transport and New Modes, or between two different New Modes).

Passing times

NeTEx Passing Times are reused to provide information for New Modes.

Vehicle path (Routes)

NeTEx Routes are enhanced to cover New Mode's Vehicle route description.

Refueling/recharging

Refueling and recharging Equipment are enhanced for New Modes.

Specific Equipments (for example Vehicle Release Equipment)

Some existing NeTEx Equipment are specialized for New Modes (Bikes padlock, possibly being IOT, other Vehicle Release Equipment, etc.)



Vehicle Access (code, etc.)

Vehicle access information are added to Customer Account (in relation with existing Contract and Medium Access Devices)

Vehicle profiles

Vehicle profiles are enhanced to cover carpooling vehicle description, bike, scooter, etc.

Passenger Trip (multimodal)

Leg of Passenger Trip are enhanced to be able to describe Leg using New Modes (with possible connections to other Legs of course).

Booking

Booking information are enhanced in order to cover New Modes needs.

Planned availability

Planned availability (opening time of a bike station or of a car sharing parking, etc.) are provided using NeTEx existing Availability Conditions.

Fare offers for new Modes

Fare Offer for New Modes is described using the very comprehensive NeTEx Fare Offer description.

SIRI protocol for realtime information exchange

The Standard Interface for Real Time Information or SIRI is an XML protocol to allow distributed computers to exchange real time information about public transport services and vehicles.

The protocol is a CEN norm, developed originally as a technical standard with initial participation by France, Germany (Verband Deutscher Verkehrsunternehmen), Scandinavia, and the UK (RTIG)

SIRI is based on the CEN Transmodel abstract model for public transport information, and comprises a general purpose model, and an XML schema for public transport information. Realtime data for New Modes Scope (SIRI)

SIRI extension for New Modes Scope (see SIRI Github, CR71).

SIRI provides information about counted values: current number of available vehicles, current number of spaces available to bring back a vehicle or to park, etc. SIRI also provide updates of positions (typically for free floating vehicles).

The SIRI Facility Monitoring (FM) service is extended to provide this counted information.



This extension is not limited to bikes and cars but is generalised to any type of Vehicle (bike, car, scooter, motorbike, etc.) and also to seat availability (in Stop Places Areas/Point of Interest/Vehicles...) or any similar facility (lockers, audio guides etc.), and is also suitable for a simple Passenger Counting. It also covers some simple measurement (fuel available in a Refueling Equipment, etc.).

This extension was defined taking into account GBFS and DATEX II inputs.

The main use cases of the extension are:

Provision of real time information about available vehicles and devices

The Facility Condition may provide information about the available vehicle and device at a specific location. This is mainly to provide information about available vehicles (bike, car, scooter, etc.) at a vehicle sharing station but also in any other place (rental service, etc.). Furthermore, it may provide information about any available devices provided by a specific service: for example, available lockers in a left-luggage area, available audio guides for an audio guide service, etc. Available vehicles (devices) should be differentiated from present but reserved vehicle.

Provision of real time information about available spaces to bring a vehicle and devices back

The Facility Condition may provide information about the available spaces to bring back vehicle (or any device) at a specific location. The main expectation is to know if a vehicle (or device) can be brought back to a specific location, or left for some time in a location (for example if there are available places in a parking). Available spaces should be differentiated from free but reserved spaces.

Provision of information about the updated location of a facility

The Facility Condition may provide information about the updated location of a facility: this is typically the position of a vehicle, but can also be the position of any service of facility (assistance service, mobile ticketing service, etc.). The intention is not to follow the vehicle or service, but to be able to know where a free floating available vehicle is located, or where is the closest assistance service, etc.



Further readings:

- ❖ NeTEx-Part 1: Public Transport Network Topology exchange format, CEN/TS 16614-1:2014
- ❖ NeTEx-Part 2: Public Transport Scheduled Timetables exchange format, CEN/TS 16614-2:2014
- ❖ NeTEx-Part 3: Fare Information exchange format, CEN/TS 16614-3:2014
- ❖ NeTEx-Part 4: Passenger Information European Profile CEN/TS 16614-4:2017
- ❖ NeTEx Introduction - White Paper (http://netex-cen.eu/wp-content/uploads/2015/12/01.NeTEx-Introduction-WhitePaper_1.03.pdf)
- ❖ NeTEx Getting Started - White Paper (http://netex-cen.eu/wp-content/uploads/2015/12/02.NeTEx-GettingStarted-WhitePaper_1.06.pdf)