Using the CEN NeTEx Standard to represent basic Rail fare data

- Briefing Report for the UIC

10 June 2014. UIC Paris

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Contents

• Introduction,
  • Motivation, Process, Methodology
  • NeTEx Functional Scope
  • Demonstration of UML & XML tools

• Rail Mappings
  • Mapping Methodology
  • B1, B2, B3 Mapping

• Summary Comments
NeTEx - CEN Standard

• XML standard for exchanging Public Transport data – primarily for passenger information systems

• Deliverables
  • CEN Specification Documents
    • Part 1 – Network (Stops, routes etc)
    • Part 2 - Timetables
    • Part 3 – Fares
  • UML Models
  • XML Schema & Examples
CEN TC278 Working Groups

CEN / TC278
Road Transport & Traffic Telematic
Plenary
Chair:

WG1, Electronic Fee Collection

WG3, Public Transport

WG4, Traffic and Traveller Information

WG5, Traffic Management

WG7, Geographic Road Data

WG8, Road Traffic Data

WG9, Dedicated Short Range Communications

WG10, Human-Machine Interfaces

WG12, AutoVehicle and Equipment Ident

WG13, Architecture & Terminology

WG14, Recovery of Stolen Vehicles

WG15, eSaftey
CEN Process

- Multi country participation organised through national standards bodies
- Open review and voting process
  - Draft, comment, revise, vote
- Build on existing standards
- Time limitations to complete and to review
- Different tracks - Full Standard vs Technical Specification
Evolving a Concrete PT Timetable schema

Transmodel
- Trident
- VDV452
- TransXChange, etc
- Bison, Noptis, etc
- IFOPT
- SIRI
- UIC Rail Timetables

CEN NeTEx 1.0 Part1
- Examples
- FareXChange
- TAP TSI, Rail Fares

CEN NeTEx 1.0 Part2

CEN NeTEx 1.0 Part3

Examples
Why? - Business Drivers

- European data exchange standards
  - Reducing costs
    - Shared markets, wide tool base, reusable components
    - Common specifications for procurement and exchange
    - Makes data costs viable for new functions
  - Managing Complexity
    - Simplified, uniform solutions
    - Harnesses know-how & best practice
  - Increasing Capability
    - Enables Advanced function, especially electronic delivery
      - Passenger information, ticketing
    - Large scale coverage, multimodal
    - More powerful representations & functions
    - Interoperability
Why? - Political Drivers

• Passenger rights
  • Objective, timely information, cross-modal
    – E.g. EU ITS action plan.
  • Accessibility

• Sustainability / Green
  • Encourage use of PT
  • Make use of PT capacity efficient (ITS)
  • E-ticketing enables more passengers on urban systems

• Harmonisation
  • Free flow of data and system use between regions
NeTEx / Transmodel Methodology
Models – Levels of Abstraction

• Conceptual model is implementation independent
  • Transmodel based, modular UML
• Conceptual model may have multiple physical models for different target implementations.
  • NeTEx Physical design for XML as modular UML Model
• Implementation is derived from physical model
  • Eg. XML, DDL etc
  • NeTEx XML Schema
Conceptual vs Concrete Levels; Model Driven Design,

1. NeTEx /Transmodel Conceptual Model - UML

NeTEx Framework VERSION, VERSION FRAME Packages

UML Transmodel PT Concepts – NeTEx submodel POINTS, LINKS, STOP POINTS, ROUTES, ROUTE LINKS, JOURNEY PATTERNS, JOURNEYs, etc, etc Packages

2. NeTEx + Physical XML Class Model - UML

Framework Classes Version, ServiceFrame

Physical Model Concrete Classes Points, Links, Stops, Routes, RouteLinks, JourneyPatterns, Journeys, etc, etc Packages

3. XML Implementation – NeTEx Schemas: How to Serialize?

Net Publication Nx XML Stops

NxXML ServiceFrame Nx XML Routes

Nx XML Point Nx XML Version

Nx XML Journeys

4. XML Examples
Common Modular Organisation of Packages

Physical

XML

NetEx Conceptual MODELS

- NetEx 2013
  - NetEx Framework
  - NetEx Part 1 MODEL
    - Network Description MODEL
    - Fixed Object MODEL
    - Tactical Planning Components MODEL
  - NetEx Part 2 MODEL
  - NetEx Part 3 MODEL

NetEx XSD Physical Models

- XSD NetEx INTRODUCTION
- XML Model
- NetEX Schema XSD
- XSD SIRI Framework
- XSD NetEx Physical Model Views
- XSD - NetEx - Explicit Frames Package
- XSD - NetEx - Framework
- XSD - NetEx - Part 1 Model
  - XSD NetEx Part 1 Physical Package Dependencies
    - «NetEx Part 1» NetworkDescriptionGrpPackage
    - «NetEx Part 1» TacticalPlanningGrpPackage
    - «NetEx Part 1» FixedObjectGrpPackage
  - XSD - NetEx - Part 2 Model
  - XSD - NetEx - Part 3 Model
- NetEx Part 3 Advisory Model

Netex-v099.7

- Examples
  - Schemas
    - NetEx_top_level Schema
    - NetEx_top_level_wsd1
    - Frames Containing netex objects
    - netex_framework
    - netex_part_1 Network
    - netex_part_1_frames
    - netex_part_1_ND
    - netex_part_1_TP
    - netex_part_1_ifopt
    - netex_part_2 Timetables
    - netex_part_3 Fares
    - netex_protocol
Protocols vs Formats

• NeTEx separates payload from message
  • Includes version and container ("Version Frame") constructs
• Data exchange as XML documents with any file protocol
  • E.g. FTP, SMTP, http
• Includes SIRI based message protocol
  • Request/Response - data satisfying specific filter criteria
  • Publish/Subscribe – e.g. for daily timetable changes
NeTEx SIRI: Request/Response

- Request for one or more NeTEx data objects
- Filter says which objects &/or values

NeTEx DB | NeTEx Producer | NeTEx Consumer

Request + Filter as NeTEx

Delivery + Data Objects as NeTEx

CEN SIRI

njsk
**NeTEx Publication**

- Asynchronous exchange
  - One off or
  - Periodic
- Reusable XML components
  - Same XML payload as for SIRI
  - Data Objects
  - Common Filters

---

**Diagram Description**

- **Producer**
  - Connects to the **NeTEx DB**
  - Sends signals to the **NeTEx Publish**

- **NeTEx Publish**
  - Filters the data based on **NeTEx Publication**
  - Sends data to the **Consumer**
    - **Consumer**
    - Receives the filtered data

- **NeTEx Publication + Results**
  - List of Data Objects
Data quality- XML Integrity constraints

• Data types: E.g. valid date, time, integer, duration, language string, enumerations, etc
• Uniqueness: Each identifier declared only once
• Referential integrity: referenced entities are also present in document
NeTEx
Functional Scope
NeTEx & Transmodel Functional Areas

- Transmodel
  - Fare Collection
  - Personnel Disposition
  - Operations Monitoring
  - Rostering
  - PT Concepts
  - Network Description
  - Management Information
  - Topography
  - POI
  - Stop Concepts
  - Stop Places
  - Accessibility
  - Tactical Planning
  - Schedules
  - Multimodal Operation
  - Vehicle Scheduling

- NeTEx Part 1
- NeTEx Part 2
- NeTEx Part 3

IFOPT
NeTEx Functional modules

NetEx Module layers

Coupled Journeys, Train Composition
Interchanges

Operational Data
Schedules, (Fixed & DRT)

Lines, Routes
Service Patterns, Timing Patterns

Network Restrictions
Points Of Interest

Network Links
Stop Places

Vehicle Types
Equipment & Facilities

Operators & Authorities
Calendars

Core & Generic: Versioning, Framers
Responsibility

Fare Products
Fare Pricing Parameters

Tariff Structure
Parking for PT

CEN TC 278 WG3
NeTEx Outline Scope: PART 1

• **Part 1 Framework**
  • Versions, Version Frames,
  • Organisations, Responsibilities, etc.
  • Day Types, Service Calendars
  • Vehicles, trains, Accessibility

• **Part 1 Public transport Network Topology. exchange format**
  • Infrastructure, infrastructure constraints,
  • Stops, Stations, etc. Interchanges
  • Routes, service patterns, etc.
  • Stop Places, Points of Interest, Parking, paths, entrances
  • Points of Interest, Parking
  • Garages, Crew points, Beacon Points
NeTEx Outline Scope: PART 2

- **Part 2 Scheduled Timetables** exchange format
  - **Basic time related data** (shared by all the domains): journey patterns, journey times, service patterns, operating days, journey interchanges, etc.
  - **Passenger information specific** objects: vehicle journeys, (passing times, Coupled Journeys, Journey Parts, Train Composition)
  - Data used specifically in the exchanges between the scheduling & vehicle monitoring systems (blocks and related concepts)
NeTEx Outline Scope: PART 3

• Part 3 Fare information
  multimodal information systems providing planned passenger information
  • planned tariff information exchanged between service operators, service operators and product owners (i.e. authorities, etc.)
  • Includes
    • Different Tariff Structures (Spatial, Time based, Yield managed)
    • Fare Pricing Parameters
  • Excludes
    • Management of fare product and applications
    • Certification, registration and identification
    • Purchasing and fulfillment
    • (price calculation)
NeTEx / Fares Scope
Fare
scope
NeTEx Fares - Use cases

• Provide information on fare products and their rules and restrictions to passengers
  • Distributing fares information for publication
  • Distributing fares information to online systems
  • Provide information on fare products and their rules and restrictions for a specific journey,
  • Identify time schedules and conditions for the lowest fares
  • Show fare zones on topographical and schematic maps,
  • Exchange of fare information between long distance (i.e. heavy rail) and local public transport
  • Provide a price calculator with up to date fare information
  • Submitting a fare scheme for approval
  • Provisioning of ticket vending machines with fare information
  • Provisioning of ticket checking devices
NeTEx Fares / A very Simplified model
## A Classic Fare Matrix

### Table 1.2: Example Triangular Fare Table with Absolute Prices

<table>
<thead>
<tr>
<th></th>
<th>Ask Ave</th>
<th>Bath Pl</th>
<th>Cam Sq</th>
<th>Dee St</th>
<th>Ely Rd</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Outward (Absolute Fare Price)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ask Ave</td>
<td>€0.40</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bath Pl</td>
<td></td>
<td>€0.50</td>
<td>€0.40</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cam Sq</td>
<td>€0.50</td>
<td></td>
<td></td>
<td>€0.50</td>
<td></td>
</tr>
<tr>
<td>Dee St</td>
<td>€0.75</td>
<td>€0.75</td>
<td></td>
<td>€0.50</td>
<td></td>
</tr>
<tr>
<td>Ely Rd</td>
<td>€1.00</td>
<td>€1.00</td>
<td>€0.75</td>
<td></td>
<td>€0.40</td>
</tr>
</tbody>
</table>

- **Scheduled Stop Point** or **Tariff Zone**
- **Destination Matrix Element**
NeTEx Point to Point Fare Structure

class XSD NeTEx TM FC Geographical Fare Structure Basic

- **TimingPoint**: 1
- **ScheduledStopPoint**: 1
- **DistanceMatrixElement**: 1..*
- **FarePrice**: +start of 1 +end of 1
- **DistanceMatrixElementPrice**: +related to 1

Name: XSD NeTEx TM FC Geographical Fare Structure Basic
Author: nick.knowles
Version: 1.0
Created: 30/04/2014 17:52:10
Updated: 09/06/2014 23:55:16
Access rights & Products

- ACCESS RIGHT: right to consumer public transport service, e.g. point to point, route, zone, network, day,

- FARE PRODUCT; Set of access rights with additional conditions, “Usage Parameters”, e.g. NRT Fare, Rail card, etc etc

- SALES PACKAGE: Named product with additional sales conditions & materialization.
NeTEx Access rights & Products

class XSD NeTEx TM FC Access Right Assignment Basic1

Name: XSD NeTEx TM FC Access Right Assignment Basic1
Author: Kasia
Version: 1.0
Created: 30/04/2014 18:35:39
Updated: 10/06/2014 08:11:15
Rhe **specific** choice (out of all the possible available **generic** values) actually made on a purchase.
For example a *Child, Single, Off-peak* fare
Access rights & Products

- **ACCESS RIGHT**: right to consumer public transport service, e.g. point to point, route, zone, network, day,

- **FARE PRODUCT**: Set of access rights with additional conditions, “Usage Parameters”, e.g. NRT Fare, Rail card, etc etc

- **SALES PACKAGE**: Named product with additional sales conditions & materialization.
TAP TSI MAPPINGS
Objectives

• How to map B1 (NRT) to NeTEx?
• What are equivalent semantics?
  • Gap Analysis: What extra NeTEx Entities, Attributes, Relationships are needed?
  • What implicit B1 semantics can NeTEx also describe?
  • Where is decomposition needed? (because NeTEx generally separates concerns & normalizes to atomic elements – cf B1 & B2 optimized views)

• How to do it efficiently?
  • Modularisation: which package does it go in?
  • Add extra view entities?
Sources

• TAP TSI B1, B2, B3 Documents
  • 2012.09 V1
  • 2013.03 Updates eg Table L
• TAP TSI 5.1 Document (Rules on using)
• TAP TSI Code lists
• Sample data
Methodology - Technical

- TAP B* Analysis Models in Enterprise Architect
  - Overview & Detail diagrams
- Extend NeTEx UML Physical Model
- Tap B*/NeTEx Mapping Table as Spreadsheet
- Extend XML schema to support B*
- Create examples to help validate schema and clarify interpretation
- B* Mapping report
- Model Documentation as part of NeTEx Part 3 documents
Summary

Comments
Summary

• NeTEx can represent B1, B2, B3 content
• Has additional capabilities
• Interpretation is quite complex – but then so are B1, B2, B3…..
• Interoperability is quite possible.
## Some Comparison Points

<table>
<thead>
<tr>
<th></th>
<th>B1, B2, B3</th>
<th>NeTEx</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Technology</strong></td>
<td>Csv files</td>
<td>XML document</td>
</tr>
<tr>
<td><strong>Packaging</strong></td>
<td>Separate files, naming convention</td>
<td>Document (s)</td>
</tr>
<tr>
<td><strong>Protocol</strong></td>
<td>ftp</td>
<td>ftp and/or SIRI</td>
</tr>
<tr>
<td><strong>Consistency</strong></td>
<td>3 separate B1, B2, B3, some common concepts</td>
<td>Unified, reusable conditions</td>
</tr>
<tr>
<td><strong>Architecture</strong></td>
<td>Optimised flat files</td>
<td>Normalized reusable component objects</td>
</tr>
<tr>
<td><strong>Expressiveness</strong></td>
<td>Limited to agreed concepts</td>
<td>Rich, extensible</td>
</tr>
<tr>
<td><strong>Integrity checking</strong></td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Versioning</strong></td>
<td>Yes</td>
<td>Fine grained, uniform</td>
</tr>
<tr>
<td><strong>Responsibility</strong></td>
<td>Supplying RU</td>
<td>Fine grained, uniform</td>
</tr>
</tbody>
</table>
Some disadvantages of NeTEx

• Larger, More complex model, more effort to understand, harder to interpret.
• XML is more verbose
• Slow standards process, multi-stakeholder participation
Some Advantages of NeTEx

• More complete
• More extensible
• Greater reuse of components and of design patterns
References

- ERA/2012/INTEROP/NP/01s Study on the standard for the exchange of fare information in the context of connection with other modes of transport (NeTEx Part 3)
- CEN TC278, Reference Data Model For Public Transport, ENV12896 revised, june 2001,
APPENDIX

Some examples of the sort of passenger information NeTEx is intended to support.
Network
Example - Paris PT & zones
Example - Fare Zones - Berlin

For trips in zones A and B.

For trips in zones B and C. Please consult the detailed network map to see in which zones you will be travelling.

For trips in zones A, B and C.
Example - London
Copenhagen fare zones
Rail / Metro zoning
Rover products
More zones
Rail add on zones

- Add on fare zones
Interchanges
Example Complex Interchanges
Complex interchanges station

Layout

Multiple platforms, & entrances

Example Rail Station with multiple tracks & two entrances
© Crown Copyright 2010
Example Station map - Wimbledon

Wimbledon Station Plan

Ground Floor

This is a map of Wimbledon Station, containing clickable icons that you can navigate by using your mouse or the tab key, allowing you to access information about the objects in this station.

- Platforms 7 and 8 Stairs
- Number of Steps: 13, 13
- The steps have handrails.

- Ticket Gates
- Accessible ticket gates are not automatic but staff will check tickets by hand.

Lower Ground

This is a map of Wimbledon Station, containing clickable icons that you can navigate by using your mouse or the tab key, allowing you to access information about the objects in this station.

- There are unisex accessible toilet facilities available.
- The main entrance doors to the toilet are not automatic.
- The entrance door to the toilet opens in.
- The toilets are kept locked.
- The toilets require a RADAR Key.
- There is an assistance alarm provided.
- There is a large cubicle available.
- There are no baby change facilities available.
Example Entrances & Platforms only

Wimbledon Stop L (Hartfield Road →NW) BCT-MKD (QUAY)
Wimbledon Stop D (The Broadway →SE) BCT-MKD (QUAY)
Wimbledon Stop P (Wimbledon Bridge →MKD) BCT-MKD (QUAY)
Wimbledon Stop C (Wimbledon Bridge→ SE BCT-MKD (QUAY)

Wimbledon Station
NaPTAN Points

Main Entrance RSE (ENTRANCE)

Ground Concourse RLY (ACCESS SPACE)
+ Stop Area GRLS

Platform 1 LU MET (QUAY)
Platform 2 LU MET (QUAY)
Platform 3 LU MET (QUAY)
Platform 4 LU MET (QUAY)
Platform 5 RPL (QUAY)
Platform 6 RPL (QUAY)
Platform 7 RPL (QUAY)
Platform 8 Tram Link MET (QUAY)

Taxi Rank SHR (QUAY)

Wimbledon Stop A (Wellsway Road →SW) BCT-MKD (QUAY)
Wimbledon Stop L (Hartfield Road →NW) BCT-MKD (QUAY)
Example Complex Station model
Connection & Transfer Times

- **CONNECTION**
  - transfer between SCHEDULED STOP POINT in timetable, with timings & accessibility

- **NAVIGATION PATH.**
  - Transfer between points within SITE, with timings and accessibility

- **ACCESS**
  - Transfer between SITEs (eg POINT OF INTEREST or STOP PLACE), with timings & accessibility
Timetables
Timetables

• NeTEx can represent the reusable elements used to derive timetables e.g. JOURNEY PATTERNS, TIMING PATTERNS, TIMING LINKs, TIME DEMAND TYPES (peak, off peak etc) etc

• Enables advanced passenger information
Timetables - Mainline

- Different Service patterns
- Timing Links vs Service Links
- Different Day Types
- Exceptions
- Footnotes
• Not every line stops at every station
• May be different in each direction
  • (eg London Paris Lille)
Journeys & Patterns

- London to Paris Outbound, Weekdays
  - 1 Route
    - 2 intermediate stops
    - Two passed Stops
  - 4 Service Patterns
  - 19 Journeys

**Eurostar London-Paris (Route 01 Outbound) Journeys, Service Patterns & Day Types**

<table>
<thead>
<tr>
<th>London St Pancras</th>
<th>Ebbsfleet</th>
<th>Ashford</th>
<th>Calais Frethun</th>
<th>Lille Europe</th>
<th>Paris Gare du Nord</th>
</tr>
</thead>
<tbody>
<tr>
<td>05:25</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>06:12</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>06:53</td>
<td></td>
<td></td>
<td></td>
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<td></td>
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<td>07:22</td>
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<td></td>
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<tr>
<td>08:02</td>
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<tr>
<td>08:55</td>
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<td>09:22</td>
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<td>10:25</td>
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<td>19:02</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>20:02</td>
<td></td>
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</tr>
</tbody>
</table>

**Service Patterns**

- **F1** - Runs Mondays and Fridays only from 4 January to 5 February.
  - Runs Monday to Friday at all other times.

- **F2** - Runs Tuesday to Thursday from 4 January to 5 February only.
Service Patterns

Eurostar London-Paris (Route 01)
Service Patterns

- Directional
Timing Patterns

Not all timing points are Stop points
Run Times & Wait Times

Compute from Start time,

+ Timing pattern,
  • Timing Points,
  • TimingLinks

+ Run times (for a given Time DemandType)
Timing Link vs Timing Pattern?

Eurostar London-Paris (Route 01)
Timing Patterns

Run time 17M
Run time 22M
Run time 32M
Run time 2H05M
Run time 2H15M
Run time 1H52M

Run time
Run time
Run time
Run time
Run time
Run time
Run time
Run time

Wait Time
Wait Time
Wait Time

London St Pancras
Ebbsfleet
Ashford
Tunnel in
Tunnel Out
Calais Frethun
Lille Europe
Paris Gare du Nord

01
01b
01c
01d
Complex Conditions & Footnotes

- Day Types
- Public Holidays
- Operating periods
- Exceptions

Timetable
Core destinations
from 12 December 2010 to 2 July 2011

KEY
PARIS
BRUSSELS

NOTES
1. Runs Mondays and Fridays only from 4 January to 5 February. Runs Monday to Friday at all other times.
2. Runs Tuesday to Thursday from 4 January to 5 February only
3. Fridays only
4. Does not run on Fridays
5. Runs from 9 May onwards

VARIATIONS
Amended Eurostar services may run on and around Public Holidays and for engineering works. Please check at the time of booking and before travelling. Please note that there are no Eurostar services on Saturday 25 December 2010.

CHECK-IN ADVICE TO TRAVELLERS
- At least 10 minutes before departure for Business Premier travellers and Eurostar™ carte blanche holders.
- At least 30 minutes before departure for all other ticket holders and Eurostar™ carte classique holders.
Joining and splitting
Coupled Journeys and Train Ids

Join Split example: Four SERVICE JOURNEYS, Five TRAIN NUMBERs

Advertised: 40447
TTID: 40447

Advertised: 447, 457
TTID: 447

Advertised: 447
TTID: 447

Advertised: 457, 60457
TTID: 457

Advertised: 447, 457, 40447
TTID: 447
Journey parts for couple journeys

Join / Split Example: 6 JOURNEY MEETINGS

- Amsterdam
- Hannover
- Copenhagen
- Berlin
- Warsaw
- Prague

JOURNEY PARTS:
- 447-JOURNEY PART-1
- 457-JOURNEY PART-1
- 40447-JOURNEY PART-1
- 447-JOURNEY PART-2
- 457-JOURNEY PART-2
- 60457-JOURNEY PART-1
- 60457-JOURNEY PART-2
- 457-JOURNEY PART COUPLE-1
- 447-JOURNEY PART COUPLE-1
- 447-JOURNEY PART COUPLE-2
- 457-JOURNEY PART COUPLE-2

447 457 40447
447 457 T-447
40447 T-40447

Meeting: 457 60457

njsk
Connections & Interchanges

For culture, for adventure, for nightlife, head to the Netherlands on direct services from Brussels-Midi/Zuid to Amsterdam and Rotterdam.

### London ↔ Netherlands

<table>
<thead>
<tr>
<th>Notes</th>
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### London ↔ North west France

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### London ↔ Geneva

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Eurostar Connections

- Routes to the Netherlands, Switzerland, France
- Simple & Complex Transfer legs
Fares
# Rail Fares with Complex Conditions

<table>
<thead>
<tr>
<th>Traînhotel PAU CASALS (3)</th>
<th>Traînhotel SALVADOR DALI (4)</th>
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<tr>
<th>Classe de service</th>
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</table>

## NOTES

1. Traînhotel n°409/407 (quotidien)
2. Traînhotel n°477/478 (quotidien)
3. Traînhotel n°11237/273 (circulation le mardi, jeudi et dimanche dans le sens Sud – Nord (Barcelone – Milan et Zurich))
4. Traînhotel n°11274/274 (circulation le lundi, mercredi et vendredi dans le sens Nord – Sud (Milan et Zurich-Barcelone))
5. Le cabbine 'Double Grande Classe' et le cabbine 'Double Affaires' doivent être utilisées uniquement par deux personnes qui se connaissent (réserver en compartiment 'Famille').
6. Carte FIP - ordre du mécanicien à présenter au poste de vente habilité.

**IMPORTANT !**

Lors d'une vente, pour toute difficulté liée à HERMES, veuillez contacter l'Assistance Gares au 30 40 50 ou 01 56 79 51 50.

P = Cabine Class Touriste occupée uniquement par 2 personnes qui se connaissent. Sur 'Mosaique' dans 'saison type de lit', sélectionner T2 et dans 'compartiment', sélectionner 'Famille'.

S et T = En Classe Single et Double Grande Classe, le dîner, les boissons et le petit-déjeuner sont inclus.

L et N = En Classe Single et Double 'Affaires', le petit-déjeuner est inclus.

R = En cabine Class Touriste, compartiment exclusivement dédié aux personnes du même sexe (Homme ou Femme) et devant mûre lorsque 2, 3 ou 4 personnes voyagent ensemble ; la cabine est entièrement réservée et devient dans ce cas 'compartiment 'Famille' en

Le Traînhotel est une offre internationale et il est interdit de descendre du train en dehors de sa gare de destination.

La réservation est ouverte à J-3 mois et jusqu'au départ du Traînhotel. La réservation reste obligatoire.
Product Restrictions & Limitations

- Who can Buy, When & Where?
- When & Where (and How) can it be used?
- Machine Readable
  - To find a applicable fares
  - (Check use)
- Human Readable
  - To explain

TICKET TERMS

<table>
<thead>
<tr>
<th><strong>CHEAP DAY</strong></th>
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<tbody>
<tr>
<td>Train Operator</td>
<td>Most Train Operating Companies</td>
</tr>
<tr>
<td>Booking Deadlines</td>
<td>No deadline - walk UP fare</td>
</tr>
<tr>
<td>Discounts</td>
<td>Discounts are available for all railcard holders</td>
</tr>
<tr>
<td>Refunds</td>
<td>Full refund if wholly unused minus cancellation fee of GBP7.50 if processed online, or if processed at call centre.</td>
</tr>
<tr>
<td>Changes To Travel Plans</td>
<td>GBP10.00 admin charge plus upgrade to next appropriate walk up fare.</td>
</tr>
<tr>
<td>Conditions</td>
<td>Reservations are not essential but are recommended on certain services. Return journey must be made on same day.</td>
</tr>
<tr>
<td>Break Of Journey</td>
<td>Valid for break of journey on outward and return portion of ticket</td>
</tr>
<tr>
<td>Availability</td>
<td>Available on most off-peak journeys on any days.</td>
</tr>
<tr>
<td>Validity</td>
<td>Only valid for off peak travel on date shown on ticket. Not valid for travel on some Monday to Friday peak services, especially to/from London. Definition of peak period is dependent on route.</td>
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In Transmodelese: “Fare Limitation Parameter”
# Modes & Products

<table>
<thead>
<tr>
<th>Mode</th>
<th>Travelcard</th>
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</tbody>
</table>

- ✔️ = Valid.
- ✗ = Not valid.
- ✔️ = Heathrow Connect: Not valid between Hayes and Harlington and Heathrow Airport.
- ✔️ = River: PAYG only available on Thames Clipper; Travelcards only provide discount, not valid for travel.
- ✔️ = Cable car: Travelcards only provide discount, not valid for travel.
- ✗ = must include Zone 3, 4, 5 or 6
Access rights & Products
Fares for a Metropolis

- Multimodal,
- Complex market segmentation / concessions, conditions
- Multiproduct, including electronic payment
- Complex zones, duration of travel etc.