UK Fares and NeTEx Profile Workshop. Part 3  Complex

London  16th July 2019. Sheffield  18th July 2019

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
</tr>
</thead>
<tbody>
<tr>
<td>13:15 – 14:00</td>
<td>NeTEx Intro &amp; Basic fares profile</td>
</tr>
<tr>
<td>14:00 – 14:30</td>
<td>NeTEx routes and timetables – detailed</td>
</tr>
<tr>
<td>14:30</td>
<td>Break</td>
</tr>
<tr>
<td>14:40 – 15:30</td>
<td>Complex fares requirement &amp; Fare modelling</td>
</tr>
<tr>
<td>15:40 – 16:00</td>
<td>Questions and Next Steps</td>
</tr>
</tbody>
</table>
Part II
NeTEx Bus Fare
Advanced features
Some types of Complexity found of fares

- **Products supported by multiple operators**
  - Tariff structures covering large networks
    - E.g. Plusbus

- **Compound products / offers:**
  - Multiple products in one package
    - E.g. Oyster, Plusbus
  - Products that are available both as separate offers and as single purchase
    - E.g. Plusbus
  - Local variation in rules & participation?

- **More complex Products & Tariff structures**
  - E.g. Capped Pay as You Go (Oyster)

- **Complex rules for a fare product, notably**
  - Day types / Timebands / Fare demand types
    - E.g. Metro & rail peak/offpeak into London
    - Plusbus exceptions Night buses after 11.30
  - Exclusions / inclusions of services
    - E.g. all Metrobus in Crawley region except and line 4
  - Eligibility conditions

- **Combining rules specified at different levels**
  - E.g. Temporal Validity conditions on tariff, product, sales offer
### UK Fare profile: Basic vs Advanced Fare features.

<table>
<thead>
<tr>
<th>Aspect</th>
<th>Basic Fare profile</th>
<th>Advanced Fare profile</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tariff Structure</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spatial</td>
<td>• Point-to-Point, Zone-to-Zone</td>
<td>Composite tariffs</td>
</tr>
<tr>
<td></td>
<td>• Zonal</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Stage fare / unit section</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Flat</td>
<td></td>
</tr>
<tr>
<td>Tariff - Temporal</td>
<td>• Time intervals</td>
<td>+ Peak/ off-peak etc conditions</td>
</tr>
<tr>
<td>Products</td>
<td>• Trip,</td>
<td>+Sale Discounts, Capping</td>
</tr>
<tr>
<td></td>
<td>• Pass,</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Carnet</td>
<td></td>
</tr>
<tr>
<td>Product options</td>
<td>• User Types, Group Tickets</td>
<td>+Complex travel constraints</td>
</tr>
<tr>
<td></td>
<td>• Simple travel constraints</td>
<td>+Complex commercial conditions</td>
</tr>
<tr>
<td>Sales Offers</td>
<td>• Media, Distribution Channel</td>
<td></td>
</tr>
<tr>
<td>Scaling</td>
<td>• Line, Network, Operator(s)</td>
<td>+Complex Multi-operator, National, modular</td>
</tr>
<tr>
<td>Prices</td>
<td>• Absolute prices</td>
<td>+ Derived prices</td>
</tr>
</tbody>
</table>
Modelling Multi-Operator Fares
Interoperating fares – eg Plus Bus: Zonal add on for rail tickets

Zones around country
- Multiple participating Bus operators
- Exceptions in each zone
- Sold via rail sales channels
Plus Bus tariff - Crawley

A Crawley, Gatwick Airport, Horley or Three Bridges PlusBus ticket gives you unlimited bus travel on participating operators' services, around the whole urban area of Crawley, Gatwick, Horley, and Three Bridges, as shown by the travel maps (below).

Interchange stations: Crawley (Station Way), Gatwick Airport, Horley (Victoria Rd), Three Bridges (Haslett Ave).

**Day prices:**
- Adult: £3.70
- Child: £1.85
- Railcard holder: £2.45

**Season prices:**

<table>
<thead>
<tr>
<th></th>
<th>Adult</th>
<th>Price / Day</th>
</tr>
</thead>
<tbody>
<tr>
<td>7-days</td>
<td>£16.00</td>
<td>£2.29</td>
</tr>
<tr>
<td>Month</td>
<td>£52.00</td>
<td>£2.60</td>
</tr>
<tr>
<td>Quarter</td>
<td>£125.00</td>
<td>£2.68</td>
</tr>
<tr>
<td>Annual</td>
<td>£440.00</td>
<td>£1.83</td>
</tr>
</tbody>
</table>

*Child discount is half adult season ticket price.*

**Railcard discount restrictions for PlusBus day tickets:**
- Some Railcards have retail restrictions. See individual Railcard for details. Sorry, Railcards do not give a discount off any PlusBus day ticket purchase.

**NETWORK Railcard (Annual Gold Card):**
- 3% off the adult fare for South East of England, upon presentation of their valid Network Railcard (Annual Gold Card), as follows:
  - Mondays to Fridays after 10:00 hours;
  - Saturdays, Sundays, Bank Holidays any time;
- The £13 minimum fare restriction does not apply to PlusBus day ticket purchases.

**Two Together Railcard:**
- holder gets 1/3 off the adult price of PlusBus day tickets, upon presentation of their valid Two Together Railcard, as follows:
  - Mondays to Fridays after 09:30 hours;
  - Saturdays, Sundays, Bank Holidays any time;
- You must buy 2 tickets at the same time.

**16-25 Railcard, 26-30 Railcard & HM Forces Railcard:**
- holder gets 1/3 off the adult price of PlusBus day tickets, upon presentation of their valid 16-25 or 26-30 Railcard or HM Forces Railcard, as follows:
  - outdoors of the South East of England at all times;
  - in the South East after the Monday to Friday morning peak period* (excluding Bank Holidays) for a journey wholly within the South East region.
- * times of off-peak services vary by route, but generally related to the availability of Off-Peak tickets.

**Senior Railcard:**
- holder gets 1/3 off the adult price of PlusBus day tickets, upon presentation of their valid Senior Railcard, as follows:
  - outdoors of the South East of England at all times;
  - in the South East after the Monday to Friday morning peak period* (excluding Bank Holidays) for a journey wholly within the South East region.
- * times of off-peak services vary by route, but generally related to the availability of Off-Peak tickets.

**Disabled Persons Railcard:**
- holder gets 1/3 off the adult price of PlusBus day tickets, upon presentation of their valid Disabled Persons Railcard, at all times, when purchased with the following rail ticket types:
  - Off-Peak Day Singles, Off-Peak Day Returns;
  - Anytime Singles, Anytime Returns;
  - Advance fares.
- Disabled Persons discounts are valid during the morning peak hours.

**Family&Friends Railcard:**
- holder gets one third off the adult PlusBus day ticket price upon presentation of their valid Family&Friends Railcard:
  - outdoors of the South East of England at all times;
  - in the South East after the Monday to Friday morning peak period* (excluding Bank Holidays) for a journey wholly within the South East region.
- * times of off-peak services vary by route, but generally related to the availability of Off-Peak tickets.

- Children MUST be charged the normal child PlusBus day ticket price (which is half the adult fare).
PLUS BUS – National bus fare trip supplements

- Available as
  - Zonal day pass origin and destination stations
  - Zonal Season pass origin and destination stations

- Coverage
  - City wide Tariff zones around stations,
  - Named operators & Lines
  - Local exceptions

- Sales Packages / Distribution / Media
  - Add-on purchased with rail ticket /season pass
  - Bought separately to rail ticket or season pass
  - As paper ticket, on smartcard some areas

- Further discounts
  - Rail cards for different User types
  - Peak/Off-peak restrictions apply to railcard discounts

- Product Owner: JSP: Branding?
Modularise; references may be internal or external

NeTEx XML documents
How to partition a Multi-operator product

- Plusbus Prices
- Plusbus Product definitions
- National Rail Travel Products
- National Rail Railcard Products
- Operator specific Lines & exceptions
- Common Plus Bus definitions
- National Stop & Plusbus Zone definitions (NPTG & NAPTAN)
Routes for which multiple Tariffs are applicable?
Metrobus 1 - Other Tariffs

Bewbush West - Crawley - Broadfield/Pease Pottage

**Adult Single Fares**

- Bewbush West (loop)
- 160 Bewbush Neighbourhood Centre
- 240 160 Gossops Green Shops
- 240 240 160 West Green Crawley Hospital/Apple Tree
- 240 240 240 240 160 Crawley Town Centre
- 240 240 240 240 240 240 160 Southgate Avenue North
- 240 240 240 240 240 240 240 160 Southgate Wensleydale
- 240 240 240 240 240 240 240 160 Broadfield (all stops)
- 240 240 240 240 240 240 240 240 160 Pease Pottage Black Swan

Fares are shown in pence. Eg. 170 = £1.70

**Return Fares**

Not available on this service.

**Child Fares**

Child Fares are available on this route at half the adult fare on single journeys.

Crawley Area MetroRider
MetroVoyager
Discovery Ticket
Gatwick Travelcard
Accepted throughout.

**PlusBus**

Crawley, Three Bridges, Gatwick Airport, Ifield and Horley PlusBus tickets are valid throughout. Please see www.plusbus.info for further information.

**Concessionary Passes**

Concessionary passes are valid throughout from 0930-2300 Mon-Fri, and anytime at weekends and public holidays.

© Metrobus 2018

[https://www.metrobus.co.uk/route-information/1](https://www.metrobus.co.uk/route-information/1)
Metrobus 1 - Other Tariffs

Metrobus Products
- Metrorider / Metrovoyager,
- Gatwick Employee Pass

FARE PRODUCTS (Other day & Period passes)

Plusbus:
- National, Local zones,
- Multi-operator
- Bundled with Rail Ticket

Discovery Pass
- Offpeak Day Pass,
- Multi-operator
- Bundled with Rail Ticket

Concessionary Pass scheme
- Regional, Local zones,
- Time restrictions,
- Multi-operator

NCS
Multiple Tariffs applicable.

Discovery Ticket, a one day travel ticket, allowing you to travel unlimited in West Sussex, East Sussex, Surrey, Brighton & Hove, East Hampshire, Kent and Medway on the following operated services.

© Metrobus 2018
Each tariff describes itself; it is the trip planner/ fare engine’s task to find the applicable, best value fares for given trip.
### Visualisation of Multiple Tariffs: Dresden - Wroclaw

<table>
<thead>
<tr>
<th>Tariff</th>
<th>Dresden Hbf</th>
<th>Annabrg</th>
<th>Großenhain</th>
<th>Bischfowitz</th>
<th>Bautzen</th>
<th>Göritz</th>
<th>Wroclaw</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Trilex Tageskarte</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ab 21 €</td>
<td>✔</td>
<td>✔</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dresden-Wroclaw-Spezial</td>
<td></td>
<td></td>
<td>✔</td>
<td>✔</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ab 35 €</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Katzensprungticket</td>
<td></td>
<td></td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td></td>
</tr>
<tr>
<td>15 €</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Katzensprungticket</td>
<td></td>
<td></td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>10 €</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>VVO-Tarif</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>VVO-Tarif</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>VVO-ZVON-Übergangstarif</td>
<td></td>
<td></td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Sachsen-Ticket</td>
<td></td>
<td></td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Bahn-Tarif</td>
<td></td>
<td></td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
</tbody>
</table>

**Trilex Tageskarte** tariff: is an off-peak flat rate **day pass** available for journeys crossing the region, and also to go to Liberec (CR). Group discounts are available.

**Dresden-Wroclaw-Spezial** is a special discounted **period return trip** fare valid on a cross-border route between Dresden (DE) and Wroclaw (PL). Group discounts are available.

**Katzensprung** tariff is an off-peak tariff offering **day passes** at two different rates for different sections; only within Saxony, only for the specified routes.

**VVO** (Verkehrsverbund Oberelbe), and **ZVON** (Zweckverband Verkehrsverbund Oberlausitz-Niederschlesien) tariffs are regional P2P tariffs only available on certain parts of the network. Regional expresses (E.g. RE 20, RB61) cost more than regular trains.

**Saxony** tariff is a regional off-peak day pass offered by Deutsch Bahn and usable as far as the border. Group discounts are available.

**Bahn tariffs** are standard P2P rail tariffs charged by national rail operators such as Deutsche Bahn and Polish Railways; available for all sections of the journey.

Modelling Sales Discount Rights
Additional Product Types - terminology

- **Discount Right**
  The product gives the right to purchase other fare products for travel at a discount, but is not itself a ticket. (e.g. Rail card, Oyster card).

- **Capped Discount Right**
  If there are multiple purchases, the purchase price is capped within a given time period (e.g. Oyster Card).

- **Usage Discount**
  The product gives a discount or rebate based on access rights consumed within a given period. Requires an account.

- **Amount Of Price Unit**
  The product holds an amount of stored value which can be used to purchase. May be linked to an account.
Rail Cards

1/3 off rail fares. with our range of Railcards.

https://www.railcard.co.uk/about-railcards/
UK Rail card products

- Single FARE PRODUCT
- Multiple SALES OFFER PACKAGES
  - Different USER PROFILEs
- Shared properties defined by GROUP OF SALES OFFER PACKAGES

Flat rate

NetEx UK Fare Profile - Complex Fares

Moving Britain Ahead
Modelling Pay As You Go Capping
Pay as you go products – Technology options for charging

1. **Simple pre-payment** (E.g. Metrobus the Key)
   - Made at start of each trip from stored value on card
   - Card debited immediately

2. **Pre-payment, post payment adjustment for usage**
   - Made at start of each trip from stored value on card, adjusted at check out or afterwards to reflect actual trip made
   - Card linked to account – deferred adjustment to card balance on next trip.

3. **Pre-payment, post payment adjustment for usage, Capped** (E.g. Oyster Card)
   - Made at start of each trip from stored value on card, adjusted afterwards to reflect actual trip made
   - Can be capped to a predefined amount within a given period, account linked.

4. **Post-payment at end of period** (E.g. Oyster Contactless)
   - Made at end of period, Card linked to account – deferred payment
   - Can be capped or discounted to a predefined amount within a given period
Moving Britain Ahead

Products – Prepaid CHARGING MOMENT

- **CHARGING MOMENT**
  - When is payment made?

**PURCHASE WINDOW**
- Can purchase within window: before (or maybe even during) travel

**EXCHANGING**
- Allowed window

**REPLACING**
- If lost etc
  - Allowed window

**REFUNDING**
- Allowed window

- **End Use**
- **Space**
  - Destination
  - Origin

- **Time**

**buy ticket**
- **Start Use**
Pay as you go Trips

Each trip is prepaid at set price

CHARGING MOMENT

PURCHASE WINDOW
Buy Smartcard before

VALIDITY PERIOD
Card expiry date

NeTEx UK Fare Profile - Complex Fares
Pay as you go - Trips - Capped

Each trip is prepaid at a set price up a limit within a time Interval, there may be further charging moments to just at end of period.
Pay as you go Trip – Contactless Capped

All trips are post paid at end of interval, capped if set price is reached

CAPPING RULE
TIME INTERVAL

CHARGING MOMENT

VALIDITY PERIOD
Of card

Space

Destination

Origin

Time

BANK TRANSFER

Stop

Stop

Stop

NeTEx UK Fare Profile - Complex Fares
Fares example - Tfl Oyster
Fares example - TfL Oyster

**FARE ZONES**
1-6, A, B, C, D

**FARE PRODUCTS**
Trip, Period Pass

**SALES PACKAGES**
Cash, Oyster, Travelcard

**USER PROFILES**
Adult, student, 11-15 etc

**GROUP TICKETS**

**FARE PRICES**

**GROUPS**

**TIME INTERVALS**

**DISCOUNT RIGHTS**
Railcard

**MODES**
Metro, Bus, Tram, River

**FARE DEMAND FACTOR**

© TfL 2016-18
Zone Doughnut - TfL Zones

- TOPOGRAPHICAL PLACEs
- FARE ZONEs 1-6, A, B, C, D
- SCHEDULED STOP POINTs
- LINES
**NeTEx UK Fare Profile - Complex Fares**

**Classic Tfl Products**

- **FARE DEMAND FACTOR**
  - Peak, off-peak

- **TARIFFS**
  - Different tariff structures for different modes

- **TIME INTERVALS**
  - 1 7 31

- **PRE-ASSIGNED FARE PRODUCT**
  - Ticket
  - Travel Card (Day / Period Pass)

- **PRE-ASSIGNED FARE PRODUCT**
  - Group Day Travel card

- **PREASSIGNED FARE PRODUCT**
  - Multitrip Boarding Pass Carnet for Cable CAR

- **PRE-ASSIGNED FARE PRODUCT**
  - 24H Cycle Pass

**NeTEx UK Fare Profile - Complex Fares**
What’s in an Oyster?

TIME INTERVALS
Day, Week, Season rtv

FARE DEMAND
Peak, Offpeak

PRE-ASSIGNED FARE PRODUCT
AMOUNT OF PRICE UNIT
CAPPED SALE DISCOUNT RIGHT
SALE DISCOUNT RIGHT
USAGE DISCOUNT RIGHT

CUSTOMER ACCOUNT

CAPPED DISCOUNT RIGHT
SALE DISCOUNT RIGHT
USAGE DISCOUNT RIGHT

Oyster Pay As You Go

Oyster Contactless

TARIFFs

5+ reward

Peak, Offpeak

Peak, Offpeak

Peak, Offpeak
Account Based Ticketing

- **Account Based Ticketing** – The product may be linked with an online account. E.g. Pay as you go, or Usage based discounts, Subscription with automatic payment or renewal
  - **Customer Account.** The fare product is linked to a Customer account. The customer’s identity is known to the operator.
  - **Anonymous Customer Account.** The product is linked to a Customer but the Customer is not necessarily known to the Operator (e.g. by means of a anonymous token, or card only product)
- **Auto top up** – balance increases if falls below a threshold
- **Subscription** – product automatically renewed
- **Pay by Installment** – Annual subscription paid monthly
Sales Offer Packages & Accounts

Third Party Entitlement

Customer Account

Photo Card

Account-linked Card

Anonymous Card

16-25 Railcard

Oyster

Child - Zip

Youth - Zip

Student

Senior

Veteran

NeTEx UK Fare Profile - Complex Fares
# Complex UK Bus Fare Products

**Discount cards, etc**

<table>
<thead>
<tr>
<th>fare_product</th>
<th>peak/off peak</th>
<th>(can) or must be account based</th>
<th>notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>sales discount sales discount right</td>
<td>✓</td>
<td>✓</td>
<td>e.g. like a railcard</td>
</tr>
<tr>
<td>capped sales discount right</td>
<td>✓</td>
<td>✓</td>
<td>payg e.g. oyster</td>
</tr>
<tr>
<td>usage discount usage discount right</td>
<td>✓</td>
<td>✓</td>
<td>rebate for use, e.g. mileage</td>
</tr>
<tr>
<td>stored value amount of price unit</td>
<td>-</td>
<td>✓</td>
<td>stored value</td>
</tr>
<tr>
<td>entitling product third party product</td>
<td>-</td>
<td>-</td>
<td>e.g. military pass</td>
</tr>
</tbody>
</table>
Specifying Complex Conditions

Parameter Assignments
Using Parameters #1

- Generic Assignment:
  - List of parameters. Can be Ored or ANDed
    - Eg 1st Class | Second Class
    - E.g. 1st Class & Private Compartment | 2nd Class & Couchette Berth

- Can be used to build complex conditions:
  - Eg Travel times for zones.
    - Zone 1 allows 30 minutes, Zone 2 allows 60 Minutes
  - E.G. Exclusions to services
    - Plusbus zone: Night Buses after 22.40, Line 23 Excluded
  - E.G. Timebands into London etc
    - Arriving into Liverpool street between 8:00 and 9:30 am
  - E.g. Fare Demand restrictions
    - Students and Seniors can only get half price off peak
Instances for a typical Fare Product & Sales Offer

- VALIDABLE ELEMENT describes access rights as a set of FARE STRUCTURE ELEMENTs which may be consumed.
- May have complex assignment conditions

NeTEx UK Fare Profile - Complex Fares
Validity Parameters

Most Network elements, Temporal elements and product components can be used as validity parameters

AND /OR

NESTING
Assignments can be ANDed and ORed together and nested to build complex conditions.
Instances for a typical Fare Product & Sales Offer

- **TARIFF**
- **FARE STRUCTURE ELEMENTs**
- **VALIDABLE ELEMENTs (product)**
- **FARE PRODUCTS**
- **SALES OFFER PACKAGE ELEMENTs**
- **SALES OFFER PACKAGE**
- **Scoping & Temporal Parameters**

- **DISTANCE MATRIX ELEMENTs**
- **PARAMETER ASSIGNMENTs (fare structure)**
- **PARAMETER ASSIGNMENTs (validable element)**
- **PARAMETER ASSIGNMENTs (product)**
- **PARAMETER ASSIGNMENTs (sales offer element)**
- **PARAMETER ASSIGNMENTs (sales offer)**

- **TIME INTERVALs**
- **TARIFF ZONEs**
- **OPERATORS**
- **USER PROFILEs**
- **DAY TYPEs**
- **MODEs**
- **Etcetera**

---

42 NeTEx UK Fare Profile - Complex Fares
Complex time restrictions – Directional Peak/ Off-peak/ Superoff-peak-

### FARE DEMAND FACTORs

(Anytime / Off peak/ Super Off-peak),

<table>
<thead>
<tr>
<th>DAY TYPE</th>
<th>TIMEs AT STOP</th>
<th>GENERIC PARAMETER ASSIGNMENTs (Exceptions)</th>
<th>SERVICE JOURNEys</th>
</tr>
</thead>
</table>

| SCHEDULED STOP POINTs |

**When are Off-Peak and Super Off-Peak tickets valid?**

Off-peak, Off-Peak Day and Super Off-Peak Day tickets (including First Class versions and Day/Family Travelcards) to and from London* are valid at the following times:

<table>
<thead>
<tr>
<th>Times</th>
<th>Arriving into London*</th>
<th>Departing from London*</th>
<th>Exceptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Morning</td>
<td>Off-Peak and Off-Peak Day: Not to arrive Liverpool St before 10:00</td>
<td>Off-Peak and Off-Peak Day: Not to leave Liverpool St between 06:00 and 10:00 (Stratford 06:00, Seven Sisters and Tottenham Hale 06:40)</td>
<td>Off-Peak and Off-Peak Day: Not to arrive Liverpool St before 10:00 (Stratford 11:52)</td>
</tr>
<tr>
<td>Morning (Monday - Friday)</td>
<td>Super Off-Peak Day: Not to arrive Liverpool St before 12:00</td>
<td>Super Off-Peak Day: Not to arrive Liverpool St before 12:00</td>
<td>Super Off-Peak Day: Not to arrive Liverpool St before 12:00</td>
</tr>
<tr>
<td>Super Off-Peak Day: Not to arrive Liverpool St before 12:00 (Stratford 12:07)</td>
<td>Super Off-Peak Day: Not to arrive Liverpool St before 12:00 (Stratford 12:07)</td>
<td>Super Off-Peak Day: Not to arrive Liverpool St before 12:00 (Stratford 12:07)</td>
<td>Super Off-Peak Day: Not to arrive Liverpool St before 12:00 (Stratford 12:07)</td>
</tr>
</tbody>
</table>

**SERVICE JOURNEYS**

- *Please note that “London” includes Liverpool Street, Stratford, Seven Sisters, Tottenham Hale and intermediate stations such as Hackney Downs. Unless specified, restrictions from stations other than Liverpool Street are determined by when the service arrives at or departs from Liverpool Street (or Stratford where trains start and finish there).

- Tickets which do not involve travel to, from or via central London are generally restricted in the morning period only. Typically, Off-Peak and Off-Peak Day tickets are valid after 08:45 or 09:00 outside Greater London, and after 09:30 for journeys outwards from the London suburbs, and Super Off-Peak Day tickets are valid after 12:00. Please enquire as to the restrictions applying to the journey you wish to make.

**SCHEDULED STOP POINTs**

- Off-Peak and Super Off-Peak tickets for long-distance journeys via London have various restrictions depending on the journey being made. The time restrictions in this table may not apply, especially for tickets from south of Manningtree/Harwich and Ely/Cambridge to destinations outside the London and South-East area. Please check our online booking engine or ask ticket office staff.

- If you’re unsure about the time restrictions that apply to your journey, it’s always recommended to check with the ticket office or the Greater Anglia Contact Centre on 0345 600 7245.
Graphic for directional time restrictions (East Midlands)
- **Anytime Single** – Fully flexible
- **Off Peak Single** – Semi-flexible. Also Super-Off peak for some operators.
- **Advance Single** – Semi flexible, no refund, quota restricted
**Standard UK Rail Return Trip Products**

- **Anytime Return** – Fully flexible
- **Off Peak Return** – semi-flexible (No advance returns)

### FARE PRODUCTS

<table>
<thead>
<tr>
<th>FARE PRODUCT</th>
<th>USAGE VALIDITY PERIOD</th>
<th>PURCHASE WINDOW</th>
<th>REFUNDING</th>
<th>EXCHANGING</th>
<th>INTERCHANGING</th>
<th>DISCOUNTING RULES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anytime Return</td>
<td>5 days outward, 1 month return</td>
<td>Up to start of travel</td>
<td>Yes - normal railcard and child discounts available</td>
<td>Yes - normal railcard and child discounts available</td>
<td>Yes - normal railcard and child discounts available</td>
<td>Child, and as for Railcard</td>
</tr>
<tr>
<td>Off Peak Return</td>
<td>5 days outward, 1 month return</td>
<td>Up to start of travel</td>
<td>Yes - normal railcard and child discounts available</td>
<td>Yes - normal railcard and child discounts available</td>
<td>Yes - normal railcard and child discounts available</td>
<td>Child, and as for Railcard</td>
</tr>
</tbody>
</table>
Summary
What is NeTEx?

- A CEN standard format for the exchange of PT data for Passenger Information
  - Networks, Timetables, Fares
- Based on CEN Transmodel conceptual model for PT data (NeTEx is a subset)
  - Concepts evolved over 20 years from real PT systems across Europe. (Now on Version 6.0)
  - Now mandated for widespread EU use
- Uses a modular XML schema
  - Model driven design from conceptual model in UML
  - Free to use under a GPL License
Benefits of Transmodel / NeTEx Approach to Fares

- **Powerful Component based representation**
  - Allows many different tariff combinations to be described with the same set of atomic components
  - Allows complex conditions to be expressed
  - Allows necessary packaging of products into different offers
  - Gives highly reusable implementations

- **Joined up conceptual model - Reuses existing Network & Timetable elements**
  - Network (Stops, tariff zones, modes, operators, etc)
  - Timetable elements, services etc
  - Temporal conditions and day types, validities

- **Robust, Flexible, Extensible Technology**
  - XML allows selective use, validation integrity checking etc
  - UML provides tool supported system documentation
  - Conceptual model for Account Based Ticketing and future developments
Some Drawbacks to a Component based Approach

- **Skills Investment needed to understand Concepts & Components**
  - Tariff structures, Access rights
  - Uses of different parameters
  - Product and Sales Offer packaging

- **Component based semantics require attention to assembly and compounding behaviour**
  - Restrict to simple combinations, single organisations
  - Exchange of data does not guarantee exchange of behaviour!