UK Fares and NeTEx Profile – Suppliers Workshop

CPT London  29 August 2019

Describing Fares with NeTEx
Describing Fares with NeTEx

- Pricing
- Network Basis
- Tariff Structure
- Access Rights
- Fare Products
- Sales Offer Packages
- Travel Specifications & Sales
- Common Framework
Describing Fares with NeTEx

Pricing

Access Rights

Fare Products

Travel Specifications & Sales

Sales Offer Packages

Tariff Structure

Network Basis

Common Framework
Component Based Fares

NeTEx UK Profile - Bus Fares with NeTEx

Moving Britain Ahead
Bewbush West - Crawley - Broadfield/Pease Pottage

Adult Single Fares

<table>
<thead>
<tr>
<th>Bewbush West (loop)</th>
<th>160 Bewbush Neighbourhood Centre</th>
</tr>
</thead>
<tbody>
<tr>
<td>240 160 Gossops Green Shops</td>
<td></td>
</tr>
<tr>
<td>240 240 160 West Green Crawley Hospital/Apple Tree</td>
<td></td>
</tr>
<tr>
<td>240 240 240 160 Crawley Town Centre</td>
<td></td>
</tr>
<tr>
<td>240 240 240 240 160 Southgate Avenue North</td>
<td></td>
</tr>
<tr>
<td>240 240 240 240 240 160 Southgate Wensleydale</td>
<td></td>
</tr>
<tr>
<td>240 240 240 240 160 Broadfield (all stops)</td>
<td></td>
</tr>
<tr>
<td>240 240 240 240 160 Pease Pottage Black Swan</td>
<td></td>
</tr>
</tbody>
</table>

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

To calculate your fare, find your location, and your destination, where the row and the column cross is your fare.

Return Fares
Not available on this service.

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

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https://www.metrobus.co.uk/route-information/1
Zonal Pass with choice of durations –

**FARE ZONE**

**TIME INTERVALS**

**FARE PRICE**

---

**Crawley Metrorider**

Unlimited travel in the Crawley Metrorider area.

- Adult: £4.90 (1 day), £20 (1 week), £4 (Evening)
- Child: £2.70 (1 day)
- Student: £6.30 (1 day)
- Family: £9

---

**Bought on bus with cash**

- 1 day: £4.90
- 1 week: £20
- Evening: £4

---

**Store on your mobile phone as m-tickets**

- 1 day: £4.20
- 1 week: £20
- Evening: £4.70

- 2 day: £7.90
- 3 day: £13.50
- 1 week: £59
- Evening: £7.90

- 4 day: £7.90
- 1 week: £59
- Evening: £7.90

---

**Loaded onto our smartcard the key**

- 1 day: £4.20
- 1 week: £20
- Annual: £7.90

- 2 day: £7.90
- 1 week: £59
- Annual: £7.90

- 3 day: £13.50
- 1 week: £59
- Annual: £7.90

---

**FARE ZONE**

- Redhill & Reigate Metrorider
- Unlimited travel in the pink zone

- Crawley Metrorider
- Unlimited travel in the blue zone

- Horsham Metrorider
- Unlimited travel in the green zone

---

**Moving Britain Ahead**
Stage /Section Count Fares

➢ Does not matter which section, just the number of sections.

How is your single fare calculated?

Distance-based fares for the West of England

In the West of England (excluding Bath Inner and Weston-super-Mare Town Zones – see pages 6 and 14) your single fare is worked out based on the route distance you are travelling.

Distances are calculated using fare stage sections rather than individual bus stops, with each section being approximately one mile long.

If you travel in 1-3 mile long sections it will be £1.50, 4-6 mile long sections will be £2.50 and so on.

Here is an example of one route and some of the fares along it:

Emersons Green, Sainsbury’s to Long Close would be £1.50 as you are travelling in three sections (numbers 1, 2 and 3, Long Close is classed as section 3 in this example as it’s where you are getting off the bus).

Long Close to Narroways Road would be £2.50 as you are travelling in four sections (4, 5, 6, 7, Long Close is counted as section 4 in this example as it’s your boarding point).

Blackberry Hospital to Downend, The Leap would be £2.50 as you are travelling in four sections (5, 4, 3, 2).
NETWORK ELEMENTS FOR TARIFFS

- Stops,
- Zones,
- Service Journeys
Network elements for tariff and product definition

- Fare structures build on Stops, Tariff Zones, and other Network & Timetable elements
  - Equivalent to those used in NaPTAN, TransXChange
- Mostly the same elements as defined in UK Basic Timetable Profile
  - MODEs, OPERATORs, LINEs, etc
  - SCHEDULED STOP POINT vs STOP PLACE.
  - Fare definitions can reference /or include them
- Some elements extended for fares:
  - TARIFF ZONE $\rightarrow$ FARE ZONE
    - Adds additional attributes
  - POINT IN PATTERN $\rightarrow$ FARE POINT IN JOURNEY PATTERN
    - Used to define Fare Stages for a route
Stop model

- **Geographical Context**
  - TOPOGRAPHIC PLACE
    - (NPTG Locality),
  - Physical Stop
    - STOP PLACE
      - (NaPTAN Stop)
  - Timetable Stop
    - SCHEDULED STOP POINTs
      - (TXC reference to a NaPTAN STOP)
    - STOP ASSIGNMENT
Nested Fare Zones - Metrorider &

- Sets of individual zones can be assigned as fare structure elements
- Zones can relate to stops
- Zones can be nested.
Network elements for tariff and product definition

- Tariffs & Fare Products may apply to individual instances or combinations of:
  - MODEs
  - OPERATORs
  - LINEs
  - +GROUPS OF LINEs
  - +NETWORKs,
- Tariffs structures may be based on:
  - STOP POINTs
  - +FARE ZONES (Tariff Zones)
  - +FARE SECTIONS
    - (FARE POINTs IN JP)
The model specifies which stops are in which tariff zone: a stop may be in more than one zone, zones maybe specific to an operator or shared.

Both stops and zones have a spatial projection. However spatial containment of a stop within a zone’s extent does not invariably imply semantic membership of the zone. In many cases the coordinates can be used to compute which stops are in a given tariff zone so as to populate the membership links.

A Tariff zone may also have presentation properties such as colour.

Tariff zones can also be related to Topographic places in a Gazeteer (ie NPTG localities)
Journey Elements for tariff definition

- Tariffs may apply to specific journeys or to journey classifications: Mostly only relevant for Coach or Rail
  - SERVICE JOURNEY
  - GROUPs OF SERVICES
  - TYPEs OF SERVICE
  - TYPEs OF PRODUCT CATEGORY

- Tariffs may apply to facilities & specific accommodation
  - CLASS OF USE
  - ACCOMODATION
Representing Tariff Structures in NeTEx

- Point-to-Point
- Zone
- Section Count
- Flat
# Basic UK Bus fare tariff types?

## Type of Product

<table>
<thead>
<tr>
<th>Access rights</th>
<th>Tariff Structure</th>
<th>Temporal Conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>TRIP</strong> (“single ride”)</td>
<td><strong>PREASSIGNED FARE PRODUCT</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Type of Product</strong></td>
<td><strong>Flat</strong></td>
<td><strong>Point to point</strong></td>
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<tr>
<td>Short hop</td>
<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td>Single trip</td>
<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td>Time-limited (“Hopper”)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Period Return</td>
<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td>Day return</td>
<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td><strong>PASS</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Day pass</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Termtime</td>
<td>-</td>
<td>?</td>
</tr>
<tr>
<td>Season pass</td>
<td>✔️</td>
<td>✔️</td>
</tr>
</tbody>
</table>
Tariff Structures

- Tariffs may depend on
  - Spatial factors E.g.
    - GEOGRAPHICAL INTERVAL
    - DISTANCE MATRIX ELEMENT
  - Temporal factors E.g.
    - TIME INTERVAL
  - Other quantitative factors eg
    - QUALITY STRUCTURE FACTOR
  - Other arbitrary factors eg
    - USER PROFILE
    - CLASS OF USE
Tariffs - Spatial aspects: Terminology

- **Flat** – There is only one price for the fare or product regardless of distance.

- **Point-to-point, Zone-to-Zone.** The fare gives the right to travel between two named stops. A discrete fare price can be given for each origin/destination pair.
  - Usually the fare prices increase progressively with increasing distance travelled, but the increase is not necessarily a strict linear function (further may be cheaper, and individual O/D prices may be adjusted arbitrarily to optimize yields, traffic, competitive advantage, etc).
  - Both Zone/Stage count and distance fares can be expressed as Z2Z/P2P.

- **Named Zone(s):** The fare gives the right to travel in and between one or more identified zones. A fare price can be given for any allowed combination of zones.
  - If the zones are disjoint, then this is in effect “Zone to Zone” If the zones overlap or are nested then the topology is more complex, but still Z2Z.

- **Stage/Section count.** The fare gives the right to travel a certain number of sections or “stages” regardless of which specific sections they are. There is a price per zone used. The resulting fare prices are inherently progressive.
Point to Point & Zone to Zone Tariff Structures
DISTANCE MATRIX ELEMENT - Notes

- DISTANCE MATRIX ELEMENT specifies in effect a table of Origin/Destination (O/D) pairs
  - DISTANCE MATRIX ELEMENT can be P2P (SCHEDULED STOP POINT) or Z2Z (TARIFF ZONE / FARE ZONE). Is P2Z also found?
  - The same DISTANCE MATRIX ELEMENT can be reused for many different products & fare combinations (adult, child, etc).
- A TARIFF is a set of DISTANCE MATRIX ELEMENTs

- FARE PRICES can be associated with each DISTANCE MATRIX ELEMENT or further combinations of it with other factors
- Advanced Comments
  - We can have reusable GROUPS OF DISTANCE MATRIX ELEMENTs
  - We can have multiple routings (SERIES CONSTRAINTs) for the same element.
Zonal Tariff Structures

- FARE ZONE
- FARE STRUCTURE ELEMENT

Tariff Structure
Zone topologies – Disjoint, nested, overlapping, doughnut etc…
Nested Fare Zones - Metrorider &

- Sets of individual zones can be assigned as fare structure elements
- Zones can relate to stops
- Zones can be nested.

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UK Bus Fare NeTEx Profile
Named Zones - e.g. Plusbus

FARE ZONEs

TOPOGRAPHIC PLACEs
Named Zones
Named FARE ZONEs - Notes

- SCHEDULED STOP POINTs assigned to one or more FARE ZONEs
  - A FARE ZONE specialises TARIFF ZONE with additional properties.
  - Use of FARE ZONEs may be disjoint, overlapping, nested, honeycomb etc..
- FARE ZONEs are assigned to one or more FARE STRUCTURE ELEMENTs
  - Each GENERIC PARAMETER ASSIGNMENT on one or more zones
- A TARIFF is a set of FARE STRUCTURE ELEMENTs

- Prices can be assigned for use of a ZONE
  - Using a DISTANCE MATRIX ELEMENT from/to same zone, with a DISTANCE MATRIX ELEMENT PRICE
  - Using a FARE STRUCTURE ELEMENT PRICE if single ZONE or same price for set of zones.
Named Zones in fare structure
-XML Code Snippet

```
<Network version="01" id="jsp:PlusBus@Zones">
  <Name>Plusbus Network</Name>
  <OperatorRef version="1.0" ref="jsp:JSP"/>
  <tariffZones>
    <TariffZoneRef version="01" ref="nptg:PlusBus_zone:CRAWLEY"/>
    <TariffZoneRef version="01" ref="nptg:PlusBus_zone:IPSWICH"/>
    ....... Etc rest of zones
  </tariffZones>
</Network>
```

```
<FareStructureElement version="01" id="jsp:Pass@PlusBus@1zone">
  <Name>Plusbus single zone</Name>
  <validityParameterAssignments>
    <GenericParameterAssignment version="01" id="jsp:Pass@PlusBus@1zone" order="1">
      <TypeOfAccessRightAssignmentRef ref="jsp:can_access" version="any"/>
      <ValidityParameterGroupingType>OR</ValidityParameterGroupingType>
      <validityParameters>
        <NetworkRef ref="nptg:PlusBus_zones"/>
      </validityParameters>
    </GenericParameterAssignment>
  </validityParameterAssignments>
</FareStructureElement>
```

- Fare Structure lists all zones
- User specifies which ones on purchase
Stage (Section)
Tariff Structures

- GEOGRAPHICAL INTERVAL
- FARE STRUCTURE ELEMENT

Tariff Structure
### Stage Fares

**GEOGRAPHIC UNIT**
1-Section

<table>
<thead>
<tr>
<th>GEOGRAPHIC INTERVALS</th>
</tr>
</thead>
<tbody>
<tr>
<td>01-03</td>
</tr>
<tr>
<td>04-06</td>
</tr>
<tr>
<td>07-09</td>
</tr>
<tr>
<td>10+</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>FARE PRICES</th>
</tr>
</thead>
<tbody>
<tr>
<td>01-03</td>
</tr>
<tr>
<td>04-06</td>
</tr>
<tr>
<td>07-09</td>
</tr>
<tr>
<td>10+</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>FARE SECTIONs</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>FAKE PRICEs</th>
</tr>
</thead>
<tbody>
<tr>
<td>01-03</td>
</tr>
<tr>
<td>04-06</td>
</tr>
<tr>
<td>07-09</td>
</tr>
<tr>
<td>10+</td>
</tr>
</tbody>
</table>

---

**SCHEDULED STOP POINTS**

- 1
- 2
- 3

---

**How is your single fare calculated?**

**Distance-based fares for the West of England**

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Long Close to Narroways Road would be £2.50 as you are travelling in four sections (4, 5, 6, 7. Long Close is counted as section 4 in this example as it’s your boarding point).

Blackberry Hospital to Downend, The Leap would be £2.50 as you are travelling in four sections (5, 4, 3, 2).
Dynamic zone counting: Trip planner uses JOURNEY PATTERN to determine number of FARE SECTIONs traversed between origin and destination POINT IN PATTERN.
Modelling Stage Fare Unit prices

GEOGRAPHIC UNIT
= a Section

<table>
<thead>
<tr>
<th>id</th>
<th>Start</th>
<th>End</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>001</td>
<td>01</td>
<td>03</td>
<td>£1.50</td>
</tr>
<tr>
<td>002</td>
<td>04</td>
<td>06</td>
<td>£2.50</td>
</tr>
<tr>
<td>003</td>
<td>07</td>
<td>09</td>
<td>£4.50</td>
</tr>
<tr>
<td>004</td>
<td>10</td>
<td></td>
<td>£5.50</td>
</tr>
</tbody>
</table>

- Price may be uniform for every section (GEOGRAPHICAL UNIT PRICE), or progressive for ranges of sections (GEOGRAPHICAL INTERVAL PRICE).
Flat Tariff Structures

- Tariff Structure
- FARE STRUCTURE ELEMENT
Flat – Only one tariff price regardless of distance, time, etc

- **Flat** = Non-progressive fare structure (spatially or temporally)
  - E.g. Single product, railcard, bicycle ticket etc
  - E.g. Shuttle bus with only two stops
  - E.g. Tfl Bus fare
- A “flat” fare may still may have other price dimensions
  - E.g. separate adult & child fare prices
Flat Rate tariff Example

- Railcard priced by user type.

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

| 16-25 Railcard | Family & Friends Railcard |
| Two Together Railcard | Senior Railcard |
| Network Railcard | Disabled Persons Railcard |
| 26-30 Railcard Trial | |

USER PROFILEs
Representing Temporal Access rights in NeTEx

- Durations
- Validity Periods
- Fare Demand Periods
We can visualise trips as lines in space time, made within the boundaries of a product validity.

- E.g. two separate tickets, outbound, return
We can visualise trips as lines in space time, made within the boundaries of a product validity

- E.g. A Return fare
1. Time intervals (Product durations for passes)

- TIME INTERVAL
- TIME UNIT
Visualising Time – Passes

- We can visualise passes as bands in space time within which frequent or unlimited trips can be made.
# Season Pass with choice of durations – TIME INTERVALS

## TIME INTERVALS

### FARE ZONE

### FARE PRICES

### SALES PACKAGES

### TYPE OF TRAVEL DOCUMENTS

---

### Crawley Metrorider

Unlimited travel in the Crawley Metrorider area.

- **All day travel (for up to 5 people)**
  - Minimum of 1 adult & maximum of 2 adults travelling at any one time.
  - Available from 13:00 and valid until 03:19 the following day.
- **For 2 adults, travelling together:**

<table>
<thead>
<tr>
<th></th>
<th>1 day</th>
<th>1 week</th>
<th>Evening</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adult</td>
<td>£4.90</td>
<td>£20</td>
<td>£4</td>
</tr>
<tr>
<td>Child</td>
<td>£2.70</td>
<td>£11</td>
<td>-</td>
</tr>
<tr>
<td>Student</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Family</td>
<td>£9</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

---

### Type of Travel

- **Ticket Structure:**
  - **Time Interval:**
  - **Fare Price:**

### Sales Packages

- **Bought on bus with cash:**
  - **1 day:** £3.90
  - **1 week:** £19.50
  - **2 day:** £7.90
  - **7 day:** £13.50
  - **1 week:** £59
  - **3 week:** £79
  - **4 week:** £79

- **Stored on your mobile phone as m-tickets:**
  - **1 day:** £4.20
  - **1 week:** £20
  - **2 day:** £7.90
  - **3 week:** £13.50
  - **4 week:** £13.50
  - **2 day:** £7.90
  - **3 week:** £13.50
  - **4 week:** £13.50

- **Loaded onto our smartcard the key:**
  - **1 day:** £4.20
  - **1 week:** £20
  - **2 day:** £7.90
  - **3 week:** £13.50
  - **4 week:** £13.50
  - **2 day:** £7.90
  - **3 week:** £13.50
  - **4 week:** £13.50

---

### Diagram

- **Class:**
  - **Definition:**
  - **Type:**
  - **Used in:**

---

### Additional Information

- **Name:** FXCP FM FS Time Interval Structure
- **Author:** nick.knowles
- **Version:** 1.0
- **Created:** 21/05/2019 00:43:53
- **Updated:** 21/05/2019 01:06:31
TIME INTERVALs- Notes

- Use TIME INTERVALs for day & season pass durations
  - Can represent both calendar periods (e.g., ID, IM, IY etc) and arbitrary (e.g., Academic term)
  - Can be used for short hopper fare (1H, 2H)
  - Usually progressive (longer is cheaper)

- Can be combined with FREQUENCY etc to limit number of trips per interval
2. Use-by dates (And other commercial conditions)

- USAGE VALIDITY PERIOD
- INTERCHANGING
- PURCHASE WINDOW
Single Trips – Fixed start

Must buy ticket within this period before (or maybe even during) travel

PURCHASE WINDOW

“Use-by” date
USAGE VALIDITY PERIOD
To start /end by

INTERCHANGING
No interchanging
No Journey break

Fixed Start time

Maximum permitted Travel duration
TIME INTERVAL

start trip

end trip

Destination

Origin

Space

Time
Single Trips – Flexible start

Must buy ticket within this period before (or maybe even during) travel

“Use-by” date

PURCHASE WINDOW

To start /end by

Maximum permitted Travel duration

TIME INTERVAL

Flexible Start time

Start trip

end trip

Time

Destination

Origin

Space

Must buy ticket within this period before (or maybe even during) travel
Single Trip – Interchanging

Maximum permitted Travel duration

TIME INTERVAL

Can interchange No journey break

INTERCHANGING

TIME

Can interchange No journey break

INTERCHANGING

Time

To start / End by

USAGE VALIDITY PERIOD

Can interchange No journey break

INTERCHANGING

Time

Can interchange No journey break

INTERCHANGING

Time

Can interchange No journey break

INTERCHANGING

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INTERCHANGING

Time

Can interchange No journey break

INTERCHANGING

Time
Single Trip – Break of Journey Allowed

INTERCHANGING
Can Interchange
Can break journey

“Use-by” date
USAGE VALIDITY PERIOD
To start /end by

Destination
Space

Origin

Time

start trip

end trip
Products – Time concepts relating to commercial conditions

- Can have separate conditions to a FARE PRODUCT, and a whole SALE OFFER PACKAGE comprising several products.
Specifying a “Use by date” and other validity periods

- Assigning USAGE VALIDITY PERIOD parameter
- Can be used to set “Use by date” as interval from a given point in time,
  - Eg Purchase, fulfilment start of trip, start of outbound etc
3. Peak/Offpeak Fare Demand periods

- FARE DEMAND FACTOR
- DAY TYPE
- TIMEBAND
- SERVICE CALENDAR
Peak and Offpeak – Fares

- E.g. Concessionary Pass product has use restrictions

**FARE DEMAND FACTOR**

**Peak: DT-**
Weekdays 0:00-09:30, 23:00-00:00
**Off-Peak: DT-**
Weekdays 09:30-23:00, + DT-Weekend

**Fare Validity**, 2018/01/01;
00:00-24:00 Off-Peak
2018/01/02;
- 00:00-08:30 Off-Peak
- 08:30-09:30 Peak
- 09:30-17:00 Off-Peak
ETC, ETC

**SERVICE CALENDAR**

2018
2019
2020

**DAY TYPE ASSIGNMENTS**

**Date → Day Type**
2018/01/01 → DT-Holiday
2018/01/02 → DT-Weekday
2018/01/03 → DT-Weekday
2018/01/04 → DT-Weekend
......etc

**DAY TYPES**

**TIMEBANDS**

**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](http://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.
Day types and Fare Validity

- Used to determine operational timetable & real time predictions

**Fare Demand Type**

**Peak:** DT-Weekdays 08:00-09:30, 07:00-18:30

**Off-Peak:** DT-Weekdays 09:30-17:00, 18:30-08:00 + DT-Weekend

**Super Off-Peak:** DT-Holiday

**Fare Validity**

- 2018/01/01; 00:00-24:00 Super OP
- 2018/01/02; 00:00-08:30 Off-Peak
- 08:30-09:30 Peak
- 09:30-17:00 Off-Peak ETC, ETC

**Date → Day Type**

- 2018/01/01 → DT-Holiday
- 2018/01/02 → DT-Weekday
- 2018/01/03 → DT-Weekday
- 2018/01/04 → DT-Weekend
- .....etc
Day types and Service Journeys

- Used to determine operational timetable & real time predictions

**SERVICE CALENDAR**

**DAY TYPES**

**DAY TYPE ASSIGNMENTS**

**DATED SERVICE JOURNEYS**

**SERVICE JOURNEYS**

**Journeys (undated)**

<table>
<thead>
<tr>
<th>J1</th>
<th>10:20</th>
<th>DT-Weekday</th>
</tr>
</thead>
<tbody>
<tr>
<td>J2</td>
<td>10:22</td>
<td>DT-Holiday</td>
</tr>
<tr>
<td>J3</td>
<td>10:32</td>
<td>DT-Weekend</td>
</tr>
</tbody>
</table>

**Date → Day Type**

- 2018/01/01 → DT-Holiday
- 2018/01/02 → DT-Weekday
- 2018/01/03 → DT-Weekday
- 2018/01/04 → DT-Weekend

…..etc

**Actual Journeys**

- 2018.01.01-J2: 10:22,
- 2018.01.02-J1: 10:20,
- 2018.01.03-J1: 10:20,
- 2018.01.04-J3: 10:32,
Peak and Off-peak – Fares

- E.g. Concessionary Pass product has use restrictions

** 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.
For example
- Monday to Friday, except bank holidays
- Saturday
Representing Fare Products in NeTEx

- FARE PRODUCTS
- VALIDABLE ELEMENTS
A FARE PRODUCT gives specific access rights

- That can be validated…
  - E.g. A single trip between two points
  - E.g. A return trip to be made in a period
  - E.g. Unlimited travel within a zone for a given period
  - E.g. Unlimited travel along a route between two points for a given period
  - E.g. The right to buy other products at a discount for a given period
A FARE PRODUCT groups a set of access or discount rights

Has VALIDABLE elements
# Basic UK Bus fare products

<table>
<thead>
<tr>
<th>Type of Product</th>
<th>Fare Product</th>
<th>Group Ticket</th>
</tr>
</thead>
</table>
| **TRIP**
| ("single ride") | **Short hop** | - |
| | **Single trip** | ✓ |
| | **Time-limited ("Hopper")** | ✓ |
| | **Period Return** | ✓ |
| | **Day return** | ✓ |
| **PASS** | **Day pass** | ✓ |
| | **Termtme** | - |
| | **Season pass** | ✓ |
| **Carnet** | **Trip** |  |
| | **Day Pass** |  |

UK Products must be one of the specified types
“Product Types” presented to user e.g. “single trip”, “day pass”, etc are classifications of different FARE PRODUCTs.
Additional Product Types - terminology

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

- **Usage Discount (USAGE DISCOUNT RIGHT)**
  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 either holds an amount of stored value which can be used to purchase, . May be linked to an account.
"A sequence or set of FARE STRUCTURE ELEMENTs, grouped together to be validated in one go."

- Effectively the smallest unit of detectable access to the network
Validable Elements

- Validable ELEMENT groups sets of access rights from the Tariff structure for use in FARE PRODUCTs
  - Can be used in more than one product
    - ACCESS RIGHTS IN PRODUCTs as VALIDABLE ELEMENTs
  - Validable ELEMENTS typically correspond to sets of parameters that can be validated or control by the control system
    - E.g. A bus ride between a origin and destination
    - E.g. A Day pass in a specified zone
- Validable elements use Fare STRUCTURE ELEMENTs
  - These may include alternative choices
  - E.g. The set of O/Ds as DISTANCE MATRIX ELEMENTs
  - E.G. The allowed durations for Season Passes
Instances for a typical Fare Product & Sales Offer

- TARIFF
- FARE STRUCTURE ELEMENTS
- PARAMETER ASSIGNMENTs
- DISTANCE MATRIX ELEMENTs
- TIME INTERVALs
- Scoping & Temporal Parameters
- VALIDABLE ELEMENTs (product)
- FARE PRODUCTs
- SALES OFFER PACKAGE ELEMENTs
- USER PROFILEs
Parameter Assignment for FARE PRODUCTS, SALES PACKAGES, etc

- GENERIC PARAMETER ASSIGNMENT
Parameter Assignment

- Allows product rules to be defined in terms of other NeTEx Elements
  - Access rights
    - (TARIFF SONEs, LINEs, DAY TYPEs, etc etc)
  - Limitations on Travel & Commercial Conditions
    - USAGE PARAMETERs,

- Used to define products and choices
  - Product definition: can be used on
    - FARE STRUCTURE ELEMENTs, VALIDABLE ELEMENTs, FARE PRODUCTs, SALES OFFER PACKAGEs,
  - For product choice by user
    - TRAVEL SPECIFICATION, CUSTOMER PURCHASE PACKAGE
  - Can be combined to created compound conditions
    - AND / OR operators
Some Commonly used parameters
Validity Parameters

Most Network elements, Temporal elements and product components can be used as validity parameters.
Elements that can make assignments
Instances for a typical Fare Product & Sales Offer

TARIFF

FARE STRUCTURE ELEMENTs

VALIDABLE ELEMENTs (product)

FARE PRODUCTs

SALES OFFER PACKAGE ELEMENTs

SALES OFFER PACKAGE

PARAMETER ASSIGNMENTs (fare structure)

DISTANCE MATRIX ELEMENTs

TIME INTERVALs

Scoping & Temporal Parameters

TARIFF ZONEs

OPERATORs

MODEs

USER PROFILEs
Instances for a typical Fare Product & Sales Offer
Generic Versus Specific Assignment
A Fare Product is a set of marketable access rights

- A single FARE PRODUCT may include all the alternate choices (with different prices for the combinations):
  - E.g. All permitted Origin & Destination pairs
  - E.g. 1st & 2nd Class accommodation
  - E.g. Adult & Child & Student users
  - E.g. Valid for a period: of either 7, 30, or 180 days
  - E.g. One, or up to 5-10 travellers as a group
  - E.g. Refundable / Not Refundable
  - E.g. With Luggage allowance
**Single Trip Fare Prices**

**Sales Package**
Single ride, “Cash”

**User Profile**
Adult

**Distance Matrix Elements**

**Fare Prices**

**Fare Table**

**Price Unit**

**User Profile**

**Fare Zones**

**Fare Product**

**Type of Travel Document**

**Operator**
Metrobus Ltd, Wheatstone Close, Crawley, West Sussex, RH10 9UA. Tel: 01293 449191

---

**Fare Table - Bewbush West - Crawley - Broadfield/Pease Pottage**

<table>
<thead>
<tr>
<th>Line</th>
<th>Fare Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>£1.70</td>
</tr>
</tbody>
</table>

To calculate your fare, find your location, and your destination, where the row and the column cross is your fare.

**Return Fares**
Not available on this service.

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

---

**Notice Assignments**

**Tariff**

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 08:30-23:00 Mon-Fri, and anytime at weekends and public holidays.
Offer; “Metrobus cash ticket”

- **Tariff Structure:** Zone to Zone;
- **Product Access rights:** single trip; bus, Operator=Metrobus, Line1
- **User Profiles:** Adult, Child,
- **Conditions:** Cannot break journey; Cannot interchange; Refundable?
- **Travel Document:** Printed “Cash ticket”;
- **Available:** at stop, or on-board (no discount);
- **Pay with:** cash or card
- **Prices:** Line1 x (n x n Z2Z elements) x (Adult | Child)
- **Brand** = Metrobus

**Travel Specification;**

- **Which Zones?**
  - Origin + Destination
- **Which User Profile?**
  - (Adult | Child)

**Purchase options**

- **Where?**
  - At stop / on-board
- **Pay How?**
  - Cash | Card
Example – Single Purchase

Travel Specification;
- Which Zones?
  - Bewbush to Crawley
- Which User Profile?
  - Adult

Purchase options
- Where?
  - On-board
- Pay How?
  - Cash
Combining Access Right Parameter Assignments
Usage Parameters

- User Profiles
- Group Tickets
- Travel Conditions
- Luggage Allowance
- Sales and After sales
- Product Entitlements
USAGE PARAMETERs - Summary

- Easy to extend with new attributes or parameters
User types in NeTEx: implemented as USER PROFILEs

- **USER PROFILE**: a named user type.
- Allows for precise characterisation:
  - Minimum maximum age, et
  - Textual description
- Specialisation of USAGE PARAMETER
  - Can have url to external Web page with further description
#6.1: UK Bus Fares - User Types?

<table>
<thead>
<tr>
<th>USER PROFILE</th>
<th>Personal</th>
<th>Discounted</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adult</td>
<td>x</td>
<td>x</td>
<td>Over 16</td>
</tr>
<tr>
<td>Infant</td>
<td>x</td>
<td>✓</td>
<td>Babes in arms free</td>
</tr>
<tr>
<td>Child</td>
<td>x</td>
<td>✓</td>
<td>c5 – c16 years</td>
</tr>
<tr>
<td>Youth</td>
<td>x</td>
<td>✓</td>
<td>c16-18 years</td>
</tr>
<tr>
<td>School Pupil</td>
<td>x</td>
<td>✓</td>
<td>At School</td>
</tr>
<tr>
<td>Student / Trainee</td>
<td>✓</td>
<td>✓</td>
<td>University, Apprentice</td>
</tr>
<tr>
<td>Senior</td>
<td>✓</td>
<td>✓</td>
<td>Resident, &gt;60 years</td>
</tr>
<tr>
<td>Disabled</td>
<td>✓</td>
<td>✓</td>
<td>Registered disabled</td>
</tr>
<tr>
<td>Disabled Companion</td>
<td>✓</td>
<td>✓</td>
<td>With disabled</td>
</tr>
<tr>
<td>Job seeker</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
</tbody>
</table>
GROUP TICKETs

- GROUP TICKETF specifies parameters for a Group
  - How many;
  - Which types of Users
  - Discount basis
  - etc
- Specialisation of USAGE PARAMETER
  - Can have url to external Web page with further description
#6.3: UK Bus Profile – Group Ticket Types?

<table>
<thead>
<tr>
<th>GROUP TICKET</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anyone</td>
<td>2-N Anyone</td>
</tr>
<tr>
<td>Family</td>
<td>1-2 Adults + 1-N, Children</td>
</tr>
<tr>
<td>Couple / Duo</td>
<td>2 Adults</td>
</tr>
<tr>
<td>School Pupils</td>
<td>1-N Adults + 2-N Pupils</td>
</tr>
</tbody>
</table>
## UK BUS Product parameters – Travel Conditions

<table>
<thead>
<tr>
<th>Condition</th>
<th>Condition</th>
<th>Local Trip</th>
<th>Coach Trip</th>
<th>Season Ticket</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>Right to Interchange</td>
<td></td>
<td>✓</td>
<td>✓</td>
<td>x</td>
<td>Trips only</td>
</tr>
<tr>
<td>Right to Break Journey</td>
<td></td>
<td>✓</td>
<td>✓</td>
<td>x</td>
<td>Trips only</td>
</tr>
<tr>
<td>Routing Restrictions</td>
<td></td>
<td>x</td>
<td>?</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Round Trip</td>
<td></td>
<td>✓</td>
<td>✓</td>
<td>x</td>
<td>Single, Period Return, Day Trip</td>
</tr>
<tr>
<td>Usage Validity Period</td>
<td></td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>See discussion of temporal factors</td>
</tr>
<tr>
<td>Frequency of Use</td>
<td></td>
<td>x</td>
<td>x</td>
<td>✓</td>
<td>e.g. 2 per day, vs unlimited use</td>
</tr>
<tr>
<td>Minimum Stay</td>
<td></td>
<td>x</td>
<td>?</td>
<td>x</td>
<td>Excursion products only?</td>
</tr>
</tbody>
</table>
# UK BUS Product Parameters – Sales & After-Sales Conditions

<table>
<thead>
<tr>
<th>Condition</th>
<th>Relevance</th>
<th>Local Trip</th>
<th>Coach Trip</th>
<th>Season Ticket</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Period in which a ticket can be bought.</td>
<td><strong>PURCHASE WINDOW</strong></td>
<td>?</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Period and conditions for reserving a ticket.</td>
<td><strong>RESERVING</strong></td>
<td></td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Can ticket be given to another to use?</td>
<td><strong>TRANSFERABILITY</strong></td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Can reservation be cancelled?</td>
<td><strong>CANCELLING</strong></td>
<td>x</td>
<td>✓</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Can you modify travel times or change journey details?</td>
<td><strong>EXCHANGING</strong></td>
<td>x</td>
<td>✓</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Can you get all or some money back?</td>
<td><strong>REFUNDING</strong></td>
<td>?</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Can you get a replacement for a lost ticket?</td>
<td><strong>REPLACING</strong></td>
<td>x</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
</tbody>
</table>
Prerequisites & Dependencies between products

- How may products and sales offers depend on each other

<table>
<thead>
<tr>
<th>Condition</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>Entitlement Required</td>
<td>Specifies a prerequisite product</td>
</tr>
<tr>
<td>Entitlement Given</td>
<td>Specifies rights to another products</td>
</tr>
</tbody>
</table>
Entitlements: Prerequisites & rights
Representing Sales Offers in NeTEx

- SALES OFFER PACKAGE
- TRAVEL DOCUMENT
- DISTRIBUTION CHANNEL
- PAYMENT METHOD
Packaging example

- **DISTRIBUTION CHANNEL**
- **PAYMENT METHOD**
- **TYPE OF TRAVEL DOCUMENT**

---

### Crawley Metrorider

**Unlimited travel in the Crawley Metrorider area.**

- **1 day**
  - Adult: £4.90
  - Child: £2.70
  - Student: -
  - Family*: £9

- **1 week**
  - Adult: £20
  - Child: £11
  - Student: -
  - Family*: -

- **1 evening**
  - Adult: £4
  - Child: -
  - Student: -
  - Family*: -

- **60 minute**
  - Adult: £2.20
  - Child: £1.10
  - Student: -
  - Family*: -

- **1 day (valid until 03:59 on the following day)**
  - Adult: £7.90
  - Child: £4.45
  - Student: -
  - Family*: -

- **4 week evening**
  - Adult: £3.70
  - Child: £1.75
  - Student: -
  - Family*: -

- **1 day (valid for 13 weeks)**
  - Adult: £15.50
  - Child: £7.90
  - Student: -
  - Family*: -

- **Annual evening**
  - Adult: £3.70
  - Child: £1.75
  - Student: -
  - Family*: -
Materialisation of product on a ticket medium – TRAVEL DOCUMENT

class FXCP FM SD Type of Travel Document

- MediaTypeEnum
  - paperTicket
  - paperTicketWithCoupons
  - coupon
  - selfPrintPaperTicket
  - smartCard
  - card
  - sms
  - mms
  - mobileApp
  - other

- MachineReadableEnum
  - none
  - magneticStrip
  - chip
  - ocr
  - barCode
  - nfc
  - shotCode
  - other

- TypeOfValue
  - characterising
  - characterised by

- TypeOfMachineReadability
  - +characterising
  - +characterised by

- TypeOfEntity
  - +characterising
  - +characterised by

- ServiceAccessRight
  - FareProduct
  - +assigned to
  - +for

- PriceableObject
  - SalesOfferPackageElement
  - +assigned to
  - +for

- DataManagedObject
  - SecurityListable
  - TravelDocument
  - +classified by
  - +classifying

- PriceableObject
  - FulfilmentMethod
  - PriceableObject

Name: FXCP FM SD Type of Travel Document
Author: NeTEx
Version: 1.0
Created: 20/05/2019 15:13:38
Updated: 21/05/2019 02:27:41
#7.1: UK Bus – Media / Travel Documents?

<table>
<thead>
<tr>
<th>TYPE OF TRAVEL DOCUMENT</th>
<th>Machine Readable</th>
<th>Human Readable</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paper</td>
<td>Barcode, OCR, ShotCode, etc</td>
<td>✓</td>
<td>From machine or conductor</td>
</tr>
<tr>
<td>E-document/pdf</td>
<td>Barcode, OCR, ShotCode, etc</td>
<td>✓</td>
<td>Self print / store on mobile device</td>
</tr>
<tr>
<td>SMS /MMS</td>
<td>Barcode, OCR, ShotCode, etc</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Card</td>
<td>OCR</td>
<td>✓</td>
<td>e.g. Travel card</td>
</tr>
<tr>
<td>E-PASSIVE</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Magstripe</td>
<td>Contact</td>
<td>✓</td>
<td>Ticket Machine / Counter only</td>
</tr>
<tr>
<td>EMV</td>
<td>Contact, NFC</td>
<td>X</td>
<td>Account Based Ticketing has id but no app</td>
</tr>
<tr>
<td>E-ACTIVE</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SmartCard</td>
<td>Contact, NFC</td>
<td>X</td>
<td>(ABT) Has travel app chip</td>
</tr>
<tr>
<td>Mobile App</td>
<td>NFC, (bluetooth)</td>
<td>✓</td>
<td>ABT Downloadable to smart device</td>
</tr>
</tbody>
</table>
- information about how/where products can be bought.

Distribution Channels and Fulfillment methods
#7.2: UK Bus – Distribution Channels?

<table>
<thead>
<tr>
<th>DISTRIBUTION CHANNEL</th>
<th>Fulfilment</th>
<th>Payment</th>
<th>Charging Moment</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Staffed</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ticket Office Counter</td>
<td>Immediate (or despatch)</td>
<td>Cash, Card, ePay</td>
<td>Prepaid</td>
<td>All</td>
</tr>
<tr>
<td>On board / Conductor</td>
<td>Immediate</td>
<td>Cash, Card, ePay</td>
<td>Prepaid</td>
<td>Trips, day passes</td>
</tr>
<tr>
<td>Retailer</td>
<td>Despatch</td>
<td>Card, ePay, (bank)</td>
<td>Prepaid</td>
<td></td>
</tr>
<tr>
<td>Call Centre</td>
<td>Despatch</td>
<td>Card, ePay, (bank)</td>
<td>Prepaid</td>
<td>Travel cards, season passes</td>
</tr>
<tr>
<td><strong>Self Service</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ticket Machine</td>
<td>Immediate</td>
<td>Cash, Card, ePay</td>
<td>Prepaid</td>
<td>At Stop</td>
</tr>
<tr>
<td>Online, mobile</td>
<td>Immediate or despatch</td>
<td>Card, ePay</td>
<td>Prepaid</td>
<td>Also On board</td>
</tr>
<tr>
<td>Electronic</td>
<td>Immediate (or on travel)</td>
<td>Card, ePay</td>
<td>Pre &amp; Post Pay (Pay as you go)</td>
<td>Acquire, top up / purchase etc</td>
</tr>
</tbody>
</table>

115  UK Bus Fare NeTEx Profile  Moving Britain Ahead
#7.3: UK Bus – Payment Methods?

<table>
<thead>
<tr>
<th>PAYMENT METHOD</th>
<th>Subscription/ Top up</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ANONYMOUS</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cash</td>
<td>x</td>
<td>£</td>
</tr>
<tr>
<td>Cash – Coins only</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td><strong>ELECTRONIC / MOBILE</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EMV Card</td>
<td>✓</td>
<td>Self print / store on mobile device</td>
</tr>
<tr>
<td>ePay</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>SMS</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td><strong>OTHER</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bank transfer</td>
<td>✓</td>
<td>Use for Season Passes, Auto top up, &amp; Subscriptions</td>
</tr>
<tr>
<td>Cheque</td>
<td>x</td>
<td>Eg. For Season Passes</td>
</tr>
<tr>
<td>Coupon / Voucher</td>
<td>x</td>
<td>E.g. for promotions</td>
</tr>
</tbody>
</table>
### Bus – Offer: Fulfilment Methods

<table>
<thead>
<tr>
<th>Type of method</th>
<th>FULFILMENT METHOD</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>COLLECT</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Collect from driver or conductor</td>
<td>[Image]</td>
<td>Basic products</td>
</tr>
<tr>
<td>Collect at counter</td>
<td>[Image]</td>
<td>E.g. for Season passes,</td>
</tr>
<tr>
<td>Collect at Machine</td>
<td>[Image]</td>
<td>Not all products</td>
</tr>
<tr>
<td>Collect at shop</td>
<td>[Image]</td>
<td>Basic products</td>
</tr>
<tr>
<td>REMOTE DOWNLOAD</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Download to device</td>
<td>[Image]</td>
<td>App or pdf eticket</td>
</tr>
<tr>
<td>Self print</td>
<td>[Image]</td>
<td>Self print to paper</td>
</tr>
<tr>
<td>email</td>
<td>[Image]</td>
<td>Online &amp; call centre purchases</td>
</tr>
<tr>
<td>SMS</td>
<td>[Image]</td>
<td>Online purchases</td>
</tr>
<tr>
<td>DESPATCH</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Post</td>
<td>[Image]</td>
<td>E.g. For Season Passes</td>
</tr>
<tr>
<td>Courier</td>
<td>[Image]</td>
<td>E.g. Online - Extra fee</td>
</tr>
</tbody>
</table>
## Season Pass (es)

### Types of Travel Documents
- Paper
- App
- Smartcard

### Sales Packages
- "Cash, m-ticket, the key"

### Fare Zones
- Horsham, Crawley, Redhill, All

### Fare Prices

#### UK Bus Fare NeTEx Profile

### Time Intervals
- 1 day
- 1 week
- Evening
- 1 month
- Annual

### Fare Product
- Season Pass

### Crawley Metrorider
- Unlimited travel in the Crawley Metrorider area
- All day travel for up to 2 people (in the same vehicle)
- Season Passes now available for cash, m-ticket on the key

### Horsham Metrorider
- Unlimited travel in the Horsham Metrorider area
- All day travel for up to 2 people
- Season Passes now available for cash, m-ticket on the key

### Redhill & Reigate Metrorider
- Unlimited travel in the Redhill & Reigate Metrorider area
- All day travel for up to 2 people
- Season Passes now available for cash, m-ticket on the key

### Metrovoyager
- Unlimited travel on all our services across the whole of the UK
- Season Passes now available for cash, m-ticket on the key

### Fare Zones
- Horsham, Crawley, Redhill, All

### Fare Prices

### Sales Packages
- "Cash, m-ticket, the key"

### Fares

<table>
<thead>
<tr>
<th>Zone</th>
<th>Adult</th>
<th>Child</th>
<th>Student</th>
<th>Family*</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 day</td>
<td>£4.00</td>
<td>£2.70</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>1 week</td>
<td>£6.00</td>
<td>£4.20</td>
<td>£3.50</td>
<td>-</td>
</tr>
<tr>
<td>Evening</td>
<td>£7.00</td>
<td>£4.20</td>
<td>£3.50</td>
<td>-</td>
</tr>
<tr>
<td>1 month</td>
<td>£11.50</td>
<td>£8.20</td>
<td>£6.65</td>
<td>-</td>
</tr>
<tr>
<td>Annual</td>
<td>£22.50</td>
<td>£15.50</td>
<td>£11.50</td>
<td>-</td>
</tr>
</tbody>
</table>

### Notes
- Adults are defined as anyone aged 16 or over.
- Children are defined as anyone aged under 16.
Example - Period Passes

**FARE PRODUCTS**

**Period Pass Product**

**SALES OFFER PACKAGES**

- **Paper “Cash Ticket”**
- **Mobile App (m-ticket)**
- **Smartcard (the-key)**

**PRICE TABLE**

- **PRODUCTS**
- **SALES OFFER**
- **PACKAGEs**

**Example - Period Passes**

**NeTEx UK Profile - Bus Fares with NeTEx**
### NeTEx UK Profile - Bus Fares with NeTEx

**Example – Period Pass Product: Cash Ticket**

<table>
<thead>
<tr>
<th>GROUP OF SALES OFFER PACKAGES</th>
<th>FARE PRODUCTS</th>
<th>FARE STRUCTURE ELEMENTS</th>
<th>USAGE PARAMETERs</th>
<th>DISTRIBUTION ASSIGNMENT</th>
<th>FARE PRICES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zonal Pass:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cash Ticket</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**SALES OFFER PACKAGES**

- **Pass: Crawley**
  - Cash Ticket
  - *Metrider (Crawley)*

- **Pass: Horsham**
  - Cash Ticket
  - *Metrider (Horsham)*

- **Pass: Redhill**
  - Cash Ticket
  - *Metrider (Redhill)*

- **Pass: All Zones**
  - Cash Ticket
  - *Metro Voyager*
Representing Fare Products in NeTEx

- FARE PRICES
- PRICING PARAMETERs
Fare Prices

- Prices are separate from the tariff elements they price.
  - An element may have different prices with different validities.
  - Prices may apply to individual elements or combination of priceable elements

- Different type of prices
  - Static / Base Prices
  - Prices Derived from Base Prices
    - Both amount and derivation
  - Dynamic Prices (pricing service)
    - Range bands for dynamic prices can be indicated by FARE QUOTA FACTORs
Price dimensions set the Fare Profile scope

- Anything which is a price dimension for a UK Bus Fare needs to be represented by a model element in the profile
  - E.g. O/Ds, zones, user types, channels, media types, etc

- Anything else is optional –
  - E.g. rules for ages of a use type such as child or senior
  - E.g. Locations to buy tickets
Pricing Dimensions

- User Profile
- Purchase Window
- Commercial Profile
- etc

Structure Element:
- Fare Demand
- Quality Factor
- Geographic Interval
- Time Interval
- Round Trip
- Routing

Sales Offer Package:
- Distribution Assignment
- Distribution Channel
- Fulfilment Method
- Payment Method

Validity Parameter:
- Series
- Distance Matrix Element
- Validity Parameter

Fare Product:
- Access Right

Usage Parameter:
- Series
- Fare Demand
Fare Prices – can be associated with pricing rules

Can be Dynamic

UK Bus Fare NeTEx Profile

Moving Britain Ahead
Price Rules – Specify discounts etc
Pricing Rules

- **Pricing rule**
  - Any arbitrary named calculation

- **Discounting rule**
  - Price is a % discount

- **Limiting discounting rule**
  - Ount with absolute minima and maxima

- **Rounding: Global parameter**
  - Round to limit
  - Round in stepsAm
Prices may be absolute or derived

- **Base Price**
  - E.g. *Adult* = £1.50

- **Pricing Rule**
  - **Discounting**
    - E.g. *Child* = 50% of *Adult*
  - **Limiting**
    - Minimum price = 50p
  - *Cumulative discounts allowed?*

- **Derived Price**
  - E.g. *Child* = £0.75
Priceable objects
Dare Table – Used to group prices
Nesting Tables

- Tables can be nested
  - Efficient encoding in XML – Avoids repetition of common properties
Fare Tables – Organising Price Combinations

- Different PRICEABLE OBJECTs can be associated with Table, Row, Column and Cell
- Cell references the price for the combination
Metrobus 1 - Dissected

SALES PACKAGE

USER PROFILE

DISTANCE MATRIX ELEMENTs

USER PROFILE

FARE ZONEs

PRICEGROUPs ➔ FARE PRICE

NOTICE ASSIGNMENTs ➔ NOTICE

UK NeTEx Fare Profile
Fare Table – Recursive Row/Column

- Each cell can refer to a price

**Prices - Allowed combinations**

---

<table>
<thead>
<tr>
<th>FARE STRUCTURE ELEMENT / TARIFF ZONE</th>
<th>TIME INTERVAL</th>
<th>USER PROFILE</th>
</tr>
</thead>
</table>

---

September 19
Fare Tables – Formatting

- Presentation of fares in tabular form
  - Table of price cells
  - Row or column can be another nested table
  - Can have row and column headers
  - Notices may relate to any element
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
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

Department for Transport

SALES PACKAGES

USER PROFILES

FARE PRODUCTS

FARE ZONE

Time Intervals

FARE PRICES

PlusBus

Adds urban bus travel to your train ticket.

search by postcode: GO > search by town: GO >

Crawley, Gatwick Airport, Horley, & Three Bridges PlusBus

A Crawley, Gatwick, 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>Duration</th>
<th>Adult Price / Day</th>
<th>Child Price / Day</th>
</tr>
</thead>
<tbody>
<tr>
<td>7 days</td>
<td>£10.00</td>
<td>£5.00</td>
</tr>
<tr>
<td>Month</td>
<td>£32.00</td>
<td>£16.00</td>
</tr>
<tr>
<td>Quarter</td>
<td>£125.00</td>
<td>£62.50</td>
</tr>
<tr>
<td>Annual</td>
<td>£440.00</td>
<td>£220.00</td>
</tr>
</tbody>
</table>

Child discounts: half adult season ticket price.

Railcard discount restrictions for PlusBus

Railcard holders get 1/3 off the adult price of PlusBus day tickets. Some Railcards have retail restrictions; see individual Network Railcard (Annual Gold Card) holders get a discount off any PlusBus day ticket purchase.

- 3 off the adult price of PlusBus day tickets for towns and cities located in the South East of England, upon presentation of their valid Network Railcard (Annual Gold Card), as follows:
  - Mondays to Fridays after 10:00 hours
  - Saturday, Sunday, Bank Holidays any time.
  - The £13 minimum fare restriction does not apply to PlusBus day ticket purchases.

- Two Together Railcard holders get 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
  - Saturday, Sunday, Bank Holidays any time.
  - You must buy 2 tickets at the same time.

- 16-25 Railcard, 26-30 Railcard & HM Forces Railcard holders get 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, at all times.
  - The £12 minimum fare restriction does not apply to PlusBus day ticket purchases.

- Senior Railcard holders get 1/3 off the adult price of PlusBus day tickets, upon presentation of their valid Senior Railcard, as follows:
  - outside 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 holders get 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
  - Adult travellers get one third off the adult PlusBus day ticket price upon presentation of their valid Family&Friends Railcard:
    - outside 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).
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?
Each tariff describes itself; it is the trip planner/ fare engine’s task to find the applicable, best value fares for given trip.
Moving Britain Ahead

Metrobus 1 - Other Tariff

Bewbush West - Crawley - Broadfield/Pease Pottage

Adult Single Fares

<table>
<thead>
<tr>
<th>Bewbush West (loop)</th>
</tr>
</thead>
<tbody>
<tr>
<td>160 Bewbush Neighbourhood Centre</td>
</tr>
<tr>
<td>240 160 Gossops Green Shops</td>
</tr>
<tr>
<td>240 240 160 West Green Crawley Hospital/Apple Tree</td>
</tr>
<tr>
<td>240 240 240 240 160 Crawley Town Centre</td>
</tr>
<tr>
<td>240 240 240 240 160 Southgate Avenue North</td>
</tr>
<tr>
<td>240 240 240 240 160 Southgate Wensleydale</td>
</tr>
<tr>
<td>240 240 240 240 160 Broadfield (all stops)</td>
</tr>
<tr>
<td>240 240 240 240 240 160 Pease Pottage Black Swan</td>
</tr>
</tbody>
</table>

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

To calculate your fare, find your location, and your destination, where the row and the column cross is your fare.

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.

---

24.01.17 Metrobus Ltd, Wheatstone Close, Crawley, West Sussex, RH10 9UA. Tel: 01293 449191

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https://www.metrobus.co.uk/route-information/1
Metrobus Products
- Metrorider / Metrovoyager,
- Gatwick Employee Pass

Discovery Pass
- Offpeak Day Pass,
- Multi-operator

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

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

FARE PRODUCTS (Other day & Period passes)

Crawley Area Metrorider
Metrovoyager
Discovery Ticket
Gatwick Travelcard
Accepted throughout.

Crawley, Three Bridges, Gatwick Airfield 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.

Metrorider
Gatwick
PlusBus
NCS

NeTEx UK Fare Profile - Scope
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
Modelling Sales Discount Rights
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
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
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

Destination

Space

Time

Origin

buy ticket
start Use
Pay as you go Trips

CHARGING MOMENT

Each trip is prepaid at set price

PURCHASE WINDOW
Buy Smartcard before

VALIDITY PERIOD
Card expiry date

Destination
Origin

Space
Time
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.
Fares example - Tfl Oyster
Fares example - Tfl Oyster

**Types of Travel Documents**
- Paper, Oyster,

**User Profiles**
- Adult, student, 11-15 etc

**Fare Products**
- Trip, Period Pass

**Sales Packages**
- Cash, Oyster, Travelcard

**Fare Prices**

**Fare Zones**
- 1-6, A, B, C, D

**Group Tickets**

**Discount Rights**
- Railcard

**Modes**
- Metro, Bus, Tram, River

**Fare Demand Factor**

**Time Intervals**

© TfL 2016-18
Classic Tfl Products

Different tariff structures for different modes

FARE DEMAND FACTOR

Peak, off-peak

TIME INTERVALS

PRE-ASSIGNED FARE PRODUCT

PRE-ASSIGNED FARE PRODUCT

PREASSIGNED FARE PRODUCT

AMOUNT OF PRICE UNIT

FARE DEmand

FARE DEMAND

FARE DEMAND

FARE DEMAND

Ticket

Travel Card (Day / Period Pass)

Group Day Travel card

Multitrip Boarding Pass Carnet for Cable CAR

24H Cycle Pass

NeTEx UK Fare Profile - Complex Fares
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

18-25 Railcard

Oyster Card

Child - Zip

Youth - Zip

Student

Senior

Veteran

Transport for London

NeTEx UK Fare Profile - Complex Fares
Sales Offer Packages & Accounts

THIRD PARTY ENTITLEMENT

CUSTOMER ACCOUNT

Photo card

Account linked card

Anonymous Card

FARE PRICE

170 NeTEx UK Fare Profile - Complex Fares

Moving Britain Ahead
## 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</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</td>
<td>✅</td>
<td>✅</td>
<td>Rebate for use, e.g. mileage</td>
</tr>
<tr>
<td>AMOUNT OF PRICE UNIT</td>
<td>-</td>
<td>✅</td>
<td>Stored value</td>
</tr>
<tr>
<td>THIRD PARTY PRODUCT</td>
<td>-</td>
<td>-</td>
<td>E.g. Military Pass</td>
</tr>
</tbody>
</table>

### Notes:
- **SALES DISCOUNT**: Sales discount right.
- **CAPPED SALES DISCOUNT RIGHT**: Capped sales discount right.
- **USAGE DISCOUNT**: Usage discount right.
- **AMOUNT OF PRICE UNIT**: Amount of price unit.
- **THIRD PARTY PRODUCT**: Entitling product.
Summary
UK Fares – core UML Model
Describing Fares with NeTEx
Instances for a typical Fare Product & Sales Offer
A Zone to Zone Product: Use DISTANCE MATRIX + Assign OPERATOR, MODE, USER PROFILES, etc.

DISTANCE MATRIX ELEMENT

USER PROFILE

NeTEx UK Fare Profile - Basic Scope
A Season Pass Product: Assign FARE ZONEs + OPERATOR, MODE, & USER PROFILES

Moving Britain Ahead

NeTEx UK Fare Profile - Basic Scope
Modelling – Stage definitions

Dynamic zone counting: Trip planner uses JOURNEY PATTERN to determine number of FARE SECTIONs traversed between origin and destination POINT IN PATTERN