### UK Fares and NeTEx Profile Workshop – 1b Scope

**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>
Scope of UK NeTEx Bus Fare profile
Main UK use case is Fare & Price distribution – i.e. Downstream

- **NPTG, NaPTAN**
- **TransXChange**
- **UK NeTEx Bus Profile**
- **Networks**
- **Maps**
- **Timetables**
- **Data Creation: Planning & Integration**
- **Data Creation: Operations, Retail**
- **Fares Build Tool**
- **Data Integration & Build Engines APIs**
- **User Applications**

Networks

- **Fares**
- **Dynamic Fares**
- **Engines**
- **APIs**

Data Integration & Build

- **Maps**
- **NPTG, NaPTAN**
# UK NeTEx profile: Aspects & Phasing

## Basic UK profile
- Versioning & Validity
- Frames & grouping
- Identifiers & references

## Advanced UK Fare Profile
- Same

## Future / Further?

<table>
<thead>
<tr>
<th>Aspect</th>
<th>UK Legacy</th>
<th>Basic UK profile</th>
<th>Advanced UK Fare Profile</th>
<th>Future / Further?</th>
</tr>
</thead>
</table>
| Common “data plumbing”      | (nptg, naptan, txc) | • Versioning & Validity  
• Frames & grouping  
• Identifiers & references | same                     |                   |
| Localities                  | NPTG      | • Locations &  
• Plus Bus Zones | same                     |                   |
| Stops                       | NaPTAN    | • Stops, Tariff ones  | same                     | Accessibility, POI? |
| Timetables                  | TXC       | • Simple EU timetables  
• (no timings, no op data) | n/a                      | Full TXC, Rail features? |
| Fares                       | new       | • Basic Bus Fares  | More Complex Bus Fares  | Long distance Fares? |

- Basic Profile
- Advanced Profile
- Out of current scope / For Future roadmap?
UK Profile scope - Modes

- Can be covered by Basic Products
  - Bus
  - Bus as add-on to Rail etc (e.g. Plus bus)
  - Ferry
  - Light Rail, Tram?

- Require additional Advanced Features
  - Bus supplements to Rail (PlusBus)
  - Metro / London Underground, PAYG, Capped fares

- Require additional complex features
  - Coach? (Seat Reservations, luggage, Routing?...)
  - Rail (routing, complex times of travel, etc)
Profile scope - Interoperability?

- Network & Timetable data
  - NPTG Localities
  - NaPTAN
  - TransXChange Line / Journey ids
  - NOC Operator codes

- A UK Bus CSV representation of Basic Fares
  - Similar to NaPTAN stop csv;
    - Flat files for core elements
  - Basic Tariff Structures:
    - Origin/Destinations, Zones, Stages
  - Products & Sales Offers
    - User Types
  - Tariff Prices
    - O/D x product/user type/ x x price
Data Architectures & Workflows?
- Distributed Peer to peer: Operator places data on website.
- Managed: An intermediary aggregates and integrates.

Granularity of exchange?
- Network scope: Network / Operator / Line / Timetable / Region..
- Frequency: (Annual, Monthly, Periodic, when it changes…)
- Prices: Exchange separately from Fare Structure?

How does data become available at a UK National Access Point?
- Discovery / Directory / Register:

What needs to be included in the data to enable self-describing data & validation of the above?
- Operator, validity conditions, code values, etc.
Fare Scope Use Case - Data Distribution

Provide fare products & fare prices as open data for third party use (in journey planners, etc.)?

- Describe available fare products and their eligibility conditions.
- Relate fare products to network (stops and tariff zones) and services (journeys & times of travel if relevant) so trip planners can compute fare products and fare prices for trips, show available products for area, etc.
- Allow products to be bundled together as a single sales offering, or offered as different packages on different media.
- Allow the separate exchange of prices from fare structures & products.
- Expose a justification of the fare (Distance, discounts etc) Support both machine readable & human readable representation of validity parameters (user types, media, etc) and conditions
- Include information about how/where products can be bought.
- Include fares valid for specific and multiple operators.
“Describe available Fare products”

What is the minimum set of products needed for UK bus fares?
Thinking about your Anytime (e.g. peak time) fare products, which of these “trip” (i.e. non-period) ticket types do you offer, and how frequently are they purchased?

<table>
<thead>
<tr>
<th>Ticket Type</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Short Hop</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time Limited (e.g. &quot;Hopper&quot;)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Return (Period or Open)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Return (Same Day)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Carnet (multiple tickets e.g. 10 trips)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

November 2018
And still thinking about Anytime fare products, which of these period passes do you offer, and how frequently are they purchased?

![Bar chart showing fare survey results for different period passes.](chart.png)

November 2018
Basic Product Types - terminology

- **Trip**
The product gives the right to make a single journey

- **Pass**
The product combines access rights to make repeated journeys within a time interval (Day, Week, Month etc)

- **Carnet**
The product comprises a number of Trips or Passes sold as a bundle at a discount. They must be used within a given period.
# Basic UK Bus fare products

<table>
<thead>
<tr>
<th>Type of Product</th>
<th>Fare Product</th>
<th>Group Ticket</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>TRIP</strong> (“single ride”)</td>
<td></td>
<td></td>
</tr>
<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>
<tr>
<td><strong>Carnet</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trip</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Day Pass</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

UK Products must be one of the specified types
“Relate fare products to network (stops and tariff zones) and services (journeys & times of travel if relevant) so trip planners can compute fare products and fare prices for trips, show available products for area etc.”

Spatial & Temporal aspects of Tariff Structure.
Tariff Structures - Spatial aspects:

- **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 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.

- **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.
1 Bewbush West - Crawley - Broadfield/Pease Pottage

**Adult Single Fares**

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

---

**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.
A Distance Matrix

NeTEx UK Fare Profile - Scope

Moving Britain Ahead
**Zonal Fare**

### Crawley Metrorider

Unlimited travel in the Crawley Metrorider area.

<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>-</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>

* All day travel for up to 5 people (minimum of 1 adult & maximum of 2 adults travelling at any one time.)

**Horsham Metrorider**

Unlimited travel in the Horsham Metrorider area.

<table>
<thead>
<tr>
<th></th>
<th>1 day</th>
<th>1 week</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
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<td></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>

* All day travel for up to 5 people (minimum of 1 adult & maximum of 2 adults travelling at any one time.)

**Redhill & Reigate Metrorider**

Unlimited travel in the Redhill & Reigate Metrorider area.

<table>
<thead>
<tr>
<th></th>
<th>1 day</th>
<th>1 week</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Adult</td>
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<td>£20</td>
<td></td>
</tr>
<tr>
<td>Child</td>
<td>£2.70c</td>
<td>£11c</td>
<td></td>
</tr>
<tr>
<td>Family*</td>
<td>£9</td>
<td>-</td>
<td></td>
</tr>
</tbody>
</table>

* All day travel for up to 5 people (minimum of 1 adult & maximum of 2 adults travelling at any one time.)

### Metrovoyager

This ticket bought on the bus gives you unlimited travel on all of our services across our entire network, including both the Crawley, Horsham, and Redhill & Reigate Metrorider areas. Also valid on all Brighton & Hove bus services.

<table>
<thead>
<tr>
<th></th>
<th>1 day</th>
<th>1 week</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Adult</td>
<td>£7.40</td>
<td>£26</td>
<td></td>
</tr>
<tr>
<td>Child</td>
<td>£4.20</td>
<td>£16.50</td>
<td></td>
</tr>
<tr>
<td>Student</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Family*</td>
<td>£12.50</td>
<td>-</td>
<td></td>
</tr>
</tbody>
</table>

* All day travel for up to 5 people (minimum of 1 adult & maximum of 2 adults travelling at any one time.)

© Metrobus 2018
Zone topologies – Disjoint, nested, overlapping, doughnut etc…

Newport Bus uses an exact fare system on all our buses. This is to ensure quick boarding time and the safety of our drivers.
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'll 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 Narrows 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).
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'll 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 (1, 2, 3). Long Close is considered the end station, as it's where the route ends.

Long Close to Blackberry Hospital will be £2.50 due to it being 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).

<table>
<thead>
<tr>
<th>地理单元</th>
<th>间隔</th>
<th>单程票价</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-3段</td>
<td>£1.50</td>
<td></td>
</tr>
<tr>
<td>4-6段</td>
<td>£2.50</td>
<td></td>
</tr>
<tr>
<td>7+段</td>
<td>£4.50</td>
<td></td>
</tr>
<tr>
<td>10+段</td>
<td>£5.50</td>
<td></td>
</tr>
</tbody>
</table>

© First Group 2018
Flat Fare

- Does not vary according to distance of travel.
  - May still have different prices for adult, child, etc

E.g. TfL bus fare £1.50, 1 hour
## Temporal aspects
(Season pass, multiple media)

### Crawley Metrorider
- **Unlimited travel in the Crawley Metrorider area.**
- **Temporal aspects:** Season pass, multiple media.

<table>
<thead>
<tr>
<th></th>
<th><strong>1 day</strong></th>
<th><strong>1 week</strong></th>
<th><strong>Evenings</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Adult</td>
<td>£4.80</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>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

### Horsham Metrorider
- **Unlimited travel in the Horsham Metrorider area.**

<table>
<thead>
<tr>
<th></th>
<th><strong>5 days</strong></th>
<th><strong>1 week</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Adult</td>
<td>£4.90</td>
<td>£20</td>
</tr>
<tr>
<td>Child</td>
<td>£2.70</td>
<td>£11</td>
</tr>
<tr>
<td>Student</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Family*</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

### Redhill & Reigate Metrorider
- **Unlimited travel in the Redhill & Reigate Metrorider area.**

<table>
<thead>
<tr>
<th></th>
<th><strong>1 day</strong></th>
<th><strong>1 week</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Adult</td>
<td>£4.90</td>
<td>£20</td>
</tr>
<tr>
<td>Child</td>
<td>£2.70</td>
<td>£11</td>
</tr>
<tr>
<td>Family*</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

### Metrovoyager
- **This ticket allows bus travel on all our services across our entire network, including Crawley, Horsham, and Redhill & Reigate Metrorider areas.**

<table>
<thead>
<tr>
<th></th>
<th><strong>1 day</strong></th>
<th><strong>1 week</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Adult</td>
<td>£7.40</td>
<td>£25</td>
</tr>
<tr>
<td>Child</td>
<td>£4.20</td>
<td>£13.50</td>
</tr>
<tr>
<td>Student</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Family*</td>
<td>£2.25</td>
<td>-</td>
</tr>
</tbody>
</table>

### NeTEx UK Fare Profile - Scope
For further details including Gatwick Travelcard on the key, and the Haywards Heath Day Saver, and Burgess Hill Day Saver, please see the fares page on our website.

© Metrobus 2018
# Season Pass with choice of durations – TIME INTERVALS

**Crawley MetroRider**

Unlimited travel in the Crawley MetroRider area.

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

- **Child**
  - 1 day: £2.70
  - 1 week: £11

- **Student**
  - 1 day: -
  - 1 week: -

- **Family**
  - 1 day: £9
  - 1 week: -
  - Evening: -

**TIME INTERVALS 50 minute**

- **1 day**
  - By cash: £7.20
  - Stored as m-ticket: £7.90

- **1 week**
  - By cash: £11.50
  - Stored as m-ticket: £18

- **3 day**
  - By cash: -
  - Stored as m-ticket: -

- **1 week**
  - By cash: £59
  - Stored as m-ticket: £7.90

- **Evening**
  - By cash: £3.70
  - Stored as m-ticket: -

**FARE ZONE**

- Fares are valid for up to 5 people (minimum of 1 adult & maximum of 2 adults travelling on any one service).
- Available from 1800 and valid until 0619 on the following day.
- For 2 adults travelling together.

**FARE PRICE**

- 1 day: £4.20
- 1 week: £13
- 13 week: £135
- Annual: £220
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**

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

**DAY TYPES**

- Pe...
### Basic UK Bus fare products

<table>
<thead>
<tr>
<th>Type of Product</th>
<th>TRIP (&quot;single ride&quot;)</th>
<th>PASS</th>
<th>PREASSIGNED FARE PRODUCT</th>
<th>Access rights</th>
<th>Tariff Structure</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Short hop</strong></td>
<td></td>
<td></td>
<td></td>
<td>Flat</td>
<td><strong>Peak / Off Peak</strong></td>
</tr>
<tr>
<td><strong>Single trip</strong></td>
<td></td>
<td></td>
<td></td>
<td>Point to point</td>
<td><strong>Group Ticket</strong></td>
</tr>
<tr>
<td><strong>Time-limited (“Hopper”)</strong></td>
<td></td>
<td></td>
<td></td>
<td>Named Zones</td>
<td><strong>Temporal Conditions</strong></td>
</tr>
<tr>
<td><strong>Period Return</strong></td>
<td></td>
<td></td>
<td></td>
<td>Zone/Stage Count</td>
<td></td>
</tr>
<tr>
<td><strong>Day return</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Day pass</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Termttime</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Season pass</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- **Access rights**
  - TRIP ("single ride")
  - PASS

- **Tariff Structure**
  - Flat
  - Point to point
  - Named Zones
  - Zone/Stage Count
  - Peak / Off Peak
  - Group Ticket

- **Temporal Conditions**
  - No journey break
  - Has use by date?
  - Max trip duration, Can interchange
  - Has use by date?
  - Must use same day
  - 1Day(elapsed or calendar)
  - Use during term 1Y
  - n x D,W,M, 1Y

---

**NeTEx UK Fare Profile - Scope**

Moving Britain Ahead
## Carnets: Multi-trip / Multi-pass offers

<table>
<thead>
<tr>
<th>Type of Product</th>
<th>Quantity</th>
<th>Related tariff structure</th>
<th>Temporal Conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Multi-trip</strong></td>
<td>✔️</td>
<td>Any individual Trip</td>
<td>Trips have use-by date</td>
</tr>
<tr>
<td><strong>Multi-Day pass</strong></td>
<td>✔️</td>
<td>Day Pass</td>
<td>Passes have specified duration</td>
</tr>
</tbody>
</table>

### Access rights

- **CARNET**

### Tariff Structures

- **FARE PRODUCT (AMOUNT OF PRICE UNIT)**

### NeTEx UK Fare Profile - Scope

- **Scope**
Moving Britain Ahead

Relating the Tariff structure to the network:

- **Point-to-point, Zone-to-Zone.**
  - What are the allowed Origin/Destination pairs?

- **Named Tariff Zone(s):**
  - Which stops are in which tariff zone?

- **Stage / Section count.**
  - Which stops in the journey pattern are the fare stages?
A Distance Matrix

NeTEx UK Fare Profile - Scope

Moving Britain Ahead
Nested Fare Zones - Metriderider & Metrovoyager

- TOPOGRAPHICAL PLACES
- FARE ZONEs
- ZONE topologies e.g
  - NESTED,
  - DISJOINT
  - HONEYCOMB
  - OVERLAPPING

© Metrobus 2018
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 reference existing NaPTAN STOP POINTS

- NPTG already has PlusBus Zones with Polygons

```xml
<fareZones>
  <FareZone version="1.0" id="mb:fewbush_West">
    <Name>Bewbush West (loop)</Name>
    <members>
      <ScheduledStopPointRef ref="naptan:4400CY0037" version="any">Brettingham Close, Bewbush</ScheduledStopPointRef>
      <ScheduledStopPointRef ref="naptan:4400CY0038" version="any">Neptune Close, Bewbush</ScheduledStopPointRef>
      <ScheduledStopPointRef ref="naptan:4400CY0039" version="any">Mercury Close, Bewbush</ScheduledStopPointRef>
      <ScheduledStopPointRef ref="naptan:4400CY0040" version="any">Sullivan Drive, Bewbush</ScheduledStopPointRef>
      <ScheduledStopPointRef ref="naptan:4400CY0042" version="any">Bewbush Roundabout, Bewbush</ScheduledStopPointRef>
    </members>
  </FareZone>
</fareZones>
```
“Describe available fare products... and their eligibility conditions”

Who can use specific products
Types of user

For which of these user types do you provide distinct fares, and how frequently are they purchased?
User Types

FARE ZONE

GROUP TICKET (family)

USER PROFILES

37

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 traveling at any one time.)
** Available from 0800 and valid until 0859 on 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>

<table>
<thead>
<tr>
<th></th>
<th>60 minute</th>
<th>1 day</th>
<th>2 day</th>
<th>3 day</th>
<th>1 week</th>
<th>4 week</th>
<th>* 22 Dub</th>
<th>Evening</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adult</td>
<td>£2.20</td>
<td>£4.20</td>
<td>£7.90</td>
<td>£11.30</td>
<td>£18</td>
<td>£59</td>
<td>£7.90</td>
<td>£3.70</td>
</tr>
<tr>
<td>Child</td>
<td>£1.10</td>
<td>£2.35</td>
<td>£4.45</td>
<td>£5.45</td>
<td>£9.75</td>
<td>£32.50</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Student</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Family*</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>£9</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Bewbush West - Crawley - Broadfield/Pease Pottage

Adult Single Fares

- 160 Bewbush Neighbourhood Centre
- 240 160 Gosspins Green Shops
- 240 240 West Green Crawley Hospital/Apple Tree
- 240 240 160 Crawley Town Centre
- 240 240 240 240 Southgate Avenue North
- 240 240 240 240 240 Pease Pottage Black Swan

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

To calculate your fare, find your location, and your destination, where the route 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.

bought on bus with cash

stored on your mobile phone as m-tickets

loaded onto our smartcard the key

Moving Britain Ahead
## UK Bus Fares – Example 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>Registered unemployed</td>
</tr>
<tr>
<td>Armed Forces</td>
<td>✓</td>
<td>✓</td>
<td>Registered</td>
</tr>
<tr>
<td>Employee Scheme</td>
<td>✓</td>
<td>✓</td>
<td>E.g. Gatwick Airport Staff</td>
</tr>
</tbody>
</table>

---

**NeTEx UK Fare Profile - Scope**

**Moving Britain Ahead**
Fare Structure – Usage Parameter–XML Code Snippet

Define the element to be priced

- USER PROFILE

```xml
<FareStructureElement id="atc:eligibilities" version="01">
    <Name>Rail card eligible user types</Name>
    <validityParameterAssignments>
        <GenericParameterAssignment order="1" id="atc@eligibilities">
            <limitations>
                <UserProfile version="any" id="atc:pass_profile@16to25">
                    <Name lang="en">16 to 25</Name>
                    <Url>https://www.16-25railcard.co.uk/</Url>
                    <DiscountingRuleRef ref="atc:rate@student" version="any"/>
                    <MinimumAge>16</MinimumAge>
                    <MaximumAge>25</MaximumAge>
                    <ProofRequired>passport</ProofRequired>
                </UserProfile>
            </limitations>
        </GenericParameterAssignment>
    </validityParameterAssignments>
</FareStructureElement>
```
Group Ticket Types

Which of these Group ticket types do you offer, and how frequently are they purchased?

![Bar chart showing different group ticket types and their frequency of purchase.](chart_image)
#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>
Eligibility parameters

- A product may be restricted to one or more profile, and have different prices associated with each profile

- Basic Fare Profile
  - USER PROFILE, which describes the social profile of a customer. It is generally used to allow discounts based on age groups (e.g. under 18), gender, profession, social status (e.g. student, retired, unemployed), etc. Can have quantitative rules
  - COMPANION PROFILE, indicating the number and characteristics of persons entitled to travel in a group or as companions to another USER PROFILE.
  - GROUP TICKET describes the number and characteristics of persons possibly entitled to travel in addition to the holder of an access right.

- Advanced Fare Profile
  - RESIDENTIAL QUALIFICATION, categorising the users depending on place of residence, sometimes used for allowing discounts.
  - COMMERCIAL PROFILE, which is used to describe customer categories depending on their commercial relations with the operator (frequent traveller, amount of purchase by a company, etc.). Normal used to allow discounts.
“Allow products that are bundled as a single offering, or offered as different packages on different media.”

Spatial & Temporal aspects of Tariff Structure
What types of Travel Document (e.g. printed ticket, self-print, smartcard, mobile device, etc.) do you offer, and how frequently are they used?
Season Pass with choice of durations – TIME INTERVALS

<table>
<thead>
<tr>
<th>Type of Travel Documents</th>
<th>1 Day</th>
<th>1 Week</th>
<th>Evening</th>
<th>60 Minute</th>
<th>1 Day</th>
<th>2 Days*</th>
<th>3 Days*</th>
<th>1 Week</th>
<th>4 Weeks</th>
<th>13 Week</th>
<th>Annual</th>
<th>Evening</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crawley Metrorider</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adult</td>
<td>£4.50</td>
<td>£2.20</td>
<td>£2.50</td>
<td></td>
<td>£2.20</td>
<td>£4.20</td>
<td>£7.90</td>
<td>£13.50</td>
<td>£18</td>
<td>£30</td>
<td>£7.90</td>
<td>£3.70</td>
</tr>
<tr>
<td>Child</td>
<td>£2.70</td>
<td>£1.10</td>
<td></td>
<td></td>
<td>£1.10</td>
<td>£2.35</td>
<td>£4.45</td>
<td>£6.45</td>
<td>£9.75</td>
<td>£13.50</td>
<td>£8.20</td>
<td>-</td>
</tr>
<tr>
<td>Student</td>
<td>-</td>
<td>-</td>
<td></td>
<td></td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Handy</td>
<td>-</td>
<td>-</td>
<td></td>
<td></td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>FARE ZONE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FARE PRICE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* All day travel for up to 5 people (minimum of 3 adult & maximum of 2 adults travelling at any one time.)
** Available from 1860 and valid until 0359 on the following day.
*** For 2 adults, travelling together.
#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><strong>VISUAL</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<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><strong>E-PASSIVE</strong></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>×</td>
<td>Account Based Ticketing has id but no app</td>
</tr>
<tr>
<td><strong>E-ACTIVE</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SmartCard</td>
<td>Contact, NFC</td>
<td>×</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>
“Support both machine readable & human readable representation of validity parameters (user types, media, etc) “

→ Pre & Post Sales conditions
### UK BUS Product parameters – Travel Conditions

<table>
<thead>
<tr>
<th>Condition</th>
<th>Relevance</th>
<th>Note</th>
<th>USAGE PARAMETER</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Local Trip</td>
<td>Coach Trip</td>
<td>Season Ticket</td>
</tr>
<tr>
<td><strong>TRAVEL HOW</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Right to Interchange</td>
<td>✓</td>
<td>✓</td>
<td>X</td>
</tr>
<tr>
<td>Right to Break Journey</td>
<td>✓</td>
<td>✓</td>
<td>X</td>
</tr>
<tr>
<td>Routing Restrictions</td>
<td>X</td>
<td>?</td>
<td>X</td>
</tr>
<tr>
<td>Round Trip</td>
<td>✓</td>
<td>✓</td>
<td>X</td>
</tr>
<tr>
<td>Usage Validity Period</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Frequency of Use</td>
<td>X</td>
<td>X</td>
<td>✓</td>
</tr>
<tr>
<td>Minimum Stay</td>
<td>X</td>
<td>?</td>
<td>X</td>
</tr>
<tr>
<td><strong>TRAVEL WHEN</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
# UK BUS Product Parameters – Sales & After-Sales Conditions

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

**Usage Parameters**

- **PURCHASE WINDOW**
- **RESERVING**
- **TRANSFERABILITY**
- **CANCELLING**
- **EXCHANGING**
- **REFUNDING**
- **REPLACING**
UK BUS  Product parameters
– Luggage allowances

- For bus, Passenger information only? No pricing implications

<table>
<thead>
<tr>
<th>Condition</th>
<th>Local Trip</th>
<th>Coach Trip</th>
<th>Season Ticket</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pram</td>
<td>✓</td>
<td>✓</td>
<td>X</td>
<td>Trips only</td>
</tr>
<tr>
<td>Wheelchair</td>
<td>✓</td>
<td>✓</td>
<td>X</td>
<td>Trips only</td>
</tr>
<tr>
<td>Suitcase</td>
<td></td>
<td></td>
<td></td>
<td>Trips only. Might be chargeable for coach</td>
</tr>
<tr>
<td>Guide dog</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>See discussion of temporal factors</td>
</tr>
<tr>
<td>Pet</td>
<td>X</td>
<td>X</td>
<td>✓</td>
<td>e.g. 2 per day, vs unlimited use</td>
</tr>
</tbody>
</table>

LUGgage ALLOWANCE
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>
“Allow the separate exchange of prices from fare structures & products”

➔ Fare Prices
What Prices are needed?

1. **Final Prices** for every parameter combination

2. **Base prices + Derivation parameters**
   - PRICING RULE as percentage of another price
   - Need rounding steps and any minimum/maximum limits

3. **Dynamic Prices?**
   - No actual price values are exchanged, instead where to fetch an online price for a given product and choice of options is indicated.

4. **Price Groups?**
   - Where price is common to several elements
Trade-offs for exchanging prices

More prices, simpler rules to calculate

Fewer prices, more complex rules & parameters to calculate
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
- Group Ticket
- Round Trip
- Routing
- Sales Offer Package
- Distribution Assignment
- Distribution Channel
- Fulfilment Method
- Payment Method
- Fare Demand
- Quality Factor
- Geographic Interval
- Time Interval
- Structure Element
- Access Right
- Fare Product
- Series
- Distance Matrix Element
- Validity Parameter
Common Bus Tariff Structures

- **Point-to-point Trip**
  - DISTANCE MATRIX ELEMENTs x USER PROFILEs x (SALES OFFER PACKAGEs).
    - \((N^2-N)/2\).  : 50-1000 stops \(\rightarrow\) 1200-500,000 OD Pairs

- **Stage fare trip**
  - GEOGRAPHICAL INTERVAL x USER PROFILEs x (SALES OFFER s).
    - \(~1-10\) intervals

- **Zonal Fare, trip or pass**
  - FARE ZONEs x TIME INTERVALs x USER PROFILEs x (SALES OFFER).
    - \(3-50\) zones

NeTEx UK Fare Profile - Scope
Include information about how/where products can be bought.

Distribution Channels and Fulfillment methods
Distribution channels

What types of distribution channels (on board, at stop, online, distributor, etc.) do you offer, and how frequently are they used?

[Bar chart showing distribution channels with labels and data]
#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>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><strong>Cash</strong>, 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>Travel cards, season passes</td>
</tr>
<tr>
<td>Call Centre</td>
<td>Despatch</td>
<td>Card, ePay, (bank)</td>
<td>Prepaid</td>
<td>At Stop</td>
</tr>
<tr>
<td>Ticket Machine</td>
<td>Immediate</td>
<td><strong>Cash</strong>, Card, (ePay)</td>
<td>Prepaid</td>
<td>Also On board</td>
</tr>
<tr>
<td>Online, mobile</td>
<td>Immediate or despatch</td>
<td>Card, ePay</td>
<td>Prepaid</td>
<td>Anywhere</td>
</tr>
<tr>
<td>Electronic</td>
<td>Immediate (or on travel)</td>
<td>Card, ePay</td>
<td>Pre &amp; Post Pay</td>
<td>Acquire, top up / purchase etc</td>
</tr>
</tbody>
</table>
Payment Methods

What types of payment methods do you offer, and how frequently are they used?

- Cash, including notes
- Cash, coins only
- Contactless Credit/Debit Card
- ePay
- SMS
- Bank Transfer

Legend:
- 5
- 4
- 3
- 2
- 1
- 0
## #7.1: UK Bus – Payment Methods

<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><strong>Paper</strong></td>
<td>Barcode, OCR, ShotCode, etc</td>
<td>✓</td>
<td>From machine or conductor</td>
</tr>
<tr>
<td><strong>E-document/pdf</strong></td>
<td>Barcode, OCR, ShotCode, etc</td>
<td>✓</td>
<td>Self print / store on mobile device</td>
</tr>
<tr>
<td><strong>SMS /MMS</strong></td>
<td>Barcode, OCR, ShotCode, etc</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td><strong>Card</strong></td>
<td>OCR</td>
<td>✓</td>
<td>e.g. Travel card</td>
</tr>
<tr>
<td><strong>E-PASSIVE</strong></td>
<td></td>
<td>✔</td>
<td></td>
</tr>
<tr>
<td><strong>Magstripe</strong></td>
<td>Contact</td>
<td>✓</td>
<td>Ticket Machine / Counter only</td>
</tr>
<tr>
<td><strong>EMV</strong></td>
<td>Contact, NFC</td>
<td>☒</td>
<td>Account Based Ticketing has id but no app</td>
</tr>
<tr>
<td><strong>E-ACTIVE</strong></td>
<td></td>
<td>✔</td>
<td></td>
</tr>
<tr>
<td><strong>SmartCard</strong></td>
<td>Contact, NFC</td>
<td>☒</td>
<td>(ABT) Has travel app chip</td>
</tr>
<tr>
<td><strong>Mobile App</strong></td>
<td>NFC, (bluetooth)</td>
<td>✓</td>
<td>ABT Downloadable to smart device</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></td>
<td>Basic products</td>
</tr>
<tr>
<td>Collect at counter</td>
<td></td>
<td>E.g. for Season passes,</td>
</tr>
<tr>
<td>Collect at Machine</td>
<td></td>
<td>Not all products</td>
</tr>
<tr>
<td>Collect at shop</td>
<td></td>
<td>Basic products</td>
</tr>
<tr>
<td>REMOTE DOWNLOAD</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Download to device</td>
<td></td>
<td>App or pdf eticket</td>
</tr>
<tr>
<td>Self print</td>
<td></td>
<td>Self print to paper – Coach only?</td>
</tr>
<tr>
<td>email</td>
<td></td>
<td>Online &amp; call centre purchases</td>
</tr>
<tr>
<td>SMS</td>
<td></td>
<td>Online purchases</td>
</tr>
<tr>
<td>DESPATCH</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Post</td>
<td></td>
<td>E.g. For Season Passes</td>
</tr>
<tr>
<td>Courier</td>
<td></td>
<td>E.g. Online - Extra fee</td>
</tr>
</tbody>
</table>
Allow the same products to be offered in different ways

Product vs Sales offer
## Season Pass (es)

### FARE ZONEs
(Horsham, Crawley, Redhill, All)

### TIME INTERVALs
(1day, 1 week, Evening, 1 month, Annual, etc)

### FARE TYPEs OF TRAVEL DOCUMENTs
paper, app, smartcard

### SALES PACKAGEs
“cash, m-ticket, the key”

### FARE PRODUCT
Season Pass

### FARE PRICES

<table>
<thead>
<tr>
<th>Metrovagner</th>
<th>Redhill &amp; Reigate Metrorider</th>
<th>Horsham Metrorider</th>
<th>Crawley Metrorider</th>
</tr>
</thead>
</table>
| **Unlimited travel on all of our services across the entire area, including with the Crawley, Horsham, and Redhill & Reigate Metrorider areas.**
| **Consecutive days:**
| **All day travel for up to 30% off peak.**
| **Effective from 1st June 2023.** | **Unlimited travel in the Redhill & Reigate Metrorider area.**
| **Consecutive days:**
| **All day travel for up to 30% off peak.**
| **Effective from 1st June 2023.** | **Unlimited travel in the Horsham Metrorider area.**
| **Consecutive days:**
| **All day travel for up to 30% off peak.**
| **Effective from 1st June 2023.** | **Unlimited travel in the Crawley Metrorider area.**
| **Consecutive days:**
| **All day travel for up to 30% off peak.**
| **Effective from 1st June 2023.** |

### TYPEs OF TRAVEL DOCUMENTs
paper, app, smartcard

### SALES PACKAGEs
“cash, m-ticket, the key”

### FARE PRODUCT
Season Pass

### FARE PRICES

<table>
<thead>
<tr>
<th>Type</th>
<th>Cash</th>
<th>M-tickets</th>
<th>Key</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adult</td>
<td>£4.80</td>
<td>£2.70</td>
<td>£8.00</td>
</tr>
<tr>
<td>Child</td>
<td>£2.70</td>
<td>£1.00</td>
<td>£3.70</td>
</tr>
<tr>
<td>Student</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Family*</td>
<td>£9.00</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

---

For further travel information, including train times and fare details, please visit our website.
Example - Period Passes

Period Pass Product

FARE PRODUCTS

SALES OFFER PACKAGES

Paper “Cash Ticket”

Mobile App (m-ticket)

Smartcard (the-key)

FARE PRODUCTS

SALES OFFER PACKAGES

PRICE TABLE

NeTEx UK Profile - Bus Fares with NeTEx
Example – Period Pass Product: Cash Ticket

Zonal Pass: Cash Ticket

PASS: Crawley
Cash Ticket

PASS: Horsham
Cash Ticket

PASS: Redhill
Cash Ticket

PASS: All Zones
Cash Ticket

Group of Sales Offer Packages

SALES OFFER PACKAGES

MetroRider
(Crawley)

MetroRider
(Horsham)

MetroRider
(Redhill)

Metro Voyager

FARE PRODUCTS

FARE STRUCTURE ELEMENTS

USAGE PARAMETERS

DISTRIBUTION ASSIGNMENT

FARE PRICES
### Example – Period Pass Product: Mobile App

#### GROUP OF SALES OFFER PACKAGES

- **Pass m-ticket**

#### SALES OFFER PACKAGES

- **Pass: Crawley M-ticket (App)**: Metrorider (Crawley)
- **Pass: Horsham M-ticket (App)**: Metrorider (Horsham)
- **Pass: Redhill M-ticket (App)**: Metrorider (Redhill)
- **Pass: All zones M-ticket (App)**: MetroVoyager

#### FARE PRODUCTS

#### FARE STRUCTURE ELEMENTS

<table>
<thead>
<tr>
<th>1d</th>
<th>2d</th>
<th>3d</th>
<th>1w</th>
<th>4w</th>
</tr>
</thead>
</table>

#### USAGE PARAMETERS

- People
- Kids

#### DISTRIBUTION ASSIGNMENT

#### FARE PRICES

- Metrorider (Crawley)
- Metrorider (Horsham)
- Metrorider (Redhill)
- MetroVoyager
UK Profile General Issues
#8.1 : Data Identifiers

- **Persistent Unique Identifiers for all components**
  - Allow for distributed allocation of ids by Operator.
  - Operator defines namespace as W3C URI

- **Use existing where available**
  - Topographic localities
    - NPTG
  - Stops
    - NaPTAN,
  - Tariff Zones / Fare Stages
    - PlusBus : (NPTG Already has)
    - Operator Defined Zones : Within NOC?
    - Local Authority Defined Zones : Within NPTG Admin code?

- **Operators**
  - NOC: Clarify process etc

- **Most components must be unique within Operator:**
  - Lines, Timetables/Services, Tariffs, etc
#8.3 : Data Management

- **Granularity**
  - Service, Line, Operator, Region, etc
  - Common Tariff Zones, Products, Prices

- Allocating systematic File names?
  - E.g. Operator_Service_Line_StartValidityDate....

- Discovery Processes?
  - Active registration / Passive Indexing

- Synchronising Timetable & Tariff updates
  - Prerequisite versions

- Validation tools
  - Schema,
  - Additional Program?, Fare “publisher”? +

- Etc
## Granularity

<table>
<thead>
<tr>
<th>Type Of Composite Frame</th>
<th>Stops</th>
<th>Timetables</th>
<th>Fares</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stop Offer</td>
<td>Stops for Area</td>
<td></td>
<td>Stops &amp; Tariff Zones for Area</td>
</tr>
<tr>
<td>Line_Offer</td>
<td>Stops for Line</td>
<td>Timetable for Line</td>
<td>Fares for Line</td>
</tr>
<tr>
<td>Network_Offer</td>
<td>Stops for Network</td>
<td>(Timetables for Network)</td>
<td>Fares for Network</td>
</tr>
</tbody>
</table>

Example file names:
- FX-PI-01_UK_METR_LINE-FARE_L01_20160302.xml
- FX-PI-01_UK_FEBR_NETWORK-FARE_WOE-060+086+110_20230909.xml
- FX-PI-01_UK_DFT_STOP-FARE_NPTG-Plusbus-UK_20150705.xml
NeTEx Validators & Profiles

System A
- PLACES
- STOPS
- ACCESSIBILITY
- OPERATORS
- ROUTES
- TIMETABLES
- FARES
- FARE PRICES

System B
- PLACES
- STOPS
- ACCESSIBILITY
- OPERATORS
- ROUTES
- TIMETABLES
- FARES
- FARE PRICES

XML Validator
- NeTEx x ML SCHEMA
- NeTEx Profile
- FareXChange Profile

Profile Conformant Document
- Pass
- Fail
- Warning
- Fail,
- Warning,
- Pass
Validation

- Validation Mechanisms
  - Schema integrity rules
  - Code lists: UK official code sets
  - Additional business rules, applied by a validator program “NeTEx Publisher”?
- How do we check all of the above are met?
Summary
We can describe any fare / tariff structure / price if we break it down into separate concerns:

- **TARIFF STRUCTUREs**
  - Spatial (Point to Point, Zone)
  - Temporal (Intervals)

- **ACCESS RIGHTS**
  - Tariff, Mode, Class of Use, Service, etc

- **PRODUCTs**
  - Parameters, User Types, Travel, After Sales, etc

- **SALES OFFER PACKAGEs**
  - Type of Ticket, Media, Distribution,

- **PRICEs**
  - Base & Derived
Component Based Fares

TARIFF + FARE STRUCTURE ELEMENTs

Access Rights

VALIDABLE ELEMENT

FARE PRODUCTS

SALES OFFER PACKAGES

Network

FARE PRICES

TRAVEL SPECIFICATION

NeTEx UK Profile - Bus Fares with NeTEx
Moving Britain Ahead
Key Points: Fares are complex, but not that complex!

- We can represent any fare using a set of reusable components
  - Tariffs can be related to the network using the concept of “Access Rights”

- For UK basic Bus fares there are four main Tariff Structures
  - (a) P2P / Z2Z, (b) Zonal, (c) Stage / Section, (d) Flat
  - We reference Stops, Zones and fare stages to define these

- For UK basic Bus fares there are two fundamental product groups
  - (a) Trip, (b) Period Pass (Day, Week, Season etc)

- For UK basic Bus fares there are a limited number of other parameters needed, many of which can be restricted
  - E.g. User Types, Group Tickets, Validity Periods, etc.
  - E.g. Type of Travel Document, Distribution Channels, Payment Methods, etc.
Describing Fares with NeTEx

Network Basis
- stops, tariff zones, line, operator
- Zone 1 contains 8 stops….Line 1 runs…

Fare policy / tariff structure:
- space-, time-based...access rights
- P2p fare, Stage fare, Flat fare

Rights to access & consume services:
- scope and order of use
- validity and usage rules
- bus trip stop X to stop Y, metro trip 3 zones

Marketable combinations of access rights
- validity & usage limiting parameters
- & charging moments
- off peak metro trip 3 zones followed by bus trip 2 zones ,no interchange, Child reduction

Sales Offer Description:
- media & travel document types
- distribution channels & contracts
- Paper ticket at ATM, carnet of 10, smartcard

Travel Specification
- Specific set of choices to purchase
- Adult single A to B on a smartcard

Prices attached to elements
Pricing rules
Adult flexible single costs £30
Child = 50% Adult price

Fulfilment & Payment Control & Validation
Billing & Clearing
NeTEx UK Fare Profile - Scope
Describing Fares with NeTEx

Common Framework

Network Basis

Tariff Structure

Access Rights

Fare Products

Sales Offer Packages

Travel Specifications & Sales

Pricing

NeTEx UK Fare Profile - Scope
A Fare Product is a set of options

- 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. Single or Return trip
  - E.g. 1\textsuperscript{st} & 2\textsuperscript{nd} Class accommodation
  - E.g. Adult & Child & Student users
  - E.g. Valid for a period: for 7 or 30, 180 days
  - E.g. One, or many travellers
  - E.g. Refundable / Not Refundable
  - E.g. With Luggage allowance